IEEE P802.11
Wireless LANs

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| TGai Functional Requirements |
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Abstract

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

The methodology on how to show compliance to those requirents will be specified in a TGai Evaluation Methodology Document.

# Overview

This document includes functional requirements that address PAR requirements and additional system performance metrics as derived from analyzing TGai use cases. Functional requirements are identified by the notation [ReqYY].

The methodology applied to evaluate if and how well functional requirements are met is specified in the TGai Evaluation Methodology document. As achieving partial or full compliance to the functional requrements is expected to have an influence on the complexity of upcoming proposals, compliance to all functional requirements shall not be mandated for considering proposals for inclusion in the TGai amandment.

The phrase “The TGai amendment provides a means” indicates that at least an optional feature must be incorporated into the TGai amendment addressing this requirement.

The phrase “All devices are required to support” indicates that a mandatory feature must be incorporated into the TGai amendment addressing this requirement.

## Summary of Functional Requirements

*-add summary list for convenience when Functional Requirements are complete*

# Functional Requirements

## System Performance

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

### Scalability

Mechanisms provided by the TGai amendment shall scale with a high number of users simultaneously entering an ESS.

[ReqYY] All devices are required to support fast initial link set-up for at least 100 stations entering an existing ESS within 1 second.

[ReqYY] All devices are required to support fast initial link set-up at least for media loads of 50%.

### Link Set-Up Time

Mechanisms provided by the TGai amendment shall minimize the time spent in the link set-up time.

[ReqYY] All devices are required to support mechanisms enabling an Initial Link Set-Up in less than 100 ms.

### ~~Coverage Interval~~

~~[ReqYY] All devices are required to enable a fast initial link set-up for coverage intervals less than 1 second.~~

~~Note—Is this a usefull requirement? We already required the link-set up to occur in less than 100ms, so the 100ms does already outperform the 1s requirement set here.~~

## Security

The PAR mandates the TGai amendment shall not deprecate existing security mechanisms of IEEE 802.11. New fast initial link set-up methods shall not degrade the security offered by Robust Security Network Association (RSNA) already defined in 802.11.

### Backward compatibility

[ReqYY] All devices are required to support existing security mechanims of IEEE 802.11.

Note—Employing existing security mechanims may result in TGai devices not fulfilling requirements regarding the expected system performance.

Should we rather use the following Req. instead? I am not sure if it is a functional requirement as it is stated. As deprecate = disapprove = criticize, I am not sure if this would be a usefull Req.

[ReqYY] The TGai amendment shall not depricate existing security mechanims of IEEE 802.11.

[ReqYY] All devices are required to support means reducing the time spent in the Fast Initial Secure Authentication Phase employing Robust Security Network Association (RSNA).

Note—This does not depricate the TGai amendment from optimizing the message flow or realizing concurrency in information exchange while applying RSNA for secure association.

### Maintaining existing security levels

[ReqYY] New fast initial link set-up methods shall not degrade the security offered by Robust Security Network Association (RSNA) already defined in 802.11.

## Additional Requirements

Note—we do not say anything about additional requirements, e.g. that fast link set-up shall work for devices moving at velocity x. I do not think that such a requirement is necessary as we use the coverage interval requirement which has been derived from AP coverage size & device velocity. I would rather specify a device velocity for a particular set-up in the evaluation methodology document later on.

### Parallization of 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 considered is worth exploring.

Note: None of the use cases requires this. It is thogh anticipated to be a good improvement helping to reduce the set-up time. Should we make it a Req.? Should we require all kinds of messages to be transferable in parallel or do we actually want only to convey certain / selected information (e.g. IP address) in parallel?

[ReqYY] The TGai amendment provides a means to support concurrency in the exchange higher layer protocol messages during the link set-up phase.

[ReqYY] The TGai amendment provides a means to support concurreny in the exchange of (selected) information usually contained in higher layer protocol messages.

**References:**

11-10/1152r01 Fast Initial Link Set-Up PAR

11-10/0238r15 TGai Use Cases