### IEEE P802.11Wireless LANs

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| Proposed Draft Specification |
| Date: 2017-11-27 |
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Abstract

We propose the draft specification skeleton to help the creation of TGba draft 0.1.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Updated WUR PHY structure and added basic WUR PHY parameters
* Rev 2: Added initial title page and updated the timing related constants table

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGba 0.1 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGba D0.1 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGba Editor: Editing instructions preceded by “TGba Editor” are instructions to the TGba editor to modify existing material in the TGba draft. As a result of adopting the changes, the TGba editor will execute the instructions rather than copy them to the TGba Draft.***

**Discussion:** *None.*

**Propose:**

* Definitions, acronyms, and abbreviations
* Definitions specific to IEEE 802.11

***TGba editor: Insert the following definitions (maintaining alphabetical order):***

primary connectivity radio (PCR): A radio with the capability to transmit and receive 20 MHz non-HT PPDU.

wake-up radio (WUR): A companion radio to a primary connectivity radio with the capability to transmit or receive WUR PPDU.

wake-up receiver (WURx): A companion receiver to a primary connectivity radio with the capability to receive WUR PPDU.

wake-up radio (WUR) physical layer (PHY) protocol data unit (PPDU): A PPDU transmitted with the TXVECTOR parameter FORMAT equal to WUR.

* Abbreviations and acronyms

***TGba editor: Insert the following acronym definitions (maintaining alphabetical order):***

OOK on-off keying

PCR primary connectivity radio

TD type dependent

WUR wake-up radio

WURx wake-up receiver

* General description
* Components of the IEEE Std 802.11 architecture

***TGba editor: Insert a new subclause after subclause 4.3.15 as follows:***

* Wake-up radio (WUR) STA

The main PHY features in a WUR STA are the following:

* <Texts to be filled>

The main MAC features in a WUR STA are the following:

* <Texts to be filled>

A WUR non-AP STA can receive a wake-up frame from a WUR AP STA to trigger a transition of the corresponding primary connectivity radio to the awake state.

* Frame formats
* General requirements

***TGba editor: Change the paragraph as follows:***

The format of the MAC frames is specified in this clause. WUR frame format is defined in Subclause 9.10, and other MAC frame formats are defined in Subclauses 9.2 to 9.9. A STA shall be able to properly construct a subset of the frames specified in this clause for transmission and to decode a (potentially different) subset of the frames specified in this clause upon validation following reception. The particular subset of these frames that a STA constructs and decodes is determined by the functions supported by that particular STA. A STA shall be able to validate every received frame using the frame check sequence (FCS) and to interpret certain fields from the MAC headers of all frames.

A STA shall transmit frames using only the frame formats described in Clause 9.

* Management and Extension frame body components
* Fields that are not elements
* Action field

<Texts to be modified>

* Elements

***TGba editor: Insert the following new subclauses after the last subclause in 9.4.2:***

* WUR Mode element

<Texts to be filled>

* WUR Capabilities element

<Texts to be filled>

* Action frame format details

***TGba editor: Insert the following new subclause after the last subclause in 9.6:***

* WUR Action details

<Texts to be filled>

***TGba editor: Insert the following new subclause after the last subclause in 9:***

* WUR frame formats

<Texts to be filled>

***TGba editor: Insert new Clauses 31 and 32 following Clause 30 as follows:***

* Wake-Up Radio (WUR) MAC specification
* Introduction

<Texts to be filled>

* Channel access

<Texts to be filled>

* Maintaining synchronization

<Texts to be filled>

* WURx duty cycle operation

<Texts to be filled>

* Power management with WUR mode

<Texts to be filled>

* Wake-up operation

<Texts to be filled>

* Wake-Up Radio (WUR) PHY specification
* Introduction

<Texts to be filled>

* WUR PHY service interface

<Texts to be filled>

* WUR PHY
* Introduction

<Texts to be filled>

* WUR PPDU format

<Texts to be filled>

* Transmitter block diagram

<Texts to be filled>

* Overview of the PPDU encoding process

<Texts to be filled>

* WUR modulation and coding schemes (WUR-MCSs)

<Texts to be filled>

* Timing related parameters

Table 32-1 (Timing-related constants) defines the timing-related parameters for WUR PPDU formats.

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| * Timing-related constants
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| Parameter | Value | Description |
|  | 312.5 kHz | Subcarrier frequency spacing for WUR PPDU |
| *TDFT,*WUR | 3.2 µs | IDFT/DFT period for the WUR PPDU |
| *TGI,*WUR | 0.8 µs | Guard interval duration for the WUR PPDU |
| *TGI,*L-LTF | 1.6 µs | Guard interval duration for the L-LTF field |
| *TSYM0,ON* | 4 µs | ON duration of WUR MCS0 OOK symbol in WUR Data field |
| *TSYM0,OFF* | 4 µs | OFF duration of WUR MCS0 OOK symbol in WUR Data field |
| *TSYM0* | 4 µs = *TSYM0,ON* = *TSYM0,OFF*  | Duration of WUR MCS0 OOK symbol in WUR Data field |
| *TSYM1,ON* | 2 µs | ON duration of WUR MCS1 OOK symbol in WUR Data field |
| *TSYM1,OFF* | 2 µs | OFF duration of WUR MCS1 OOK symbol in WUR Data field |
| *TSYM1* | 2 µs = *TSYM1,ON* = *TSYM1,OFF*  | Duration of WUR MCS1 OOK symbol in WUR Data field |
| *TSYM* | *TSYM0* or *TSYM1* depending on WUR MCS | Duration of OOK symbol in WUR Data field |
| *TSYNC* | TBD | Duration of OOK symbol in WUR SYNC field |
| *T*L-STF | 8 µs = 10 × *TDFT,*WUR /4 | Non-HT Short Training field duration |
| *T*L-LTF | 8 µs = 2 × *TDFT,*WUR + *TGI,*L-LTF | Non-HT Long Training field duration |
| *T*L-SIG | 4 µs | Non-HT SIGNAL field duration |
| *T*WUR-MARK | 4 µs | WUR MARK field duration |
| *T*WUR-SYNC0 | 128 µs | WUR SYNC field duration for WUR MCS0 |
| *T*WUR-SYNC1 | 64 µs | WUR SYNC field duration for WUR MCS1 |

Table 32-2 (Frequently used parameters) defines parameters used frequently in Clause 32 (Wake-Up Radio (WUR) PHY specification).

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| * Frequently used parameters
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| Symbol | Explanation |
| *NSPDB* | Number of OOK symbols per data bit.For WUR MCS0, *NSPDB* =4. For WUR MCS1, *NSPDB* =2. |
| *NSPCB* | Number of OOK symbols per encoded bit. *NSPCB* =1. |
| *NCBPDB* | Number of coded bits per data bit.For WUR MCS0, *NCBPDB* =4.For WUR MCS1, *NCBPDB* =2. |
| *NTX* | Number of transmit chains |
| *NWUR-SYNC* | Number of OOK symbols in the WUR SYNC field  |

* Mathematical description of signals

<Texts to be filled>

* WUR preamble
* Introduction

<Texts to be filled>

* Non-WUR portion of WUR format preamble

<Texts to be filled>

* WUR SYNC field

<Texts to be filled>

* WUR Data field

<Texts to be filled>

* WUR transmit specification

<Texts to be filled>

* WUR receiver specification

<Texts to be filled>

* WUR transmit procedure

<Texts to be filled>

* WUR receive procedure

<Texts to be filled>

* WUR PLME

<Texts to be filled>

* Parameters for WUR-MCSs

<Texts to be filled>