IEEE P802.11
Wireless LANs

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| PDT Downlink Waveform Generation |
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Abstract

This document contains Proposed Draft Text (PDT) for the downlink waveform generation of the TGbp (AMP, Ambient Power) amendment to the 802.11 standard.

# Revision information

The following is a summary of the important changes that occurred within each revision of this document:

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| **Revision** | **Major changes** |
| 0 | Initial revision |
| 1 | Change the term Single Carrier (SC) to Contineous Wave (CW) to avoid confusion with DSSS and DMG; update author list with affiliation and email address |
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# Introduction

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 TGbp Draft. The abstract, revision information, introduction, explanation of the proposed changes, and references sections are not part of the adopted material.

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

## Explanation of the proposed changes:

The proposed changes to the 802.11 TGbp draft within this document are based on the following motions adopted by the TGbp task group.

### Relevant passing motions:

[Motion #30, [1]]

* The (3dB) bandwidth of the AMP DL PPDU in 2.4 GHz is at least 10 MHz for backscattering communication. The transmit spectrum mask is TBD.

[Motion #39, [1]]

* The carrier waveform for AMP Downlink PPDU is constructed by repeating one predefined base waveform of TBD micro-second, and additional pseudo-random phase is applied to each base waveform
* The base waveform definition is TBD
* Note:
	+ The SYNC and Data fields are OOK modulated on the carrier waveform
	+ The Excitation field is not OOK modulated.

[Motion #70, [1]]

* The SYNC, Data field and Excitation field of 11bp DL PPDU use OFDM symbol as base carrier waveform for OOK modulated AMP communication?

[Motion #71, [1]]

* The base OFDM symbol is defined as 4us OFDM symbol, and generated by performing 64-point IFFT of the predefined sequence and pre-append the last 0.8us waveform as the cyclic prefix?

[Motion #94, [1]]

* 11bp recommend single carrier wave as WPT waveform in Sub-1GHz.

[Motion #98, [1]]

* The SYNC, Data field and Excitation field of 11bp AMP-S1G Downlink PPDU and AMP-S1G Uplink PPDU use single carrier wave as base carrier waveform for OOK modulated AMP communication

# Text to be adopted begins here:

***TGbp editor: Please add the following new subclauses for AMP DL carrier waveform to the 802.11bp draft D0.1:***

# 40. Ambient Power (AMP) PHY specification

## 40.3 AMP PHY (2.4GHz)

### 40.3.3 Transmitter block diagram

### AMP DL carrier wave generation

AMP DL carrier waveform is used by an AMP STA to modulate the OOK signal of the AMP SYNC and AMP Data subfields of the AMP DL PPDU. AMP DL carrier waveform is also used for the Excitation subfield(s) of the AMP DL PPDU, which is not OOK modulated.

The carrier waveform for AMP DL PPDU is constructed by repeating one base 4us OFDM symbol, and applying pseudo-random phase to each symbol. The base OFDM symbol is generated by performing 64-point IFFT of TBD loaded tones and pre-append the last 0.8us waveform as the cyclic prefix.

## 40.4 AMP PHY (sub-1 GHz)

### 40.4.3 Transmitter block diagram

### 40.4.3.1 AMP DL carrier wave generation

A continuous wave (CW) is a sinusoidal wave of constant amplitude and frequency. In Sub-1 GHz mono-static backscattering, the CW waveform is used by an AMP STA to modulate the OOK signal of the AMP SYNC subfield and Data subfield of the AMP DL PPDU. The CW waveform is also used for the Excitation subfield(s) of the AMP DL PPDU which is not OOK modulated.

### 40.4.3.2 Recommendation for WPT carrier wave generation

For WPT in Sub-1 GHz, the CW wavefrom is the recommended waveform.

# Text to be adopted ends here.

**References:**

1. [11-24-1322r9](https://mentor.ieee.org/802.11/dcn/24/11-24-1322-09-00bp-tgbp-motion-dock.pptx): TGbp Motion Dock, Bo Sun (Sanechips)