IEEE P802.11
Wireless LANs

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| IEEE 802.11 TGaxMarch 2015 Berlin PHY Ad Hoc Meeting Minutes |
| Date: 2015-03-10 |
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Abstract

TGax meeting minutes from the IEEE 802.11 Berlin PHY Ad hoc session, March 10, 2015.

**IEEE 802.11 Task Group ax PHY Ad Hoc**

**March 2015 Berlin Meeting**

**Estrel Berlin, Berlin, Germany**

**March 10th, 2015**

**Tuesday, March 10th, 2015, AM2 TGax Session (10:30-12:30)**

1. **Meeting called to order by Jianhan Liu (MediaTek) at 10:30.**
	1. The agenda is contained in 11-15/0404r0 which is on the server.
2. **Administrative Items**
	1. Chair reminded the IEEE 802 and IEEE 802.11 Policy and Procedure.
	2. Chair also reminded to do attendance.
3. **Set and approve agenda**
	1. Proposed agenda for Tuesday AM2:
		1. Call Meeting to order
		2. IEEE 802 and 802.11 IPR Policy and procedure.
		3. Presentations follow the order of DCN.
		4. Recess
	2. Chair asked for approval of the proposed agenda. – Agenda approved.
4. **Presentation**
	1. 15/0305r1 “ Effective Subcarrier Assignment for DL-OFDMA”, Katsuo Yunoki (KDDI)

Summary: Flexible subcarrier assignment for DL-OFDMA was proposed. This scheme will realize more effective resource utilization. Further studies are required for detailed mechanism definitions.

Discussions:

Robert/Intel, this can be also solved by frame aggregation and fragmentation.

Answer: no considered

Robert: this should be considered to optimize the network when there are many users. 100B are very short PPDUs, so the optimization does not improve network effiency since most PPDU of long.

SP:

**4. Multi-user (MU) features**

The amendment shall allow to assign flexible number of subcarriers for each destination in DL-OFDMA PPDU.

Discussion:

Ron/Brcm: destination should be STA. Flexible’s definition? Any number of subcarriers? Is 26+52 flexible?

Answer: Yes

Robert: need to be specific about how flexible it is. If we have 4 modes in 20MHz, is it flexible or fixed?

Answer: It is fixed. Any suggestions?

Ron: then we don’t know how to vote. Flexible is not defined. What’s the granularity?

Change “flexible” to “any number”.

Joonsuk/Apple: how to signal for any number?

Jianhan: good question, but not related to SP.

Yes: 1

No: 48

Abs: 47

* 1. 15/0330r1 “OFDMA Numerology and Structure”, Shahrnaz Azizi (Intel), and Jinsoo Choi (LG)

Summary: proposed the OFDMA resource units granularity and locations, and the total usable tones for different bandwidths.

Discussions:

Sayantan/Nokia: resource unit fixed or variable across time?

Answer: Flexible for further study.

Daewon/Newracom: limited allocation on the center, can you explain more?

Answer: Always a 26x1 in the center for 20MHz (slide20) for 3 or 4 allocations.

Daewon: What is it mean by limited?

Answer: Only one 26x1 allocation.

Minho: 20MHz fixed locations violate spectrum mask. what is the performance degradation to legacy users?

Answer: ACI will be considered later. Are you concerned with VHT?

Minho: HE in 20MHz channel and VHT in adjacent 20MHz channel is what I meant.

Ron: high BW to low BW sta ACI is the main issue, not low BW to low BW.

Minho: in appendix simulation conditions, not fairness scheduler, so exaggerate the gain of small BW allocations. Need to use more practical scheduler.

Answer: Can consider other schedulers. But don’t think the results will change.

Interdigital: both UL/DL?

Answer: Yes.

Interdigital: In UL, is pilot enough for UMi?

Answer: 11ah uses 2 pilos per 26 tones.

Interdigital: slide 29, the figure above is a case of using locations in the figure below?

Answer: Yes

Interdigital: Allocations may be asymmetric across Dc tone?

Answer: Yes, some can use different sizes on each side

Interdigital: Pilot are not shown? Is pilot dependent on the block?

Answer: Yes

Joonsuk/Apple: slide 25, does it mean we have only 5 options?

Answer: No, it is just Lego blocks. Scheduler can move up and down over rows.

Joonsuk: Only contiguous resource allocation?

Answer: Anything is possible. It is an independent issue. This is just basic size of blocks allowed.

SP1: Do you agree to add the following in 11ax SFD?

The tone structure of the Data field of the HE PPDU is as follows:

(6,5) guard tones and 3 DC tones for a 20MHz non-OFDMA PPDU

(6,5) guard tones and at-least 3 DC tones for 20MHz OFDMA PPDU

More DC tones may be possible, contingent on the exact number of pilot tones adopted for the “102 data + 4 to 6 pilot” tone RU

(12,11) guard tones and 5 DC tones for a 40MHz non-OFDMA PPDU

(12,11) guard tones and 5 DC tones for a 40MHz OFDMA PPDU

(12,11) guard tones and 5 DC tones for an 80MHz non-OFDMA PPDU

This means a total of 996 non-zero tones for 80MHz SU or MU-MIMO PPDUs

(12,11) guard tones and 7 DC tones for an 80MHz OFDMA PPDU

This means a total of 994 = (484+26+484) usable tones for an 80 MHz OFDMA PPDU

Note: The term “OFDMA PPDU” also includes the “potential” case where MU-MIMO is being done on part of the PPDU BW.

Daewon: two different numerologies for OFDMA/non-OFDMA PPDU? What are those PPDU?

A: Non-OFDMA means SU/MU-MIMO with one chunk of tones. The definitions are not fixed.

D: SFD does not have a definition. Just want to know the definition in SP.

A: Non-OFDMA PPDU, for example 20MHz 242 tones, it is assigned to the one user.

Minho: numerology is very crucial design. This is a very big contribution. We need time to digest. Please defer the SP to the next meeting.

A: Prefer to run the SP just to get the idea. We can consider deferring motion.

Yes: 40

No: 33

Abstain: 26

SP2: Do you agree to define 20MHz, 40 MHz, and 80MHz OFDMA building blocks as follows

26-tone, 52-tone and 102 data tones plus 4-6 pilot tones as defined in slide 6, and at fixed positions as shown in slides #24 (or 25), #26 and #27

An OFDMA PPDU can carry a mix of different tone unit sizes within each 242 tone unit boundary

242-tone at fixed positions as shown in slides #26 and #27

484-tone at fixed positions as shown in slide #27

Note that 40MHz OFDMA is two replicas of 20MHz, and 80MHz OFDMA is two replicas of 40MHz plus one central 26-tone. The following is TBD:

Exact location of leftover tones within a 242 unit

Daewon: Can you clarify the replica of 20MHz?

A: 40MHz has two replicas of blocks shown in 20MHz block locations.

D: Fixed locations?

A: Fixed locations is shown as the figure, using A particular hierarch.

Yes: 42

No: 34

Abstain: 36

* 1. 11-15/0344r0 “SIG field design principle for 11ax”, Young Hoon Kwon (Newracom)

Summary: Analyzes SIG field structure on how to indicate resource allocation information.

Proposes two possible way of SIG field design for efficient resource allocation information delivery: Variable length HE-SIG field, Partial indication of resource allocation information

Robert/Intel: variable length of SIGB means before LTF?

A: Yes

R: Partial indication?

A: Does not have whole resource allocation, but only partial information.

R: Like to know more since there are multiple ways of doing that.

Jiayin/Huawei: for both UL/DL?

A: For OFDMA, both in UL/DL.

Wookbong: OFDM still need resource allocation?

A: TBD.

Quantenna: SIGA replica over each 20MHz?

A: TBD

SP1: Do you agree to add to the TG Specification Framework:

3.y.z HE-PPDU shall include HE-SIG-B field that includes resource allocation information, and the number of OFDM symbols of HE-SIG-B field is variable.

Robert: suggest to split to two SPs since it is talking about two things.

A: OK.

Wookbong: UL and DL?

Robert: how about only DL?

A: OK.

Robert: there is implication of SIGA before SIGB.

A: People may think about LTF before SIGB.

Robert: we can say just followed by, not directly after.

Robert: we may add a SP of structure of SIGA+SIGB

Jianhan: out of scope

Ron: location of SIGB?

A: After SIGA. Don’t want to specify. Not sure if it is right after SIGA.

Ron: still prefer exact location of SIGB

A: SP just want to make it open.

Jiayin: variable includes zero?

A: Change SP. Remove DL, add number of symbols can be zeros

Bin/Qualcomm: SP mixes two things together. Always SIGB, and variable SIGB. Break it.

A: Change it to two SP.

Peter/Huawei: length of SIGB in SIGA. To cover zero SIGB, need indication.

Jianhan: Bin’s proposal is better.

Joonsuk/Apple: We don’t have definition of SIGA and SIGB yet.

A: SIGB means info that is needed to enable decoding of payload.

J: Can you define it in SP?

A: Will bring back SP to tgax session.

Sameer/Qualcomm: now it cannot be zero.

A: Will fix.

SP2: Do you agree to add to the TG Specification Framework:

3.y.z HE-PPDU shall include HE-SIG-B field which is composed of more than one decoding blocks, and target receiver of the HE-PPDU may need to decode more than one HE-SIG-B decoding blocks.

Deferred.

* 1. 11-15/0358r1, “Numerology for 11ax”, Daewon Lee (Newracom)

Summary: proposed numerology for 11ax. Use aggregated 20MHz for 40MHz/80MHz.

Wookbong/LG: slide 3, why not divide by 9?

A: We may have to find an integer division of 20MHz.

Wookbong: don’t think it is most important.

Ron/BRCM: we don’t have defined spectrum mask.

A: 11ac spectrum mask. Here is to see how many tones to use for 11ac mask.

R: Do we have to?

A: For discussion.

R: We think the implementation is using 80MHz downclock by 4.

A: Then 20MHz need 25MHz extraction. Need further discussions on implementation.

R: 11ah use downclock by 10. Why cannot be the same implementation here?

A: 11ax is a new system. Why it can be applied to 2.4/5Ghz is open.

SP is delayed to TGax main session PM1.

1. **The chair announced the end of PHY ad hoc session.**