IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CID 6048 S1G LTF Scaling Factors | | | | |
| Date: 2024-01-04 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| David Goodall | Morse Micro |  |  | dave@morsemicro.com |
| Dave Halasz | Morse Micro |  |  | dave.halasz@morsemicro.com |

Abstract

This document contains proposed text changes to address IEEE P802.11-REVme SB1 CID 6048.

Revision History:

R0: Initial version.

# CID 6048

|  |  |  |  |
| --- | --- | --- | --- |
| CID | Clause | Comment | Proposed Change |
| 6048 | 23.3.7 | The scaling factors for the LTF fields in Table 23-8 for the 802.11ah 1 and 2 MHz duplicate modes appear to be incorrect. For example the LTF1 for 1 MHz duplicate mode would presumably be a multiple of 26 for 2, 4, 8 and 16 MHz channel widths but is much larger for the higher bandwidths. | Review scaling factors for 1 and 2 MHz duplicate modes and add extra rows as required. |

## Background

From Section 23.1.4 PPDU formats:

“The FORMAT parameter determines the overall structure of the PPDU, and the allowed values are:

— S1G, for S1G non-duplicate PPDUs

— S1G\_DUP\_2M, for S1G 2 MHz duplicate PPDUs

— S1G\_DUP\_1M, for S1G 1 MHz duplicate PPDUs”

From Section 23.3.8 S1G preamble:

“The duplicate mode PPDU formats S1G\_DUP\_2M and S1G\_DUP\_1M use the S1G\_SHORT and S1G\_1M preambles, respectively.”

Section 23.3.4.5 Construction of Preambles for S1G\_DUP\_2M and S1G\_DUP\_1M specifies that the preambles are constructed initially as 2 MHz (S1G\_SHORT) and 1 MHz (S1G\_1M) preambles respectively and then duplicated in frequency with phase rotation to fill the final transmission bandwidth, which may be 4, 8 or 16 MHz for S1G\_DUP\_2M and 2, 4, 8 or 16 MHz for S1G\_DUP\_1M.

Table 23-8 contains scaling factors for the preambles and data fields of the various PPDU formats. This table has entries that account for the duplicated data fields of the S1G\_DUP\_2M and S1G\_DUP\_1M formats, labelled S1G\_DUP\_2M-Data and S1G\_DUP\_1M-Data respectively.

The scaling factors for the STF and for the signal fields are common to S1G non-duplicate mode, and the duplicate modes S1G\_DUP\_2M and S1G\_DUP\_1M for the respective transmission bandwidths. However, the scaling factors for LTF1 and LTF2-LTFN only account for S1G non-duplicate PPDUs. Therefore, additional rows need to be added to the table for LTF1 and LTF2-LTFN for S1G\_DUP\_2M and S1G\_DUP\_1M.

## Proposed Resolution: CID 6048

Instruction to Editor: Update Table 23-8 as shown below using D4.1 as a baseline.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| * Tone scaling factor and guard interval duration values  for PHY fields | | | | | | |
| Field | as a function of bandwidth per frequency segment | | | | | Guard interval duration |
| 1 MHz | 2 MHz | 4 MHz | 8 MHz | 16 MHz |
| STF | 6 | 12 | 24 | 48 | 96 | N/A  (See NOTE 2) |
| LTF1 | 26 | 56 | 114 | 242 | 484 | For bandwidths ≥ 2 MHz, duration is *TGI2*.  For 1 MHz bandwidth, duration is *TGI2* for first and second symbols, and *TGI* for third and fourth symbols. |
| S1G\_DUP\_1M-LTF1  (see NOTE 4) | N/A | 52 | 104 | 208 | 416 | Duration is *TGI2* for first and second symbols, and *TGI* for third and fourth symbols. |
| S1G\_DUP\_2M-LTF1  (see NOTE 4) | N/A | N/A | 112 | 224 | 448 | *TGI2* |
| SIG | 26 | 52 | 104 | 208 | 416 | *TGI* |
| SIG-A for long format | N/A | 52 | 104 | 208 | 416 | *TGI* |
| D-STF for long format | N/A | 12 | 24 | 48 | 96 | N/A |
| LTF2~LTFNLTF | 26 | 56 | 114 | 242 | 484 | *TGI* |
| S1G\_DUP\_1M- LTF2~LTFNLTF  (see NOTE 4) | N/A | 52 | 104 | 208 | 416 | *TGI* |
| S1G\_DUP\_2M- LTF2~LTFNLTF  (see NOTE 4) | N/A | N/A | 112 | 224 | 448 | *TGI* |
| D-LTF for long format | N/A | 56 | 114 | 242 | 484 | *TGI* |
| SIG-B for long format | N/A | 56 | 114 | 242 | 484 | *TGI* |
| First Data Symbol | 26 | 56 | 114 | 242 | 484 | *TGI*  (see NOTE 3) |
| From second to the last Data Symbols | 26 | 56 | 114 | 242 | 484 | *TGI* or *TGIS*  (see NOTE 3) |
| S1G\_DUP\_1M-Data  (see NOTE 1) | N/A | 52 | 104 | 208 | 416 | *TGI* or *TGIS*  (see NOTE 3) |
| S1G\_DUP\_2M-Data  (see NOTE 1) | N/A | N/A | 112 | 224 | 448 | *TGI* or *TGIS*  (see NOTE 3) |
| NOTE 1—For notational convenience, S1G\_DUP\_1M-Data and S1G\_DUP\_2M-Data is used as a label for the Data field of a duplicate PPDU with format type S1G\_DUP\_1M or S1G\_DUP-2M, respectively.  NOTE 2—The OFDM symbols of the STF field do not have a guard interval, therefore its duration is not applicable.  NOTE 3—*TGI* denotes guard interval duration when TXVECTOR parameter GI\_TYPE equals LONG\_GI, *TGIS* denotes short guard interval duration when TXVECTOR parameter GI\_TYPE equals SHORT\_GI. Regardless of the GI\_TYPE value in TXVECTOR, the first Data OFDM symbol always uses *TGI* as its guard interval duration.  NOTE 4—For notational convenience, S1G\_DUP\_1M-LTF1 and S1G\_DUP\_2M-LTF1 is used as a label for the LTF1 of a duplicate PPDU with format type S1G\_DUP\_1M or S1G\_DUP-2M, respectively and S1G\_DUP\_1M- LTF2~LTFNLTF and S1G\_DUP\_2M- LTF2~LTFNLTF is used as a label for the LTF2~LTFNLTF of a duplicate PPDU with format type S1G\_DUP\_1M or S1G\_DUP-2M, respectively. | | | | | | |

**References:**