Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Change in H-ARQ MAP**
Date Submitted	**2004-08-20**
Source(s)	Geunhwi Lim, Wonil Roh, Yong Chang, Hong Sung Chang, JungWon Kim, TaeWon Kim Samsung Electronics Co. Ltd. geunhwi.lim@samsung.com
Re:	
Abstract	**Change in H-ARQ MAP**
Purpose	Adoption of proposed changes into P802.16d /D5-2004
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 (Version 1.0) <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing 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:r.b.marks@ieee.org> as early as possible, in written or electronic form, of any patents (granted or under application) that may cover technology that is under consideration by or has been approved by IEEE 802.16. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

1 Introduction

1.1 Problem 1

Even though the current system defines H-ARQ operation and DIUC/UIUC in physical layer, there is no support of the operation in the H-ARQ MAP. Hence, several formats should be changed to proper operation of the H-ARQ and we propose a text change for H-ARQ MAP.

1.2 Problem 2

The length of Safety Pattern field in the Format Configuration IE should be changed from 10 bits to 5 bits.
The following text is the definition of the Safety Pattern value usage. The range of the value for safety pattern should be less than 32.

> **Safety Pattern**
> If this value is less than 16, the number of safety bins is 12 and the indices of allocated bins for safety are $16m+x$, where x is the value of Safety Pattern and $m = 0 \ldots 11$. If this value is not less than 16, the number of safety bins is 24 and the indices of allocated bins for safety are $16m+x'$ and $16m+(x'+8)$, where $x' = x - 16$ and $m = 0...11$.

We propose to allocate the remaining 5 bits to Symbol for Broadcast, DL Band AMC, and UL Band AMC fields in the same table.

1.3 Problem 3

The usage of the Extension Compact DL/UL-MAP IE is similar with the Extended DL-MAP IE but the format is different slightly. This will increase the complexity of the interpreter. We propose a format change for the Extension Compact DL/UL-MAP IE to reduce the complexity.

2 Proposed Text

In page 106, Line 41, change the following text

Table 87—Compact_DL-MAP IE types

Compact DL-MAP Type	Description
0	~~Normal subchannel~~ Diversity
1	Band AMC
2	Safety
3	DIUC Diversity
4	Format_Configuration_IE
5	H-ARQ_ACK_BITMAP_IE
6	~~Reserved~~ DIUC AMC
7	Extension

Table 88—Compact_UL-MAP IE types

Compact_UL-MAP Type	Description
0	~~Normal subchannel~~ Diversity
1	Band AMC
2	Safety
3	UIUC Diversity
4	H-ARQ_Region_IE

5	CQI_Region_IE
6	~~Reserved~~ UIUC AMC
7	Extension

In page 107, Line 30, change the following text

Table 89—Format ~~c~~Configuration DL-MAP IE

Syntax	Size	Notes
Compact_DL-MAP_IE( ) {		
~~DL-MAP~~ Type = 4	3 bits	Format ~~–~~Configuration Compact DL-MAP_IE
New Format Indication	1 bits	0 = Use the format configured by the latest Format Configuration Compact DL-MAP_IE 1 = New format
if (New Format Indication == 1) {		
CID Type	2 bits	00 = Normal CID 01 = RCID11 (default) 10 = RCID7 11 = RCID3
Safety Pattern	~~10~~ 5 bits	
Subchannel type for Band AMC	2 bit	See Band AMC specification (8.4.6.3). 00 = Default type (default) 01 = 1x6 type 10 = 2x3 type 11 = 3x2 type
Max Logical Bands	2 bits	0 = 3 bands, 1 = 6 bands, 2 = 12 bands (default) 3 = 24 bands
No. Symbols for Broadcast	~~4~~ 5 bits	No. Symbol, (default = 0)
No. Symbols for DL Band AMC	~~4~~ 6 bits	No. Symbol, (default = 0)
No. Symbols for UL Band AMC	~~4~~ 6 bits	No. Symbol, (default = 0)
}		
}		

In page 116, Line 45, change the following text

6.3.2.3.43.6.4 DIUC Compact DL-MAP IE ~~for DIUC subchannel~~

Table 97—~~H-ARQ~~ DIUC Compact DL-MAP IE format ~~for DIUC subchannel~~

Syntax	Size	Notes
Compact DL-MAP_IE () {	_	_
~~DL-MAP~~ Type = 3	3 bits	DIUC type
Reserved	1 bits	
DIUC	4 bits	See DIUC section
if(DIUC == 15) {		
Extended DIUC dependent IE	variable	

} else {					
RCID_IE		variable			
~~No. Subchannels~~ Duration		8 bits		~~The number of subchannels allocated by the IE~~ In OFDMA slots (see 8.4.3.1)	
Repetition Coding Indication		2 bits		0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b11 - Repetition coding of 6 used	
H-ARQ_Control_IE		variable			
CQICH_Control_IE		variable			
}					

In page 118, Line 1, change the following text

6.3.2.3.43.6.6 Extension Compact DL-MAP IE ~~for extension~~

Table 99—~~H-ARQ~~ Extension Compact DL-MAP IE format ~~for extension~~

Syntax		Size		Notes	
Compact DL-MAP_IE () {		_		_	
~~DL-MAP~~ Type = 7		3 bits			
Extended DIUC Indicator		1 bits		0 = Sub-type 1 = Extended DIUC	
if (Extended DIUC Indicator = 1)					
DIUC		4 bits			
else					
Sub-type		~~5~~4 bits		Extension sub-type	
Length		4 bits		Length of the IE in Bytes	
Payload		Variable		~~Sub-type dependent payload~~	
}					

In page 118, add the following text
6.3.2.3.43.6.7 DIUC AMC Compact DL-MAP IE

Table 99a —DIUC AMC Compact_DL-MAP IE format

Syntax		Size		Notes	
Compact DL-MAP_IE () {		_		_	
Type = 6		3 bits			
Reserved		1 bit			
RCID_IE		variable		_	
DIUC		4 bits			
Repetition Coding Indication		2 bits		0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used	

		0b11 - Repetition coding of 6 used
Reserved	2 bits	
Nband	Nb-Band bits	Number of bands, 0 = use BITMAP instead
if(Nband == 0){	_	_
Band BITMAP	Nb-BITMAP bits	n-th LSB is 1 if n-th band is selected
}else {	_	_
for (i=0;i< Nband ; i++)	_	_
Band Index	Nb-Index bits	Band selection.
}	_	_
Allocation Mode	2 bit	Indicates the subchannel allocation mode. 00 = same number of slots for the selected bands 01 = different number of slots for the selected bands 10 = reserved 11 = reserved
Reserved	2 bits	
if(Allocation Mode == 00){		
Duration	8 bits	
} else if(Allocation Mode == 01){		
for (i=0;i< band count ;i++){	_	If Nband is 0, band count is the number of '1' in Band BITMAP. Otherwise band count is Nband.
Duration	8 bits	In OFDMA slot for band
}	_	_
}		
H-ARQ_Control_IE	variable	
CQICH_Control_IE	variable	
}	_	_

In page 121, Line 50, change the following text

6.3.2.3.43.7.4 UIUC Compact DL-MAP IE ~~for UIUC subchannel~~

Table 103—~~H-ARQ~~ UIUC Compact DL-MAP IE format ~~for UIUC subchannel~~

Syntax	Size	Notes
Compact UL-MAP_IE () {	_	_
~~Compact UL-MAP~~ Type = 3	3 bits	UIUC type
Reserved	1 bits	
UIUC	4 bits	
if (UIUC == 12) {		
OFDMA Symbol offset	8 bits	
Subchannel offset	7 bits	
No. OFDMA Symbols	7 bits	
No. Subchannels	7 bits	
Ranging Method	2 bits	0b00 - Initial Ranging over two symbols 0b01 - Initial Ranging over four symbols

				0b10 - BW Request/Periodic Ranging over one symbol 0b11 - BW Request/Periodic Ranging over three symbols
reserved		1 bit		Shall be set to zero
} else if (UIUC == 14) {				
CDMA Allocation_IE()		32 bits		
} else if (UIUC == 15) {				
Extended UIUC dependent IE		variable		
} else {				
RCID_IE		variable		
~~No. Subchannels~~ Duration		8 bits		~~The number of subchannels allocated by the IE~~ In OFDMA slots (see 8.4.3.1)
Repetition Coding Indication		2 bits		0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b11 - Repetition coding of 6 used
H-ARQ_Control_IE		variable		
}				
}				

In page 121, Line 50, add the following text

6.3.2.3.43.7.7 UIUC AMC Compact UL-MAP IE

Table 104—UIUC AMC Compact UL-MAP IE format

Syntax	Size	Notes
Compact UL-MAP_IE () {	_	_
Type = 6	3 bits	UIUC AMC
Reserved	1 bit	
RCID_IE	variable	
UIUC	4 bits	Number of encapsulate packet
Repetition Coding Indication	2 bits	0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b11 - Repetition coding of 6 used
Reserved	2 bits	
Nband	Nb-Band bits	Indicates the number of selected bands. 0 = BITMAP indicates the number and offset of selected bands
if(Nband == 0){	_	_
Band BITMAP	Nb-BITMAP bits	n-th LSB is 1 if n-th band is selected
}else {		
for (i=0;i<Nband;i++)	_	_
Band Index	Nb-Index bits	Band selection.
}	_	_

Allocation Mode	2 bits	Indicates the subchannel allocation mode. 00 = same number of slots for the selected bands 01 = different number of slots for the selected bands 10 = reserved 11 = reserved
Reserved	2 bits	
if(Allocation Mode == 0){		
Duration	8 bits	
} else if(Allocation Mode == 1){		
for (i=0;i< band count ;i++){		If Nband is 0, band count is the number of '1' in Band BITMAP. Otherwise band count is Nband.
Duration	8 bits	In OFDMA slot for band
}		
}		
H-ARQ_Control_IE	variable	
}	_	_

In page 124, Line 12, change the following text

6.3.2.3.43.7.7 Extension Compact UL-MAP IE ~~for extension~~

Table 106—~~H-ARQ~~ Compact UL-MAP IE format ~~for extension~~

Syntax	Size	Notes
Compact UL-MAP_IE () {	_	_
~~UL-MAP~~ Type = 7	3 bits	
Extended UIUC Indicator	1 bits	0 = Sub-type 1 = Extended UIUC
if (Extended UIUC Indicator = 1)		
UIUC	4 bits	
else		
Sub-type	~~5~~4 bits	Extension sub-type
Length	4 bits	Length of the IE in Bytes
Payload	Variable	~~Sub-type dependent payload~~
}		

References:

[1] IEEE P802.16-REVd/D5-2004 Draft IEEE Standards for local and metropolitan area networks part 16: Air interface for fixed broadband wireless access systems