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Title	MATI and SATI Mapping within CXCC	
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Re:	Working Group Review of Working Document P80216h_D1	
Abstract	This contribution proposes to map MATI and SATI within the coexistence control channel CXCC to support the over the air advertisement phase of the credit token based co-existence protocol. This contribution is related to the comments #29, #30, #67 and #173 provided in the review [2] corresponding to the IEEE 802.16 Working Group Letter Ballot #24. The proposed text is intended to update text in subclauses 6.3.2.3.64, 6.3.2.3.65, 10.5.3 and 15.4.2.5.6 of the draft [1].	
Purpose	Propose contribution to map MATI and SATI within CXCC.	
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MATI and SATI Mapping within CXCC

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Overview

This contribution proposes to map MATI and SATI within the coexistence control channel CXCC to support the over the air advertisement phase of the credit token based co-existence protocol. This contribution is related to the comments #29, #30, #67 and #173 provided in the review [2] corresponding to the IEEE 802.16 Working Group Letter Ballot #24. The proposed text is intended to update text in subclauses 6.3.2.3.64, 6.3.2.3.65, 10.5.3 and 15.4.2.5.6 of the draft [1].

Specific editorial changes

This section provides a list of changes to the draft document.

Blue text represents specific editorial additions.

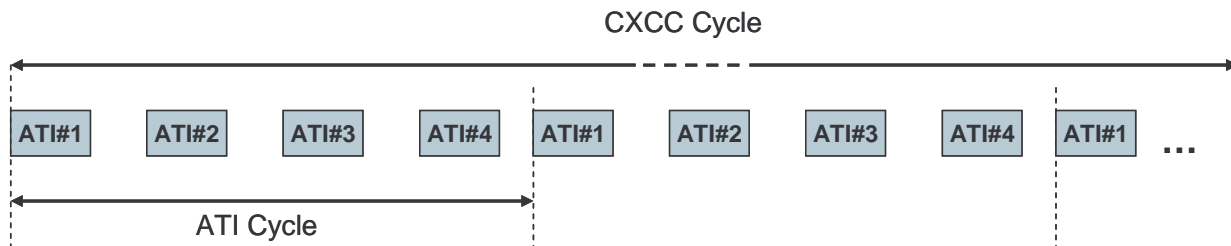
~~Red strikethrough~~ text is to be deleted.

Black text is text already in the draft.

Bold italic text is editorial instructions to the editor.

Overview

The MATI and SATI slots conveying the over the air advertisement messages (MADD and SADD) can be mapped within the co-existence control channel (CXCC) cycle described in subclause 10.5.3. In the CXCC cycle depicted in Table 345d, it is proposed to introduce 4 ATIs (Advertisement Time Interval, namely ATI#1, ATI#2, ATI#3 and ATI#4) that can be used to support the transmissions of MADD and SADD messages. With respect to this, each ATI can be used indifferently for MATI or SATI within the CXCC. Each ATI occurs every 200 ms. 4 consecutive ATIs compose an ATI cycle (400 ms). The ATI cycle is repeated periodically. The 10 minutes CXCC cycle is composed of 12.5 ATI cycles.



Text proposal for section 10.5.3

Replace Table 345d by the one below (related to comment #67 of [2]).

Table 345d—Coexistence Control Channel Function and Frame Numbering Scheme

Function Of Control Channel	Control Channel Function Name & Chapter	CX_MAC_NO containing Control Channel for given Frame Duration			
		5 ms	10 ms	20 ms	Starting Time WRT Absolute Reference (msec)
GPS Timing Recovery (DL)	TBD GPS timing recovery	1	1	1	0
ATI#1		21	11	6	100
GPS Timing Recovery (UL)		41	21	11	200
ATI#2		61	31	16	300
GPS Timing Recovery (DL)		81	41	21	400
ATI#3		101	51	26	500
GPS Timing Recovery (UL)		121	61	31	600
ATI#4		141	71	36	700
GPS Timing Recovery (DL)		161	81	41	800
ATI#1		181	91	46	900
GPS Timing Recovery (UL)		201	101	51	1000
ATI#2		221	111	56	1100
GPS Timing Recovery (UL)		241	121	61	1200
ATI#3		261	131	66	1300
CX_CMI_D1		281	141	71	1400
ATI#4		301	151	76	1500
CX_CMI_U1		321	161	81	1600

ATI#1		341	171	86	1700
CX_CMI_D2		361	181	91	1800
ATI#2		381	191	96	1900
No+Io		401	201	101	2000
ATI#3		421	211	106	2100
CX_CMI_U2		441	221	111	2200
ATI#4		461	231	116	2300
AT2		481	241	121	2400
ATI#1		501	251	126	2500
Spare	TBD use	521	261	131	2600
ATI#2		541	271	136	2700
CX_CMI_D3		561	281	141	2800
ATI#3		581	291	146	2900
No+Io		601	301	151	3000
ATI#4		611	311	156	3100
Spare		641	321	161	3200
ATI#1		661	331	166	3300
CX_CMI_U3		681	341	171	3400
ATI#2		701	351	176	3500
AT3		721	361	181	3600
ATI#3		741	371	186	3700
Spare	TBD use	761	381	191	3800
ATI#4		781	391	196	3900
No+Io		801	401	201	4000
ATI#1		821	411	206	4100
CX_CMI_D4	Reserved	841	421	211	4200
ATI#2		861	431	216	4300
Spare		881	441	221	4400

ATI#3		901	451	221	4500
CX_CMI_U4	Reserved	921	461	231	4600
ATI#4		941	471	236	4700
AT4		961	481	241	4800
ATI#1		981	491	246	4900
No+Io		1001	501	251	5000
ATI#2		1021	511	256	5100
Spare	TBD	1041	521	261	5200
ATI#3		1061	531	266	5300
CX_CMI_D5	Reserved	1081	541	271	5400
ATI#4		1101	551	276	5500
Spare		1121	561	281	5600
ATI#1		1141	571	286	5700
CX_CMI_U5	Reserved	1161	581	291	5800
ATI#2		1181	591	296	5900
No+Io		1201	601	301	6000
ATI#3		1221	611	306	6100
Spare		1241	621	311	6200
ATI#4		1261	631	316	6300
CX_CMI_D6	Reserved	1281	641	321	6400
ATI#1		1301	651	326	6500
Spare	TBD use	1321	661	331	6600
ATI#2		1341	671	336	6700
CX_CMI_U6	Reserved	1361	681	341	6800
ATI#3		1381	691	346	6900
No+Io		1401	701	351	7000
ATI#4		1421	711	356	7100
Freq_Key 1		1441	721	361	7200

ATI#1		1461	731	366	7300
Freq_Key 2		1481	741	371	7400
ATI#2		1501	751	376	7500
Freq_Key 3		1521	761	381	7600
ATI#3		1541	771	386	7700
Freq_Key 4		1561	781	391	7800
ATI#4		1581	791	396	7900
No+Io		1601	801	401	8000
ATI#1		1621	811	406	8100
Spare		1641	821	411	8200
ATI#2		1661	831	416	8300
Spare		1681	841	421	8400
ATI#3		1701	851	426	8500
Spare		1721	861	431	8600
ATI#4		1741	871	436	8700
Spare		1761	881	441	8800
ATI#1		1781	891	446	8900
No+Io		1801	901	451	9000
ATI#2		1821	911	456	9100
Spare		1841	921	461	9200
ATI#3		1861	931	466	9300
Spare		1881	941	471	9400
ATI#4		1901	951	476	9500
Spare		1921	961	481	9600
ATI#1		1941	971	486	9700
Spare		1961	981	491	9800
ATI#2		1981	991	496	9900

Text proposal for section 6.3.2.3.64

Replace the beginning of the text of section 6.3.2.3.64 by the amended text below (related to comment #29 of [2]).

The Master Advertisement Discovery Descriptor (MADD) message specifies the advertisement discovery information sent by the master BS towards the SSs located in the overlapped area of this master cell with the surrounding slave cells. This information is sent periodically by the master BS in MATI in downlink (section ~~Error! Reference source not found.~~) within the coexistence control channel CXCC on a given channel (frequency domain). ~~This information is sent every T_{MATI} (time interval between two consecutive MATIs). These consecutive MATIs (TBD) are part of an advertisement discovery sequence of time duration TAD. This sequence occurs cyclically. The time interval between two sequences is of time duration T_s .~~ MADD provides the necessary information to the SSs of the surrounding slave cells to inform the slave BSs about possibilities of radio resources sharing with this master cell.

Text proposal for section 6.3.2.3.65

Replace the beginning of the text of section 6.3.2.3.65 by the amended text below (related to comment #30 of [2]).

The Slave Advertisement Discovery Descriptor (SADD) message specifies the advertisement discovery information sent by the slave BS towards the SSs located in the overlapped area of this slave cell with the surrounding master cells. This information is sent periodically by the slave BS in SATI in downlink (section ~~Error! Reference source not found.~~) within the coexistence control channel CXCC on a given channel (frequency domain). ~~This information is sent every T_{SATI} (time interval between two consecutive SATIs). These consecutive SATIs (TBD) are part of an advertisement discovery sequence of time duration T_S . This sequence occurs cyclically. The time interval between two consequences is of time duration T_s .~~ SADD provides the necessary information to the SSs of the surrounding master cells to inform the master BSs about possibilities of radio resources sharing with this master cell.

Text proposal for section 15.4.2.5.6

Replace the beginning of the text of section 15.4.2.5.6 by the amended text below (related to comment #173 of [2]).

To facilitate urgent (critical time) case or case when BSIS is not valid, Θ over the air signaling for the first phase (advertisement) of the negotiation cycle would be also of great support to facilitate ~~urgent (critical time)~~ radio resources sharing opportunities discovery between IEEE WirelessMAN-CX systems themselves, but also between IEEE WirelessMAN-CX systems and non IEEE WirelessMAN-CX systems. This section describes discovery messages and procedures so that:

- Master BSs can advertise periodically to the neighboring slave BSs about their offers of radio resources for renting. This enables the slave BSs to be aware of master BSs' offers.
- Slave BSs can inform periodically the surrounding cells about their search of radio resources sharing opportunities for renting. This enables slave BSs to inform the master BSs that they are looking for temporally some additional radio resources.

Specific master BS and slave BS downlink time intervals ~~(TBD)~~ are used to support the over the air advertisement discovery messages in support of the credit tokens based negotiation. These time intervals

(subclause 10.5.3), ~~not yet defined, are temporary called~~ are respectively named MATI (Master Advertisement Time Interval) and SATI (Slave Advertisement Time Interval).

Usage of MATI and SATI within CXCC ~~the advertisement discovery MAC frame structure~~

The usage of MATI is: ~~and SATI is described in this paragraph.~~

- The MATIs are dedicated to master BS transmissions in downlink.
- Each MATI is used by a master BS in downlink for broadcasting. At a given time, each MATI can only be used by a single BS among within the co-existence neighborhood. ~~However, a same MATI can be used by different BSs at different times.~~
- Each master BS can use any MATI provided it is not already used by any other MATI BS of the co-existence neighborhood.
- MADD (Master Advertisement Discovery Descriptor) message is sent in MATI (Section *Error! Reference source not found.*).

~~The MATIs are ranked in each Advertisement discovery sequence in such a way that the first MATI is assigned to the master BS whose renting period will occur first (i.e. min of the T_Start_M), the second MATI is assigned to the master BS whose renting period will occur in second, and so on. Re-ranking is updated dynamically each time a new master BS is arriving. This mechanism avoids the SSs of the slave cells (see paragraph "Advertisement discovery from master cell by slave cell" below) to scan all MATIs when the slave cells have to find very shortly some available resources to rent. In this manner, they have directly knowledge of the next available resources they can propose credit tokens for.~~

- Each master cell releases the MATI it is using when its negotiation starting time has elapsed. This enables new arriving master cells to use this MATI (eventually after the re-ranking) to advertise incoming channels radio resource reuse opportunities.

The usage of SATI is:

- The SATIs are dedicated to slave BS transmissions in downlink.
- Each SATI is used by a slave BS in downlink for broadcasting. Each SATI can only be used by a single BS among the co-existence neighborhood. ~~However, a same SATI can be used by different slave BSs at different times.~~
- Each slave BS can use any SATI provided it is not already used by any other slave BS of the co-existence neighborhood.
- SADD (Slave Advertisement Discovery Descriptor) message is sent in SATI (Section *Error! Reference source not found.*).

- A "master" SS is a SS belonging to a master cell. A "slave" SS is a SS belonging to a slave cell.

~~The MATI and SATI time positions are known by the "master" and "slave" SSs within CXCC.~~

—There are no direct RF communications between the master and slave BSs. The master-slave BS communications are performed via master and slave SSs which act as RF bridges to convey the information as follows:

-o A “slave” SS performs the RF bridge between its slavehome BS and the foreign master BS (provided the coverage of the master cell overlaps with the slave cell area, and this slave SS is located in the overlapping area).

-o A “master” SS performs the RF bridge between its masterhome BS and the foreign slave BS (provided the coverage of the slave cell overlaps with the master cell area, and this master SS is located in the overlapping area).

—Slave SSs in the overlapped (master/slave) cell area listen to the MATIs. Master SSs in the overlapped (master/slave) cell area listen to the SATIs.

References

- [1] IEEE 802.16h/D1: Part 16: Air Interface for Fixed Broadband Wireless Access Systems Amendment for Improved Coexistence Mechanisms for License-Exempt Operation; 2006-10-10
- [2] IEEE 802.16 Working Group Letter Ballot #24 comments review, “LB24_Grandblaise_David.cmtb”, 2006-11-05