IEEE P802.11
Wireless LANs

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| Some Subsetting and Addressing Text |
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Abstract

This document provides some tentative text concerning solutions to the subsetting (see 11-13/0526r3) and addressing problems for a P802.11ak draft. It uses Draft P802.11REVmc\_D2.3 as its base document.

**Editor’s notes**

The editor’s notes do not form a part of this standard. They will be removed before publication. Please do not comment on editor’s notes in any ballot on the draft, as these comments would have no effect on the published standard.

***Editor’s Note: Editor’s Notes in the body of the standard appear like this. They will be removed before*** ***publication. They indicate some item of work or comment that will be addressed prior to publication.***

***This text is based on 802.11REV-mc D2.3 and will need to be revised in light of 802.11 amendments not incorporated in that draft and adopted after that draft but before P802.11ak.***

**Table of Contents**

Introduction 6

1 Overview 6

2 Normative references 6

3 Definitions, acronyms, and abbreviations 6

3.1 Definitions 6

3.2 Definitions specific to IEEE 802.11 6

3.3 Abbreviations and acronyms 6

4 General Description 7

4.1 General description of the architecture 7

4.2 How wireless local area networks (WLANs) are different 7

4.3 Components of the IEEE Std 802.11 architecture 7

4.3.12 STA transmission of Data frames outside the context of a BSS 7

4.3.20 General Link (GLK) 7

4.3.20.1 GLK STA identification and general capabilities 7

4.3.20.2 GLK MSPDU addressing 7

4.3.20.3 CBA-MSDU Subsetting and Tagging 7

4.4 Logical service interfaces 8

4.5 Overview of the services 8

4.6 Multiple logical address spaces 8

4.7 Differences among ESS, PBSS, and IBSS LANs 8

4.8 Differences between ESS and MBSS LANs 8

4.9 Reference model 8

4.10 IEEE Std 802.11 and IEEE Std 802.1X-2010 8

4.11 Generic advertisement service (GAS) 8

5 MAC service definition 8

5.1 Overview of MAC services 8

5.2 MAC data service specification 8

6 Layer management 8

7 PHY service specification 8

8 Frame formats 9

8.1 General requirements 9

8.2 MAC frame formats 9

8.2.1 Basic components 9

8.2.2 Conventions 9

8.2.3 General frame format 9

8.2.4 Frame fields 9

8.2.4.1.4 To DS and From DS fields 9

8.2.5 Duration/ID field (QoS STA) 9

8.3 Format of individual frame types 9

8.3.1 Control frames 9

8.3.2 Data frames 9

8.3.2.1 Data frame format 9

8.3.2.2 Aggregate MSDU (A-MSDU) format 10

8.3.2.3 Control Block (CB) A-MSDU (CBA-MSDU) format 10

8.3.2.3.1 Infix Data 11

8.3.2.3.2 Subsetting Exclusion and Infix CB (SEI-CB) 11

8.3.2.3.3 Subsetting Inclusion and Infix CB (SII-CB) 11

8.3.2.3.4 Vendor Specific CB 11

8.3.3 Management frames 12

8.3.3.1 Format of Management frames 12

8.3.3.2 Beacon frame format 12

8.3.3.3 ATIM frame format 12

8.3.3.4 Disassociation frame format 12

8.3.3.5 Association frame format 12

8.3.3.6 Reassociation Request frame format 12

8.3.3.7 Probe Request frame format 12

8.3.3.8 Probe Response frame format 12

8.3.3.9 Authentication frame format 12

8.3.3.10 Deauthentication frame format 12

8.3.3.11 Action frame format 12

8.3.3.12 Action No Ack frame format 12

8.3.3.13 Timing Advertisement frame format 12

8.3.4 Extension frames 12

8.4 Management and Extension frame body components 13

8.4.1 Fields that are not elements 13

8.4.2 Elements 13

8.4.2.1 General 13

8.4.2.157 GLK Capabilities element 13

8.4.2.158 GLK SSIDs element 13

8.4.3 Information Subelements 14

8.4.4 Access network query protocol (ANQP) elements 14

8.5 Fields used in Management and Extension frame bodies and Control frames 14

8.6 Action frame format details 14

8.7 Aggregate MPDU (A-MPDU) 14

9 MAC sublayer functional description 14

9.1 Introduction 14

9.2 MAC architecture 14

9.2.1 General 14

9.2.2 DCF 14

9.2.3 PCF 14

9.2.4 Hybrid coordination function (HCF) 14

9.2.5 Mesh coordination function (MCF) 14

9.2.6 Combined use of DCF, PCF, and HCF 14

9.2.7 MAC data service 14

9.3 DCF 15

9.4 PCF 15

9.5 Fragmentation 15

9.6 Defragmentation 15

9.7 Multirate support 15

9.8 MSDU transmission restrictions 15

9.9 HT Control field operation 15

9.10 Control Wrapper operation 15

9.11 A-MSDU operation 15

9.12 A-MPDU operation 15

9.13 PPDU duration constraint 15

9.14 DMG A-PPDU operation 15

9.15 LDPC operation 15

9.16 STBC operation 15

9.17 Short GI operation 15

9.18 Greenfield operation 15

9.19 Operation across regulatory domains 15

9.20 HCF 15

9.21 Mesh coordination function (MCF) 15

9.22 Block acknowledgement (block ack) 15

9.23 No Acknowledgement (No Ack) 15

9.24 Protection mechanisms 16

9.25 MAC frame processing 16

9.26 Reverse direction protocol 16

9.27 PSMP Operation 16

9.28 Sounding PPDUs 16

9.29 Link adaptation 16

9.30 Transmit beamforming 16

9.31 Antenna selection (ASEL) 16

9.32 Null data packet (NDP) sounding 16

9.33 Mesh forwarding framework 16

9.34 DMG channel access 16

9.35 DMG AP or PCP clustering 16

9.36 DMG beamforming 16

9.37 DMG block ack with flow control 16

9.38 DMG link adaptation 16

9.39 DMG dynamic tone pairing (DTP) 16

9.40 DMG relay operation 16

10 MLME 16

11 Security 16

12 Fast BSS transition 17

13 MLME Mesh procedures 17

13.1 Mesh STA dependencies 17

13.2 Mesh discovery 17

13.3 Mesh peering management (MPM) 17

13.4 Mesh peering management finite state machine (MPM FSM) 17

13.5 Authenticated mesh peering exchange (AMPE) 17

13.6 Mesh group key handshake 17

13.7 Mesh security 17

13.8 Mesh path selection and metric framework 17

13.9 Airtime link metric 17

13.10 Hybrid wireless mesh protocol (HWMP) 17

13.11 Interworking with the DS 17

13.11.1 Overview of interworking between a mesh BSS and a DS 17

13.11.2 Gate announcement (GANN) 17

13.11.3 Data forwarding at proxy mesh gates 17

13.11.4 Proxy information and proxy update 17

13.11.5 Mesh STA collocation 17

13.12 Intra-mesh congestion control 18

13.13 Synchronization and beaconing in MBSSs 18

13.14 Power save in mesh BSS 18

14 Frequency-Hopping spread spectrum (FHSS) PHY specification for the 2.4 GHz industrial, scientific, and medical (ISM) band 18

15 Infrared (IR) PHY specification 18

16 DSSS PHY specification for the 2.4 GHz band designated for ISM applications 18

17 High rate direct sequence spread spectrum (HR/DSSS) PHY specification 18

18 Orthogonal frequency division multiplexing (OFDM) PHY specification 18

19 Extended Rat PHY (ERP) specification 18

20 High Throughput (HT) PHY specification 18

21 Directional multi-gigabit (DMG) PHY specification 18

Annex A, Bibliography 18

Annex B, Protocol Implementation Conformance Statement (PICS) 19

Annex C, ASN.1 encoding of the MAC and PHY MIB 19

… 19

NOTE — The editing instructions contained in this amendment define how to merge the material contained therein into the existing base standard and its amendments to form the comprehensive standard.

The editing instructions are shown in ***bold italic***. Four editing instructions are used: ***change***, ***delete***, ***insert***, and ***replace***. Change is used to make corrections in existing text or tables. The editing instructions specify the location of the change and describe what is being changed by using ~~strike through~~ (to remove old material) and underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make changes in figures or equations by removing the existing figure or equation and replacing it with a new one. Editorial notes will not be carried over into future editions because the changes will be incorporated into the base standard.

# Introduction

***This section will not be included when P802.11ak is rolled into the base standard.)***

IEEE Std 802.11 was originally designed with the assumption that non-AP non-mesh STAs would be leaf nodes of the network. This amendment extends the 802.11 standard so that communication between STAs can be used as a transit link inside a general network conformant to IEEE Std 802.1Q.

Areas of extension are as follows:

1. Use of EPD, as opposed to LPD, in all MSDUs between GLK STAs
2. Facilities for a GLK AP to send a multi-destination MSPU to an arbitrary subset of its associated GLK STAs
3. Facilities for different associated GLK STAs to see multi-destination MSDU from a GLK AP with different infix information after the initial addresses and before the payload

# Overview

# Normative references

# Definitions, acronyms, and abbreviations

## Definitions

## Definitions specific to IEEE 802.11

## Abbreviations and acronyms

***Insert the following acronyms (maintaining alphabetical order):***

CB Control Block

CBA-MDSU Control Block Aggregated MSDU

CBA-MPDU Control Block Aggregated MPDU

SEI-CB Subsetting Exclusion and Infix CB

SII-CB Subsetting Inclusion and Infix CB

# General Description

## General description of the architecture

## How wireless local area networks (WLANs) are different

## Components of the IEEE Std 802.11 architecture

### 4.3.12 STA transmission of Data frames outside the context of a BSS

Change 4.3.20 as follows:

### 4.3.20 General Link (GLK)

GLK STAs are extensions of non-GLK STAs such that a link between two GLK STAs is suitable, insofar as the capabilities of 802.11 wireless permit, to be used as transit links in the interior of an IEEE Std 802.1Q network. All non-GLK STAs use LPD and interpret Priority Code Points according to IEEE Std 802.1D while all GLK STAs use EPD and interpret Priority Code Points according to IEEE Std 802.1Q.

#### 4.3.20.1 GLK STA identification and general capabilities

Every STA is either a GLK STA or a non-GLK STA. A GLK STA is a QoS STA and an HT STA. GLK STAs advertise themselves as such and provide further information on their capabilities through the use of the GLK Capabilities and GLK SSIDs elements in Beacons and other appropriate MPDUs. A GLK STA uses EPD MSDUs while a non-GLK STA uses LPD MSDUs.

A GLK AP assures that non-GLK STAs will not try to associate with it by using the wildcard SSID and advertising its actual SSID in the GLK Capabilities Element. Should a non-GLK STA attempt to associate with a GLK AP, the GLK AP will refuse the association.

A GLK STA shall not attempt to form an infrastructure, IBSS, or PBSS association or mesh peering with any non-GLK STA.

#### 4.3.20.2 GLK MSPDU addressing

GLK STAs support the 4-address format.

#### 4.3.20.3 CBA-MSDU Subsetting and Infix

GLK STAs support communication with Control Block (CB) Aggreagated MSDUs (CBA-MSDUs) including support of SEI-CB and SII-CB. This permits the inclusion of additional information with an A-MSDU that determines which receivers of a group addressed A-MSDU should accept that frame and provides for different receivers to receive the A-MSDU subframes with different infix data after the initial subframe address information and before the remainder of the subframe payload.

## Logical service interfaces

## Overview of the services

## Multiple logical address spaces

## Differences among ESS, PBSS, and IBSS LANs

## Differences between ESS and MBSS LANs

## Reference model

## IEEE Std 802.11 and IEEE Std 802.1X-2010

## Generic advertisement service (GAS)

# MAC service definition

## Overview of MAC services

## MAC data service specification

# Layer management

# PHY service specification

# Frame formats

## General requirements

## MAC frame formats

### Basic components

### Conventions

### General frame format

### Frame fields

#### 8.2.4.1.4 To DS and From DS fields

***Change the last row in Table 8-4 – To/From DS combination in Data frames***

|  |  |
| --- | --- |
| To DS = 1From DS = 1 | A Data frame using the four-address MAC header format. This standard defines procedures for using this combination of field values only in a mesh BSS or by a GLK STA.This is the only valid combination for individually addressed Data frames transmitted by a mesh STA. |

### Duration/ID field (QoS STA)

## Format of individual frame types

### Control frames

### Data frames

#### Data frame format

***Change text as follows:***

When a Data frame sent by a non-GLK STA carries an A-MSDU, the DA and SA values related to each MSDU carried by the A-MSDU are carried within the A-MSDU. One or both of these fields may also be present in the Address 1 and Address 2 fields as indicated in Table 8-23 (Address field contents).

NOTE 2—If a DA or SA value also appears in any of these address fields in a Data frame sent by a non-GLK STA, the value is necessarily the same for all MSDUs within the A-MSDU because this is guaranteed by the To DS and From DS field settings.

***Change text as follows:***

An A-MSDU contains only MSDUs whose DA and SA parameter values map to the same receiver address (RA) and transmitter address (TA) values, i.e., all the MSDUs are intended to be received by a single receiver if individually addressed and the same set of receivers if group addressed, and necessarily they are all transmitted by the same transmitter. The rules for determining RA and TA are independent of whether the frame body carries an A-MSDU.

#### Aggregate MSDU (A-MSDU) format

***Insert the following new clause 8.3.2.3:***

#### Control Block (CB) A-MSDU (CBA-MSDU) format

A CBA-MSDU is a sequence of Control Blocks (CBs) followed by 0 to 3 octets of padding followed by an A-MSDU as shown in Figure 8-48a (CBA-MSDU structure).

CB 1

 **Figure 8-48a – CBA-MSDU structure**

CB 2

CB n

Padding

•••

A-MSDU

 2 - 1025 2 - 1025 2 - 1025 0 - 3

The CBs influence handling of the CBA-MSDU at a receiving STA. Each CB consists of from 2 to 1025 octets beginning with a 2-octet header as shown in Figure 8-48b (CB header structure).

CB type

CB end

CB critical

CB data length

B0 B3 B4 B5 B6 B15

Bits: 4 1 1 10

 **Figure 8-48b – CB header structure**

The CB data length is an unsigned 10-bit value giving the number of octets of data in the CB after the CB header.

The CB type is a 4-bit field that, in conjunction with the CB data, specifies the effect of the CB at a receiver of the CBA-MSDU. CB types 1, 2, and 15 are specified in clauses 8.3.2.3.2 through 8.3.2.3.4. CB types 0 and 3 through 14 are reserved for future specification. If more than one CB of type 1 or 2 occurs in a CBA-MSDU, a receiving STA shall discard that CBA-MSDU.

If the CB end bit is zero, the CB is the last CB in that CBA-MSDU and is followed by padding and then the A-MSDU. If the CB end bit is one, another CB immediately follows the CB with no intervening padding octets.

If a receiving STA implements the CB type, the CB critical bit has no effect at that STA. If a receiving STA does not implement the CB type and the CB critical bit is zero, that STA ignores that CB. If a receiving STA does not implement the CB type and the CB critical bit is one, that STA discards the CBA-MSDU.

#### 8.3.2.3.1 Infix Data

Infix data means a sequence of octets that occurs after MSDU prefix addressing information and before the remaining MSDU payload. It is commonly, but not necessarily, a sequence of one or more IEEE 802.1 “tags”.

#### 8.3.2.3.2 Subsetting Exclusion and Infix CB (SEI-CB)

The Subsetting Exclusion and Infix CB (SEI-CB) is CB type 1. It provides facilities (1) to cause a group addressed CBA-MSDU to be accepted by a subset of the receiving STAs and (2) to enable infix data that would otherwise occur at the beginning of all the CBA-MSDU A-MSDU subframes to appear only once in the SEI-CB.

The CB data of an SEI-CB is a 1-octet Infix Data length followed by Infix Data and a sequence of AIDs, as shown in Figure 48c (SEI-CB structure). The Infix Data length is the number of octets of Infix Data.

Octets: 1 0 - 255 2 2 2

Infix Data length

Infix Data

AID 1

 **Figure 8-48c – SEI-CB structure**

AID 2

•••

AID n

Deducting 1 plus the Infix Data length from the CB Data length of the SEI-CB determines the length of the list of AIDs. If the CB data length is less than 1 plus the Infix Data length and the CB critical bit is zero, the SEI-CB is ignored. If the CB data length is less than 1 plus the Infix Data length and the CB critical bit is one, the CBA-MSDU is discarded.

A STA receiving a CBA-MSDU on an association whose AID appears in the SEI-CB in that CBA-MSDU discard the CBA-MSDU. A STA receiving a CBA-MSDU on an association whose AID does not so appear accepts the CBA-MSDU and processes the enclose A-MSDU subframes with the Infix Data provided in the SEI-CB inserted after the initial address fields of each A-MSDU subframe.

#### 8.3.2.3.3 Subsetting Inclusion and Infix CB (SII-CB)

The Subsetting Inclusion and Infix CB (SII-CB) is CB type 2. It provides facilities (1) to cause a group addressed CBA-MSDU to be accepted by a subset of the receiving STAs and (2) to enable the CBA-MSDU A-MSDU subframes to be processed by different receiving STAs with different Infix Data.

The CB data of an SII-CB is one octet of length information for Infix Data prefix and Infix Data suffix followed by the Infix Data prefix and suffix and a sequence of AID items, as shown in Figure 48d (SII-CB structure). The Infix Data prefix and suffix lengths are the number of octets of Infix data prefix and suffix, respectively.

Octets: 1 0 - 15 0-15 3-18 3-18 3-18

Infix Data prefix and suffix lengths

Infix Data prefix

AID Item 1

 **Figure 8-48d – SII-CB structure**

AID Item 2

•••

AID Item n

Infix Data suffix

The Infix Data prefix and suffix lengths octet is as shown in Figure 8-48e (Infix Data prefix and suffix lengths structure).

Bits: 4 4

Infix Data prefix length

Infix Data suffix length

 B0 B3 B4 B7

 **Figure 8-48e – Infix Data prefix and suffix lengths structure**

Each AID Item consists of an AID followed by a control octet and optionally by local Infix Data as shown in Figure 8-48f (AID Item structure).

Octets: 2 1 0-15

AID

AID Item control

Local Infix Data

 **Figure 8-48f – AID Item structure**

The Infix Data local length field in the AID Item control octet gives the length of the local Infix Data in octets. The AID Item control octet is as shown in Figure 8-48g (AID Item control octet structure).

Include prefix

Include suffix

Reserved

Infix Data local length

 B0 B1 B2 B3 B4 B7

Bits: 1 1 2 4

 **Figure 8-48g – AID Item control octet structure**

The CB data length with 1 and the Infix Data prefix and suffix lengths decuted determines the length of the AID Item list.

A STA receiving a CBA-MSDU on an association whose AID does not appear in an AID Item in the SII-CB in that CBA-MSDU discards the CBA-MSDU. A STA receiving a CBA-MSDU on an association whose AID appears in an AID Item in the SII-CB in that CBA-MSDU accepts the CBA-MSDU and processes the enclose A-MSDU subframes with Infix Data determined as follows: the local Prefix Data from the AID Item for the receiving STA is augmented by the Infix Data prefix if the Include prefix flag is on in the AID control octet and by the Infix Data suffix if the Include suffix flag is on in the AID control octet. The resulting Infix Data is inserted after the initial address fields of each A-MSDU subframe as processed by that receving STA.

#### 8.3.2.3.4 Vendor Specific CB

The Vendor Specific CB is CB type 15.

The CB data field of the Vendor Specific CB starts with a 3 octet OUI. The meaning of any additional CB data and the effect of the Vendor Specific CB are specified by the organization to which the OUI is assigned. If the CB data length is less than 3 and the CB critical bit is zero, the CB is ignored. If the CB data length is less than 3 and the CB critical bit is one, the CBA-MSDU is dropped.

NOTE: It is recommended that the OUI be followed by a sub-type field and a version field to accommodate multiple and evolving uses under one OUI.

### Management frames

### Extension frames

## Management and Extension frame body components

### Fields that are not elements

### Elements

### Information Subelements

### Access network query protocol (ANQP) elements

## Fields used in Management and Extension frame bodies and Control frames

## Action frame format details

## Aggregate MPDU (A-MPDU)

# MAC sublayer functional description

## Introduction

## MAC architecture

### General

### DCF

### PCF

### Hybrid coordination function (HCF)

### Mesh coordination function (MCF)

### Combined use of DCF, PCF, and HCF

### MAC data service

## DCF

## PCF

## Fragmentation

## Defragmentation

## Multirate support

## MSDU transmission restrictions

## HT Control field operation

## Control Wrapper operation

## A-MSDU operation

## A-MPDU operation

## PPDU duration constraint

## DMG A-PPDU operation

## LDPC operation

## STBC operation

## Short GI operation

## Greenfield operation

## Operation across regulatory domains

## HCF

## Mesh coordination function (MCF)

## Block acknowledgement (block ack)

## No Acknowledgement (No Ack)

## Protection mechanisms

## MAC frame processing

## Reverse direction protocol

## PSMP Operation

## Sounding PPDUs

## Link adaptation

## Transmit beamforming

## Antenna selection (ASEL)

## Null data packet (NDP) sounding

## Mesh forwarding framework

## DMG channel access

## DMG AP or PCP clustering

## DMG beamforming

## DMG block ack with flow control

## DMG link adaptation

## DMG dynamic tone pairing (DTP)

## DMG relay operation

# MLME

# Security

# Fast BSS transition

# MLME Mesh procedures

## Mesh STA dependencies

## Mesh discovery

## Mesh peering management (MPM)

## Mesh peering management finite state machine (MPM FSM)

## Authenticated mesh peering exchange (AMPE)

## Mesh group key handshake

## Mesh security

## Mesh path selection and metric framework

## Airtime link metric

## Hybrid wireless mesh protocol (HWMP)

## Interworking with the DS

### Overview of interworking between a mesh BSS and a DS

### Gate announcement (GANN)

### Data forwarding at proxy mesh gates

### Proxy information and proxy update

### Mesh STA collocation

## Intra-mesh congestion control

## Synchronization and beaconing in MBSSs

## Power save in mesh BSS

# Frequency-Hopping spread spectrum (FHSS) PHY specification for the 2.4 GHz industrial, scientific, and medical (ISM) band

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# DSSS PHY specification for the 2.4 GHz band designated for ISM applications

# High rate direct sequence spread spectrum (HR/DSSS) PHY specification

# Orthogonal frequency division multiplexing (OFDM) PHY specification

# Extended Rat PHY (ERP) specification

# High Throughput (HT) PHY specification

# Directional multi-gigabit (DMG) PHY specification

# Annex A, Bibliography

# Annex B, Protocol Implementation Conformance Statement (PICS)

Need to do something about the PICS.

# Annex C, ASN.1 encoding of the MAC and PHY MIB

Need to do something about the MIB.

# …