IEEE P802.11  
Wireless LANs

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| IMMW SG January 2024 Meeting Minutes | | | | |
| Date: 2024-02-19 | | | | |
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Abstract

This document contains the minutes for the IMMW SG January 2024 Meeting Minutes.

Revision history:

* Rev0: initial version

Abbreviations:

* C: Comment
* A: Answer

# 1st Meeting: Tuesday, January 16, 2024, PM2, (16:00-18:00 ET)

1. The Chair, Laurent Cariou (Intel), calls the meeting to order. The Chair notifies the attendees that the agenda is in [IMMW SG January 2024 meeting agenda](https://mentor.ieee.org/802.11/dcn/23/11-23-2178-02-immw-immw-sg-january-2024-meeting-agenda.pptx)
   * Note that this is a hybrid meeting, with some participants in person and some participating online through a webex session
   * Need to pay the registration fee to attend
2. IEEE-SA Policies and Procedure

The chair reviews the IEEE-SA Patent Policy:

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair. Speak up now and respond to this Call for Potentially Essential Patents. **Nobody speaks/writes up**.

1. The chair goes through other guidelines for IEEE WG meetings, Patent-related information, Participation in IEEE 802 Meetings, and Copyright. The Chair asks that it be minuted that the **Copyright Policy** was presented.

* Chair provides an attendance reminder:

3.1. Please, **record your attendance** during the session by using the IMAT system:

* login to [*imat*](https://imat.ieee.org/attendance)
* select “802 Plenary Mixed-mode Session - November 2023”
* select “C/LM/WG802.11 Attendance” entry
* click “IMMW SG” session that you are attending
* If you are unable to record your attendance, please, contact Laurent Cariou (laurent.cariou@intel.com) and Volker Jungnickel (volker.jungnickel@hhi.fraunhofer.de) for assistance

1. Motions

*Chair reviews the proposed agenda.*

**Move to approve the agenda in doc.** [**11-24/2178r1**](https://mentor.ieee.org/802.11/dcn/23/11-23-2178-01-immw-immw-sg-january-2024-meeting-agenda.pptx)

Discussion:

C: None

**Result: Agenda approved with unanimous consent.**

**Move to approve IMMW SG minutes listed below:**

November plenary: [**11-23/2089r0**](https://mentor.ieee.org/802.11/dcn/23/11-23-2089-00-immw-immw-sg-meeting-minutes-for-november-plenary-meeting.docx)

**Move: Volker Jungnickel Second: Xiaofei Wang**

Discussion:

C: None

**Result: Approved with unanimous consent.**

**Move to confirm the appointment of Volker Jungnickel as the IMMW SG secretary**

**Move: Xiaofei Wang Second: Tuncer Baykas**

Discussion:

C: None

**Result: Approved with unanimous consent.**

1. Announcements: None
2. Submissions

[**0066r0**](https://mentor.ieee.org/802.11/dcn/24/11-24-0066-00-immw-discussion-on-target-objectives-for-immw.pptx) **Discussion on Target Objectives for IMMW, Eunsung Park (LG Electronics)**

Statements not in slides: Focus on additional targets: Peak data rate should be in focus, 10G is not reached (slide 3), further configurations maybe needed, 11ac vs. 11be based numerology is debated, mm-wave is also beneficial for latency, channel access should be efficient, blockage issue to be adressed, beamforming accuracy maybe beneficial, multiple users, power consumption in mobile devices, BF training costs energy, support of practical use cases w.r.t. peak data rate.

Q: Slide 4: 4k-QAM, phase noise is 20 dB higher at these frequencies, 4k maybe impractical

A: Just one example for higher data rate, just one approach, need to be carefully checked.

[**0116r1**](https://mentor.ieee.org/802.11/dcn/24/11-24-0116-01-immw-immw-draft-proposed-par.docx) **IMMW Draft Proposed PAR, Laurent Cariou (Intel)**

Statements not in the document: First draft of scope, intended as starting point in the discussion, how to capture the limited scope. Keen to make this project a success, limit the scope at least in some points. SU-MIMO, OFDM-based, mm-wave 45-71 GHz, non-overlapping bands, …

C: Editorial reminder, to repeat units: 42 GHz to 71 GHz

A: Done.

C: KPIs for thorughput, latency in 11bn PAR, what about this here

A: Take simpler approach here, maybe limit BW modes. Let us see what feedback we get.

C: Editorial: “identified unlicensed band” should be reformulated

A: Can be discussed.

C: Editorial “ensure” creates comments in NESCOM: Text appears in final standard as in the PAR, e.g. “amendment shall ensure coexistence…”, Suggestion “amendment provides coexistence mechanisms”.

A: Point taken.

C: Reuse of sub-7GHz, how to include possible modifications to be defined?

A: Reuse does not limit to define additional things.

C: OFDM is questioned by some contributions, suggests to remove OFDM-based

A: Go through this after hearing the contributions. Goal is to narrow down the scope as much as we can.

C: Know what SC means, value of task group is to reuse sub-7GHz baseband.

A: Let us come back after contribution is presented.

C: In 60 GHz, coexistence instead of backwards-compatibility, what about backwards-compatibility at lower frequencies? What about DFT-spread OFDM.

A: No changes in lower bands in this group, OFDM should be in the focus.

C: All sub-7GHz bands or one of them.

A: Clear, to be reformulated (at least one).

C: Add “in unlicensed bands” before “between 42 GHz and 71 GHz”

***New revision 0116r2 to be uploaded.***

[**2102r1**](https://mentor.ieee.org/802.11/dcn/23/11-23-2102-01-immw-multi-link-operation-for-mmwave-wi-fi-sensing.pptx) **Multi-Link Operation for mmWave Wi-Fi Sensing, Saira Rafique (Vestel Elektronik Sanayi ve Ticaret A.S.)**

Statements not in slides: Min. BW 80 MHz, Slide 6: Near STAs use mmwave and need no triangulation. Being connected to mm-wave is enough to know the position.

C: Slide 7: How to switch between mm-wave and sub-7 GHz band?

A: Define a threshold for the coverage region.

C: Positioning vs. sensing, what is meant here? Are you considering both or only one of them, how to reuse positioning/sensing in IMMW?

A: Yes, take advantage of high frequency bands to enhance positioning, could also think about sensing in other scenarios.

[**0069r0**](https://mentor.ieee.org/802.11/dcn/24/11-24-0069-00-immw-mimo-analysis-for-immw.pptx) **MIMO analysis for IMMW, Bo Gong (Huawei)**

Statements not in slides: Channel rank does not exceed the number of multipath [3], NLOS path can be ignored for mm-wave. Probability of blockage is 0.126. Rank of LOS channel is usually 1. NLOS rank is 2-5 but channel is rather weak. Way out could be dual-pol 🡪 2 SS are enough, it needs spatial separation and dual-pol for 4 SS.

C: First implementation will see SISO only

[**0096r0**](https://mentor.ieee.org/802.11/dcn/24/11-24-0096-00-immw-mmwave-rts-cts.pptx) **mmWave RTS CTS, Leonardo Lanante (Ofinno)**

Statements not in slides: RTS/CTS may not be reliably be heard, due to directionality, depending on location. Invisible STA transmissions can lead to error (Slide 5), proposal is to use RTS/CTS by using lower band.

C: Why do we care about omni-directional hidden node? We need to care only about directional hidden nodes? 11ay talks about SU-MIMO, using RTS only in directional mode, should be enough.

A: It is directional but there maybe interference. If we define mechanism to measure interference, this is no problem.

C: Directional RTS, problem is that it makes mm-wave link dependent on sub-7 GHz link. We need to know the interference in the right frequency range. Don’t think it works, stick with existing ad/ay.

A: Clarify that mechanism is not only way to do it, continued offline

[**0076r0**](https://mentor.ieee.org/802.11/dcn/24/11-24-0076-00-immw-comparison-of-ofdm-and-edmg-sc-waveform.pptx) **Comparison of OFDM and EDMG SC Waveform, Thomas Handte (Sony)**

Statements not in slides: should not compromise performance w.r.t. EDMG, choose right BW which has similar performance, PSD is traded against backoff

C: Do you mean that phase shifter makes DPD available?

A: Phase shifter introduces significant loss, needs PA, as many PS as PS.

C: Why PSD is a measure of performance, one would expect throughput, for instance.

A: Throughput includes further aspects like phase noise, here PSD is choosen as first rule of thumb.

C: Agree that 640 MHz maybe a good choice. Slide 2: IMMW should not compromise performance against EDMG. Doubt this is right, applications in consumer electronics may be allowed to compromise performance. Main concern is how to support 60 GHz with limited effort.

A: What matters is E2E performance. Short range is good to have. Higher BW modes are probably optional.

C: Where figure in slide 6 comes from?

A: This is selfmade, it was explained again how it was constructed.

C: Should IMMW have a SC mode?

A: This is not the point of this submission. From systems perspective, it makes sense to consider OFDM waveform. 1.7 GHz is probably too much for OFDM.

*Chair decided this was last submission. Open submission in the agenda are shifted to next meeting.*

**Recess at 17:54 ET**

# 2nd Meeting: Wednesday, January 17, 2024, PM2, (16:00-18:00 ET)

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  1. If you are unable to record your attendance contact Laurent Cariou (laurent.cariou@intel.com) and Volker Jungnickel (volker.jungnickel@hhi.fraunhofer.de) for assistance

1. Motions

Chair reviews proposed agenda. Two submissions were not uploaded onto Mentor yet and taken off the agenda, accordingly.

**Move to approve the agenda in doc.** [**11-24/2178r2**](https://mentor.ieee.org/802.11/dcn/23/11-23-2178-02-immw-immw-sg-january-2024-meeting-agenda.pptx)

Discussion:

C: None.

Result: Agenda approved with unanimous consent.

1. Announcements: None
2. Submissions

[**0008r2**](https://mentor.ieee.org/802.11/dcn/24/11-24-0008-02-immw-existing-technologies-consideration.pptx) **Existing Technologies Consideration, Nelson Costa (Peraso)**

Statements not in slides: Increasing number of deployments for 11ad/ay. P2P links have higher rate, dense networks have lower throughput, lower cost. Outdoor apps are doing well. High speed in US, less TP is more needed in other parts of the world. Indoors: How wide we can make the beam vs. range? High TP but bursty traffic. No coexistence issues with sub-7GHz devices. 15 m range with wide beam (22-47° HPBW) and 120° steering range. Preamble is primary method of detection and interference mitigation, coherent is more sensitive than ED. Do not just rely on ED! Backwards-compatibility is considered important. SC should be considered.

C: None.

[**0133r0**](https://mentor.ieee.org/802.11/dcn/24/11-24-0133-00-immw-channel-raster-considerations-for-60ghz-band-in-immw.pptx) **Channel raster considerations for 60GHz band in IMMW, Micky Mehta (Pharrowtech)**

Statements not in slides: There are differences in the protocol stack between 15.3c, 11ad, 11ay and sub-7GHz. How much change is needed in PHY and MAC? Scalable channelization: Steps of 2^n would be helpful. Non-overlapping channels are of interest.

C: How do you fit sub-7GHz design into these channels?

A: Benefit is that existing transceivers can fit to the new channelization.

C: How deep the 11ad/ay is already burned into regulatory rules?

A: It is an easier way to integrate the existing channelization.

C: Good approach from backwards-compatibility, 320 MHz based channelization is coming from sub-7GHz. How efficient is this in terms of spectrum utilization?

A: Implementing narrower bands is not suggested.

C: 160 MHz is probably the starting point.

C: Non-overlapping channels is also proposed for the PAR.

[**0167r0**](https://mentor.ieee.org/802.11/dcn/24/11-24-0167-00-immw-discussion-on-bandwidth-issue-in-immw.pptx) **Discussion on bandwidth issue in IMMW, Yue Xu (Huawei)**

Statements not in slides: None.

C: None.

[**0081r1**](https://mentor.ieee.org/802.11/dcn/24/11-24-0081-01-immw-thoughts-on-immw-extensions-to-optical-bands.pptx) **Thoughts on IMMW extensions to optical bands, Andreas Bluschke (Self)**

Statements not in slides: Non-RF use cases to be considered. RF signal is upconverted to optical band, then no RF is needed. For new integrated LC bands, control-/management can be done via the existing 11bb channels. Similar approach as proposed for IMMW PAR can also be used for optical bands.

C: 2.4 GHz is not used in 11bb, use 5/6 GHz bands on optical bands, for same purpose.

***New revision 0081r2 to be uploaded.***

**[0062r0](https://mentor.ieee.org/802.11/dcn/24/11-24-0062-00-immw-channelization-to-include-optical-bands.pptx), Channelization to include optical bands, Volker Jungnickel (Fraunhofer HHI)**

Statements not in slides: New research results from two sources indicate that at least 1.5 GHz bandwidth can be used, currently limited by RX frontend used. Both P2P / high rate and P2MP applications at moderate rate have been tested. In general, the new channelization to be defined by IMMW project should be reused for integrated optical bands.

C: None.

[**0077r0**](https://mentor.ieee.org/802.11/dcn/24/11-24-0077-00-immw-numerology-to-include-optical-bands.pptx) **Numerology to include optical bands, Volker Jungnickel (Fraunhofer HHI)**

Statements not in slides: Delay in LC channels spread is less than 100 ns. Max. Doppler frequency/ channel coherence time are are orders of magnitude higher/lower compared to mmw-wave, respectively. Phase noise is at least 30 dB lower compared to mm-wave and the same or lower compared to sub-7GHz bands. Accordingly, both, the existing sub-7GHz numerology and a new numerology to be defined for mm-wave operation could be reused over optical bands. Optical bands can be considered transparent in this range.

C: None.

1. Goals for March 2024

* Further contribution and discussion of PAR and CSD

1. Teleconference/ad-hoc plan

* No telecon plans for now
* Will announce them with 10 days notice

1. AoB

* None

1. **Adjourn at 17:05 ET**