IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Minutes of the March 2024 meetings of the IEEE 802.11 Coexistence Standing Committee | | | | |
| Date: 2024-04-10 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Guido R. Hiertz | Ericsson GmbH | Ericsson Allee 1 52134 Herzogenrath Germany |  | hiertz@ieee.org |

Abstract

This document contains the minutes of the March 2024 meetings of the IEEE 802.11 Coexistence Standing Committee.

# Tuesday, March 12th, 2024, PM1 session

1. At 2024-03-12T13:45-06:00 the chair calls the meeting of the IEEE 802.11 Coexistence Standing Committee to order. Marc Emmelmann acts as chair of the SC. Guido R. Hiertz acts as recording secretary.
2. The chair begins presenting from the first pages of 11-24/267r1. Afterwards, the chair presents the proposed agenda as contained in 11-24/265r1.
3. At 2024-03-12T13:49-06:00 the chair presents the motion on page 6 of 11-24/267r1
   1. Move to approve Coex SC agenda as contained in 11-24/0265r1.
      1. Mover: Rich Kennedy
      2. Second: Guido Hiertz
      3. Approved by unanimous consent
   2. Thereby, also the minutes of the last meeting as contained in 11-23/157r0 are approved.
4. At 2024-03-12T13:50-06:00 the chair presents 11-23/448r1 reminding all attendees of their obligations when attending this meeting.
5. At 2024-03-12T13:52-06:00 the chair continues presenting from page 10 of 11-24/267r1.
6. At 2024-03-12T13:52-06:00 until 2024-03-12T14:12-06:00 Guido R. Hiertz presents 18-24/23r0.
   1. Comment: What does EC require to recognize as SDO?
   2. Comment: The European Commission argues its obligations under the Technical Barriers to Trade (TBT) agreement set by the World Trade Organization cause it to only recognize European Standards Organizations, IEC, ISO, and ITU as Standards Developing Organizations.
   3. Comment: What can be done about listing EN 303 687?
   4. Comment: ETSI TC BRAN developed a response to the EC in which TC BRAN explains why its normative references are fine. If this won’t be accepted, TC BRAN will need to develop a new version of EN 303 687 in which it refers to other documents or uses informative references, only.
   5. Comment: TC BRAN coul use an older ISO standard.
   6. Comment: IEEE 802.11ax is not available as ISO standard.
   7. Comment: What is CEST?
   8. Comment: CEST stands for Central European Summertime. That’s UTC plus two hours.
7. At 2024-03-12T14:12-06:00 Sebastian Max presents 11-24/445r0. He concludes his presentation at 2024-03-12T14:31-06:00.
   1. Comment: On slide 4, is the cloud gaming traffic on each of the three Wi-Fi links?
   2. Comment: Yes.
   3. Comment: Randomzation happens in the Wi-Fi traffic etc.
   4. Comment: Yes.
   5. Comment: Regarding page 12, what is the surprising aspect you observed?
   6. Comment: The fully dynamic puncturing denotes puncturing that occurs in time and frequency. The requires to be able to do arbitrary 20 MHz holes in spectrum. Dynamic channel bandwidth is much more simple in frequency domain. Just goes down to 80 MHz, 40 MHz, 20 MHz. The surprise effect is that it is as good as fully dynamic. I was surprised because it is almost as good the fully dynamic puncturing.
   7. Comment: It might be that in this punctured 20 MHz all the BT link end up operating. It’s magnetic to attract other BT there, too.
   8. Comment: Regarding slide 4, do these devices have both Wi-Fi and BT?
   9. Comment: That’s a different scenario. Then, you could do in-device coexistence. That would allow for some kind of cross-technology scheduling.
   10. Comment: On page 5, please provide some details on the traffic description.
   11. Comment: All of this is just Wi-Fi traffic. There is no Bluetooth traffic.
   12. Comment: On slide 12, the lower bound of the gaming delay is just from channel access?
   13. Comment: I am measuring the round-trip time of the channel access delay, only. This is the delay of an uplink control frame plus the downlink video frame delay. This is the 99 %. A gamer pushes a button, then a frame is generated and the gamer sees the video.
   14. Comment: Is the gaming traffic load still carried in 20 MHz?
   15. Comment: A 20 MHz channel is really tight to carry this traffic.
   16. Comment: Would you end up with just 20 MHz for Wi-Fi if there are so many Bluetooth links?
   17. Comment: I don’t have a related CDF.
   18. Comment: Here in this presentation I don’t have Bluetooth results. Please look at my ETSI BRAN results. There I include Bluetooth results.
   19. Comment: Regarding slide 7, why is Bluetooth already on 20 MHz?
   20. Comment: On the right side, Bluetooth starts the transmission on a channel that it hopped to. It does hop there, sees not transmission, starts to transmit itself.
8. At 2024-03-12T14:51-06:00 Ratnesh Kumbhkar presents 11-24/521r0. He concludes his presentation at At 2024-03-12T15:08-06:00.
   1. Comment: On slide 6, you are stating that you reduced the duration between the Acknowledgment and the Bluetooth transmission.
   2. Comment: Yes
   3. Comment: Do you believe BT will be able to do this?
   4. Comment: Yes, I believe it should be possible.
   5. Comment: On slide 8, the sum of Wi-Fi 1 and Wi-Fi 3 is 50 %?
   6. Comment: No, it’s close to 80 %. The combined duty cycle is high.
   7. Comment: Regarding slide 9, do you have a ballpark number of how many Bluetooth devices could be used?
   8. Comment: I see that the glitches are not going to zero.
   9. Comment: The last attempt is in the prioritized channels, that’s the fourth channel.
   10. Comment: First attempt is uniform in all channels
   11. Comment: Would it help to prioritize the last two transmission attempts?
9. At 2024-03-12T15:26-06:00 the chair declares the meeting to be in recess.

# Tuesday, March 12th, 2024, EVE session

1. At 2024-03-12T19:31-06:00 the chair calls the meeting of the IEEE 802.11 Coexistence Standing Committee to order. Marc Emmelmann acts as chair of the SC. Guido R. Hiertz acts as recording secretary.
2. The chair reviews 11-24/265r1.
3. At 2024-03-12T19:35-06:00 Carlos Aldana presents 11-24/360r0. He concludes his presentation at 2024-03-12T19:46-06:00.
   1. Comment: Coming up with a single set of parameters is not realistic for IEEE 802.15 use cases. The 802.15.4 PHYs range from channel bandwidths in kHz to 500 MHz. Very different bands are supported that are not all U-NII. For a particular slice that is relevant to this group we can come with a specific set of parameters.
   2. Comment: Regarding slide 11, you are not specific to which band this refers to. In U-NII-3 there are no such requirements. As I understand discussions at TC BRAN, LBT is not necessarily considered mandatory.
   3. Comment: This is only for some U-NII bands. There is a strong likelihood that LBT will become mandatory also for NB FH. It’s not only for the benefit of NB FH but also for wideband transmissions.
   4. Comment: I believe the disucssions should occur at TC BRAN. My proposed way forward is to resolve this at ETSI.
   5. Comment: I believe we should agree here and bring it to ETSI.
   6. Comment: What do you mean with the probability?
   7. Comment: IEEE 802.11 has statements regading Energy Detection occurring with a least 90 % probability.
   8. Comment: We should wait for the regulatory rules.
   9. Comment: I know about tests that that require a device to detect a channel as occupied at least nine out of ten times when a certain energy level is exceeded. We want to enable many different options that have equivalent performance. The more specific we are the higher the chance that it doesn’t make sense at work. Each technology will have different requirements.
   10. Comment: What are the next steps?
   11. Comment: We need to converge on the different requirements that are to be defined. That will help to generate a cleaner draft in IEEE 802.15.4ab.
   12. Comment: The way would to be go to other groups and to ask for their opinion. We have seen lots of good simulation results. We should ask the task group members.
   13. Comment: We hope that we get sufficient feedback from both groups.
   14. Comment: This is a starting point. Let’s set a deadline for this proposal. Afterwards, we can converge. The two chairs should set a deadline.
4. At 2024-03-12T20:10-06:00 the chair declares the meeting to be in recess.

# Wednesday, March 13th, 2024, AM2 session

1. At 2024-03-13T10:34-06:00 the chair calls the meeting of the IEEE 802.11 Coexistence Standing Committee to order. Marc Emmelmann acts as chair of the SC. Guido R. Hiertz acts as recording secretary.
2. The chair presents 11-24/265r2. The proposed changes to the agenda are approved by unanimous consent.
   1. Attendees discuss about the need for further conference calls and potential next steps.
3. At 2024-03-13T10:45-06:00 Rich Kennedy presents 11-24/311r1. He concludes his presentation at 2024-03-13T10:49-06:00.
4. At 2024-03-13T10:50-06:00 the chair presents 11-24/267r1. He concludes his presentation at At 2024-03-13T10:52-06:00.
5. At 2024-03-13T10:53-06:00 Sebastian Max presents BRAN(24)123011, that is available from https://www.ieee802.org/11/private/ETSI\_documents/BRAN/05-CONTRIBUTIONS/2024/2024\_02\_19\_OR\_BRAN%23123/BRAN(24)123011\_Balancing\_WB\_and\_NBFH\_Channel\_Access\_Mechanisms.pptx
   1. At 2024-03-13T11:14-06:00 attendees discuss the presentation.
      1. Comment: Would you set EDT higher than regulatory values?
      2. Comment: In a new version of the harmonized standard an EDT ramp-up could become permitted for Bluetooth.
      3. Comment: Have you looked at the number of Bluetooth links at which they start impacting each other?
      4. Comment: No, I would like to do this. It would be interesting to look at this.
      5. Comment: Why is the 100 % Wi-Fi case interesting? We know that Wi-Fi cannot operate in cases of 100 % load. It can operate up to 70 %. Then it breaks. It would be interesting to look at the 75 % load case. Furthermore, I notice that this document available to IEEE 802.11 members, only.
      6. Comment: 100 % load is the full buffer case. This is what is shown here. It is good to explore the extremes.
      7. Comment: I was arguing that Wi-Fi cannot operate at 100 % utilization.
      8. Comment: This is not 100 % spectrum utilization.
      9. Comment: Your presentations are getting and better. Thank you very much. This is really important stuff. Your work will have positive impact for decades.
   2. At 2024-03-13T11:25-06:00 Sebastian continues presenting. He concludes his presentation at 2024-03-13T11:32-06:00.
      1. Comment: Do you do probe responseses etc.?
      2. Comment: No, I just simulate traffic. Of course, leaving the primary 20 MHz empty, also helps with not impacting management traffic. Furthermore, at least always 20 MHz will be idle. Not all channels are equal for Wi-Fi.
      3. Comment: Wouldn’t Bluetooth need three, four, five connection events to see which bins are empty?
      4. Comment: It is assumed that Bluetooth implements SCD. Waiting for a full connection event would be visible in the results. I am assuming that secondary deferral can occur within 400 µs. Furthermore, the cloud gaming traffic is not on the high traffic side. Wi-Fi can transmit within one TXOP.
      5. Comment: With SCD you are jumping 160 MHz away. So, you also jump for a third deferral?
      6. Comment: Yes
      7. Comment: What happens if you puncture multiple 20 MHz segments simultaneously?
      8. Comment: The fully dynamic puncturing is the optimum. Current products are not able to do this. I use this assumption to show the best case. This is just the upper boundary. No other puncturing case can be better than this. Dynamic bandwidth selection after backoff, however, is implemented in today’s products.
      9. Comment: Do you believe there would be differences if there was a 10 MHz or 4 MHz puncturing?
      10. Comment: Yes, that would be even better.
      11. Comment: In IEEE 802.11be we don’t have that much flexibility for puncturing. For your information, what is implemented in most products launched now is static puncturing.
      12. Comment: To me it was a surprise that already dynamic bandwidth selection can help very much.
      13. Comment: These results show the best we have seen. I don’t understand why there is so much of a push for LBT.
      14. Comment: Seeing the effect on both technologies is very important to have positive discussions. This could lead to specific draft text.
      15. Comment: In your conclusions, short LBT for NB FH plus secondary channel deferral, and EDT ramp up would be the way to go.
      16. Comment: How are discussion at ETSI?
      17. Comment: Extensive, very good. We had more Bluetooth members there.
      18. Comment: Can you put this presentation on IEEE 802.11 mentor, too?
      19. Comment: Yes, I will.
6. At 2024-03-13T11:47, the chair declares the meeting adjourned.