IEEE P802.11
Wireless LANs

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| Clause Za.3 Comment Resolutions  |
| Date: 2015-09-14 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| SK Yong | Apple Inc |  |  |  |
|  |  |  |  |  |

Abstract

This document provides proposed comment resolutions for following comments in the Table below

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| **CID** | **Commenter** | **Clause Number(C)** | **Page (C)** | **Line (C)** | **Type of Comment** | **Assignee** | **Comment** | **Proposed Change** |
| 1202 | Jarkko Kneckt | Za.3.1 | 27 | 10 | T | SK Yong | Unnecessary foot node | Delete the foot node. |
| 1015 | Graham Smith | Za.3.1. | 34 | 14 | T | SK Yong | "If the probability of false positives in the Service Hint element is relatively high.." How do it know? What is relatively high? Is it more like 'if the STA wants to be double sure?' I don't know but please think about this a bit and see if you can make it a bit clearer or specific. | As per comment. Also change title of figure accordingly |
| 1016 | Graham Smith | Za.3.1. | 35 | 1 | T | SK Yong | "If the probability of false positive is relatively low.." How do it know? What is relatively low? Is this the 'standard method? Anyway, if you accept my previous comment then simply replace with "Alternatively.." | Replace "If the probability of false positive is relatively low.." with "Alternatively..." Aslo change title of Figure accordingly. |
| 1074 | Adrian Stephens | Za.3.1 | 27 | 23 | E | SK Yong | Figures Za-2 have a number of editorial issues that need to be fixed.1. Text is a bit on the small side (should be ~9 points equivalent after scaling)2. Arrows don't connect to vertical lines3. Odd line break (e.g. before "Y")4. Arrows are a bit small5. Braces are over heavy | Generally stick to as few font sizes and line widths as possible.Correct issues as indicated in comment throughout Annex Za. |
| 1111 | Su Khiong Yong | Za.3 | 26 | 20 | T | SK Yong | The descrptions in section Za.3 are need to be updated to reflect the changes from PAD Service Information Request/Response to ANQP-SD Service Information Request/Response | A contribution will be submmmited |
| 1140 | Filip Mestanov | Za.3 | 26 | 22 | T | SK Yong | "for obtaining service information" | Change to "for obtaining service and access netowork information" |
| 1014 | Graham Smith | Za.3.1. | 34 | 10 | T | SK Yong | Make the note 2 part of the text. | Make the note 2 part of the text. |
| 1201 | Jarkko Kneckt | Za.3.1 | 27 | 15 | T | SK Yong | I assume that AP does not offer a service, the service may be offered through an AP. | Change as commented. |
| 1558 | Xiaofei Wang | Za.3 | 26 | 21 | E | SK Yong | PAD is defined in 3.1 as "Pre-association Discovery Protocol", but line 33.21 says "pre-association discovery (PAD) protocol", there are also multiple "pre-association discovery (PAD)" in the draft. The usage of PAD is not consistent. | provide the correct definition for PAD and use the acronym PAD consistently throughout the specification |
| 1227 | Ganesh Venkatesan | Annex-Za | 27 | 14 | T | SK Yong | "If the probability of false positives in the Service Hint element is relatively high"what contributes to this? How will a non-AP STA be able to assess this? By trial and error? Hopefully not. | Clarify when the probability of collision is high and describe how a non-AP STA can assess this. |
| 1454 | Yunsong Yang | Za.3.1 | 27 | 23 | T | SK Yong | In this subclause and Figure Za-2, when the procedure describes the use of Probe Request and Probe Response frames, the responding STA is the AP. But when the procedure describes the use of Service Information Request and Service Information Response, the responding entity should be the PAD proxy. The same comment applies to Figures Za-3, Za-4, and Za-5. | Redraw Figures Za-2, Za-3, Za-4, and Za-5 to each include a PAD Proxy on the right. Terminate the Service Information Request/Response at the PAD Proxy. And change the description text accordingly. |
| 1298 | Stephen McCann | Za.3 | 27 | 23 | T | SK Yong | The message flow diagrams Figure Za-2 - Figure Za-5 all need to be updated with corrected terms and messages. | Commentor will provide a submission to re-write this clause |
| 1454 | Yunsong Yang | Za.3.1 | 27 | 23 | T | SK Yong | In this subclause and Figure Za-2, when the procedure describes the use of Probe Request and Probe Response frames, the responding STA is the AP. But when the procedure describes the use of Service Information Request and Service Information Response, the responding entity should be the PAD proxy. The same comment applies to Figures Za-3, Za-4, and Za-5. | Redraw Figures Za-2, Za-3, Za-4, and Za-5 to each include a PAD Proxy on the right. Terminate the Service Information Request/Response at the PAD Proxy. And change the description text accordingly. |
| 1298 | Stephen McCann | Za.3 | 27 | 23 | T | SK Yong | The message flow diagrams Figure Za-2 - Figure Za-5 all need to be updated with corrected terms and messages. | Commentor will provide a submission to re-write this clause |
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Proposed resolution:

Replace Clause Annex AA with the following (D1.3):

**AA.1 Pre-association service discovery usage scenarios**

The Preassociation service discovery (PAD) procedures (see 10.26) supports alternative usages, depending on the deployment scenario, for obtaining service information. In the following sub-clauses, two usage scenarios are described: background search and immediate search.

**AA 1.1 Background Search**

Applications that run in the background (e.g., automatically receiving sales coupons that a user has previously signed up for) may not require immediate discovery results to be presented to the user. It may be appropriate to prevent non-AP STAs, running such background applications, from performing a Solicited PAD procedure. Furthermore, Solicited PAD procedure in a dense WLAN environment can cause network congestion. In such a scenario, it is more effective to perform Unsolicited PAD procedure, whereby an AP or PCP advertises multiple services it proxied, while non-AP STAs need to respond only if there is a matched service.

The AP or PCP may elect to advertise several typical services using Service Hash element, and advertise the remaining services using Service Hint element, in the Beacon frames. Alternatively, the AP may elect to advertise all of the services using either the Service Hash or Service Hint element in the Beacon frames. Upon receiving the Beacon frame, a non-AP STA processes the Service Hash and Service Hint elements to verify if there are any potential matching services. Figure AA-1— (Example of a message exchange for background search with high probability of false positive) and Figure AA-2— (Example of a message exchange for background search with low probability of false positive) show two cases where there is a matching Service Hint.

If the probability of false positives as indicated in False Positive Probability Range field of the Service Hint element is relatively high (see Figure AA-1— (Example of a message exchange for background search with high probability of false positive)), the non-AP STA may send a Probe Request with the Service Hash element to confirm the service is indeed offered through the AP or PCP. The AP or PCP then responds with a Probe Response with Service Advertisement element that containing the corresponding Service Name and Instane Name. The non-AP STA may then send an ANQP-SD Request with Service Information Request ANQP-element containing the Service Name, Instance Name and specific Service Information Query Request to obtain more information about the service from the AP or PCP. The AP or PCP responds to the ANQP-SD Request with the ANQP-SD Response with Service Information Response ANQP-element containing the Service Name, Instance Name and specific Service Information Query Response. After the ANQP-SD Request and ANQP Response exchange, the non-AP STA should be able to make an informed decision about choosing to associate to the AP or PCP.



**Figure AA-1— Example of a message exchange for background search with high probability of false positive**

If the probability of false positive is as indicated in False Positive Probability Range field of the Service Hint element relatively low (see Figure AA-2— (Example of message exchange for background search with low probability of false positive)), the non-AP STA may directly send an ANQP-SD Request with Service Information Request ANQP-element containing the Service Name and specific Service Information Query Request to obtain more information about the service from the AP or PCP.

The AP or PCP responds to the ANQP-SD Request with the ANQP-SD Response with Service Information Response ANQP-element containing the Service Name, Instance Name and specific Service Information Query Response. After the ANQP-SD Request and ANQP Response exchange, the non-AP STA should be able to make an informed decision about choosing to associate to the AP or PCP.



**Figure AA-2— Example of a message exchange for background search with low probability of false positive**

In a scenario where there is a matching Service Hash element, the non-AP STA may directly send an ANQP-SD Request with Service Information Request ANQP-element containing the Service Name and specific Service Information Query Request to obtain more information about the service from the AP as shown in Figure AA-3 —Example of message exchange for background search with matching Hash element.

The AP or PCP responds to the ANQP-SD Request with the ANQP-SD Response with Service Information Response ANQP-element containing the Service Name, Instance Name and specific Service Information Query Response. After the ANQP-SD Request and ANQP Response exchange, the non-AP STA should be able to make an informed decision about choosing to associate to the AP or PCP.

Alternatively, the non-AP STA may choose to associate based on the matching Service Hash element.



**Figure AA-3— Example of a message exchange for background search with matching service hash element**

**AA1.2 Immediate Search**

Applications that are initiated by users (e.g., a user is looking for a fast movie download service) require immediate discovery results to be presented to the user. In this scenario, a non-AP STA should perform a Solicited PAD precudure, whereby the non-AP STA sends Probe Request frames to query specific services immediately after user initiation of the service/application and the AP or PCP responds with a Probe Response frame accordingly if there is a matched service (Figure AA-4— (Example of message exchange for immediate search). The Probe Request frame contains the Service Hash element of the search service. The AP or PCP responds with a Probe Response frame with a Service Advertisement element containing the corresponding Service Name and Instance Name. The non-AP STA then may perform an ANQP-SD Request and ANQP-SD Response exchange with the AP or PCP, as shown in Figure AA-4— (Example of message exchange for immediate search), to obtain more information about the service. After the ANQP-SD Request and ANQP Response exchange, the non-AP STA should be able to make an informed decision about choosing to associate to the AP or PCP.

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**Figure AA-4: Example of message exchange for immediate search**