IEEE P802.11  
Wireless LANs

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| IEEE 802.11 TGax  September 2015 Bangkok Meeting Minutes | | | | |
| Date: 2015-09-30 | | | | |
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Abstract

Minutes of the TGax full meetings from the IEEE 802.11 September 2015 session, September 13th – 18th, 2015.

Minutes from the TGax ad hoc sessions are contained in the following documents.

* PHY ad hoc:
  + <https://mentor.ieee.org/802.11/dcn/15/11-15-1205-00-00ax-sept-2015-phy-ad-hoc-meeting-minutes.docx>
* MAC ad hoc:
  + <https://mentor.ieee.org/802.11/dcn/15/11-15-1130-02-00ax-sept-2015-mac-ad-hoc-meeting-minutes.docx>
* Multiuser ad hoc:
  + <https://mentor.ieee.org/802.11/dcn/15/11-15-1160-00-00ax-tgax-mu-ad-hoc-meeting-minutes-september-2015.docx>
* Spatial Reuse ad hoc:
  + <https://mentor.ieee.org/802.11/dcn/15/11-15-1206-00-00ax-september-2015-tgax-spatial-reuse-ad-hoc-meeting-minutes.docx>

**IEEE 802.11 Task Group ax**

**September 2015 Bangkok Meeting**

**Centara Grand, Bangkok, Thailand**

**September 13th – 18th, 2015**

**Monday, September 14th, 2015, AM2 TGax Session (10:30-12:30)**

1. The meeting called to order by Osama Aboul-Magd (Huawei Technologies), the chair of the TGax, @10:30
   1. About 150 people are in the room@11:30 AM.
2. Announcement
   1. Agenda Doc.11-15/0987r0 on the server. Rev. 1 is the working document.
   2. Meeting Protocol: Please announce your affiliation when you first address the group during a meeting slot.
   3. Attendance reminder.
      1. The attendance server: https://imat.ieee.org/
      2. See 11-09-0517r0 for more information.
3. The chair reviewed the mandatory 5 slides of P&P.
   1. Instructions for the WG Chair.
   2. Participants, Patents, and Duty to Inform.
   3. Patent Related Links.
   4. Call for potentially essential patents.
      1. Chair asked if anyone is aware of potentially essential patents.
      2. **No potentially essential patents reported.**
   5. Other Guidelines for IEEE WG Meetings.
4. Agenda items for the week
   1. Approve TG and Teleconferences minutes since July meeting.
   2. Continue to advance task group documents.
      1. Simulation Scenarios
      2. Evaluation Methodology
      3. Channel Model
      4. Function Requirements
      5. Specification Framework
   3. Ad Hoc group meetings
   4. Technical Presentations and related straw polls and/or motions
   5. Schedule Teleconference times.
5. General Flow of the meeting
   1. Slides 13 and 14 of the 15/0987r0 contain general flow of the meeting.
   2. There are eight meeting slots planed for TGax.

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|  | Monday | | Tuesday | | Wednesday | | Thursday |
| AM1 |  | |  | | TGax | | TGax |
| AM2 | TGax | | TGax  (ad hoc) | TGax  (ad hoc) |  | |  |
| PM1 | TGax  (ad hoc) | TGax  (ad hoc) | TGax  (ad hoc) | TGax  (ad hoc) | TGax  (ad hoc) | TGax  (ad hoc) | TGax |
| PM2 |  | | TGax | | TGax  (ad hoc) | TGax  (ad hoc) |  |
| PM3 | TGax | | TGax | |  | |  |

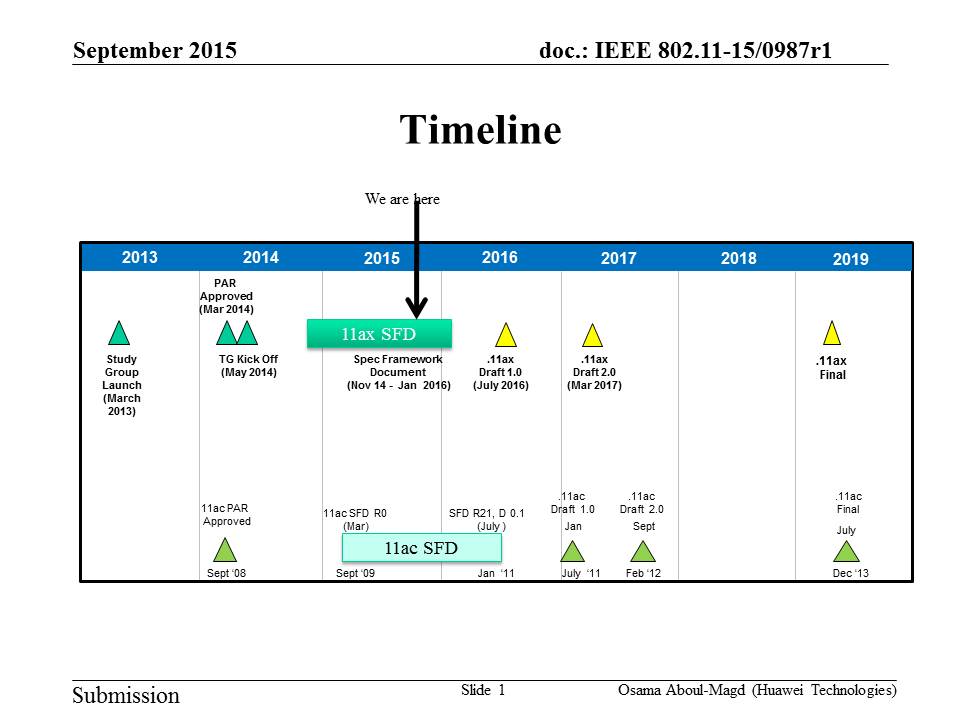
1. Call for submissions – slides 15 to 19 of 15/0987 contains the submission lists
   1. PHY - 24
      1. 11-15-0579, “Preamble Design and Auto-detection,” Hongyuan Zhang (Marvell)
      2. 11-15-0580, “11ax Coding Discussion,” Hongyuan Zhang (Marvell)
      3. 11-15-0810, “HE PHY Padding and Packet Extension,” Hongyuan Zhang (Marvell)
      4. 11-15-1031, “DL MU Signaling,” Katsuo Yunoki (KDDI)
      5. 11-15-1051, “HE NDP frame for sounding,” Young Hoon Kwon (Newracom)
      6. 11-15-1059, “SIG-B Encoding Structure Part II,” Ron Porat (Broadcom)
      7. 11-15-1066, “HE-SIG-B Contents,” Kaushik Josiam (Samsung)
      8. 11-15-1068, “Reliable Transmission Scheme for HE-SIG-B and Data,” Jianhan Liu (MediaTek)
      9. 11-15-1070, “1024 QAM Proposal,” Eunsung Park (LG Electronics)
      10. 11-15-1071, “Tone Grouping Factors and NDP format for 11ax,” Sameer Vermani (Qualcomm)
      11. 11-15-1075, “Number of BSS Color bits,” Junichi Iwatani (NTT)
      12. 11-15-0826, ”HE-SIG-A Transmission for Range Extension,” Jiayin Zhang (Huawei)
      13. 11-15-1077, “HE-SIG-A Content,” Jiayin Zhang (Huawei)
      14. 11-15-0853, “Extensible Preamble Format Design,” Leonardo Lanante (Kyutech)
      15. 11-15-1088, “LTF Design for Uplink MU-MIMO,” Daewon Lee (Newracom)
      16. 11-15-1089, “Considerations on PHY Padding and Packet Extension in 11ax,” Yujin Noh (Newracom)
      17. 11-15-1091, “Considerations on Range Extension with SIG-A Repetition,” Yujin Noh (Newracom)
      18. 11-15-1092, “Support of 1x/2x/4x OFDM Symbol in HE SU PPDU,” Heejung Yu (Yeungnam Univ.)
      19. 11-15-1106, “SIG-B Structure,” Reza Hedayat (Newracom)
      20. 11-15-1111, “SIG-B Resource Unit Allocation Coding,” Amin Jafarian (Newracom)
      21. 11-15-1119, “Discussions on HE SIG-A Structure,” John Son (Wilus Institute)
      22. 11-15-1122, “Identifiers in HE PPDUs for power saving,” Alfed Asterjadhi (Qualcomm)
      23. 11-15-0602, “HE-LTF squence for UL MU-MIMO,” Xiaogang Chen (Intel)
      24. 11-15-0823, “Preamble Design and Auto-Detection for 11ax,” Sungho Moon (Newracom)
   2. MAC - 18
      1. 11-15-1013, “802.11ae & 802.11ax,” Guido R. Hiertz (Ericsson)
      2. 11-15-1014, “Multiple BSSID Element,” Guido R. Hiertz (Ericsson)
      3. 11-15-1015, “Proxy ARB in 802.11ax,” Guido R. Hiertz (Ericsson)
      4. 11-15-1033, “Data field in HE PPDU,” Yongho Seok (Newracom)
      5. 11-15-1034, “Notification of Operating Mode Changes,” Yongho Seok (Newracom)
      6. 11-15-1044, “Further Study of 11ax Multicast,” Kazuyuki Sakoda (Sony)
      7. 11-15-1052, “Bandwidth for UL MU transmission,“ Young Hoon Kwon (Newracom)
      8. 11-15-1060, “Receive Operating Mode Indication for Power Save,” Eric Wong (Apple)
      9. 11-15-1063, “11ax Channel access procedure,” Chao-Chun Wang (MediaTek)
      10. 11-15-1067, “MU TXOP truncation,” Jeongki Kim (LG Electronics)
      11. 11-15-1096, “Recovery Procedures in Cascading Sequences,” John Son (Wilus Institute)
      12. 11-15-1098, “ACK/BA frame for UL MU under cascading structure,” Narendar Madhavan (Toshiba)
      13. 11-15-1114, “Airtime Analysis of EDCA,” Sean Coffey (RealTek)
      14. 11-15-1115, “High Efficiency in Accessing the Medium,” Sean Coffey (RealTek)
      15. 11-15-1116, “Trigger Frame Channel Access,” Jinsoo Ahn (Yonsei Univ.)
      16. 11-15-1120, “Buffer Status Report,” Alfred Asterjadhi (Qualcomm)
      17. 11-15-1121, “HE A-Control field,” Alfred Asterjadhi (Qualcomm)
      18. 11-15-1137, “Triggered OFDMA Random Access Observations,” Russell Huang (MediaTek)
   3. MU - 15
      1. 11-15-1043, “Overall Protocol of UL MU BA for Multicast Transmission,” Kazuyuki Sakoda (Sony)
      2. 11-15-1047, “RU selection process upon TF-R reception,” Stephane Baron (Canon)
      3. 11-15-1053, “Multiuser Block ACK Request (MU-BAR),” Guoqing Li (Apple)
      4. 11-15-1057, “Multiple Resource Unit Allocation for TGax OFDMA,” Kome Oteri (InterDigital)
      5. 11-15-1062, “NAV Consideration for UL MU Response to Trigger frame,” Po-Kai Huang (Intel)
      6. 11-15-1065, “11ax uplink Multi-TID aggregation,” Chao-Chun Wang (MediaTek)
      7. 11-15-1086, “Consideration on multi-STA BA frame indication,” Jing Ma (NICT)
      8. 11-15-1097, “Reducing Channel Sounding Protocol Overhead for 11ax,” Narendar Madhavan (Toshiba)
      9. 11-15-1102, “Fragmentation with MU Operation,” Chittabrata Ghosh (Intel)
      10. 11-15-1103, “DL Sounding Sequence with UL MU Feedback,” Chittabrata Ghosh (Intel)
      11. 11-15-1105, “UL OFDMA-based Random Access Procedure,” Chittabrata Ghosh (Intel)
      12. 11-15-1107, “Power Save with Random Access,” Chittarata Ghosh (Intel)
      13. 11-15-1117, “Regarding UL MU protection,” Woojin Ahn (Yonei Univ.)
      14. 11-15-1123, “Acknowledgement to DL MU,” Liwen Chu (Marvell)
      15. 11-15-1129, “Feedback overhead in DL-MU-MIMO,” Filippo Tosato (Toshiba)
   4. SR – 12 submissions
      1. 11-15-1045, “Dynamic CCA control and TPC Simulation Results with SS1-SS3,” Takeshi Itagaki (Sony)
      2. 11-15-1058, “CCA consideration for UL MU transmission,” Kiseon Ryu (LG Electronics)
      3. 11-15-1069, “Adaptive CCA and TPC,” James Wang (MediaTek)
      4. 11-15-1081, “Further consideration on receive behaviour based on the cascading structure and the BSS color scheme,” Jing Ma (NICT)
      5. 11-15-1082, “Analysis of BSS and ESS Structure During Concurrent SR Transmissions,” Chuck Lukaszewski (Aruba/HP)
      6. 11-15-1083, “Cost/Benefit Analysis of SR Techniques,” Chuck Lukaszewski (Aruba/HP)
      7. 11-15-1101, “DSC/DCCA Calibration with TGax Agreed Scenarios,” Masahito Mori (Sony)
      8. 11-15-1104, “TXOP Considerations for Spatial Reuse,” Reza Hedayat (Newracom)
      9. 11-15-1109, “OBSS NAV and PD Threshold Rule for Spatial Reuse,” Rossi Jun Luo (Huawei)
      10. 11-15-1110, “BSS TXOP,” Amin Jafarian (Newracom)
      11. 11-15-1118, “Discussions on Spatial Reuse Enhancement,” Geonjung Ko (WILUS)
      12. 11-15-1138, “To DSC or not to DSC,” Filip Mestanov (Ericsson)
   5. Simulation and TG - 12
      1. 11-15/1039, “Spatial Reuse Measurements,” Chuck Lukaszewski (Aruba Networks, a HP company)
      2. 11-15-1046, “MAC calibration results,” Stephane Baron (Canon)
      3. 11-15-1048, “On TGax Scenario 4 channel model,” Marcin Filo (Univ. of Surrey)
      4. 11-15-1049, “Implications of wrap-around for TGax Scenario 3 and Scenario 4,” Marcin Filo (Univ. of Surrey)
      5. 11-15-1056, “Clarifying Link Level Simulator Assumptions,” Kome Oteri (InterDigital)
      6. 11-15-1087, “MU BFee Interference channel feedback,” Sigurd Schelstraete (Quantenna)
      7. 11-15-1095, “OFDMA performance in 11ax,” Suhwook Kim (LG Electronics)
      8. 11-15-1099, “Power Save Simulation Results,” Hyeyoung Choi (LG Electronics)
      9. 11-15-1100, “Discussion on Deep and Shallow Sleep States,” Chittabrata Ghosh (Intel)
      10. 11-15-1113, “Box5 Calibration results,” Vida Ferdowsi (Newracom)
      11. 11-15-1134, “11ax Support for IoT,” Shimi Shilo (Huawei)
      12. 11-15-1135, “Results for SS6 calibration case for single BSS and OBSS,” Esa Tuomaala (Nokia)
2. Agenda for Monday, May 11th, AM2 (10:30 – 12:30).
   1. Proposed Agenda for Monday AM2 session:
      1. Call meeting to order
      2. Patent policy, etc.
      3. Call for submissions
      4. Set Ad Hoc Groups schedule and approve agenda
      5. Summary from July 2015 meeting
      6. SFD review - Editor
      7. TG motions
         1. Approve TG meeting and Teleconference minutes since July meeting.
         2. Approve the latest SFD revision.
      8. Timeline Reminder
      9. Ad Hoc group Rules
      10. Presentations
      11. Recess
   2. Chair asked if there are any other items – No items proposed. Meeting will be conducted based on this order.
3. Ad Hoc Groups scheduling

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Monday | | Tuesday | | Wednesday | | Thursday |
| AM1 |  | |  | | TGax | | TGax |
| AM2 | TGax | | TGax  (PHY) | TGax  (MAC) |  | |  |
| PM1 | TGax  (PHY) | TGax  (MAC) | TGax  (SR) | TGax  (MU) | TGax  (PHY) | TGax  (MAC) | TGax |
| PM2 |  | | TGax | | TGax  (SR) | TGax  (MU) |  |
| PM3 | TGax | | TGax | |  | |  |

Osama will talk to WG 1st Vice Chair if we can change a Tuesday meeting into the ad hoc sessions.

But for now, the above plan is agreed.

1. Presentations
   1. Chuck Lukaszewski (Aruba/HP) presented “Spatial Reuse Measurements,” based on the submission 11-15/1039r0.
      1. Summary
         1. The SR ad hoc has defined a calibration scenario, and nine companies have presented initial findings.
         2. This contribution adds empirical, open air measurements using modified ED & preamble detect (PD) thresholds.
            1. Spatial reuse via PD threshold tuning is real.
            2. Improvement scales with BSS count, but linearity depends on many factors including inter-BSS distance, intra-BSS distance and supportable MCS.
      2. Discussions:
         1. Q: How actually did you change the threshold? 🡪 Proprietary implementation.
         2. Q: A member asked a question on the PD adjustment. 🡪 Configuration.
         3. Q: Another member asked about the measurement conditions such as use of RTS/CTS.
2. Summary from July 2015 Meeting
   1. Passed a number of motions affecting the TG Specification Framework. Motions passed related to PHY, MAC, and MU.
   2. Latest revision (not yet approved) of the Specification Framework is available at;
      1. [https://mentor.ieee.org/802.11/dcn/15/11-15-0132-07-00ax-spec-framework.docx](https://mentor.ieee.org/802.11/dcn/15/11-15-0132-06-00ax-spec-framework.docx)
   3. Approved new revisions of the Evaluation Methodology TG documents.
      1. <https://mentor.ieee.org/802.11/dcn/14/11-14-0571-10-00ax-evaluation-methodology.docx>
      2. [https://mentor.ieee.org/802.11/dcn/14/11-14-0980-14-00ax-simulation-scenarios.docx](https://mentor.ieee.org/802.11/dcn/14/11-14-0980-12-00ax-simulation-scenarios.docx)
   4. Other TG documents
      1. <https://mentor.ieee.org/802.11/dcn/14/11-14-0882-04-00ax-tgax-channel-model-document.docx>
      2. <https://mentor.ieee.org/802.11/dcn/14/11-14-1009-02-00ax-proposed-802-11ax-functional-requirements.doc>
3. Timeline (Reminder)



1. Approval of TG Minutes (July 2015 Meeting and Telecon Minutes)
   1. **Motion: Approve TGax minutes of meetings and teleconferences from July 2015 Plenary meeting to today:** 
      1. [**https://mentor.ieee.org/802.11/dcn/15/11-15-0884-01-00ax-tgax-july-2015-waikoloa-meeting-minutes.docx**](https://mentor.ieee.org/802.11/dcn/15/11-15-0884-01-00ax-tgax-july-2015-waikoloa-meeting-minutes.docx)
      2. [**https://mentor.ieee.org/802.11/dcn/15/11-15-0971-01-00ax-july-meeting-minutes-of-the-spatial-reuse-ad-hoc-group.docx**](https://mentor.ieee.org/802.11/dcn/15/11-15-0971-01-00ax-july-meeting-minutes-of-the-spatial-reuse-ad-hoc-group.docx)
      3. [**https://mentor.ieee.org/802.11/dcn/15/11-15-0949-01-00ax-july-2015-hawaii-tgax-mu-ad-hoc-meeting-minutes.docx**](https://mentor.ieee.org/802.11/dcn/15/11-15-0949-01-00ax-july-2015-hawaii-tgax-mu-ad-hoc-meeting-minutes.docx)
      4. [**https://mentor.ieee.org/802.11/dcn/15/11-15-0922-01-00ax-july-2015-hawaii-tgax-mac-ad-hoc-meeting-minutes.docx**](https://mentor.ieee.org/802.11/dcn/15/11-15-0922-01-00ax-july-2015-hawaii-tgax-mac-ad-hoc-meeting-minutes.docx)
      5. [**https://mentor.ieee.org/802.11/dcn/15/11-15-0913-00-00ax-ieee-802-11-tgax-july-2015-hawaii-phy-ad-hoc-meeting-minutes.docx**](https://mentor.ieee.org/802.11/dcn/15/11-15-0913-00-00ax-ieee-802-11-tgax-july-2015-hawaii-phy-ad-hoc-meeting-minutes.docx)
      6. **Moved Lei Wang, Seconded by Guido R. Hiertz**
      7. **Motion approved with no objection.**
2. SFD Review – deferred.
3. Ad Hoc Group Rules
   1. A straw poll needs to achieves at least 75% at the ad-hoc level to be converted to a motion at the TG level.
   2. In the case a consensus can not be reached within an Ad Hoc group (a stalemate that prohibits further progress), the subject is moved to the Task group, if an Ad Hoc straw poll vote to move the subject to the Taskgroup achieves >50% approval.
   3. A straw poll affecting the Spec Framework has to start with,
      1. Do you agree to add to the TG Specification Frame work document?
         1. x.y.z. <feature description>
   4. For further details, please see 11-15-0075r0
   5. Ad hoc produces minutes.
   6. Ad Hoc Group Meetings for this afternoon (room assignments)
      1. PHY Ad Hoc: World Ballroom B
      2. MAC Ad Hoc: World Ballroom C
4. Presentations
   1. Guido R. Hiertz (Ericsson) presented “Proxy ARP in 802.11ax,” based on the submission 11-15/1015r1
      1. Summary
         1. Follow up presentation to the Proxy ARP with 802.11ax AP presented in July 2015.
         2. The advantages of having the Proxy ARP include less low MCS broadcast traffic on the wireless medium and better power save for STAs.
         3. For the case of IPv6, Neighbor Discovery will be used instead of the Proxy ARP.
      2. Discussions:
         1. A member expressed an concern on the management mechanism.
      3. **Straw Poll**
         1. **Do you agree to add the following to the IEEE 802.11 TGax Specification Framework?**

**Add to the end of Clause 6 (MAC): “The amendment shall define a HE AP to implement Proxy ARP capability.”**

* + - * 1. **Result: Y/N/A = 32/8/many. The straw poll will be converted to a motion.**
  1. Esa Tuomaala (Nokia) presented “Results for SS6 calibration case for single BSS and OBSS,” based on the submission 11-15/1135r0.
     1. Summary
        1. The box 5 simulation results for SS6 calibration case presented.
     2. Discussions:
        1. Q: A member asked about the simulation conditions.
        2. Q: Another member asked if the results were compared with those provided by other members? 🡪 Yes. The results are very close.
        3. Q: A member asked about the topology of the simulation scenario.
  2. Stephane Baron (canon) presented “MAC Calibration Results,” based on the submission 11-15/1046r0
     1. Summary
        1. Simulation results for test cases 1-3 according to 802.11ax Simulation Scenarios document and Evaluation Methodology presented.
        2. The results are compared with previous contributions and match pretty well with previous simulation results.
     2. Discussions:
        1. No discussion.

1. TGax meeting recessed @ 12:28 until PM1 (13:30) for ad hocs sessions and EVE for TG full session.

**Monday, September 14th, 2015, PM1 TGax Ad Hoc Sessions (13:30-15:30)**

* PHY and MAC ad hoc sessions
  + PHY Ad hoc
    - Meeting room: World Ballroom B
    - Agenda: 11-15-1125
  + MAC Ad hoc
    - Meeting room: World Ballroom C
    - Agenda: 11-15-1126

There was an announcement that TGax session Monday PM3 (EVE) will be the PHY and MAC ad hoc sessions.

* PHY and MAC ad hoc sessions
  + PHY Ad hoc
    - Meeting room: World Ballroom B
    - Agenda: 11-15-1125
  + MAC Ad hoc
    - Meeting room: World Ballroom C
    - Agenda: 11-15-1126

**Monday, September 14th, 2015, PM3 (EVE) TGax Ad Hoc Sessions (19:30-21:30)**

* PHY and MAC ad hoc sessions
  + PHY Ad hoc
    - Meeting room: World Ballroom B
    - Agenda: 11-15-1125
  + MAC Ad hoc
    - Meeting room: World Ballroom C
    - Agenda: 11-15-1126

**Tuesday, September 15th, 2015, AM2 TGax Ad Hoc Session (10:30-12:30)**

* PHY and MAC ad hoc sessions
  + PHY Ad hoc
    - Meeting room: World Ballroom B
    - Agenda: 11-15-1125
  + MAC Ad hoc
    - Meeting room: World Ballroom C
    - Agenda: 11-15-1126

**Tuesday, September 15th, 2015, PM1 TGax Ad Hoc Session (13:30-15:30)**

* MU and SR ad hoc sessions
  + MU Ad hoc
    - Meeting room: World Ballroom B
    - Agenda: 11-15/1141
  + SR Ad hoc
    - Meeting room: World Ballroom C
    - Agenda: 11-15/1143

**Tuesday, September 15th, 2015, PM2 TGax Session (16:00-18:00)**

1. The meeting called to order by Osama Aboul-Magd (Huawei Technologies), the chair of the TGax, @16:00
   1. About 130 people are in the room @ 17:00.
2. Announcement
   1. Agenda Doc.11-15/0987r3 on the server. Rev. 4 is the working document.
   2. Meeting Protocol: Please announce your affiliation when you first address the group during a meeting slot.
   3. Chairperson reminded that we are still operating under the IEEE 802 and IEEE 802.11 Policy and Procedure.
   4. Call for potentially essential patents.
      1. Chair asked if anyone is aware of potentially essential patents.
      2. **No potentially essential patents reported.**
   5. Attendance reminder.
3. Agenda items for Tuesday PM2 session
   1. Call Meeting to order
   2. IEEE 802 and 802.11 IPR Policy and procedure.
   3. Progress Review
   4. Presentations (TG Presentations)
   5. Recess
   6. Chair asked if there is any item to add. Nothing requested.
   7. Chair asked if there is any objection to accept this agenda for Tuesday PM2.
      1. No objection. The agenda for Tuesday PM2 was accepted.
4. Progress Review
   1. PHY: 7 presentations left. The ad hoc chair said one more time slot will be enough.
   2. MAC: all presentations but two finished.
   3. MU: 9 presentations finished. 7 presentations left.
   4. SR: 3 presentations finished. Still have 9 presentations to heat.
   5. Chairperson suggested MU and SR ad hoc meetings for this evening. No objection.

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|  | Monday | | | Tuesday | | | Wednesday | | Thursday |
| AM1 |  | | |  | | | TGax | | TGax |
| AM2 | TGax | | | TGax  (PHY) | TGax  (MAC) | |  | |  |
| PM1 | TGax  (PHY) | | TGax  (MAC) | TGax  (SR) | TGax  (MU) | | TGax  (PHY) | TGax  (MAC) | TGax |
| PM2 |  | | | TGax | | | TGax  (SR) | TGax  (MU) |  |
| PM3 | TGax  (PHY) | TGax  (MAC) | | TGax  (SR) | | TGax  (MU) |  | |  |

If MU ad hoc finishes this evening, MAC ad hoc on Thursday PM1 will be SR session, and Thursday PM2 will be the TGax full session.

1. Presentations
   1. Sigurd Schelstraete (Quantenna) presented “MU BFee Interference channel feedback,” based on the submission 11-15-1087-00.
      1. Summary
         1. MU-MIMO and TxBF precoding are based on channel information obtained during sounding which need to be “refreshed” at an appropriate rate to keep up with the changes.
         2. A mechanism to enable interference channel measurement from BFee to BFer should be provided.
      2. Discussion
         1. A member asked for the details of the beamforming technique.
         2. Some members asked for the relationship of the performance gain and overhead. 🡪 Slide 6 basically discusses about this.
         3. The relation between the proposed mechanism and link adaptation discussed.
      3. **Straw Poll: Do you agree to add the following to the IEEE 802.11 TGax Specification Framework?**
         * **11ax shall define a mechanism to enable MU BFees to provide the MU BFer with feedback information on the interference channel estimates determined at the receiver**
         1. Discussion
            1. It is not clear what exactly the interference channel means.
         2. **Result: Y/N/A = 19/26/54.**
   2. Kome Oteri (InterDigital) presented “Clarifying Link Level Simulator Assumptions,” based on the submission 11-15-1056-01.
      1. Summary
         1. The link level results may vary widely based on impairment assumptions such as CFO Model and phase noise model.
         2. Would like these assumptions to be specified in the 802.11ax evaluation methodology document.
      2. Discussion
         1. No discussion.
      3. **Straw Polls**
         1. **Straw Poll #1: the link level results may vary widely based on impairment assumptions such as CFO Model and phase noise model**
            * **We would like these assumptions to be specified in the 802.11ax evaluation methodology document**
            1. Discussions:

It is not clear what will be the required action.

Need draft text.

* + - * 1. **Result: Y/N/A = 28/0/many**
      1. **Straw Poll #2: Do you agree with the following?**

**A table listing PHY impairments for 802.11ax shall be added to the EM document**

* + - * 1. Discussions: no discussion.

The straw poll text needs to be more specific. 🡪 SP text modified.

* + - 1. **Modified Straw Poll: Do you agree with the following?**

**Add the table listed on page 15 and 16 to the EM document.**

* + - * 1. **Result: Y/N/A = 24/0/many 🡪 will have a motion**
  1. Marcin Filo (Univ. of Surrey) presented “Implications of wrap-around for TGax Scenario 3 and Scenario 4,” based on the submission 11-15-1049-01.
     1. Summary
        1. Implications of the use of Wrap-Around (WA) in TGax scenarios 3 and 4 are investigated.
        2. Simulations studies indicate significant differences in the achieved area capacity (Mbps per km2) with different number of simulated rings and also the need to reconsider some of the scenario specific simulation parameters.
        3. Wrap-around is necessary for proper evaluation of SCE#3 and SCE#4.
     2. Discussion
        1. A member asked how to simplify the assumptions and model.
  2. Marcin Filo (Univ. of Surrey) presented “On TGax Scenario 4 channel model,” based on the submission 11-15-1048-00.
     1. Summary
        1. Two issues with existing SCE#4 channel model were highlighted and recommendations were provided.
           1. ITU UMi LOS Path-loss is a two-slope model with a break point distance (dBP) derived based on the Frensel zone theory.
           2. ITU UMi path-loss model is extended by allowing 3D distance for path-loss calculation (UMi LOS formula was originally derived for 2D distance).
        2. Two proposals to improve existing SCE#4 channel model were presented and appropriate recommendations were provided.
     2. Discussion
        1. No discussion.
  3. Chittabrata Ghosh (Intel) presented “Discussion on Deep and Shallow Sleep States,” based on the submission 11-15-1100-02.
     1. Summary
        1. Continuation of the discussion happened in the previous meeting.
        2. Proposed current consumption values in Deep Sleep state for 20MHz, 40MHz, and 80MHz channel bandwidths.
        3. Also proposed to modify definition of Shallow and Deep Sleep states, and proposed to modify the latency in transition from Deep Sleep to Listen state.
     2. Discussion
        1. No discussion.
     3. **Straw Polls**
        1. **Straw Poll #1: Do you agree to define the current consumption value in Deep Sleep state in the Simulation Scenarios document as proposed in Slide 5?**
           1. Discussion: No discussion.
           2. **Result: No objection.**
        2. **Straw Poll #2: Do you agree to include the modified definition for Shallow and Deep Sleep state in the Simulation Scenarios document as discussed in Slide 6?**
           1. Discussion: No discussion.
           2. **Result: No objection.**
        3. **Straw Poll #3: Do you agree to modify the transition time from Deep Sleep to Listen state in the Simulation Scenarios document as proposed in Slide 8?**
           1. Discussion: A member asked how these numbers are selected? 🡪 Based on discussions.
           2. **Result: No objection.**

1. Plans for the evening session:
   1. MU and SR ad hoc sessions
      1. MU Ad hoc
         1. Meeting room: World Ballroom B
         2. Agenda: 11-15-1141
      2. SR Ad hoc
         1. Meeting room: World Ballroom C
         2. Agenda: 11-15-1143
2. AoB
   1. None.
3. Recess @ 17:54 until PM3(19:30) for the MU and SR ad hocs sessions, this evening.

**Tuesday, September 15th, 2015, PM3 (EVE) TGax Ad Hoc Session (19:30-21:30)**

* MU and SR ad hoc sessions
  + MU Ad hoc
    - Meeting room: World Ballroom B
    - Agenda: 11-15-1141
  + SR Ad hoc
    - Meeting room: World Ballroom C
    - Agenda: 11-15-1143

**Wednesday, September 16th, 2015, AM1 TGax Session (8:00-10:00 AM)**

1. Meeting called to order by Osama Aboul-Magd (Huawei Technologies), chair of TGax, @ 8:00.
   1. The agenda document 11-15/0987r4 is on the server.
      1. Rev y is the working document.
      2. About 130 people are in the meeting room@9:00 AM.
2. Administrative Items
   1. Chair reminded the IEEE 802 and IEEE 802.11 Policy and Procedures.
   2. Chair asked people to state name and affiliation when addressing for the first time.
   3. Chair also reminded people to do attendance.
3. Agenda setting
   1. Proposed agenda for this session:
      1. Meeting call to order
      2. Reminder
         1. IEEE 802 and IEEE 802.11 P&P.
         2. Attendance
      3. Update on TG progress
      4. Presentations
      5. Recess
   2. Chair asked if there is any objection to proceed with this agenda. No objection.
      1. The agenda for Wednesday AM1 was approved.
4. Status update from Ad Hoc groups
   1. Report
      1. MAC 2 remaining presentations 🡪 to be presented in TGax full session
      2. MU 1 remaining presentation 🡪 to be presented in TGax full session
      3. PHY 7 remaining presentations
      4. SR 4 remaining presentations
   2. Plans

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Monday | | | Tuesday | | | Wednesday | | Thursday |
| AM1 |  | | |  | | | TGax | | TGax |
| AM2 | TGax | | | TGax  (PHY) | TGax  (MAC) | |  | |  |
| PM1 | TGax  (PHY) | | TGax  (MAC) | TGax  (SR) | TGax  (MU) | | TGax  (PHY) | TGax  (SR) | TGax |
| PM2 |  | | | TGax | | | TGax | |  |
| PM3 | TGax  (PHY) | TGax  (MAC) | | TGax  (SR) | | TGax  (MU) |  | |  |

On Thursday, we start motions from 9:00AM.

The modified meeting plan was agreed.

1. Presentations
   1. Suhwook Kim (LG Electronics) presented “Power Save Simulation Results,” based on the submission 15/1099r0.
      1. Summary:
         1. Simulation results based on the power save calibration scenario presented.
         2. In next step, we will consider the case when there are PS STAs and active STAs together.
      2. Discussions
         1. A member asked if the author anticipates the changes in simulation results when considering the active STAs in the scenario. The answer is that the changes in the listen interval may cause changes in the power efficiency.
         2. Another member commented that the traffic direction will have some impacts on the power efficiency.
   2. Suhwook Kim (LG Electronics) presented “OFDMA performance in 11ax,” based on the submission 15/1095r02.
      1. Summary:
         1. The OFDMA performance using PHY/MAC integrated simulator presented.
         2. Performance gain of OFDMA depends on topology, traffic direction, and traffic load.
            1. OFDMA shows 20~80% throughput gain in high loaded traffic.
      2. Discussions
         1. Q (slide 58): A member asked for the reason why STAs have similar throughput performance for OFDMA cases.
         2. Q: The impact of frequency selective fading questioned.
         3. Q: Another member asked for the impact of the HE frame formats, i.e. SU and MU, on the throughput performance.
         4. Q: A member asked for the details of collision in a single BSS scenario.
   3. Yong Hoon Kwon (Newracom) presented “Bandwidth for UL MU Transmission,” based on the submission 15/1052r0.
      1. Summary:
         1. Several UL MU transmission procedures in current SFD text are not clearly defined.
         2. Proposed to modify current SFD text slightly such that UL MU transmission features can be more clearly described under newly added features.
      2. Discussions
         1. Q: Will the change be applied to all trigger frames? 🡪 Yes.
      3. **Straw Polls**
         1. **Straw Poll #1: Do you agree to modify sub-clause 4.1 of the TG Specification Framework as follows?**
         * **An AP shall not allocate UL subchannel in any 20 MHz channel that is not occupied by the ~~Trigger frame~~ immediately preceding DL PPDU. In each 20 MHz channel occupied by the ~~Trigger frame~~ immediately preceding DL PPDU, there is at least one allocated subchannel for UL transmission.** 
           1. Discussion:

Clarification asked for the “preceding DL PPDU” 🡪 “preceding DL PPDU” that has the trigger.

Further clarification discussed.

* + - * 1. **Result: Y/N/A = 45/3/22**
      1. **Straw Poll #2: Do you agree to modify sub-clause 4.1 of the TG Specification Framework as follows?**
      * **An UL OFDMA MPDU/A-MPDU is the acknowledgement of the trigger frame. When the AP receives MPDU correctly from at least one STA indicated by any trigger frame, the frame exchange initiated by all ~~the~~ trigger frame(s) is successful.**
        1. Discussion:

A member commented that this modification changes the original intention.

Suggestion: remove “all” 🡪 the presenter does not agree with this change.

* + - * 1. **Result: Y/N/A = 31/19/many**
  1. Russell Huang (MediaTek) presented “Triggered OFDMA Random Access Observations,” based on the submission 15/1157r1.
     1. Summary:
        1. STAs start UL MU operation after AP sends the trigger frames.
        2. For random access cases, STAs randomly access an RU by using a certain randomization algorithm.
        3. Proposed that AP broadcast the parameter(s) in the trigger frame.
     2. Discussions
        1. Each STA may have different channel gain and would like to know those information can be considered. 🡪 It is doable.
        2. There was a related submission and would like to know the relation between proposals. 🡪 They are orthogonal.
     3. **Straw Poll: Do you support to let AP broadcast a TBD parameter in the trigger frame to the STAs so that STAs can initiate the random access process after the trigger frames?**
        1. Discussion:
        2. **Result: Y/N/A = 87/0/19, this SP will be converted to a motion.**

1. AoB
   1. None.
2. Recess @ 9:55 until tomorrow AM1 (Thursday, 8:00 AM)

**Wednesday, September 16th, 2015, PM1 TGax Ad Hoc Session (13:30-15:30)**

* PHY and SR ad hoc sessions
  + PHY Ad hoc
    - Meeting room: World Ballroom B
    - Agenda:
  + SR Ad hoc
    - Meeting room: World Ballroom C
    - Agenda:

**Wednesday, September 16th, 2015, PM2 TGax Session (16:00-18:00)**

1. Meeting called to order by Osama Aboul-Magd (Huawei Technologies), chair of TGax, @ 16:00.
   1. The agenda document 11-15/0987r4 is on the server.
      1. Rev 5 is the working document.
      2. There were 120 people in the room@16:30.
2. Administrative Items
   1. Chair reminded the IEEE 802 and IEEE 802.11 Policy and Procedures.
   2. Chair asked people to state name and affiliation when addressing for the first time.
   3. Chair also reminded people to do attendance.
3. Agenda setting
   1. Proposed agenda for this session:
      1. Meeting call to order
      2. Reminder
         1. IEEE 802 and IEEE 802.11 P&P.
         2. Attendance
      3. Update on TG progress
      4. Presentations
         1. 11-15/1086
         2. 11-15/1134
      5. Recess
   2. Chair asked if there is any objection to proceed with this agenda. No objection.
      1. The agenda for Wednesday AM1 was approved.
4. Status update from Ad Hoc groups
   1. Report
      1. PHY 9 straw polls passed and they will be converted to motions.
      2. SR Heard all presentations. One straw poll passed.
5. Presentations
   1. Jing Ma (NICT) presented “Consideration on multi-STA BA frame indication,” based on the submission 11-15-1086-01.
      1. Summary
         1. Proposed to assign one bit in the BA Control field to indicate that the BA frame is the Multi-STA BA frame.
      2. Discussion: No discussion.
      3. **Straw Poll: Do you agree to add to the TG Specification Frame work document?**

**Do you agree to use a reserved bit in BA control field to indicate that the frame is multi-STA BA frame.**

* + - 1. **Result: Y/N/A = 10/0/many, this SP will be converted to a motion.**
  1. Shimi Shilo (Huawei) presented “11ax Support for IoT,” based on the submission 11-15-1134-02.
     1. Summary
        1. New designs within 11ax can help 11ax become the IoT leader within 802.11.
        2. The low PAPR single-carrier approach may provide the 10dB link margin improvement defined by the LRLP initiative, as well as a better alternative than 11b.
     2. Discussion:
        1. A member asked for the background for this idea.
        2. Another member commented that this is appropriate for a new project.
        3. The combined metric on slide 15 is not clear.
        4. Longer range and PAPR – what are they related? 🡪 Backoff of power amplifier.
        5. …
        6. People generally seem to have interest on this topic. However, it is questionable if the 802.11ax is the right place to do this work.

1. AoB
   1. Plans for tomorrow.
      1. TG Motion starts 8:30 AM.
2. Recess @ 16:55 until start of Thursday AM1 (8:00 AM).

**Thusday, September 17th 2015, AM1 Session (8:00 - 10:00 AM)**

1. The meeting called to order by Osama Aboul-Magd (Huawei Technologies), the chair of TGax, @8:04 AM.
   1. Agenda 11-15/0987r5 is on the server.
   2. There were 150 people in the room @ 9:00 AM.
2. Administrative Items
   1. Chair reminded the IEEE 802 and IEEE 802.11 P&P.
   2. Chair asked people to state name and affiliation when addressing for the first time in the session.
   3. Attendance!
3. Agenda for today’s session
   1. Thursday AM1 and PM1
      1. Call Meeting to order
      2. IEEE 802 and 802.11 IPR Policy and procedure.
      3. Presentations
      4. TG Motions – starting at 8:30 am
      5. SSD and EVM Morions
      6. Goals for November 2015
      7. Telecon Schedule
      8. Adjourn
   2. Chair asked if there are any modifications to the agenda for AM1.
   3. Agenda for AM1 and PM1 approved without objections.
4. TG Motions
   1. **PHY Motion #36:**

**Move to make the following text changes in 11ax SFD (3.3.3 Coding)**

**- LDPC is the only coding scheme in the HE PPDU Data field for allocation sizes of *484 tones*, 996 tones and 996\*2 tones.**

**- ….**

**- Support of LDPC code for both TX and RX is mandatory for HE STAs declaring support for at least one of HE 40/80/160/80+80 SU-PPDU bandwidths, ……..**

* + 1. **Moved by Hongyuan Zhang, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection**
  1. **PHY Motion #37:**

**Move to add to the TG Specification Framework:**

**- 4.y.z The spec shall define an HE-NDP for DL Sounding. The frame format of HE-NDP is based on the 11ax SU PPDU format and is shown in the diagram below. The presence and duration of packet extension at the end of HE-NDP is TBD.**

Format of HE-NDP

HE-LTFs

L-LTF

L-SIG

TBD

HE-SIG-A

HE-STF

Packet Extension

L-STF

* + 1. **Moved by Yong Hoon Kwon, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection**
  1. **PHY Motion #38:**

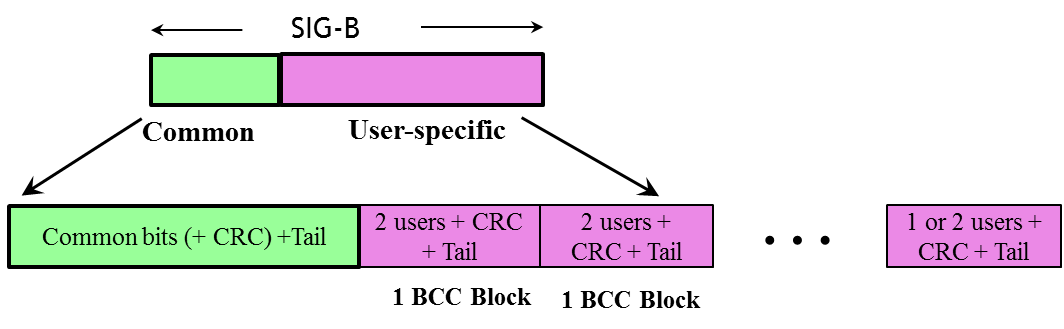
**Move to add the following text to the TGax spec framework document:**

***“802.11ax spec shall not support Ng=1 for sounding feedback. Note that the tone grouping factor, Ng is defined with respect to data tones of the 11ax PPDU. ”***

* + 1. **Moved by Sameer Vermani, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection**
  1. **PHY Motion #39:**

**Move to add the following text to the SFD: The encoding structure of each BCC in SIG-B is as shown in the figure and as described below:**

* **2 users are grouped together and jointly encoded in each BCC block in the user specific section of HE SIG-B**
* **The CRC in the common block is TBD**
* **The last user information is immediately followed by tail bits (regardless of whether the number of users is odd or even) and padding bits are only added after those tail bits**



* + 1. **Moved by Ron Porat, Seconded by Yasu Inoue**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #40:**

**Move to add the following text to the 11ax SFD:**

* **The user specific subfields of HE-SIG-B containing the per user dedicated information  include the following fields**
* **STA-ID**
* **For single-user allocations in a RU:  NSTS (Number of Spatial Streams), TxBF (transmit beamforming ), MCS (Modulation and Coding Scheme) and Coding (Use of LDPC)**
* **For each user in a multi-user allocation in a RU:  Spatial Configuraiton Fields, MCS and Coding.**
* **Other fields are TBD.**
  + 1. **Moved by Yasu Inoue, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #41:**

**Move to add the following text to the 11ax SFD:**

* **For MU-MIMO allocation of RU size > 20MHz, the user-specific subfields is dynamically split between two HE-SIG-B content channels(1/2) and the split is decided by the AP (on a per case basis)** 
  + 1. **Moved by Yasu Inoue, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #42:**

**Move to add the following text to the 11ax SFD:**

* **1024 QAM is used as an optional feature for SU and MU using resource units equal to or larger than 242 tones in 11ax**
  + 1. **Moved by Eunsung Park, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #43:**

**Move to add to SFD:**

* **HE-SIG-A shall include the following fields in SU PPDU.**
  + **The size of each field is TBD**
  + **The other fields are TBD**

|  |
| --- |
| **Format indication** |
| **TXOP duration** |
| **BW** |
| **Payload GI** |
| **PE** |
| **MCS** |
| **coding** |
| **LTF compression** |
| **Nsts** |
| **STBC** |
| **BF** |
| **CRC** |
| **tail** |

* + 1. **Moved by Jiayin Zhang, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection**
  1. **PHY Motion #44:**

**Move to add to SFD**

* + **HE-SIG-A shall include the following fields in MU DL PPDU.**
    - **The size of each field is TBD**
    - **The other fields are TBD**

|  |
| --- |
| **Format indication** |
| **TXOP duration** |
| **Number of HE-SIG-B symbols** |
| **MCS of SIGB** |
| **CRC** |
| **tail** |

* + 1. **Moved by Jiayin Zhang, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #45:**

**Move to add to SFD**

* + **HE-SIG-A shall include the following fields in MU UL PPDU.**
    - **The size of each field is TBD**
    - **The other fields are TBD**

|  |
| --- |
| **Format indication** |
| **TXOP duration** |
| **CRC** |
| **tail** |

* + 1. **Moved by Jiayin Zhang, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #46:**

**Move to add to the SFD:**

* + **The spec shall support adding a BSS COLOR field in the SIG-A field**
    - **The BSS COLOR field is an identifier of the BSS (size TBD)**
    1. **Moved by Alfred Asterjadhi, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #47:**

**Move to add the following rules to the SFD:**

* + - **An HE non-AP STA may enter the Doze state until the end of an HE DL MU PPDU if:** 
      * **the value of the PPDU’s BSS COLOR field is equal to the BSS COLOR of its BSS, and**
      * **the value derived from any of the STA Identifiers in the SIG-B field does not match its own identifier or that of a broadcast/multicast identifier**
  + **An HE non-AP STA may enter the Doze state until the end of an HE UL MU PPDU if:**
    - * **the value of the PPDU’s BSS COLOR field is equal to the BSS COLOR of its BSS**
    1. **Moved by Alfred Asterjadhi, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #48:**

**Move to add the SFD**

* **an UL/DL Flag field in the SIG-A of an HE SU PPDU**
  + **The UL/DL Flag indicates whether the frame is Uplink or Downlink**
    - * + **The value of this field for TDLS is TBD**
    1. **Moved by Alfred Asterjadhi, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #49:**

**Move to add the following rules to the SFD:**

* + **An HE STA may enter the Doze state until the end of an HE SU PPDU if:**
    - * **the value of the PPDU’s BSS COLOR field is equal to the BSS COLOR of its BSS, and**
      * **the value of the UL/DL Flag field indicates that the frame is uplink**
    1. **Moved by Alfred Asterjadhi, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #50**

**Move to assign 6 bits for BSS Color field.**

* + 1. **Moved by: Yasu Inoue, Seconded by Ron Porat**
    2. **Discussion:**
       1. **A member expressed he believes 8 bits are needed for the BSS Color field.**
    3. **Motion to defer PHY Motion #50.**
       1. **Moved by Chuck Lukaszewski, Seconded by Sean Coffey**
       2. **Result: Y/N/A = 28/35/32, motion failed.**
    4. **Motion to amend PHY Motion #50**

**Move to amend PHY Motion #50 to “Move to assign 6 bits for BSS Color field.”**

* + - 1. **Moved by Yasu Inoue, Seconded by Chuck L.**
      2. **Discussion:**
         1. **A member is not comfortable with this amendment.**
      3. **Result: Y/N/A = 31/23/40, motion passes. PHY Motion #50 is amended.**
    1. **Amended PHY Motion #50**

**Move to assign at least 6 bits for BSS Color field.**

* + - 1. **Result: Y/N/A = 52/18/24, Motion failed.**
  1. **PHY Motion #51**

**Move to add to the SFD as below:**

**11ax preamble shall have a 4us symbol repeating the L-SIG content, right after the legacy section**

* + **This symbol shall be modulated by BPSK and rate ½ BCC.**



* + 1. **Moved by Hongyuan Zhang, Seconded by Ron Porat.**
    2. **Motion accepted with no objection.**
  1. **PHY Motion #52**

**Move to insert the following in SFD:**

* **In L-SIG, the L-LENGTH field is set to a value not divisible by 3.**
* **The value of L\_LENGTH mod 3 will be used for signaling of one bit of TBD information.**
  + 1. **Moved by Hongyuan, Seconded by Ron Porat.**
    2. **Motion accepted with no objection.**
  1. **PHY Motion #53**

**Move to add dual sub-carrier modulations (DCM) as optional modulation schemes for HE-SIGB and Payload to 11ax SFD**

* 1. **Dual sub-carrier modulation (DCM) are only applied to BPSK, QPSK and 16QAM modulations.**
     1. **Moved by Jianhan Liu, Seconded by Ron Porat.**
     2. **Discussion**
        1. **A member expressed objection to the motion.**
     3. **Result: 54/2/35, Motion passes.**
  2. **PHY Motion #54**

**Move to add one bit DCM indication in HE-SIGA to 11ax SFD**

* + 1. **Moved by Jianhan Liu, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #55**

**Move to add to 11ax SFD that HE-SIG-A shall have a repetition mode for range extension**

* **In the repetition mode, HE-SIG-A symbols are repeated once in time. The bit interleaver is bypassed in the repeated HE-SIG-A symbols**
* **The repetition mode is indicated before HE-SIG-A.**
  + 1. **Moved by Jaiyin Zhang, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #56**

**Move to add to TGax Specification Framework Document**

* + **The HE-LTF sequences for UL MU-MIMO shall be generated as follows. For each stream, a common sequence shall be masked repeatedly in a piece-wise manner by a distinct row of an 8x8 orthogonal matrix. When the length of the LTF sequence is not divisible by 8, the last M elements of the LTF sequence (M being the remainder after the division of LTF length by 8) shall be masked by the first M elements of the orthogonal matrix row.** 
    1. **Moved by Xiaogang Chen, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #57**

**Move to add to TGax Specification Framework Document**

* **The orthogonal matrix used to mask the HE-LTF sequence in SP1 is the 8x8 Pmatrix used in 11ac.**
  + 1. **Moved by Xiaogang Chen, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #58**

**Move to add the following text into Section 3.4 HE Data Field of the current SFD:**

* **An 11ax SU  PPDU should apply the MAC/PHY pre-FEC padding scheme as in 11ac, to pad toward the nearest of the four possible boundaries (“a” factor) in the last Data OFDM symbol(s), and then use post-FEC padding bits to fill up the last OFDM symbol(s).**
  + **Packet Extension (PE) field is defined at the end of 11ax PPDUs.**
  + **PE should have the same average power as data field.**
    1. **Moved by Hongyuan Zhang, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #59**

**Move to add the following text into SFD:**

* **11ax shall define the max packet extension modes of 8µs and 16µs, correspond to the short symbol segment padding boundaries (“*a-*factor”) according to the following PE duration (*TPE*) values:**
  + **Max packet extension mode 8 µs: *TPE* = [0 0 4 8] µs for *a = 1~4* respectively;**
  + **Max packet extension mode 16 µs: *TPE* = [4 8 12 16] µs for *a = 1~4* respectively.**
* **HE Capability field shall define two constellation level thresholds (*threshold16* and *threshold8*) for a given {NSS, BW} combination, to determine if and when max packet extension modes 8 µs and 16 µs are applied, i.e.**
  + **3 bits are used to specify each threshold as the table below.**
  + **If constellation ≥ *threshold16* apply max PE 16 µs mode, else if constellation ≥ *threshold8* apply max PE 8 µs mode, else no packet extension.**
  + **If no PE is required for all constellations both *threshold8*and *threshold16*are set to 111**
  + **If only max PE 8 µs mode is required, set *threshold16* to be 111, and *threshold8* to be the constellation at which max PE 8 µs mode starts**
  + **If only max PE 16µs mode is required, set *threshold16* to be the constellation at which max PE 16µs mode starts, and *threshold8* to be 111**
  + **When ≥80 MHz is supported, no thresholds are defined for RU size less than or equal to 242 tones (20 MHz); otherwise, thresholds are defined down to a TBD RU size.**

|  |  |
| --- | --- |
| **Constellation** | **Threshold Encoding in HE Capability** |
| **BPSK** | **000** |
| **QPSK** | **001** |
| **16QAM** | **010** |
| **64QAM** | **011** |
| **256QAM** | **100** |
| **1024QAM** | **101** |
| **None** | **111** |

* + 1. **Moved by Hongyuan Zhang, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #60**

**Move to add the following text into SFD:**

* + **The number of uncoded bits for each of the first 3 short symbol segments (a=1~3) equals to the number of uncoded bits corresponding to *NSD.short* subcarriers as specified by the following table, and the number of uncoded bits for the last short symbol segment (a=4) equals to the number of bits of the whole OFDM symbol subtracting the total number of uncoded bits of the first three short symbol segments.**

|  |  |
| --- | --- |
| **RU Size** | **NSD\_short** |
| **26** | **6** |
| **52** | **12** |
| **106** | **24** |
| **242** | **60** |
| **484** | **120** |
| **996** | **240** |
| **996x2** | **492** |

* + 1. **Moved by Hongyuan Zhang, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #61**

**Move to add the following text (this page and next page) into SFD:**

* **HE-SIG-A field contains a “*a-factor*” field of 2 bits, and a “PE-Disambiguity” field of 1 bit, with setting methods as blow:**
* **In L-SIG, the L-LENGTH field is set by:**



* + **In HE-SIG-A:**
  + ***a-factor* field:**

|  |  |
| --- | --- |
| **a-factor value** | **a-factor field encoding** |
| **1** | **01** |
| **2** | **10** |
| **3** | **11** |
| **4** | **00** |

* + **PE Dis-ambiguity Field:**



* + 1. **If , where , set this field to 1; otherwise, set to 0.**



* + 1. **At receiver side, the following equations may be run to compute *NSYM* and *TPE* respectively:**



* + 1. **Moved by Hongyuan Zhang, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection**
  1. **PHY Motion #62**

**Move to add the following text into SFD:**

* **When the AP transmits DL-MU packets:**
  + **All users use the same NSYM and a-factor values according to the user with the longest span.**
  + **Based on a-factor value and each user’s PE capabilities, compute the PE duration for each user TPE,u, and the PE duration of the whole DL-MU PPDU is TPE = maxu(TPE,u).**
  + **In HE-SIG-A field, the “a-factor” field, the “PE Disambiguity” field, and the “LDPC extra symbol” field, are common for all users.**
    1. **Moved by Hongyuan Zhang, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection**
  1. **PHY Motion #63**

**Move to add the following text into SFD:**

* **For UL-MU packet transmission:**
  + **AP indicates its desired *Nsym*, *a-factor,* LDPC Extra Symbol indicationand *PE* duration values in trigger frame.**
  + **Possible PE values for UL-MU are TBD.**
  + **Each user when transmitting the UL-MU PPDU, shall encode and conduct PHY padding using the parameters:**
  + ***NSYM* as indicated in the trigger frame;**
  + ***a-factor* as indicated in the trigger frame;**
  + **LDPC Extra Symbol as indicated in the trigger frame;**
  + **Append PE specified in the trigger frame.**
    1. **Moved by Hongyuan Zhang, Seconded by Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #64**

**Move to add the following text to the 11ax SFD:**

* **The RU allocation signaling in the common field of HE-SIG-B signals an 8 bit  per 20MHz PPDU BW for signaling** 
  + **The RU arrangement in frequency domain**
  + **Number of MU-MIMO allocations: The RUs allocated for MU-MIMO and the number of users in the MU-MIMO allocations.**
  + **The exact mapping of the 8 bit to the RU arrangement and the number of MU-MIMO allocations is TBD.**
  + **Signaling for the center 26 unit in 80MHz is TBD**
    1. **Moved by Yasu Inoue, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **PHY Motion #65**

**Move to add the following text to the 11ax SFD:**

* **The length of the user specific subfield in HE-SIG-B for a single-user allocation is equal to the length of the user specific subfield of each user in a multi-user allocation.**
  + 1. **Moved by Yasu Inoue, Seconded by Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motion #27**

**Moved to add to the end of Clause 6 (MAC) of the IEEE 802.11 TGax Specification Framework:**

* **“The amendment shall define a HE AP to implement Proxy ARP capability.”**
  + 1. **Moved by Guido R. Hiertz, Seconded by Ron Porat.**
    2. **Discussion:** 
       1. **A member commented “shall” is too restrictive. “may” will be appropriate.**
       2. **Another member asked for the clarification on the motion text.**
       3. **This is an implementation issue.**
    3. **Result: Y/N/A = 29/27/64, motion fails.**
  1. **MAC Motion #28**

**Move to add the following to the IEEE 802.11 TGax Specification Framework**

* **6.X.Y: “HE STAs shall support the Multiple BSSID Set.”**
  + 1. **Moved by Guido R. Hiertz, Seconded by Ron Porat.**
    2. **Motion accepted with no objection.**

1. AOB
2. Recess @ 9:47 until PM1 this afternoon.

**Thusday, September 17th 2015, PM1 Session (13:30 - 15:50)**

1. The meeting called to order by Osama Aboul-Magd (Huawei Technologies), the chair of TGax, @13:30.
   1. Agenda 11-15/0987r5 is on the server. Rev 6 is working document.
   2. There were 150 people in the room.
2. Administrative Items
   1. Chair reminded the IEEE 802 and IEEE 802.11 P&P.
   2. Chair asked people to state name and affiliation when addressing for the first time in the session.
   3. Attendance!
3. Agenda Setting
   1. Proposed agenda for this session - Thursday PM1
      1. Call Meeting to order
      2. IEEE 802 and 802.11 IPR Policy and procedure.
      3. Agenda Setting
      4. TG Motions
         1. Based on SPs from the different Ad Hoc groups
         2. SSD and EMD motions
      5. Goals for July 2015
      6. Telecon Schedule
      7. Adjourn
   2. Chair asked if there are any objections to proceed with this agenda – no objections.
      1. The agenda approved.
4. TG Motions
   1. **MAC Motions #29**

**Move to add the TGax SFD:**

* **6.1 General  
  In a downlink MU HE PPDU, at most one A-MPDU is allowed to contain one or more MPDUs that solicit an immediate response, except when an immediate response is carried in UL MU PPDU. In such case, one or more A-MPDUs are allowed to contain one or more MPDUs that solicit an immediate response carried in UL MU PPDU.**
  + 1. **Moved by: Yongho Seok, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #30**

**Move to add the TGax SFD:**

* **6.2 Power Save  
  HE STA may use a notification of its operating mode changes for 802.11ax power saving mechanism**
  + 1. **Moved by: Yongho Seok, Seconded by: Ron Porat**
    2. **Discussion:**
       1. **A member mentioned this is already allowed.**
    3. **Result: Motion accepted with no objection.**
  1. **MAC Motions #31**

**Move to add the TGax SFD:**

* + **6.2 Power Save  
    The 802.11ax Operating Mode Notification behavior should specify a clarification for**
    1. **A channel width that a STA can transmit**
    2. **A number of spatial streams (Tx NSS) that a STA can transmit**
    3. **Moved by: Yongho Selo, Seconded by: Ron Porat.**
    4. **Result: Y/N/A = 22/9/50, motion fails.**
  1. **MAC Motions #32**

**Move to add to 11ax SFD:**

* **the spec shall define a mechanism for a transmitting STA to indicate its RX operating mode, i.e. RX NSS, RX channel width, in a transmitted DATA type MAC header, so that the responding STA shall not transmit a subsequent PPDU using an NSS or channel width value not indicated as supported in the RX operating mode of the transmitting STA.**
  + **The responding STA shall not adopt the new NSS and BW until a time TBD.** 
    1. **Moved by: Guoqing Li, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #33**

**Move to add the following text in SFD**

* **When a STA receives a CF-End from an OBSS STA, if the last NAV update was caused by an Intra-BSS frame, the STA should not reset its NAV**
  + 1. **Moved by: Jeongki Kim, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #34**

**Move to add the following text to the spec framework**

* **The STA determines whether the detected frame is an inter-BSS or an intra-BSS frame by using BSS color or MAC address in the MAC header. If the detected frame is an inter-BSS frame, under TBD condition, uses TBD OBSS PD level that is greater than the minimum receive sensitivity level**
* **NOTE*–*Maybe extra rules need to be added to ensure that all 11ax STAs can make the decision in a consistent manner.**
  + 1. **Moved by: Jianhan Liu, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #35**

**Move to add the following text into 11ax SFD**

**4.1 In cascading sequence, when AP does not receive acknowledgements from a STA after sending DL Data MPDUs, AP may recover using one of the following procedures:**

* + - **Transmitting a BAR with SSN value set to the SN of the unacknowledged Data MPDUs**
    - **Retransmitting unacknowledged Data MPDUs**
    - **Transmitting additional Data MPDUs along with a BAR with SSN value set to the SN of the unacknowledged Data MPDUs**
    1. **Moved by: John Son, Seconded by: Jinsoo Ahn.**
    2. **Discussion:**
       1. **A member mentioned this is not necessary.**
    3. **Result: Y/N/A = 10/17/39, motion fails.**
  1. **MAC Motions #36**

**Move to add to the TG Specification Frame work document**

* **4.1. DL-OFDMA shall reuse the same sharing mechanism of an EDCA TXOP as DL MU-MIMO.** 
  + 1. **Moved by: Jinsoo Ahn, Seconded by: John Son.**
    2. **Discussion**
       1. **A member asked for the intention of this motion and asked if there is anything to define for this.**
       2. **Another member asked for further clarification on the intention of this motion.**
       3. **“shall” is too strong. “may” will be more appropriate.**
    3. **Motion to amend**

**Amend the MAC Motion #36 as:**

* **Do you agree to add to the TG Specification Frame work document?**
  1. 4.1. DL-OFDMA shall reuse sharing an EDCA TXOP mechanism of DL MU-MIMO.
* **to**
* **Move to add to the TG Specification Frame work document**
  1. **4.1. DL-OFDMA may reuse the same sharing mechanism of an EDCA TXOP as DL MU-MIMO.** 
     + - 1. **Moved by Alfred Asterjadhi, Seconded by Jinsoo Ahn.**
         2. **Result: Y/N/A = 14/0/51, motion to amend passes.**
     1. **Main Motion**

**Move to add to the TG Specification Frame work document**

* + **4.1. DL-OFDMA may reuse the same sharing mechanism of an EDCA TXOP as DL MU-MIMO.** 
    - 1. **Moved by: Jinsoo Ahn, Seconded by: John Son.**
      2. **Result: Amended MAC motion #36 accepted with no objection.**
  1. **MAC Motions #37**

**Move to add the following to 11ax SFD**

**Non-AP STAs support using the QoS Control field in QoS Data and QoS Null frames to report per- TID Buffer Status information**

* + 1. **Moved by: Alfred Asterjadhi, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #38**

**Move to add the following to 11ax SFD**

**An AP can poll STAs for buffer status reports using the frame carrying the trigger info.**

* + **The poll can request for specific buffer status information with TBD granularity.**
    1. **Moved by: Alfred Asterjadhi, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #39**

**Move to add the following to 11ax SFD**

**The spec shall define an HE variant (of the VHT variant) of the HT Control field that carries one or more control fields for HE control information**

* + **B0 and B1 of the HT Control field in this case are set to 1**
  + **The control fields can be called HE Control field**
    1. **Moved by: Alfred Asterjadhi, Seconded by: Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #40**
* **Move to modify sub-clause 4.1 of the TG Specification Framework as follows**
  + **An AP shall not allocate UL subchannel in any 20 MHz channel that is not occupied by the ~~Trigger frame~~ immediately preceding DL PPDU that contains trigger information. In each 20 MHz channel occupied by the ~~Trigger frame~~ immediately preceding DL PPDU that contains trigger information, there is at least one allocated subchannel for UL transmission.** 
    1. **Moved by: Yong Hoon Kwon, Seconded by: Reza Hedayat**
    2. **Result: Motion accepted with no objection.**
  1. **MAC Motions #41**

**Move to add to the TG SFD:**

* + - **A HE AP is allowed to broadcast a TBD parameter in the trigger frame to the STAs so that STAs can initiate the random access process after the trigger frames**
    1. **Moved by: Russell Huang, Seconded by: Ron Porat**
    2. **Discussion**
       1. **Clarification on the motion text is required.**
    3. **Result: Motion accepted with no objection..**
  1. **MU Motions #12**

**Move to add to the TG Specification Frame work document**

* + - **4.y.z. The amendment shall include a mechanism to multiplex acknowledgment frames in response to Multicast receptions under GCR BA operation.**
    1. **Discussion**
       1. Clarification on the motion text discussed.
    2. **Moved by: Kazuyuki Sakoda, Seconded by: Guido R. Hiertz.**
    3. **Result: Motion accepted with no objection.**
  1. **MU Motions #13**

**Move to add to the TG SFD:**

* **The spec shall define a MU-BAR frame to solicit BA/ACKs from multiple STAs in UL MU transmissions**
  + 1. **Moved by: Guoqing Li, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motions #14**

**Move to add to the SFD**

**4 Multi-user (MU) features**

**4.1 General**

**STA shall consider CCA status to respond to a Trigger frame under a non-null TBD set of conditions.**

* + 1. Discussion:
       1. Clarification is required for the text “consider CCA”
    2. **Moved by: Kiseon Ryu, Seconded by: Jinsoo Choi.**
    3. **Result: Motion accepted with no objection.**
  1. **MU Motion #15**

**Move to add to the TG Specification Frame work document**

* **x.y.z. A STA that is polled from a trigger frame for UL MU transmission considers the NAV in determining whether to respond unless one of the following conditions is met**
  + **the NAV was set by a frame originating from the AP sending the trigger frame**
  + **the response contains ACK/BA and the duration of the UL MU transmission is below a TBD threshold**
  + **Other condition TBD**
    1. **Moved by: Po-Kai Huang, Seconded by: Chittabrata Ghosh.**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motion #16**

**Move to add to the SFD:**

* **The spec shall allow multiple TIDs in a single PSDU between AP and a STA for DL/UL OFDMA/MU-MIMO**
* **Multiple TIDs aggregation rules are TBD if necessary**
  + 1. **Moved by: Jianhan Liu, Seconded by: Hongyuan Zhang**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motion #17**

***Move to add to the TG Specification Framework:***

* ***x.y.z.* :** 
  1. **The amendment shall define a mechanism to enable multiplexing of the Compressed Beamforming Action frame (CSI feedback) from multiple stations using UL MU(MIMO or OFDMA) mode**
     1. **Moved by: Narendar Madhavan, Seconded by: Ron Porat.**
     2. **Result: Motion accepted with no objection.**
  2. **MU Motion #18**

***Move to add to the TG Specification Framework:***

* ***x.y.z.* :** 
  1. **The amendment shall define a new channel sounding sequence that includes trigger information in order to facilitate UL MU mode of Compressed Beamforming Action frame from multiple STAs.**
     1. **Moved by: Narendar Madhavan, Seconded by: Masahito Mori**
     2. **Result: Motion accepted with no objection.**
  2. **MU Motion #19**

**Move to add to the TG SFD:**

* **The spec shall support fragmentation negotiation in A-MPDUs for HE STAs**
  + 1. **Moved by: Chittabrata Ghosh, Seconded by: Po-Kai Huang**
    2. **Discussion**
       1. **A member asked for a question of what is fragmentation negotiation.**
    3. **Result: Y/N/A = 49/4/31, motion passes.**
  1. **MU Motion #20**

**Move to include the DL sounding sequence illustrated in Slide 15 (of 802.11-15/1103r0) to the spec framework**

* + 1. **Moved by: Chittabrata Ghosh, Seconded by: Po-Kai Huang**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motion #21**

**Move to add to the spec framework**

***The spec shall indicate cascaded sequence of Trigger frames for random access by using a bit in the Trigger frame.***

* + 1. **Moved by: Chittabrata Ghosh, Seconded by: Po-Kai Huang**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motions #22**

**Move to add to the spec framework**

***The spec shall include a mechanism that allows the Beacon frame to indicate the target transmission time(s) of one or more Trigger frame(s) that allocates resources for random access.***

* + 1. **Moved by: Chittabrata Ghosh, Seconded by: Po-Kai Huang**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motion #23**

**Move to add the following to the SFD:**

* **The spec shall allow that the schedule information for OFDMA acknowledgement from STAs is contained in the MAC header of DL MPDU.**
  + 1. **Moved by: Lei Wang, Seconded by: Kiseon Ryu.**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motion #24**

**Move to add the following to the SFD**

* + - **The content of scheduling subfield for an UL OFDMA ACK/BA includes;**
      * **UL PPDU Length (9 bits) + RU Allocation (TBD).**
    1. **Moved by: Lei Wang, Seconded by: Kiseon Ryu.**
    2. **Result: Motion accepted with no objection.**
  1. **MU Motion #25**

**Move to add the following to the IEEE 802.11 TGax Specification Framework (sec 4.1)**

* + **The amendment shall define a mechanism to reduce the MIMO compressed beamforming feedback overhead** 
    1. **Moved by: Filippo Tosato, Seconded by: Ron Porat**
    2. Discussion
       1. A member asked for more information.
    3. **Result: Motion accepted with no objection.**
  1. **MU Motion #26**

**Move to add to the TG Specification Frame work document**

**Use a reserved bit in BA control field to indicate that the frame is multi-STA BA frame.**

* + 1. **Moved by: Yasu Inoue, Seconded by: Guido R. Hiertz**
    2. Discussion
       1. A member mentioned this information is self-contained.
    3. **Result: 18/13/50, motion fails.**
  1. **MU Motion #27**

**Move to include in the SFD the following random access procedure:**

* + **When an STA has a frame to send, it initializes it’s OBO (OFDMA Back-off) to a random value in the range 0 to CWO (OFDMA Contention window)**
  + **For an STA with non-zero OBO value, it decrements its OBO by 1 in every RU assigned to AID value TBD within the TF-R**
  + **For an STA, its OBO decrements by a value, unless OBO=0, equal to the number of RUs assigned to AID value TBD in a TF-R**
    - * **OBO for any STA can only be 0 once every TF-R**
  + **An STA with OBO decremented to 0 randomly selects any one of the assigned RUs for random access and transmits its frame**
    1. **Moved by: Chittabrata Ghosh, Seconded by: Po-Kai Huang.**
    2. **Result: Motion accepted with no objection.**
  1. **SR Motion #1**

**Move to add to the TG Specification Frame work document**

* + **5.1 Features for operation in dense environments [802.11ax SFD]**

**A STA should regard an Inter-BSS PPDU with a valid PHY header and that has a receive power/RSSI below the OBSS PD level used by the receiving STA and that meets additional TBD conditions, as not having been received at all (e.g., should not update its NAV), except that the medium condition shall indicate BUSY during the period of time that is taken by the receiving STA to validate that the PPDU is from an Inter-BSS, but not longer than the time indicated as the length of the PPDU payload**

* + - **The OBSS PD level is greater than the minimum receive sensitivity level**
    1. **Moved by: Luo Jun , Seconded by: Ron Porat**
    2. **Result: Motion accepted with no objection.**
  1. **SR Motion #2**

**Move to add to Section 5.1 of the SFD:**

* + **“The amendment shall include one or more mechanisms to improve spatial reuse by allowing adjustments to one or more of the CCA-ED, 802.11 Signal Detect CCA, OBSS\_PD or TXPWR threshold values. The constraints on selecting threshold values are TBD.”**
    1. **Moved by: Filip Mestanov , Seconded by: Guido R. Hiertz.**
    2. **Result: Y/N/A = 35/5/36, motion passes.**
  1. **SR Motion #3**

**Move to add to 11ax SFD:**

**The specification to consider a procedure that may revise the NAV depending on TBD conditions at the recipient of the ongoing OBSS frame.**

* + 1. **Moved by: Reza Hedayat, Seconded by: Ron Porat.**
    2. **Result: Motion accepted with no objection.**
  1. **SR Motion #4**

**Move to add the following text into 11ax SFD**

* **An 11ax STA regards a valid OBSS PPDU *as not having been received at all (e.g., should not update its NAV), except that the medium condition shall indicate BUSY during the period of time that is taken by the receiving STA to validate that the PPDU is from an Inter-BSS, but not longer than the time indicated as the length of the PPDU payload* if the RXPWR of the received PPDU is below the OBSS\_PD threshold and TBD conditions are met, noting that the OBSS\_PD threshold is accompanied by a TXPWR value and a reduction in the TXPWR may be accompanied by an TBD increase in the OBSS\_PD threshold value.** 
  + 1. **Moved by: Tianyu Wu , Seconded by: Ron Porat**
    2. **Result: Motion accepted with no objection.**

1. TG Document Motions
   1. Due to time constraint, the chair suggested each author of the document to contact
2. Goals for November 2015
   1. Continue to advance the TG documents based on submissions.
      1. Expectation is more submissions affecting the TG specification framework document will be considered.
   2. Technical Presentations
3. Teleconference scheduling
   1. Continue to advance the TG documents based submissions.
      1. Expectation is more submissions affecting the TG specification framework document will be considered.
   2. Technical Presentations
4. Teleconference Planning
   * 1. .Thursday, October 15th, 10:00 – 12:00 ET.
5. AOB

Chair thanks to all members and ad hoc chairs for their hard work during this week.

1. Adjournment
   1. TGax adjourned for the week @ 15:29.