IEEE 802.18

Radio Regulatory-TAG

|  |  |  |  |
| --- | --- | --- | --- |
| Radio Regulatory Technical Advisory Group Minutes | | | |
| Date: 16-23sep21 | | | |
| Name | Affiliation | Address | Email |
|  |  |  |  |
| Author and Officer presiding: | | | |
| Jay Holcomb,  Chair, RR-TAG | Itron | Liberty Lake, (Spokane) WA | jholcomb@ieee.org |

Co-Vice-chairs are [Stuart Kerry (OK-Brit/Self)](mailto:stuart@ok-brit.com) and [Al Petrick (Skyworks Solutions)](mailto:apetrick@ieee.org)

Abstract

Minutes of the IEEE 802 RR-TAG teleconference

These are the Minutes of the IEEE 802 RR-TAG teleconference Thursday, 16-23sep21

1. Chair presents slide 2, Registration for the Sept 802 electronic wireless interim session
   1. This meeting is part of the IEEE 802 September wireless interim session
   2. You must pay the registration fee in order to attend
   3. If you have not already done so, you can register at: <https://cvent.me/NxZeZx>
   4. If you do not intend to register for this session you must leave this meeting and, if you have logged attendance on IMAT, please email the 802.18 chair or a vice chair to have your attendance cancelled
   5. At conclusion of each of the 802.18 calls, the Webex log and IMAT was reviewed.
2. Chair calls the meeting to order at 15:02 et
3. Chair presents slides 4 – 7 of 802.18-21/0106r01, the call to order and administrative items
   1. Includes IEEE 802 meeting and participant’s guidelines and requirements.
4. Chair presents slides 7, the agenda:
   1. Call to Order
      1. Attendance is on IMAT (w/VC & webex checks)
      2. This interim does count for participation credit. Need 75%.
      3. Remember to mute when not speaking, thanks.
      4. Please request Q in the chat window.
   2. Administrative items
      1. Someone to take some notes, Peter E.
      2. Attendance & monitor chat window, Stuart K
   3. Approve agenda, last minutes & announcements.
   4. Discussion items
      1. EU Items
      2. Other Regions Items
      3. ITU-R Items
      4. FCC NPRM on 60GHz
      5. General Discussion Items
   5. Actions required.
      1. Inputs on FCC NPRM on 60 GHz reply comments.
      2. Anything new today
      3. ongoing: WRC-23 AI Viewpoints & Freq. table fill in
   6. AOB
   7. Adjourn
5. Chair presents slides 9 - 11 Administrative – Motions and more
   1. **Motion: To approve the agenda as presented on previous slide**

Moved by: Stuart Kerry (OK-Brit, self)

Seconded by: Vijay Auluck (self)

Discussion? None

Vote: Approved by unanimous consent

* 1. **Motion:** To approve the minutes in document <https://mentor.ieee.org/802.18/dcn/21/18-21-0088-01-0000-minutes-electronic-plenary-15-22jul21-rr-tag-mad.docx> 23-Jul-2021 23:55:03 ET, with editorial privilege for the 802.18 chair.

Moved by: Mike Lynch (MJLynch Assoc.)

Seconded by: Edward Au (Huawei)

Discussion? None

Vote: Approved by unanimous consent

* 1. **Administrative moving forward** 
     1. For Sept 2021, Wireless Interim Session will be electronic, with one ($50, $75, $125) registration fee for all groups.
        1. Dates are last Friday 10sep21 to our .18 meeting on 23sep21. 802.18 will meet our normal Thursday’s, 16th and 23rd.
           1. On the 16th, overlaps with last 30 minutes of 802.11az and 802.11bh; and 802.24 has moved to 16th at 1500et
     2. Looking at a wireless session opening meeting Friday 10sep21 at 0900et (similar to what was done at f2fs)
     3. Agenda for Sept 10th 802 Wireless Interim is here: <https://mentor.ieee.org/802-ec/dcn/21/ec-21-0140-04-WCSG-2021-09-wireless-interim-opening-plenary-agenda.xlsx>
     4. From WCSC on 07July:  ~~$50 – 14jul-27aug; $75 – 28aug-09sep;~~ $125 >09sep;
     5. The September 2021 electronic wireless interim session registration is open:
     6. <http://802world.org/wireless/> REGISTRATION WEBSITE: <https://cvent.me/NxZeZx>
     7. Note: As announced on the .18 list server on 12Aug21 and now the updated WG P&P approved by the EC this week (29th):
        1. A credited interim session (an interim session with attendance credit) is one that has been declared by the Working Group Chair or Technical Advisory Group Chair.
     8. 802.18 will be taking attendance using IMAT and it will count for voting membership participation credit.
        1. Like previous wireless interims, 75% is needed, need both calls.
  2. For **Nov 2021** Plenary – Vancouver – was addressed on the EC call on 07Sep21.
     1. And it was approved for the Nov 2021 Plenary to be electronic/virtual.
     2. Also approved was the $50 / $75 / $125 meeting fee like we have been doing.

* + 1. **Early Registration: Until Thursday 11:59 PM UTC October 21, 2021** \* $US 50.00 for all attendees
    2. **Standard Registration: Until Friday 11:59 PM UTC November 5, 2021** \* $US 75.00 for all attendees
    3. **Late Registration: After Friday 11:59 PM UTC November 5, 2021** \* $US 125.00 for all attendees
    4. **Registration Fees are Non-Transferable and Non-Refundable**
    5. **REGISTRATION WEBSITE:** [**https://cvent.me/4xn8Ql**](https://cvent.me/4xn8Ql)
    6. **SCHEDULED SESSIONS**
    7. Meetings will take place between November 5-19, 2021.
    8. The dates and times of specific WG and TAG meetings will be provided by the Working Group Chairs.
    9. Information is available at [https://ieee802.org/802tele\_calendar.html](https://urldefense.com/v3/__https:/ieee802.org/802tele_calendar.html__;!!F7jv3iA!mIj7hYJYj38R6agYT--N_zFo-0q_cZUBHvvk_La3dCCECpGaAxZZLZ_IZg7NG7r1Pg$)
    10. .18 at this point will be our normal weekly times and call-in, Thursday’s 11th and 18th Nov21.
  1. For **Jan 2022** Wireless Interim – Panama
     + 1. WCSC Sept. call, the Jan 2022 Wireless Interim will be electronic/virtual.
       2. Also approved was the $50 / $75 / $125 meeting fee like coming up at the Sept. Wireless Interim

1. Chair presents slides 12 - 13, **EU items to share**
   1. General EU info: [<ojeu>](https://eur-lex.europa.eu/oj/direct-access.html) [<HStds>](https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/) <https://www.etsi.org/deliver/etsi_en/>
      1. Remember – BRAN documents can be found in the 802.11 private area documents (daily refresh)
   2. **ETSI – ERM** [**<TG-UWB>**](https://portal.etsi.org/tb.aspx?tbid=729&SubTB=729) **next call, meeting #59, \_(some focused calls in sept.)\_**
      1. Anything to share today? not today.
      2. 15jul: Working on new SR doc to extend UWB to 12.4 GHz, (tbd), much broader, up to 4 GHz OBW (tbd).
   3. **ETSI –** [<BRAN>](https://portal.etsi.org/tb.aspx?tbid=287&SubTB=287) **next meeting #111 27sep-01oct21; ad hocs/CALLS: 01,02,06,07,08,09,10, 21sep21**
      1. One of the 60GHz standards, EN 303 753, rapporteur meeting on 21sep21
      2. Agenda for #111 is on the BRAN site and the 802.11 members area.
      3. Last week, 09sep:
      4. EN 301 598 – TVWS – approved and next is EC assessment. then to ENAP and heading for the OJEU.
      5. EN 301 893 5 GHz - had 2 calls, cleaning up the standards. Working to conclude in meeting #112 in Dec.
      6. EN 303 687 6 GHz - have had 3 ad hoc meetings, 1 was on client-to-client communications with some values still being discussed. 2 were on NB FH and discussions continue.
      7. EN 303 753, 1 of the 60GHz stds has a call today/10th and then #2 is 21sep21
         1. EN 303 722 another 60GHz standard is waiting on ENAP.
         2. (not discussed though: EN 302 567 – another 60GHz (.11ad and .11ay) has passed 2nd ENAP, it is now an approved standard, next is to EC to approve for the OJEU.)
      8. Next plenary starts on 27sept. Looking at 4 – 90min, sessions each day.
   4. **CEPT–ECC** [**<SE24>**](https://cept.org/ecc/groups/ecc/wg-se/se-24/client/introduction/) **next virtual meeting, #M105 10-12Jan22**
      1. ECC report 327 is back from public review and will be agreed upon at next SE meetings. More UWB work on bands above 6 GHz. Proposed changes will be in the regulations, just how is tbd. Expected 1H2022.
      2. **02sep:** Looking at UWB radiodetermination applications in 116 – 260GHz for vehicular use.
      3. **15jul:** SE-24-UWB working on new regulations by end of year for >6GHz. Includes items, fixed outdoor, okay in vehicles, higher power (-31.2dBm/MHz indoor), etc. See ECC report 327. This could be significant changes. More to come.
   5. **CEPT – ECC** [**<SE45>**](https://cept.org/ecc/groups/ecc/wg-se/se-45/client/introduction/) **next call #14 28-29Oct21**
      1. Anything to share today? not today
   6. **CEPT – ECC** [**<FM57>**](https://cept.org/ecc/groups/ecc/wg-fm/fm-57/client/introduction/) **next call #16 14-15Sep21**
      1. Resolution of public consultation comments on Draft ECC report 330; re: WAS/RLAN use of the 5725-5850MHz band (CEPT work item FM57\_03).
         1. Output of the resolution meeting [TEMP01R3](https://urldefense.com/v3/__https:/cept.org/ecc/groups/ecc/wg-fm/fm-57/client/meeting-documents/file-history/?fid=66192__;!!F7jv3iA!mCTImXbqHUEmXdRE-Le21C7Pv9EfUbqFt7Qxar2NoKB6LSyy2y7L_Bb1pSadyKV1TA$) will be sent to the next WGFM meeting.
      2. A request from WGFM on how to establish a list of countries that either do or do not permit the use of the band 5725-5850 MHz above 25mW EIRP for the purposes of CDC operation.
         1. [TEMP02R2](https://urldefense.com/v3/__https:/cept.org/ecc/groups/ecc/wg-fm/fm-57/client/meeting-documents/file-history/?fid=66233__;!!F7jv3iA!mCTImXbqHUEmXdRE-Le21C7Pv9EfUbqFt7Qxar2NoKB6LSyy2y7L_Bb1pSbuZpWorA$) approved at FM57 and sent to WGFM in response detailing a template that could be used as part of an ECO table for enabling CDC operation whilst protecting incumbent services in countries where CDC is not allowed.
      3. The work that FM57 was created for (e.g. 6GHz Regulation and 5.8GHz ECC report) is now complete and the FM57 group will be closed at the next WGFM meeting.
      4. nice site: CEPT 6 GHz status across the countries: <https://docdb.cept.org/implementation/16737>
2. Chair presents slides 14 - 15 **Other regions (outside EU-Stds and USA), items to share**
   1. **Malaysia MCMC has recently begun a public consultation that seeks public view on the possibility of allocating 6 GHz spectrum to unlicensed use.**
   2. Deadline for submitting comments is 5:00pm Selangor Darul Ehsan local time, **October 11, 2021. (23sept out of .18)**
   3. For details, you would refer to the 15-page document at:
   4. <https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/PC_WiFi.pdf>
   5. Q1) MCMC seeks your views and comments on the demand for spectrum for Wi-Fi in the 6 GHz frequency band.
   6. Q2) MCMC seeks your views and comments on the emerging technologies utilizing the 6 GHz frequency band.
   7. Q3) MCMC seeks your views and comments on the frequency range within the 6 GHz frequency band that could be considered for Wi-Fi under the Class Assignment in Malaysia. Should MCMC consider allowing Wi-Fi to operate in the entire 1200 MHz (5925 MHz to 7125 MHz frequency band) or only in the 500 MHz (5925 MHz to 6425 MHz frequency band)?
   8. Q4) MCMC seeks your views and comments on: i. the coexistence between Wi-Fi and incumbent services (i.e. fixed service and fixed-satellite service); and ii. the potential interference mitigation between these services.
      1. note: Refer to Table 1 of the document on the status of incumbents in this frequency band of interest.
   9. Q5) MCMC seeks your views and comments on the potential technical and operational conditions to be imposed if the 6 GHz frequency band is introduced for Wi-Fi under the Class Assignment. Should part of the frequency band be limited to indoor operation? Should standard power devices operating under the Automatic Frequency Coordination (AFC) system be adopted in Malaysia?
      1. note: Refer to Table 2 of the document on the existing conditions of WLAN and SRD.
   10. Q6) What other key issues need to be considered in introducing Wi-Fi in the 6 GHz frequency range?
   11. Consultation is in mentor: <https://mentor.ieee.org/802.18/dcn/21/18-21-0103-00-0000-malaysia-mcmc-consultation-wlan-in-the-6ghz-band.docx>
   12. Brazil – ANATEL - **Public Consultation 46** 
       1. This public consultation aims to reassess the limits of undesirable emissions from very low power devices operating in the 5,925 MHz to 7,125 MHz band.
       2. The deadline for submission of comments is 30th November 2021. For more information on this public consultation, please refer to this link and is in Portuguese language only.
   13. Anything to share today for other regions? not today
3. Chair presents slides 16-18, **ITU-R items to share**
   1. Anything to share? not today
   2. **WRC-23 agenda items, the list is on the ITU-R website at:** 
      1. <https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-23-studies.aspx> (updated 26Aug20)
         1. <https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000D0041PDFE.pdf>
         2. <https://mentor.ieee.org/802.18/dcn/20/18-20-0107-01-0000-res-811-wrc-19-wrc-23-agenda-items.docx>
   3. **IEEE 802 viewpoints on WRC-23 agenda items.** 
      1. Doc for viewpoints updated (actions items in notes on this slide in agenda): <https://mentor.ieee.org/802.18/dcn/21/18-21-0039-01-0000-ieee-802-viewpoints-on-wrc-23-agenda-items.pptx>
      2. Was going to review IEEE 802 viewpoints and any updates, agenda is filled up so will move to end or a future meeting.
      3. Reference:
         1. btw- the initial AIs to consider IEEE 802 viewpoints:
            1. 1.1 -800-4 990 MHz and Resolution 223. Connection w/ITS going there?
            2. 1.2 -300-3 400MHz, 3 600-3 800MHz, 6 425-7 025MHz, 7 025-7 125MHz and 10.0-10.5GHz for International Mobile Telecommunications (IMT) and resolution 245.
            3. 1.5 -470-960 MHz in Region 1-consider possible regulatory actions, Resolution **235.**
            4. 10 **-**recommend to the Council items for inclusion in the agenda for the next WRC
      4. Was going to review IEEE 802 viewpoints and any updates, agenda is filled up so will move to end of a future meeting.
   4. **Liaison from ITU-R WP5A re: M.2121 ITS, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0059-00-0000-request-for-input-itu-r-m-2121-its.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0059-00-0000-request-for-input-itu-r-m-2121-its.docx)
      1. WP 5A next \_\_meeting is 15-26nov21 **(probably upload to WP5A 02nov21; out of .18 then 15oct for EC 10 day)**
      2. Document 59 is assigned to TGbd for consideration, as the document relates to ITS topics.
      3. Is there a status from TGbd?
   5. **Liaison from ITU-R WP5A re: M.1801-2, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0058-00-0000-request-for-input-itu-r-m-1801-2.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0058-00-0000-request-for-input-itu-r-m-1801-2.docx)
   6. **Liaison from ITU-R WP5A re: M.1450-5, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0057-00-0000-request-for-input-itu-r-m-1450-5.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0057-00-0000-request-for-input-itu-r-m-1450-5.docx)
      * 1. WP 5A next \_\_meeting is 15-26nov21
        2. Documents 57 and 58 are assigned to the ITU Ad hoc group for processing. ad hoc has met on these.
        3. **.11 ITU ad hoc is meeting on later today, 16sep21. .18 should some drafts for review soon.**
   7. **Liaison from ITU-R WP 1A re: Light Communications, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0080-00-0000-request-for-information-itu-r-wp-1a.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0080-00-0000-request-for-information-itu-r-wp-1a.docx)
      1. WP 1A next e-meeting is 03-12nov21 **(probably upload to WP5A 20oct21; out of .18 then 08oct for EC 10 day)**
      2. Reviewing the document to develop recommended modifications to reflect the work underway with P802.11bb and 802.15.7a/802.15.13.
      3. .11/.15 has worked on a draft response and it is now in .18 mentor: <https://mentor.ieee.org/802.18/dcn/21/18-21-0109-00-0000-liaison-response-to-itu-r-wp-1a-on-vlc-standards.docx>
      4. Note, .11 and .15 are still reviewing and it will come to .18 next week.
         1. Looking at the draft, maybe some questions on bottom of page 5 for c) and d)
            1. c) that the IEEE 802.15 Working Group completed the IEEE Std 802.15.7-2011 IEEE Standard for Local and metropolitan area networks – Short Range Wireless Optical Communication Using Visible Light in 2011;

do not see IEEE Std 802.15.7-2011 in the standards list we received in March 2021, it was superseded by IEEE Std 802.15.7-2018, so should discuss if c) should be updated accordingly.

* + - * 1. d) that the IEEE 802.15 Working Group completed the IEEE Standard for Local and metropolitan area networks – Part 15.7: Short-Range Optical Wireless Communications in 2018;

seems should add the full standard name in this line, IEEE Std 802.15.7-2018

1. Chair presents slides 19, **FCC NPRM on 60GHz on Radar Sensing Technology**
   1. Allowing Expanded Flexibility and Opportunities for Radar Operation in the 57-64 GHz band ET Docket No. 21-264
   2. Proceeding: [https://www.fcc.gov/ecfs/search/filings?q=((proceedings.name:((21%5C-264\*))%20OR%20proceedings.description:((21%5C-264\*))))&sort=date\_disseminated,DESC](https://www.fcc.gov/ecfs/search/filings?q=((proceedings.name:((21%5C-264*))%20OR%20proceedings.description:((21%5C-264*))))&sort=date_disseminated,DESC)
   3. **FR Document:** [2021-16637](https://urldefense.com/v3/__https:/www.federalregister.gov/documents/2021/08/19/2021-16637/fcc-seeks-to-enable-state-of-the-art-radar-sensors-in-60-ghz-band?utm_campaign=subscription*mailing*list&utm_source=federalregister.gov&utm_medium=email__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNoMDxVRbg$); **Citation:** 86 FR 46661; [PDF](https://urldefense.com/v3/__https:/www.govinfo.gov/content/pkg/FR-2021-08-19/pdf/2021-16637.pdf?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription*mailing*list__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNrPJarxaw$)Pages 46661-46672 *(12 pages)*; [Permalink](https://urldefense.com/v3/__https:/www.federalregister.gov/d/2021-16637?utm_medium=email&utm_campaign=subscription*mailing*list&utm_source=federalregister.gov__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNp91K_sRw$)
   4. It is on Mentor: r02 is the July OET versions (r01 is the later Federal Register version). Have not seen in Errata on the OET version: <https://mentor.ieee.org/802.18/dcn/21/18-21-0079-02-0000-fcc-nprm-allowing-expanded-flexibility-for-radar-operation-in-57-64-ghz-band.docx>
   5. From .11 CoEx, July presentation: <https://mentor.ieee.org/802.11/dcn/21/11-21-1089-00-coex-coexistence-between-radars-and-communication-systems-in-the-60ghz-band-u-s-update.pptx>
   6. 802.15.3 might have interest. (sent above to .15)
   7. **Comments due 20Sep21 (did not make it) == Reply comments due 18Oct21. A draft is ready for review**
      1. On mentor: <https://mentor.ieee.org/802.18/dcn/21/18-21-0110-00-0000-reply-comments-of-ieee-802-60-ghz-motion-sensing-fcc-nprm-et-21-264.docx>
   8. **Today it was introduced and discussed what is next on the draft, and maybe setup an ad hoc if needed, yes.** 
      1. Will setup for tuesday/wednesday (21st & 22nd) next week at 1500et.
      2. May need more the following week, tbd.
   9. If ready next week maybe wait till 30th, in case other comments are filed we want to reply to?
   10. **A timeline to work on:** 
       1. After today, send out to .11, .15 and .18 and cc:lmsc. Reply Comments coming for approval and here are ad hocs.
          1. Will hold off sending to lmsc/EC until after ad hocs next week.
       2. 21/22Sept- ad hoc(s) to review/refine/edit (best to setup now…)
       3. \_\_\_\_Sept- more ad hocs week of 26th if needed
       4. 30Sept - .18 approves, confirm 2nd on EC ballot.
       5. 01Oct - get approval to start EC ballot or head to approve on EC 05Oct call?
       7. 12 oct – if EC ballot, now closed and get permission to upload by 18oct.
2. Chair presents slide 20, **General Discussion Items**
   1. **The September 2021 FCC open commission meeting looks to be full, here are 2 of note.** 
      * 1. <https://www.fcc.gov/news-events/events/2021/09/september-2021-open-commission-meeting>
      1. **Authorizing 6 GHz Band Automated Frequency Coordination Systems**
         1. The Commission will consider a [Public Notice](https://www.fcc.gov/document/authorizing-6-ghz-band-automated-frequency-coordination-systems) beginning the process for authorizing Automated Frequency Coordination Systems to govern the operation of standard-power devices in the 6 GHz band (5.925-7.125 GHz). (ET Docket No. 21-352)
      2. **Spectrum Requirements for the Internet of Things**
         1. **The Commission will consider a** [**Notice of Inquiry**](https://www.fcc.gov/document/spectrum-requirements-internet-things) **seeking comment on current and future spectrum needs to enable better connectivity relating to the Internet of Things (IoT). (ET Docket No. 21-353)**
            1. [https](file:///C:\Users\jholcomb\OneDrive%20-%20Itron\Documents\2standards\ieee\802-18\2109sep-koa\https)[://docs.fcc.gov/public/attachments/DOC-375610A1.pdf](https://docs.fcc.gov/public/attachments/DOC-375610A1.pdf)
            2. In mentor: <https://mentor.ieee.org/802.18/dcn/21/18-21-0108-00-0000-fcc-pn-on-spectrum-for-the-internet-of-things.docx>
         2. **Some questions maybe of interest to IEEE 802, e.g.,**
            1. 1) please refer to portions of paragraph 6 re IEEE:

Standards groups such as 3GPP, IEEE, and others are also involved with IoT development. Are these standards providing sufficient guidance for IoT implementation in already existing spectrum bands?

If the growing need for IoT connectivity is not being met with the current and planned licensed spectrum resources, what steps can the Commission take to address this important use in the future?

* + - * 1. 2) please refer to paragraphs 10 and 11 asking the role of unlicensed spectrum and whether additional unlicensed spectrum should be considered.

1. Chair presents slide 21, **General Discussion Items – ongoing - MSGs 6 GHz**
   1. 1. The WInnforum “6 GHz Committee”, all groups meet every 2 weeks except interference-weekly (168 people)
      1. <https://www.wirelessinnovation.org/6ghz-multistakeholder-committee>
      2. For access to documents from the committee, can request to be an observer from the MSG below.
      3. New org: 2 (now) focus areas:
         1. ) AFC Functional Specification -WG – includes: Interference-TG, Incumbent Info-TG, security (new) and Protocols 3GPP-TG
         2. 2) AFC Test and Certification-WG
      4. The members of the Wireless Innovation Forum have balloted and approved a new document entitled “Recommendations for Addressing Blank, Uncollected, Erroneous, or Conflicting Database Elements for Incumbent Systems in the U.S. U-NII 5 & 7 Bands for the Purpose of Automated Frequency Coordination Systems” (document number WINNF-RC-1010-V1.0.0). This document and the associated appendix are publicly available here: <https://6ghz.wirelessinnovation.org/work-group-products>
   2. 2. From the FCC R&O, an informal MSG (“Group”) has also been formed. (260+ people)
      1. <https://groups.wirelessinnovation.org/wg/6MSG/dashboard>.
      2. Work stream 1-interference protection and resolution (CableLabs, EPRI, Lake Cty, APCO) Meets biweekly, from 28Jan21-10:00 et,
      3. Work stream 2 - correct incumbent data (ULS) (Comsearch, APCO)
      4. Work stream 3 - AFC and how it provides protection, etc. (Charter, Google, UTC)
      5. Overall Co-chairs: NPSTC, UTC, WFA, WISPA.
      6. Anything to share today? This group is meeting Friday, 24sep21.
2. Chair presents slide 22, **General Discussion Items – ongoing - Table of IEEE 802 Stds Frequency Bands**
   1. **Problem statement**
      1. It is difficult for 802 wireless standards developers to quickly and accurately identify all the frequency bands by the family of 802 wireless standards in a regularly maintained database.
      2. The primary application is to simplify identification of potential frequency bands for coexistence assessment.
   2. **Initial Audiences:** 
      1. 1) 802 wireless standards developers
      2. 2) 802.19 wireless coexistence working group
   3. **Ad hoc calls** 
      1. **The spreadsheet is going, always look for latest:**
      2. <https://mentor.ieee.org/802.18/dcn/21/18-21-0036-07-0000-frequency-table-template.xlsx>
   4. **From ad hoc call on 27jul21**
      1. Reviewed the draft of rev07
         1. In instructions:
            1. Clarified Standard-Year and put in an example.
            2. Clarified PHY Amendment (Date of Initial Approval) with an example and to not leave blank, copy over the standard if there is no amendment.
            3. Clarified PHY Name to start with the Acronym, then the name.
         2. In notes: Added a general note to only consider Active standards, not in active-withdrawn standards.
   5. The activity is entering the phase to fill in the sheet now, so more intense and time consuming.
   6. Have a focused call on 22nd 14:00pt to review some of the .15 frequency ranges.
   7. The next meeting will be 28sep21. (call-in in backup slides here)
3. Chair presents slide 23, Actions / AOB / Recess
   1. **Actions required:** 
      * FCC NPRM 60GHz reply comments input
      * chair set up ad hocs for FCC NPRM on 60GHz next Tuesday and Wednesday. done.
   2. **AOB before recess to next Thursday, 23sep21?**
      1. none heard
   3. Remember, must be registered and to log attendance in **IMAT** (and participation credit available)
   4. Attendance on-line today: \_42\_\_ and voters on-line: \_26\_\_
   5. **Recessed at 15:58 until next Thursday 23Sep21, 15:00et/19:00utc**
4. Chair presents slide 24, **2nd – call - Thursday (23sep21) Agenda**
   1. **Reminder we are still under all IEEE policies as shown last Thursday (16Sep21)**
      1. **Attendance is on IMAT (w/VC and webex checks)**
      2. Someone to take a few notes: \_\_\_
      3. Attendance and request queue in chat window, Stuart K.
   2. **Item's routine or from last week or new**
   3. **Discussion items** 
      1. EU Items
      2. Other Regions Items
      3. ITU-R Items w/liaisons
      4. FCC NPRM on 60GHz
      5. General Discussion Items
   4. **Actions required**
      1. ITU-R Liaisons
      2. FCC NPRM on 60 GHz reply comments
      3. Anything new today
      4. ongoing: WRC-23 AI Viewpoints & Freq. table fill in
   5. **AOB**
   6. **Adjourn**
   7. **Any objections to accepting the agenda?**
      1. None heard
      2. **Results:** Approved by unanimous consent
5. **Chair presents slides 25-26, EU items to share**
   1. General EU info: [<ojeu>](https://eur-lex.europa.eu/oj/direct-access.html) [<HStds>](https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/) <https://www.etsi.org/deliver/etsi_en/>
   2. Remember – BRAN documents can be found in the 802.11 private area documents (daily refresh)
   3. **ETSI –** [**<BRAN>**](https://portal.etsi.org/tb.aspx?tbid=287&SubTB=287) **next meeting #111 27sep-01oct21; starts at 9am CET.**
      1. Anything to share today? not today
      2. 16sep: One of the 60GHz standards, EN 303 753, rapporteur meeting on 21sep21
         1. Agenda for #111 is on the BRAN site and the 802.11 members area.
      3. 09sep:
         1. EN 301 598 – TVWS – approved and next is EC assessment. then to ENAP and heading for the OJEU.
         2. EN 301 893 5 GHz - had 2 calls, cleaning up the standards. Working to conclude in meeting #112 in Dec.
         3. EN 303 687 6 GHz - have had 3 ad hoc meetings, 1 was on client-to-client communications with some values still being discussed. 2 were on NB FH and discussions continue.
         4. EN 303 753, 1 of the 60GHz stds has a call today/10th and then #2 is 21sep21
         5. EN 303 722 another 60GHz standard is waiting on ENAP.
         6. (not discussed though: EN 302 567 – another 60GHz (.11ad and .11ay) has passed 2nd ENAP, it is now an approved standard, next is to EC to approve for the OJEU.)
         7. Next plenary starts on 27sept. Looking at 4 – 90min sessions each day.
   4. **CEPT–ECC** [**<SE24>**](https://cept.org/ecc/groups/ecc/wg-se/se-24/client/introduction/) **next virtual meeting, #M105 10-12Jan22**
      1. Anything to share today? not today
      2. 16sep: ECC report 327 is back from public review and will be will agreed upon at next SE meetings. Proposed changes will be in the regulations, just how is tbd. Expected by early 2022.
      3. 02sep: Looking at UWB radiodetermination applications in 116 – 260GHz for vehicular use.
      4. 15jul: SE-24-UWB working on new regulations by end of year for >6GHz. Includes items, fixed outdoor, okay in vehicles, higher power (-31.2dBm/MHz indoor), etc. See ECC report 327. This could be significant changes. More to come.
   5. **CEPT – ECC** [**<SE45>**](https://cept.org/ecc/groups/ecc/wg-se/se-45/client/introduction/) **next call #14 28-29Oct21**
      1. Anything to share today? not today
   6. **CEPT – ECC** [**<WGFM>**](https://cept.org/ecc/groups/ecc/wg-fm/client/introduction/)  **next web meeting #100 04-08Oct21**
      1. At the end of the WGFM meeting, 08Oct21, FM 57 will be dissolved.
   7. **CEPT – ECC** [**<FM57>**](https://cept.org/ecc/groups/ecc/wg-fm/fm-57/client/introduction/) **last call #16 14-15Sep21; next call: \_\_\_\_\_**
      1. Anything to share today? not today
      2. 16sep: 1) Resolution of public consultation comments on Draft ECC report 330; re: WAS/RLAN use of the 5725-5850MHz band (CEPT work item FM57\_03).
         * 1. Output of the resolution meeting [TEMP01R3](https://urldefense.com/v3/__https:/cept.org/ecc/groups/ecc/wg-fm/fm-57/client/meeting-documents/file-history/?fid=66192__;!!F7jv3iA!mCTImXbqHUEmXdRE-Le21C7Pv9EfUbqFt7Qxar2NoKB6LSyy2y7L_Bb1pSadyKV1TA$) will be sent to the next WGFM meeting.
         1. 2) A request from WGFM on how to establish a list of countries that either do or do not permit the use of the band 5725-5850 MHz above 25mW EIRP for the purposes of CDC operation.
            1. [TEMP02R2](https://urldefense.com/v3/__https:/cept.org/ecc/groups/ecc/wg-fm/fm-57/client/meeting-documents/file-history/?fid=66233__;!!F7jv3iA!mCTImXbqHUEmXdRE-Le21C7Pv9EfUbqFt7Qxar2NoKB6LSyy2y7L_Bb1pSbuZpWorA$) approved at FM57 and sent to WGFM in response detailing a template that could be used as part of an ECO table for enabling CDC operation whilst protecting incumbent services in countries where CDC is not allowed.
         2. The work that FM57 was created for (e.g. 6GHz Regulation and 5.8GHz ECC report) is now complete and the FM57 group will be closed at the next WGFM meeting**.**
      3. nice site: CEPT 6 GHz status across the countries: <https://docdb.cept.org/implementation/16737>
6. Chair presents slide 27, **Other regions (outside EU-Stds and USA), items to share**
   1. Anything to share today? not today
7. Chair presents slides 28-30, **ITU-R items to share**
   1. Anything to share today beyond the 4 liaisons? not today
   2. **WRC-23 agenda items, the list is on the ITU-R website at:** 
      1. <https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-23-studies.aspx> (updated 26Aug20)
         1. <https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000D0041PDFE.pdf>
         2. <https://mentor.ieee.org/802.18/dcn/20/18-20-0107-01-0000-res-811-wrc-19-wrc-23-agenda-items.docx>
   3. **IEEE 802 viewpoints on WRC-23 agenda items.** 
      1. Doc for viewpoints updated (actions items in notes on this slide in agenda): <https://mentor.ieee.org/802.18/dcn/21/18-21-0039-01-0000-ieee-802-viewpoints-on-wrc-23-agenda-items.pptx>
      2. Reference:
         1. btw- the initial AIs to consider IEEE 802 viewpoints:
            1. 1.1 -800-4 990 MHz and Resolution 223. Connection w/ITS going there?
            2. 1.2 -300-3 400MHz, 3 600-3 800MHz, 6 425-7 025MHz, 7 025-7 125MHz and 10.0-10.5GHz for International Mobile Telecommunications (IMT) and resolution 245.
            3. 1.5 -470-960 MHz in Region 1-consider possible regulatory actions, Resolution **235.**
            4. 10 **-**recommend to the Council items for inclusion in the agenda for the next WRC
      3. Need to review IEEE 802 viewpoints and any updates and action items. This week is full will push this out.
   4. For miscellaneous links for ITU-R, SGs, WPs and calendars, see back up slides later.
   5. **Liaison from ITU-R WP5A re: M.2121 ITS, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0059-00-0000-request-for-input-itu-r-m-2121-its.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0059-00-0000-request-for-input-itu-r-m-2121-its.docx)
      1. WP 5A next \_\_meeting is 15-26nov21 **(probably upload to WP5A 26oct21; out of .18 then 07oct for EC 10 day)**
      2. Document 59 is assigned to TGbd for consideration, as the document relates to ITS topics.
      3. Is there a status from TGbd? nothing heard
   6. **Liaison from ITU-R WP5A re: M.1801-2, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0058-00-0000-request-for-input-itu-r-m-1801-2.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0058-00-0000-request-for-input-itu-r-m-1801-2.docx)
   7. **Liaison from ITU-R WP5A re: M.1450-5, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0057-00-0000-request-for-input-itu-r-m-1450-5.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0057-00-0000-request-for-input-itu-r-m-1450-5.docx)
      1. WP 5A next \_\_meeting is 15-26nov21 (probably upload to WP5A 26oct21; **out of .18 then 07oct** for EC 10 day)
      2. Documents 57 and 58 are assigned to the ITU ad hoc group for processing. ad hoc has met on these.
      3. **.11 ITU ad hoc met last week 16sep21.**
      4. **and from there the liaison contributions are being uploaded now, .18 will vote to approve in couple weeks.**
      5. <https://mentor.ieee.org/802.18/dcn/21/18-21-0116-00-0000-proposed-modifications-to-itu-r-m-1450-5.docx>
      6. <https://mentor.ieee.org/802.18/dcn/21/18-21-0117-00-0000-proposed-modifications-to-itu-r-m-1801-2.docx>
   8. **Liaison from ITU-R WP 1A re: Light Communications, see** [**https://mentor.ieee.org/802.18/dcn/21/18-21-0080-00-0000-request-for-information-itu-r-wp-1a.docx**](https://mentor.ieee.org/802.18/dcn/21/18-21-0080-00-0000-request-for-information-itu-r-wp-1a.docx)
      1. WP 1A next e-meeting is 03-12nov21 **(probably upload to WP5A 20oct21; out of .18 then 30sep for EC 10 day)**
      2. Reviewing the document to develop recommended modifications to reflect the work underway with P802.11bb and 802.15.7a/802.15.13.
      3. **.11 & .15 worked on a responses** 
         1. <https://mentor.ieee.org/802.11/dcn/21/11-21-1457-02-0000-liaison-response-to-itu-r-wp-1a-on-vlc-standards.docx>
         2. <https://mentor.ieee.org/802.15/dcn/21/15-21-0434-01-0000-liaison-response-to-itu-r-wp-1a-on-vlc-standards.docx>
      4. **and a draft merged version it is now updated in .18 mentor:**
         1. <https://mentor.ieee.org/802.18/dcn/21/18-21-0109-01-0000-liaison-response-to-itu-r-wp-1a-on-vlc-standards.docx>
      5. Reviewed with plan to vote on it next week to approve to send to EC and then to WP 1A.
         1. A few typos was all that was seen.
      6. After the meeting r02 was uploaded with a the few editorial updates.
      7. <https://mentor.ieee.org/802.18/dcn/21/18-21-0109-02-0000-liaison-response-to-itu-r-wp-1a-on-vlc-standards.docx>
8. Chair presents slides 31, **FCC NPRM on 60GHz on Radar Sensing Technology**
   1. Allowing Expanded Flexibility and Opportunities for Radar Operation in the 57-64 GHz band
   2. Proceeding: [https://www.fcc.gov/ecfs/search/filings?q=((proceedings.name:((21%5C-264\*))%20OR%20proceedings.description:((21%5C-264\*))))&sort=date\_disseminated,DESC](https://www.fcc.gov/ecfs/search/filings?q=((proceedings.name:((21%5C-264*))%20OR%20proceedings.description:((21%5C-264*))))&sort=date_disseminated,DESC)
   3. It is on Mentor: r02 is the July OET versions (r01 is the later Federal Register version). <https://mentor.ieee.org/802.18/dcn/21/18-21-0079-02-0000-fcc-nprm-allowing-expanded-flexibility-for-radar-operation-in-57-64-ghz-band.docx>
   4. **Reply comments due 18Oct21, draft reply comments are at:** <https://mentor.ieee.org/802.18/dcn/21/18-21-0110-00-0000-reply-comments-of-ieee-802-60-ghz-motion-sensing-fcc-nprm-et-21-264.docx>
   5. **Had ad hoc meetings this week. A** [**<new contribution>**](https://mentor.ieee.org/802.18/dcn/21/18-21-0115-00-0000-reply-comments-of-ieee-802-60-ghz-motion-sensing-fcc-nprm-et-21-264-contribution.docx) **was submitted and still working on how to integrate.**
   6. **Was going to review latest draft and determine if more ad hocs are needed next week (which are standing by), though no ne draft to review**
   7. **There are some compromises being work with the new contribution and making good progress.**
   8. **Will work on having something on Mentor Monday for all to review.**
   9. **Please use the .18 list server with progress on reply comments, for all to follow the progress and being able to contribute.**
   10. **Remember IEEE 802 is an individual process.**
   11. **A timeline to work on:** 
       1. **21/22, 27,28,29Sept- ad hoc(s) to review/refine,.**
       2. **28Sept – Tuesday – goal to have a final draft on list server for all of .18 to review before vote on thursday the 30th.**
       3. **30Sept - .18 approves**
       4. **01Oct - get approval to start EC ballot**
       5. **12 oct – if EC ballot, now closed and get permission to upload by 18oct.**
9. Chair presents slide 32, **General Discussion Items - – from last week**
   1. **The September 2021 FCC open commission meeting looks to be full, here are 2 of note.** 
      * 1. <https://www.fcc.gov/news-events/events/2021/09/september-2021-open-commission-meeting>
      1. **Authorizing 6 GHz Band Automated Frequency Coordination Systems**
         1. The Commission will consider a [Public Notice](https://www.fcc.gov/document/authorizing-6-ghz-band-automated-frequency-coordination-systems) beginning the process for authorizing Automated Frequency Coordination Systems to govern the operation of standard-power devices in the 6 GHz band (5.925-7.125 GHz). (ET Docket No. 21-352)
      2. **Spectrum Requirements for the Internet of Things**
         1. **The Commission will consider a** [**Notice of Inquiry**](https://www.fcc.gov/document/spectrum-requirements-internet-things) **seeking comment on current and future spectrum needs to enable better connectivity relating to the Internet of Things (IoT). (ET Docket No. 21-353)**
            1. [https](file:///C:\Users\jholcomb\OneDrive%20-%20Itron\Documents\2standards\ieee\802-18\2109sep-koa\https)[://docs.fcc.gov/public/attachments/DOC-375610A1.pdf](https://docs.fcc.gov/public/attachments/DOC-375610A1.pdf)
            2. In mentor: <https://mentor.ieee.org/802.18/dcn/21/18-21-0108-00-0000-fcc-pn-on-spectrum-for-the-internet-of-things.docx>
         2. **Some questions maybe of interest to IEEE 802, e.g.,**
            1. 1) please refer to portions of paragraph 6 re IEEE:

Standards groups such as 3GPP, IEEE, and others are also involved with IoT development. Are these standards providing sufficient guidance for IoT implementation in already existing spectrum bands?

If the growing need for IoT connectivity is not being met with the current and planned licensed spectrum resources, what steps can the Commission take to address this important use in the future?

* + - * 1. 2) please refer to paragraphs 10 and 11 asking the role of unlicensed spectrum and whether additional unlicensed spectrum should be considered.

1. Chair presents slide 33, **General Discussion Items - new**
   1. Along with the Open Commission meeting next week introducing the NOI on unlicensed spectrum for IoT, it was reported that the acting Chairwomen Rosenworcel spoke at the 2021 NTIA ([National Telecommunications and Information Administration](https://www.ntia.doc.gov/)) Spectrum Policy Symposium this week, looking at unlicensed spectrum past and future for spectrum policy is so important. She has always supported unlicensed spectrum. Her remarks can be found at: <https://docs.fcc.gov/public/attachments/DOC-375907A1.docx>
2. Chair presents slide 34, **General Discussion Items – ongoing - MSGs 6 GHz**
   1. The WInnforum “6 GHz Committee”, all groups meet every 2 weeks except interference-weekly (168 people)
      1. <https://www.wirelessinnovation.org/6ghz-multistakeholder-committee>
      2. For access to documents from the committee, can request to be an observer from the MSG below.
      3. New org: 2 (now) focus areas:
         1. ) AFC Functional Specification -WG – includes: Interference-TG, Incumbent Info-TG, security (new) and Protocols 3GPP-TG
         2. 2) AFC Test and Certification-WG
      4. **16sep:** The members of the Wireless Innovation Forum have balloted and approved a new document entitled “Recommendations for Addressing Blank, Uncollected, Erroneous, or Conflicting Database Elements for Incumbent Systems in the U.S. U-NII 5 & 7 Bands for the Purpose of Automated Frequency Coordination Systems” (document number WINNF-RC-1010-V1.0.0). This document and the associated appendix are publicly available here: <https://6ghz.wirelessinnovation.org/work-group-products>
   2. 2. From the FCC R&O, an informal MSG (“Group”) has also been formed. (260+ people)
      1. <https://groups.wirelessinnovation.org/wg/6MSG/dashboard>.
      2. Work stream 1-interference protection and resolution (CableLabs, EPRI, Lake Cty, APCO) Meets biweekly, from 28Jan21-10:00 et,
      3. Work stream 2 - correct incumbent data (ULS) (Comsearch, APCO)
      4. Work stream 3 - AFC and how it provides protection, etc. (Charter, Google, UTC)
      5. Overall Co-chairs: NPSTC, UTC, WFA, WISPA.
      6. Work stream 1 – draft final report is still in 0.x revs, indicating the final v1.0 is a ways out and the schedule is heading right.
      7. The group meets tomorrow the 24th.
3. Chair presents slide 35, **General Discussion Items – ongoing - Table of IEEE 802 Stds Frequency Bands**
   1. **Problem statement**
      1. It is difficult for 802 wireless standards developers to quickly and accurately identify all the frequency bands by the family of 802 wireless standards in a regularly maintained database.
      2. The primary application is to simplify identification of potential frequency bands for coexistence assessment.
   2. **Initial Audiences:** 
      1. 1) 802 wireless standards developers
      2. 2) 802.19 wireless coexistence working group
   3. **Ad hoc calls** 
      1. **The spreadsheet is going, always look for latest:**
      2. <https://mentor.ieee.org/802.18/dcn/21/18-21-0036-07-0000-frequency-table-template.xlsx>
   4. **From ad hoc call on 27jul21**
      1. Reviewed the draft of rev07
         1. In instructions:
            1. Clarified Standard-Year and put in an example.
            2. Clarified PHY Amendment (Date of Initial Approval) with an example and to not leave blank, copy over the standard if there is no amendment.
            3. Clarified PHY Name to start with the Acronym, then the name.
         2. In notes: Added a general note to only consider Active standards, not in active-withdrawn standards.
   5. The activity is entering the phase to fill in the sheet now, so more intense and time consuming.
   6. **Had a focused call on 22nd 14:00pt to review some of the .15 frequency ranges.**
   7. **The next meeting will be 28sep21. (call-in in backup slides here)**
4. Chair presents slide 36, **Actions Required**
   * **FCC NPRM 60GHz reply comments input, and .18 folks be prepared to vote next week, webex polling.**
   * **ITU-R WP 1A liaison inputs, and .18 folks be prepared to vote next week, webex polling .**
   * **All – review both WP 5A liaisons for vote on 07Oct21.**

ongoing:

* + For IEEE 802 viewpoints on WRC-23 AIs, reach out to those identified, looking for input on the viewpoints.

1. Chair presents slide 37 Any Other Business
   1. none heard
2. Chair presents slide 38, Adjourn.
   1. **Next “weekly” teleconference (sched’d to 13jan22): 30sep –*15:00–<15:55* et** 
      1. Call in info: <https://mentor.ieee.org/802.18/dcn/16/18-16-0038-19-0000-teleconference-call-in-info.pptx>
      2. Also, see back up slide in this agenda.
      3. note: new call-in starting 09sep21, see back up slides in agenda
      4. All late changes/cancellations will be sent out to the 802.18 list server.
   2. Overall IEEE 802 schedule: <http://ieee802.org/802tele_calendar.html>
      1. or only 802.18: [IEEE 802.18 TAG Calendar](https://calendar.google.com/calendar/embed?src=c2gedttabtbj4bps23j4847004%40group.calendar.google.com&ctz=America%2FNew_York)
   3. Adjourn:
      1. Any objection to Adjourn.
      2. None heard, Adjourn at 15:36et
   4. **The next IEEE 802 plenary will be electronic in November 2021**
   5. **The IEEE 802.18 (wireless) interim will be electronic in Jan 2022**
   6. **Thank You**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Voting Attendees:** |  |  | **16-Sep** | **23-Sep** |
| 1 | **Au** | Edward (Kwok Shum) | Huawei Technologies Co., Ltd | **x** | **x** |
| 2 | **Auluck** | Vijay | Self | **x** | **x** |
| 3 | **Boldy** | David | Broadcom Corporation | **x** | **x** |
| 4 | **de Vegt** | Rolf | Qualcomm Incorporated | **x** | **x** |
| 5 | **Ecclesine** | Peter | Cisco Systems, Inc. | **x** | **x** |
| 6 | **Hiertz** | Guido | Ericsson AB | **x** | **x** |
| 7 | **Holcomb** | Jay | Itron Inc. | **x** | **x** |
| 8 | **Ikegami** | Tetsushi | Meiji University | **x** |  |
| 9 | **Jones** | Vincent Knowles IV | Qualcomm Incorporated | **x** | **x** |
| 10 | **Kain** | Carl | USDOT, Noblis, Inc. |  | **x** |
| 11 | **Kenney** | John | TOYOTA InfoTechnology Center U.S.A. | **x** | **x** |
| 12 | **Kerry** | Stuart | OK‐Brit, Self | **x** | **x** |
| 13 | **Lansford** | James | Qualcomm Incorporated | **x** | **x** |
| 14 | **Levy** | Joseph | InterDigital, Inc. |  | **x** |
| 15 | **Lynch** | Michael | MJ Lynch & Associates, LLC. | **x** | **x** |
| 16 | **Nikolich** | Paul | Self, HPE,  Huawei, Wyebot, UNH BCoE, YAS BBV, Origin Wireless | **x** |  |
| 17 | **Palm** | Stephen | Broadcom Corporation | **x** | **x** |
| 18 | **Petrick** | Al | Skyworks Solutions Inc. | **x** | **x** |
| 19 | **Pirhonen** | Riku | NXP Semiconductors | **x** | **x** |
| 20 | **Rolfe** | Benjamin | Blind Creek Associates |  | **x** |
| 21 | **Rosdahl** | Jonathan | Qualcomm | **x** |  |
| 22 | **Sand** | Stephan | German Aerospace Center (DLR) | **x** |  |
| 23 | **Shellhammer** | Steve | Qualcomm Incorporated | **x** |  |
| 24 | **Sherlock** | Ian | Texas Instruments | **x** | **x** |
| 25 | **Stanley** | Dorothy | Hewlett Packard Enterprise | **x** | **x** |
| 26 | **Verso** | Billy | Qorvo | **x** | **x** |
| 27 | **Wang** | Lei | FutureWei Technologies, Inc. | **x** |  |
| 28 | **Yaghoobi** | Hassan | Intel Corporation | **x** | **x** |
| 29 | **Yucek** | Tevfik | Qualcomm Incorporated | **x** | **x** |
|  |  |  |  |  |  |
|  | **Non-Voting Attendees:** |  |  |  |  |
| 1 | **Aldana** | Carlos | Facebook | **x** |  |
| 2 | **Baykas** | Tuncer | Kadir Has University |  | **x** |
| 3 | **Berens** | Friedbert | FBConsulting Sarl | **x** | **x** |
| 4 | **Cordeiro** | Carlos | Intel Corporation | **x** |  |
| 5 | **da Silva** | Claudio | Facebook | **x** | **x** |
| 6 | **Dabak** | Anand | Texas Instruments | **x** |  |
| 7 | **Eitan** | Alecsander | Qualcomm Incorporated | **x** |  |
| 8 | **Fang** | Yonggang | MediaTek | **x** | **x** |
| 9 | **Ginsburg** | Brian | Texas Instruments |  | **x** |
| 10 | **Haasz** | Jodi | IEEE SA | **x** | **x** |
| 11 | **Hamilton** | Mark | Ruckus/CommScope | **x** | **x** |
| 12 | **Hu** | Chunyu | Facebook | **x** |  |
| 13 | **Jeffries** | Timothy | FutureWei Technologies, Inc. | **x** | **x** |
| 14 | **Kürner** | Thomas | TU Braunschweig | **x** |  |
| 15 | **Norman** | Alan | Facebook | **x** |  |
| 16 | **Sarris** | Ioannis | Adveos | **x** |  |
| 17 | **Scott** | Andy | NCTA |  | **x** |
| 18 | **Tian** | Bin | Qualcomm Incorporated | **x** |  |
| 19 | **Ward** | Lisa | Rohde & Schwarz | **x** | **x** |