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Title	Removal of Subchannel Rotation	
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Source(s)	Sean Cai Mary Chion Yunsong Yang	scai@ztesandiego.com mchion@ztesandiego.com yyang@ztesandiego.com
	ZTE San Diego Inc. 10105 Pacific Heights Blvd. San Diego, CA 92121 USA	
Re:	Response to Sponsor Ballot on IEEE802.16_Cor1_D3 document	
Abstract	In this contribution, we propose to remove subchannel rotation.	
Purpose	To incorporate the text changes proposed in this contribution into the IEEE802.16_Cor1_D4 draft.	
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Removal Of Subchannel Rotation

Sean Cai, Mary Chion, Yunsong Yang
ZTE San Diego Inc.

1. Problem Statement

In the current standard, a rotation scheme is applied for each OFDMA slot-duration in any zone, except zones marked as AAS zone, optional PUSC zone (8.4.6.2.5) or zone using the adjacent-subcarriers permutations (8.4.6.3). On each slot-duration, the rotation scheme is applied to all UL subchannels that belong to the segment (see 8.4.4.5), except those subchannels indicated in the UL-MAP by UIUC = 0, UIUC = 13 or UIUC = 12 or the allocation made by Compact UL-MAP IE for H-ARQ Region allocation (6.3.2.3.43.7.5) or Compact UL-MAP IE for CQICH Region allocation(6.3.2.3.43.7.6).

If a non-HARQ MSS and an HARQ MSS are assigned in the same zone, the non-HARQ MSS will not have the correct information as of which subchannels should be rotated, since it doesn't read HARQ related IEs. As a result, the non-HARQ MSS will choose the wrong subchannels to rotate for its transmission, which could overlap with those for an HARQ MSS even though there is no overlap in the logical allocation. Although, one may avoid this overlap by allocating the non-HARQ MSS and the HARQ MSS in different zones, the overall MAC efficiency will suffer. Given the current PHY mapping of subchannels already provides the benefit of frequency diversity, additional subchannel rotation is unnecessary.

2. Proposed solutions

A straightforward remedy is to remove the section 8.4.6.2.6 Data subchannel rotation scheme.

3. Specific text changes

Remove the entire section 8.4.6.2.6.

[Modify the following text in section 8.4.9.4.4 Example of OFDMA uplink CC encoding]

~~(35,448,+1/0), (35,449,-0.707/+0.707), (35,450,-0.707/-0.707), (35,451,+1/0), (35,512,+1/0), (35,513,-0.707/+0.707), (35,514,-0.707/-0.707), (35,515,-1/0), (35,984,+1/0), (35,985,-0.707/-0.707), (35,986,+0.707/-0.707), (35,987,+1/0), (35,1189,-1/0), (35,1190,-0.707/-0.707), (35,1191,-0.707/-0.707), (35,1192,+1/0), (35,1505,+1/0), (35,1506,+0.707/-0.707), (35,1507,-0.707/+0.707), (35,1508,+1/0), (35,1753,-1/0), (35,1754,-0.707/-0.707), (35,1755,+0.707/-0.707), (35,1756,+1/0), (36,448,-0.707/+0.707), (36,449,+0.707/-0.707), (36,450,+0.707/-0.707), (36,451,+0.707/+0.707), (36,512,+0.707/+0.707), (36,513,-0.707/-0.707), (36,514,-0.707/+0.707), (36,515,+0.707/+0.707), (36,984,-0.707/-0.707), (36,985,+0.707/+0.707), (36,986,+0.707/-0.707), (36,987,-0.707/+0.707), (36,1189,+0.707/+0.707), (36,1190,+0.707/-0.707), (36,1191,-0.707/+0.707), (36,1192,-0.707/-0.707), (36,1505,-0.707/-0.707), (36,1506,-0.707/-0.707), (36,1507,-0.707/-0.707), (36,1508,+0.707/-0.707), (36,1753,-0.707/+0.707), (36,1754,-0.707/-0.707), (36,1755,+0.707/-0.707), (36,1756,+0.707/+0.707), (37,448,+1/0), (37,449,-0.707/-0.707), (37,450,+0.707/-0.707), (37,451,-1/0), (37,512,+1/0), (37,513,-0.707/+0.707), (37,514,+0.707/+0.707), (37,515,+1/0), (37,984,+1/0), (37,985,+0.707/-0.707), (37,986,+0.707/-0.707), (37,987,+1/0), (37,1189,+1/0), (37,1190,+0.707/+0.707), (37,1191,-0.707/-0.707), (37,1192,+1/0), (37,1505,-1/0), (37,1506,-0.707/-0.707)~~

~~+0.707), (37,1507,+0.707/0.707), (37,1508,-1/0), (37,1753,+1/0), (37,1754,-0.707/0.707), (37,1755,-0.707/+0.707), (37,1756,-1/0), (38,232,+1/0), (38,233,+1/0), (38,234,-0.707/+0.707), (38,235,-0.707/+0.707), (38,704,+1/0), (38,705,+1/0), (38,706,-0.707/+0.707), (38,707,-0.707/+0.707), (38,908,+1/0), (38,909,+1/0), (38,910,-0.707/0.707), (38,911,-0.707/+0.707), (38,1225,+1/0), (38,1226,+1/0), (38,1227,-0.707/0.707), (38,1228,-0.707/0.707), (38,1473,+1/0), (38,1474,+1/0), (38,1475,-0.707/0.707), (38,1476,+0.707/+0.707), (38,1813,+1/0), (38,1814,+1/0), (38,1815,+0.707/+0.707), (38,1816,-0.707/+0.707), (39,232,-0.707/+0.707), (39,233,-0.707/+0.707), (39,234,+0.707/0.707), (39,235,+0.707/0.707), (39,704,+0.707/+0.707), (39,705,-0.707/0.707), (39,706,+0.707/0.707), (39,707,-0.707/0.707), (39,908,-0.707/+0.707), (39,909,-0.707/0.707), (39,910,-0.707/0.707), (39,911,-0.707/0.707), (39,1225,+0.707/0.707), (39,1226,+0.707/0.707), (39,1227,-0.707/0.707), (39,1228,+0.707/0.707), (39,1473,-0.707/+0.707), (39,1474,+0.707/0.707), (39,1475,-0.707/+0.707), (39,1476,-0.707/+0.707), (39,1813,+0.707/+0.707), (39,1814,-0.707/+0.707), (39,1815,-0.707/+0.707), (39,1816,-0.707/0.707), (40,232,+1/0), (40,233,+1/0), (40,234,+0.707/0.707), (40,235,+0.707/0.707), (40,704,+1/0), (40,705,+1/0), (40,706,+0.707/0.707), (40,707,+0.707/0.707), (40,908,+1/0), (40,909,+1/0), (40,910,+0.707/0.707), (40,911,-0.707/+0.707), (40,1225,+1/0), (40,1226,+1/0), (40,1227,+0.707/+0.707), (40,1228,+0.707/0.707), (40,1473,+1/0), (40,1474,+1/0), (40,1475,+0.707/0.707), (40,1476,-0.707/+0.707), (40,1813,+1/0), (40,1814,+1/0), (40,1815,+0.707/0.707), (40,1816,-0.707/+0.707);~~

(35,448,1.33)(35,449,-0.707-0.707i)(35,450,-0.707-0.707i)(35,451,-1.33)
(35,512,1.33)(35,513,0.707-0.707i)(35,514,-0.707+0.707i)(35,515,1.33)
(35,984,1.33)(35,985,-0.707-0.707i)(35,986,0.707-0.707i)(35,987,1.33)
(35,1189,-1.33)(35,1190,0.707+0.707i)(35,1191,0.707+0.707i)(35,1192,-1.33)
(35,1505,1.33)(35,1506,-0.707-0.707i)(35,1507,-0.707-0.707i)(35,1508,-1.33)
(35,1753,1.33)(35,1754,-0.707-0.707i)(35,1755,0.707-0.707i)(35,1756,-1.33)
(36,448,0.707+0.707i)(36,449,0.707-0.707i)(36,450,0.707-0.707i)(36,451,-0.707+0.707i)
(36,512,0.707-0.707i)(36,513,0.707+0.707i)(36,514,-0.707+0.707i)(36,515,0.707+0.707i)
(36,984,-0.707-0.707i)(36,985,0.707+0.707i)(36,986,0.707-0.707i)(36,987,-0.707-0.707i)
(36,1189,-0.707+0.707i)(36,1190,-0.707-0.707i)(36,1191,0.707+0.707i)(36,1192,0.707-0.707i)
(36,1505,0.707+0.707i)(36,1506,0.707+0.707i)(36,1507,0.707-0.707i)(36,1508,0.707-0.707i)
(36,1753,-0.707+0.707i)(36,1754,-0.707-0.707i)(36,1755,-0.707-0.707i)(36,1756,0.707-0.707i)
(37,448,1.33)(37,449,0.707+0.707i)(37,450,-0.707-0.707i)(37,451,-1.33)
(37,512,1.33)(37,513,0.707+0.707i)(37,514,0.707-0.707i)(37,515,-1.33)
(37,984,1.33)(37,985,-0.707+0.707i)(37,986,0.707-0.707i)(37,987,-1.33)
(37,1189,1.33)(37,1190,-0.707+0.707i)(37,1191,0.707-0.707i)(37,1192,1.33)
(37,1505,-1.33)(37,1506,0.707+0.707i)(37,1507,-0.707+0.707i)(37,1508,1.33)
(37,1753,-1.33)(37,1754,-0.707+0.707i)(37,1755,-0.707+0.707i)(37,1756,1.33)
(38,448,-1.33)(38,449,-0.707+0.707i)(38,450,-0.707-0.707i)(38,451,-1.33)
(38,512,1.33)(38,513,-0.707-0.707i)(38,514,-0.707-0.707i)(38,515,1.33)
(38,984,1.33)(38,985,0.707-0.707i)(38,986,-0.707-0.707i)(38,987,1.33)
(38,1189,-1.33)(38,1190,0.707-0.707i)(38,1191,-0.707+0.707i)(38,1192,-1.33)
(38,1505,-1.33)(38,1506,0.707-0.707i)(38,1507,-0.707-0.707i)(38,1508,-1.33)
(38,1753,-1.33)(38,1754,0.707+0.707i)(38,1755,0.707-0.707i)(38,1756,-1.33)
(39,448,0.707+0.707i)(39,449,-0.707+0.707i)(39,450,0.707+0.707i)(39,451,0.707-0.707i)
(39,512,-0.707+0.707i)(39,513,-0.707+0.707i)(39,514,-0.707+0.707i)(39,515,0.707+0.707i)
(39,984,-0.707+0.707i)(39,985,-0.707+0.707i)(39,986,0.707+0.707i)(39,987,-0.707+0.707i)
(39,1189,-0.707-0.707i)(39,1190,-0.707+0.707i)(39,1191,0.707-0.707i)(39,1192,0.707-0.707i)
(39,1505,0.707-0.707i)(39,1506,-0.707+0.707i)(39,1507,-0.707-0.707i)(39,1508,-0.707-0.707i)

(39,1753,-0.707-0.707i)(39,1754,0.707+0.707i)(39,1755,0.707-0.707i)(39,1756,0.707-0.707i)
(40,448,-1.33)(40,449,0.707-0.707i)(40,450,0.707-0.707i)(40,451,-1.33)
(40,512,-1.33)(40,513,0.707+0.707i)(40,514,-0.707+0.707i)(40,515,-1.33)
(40,984,-1.33)(40,985,0.707-0.707i)(40,986,-0.707-0.707i)(40,987,-1.33)
(40,1189,1.33)(40,1190,0.707+0.707i)(40,1191,-0.707-0.707i)(40,1192,-1.33)
(40,1505,1.33)(40,1506,0.707+0.707i)(40,1507,0.707-0.707i)(40,1508,1.33)
(40,1753,1.33)(40,1754,-0.707+0.707i)(40,1755,0.707-0.707i)(40,1756,1.33)

4. References

- [1] IEEE 802.16-2004
- [2] P80216_Cor1_D3