IEEE P802.11
Wireless LANs

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| Proposed Spec Text for Phase Rotation |
| Date: 2018-09-10 |
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Abstract

This submission proposes spec text for phase rotation in a FDMA transmission to be added into D1.0 of 802.11ba

Revisions:

* Rev 0: Initial version of the document.

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 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGba 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.***

**TGba Editor: *Please modify the text in section 32.2.4.8 (Construction of the WUR-Sync and WUR-Data for the FDMA transmission) of 11ba draft 1.0:***

32.2.4.8 Construction of the WUR-Sync and WUR-Data for the FDMA transmission

Construct the WUR-Sync and WUR-Data waveform for the FDMA transmission as follows:

1. Determine the WUR\_DATARATE from the WUR\_TXVECTOR for each 20MHz sub-channel.
2. Sync-bit sequence generation and Manchester based encoder for each 20MHz sub-channel: Generate the Sync-bit sequence according to the WUR\_DATARATE as described in 32.2.8.3 (WUR SYNC field)and Manchester encoded bits which follow the Sync-bit sequence according to the input bits as described in 32.2.9 (WUR-Data field) for each 20MHz sub-channel.
3. Waveform generation for the WUR-Sync field: Generate the MC-OOK waveform for the WUR-Sync field by using either HDR On-WG or Off-WG according to the Sync-bit for each 20MHz sub-channel. Each Sync-bit duration, T*Sync* is 2 μs.
4. Waveform generation for the WUR-Data field: The output of the *k*th Manchester based encoder determines which samples to take either from the *k*th HDR On-WG or LDR On-WG of corresponding 20 MHz sub-channel or from Off-WG, depending on the WUR\_BANDWIDTH and the WUR\_DATARATE, where *k* (0, 1, …, *K*-1) is the index of the 20 MHz sub-channel. The samples in Off-WG have zero energy. Each symbol duration, *TSym* is 2 μs for high data rate (*TSYM-HDR*) and 4 μs for low data rate (*TSYM-LDR*).
5. Phase rotation: Apply appropriate phase rotation for each 20MHz sub-channel as described in 32.2.7 (Mathematical description of signals).
6. f) Append the padding on non-punctured 20MHz sub-channel: If the duration of WUR transmission on any non-punctured 20MHz sub-channel is shorter than L\_LENGTH described in 32.3.1 (TXTIME and PSDU length calculation), the padding is used to align the length indicated by the LENGTH field in the L-SIG, and the padding is not applied to the punctured 20MHz sub-channel.
7. g) CSD: Apply the CSD for each RF chain per each 20 MHz respectively according to the WUR\_DATARATE of each 20 MHz sub-channel.
8. h) The CSD outputs for the same RF chain per each 20 MHz sub-channel are added across the 20 MHz sub-channels, sample by sample.
9. i) Windowing: Apply windowing.
10. j) Analog and RF: Upconvert the resulting complex baseband waveform associated with each transmit chain to an RF signal according to the center frequency of the desired channel and transmit.

**TGba Editor: *Please add the following text to the bottom of section 32.2.7 (Mathematical description of signals) in 11ba draft 1.0:***

For a FDMA PPDU transmission, the time domain waveform of WUR-Sync and WUR-Data can be obtained by taking the Inverse Discrete Fourier Transform (IDFT) as described below.

$\overline{\begin{array}{c}r\_{Sym}^{\left(i\_{TX}\right)}\left(t\right)=\frac{\sqrt{2}}{\sqrt{N\_{Sym}^{Tone}N\_{TX}N\_{20MHz}}}w\_{T\_{Sym}}\left(t\right)\sum\_{i\_{BW}=0, i\_{BW}\in On}^{N\_{20MHz}-1}\sum\_{k=-32}^{31}Υ\_{k-K\_{shift}\left(i\_{BW}\right),BW}X\_{sym}\left(k\right)\\ exp\left(j2π\left(k-K\_{shift}\left(i\_{BW}\right)\right)Δ\_{F, WUR}\left(t-T\_{GI,Sym}-T\_{CS,Sym}^{i\_{TX}}\right)\right)\end{array}}$ (32-a)

where

$\overline{i\_{BW}}$ is the index of the 20MHz sub-channel from 0 to *N*20*MHz* -1.

$\overline{i\_{BW}\in On}$ denotes indices of the 20MHz sub-channels which are composed of On symbol.

$\overline{N\_{20MHz}}$ is defined in 21.3.7.3 (Channel frequencies).

$\overline{Υ\_{k,BW}}$ is defined by Equation (21-15) and Equation (32-b) for 40MHz and 80MHz, respectively.

$\overline{K\_{shift}\left(i\right)=32×\left(N\_{20MHz}-1-2i\right)}$.

For a 80MHz FDMA PPDU transmission,

$\overline{Υ\_{k,80}=\left\{\begin{array}{c}1, \&k<-64\\-1, \&-64\leq k<0\\-1, \&0\leq k<64\\1, \&64\leq k\end{array}\right.}$. (32-b)