IEEE P802.11
Wireless LANs

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| TGai Requirements Document |
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Abstract

This document summarizes the TGai requirements as derived from the PAR and from analyzing the TGai use cases.

The methodology on how to show compliance to these requirents will be specified in a TGai Evaluation Methodology Document that will also specify the subset of requirements which are mandatory to be met in order for a proposal to be considered for inclusion in the TGai amendment.

# Introduction

## Purpose

This document defines requirements for solutions addressing functionality to be provided by the TGai amendment.

Apart from setting functional requirements, this documents specifies performance requirements and constrains for solutions addressing functionality to be provided by the TGai amendment.

## Scope

The scope for deriving requirements is set by the P802.11ai PAR [1], as well as by the TGai use case document [2].

Requirements are identified by a preceeding unique number ( [Reqx.x.x] ) and may be followed by additional, informative text starting with “Note—“.

## Definitions, acronyms, and abbreviations

<<< Relevant defintions, e.g. based on the use case document, to be included here. >>>

FILS: Fast Initial Link Setup [1]

Link Setup: the process of gaining the ability to send IP traffic with a valid IP address through the AP. Link Setup may involve more than one AP in an ESS. This includes AP/Network discovery and (secure) Association and Authentication. [3]

Link Setup Time: the amount time required in the use case to establish link setup. Timing starts when the STA elects to perform Link Setup. [3]

## References

[1] 11-10/1152r01: Fast Initial Link Set-UP Project Authorizaiton Request

[2] 11-10/1152r01: Fast Initial Link Set-Up PAR

[3] 11-10/0238: TGai Use Cases

[4] 11-11-0811: TGai Evaluation Methodology

# Requirements

## Functional requirements [What the system shall do]

### Link Set-Up

[Req2.1.1.1] The TGai amendment shall support a **link set-up**. The solutions shall provide mechanisms for AP & network discovery, network discovery, association and authentication, as well as IP-address assignment.

### Scalability

[Req2.1.2.1] The TGai amendment shall support **robustness in the presence of a large number of users**. Solutions shall demonstrate that they scale with a high number of users simultaneously entering an ESS.

### Concurrency in information exchange

Reducing the number of messages transmitted over the air per user frees airtime and may increase the number of users that may simultaneously enter an ESS. Concurrency in the exchange of higher layer protocol messages while setting up the 802.11 MAC link is desireable. [1]

[Req2.1.3.1] The TGai amendment shall support **concurrency in information exchange**. The solution shall provide mechanisms to exchange appropriate information during the link set-up phase. This information is usually contained in higher layer protocol messages.

Note—An example for such concurrency is the exhange if information for IP-address assignment as part of the messege sequence used for 802.11 authentication or association.

## Performance requirements [How well the requirements should perform]

The TGai amendment shall enable IEEE 802.11 devices to effectively work in an environment where mobile devices are constantly entering and leaving the coverage area of an existing extended service set (ESS) and thereby have to do an initial link set-up to establish wireless local area network connectivity. [1]

### Link Set-Up Time

[Req2.2.1.1] The TGai amendment shall support an **initial link set-up time** which is an improvement over IEEE 802.11. Solutions shall demonstrate that they can provide a secure link set-up in less than 100 ms.

### Scalability

[Req2.2.2.1] The TGai amendment shall support a **minimum user load**. Solutions shall demonstrate that they support at least 100 non-AP STAs entering an ESS within 1 second, and sucsessfully conducting a link set-up.

Note—TGai entertains submissions on the theoretical limits of the number of packet exchanges achievable in 1 second as a function of packet size and data rate.

[Req2.2.2.2] The TGai amendment shall support **robustness in the presence of high background load**. Solutions shall demonstrate that they can provide a link set-up for media loads of at least 50%.

## Non-Functional requirements, such as reliability, safety, environmental [temperature]

TGai has not identified non-functional requirements.

## Enabling requirements [Production, development, testing, training, support, deployment, and disposal].

TGai has not indentified enabling requirements.

## Constraints – [e.g. Technology, design, tools, and/or standards]

### Maintaining existing security level

[Req2.5.1.1] The TGai amendment shall assure **maintaining RSNA’s security level**. Solutions shall demonstrate that they do not degrade the security offered by Robust Security Network Association (RSNA) already defined in 802.11. Solutions employing security schemes other than RSNA shall demonstrate that they are at least as secure as RSNA.

### Backward compatibility

The TGai amendment shall not depricate existing security mechanims of IEEE 802.11. The following requirement is broader and covers that particual aspect set by the PAR [1].

[Req2.5.2.1] The TGai amendment shall assure **backward compatibility**. Solutions shall assure that STAs can conduct a secure link set-up using mechanisms as defined in IEEE 802.11.

Note—In case of a backward compatible link establishment, it may not be assured that devices comply to the performance requirements as defined in Section 2.2.

# Verification

The TGai Evaluation Methodology Dodument [4] defines the procedure of verifying that the requirements in Section 2 are met. It also defines the subset of requirements mandatory to be met in order to have draft amending text considered for inclusion in the TGai amendment.

Submissions shall indicate their level of compliance to requirements to each of the requirements in this document: “full”, “partial”, “n/a”.

# Annex

## Non-Requirements (Informative)

This section lists requirements discussed by TGai and motioned out of scope (hence being noted as “non-requirements”).

No requirement brought to the attention to TGai has explicitly been motioned out of scope.