IEEE P802.11  
Wireless LANs

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| **TGax D1.1 Comment Resolutions for 28.3.7 HE-MCSs** |
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Abstract

This submission proposes resolutions for comments of TGax D1.1 with the following CIDs:

* 5300, 6837, 6838, 7221, 7514, 8859, 8862

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax D1.1 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D1.1 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

#### *CID 7221, 7514*

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| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 7221 | 28.3.7 | 256.07 | In the Trigger frame, HE-MCS is identified for in the User Info field. The description (line 65 in page 46) is refering to this subclause. But it isn't mentioned on Trigger frame in this subclause. | It is better to add something like the following: And also in the User Info field of Trigger frame, MCS is indicated for the HE trigger-based PPDU response for the responding STA. | Revised-  Agree in principle with the commenter. Clarify the corresponding sentence.  TGax editor to make the changes shown in 11-17/0320r0. |
| 7514 | 28.3.7 | 256.07 | For an HE trigger-based PPDU, the HE-MCS is carried in a User Info field of the Trigger frame soliciting the HE trigger-based PPDU. | Changing  "For an HE trigger-based PPDU, it is carried in the User Info fields of the Trigger frame."  to  "For an HE trigger-based PPDU, it is carried in a User Info field of the Trigger frame soliciting the HE trigger-based PPDU." | Revised-  Agree in principle with the commenter. Clarify the corresponding sentence.  TGax editor to make the changes shown in 11-17/0320r0. |

*TGax Editor: Please make the following changes in Line 7 on Page 264:*

For an HE trigger-based PPDU, it is carried in the User Info field~~s~~ of the Trigger frame soliciting the HE trigger-based PPDU.

#### *CID 8859*

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| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 8859 | 28.3.7 | 256.06 | Change "For an HE MU PPDU it is carried in the HE-SIG-B field." to "For an HE MU PPDU it is carried per user in the HE-SIG-B field." | See comment | Revised-  Agree in principle with the commenter. Modify the corresponding sentences for clarification.  TGax editor to make the changes shown in 11-17/0320r0. |

*TGax Editor: Please make the following changes in Line 6 on Page 264:*

For an HE MU PPDU, it is carried per user in the user specific field of HE-SIG-B ~~field~~.

#### *CID 5300, 8862*

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| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 5300 | 28.3.7 | 256.33 | There are two types of MCSs, i.e., HE-MCS and HE-SIG-B-MCS. Thus, HE-SIG-B-MCSs which can be used for DCM also need to be defined. | Add "HE-SIG-B-MCSs" into the relevant sentence as follows.  "It is only applied for the HE-MCSs and HE-SIG-B-MCS with indices 0, 1, 3 and 4." | Revised-  Agree in principle with the commenter. Modify the corresponding sentences.  TGax editor to make the changes shown in 11-17/0320r0. |
| 8862 | 28.3.7 | 256.30 | Paragraph on DCM should be improved for clarity. | Change to e.g. "DCM is an optional modulation scheme used for the HE-SIG-B field and the Data field in an HE PPDU. The use of DCM for the HE-SIG-B field in an HE MU PPDU is indicated in HE-SIG-A. The use of DCM for the Data field in an HE SU PPDU, HE trigger-based PPDU or HE extended range SU PPDU is indicated in HE-SIG-A. The use of DCM for the Data field in an HE MU PPDU is indicated in HE-SIG-B. DCM is only applied for the HE-MCSs with indices 0, 1, 3 and 4." | Revised-  Agree in principle with the commenter. Modify the corresponding paragraph.  TGax editor to make the changes shown in 11-17/0320r0. |

*TGax Editor: Please make the following changes in Line 30 to 34 on Page 264:*

DCM is an optional modulation scheme used for the HE-SIG-B field and the Data field in an HE PPDU. ~~It is indicated in the HE-SIG-A field~~The use of DCM for the HE-SIG-B field in an HE MU PPDU is indicated in the HE-SIG-A field. ~~and~~The use of DCM for the Data field in HE SU PPDU, HE trigger-based PPDU ~~and~~or HE extended range SU PPDU is indicated in the HE-SIG-A filed. ~~and indicated in the HE-SIG-B field~~The use of DCM for the Data field in an HE MU PPDU is indicated in the HE-SIG-B field. ~~It~~DCM is only applied for the HE-MCSs and HE-SIG-B-MCSs with indices 0, 1, 3 and 4.

#### *CID 6837, 6838*

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| **CID** | **Clause** | **PP.LL** | **Comment** | **Proposed Change** | **Resolution** |
| 6837 | 28.3.7 | 256.22 | The draft adds two new optional 1024-QAM based MCSs (MCSs 10 and 11): options piled on top of options, as the 256-QAM based MCSs (MCSs 8 and 9) are also optional. The document that introduces them (15/1070r3, September 2015) is remarkably candid about the motivation. After wading through 8 pages listing 111 co-authors, we have "'average throughput enhancement of 4X' may not be so appealing to market even if it is very important technically". (!). But fear not, because "1024 QAM provides a good marketing point on 11ax". It also aims to "Keep superior to other standards in terms of modulation technology (LTE decided to use 256QAM)". These are deeply unworthy justiifcations for adding modes to the standard. We have been reminded repeatedly that the PAR and CSD act as a 'contract' between the Working Group and the IEEE-SA, and the original proposal, \*by its own account\* violated the contract, dismissing the agreed goal of the ax project and substituting their own. Worse, the substituted goal is a throwback to the long-discredited 'number-on-the-box' approach that the agreed ax goals were expressly agreed to replace. Since MCS 9 (256-QAM rate 5/6) already covers only a very small fraction of the full BSS coverage area, the practical gain of 1024-QAM is highly questionable. The maximum possible gain is upper-bounded by 25%, but will presumably be much lower in practice, especially since, unlike 256-QAM, 1024-QAM will only be usable within HE modes, with corresponding throughput loss due to the much longer preambles. The modes should be removed. | Delete the 1024-QAM modes and all references and supporting modes in the draft. | Rejected-  TGax members adopted 1024 QAM as an optional feature for 802.11ax after long and careful consideration. I have no doubt that 802.11ax can benefit from 1024 QAM in terms of both the maximum throughput and the average throughput as shown in several contributions including 11-15/1070r3. Note that the average throughput enhancement is one of the goals of 11ax. So, I can not see any reason to remove the 1024 QAM mode. If commenter wants to remove it, provide a pertinent contribution and do Motion. |
| 6838 | 28.3.7 | 256.30 | In a severely bloated amendment, we should look for ways to simplify the text and to focus on the central goals of the project. One way is to remove minor modes that are only tangentially related to the goals of the project. One of these is DCM, yet another low-rate range-extension mode in an amendment that has nothing to do with range extension. There is not one word about range extension in the PAR or CSD, yet range extension modes clutter up the draft. To the extent that low-rate modes displace use of higher ratre modes on the medium, they actually work counter to the goals of the amendment. It may very well be that range extension would make a worthy and interesting project in itself, with a carefully worked out PAR and CSD. DCM is an optional, low-rate mode that can't even be used in conjunction with other range extension modes (STBC). It's a marginal special case and the draft would be better without it. | Delete DCM and all references to it in the draft. | Rejected-  TGax members adopted DCM as an optional feature for 802.11ax after long and careful consideration. I have no doubt that DCM can not only achieve a range extension but also have good performance in a dense environment which is the scenario considered in 11ax. So, I can not see any reason to remove the DCM mode. If commenter wants to remove it, provide a pertinent contribution and do Motion. |