IEEE P802.11
Wireless LANs

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| November 2019 meeting minutes |
| Date: 2019-12-10 |
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Abstract

This document contains the minutes of the meetings of the IEEE 802.11 Coexistence Standing Committee during the November 2019 IEEE 802 plenary meeting.

Location: Hilton Waikoloa Village, 69-425 Waikoloa Beach Drive, Waikoloa, Hawaii, 96738, USA

# Wednesday, 2019-11-13, PM1

At 2019-11-13T13:30-10:00 the chair calls the meeting of the IEEE 802.11 Coexistence Standing Committee (SC) to order. Andrew Myles acts chair. Guido R. Hiertz acts as recording secretary. The chair introduces document 11-19/1763r4. This document contains the proposed agenda for this week’s meetings of the SC. The third revision (R3) of the document is available on Mentor. R4 is equivalent to this document and will contain all modifications that will arise from this meeting.

At 2019-11-13T13:34-10:00 the chair arrives at page 11 of his document. At 13:35 the chair asks for approval of the agenda by unanimous consent. Nobody objects.

At 2019-11-13T13:38-10:00 the chair presents page 18 and asks for unanimous approval of meeting minutes of the SC’s meetings in September. The September meeting minutes are contained in 11-19/1776. Nobody objects to approving the minutes by unanimous consent. Afterwards, the chair continues from page 19.

Comment: What does it mean that there are eight deployments of LAA?

Chair: You need to see the reference. It means that a vendor has deployed it in part of their network.

Comment: What is the granularity?

Chair: This is the global market, there is not much detail. This is a high level view of it.

Comment: These are not a lot of deployments.

Chair: You are right. In case of LAA LTE it’s growing slowly.

Comment: NR-U doesn’t exist yet.

Chair: Yes, it does not exist yet.

Chair: 45 operators globally is not a lot. The other question is if these are major markets.

At 2019-11-13T13:43-10:00 the chair continues from page 23.

Comment: I want to point out that the exact same liaison letter is sent to 3GPP.

Chair: Correct.

At 2019-11-13T13:45-10:00 the chair continues from page 27.

Comment: How should I read the second bullet on page 27?

Chair: Essentially this is the question of using Energy Detection (ED) only, or if there should be a choice to use Preamble Detection and ED.

At 2019-11-13T13:47-10:00 the chair continues from page 29.

Comment: I want to correct your statement of the second chair candidate. He has grounds in 3GPP and Wi-Fi.

Chair: I understand that both have backgrounds in both industries.

At 2019-11-13T13:50-10:00 the chair continues from page 33. At 2019-11-13T13:55-10:00 the chair arrives at page 36.

Comment: I am disappointed to see that months of discussion were wasted on this topic although several warned that restricting the use of short control signaling would be detrimental to 802.11, too. There is a discrepancy between the 802.11 standard and what our products are implementing or how they behave. If the harmonized 5 GHz standard becomes too restrictive, we shoot ourselves in the foot.

Chair: We live in a grey world. Certainly. More than a black and white world. Without any question, we should make sure that everyone knows what is allowed.

Comment: Consistent simulations show that backoff for beacons show better performance. It is not that using PIFS access with a beacon transmission will provide better performance. Unlike Wi-Fi, 3GPP technologies will be impacted by non-deterministic beacon transmissions. The use of PIFS should be reflected in the standard so that implementers do the same or have same opportunities.

Chair: We do not know why PIFS access has been implemented. At Cisco, some junior engineer had implemented this because he was lazy. Maybe we are all better off not using PIFS access for beacon frames.

Comment: If everyone tries to access the medium at a deterministic time, everyone will fail. However, fairness is also important.

Chair: The refinement of the standard will occur during the IEEE-SA ballot stage. I submitted a comment for IEEE 802.11REVmd.

At 2019-11-13T14:07-10:00 arrives at page 43.

Comment: What happens with broadcast transmissions?

Chair: It is further explained in the text. Broadcast transmissions are assumed to be always successful.

Comment: Why don’t you use the feedback received in a queue for another flow?

Chair: This is not how the 802.11 standard works.

Comment: Assume you have feedback for the voice category. If there is feedback for this priority class you must use this for updating the backoff procedure.

Comment: I recommend you check the 802.11 standard. Your understanding of the standard does not match the understanding of anyone else in this room.

Comment: We should postpone the discussion.

Chair: I made an assertion about the standard and that is challenged.

Comment: The standard is wrong if does set the backoff counter to CWmin for every broadcast transmission.

Comment: Please look at 10.22.2.2. It defines what a failure is and what the consequences are.

At 2019-11-13T14:21-10:00 the chair arrives at page 46. At 2019-11-13T14:24-10:00 the chair presents 11-19/1777r0.

Comment: We should not decide anything today. Obviously, we need to provide time to those who want to check the standard.

Chair: We might take a decision tomorrow, or we might wait until January.

Comment: If you intend to remotely attend the ETSI BRAN meeting please talk to me. I will take care of assignment of meeting slots. I will try to assign meeting times that are convenient for persons living in California.

At 2019-11-13T14:30-10:00 continues from page 49.

Comment: What do we call bias?

Chair: Think about a series of feedback events. Successful transmission, failed transmission etc. In NR-U they intend to use a selection of the feedback events. If they only chose the feedback events of successful transmissions, then this would not be fair. The goal is that the feedback pattern would be the same regardless if you use every feedback.

Comment: What happens if the beginning of the COT is a mixture of broadcast and unicast packets?

Chair: Let’s assume there are broadcast and unicast packets. Generally, this hasn’t been done in 802.11.

Comment: The 802.11ax trigger frame is a broadcast packet.

Chair: In case of trigger frame it is a uni- or multicast packet with feedback. Presumably somebody responds to that. A broadcast is something when there is no response and you don’t expect one.

Comment: You mentioned beacon as an example. However, please remember that 802 relies on broadcast for ARP with IPv4 and NDP for IPv6. Without broadcasts, no 802 network works.

Chair: Yes, I agree. broadcast packets are very important for us and beacons are just one example.

Comment: Why do you focus on the beginning of the COT?

Chair: This is where collisions occur. This is the fundamental.

Comment. That was when the frames were short. Today, collisions occur later because packets are longer.

Chair: If one frame is very short and one is long they both look at the start of the frame to find out if a transmission was successful.

Comment: Why is CW updated on the first packet? On the first packet you don’t know if there was a collision or if the packet was lost. If the first packet went through and was acknowledged then we assume the rest of the TXOP is fine.

Comment: Long frames will happen with 802.11ax and 802.11ac. E.g. these frames can be 5 ms.

Comment: If you start an A-MPDU without RTS/CTS the medium is used for a long time.

At 2019-11-13T14:45-10:00 the chair presents 11-19/2066r0.

Comment: Why are you presenting this now? I thought you wanted to give folks sufficient time to review the topic?

Chair: We are not going to decide now. Folks can comment and propose changes. Please read it. We are not considering it now. We have a number of choices tomorrow. We may delay it to January, or we approve it tomorrow.

At 2019-11-13T14:48-10:00 the chair arrives at page 53 of 11-19/1763r4.

Comment: What is the definition of blocking energy?

Chair: Blocking energy is sometimes known as reservation signal.

Comment: Is there a definition in ETSI BRAN?

Chair: Nothing in the ETSI BRAN specification defines it. This is a concept that is relatively well understood. Some implementations send energy to the medium from the time they access the medium until they transmit data. Under the proposed ETSI BRAN rules this is not allowed.

Comment: If I look at 802.11ba, the WUR has a preambles followed by 4 MHz ON/OFF keying. The preamble is never used by 802.11ba.

Chair: I would not call this a blocking energy. It reserves the channel in a normal way.

Comment: That preamble is never used by the radio. It is obviously used for reservation and it is never for feedback.

Chair: So, the preamble of 802.11ba is a broadcast and thus permitted. I believe it is okay.

Comment: It is not defined what this transmission is. What is a transmission? This is just your interpretation.

Chair: I believe it means that the transmission is right at the beginning of the COT. It is wishy washy.

At 2019-11-13T15:00-10:00 continues from page 65. The documents listed there will be discussed tomorrow. The chair then continues from page 67.

Comment: The tests by Rohde & Schwarz was not an official ETSI BRAN meeting. It was an event that Rohde & Schwarz invited to.

Chair: That is correct. Regardless, testing is always helpful input.

Comment: Our work of the preamble test is still ongoing.

Comment: Rohde & Schwarz observed successful detection with a new an extended preamble signal.

Comment: Rohde & Schwarz observed that devices behave different if they have clients associated with them. An idle AP would mostly defer. As soon as a client was associated the AP would not defer.

Chair: Folks should check if a preamble by itself is enough.

Comment: At 3GPP, proponents of the use of the 802.11a preamble conveyed the impression that all that is needed to transmit is the 802.11a preamble’s STF, LTF, and signal field. That’s 20 µs. Nobody supporting the use of the 802.11a preamble ever stated that an additional two OFDM symbols are needed to make existing devices respect the preamble.

Comment: I agree the standard does enforce that after the preamble you must be silent. But there is no such case. In a product you would not do that. Your device would get locket up there is something like 20 µs of a preamble and then nothing. Real products don’t defer for the preamble, only.

Comment: If there is no energy after the preamble, we do not defer for the duration indicated in the preamble.

Comment: I want to put into the minutes that you are not following an orderly process. You insert your opinion in this discussion and you are not respecting the queue that was formed. You are providing yourself priority over other participants.

Chair: We know that more than the preamble is needed. If 3GPP would agreed to use the preamble, it would have been a disaster. So, the refinement is valid.

Comment: I worked on implementations. As soon as you see that this is not valid, you would ignore it. That’s a sanity check.

Comment: There is the reserved bit in the preamble.

Comment: The reserved bit has to be used in conjunction with other NR-U specific details. And it will combine the information with other knowledge.

Comment: The standard talks about a valid preamble. It was not our interpretation that the preamble would be analyzed stand-alone. The whole thing is a sequence. Everything needs to be evaluated.

Chair: This seems to be a universal interpretation that after the preamble, more needs to received to make an 802.11 implementation respect the 802.11a preamble.

Comment: Your preamble may not be valid for your version but for another version.

Comment: I do not agree with this opinion.

Comment: The document BRAN(19)103035r2 contains the wavefiles. That’s the only difference to the R1.

At 2019-11-13T15:30 the chair declares the meeting of the SC in recess.

# Thursday, 2019-11-14, PM1

At 2019-11-14T13:32 the chair calls the meeting of the Coexistence SC to order. Andrew Myles acts as chair. Guido R. Hiertz acts as recording secretary. The chair presents 11-19/1763r6. This document is equivalent to R5, which is stored on Mentor. R6 will contain any modification that may be applied to R5.

At 2019-11-14T13:34-10:00 the chair continues presenting from page 69 of his submission.

At 2019-11-14T13:35-10:00 David Boldy presents 11-19/2060r0.

Char: You mentioned the test wave form by Qualcomm. Are you willing to repeat the test with this waveform?

Comment: Yes, we will test and we will share our results with the SC.

Comment: In 3GPP, there is an ongoing discussion about adopting or not a common preamble. For NR-U it will be discussed if a common preamble in 6 GHz can be used. The proposed idea is to use the first two elements of the 802.11a preamble. That’s the STF and LTF. We are fighting so much for this. Any support is helpful.

Comment: I am the rapporteur for the 6 GHz WI in ETSI BRAN. I made a call that we need submissions for many aspects of the 6 GHz standard. Channel access mechanism, channelization, and receiver blocking are needed. Please contribute.

Comment: There need to be two more OFDM symbols to have a reliable preamble reception Without the extra symbol the preamble reception won’t work. How does that go with the universal preamble that only consists of the STF and LTF?

Comment: In 3GPP, they say we just do what we want, we don’t need to talk to anyone else. This is not a good attitude. If a preamble would be adopted, it will be a very short one.

Comment: So, if other technologies want to use the 802.11a preamble they need to implement 802.11a OFDM further symbols?

Chair: If they want us to detect them they have to implement the preamble and several additional symbols to make it work. Only then it works. Otherwise, they will not be protected by our devices. There is a disconnect between what we thought how the technology works and what happens in reality.

Comment: This topic will come up at next week’s 3GPP meeting. Release 16 will freeze next week. The item we currently discuss is not a feature under consideration.

Chair: I ask everyone with participation in 3GPP to please influence them.

Comment: A preamble with 16 µs gap that is repeated for infinity can never happen in reality.

Chair: The test method was not realistic. The believe in the past was that the preamble is sufficient to protect the wireless medium. But it has been proven that this is not sufficient.

Comment: The test system is not realistic because communication did not follow. Our products assume that after the preamble there will be more communication. Otherwise, they detect the channel as idle.

Comment: Ericsson and Nokia created a test signal that is not realistic. The standard defines a probability of 90 % that preambles are received. So, within it is your right to miss 10 % of all preambles. Hence, a device could get onto the medium and start transmitting. You cannot conclude anything here from what they present.

Comment: The originally proposed test foresaw that some 10 ms of noise at level exceeding −62 dBm would be created. This destroys all communication between the DUT and the companion. Then, a gap of 16 µs follows. Afterwards, a preamble of 20 µs duration is sent at a level of −82 dBm. The preamble’s signal field indicates ca. 5 ms duration. If the device does not transmit during the 5 ms, it would pass. Otherwise it does not pass. The issue with this test is that it cannot be implemented on existing test equipment. Rohde & Schwarz was looking for a test that could be implemented by products in the market. They want to avoid that new equipment needs to be bought. Hence, it was proposed that a recorded sequence of preamble, noise, and silence would be used in infinite loop. This is easy to implement for existing test equipment. Hence, the modified test.

Comment: I believe we must not draw conclusions from tests if they are not implemented correctly.

At 2019-11-14T13:55-10:00 David continues from page 4 of his presentation.

Comment: It was said there was no change to the previous version.

Comment: Yes, the minimum point is now at −28 dBr.

At 12019-11-14T14:03-10:00 Dorin Viorel presents 11-19/2087r0. At 2019-11-14T14:20-10:00 Dorin concludes his presentation.

Comment: This is not only about protecting 802.11ac or other legacy devices from 802.11ax interference. It’s also about 802.11ax Wave 1 products being protected from interference cause by 802.11ax Wave 2 products.

Comment: The analysis is okay for what you have done. But some of your analysis does not apply for all of 802.11ax.

Comment: NR-U uses 5 MHz channels and it can block the next three 5 MHz channels.

Comment: There was some opposition to a Broadcom proposal at ETSI BRAN.

Comment: We very carefully monitor this discussion. We see some trends here that are concerning. There is a related discussion.

Comment: This is very concerning. 802.11ax preamble puncturing has severe impact on existing products.

Comment: In the past, we took a less aggressive approach to see if a problem exist.

Comment: This is not the most aggressive assumptions. Both victim and aggressor use the same spectral density.

Comment: Sooner or later the owners of legacy equipment will get after us.

Comment: I have a point of order. You talked about companies. We are individuals here.

Comment: I would like to support the overall approach of this contribution. Any technology using puncturing has an impact. Although NR-U is being frozen the mask discussion has been going on for several months. The discussion is that if in IEEE 802.11ax −20dBr is okay, then they assume this is acceptable for 3GPP technologies, too. There is no justification at 802.11ax why this mask should be used. There should be related information. Then, other technologies would be mindful.

Comment: We plan to present this in NR-U. And we ask for input from this group, here.

Comment: In general, these transmit masks are difficult to comply with. Usually, real products are lower with the PAs. You are assuming the aggressor uses the mask exactly. This is not realistic.

Comment: There is another discussion about the tolerance in products.

Comment: I propose to have an analysis in a system approach. Then, the situation may look different.

Comment: If preamble puncturing rules are too relaxed, it also causes problems with radar detection. DFS of a device may fail because its neighbor in an adjacent channel uses puncturing and thereby masks the radar signal. The authorities will make our life miserable, if this happens.

Comment: I want to go back to the two extra symbols after the 20 µs preamble. What is probably happening is that a preamble following by noise or nothing is ignored by our products. I believe what is going on in our products is that the system is going to idle mode. Because the CRC check in 802.11n fails.

Chair present page 75 of his slide 11-19/1763r6 at 2019-11-14T14:39-10:00. At 2019-11-14T14:49-10:00 attendees discuss about page 88.

Comment: It’s not abot ED or PD. One aspect we need to consider, is that even though the PD is −82 dBm, that tunability is also very important. A fixed ED or PD threshold will not cover all scenarios. There are devices that have higher or lower detection values. If ED is tunable then it would be as good as PD. But ED cannot be tuned because it is not searching for signals like PD does. I might have weak links. Then, I cannot tune my ED. There are operators in 3GPP that ask for preamble for exactly this reason. They want to tune according to the use case. It will not be possible to tune the ED to much lower. In ETSI it looks like we are working backwards. 3GPP has left open this decision. PD is not precluded there. That has been taken care of.

Chair: The ETSI standard allows you to lower your threshold.

Comment: You cannot tune ED lower because you will drown in noise. There is a document in 3GPP that says the ED can be going down to −85 dBm. However, our implementations cannot go down to that level. If current technology would allow to perform ED at the PD threshold, then ED would be a better approach.

Comment: It’s an unlicensed band. There is no preference to any technology. There is no such thing as operators in unlicensed bands. Operators have no authority about the spectrurm.

Comment: An admin can set the AP parameters, only. They cannot set the client parameters. The concept of an operator does not exist in license-exempt spectrum.

Comment: PD can ensure that interference is lowered because I am deferring to other signals.

Comment: I believe there are operators in license-exempt spectrum. If there are networks with morer than 100,000 APs deployed how do you name this?

Comment: Service providers. That is not an operator. We actually deploy thousands of APs.

Comment: In license-exempt spectrum there is no god.

Comment: Currently, most peoples in Wi-Fi want to enforce maintaining the ED/PD status quo in 6 GHz.

At 2019-11-14T14:58-10:00 chair arrives at page 89.

Comment: Is there any drawback to delay?

Comment: They will miss our input in a couple of weeks time.

Chair: The interest of everybody should be to get EN 301 893 out as soon as possible. With 802.11ax, all of us currently need notified bodies.

Comment: I don’t know what the issue of this would be for 802.11be.

Chaiir: If we wait for 802.11be that would be too late.

Comment: LAA LTE has delayed ACK. If only the most recent ACK is considered then there is an issue with delayed ACK.

Chair: The key issue is if there is bias. I believe there is not bias in 802.11. Does 3GPP have bias?

Comment: LAA LTE does not have bias.

Comment: Subjective text can be subjectively interpreted.

Comment: Once the text is changed 3GPP might want to change their interpretation.

At 2019-11-14T15:06 the chair asks the following straw poll:

“The Coexistence SC should consider a motion in next few minutes to send a LS reply to ETSI wrt the CW management requirements”

Yes: 5 No: 3 Abstain: 9

At 15:09 the chair presents 11-19/2066r0.

Comment: Can we change the letter rnow?

Chair: Yes.

Comment: We should explain what the mechanism in 802.11 is that has a problem.

Comment: If it would ease the discussion we could amend the text. This is related to HT-delayed Block ACKs.

The chair uploads 11-19/2066r1 of the proposed liaison letter.

At 2019-11-14T15:08-10:00 the following motion is called:

“The IEEE 802.11 Coex SC recommends to the IEEE 802.11 WG that the material in 11-19-2066-01 be sent to ETSI BRAN as a response to its Liaison Statement to the IEEE 802.11 WG in 11-19-1777-00”

• Moved: David Kloper

• Seconded: David Boldy

Attendees discuss the motion.

Comment: What is the benefit if sending this?

Chair: It seems sensible to respond to them, assuming our analysis is correct. This makes it more likely that they may include a text in the HS that satisfies our technology. If we don’t send it, they could be doing something different.

Comment: If we have a device that uses the lowest MCS would that be a bias, since it tries to make it more robust?

Chair: No. This is only meant against LAA LTE. They do not consider all feedbacks received. It’s not a problem for Wi-Fi. It may be a problem for other systems.

Chair: It is an an orthoganl issue if we talk about making a TXOP more robust with the first transmission.

Comment: The main outstanding issue is what to do with the word shall.

Comment: Retransmissions are too difficult to test. At ETSI BRAN, HPE and Ericsson had a joined submission in which they explain the issue. They outline that two distributions are super-imposed. Testing this needs a high number of events. This is very time-consuming and make testing very difficult. Also, the 5 GHz HS allows some freedom. E.g., a device could use the persistence factor that was once proposed for 802.11e but not adopted in the end. Furthermore, with retransmissions, devices might use longer slot durations. For a pure blackbox test, all of this makes it very difficult to come to a conclusion.

At 2019-11-14T15:26-10:00 the question is called.

Result: Yes: 10, No: 0, Abstain: 8

At 2019-11-14T15:33-10:00 the chair declares the meeting of SC adjourned.