IEEE P802.11
Wireless LANs

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| 802.11[802.11az PHY Spec Text for Random LTF Symbol Generation](relative to REVmd D0.5) |
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**Abstract**

This submission proposes P802.11az draft amendment text for the P802.11az PHY spec. The baseline documents that this proposal depends on are:

1. D0.05 of REVmd
2. D3.0 of PIEEE802.11ax
3. D0.3 of PIEEE802.11az

***TGaz Editor: Insert the following subclause after 28.3.17 (HE TB NDP feedback PPDU):***

**28.3.17a Generation of Secure LTF Symbol**

When the TXVECTOR parameter LTF\_SEQUENCE is present, each sounding symbol of the HEz LTF field shall be generated from $4P+3 $input bits denoted by $b\_{i}$ for $i=0, …,4P+2$, which are derived from a corresponding SAC specified in subclause 9.3.1.20. The generation process is shown in Figure 28-aa.

 

Figure 28-aa Generation of Secure LTF Symbol

The number $P$ is 7, 8, 9, and 10 for 20, 40, 80, and 160/80+80 MHz transmissions, respectively. A CSD value $τ\_{CS}$ is given by

$τ\_{CS}=T\_{s}\sum\_{i=0}^{P-1}b\_{i}∙2^{i}$ (28-rr)

where $T\_{s}$ is 50, 25, 12.5, and 6.25 ns for 20, 40, 80, and 160/80+80 MHz transmissions, respectively; the bits $b\_{i}$ for $i=0,…,P-1$ are the first $P$ bits of the $4P+3 $input bits. A sequence of $2^{P}$ 8PSK symbols are generated by $P-1$ iterations. In the $p$-th iteration, two sequences $s\_{1}^{(p)}$ and $s\_{2}^{(p)}$are generated by concatenating two sequences $s\_{1}^{(p-1)}$ and $s\_{2}^{(p-1)}$ that are generated in the ($p-1)$-th iteration as

$s\_{1}^{(p)}=[s\_{1}^{\left(p-1\right)},s\_{2}^{(p-1)} ]$ and (28-ss)

$s\_{2}^{(p)}=[φ\_{p}∙s\_{1}^{\left(p-1\right)},-φ\_{p}∙s\_{2}^{(p-1)} ]$, for $p=1,…,P-1$ (28-tt)

where $[a,b ]$ denotes the concatenation of two sequences $a$and $b$; $c∙d$ denotes the multiplications of a scalar $c$ with each element of sequence $d$; the initial sequences $s\_{1}^{\left(0\right)}$and $s\_{2}^{\left(0\right)}$are two 8PSK symbols and are given by

$s\_{1}^{\left(0\right)}=exp\left(j\frac{π}{4}\sum\_{i=P}^{P+2}b\_{i}∙2^{i-P}\right)$ (28-uu)

$s\_{2}^{\left(0\right)}=exp\left(j\frac{π}{4}\sum\_{i=P+3}^{P+5}b\_{i}∙2^{i-P-3}\right)$ (28-vv)

where $b\_{i}$ is the $i$-th bit of the $4P+3 $input bits. The scalar $φ\_{k}$ in Equation (28-tt) is an 8PSK symbol and is given by

$φ\_{p}=exp\left(j\frac{π}{4}\sum\_{i=P+3p+3}^{P+3p+5}b\_{i}∙2^{i-P-3p-3}\right)$, for $p=1,…, P-1$ (28-ww)

where $b\_{i}$ is the $i$-th bit of the $4P+3 $input bits.

The sequences $s\_{1}^{\left(P-1\right)}$and $s\_{2}^{(P-1)}$ are mapped to the subcarriers that are used by the non-OFDMA HE PPDU transmission defined in subclause 28.3.9. The subcarrier mapping is as the following:

— In a 20 MHz transmission, the mapping is given by:

 TBD

— In a 40 MHz transmission, the mapping is given by:

 TBD

— In an 80 MHz transmission, the mapping is given by:

 TBD

— In a 160/80+80 MHz transmission, the mapping is given by:

 TBD

After the subcarrier mapping, a linear phase shift for a time-domain cyclic shift is applied to each subcarrier. The phase of the $k$-th subcarrier is rotated by $exp\left(j2πk∆\_{F}τ\_{CS}\right)$, where $∆\_{F}=156.25 kHz$ is the subcarrier spacing and $τ\_{CS}$ is given by Equation (28-rr). After the phase shift, the frequency domain signal is transformed to the time domain. A zero power guard interval is added to the transformed time domain signal as a prefix for each LTF symbol.