

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Corrections to sounding protocol	
Date Submitted	2005-03-17	
Source(s)	Eyal Bick Yuval Lomnitz Uri Pearlmutter Yigal Eliaspur Intel Corp.	Eyal.Bick@intel.com Yuval.Lomnitz@intel.com Yigal.Eliaspur@intel.com
	Kevin Baum Fred Vook Motorola	
Re:	IEEE P802.16e/D2-2004	
Abstract	Corrections to sounding definitions	
Purpose	Adopt changes	
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.	
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.	
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures < http://ieee802.org/16/ipr/patents/policy.html >, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair < mailto:chair@wirelessman.org > as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site < http://ieee802.org/16/ipr/patents/notices >.	

Corrections to sounding protocol

*Eyal Bick, Yuval Lomnitz
Uri Pearlmutter, Yigal Eliaspur
Intel
Kevin Baum, Fred Vook
Motorola*

1. Motivation

The following corrections are required to the sounding protocol:

1. Capability negotiation for sub-features of the sounding
2. Capability negotiation for the required response time
3. Reference to the UL-sounding IE from a section under UL-MAP (for clarity).
4. Remove some unnecessary overhead bits from the IE

2. Details

2.1. Capability negotiation for sub-features of the sounding

The power assignment is a different capability since it requires the SS to feed-back parameters from the downlink channel into the UL transmission pattern (whereas the default mode only requires transmission of a predefined pattern).

Also there is no limitation to the total number of sounding transmissions required from one SS.

2.2. Capability negotiation on the required response time

The current definition is that the response is in the same frame as the request. However, in worst case the UL map (carrying the request) may end at the end of the DL subframe, leaving no time for response. We suggest to add a bit to the sounding IE that indicates if the response is on current or next frame, and a capability negotiation on the SS processing time turnaround capability.

2.3. Reference to the UL-sounding IE from a section under UL-MAP (for clarity)

UL-sounding IE is defined under section 8.4.6.2 (Uplink), and is the only UL-MAP IE that is not referred to from 8.4.5.4 (UL-MAP format).

3. Changes summary

[Add a new section 8.4.5.4.X]

8.4.5.4.X UL_Sounding_Command_IE

UL_Sounding_Command_IE is defined in 8.4.6.2.8.1, table 315k.

[Replace the last sentence in the first paragraph of 8.4.6.2.8.1 with the following text]

~~In this case, the first sounding symbol is transmitted within the frame containing the relevant sounding instruction.~~

The first sounding symbol is transmitted in the frame containing the relevant sounding instruction if Sounding_Relevance is set to 0. The Sounding_Relevance_Flag indicates whether the Sounding relevance applies to all CIDs in the sounding command or whether a different Sounding Relevance can be applied individually for each CID in the sounding command. For each sounding assignment being made in this IE, the Sounding Relevance cannot be set to 0 unless the respective SS has a sounding

response time capability less than or equal to the time between the completion of the transmission of the UL_Sounding_Command_IE and the beginning of its respective sounding assignment.

[Add the following lines to table 315k, p.394 line 23, under Send Sounding Report Flag]:

Sounding_Relevance_Flag	1 bit	0 = Sounding relevance is the same for all CIDs 1 = Sounding relevance is specified for each CID
If(Sounding_Relevance_Flag==0) {		
Sounding_Relevance	1 bit	0 = All CIDs respond in the frame carrying the instruction 1 = All CIDs respond in next frame
}		

[Replace the “Reserved” row in table 315k, p.395 line 29, with the following]:

If(Sounding_Relevance_Flag==1) {		
Sounding_Relevance	1 bit	0 = Respond in the frame carrying the instruction 1 = Respond in next frame
}		

[Replace the “Reserved” row in table 315k, p.396 line 26, below Shortened basic CID with the following]:

If(Sounding_Relevance_Flag==1) {		
Sounding_Relevance	1 bit	0 = Respond in the frame carrying the instruction 1 = Respond in next frame
}		

[Remove the following rows labeled “Reserved” in Table 315k]:

p.394 line 49;
p.395 lines 6, 33, 38;
p.396 line 21

[make the following changes in table in 11.8.3.7.11 p.522]

Type	Length	Value	Scope
161	2	Bit #0: CSIT compatibility type A. Bit #1: CSIT compatibility type B. Bit #2-7: reserved Bit #2: Power assignment capability (indicate support for non equal power assignment) Bits #3-5: Sounding response time capability Bits #6-9: max number of simultaneous sounding instructions (0 = unlimited) Bit #10: SS does not support P values of 9 and 18 when supporting CSIT type A	SBC-REQ (see 6.3.2.3.23) SBC-RSP (see 6.3.2.3.24)

		Bit #11-15: <i>reserved</i>	
--	--	-----------------------------	--

The maximum allowed sounding response time for an SS shall be 2 ms. The sounding response time capability encodings are as follows:

Bits 3-5	Time needed for SS to respond to a sounding command transmitted by the BS
000	0.5 ms
001	0.75 ms
010	1 ms
011	1.25 ms
100	1.5 ms
101	min(2 ms, Next Frame)
110	min(5ms, Next Frame)
111	Next Frame