IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IEEE 802.11 Task Group AY  July 2016 San Diego Meeting Minutes | | | | |
| Date: 2016-07-28 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| JeorgeHurtarte | Teradyne | 500 Riverpark Drive,  North Reading, MA 01864 | +1-978-370-2224 | jeorge.hurtarte@teradyne.com |
| Edward Au | Huawei | 303 Terry Fox Drive, Suite 400, Ottawa, ON K2K 3J1 |  | edward.ks.au@huawei.com |

Abstract

Task Group AY meeting minutes from the IEEE 802.11 San Diego session, July 24-29, 2016.

**IEEE 802.11 Task Group AY**

**July 2016 San Diego Meeting**

**July 24-29, 2016**

**Monday, July 25, 2016, PM2 Session (16:00-18:00)**

1. The IEEE 802.11ay task group meeting was called to order at 16:00by the Chair, Edward Au (Huawei).
2. Chair introduced himself and secretary, Jeorge Hurtarte (Teradyne).
3. Agenda Doc. IEEE 802.11-16/0763r1
4. Chair reviewed the IEEE-SA patent policy, logistics, and reminders on Task Group rules, including meeting guidelines and attendance recording procedures.
   1. Chair asked if anyone has any questions about the IEEE-SA patent policy, logistics or reminders. No questions.
   2. Chair asked if anybody has any disclosures related to the patent policy. None.
   3. Chair asked if there were any questions on any of the above items. None.
   4. Chair reminded all to record their attendance.
   5. Chair reminded all to upload their presentations.
5. Chair introduced the leadership of the Task Group (slide 11)
6. Chair reviewed the meeting time slots, locations and agenda items for the week (see slides 12-13of the agenda document).
7. Chair proceeded to discuss the agenda items for the Monday July 25, 2016 PM2 session.
8. Chair reviewed the progress of the Task Group AY and related documents (slide 16-17)
9. Motion #66: Motion to approve the May 2016 interim meeting minutes
   1. Move: Edward Au (Huawei)
   2. Second: Kerstin Johnsson (Intel)
   3. No objections noted. Unanimous consent.
   4. The May 2016 Waikoloa minutes were approved.
10. Chair reviewed the timeline of the Task Group (slide 18).
11. Chair reviewed the list of presentations submitted (slides 20-23) and schedule for presenting those during the week.
    1. Chair asked if there were any additional presentations submissions or changes to the agenda items. None.
12. Chair reviewed the agenda setting for the week (slide 24)
13. Chair reviewed the selection procedure for contributions (slide 25).
14. Presentations
    1. Presentation by Weimin Xing (ZTE Corp.), Signaling in Control Mode PPDUs for 11ay, Doc. IEEE 11-16/0814r1. Key points reviewed:
       1. The issue of control trailer signaling and EDMG control mode signaling is discussed, and several solutions for this issue are shown in these slides.
          1. Option 1: separate signaling bit for control trailer and EDMG control mode
          2. Option 2: different b22~b23 values for control trailer signaling and EDMG control mode signaling
          3. Option3: using other bits in L-Header or MAC header
       2. Option 2 is recommended, since it’s simple and left a reserve value for the future.
       3. Opened the floor for discussion.
    2. Presentation by Shunsuke Fujio (Fujitsu Laboratories Ltd.), DL MU-MIMO Hybrid BF and CSI Feedback for 11ay, Doc. IEEE 11-16/0858r1. Key points reviewed:
       1. CSI feedback overhead in DL MU-MIMO operation evaluated.
       2. A new interleaved hybrid BF method for MU-MIMO proposed.
       3. Opened the floor for discussion.
       4. Straw Poll #1.Do you agree to insert the following text into the SFD “11ay supports MU-MIMO BF with or without CSI feedback.”
          1. Yes: 4
          2. No: 0
          3. Abstain: Most
          4. Straw poll is passed
    3. Presentation by Yan Xin (Huawei), Non uniform constellation of HOM for SC in 11ay, Doc. IEEE 11-16/0955r0. Key points reviewed:
       1. Simulation shows that the non-uniform constellations (NUCs) proposed in this presentation and the NUCs proposed in [3]-[6] can significantly improve the error rate performance of the uniform (squared) QAM constellations (up to 1.6 dB) and DVB S2X constellations (up to 1.5 dB).
       2. The performance of the NUCs proposed in this presentation are also compared with the NUCs in [3]-[6]. In most cases (different code rates and impairment setups), the NUCs proposed in this presentation result in better performance than the NUCs [3]-[6].
       3. NUCs should be considered to be used in 11ay especially for relatively higher order modulation, such as 64-point modulation, which may be significantly impacted by phase noise.
       4. Opened the floor for discussion.
       5. Straw Poll #1.Do you agree to insert “A 64-point non-uniform constellation shall be included in the 11ay specification” in 11ay SFD?”
          1. Yes: 35
          2. No: 2
          3. Abstain: 13
          4. Straw poll is passed.
    4. Presentation by Jinjing Jiang (Marvell), Multi-TID Aggregation for 11ay, Doc. IEEE 11-16/0932r0. Key points reviewed:
       1. Multi-TID Aggregation
          1. There could be multiple flows among a pair of STAs, which have different QoS requirement
       2. Enable Aggregation of unicast Management Frame and single Data MPDU soliciting ACK
          1. It is not efficient in terms of link utilization to insert {single frame + ACK} exchanges in between high rate data frame exchange
          2. Management frame that asks for ACK is not allowed in AMPDU
          3. Single data MPDU from other TIDs
       3. Opened the floor for discussion.
       4. Straw Poll #1.Do you agree to add to 11ay Specification: “the extended Multi-TID BA variant for EDMG STAs is signaled by setting B1B2B3B4 == 1110 of the BA Control subfield”?
          1. Yes: 29
          2. No: 0
          3. Abstain: 15
          4. Straw poll is passed.
       5. Straw Poll #2. Do you agree to add to 11ay Specification: the extended Multi-TID BA variant for EDMG STAs has the format as shown in slide 9 of the presentation?
          1. Yes: 22
          2. No: 0
          3. Abstain: 19
          4. Straw poll is passed.
    5. Presentation by Shigenobu Sasaki (Niigata Univ.), Proposed Structure of Informative Annex for the IEEE 802.11ay Channel Model Document, Doc. IEEE 11-16/0549r1. Key points reviewed:
       1. This contribution contains the proposed structure of Informative Annex for the IEEE 802.11ay channel model document.
       2. Experimental setups and results under various environments will be accommodated based on the future contributions submitted by different parties or contributors
       3. Opened the floor for discussion.
    6. Presentation by Shigenobu Sasaki (Niigata Univ.), Proposed Text for Informative Annex in the IEEE 802.11ay Channel Model Document, Doc. IEEE 11-16/0976r0. Key points reviewed:
       1. This contribution contains the proposed text on measurement results and simulations related to an outdoor open area access scenario, which will be included to the proposed Informative Annex for the IEEE 802.11ay Channel model document [3].
       2. Main text of this contribution is based on the authors’ previous contribution [5].
       3. Opened the floor for discussion.
15. Meeting recessed at 17:29 and will resume on Tuesday AM1.

**Tuesday, July 16, 2016, AM1 Session (08:00-10:00)**

1. The meeting was called to order at 08:01by the Chair, Edward Au (Huawei).
2. Agenda Doc.IEEE 802.11-16/0763r3
3. Chair reviewed the IEEE-SA patent policy, logistics, email reflector logistics, and reminders on Task Group rules.
   1. Chair asked if anybody has any disclosures related to the patent policy.
   2. Chair asked if anyone has any questions about the IEEE-SA patent policy, logistics or reminders. No questions.
   3. Chair reminded all to record their attendance.
4. Presentations
   1. Presentation by Nada Golmie (NIST), Multipath Component Tracking and Channel Model for Lecture Room, Doc. IEEE 11-16/0846r0. Key points reviewed:
      1. This document presents results from tracking measured MultiPath Components (MPCs) in a lecture room, the resultant Quasi-deterministic (Q-D) channel model at 83 GHz, and preliminary measurements at 60 GHz.
      2. Opened the floor for discussion.
   2. Presentation by Robert Müller (Technische Universität Ilmenau), Analysis of cluster effects under using pencil beam antennas on metal & class structures, Doc. IEEE 11-16/0956r0. Key points reviewed:
      1. Power of the reflections highly depends on the incident angles
      2. Specular-like reflections are the strongest
      3. Wall and entrance door have different scattering properties. The wall is more regular than the entrance door
      4. For modeling, if we talk about pencil beams, we need to have a precise information of the scatterer in order to describe the reflections, since a small change in the incident and reflected angles leads to high losses
      5. Spatial consistency is very important, more deterministic approaches
      6. For beam-forming, with pencil beams an update is necessary more often (in location). Wider beams reduce the received power but also need to update the beam-former coefficients more often
      7. Opened the floor for discussion.
   3. Presentation by Rui Yang (InterDigital), EDMG-CEF Design for Control and SC PHY in MIMO Modes, Doc. IEEE 11-16/0912r0. Key points reviewed:
      1. In this contribution two EDMG-CEF design options for control and single carrier PHY to support 11ay SU and MU MIMO are proposed.
      2. Opened the floor for discussion.
      3. Straw Poll #1. Do you agree that the SFD will include the following:
         1. EDMG-CEF shall be built based on a Golay complementary pair, e.g., (Ga\_128, Gb\_128 ) defined in 11ad
         2. Yes: 6
         3. No: 0
         4. Abstain: Majority
         5. Straw poll is passed
      4. Straw Poll #2. Do you agree that the SFD will include the following:
         1. The basic building block of EDMG-CEF shall include a combination of the sequences in the L-CEF, i.e., Gu\_512,Gv\_512, with the circulant property.
            1. Yes: 3
            2. No: 0
            3. Abstain: Majority
            4. Straw poll is passed
      5. Straw Poll #3. Do you agree that the SFD will include the following:
         1. The basic building block of EDMG-CEF may be extended or reduced.
            1. Yes: 3
            2. No: 0
            3. Abstain: Majority
            4. Straw poll is passed
      6. Straw Poll #4. Do you agree that the SFD will include the following:
         1. The basic building block shall be modulated using rotated BPSK, e.g., pi/2-BPSK as L-CEF.
            1. Yes: 14
            2. No: 0
            3. Abstain: 21
            4. Straw poll is passed.
   4. Presentation by Artyom Lomayev (Intel), Non-EDMG Part of Preamble for MIMO in 11ay, Doc. IEEE 11-16/0988r1. Key points reviewed:
      * + 1. This presentation proposes a definition of the non-EDMG portion of the preamble for MIMO in 11ay.
          2. Two options for the non-EDMG preamble were considered. It was shown that the option with the cyclic shift has an advantage in terms of SNR required to achieve a reliable header reception.
      1. Opened the floor for discussion.
      2. Straw Poll #1. Would you agree to insert the following in section 7 of the SFD?:
         1. ”For SC MIMO transmissions, the 11ay specification shall support a preamble structure with cyclic shift. A cyclic shift TiSC value is used for the L-STF, L-CEF, L-Header and EDMG-Header-A fields of the PPDU for stream i out of a total of N streams, where 1 ≤ i ≤ N. TiSC is defined in SC chip units at 1.76 GHz for single channel or multiple channels transmission. TiSC shall be inserted after EDMG-Header-A. The particular value for each configuration is TBD”
            1. Yes: 37
            2. No: 0
            3. Abstain: 18
            4. Straw poll is passed.
   5. Presentation by Assaf Kasher (Qualcomm), Control Trailer Clarification, Doc. IEEE 11-16/1009r0. Key points reviewed:
      1. This presentation clarifies details about the control trailer modulation and encoding
      2. Opened the floor for discussion.
      3. Straw Poll #1.Do you agree to replace the text in 3.1.1 with the following text?:
         1. “A Control Trailer may be used in Control mode PPDUs in place of TRN-Units to carry control data. The control trailer is an LDPC codeword with 18 data octets and 168 parity bits, added after the data part of a control PHY packet, using and continuing the control PHY modulation and encoding. If a control trailer is added to a packet, the value of the Training Length field in the L-Header shall be greater than or equal to 2. If the value in the Training Length field in the L-Header is greater than 2, AGC subfields and CE and TRN subfields will be appended after the control trailer.”
            1. Yes: 24
            2. No: 0
            3. Abstain: 18
            4. Straw poll is passed.
5. Meeting recessed at 09:34 and will resume on ThursdayAM1.

**Thursday, July 28, 2016, AM1 Session (08:00-10:00)**

21. The meeting was called to order at 08:00 by the Chair, Edward Au (Huawei).

1. Agenda Doc. IEEE 802.11-16/0763r5
2. Chair reminded all about the IEEE-SA patent policy, logistics, and reminders on Task Group rules.
   1. Chair asked if anybody has any disclosures related to the patent policy. None.
   2. Chair reminded all to record their attendance.
3. Presentations
   1. Presentation by Li-Hsiang Sun (InterDigital), Link Level Performance Comparisons of Open Loop, Closed Loop and Antenna Selection for SU-MIMO, Doc. IEEE 11-16/0911r1. Key points reviewed:
      * + TGay has agreed that 11ay will support SU-MIMO [1]
        + In [2], we have shown 11ay system throughput benefits from CL SU-MIMO, using theoretical achievable sum rate.
        + Still further studies are required to see whether benefits exist for SU-MIMO with equal MCS among spatial streams with single CRC.
        + In this contribution, we performed SU-MIMO link level simulations based on 11ay channel model for analog beamforming, and baseband open loop, closed loop, antenna selections precoding as a follow-up study.
        + We demonstrated that CL SU-MIMO achieves up to 20 dB performance gain compared to OL SU-MIMO, particularly for the case Ntx > Nss
        + Antenna selection provides better performance for SU-MIMO than OL while requiring significantly less feedback than CL
        + Floor opened for discussion
   2. Presentation by Yutaka Murakami (Panasonic),Open Loop Spatial Multiplexing with Phase Hopping for 11ay, Doc. IEEE 11-16/0959r0. Key points reviewed
      * + Several MIMO scenarios for 11ay have been proposed [1], and the contribution of [2] proposed open loop spatial multiplexing (OLSM) + PH(Phase Hopping) as OLSM and showed PER(Packet Error Rate) performance.
        + This presentation shows new simulation results in OLSM + PH with precoding and discusses benefit of precoding.
        + Precoding + PH has advantage at unequal power case, compared with no precoding with PH. Therefore, introducing precoding is worthy.
        + Floor opened for discussion
        + Straw Poll #1.Do you agree to modify the following in clause 6.1 of the SFD?: “For EDMG OFDM mode, the 11ay specification shall define SU EDMG PPDU transmission with and without phase hopping. An EDMG STA may support transmission and reception of SU EDMG PPDU with phase hopping. In this mechanism, the following apply:

- Precoding may be used

-The period of phase hopping is TBD.”

* + - * 1. Yes: 26
        2. No: 0
        3. Abstain: 22
        4. Straw poll passes.
  1. Presentation by Sang G. Kim (LG Electronics), On Random Access in A-BFT, Doc. IEEE 11-16/0948r0. Key points discussed:
     + - Accommodating many 11ad and 11ay STAs while maintaining existing 11ad designs
       - There is a bottleneck due to limited resources for access attempts that is inherent in existing 11ad A-BFT designs
       - In this contribution, we proposed efficient ways of handling the situation while maintaining existing 11ad designs and less impacts to 11ay designs
       - Opened floor for discussion
       - Straw Poll #1. Do you agree to add the following text into SFD?: “11ay shall support dynamic load balancing in A-BFT by providing means to adjust necessary parameters (e.g. RSSBackoff or/and RSSRetryLimit).”
         1. Yes: 35
         2. No: 0
         3. Abstain: 10
         4. Straw poll is passed.
  2. Presentation by Laurent Cariou (Intel), Bandwidth signaling for EDMG, Doc. IEEE 11-16/0954r0. Key points discussed:
     + - Part 1:Define channelization and BW/primary channel indication in EDMG header A
       - Part 2:Define how to signal BW in RTS/CTS for channel bonding operation
       - Opened floor for discussion
       - Straw Poll #1. Do you agree to change channelization section 6.2.4 of the SFD to include overlapping channels, with the following figure (see slide 17) and with the changes proposed in slide 4 and 6.
         1. Yes: 41
         2. No: 0
         3. Abstain: 5
         4. Straw poll is passed.
       - Straw Poll #2. Do you agree to add to the SFD:
         1. 1 bit “channel aggregation” field is added in EDMG-Header-A for SU and MU PPDU

Set to zero for channel bonding or single 2.16GHz channel

Set to one for channel aggregation

* + - * 1. The “BW” field is 8 bits long:

Bit 1-8 corresponds to channel 1-8

For each channel, the corresponding bit is set to 1 if used and to 0 if not used

* + - * 1. The spec shall only allow the following combinations for channel aggregation:

2.16GHz + 2.16GHz

4.32GHz + 4.32GHz

* + - * 1. The “Primary Channel” field is 3 bits long and contains the 3 LSBs of (channel number-1) corresponding to the primary channel of the BSS.
        2. The format of the BW and Primary Channel fields are the same for inclusion in the EDMG-Header-A field and in the control trailer.
        3. Yes: 36
        4. No: 0
        5. Abstain: 15
        6. Straw poll is passed.
      * Straw Poll #3. Do you agree to add to the SFD the following and update section 6.2.3.2.2:
        1. When reserved bits 22-23 are set to 1 in the PHY header of a Control mode PPDU, the Scrambler Initialization field shall be formatted as follows [X means that the value for this bit is reserved]:

[0 0 X X]: indicates the presence of a control trailer (see 3.1.1)

[0 1 X X]:indicates the presence of an EDMG-Header A.

[1 B1 B2 B3]: in case of RTS/CTS, B1-B3 are used for bandwidth signaling. For other frames, B1-B3 are reserved."

Yes: 33

No: 0

Abstain: 12

Straw poll is passed.

* 1. Presentation by Assaf Kasher (Qualcomm), EDMG Header Encoding and Modulation, Doc. IEEE 11-16/1011r1. Key points discussed:
     + - In this presentation we presented the design of EDMG Header-A encoding and modulation
       - Suggested designs benefits
       - Supports 112 payload bits + 16 CRC bits
       - Full reuse of L-Header LDPC encoder and decoder
       - Full reuse of L-Header modulation and demapping   
         (except the duplication used for L-Header)
       - Performance results for EDMG Header-A show expected performance (3dB less than L-Header), with about 3dB margin relative to MCS1
       - Straw Poll #1. Do you agree to insert in the SFD?: “in SC and OFDM modulations, EDMG-Header-A is two DMG SC symbols long comprising of 112 data bits followed by a 16 bit CRC. The EDMG-Header-A is transmitted as follows:

- The CRC is the same CRC as that of the header of the DMG SC mode

- First 64 bits and second 64 bits are each encoded and modulated as specified in steps 1-5 in section 20.6.3.1.4 (Header encoding and modulation). Restricting to steps 1-5 means that the symbol is not duplicated to the second symbol as in DMG.

- GI is added after each SC block (same as for DMG SC mode)

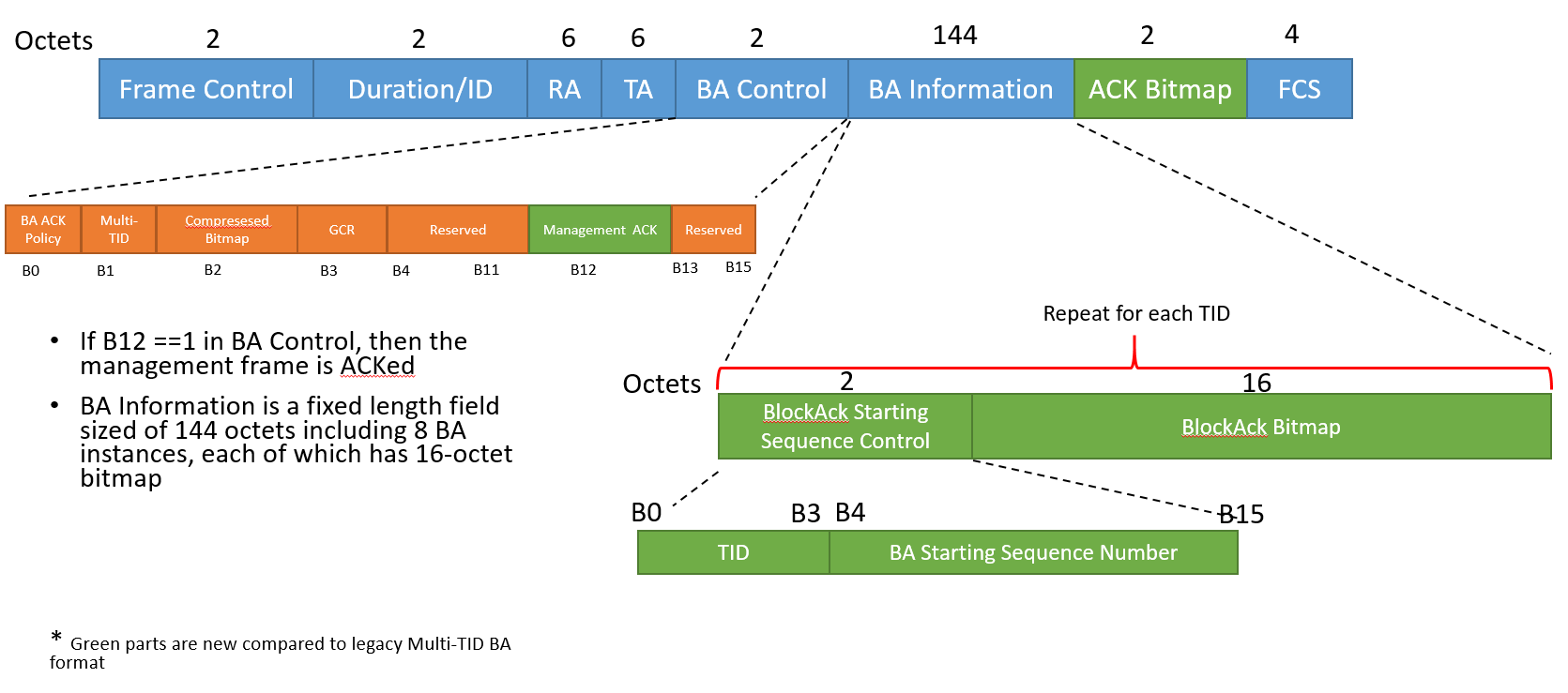
Processing is illustrated in Slide 7

* + - * 1. Yes: 21
        2. No: 0
        3. Abstain: 19
        4. Straw poll is passed.

1. Meeting recessed at 09:50 and will resume on Thursday PM1.

**Thursday, July, 2016, PM2 Session (13:30-15:30)**

1. The meeting was called to order at 13:34by the Chair, Edward Au (Huawei).
2. Agenda Doc. IEEE 802.11-16/0763r6
3. Chair reminded all about the IEEE-SA patent policy, logistics, and reminders on Task Group rules.
   1. Chair asked if anybody has any additional presentations for the meeting. None.
   2. Chair reminded all to record their attendance.
4. Presentations
   1. Presentation by Artyom Lomayev (Intel), EDMG Header-B Encoding and Modulation Method for SC PHY in 11ay, Doc. IEEE 11-16/0989r0. Key points discussed:
      * + This presentation defines the EDMG Header-B encoding and modulation for SC PHY MU-MIMO transmission.
        + The proposed method is based on the encoding and modulation defined for the legacy SC PHY in 11ad standard.
        + Opened floor for discussion
        + Straw Poll #1. Do you agree to insert the following into the SFD: “The 11ay specification shall define first 7 bits of EDMG-Header-B for scrambler seed value and define the total number of bits to 64 as in the legacy 11ad header.”?
          1. Yes: 30
          2. No: 0
          3. Abstain: 21
          4. Straw poll is passed.
        + Straw Poll #2. Do you agree to insert the following into the SFD: “The 11ay specification shall define encoding and modulation method for EDMG-Header-B as described in the 11-16-0989-00-00ay.”?
          1. Yes: 22
          2. No: 0
          3. Abstain:18
          4. Straw poll is passed.
   2. Presentation by Artyom Lomayev (Intel), EDMG STF and CEF Design for SC PHY in 11ay, Doc. IEEE 11-16/0994r1. Key points discussed:
      * + This presentation proposes EDMG-STF and CEF fields design of EDMG portion of preamble for SC PHY defined in the SFD, [1].
        + First, the general structure of the EDMG-STF and CEF fields utilizing the Golay complementary sequences is proposed and then exact definition of the Golay sequences is provided.
        + The EDMG-STF and CEF fields are defined for SISO and MIMO transmission and channel bonding of 2 and 4 channels.
        + Opened floor for discussion
        + Straw Poll #1. Do you agree to add the following to the SFD document?: “An EDMG STA shall use for SC PHY the Golay sequences and STF and CEF fields definition for SISO, MIMO and channel bonding CB = 1, 2, 4 as defined on slides #6, #18, and #24 in the 11-16-0994-01-00ay.”
          1. Yes: 31
          2. No: 0
          3. Abstain: 11
          4. Straw poll is passed.
   3. Presentation by Alexander Maltsev (Intel), Channel models for IEEE 802.11ay, Doc. IEEE 11-15/01150r5.
      * + Alexander encourages members to review the document and provides him feedback.
        + Opened floor for discussion
   4. Presentation by Laurent Cariou (Intel), Preliminary design of EDMG PHY headers, Doc. IEEE 11-16/1046r0.
      * + Opened floor for discussion
        + Straw Poll #1. Do you agree to add to the SFD the following fields in the EDMG-header A of an EDMG SU PPDU: SU/MU field (1 bit), BW (TBD), primary channel (TBD bits), MCS (TBD), GI/CP length field (2 bits), PSDU length field (22 bits), Beamformed field (1 bit), Short/Long LDPC (1 bit), number of SS (TBD)?
          1. Yes: 21
          2. No: 0
          3. Abstain:19
          4. Straw poll is passed.
        + Straw Poll #2. Do you agree to add to the SFD the following fields in the EDMG-header A of an EDMG MU PPDU: SU/MU (1 bit), BW (TBD), primary channel (TBD bits), AID for each destination STA (8 bits AID field, 8 destination STAs), GI/CP length field (2 bits), Beamformed field (1 bit), Short/Long LDPC (1 bit)?
          1. Yes: 22
          2. No: 0
          3. Abstain: 17
          4. Straw poll is passed.
        + Straw Poll #3. Do you agree to add to the SFD the following fields in the EDMG-header B for an EDMG MU PPDU: PSDU length field (22 bits), MCS (TBD)?
          1. Yes: 22
          2. No: 0
          3. Abstain: 17
          4. Straw poll is passed.
5. Motion #67:
   1. Move to adopt document 15/0866r4 as the baseline document for the Evaluation Methodology Document: <https://mentor.ieee.org/802.11/dcn/15/11-15-0866-04-00ay-11ay-evaluation-methodology.doc>
   2. Move: Kerstin Johnsson (Intel)
   3. Second: Rob Sun (Huawei)
   4. Result: The motion is passed (31 Yes; 0 No; 1 Abstain)
6. Motion #68:
   1. Do you agree to insert “A 64-point non-uniform constellation shall be included in the 11ay specification” in 11ay SFD?
   2. Move: Yan Xin (Huawei)
   3. Second: Thomas Handte (Sony)
   4. Result: The motion is passed (38 Yes; 1 No; 4 Abstain)
7. Motion #69:
   1. Do you agree to add to the SFD “the extended Multi-TID BA variant for EDMG STAs is signaled by setting B1B2B3B4 == 1110 of the BA Control subfield”?
   2. Move: Jinjing Jiang (Marvell)
   3. Second: Ping Fang (Huawei)
   4. Result: Passed with unanimous consent
8. Motion #70:
   1. Do you agree to add to the SFD “the extended Multi-TID BA variant for EDMG STAs has the format as shown below”?
   2. Move: Jinjing Jiang (Marvell)
   3. Second: Carlos Cordeiro (Intel)
   4. Result: Passed with unanimous consent



1. Motion #71:
   1. Do you agree to add to the SFD “EDMG-CEF for SC PHY shall be built based on the Golay complementary pair, e.g., (Ga128, Gb128), defined in 11ad for single 2.16 GHz channel transmission.”?
   2. Move: Rui Yang (InterDigital)
   3. Second: Xiaofei Wang (InterDigital)
   4. Result: Passed with unanimous consent
2. Motion #72:
   1. Do you agree to add to the SFD “EDMG-CEF for SC PHY shall be modulated using rotated BPSK, e.g., pi/2-BPSK as L-CEF.”?
   2. Move: Rui Yang (InterDigital)
   3. Second: Xiaofei Wang (InterDigital)
   4. Result: The motion is failed (10 Yes; 5 No; 19 Abstain)
3. Motion #73:
   1. Would you agree to insert the following in section 7 of the SFD: “For SC MIMO transmissions, the 11ay specification shall support a preamble structure with cyclic shift. A cyclic shift TiSC value is used for the L-STF, L-CEF, L-Header and EDMG-Header-A fields of the PPDU for stream i out of a total of N streams, where 1 ≤ i ≤ N. TiSC is defined in SC chip units at 1.76 GHz for single channel or multiple channels transmission. TiSC shall be inserted after EDMG-Header-A. The particular value for each configuration is TBD.”?
   2. Move: Artyom Lomayev (Intel)
   3. Second: Dmitry Cherniavsky (SiBEAM)
   4. Result: Passed with unanimous consent
4. Motion #74:
   1. Do you agree to replace the text in 3.1.1 of the SFD with the following text: “A Control Trailer may be used in Control mode PPDUs in place of TRN-Units to carry control data. The control trailer is an LDPC codeword with 18 data octets and 168 parity bits, added after the data part of a control PHY packet, using and continuing the control PHY modulation and encoding. If a control trailer is added to a packet, the value of the Training Length field in the L-Header shall be greater than or equal to 2. If the value in the Training Length field in the L-Header is greater than 2, AGC subfields and CE and TRN subfields will be appended after the control trailer.”?
   2. Move: Edward Au (Huawei)
   3. Second: Carlos Cordeiro (Intel)
   4. Result: Passed with unanimous consent
5. Motion #75:
   1. Do you agree to modify the following in clause 6.1 of the SFD: “For EDMG OFDM mode, the 11ay specification shall define SU EDMG PPDU transmission with and without phase hopping. An EDMG STA may support transmission and reception of SU EDMG PPDU with phase hopping. In this mechanism, the following apply:

- Precoding may be used

- The period of phase hopping is TBD.”

* 1. Move: Yutaka Murakami (Panasonic)
  2. Second: Dmitry Cherniavsky (SiBEAM)
  3. Result: Passed with unanimous consent

1. Motion #76:
   1. Do you agree to add the following text into SFD: “11ay shall support dynamic load balancing in A-BFT by providing means to adjust necessary parameters (e.g. RSSBackoff or/and RSSRetryLimit).”?
   2. Move: Sang Kim (LG Electronics)
   3. Second: Kerstin Johnsson (Intel)
   4. Result: Passed with unanimous consent
2. Motion #77:
   1. Do you agree to change channelization in section 6.2.4 of the SFD to include overlapping channels, with the following figure and with the changes proposed in slides 4 and 8 of 16/0954r0.
   2. Move: Edward Au (Huawei)
   3. Second: Kerstin Johnsson (Intel)
   4. Result: Passed with unanimous consent



1. Motion #78:
   1. Do you agree to add to the SFD:
   * 1 bit “channel aggregation” field is added in EDMG-Header-A for SU and MU PPDU
     + Set to zero for channel bonding or single 2.16GHz channel. Set to one for channel aggregation
   * the “BW” field is 8 bits long:
     + Bit 1-8 corresponds to channel 1-8
     + For each channel, the corresponding bit is set to 1 if used and to 0 if not used
   * The spec shall only allow the following combinations for channel aggregation:
     + 2.16GHz + 2.16GHz
     + 4.32GHz + 4.32GHz
   * the “Primary Channel” field is 3 bits long and contains the 3 LSBs of (channel number-1) corresponding to the primary channel of the BSS.
   * the format of the BW and Primary Channel fields are the same for inclusion in the EDMG-Header-A field and in the control trailer.
   1. Move: Edward Au (Huawei)
   2. Second: Yan Xin (Huawei)
   3. Result: Passed with unanimous consent
2. Motion #79:
   1. Do you agree to add to the SFD the following and update section 6.2.3.2.2:
      * When reserved bits 22-23 are set to 1 in the PHY header of a Control mode PPDU, the Scrambler Initialization field shall be formatted as follows [X means that the value for this bit is reserved]:
        + [0 0 X X]: indicates the presence of a control trailer (see 3.1.1)
        + [0 1 X X]: indicates the presence of an EDMG-Header A.
        + [1 B1 B2 B3]: in case of RTS/CTS, B1-B3 are used for bandwidth signaling. For other frames, B1-B3 are reserved."
   2. Move: Edward Au (Huawei)
   3. Second: Carlos Cordeiro (Intel)
   4. Result: The motion is passed (18 Yes; 0 No; 13 Abstain)
3. Motion #80:
   1. Do you agree to add the following text into SFD: “in SC and OFDM modulations EDMG-Header-A is two DMG SC symbols long comprising of 112 data bits followed by a 16 bit CRC. The EDMG-Header-A is transmitted as follows:
      * The CRC is the same CRC as that of the header of the DMG SC mode
      * First 64 bits and second 64 bits are each encoded and modulated as specified in steps 1-5 in section 20.6.3.1.4 (Header encoding and modulation). Restricting to steps 1-5 means that the symbol is not duplicated to the second symbol as in DMG.
      * GI is added after each SC block (same as for DMG SC mode)

Processing is illustrated in Slide 7 of 16/1011r1.”?

* 1. Move: Edward Au (Huawei)
  2. Second: Carlos Cordeiro (Intel)
  3. Result: Passed with unanimous consent

1. Motion #81:
   1. Do you agree to insert the following into the SFD: “The 11ay specification shall define first 7 bits of EDMG-Header-B for scrambler seed value and define the total number of bits to 64 as in the legacy 11ad header.”?
   2. Move: Artyom Lomayev (Intel)
   3. Second: Dmitry Cherniavsky (SiBEAM)
   4. Result: Passed with unanimous consent
2. Motion #82:
   1. Do you agree to insert the following into the SFD: “The 11ay specification shall define encoding and modulation method for EDMG-Header-B as described in the 11-16-0989-00-00ay.”?
   2. Move: Artyom Lomayev (Intel)
   3. Second: Majid Ghanbarinejad (Huawei)
   4. Result: The motion is passed (16 Yes; 0 No; 14 Abstain)
3. Motion #83:
   1. Do you agree to insert the following into the SFD: “An EDMG STA shall use for SC PHY the Golay sequences and STF and CEF fields definition for SISO, MIMO and channel bonding CB = 1, 2, 4 as defined in slides #6, #18, and #24 in the 11-16-0994-01-00ay. EDMG STF and CEF are modulated using pi/2-BPSK.”?
   2. Move: Artyom Lomayev (Intel)
   3. Second: Dmitry Cherniavsky (SiBEAM)
   4. Result: Passed with unanimous consent
4. Motion #84:
   1. Do you agree to add to the SFD the following fields in the EDMG-header A of an EDMG SU PPDU: SU/MU field (1 bit), BW (TBD), primary channel (TBD bits), MCS (TBD), GI/CP length field (2 bits), PSDU length field (22 bits), Beamformed field (1 bit), Short/Long LDPC (1 bit), number of SS (TBD)?
   2. Move: Laurent Cariou (Intel)
   3. Second: Carlos Cordeiro (Intel)
   4. Result: Passed with unanimous consent
5. Motion #85:
   1. Do you agree to add to the SFD the following fields in the EDMG-header A of an EDMG MU PPDU: SU/MU (1 bit), BW (TBD), primary channel (TBD bits), AID for each destination STA (8 bits AID field, 8 destination STAs), GI/CP length field (2 bits), Beamformed field (1 bit), Short/Long LDPC (1 bit)?
   2. Move: Laurent Cariou (Intel)
   3. Second: Carlos Cordeiro (Intel)
   4. Result: Passed with unanimous consent
6. Motion #86:
   1. Do you agree to add to the SFD the following fields in the EDMG-header B for an EDMG MU PPDU: PSDU length field (22 bits), MCS (TBD)?
   2. Move: Laurent Cariou (Intel)
   3. Second: Carlos Cordeiro (Intel)
   4. Result: Passed with unanimous consent
7. Chair reviewed the goals for the September 2016 wireless interim meeting, including the vice chair election that will be conducted in the first session of the interim meeting.
8. Chair reviewed the teleconference schedule (10:00 am ET – 11:00am ET, August 24, 2016). No objection.
9. The Task Group AY San Diego meeting was adjourned on July 28, 2016 at 15:45**.**