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Title	**Changes to Focused Contention in OFDM-256 Mode**
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Source(s)	David A Castelow, Airspan Communications, Cambridge House, Oxford Road, Uxbridge, UK Voice: +44 1895 467281 Fax: +44 1895 467202 mailto:dcastelow@airspan.com Naftali Chayat, Tal Kaitz, Alvarion, 21 A Habarzel St. Ramat – Hahayal Tel - Aviv 69710 P.O. Box 13139, Tel-Aviv 61131, Israel Voice: +972 36 457801 Fax: +972 (36) 456222 mailto:naftali.chayat@alvarion.com Adam Kerr, ArrayComm., Inc. 2480 North First St., Suite 200 San Jose, CA 95131-1014 Voice: +1 408 952 1821 Fax: +1 408 428 9083 mailto:adam@arraycomm.com
Re:	Supporting document for Sponsor Ballot
Abstract	Changes required in order to enable efficient Focused Contention in sub-channelized enabled BS.
Purpose	The document is intended for consideration within comments resolution process.
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Changes to Support Focused Contention with Sub-channelized Modes

David A Castelow, Naftali Chayat, Tal Kaitz, Adam Kerr
Airspan, Alvarion, ArrayComm
March 2004

References

1. IEEE, “Draft IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems,” IEEE P802.16-REVd/D3-2004.
2. Jerry Krinock, Manoneet Singh, Mike Paff, Arvind Lonkar, Lawrence Fung, 02/01/04, C802.16a-02/12, “Contention Schemes For OFDM Mode AL, Revision 0,” http://grouper.ieee.org/groups/802/16/tga/contrib/C80216a-02_12.pdf.
3. Jerry Krinock, Manoneet Singh, Mike Paff, Arvind Lonkar, Lawrence Fung, 02/01/16, C802.16a-02/14, “Supplement to "Contention Schemes For OFDM Mode AL, Revision 0",” http://grouper.ieee.org/groups/802/16/tga/contrib/C80216a-02_14.pdf.

Introduction

The changes proposed in this document are to modify the Focused Contention option for the OFDM Physical Layer of IEEE P802.16-REVd [1], originally proposed as part of 802.16a by the contributions [2,3].

The changes are proposed in order to simplify the implementation of focused contention within both transmitters and receivers that support subchannelisation, by aligning the focused contention carriers with sub-sets of the subchannelisation carriers. In 1/16 bandwidth sub-channels there are 12 carriers: 4 groups of 3 carriers, and the intention is that each 1/16 sub-channel shall provide 3 focused contention groups for a total of 48 channels.

We propose that the scope of focused contention be extended to allow focused contention during symbols that, for other sub-channels, are allocated to carrying data. Because the focused contention mode is optional, this capability can be scheduled if it is thought beneficial to the basestation scheduling and if the basestation is capable of the decode. Indeed, the change to only support focused contention on a limited number of carrier groups means that the other channels are available for carrying data, subject to interference from the transmissions of users of neighbouring basestations.

In some circumstances (including but not limited to AAS) it is advantageous if the low order bits of the Basestation ID (BSID) are used to select the subchannels from which the contention channels are selected. This can be done by allocation in the BS: it requires minimal new functionality in the SS.

Text Changes

Change 1

Replace,
Table 220—OFDM Contention channels
Page 440, Line 47 to Page 441, Line 12:

Contention channel index	Frequency offset index 0	Frequency offset index 1	Frequency offset index 2	Frequency offset index 3
0	–100	-50	1	51
1	–99	–49	2	52
2	-98	–48	3	53

Contention channel index	Frequency offset index 0	Frequency offset index 1	Frequency offset index 2	Frequency offset index 3
...	...	...	...	...
K	k-100	k-50	K+1	k+51
...	...	...	...	...
48	-52	-2	49	99
49	-51	-1	50	100

With

Contention channel index	Frequency offset index 0	Frequency offset index 1	Frequency offset index 2	Frequency offset index 3	Contention Channel belongs to subchannel (See Table 186)
0	-100	-37	1	64	00010
1	-99	-36	2	65	00010
2	-98	-35	3	66	00010
3	-97	-34	4	67	00010
4	-96	-33	5	68	00010
5	-95	-32	6	69	00010
6	-94	-31	7	70	00110
7	-93	-30	8	71	00110
8	-92	-29	9	72	00110
9	-91	-28	10	73	00110
10	-90	-27	11	74	00110
11	-89	-26	12	75	00110
12	-87	-50	14	51	01010
13	-86	-49	15	52	01010
14	-85	-48	16	53	01010
15	-84	-47	17	54	01010
16	-83	-46	18	55	01010
17	-82	-45	19	56	01010
18	-81	-44	20	57	01110
19	-80	-43	21	58	01110
20	-79	-42	22	59	01110
21	-78	-41	23	60	01110
22	-77	-40	24	61	01110
23	-76	-39	25	62	01110
24	-75	-12	26	89	10010
25	-74	-11	27	90	10010
26	-73	-10	28	91	10010
27	-72	-9	29	92	10010
28	-71	-8	30	93	10010
29	-70	-7	31	94	10010
30	-69	-6	32	95	10110
31	-68	-5	33	96	10110

32	-67	-4	34	97	10110
33	-66	-3	35	98	10110
34	-65	-2	36	99	10110
35	-64	-1	37	100	10110
36	-62	-25	39	76	11010
37	-61	-24	40	77	11010
38	-60	-23	41	78	11010
39	-59	-22	42	79	11010
40	-58	-21	43	80	11010
41	-57	-20	44	81	11010
42	-56	-19	45	82	11110
43	-55	-18	46	83	11110
44	-54	-17	47	84	11110
45	-53	-16	48	85	11110
46	-52	-15	49	86	11110
47	-51	-14	50	87	11110

Change 2

Edit section 8.3.6.3.1 Page 440 Line 1 as below:

8.3.6.3.1 Parameter selection

The SS shall examine the UL_MAP message for a future frame and select (in accordance with 6.4.8) a futureREQ Region during which to make its request. If Focused Contention Supported = 1 was returned by the BS in SBC-RSP message during SS initialization and if the SS is capable of focused contention, it may choose either a REQ Region-Full or REQ Region-Focused. Otherwise, it shall choose a REQ Region-Full. If the chosen REQ Region is a REQ Region-Focused, the SS shall also select a contention code and a contention channel~~,~~. The contention code shall be selected at random with equal probability~~, *a contention code*~~ from Table 219. The ~~and similarly a~~ contention channel shall be selected from Table 220 based upon a random selection with equal probability amongst the group of possible contention channel indices~~codes~~ that are consistent with the allocation, as indicated in table 220. The indices {–100 to +100} in the body of Table 220 refer to the subcarrier indices as defined in 8.3.2.4.
If the BS supports subchannelization, the last C_{SE} contention codes of the allocation shall only be used by subchannelization enabled SSs that wish to receive a subchannelized allocation. In response, the BS may provide the requested allocation as a subchannelized allocation; and may provide the requested allocation as a full (default) allocation, or may provide no allocation at all. The value of C_{SE} is transmitted in the UCD channel encoding TLV messages. The default value of C_{SE} is 0.

A BS that supports Focused Contention may allocate the Focused Contention region based upon the BSID, thereby reducing the probability of interference from SSs operating in nearby cells operating on the same frequency.

The Focused Contention region allocation shall be in multiples of 1/8 subchannels, providing between 6 and 48 contention channels.

Change 3

(Pure Editorial) Edit section 8.3.6.3.3 Page 441 Line 27 as below:

8.3.6.3.3 Focused Contention transmission

The REQ Region-Focused bandwidth requesting mechanism consists of two phases. The Phase-1 is that an SS requesting bandwidth sends a signal to the BS in the uplink TO of REQ Region Focused identified by UIUC=3. One REQ Region Focused uplink interval with UIUC=3 shall be 4 subcarriers by two OFDM symbols. The Phase-1 bandwidth requesting signal transmission is described in this section. Following the Phase-1, the BS may include in its UL-MAP an allocation for the SS using UIUC=4 and the

Focused_Contention_IE as defined in Table 210. The SS is identified in this Focused_Contention_IE by the Frame Number index, Transmit Opportunity index, Contention Channel index, and Contention Code index ~~which~~ that the SS used to send the Phase-1 bandwidth requesting signal. The Phase-2 is that the SS requesting bandwidth responds to this UL-MAP allocation with a bandwidth request MAC header as defined in 6.4.2.1.2. The Phase-2 uplink interval with UIUC=4 shall consist of a short preamble and shall have the duration indicated by the relevant field of the UL-MAP_IE() and shall use the most robust mandatory burst profile.