IEEE P802.11
Wireless LANs

|  |
| --- |
| 11be PDT: Spectral flatness |
| Date: 2020-08-25 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Xiaogang Chen | Intel |  |  | Xiaogang.c.chen@Intel.com |
| WookBong Lee | Samsung |  |  |  |
| Bin Tian | Qualcomm |  |  |  |
| Youhan Kim | Qualcomm |  |  |  |
| Bo Sun | ZTE |  |  |  |

Abstract

This contribution proposes the draft text on transmit spectral mask for TGbe D0.1.

R0: main changes comparing with 11ax include:

* Add spectral flatness in test indices for 320MHz.
* Relax edge tone text requirement to -6dB.

35.3.17.2 Spectral flatness

Spectral flatness measurements shall be conducted using BPSK modulated EHT PPDUs. The EHT PPDUs shall be demodulated using the following (or equivalent) procedure:

* Start of PPDU shall be detected.
* Transition from L-STF to L-LTF shall be detected and fine timing shall be established.
* Coarse and fine frequency offsets shall be estimated.
* Symbols in a PPDU shall be manipulated to account for both frequency error and sampling offset drift.
* For each EHT-LTF symbol, transform the symbol into subcarrier received values, estimate the phase from the pilot subcarriers, and compensate the subcarrier values according to the estimated phase.
* For each of the data OFDM symbols: transform the symbol into subcarrier received values.

The spectral flatness test shall be performed over at least 20 EHT PPDUs. The PPDUs under test shall be at least 16 data OFDM symbols long.

Evaluate spectral flatness using the subcarrier received values or the magnitude of the channel estimation of the occupied subcarriers of the transmission EHT PPDUs. Nonoccupied subcarriers of the transmitted EHT PPDUs shall be ignored during averaging and testing. Resource unit power boosting and beamforming should not be used when measuring spectral flatness.

Let *Ei,avg* denote the magnitude of the channel estimation on subcarrier *i* or the average constellation energy of a BPSK modulated subcarrier *i* in an EHT data symbol. In a contiguous EHT transmission having a bandwidth listed in Table 35-x1 (Maximum transmit spectral flatness deviations), *Ei,avg* of each of the subcarriers with indices listed as tested subcarrier indices shall not deviate by more than the specified maximum deviation in Table 35-x1 (Maximum transmit spectral flatness deviations) from the average of *Ei,avg* over subcarrier indices listed as averaging subcarrier indices. Averaging of *Ei,avg* is done in the linear domain.

|  |
| --- |
| Table 35-x1 Maximum transmit spectral flatness deviations |
| Bandwidth of transmission (MHz) | Averaging subcarrier indices (inclusive) | Tested subcarrier indices (inclusive) | Maximum deviation (dB) |
| 20 | [–84 : –2 , +2 : +84] | [–84 : –2 , +2 : +84] | ±4 |
| [–122 : –85 , +85 : +122] | +4/–6 |
| 40 | [–168 : –3 , +3 : +168] | [–168 : –3 , +3 : +168] | ±4 |
| [–244 : –169 , +169 : +244] | +4/–6 |
| 80 | [–344 : –3 , +3 : +344] |  [–500 : –3, +3 : +500]  | +4/–6 |
| 160 | [–696 : –515, –509 : –166, +166 : +509, +515 : +696] | [–1012 : –515, –509 : –12, +12 : +509, +515 : +1012]  | +4/–6 |
| 320 | [-1720 : -1539, -1533 : -1190, -858 : -515, -509 : -328, +328 : +509, +515 : +858, +1190 : +1533, +1539 : +1720] | [–2036 : –1539, –1533 : –1036, –1012 : –515, –509 : –12, +12 : +509, +515 : +1012, +1036 : +1533, +1539 : +2036, ]  | +4/–6 |
| Note: [*x1*:*y1*, *x2*:*y2*] represents the set of subcarriers with index *k* that satisfies either *x1* ≤ *k* ≤ *y1* or *x2* ≤ *k* ≤*y2* |

In an 80+80 MHz transmission, each segment shall meet the spectral flatness requirement for an 80 MHz transmission. In an 160+160 MHz transmission, each segment shall meet the spectral flatness requirement for an 160 MHz transmission.

For the spectral flatness test, the transmitting STA shall be configured to use a spatial mapping matrix *Qk* (see 35.3.xx (OFDM modulation)) with flat frequency response. Each output port under test of the transmitting STA shall be connected through a cable to one input port of the testing instrumentation. The requirements shall apply to 20 MHz, 40 MHz, 80 MHz, 160 MHz, 320MHz contiguous transmissions as well as 80+80 MHz and 160+160MHz transmissions.