IEEE 802.18

Radio Regulatory-TAG

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| Radio Regulatory Technical Advisory Group Minutes |
| Date: 28oct21 |
| 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 Al Petrick (Skyworks Solutions) and Stuart Kerry (OK-Brit/Self)

Abstract

Minutes of the IEEE 802 RR-TAG teleconference

These are the Minutes of the IEEE 802 RR-TAG teleconference Thursday, 28oct21

1. Chair calls the meeting to order at 15:02 et
2. Chair presents slides 2 – 6 of 802.18-21/0128r01, the call to order and administrative items
	1. Includes IEEE 802 meeting and participant’s guidelines and requirements.
3. Chair presents slides 7, the agenda:
	1. Call to Order
		1. Attendance is not on IMAT (w/VC & webex)
		2. Remember to mute when not speaking, thanks.
		3. 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. General Discussion Items
	5. Actions required.
		1. Anything new today
		2. ongoing: WRC-23 AI Viewpoints & Freq. table fill in
	6. AOB
	7. Adjourn
4. Chair presents slides 8 - 9 Administrative – Motions and more
	1. **Motion: To approve the agenda as presented on previous slide**

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

Seconded by: Hassan Yaghoobi (Intel)

Discussion? None

Vote: Approved by unanimous consent

* 1. **Motion:** To approve the minutes in document <https://mentor.ieee.org/802.18/dcn/21/18-21-0127-00-0000-minutes-21oct21-rrtag-teleconference.docx> 22-Oct-2021 14:18:36 ET, with editorial privilege for the 802.18 chair.

Moved by: Al Petrick (Skyworks)

Seconded by: Stephen Palm (Broadcom)

Discussion? None

Vote: Approved by unanimous consent

* 1. **Administrative moving forward**
		1. For **Nov 2021** Plenary – (was Vancouver) – EC call on 07Sep21 approved to be electronic/virtual.
			1. Also approved was the $50 / $75 / $125 meeting fee like we have been doing.
			2. ~~Early Registration: Until Thursday 11:59 PM UTC October 21, 2021~~ ~~\* $US 50.00 for all attendees~~
			3. Standard Registration: **Until Friday 11:59 PM UTC November 5, 2021 \* $US 75.00 for all attendees**
			4. Late Registration: After Friday 11:59 PM UTC November 5, 2021 \* $US 125.00 for all attendees
			5. Registration Fees are Non-Transferable and Non-Refundable
			6. **REGISTRATION WEBSITE:** [**https://cvent.me/4xn8Ql**](https://urldefense.com/v3/__https%3A/cvent.me/4xn8Ql__;!!F7jv3iA!mIj7hYJYj38R6agYT--N_zFo-0q_cZUBHvvk_La3dCCECpGaAxZZLZ_IZg53vVm76Q$)
			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>
			10. .18 at this point will be our normal weekly times and call-in, Thursday's 11th and 18th Nov21.
		2. For **Jan 2022 Electronic Wireless Interim – (was Panama)** - Opening is Friday 14Jan21 10:00et
			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
			3. .18 will be our normal weekly times and call-in, Thursday’s 20th and 27th Jan21,
				1. and will have voting participation credit.
		3. For **March 2022** Plenary – Orlando
			1. Decision point will be EC call 07dec21.
			2. Will have a poll during November plenary like before, if it is a in-personwould you go?
1. Chair presents slides 10 - 11, **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)
			1. for reference, ad hoc meetings can make decisions, rapporteur meetings cannot.
	2. **ETSI –** [<BRAN>](https://portal.etsi.org/tb.aspx?tbid=287&SubTB=287) **next call #112 13-17dec21; lots of ad hocs (10) before then. (14 calls between meetings)**
		1. BRAN(21)111002r2 and 111036r3 are the keys to knowing which 111x meeting is on which topic. 111j is on both EN 301 893 and EN 303 687. More details below.
		2. Some comments on TVWS, EC working with multiple consultants, with multiple output from them, this is challenging.
		3. ENAP has ended on EN 303 722, one country with technical comments. should be able to resolve okay. meeting is scheduled to resolve then a 2nd ENAP will be needed.
		4. 6 GHz, EN 303 687, discussions continue on NB FH, still trying to understand the compromise made.
		5. 5 GHz going smoothly. Have heard some question on radars thought not to BRAN at this time. Just need to be aware as some specific companies seem to not be following the rules.

• ETSI TC BRAN ad hoc meeting #111a
 Dedicated to ENAP comment resolution for EN 303 722
 Proposed agenda in BRAN(21)111a001
 2021-11-04T09:00+01:00 until 2021-11-04T12:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42763>>

• ETSI TC BRAN ad hoc meeting #111b
 Dedicated to TS 103 754
 Proposed agenda in BRAN(21)111b001
 2021-11-02T09:00+01:00 until 2021-11-02T11:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42764>>

• ETSI TC BRAN ad hoc meeting #111c
 Dedicated to TS 103 754
 Proposed agenda in BRAN(21)111c001
 2021-12-01T09:00+01:00 until 2021-12-01T11:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42765>>

• ETSI TC BRAN ad hoc meeting #111d
 Dedicated to TR 103 721
 Proposed agenda in BRAN(21)111d001
 2021-11-16T10:00+01:00 until 2021-11-16T12:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42766>>

• ETSI TC BRAN ad hoc meeting #111e
 Dedicated to EN 303 687
 Proposed agenda in BRAN(21)111e001
 2021-11-23T09:30+01:00 until 2021-11-23T12:30+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42767>>

• ETSI TC BRAN ad hoc meeting #111f
 Dedicated to EN 303 687
 Proposed agenda in BRAN(21)111f001
 2021-11-30T09:30+01:00 until 2021-11-30T12:30+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42768>>

• ETSI TC BRAN ad hoc meeting #111g
 Dedicated to EN 303 687
 Proposed agenda in BRAN(21)111g001
 2021-12-03T09:30+01:00 until 2021-12-03T12:30+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42769>>

• ETSI TC BRAN ad hoc meeting #111h
 Dedicated to EN 301 893
 Proposed agenda in BRAN(21)111h001
 2021-11-23T16:00+01:00 until 2021-11-23T19:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42770>>

• ETSI TC BRAN ad hoc meeting #111i
 Dedicated to EN 301 893
 Proposed agenda in BRAN(21)111i001
 2021-12-01T15:00+01:00 until 2021-12-01T18:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42771>>

• ETSI TC BRAN ad hoc meeting #111j
 Dedicated to EN 301 598
 Proposed agenda in BRAN(21)111j001
 2021-11-03T09:00+01:00 until 2021-11-03T12:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42772>>

• ETSI TC BRAN ad hoc meeting #112a
 Dedicated to EN 301 893 and EN 303 687
 Proposed agenda in BRAN(21)112a001
 2022-01-10T10:00+01:00 until 2022-01-10T16:00+01:00
 <<https://portal.etsi.org/Meetings.aspx#/meeting?MtgId=42773>>

* + 1. **21oct:** EN 301 598 TVWS got EC HASTAC approval, User Access Restrictions were accepted and will go to publication. Same UAR as in 5 GHz and 6 GHz drafts. One opinion is this is a positive step.
			1. EN 303 687 6 GHz rapporteurs meetings heard two NB FH prezos, will continue in EN 303 687 ad hocs, which can take decisions. The NB FH prezos were multi-companies. One point is how the LBT will be done.
			2. Look at documents for ad hocs BRAN(21)111k… and 111l… for more.
			3. The next draft version EN 303 687 r14 was introduced and had questions if all the new info should be in the draft yet, discussions continue.
			4. Regulators were clear that 6 GHz is for RLAN not SRD.
	1. **CEPT –** [**<ECC>**](https://cept.org/ecc/groups/ecc/client/introduction/) **(and more) next call, #57 02-05Nov21**
		1. Anything to share today? not today
		2. 14oct: after the .18 call last , ECC will take up discussion of a WI on upper 6GHz for RLAN.
	2. **CEPT – ECC** [**<SE45>**](https://cept.org/ecc/groups/ecc/wg-se/se-45/client/introduction/) **call #14 28-29Oct21; next meeting #15 – Jan2022 - not posted yet**
	3. Anything to share today? yes . Meeting #14 wrapped up on the 1st day.
		1. Final report moved up to Jan, 2024. [https://www.cept.org/ecc/groups/ecc/wg-se/se-45/client/meeting-documents/?flid=29448](https://urldefense.com/v3/__https%3A/www.cept.org/ecc/groups/ecc/wg-se/se-45/client/meeting-documents/?flid=29448__;!!F7jv3iA!mB5ZQo9Bo-O1jA0inWo-_d60J1NcmgnJyTx4AUxwq_CZ4dHwBd3V_qaPd4dmr9DaaQ$)
		2. Heard two docs,
			1. the (21)008 JRC taken onboard – JRC Ispra Italy campus 40 sq km under JRC control. Hosts European Microwave Signature Laboratory (EMSL), a truncated 20m sphere,
			2. the (21)010 Scenarios ANFR doc gets heavy questioning.
		3. Next meeting January – CBTC rail side needs to get more technical about what exists today into 2024.
	4. **CEPT – ECC** [**<WGFM>**](https://cept.org/ecc/groups/ecc/wg-fm/client/introduction/)  **next meeting #101 07-11Feb22, Tentative, ECO (no virtual)**
		1. Anything to share today? not today
	5. nice site: CEPT 6 GHz status across the countries: <https://docdb.cept.org/implementation/16737>
1. Chair presents slides 12, **Other regions (outside EU-Stds and USA), items to share**
	1. UK - [**Department for Digital, Culture, Media & Sport**](https://www.gov.uk/government/organisations/department-for-digital-culture-media-sport)**; Wireless Infrastructure Strategy: call for evidence**
	2. <https://www.gov.uk/government/consultations/wireless-infrastructure-strategy-call-for-evidence>
	3. The government is committed to making the UK a global leader in digital connectivity. The pandemic has thrown the importance of connectivity into sharp relief, and it will continue playing a critical role in growing our economy, delivering our levelling up agenda and ensuring we meet our Net Zero ambitions. Our Wireless Infrastructure Strategy will set out the framework for the development, deployment and adoption of 5G and future wireless networks in the UK over the next decade.
	4. To support this, the government is undertaking an extensive programme of evidence gathering:
	5. This call for evidence has been launched to help us better understand what wireless connectivity the UK will need over the next decade and what more needs to be done to deliver it.
	6. In July, [the DCMS Secretary of State commissioned Ofcom to undertake analysis to support the development of the strategy](https://www.gov.uk/government/publications/letters-between-dcms-and-ofcom-on-the-future-of-wireless-networks-infrastructure). This complements Ofcom’s strategic review of the mobile market.
	7. Submissions of evidence should be emailed to wirelessinfrastructurestrategy@dcms.gov.uk by 25 November 2021.
	8. Anything else to share today?
		1. **UK- OFCOM** - We’re delighted to invite you to an upcoming Ofcom spectrum event: Enabling growth and innovation beyond 5G - the role of spectrum management.
			1. This will be held virtually from 3pm (BST-tbd) on 29 November.
		2. **Canada - RABC –**has a similar event with the new Spectrum Management Innovation Committee (for members)
			1. November 23 @ 13:00-14:30 EST; [https://www.rabc-cccr.ca/event/spectrum-management-innovation-committee/](https://urldefense.com/v3/__https%3A/www.rabc-cccr.ca/event/spectrum-management-innovation-committee/__;!!F7jv3iA!jY7-mZs2_CM8GYuRXCTLjh-SdU-dNvAT52DzoLXSyBPPFdDFo04b87GZlpaP4IuTUQ$)
	9. **reminders**
		1. 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](https://sistemas.anatel.gov.br/SACP/Contribuicoes/TextoConsulta.asp?CodProcesso=C2513&Tipo=1&Opcao=andamento) and is in Portuguese language only.
2. Chair presents slide 13, **ITU-R items to share**
	1. Status on ITU-R WP 5A submissions on [M.1450](https://mentor.ieee.org/802.18/dcn/21/18-21-0116-03-0000-proposed-modifications-to-itu-r-m-1450-5.docx)/[M.1801](https://mentor.ieee.org/802.18/dcn/21/18-21-0117-03-0000-proposed-modifications-to-itu-r-m-1801-2.docx) is in EC ballot, will close 21Oct21.
		1. Ballot passed 8-1-0-4, made rev04s of the submissions and sent to ITU-R liaison for upload.
	2. Anything else to share? nothing else
	3. **ongoing: 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>
	4. **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. Soon, will review actions noted at the July Plenary.
		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
	5. For miscellaneous links for ITU-R, SGs, WPs and calendars, see back up slides in agenda..
3. Chair presents slides 14 - 15, **General Discussion Items**
	1. **USA President Biden, appoints/nominates/names/designates** [**Jessica Rosenworcel**](https://www.fcc.gov/document/chairwoman-rosenworcel-statement-designation-lead-fcc) **as FCC chair, (in the middle of the Oct. Open Commission call), with congress confirmation coming.**
	2. **Also nominated was** [**Gigi Sohn**](https://en.wikipedia.org/wiki/Gigi_Sohn) **as the 4th commissioner.**
	3. **FCC NOI on Spectrum Requirements for the Internet of Things (12-353)**
		1. In mentor: <https://mentor.ieee.org/802.18/dcn/21/18-21-0108-02-0000-fcc-noi-on-spectrum-for-the-internet-of-things.docx>
	4. **Reply Comment Date: November 16, 2021, would have to start EC ballot 04Nov, next week.**
		1. **Should we try to do some reply comments?**
	5. **Some questions may be 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?
		2. 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?
	6. **FCC NOI on Spectrum Requirements for the Internet of Things**
		1. Some questions maybe of interest to IEEE 802, e.g.
			1. please refer to paragraphs 10 and 11 asking the role of unlicensed spectrum and whether additional unlicensed spectrum should be considered. **From paragraph 10:**
		2. … … … Thus, the regulatory barriers to implement an unlicensed IoT system or connect IoT devices in the home or a business are lower provided the lack of interference protection does not pose an impediment. **For example, most in-home IoT devices such as thermostats, water or gas leak detectors, and smart home controllers connect to the Internet using unlicensed Wi-Fi connections.**
			1. IEEE 802 could make a supportive statement on the bold line above.
			2. The IoT term is so broad, so may need to clarify the different IoT devices/uses
				1. question: is there any indication in the NoI of what IoT focus is here?
		3. **Some of the questions from paragraph 11:**
			1. What role have unlicensed devices played in the growth of IoT?
			2. What role is anticipated for unlicensed devices as IoT devices continue to proliferate for home and business applications?
			3. Does the lack of interference protection make unlicensed devices unsuitable for some IoT applications?
				1. IEEE 802 stds do well with sharing in general.
			4. **Is the amount of spectrum available for use by unlicensed devices adequate to meet the needs of the IoT?**
			5. Should additional spectrum be considered for unlicensed operations exclusively for IoT devices and applications?
			6. Are there unique properties of IoT devices that would be better served by targeted rule changes to the unlicensed spectrum access rules?
			7. If so, what changes would be necessary to ensure increased utility of unlicensed IoT devices.
	7. **Observation from one:** this NOI is heavy on more licensed spectrum for carriers….
		1. **After reviewing next slide, then are their others that would help in next week to work on reply comments?** Limited response, will setup ad hocs and see what response is.
4. Chair presents slide 16, **General Discussion Items – ongoing fyi - MSGs 6 GHz**
	1. The WInnforum “6 GHz Committee”, all groups meet every 2 weeks except ***Incumbent Information, interference and Test & Certification***-weekly (168 people); some docs: <https://6ghz.wirelessinnovation.org/work-group-products>
		1. <https://www.wirelessinnovation.org/6ghz-multistakeholder-committee>
		2. For access to documents from the committee, can request to be an observer from MSG below.
		3. Org: 2 focus areas:
			1. ) AFC Functional Specification -WG – includes: Interference-TG, Incumbent Info-TG, security and Protocols 3GPP-TG
			2. 2) AFC Test and Certification-WG
		4. **Anything to share? not today**
		5. **21oct:** TR-1014 (IR3) is in internal ballot, being shared with WFA AFC TG
			1. The process of coordination with the different organization has improve and time to approval is quicker.
			2. <https://www.wi-fi.org/file/afc-specification-and-test-plans> (open to all, just need contact info and privacy agreement)
	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?** meeting coming up on 29th , the initial schedule is much shorter than normal as the meetings are not lasting long.
		7. **21oct:** MWG WS#3 received briefing on work underway in WFA AFC
			1. <https://syndicated.wifinowglobal.com/resource/wi-fi-alliance-accelerates-wi-fi-6e-development-with-automated-frequency-coordination/>
5. Chair presents slide 17, **General Discussion Items – ongoing fyi - Table of IEEE 802 Stds Frequency Ranges**
	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/21/18-21-0036-08-0000-frequency-table-template.xlsx>
	4. **From ad hoc call on 28sept21 call on 26oct21 was cancelled**
		1. Updated most of the 802.15 cells/rows, less UWB ones.
		2. And proposing to swap columns D&E to get the clause numbers for the current standard by the current standards. and clarified what goes in the clause cell.
	5. The activity is entering the phase to fill in the sheet now, so more intense and time consuming.
	6. The **next meeting will be 23nov21.** (call-in in backup slides here)
6. Chair presents slide 18 **Actions Required**
	* Find additional info the Canada RABC new spectrum committee meeting coming up.
	* setup 2 ad hocs on IoT potential reply comments
	*
	*

ongoing:

* + For IEEE 802 viewpoints on WRC-23 AIs, reach out to those identified, looking for input on the viewpoints.
	1. **Proactive Spectrum Sharing – Contact Rich Kennedy if you can help or have inputs. or want to join the task force.**
1. Chair presents slide 19 Any Other Business
	1. none heard
2. Chair presents slide 20, Adjourn.
	1. **Next “weekly” teleconference (sched’d to 13jan22): 04nov –*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 the agenda.
		3. 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 802.18’s: [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 15:56et
	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
3. Attendance

|  |  |  |
| --- | --- | --- |
| **Voting Attendees:** |  | **28-Oct** |
| **Auluck** | Vijay | Self | **x** |
| **Ecclesine** | Peter | Cisco Systems, Inc. | **x** |
| **Hiertz** | Guido | Ericsson GmbH | **x** |
| **Holcomb** | Jay | Itron Inc. | **x** |
| **Kain** | Carl | USDOT, Noblis, Inc. | **x** |
| **Kenney** | John | TOYOTA InfoTechnology Center U.S.A. | **x** |
| **Kerry** | Stuart | OK‐Brit, Self | **x** |
| **Levy** | Joseph | InterDigital, Inc. | **x** |
| **Lynch** | Michael | MJ Lynch & Associates, LLC. | **x** |
| **Palm** | Stephen | Broadcom Corporation | **x** |
| **Petrick** | Al | Skyworks Solutions Inc. | **x** |
| **Rolfe** | Benjamin | Blind Creek Associates | **x** |
| **Stanley** | Dorothy | Hewlett Packard Enterprise | **x** |
| **Yaghoobi** | Hassan | Intel Corporation | **x** |
| **Yucek** | Tevfik | Qualcomm Incorporated | **x** |
|  |  |  |  |
| **Non-Voting Attendees:** |  |  |
| **Jeffries** | Timothy | FutureWei Technologies, Inc. | **x** |