IEEE P802.11
Wireless LANs

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| Active Scanning related requirements for Specification Frame Work Document  |
| Date: 2012-02-13 |
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Abstract

The document contains minimal set of requirements to achieve faster, more precise and less overhead creating active scanning mechanism. More requirements will be added later.

The requirements are grouped according to enhancement. The need for each requirement is explained with motivation clause, then the concept is explained and finally a strawpoll questions 802.11ai opinion.

The submission contains the strawpolls done in January 2012 in Jacksonville and proposes 5 new strawpolls for text to be added to Specification framework document.

The submissions that are covered with these requirements are based on:

11-1414r4 Probe Request and Response in TGai

11-1521r2 AP and Network Discovery Enhancements

11-1523r6 Access Delay Reduction for FILS

11-1619r3 Active Scanning

12-50r0 Broadcast Probe Response including Normative Text

12-56r0 FILS enabled active scanning

12-59r0 Selection of the AP for Scanning

12-60r0 Text for Selection of the AP for scanning

12-61r0 Probe Response frame transmission interval

12-62r0 Text for Probe Response frame transmission interval

12-67r0 Active Scanning Time Notification

12-124r0 Text for access delay reduction for FILS

Normative text to implement the choices is provided in 11-1619r3.

# FILS capability indication

**Motivation**

Without indication which STAs are FILS capable, the scanning STAs or responding STAs cannot detect other FILS capable STAs. The detection of the FILS capable STAs is needed to the use of FILS specific scanning logic.

**Concept**

If applicable, Probe Request, Probe Response and Beacon should indicate FILS capability.

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 21 No: 0 Abstain: 5

# Probe Request

**Motivation**

The requesting STA may have information of the STAs which it already knows or from which it is not interested to receive Probe Request. The knowledge may be obtained during the time when the STA was looking for TXOP to transmit the Probe Request, or from the previous Probe Request.

**Concept**

The probe request may restrict responses by indicating APs that should or should not respond

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 19 No: 0 Abstain: 3

***NewStrawpoll 1***

* ***Motivation***

The MAC address, SSID, Mesh ID, HESSID and Network ID (TBD) set clear rules who should respond or not.

* ***Concept***

The same criteria may be used to define the responding and not responding devices. The criteria shall include at least the following information elements:

* + MAC address of the responding STA (BSSID)
	+ SSID
	+ Mesh Id
	+ HESSID
	+ Network ID / Roaming ID (TBD)
* ***Strawpoll***

Do you agree on above mentioned concept?

Yes: No: Abstain:

**Motivation**

Without knowledge of the time when the Probe Request transmitter is available to receive Probe Responses, the individually addressed Probe Responses may be unnecessarily (re)transmitted.

In congested BSS, it may be difficult and power consuming for the requesting STA to transmit a frame to indicate that the STA is no longer available to receive Probe Responses.

**Concept**

The transmitter of the Probe Request frame may indicate the time when it is available to receive Probe Response frames.

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 17 No: 0 Abstain: 5

# Canceling Probe Responses transmission

**Motivation**

The general knowledge when the STA is receiving at the channel reduces transmissions of unnecessary Probe Responses.

The requesting STA may indicate to be available to receive Probe Responses for a certain time period. If the channel is idle, the device may need unnecessarily use its battery to be available at the channel.

**Concept**

Responses to Probe Request may be cancelled by requesting STA

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 13 No: 2 Abstain: 8

***NewStrawpoll 2***

* ***Motivation***

The Probe Request transmitter may sense the channel Idle, but the STA transmitting the Probe Response may sense the channel Busy. The Probe Response transmitter needs to get an indication from the Probe Request transmitter to know if it is no longer available to receive Probe Responses. Some frames like Association Request indicate that the device has already selected AP for its use. Thus, no more Probe Responses are needed.

* ***Concept***

The Probe Request transmitter should have means to send a (TBD) frame to indicate that it is no longer available to receive Probe Response frames

* ***Strawpoll***

Do you agree on above mentioned concept?

Yes: No: Abstain:

***NewStrawpoll 3***

* ***Motivation***

The scanning device may transmit multiple Probe Requests with different request parameters. Managing each request separately may lead to unnecessary overhead and slow down the scanning operation.

* ***Concept***

A single cancelation frame (TBD) should terminate all ongoing requests, or set new criteria to the requests.

* ***Strawpoll***

Do you agree on above mentioned concept?

Yes: No: Abstain:

# Probe Response

**Motivation**

The broadcast addressed Probe Response may be received by many STAs. The broadcast addressed Probe Responses are not acknowledged and thus not retransmitted. This reduces traffic load in congested situations.

**Concept**

The Probe Response frame may be transmitted to an individual or broadcast address.

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 16 No: 0 Abstain: 7

**Motivation**

The BSS information on other channels helps to select the channel that is scanned next. More information of the BSSs provides more knowledge to scanning STA. For instance, if the STA transmits Probe Request to individual address, it may collect information of many APs with reduced amount of Probe Responses.

**Concept**

The Probe Response may contain information of other than responding AP (Comprehensive response).

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 14 No: 1 Abstain: 8

***NewStrawpoll 4***

* ***Motivation***

The Probe Request frames may request different parameter values to be responded in Probe Response. The Requested Parameters are important for the requesting STA and the information needs to be provided.

* ***Concept***

The all requested parameters, as specified in all Probe Requests that are responded, shall be included to the response frame.

* ***Strawpoll***

Do you agree on above mentioned concept?

Yes: No: Abstain:

# Probe Response collision avoidance

**Motivation**

The amount of unnecessary copies of the responses should be minimized to avoid overhead and to speed up the network operation. The smaller amount of transmitted frames reduces traffic load and speeds up the discovery operation.

**Concept**

AP may respond to multiple Probe Requests with a single response frame.

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 12 No: 0 Abstain: 8

**Motivation**

The Beacon frame needs to be transmitted at TBTT to provide information of the availability of the AP and to indicate availability of the buffered frames for power saving STAs.

The amount of unnecessary copies of the Probe Response frames should be minimized. The smaller amount of transmitted frames reduces traffic load and speeds up the discovery operation.

**Concept**

AP may transmit a Beacon frame instead of Probe Response frame if the TBTT occurs within short time interval

**Strawpoll**

Do you agree on above mentioned concept?

Yes: 13 No: 1 Abstain: 6

***NewStrawpoll 5***

* ***Motivation***

The amount of unnecessarily transmitted Probe Responses should be minimized to avoid overhead and to speed up the network operation. In some cases it may happen that other AP transmits a Probe Response that contained the operation parameters of the AP. Multiple copies of the same parameter values should be avoided.

* ***Concept***

The AP may not transmit Probe Response frame if it has received successfully transmitted Probe Response or Beacon frame that contained its operation parameters.

* ***Strawpoll***

Do you agree on above mentioned concept?

Yes: No: Abstain:

# References:

11-1414r4 Probe Request and Response in TGai

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