IEEE P802.11  
Wireless LANs

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| IEEE 802.11 TGbq  Plenary Meeting Minutes July 2025 | | | | |
| Date: 2025-09-02 | | | | |
| Author(s): | | | | |
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| Jonghoe Koo | Samsung Electronics |  |  | jh89.koo@samsung.com |

Abstract

This document contains the IEEE 802.11 TGbq minutes for the July Plenary 2025.

Revision history:

R0: initial version

R1 some editorial changes

R2 some updates on the record of the discussion for the presentation of IEEE 11-25/1395r1

Abbreviations:

Q Question

A Answer

C Comment

# Tuesday PM1, July 29, 2025, 14:30pm - 16:30pm (CET)

TGbq Chair: Edward Au (Huawei)

TGbq Vice-Chair: Rui Cao (NXP)

TGbq Vice-Chair: Abhishek Patil (Qualcomm)

TGbq Vice-Chair: Sang Kim (LG Electronics)

TGbq Secretary: Jonghoe Koo (Samsung Electronics)

TGbq Editor: Cheng Chen (Intel)

**Opening formalities**

1. The IEEE 802.11 TGbq meeting was called to order at 14:30pm CET by the Chair.
2. Chair introduced the TGbq leadership members.
3. Chair reminded the meeting registration.
4. Chair presented the TGbq meeting agenda [IEEE 802.11-25/1055r3](https://mentor.ieee.org/802.11/dcn/25/11-25-1055-03-00bq-tgbq-agenda-2025-july-plenary.xlsx).
5. Chair reviewed the meeting agenda and the agenda was approved by unanimous consent.

**[Administrative items]**

1. Chair presented TGbq supplementary materials [IEEE 802.11-25/1056r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1056-00-00bq-supplementary-material-for-2025-july-plenary.pptx) slides.
2. Chair reviewed IEEE 802 required notices (emphasizing to ensure to announce name and affiliation at the first time to speak, anti-trust compliance, IEEE 802 WG rules and policies, etc.), IEEE SA meeting guidelines, IEEE Codes of Ethics and Conduct, IEEE individual process, and IEEE-SA standards activities with the fair and equitable consideration.
3. Chair reminded all to record their attendance in IMAT and other meeting reminders.

## General business

**Meeting minutes**

1. Motion (Procedural): Move to approve the May 2025 interim meeting minutes ([25/0940r3](https://mentor.ieee.org/802.11/dcn/25/11-25-0940-03-00bq-tgbq-may-2025-interim-meeting-minutes.docx)).
   1. Moved: Jonghoe Koo (Samsung Electronics)
   2. Seconded: Sang Kim (LG Electronics)
   3. Discussion: None
   4. Result: Approved by unanimous consent

**Task Group chair’s report**

1. Chair shared the status of the IEEE 802.11 TGbq as posted on the website: (<http://ieee802.org/11/Reports/tgbq_update.htm>)
2. Chair mentioned the background of TGbq and the MAC/PHY technology scope. Chair also noted that it has received approval from LMSC and SA. Chair shared that there are brief records and agendas for the TGbq February and April teleconference calls, as well as the TGbq March and May plenary/interim meetings.

**Contributions**

**Presentation of** [**IEEE 11-25/1125r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1125-00-00bq-immw-channel-bandwidth-and-throughput-discussions.pptx)**, IMMW Channel Bandwidth and Throughput Discussions (Alfonso Fernandez, Nokia)**

1. Alfonso presented [IEEE 11-25/1125r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1125-00-00bq-immw-channel-bandwidth-and-throughput-discussions.pptx).
2. Q: 11bq PPDU is basically designed based on the existing sub-7GHz PHY. Could you elaborate how to make it possible to use 5.12GHz bandwidth by reusing the existing sub-7GHz PHY?
3. A: We need a short subcarrier spacing. Otherwise, FFT size becomes very long. If we combine the design parameter numbers of 2.4GHz in a good manner, then 5.12GHz bandwidth is possible with reasonable FFT size.
4. Q: Short subcarrier spacing is achieved by upclocking the existing PHY, e.g., 8x upclocking. However, there are no parameters that can be used for upclocking to make 5.12GHz bandwidth. Without discussing the PHY numerology and upclocking rate, it is not easy to see the feasibility of 5.12GHz bandwidth.
5. A: We can integrate multiple things from different frequency bands and combine them with appropriate tuning to get the subcarrier spacing required to implement 5.12GHz bandwidth.
6. Q: There is a trade-off between cost and performance. If we consider the cost for implementation, more than 2GHz may not be reasonable. Considering the minimum throughput, 160MHz bandwidth is best for minimum bandwidth. In addition, in order to make many commercial devices utilize 60GHz, 160MHz is good as the minimum bandwidth. 640MHz or 1280MHz bandwidth is preferred as the maximum bandwidth in consideration of the reasonable cost.
7. A: My opinion is not to limit power and bandwidth. The future devices may support wider bandwidth for higher performance. If we combine the current parameter numbers, we can achieve higher capacity. I insist 11bq should cover 5.12GHz bandwidth for future usage.
8. Q: I think the 5.12GHz bandwidth is quite aggressive. It is not realistic in terms of the cost to implement and deployment. If we need a wider coverage, we can use sub-7GHz link which is the mandatory for 11bq devices. 5120MHz is not realistic in both commercialization and practicality.
9. A: My main scenario is a room scenario. It can cover a room with very high throughput at different rooms in home with Fiber-to-the-Home (FTTH).

**Presentation of** [**IEEE 11-25/1304r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1304-00-00bq-discussion-on-trn-field-in-immw-ppdu.pptx)**, Discussion on TRN field in IMMW PPDU (Mengshi Hu, Huawei)**

1. Mengshi presented [IEEE 11-25/1304r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1304-00-00bq-discussion-on-trn-field-in-immw-ppdu.pptx).
2. Q: In slide 9, we may need to consider PHY limitation to assess the necessity of defining TRN in TGbq. In slide 6, among the considerations for the TRN field structure, one of the objectives is OFDM phase tracking. The purpose is to align the phase, which depends on the phase model used. Therefore, it would be beneficial to carefully design TRN by considering PHY and system-level factors.
3. A: Thanks for the comments.
4. Q: In the diagram, the TRN follows the data transmission portion.
5. A: This could be based on different use cases. TRN is appended after the data portion. If a user is moving slowly, then we can first transmit data and then check the movement based on the subsequent TRN and beam tracking operation. In the initial SLS, data is not required because the focus is solely on determining whether TRN is successfully received or not.
6. Q: I understand that in some cases, data is included, while in others, only TRN is used. In such scenarios, should the format of the TRN remain the same or be different?
7. A: This could be related to the MAC topic. For instance, when considering lightweight beacons or sector-level sweeps, the role of the preamble and how it functions should also be carefully considered.

**Presentation of** [**IEEE 11-25/1300r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1300-00-00bq-on-numerology-and-bandwidth-for-immw.pptx)**, On Numerology and Bandwidth for IMMW (Jiqing Ni, Oppo)**

1. Jiqing presented [IEEE 11-25/1300r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1300-00-00bq-on-numerology-and-bandwidth-for-immw.pptx).
2. Q: In slide 4, first value of the SCS, 312.5 kHz, corresponds to a 512 FFT size. The appropriate numerology for this configuration is 468 data tones and 16 pilot tones. However, the table below indicates 416 data tones. Could you clarify this?
3. A: This is for simulation purposes, to apply the same coding parameters as other configuration values.
4. Q: In slide 6, could you elaborate further on why the current submodule cannot be directly reused by upclocking?
5. A: In the current product, carrier sensing is performed only on the primary channel at 20 MHz. If the channel width is increased to 40 or 80 MHz, the working clock will also change accordingly. In the current product, it is challenging to apply a working clock greater than 320 MHz.
6. Q: In slide 5, in the simulation results, you applied PN. Why does the narrowest subcarrier spacing not lead to the worst performance?
7. A: As the tone spacing increases, the number of PTs decreases. The number of PTs would impact to the PER performance.
8. Q: Regarding the maximum bandwidth, is there a specific reason for limiting it to 640 MHz?
9. A: In case where mmWave links are used alongside sub-7 GHz, it seems that bandwidth higher than 640 MHz may not be necessary.
10. Q: I proposed using bandwidths up to 1280 or 2560 MHz. Let’s have further discussion on this.
11. Q: In your simulation results, are you claiming that smaller subcarriers yield the best performance though it causes the most severe ICI?
12. A: For 64QAM, different tone spacing gives similar performance while 2.5MHz tone spacing has better performance for 256QAM according to the simulation results.

**Presentation of** [**IEEE 11-25/1301r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1301-00-00bq-on-reusing-existing-phy-spec-in-sub7-25ghz-bands-for-immw.pptx)**, On Reusing Existing PHY Spec in Sub7.25GHz Bands for IMMW (Jiqing Ni, Oppo)**

1. Jiqing presented [IEEE 11-25/1301r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1301-00-00bq-on-reusing-existing-phy-spec-in-sub7-25ghz-bands-for-immw.pptx).
2. Q: In slide 6, even if Nss is 1, mLTF might still be necessary. For sub-7 GHz, there is a 320 MHz PPDU, and mLTF0 is either 80 µs or 20 µs depending on the implementation. However, this is not directly a 320 MHz bandwidth LTF. Additionally, how is the 640 MHz PPDU decoded?
3. A: Yes, wider bandwidth PPDU may need the mLTF.
4. Q: The front part of the preamble can be reused from sub-7 GHz, and a bandwidth-specific portion can be appended afterward.
5. Q: In slide 3, are you considering the operation of a single radio transitioning between lower and higher bands? From a feasibility perspective, the implementation differs between lower and higher bands.
6. A: While the RF part differs, other modules can be reused.
7. Q: In slide 5, carrier sensing (CS) in sub-7GHz is performed at 20 MHz, but in 60 GHz, it may need to be conducted over a wider bandwidth.
8. A: By reusing the CS part of sub-7 GHz, cost reduction can be achieved.
9. Q: Are you considering different upsampling rates for CS and data reception?
10. A: We have discussed the ppm requirement. If the ppm requirement is the same, upsampling is not necessary.

**Closing formalities**

1. Chair mentioned that there will be three MAC contribution presentations at the next meeting.
2. Chair asked members to review the Liason from the Telecommunication Engineering Centre (TEC), India [(IEEE 11-25/1334r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1334-00-0000-liaison-from-tec-india.docx)).
3. Chair requested to be informed if there is a need for a straw poll discussion regarding the previous presentations. Chair stated that he would allocate a slot for discussing the requested SP during the September Interim or teleconference call according to the request.
4. The next meeting is scheduled from 19:30pm to 21:30pm CET on Tuesday, July 29.
5. Chair reminded the meeting registration.
6. The chair announced that the meeting is recessed at 16:19pm CET.

# Tuesday PM3, July 29, 2025, 19:30pm - 21:30pm (CET)

TGbq Chair: Edward Au (Huawei)

TGbq Vice-Chair: Rui Cao (NXP)

TGbq Vice-Chair: Abhishek Patil (Qualcomm)

TGbq Vice-Chair: Sang Kim (LG Electronics)

TGbq Secretary: Jonghoe Koo (Samsung Electronics)

TGbq Editor: Cheng Chen (Intel)

**Opening formalities**

1. The IEEE 802.11 TGbq meeting was called to order at 19:30pm CET by the Chair.
2. Chair introduced the TGbq leadership members.
3. Chair reminded the meeting registration.
4. Chair presented the TGbq meeting agenda [IEEE 802.11-25/1055r4](https://mentor.ieee.org/802.11/dcn/25/11-25-1055-04-00bq-tgbq-agenda-2025-july-plenary.xlsx).
5. Chair reviewed the meeting agenda and the agenda was approved by unanimous consent.
6. Chair presented TGbq supplementary materials [IEEE 802.11-25/1056r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1056-00-00bq-supplementary-material-for-2025-july-plenary.pptx) slides.
7. Chair reviewed IEEE 802 required notices (emphasizing to ensure to announce name and affiliation at the first time to speak, anti-trust compliance, IEEE 802 WG rules and policies, etc.), IEEE SA meeting guidelines, IEEE Codes of Ethics and Conduct, IEEE individual process, and IEEE-SA standards activities with the fair and equitable consideration.
8. Chair reminded all to record their attendance in IMAT and other meeting reminders.

**Contributions**

**Presentation of** [**IEEE 11-25/1193r1**](https://mentor.ieee.org/802.11/dcn/25/11-25-1193-01-00bq-on-demand-immw-link-activation.pptx)**, On-demand IMMW link activation (Jonghoe Koo, Samsung)**

1. Jonghoe presented [IEEE 11-25/1193r1](https://mentor.ieee.org/802.11/dcn/25/11-25-1193-01-00bq-on-demand-immw-link-activation.pptx).
2. Q: Establishing sub-7GHz link first and then subsequently adding a mmWave link may cause the drawback of additional delay required for the mmWave link’s authentication procedure.
3. A: The purpose of adding mmWave link later is to minimize the use of the mmWave link as much as possible and to activate the mmWave link only if the non-AP MLD wants to use a service based on the mmWave link. If a mmWave link is added later, there will be initial overhead for the mmWave addition and delay required for initial beamforming training. We need more discussion to reduce this initial mmWave link preparation time.
4. Q: To support the use of mmWave in client devices, are you considering using mmWave beacons or obtaining relevant information through sub-7GHz link?
5. A: Due to the very narrow mmWave coverage, it is assumed that users can identify areas where mmWave link service is available. When a user enters mmWave link coverage or a zone supporting mmWave service and initiates an application that operates on a mmWave link, the mmWave link can then be utilized.
6. Q: I think that ICF/ICR in sub-7GHz link can be used to wake up mmWave link if needed.
7. A: The user device mainly uses sub-7GHz link. There should be a trigger point to initiate mmWave link usage, e.g. by sub-7GHz link signalling as you mentioned.
8. Q: If sub-7GHz and mmWave links are independently associated, how would mmWave link-related information or context exchange occur through the sub-7GHz link? Clarification is needed regarding the meaning of "mmWave link associated." The concept is ambiguous.
9. A: According to the state machine diagram, the association status can vary for each link. The statement “the mmWave link is associated” means that a mmWave link exists as a setup link between the non-AP MLD and the AP MLD as defined in the MLO concept.

**Presentation of** [**IEEE 11-25/1312r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1312-00-00bq-immw-channel-access-considerations.pptx)**, IMMW Channel Access Considerations (Charlie Pettersson, Ericsson)**

1. Charlie presented [IEEE 11-25/1312r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1312-00-00bq-immw-channel-access-considerations.pptx).
2. Q: In slide 4, you said that for the high PSD mode, 30 dB directivity gain is required. Could you clarify that there are no requirements for low PSD mode? Is it related to omni-directional?
3. A: Yes, it is. There may be a different requirement for low PSD mode, e.g., rate adaption or transmit power control. The harmonized standard can support both High and Low PSD modes.
4. Q: For many Wi-Fi applications, 30 dB directivity antenna gains looks too much. How does the value of 30 dB come from?
5. A: This is one of the implementation options. We cannot restrict to implement a chip not supporting 30 dB directivity antenna gain.
6. Q: In slide 6, if we consider initially performing rough beam training, determining the sector, and then later conducting beam refinement, a narrow beam mode can be used after beamforming phase only if sufficient gain is achievable. Prior to that, a low mode would likely need to be utilized.
7. A: Based on the beamforming result, if the gain is larger than 30 dB, the high PSD mode is used. We have to fallback to another mechanism.
8. Q: In slide 5, could you clarity the simulation setup? How many transmitters are there and what is its duty cycle?
9. A: the transmitter (AP) is 100% active. Only the stations are active on 20-40% duty cycle.
10. Q: Is the scheme that you mentioned in slide 8 the same as the scheme described in slide 4?
11. A: Yes.
12. Q: Is there any receiver-side operation to have higher SNR for the narrow beam transmitted by the transmitter which utilizes high PSD mode?
13. A: The receiver simply forms a receive beam in a specific direction, and nothing else is required.
14. Q: Regarding your straw poll, is the no-LBT mode for directive IMMW transmission that you want to further look into related to the SP-based channel access?
15. No, I propose not to perform the LBT.
16. Q: If there is no carrier-sensing, there are collisions when multiple stations are accessing the channel. How to solve the collision issue?
17. A: If the beam is narrowed, it will not cause widespread interference in the surrounding area.

**Presentation of** [**IEEE 11-25/1327r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1327-00-00bq-virtual-channel-contention-for-immw.pptx)**, Virtual Channel Contention for IMMW (Ning Gao, Oppo)**

1. Ning presented IEEE [11-25/1327r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1327-00-00bq-virtual-channel-contention-for-immw.pptx).
2. Q: Did you consider the failure case? Is there any consideration for the scenario where contention on the sub-7GHz channel leads to a failure in accessing the mmWave channel?
3. A: This is an unavoidable issue in all kind of channel access mechanisms. In this case, we need to use another channel access mechanism to access mmWave channel. One of the options is to try sub-7GHz channel access again to have mmWave channel access acquisition.
4. Q: In slide 3, for the first bullet, is it your assumption that announcement frame transmission over the sub-7GHz link precedes every mmWave channel access? This would incur significant overhead. For the second bullet, what is your channel access assumption for the mmWave link? Is this omnidirectional or directional? If it's omnidirectional, there's an issue in terms of the limited range; if it's directional, how is the direction determined?
5. A: For the second question, my answer is that is the out-of-scope of my proposal. My objective is to reduce conflicts on the mmWave link channel, especially when there are many mmWave stations.
6. Q: Honestly, this is not a reliable method. In slide 4, other STAs still participate.
7. A: It’s mainly for fairness. If a STA intends to use mmWave, I believe it should announce that it will use it.
8. Q: What if virtual contention is lost due to OBSS? Wouldn't the mmWave link remain underutilized?
9. A: This announcement frame is successfully transmitted and received in sub-7GHz link with high probability.
10. Q: There is another SIFS after the condition. Does the announcement frame protect the mmWave channel link with NAV?
11. A: NAV is not set. This is merely an announcement.
12. Q: If legacy devices are present, how does virtual contention work for multiple devices? What about legacy devices?
13. A: Legacy devices would simply contend within the mmWave link. My idea is to reduce the number of devices participating in a single contention by using an announcement frame.
14. Q: If the mmWave channel is idle but the virtual contention channel is very busy, what happens then? Would it be impossible to access the mmWave channel?
15. A: In such cases, it would be better to access the mmWave channel.
16. Q: If all STAs participate in the mmWave channel after receiving the IMMW Access announcement frame, what is the point? Only one terminal made the request. The assumption of sub-7 GHz offloading is that it does not impose excessive burden on sub-7 GHz link. However, in this case, the IMMW access request/announcement/RTS/CTS exchange is burdensome. It would be simpler to just send an RTS.
17. A: I agree the overhead of virtual contention. However, the advantage is that it saves mmWave power at the STA. The mmWave operation itself for channel contention consumes power. It’s a concept similar to TWT SP.

**External Liason**

**Liason from TEC, Department of Telecommunications, India.**

1. Chair shared the Liason from TEC, India ([IEEE 11-25/1334r0)](https://mentor.ieee.org/802.11/dcn/25/11-25-1334-00-0000-liaison-from-tec-india.docx). Chair mentioned that the WG chair has requested to review this document and the technical requirements in TGbq.
2. Chair mentioned that there are no technical concerns on this document at the moment. Chair mentioned that TGbq and 11 WG can respond with a liaison reply regarding the fact that 11 WG has recently started creating of Task group bq and inform them about the potential use case document that we have already discussed in the study group, along with the TGbq proposed timeline.
3. Chair mentioned that he will work with WG chair to prepare the liaison reply that will be presented on Thursday PM1.

**Closing formalities**

1. The next meeting is scheduled from 14:30pm to 16:30pm CET on Thursday, July 31.
2. The chair announced that the meeting is recessed at 21:18pm CET.

# Thursday PM1, July 31, 2025, 14:30pm - 16:30pm (CET)

TGbq Chair: Edward Au (Huawei)

TGbq Vice-Chair: Rui Cao (NXP)

TGbq Vice-Chair: Abhishek Patil (Qualcomm)

TGbq Vice-Chair: Sang Kim (LG Electronics)

TGbq Secretary: Jonghoe Koo (Samsung Electronics)

TGbq Editor: Cheng Chen (Intel)

**Opening formalities**

1. The IEEE 802.11 TGbq meeting was called to order at 14:30pm CET by the Chair.
2. Chair introduced the TGbq leadership members.
3. Chair reminded the meeting registration.
4. Chair presented the TGbq meeting agenda [IEEE 802.11-25/0515r5](https://mentor.ieee.org/802.11/dcn/25/11-25-0515-05-00bq-tgbq-agenda-2025-may-wireless-interim.xlsx) and reviewed the agenda items.
5. Chair reviewed the meeting agenda and the agenda was approved by unanimous consent.

**[Administrative items]**

1. Chair presented TGbq supplementary materials [IEEE 802.11-25/1056r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1056-00-00bq-supplementary-material-for-2025-july-plenary.pptx) slides.
2. Chair reviewed IEEE 802 required notices (emphasizing to ensure to announce name and affiliation at the first time to speak, anti-trust compliance, IEEE 802 WG rules and policies, etc.), IEEE SA meeting guidelines, IEEE Codes of Ethics and Conduct, IEEE individual process, and IEEE-SA standards activities with the fair and equitable consideration.
3. Chair reminded all to record their attendance in IMAT and other meeting reminders.

**External Liason**

**Draft response to liason from TEC, Department of Telecommunications, India.**

1. Chair presented the draft response to liason document ([25/1394r2](https://mentor.ieee.org/802.11/dcn/25/11-25-1394-02-00bq-liaison-communication-to-telecommunication-engineering-centre-re-draft-standard-on-wi-fi.docx)) titled ‘Liaison communication to Telecommunication Engineering Centre re: draft standard on Wi-Fi’ and noticed that there were no feedback.
2. There are neither comments nor feedback on the draft response to liason.
3. Chair stated that the clean version of the liason response will be uploaded for the WG closing plenary.

**Contributions**

**Presentation of** [**IEEE 11-25/1332r1**](https://mentor.ieee.org/802.11/dcn/25/11-25-1332-01-00bq-immw-range-extension.pptx)**, IMMW Range Extension (Safi Hoque, Ofinno)**

1. Safi presented [IEEE 11-25/1332r1](https://mentor.ieee.org/802.11/dcn/25/11-25-1332-01-00bq-immw-range-extension.pptx).
2. Q: Regarding Solution 2, why do you want to have a lower bandwidth PPDU? Could you clarify the reason? Is it because the power is more concentrated in a narrower bandwidth compared to a wider one? I prefer to have 160 MHz. Defining 40/80 MHz requires further discussion. In addition, how about the phase noise?
3. A: CFO correction doesn't have to be highly accurate. It only needs to be sufficient for data decoding.
4. Q: In Solution 1, I think CFO pre-correction is a good direction. However, it only has meaning if it is implemented. Explicit indication requires further discussion.
5. Q: The assumption itself is that light beacons or BFT are being performed. Why is range extension necessary for such scenarios?
6. A: Without a beacon, how can BFT be performed?
7. Q: We have sub-7 GHz, so why is BFT necessary before association? The assumption is correct for 11ad/ay, but it does not apply here.
8. Q: Solution 2 seems also a wrong direction. What is the reason for defining low bandwidth (40/80MHz) PPDU?
9. Q: You proposed an additional mode for PPDU. How do you plan to enable this mode even for data transmission, or do you intend to activate it only for beamforming training?
10. A: I was thinking of turning it on only during beam training.
11. Q: This mode is only used for triggering or scheduling. Otherwise, there is no way to signal.
12. Q: Are you planning to propose a combined solution of the two, or are you suggesting to choose one of them? Adding new bandwidth to data transmission. Low bandwidth is only used for beam training, not for data. Is that correct?
13. Q: I have a question about Solution 1. In 11ad/ay, the control mode is an enhanced mode for the data portion. What would be the outcome for the data portion? Wouldn’t the data portion become the bottleneck? Do you have any simulation results?
14. A: Currently, there are no results, but the packet detection performance can be included in the next contribution.
15. Q: If the data portion cannot operate after CFO correction, I would like to see the simulation results. Secondly, could you elaborate on the procedure and explain why?
16. A: We may define something in sub-7 GHz signalling. Both links are driven by the same clock. The mmWave CFO is correlated to the sub-7 GHz CFO.

**Presentation of** [**IEEE 11-25/1284r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1284-00-00bq-anchor-channel-for-immw-link.pptx)**, Anchor Channel for IMMW link (Liangxiao Xin, Oppo)**

1. Liangxiao presented [IEEE 11-25/1284r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1284-00-00bq-anchor-channel-for-immw-link.pptx).
2. Q: In slide 3, why do we need to have anchor link? Any sub-7GHz link does cross-link operation for the mmWave link.
3. A: It’s overhead if beacons and management frames containing mmWave information are transmitted over all sub-7GHz links.
4. Q: Option 1 (one anchor link) limits the STA’s ability to connect to the AP via the mmWave link. If the AP uses a 2.4GHz link as the anchor link, how can a STA that only supports 5GHz as the sub-7GHz link communicate with the AP over the mmWave link? In addition, there is a link switch concept in the MLO.
5. A: If we allow multiple sub-7GHz anchor links, we can achieve operational flexibility. However, it increase the complexity of implementation.
6. Q: If you have only one anchor link that is able to perform TWT and cross-link power save, then it does not work.
7. A: Beacon is the example. Both AP and STA have to know which link is used for mmWave management.
8. Q: I do not support this anchor link concept since it ruins the benefit of adopting the MLO.
9. Q: Regarding option 2, why and what kind of information does multiple anchor links convey for the mmWave link?
10. A: Anchor links are used to exchange TWT scheduling information operated on the mmWave link or some information to perform Co-RTWT.
11. Q: Are you considering multi-AP operation on the mmWave? Channel access and medium behaviour of the mmWave may involve spatial reuse. CR-TWT coordination may not be necessary. I don’t see any case where two APs are coordinated. In slide 4, it mentions that a non-AP STA faces difficulty in accessing sub-7GHz and enabling the anchor link. What does it mean?
12. A: In case where Non-AP MLD does not support 2.4GHz but only support 5GHz, and the 5GHz link is the anchor link, this Non-AP MLD cannot communicate with the AP over the mmWave link.
13. Q: Non-AP can freely use any sub-7GHz link for the management of mmWave. There would be no issue even if the concept of an anchor link is absent.
14. Q: In slide 3, is the beacon in the first bullet another new sub-7GHz beacon for the mmWave? In addition, any sub-7GHz link beacon contains the basic information of the mmWave link, so what more information should be delivered? If a STA has 2.4GHz and wants to have 5GHz link information, then STA can just probe the AP over 2.4GHz to get the information of the 5GHz link. Same philosophy can be applied here. Any sub-7GHz link brings the basic mmWave link information in its Reduced Neighbor Report, and the STA can send multi-link probe over a sub-7GHz link to get more information of the mmWave link if the STA is interested in the mmWave link.
15. A: Basic motivation here is to reduce overhead. Not only the signalling required for discovery and association, but also TWT scheduling and other information should be considered as part of the sub-7GHz overhead.
16. Q: The anchor link should be specifically determined for each Non-AP MLD. It is also the next level of discussion to define which types of information can be delivered on the anchor link.
17. Q: What kind of operations can be done on the anchor channel?
18. A: This is a big question. We still need a more discussion.

**Presentation of** [**IEEE 11-25/1285r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1285-00-00bq-contention-free-immw-link-channel-access.pptx)**, Contention Free IMMW link channel access (Liangxiao Xin, Oppo)**

1. Liangxiao presented [IEEE 11-25/1285r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1285-00-00bq-contention-free-immw-link-channel-access.pptx).
2. Q: In slide 4, do you also consider that even sub-7GHz link does not have data to transmit? Performing channel access in sub-7GHz when there is no data on that link? Why is a companion TXOP necessary? Why does the STA need to obtain TXOP for both the sub-7GHz and mmWave channels?
3. A: A similar concept has been discussed in 11bp. I intended to apply it to 11bq as well.
4. Q: The proposal looks only useful for STR. In a basic scenario, we do not need to access both sub-7GHz and the mmWave link channels simultaneously. We had a contribution previously presented, where backoff occurs in sub-7GHz. And once the backoff is completed, mmWave channel access is initiated. We should reconsider this assumption.
5. A: We can consider realistic implementation within the current product. There may be leakage of the side-lobe. The preamble is omnidirectional. During data transmission, the side-lobe of the signal sent by OBSS may be detected.
6. Q: This type of channel access with which STA grabs TXOPs for both sub-7GHz link and mmWave link is only beneficial for STR case.
7. A: I’m not restricting the non-STR.
8. Q: Do we need to align these two transmission in sub-7GHz link and mmWave link?
9. A: I’m proposing the simultaneous transmission on sub-7GHz and mmWave links as one of the options for mmWave channel access.
10. Q: Tight synchronization between the two links will likely be necessary. For example, they need to operate within PIFS.
11. A: In slide 5, ICF/ICR may be an option to handle the issue.
12. Q: It is highly possible that the sub-7GHz link is serving other STAs when the mmWave non-AP STA wants to access the mmWave link.
13. A: In such cases, a different approach must be used.
14. Q: How would operations like PS poll and other power-saving mechanisms function?
15. A: It’s open to discuss.

**Presentation of** [**IEEE 11-25/1359r1**](https://mentor.ieee.org/802.11/dcn/25/11-25-1359-01-00bq-lightly-licensed-mmwave-bands-for-tgbq.pptx)**, Lightly licensed mmWave bands for TGbq (Thomas Handte, Sony)**

1. Thomas presented [IEEE 11-25/1359r1](https://mentor.ieee.org/802.11/dcn/25/11-25-1359-01-00bq-lightly-licensed-mmwave-bands-for-tgbq.pptx).
2. Q: I have no technical concerns. However, additional consideration is needed for utilizing Wi-Fi in the licensed band area. From a market perspective, it only makes sense if it can be applied to massive products. The discussion should focus on ensuring compliance with spectrum regulations without violating them.
3. A: I essentially agree. The fact that regulations vary by country should also be taken into account. A cloud-based database for available channels as implemented in Automatic Frequency Coordination (AFC) for 6 GHz band may be helpful to control channel access to lightly licensed bands.
4. Q: The success of 11ad at 60GHz was not significant, and AFC seems similar in this regard. From the beginning of the specification development, we need to carefully consider these factors to achieve market success.
5. Q: In Japan, mmWave is primarily open for the 50-60GHz range. How will coexistence issues with other products and technologies using the same bandwidth be addressed? What about synchronization requirements?
6. A: Regarding interference and synchronization issues, further consideration is needed.
7. Q: It seems more suitable for enterprise use cases or specific deployments, e.g., localized area or campus, but it may be challenging for widespread public use.
8. A: The minimum requirement for the size of such an area could be considered. A usage fee could be imposed based on the size of the space where it is applied.
9. Q: What are the advantages of deploying 802.11 technology compared to a cellular system, such as 5G PHY/MAC?
10. A: There is a significant difference in terms of device cost. IEEE is a better venue to address interference issues.
11. Q: Do you think there will be a significant difference between 29GHz and 60GHz from specification development perspective? Do we need to define two separate protocols—one for 29GHz and another for 60GHz?
12. A: Generally I don’t see a big difference. However, compatibility with other technologies operating in the same band must be considered.

## [Agenda modification]

1. Chair asked if anyone would like to present within 15 minutes.
2. Leonardo mentioned that he could present his contribution within the 15 minutes.
3. Chair asked if there were any objections to adding one contribution for presentation for the remaining time, and there was no objections.

**Presentation of** [**IEEE 11-25/1339r0**](https://mentor.ieee.org/802.11/dcn/25/11-25-1339-00-00bq-crosslink-icf-icr-for-immw.pptx)**, Crosslink ICF/ICR for IMMW (Leonardo Lanante, Ofinno)**

1. Leonardo presented [IEEE 11-25/1339r0](https://mentor.ieee.org/802.11/dcn/25/11-25-1339-00-00bq-crosslink-icf-icr-for-immw.pptx).
2. There is no question for this presentation.

**Closing formalities**

1. Chair called for technical contribution and straw polls for the scheduled teleconference calls.
2. Chair announced the future teleconference call schedules as follows:
   1. 10:00am ET to 11:30am ET
   2. Tuesday, 19 August, 26 August, 2 September.
3. **Adjourn**
4. The chair announced that the call was adjourned at 16:20pm CET.