IEEE P802.11
Wireless LANs

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| Draft Text Changes in Subclauses 8.4.2.170c and 9.32j for D0.1 |
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Abstract

This document provides resolutions for CID 85, 460, 928

The changes are in the following subclauses: 8.4.2.170c, 9.32j

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# 0 Revision Notes

R0: First draft

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Comment** | **Page Number** | **Subclause** | **Line Number** | **Proposed Changes** | **Proposed Resolution** |
| 85 | What happens if the values are not divisible (the result is not an integer) | 148 | 9.32j | 37 | Make it clear or define a rule for restriction otherwise | **Revise.**-see IEEE 802.11-13/0833r2. |
| 460 | The length of Page segment has to be integer. However, the equation "Length of Page segment = (Number of blocks in Page Bitmap /Page Segment Count)" can result in a non-integer number. | 148 | 9.32j | 37 | Change the equation as follows: "Length of Page segment = floor(Number of blocks in Page Bitmap /Page Segment Count)", and add the following sentence after the equation "where floor(x) is the largest integer not greater than x." | **Revise.**-see IEEE 802.11-13/0833r2. |
| 928 | Current TIM segmentation signaling is unable to indicate an arbitrary page segment length. For example, it is not able to indicate page segment of 3 blocks for a total of 6 blocks in the page bitmap. | 148 | 9.32j | 37 | Amendment is needed to indicate an arbitrary number of blocks per TIM segment. | **Revise.** -see IEEE 802.11-13/0833r2. |

**Discussions:**

The problem with current signaling is that it cannot indicate any arbitrary page segment length, which limits the scheduling flexibility of AP. For example, current scheme cannot indicate a page segment length of 3 given a page bit map of length 8.

A simple solution is to signal explicitly the Page Segment Length in the Segment Count element. The Page Segment Length field is of length 5 bits.

*Current:*

Page Index

(2b)

Page Segment Count

(5b)

Page Bitmap

(0/8/16/24/32 b)

Page Offset

(5b)

Page Period

(8b)

TIM Offset

(4b)

*Revised:*

The Page Segment Length indicates the number of blocks in each TIM segment of the associated page except for the last TIM segment. In the last TIM segment, all the remaining blocks that are indicated by the values in each corresponding bit of the Page Bitmap shall be supported.

**Example 1:**

There are 6 blocks of associated STAs:

AP signaling: Page Segment Length = 3, Page Segment Count =2:

TIM segment 1 contains block 1-3;

TIM segment 2 contains block 4-8, but effectively it addresses block 4-6, as block 7 and 8 do not contain any STAs.

**Example 2:**

There are 7 blocks of associated STAs:

AP signaling: Page Segment Length = 2, Page Segment Count =3:

TIM segment 1 contains block 1-2;

TIM segment 2 contains block 3-4;

TIM segment 3 contains block 5-8, but effectively it addresses block 5-7, as block 8 does not contain any STAs.

**Example 3:**

There are 7 blocks of associated STAs:

AP signaling: Page Segment Length = 2, Page Segment Count =4:

TIM segment 1 contains block 1-2;

TIM segment 2 contains block 3-4,

TIM segment 3 contains block 5-6,

TIM segment 4 contains block 7-8, but effectively it addresses block 7, as block 8 does not contain any STAs.

# Proposed Changes

* Segment Count element

*CID 85, 460, 928: The proposed resolution is to revise the text as follows:*

***Modify the paragraph starting at Page 80 Line 63 as follows:***

The Segment Count element contains the list of page segments included in TIM segments that will be served during the TIM intervals within a DTIM interval (see 9.32j (TIM and Page segmentation). The Information field contains Page Index, Page Segment Length, Page Segment Count, Page Offset, and Page Bitmap fields. The total length of the Information field is ~~4-8~~ 6-10 octets. The frame format of the Segment Count element is defined in Figure 8-401cr (Segment Count element format).

***Modify Figure 8-401cr as follows:***

***Insert the Page Segment Length field and the Reserved field after the Page Index field as shown in the following figure:***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits:** |  |  |  | 2 | 5 | 3 | 5 | 5 | 4 |  |
|  | Element ID | Length | Page Period | Page Index | Page Segment Length | Reserved  | Page Segment Count | Page Offset | TIM Offset | Page Bitmap |
| **Octets:**  | 1 | 1 | 1 |   |  | ~~1~~ 3  |  ~~1~~  0-4  |

Figure 8-401cr -- Segment Count element format

***Insert the following paragraph starting at Page 81 Line 22:***

The Page Segment Length field indicates the number of blocks in each TIM segment for the associated page except for the last TIM segment. This field is of length 5 bits. A Page Segment Length of 3 indicates the length of page segment is 4.

* TIM and Page segmentation

*CID 85, 460, 928: The proposed resolution is to revise the text as follows:*

***Modify the paragraph starting at Page 147 Line 38 as follows:***

The TIM element usually indicates downlink buffered data for all STAs in the BSS. However, in a BSS with

large amount of associated STA, it is not viable to indicate downlink buffered data for all STAs in a Page in

the TIM element. Hence, when dot11TIMSegmentSupported is true, an AP may fragment the TIM element

into ~~equal sized~~ TIM segments consisting only of Page segment with a subset of STA AIDs as depicted in Figure 9-44d (Illustration of TIM and Page Segmentation with Segment Count IE). All TIM segments shall have equal size except for the last segment.

***Modify the paragraph starting at Page 148 Line 28 as follows:***

The Segment Count element indicates assignment of STAs in Page segments corresponding to their assigned

TIM segments. STAs within the assigned Page segment wake up at corresponding TIM segment sequentially to receive buffered data from AP and access medium for uplink traffic. In order to wake up at the appropriate TIM segment, the STAs may compute the Page segment assignment to the TIM segments using the length of the Page Bitmap field and the value in the Page Segment Length field and Page Segment Count field of Segment Count ~~IE~~ element. The length of Page segment assigned to each TIM segment except for the last TIM segment is indicated by the Page Segment Length. In the last TIM segment, all the remaining blocks that are indicated by the values in each corresponding bit of the Page Bitmap shall be supported.  ~~calculated as:~~

~~Length of Page segment = (Number of blocks in Page Bitmap /Page Segment Count),~~

~~where the number of blocks in Page Bitmap is defined from the size of the Page Bitmap field in Segment~~

~~Count IE and the Page Segment Count field is defined in Segment Count element.~~ At every TIM segment except for the last TIM segment, the STAs may compute the initial block offset and block range indicated in the segment based on the following equations:

***Insert the following paragraph staring at Page 148 Line 57:***

For the last TIM segment, the TIM segment start and TIM segment end may be computed based on the following equations:

TIM segment start = Page Offset + (Length of Page Segment) x (TIM Segment Number)

TIM segment end = Page Offset + 8 x N -1

where N is the number of octets in the page bitmap in the Segment Count element for the associated page.