IEEE P802.11
Wireless LANs

|  |
| --- |
| Resolutions to 32.3.8.2 Non\_NGV portion of NGV format preamble |
| Date: 2021-08-13 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yujin Noh | Senscomm |  |  | yujin.noh at senscomm.com |
|  |  |  |  |  |

Abstract

This submission shows

* Comments from TGbd draft 2.0.
* Resolutions applied to TGbd draft 2.0.
* 12 CIDs: 2029, 2032, 2189, 2033, 2098, 2034, 2094, 2185, 2030, 2187, 2188, and 2031

Revisions:

* Rev 0: Initial version of the document.
* Rev 1:
	+ add CIDs 2032, 2033, 2098 and 2034 from DCN1345
	+ add editorial CID 2189 related to CID2032.
	+ For CID 2031, Equations (32-9) in L-SIG and (32-12) in RL-SIG are updated.
	+ Mathematical notations removed from the resolution box since math symbols are not copied to excel sheet.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2029 | 86.04 | reorganize both 32.3.8.2.1 (Cyclic shift for pre-NGV modulated fields) and 32.3.8.3.2 (Cyclic shift for NGV modulated fields) into 32.3.8.2's subclauses. 32.3.8.3 is for Non\_NGV portion of NGV format preamble. It is the spec structure of 11ax and 11be. | as in comment | RevisedIts structure depends on the amendments. 11bd have the same format of the contents in 11ac which is different from 11ax and 11be. It is a decision point not a technical one.For RL-SIG, NGV-SIG, and RNGV-SIG fields, even though those are in NGV portion of NGV format preamble, the cyclic shift values for pre-NGV modulated fields are applied. To reorganize those confusing structure well for comfortable reads, 11ax and 11be have introduced a new structure. TGbd Editor: Incorporate the changes in 11-21-1344-01-00bd-Resolutions to 32.3.8.2 Non\_NGV portion of NGV format preamble. |
| 2032 | 89.46 | two RL SIG definition such as 32.3.8.2.5 (RL-SIG definition) and 32.3.8.3.3 (RL-SIG definition). Delete one of those. | as in comment | RevisedRedundant 32.3.8.3.3 (RL-SIG definition) is deleted. Same resolution applied for CIDs 2032 and 2189.TGbd Editor: No more modification is required. |
| 2189 | 88.61 | According to CID 1773 of LB 251 and https://mentor.ieee.org/802.11/dcn/21/11-21-0025-02-00bd-the-comment-resolution-for-32-3-8-2-5.docx Subclause 32.3.8.2.5 should be moved to 32.3.8.3.3. This was done. Hence, please delete Subclause 32.3.8.2.5. | as in comment | Revised.As the commenter mentioned, the resolution of CID1773 is to move RL-SIG part to NGV portion of NGV format preamble portion. However mistakenly the original RL-SIG definition part in non-NGV portion of NGV format preamble is not deleted in the 11bd draft 2.0.Redundant 32.3.8.3.3 (RL-SIG definition) is deleted. Same resolution applied for CIDs 2032 and 2189.TGbd Editor: No more modification is required. |

***Discussion***

For CID 2029

***   ***

In 11bd for RL-SIG, NGV-SIG, and RNGV-SIG fields, even though those are in NGV portion of NGV format preamble, the cyclic shift values for pre-NGV modulated fields are applied. To reorganize those confusing structure well for comfortable reads, 11ax and 11be have introduced a new structure of the contents above.

For CIDs 2032 and 2189, there are two subclauses on RL-SIG definition as below. One should be deleded.

 

As in CID2189, the resolution of CID1773 is to move RL-SIG part to NGV portion of NGV format preamble portion. However mistakenly the original RL-SIG definition part is not deleted in the 11bd draft 2.0. That’s why two RL-SIG definition subclauses are shown in the current spec.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 1773 | 65.50 | 32.3.8.2.5 RL-SIG definition should not be included in 32.3.8.2 Non\_NGV portion of NGV format preamble since RL-SIG is not part of Non-NGV portion. "The RL-SIG field is a repeat of the L-SIG field and is used to differentiate an NGV PPDU from a non-NGV PPDU." | Please move this subclause to 32.3.8.3 NGV portion of NGV format preamble32.3.8.3 NGV portion of NGV format preamble | REVISED (EDITOR: 2021-02-27 00:14:48Z) 22 Jan - SP 2In principle, the commenter is right. The Non-NGVportion of NGV format preamble means the following 3 fields. L-STF, L-LTF and L-SIG. so, it is right that the description of RL-SIG field moves to the NGV portion of NGV format preamble.TGbd Editor: Incorporate the changes in https://mentor.ieee.org/802.11/dcn/21/11-21-0025-02-00bd-the-comment-resolution-for-32-3-8-2-5.docx |

***To TGbd Editor:*** ***P86L01*** *update the description as below.*

***------------- Begin Text Changes ---------------***

32.3.8 NGV preamble

32.3.8.1 Introduction

An NGV preamble is defined to carry the required information to operate in a system with multiple transmit and multiple receive antennas. To maintain compatibility with non-NGV STAs, specific non-NGV fields are defined that can be received by non-NGV STAs compliant with Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification). The non-NGV fields are followed by NGV fields specific to NGV STAs.

32.3.8.2 Cyclic shift

~~32.3.8.2 Non\_NGV portion of NGV format preamble~~

32.3.8.2.1 Cyclic shift for pre-NGV modulated fields

32.3.8.2.2 Cyclic shift for NGV modulated fields

~~32.3.8.2.2~~ 32.3.8.3 L-STF definition

~~32.3.8.2.3~~ 32.3.8.4 L-LTF definition

~~32.3.8.2.4~~ 32.3.8.5 L-SIG definition

~~32.3.8.2.5~~ 32.3.8.6 RL-SIG definition

~~32.3.8.3 NGV portion of NGV format preamble~~

~~32.3.8.3.1 Introduction~~

~~The NGV portion of the NGV format preamble consists of the RL-SIG, NGV-SIG, RNGV-SIG, NGV-STF,~~

~~and NGV-LTF fields.~~

~~32.3.8.3.2 Cyclic shift for NGV modulated fields~~

~~32.3.8.3.3 RL-SIG definition~~

~~The RL-SIG field is a repeat of the L-SIG field and is used to differentiate an NGV PPDU from a non-NGV~~

~~PPDU. RL-SIG shall be modulated same as L-SIG.~~

~~…~~

$$η\_{L-RSIG}=1$$

~~32.3.8.3.4~~ 32.3.8.7 NGV-SIG definition

~~32.3.8.3.5~~ 32.3.8.8 RNGV-SIG definition

~~32.3.8.3.6~~ 32.3.8.9 NGV-STF definition

~~32.3.8.3.7~~ 32.3.8.10 NGV-LTF definition

32.3.9 Data field

***------------- End Text Changes ------------------***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2033 | 90.07 | In Equation (32-13) and its notion, Eta\_L-RSIG has not been discussed before. Delete unnecessary symbol. | as in comment | RevisedAgreed in principle. However, the Equation (32-13) is not existed by deleting the 32.3.8.3.3 (RL-SIG definition) under the resolution of CID 2032.Same resolution applied for CIDs 2033, 2098 and 2034.TGbd Editor: No more modification is required. |
| 2098 | 90.07 | Typos L-SIG and L-RSIG in 32.3.8.3.3 RL-SIG section. | Revise accordingly throughout the whole subclause. | RevisedAgreed in principle. However, 32.3.8.3.3 (RL-SIG definition) is deleted by the resolution of CID 2032.Same resolution applied for CIDs 2033, 2098 and 2034.TGbd Editor: No more modification is required. |
| 2034 | 90.21 | In Equation (32-13) and its notion, Eta\_L-RSIG has not been discussed before. Delete unnecessary symbol. | as in comment | RevisedAgreed in principle. However, the Equation (32-13) is not existed by deleting the 32.3.8.3.3 (RL-SIG definition) under the resolution of CID 2032.Same resolution applied for CIDs 2033, 2098 and 2034.TGbd Editor: No more modification is required. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2094 | 86.25 | The subcarrier index k in the argument of exp should also include the K\_shift term. It is applied to both Eqs. (32-6) and (32-7). | As in comment. | Revised.Equation (32-6) and Equation (32-7) are updated based on the comment.TGbd Editor: Incorporate the changes in 11-21-1344-01-00bd-Resolutions to 32.3.8.2 Non\_NGV portion of NGV format preamble. |
| 2185 | 86.26 | There is an extra comma between Kshift and (iBW) in Equation (32-6) and (32-7). Please remove the comma so that the formula is consistent with P86L43 and P87L25. | as in comment | RevisedUnnecessary comma is deleted.Equation (32-6) and Equation (32-7) are updated based on the comment.TGbd Editor: Incorporate the changes in 11-21-1344-01-00bd-Resolutions to 32.3.8.2 Non\_NGV portion of NGV format preamble. |

***To TGbd Editor:*** ***P86L21*** *update the corresponding equation as below.*

***------------- Begin Text Changes ---------------***

******

$r\_{L-STF}^{\left(i\_{TX}\right)}\left(t\right)= \frac{1}{\sqrt{N\_{TX}N\_{L-STF}^{Tone}}}w\_{T\_{L-STF}}(t)η\_{L-STF}\sum\_{i\_{BW}=0}^{N\_{10MHz}-1}\sum\_{k=-26}^{26}\left(\begin{matrix}γ\_{\left(k-K\_{shift}\left(i\_{BW}\right)\right),BW}S\_{k,10}\\ ∙exp⁡\left(j2π\left(k-K\_{shift}\left(i\_{BW}\right)\right)∆\_{F}\left(t-T\_{cs}^{i\_{TX}}\right)\right)\end{matrix}\right)$ (32-6)

***------------- End Text Changes ------------------***

***To TGbd Editor:*** ***P87L01*** *update the corresponding equation as below.*

***------------- Begin Text Changes ---------------***

******

$r\_{L-LTF}^{\left(i\_{TX}\right)}\left(t\right)= \frac{1}{\sqrt{N\_{TX}N\_{L-LTF}^{Tone}}}w\_{T\_{L-LTF}}(t)η\_{L-LTF}\sum\_{i\_{BW}=0}^{N\_{10MHz}-1}\sum\_{k=-26}^{26}\left(\begin{matrix}γ\_{\left(k-K\_{shift}\left(i\_{BW}\right)\right),BW}L\_{k,10}\\ ∙exp\left(j2π(k-K\_{shift}\left(i\_{BW}\right))∆\_{F}(t-T\_{cs}^{i\_{TX}})\right)⁡\end{matrix}\right)$ (32-7)

***------------- End Text Changes ------------------***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2030 | 86.34 | delete "MCS 0 or". The power boosting is applied to when NGV-MCS indicates 15 for extended range. | as in comment | Rejected. NGV PPDU modulated with BPSK(MCS0) and BPSK with DCM(MCS15) shall power boost L-STF and L-LTF by 3dB according to the Motion 63, 65 and 77 approved in https://mentor.ieee.org/802.11/dcn/19/11-19-0514-14-00bd-802-11bd-frd-sfd-motion-booklet.pptx,.  |

***Discussion***

Considering the Motions 63, 64, and 77 as below, NGV PPDU modulated with BPSK(MCS0) and BPSK with DCM(MCS15) shall power boost L-STF and L-LTF by 3dB.





|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2187 | 88.37 | Equation (32-10) reads "k+23, 1 \leq k \leq -6". "k" cannot be larger or equal to 1 and at the same time be smaller or equal to -6. Hence, remove the minus sign in front of the 6 | as in comment | RevisedEquation (32-10) is updated based on the comment.TGbd Editor: Incorporate the changes in 11-21-1344-01-00bd-Resolutions to 32.3.8.2 Non\_NGV portion of NGV format preamble. |

***Discussion***

No discussion.

***To TGbd Editor:*** ***P88L36*** *update the corresponding equation as below.*

***------------- Begin Text Changes ---------------***

******

$M\_{10}^{r}\left(k\right)=\left\{\begin{matrix}k+26, -26\leq k\leq -22\\k+25, -20\leq k\leq -8\\\begin{matrix}k+24, -6\leq k\leq -1\\k+23, 1\leq k\leq 6\\\begin{matrix}k+22, 8\leq k\leq 20\\k+21, 22\leq k\leq 26\end{matrix}\end{matrix}\end{matrix}\right.$ (32-10)

***------------- End Text Changes ------------------***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2188 | 88.59 | Equation (32-10) defines M^{r}\_{10}(k), but the NOTE on line 59 mentions M^{r}\_{20}. Please replace "20" with "10" in the subindex of M and add "(k)" as argument to the function. | as in comment | RevisedMathematical notation is updated based on the comment.TGbd Editor: Incorporate the changes in 11-21-1344-01-00bd-Resolutions to 32.3.8.2 Non\_NGV portion of NGV format preamble. |

***Discussion***

No discussion.

***To TGbd Editor:*** ***P88L59*** *update the corresponding description as below.*

***------------- Begin Text Changes ---------------***

NOTE— $M\_{10}^{r}\left(k\right) $ $M\_{20}^{r} $is a “reverse” function $ $of the *M*$\left(k\right) $defined in 17.3.5.10 (OFDM modulation).

***------------- End Text Changes ------------------***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 2031 | 89.09 | In Equation (32-12), D\_k,20 should D\_k,10 as defind at P88L27. | as in comment | RevisedMathematical notation is updated. Some description on the Equation (32-12) is added. Equation (32-9) is also updated by deleting unnecessary power boosting factor.TGbd Editor: Incorporate the changes in 11-21-1344-01-00bd-Resolutions to 32.3.8.2 Non\_NGV portion of NGV format preamble. |

***Discussion***

No discussion.

***To TGbd Editor:*** ***P89L09*** *update the description as below.*

***------------- Begin Text Changes ---------------***



$r\_{RL-SIG}^{\left(i\_{TX}\right)}\left(t\right)= \frac{1}{\sqrt{N\_{TX}N\_{RL-SIG}^{Tone}}}w\_{T\_{L-SIG}}(t)\sum\_{i\_{BW}=0}^{N\_{10MHz}-1}\sum\_{k=-26}^{26}\left(\begin{matrix}γ\_{\left(k-K\_{shift}\left(i\_{BW}\right)\right),BW}(D\_{k,10}+p\_{1}P\_{k})\\ ∙exp⁡(j2π\left(k-K\_{shift}\left(i\_{BW}\right)\right)∆\_{F}(t-T\_{GI}-T\_{cs}^{i\_{TX}})\end{matrix}\right)$ (32-12)

where

$N\_{RL-SIG}^{Tone}$ has the value given in Table 32-8 (Tone scaling factor and guard interval duration values for PHY fields).

$p\_{1}$ is the second pilot value in the sequence defined in 17.3.5.10 (OFDM modulation)

***------------- End Text Changes ------------------***

***To TGbd Editor:*** ***P89L09*** *update the description as below.*

***------------- Begin Text Changes ---------------***



$r\_{L-SIG}^{\left(i\_{TX}\right)}\left(t\right)= \frac{1}{\sqrt{N\_{TX}N\_{L-SIG}^{Tone}}}w\_{T\_{L-SIG}}(t)\sum\_{i\_{BW}=0}^{N\_{10MHz}-1}\sum\_{k=-26}^{26}\left(\begin{matrix}γ\_{\left(k-K\_{shift}\left(i\_{BW}\right)\right),BW}(D\_{k,10}+p\_{0}P\_{k})\\ ∙exp⁡(j2π\left(k-K\_{shift}\left(i\_{BW}\right)\right)∆\_{F}(t-T\_{GI}-T\_{cs}^{i\_{TX}})\end{matrix}\right)$ (32-9)

where

$$…$$

$$η\_{L-SIG}=1$$

$$…$$

***------------- End Text Changes ------------------***