IEEE P802.11
Wireless LANs

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| TGbi Requirements Tracking |
| Date: 2022-03-14 |
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### Overview

This document tracks Requirements against Issues and Use Cases for TGbi.

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| --- | --- |
| R0 | Initial Draft for Discussion |
| R1 | Update after discussion |
| R2 | Update after discussion, including process addition and examples |
| R3 | Adding first round of Requirements from 22/107r2 and 22/109r2 |
| R4 | Updating with Use Case/Issue list, and other items from Plenary discussions |
| R5 | Altered 22/109r2 requirements to 22/109r3 requirements text |
| R6 | Corrected typo in Req. 23 |
| R7 | Added requirements from 22/623r1 |

# Requirements

The following table summarizes the requirements for TGbi.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Requirement** | **Issue / Use Case Reference** | **Status** | **Information** |
| 1 | 11bi shall define a mechanism to prevent an eavesdropper distinguishing whether authentication exchanges between CPE Clients and CPE AP use identical **SAE credentials** or distinct SAE credentials (where a CPE AP supports multiple SAE credentials). | I1, I5 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 2 | 11bi shall define a mechanism to prevent an eavesdropper distinguishing whether reassociation exchanges between CPE Clients and CPE APs use identical **PMK** or distinct PMK | I1, I5 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 3 | 11bi shall define a minimal set of Elements for transmission by a CPE Client in **a probe request** prior to authentication. | I2 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 4 | 11bi shall define a mechanism for a CPE Client and CPE AP **to establish keys from an Authentication exchange** which can then be used to protect the (Re)Association Request/Response.  | I2 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 5 | 11bi shall define a mechanism for a CPE Client and CPE AP **to** **protect the (Re)Association Request/Response**.  | I2 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 6 | 11bi shall define a mechanism for a CPE Client **to change its own OTA MAC Address** when reassociating from a CPE AP to another CPE AP | I3 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 7 | 11bi shall define a mechanism for a CPE Client to initiate **changing** **its own OTA MAC Address** used with a CPE AP in Associate STA State 4 without any loss of connection. | I3 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 8 | 11bi shall define a mechanism for a CPE AP to initiate **changing the OTA MAC Addresses of all associated CPE Client’s** in the BSS (those CPE Clients in Associate STA State 4) simultaneously without any loss of connection | I3 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 9 | 11bi shall define a mechanism for a CPE Client and CPE AP **to change the transmitted SN** to an uncorrelated new value on downlink and uplink to new values in Associate STA State 4, without any loss of connection. | I3 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 10 | 11bi shall define a mechanism for a CPE Client and CPE AP **to change the transmitted PN** to an uncorrelated new value on downlink and uplink to new values in Associate STA State 4, without any loss of connection. | I3 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 11 | 11bi shall define a mechanism for a CPE Client and CPE AP **to change the CPE Client’s AID** to an uncorrelated new value in Associate STA State 4, without any loss of connection. | I3 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 12 | 11bi shall define a mechanism for a CPE Client and CPE AP to establish the CPE Client’s DS MAC Address without the CPE Client’s DS MAC Address being transmitted in the clear. | I3 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 13 | 11bi shall define a mechanism for CPE Clients and CPE APs to transmit and receive the CPE Client’s DS MAC Address in SA and DA in protected form on both the downlink and uplink. | I4 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 14 | 11bi shall define a mechanism for CPE Clients and CPE APs to transmit and receive other DS MAC Addresses in SA and DA in protected form on both the downlink and uplink. | I4 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 15 | 11bi shall define a mechanism for a BPE Client to determine which of the BPE Client’s configured networks a BPE AP belongs to (if any), while providing some mitigation against an eavesdropper easily identifying the ESS of the BPE AP. | I6 | Proposed  | Proposed -22/107r2 (9 March 2022) |
| 16 | 11bi shall define a mechanism for the BPE AP to refrain from transmitting Beacon frames containing elements except TBD element(s).  | I2, I6 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 17 |  BPE AP may change its BSSID while there are no Clients associated. | I6/I7 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 18 | 11bi shall define a mechanism for a BPE AP to facilitate changing its BSSID while there are Clients associated, without disrupting the connectivity from the Clients. | I6/I7 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 19 | 11bi shall define a mechanism for a BPE Client and BPE AP to establish the BPE AP’s DS MAC Address without the CPE AP’s DS MAC Address being transmitted in the clear. *This will likely be the same mechanism as used in Req 12.* | I6 | Proposed  | Proposed - 22/107r2 (9 March 2022) |
| 20 | 11bi shall define a mechanism for the 11bi non-AP STA to refrain from transmitting Probe Request frames containing elements except TBD element(s) |  I2  |  Proposed | Proposed – 22/109r3 (10 March 2022; SP Y15, N7, A14) |
| 21 | 11bi shall define a mechanism to protect the Frame Body field of the (Re)Association Request frame |  I2  |  Proposed | Proposed – 22/109r3 (10 March 2022) |
| 22 | 11bi shall define a mechanism to protect the Frame Body field of the (Re)Association Response frame  | I2  |  Proposed | Proposed – 22/109r3 (10 March 2022) |
| 23 | 11bi shall define a private MAC address that is used by the 11bi non-AP STA or 11bi non-AP MLD for the DS and can be different for different ESS. * The private MAC address of a 11bi non-AP STA or a 11bi non-AP MLD shall not be carried in the MAC header of the frame and shall not be carried in the frame body of a frame without protection
	+ if the frame is transmitted by the 11bi non-AP STA or any non-AP STA affiliated with the 11bi non-AP MLD or
	+ if the frame is transmitted by the 11bi AP to the 11bi non-AP STA or by any AP affiliated with a 11bi AP MLD to any non-AP STA affiliated with the 11bi non-AP MLD
* 11bi non-AP STA or 11bi non-AP MLD can decide the lifetime of the private MAC address
 | I3  |  Proposed | Proposed– 22/109r3 (10 March 2022) |
| 24 | 11bi shall define a mechanism to carry the private MAC address of 11bi non-AP STA or 11bi non-AP MLD in protected (Re)Association Request frame  | I3  |  Proposed | Proposed – 22/109r3 (10 March 2022) |
| 25 | 11bi shall define a mechanism to randomize over the air MAC address of the 11bi non-AP STA or 11bi non-AP MLD (carried in Address 1 field or Address 2 field of the MAC header) during BSS transition | I3  |  Proposed | Proposed – 22/109r3 (10 March 2022) |
| 26 | Unicast management frames between CPE AP and assocaited CPE Client are encrypted. | I2 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 27 | 11bi shall define a mechanism for a CPE Client to reset the scrambled when its MAC address is changed in Associate STA State 4, without any loss of connection. | I3, I2 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 28 | 11bi shall define a mechanism for CPE Aps and CPE Clients to use different MAC addresses for ongoing sensing measurements and dta transmissions. | I2, I8 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 29 | 11 bi shall define a mechanism to protect transmitted sensing measurement frames against eavesdropper sensing estimations, i.e., the frames are protected from the eavesdroppers to perform sensing or ranging from the received frames. | I2, I8 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 30 | 11bi shall define a mechanism for a CPE Client and CPE AP to obfuscate the transmitted TID to an uncorrelated new value on downlink and uplink to new values in Associate STA State 4, without any loss of connection. | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 31 | 11bi shall define a mechanism for CPE Clients and CPE APs to encrypt power save related MAC Header fields (PM, EOSP, MD). | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 32 | 11bi shall define a mechanism for CPE Clients and CPE APs to encrypt the +HTC field and the HT Control field. | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 33 | 11bi shall define a mechanism for CPE Clients and CPE APs to encrypt the Retry bit. | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 34 | 11bi shall define a mechanism for the BPE AP to transmit encrypted management frames.  | I2, I6 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 35 | 11bi shall define a mechanism to randomize Beacon transmission times. | I2, I6 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 36 | 11bi shall define a mechanism for the BPE Client and BPE AP to fast active and passive scan available PBE APs in the channel. | I2, I6 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 37 | 11bi shall define new RNR element to include obfuscated BPE AP identifiers for out-of-the-band discovery of the BPE AP.  | I2, I6 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 38 | 11bi shall define a mechanism to obfuscate affiliated BPE APs parameters so that eavesdropping STAs cannot determine that they belong to the same AP MLD. | I2, I6 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 39 | 11bi shall define a mechanism to for BPE AP and BPE Client to change the OTA MAC addresses, SN and PN they use for unicast transmissions at STA specific schedule. | I6, I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 40 | 11bi shall define a mechanism to for BPE AP to obfuscate the RA, SN and PN of the group frames to avoid BPE AP tracking. | I6, I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 41 | BPE Client and BPE AP shall reset the Scrambler Seed on individual and group addressed frames when MAC address is changed. | I6, I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 42 | BPE-F-111bi shall define a mechanism for BPE APs and BPE Clients to use different MAC addresses for ongoing sensing measurements and data transmissions.  | I2, I6, I7, I8 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 43 | 11bi shall define a mechanism to protect transmitted sensing measurement frames against eavesdropper sensing estimations, i.e., the frames are protected from the eavesdroppers to perform sensing or ranging from the received frames. | I2, I6, I7, I8 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 44 | 11bi shall define a mechanism for a BPE Client and BPE AP to obfuscate the transmitted TID to an uncorrelated new value in Associate STA in State 4, without any loss of connection. | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 45 | 11bi shall define a mechanism for BPE Clients and BPE APs to encrypt power save related MAC Header fields (PM, EOSP, MD). | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 46 | 11bi shall define a mechanism for BPE Clients and BPE APs to encrypt the +HTC field and the HT Control field. | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |
| 47 | 11bi shall define a mechanism for BPE Clients and BPE APs to encrypt the Retry bit. | I7 | Proposed  | Proposed – 22/623/r2 (14 April 2022) |

# References:

The following table contains relevant reference information including:

1. Motioned Use cases/Issues document
2. Minutes
3. Presentations

|  |  |  |
| --- | --- | --- |
|  | **References** | **Relevant Requirement(s)****(optional)** |
| 1 | **11-21-641r7 Proposed Issues** | R1-19 |
| 2 | **11-21-1848r2 Requirements Document** | R1-19 |
| 3 | **11-21-0109r1 Proposed 11bi Requirements** | R1-19 |
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# List of Use Cases and Issues:

The following table contains a list of use cases and issues from the latest motioned Use cases/Issues document.

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|  | **Issues/Use Cases** |
| I1 | **Protecting password identifiers** |
| I2 | **Avoid element fingerprint** |
| I3 | **STA MAC address persistence within an ESS** |
| I4 | **Tracking SA and DA OTA** |
| I5 | **Protecting authentication identifiers and key identifiers** |
| I6 | **Mobile AP privacy** |
| I7 | **Protecting behavioral figerprinting while associated** |
| I8 | **PHY/RF related privacy** |
| U1 | **Smart home environment** |
| U2 | **Remote stalking in public places** |
| U3 | **Avoid fingerprinting from SSID elements or SSID list elements in probe requests** |

# Requirements Tracking Document Process:

Proposed Requirements from Submissions:

1. A submission can propose requirements related to one or more issues or use cases from the Use Case Document (21/641).
2. A presenter may ask for one or more straw polls on a requirement to determine the level of consensus on that requirement.
3. A presenter may ask for a requirement that has been presented to the group to be added to the Requirements Table as a proposed requirement.
	1. No specific straw poll results or other indicators are required for a requirement to be added to the Requirements table.
	2. A presenter may choose to work further on a requirement instead of asking for it to be added to the Requirements Tracking document.

Brainstorming for Requirements

1. Chair may dedicate one or more meetings to review existing requirements and lead brainstorming for additional requirements, if needed

Conversion of Proposed Requirements to Approved Requirements

1. A presenter may initiate a motion to approve one or more proposed requirements.
	1. The approval metric is the standard Y>=.75(Y+N).
2. With notice, the chair may dedicate one or more meetings to review existing requirements and motion one or more proposed requirements for approval.
3. If a motion to approve a requirement fails, the status of that requirement is updated to Failed in the table.

Examples:

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|  | **Requirement** | **Issue / Use case Reference** | **Status** | **Information** |
| 1 | STA may make a loud noise when unassociated. | I-1,2,5 | Proposed | **Proposed** (12 Nov 2021; SP Y4 ,N16) |
| 2 | STA may play music while associated. | I-1,2,5 U-3 | Approved | Proposed (14 Nov 2021; SP Y13, N2)**Approved** (Motion #12, 14 May 2022) |
| 3 | STA must make a loud noise when unassociated. | I-2 | Failed  | Proposed (14 Nov 2021; SP Y13, N2)**Failed** (Motion #1, 14 May 2022) |