The Corrigendum document does not contain the accepted resolution of comment 80216maint-04/010#614, dealing with Initial Ranging.

Suggested Remedy
Review and adopt contribution C80216maint-05/009r4.

Proposed Resolution
Recommendation:

Reason for Recommendation
Resolution of Group: Accepted
Decision of Group: Accepted
Review and adopt contribution C80216maint-05/009r4.

Reason for Group’s Decision/Resolution

Group’s Notes
Group's Action Items

Editor’s Notes
Editor's Actions
k) done

Last sentence of the ninth paragraph was not in the official version of 802.16-2004 and it was underlined to indicate it's a new sentence. We could not identify where it came from.

Editor’s Questions and Concerns
Editor's Action Items
In section 8.3.12 "Frequency and timing requirements" of IEEE802.16-2004 it is stated that the symbol clock frequency of the subscriber station (SS) "shall be synchronized and locked to the BS with a tolerance of maximum 2% of the subcarrier spacing". The wording here is ambiguous.

Suggested Remedy
Adopt the text changes proposed in contribution C80216maint-05_010r2.

Reason for Recommendation

Resolution of Group Decision of Group: Rejected

Reason for Group's Decision/Resolution
Author requested to reject the comment on the grounds that the solution is not technically complete.
Deletion of this section is not acceptable. It deteriorates specifications by removing an important part of standard using Advanced Antenna system - beamforming method.

Proposed Resolution Recommendation: Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group: Rejected

Reason for Group's Decision/Resolution
When the group decided on the deletion of section 8.4.4.7, the group's feeling was that the section is erroneous, does not comply with the rest of the spec and is incomplete.
Feedback from the subscriber stations is essential for successful operation of AAS systems. Thereby phase feedback plays an important role, especially in FDD systems where it has a twofold use. On one hand it can be used for re-calibration of the BS antenna array due to changes in environmental conditions such as temperature, on the other hand it allows to respond to differences in the multipath propagation conditions for Tx and Rx frequency bands.

The importance of the AAS-FBCK-REQ/RSP messages is underlined in section 6.3.7.6.5 of IEEE 802.16-2004 by stating 'Using FDD, the BS shall issue AAS-FBCK-REQ messages. Using TDD the BS may issue AAS-FBCK messages'.

However, the current definition of the AAS-FBCK-REQ/RSP message bodies is ambiguous in a threefold manner:
1. The frequency measurement resolution is only properly defined for the DL preamble. In case of a measurement on the DL data of an individual SS, the current definition is very likely to point to subcarriers, that do not belong to the allocation of the SS addressed by the AAS-FBCK-REQ/RSP message. Especially for small allocations, covering only one or 2 subchannels, a finer granularity of the frequency measurement resolution is required.
2. It is not clear whether the measurement for a value of '1' of the 'Measurement Data Type' field should extend over the whole bursts for the addressed subscriber station, including eventually present AAS preambles, or not.
3. For the frequency measurement points, the definition of the measurement values to be reported is ambiguous - presumably for each frequency measurement point the average over the measurement period indicated by Frame Number and Number of Frames has to be reported.

Corrections and clarifications are suggested to address the above ambiguities.

**Suggested Remedy**

On page 90, starting at line 17 add the following text:

Change table 307 as indicated:

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFDMA-AAS-FBCK-REQ_Message.Body(){}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frame Number</td>
<td>8 bits</td>
<td></td>
</tr>
<tr>
<td>Number of Frames</td>
<td>7 bits</td>
<td></td>
</tr>
<tr>
<td>Measurement Data Type</td>
<td>1 bit</td>
<td>0=measure on downlink preamble</td>
</tr>
</tbody>
</table>
| Measurement Data Type | 1 bit | 0 = measure on downlink preamble only  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>1 = measure on downlink data (for this SS) only</th>
</tr>
</thead>
</table>
| Feedback Request Counter | 3 bits | if Measurement Data Type = 0 {  
| Frequency Measurement Resolution | 2 bits |   0b00 = 32 subcarriers  
|                                     |       |   0b01 = 64 subcarriers  
|                                     |       |   0b10 = 128 subcarriers  
|                                     |       |   0b11 = 256 subcarriers  
|                                     |       | }  
| reserved | 3 bits | if Measurement Data Type = 1 {  
|             |       |   0b00 = 1 subcarrier  
|             |       |   0b01 = 4 subcarriers  
|             |       |   0b10 = 8 subcarriers  
|             |       |   0b11 = 16 subcarriers  
|             |       | }  
| reserved | 3 bits | Shall be set to zero  

Add a description of the 'Measurement Data Type' field below table 307 as indicated:

Measurement Data Type
Indicates the type of data on which the measurement is carried out. If the 'Measurement Data Type' field entry is set to '1' the measurement is carried out over all DL bursts for this SS during the period, that is indicated by Frame Number and Number of Frames. The measurement thereby extends over the DL bursts as a whole, including AAS DL preambles.

Change the description of the 'Frequency Measurement Resolution' field below table 307 as indicated:

Frequency Measurement Resolution
Indicates the frequency measurement points to report on. Measurement points shall be on the frequencies corresponding to the negative subcarrier offset indices \(-\frac{N_{used}}{2} + n\) times the indicated subcarrier resolution and corresponding to the positive subcarrier indices \(\frac{N_{used}}{2} - n\) times the indicated subcarrier resolution where \(n\) is a positive integer. In case of measurement on the downlink data (value '1' of the 'Measurement Data Type' field) only the frequencies occurring in the allocations of the addressed SS shall be reported.

Change the description of the 'Re(Frequency_value[i] and Im(Frequency_value[i])' field below table 308 as indicated:
The real (Re) and imaginary (Im) part of the mean measured complex amplitude on the frequency measurement point (low to high frequency) in signed integer fixed point format ([+-][2bits].[5bits]).

Reason for Recommendation

Resolution of Group: Accepted

On page 90, starting at line 17 add the following text:

Change table 307 as indicated:

Table 307 – OFDMA AAS Feedback Request message body

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFDMA-AAS-FBCK-REQ_Message_Body()</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frame Number</td>
<td>8 bits</td>
<td></td>
</tr>
<tr>
<td>Number of Frames</td>
<td>7 bits</td>
<td></td>
</tr>
<tr>
<td>Measurement Data Type</td>
<td>1 bit</td>
<td>0=measure on downlink preamble only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=measure on downlink data (for this SS) only</td>
</tr>
<tr>
<td>Feedback Request Counter</td>
<td>3 bits</td>
<td></td>
</tr>
<tr>
<td>Frequency Measurement Resolution</td>
<td>2 bits</td>
<td>if Measurement Data Type = 0 {</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b00 = 32 subcarriers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b01 = 64 subcarriers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b10 = 128 subcarriers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b11 = 256 subcarriers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>if Measurement Data Type = 1 {</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b00 = 1 subcarrier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b01 = 4 subcarriers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b10 = 8 subcarriers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0b11 = 16 subcarriers</td>
</tr>
</tbody>
</table>
Add a description of the 'Measurement Data Type' field below table 307 as indicated:

**Measurement Data Type**

<table>
<thead>
<tr>
<th>Reason for Group's Decision/Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group's Notes</td>
</tr>
<tr>
<td>Group's Action Items</td>
</tr>
</tbody>
</table>

**Editor's Notes**

<table>
<thead>
<tr>
<th>Editor's Actions</th>
<th>Editor’s Action Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>k) done</td>
<td></td>
</tr>
</tbody>
</table>

**Editor's Questions and Concerns**

**Editor's Action Items**
A well-designed permutation should minimize the hit ratio between any two subchannels. However, the hit ratio of PUSC in reuse 1/3 configuration is such that a single subchannel in one cell may be hit by the same subchannel in the neighbor cell in as many as 38% of its tones.

Additional problems with PUSC permutation:

The standard deviation of the hit count on a subchannel is high and itself varies widely between different subchannels and IDcell pairs. The number of different permutation sequences is restricted to 8 due to the size of the odd major groups.

Suggested Remedy

Adopt contribution 802.16maint-05/083 ("Hit Ratio Problems with PUSC Permutation").
Several changes to the PUSC permutation IDcell values were adopted in session #35 as a result of contribution maint-04/72r3. As a result, the IDcell for the outer permutation in the first DL zone is now 0 and for the inner permutation it is now specified by the preamble IDcell.

The accepted solution is not satisfactory in the sense that it forces a reuse-3 deployment on the first zone, while the standard is clearly built to support unplanned frequency reuse-1 in other zones (FUSC, PUSC with 'use all SC', optional FUSC). The need to plan the deployment for the first zone takes most of the sting about of the standard's support for reuse-1.

A possible solution is to have the outer permutation in the first zone behave differently based on the LSB of the preamble IDcell. For example:

- IDcell of outer permutation for 1st DL zone = 0 if LSB = 0;
- IDcell of outer permutation for 1st DL zone = preamble IDcell (as is the case for zones with 'use all SC=1') if LSB = 1

**Suggested Remedy**
clarify the support for reuse-1 on the first DL zone:

[modify the text on page 92, lines 17-20 as follows: ]

In the first PUSC zone of the downlink (first downlink zone), the default used DL PermBase is **equal to 0 when the LSB of the preamble IDcell is 0, and is equal to the preamble IDcell when the LSB is 1**. When the 'Use all SC indicator=0' in the STC_DL_Zone_IE(), DL PermBase is replaced with 0. For all other cases DL PermBase parameter in the STC_DL_Zone_IE() shall be used.
The in-slot subcarrier rotations in both DL-PUSC and UL-PUSC permutations are clearly not suited for repetition codes. When repetition occurs over time, repeated bits are placed on the same subcarrier rather than on different subcarriers. As a result, repetition does not combat the fading properties of the channel.

This problem occurs with DL-PUSC and with UL-PUSC when the subchannel rotation scheme is not applied (optional UL PUSC, AAS mode).

Suggested Remedy
change PUSC so that in-slot rotation takes both time and frequency into account:

1) [modify the text on page 569, lines 59-61 of 802.16-REVd/D5 as follows:]

   \[ s is the index number of a subchannel, from the set [0...Nsubchannels-1] \]
   \[ t is the index number of the slot-duration within the zone; the first slot-duration has index 0 \]
   \[ nk = (k + 13 \cdot (s + t)) \mod Nsubcarriers \]

2) [modify the text on page 573, lines 21-29 of 802.16-REVd/D5 as follows:]

   \[ subcarrier(n, s) = (n + 13 \cdot (s + t)) \mod Nsubcarriers \]

   where

   \[ n is a running index 0...47 \]
   \[ s is the subchannel number. \]
   \[ t is the index number of the slot-duration within the zone; the first slot-duration has index 0 \]
   \[ Nsubcarriers is the number of subcarriers per subchannel. \]
Motion to rule the comment in scope by Ran Yaniv, seconded by Tal Kaitz

Vote:
In favor: 8
Against: 10
Abstain: 2
Fails
In section 8.4.14.1 "Center frequency and symbol clock frequency tolerance" of 802.16-2004 it is stated that the symbol clock frequency of the subscriber station (SS) "shall be synchronized to the BS with a tolerance of maximum 2% of the subcarrier spacing". This specification is misleading.

Suggested Remedy
Adopt the changes according contribution C80216maint-05_011r2.

Proposed Resolution Recommendation: Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group: Accepted-Modified
Adopt the changes according contribution C80216maint-05_011r4

Reason for Group's Decision/Resolution

Group's Notes
Group's Action Items

Editor's Notes Editor's Actions  k) done

Editor's Questions and Concerns

Editor's Action Items
One solution is to apply PRBS to all the sub-carriers, starting from first used one, in physical number ordering. Alternatively, in the downlink, for PUSC, FUSC, AMC, and optional FUSC permutation, pilot tones are logically renumbered frequency-domain first (starting from the lowest numbered subcarrier) then time (starting from the lowest numbered OFDMA symbol). In PUSC only pilot tones of clusters assigned to the specific segments are logically sequenced and pilot tones are not subject to cluster renumbering. After pilot tones are logically sequenced, the PRBS sequence described in 8.4.9.4.1 are mapped to the pilot tones.

Proposed Resolution Recommendation: Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group: Accepted-Modified

On page 144, line 48, append the sentence:

"A new value shall be generated by the PRBS for every subcarrier up to the highest numbered usable subcarrier, in order of physical subcarriers, including the DC subcarrier and usable subcarriers that are not allocated."

Reason for Group's Decision/Resolution

Group's Notes
Deferred until 4:30 pm

Group's Action Items

Editor's Notes Editor's Actions k) done

Editor's Questions and Concerns

Editor's Action Items
Rejection of comment 13 means ambiguity remains.

(a) the 802.1Q standard in force when .16-2004 was published was .1Q-2003, so there are at very least editorial corrections to be made.

The draft document is incomplete because it does not deal with the following problem.
The definition of the contents of the 802.3/Ethernet PDU are ambiguous because of the definitions of frames in 802.3.
In 802.3 there is a definition of an entire frame. This includes the inter-frame gap, the preamble at the beginning and the FCS at the end. However there is no definition in that standard of an entity that includes the necessary components (e.g. source and destination MAC address) and does not include these extraneous items. Therefore 802.16 needs to be explicit about what data is included.

See contribution C80216maint-05/075r5 for further supporting argument and technical changes.

Suggested Remedy

Adopt contribution C80216maint-05/075r5.

Also fix references to current version of 802.1Q (2003, not 1998).
Replace page 8, line 14, with the following:
5.2.5 IEEE Std 802.1Q-19982003 virtual local area network (VLAN) specific part
This CS shall be employed when IEEE Std 802.1Q-19982003 tagged VLAN frames are to be carried over the IEEE Std 802.16 network.

Page 8, line 16, modify as follows:
5.2.5.1 IEEE Std 802.1Q-19982003 VLAN CS PDU format

Page 8, line 21, modify as follows:
The format of the IEEE Std 802.1Q-19982003 VLAN CS PDU shall be as shown in Figure 14 (when header suppression is enabled at the connection but not applied to the CS PDU) or Figure 15 (with header suppression). In the case PHS is not enabled, PHSI field shall be omitted.

Replace Page 9, line 1 to line 8 with the following:
5.2.5.2 IEEE Std 802.1Q-19982003 CS classifiers
The following parameters are relevant for IEEE Std 802.1Q-19982003 CS classifiers:
- IEEE Std 802.3/Ethernet header classification parameters-zero or more of the IEEE Std 802.3/Ethernet header classification parameters (Destination MAC address, source MAC address, Ethertype/SAP).
- IEEE Std 802.1D-19982003Parameters-zero or more of the IEEE classification parameters (IEEE Std 802.1D-19982003 Priority Range, IEEE Std 802.1Q-19982003VLAN ID).
- For IP over IEEE Std 802 1Q-19982003 VLAN IP headers may be included in classification. In this case the IP classification parameters...
IP headers may be included in classification. In this case, the IP classification parameters (11.13.19.3.4.2-11.13.19.3.4.7) are allowed.

Proposed Resolution Recommendation: Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group: Withdrawn

Reason for Group’s Decision/Resolution

Group’s Notes

Group’s Action Items

Editor’s Notes Editor’s Actions 1) none needed

Editor’s Questions and Concerns

Editor’s Action Items
Add sentence to the first paragraph: "This message is not applicable for OFDMA PHY" and also add the same sentence for section 6.3.2.3.21.

Suggested Remedy
Add sentence to the first paragraph: "This message is not applicable for OFDMA PHY" and also add the same sentence for section 6.3.2.3.21.

Proposed Resolution Recommendation: Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group: Accepted-Modified

On page 20, line 47, insert the following:
"Add the following sentence at the beginning of the section:
This mechanism is not applicable to OFDMA PHY."

On page 20, line 65, insert the following:
"6.3.2.3.21 Downlink Burst Profile Change Response (DBPC-RSP) message
Add the following sentence at the beginning of the section:
This mechanism is not applicable to OFDMA PHY."

Reason for Group's Decision/Resolution

Group's Notes

Group's Action Items

Editor's Notes

Editor's Actions k) done

Editor's Questions and Concerns

Editor's Action Items
As shown in contribution 802.16maint-05/094, the performance of the ranging codes in noise limited conditions is not satisfactory.

**Suggested Remedy**

Adopt the changes recommended in 802.16maint-05/094

**Proposed Resolution**

**Recommendation by**

**Reason for Recommendation**

**Resolution of Group**

**Decision of Group: Rejected**

Motion to rule the comment as out of scope, by Zion Hadad, seconded by Frank Draper:

In favor: 15
Against: 8
Fails

Vote to accept the comment:

In favor: 3
Against: 16
Fails

**Reason for Group’s Decision/Resolution**

The group believes that the contribution is an improvement and thus out of scope of the project, in addition, the suggestions in the contribution might not provide improvement in an interference limited scenarios.

**Group’s Notes**

**Group’s Action Items**

**Editor’s Notes**

**Editor’s Actions**

1) none needed

**Editor’s Questions and Concerns**

**Editor’s Action Items**
802.16-2004 defines an initial ranging scheme that is based on transmitting either one or two CDMA codes over 6 subchannels (8 with optional PUSC).

However, these schemes do not work when the deployment consists of a multiple-antenna BS (a supported configuration of 802.16-2004) and a power limited SS that requires either repetition or mini-subchannels for its operation. In such scenarios, the code misdetection rate goes as high as 25% misdetection rate for a 1% false alarm rate. With a single-antenna BS, detection performance is only marginal.

These results are obtained under unrealistically optimistic assumptions: time offset is perfectly known, a single code hypothesis, and that there is no contention on the ranging slot.

Suggested Remedy
Consider and adopt contribution C802.16maint-05/094.
In the ranging codes initial clock count formula, the 120 should not be changed to 144.

Suggested Remedy
In the ranging codes initial clock counter formula, the 120 should not be changed to 144.

Proposed Resolution
Recommendation: In the ranging codes initial clock count should not be multiple of 144 to avoid wrap around. The original 120 was fine.

Reason for Recommendation

Resolution of Group
Decision of Group: Rejected

Reason for Group’s Decision/Resolution
The author requests the comment to be rejected due to lack of harmonization

Group’s Notes
Deferred until Thursday 08:00

Group’s Action Items

Editor’s Notes
Editor’s Actions: 1) none needed

Editor’s Questions and Concerns

Editor’s Action Items
The section on CINR reporting contains several problems:

1. The text does not specify to what the CINR measurement relates.
2. The text states that CINR is measured on "messages". It is not clear to which "messages" the text refers.
3. It is not clear whether the averaging factor alpha applies to measurements reported through CQICH.
4. CINR estimates derived for CQICH should be kept distinct from reports triggered by REP-REQ/RSP.

Suggested Remedy
Adopt contribution 802.16maint-05/082r1.

Proposed Resolution Recommendation: Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group: Rejected

Reason for Group’s Decision/Resolution
The author requested the comment to be rejected due to lack of harmonization

Group’s Notes
Defer until Wednesday morning and tie to Comment #18.

Group’s Action Items

Editor’s Notes

Editor’s Actions I) none needed

Editor’s Questions and Concerns

Editor’s Action Items
I object to the accepted solution since it adds an unneeded restriction to the system. For zones with 'use all SC=1', a separate PermBase value should be used for inner/cluster permutations of PUSC without any additional complexity.

This has merit because it can be shown that PUSC permutation hit-ratio properties depend on the DL_PermBase value used; hence better optimization of hit-ratio can be achieved by selecting distinct PermBase values for the different components of the permutation.

Suggested Remedy

[Add the following field to table 358 (DCD channel encodings):]

| DL_ClusterPermBase | 21 | 1 | Value used in the clustering renumbering formula described in section 8.4.6.1.2.1.1, for PUSC zones for which the indicator 'use all SC' = 1.

OFDMA

[modify text on page 92, lines 16-21]

LogicalCluster = RenumberingSequence( (PhysicalCluster+13*IDcell*DL_PermBase DL_ClusterPermBase) mod 120)

In the first PUSC zone of the downlink (first downlink zone), the default used IDcell is 0. In the first PUSC zone of the downlink (first downlink zone) the default used DL_ClusterPermBase is 0. When the 'Use all SC indicator=0' in the STC_DL_Zone_IE(), DL_ClusterPermBase is replaced with 0. For all other cases DL_ClusterPermBase parameter transmitted in the DCD message shall be used, or, if the parameter was not transmitted in a DCD message, the DL_PermBase parameter in the STC_DL_Zone_IE() shall be used.

Proposed Resolution

Recommendation: 

Reason for Recommendation

[Add the following field to table 358 (DCD channel encodings):]
LogicalCluster = RenumberingSequence( (PhysicalCluster + 13 * IDcell) mod 120)

In the first PUSC zone of the downlink (first downlink zone), the default used DL_ClusterPermBase is 0. When the 'Use all SC indicator=0' in the STC_DL_Zone_IE(), DL_ClusterPermBase is replaced with 0. For all other cases, DL_ClusterPermBase parameter transmitted in the DCD message shall be used, or, if the parameter was not transmitted in a DCD message, the DL_PermBase parameter in the STC_DL_Zone_IE() shall be used.

<table>
<thead>
<tr>
<th>Resolution of Group</th>
<th>Decision of Group: Rejected</th>
</tr>
</thead>
</table>

**Reason for Group's Decision/Resolution**

Vote to accept the comment:

In favor: 2
Against: 4
Fails

**Reason:**
Use of the same permutation is to enable macro-diversity multicast/broadcast services when 'use all SC=1'

**Group's Notes**

**Group's Action Items**

**Editor's Notes**

**Editor's Actions**

1) none needed

**Editor's Questions and Concerns**

**Editor's Action Items**