IEEE P802.11  
Wireless LANs

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| Simulation Scenario | | | | |
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Abstract

This document contains the proposed text for 11ax Simulation Scenario document 11-14/0980r16

**Single BSS Scenario**

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| **Parameter** | | **Value** |
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| **Topology** | | |
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| Environment description | An open area with an AP and many STAs. Three different sizes of the area are defined and the STA densities are the same. Three topologies are defined.   1. 10m x 10m area with 20 STAs 2. 20m x 20m area with 80 STAs 3. 30m x 30m area with 180 STAs | |
| APs location | AP is at the center of the area | |
| AP Type | HE AP | |
| STAs location | Place STAs randomly within the area | |
| STAs type | All STAs are HE or all STAs are 11ac VHT | |
| Channel Model | Fading model  TGac channel model D NLOS for all the links. | |
| Penetration Losses | Pathloss model PL(d) = 40.05 + 20\*log10(fc/2.4) + 20\*log10(min(d,5)) + (d>5) \* 35\*log10(d/5) + 18.3\*F^((F+2)/(F+1)-0.46) + 5\*W  d = max(3D distance [m], 1)  fc = frequency [GHz]  F = number of floors traversed  W = number of walls traversed in x-direction plus number of walls traversed in y-direction  Shadowing  Log-normal with 5 dB standard deviation, iid across all links | |
|  | | |
| **PHY parameters** | | |
| Center frequency and BW | Operation Channel: 5GHz with 80 MHz channel | |
| MCS | Use MCS5 or MCS9 for all transmission | |
| GI | Long GI | |
| STA TX power | 15 dBm | |
| AP TX Power | 20 dBm | |
| AP #of TX antennas | 1 | |
| AP #of RX antennas | 1 | |
| STA #of TX antennas | 1 | |
| STA #of RX antennas | 1 | |
|  | | |
| **MAC parameters** | | |
| Access protocol parameters | EDCA with default parameters according to the access category | |
| UDP packet size | 100/1500 bytes | |
| Aggregation | 64 MPDU per AMPDU | |
| Max # of retries | 10 | |
| RTS/CTS Threshold | No RTS/CTS | |
| Association | All STAs are associated to the AP | |

Notes:

* 11ac STAs are randomly assigned as an access category among AC\_VO, AC\_VI, or AC\_BE.
* To trigger UL OFDMA, for each available RU, HE AP selects a STA randomly among all STAs
* Uplink traffic only and STAs use full buffer traffic
* HE STAs are waiting for trigger frames to transmit uplink traffic

Expected Results:

1. UL system throughput and UL 5% percentile throughputs
2. In each topology, comparison of UL throughputs between cases of all HE STAs and all 11ac STAs
3. Throughput comparison among 3 topologies

**Basic Multiple BSS Scenario**

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| --- | --- | --- |
| **Parameter** | | **Value** |
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| **Topology** | | |
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| Environment description | There is an open area with 3 AP. The locations of 3 APs form a regular triangle and the distance between any two APs is 30 meters. 3 topologies are defined.  In each BSS,   1. 13 STAs are within a 15-meter radius circle (39 STAs total) 2. 26 STAs are within a 15-meter radius circle (78 STAs total) 3. 52 STAs are within a 15-meter radius circle (156 STAs total) | |
| APs location | AP is at the center of 15-meter radius circle the circle. Any two APs are separated by 30 meters. | |
| AP Type | HE AP | |
| STAs location | Inside each BSS, place STAs randomly within the circle | |
| STAs type | Inside each BSS, all STAs are HE or all STAs are 11ac VHT | |
| BSS traffic type | 1. 3 BSSs are UL traffic 2. 1 BSS is DL traffic and the other 2 BSSs are UL traffic 3. 2 BSSs are DL traffic and the rest 1 BSS is UL traffic | |
| Channel Model | Fading model  TGac channel model D NLOS for all the links. | |
| Penetration Losses | Pathloss model PL(d) = 40.05 + 20\*log10(fc/2.4) + 20\*log10(min(d,5)) + (d>5) \* 35\*log10(d/5) + 18.3\*F^((F+2)/(F+1)-0.46) + 5\*W  d = max(3D distance [m], 1)  fc = frequency [GHz]  F = number of floors traversed  W = number of walls traversed in x-direction plus number of walls traversed in y-direction  Shadowing  Log-normal with 5 dB standard deviation, iid across all links | |
|  | | |
| **PHY parameters** | | |
| Center frequency and BW | Operation Channel: 5GHz with 80 MHz channel | |
| MCS | Use MCS5 or MCS9 for all UL/DL transmission | |
| GI | Long GI | |
| STA TX power | 15 dBm | |
| AP TX Power | 20 dBm | |
| AP #of TX antennas | 1 | |
| AP #of RX antennas | 1 | |
| STA #of TX antennas | 1 | |
| STA #of RX antennas | 1 | |
|  | | |
| **MAC parameters** | | |
| Access protocol parameters | EDCA with default parameters according to the access category | |
| UDP packet size | 100/1500 bytes | |
| Aggregation | 64 MPDU per AMPDU | |
| Max # of retries | 10 | |
| RTS/CTS Threshold | No RTS/CTS or Enable RTS/CTS | |
| Association | All STAs are associated to the designated AP | |

Notes:

* Inside each BSS, 11ac STAs are randomly assigned as an access category among AC\_VO, AC\_VI, or AC\_BE.
* To trigger UL OFDMA, for each available RU, HE AP selects a STA randomly among all STAs
* For the BSS with UL traffic
  + Uplink traffic only and STAs use full buffer traffic
  + HE STAs are waiting for trigger frames to transmit uplink traffic
* For the BSS with DL traffic
  + AP is the only device competing the medium and uses full buffer traffic
  + STAs only send acknowledgement to AP

Expected Results:

1. UL/DL system throughputs and UL/DL 5% percentile throughputs
2. In each topology, comparison of UL throughputs between cases of all HE STAs and all 11ac STAs
3. Throughput comparison among 3 topologies having the same traffic type
4. For each topology, comparison of the DL throughputs between different neighboring BSS traffic types
   * DL BSS with one DL neighboring BSS and one UL neighboring BSS
   * DL BSS with one two UL neighboring BSSs