IEEE P802.11
Wireless LANs

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| Minutes of the November 2017 meetings of the Coexistence Standing Committee (SC) |
| Date: 2017-12-07 |
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Abstract

This document contains the meeting minutes of the Monday, Wednesday, and Thursday sessions of IEEE 802.11 Coexistence Standing Committee during the IEEE 802.11 November 2017 meeting.

*“Those who would give up essential Liberty, to purchase a little temporary Safety, deserve neither Liberty nor Safety.”* – Benjamin Franklin

# Monday 2017-11-06, PM2 time slot

At 2017-11-06T16:01-05:00 the chairman of the Coexistence Standing Committee (SC) calls the meeting to order. Andrew Myles is chairman of the Coexistence SC. Guido R. Hiertz is secretary of the Coexistence SC.

The chairman presents 11-17/1551r2. This submission contains the proposed agenda for this week’s sessions. The chairman will upload 11-17/1551r3 if there are any modifications to the agenda.

The chairman asks for unanimous approval of the minutes of the Coexistence SC meetings in Hawaii, in September. Nobody objects to approving the minutes contained in 11-17/1544r0 by unanimous consent.

At 2017-11-06T16:02-05:00 the chairman arrives at page eight of his submission. At 2017-11-06T16:04-05:00 the chairman reviews the proposed agenda. At 2017-11-06T16:07-05:00 the chairman asks for approval of the proposed agenda. The Coexistence SC approves the proposed agenda by unanimous consent.

At 2017-11-06T16:07-05:00 the Coexistence SC approves the meeting minutes the previous meeting contained in 11-17/1544r0.

At 2017-11-06T16:08-05:00 the chairman continues presenting from page thirteen of his submission. At 2017-11-06T16:12-05:00 the chairman arrives at page 23 of his submission. The continues with presenting his document 11-17/1588. At 2017-11-06T16:26-05:00 the chairman concludes the presentation of 11-17/1588.

1. There was a presentation from Samsung on Buffer Occupancy (BO).
2. There were various presentations that considered fairness based on BO status.
3. We should not read too much into the word “operators” on page 5. Everyone may be an operator.
4. You need to uplevel the coexistence process. We should be happy to operate in lightly licensed bands too. We should address this spectrum too. We should not restrict ourselves to unlicensed spectrum.
5. Yes, you are right. I fell into the trap of looking at it too narrow.
6. I agree, we should also look at bands that may be licensed for small money.

At 2017-11-06T16:34-05:00 the chairman returns to page 24 of his submission 11-17/1551r2.

1. We should have more participants at 3GPP to work on NR-U. Also, 3GPP needs to understand that there is a significant party. So far there was only one company in 3GPP reminding them.
2. The only way of influencing 3GPP is by being there.
3. NR-U is much more likely to coexist with LAA LTE. LAA LTE is not a competitor to 802.11. However, NR-U standalone is a competitor to 802.11. The coexistence impact is much higher with NR-U in standalone mode because all of its coordination messages also go over the unlicensed spectrum.
4. For LAA LTE the coexistence issue is small because its control messages are going over licensed spectrum.
5. So more 802.11 attendees should go to 3GPP.
6. Please remind we represent ourselves here. We are individuals. We are not here as companies.
7. We should consider how as 802.11 we have influence on 3GPP.
8. There is an activity in ETSI BRAN for the coordination of unlicensed systems such as 802.11, MuLTEfire etc.

At 2017-11-06T16:40-05:00 the chairman continues from page 25 of 11-17/1551r2.

1. You are confusing ED and PD on your page 26.
2. Yes, you are right.

At 2017-11-06T16:45-05:00 the chairman continues from page 27 of 11-17/1551r2.

1. You should not make ETSI documents available through your submission. They are not publicly accessible.
2. The ETSI BRAN submissions need to be in the password protected 802.11 members area.
3. This is right. I will upload a revised version without the documents included.

At 2017-11-06T16:47-05:00 the chairman continues from page 29 of 11-17/1551r2.

1. There was a single simulation result only. This assumed 802.11ac and cannot be used to draw conclusions on 802.11ax.
2. The ED is a protection of 802.11a against 802.11n etc. It was always a protection against ourselves. The preamble helps a little bit. But ED deals with missed preambles. 802.11ax is grained in us. This −62 dBm comes from 20 dB less of what was considered to be an implementable receiver sensitivity requirement. It is very difficult to defend these numbers. Now as everything tends to be dense, an interferer at −62 dBm is really high.
3. I put in a comment to 802.11ax to change the ED to −72 dBm.
4. The values have worked for us for twenty years.
5. But this brings a transient period and we need to work with it.
6. If it brings benefits for us, we should change the threshold.
7. At the moment, EN 301 893 imposes a level of −72 dBm on 802.11ax if nothing changes.
8. Do we have any liaison with WFA here?
9. No, we do not at the moment.
10. For many years the Harmonized Standard EN 301 893 just pointed to 802.11.
11. The issue truly is what is the regulatory requirement in Europe. We must think about coexistence and regulatory requirement and not about what features are there in our standards. What do we bring into a regulatory requirement from our side? You are just showing the consequences of neglecting.
12. We should be careful that we do not restrict ourselves too much. We are doing more harm to ourselves than to others. We are restricting Europe. Rules need to be continuously modified to allow latest equipment to be sold in Europe. With strict rules, we will always run behind.
13. We often heard that our own devices don’t agree with these regulatory rules anyway. We are risking here that our own devices do not meet the requirements since a lot of them do not comply with even basic aspects of 802.11.
14. Maybe we can allow for more innovation if the other devices deserve our trust.
15. The European rules killed LTE-U probably worldwide. The European rules forced 3GPP to use LBT.
16. We must balance the need for innovation and the fear of other technologies.
17. I don’t understand any argument against flexibility.
18. As an industry we would be benefitting from more flexibility.
19. The days of fixed ED and PD values are over.
20. The only thing that matters is SINR. Nothing else matters.
21. If you can transmit when knowing that the SINR at the interfered side is okay you should go.
22. The myth of −82 dBm stops many transmissions.
23. We should be using dynamic values here.
24. Current ED and PD are inefficient schemes on protecting the receiver.
25. I don’t understand why allowing other technologies using our preamble would mean weaponizing them.
26. The same thing is going on and it is called receiver performance. In 60 GHz ETSI BRAN is debating what is needed. They analyze ideas to go without LBT.
27. Traditional sensing doesn’t work anymore. It’s inefficient. It maybe that we need sharing with a fixed interferer, a fixed microwave etc. We need to develop means transmitting concurrently. We should be adapting to the environment. We will be sharing very different in the next generation spectrum that we have access to.
28. The thresholds may be very different for a door bell ringer for 5 m distance or outdoor links over 1 km or more.

At 2017-11-06T17:22-05:00 the chairman continues from page 32 of 11-17/1551r2.

1. The addition of a generic description of the 802.11 preamble brings complexity that must not be underestimated.
2. The testing aspect is important too. Today, testing in certification bodies already takes hours. That is very costly.
3. If we integrate the 802.11 preamble into EN 301 893 we also need to provide how to test this. We need to define all aspects that are needed for interoperable behavior. The tests will need to consider temporal accuracy, frequency drift, phase shift etc. All needs to be described to have meaningful tests. This is totally new to regulatory standards. Doing this at notified bodies (test labs) will be costly.
4. Adding our preamble to the European standard has the risk of excluding many products from the European market as they either cannot meet the requirements, because their design is not good enough, or the vendor’s business model does not allow for additional costly testing. However, there is a fourth option. We could just describe that any technology deferring for itself at −82 dBm is permitted to defer to other technologies at −62 dBm. Otherwise, the defer level of −72 dBm remains. This is a generic description that can be easily tested without requiring protocol knowledge or expensive test equipment.
5. I agree that testing is very complex and expensive. Currently there is already testing by compliance declaration.
6. There is always a risk if regulators catch you not meeting the requirements.
7. It’s clear that inappropriate language in the European standard can kill us here.
8. Constantly acting out of fear has not taken us anywhere. It harms us and our technology’s future.

At 2017-11-06T17:31-05:00 the chairman continues from page 33 of 11-17/1551r2.

1. I am speaking in favor of Plan D. We are crawling here, we are under heavy burden of the regulatory rules. We are shooting ourselves in the foot. We are harming ourselves.
2. It is true that we are restricting ourselves. I agree that we are acting on fear. But I am not willing to blow up an industry by experimenting.
3. What is your view on going back to −62 dBm. What will regulatory authorities. ED at −62 dBm for all technologies.
4. At ETSI BRAN we saw the British, the German, the Austrian, and the French authorities to regularly participate. The French authority acted as chairman during coexistence debates. There was a period during which France did not attend TC BRAN because the according employee left the authority. I would argue that the British is the most vocal. German authority comments sometimes. The Austrian and French authorities are not very vocal during meeting. I believe that authorities will not intervene with the industry’s decisions. They are just happy for the industry to agree.
5. I agree. I don’t expect that authorities would care if we revert to higher ED threshold again. The authorities want progress and the market to flourish. They don’t care about specific values and do not simulate the pros and cans of ED thresholds themselves.
6. If this is important why isn’t there more people here?
7. Last time you just presented to 802.11ax but now you are presenting options.

The Chairman closes the meeting at 2017-11-06T17:55-05:00.

# Wednesday 2017-11-08, PM1 time slot

At 2017-11-08T13:32-05:00 the chairman of the Coexistence Standing Committee (SC) calls the meeting to order. Andrew Myles is chairman of the Coexistence SC. Guido R. Hiertz is secretary of the Coexistence SC.

The chairman presents 11-17/1551r3. This submission contains the approved agenda for this week’s sessions. The chairman will upload 11-17/1551r4 if there are any modifications to the agenda. At 2017-11-08T13:33-05:00 the chairman informs attendees that a report about 3GPP’s meeting will not become available. The chairman continues from page 38 of his presentation.

At 2017-11-08T13:38-05:00 attendees discuss

1. Regarding your page 39 I believe that just a generic description is needed, not a generic or common preamble.
2. Deferral rule should also be defined in general terms. It must be ensured that there is deferral for the total transmission time.
3. If a new technology came along this technology would defer to 802.11 at −62 dBm and not at −82 dBm.
4. This gives the freedom to kind of all kind of things. We don’t want to put handcuffs on other technologies.
5. It certainly could be written in a way that it is enforceable.
6. I believe a different preamble does not solve the problem. Here could come another technology and backoff to existing technologies at −62 dBm. With coordinated systems we even don’t enter the domain of common preamble detection.
7. We need one comment preamble for all technologies.

At 2017-11-08T13:47-05:00 Matthew Fischer presents 11-17/1577r0. At 2017-11-08T14:12-05:00 Matthew Fischer concludes his presentation.

1. The grant can go out to multiple UEs in frequency domain so that all of them perform LBT simultaneously.
2. Release 14 already discusses the opportunity to do multiple LBT attempts. That happens at every 1 ms. In the next release this doubled to taking chances every 500 µs.
3. The current interpretation in 3GPP RAN1 is that they can have an infinite amout of opportunities per single grant per station.
4. I believe multiple grants possible are possible. I created it differently with the packet associated with the grant being discarded if the medium is not idle. Later this text was modified by ETSI BRAN and its chairman. It was rewritten. The original text was unambiguous
5. We need evidents. There are no evidents that something is broken.
6. I believe the current text talks about a single opportunity. The term “grant” is singular.
7. When I created the text, I had more formal language. The BRAN chairman changed the text as he believed he needed to bring the text in line with some believed BRAN style. In this transition things got lost.
8. I believe the simplest is to limit the number of grants per responding device.
9. Don’t you think we can use this in 802.11 too?
10. We have legacy devices out there. I am hesitating to say if that is good or not. We need more analysis.
11. Does LAA try to increase the number of LBT attempts? There are also the features of a short TTI in 3GPP. Unlicensed NR will start in January.
12. There is a risk that the number of transmission attempts of the responding device can go to hundreds of transmission attempts.
13. The autonomous uplink feature is an issue too where devices start transmitting anytime after 25 µs.
14. The easiest is to add some restriction to the number of opportunities per grants per responding device.

The group agrees that this topic needs to be discussed at TC BRAN.

At 2017-11-08T14:32-05:00 the chairman presents page 48 of 11-17/1551r3. At 2017-11-08T14:32-05:00 the chairman presents submission 11-17/1637r0.

1. You need to very careful here. I warn you not to block our spatial reuse features that are coming with 802.11ax.
2. Don’t argue about efficiency. This is thin ice. We know how inefficient 802.11 is.
3. I agree.
4. Do not invite authorities to decide for us what is efficient or not. Don’t wake them or make them look at efficiency aspects.
5. Do you want to them analyze the efficiency of various technologies and require us to act? This could mean they would ban or prohibit some of our technology or older versions of it.
6. I am the first to say that 802.11 is phenomenal inefficient. But it is efficient in the multiple operator context.
7. I agree that CSMA does not scale well when the number of devices grows. But I believe that any technology has control issues when being deployed in dense scenarios.
8. Having no rules could work. But is could also not work.
9. I agree with what was said. We should be carefully wording. We will regret vague definitions later.
10. There can be serve problems later. The previous commenter is right that we need to be careful to not to be too restrictive.
11. We need to understand the risks. We must not go too far with regulationd. But we also must not go too far the other way with people stomping on us.

At 2017-11-08T15:02-05:00 the chairman presents page 50 of 11-17/1551r3. At 2017-11-08T15:04-05:00 Shubhodeep Adhikari presents submission 11-17/1759r0. At 2017-11-08T15:24-05:00 Shubhodeep Adhikari concludes his presentation.

1. There is also padding in 802.11 data. That padding occurs at the end of 802.11 transmissions and serves the sole purpose of blocking others from grabbing the wireless medium.
2. Padding in 802.11 is much less. In LAA LTE all transmissions have to start at sub-frame boundaries and are thus useless until then. Thus, the reservation signal is not useful.
3. Your argument was that LAA was using longer padding. Therefore, you are talking about the magnitudes of padding. However, you were talking in general about padding and to ban it.
4. The amount of padding signal will be much larger with LAA. These are not signals to block others from the wireless medium. As it stands now there is no valid data in the blocking energy.
5. In 802.11, we perform padding to keep the channel busy and continue holding it. It is the same purpose. Therefore, I advise you keeping the magnitude in mind. Don’t talk about it in general as 802.11 does “blocking energy” too.
6. We should be careful about unintended consequences. Padding is an interesting issue to discuss. However, the author pointed out that the existing version of EN 301 893 does disallow reservation signals.
7. Prepending or appending is the same. It does not make use of the medium. In 802.11 there is even padding between A-MPDUs to allow for cheap implementations that are not quick enough to decipher an encrypted packet. So, the overhead is either in the beginning or in the end. But it’s always useless. In any case, padding and “blocking energy” is also needed in 802.11.
8. There is even the packet extension feature in 802.11.
9. Reservation signals are not defined in the 3GPP standard and thus they have no valid use. Would they have been defined in the standard we could have accepted them. But they are not. They serve no purpose.

The chairman declared the meeting to be in recess at 2017-11-08T15:33-05:00.

# Thursday 2017-11-08, PM1 time slot

At 2017-11-09T13:33-05:00 the chairman of the Coexistence SC calls the meeting to order. Andrew Myles is chairman of the Coexistence SC. Guido R. Hiertz is secretary of the Coexistence SC.

The chairman presents 11-17/1551r4. This submission contains the approved agenda for this week’s sessions. The chairman will upload 11-17/1551r5 if there are any modifications to the agenda during this session. The chairman presents from page 49 of his submission 11-17/1551r4.

1. Spatial reuse simulation results have been dependent on the scenario. The scenario determines what kind of result you achieve. I understand that various people have different opinion here.
2. I belive a generic spatial reuse enabler should go into EN 301 893.
3. I agree.
4. Banning of blocking energy is a double-edged sword.
5. I believe padding has other purposes/use. This is different from blocking.
6. I believe that “blocking energy” or padding is all the same. It’s keeping the medium busy for legit reasons. I don’t want restrictions here. Otherwise, we will harm 802.11.
7. Suppose there is non-full buffer traffic and if I waste 90 % of the TXOP that makes me more aggressive than a different node that does not do this reservation. The reserving devices will take 9 times more of the spectrum. It is not only a harm on LAA but it is also a harm on Wi-Fi. A loss of spectral efficiency harms also co-channel nodes.
8. Yes, there could be a restriction on the duration of reservation signals. 802.11 stated to 3GPP that they should please reduce the use of reservation signals. Maybe as a compromise is that 100 µs instead of 500 µs reservation signals are permitted.
9. Padding is intrinsic to all technologies. There is only a fixed amount of resources that you can use to transmit. The resource blocks in LAA LTE are fixed to 1 ms. LAA LTE is limited so that it can start at 1 ms boundaries only.
10. Testing, is difficult, how to specify it without knowing how to differentiate between data and reservation without fully understanding the protocol. In EN 301 893, rules for adaptivity also need to end up in tests. Otherwise, authorities will not accept the rule.
11. I want to note that reservations signals are only in downlink and not in the uplink. That says that there is an easy path to avoid this.
12. Ther always is testing by declaration. You just declare that you are okay.

At 2017-09-11T13:54-05:00 the chairman presents 11-17/1639r0. At 2017-09-11T14:05-05:00 the chairman concludes his presentation and presents 11-17/1393r0. At 2017-09-11T14:21-05:00 the chairman concludes his presentation.

1. In your submission you made an ETSI BRAN submission available to everyone. That is unacceptable. Use a link to the 802.11 members area.
2. There are no further starting positions agreed on at 3GPP. There was no agreement. So, there is still an issue here.
3. There are other mechanisms for LTE now to achieve the goal of being more agile.
4. I believe your interpretation of the RE-Directive is not warranted. We are disagreeing here.
5. What is your intention here? Right now, they own a TXOP and they have it. They can waste it as they want. Do you want to make them better? Do we want to help them to be better than us?
6. I believe technology is developing anyway.
7. I find your argument on preambles is dangerous to get dragged into. We have CTS-to-self and other means to reserve the medium. I am worried getting dragged into a debate.
8. Their desire of blocking engery impacts our desire to use control frames. I would be less concerned if there were solid arguments but without them I believe this is bad for the Wi-Fi community to send this letter.
9. Yes, in a sense I went to go for a compromise than a ban since we are wastetful too.
10. Yes, but currently we don’t have a restriction for Wi-Fi at all.
11. We are trying to find a set of rules that restrict us and rules that allow us to improve.
12. I see a lot of downsides to what you propose here and no upsides. There is not fairness argument here.
13. They are improving their technology already. There is no upside to this letter or argument at all.
14. CTS-to-self is well-defined in the 802.11 standad. Features like this make them different from blocking energy. There are rules in the 802.11 standard that a STA transmit only when it has a packet. If 802.11 were to do something outside of the standard then this could be detrimental to 802.11.
15. So, you point is that because CTS-to-self is defind in the standard it is some kind of communication which blocking energy is not.
16. We are just talking about extraneous energy.
17. There is a co-channel Wi-Fi and an inefficient LAA will harm it. If you run non-full buffer traffic the 90 % of blocking energy that LAA uses makes it behave like nine LAA LTE nodes. That blocks Wi-Fi from access to the channel. That is the risk.
18. It’s not that the inefficiency only harms LAA. Iti also harms Wi-Fi.
19. If you had a poorly designed node in Wi-Fi using too low rates then this is also inefficient use othe wireless medium.
20. I agree on putting restrictions in regulations.
21. I agree that efficiency is dangerous to debate. I could easily show that 802.11 is far more inefficient than other technologies. The efficiency argument is harming 802.11.
22. We know that LAA can resolve the inefficiency so why not remove it.
23. If an LAA node transmits junk because of this reservation signal it also harms QoS. The more blocking energy the less chances to access the wireless medium. I don’t think we can compare different technologies in their inefficiencies.
24. It is important to be fair. For example, the level of −72 dBm for ED was achieved by simulations under some assumptions. So, the efficiency discussion is highly depending on the input assumptions.
25. There is much more overhead in LAA as LTE was designed for 300 km/h and more. The control message overhead is high here.

At 2017-11-09T14:45-05:00 Shubhodeep Adhikari presents 11-17/1760r0. At 2017-11-09T14:58-05:00 Shubhodeep concludes his presentation.

1. We are saying that we have the option to do −72 dBm only plus you have the option to do the “dual threshold option.”
2. In either case we need the “dual threshold option”. This should be enabled either by a reference to the 802.11ax standard or by copying the preamble into EN 301 893.
3. I just wanted to make sure that the −72 dBm only option remains.
4. You could choose to implement a common preamble (the 802.11 preamble) or chose to do the −72 dBm threshold only.
5. What is the impact on other technologies? We need to look at the eNB and the UE. If they implement preamble than they have more access. If we look at a UE, it will always operate ED only. Unless we exclude that short 25 µs option this allows also the UE to use ED at −62 dBm only. The gap is not long enough to sense the preamble.
6. There are two options now. Do you think one should be permitted to dynamically change between one or the other option?
7. −62 dBm is not allowed if a device has grabbed the medium with −82 dBm.
8. Currently, there is no permission to dynamically flip the sensing mechanism in use.
9. 802.11ax did not pass the letter ballot. 802.11ax could change at any time. We could say the industry has some plans for 802.11ax.
10. I believe switchting between one or the other sensing option might have impact on fairness.

At 2017-11-09T15:13-05:00 Menzo Wentik presents 11-17/1428r3. At 2017-11-09T15:22 Menzo concludes his presentation. At 2017-11-09T15:22 Menzo presents 11-17/1720r0. At 2017-11-09T15:26-05:00 concludes his presentation. At 2017-11-09T15:27-05:00 Menzo mentions submission 11-17/1721r0.

1. In the context of ETSI BRAN this shows that EN 301 893 holds back innovation.
2. The distance is this the distance between each AP?
3. No.
4. What kind of scenario have you analyzed?
5. It is not intended to be a real-life scenario.
6. There are other simulations in this document that are more realistic.
7. That is very interesting. Seems very plausible. If you had some devices that did this and some that are legacy, what is the result?
8. I have some results that show the outcome. I am replacing more and more devices in the simulations with deterministic backoff devices.
9. The message is that it is backwards compatible. It would not put things upside down.
10. The danger is that it works so well that the deterministic guys cluster and the guy who does exponential is excluded from the medium.
11. No, it helps also the exponential backoff devices.

The chairman declares the meeting adjourned at 2017-11-09T15:32-05:00.