IEEE P802.11
Wireless LANs

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| [The Comment resolution for 32.3.8.3.6] |
| Date: 2021-01-11 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Dongguk Lim | LG Electronics | 19, Yangjae-Daero 11 gil, Seoch-gu, Seoul, Korea |  | dongguk.lim@lge.com |
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Abstract

This submission proposes resolutions for following 15 CIDs: 1086, 1195, 1542, 1543, 1544, 1545, 1546, 1821, 1822, 1823, 1824, 1825, 1826, 1827, and 1828

Revisions:

* Rev 0: Initial version of the document.

## CID 1086, 1195, 1542, 1543, 1544, 1545, 1546, 1821, 1822, 1823, 1824, 1825, 1826, 1827, and 1828

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1086 | 69.55 | 32.3.8.3.6 | Not much overhead saving from introducing NGV-LTF-1x over 2x LTF. Remove 1x LTF mode. | as in comment | Rejected  |
| 1195 | 69.62 | 32.3.8.3.6 | "1.6 us" should be "1.6 <micro>s". See also 80.27. | Change in both locations. | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1542 | 69.26 | 32.3.8.3.6 | Change "... (NGV-LTF) field provides a means ... " to "... (NGV-LTF) field provides means ..." | As in the comment. | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1543 | 69.28 | 32.3.8.3.6 | Change "... for NSTS space-time streams ... " to "... for NSS spatial streams ... " | As in the comment. | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1544 | 69.30 | 32.3.8.3.6 | Change "... NSTS matrix ..." to "... NSS matrix ..." | As in the comment. | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1545 | 69.37 | 32.3.8.3.6 | Change "... the number of space-time streams, NSTS ..." to "the number of spatial streams, NSS ..." | As in the comment. | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1546 | 69.46 | 32.3.8.3.6 | Change "NSTS" to "NSS" in Table 32-11. | As in the comment. | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1821 | 69.23 | 32.3.8.3.6 | Nsts is not defined with no STBC supported | "Nsts" or "space time streams" should be replaced with "Nss" or "spatial streams" in subclause 32.3.8.3.6 (NGV-LTF definition) | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1822 | 69.57 | 32.3.8.3.6 | no definition of extended range transmssion. | add how to set the extended range transmission in the spec. | Rejected  |
| 1823 | 69.60 | 32.3.8.3.6 | repeatedNGV-LTF-2x should be replaced with NGV-LTF-2x-Repeat | as in comment | Revised. For consistent use of terminology, it should be modified as word definded in talbe 32-6.TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1824 | 70.17 | 32.3.8.3.6 | LTFright should be in Italic | as in comment | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1825 | 70.62 | 32.3.8.3.6 | add NGV-LTF-2x-Repeat like NGV-LTF-1x in subclause 32.3.8.3.6 (NGV-LTF definition) | as in comment | RevisedTGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1826 | 71.24 | 32.3.8.3.6 | Nsts is not defined with no STBC supported | Nsts should be replaced with Nss in Fig 32-10 | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1827 | 71.44 | 32.3.8.3.6 | Nsts is not defined with no STBC supported | "per STS" should be replaced with "per SS" in Fig 32-11 | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |
| 1828 | 72.20 | 32.3.8.3.6 | Nsts is not defined with no STBC supported | "Nsts" should be replaced with "Nss" in Equation 32-27 | Accepted TGbd Editor: makes a changes according to this document 11-21/0028r0 |

Discussion for CID # 1086

NGV-LTF-1x excluding the GI has a half symbol duration when it compares with a symbol duration of NGV-LTF-2x excluding GI. And, since a large number of Midamble symbols can be inserted in the data part, we can reduce the overhead of mid-amble by using the NGV-LTF-1x. Please refer to the 11-19/1152r2 for the results of overhead reduction.

Discussion for CID # 1822

11bd don’t have defined the extended range transmission and this sentence just means that we can extend the transmission range by using the NGV-LTF-2x-Repeat because the NGV-LTF-2x-Repeat can provide a more robust or reliable 11bd transmission. Thus, we don’t need to define the extended range transmission in 11bd. And the setting method for the use of NGV-LTF-2x-Repeat has been described in the next sentence.

**Propose :**

***TGbd editor: please modify the sentence in P69L62 and in P80L27 as follows***

***at P69L62***

 … one cyclic prefix of duration 1.6 ~~us~~$μs$. (#1195)

***at P80L27***

… Table 32-14 (Receiver minimum input level sensitivity) apply 1.6 ~~us~~$μs$ GI, NGV-LTF-2x, LDPC and NGV (#1195)

**Propose :**

***TGbd editor: please modify the sentence in P69L26 and in P80L27 as follows***

The NGV Long Training field (NGV-LTF) field provides ~~a~~ means for the receiver to estimate the MIMO … (#1542)

**Propose : *TGbd editor: please change NSTS to NSS and space-time streams to space streams as follows in sub-clasue 32.3.8.3.6***

… The transmitter provides training for *N~~STS~~SS* ~~space-time~~ spatial (#1543)streams (spatial mapper inputs) used for the transmission of the PSDU(s). For each tone, the MIMO channel that can be estimated is an *NRX*  *N~~STS~~SS* matrix.(# 1544) A NGV transmission has a preamble that contains NGV-LTF symbols, where the data tones of each NGV-LTF symbol are multiplied by entries belonging to a matrix *PNGV-LTF*, to enable channel estimation at the receiver. The pilot tones of each NGV-LTF symbol are multiplied by the entries of a matrix *RNGV-LTF* defined in the following text. The multiplication of the pilot tones in the NGV-LTF symbol by the *RNGV-LTF* matrix instead of the *PNGV-LTF* matrix allows receivers to track phase and frequency offset during MIMO channel estimation using the NGV-LTF. The number of NGV-LTF symbols, *NNGV-LTF*, is a function of the number of ~~space-time~~ spatial streams *N~~STS~~SS* as shown in Table 32-11 (Number of NGV-LTFs required for different numbers of ~~space-time~~ spatial streams).(# 1545) As a result the NGV-LTF field consists of one or two symbols.

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| Table 32-11 Number of NGV-LTFs required for different numbers of ~~space-time~~ spatial streams (# 1546) |
| *N~~STS~~SS* | *NNGV-LTF* |
| 1 | 1 |
| 2 | 2 |

**Propose : *TGbd editor: please modify the below sentences in P69L54 as follows***

An NGV PPDU supports three NGV-LTF formats: NGV-LTF-1x, NGV-LTF-2x, and ~~repeated~~ NGV-LTF-2x-Repeat. NGV-LTF-2x is the default LTF format; NGV-LTF-1x is used for high efficiency transmission of one spatial stream and ~~repeated~~ NGV-LTF-2x-Repeat is used for extended range transmissions. When DCM and BPSK modulation is applied to the NGV Data field of PPDU in 10MHz, the NGV-LTF symbol uses ~~repeated~~ NGV-LTF-2x-Repeat regardless of the value of the LTF Format subfield in the NGV-SIG field. ~~Repeated~~ NGV-LTF-2x-Repeat is constructed by repeating the time domain symbol of NGV-LTF-2x excluding GI and pre-append one cyclic prefix of duration 1.6 ~~us~~$μs$. (#1823)

**Propose : *TGbd editor: please modify the sentence in P78L17 as follows***

NOTE— *LTFleft* is identical to the leftmost 26 elements of Equation (17-8), and ~~LTF~~~~right~~ *LTFright* is identical to the rightmost 26 elements of Equation (17-8). (#1824)

**Propose : *TGbd editor: please insert the below text and figure after figure 32-11 in the 11bd D1.0***

The generation of time domain symbol of NGV-LTF-2x-Repeat is equivalent to modulating every tone in an OFDM symbol of 6.4 μs excluding GI, and then the OFDM symbol is repeated in time domain, as shown in Figure 32-12 (Generation of NGV-LTF-2x-repeat symbols).



Figure 32-12—Generation of NGV-LTF-2x-Repeat symbols

(#1825)

**Propose : *TGbd editor: please change NSTS to NSS in figure 32-10 as follows***

(#1826)

**Propose : *TGbd editor: : please change* STS *to* SS *in figure 32-11 as follows***

(#1827)

**Propose : *TGbd editor: please modify the equation (32-27) as follows***

$$r\_{NGV-LTF}^{\left(i\_{TX}\right)}\left(t\right)=\frac{1}{\sqrt{N\_{STSSS}N\_{NGV-LTF}^{Tone}}}\sum\_{n=0}^{N\_{NGV-LTF}-1}w\_{T\_{NGV-LTF}}(t-nT\_{NGV-LTF})\sum\_{k=-N\_{SR}}^{N\_{SR}}\sum\_{m=1}^{N\_{STSSS}}\left(\begin{matrix}\left[Q\_{k}\right]\_{i\_{TX},m}γ\_{k,BW}[A\_{NGV-LTF}^{k}]\_{m,\left(n+1\right)}NGV-LTF\_{k}\\ ∙exp⁡(j2πk∆\_{F,NGV}(t-nT\_{NGV-LTF}-T\_{GI}-T\_{CS,NGV}(m))\end{matrix}\right)$$

(#1828, #1114)

**References:**

**[1] 802.11bd D1.0**