IEEE P802.11
Wireless LANs

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| CR on UL OFDMA in DFS Channels |
| Date: 2017-07-10 |
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Abstract

This submission proposes resolutions for the following comments from the letter ballot on P802.11ax D1.0:

4966, 4967, 5249, 8078, 8599, 8600, 8601, 9788, 9789

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version.

R1: Editorial updates suggested by Mark Rison (“26-tone RU” 🡪 “a 26-tone RU” in two places, “with the exception” 🡪 “except” in one place, “the STA” 🡪 “a STA” in one place, “pulses.)” 🡪 pulses).” in one place).

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| **CID** | **Commenter** | **Clause** | **Page** | **Comment** | **Proposed Change** |
| 4966 | Brian Hart | 28.3.3.2 | 229.04 | "DFS channel" is undefined .. and practically time-varying | Reference Operating Classes with a defined BehaviorLimit associated with DFS from Annex D/E |
| 4967 | Brian Hart | 28.3.3.2 | 229.10 | Friendly legacy APs tolerant of narrow PPDUs have no way to upgrade their SW to declare they can tolerate narrow Rus | Add a Extended Capability bit for legacy APs to be able to declare "Even if I'm here, don't block usage of narrow RUS on my account" |
| 5249 | Dorothy Stanley | 28.3.3.2 | 229.10 | We don't really have a definition for "DFS channel" | Take a look at 11.9.8.5 "HT-greenfield transmissions in operating classes that include a behavior limit of DFS\_50\_100\_Behavior" for a more precise way to write this requirement |
| 8078 | Massinissa Lalam | 28.3.3.2 | 229.14 | How is the AP "advised" ? This requirement should be mandatory in my opinion with something like "NOTE--If a HE non-AP STA does not respond with a 26-tone RU in HE trigger-based PPDU in a DFS channel, then APshall trigger with no less than 52-tone RU for the same HE non-AP STA in the next HE trigger-based PPDU transmission." | As in comment. |
| 8599 | Sigurd Schelstraete | 28.3.3.2 | 229.09 | It would be preferable to control the behavior of the HE AP through e.g. a MIB variable. This variable would control whether the AP needs to take special measures in the presence on non-HE OBSS or not. | Introduce configuration control for the behavior of an HE AP in the presence of non-HE OBSS. |
| 8600 | Sigurd Schelstraete | 28.3.3.2 | 229.09 | "if an HE AP operates in a DFS channel where there is a non-HE OBSS" needs to be more specific as to when the condition applies. | Provide more detail as to which metrics will trigger the specific condition to not request 26-tone RUs. |
| 8601 | Sigurd Schelstraete | 28.3.3.2 | 229.11 | "and the HE non-AP STA shall not respond with 26-tone RU". This may put STAs that oberve an OBSS at a disadvantage, since it has no way to indicate explicitly why it is not responding. It may be underserved as a result. | It would be better to have a mechanism that enables STAs to indicate the presence of a non-HE OBSS to the HE AP. |
| 9788 | Youhan Kim | 28.3.3.2 | 229.09 | "DFS channel" is not a defined term. | Change "if an HE AP operates in a DFS channel" to "if an HE AP STA operates in a channel requiring DFS behavior". |
| 9789 | Youhan Kim | 28.3.3.2 | 229.09 | Clarify how the existence of non-HE OBSS is determined. | Clarify how the existence of non-HE OBSS is determined. |

**Background**

The corresponding text from D1.3 is the following:

D1.3 P309L56:

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| The 26-tone RU, 52-tone RU, 106-tone RU and 242-tone RU are used in the 20 MHz, 40 MHz, 80 MHz, 160 MHz and 80+80 MHz HE MU PPDU formats or HE TB PPDU formats, with the exception that if an HE AP operates in a DFS channel where there is a non-HE OBSS, the HE AP shall not trigger any 26-tone RU and the non-AP HE STA shall not respond with 26-tone RU in a HE TB PPDU in which HE data field is conveyed. The 106-tone RU is used in HE ER SU PPDU format.NOTE—If a non-AP HE STA does not respond with a 26-tone RU in HE TB PPDU in a DFS channel, then AP is advised to trigger 52-tone RU for the same non-AP HE STA in the next HE TB PPDU transmission. |

**Proposed Resolution: CID 4966, 5249, 9788**

**Revised**. Commenter is correct that the term “DFS channel” is undefined. Proposed text update in 11-17/1066r1 uses the phrase “operating in an operating class for which the behavior limits set listed in Annex E includes the DFS\_50\_100\_Behavior” instead.

Instruction to Editor: Implement the proposed text changes in 11-17/1066r1.

**Proposed Resolution: CID 4967**

**Revised**. Proposed text update in 11-17/1066r1 has added the “OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support” bit to the Extended Capabilities as the commenter has suggested.

Instruction to Editor: Implement the proposed text changes in 11-17/1066r1.

**Proposed Resolution: CID 8078**

**Revised**. The AP ultimately chooses which RU sizes to allocate for UL OFDMA, similar to the AP choosing the MCS and other parameters. The NOTE is a recommendation on the AP’s operation. Proposed text update in 11-17/1066r1 clarifies that this is a recommendation.

Instruction to Editor: Implement the proposed text changes in 11-17/1066r1.

**Proposed Resolution: CID 8599**

**Revised**. Behavior of an HE AP in the presense of non-HE OBSS has been clarified in the proposed text updates in 11-17/1066r1, and did not require a MIB variable.

Instruction to Editor: Implement the proposed text changes in 11-17/1066r1.

**Proposed Resolution: CID 8600, 9789**

**Revised**. Proposed text update in 11-17/1066r1 has added details on cases when the 26-tone RU is not utilized in UL OFDMA.

Instruction to Editor: Implement the proposed text changes in 11-17/1066r1.

**Proposed Resolution: CID 8601**

**Rejected**. In the case where some STAs are able to hear (and thus interfer with) legacy OBSS, while some other STAs are not able to hear (and thus not interfer with) legacy OBSS, it is not necessary to restrict the use of 26-tone RUs by those STAs not interfering w/ legacy OBSS.

**Proposed Text Updates:**

* Extended Capabilities element

*TGax Editor: Add the following row to Table 9-135 at D1.3 P107L25.*

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| Table 9-135 – Extended Capabilities element  |
| Bit | Information | Notes |
| <ANA> | OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support | If operating in an operating class for which the behavior limits set listed in Annex E includes the DFS\_50\_100\_Behavior:An AP STA sets the OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support field to 1 when dot11OBSSNarrowBWRUinULOFDMATolerated is true, and sets it to 0 otherwise.A non-AP STA sets the OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support field to 0.If operating in an operating class for which the behavior limits set listed in Annex E does not include the DFS\_50\_100\_Behavior:A STA sets the OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support field to 0. |

27.5.2.2 Rules for soliciting UL MU frames

27.5.2.2.1 General

*TGax Editor: Add the following paragraph at D1.3 P219L58.*

An AP operating in an operating class for which the behavior limits set listed in Annex E includes the DFS\_50\_100\_Behavior shall not transmit a Trigger frame that contains at least one User Info field whose RU Allocation subfield indicates a 26-tone RU or a frame with a UMRS Control field whose RU Allocation subfield indicates a 26-tone RU if the AP has received at least one Beacon frame or Probe Response frame in which any of the following are true:

* The Extended Capabilities element is not present.
* The OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support bit in the Extended Capabilities element is not present.
* The OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support bit in the Extended Capabilities element is 0.

NOTE — If a non-AP HE STA does not respond to a Trigger frame or a frame with a UMRS Control field in which the STA was allocated a 26-tone RU when operating in an operating class for which the behavior limits set listed in Annex E includes the DFS\_50\_100\_Behavior, then the AP is recommended not to allocate 26-tone RU for the same non-AP HE STA in the next Trigger frame or frame with a UMRS Control field.

27.5.2.3 STA behavior for UL MU operation

*TGax Editor: Add the following paragraph at D1.3 P221L52.*

A non-AP HE STA operating in an operating class for which the behavior limits set listed in Annex E includes the DFS\_50\_100\_Behavior shall not transmit an HE TB PPDU in response a Trigger frame or a frame with a UMRS Control field that is intended to the STA or is designated for UL OFDMA-based random access if the RU Allocation subfield allocated to the STA or designated for UL OFDMA-based random access indicates 26-tone RU and the non-AP HE STA has received at least one Beacon frame or Probe Response frame in which any of the following are true:

— The Extended Capabilities element is not present.

* The OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support bit in the Extended Capabilities element is not present.
* The value of the OBSS Narrow Bandwidth RU in UL OFDMA Tolerance Support bit in the Extended Capabilities element is 0.

28.3.3.2 Resource unit, guard and DC subcarriers

*TGax Editor: Modify D1.3 P309L57 as follows.*

The 26-tone RU, 52-tone RU, 106-tone RU and 242-tone RU are used in the 20 MHz, 40 MHz, 80 MHz, 160 MHz and 80+80 MHz HE MU PPDU formats.The 52-tone RU, 106-tone RU and 242-tone RU are used in the 20 MHz, 40 MHz, 80 MHz, 160 MHz and 80+80 MHz HE TB PPDU formats. The 26-tone RU is used in the 20 MHz, 40 MHz, 80 MHz, 160 MHz and 80+80 MHz HE TB PPDU formats, except when a STA is operating in an operating class for which the behavior limits set listed in Annex E includes the DFS\_50\_100\_Behavior (see 27.5.2.2.1 and 27.5.2.3 for further details.) The 106-tone RU is used in HE ER SU PPDU format.

Annex C

* MIB Detail

*TGax Editor: Modify D1.3 P511L29 as follows.*

Dot11StationConfigEntry ::= SEQUENCE

 {

 …,

 dot11FutureChannelGuidanceActivated TruthValue,

 dot11HEOptionImplemented TruthValue,

 dot11OBSSNarrowBWRUinULOFDMATolerated TruthValue

 }

…

*TGax Editor: Add the following text at D1.3 P511L46.*

dot11OBSSNarrowBWRUinULOFDMATolerated OBJECT-TYPE

 SYNTAX TruthValue

 MAX-ACCESS read-only

 STATUS current

 DESCRIPTION

 "This is a capability variable.

 Its value is determined by device capabilities.

 This attribute indicates whether the AP STA is able to tolerate 26-tone RU UL OFDMA transmissions using HE TB PPDU from OBSS (not falsely classify the 26-tone RU UL OFDMA transmissions as radar pulses)."

::= { dot11StationConfigEntry <ANA> }

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