\_IEEE P802.11  
Wireless LANs

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| Comment Resolution for Subclauses | | | | |
| Date: 2013-09-11 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Amin Jafarian | Qualcomm  Inc. | 5775 Morehouse Dr  San Diego,  CA 92109 | 1-858-651-9464 | Jafarian@qti.qualcomm.com |

Abstract

This document provides resolution for the comments in subclause 4.11

CID List:

499, 500, 501, 328, 234, 608, 757, 756, 755, 329, 502, 504, 370, 371, 845, 378, 330, 94, 146, 147, 609, 503, 614, 95, 611, 505, 615, 331, 612, 616, 507, 506, 610, 333, 332, 96, 369, 97, 235, 508

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| **CID** | **P.L** | **Sub C.** | **Comment** | **Propose Change** | **Resolution** |
| 499 | 3.4 | 4 | This instruction add a new subclause 4.11a, though, new subclauses 4.11b to 4.11e are also added. | Modify the instruction as "Add new subclauses 4.11a to 4.11e after subclause 4.11 as follows:" | Accept  TGah Editor to make changes as shown in the Proposed Resolution |
| 500 | 3.4 | 4 | A general description of Sensor type STA shall be provided to specify what is a Sensor type STA. The general description of Sensor type STA may describe about Support for non-TIM mode and energy limited STAs. | Add new subclause 4.11f which describes Sensor type STA. See 11/13-0668r0 for proposed change. | Commenter is planning to withdraw the comment |
| 501 | 3.4 | 4 | It is better to provide a general description of Subchannel Selective Transmission (SST) to describe the benefit (reason) of SST. | Add new subclause 4.11g which describes SST. See 11/13-0668r0 for proposed change. | Commenter is planning to withdraw the comment |
| 328 | 3.9 | 4.11a | The language is inexact. | Change to: A Relay AP is defined as an AP with dot11RelayAPEnabled set to true. | Revised: the sentence is modified  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 234 | 3.9 | 4.11a | "A Relay AP is defined as an AP that has Relay capability, for example 4 address frame support...". Should it be "for eample in 4-address frame format"? | as commented | Revised:  The sentence is changed.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 608 | 3.9 | 4.11a | The defition of Relay AP should be deterministic, not using "for example". Besides, the setting of dot11RelayAPEnabled should be the right condition to tell if an AP is a Relay AP. | Change the paragraph in line 9 page 3 to the following: A Relay AP is defined as an AP that has dot11RelayAPEnabled set to true. | Revised:  The sentence is changed.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 757 | 3.9 | 4.11a | "One more hop Relay" has to fulfill the full function of RSN. | Change "for example 4 address frame," to "for example, 4 address frame and compatibility with RSNA capability,". Or otherwise discard entire "Relay" concept. | Rejected:  The Relay is an AP as such it inherits the capability of AP, one of which can be RSNA |
| 756 | 3.9 | 4.11a | "One more hop Relay" may pose any exclusive usage of existing and potential functionalities, e.g. 11s mesh, 11ak GLK, traditional power saving scheme, architectural DS and ESS concept and 11r hand over. | Clarification matrices (Table) to indicate the possible combinatory usages and prohibitions. Or otherwise discard entire "Relay" concept. | Rejected:  The Relay is an AP as such it inherits the capability of AP, and additional capabilities are not precluded |
| 755 | 3.9 | 4.11a | "One more hop Relay (or 2 hop reachability)" has been an idea of improving coverage for more than 15 years and never been adopted as a viable architecture because of no attracting balance of the gain and resource comsumption. Hence, any rationale taking account on S1G (11ah) propagation features is preferable, especially in term of PAR conformance. | Language a rationale, e.g. In case of sub 1GHz frequency, the propagation characteristics with rich diffraction behind obstacles and useful penetration through walls are able to be expected. This feature of S1G (11ah) can be efficiently enhanced and reinforced by simple one more hop relay to achieve a distinguished coverage than ever, even if consuming all four address fields of frame architecture and complication of security bootstrapping, and so on. Or otherwise discard entire "Relay" concept. | Rejected:  There is no need to include all the benefits of the feature in this subclause |
| 329 | 3.10 | 4.11a | Minor language correction. | Change "Relay AP shall include" to "A Relay AP shall include" | Revised:  The sentence is changed.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 502 | 3.11 | 4.11a | Relay function is out of scope of P802.11ah PAR, and has several flaws to be solved (see other comments). It shall be considered in MAC project like P802.11ak. | Remove Relay related subclauses (4.11a, 8.7.2.170q, 8.7.2.170r, 8.7.2.170s, 8.5.23b, 9.32n, and 10.1.4.3.3) and related descriptions. They shall be re-considered in P802.11ak. | Reject:  The introduction of this feature has been already discussed and accepted by the group. |
| 504 | 3.11 | 4.11a | (If Relay function is not removed) In subclause 4.11a, a Relay AP is defined as an AP with dot11RelayAPEnabled set to true. Though, in subclause 9.32n, a Relay AP is defined as an AP with dot11RelayAPActivated set to true. | Replace dot11RelayAPEnabled by dot11RelayAPActivated. | Revised:  The sentence is modified  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 370 | 3.12 | 4.11a | The capabilities for Relay AP are not complete. | Add "supports forwarding and receiving frames to/from the R-STA" in the paragraph. | Revised:  The concept is adopted.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 371 | 3.15 | 4.11a | The capabilities for Relay STA are not complete. | Add "supports forwarding and receiving frames from the R-AP" in the paragraph. | Revised:  The concept is adopted.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 845 | 3.15 | 4.11a Relay | in line 9 it says AP shall include Relay element in the beacon/probe response but line 16 STA must receive it in association response | shall include Relay element in the beacon, probe response and association response | Reject: The Relay consists of Relay-AP and Relay-STA. Relay-STA is not sending Beacons to include the Relay element in that. |
| 378 | 3.18 | 4.11a | Typo | Change 'an Relay' to 'a Relay' | Revised:  The line is changed.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 330 | 3.18 | 4.11a | Can there be an AP that is separate from a Relay? The language seems to imply it because it defines the components of a Relay independently. And the definition of Relay STA is a bit confusing, because the name makes it sound like it performs a relay function, but it does not - it is the combined entity, Relay STA + Relay AP that performs the relay action. Any STA that is associated with a Relay becomes a Relay STA. Calling a Relay a Relay and then calling things Relay AP and Relay STA makes everything very confusing. | Forbid the existence of a Relay AP that does not also contain a Relay STA - also consider changing the names of everything in order to avoid confusion. Maybe Relay stays as Relay and Relay AP changes to Relay Forwarding Function and Relay STA changes to Relay Endpoint Function - or something. | Revised:  The concept is adopted.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 94 | 3.18 | 4.11a | Definition of a Relay is unclear and conflicts with Figure 4-23a. According to Figure 4-23a a Relay consists of a Relay AP and a Relay STA but in the definition it says it consists of a STA | Replace the definition of a relay as "A Relay is an entity that logically consists of a Relay AP and a Relay STA..." | Revised:  The sentence is removed. I agree with the commenter and the concept is adopted in the text.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 146 | 3.18 | 4.11a | change 'an' to 'a' and change 'a STA' to 'a Relay STA' | as comment | Revised:  The sentence is modified.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 147 | 3.18 | 4.11a | The definition of Relay STA is not in consistance with the same term used in lots of other clauses, e.g. in clause 8.3.4a.1.3, clause 9.32n.3, etc. | Unify the use of "Relay", "Relay STA" and "Relay AP" all over the spec. | Reject: The comment failed to identify an exact issue.  In response to the commenter: Subclause 4.11 and 9.32n are modified to define a consistent language. |
| 609 | 3.18 | 4.11a | mis-use the brackets. | change the 1st sentence in the paragraph in line 18 page 3 to the following: A Relay is an entity that logically consists of an Relay AP and a STA, as illustrated in Figure 4-23a, where Relay1 and Relay2 are Relays whose Relay STAs are associated with an AP that is a Root AP, and STA1, STA2, STA3, and STA4 are STAs that are associated with the Relay AP inside Relay1 and Relay2, respectively. | Accept  TGah Editor to make changes as shown in the Proposed Resolution |
| 503 | 3.18 | 4.11a | (If Relay function is not removed) A Relay is defined as an entity that logically consists of an Relay AP and a STA. It is not clear what layer the Relay AP and the Relay STA are connected. Are they connected at MAC\_SAP, LLC, or Higher Layer? Also, a mechanism to exchange TXOP information between Relay AP and Relay STA for TXOP sharing is necessary. | A reference model of Relay shall be defined. Details are TBD. | Reject: The comment does not identify an issue.  In response to the commenter:  Standard may not define how and at which level Relay AP and Relay STA are connected. It is left to the implementation.  TXOP sharing exchange information is done in the frame, there is no need for further communication as long as the rules are clear |
| 614 | 3.19 | 4.11a | The following sentence is long and contains grammatical errors: "STA1, STA2, STA3, and STA4 are STAs that are associated with the Relay AP inside Relay1 and Relay2, respectively)." | Replace with: "STA1 and STA2 are STAs associated with the Relay AP inside Relay1. STA3, and STA4 are STAs associated with the Relay AP inside Relay2." | Accept:  TGah Editor to make changes as shown in the Proposed Resolution |
| 95 | 3.20 | 4.11a | It is not clear which is the AP that sends the Relay Element | What kind of AP is that? Is it a part of the Relay? Is it the Root AP? Clarify. | Reject:  Relay AP is defined as an AP with dot11RelayAPOperation set to true. Relay AP shall include the Relay element in its Beacon. |
| 611 | 3.22 | 4.11a | Need clarifications for the Relayed frames between a Relay AP and a Relay STA, e.g., 1). whtat're the relayed frames? 2). How is the relay / forwarding done between the Relay AP and a Relay STA (locagical co-located components in a Relay station)? 3). do the Relay AP and the Relay STA of the same Relay have separately MAC addresses? | Provide clarifications to address the questions listed in this comment regarding Relay. | Revise: The first concept is adopted.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah  More detail:  1-The text is change to reflect the concern  2- The connection between Relay AP and Relay STA is left to the implementation and is not needed to be defined in the standard.  3- They are two different entity so they will have different MAC addresses. |
| 505 | 3.22 | 4.11a | (If Relay function is not removed) The 4-address frame format or the A-MSDU format shall be used for relayed frames between a Root AP and a Relay STA. | Modify 3rd sentence of 3rd paragraph as following. Also see next comment. ---- Relayed frames between a Root AP and a Relay STA use either the 4-address frame format or the A-MSDU format, so that .... | Revised:  The concept is adopted and the sentence is added with some minor changes.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 615 | 3.23 | 4.11a | Relays may use A-MSDU format or 4-address format. How is this chosen and does it need to be signalled? |  | Reject: Comment failed to identify an issue.  In response to the commenter:  signaling is not necessary since both frames will have adequate information to get relayed to the correct destination/source |
| 331 | 3.26 | 4.11a | Normative text here contradicts earlier normative text - not exactly, but it is confusing : "only if its Relay STA has an association with an AP" - I think that the problem is confusion in the use of "Relay" and "Relay AP" | Resolve the contradiction. | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 612 | 3.26 | 4.11a | The paragraph in line 26 page 3 adds a clarification to the 2nd part of the paragraph in line 9 page 3, which makes the 2nd part of line 9 page 3 incomplete and useless. | Remove "Relay AP shall include the Relay element in its Beacon and Probe Responses" from the paragraph in line 9 page 3. | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 616 | 3.26 | 4.11a | "A Relay AP shall include the Relay element in its Beacon and Probe responses only if its Relay STA has an association with an AP."  What does this mean? If its relay STA does not have an association with an AP, what does the beacon contain? Does it act like a regular AP? What is in the Relay element? |  | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 507 | 3.26 | 4.11a | (If Relay function is not removed) Descriptions of Relay in subclause 4.11a and 9.32n allow a Relay AP inside a Relay to transmit Beacon and Probe Response frames even if corresponding Relay-STA is not associated with Root AP. This will cause non AP STA to associate a Relay AP which does not have a path to a Root AP. In most use cases, Relay shall start its Relay AP only if its Relay STA is associated with Root AP. | Modify 4th paragraph as following. --- A Relaying AP inside a Relay shall start when its corresponding Relay STA is associated with a Root AP, and shall stop when its corresponding Relay STA is not associated with a Root AP. | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 506 | 3.26 | 4.11a | (If Relay function is not removed) Both a relaying AP inside a Relay and a Root AP are defined as Relay AP. This causes several confusions in the subclause 4.11a and 9.32n. For example, 4th paragraph of subclause 4.11a shall apply only to a Relay AP inside a Relay, not to a Root AP. | Define a new term "Relay capable AP", which covers both a Relay AP inside a Relay and a Root AP (i.e. same as current Relay AP). Change definition of Relay AP as a Relay capable AP which forms a Relay with its corresponding Relay STA. A Relay capable AP shall set dot11RelayCapable to true. A Relay AP shall set both dot11RelayCapable and dot11RelayAPActivated to true. | Reject: The Root AP is not defined as Relay AP, so there is no need to define a new MIB variable. |
| 610 | 3.48 | 4.11a | inappropriate figure title | Change the title of Figure 4-23a to the following: Relays | Accept:  TGah Editor to make changes as shown in the Proposed Resolution |
| 333 | 3.49 | 4.11a | Root AP is mentioned in the caption but not really defined elsewhere. | Provide a formal definition for Root AP. | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 332 | 3.53 | 4.11a.1 | Is there a definition for "hop"? Why not just say that there is only one Relay allowed between a STA and its root AP? | As per comment. | Reject:  The definition of “hop” already exists in the baseline. |
| 96 | 3.57 | 4.11a.1 | The sentence "The introduction of a relay allows non-AP STAs to use higher MCSs and reduce the time non-AP STAs will stay in Active mode. This improves battery life on non-AP STAs." | Speculative. It is not definite that the battery life will increase since it depends on the exact network configuration. Remove sentence. | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 369 | 3 | 4.11a | Should indicate Relay STA is a non-AP STA. | "A Relay STA is defined as a non-AP STA with the dot11RelaySTACapable set to true which......" | Revised:  The concept is adopted.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 97 | 4.1 | 4.11a.1 | The sentence "There is an overhead cost on overall network efficiency and increased complexity with the use of relay STAs. To limit this overhead, the relaying function shall be bi-directional..." | It is not clear how bi-directionality can reduce the overhead cost. Remove "To limit this overhead" in the beginning of the sentence. | Revise: The concept is adopted. The sentence is removed.  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 235 | 4.2 | 4.11a1 | "To limit this overhead, the relaying function shall be bi-directional and limited to two hops only." Since one hop is also allowed, should it changes to "...limited to at most two hops." | as commented | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 508 | 4.2 | 4.11a.1 | (If Relay function is not removed) As Relay function is limited to two hop only, a Relay STA shall not be associated with a Relay AP. There are no description about this limitation in this document. | Add following sentence at the end of the last paragraph of subclause 4.11a.1. ---- A Relay STA shall not be associated with a Relaying AP inside a Relay. | Revise: The concept is adopted  TGah Editor to make the changes as shown in the document 11-13-1140-00-00ah |
| 125 |  | 4.11a | In the whole relay discussion the security architecture is not discussed | Please clarify the following: What is the Authentication process from a STA to a relay? How can a STA know that the relay is a "secure" relay? How is the security architecture when relays are introduced? | Rejected:  The Relay is an AP as such it inherits the capability of AP, one of which can be RSNA |

**4.11a Relay**

A Relay is an entity that logically consists of a Relay AP and a Relay STA.

The Relay AP is an AP with additional functionalities for the relaying of frames (see clause 9.32m) that resides inside a Relay entity. The Relay AP supports 4 address frame format and includes the Relay element in its Beacon and Association and Probe Responses.

The Relay STA is a non-AP STA with additional functionalities for the relaying of frames (see clause 9.32m), that resides inside a Relay and that successfully completes association and authentication with a parent AP, and receives a Relay element in the association response.

The Relay forwards frames from (to) STAs associated to the Relay AP to (from) the AP that Relay STA is associated to.

A non-Relay AP that has Relay STAs associated to it is called Root AP. The Root AP includes a Relay element with the Control field set to 0 in Beaocons, Probe Reponses and Assocition responses.

The Relay is illustrated in Figure 4-23a, where Relay1 and Relay2 are Relays whose Relay STAs are associated with an AP that is a Root AP. STA1 and STA2 are STAs associated with the Relay AP inside Relay1. STA3, and STA4 are STAs associated with the Relay AP inside Relay2. Relayed frames between a AP and its associated Relay STA use either the 4-address frame format or the A-MSDU format.

**4.11a.1 Two-hop Relay function**

The relay function allows an AP and non-AP STAs to exchange frames with one another by the way of a relay. The introduction of a relay enablesnon-AP STAs to use higher MCSs and reduce the time non-AP STAs will stay in Active mode. This improves battery life on non-AP STAs. Relay STAs may also provide connectivity for non-AP STAs located outside the coverage of the AP.

The relaying function is bi-directional, and this standard describes necessary rules and mechanisms to enable two-hop Relay operation.