Comment # 360 **Comment submitted by:** Tal Kaitz

Comment Type Technical, Binding **Starting Page #** 161 **Starting Line #** 47 **Fig/Table#** **Section** 8.4.3.6

The preamble deifintion for subchannelization is
a Wrong. There should be exactly 25 non zero subcarriers in the preamble of every subchannel
b. Probably not optimized to the allocation in table 116ac.

Suggested Remedy

Use the preamble sequences given in a submitted document.

Resolution of Group **Decision of Group:** **Accepted**

Modify the preamble sequences as described in C802.16a-02/98.

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 363 **Comment submitted by:** Tal Kaitz

Comment Type Editorial **Starting Page #** 170 **Starting Line #** 21 **Fig/Table#** 116 **Section** 8.4.5.3

The mentioned Extended UIUC are 'AAS' and 'Power control'. There is no mentioning of 'Subchannelization IE'

Suggested Remedy

Add

Resolution of Group **Decision of Group:** **Accepted**

add 'Subchannelization IE' in table 116av after "extended UIUC dependent IE" in the notes column

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 370 **Comment submitted by:** David Trinkwon

Comment Type Editorial **Starting Page #** 195 **Starting Line #** 29 **Fig/Table#** Tabl **Section**

Frame Duration Code N=9 is undefined

Suggested Remedy

Change "Reserved" codes to 9 - 255

Resolution of Group **Decision of Group:** **Accepted**

Change "Reserved" codes to 9 - 255

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 373 **Comment submitted by:** Nico van Waes

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section**

Suggested Remedy

Implement the editorial corrections as shown in C80216a-02/99.

Resolution of Group **Decision of Group:** **Accepted**

Implement the editorial corrections as shown in C802.16a-02/99.

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 374 **Comment submitted by:** Pan Yuh Joo

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section**

Suggested Remedy

Modify the preamble sequences as described in C80216a-02/93.

Resolution of Group **Decision of Group:** **Accepted**

Modify the preamble sequences as described in C802.16a-02/93.

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 375 **Comment submitted by:** Lei Wang

Comment Type Editorial **Starting Page #** 175 **Starting Line #** 56 **Fig/Table#** **Section**

Suggested Remedy

change "long" to "short"

Resolution of Group **Decision of Group:** **Accepted**

change "long" to "short"

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 379 **Comment submitted by:** Brian Edmonston

Comment Type Editorial **Starting Page #** 154 **Starting Line #** **Fig/Table#** **Section**

There is a typo for 16QAM rate 1/2. The P1 value of '2' is incorrect.

Suggested Remedy

Change the P1 value to 3N/4.

Resolution of Group **Decision of Group:** **Accepted**

Change the P1 value to 3N/4.

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 380 **Comment submitted by:** Arthur Wang

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section**

Suggested Remedy

In Table 116cn, change 10.25 to 5.25

Resolution of Group **Decision of Group:** **Accepted**

In Table 116cn, change 10.25 to 5.25.

Reason for Group's Decision/Resolution

Editor's Notes **Editor's Actions** k) done

Comment # 357 **Comment submitted by:** Marianna Goldhammer

Comment Type Technical, Binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section**

I insisted in last meeting of the Ballot Resolution Committee to mark the comment 345 as REJECTED. No one of the BRC members objected this decision. BRC report states clearly that: "Comment 345 was further discussed and REJECTED by the Committee. Detailed technical rationale for the rejection was developed and incorporated into the database. A new database, 802.16-02/54r3 will be issued today with the technical rationale incorporated."

Suggested Remedy

Mark comment 345 as REJECTED in the new data base version. Mention in meeting minutes the change and its cause.

Resolution of Group **Decision of Group:** **Rejected**

Reason for Group's Decision/Resolution

vote in favor of changing comment 345 group resolution to "rejected": in favor: 4
against: 16
The comment resolution database was available to the entire BRC and no-one identified this specific problem in the database. Furthermore, the issue is irrelevant to the sponsor ballot process.

Editor's Notes **Editor's Actions** I) none needed

Comment # 358 **Comment submitted by:** Marianna Goldhammer

Comment Type Technical, Binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 8.4.5.3

Open the subchannelization to all the MAC functionnality, defined for OFDM.
The sub-channelization brings significant system improvemens. As all the features are possible for the OFDMA mode, there is no technical reason for artificial restrictions for FFT 256 sub-channelization.

Suggested Remedy

Delete any restriction refering sub-channelization.

Resolution of Group **Decision of Group:** **Rejected**

Reason for Group's Decision/Resolution

vote: in favor: 4
against: 14

No specific text proposed, but see also the response to 359

Editor's Notes **Editor's Actions** I) none needed

Document under Review: Ballot Number: Comment Date

Comment # 359 Comment submitted by: Marianna Goldhammer

Comment Type Technical, Non-binding Starting Page # Starting Line # Fig/Table# Section

The "Group resolution" to my comment 336 demonstrates lack of system design understanding. The artificial prevention of the OFDM-subchannelization mode from some of its basic features was done from non-technical considerents!

1. The SS PA design is generaly optimized to cost, not to link-budget. At the resulting transmitted power, the cell size can be increased accordingly with 6 dB (see simulation results) link-budget increase, if power concentration is made on one channel.

2. The error correction performance should be considered as a combination of the 2 mechanisms provided by the 802.16a standard: FEC and ARQ. These mechanisms work in a complementary mode, the ARQ being efficient for small packets, where the FEC has a reduced performance.

3. The example related to peak data rate:
- is restricted to TDD systems only, where there are interruptions in up-link traffic due to the MAC frame character
- does not take into account the possibility of making fragmentation, invented by the standard in order to support such cases
- the peak-data rates are actually 8 times lower with OFDMA systems (32 sub-channels instead of 4), but this does not prevent the standard to allow full sub-channelization capabilities for OFDMA
- the peak data rates are almost 8 times lower for Mesh systems, having 10 nodes (see supporting paper), but this does not prevent Mesh inclusion within the standard
- the delays are always inverse proportional with data rates, so Mesh systems and OFDMA systems will always have much higher delays

4. The "Region focused" BW request is a mechanism that require minimum BW, but the HUGE penalty is the much higher delays, 2 MAC frames and more. I would not recommend the use of this mechanism with Mesh systems, that anyway require a double MAC frame duration at least!

5. The REQ region full has HUGE bandwidth consumptions (see supporting paper). The resulting system will not be able to provide symmetrical data rates!

6. The "REQ region full" with sub-channelization is the best compromize, allowing 4 times lower BW consumption (see supporting paper) and minimum delays.

7. The piggy-back mechanism works only if there is UL data for transmission. Generally is not the case due to:
- bursty nature of IP traffic
- FTP high windows in down-link, making the up-link FTP ACK to come at large intervals

8. The length field of transmitted data problem (max. 5bits (31 symbols), 4 bits reserved) reflects the reluctance of main companies involved in OFDM design to technical improvements, that will affect their existing designs:
- we requested to add 8 pilots to the existing 200 pilots, in order to make easier the phase tracking process; this would assign 4

pilots/sub-channel. REJECTED
- we and IMEC demonstrated that is possible to make decision aided phase tracking, and use no pilots at all. Wi-LAN not accepted this solution.
- we proposed, as a compromise solution, while keeping the existing 5 bits length, a concatenation mode, the was REJECTED due to 3% overhead ?!

Conclusion: all the argumentation against the network-entry, full-region BW request and normal packet transmissoin are artificial.
These modes were blocked due to non-technical considerates, in flagrant contradiction with the IEEE 802 standards developing principles!

a

Suggested Remedy
Resolution of Group **Decision of Group: Rejected**

Reason for Group's Decision/Resolution
P80216a/D6 does not allow UIUC's 1 ("Initial ranging") and 2 ("REQ Region Full") to be used during subchannelization and does not allow for allocations longer than 32 OFDM symbols in sub-channelization mode.

The UIUCs were omitted because it would allow a subscriber to demand service from a BS when its link budget is sufficient only to allow the use of 1 subchannel. This would occur if the SS implements a PA which is economized to the point where it anticipates the gain achieved by subchannelization. This gain is in theory 6 dB (1/4th the bandwidth), but in practice will be less due to the effects of smaller possible FEC blocks, only 2 pilots per subchannel, and interference from the other subchannels.

Three problems would arise from this.

The first problem is that the peak UL data rate for an SS with such a link budget would be reduced by a factor of 4. The second problem is that it would force the BS scheduler to always provision UL allocations to SSs with such a link budget, instead of having the choice to optimize allocations over subchannels and full symbol allocations. Consider for example a 7 MHz licensed channel in which an SS capable of communicating only over one subchannel requests an allocation for 1500 bytes. This would mandate the BS to allocate a total of 8.25 ms (the order of an entire frame duration) solely for this subchannelized traffic. To allow this single allocation in combination with a few mandatory full OFDM symbol allocations, the BS would be forced to spread the allocation over multiple frames, causing excessive end to end delays. The third problem is that during initial ranging, substantial offsets from the desired received power can occur at the BS side, which could produce substantial distortion in other subchannels, were this to be allowed. With the adopted P80216a/D6 language, subchannelization is only allowed after the SS power has been adjusted to result in near-equal received power at the BS side, so that this problem would not occur.

In addition, P80216a/D6 does not allow the use of UIUC 2, since an efficient method of requesting bandwidth has already been defined through UIUC 3 ("REQ Region Focused"), which also allows the SS to indicate its preference (though not a demand) for a subchannelized allocation. Of course, a SS can also use the REQ Region Full or the "piggy-backing" mechanism to request bandwidth. There is hence no need to duplicate the bandwidth request through a fourth mechanism.

Allocations longer than 32 OFDM symbols are omitted because these would not achieve any substantial additional preamble overhead reduction (which is the second aim of subchannelization, after granularity reduction), whereas the BS would have to deal with the increasingly difficult phase tracking problem due to the availability of only two pilots. P80216a/D6 allows for 5 bit, or 32 OFDM symbols of subchannelized allocation (allowing for 180 to 830 bytes of data). The overhead, 1 OFDM symbol preamble, would hence result in about 3% of overhead.

P80216a/D6 provides the mechanism of allocating certain Focused Contention codes for SSs to REQUEST a subchannelized allocation as per the suggested remedy. However, this language differs from the proposed remedy in that the proposed remedy seeks the mechanism of allocating certain Focused Contention codes for SSs to DEMAND a subchannelized allocation. The reason why this was not adopted is that it places undesirable additional constraints on the BS scheduler as discussed as above.
Using Focused Contention on a subchannel does not add any efficiency, since it only uses 4 carriers, exactly as when using the full channel. It would only make a small difference if an economically unviable low number of SSs were present, such that only one or two subchannels allocated to this would suffice. It would however require allocations both on the full channel and on the subchannel to support both SSs capable and not capable of sub-channelization, which would actually decrease the efficiency.

Editor's Notes **Editor's Actions** I) none needed

Comment # 361 **Comment submitted by:** Marianna Goldhammer

Comment Type Technical, Binding **Starting Page #** 168 **Starting Line #** 62 **Fig/Table#** **Section** 8.4.5.2

This comment provides a slightly modified text to the comment 345, which refers to initial ranging with sub-channelization.
The intention is to gain 5-6 dB due to power concentration.

Suggested Remedy

Insert :
The initial ranging interval can be allocated to SSs which use subchannelization. In this case the BS allocates an UL interval , to be used with sub-channelization. Using the procedure of 8.4.4.3.5 and an UIUC code of 1 in the OFDM UL MAP Information Element will be possible to specify on which sub-channel will be sent the initial ranging burst.
An SS will first attempt to perform the initial ranging in full OFDM mode. If the network entry process failed, the SS may try to use the network entry sub-channelization mode.

Delete the note under the table 116av.

Resolution of Group **Decision of Group: Rejected**

Reason for Group's Decision/Resolution

vote: in favor: 11
against: 13
see rationale in 359

Editor's Notes **Editor's Actions** I) none needed

Comment # 362 **Comment submitted by:** Marianna Goldhammer

Comment Type Technical, Binding **Starting Page #** 170 **Starting Line #** **Fig/Table#** 116 **Section** 8.4.5.3

The Region-full bandwidth request, when using sub-channelization, requires 4 times more spectrum than transmitting the BW request MAC header on one sub-channel, The MAC header has 6 bytes, as compared with 24 bytes of one OFDM symbol and with 6 bytes of a sub-channelization symbol. This mechanism is the only one suitable for time-critical applications.
The mechanism of focused BW request , with subchannelization, introduces delays, that can be 2 MAC frames or more.
See the supporting document for performance

Suggested Remedy

Delete note bellow table 116av

Resolution of Group **Decision of Group:** **Rejected**

Reason for Group's Decision/Resolution

vote: in favor: 8
against: 11
see rationale in 359

Editor's Notes **Editor's Actions** I) none needed

Comment # 364 **Comment submitted by:** Vladimir Yanover

Comment Type Technical, Binding **Starting Page #** 170 **Starting Line #** 24 **Fig/Table#** 116 **Section** 8.4.5.3

Table 116av and sentence
"When subchannelization is active (see 8.4.4.3.5), only UIUCs 5 through 13 shall be used."
preclude from using of focused contention function in subchannelization region. There is no visible reason to refuse from using this extremely efficient type of signaling in subchannelization region (once it implemented in the system).

Suggested Remedy

Delete "else {" at line 24 and the correspondent "}"

Delete the sentence at the line 44:
"When subchannelization is active (see 8.4.4.3.5), only UIUCs 5 through 13 shall be used."

Update Table 116bc to ensure that for each Contention Channel all Carrier Offset Indexes fail into certain subchannels, for example as suggested by Marianna Goldhammer -see the following table with columns
1) Contention Channel Index2) Carrier offset index 0 3)Carrier offsetindex 1 4)Carrier offset index 2 5) Carrier offset index 3 6) Sub-channel

0	-87	-50	1	64	1
1	-86	-49	2	65	1
…	…	….	…	….	1
11	-76	-39	12	75	1
12	-75	-12	39	76	4
13	-74	-11	40	77	4
…	…	…	…	…	4
23	-64	-1	50	87	4
24	-100	-37	14	51	3
25	-99	-36	15	52	3
…	…	…	…	…	3
35	-89	-26	25	62	3
36	-62	-25	26	89	2
37	-61	-24	25	88	2
…	…	…	…	…	2
47	-51	-14	37	100	2

Resolution of Group **Decision of Group:** Rejected

Reason for Group's Decision/Resolution

vote: in favor: 6
against: 10
see rationale in 359

Editor's Notes

Editor's Actions I) none needed

Comment # 365 **Comment submitted by:** Tal Kaitz

Comment Type Technical, Binding **Starting Page #** 170 **Starting Line #** 33 **Fig/Table#** 116 **Section** 8.4.5.3

The duration of the subchanelized allocation is represented by 5 bits only is therefore handicapped to be only 31 symbols.

This restriction is contrary to any technical logic:

A. In the subchannelized UL-MAP there are 4 resreved bits. The bits can and should be used to increase the duration field to 9 bits.

B. It is true that tracking long packets may require deidcated synchronization mechanism in the BS. However, there are absolutley no complexity considerations for the SS. The decsion wether to implement better tracking mechanism should be left to the decision of the BS vendor. If the mechanisms are implemented in the BS, then the BS can allocate long packets. If not , then the BS will allocte only short bursts (perhaps even shorter than the said 32 symbols). **The standard should NOT address the lowest common denominator for optional modes.** By following the same rationale, we might as well delete the turbo coding option, because some vendors dislike the increased complexity.

Suggested Remedy

Change the fieds duration field to 9 bits.
Delete the 4 reserved bits.

Resolution of Group **Decision of Group:** **Rejected**

Reason for Group's Decision/Resolution

vote: in favor: 10 (Sponsor rules require 75% for change)
against: 10
see rationale in 359

Editor's Notes **Editor's Actions** I) none needed

Comment # 366 **Comment submitted by:** Tal Kaitz

Comment Type Technical, Binding **Starting Page #** 170 **Starting Line #** 43 **Fig/Table#** 116 **Section** 8.4.5.3

The use of all UIUC for subchannelization is artificially restricted to 5-13 without valid technical reasons.
All relevant MAC functionalities should be supported in subchannelization mode. Specifically:
A. Allow network entry in subchannelization. This will allow distant SSs to gain a 6dB improvemnt in link budget. See Tal's document for some discussion.
B. Allow BW requests in subcahhenlzition. This will reduce the overheads associated with BW requests. See Marianna's submission for analysis.
C. Allow Focused contention requests in subchannelization.

Suggested Remedy

Replace the footnote on line 44 pg 170 with ... UIUC 1...13.

Resolution of Group **Decision of Group:** **Superceded**

Reason for Group's Decision/Resolution

superceeded by group decision on comment 362, 364, 368 and 369
see also rationale in 359

Editor's Notes **Editor's Actions** I) none needed

Comment # 367 **Comment submitted by:** Marianna Goldhammer

Comment Type Technical, Binding **Starting Page #** 171 **Starting Line #** **Fig/Table#** 116 **Section** 8.4.5.3.2

Define the focused contention information element (up-link BW allocation) for subchannelization.

Suggested Remedy

Replace "Duration"field with:

if (subchannelization a){

Subchannel Index	3 bits	0x1 = subchannel 1 0x5 = subchannel 1 and 2 0x2 = subchannel 2 0x6 = subchannel 3 and 4 0x3 = subchannel 3 0x0 = reserved 0x4 = subchannel 4 0x7 = reserved
Duration	9 bits	in OFDM symbols

}else

Duration	12 bits

Resolution of Group **Decision of Group:** Rejected

Reason for Group's Decision/Resolution

vote: in favor: 6
against: 10
see rationale in 359

Editor's Notes **Editor's Actions** I) none needed

Comment # 368 **Comment submitted by:** Marianna Goldhammer

Comment Type Technical, Binding **Starting Page #** 174 **Starting Line #** 79 **Fig/Table#** **Section** 8.4.5.3.1

If the BW request is made on a specific sub-channel, is no need to use the Cse threshold. Obviously, only SS supporting sub-channelization will request BW in this way.
Text should be provided to clearly describe the focused contention BW request in both OFDM and OFDMS (OFDM with sub-channelization) modes.

Suggested Remedy

Replace the text starting at line 49:
IIf the BS supports subchannelization, and the BW request allocation uses the full band, the last C SE contention codes 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, may provide the requested allocation as a full (default) allocation,
or may provide no allocation in at all. The value of C SE is transmitted in the UCD channel encoding TLV
messages. The default value of C SE is 0.

If the BW request allocation is included in a sub-channelization allocation, the Cse value is not relevant. The BW request will use only focused contention channels that are, according to table 116bc, included in the specified sub-channel.

Resolution of Group **Decision of Group:** **Rejected**

Reason for Group's Decision/Resolution

vote: in favor : 5
against : 9
see rationale in 359

Editor's Notes **Editor's Actions** I) none needed

Comment # 369 **Comment submitted by:** Marianna Goldhammer

Comment Type Technical, Binding **Starting Page #** 175 **Starting Line #** 30 **Fig/Table#** 116 **Section** 8.4.5.3.1

It is beneficial to take full advantage of the focused contention in the sub-channelization region. The carriers used in focused contention, for every contention channel, occupy generally 2 sub-channels.
These 2 sub-channels are different from the couple of sub-channels that can be combined for data transmission, so actually no sub-channel can be used during the focused-contention. This implies that all the traffic, even on not-used subchannels, has to be fragmented and delayed.
The proposed allocation is in line with the new 802.16a-D6 sub-channel carrier allocation.
See supporting document for performance.

Suggested Remedy

Realocate the carriers for contention channels and their indexes according to Table 3 in suporting document. Replace table 116bc with Table 3.

Resolution of Group **Decision of Group:** **Rejected**

Reason for Group's Decision/Resolution

vote: in favor: 6
against: 11
see rationale in 359

Editor's Notes **Editor's Actions** I) none needed