### **IEEE P802.11Wireless LANs**

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| PDT AMP Downlink Synchronization Field |
| Date: 2025-9-12 |
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**Introduction**

This document provides proposed draft text for IEEE 802.11bp draft.

The following Motions apply to this PDT:

* **PM-10**: The AMP-Sync field in AMP Downlink PPDU in 2.4 GHz is defined with chip duration of 2µs for backscattering case.

[Motion #18, [1] and [10]]

* **PM-18**: IEEE 802.11bp defines at least one AMP-Sync in the AMP Downlink PPDU in 2.4 GHz for backscatter communication, and at least one AMP-Sync in the AMP Downlink PPDU in 2.4 GHz for non-backscatter communication. The AMP-Sync is independent of the integrated and non-integrated deployment.

[Motion #33, [1] and [26]]

* **PM-21**:
	+ 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 #39, [1], [40], [41], [42] and [43]]

* **PM-25**:
	+ IEEE 802.11bp defines 4 base sequences used for AMP DL/UL SYNC field in 2.4GHz frequency band.
		- 1 base sequences, S1, for DL non-backscatter SYNC field.  S1 and a function of S1, are used for different DL data rate.
		- 1 sequence, S2,  for DL backscatter SYNC field.
		- 1 base sequence, S3, for UL active transmission SYNC field.
		- 1 sequence, S4, for UL backscatter SYNC field.
		- Detailed SYNC sequence designs are TBD
	+ Besides the above 4 base sequences, the need of additional sequence S5 is TBD if mono-static and bi-static backscattering UL SYNC field design is different.

[Motion #69, [1] and [69]]

* **PM-26**:
	+ The SYNC, Data field and Excitation field of 11bp DL PPDU use OFDM symbol as base carrier waveform for OOK modulated AMP communication.

[Motion #70, [1], [41], [42] and [70]]

* **PM-30**: IEEE 802.11bp will specify, in 2.4 GHz, DL synchronization sequence with the same chip duration for all data rates for non-backscatter case.

[Motion #76, [1] and [76]]

* **PM-39**: The AMP DL SYNC for backscattering without frequency shift shall differentiate the operating band of sub-1GHz or 2.4GHz.

[Motion #89, [1] and [91]]

* **PM-40**: The Chip Duration of the Downlink Sync Field Transmitted in 2.4 GHz to a non-Backscatter STA shall be 2 µs.

[Motion #90, [1] and [92]]

* **PM-41**:
* The Downlink Sync Field Transmitted in 2.4 GHz to a non-Backscatter STA shall use a Sequence of Chips $W$ to indicate a data rate of 250 kb/s and a Sequence of Chips $\overbar{w}$ to indicate a data rate of 1 Mb/s.
* Note, $\overbar{W}$ is the Logical Complement of $W$.

[Motion #91, [1] and [92]]

* **PM-42**: The Downlink Sync Field transmitted in 2.4 GHz to a non-Backscatter STA consists of two Segments
	+ The first Segment is a Chip Sequence designed to support Sync Field Detection and Timing alignment.
	+ The second Segment is a “Special Segment” which is designed to reduce the False Alarm rate.

[Motion #92, [1] and [93]]

* **PM-43**: The AMP-Sync field of the AMP DL PPDU for non-backscatter STAs in 2.4 GHz, shall support both the correlation-based Sync field detector and the differential decoder Sync field detector.

[Motion #93, [1], [94] and [95]]

***TGbp editor: Please add the following subclause 40.3.8.2.2:***

**40.3.8.2.2 AMP DL synchronization field**

The AMP-Sync field use OFDM symbol as carrier waveform (see 40.3.3.1) and shall be constructed as an OOK signal.

For the non-backscatter mode, the AMP-Sync field consists of two segments: NAMETBD1 and NAMETBD2. The NAMETBD1 is a binary sequence used by the receiver for PPDU detection, symbol timing recovery and determination of the data rate. The NAMETBD2 is to reduce false alarm rate. For 250kbps data rate, the NAMETBD1 is constructed by the TBD-bit sequence W, where each bit in the sequence is mapped to an OOK symbol of duration 2 µs. For 1Mbps data rate, the NAMETBD1 is constructed by the logical complement of W, where each bit in the sequence is mapped to an OOK symbol of duration 2 µs. Figure 40-TBD1 shows the AMP-Sync field format.

**Figure 40-TBD1 – AMP-Sync field format**

NAMETBD1

NAMETBD2

For the backscatter mode, the AMP-Sync field consists one segment: NAMETBD3. The NAMETBD3 is a binary sequence used by the receiver for PPDU detection and symbol timing recovery. The NAMETBD3 is constructed by the TBD-bit sequence NAMETBD3, where each bit in the sequence is mapped to an OOK symbol of duration 2 µs. The DL AMP-Sync field for backscatter mode without frequency shift shall differentiate the operating band of sub-1GHz or 2.4GHz (how to differentiate is TBD).