IEEE P802.11
Wireless LANs

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| Wireless Next Generation (WNG) Standing CommitteeMeeting Minutes for May-2022 Electronical Meeting |
| Date: May 16, 2022 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Lei Wang | Futurewei | 2220 Central Expressway, Santa Clara, CA 95050, USA | +1-858-205-7286 | Lei.wang1@futurewei.com |
| Jim Lansford | Qualcomm | 7775 N Topeka AveCascade, CO 80809, USA | +1-719-286-8660 | Jim.lansford@ieee.org |

Abstract

Meeting Minutes for the WNG SC meetings held electronically, on May 10th and May 16th, 2022.

**WNG Meeting Session #1: May 10th, 2022, 11:15am to 1:15pm ET**

Chair: Jim Lansford (Qualcomm)

Vice Chair & Secretary: Lei Wang (Futurewei)

**Meeting Agenda:**

The meeting agenda for WNG 2022-May meeting is shown below, and also published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/22/11-22-0662-01-0wng-agenda-for-wng-sc-2022-may.pptx>

* Call Meeting to Order
* Agenda approval
* Attendance reminder
* Documentation reminder
* Announcements
* Vice chair & Secretary confirmation
* Approval of Previous meeting minutes
	+ Minutes from March 2022 WNG Meeting
	+ Minutes from April 2022 WNG special meeting
* Presentations
	+ Tuesday 10 May 2022, 11:15 – 13:15 EDT and 1900-2100 EDT
	+ Monday 16 May 2022 1900-2100 EDT
* Plans for July 2022
* Adjourn

In addition, the detailed agenda for the three WNG meeting sessions with presentations for each session is included in the agenda file, and also as shown below:



**Meeting Minutes:**

* Vice Chair called the meeting to order at 11:20am ET on Tuesday, May 10th, 2022, and showed the group the agenda file, then handed off to Chair to host the meeting.
* Chair reminded the group to record the attendance of this meeting by using the IEEE Attendance Tool. The link to the attendance tool is also provided in the chat window of the electronic meeting.
* Agenda approval:

<https://mentor.ieee.org/802.11/dcn/22/11-22-0662-01-0wng-agenda-for-wng-sc-2022-may.pptx>

* The agenda was approved by unanimous consent.
* Chair also noted the affiliation FAQ, anti-trust FAQ, ethics code, IEEE 802.11 policies and procedures, and IEEE 802 policies and procedures.
* Chair covered the voting rules for WNG SC, being a standing committee.
* Chair pointed out that the version number of the agenda file is 0662r1, which is correctly shown in the agenda file name, but not yet updated in the slide header of the agenda slides. He will correct it soon.
* Approval of previous meeting minutes for March WNG meeting and April WNG teleconference
	+ Minutes from 2022-March WNG Meeting

<https://mentor.ieee.org/802.11/dcn/22/11-22-0469-00-0wng-wng-meeting-minutes-2022-march-electronic-meeting.docx>

* + - The 2022-March WNG SC meeting minutes was approved by unanimous consent.
	+ Minutes from 2022-April WNG teleconference

<https://mentor.ieee.org/802.11/dcn/22/11-22-0619-01-0wng-minutes-teleconference-april-6-2022.docx>

* + - The 2022-April WNG SC teleconference meeting minutes was approved by unanimous consent.
* Vice Chair and Secretary Confirmation
	+ Chair informed the group that, in this May interim meeting, 802.11 Working Group (WG) needs to have elections for Task Groups (TGs) and Standing Committees (SCs) leadership positions, where TGs/SCs chairs are appointed by WG Chair, TGs/SCs Vice Chairs are elected by TGs/SCs, and TGs/SCs Secretaries are appointed by TGs/SCs chairs.
	+ WNG SC Vice Chair
		- Chair informed the group that the current WNG SC Vice Chair, Lei Wang, has indicated to continue volunteering in this role, and no other nominations have been received.
		- Chair asked if any discussion on WNG SC Vice Chair election and if any objections to re-elect Lei as WNG SC Vice Chair.
		- No discussion, no objection, with 262 attendees in the electronically meeting.
		- Chair stated that Lei has been re-elected as WNG SC Vice Chair for another 2-year term.
	+ WNG SC Secretary
		- Chair informed the group that he would like to re-appoint Lei as WNG SC secretary; and asked if any discussions and any objections.
		- No discussion, no objection, with 267 attendees in the electronically meeting.
		- Chair stated that Lei has been re-appointed as WNG SC Secretary.
* Approximately 310 people attended the WNG meeting electronically.
* Presentation #1: “Next Generation after be – follow up”, Laurent Cariou (Intel)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0729-00-0wng-next-generation-after-802-11be-follow-up.pptx>

* + Laurent presented the contribution.
	+ Summary of Discussion
		- Clarified that it is about not much UL throughput gain, with the statement on slide 7 regarding 11ax “Multi-user operation (OFDMA) brought densification benefits, but did not bring significant throughput gains in the end in most of the scenarios”
		- Explained that the requirement related to P2P is from vendors; and agreed it will be further studied.
		- Discussed and agreed that coverage, coexistence, power consumption, complexity, etc., need further investigation and study.
* Presentation #2: “Next generation WLAN beyond 11be”, Jinsoo Choi (LG Electronics)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0685-00-0wng-discussion-on-next-generation-wi-fi.pptx>

* + Jinsoo presented the contribution.
	+ Summary of Discussion
		- Discussed the challenges and feasibility of “being deterministic” in Wi-Fi networks with contention-based channel access and operating in unlicensed bands. Agreed that “deterministic” may not be realistic in dense environments.
		- Discussed how AI could be helpful to increase reliability, e.g., proper planning, congestion control, load balance, channel access control, etc.
		- Discussed and agreed that it could be a practical problem to have channel bandwidth larger than 320MHz.
* Presentation #3: “Open, Softwarized, Data-Driven 802.11 Networks”, Francesco Restuccia (Northeastern University)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0460-03-0wng-making-the-case-for-open-softwarized-data-driven-802-11-networks.pdf>

* + Francesco presented the contribution.
	+ Summary of Discussion
		- Clarified that the proposal is not just about CSI, instead, beyond CSI sensing (in 11bf), we need to generalize the collaboration by creating right interfaces and tools, to enable the AI applications and to easily deploy AI/Network optimization, so as to improve Wi-Fi performance and to bring Wi-Fi complexity / cost done, e.g., having smarter APs, self-adaptive devices, etc.
		- Discussed how to management the overhead and complexity of AI itself, e.g., needs lots of data, training, and processing; and the mentioned methods include: edge computation, don’t need to train the models from scratch every time, starting from existing knowledge, combination of getting new data and what have been learnt so far, etc.
		- Clarified that the interfaces are needed to enable AI-driven features and could depend on the supports from chipsets.
	+ Straw Poll: Do you support the creation of a TIG to describe use cases for AI/ML applicability in 802.11 systems and investigate the technical feasibility of "features enabling support of AI/ML based algorithms in the 802.11 MAC/PHY“?
		- Summary of Discussion:
			* Clarified that the expected output from a TIG is a report that may include recommendations.
			* Clarified that this proposed TIG is a separate activity from the SG proposal as mentioned in WNG contributions about “beyond be”.
		- Result: (with 267 attendees)
			* 102 yes, 41 no, 42 abstain
* Recessed at 1:16pm ET.

**WNG Meeting Session #2: May 10th, 2022, 7:00pm to 9:00pm ET**

Chair: Jim Lansford (Qualcomm)

Vice Chair & Secretary: Lei Wang (Futurewei)

**Meeting Agenda:**

The meeting agenda for WNG 2022-May meeting is published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/22/11-22-0662-01-0wng-agenda-for-wng-sc-2022-may.pptx>

**Meeting Minutes:**

* Chair called the meeting to order at 7:00pm ET on Tuesday, May 10th, 2022.
* Chair reminded the group to record the attendance of this meeting by using the IEEE Attendance Tool. The link to the attendance tool is also provided in the chat window of the electronic meeting.
* Chair also noted the affiliation FAQ, anti-trust FAQ, ethics code, IEEE 802.11 policies and procedures, and IEEE 802 policies and procedures.
* Chair covered the voting rules for WNG SC, being a standing committee.
* Chair showed the list of presentations scheduled for this WNG session:
	+ "Next Gen After 11be v2", Vinko Erceg (Broadcom)
	+ “Beyond be”, Rolf de Vegt (Qualcomm Technologies, Inc.)
	+ “Next gen WLAN”, E. Lei (Haier)
	+ “Further discussion on next generation WLAN”, Ming Gan (Huawei)
* Approximately 255 people attended the WNG meeting electronically.
* Presentation #4: "Next Gen After 11be v2", Vinko Erceg (Broadcom)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0734-00-0wng-next-gen-after-11be-v2.pptx>

* + Vinko presented the contribution.
	+ Summary of Discussion
		- Questioned and discussed the performance improvement for low end devices, e.g., single radio client devices, 2x2 client devices, considering that currently most of client devices are 2x2, still have some single radio devices.
		- Questioned and discussed how to deal with the regions without 6GHz band allocation, e.g., use MLO with 60GHz bands.
		- Clarified that the Multi-Layer Tx in the contribution refers to the use of different MCSs.
		- Questioned and discussed large bandwidth vs. UWB; and pointed out that, back to early days of 802.11, the group looked into UWB and then decided to take a different route from UWB.
		- Pointed out that the current FCC rules set the max channel bandwidth to 320MHz in 6GHz, then it would require regulatory changes for larger channel bandwidth than 320MHz.
		- Clarified that 11be feature development should keep going on as planned, and the discussions in WNG should focus on “beyond be”.
		- Questioned if 6GHz/5GHz bands are good enough for next 12 years; and the answer was that, if needed, a new group can be created to target the needs. May be open something above 10GHz bands.
* Presentation #5: “Beyond be”, Rolf de Vegt (Qualcomm Technologies, Inc.)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0708-00-0wng-beyond-be-next-step.pptx>

* + Rolf presented the contribution.
	+ Summary of Discussion
		- Discussed and agreed that the TG starting time could be sooner than May 2023, if everything about the PAR works out smoothly.
		- Questioned and discussed the direction of designing different circuits for device-level low power consumption: it is important, and it could be a separate activity. There is a WNG contribution specifically on this topic, which is scheduled to be presented in next Monday’s WNG session.
		- Clarified that the performance requirement numbers for high reliability are expected to be context / environment dependant and should be discussed in the proposed SG (Study Group).
		- Also clarified that the operation bands should be discussed in SG; and the throughput improvement will be always a target and should be on top of 11be throughput.
		- Discussed the project naming, agreed to continue the discussion, and may need to communicate with Wi-Fi Alliance (WFA) if include numbering.
* Presentation #6: “Next gen WLAN”, E Lei (Haier)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0697-00-0wng-next-gen-wlan-and-xr.pptx>

* + Yaxin Wen presented the contribution on behalf of E Lei, due to E Lei’s availability.
	+ Summary of Discussion
		- None.
* Presentation #7: “Further discussion on next generation WLAN”, Ming Gan (Huawei)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0723-00-0wng-further-discussion-on-next-generation-wlan.pptx>

* + Ming presented the contribution.
	+ Summary of Discussion
		- Clarified that the proposal of this contribution could be done either in the TIG as proposed by a previous WNG contribution or in the SG as proposed by some other WNG contributions, although the presenter prefers to doing it in SG.
		- Questioned and discussed that different ML types may need different supports from 802.11 MAC/PHY, and the proposal is to have a unified design to support all 4 types of MLs.
		- Discussed the concerns that the MLs need a large amount of data, high complexity, and high processing power for WLAN network/devices; and the possible schemes could include using offline computations, using combination of real data and training data, having some light training, etc.
		- Discussed how to do a fair comparison among the ML algorithms; one possible solution could be first to decide which ML algorithms for a certain use case, then compare them in the context of use case.
		- Questioned what needs to be standardized with the MLs, and the answer was, to start with, we need to specify what needs to be exchanged over air, to have common framework and input/output interfaces.
		- Questioned and discussed how MLs work for real-time functions/features, e.g., channel access, and agreed that the ML use cases could be limited, and further studies are needed.
* Recessed at 9:00pm ET.

**WNG Meeting Session #3: May 16th, 2022, 7:00pm to 9:00pm ET**

Chair: Jim Lansford (Qualcomm)

Vice Chair & Secretary: Lei Wang (Futurewei)

**Meeting Agenda:**

The meeting agenda for WNG 2022-May meeting is published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/22/11-22-0662-01-0wng-agenda-for-wng-sc-2022-may.pptx>

**Meeting Minutes:**

* Chair called the meeting to order at 7:01pm ET on Monday, May 16th, 2022.
* Chair reminded the group to record the attendance of this meeting by using the IEEE Attendance Tool. The link to the attendance tool is also provided in the chat window of the electronic meeting.
* Chair also noted the affiliation FAQ, anti-trust FAQ, ethics code, IEEE 802.11 policies and procedures, and IEEE 802 policies and procedures.
* Chair covered the voting rules for WNG SC, being a standing committee.
* Chair showed the list of presentations scheduled for this WNG session:
	+ “Next Generation WLAN beyond 11be”, Chunyu Hu (Meta)
	+ “Thoughts on Next Gen WLAN”, Xiaofei Wang (Interdigital)
	+ “Ambient power enabled IOT for Wi-Fi”, Lei Huang (OPPO)
* Approximately 194 people attended the WNG meeting electronically.
* Summary of discussion before the presentations:
	+ Questioned what the consequences of the Straw Poll (SP) in a previous WNG session regarding AI/ML for 802.11 networks would be.
	+ WNG Chair clarified that the SP is to assess the options of the group and to provide information to the presenter. It would be totally up to the presenter to decide what to do next.
	+ WG Chair agreed with WNG Chair about the consequences of SPs; and also informed that a motion corresponding to the WNG AI/ML SP is expected in the Closing Plenary of 802.11 May interim electronical meeting on Tuesday, May 17, 2022, referring to slide 10 of document 22/597r1.
	+ WG Chair also clarified that, although people can bring up motions to 802.11 meetings, it would be encouraged to inform the chair in advance.
* Presentation #8: “Next Generation WLAN beyond 11be”, Chunyu Hu (Meta)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0779-00-0wng-802-11bx-enabling-metaverse-metaverse-ar-vr-and-wearables.pptx>

* + Chunyu presented the contribution.
	+ Summary of Discussion
		- Questioned the average latency and jitter regarding the latency numbers referred to in the presentation; and the answer emphasized the importance of controlling jitter and having predicable latency, also pointed out that different applications will have different requirements on latency and jitter.
		- Clarified that “Native” support to peer-to-peer links means further supports at PHY/MAC level, comparing to the existing support in 802.11; and details are subject to further discussion.
		- Questioned and discussed the density levels that need to be supported by WLAN; and pointed out that different applications have different usage scenarios, for example, home usage, office environment, want all people to use it, don’t want to limit number of users.
		- Pointed out that WLAN may have a different scope than 3GPP, regarding the latency, due to 3GPP’s big task of its core network.
		- Pointed out that, in a sub-20ms MTP latency, the percentage of communication latency may depend on different applications.
* Presentation #9: “Thoughts on Next Gen WLAN”, Xiaofei Wang (Interdigital)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0694-00-0wng-thoughts-on-next-gen-wlan.pptx>

* + Xiaofei presented the contribution.
	+ Summary of Discussion
		- Questioned and discussed the process for multi-generation project planning; agreed not aware of any existing process supporting it, just a suggestion for the group to consider.
		- Discussed how HARQ can improve throughput.
		- Provided an example for the proposal of “Better Integration of various 802.11 amendments”, i.e., 11bf, combining communication and sensing.
* Presentation #10: “Ambient power enabled IOT for Wi-Fi”, Lei Huang (OPPO)

<https://mentor.ieee.org/802.11/dcn/22/11-22-0645-02-0wng-ambient-power-enabled-iot-for-wi-fi.pptx>

* + Lei Huang presented the contribution.
	+ Summary of Discussion
		- Clarified that the proposal is to have a combined circuit for both energy harvesting and low-power transceiver.
		- Clarified that this proposal is to have a single radio station, while 11ba requires WLAN radio and a companion radio.
		- Questioned the max distance for an IoT device to maintain operation using energy harvesting; and the answer is about 20 meters for sensor devices at sub-1GHz, based on rough calculations.
		- Commented the scope of the current proposal; and suggested and agreed not to narrow down the scope for now, e.g., frequency bands, candidate technologies, etc., instead, allow further broad discussions on the topics.
		- Clarified that the proposal is about bi-directional traffic, not UL only.
	+ Straw Poll #1: Do you think ambient power-enabled IoT for WLAN would be an interesting topic for 802.11 to study as a separate activity?
		- Summary of Discussion:
			* Suggested and agreed to add “as a separate activity” at the end of straw poll text.
		- Result (with 187 attendees)
			* 79 Yes, 23 No, 28 abstain
	+ Straw Poll #2: Do you support the formation of a new 802.11 Topic Interest Group (TIG) for “Support of Ambient Power-Enabled IoT for WLAN”?
		- Summary of Discussion:
			* Suggested and agreed to change “Study Group (SG)” to “Topic Interest Group (TIG)” in the straw poll text.
			* Suggested and agreed to remove the text about target bands in the straw poll text.
		- Result: (with 186 attendees)
			* 70 Yes, 21 No, 36 abstain
* Plans for July 2022:
	+ Call for contributions: WNG chair will issue a call for contributions before 802.11 plenary meeting in July 2022.
* Adjourned at 9:03pm ET.