IEEE P802.11
Wireless LANs

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| Proposed Resolutions to CID 5011, 6900, 6998, and 9056 |
| Date: 2017-07-19 |
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Abstract

This document provides proposed resolutions to CID 5011, CID 6900, and 9056. These CIDs are related to the TGax PAR statement; “*This amendment defines standardized modifications to both the IEEE 802.11 physical layers (PHY) and the IEEE 802.11 Medium Access Control layer (MAC) that enable at least one mode of operation capable of supporting at least four times improvement in the average throughput per station*” and the stated 4x per-STA throughput improvement.

Proposed resolution to CID 6998 is also given in this document. CID 6998 is a general statement about the draft and doesn’t point to any specific area of the draft.

The four CIDs belong to the Editor group.

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| **CID** | **Claue.****Page** | **Comment** | **Proposed Change** | **Resolution** | **Owning Ad-hoc** |
| 6901 | 1.01 | I am concerned that the current draft has not been shown to provide the level of performance improvement specified in the PAR. While a lot of work has gone into this draft, it seems premature to stop work on the technical aspects if there are any other improvements that could be added to help this amendment reach its avowed goal. |  | RejectedThe comment doesn’t point to any specific issue with the draft. The TG continues to improve the draft as a result of the WG balloting process.As for the performace improvement specified in the PAR, many simulation studies and results were presented to the TG showing that a throughput improvement of 4x as stated in the PAR is possible for a given assumptions. A list of these simulation studies is given in <this document> for reference. | EDITOR |
| 7690 | 1.01 | The purported goal of the ax project was to achieve a 4x improvement in system throughput in dense environments. It seems the current draft falls far short of this goal. Either there needs to be more persuasive justification, or the stated goals should be changed. N.B.: it is not remotely persuasive to cite numbers derived from extended range modes in such calculations. A mode that provides data connectivity where none would have existed under the baseline standard would provide an infinite "improvement" if we arllowed x/0 calculations, but this would be an abuse of language. No reasonable reader would interpret such a range extension as an "infinite" throughput improvement. If it had been considered important to extend range, it would have been very easy to say so. What is needed, therefore, is a showing that under a reasonable prior deployment we get system throughput x1 while using ax technology in the same deployment we would get >= 4 x1. Here the throughput between any pair of connected devices in the absence or silence of all others should be 'reasonable', i.e., certainly not 0 or anything close to it. | Provide detailed justification for the 4x improvement goal in scenarios where the 'before' deployment is credible: at a minimum, each pair of connected devices should be capable of supporting a reasonable throughput in the absence or silence of all others. In particular, do not use range extension modes in this calculation. If the current draft cannot credibly support anywhere near to a 4x improvement, as seems all too likely to be the case, then revise the PAR and CSD. | RejectedMany simulation results were presented to the TG showing that the 4x improvement is possible for the given assumptions. References to these simulation results are given at the end of <this document>. For example, simulation results in doc.11-17/0090r1 shows a throughput improvement of over 4x for UL MU MIMO. Doc. 11-16/1363r1 shows a gain over 4x for a micx of UL/DL traffic.It is worth noting that none of the simulation results presented has used extended range. | EDITOR |
| 6998 | G | Unfortunately, even with the additional time allowed for the review of this amendment and a significant time commitment on my part, I did not have enough time to review and comment on all of the clauses that warranted comment. It seemed that every clause I looked at required correction and comment. Given state of this draft it was very difficult for me to review high level technical features and their interactions, which I believe is critical for a complete technical review of the amendment. I was forced to spend most of my time trying to figure out what the technical features were and how they should be correctly described/specified. The lack of clear feature descriptions in clause 4 further hampered my ability to review and understand the goals and purpose of the new HE features. It was very difficult to understand how the HE features should work with the existing features in the baseline specification. It was also difficult to know which features were dependent on other features, and how features need to work together. Lastly, it was not clear how these new features would extend the capabilities of 802.11 and provide for improved performance in a high density environment. | Improve the descriptions in clause 4, so that there is a useful description as to what the new features are and how they work together and with legacy features to provide improved performance. In hindsight, given the current state of the amendment it would have made more sense to do a TG review prior to sending the amendment in its current form to the WG for letter ballot. In addition it would be helpful if all of the authors of this document were familiar with the 802.11 Editorial Style Guide or if is not possible for the authors to follow the Style Guide that the editor(s) provide more in depth editing prior to submitting this amendment to WG letter ballot again. I understand that many members wish to quickly complete this amendment, but in my view it would be a mistake to lower the quality of the specification simply to speed things along. I don't see how any voter who reviewed the current draft could consider it ready to go the Sponsor Ballot. | RejectedThe comment is a general statement about the draft and doesn’t specify any specific issue.The commenter is not specific about what needs to be improved in clause 4. Cluase 4.3.14a has been extensively revised as a result of comment resolutions in doc 11-17/1058r8The TG always attemps to improve the quality of the draft as a result of the balloting process and the associated comments resolution | EDITOR |
| 9056 | G | It's not clear in the Nov presnetations that the 4 times of performance improvement has been verified by simulations. There have been a lot of quesuions. | Need to define a represnetative use case and evaluate the performance improvement wth respect to 11n and ac. | RejectedThe comment doesn’t point to any specific issue with the draft. Many simulation studies and results were presented to TG showing that a throughput improvement of 4x as stated in the PAR is possible for a given set of assumptions.A list of these simulation studies is given in <this document> for reference | EDITOR |

References:

[1] <https://mentor.ieee.org/802.11/dcn/17/11-17-0095-00-00ax-proposal-on-simulation-scenario-document-for-11ax-par-verification-doc.docx>

[2] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-10-00ax-ofdma-performance-in-11ax.ppt>

[3] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-09-00ax-ofdma-performance-in-11ax.ppt>

[4] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-08-00ax-ofdma-performance-in-11ax.ppt>

[5] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-07-00ax-ofdma-performance-in-11ax.ppt>

[6] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-06-00ax-ofdma-performance-in-11ax.ppt>

[7] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-05-00ax-ofdma-performance-in-11ax.ppt>

[8] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-04-00ax-ofdma-performance-in-11ax.ppt>

[9] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-03-00ax-ofdma-performance-in-11ax.ppt>

[10] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-02-00ax-ofdma-performance-in-11ax.ppt>

[11] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-01-00ax-ofdma-performance-in-11ax.ppt>

[12] <https://mentor.ieee.org/802.11/dcn/15/11-15-1095-00-00ax-ofdma-performance-in-11ax.ppt>

[13] <https://mentor.ieee.org/802.11/dcn/16/11-16-1414-02-00ax-verifying-11ax-s-par-by-ul-mu-mimo.pptx>

[14] <https://mentor.ieee.org/802.11/dcn/17/11-17-0090-01-00ax-11ax-par-verification-using-ul-mu-mimo.pptx>

[15] <https://mentor.ieee.org/802.11/dcn/17/11-17-0076-00-00ax-multiple-bss-simulations-for-par-verification.pptx>

[16] <https://mentor.ieee.org/802.11/dcn/16/11-16-1604-00-00ax-single-bss-simulations-for-par-verification.pptx>

[17] <https://mentor.ieee.org/802.11/dcn/16/11-16-1198-03-00ax-preliminary-11ax-par-verification.pptx>

[18] <https://mentor.ieee.org/802.11/dcn/16/11-16-1143-01-00ax-11ax-par-verification.pptx>

[19] <https://mentor.ieee.org/802.11/dcn/16/11-16-1435-00-00ax-par-verification-simulation-followup.pptx>

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**References:**