IEEE P802.11
Wireless LANs

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| Minutes of the Extremely High Throughput (EHT) Topic Interest Group (TIG) July 2018 meetings |
| Date: 2018-07-13 |
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Abstract

This document contains the meeting minutes of the two sessions of the EHT TIG held during the July 2018 IEEE 802 plenary meeting.

# Tuesday, 2018-07-10, Evening session

At 2018-07-10T19:33-07:00 the Chairman calls the meeting of the Extremely High Throughput (EHT) Topic Interest Group (TIG) to order. Mike Montemurro acts as Chairman of the EHT TIG. Guido R. Hiertz volunteers acting as recording secretary.

At 2018-07-10T19:34-07:00 the Chairman presents 11-18/1067r1. 11-18/1067r0 of the document is currently available on Mentor server. The Chairman states that he will upload version R1 of the document after the meeting. The Chairman explains that version R1 will contain any modifications that he will apply to 11-18/1067r0 during this meeting. The Chairman reminds all attendees to record their attendance of this meeting. The Chairman reviews the IEEE patent policy and requirements for attendees.

At 2018-07-10T19:36-07:00 the Chairman asks attendees for potentially essential patents. Nobody speaks up.

At 2018-07-10T19:37-07:00 the Chairman presents slide 12 of 11-18/1067r1. This document contains the proposed agenda. The Chairman asks for approval of the agenda.

Guido R. Hiertz moves to approve the proposed agenda.

Matthew Fischer seconds to approve the proposed agenda.

The motion is approved by unanimous consent.

At 2018-07-10T19:38-07:00 the Chairman asks for approval of the teleconference meeting minutes contained in 11-18/1095r2. Nobody objects to approving the meeting minutes by unanimous consent.

At 2018-07-10T19:40-07:00 Laurent Cariou begins presenting 11-18/1271r0. At 2018-07-10T19:56-07:00 Laurent Cariou completes presenting his document. Attendees form a queue to ask questions and to discuss the presentation.

Comment: I believe it is reasonable to start a Study Group (SG) in September. Regarding the start of a Task Group my preference is to have a longer SG to have more time to write the PAR. My preference for TG begin is May 2019. We should have an open SG discussion. Don’t mention features now. We will see which features will come up in the SG.

Comment: I believe this is a period where we lose time very easily. Therefore, we believe we should form a TG as soon as possible. The more blur we put in the SG the more time we lose.

Comment: I like this presentation. The time we spend on features in the SG is a waste of time. We need the time in the TG to vote on features. I like what you are doing here. There are not that many ideas for us here to pursue. We should try to get to a TG right away. It doesn’t matter what somebody proposes in an SG. What matters is what somebody brings into a TG. What we are really debating, is if we want to go fast or slow.

Comment: I am not opposing to go fast but we need approval by the EC too.

At 2018-07-10T20:03-07:00 David Yangxun presents 11-18/1180r0. At 2018-07-10T20:16-07:00 David Yangxun concludes his presentation. Attendees form a queue to debate the presentation.

Comment: This is going in the wrong direction. Is it two years or two hundred years? This is enough for five different task groups. This is too much.

Comment: These are just examples. We are open for candidate technologies based on consensus decisions.

Comment: I believe it’s better to start from a limited list than to assume everything is in.

Comment: Would your preference be to meet as SG in September?

Comment: This depends on the outcome of our discussion.

At 2018-07-10T20:21-07:00 David Lopez-Perez begins presenting his document 11-18/1190r1. At 2018-07-10T20:27-07:00 David Lopez-Perez ends his presentation. Attendees form a queue and ask questions.

Comment: What are you talking about in your last slide?

Comment: We are happy with the first option presented in the first presentation. We want at TG formation as quickly as possible.

At 2018-07-10T20:29-07:00 Sigurd Schelstraete begins presenting 11-18/1191r0. At 2018-07-10T20:37-07:00 Sigurd concludes his presentation. Attendees debate the presentation.

Comment: It is more important to perform a feasibility study on the calibration.

Comment: Calibration is crucial. I agree on this.

Comment: I see that there is a problem with the overhead. What are your thoughts about compressing today’s feedback information?

Comment: It would be great to compress more. But we really need to consider the possibility of implicit feedback.

Comment: I propose to start forming a TG. So, we can work on this. This is just a TIG.

Comment: I agree on the point earlier made that the duration of the SG should be limited to the minimum.

Comment: Nothing is proposed here. It is just free thinking. I agree some ideas are a bit unusual here. Don’t get hung up on any example here.

At 2018-07-10T20:45-07:00 Ron Porat begins presenting 11-18/1116r0. At 2018-07-10T20:59-07:00 Ron Porat concludes his presentation. Attendees form a queue to ask questions.

Comment: The proposed cadence is not ambitious. Why don’t we go for a faster cadence already now instead of waiting for another five years?

Comment: We need to find the right technology. We believe we still have a lot to do with 802.11ax.

Comment: Our main issue is the quality of submissions. Most important is the right technology.

Comment: Why do you think that HARQ is an important feature?

Comment: We believe it is not important for high throughput. It is a real-world feature that we need.

Comment: In 802.11ac and 802.11ax you rejected HARQ. Why is it good now?

Comment: The time for long hanging fruits is over. Now we have to do the hard work.

At 2018-07-10T21:04-07:00 the Chairman explains that the rest of this session is dedicated to debating formation of an SG. There seems to be preference for a short SG period. The features to be included need to be debated in the TG, SG, or could be mentioned in the PAR.

Comment: I believe before we discuss the features it is hard to discuss formation of an SG.

The Chairman asks for a show of hands to estimate the number of attendees that want to continue hearing technical resp. feature-oriented presentations. There are roughly double the number of attendees that prefer to continue discussing features before debating SG formation. Consequently, discussion of SG formation is postponed.

At 2018-07-10T21:08-07:00 Jianhan Liu presents 11-18/1155r1. At 2018-07-10T21:16-07:00 Jianhan ends his presentation. Attendees form a queue to discuss.

Comment: Do you want to use multi bands to transmit simultaneously?

Comment: Yes, but only if both bands are idle.

Comment: Why do you bring the FDD mode here?

Comment: You can do FDD, it is just one possible solution.

At 2018-07-10T21:23-07:00 the Chairman declares the meeting in recess.

# Thursday, 2018-07-12, AM2 session

At 2018-07-12T10:33-07:00 the Chairman calls the meeting of the Extremely High Throughput (EHT) Topic Interest Group (TIG) to order. Mike Montemurro acts as Chairman of the EHT TIG. Guido R. Hiertz volunteers acting as recording secretary.

At 2018-07-12T10:34-07:00 the Chairman presents 11-18/1067r2. The Chairman reminds all attendees to record their attendance of this meeting.

At 2018-07-12T10:38-07:00 Hongyuan Zhang begins presenting 11-18/1161r0. At 2018-07-12T10:44-07:00 Hongyuan ends his presentation.

Comment: I believe this is a very good proposal. We should reduce the latency.

Comment: In this case the APs need to agree on some schedule. AP1 needs to inform AP2.

Comment: Yes, this is another level of coordination. Here, we are just considering that the AP is aware of the channel between the APs.

Comment: These are good candidate features to consider. If multiple APs are coordinating, how, do we split the data between the APs? In IEEE 802 we do only MAC and PHY. I assume something needs to be done so that the traffic can be combined at the receiver.

Comment: We believe we can use Ethernet or a wireless backhaul for coordination.

Comment: We might need to do something end to end.

Comment: Do you assume that in multi-channel case the APs use the same MAC address on both radios?

Comment: Probably the same MAC address.

Comment: This requires duplicate frame detection etc.

Comment: Any work area is in the scope of IEEE. We can also address issues on top of the MAC layer.

Comment: I believe the multi-AP stuff is a huge area to work on. Coordinated transmissions will take longer than I thought of the duration of the EHT program should be. What are your thoughts on the complexity? In the terms of nulling etc.

Comment: I believe frequency and time synchronization is easier to target. We can at least study the case of beamforming.

At 2018-07-12T10:51-07:00 Jinsoon Choi presents his document 11-18/1171r0. At 2018-07-12T11:05-07:00 Jinsoon concludes his presentation. Attendees form a queue to start debating the submission.

Comment: These are good features to study. However, for this particular channel access scheme on slide 9, I have concerns. This poses a huge risk. Until today, we haven’t seen how 802.11ax works in reality.

Comment: It is disallowing clients to do things alone. Other study items are good.

Comment: Yes, we are not opposing the channel access based on EDCA. However, we may reverse the channel access under some circumstances. Sometimes we could improve system performance.

Comment. Not allowing EDCA poses a risk. This idea needs more evaluation.

Comment: I have a question about HARQ. How does it work with packet collisions and packet loss?

Comment: We cannot differentiate a collision from a lost packet. We need to think more here.

Comment: We want to avoid as much as possible immediate UL transmissions and have more trigger-frame based transmissions.

At 2018-07-12T11:11-07:00 Tianyu Wu presents 11-18/1184r1. At 2018-07-12T11:27-07:00 Tianyu ends presenting. Attendees debate his presentation.

Comment: I am thinking there could be multiple primary channels.

Comment: We do not foresee requiring stations to transmit on all primary channels.

Comment: Is there an anchor channel per AP?

Comment: Yes, the STAs need to operate on at least one anchor channel.

At 2018-07-12T11:30-07:00 the Chairman presents page 14 of 11-18/1067r2.

The Chairman reminds the group that the PAR may be used to set and limit the scope. However, any vote here or at the WG cannot limit what the SG will study or do.

At 2018-07-12T11:34-07:00 Ron Porat presents 11-18/1263r3. At 11:37 Ron ends his presentation.

Comment: I think the problem is that all the keywords do mean nothing. This means we go into an SG without any focus. The SG could study anything. The second issue is about the timeline. We would spend a whole one year talking about ideas without working on ideas.

Comment: I believe it is a good thing that we define it broad. The goal is not to restrict people before we are in the TG. The SG is to set the scope. According to the timeline, we will need the time to understand the scope. We reach the focus within about three meetings. I believe the timeline is reasonable. It’s not too long and it’s not extremely short.

Comment: I have a question about low latency. What is the rationale for this topic? I understand you want to open up the scope.

Comment: We are interested in latency as a topic. This is the company view of the company I work for.

Comment: I find the bottom sentence strange. Most other groups don’t define the timeline before the SG is formed.

Comment: Here in the motion we try to be between the SG working for years and narrowing the scope substantially.

Comment: SGs exist for six months.

Comment: The low latency comes from the gaming use case. Just increasing the capacity does not reduce the latency.

Comment: I like to speak in favor of low latency as a goal of the SG. Just higher throughput will not be doing the job. For AR/VR we need low latency and higher throughput.

Comment: I support low latency as application. It is needed with multi-player games. Not needed with single player games.

At 2018-07-12T11:47-07:00 Laurent Cariou starts presenting 11-18/1316r0. At 2018-07-11T11:53-07:00 he ends his presentation.

Comment: Does the group want to run straw polls on each of the proposed motions?

Comment: Yes, I believe it is good to straw poll all motions.

Comment: I want to point out there has been concerns about IEEE moving slow. Now we have a very clear choice as to what we want to put forward.

Comment: In six months we have sufficient time to discuss what we want to do. If we add everything in the SG it will take one year. Laurent’s proposed motion is more confined. It does not mean that we cannot discuss these features. However, to have a new working mode we need to get started. If you are concerned about timelines I cannot see how you vote for Ron’s motion.

Comment: One proposal is focusing on high throughput and the other is focusing on high throughput and low latency.

Comment: I like to run a straw poll on starting with Laurent’s or Ron’s proposed motion.

Comment: I think this is a good approach. And then we put the motion on the screen.

Comment: I disagree with a previous comment. Ron’s proposed motion is more open. Other technologies are developing but are not ending up anytime soon in the market.

Comment: 16 streams and 320 MHz are not seen life in any station in the near future. By looking at what Ron is proposing it is more inclusive. It gives us the chance to study the low end of devices too.

Comment: I ask that you remove the URL from your presentation.

Comment: I am not advocating that we should not talk about features. However, we should talk about less features to get the project going. More frequent projects, limited scope. We cannot have these open ended, wide SGs.

Comment: I work with 3GPP. They work on NR-U. I want to read out one presentation in 3GPP. They cite HARQ as first reason that unlicensed LTE will work better than Wi-Fi. Furthermore, I want to read from Intel’s and Qualcomm’s webpages. Both companies claim that NR-U and LAA LTE work much better than Wi-Fi.

The Chairman instructs the attendee to focus his comment on the topic of the debate. Otherwise the attendee shall stop talking.

Comment: Do we disagree that there are fundamental reasons that LTE unlicensed has better proposal than Wi-Fi?

Comment: We are not debating this. We are working on the straw poll.

The Chairman has the following from page 4 of 11-18/1336r1 presented on the screen:

“Approve the formation of the 802.11 Extremely High Throughput (EHT) study group to consider development of a Project Authorization Request (PAR) and Criteria for Standards Development (CSD) for 1 to 7.125 GHz operation

* With the primary objective of increasing throughput to support high throughput applications such as video-over-WLAN, AR and VR.
* Candidate features include but are not limited to: 320 MHz bandwidth, multiband aggregation and operation, 16 spatial streams and Multi-AP coordination”

The Chairman asks the following straw poll:

“Do you support using the text shown on the screen as the motion text for EHT study group creation?”

Result: Yes: 72 No: 43 Abstain: 25

The Chairman has page 5 of 11-18/1336r1 being shown on the screen:

“Move to approve formation of an EHT SG (Extreme High Throughput Study Group) to develop a Project Authorization Request (PAR) and a Criteria for Standards Development (CSD) for a new 802.11 amendment for operating in the bands between 1 to 7.125 GHz, with the primary objectives:

* To increase peak throughput and improve efficiency
* To support high throughput and low latency applications such as video-over-WLAN, gaming, AR and VR

With target start of the task group in May 2019”

The Chairman asks the following straw poll:

“Do you support using the text shown on the screen as the motion text for EHT study group creation?”

Result: Yes: 101 No: 40 Abstain: 11

The Chairman states that the motion to be proposed to the 802.11 WG is the last one since it received more positive votes.

Comment: Please let me know if this procedural or technical?

Chairman: This is procedural.

Comment: This is a proposed motion to start an SG. The SG will decide when to start a TG.

Comment: We are just saying this is a target date.

The Chairman ask attendees to stand if “With target start of the task group in May 2019” should be removed from the proposed motion that received the most votes.

The Chairman concludes that there are roughly 46 attendees that want to keep the date and that about 36 attendees prefer to remove the date.

The Chairman states that the agreed motion that will be proposed to the WG is the following:

“Move to approve formation of an EHT SG (Extreme High Throughput Study Group) to develop a Project Authorization Request (PAR) and a Criteria for Standards Development (CSD) for a new 802.11 amendment for operating in the bands between 1 GHz and 7.125 GHz, with the primary objectives:

* To increase peak throughput and improve efficiency
* To support high throughput and low latency applications such as video-over-WLAN, gaming, AR and VR

With target start of the task group in May 2019”

At 2018-07-12T12:24-07:00 the Chairman declares the meeting of the EHT TIG adjourned.