IEEE P802.11
Wireless LANs

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| IEEE 802.11bd November 2020 meeting minutes - Plenary  |
| Date: 2020-11-03 |
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Abstract

This document includes minutes of all IEEE 802.11bd teleconferences occurring during the 802.11 November Plenary meeting – 2-10 November 2020.

Version Tracking:

R0: 3 November teleconference session 9:00-11:00 am ET and 6 November teleconference session 9:00-11:00 am ET

# Tuesday 3 November 2020 @ 9:00-11:00 am ET

## Opening (IEEE 802.11-20/1561r5)

* 1. Call to order 9:04 am ET
	2. Chair instructed members to record attendance in IMAT.
	3. Chair introduced the patent policy and meeting rules (slides 2-6).
	4. No response to the call for patents.
	5. Chair reviewed Meeting Guidelines (slides 7-10)
	6. Chair reviewed Teleconference plan, TGbd Documents, and TGbd Timeline, which has one month milestone delay from September 2020 to October 2020 (slides 11-13).
	7. Chair introduced the task group leadership (slide 25)

## Agenda (IEEE 802.11-20/1561r5)

* 1. Chair presented the agenda: https://mentor.ieee.org/802.11/dcn/20/11-20-1561-05-00bd-tgbd-teleconference-agenda-for-oct-2020.pptx. (slide 27):
* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approval of agenda
* Approve the appointment of TGbd Secretary
* Approve the minutes
* Future Teleconference plan
* Presentations and discussion (Call for submission)
	+ 11-20/1166r3, NGV 11bd Architecture Discussion, Joseph Levy (InterDigital)
	+ 11-20/1728, 802-11bd-NGV-Ranging-Status-and-Types, Stephan Sand (DLR)
* Next teleconference on Nov. 6th
* Adjourn
	1. Chair amended the agenda: adding 1 item to the presentations and discussion section:
	+ 11-20/1761, 11az ranging in 11bd, Bahar Sadeghi (Intel)
	1. The updated agenda was approved without objection

### Approval of the appointment of TGbd Secretary

* 1. Approved with unanimous consensus.

### Approval of the TC minutes

* 1. Move to approve the teleconference minutes for September Interim week meetings (11-20/1489r1) and teleconference minutes for October meetings (11-20/1655r3).

 - <https://mentor.ieee.org/802.11/dcn/20/11-20-1489-01-00bd-tgbd-september-2020->
 teleconference-minutes-interim.docx

 - https://mentor.ieee.org/802.11/dcn/20/11-20-1655-03-00bd-tgbd-october-2020-
 teleconference-minutes.docx

Motion is approved unanimously.

### 11-20/1166r3, NGV 11bd Architecture Discussion, Joseph Levy (InterDigital)

* 1. Presented by Joseph Levy (InterDigital)
	2. It was noted that there is a typo on slide 4.
	3. It was noted that there is a typo for reference 6.
	4. Chair asked Joseph Levy to submit 1166r4 to Nov. 4th ARC teleconference after fixing the typos.

### 11-20/1728r0, 802.11bd NGV Ranging Status and Types, Stephan Sand (DLR)

* 1. Presented by Stephan Sand (DLR)
	2. A question was asked whether it means that 11bd devices will implement FTM EDCA since it says that FTM EDCA does not need 11bd changes on slide 5. The presenter answered that if this method will be mandatory for 11bd devices, no further changes are required.
	3. A question was asked whether measurement report for NTB ranging will be reported immediately without delay. The presenter answered that low latency for NTB ranging will be achieved if all exchanges will be done in one TXOP. A following comment was made that the requirements of all 11bd devices supporting NTB ranging and supporting immediate measurement feedback are too high. The presenter agrees that the requirements are high and that while a non-immediate measurement feedback reduces these requirements it also increases the latency
	4. A question was asked whether Passive NTB is defined in NGV. The presenter answered that if NTB ranging is implemented the RSTA and ISTA would have to exchange LMRs and LCI reports to enable stations to obtain their relative position passively. A following comment was made that such protocols and devices are not existing in 11az right now and we would need to define these messages in 11bd. The presenter clarifies that the LMR and LCI report messages are already defined in 11az
	5. A comment was made that the presentation is very useful. A following question was asked whether specific LTF training sequence is needed for FTM EDCA. A commenter answered that FTM frames do not use a specific LTF training sequence, and it is receiver implementation specific, which sequences are used for estimating the TOA.
	6. A question was asked why no need for advertisement regarding Mandatory vs Optional Ranging types. The presenter answered that if NTB ranging is mandatory for every NGV device, then every NGV device can do NTB ranging, hence no need for advertisement.
	7. SPs will be run after the other related presentation is presented.

### 11-20/1761r0, 11az ranging in 11bd, Bahar Sadeghi (Intel)

* 1. Presented by Bahar Sadeghi (Intel).
	2. A question was asked how LMR can be done is 3 TXOPs illustrated on slide 6 since 6-7 TXOPs may be required for LMR. The presenter answered that the measurement may be able to be done in 3 TXOPs for some scenarios and use case.
	3. A question was asked about 10 MHz channel ranging accuracy. The presenter answered that it is not accurate, but the inaccuracy also depends on channel model. A following comment was made that typical WiFi devices have several meters inaccuracy. The presenter answered that the inaccuracy depends on applications, e.g., meters on parking lot has much smaller inaccuracy. The presenter also commented that the more accuracy, the more applications you can apply the ranging.
	4. A comment was made that FCC recently announced that no ITS band in 5.9 GHz will be allocated for 11p or 11bd. NGV devices can possibly operate in 60 GHz unlicensed band with OCB. A following question was asked how this proposal will be changed given FCC recent decision, and how this proposal will affect regions outside US. The presenter answered that we can do ranging in 60GHz unlicensed band. If ITS band is available in other regions, we can use 11bd ranging as it is, and apply 11az ranging in non ITS bands. The presenter stated to look at the implications for NTB ranging if no ITS band is available. A further comment was made that under FCC new rule, ITS band will be operated with 3GPP protocol instead of IEEE protocol, i.e., advertise under CV2X channel. The presenter answered that equivalent SCH under 1609 can be useful for advertisement.
	5. A comment was made that high accuracy ranging is challenging, but it is possible even for 10 and 20 MHz. For instance, GPS is only using 1 MHz signals. Centimeter accuracy can be achieved depending on compute power and implemented algorithms.
	6. A question was asked if safety critical use cases are considered in the proposal. The presenter answered that it can be done if no urgency is required. A comment was made that CCH and SCH for safety are available in Europe in 5.9 GHz ITS band, some are in WiFi unlicensed band, so minimum change for 11bd to support ranging.
	7. Both presenters agreed to harmonize SPs offline before next teleconference.

### Adjourn

* 1. Chair announced the next TGbd teleconference will be on Friday 6 November @ 9:00 am ET.
	2. Chair recessed the meeting at 11:00 am ET.

Attendance from IMAT pending

# Friday 6 November 2020 @ 9:00-11:00 am ET

## Opening (IEEE 802.11-20/1561r7)

* 1. Call to order 9:00 am ET
	2. Chair instructed members to record attendance in IMAT.
	3. Chair introduced the patent policy and meeting rules (slides 2-6).
	4. No response to the call for patents.
	5. Chair reviewed Meeting Guidelines (slides 7-10)
	6. Chair reviewed Teleconference plan, TGbd Documents, and TGbd Timeline (slides 11-13)
	7. Chair introduced the task group leadership (slide 31).

## Agenda (IEEE 802.11-20/1352r7)

* 1. Chair presented the agenda: <https://mentor.ieee.org/802.11/dcn/20/11-20-1561-07-00bd-tgbd-teleconference-agenda-for-oct-2020.pptx> (slide 33):
* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approval of agenda
* Presentations and discussion (Call for submission)
	+ 11-20/1761r2(updated), 11az ranging in 11bd, Bahar Sadeghi (Intel)
	+ 11-20/1728r1(updated), 802-11bd-NGV-Ranging-Status-and-Types, Stephan Sand (DLR)
	+ SPs
	+ 11-20/1802, summary of ARC SC discussion on 11-20/1164r4
* Next teleconference on Nov. 20th
* Adjourn
	1. The agenda was approved without objection

### 11-20/1761r2, 11az ranging in 11bd, Bahar Sadeghi (Intel)

* 1. Presenter described changes made in r2 of the document, mainly spec work to enable ranging feature in 11bd.
	2. A comment was made that NPRM will be adopted in US in two weeks, which will disallow WiFi activity in 5.9 GHz ITS band, only lower 45 MHz in unlicensed 5.9 GHz band will be available for NGV devices, while contending with other WiFi devices such as 11n, 11ac devices. A following comment was made that advertisement for ranging can be sent via CV2X channel in ITS band, while other messages exchanged in the ranging measurements can be done in lower 45MHz unlicensed channels. On the other hand, ITS band still can be used for 802.11p and 802.11bd in Europe for now. The presenter answered that this coming restriction on ITS band in US for ranging advertisement is already being considered in her proposal.

### 11-20/1728r1, 802-11bd-NGV-Ranging-Status-and-Types, Stephan Sand (DLR)

* 1. Presenter described changes made in r1 of the document, more detailed descriptions of various 11az ranging methods relevant to NGV operations.
	2. A question was asked for the comparisons among various ranging methods for security/privacy on slide 5, some methods are marked with “-”, while Passive TB is marked as “No”, what is difference between “No” and “-“ values. The presenter answered that “-” also means “No”.
	3. A comment was made regarding FTM EDCA vs NTB, NTB ranging has much lower medium overhead in NGV band with unicast transmission, and it requires at most two frames in the initiating phase. Afterwards four to five frames would be transmitted in one TXOP. NTB ranging can transmit more measurements and is more efficient.
	4. A comment was made regarding Passive Ranging, TF passive TB ranging Sounding vs NDPA; passive ranging has twice the error variance compared to active ranging. Passive TB ranging allows the PSTAs to detect the ranging window. In contrast for passive NTB without similar mechanism a PSTA might miss the NTB message exchange, it will not know when the next message exchange will come. Passive TB ranging is unique, it may worth looking into. NDPA can be replaced by trigger NDP, which is also a control frame. A further comment was made that passive TB ranging is more suitable for ranging within infrastructures such as parking lots, which can get two measurements within very tight timing. PSTAs can overhear TF NDPA. Passive ranging is more suitable for ranging among random, pair-wised devices, which only cares for linear distances. An additional comment was made that 11az passive TB ranging uses full band, not OFDMA to send messages, specifically 11az passive TB ranging uses sequential communication to each individual user, that is why passive TB ranging is preferred. It is different than HE OFDMA communications. The presenter answered that 11bd has channel bandwidth limitation (10/20 MHz channel), and many cars require services at the same time, scalability is required to employ 11az ranging method in the 5.9 GHz band.
	5. A comment was made that LTF repetitions can be (extend range, security) applied in NDP, which provides better SNR as long as the channel coherence time is larger than the duration of the LTF repetitions, hence much better measurements. The presenter answered that currently 11bd has only up to 2 spatial streams, and only up to 2 LTF symbols, hence the advantage from LTF repetition is only up to 3dB. A further comment was made that if LTF repetition is used outside ITS band, it will be larger improvement.
	6. A question was asked why there is no NTB negotiation for ITS band in the ranging process. The editor answered that parameter negotiation can be done in management frames in higher layer. Two frames exchanges are needed before measurement. A following comment was made that since 11bd doesn’t use encryption and decryption, then we will have to enable it just for security ranging.
	7. A comment was made that since Passive NTB Ranging is not defined in 11az, then we have to define this as a ranging variant. The presenter confirmed that we will have to define it and the negotiation procedure before the measurements if Passive NTB Ranging is adopted for NGV.
	8. A comment was made that NTB ranging is not just one TXOP, you need two TXOPs for negotiation, and possibly two more TXOPs due to delayed feedback. The presenter answered that one TXOP for NTB ranging in the presentation only considers the measurement exchange with an immediate LMR feedback for low latency in the highly dynamic vehicular environment, but no negotiation or non-immediate LMR feedback.

### Straw Poll for 11-20/1728r2, 802-11bd-NGV-Ranging-Status-and-Types, Stephan Sand (DLR)

* 1. Discussion: A question was asked why we need to change from RTT to NTB for ranging. The presenter answered that he just wants to make it very specific. A following question was asked if NTB excludes TB ranging supported in 11az. The presenter answered that the question is addressed in SP #2 and SP #3. The presenter further commented that 11bd focuses on one ranging type. Fundamentally it is RTT measurement, to facilitate the PSTAs overhearing the message exchanges to do the measurements.
	2. Straw Poll: “Do you agree to add in the SFD “11bd supports distance measurement using NTB ranging for 10MHz and 20MHz bandwidth PPDUs in the 5.9 GHz band. This feature is optional.””?
	3. Straw Poll results: 21 yes / 0 no / 5 abstain / 26 no response

### Motion for 11-20/1728r2, 802-11bd-NGV-Ranging-Status-and-Types, Stephan Sand (DLR)

* 1. Motion: Move to add in the SFD “11bd supports distance measurement using NTB ranging for 10MHz and 20MHz bandwidth PPDUs in the 5.9 GHz band. This feature is optional.”
	2. Moved: Stephan, Seconded: Qinghua Li
	3. No discussion of the Motion
	4. Motion is approved unanimously

### Straw Poll for 11-20/1728r2, 802-11bd-NGV-Ranging-Status-and-Types, Stephan Sand (DLR)

* 1. Discussion: A question was asked why passive NTB ranging is needed for positioning since it can be done via GPS. The presenter answered that GPS is not reliable sometimes due to low power, in urban canyons due to multipath propagation and not reliable within infrastructures such as parking garages or tunnels. A following question was asked about how to initiate passive NTB ranging exchange. The presenter answered that announcements related to positioning need to be transmitted.
	2. Straw Poll: “Do you agree to add in the SFD “11bd supports distance measurement using hyperbolic positioning using differential time of arrival for 10MHz and 20MHz bandwidth PPDUs in the 5.9 GHz band. This feature is optional.””?
	3. Straw Poll is deferred.

### Straw Poll for 11-20/1728r2, 802-11bd-NGV-Ranging-Status-and-Types, Stephan Sand (DLR)

* 1. Discussion: A comment is made that positioning is useful, 11bd should support it regardless 5.9GHz band or outside the 5.9GHz band. GPS positioning has been used for many years, it should not be replaced with this alternative ranging method. A following question was asked that whether it is intended to define MAC to support NTB ranging for positioning. The editor answered that this is done in higher layer so we do not need to do anything in spec. 1609 control frames can be used to do the advertisement. The editor further clarified that the 11bd spec needs to include texts “11bd devices rely on 1609 control frames to do capability discovery”, then no 11bd spec is needed except pointing out that capability discovery is done in higher layer.
	2. Straw Poll: “Do you agree to add in the SFD “11bd supports negotiation of ranging features using higher layer mechanisms.””?
	3. Straw Poll will be run next TC due to time constraint.

### Closing

* 1. Chair announced the next TGbd teleconference will be on Friday 20 Nov @ 10:00 am ET
	2. Chair recessed the meeting at 11:02 am ET.

Attendance from IMAT pending

# Next Meetings

Working Group Plenary:

Online, TBS

Teleconferences:

TBS

 Meeting Documents:

 <https://mentor.ieee.org/802.11/documents>

 Task Group Email reflector:

 <http://www.ieee802.org/11/email/stds-802-11-tgbd/index.html>

 Website:

 <http://www.ieee802.org/11/Reports/tgbd_update.htm>