IEEE P802.11
Wireless LANs

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| Clause 8.4.2.171 Comment Resolutions 2 |
| Date: 2015-06-19 |
| Author(s): |
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| SK Yong | Apple Inc |  |  |  |
| S.Abraham | Qualcomm Inc. |  |  |  |

Abstract

This document provides proposed comment resolutions for follow comments:

CID #1341, 1331, 1259, 1358, 1305, 1120, 1084, 1213, 1255, 1159, 1423, 1630, 1507, 1357, 1257, 1435, 1390, 1365, 1661, 1416, 1389, 1112, 1258, 1391, 1436

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| **CID** | **Commenter** | **Clause Number(C)** | **Page (C)** | **Line (C)** | **Type of Comment** | **Assignee** | **Comment** | **Proposed Change** |
| 1341 | Lei Wang | 8.4.2.171 | 9 | 21 | T | SK Yong | Why not use "max number of services" to name the field of bit 0 to 8 in Figure 8-576b, if it actually means "max number of services". | Change the field name "Number of services" to "Maximum Number of services". |
| 1331 | Yongho Seok | 8.4.2.171 | 9 | 24 | T | SK Yong | "The Number of services field is used to indicate the maximum number of services, n, that can be supported by the AP. The maximum number of services is 512."The 9 bits can represents from 0 to 511. Please specify how to indicate 512 services. | As per comment. |
| 1259 | Stephen McCann | 8.4.2.171 | 10 | 4 | T | SK Yong | What is the format of the "m-bit Service Hint Map"? I think it should be defined somewhere. | Text needs to be added which provided the definition of this sub-field. Alternatively a reference would also be ok. |
| 1358 | Yasuhiko Inoue | 8.4.2.171 | 10 | 4 | T | SK Yong | Format of the "m-bit Service Hint Map" is not clear enough. | Please add some text how to set this field. |
| 1305 | Tomoko Adachi | 8.4.2.171 | 10 | 4 | T | SK Yong | How do you set a value in the m-bit Service Hint Map? | Clarify. |
|  1120  | Filip Mestanov | 8.4.2.171 | 10 | 4 | T | SK Yong | Considering that the Service Hint element goes into the Beacon frames, in order to not make the Beacon frame too large I find it beneficial to limit the "m-bit Service Hint Map" to a certain size (e.g., 60 to 100 octetes). | Per comment |
| 1084 | Bo Sun | 8.4.2.171 | 9 | 11 | T | SK Yong | It's not clear the usage of Service Hint element is to inform what services the AP can support or what services the AP is providing. And there's no clear statement how this element should be used. | Provide detailed statement on how this element is used somewhere in the spec |
| 1213 | Ganesh Venkatesan | 8.4.2.171 | 9 | 24-25 | T | SK Yong | "The Number of services field is used to indicate the maximum number of services, n, that can be supported by the AP. The maximum number of services is 512"is the Service Hint element available for use only by the AP? Why? Also, it is clear that the maximum value for Number of Services is limited to 512 (9 bits). It is redundant to state the limit. | Delete "by the AP" or be explicit in Cl. 4.5.9 (and others that apply) that PAD is discovery of services offered by an infrastructure network, prior to association by querying the corresponding AP"and Delete "The maximum number of services is 512" |
| 1255 | Stephen McCann | 8.4.2.171 | 10 | 4 | T | SK Yong | I think there should be a maximum length constraint on the m-bit Service Hint Map | Change the text to add "...with a maximum size of XXX octets" |
| 1159 | Jarkko Kneckt | 8.4.2.171 | 9 | 13 | T | SK Yong | The elements have 1-octet Length field. The 2-octet length field may not be supported by all 802.11 implementations. Please use Element Fragmentation as described in 802.11ai D4.0 to handle long elements that do not fit within normal element structure, do not invent additional incompatible mechanisms. | Change the Length field to 1 octet and use Element Fragmentation to handle the long element. |
| 1423 | Matthew Fischer | 8.4.2.171 | 9 | 24 | T | SK Yong | Is it really the maximum? | Is this maximum value indicated as an upper bound in a behavioral part of the text? And is it really an upper bound? Could the AP include 512 services here, and then include several service hash values in individual service hash elements that are not included in this service hint and then the total is more than 512? |
| 1630 | Robert Slater | 8.4.2.171 | 10 | 6 | G | SK Yong | A length range should be indicated for the m-bit Servicce Hint Map, even if the theoretical basis for that range is explained elsewhere (section 10.25.3.4.5 most likely) | Add a length range for the m-bit Service Hint Map based on the minimum and maximum number of services and hash functions permitted by PAD, with discussion of the reasonable probabilities of false positives which also factor into the minimum and maximum length left to section 10.25.3.4.5 |
| 1507 | Richard Roy | 8.4.2.171 | 9 | 24 | T | SK Yong | Change "The Number of services field is used to indicate the maximum number of services, n, that can be supported" | to "The Number of services field is used to indicate the maximum number of services, n, that are supported" and un-italicize "that". |
| 1357 | Yasuhiko Inoue | 8.4.2.171 | 9 | 11 | T | SK Yong | "The Service Hint element contains information identifying services that are supported by an AP. The Service Hint element is transmitted in beacons."I am not in support of putting eveything in the beacon. | Please minimize the information to include in a beacon and define appropriate Action frames for this purpose. |
| 1257 | Stephen McCann | 8.4.2.171 | 9 | 19 | E | SK Yong | What is a Bloom Filter. | A specific reference needs to be added here as to what a Bloom Filter is. |
| 1435 | Yunsong Yang | 8.4.2.171 | 9 | 24 | T | SK Yong | Should "the maximum number" be "the actual number" or simply "the number"? What does "maximum" mean? | Delete "maximum". |
| 1390 | Mitsuru Iwaoka | 8.4.2.171 | 9 | 24 | T | SK Yong | The Number of services field is 9 bits width and can not indicate the maximum number of services of 512. | Change the fifth paragraph as follows:"The Number of services field is used to indicate the maximum number of services, n, that can be supported by the AP minus 1. The maximum number of services is 512." |
| 1365 | Jouni Malinen | 8.4.2.171 | 9 | 25 | T | SK Yong | The maximum value that can be encoded in a 9-bit field is 511, but Number of services field is claimed to have maximum value of 512. Similarly, 4-bit field has maximum value of 15, but maximum value for Number of Hash functions is claimed to be 16. Were these maximums supposed to be 511 and 15, respectively, or are the fields supposed to encode n-1 and k-1 to allow the claimed maximums to be indicated?It looks like at least the Number of Hash functions field is indeed using k-1 design based on later parts of the draft (i.e., value 0 indicates 1 hash function). | Replace "512" with "511" on page 9 line 25 and "16" with "15" on page 10 line 2.Alternatively, this comment can be addressed by changing the description for these subfields to be value-1. |
| 1661 | David Hunter | 8.4.2.171 | 9 | 13 | T | SK Yong | "m-bit Service Hint Map": there is no such thing as an "m-bit", and the name "Service Hint Map field" is sufficiently descriptive of the field. | Replace "m-bit Service Hint Map" with "Service Hint Map" throughout this draft. |
| 1416 | Matthew Fischer | 8.4.2.171 | 9 | 21 | T | SK Yong | bloom filter information field figure labeling does not follow convention | Bloom filter information field diagram problem - the bits label beneath a diagram in the standard is normally a count of bits for each subfield, but in this diagram it is the bit positions for the subfields. This is not according to convention and needs to be changed to follow convention. |
| 1389 | Mitsuru Iwaoka | 8.4.2.171 | 9 | 21 | E | SK Yong | The format of Figure 8-576b (Bloom Filter Information field format) does not follow the 802.11 style guide. | Add Bit index above fields of Figure 8-576b (Bloom Filter Information field format) as follows:"B0 B8 B9 B12 B13 B15"Change the "Bits" line under the fields of Figure 8-576b as follows:"Bits: 9 4 3" |
| 1112 | Zhigang Rong | 8.4.2.171 | 9 | 21 | T | SK Yong | What is the purpose for the AP to indicate the number of services to the STAs? If it is just for the STAs to compute the probability of false, why not the AP just indicates the target probability directly? The coding will be more efficient if the AP just indicates the target probability of false. For example, assuming a granularity of 10% is good enough, only 4 bits are needed. Then we can delete the reserved bits and save a whole octet. | Change the "Number of services" field to a 4-bit "False Alarm Probability" field. Remove the Reserved field. Remove the text describing the "Number of services" field. And add a table defining the values of "False Alarm Probability" field accordingly, e.g. 0000 corresponding to 0 ~ 10%, 0001 corresponding to 10 ~ 20%, etc.. |
| 1258 | Stephen McCann | 8.4.2.171 | 9 | 21 | T | SK Yong | What's the point of compressing the initial sub-fields into 2 octets, when you also have an m-bit variable length field following it? | Use one octet for each of the three sub-fields as shown in Figure 8-576b |
| 1391 | Mitsuru Iwaoka | 8.4.2.171 | 10 | 1 | T | SK Yong | The Number of Hash functions field is 4 bits width and can not indicate the maximum number of Hash functions of 16. | Change the sixth paragraph as follows:"The Number of Hash functions field is used to indicate the number of hash functions, k, (out of the maximum of 16) used by the Bloom filter minus 1." |
| 1436 | Yunsong Yang | 8.4.2.171 | 10 | 1 | T | SK Yong | Clearly, the value of the field isn't equal to k. Thus, the relationship between the values of the field and k should be described. | Add the following after the sentence: "The value of the Number of Hash Functions field is set to a value equal to k minus one." |

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| Jouni Malinen | 208 | 1 | 8.4.2.171 | How is the Bloom filter value supposed to be encoded in the m-bit Service Hint Map subfield? The text here does not seem to give any guidance and 10.25.3.4.5 is just defining number of H(j,X,m) functions that return integer values in 0..m-1 range. Annex Za seems to have some language on Bloom filters, but it seems to be focused on describing how to determine what value m to use. Where is the encoding of the m bits to this elements described? | Resolution: Revised. See below |

Proposed resolution:

Replace Section 8.4.2.171 (as in D1.2) with the following

The Service Hint element contains information identifying services that are supported by an AP. The Service Hint element is included in Beacon and Probe Response frames.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Element ID | Length | Bloom Filter Information | Bloom Filter Bit Array  |
| Octets | 1 | 1 | 1 |  Variable |

Figure 8-577a – Service Hint element format

The Element ID field and Length field are defined in [8.4.2.1](#Section_8_4_2_1) (General).

The Bloom Filter Information field is a 1-octet field, representing the settings of the Bloom filter. The format of the Bloom Filter Information field is shown in Figure 8-577b.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 | B3 | B4 | B7 |
|  | False Positive Probability Range  |  | Number of Hash Functions |  |
| Bits | 4 |  | 4 |  |

Figure 8-577b – Bloom Filter Information field format

The False Positive Probability Range represents the target false positive probability range of the Bloom filter. The False Positive Probability Range field is shown in Table 8-xyz

Table 8-xyz Target false positive probability range

|  |  |
| --- | --- |
| Values of Bits B0~B3 | Target false positive probability range, *p* |
| 0 | *p* > 25% |
| 1 |  20% < *p* ≤ 25% |
| 2 | 15% < *p* ≤ 20% |
| 3 | 10% < *p* ≤ 15% |
| 4 | 5% < *p* ≤ 10% |
| 5 | 1% < *p* ≤ 5% |
| 6 | 0.5% < *p* ≤ 1% |
| 7 | 0.1% < *p* ≤ 0.5 % |
| 8 | 0.05% < *p* ≤ 0.1 % |
| 9 | 0.01% < *p* ≤ 0.1 % |
| 10 | *p* ≤ 0.01% |
| 11:15 | Reserved  |

The Number of Hash Functions field is set to a value equal to *k*-1, where *k* is the number of hash functions (out of the maximum of 16) used by the Bloom filter as described 10.25.3.4.4.

The Bloom Filter Bit Array field is a variable-length field that provides an indication about the services offered by the AP with a target probability of false positive, *p*. The maximum length of the Bloom Filter Bit Array field is 128 octets. Each service hash X is mapped to k bit positions that are calculated using the function H(j,X,m) where j = 0,…,k-1 as given 10.25.3.4.4.

~~For more information on the operation of the Bloom filter see 10.25.3.4.5.~~ For more information on the determination of the length of the Bloom Filter Bit Array field for a given false positive probability and the number of services supported see Annex [ZA.4](#Annex_Za_4_Bloom_Filter)

**10.25.3.4.4 Bloom filter Hash function operation**

***Change lines 14 of page 30 as follows***

Let H(*j*,X,*m*) denote the hash function that computes the jth bit position corresponiding the the service hash X.\