IEEE P802.22
Wireless RANs

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Author(s):				
Name	**Company**	**Address**	**Phone**	**email**
Carl R. Stevenson	WK3C Wireless LLC	4991 Shimerville Rd., Emmaus, PA, 18049-4955 USA	(610) 841-6180	wk3c@wk3c.com

Abstract

The attached report is the output from the comment processing/resolution tool, showing the status of comments as of the datea above.

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Cl **00** *SC* *P* *L* # 797
Chouinard, Gerald Communications Rese

Comment Type **ER** *Comment Status* **D**

How can we insert comments at the right place? ... in the right order such as this one appearing as the comment number 1.

It would be useful to have strike-out and bold text to show what text is removed and what is added.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Need clarification from Gerald on just what he means about inserting comments at the right place.

Cl **00** *SC* *P* *L* # 801
Chouinard, Gerald Communications Rese

Comment Type **ER** *Comment Status* **D**

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED REJECT.

No comment or suggested remedy.

Cl **00** *SC* *P* *L* # 672
Song, Myung Sun ETRI

Comment Type **E** *Comment Status* **D**

It is desirable to work on mandatory items first and then optional items as motioned at the last meeting. Madatory items will be classified in the complance table.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Agreed

Cl **00** *SC* *P* *L* # 753
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **D**

VoIP shall be supported and QoS (delay, BER for examples) should be stated clearly.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED REJECT.

Please supply suggested remedy(ies).

Cl **00** *SC* *P* *L* # 13
HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

CMAC - Cognitive MAC is a name that is too general for the 802.22 scenario. Similarly, CR - Cognitive Radio is too general for our spec.

SuggestedRemedy

Modify CMAC to be 802.22 MAC or WRAN MAC or MAC.
Modify CR to be WRAN or 802.22 systems

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Simply "MAC" seems a reasonable term for our MAC - since the whole document is 802.22 and relates to cognitive WRANS, it seems odd to spell it out everyplace in the document.

Cognitive Radio is one of our key differentiators, the FCC has a definition for that term, and other regulators know what the term means, however, using "CR" as a general replacement for "WRAN" or "802.22 systems" may be inappropriate.

Note to author(s) and editor(s) - Search the document for instances of "CMAC" and replace them with "MAC" and search for instances of "CR" and make sure that they are refering to "Cognitive Radio" and not being used as a general replacement for "WRAN" or "802.22 systems."

Cl **00** SC P L # 752
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **D**

Low complexity CPE is very important to a large scale deployment of WRAN. The specs shall facilitate to support different level of complexity CPEs.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Agree with the sentiment of your comment, but don't know what to do since you don't point to any particular part of the draft, nor do you propose any suggested remedy(ies).

Cl **00** SC P **125** L **8** # 4
Ang, Chee Wei Institute for Infocomm

Comment Type **TR** *Comment Status* **D**

There is no procedure for systematic shutdown of CPE and BS. For example, in page 125 line 8 it is described that a WRAN has to shutdown if there is no TV channel found empty during its operation. But how should shutdown be performed? Should it be implicitly done that the BS simply turn off its broadcast and having all CPEs lose synchronization and will thus also switch off.

SuggestedRemedy

To include a shutdown procedure.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Presumption is that BS will explicitly tell CPEs to stop transmitting and that BS will also stop transmitting after so notifying CPEs.

If you have a specific proposal for a shutdown procedure, please submit in next round of comments against this page and line number.

Cl **00** SC P **216** L # 607
Pirat, Patrick France Telecom

Comment Type **TR** *Comment Status* **D**

Fractional Bandwidth Usage is optional.

SuggestedRemedy

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **00** SC P **240** L # 610
Pirat, Patrick France Telecom

Comment Type **T** *Comment Status* **D**

Several sensing approaches are described. The section is only theoretical. Simulation results and evaluation of the performances are expected.

SuggestedRemedy

Move examples of proven (to the WG's satisfaction) sensing techniques to an informative annex and specify the sensing function as a "black box". The "black box" specification should include all of the necessary inputs, outputs, and behaviors implemented, but should not restrict the implementation of the internals of the "black box."

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **00** SC **1.3** P **1** L **17** # 9
Murray, Peter Motorola

Comment Type **ER** *Comment Status* **D**

No text in clause

SuggestedRemedy

Set to TBD if intention is to provide content, otherwise delete subclause 1.3

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **00** *SC* **5** *P* **6** *L* **2** # 10

Murray, Peter Motorola

Comment Type **ER** *Comment Status* **D**

No text in clause 5

SuggestedRemedy

Set to TBD if intention is to provide content, otherwise delete subclause 5 and renumber remainder of document.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Expectation is that this clause will need to be completed.

Cl **00** *SC* **6.15.5.1** *P* **127** *L* **51** # 141

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""If the status of the RNG-RSP message is continue, the ...""

SuggestedRemedy

If the status of the RNG-RSP message is Continue, the ...

or

If the status of the RNG-RSP message is continue, the ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Understood intention is to either CAP names of states, functions, etc. ("Continue") or alternatively italicize them (the "or" in the remedy). Editor(s) should review document and IEEE-SA Style Guide and make such things consistent.

Cl **00** *SC* **6.6** *P* **16** *L* **10** # 6

Murray, Peter Motorola

Comment Type **E** *Comment Status* **D**

Compare the size of Fig 6 wih Fig 7, subclause 6.8 page 24 line 1-2

SuggestedRemedy

Have an agreed minimum text box size which expands with the content.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Editor(s) should review document and IEEE-SA Style Guide and make such things consistent.

Cl **00** *SC* **6.8.3.2** *P* **33** *L* **5** # 140

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

In Table 41, FEC code type and modulation type fields are not specified. Add BCC and LDPC coding types. Define the values and remove the ""TBD"".

SuggestedRemedy

All of the above.

Proposed Response *Response Status* **O**

Cl **00** *SC* **8.9.1.3** *P* **256** *L* # 611

Pirat, Patrick France Telecom

Comment Type **T** *Comment Status* **X**

I suggest to remove this section since it is confusing. I remember I provided these figures some months ago as the result of measurements on a single carrier upstream channel. That makes no sense with the decisions taken today. Also remove Table 246.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **00** *SC* **9** *P* **278** *L* **18** # 12

Murray, Peter Motorola

Comment Type **ER** *Comment Status* **D**

No Text

SuggestedRemedy

Set to TBD if intention is to provide content, otherwise delete subclause

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **00** *SC* **Figure 204** *P* *L* # 604
Pirat, Patrick France Telecom

Comment Type **TR** *Comment Status* **X**

Provide frequency domain description for one channel only. Channel bonding is optional and should be described in an other section.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **00** *SC* **General comment** *P* *L* # 8
Murray, Peter Motorola

Comment Type **E** *Comment Status* **D**

Clause titles, Table Titles can appear on separate pages to the body text or the actual table.

SuggestedRemedy

Style sheet should be adjusted to ensure that a new clause heading always has at least one line of text on the same page.
Also the table number and heading should always be on the same page as the beginning of the table.
Where necessary a page break should be used to keep a table number and title on the same page as the table.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Editor(s) should review document and IEEE-SA Style Guide and make such things consistent.

Cl **00** *SC* **Several** *P* *L* # 11
Murray, Peter Motorola

Comment Type **ER** *Comment Status* **D**

There are several ""TBD"" locations in the document.

SuggestedRemedy

I know you know:}

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Provide normative content where necessary (options go in annexes).

Cl **00** *SC* **table 226** *P* *L* # 609
Pirat, Patrick France Telecom

Comment Type **T** *Comment Status* **X**

Maximum data rate value given for 3 channels. Since channel bonding is optional the value should be given for one channel.

SuggestedRemedy

Maximum: 24,2 Mbps

Proposed Response *Response Status* **O**

Cl **00** *SC* **Table 228** *P* *L* # 608
Pirat, Patrick France Telecom

Comment Type **E** *Comment Status* **D**

FFT modes. The mandatory mode is 2K. Other modes should be removed from this section.

SuggestedRemedy

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **00** *SC* **Table 230** *P* *L* # 605
Pirat, Patrick France Telecom

Comment Type **TR** *Comment Status* **X**

Remove 12, 18, 17, 21, 16, 24 MHz

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **00** *SC* **Table 232** *P* *L* # 606
Pirat, Patrick France Telecom

Comment Type **TR** *Comment Status* **X**

Remove 2 and 3 TV bands columns.
Parameters such as Nb of guard sub-carriers, Nb of used sub-carriers, Nb pilots,... should be quoted ""to be defined"".

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **0010** *SC* **10.1** *P* **279** *L* **3** # 142
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 247
Lost DS-MAP and lost US-MAP intervals: how does losing MAP messages affect synchronization? Isn't sync based on the preambles?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **003** *SC* **3.10** *P* **3** *L* **17** # 149
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...where BS and...""

SuggestedRemedy

...during which the BS and ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **003** *SC* **3.12** *P* **3** *L* **22** # 150
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...and CRC.""

SuggestedRemedy

...and a CRC.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **003** *SC* **3.13** *P* **3** *L* **24** # 151
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...client subscriber stations (SSs) ...""

SuggestedRemedy

...client consumer premises equipment (CPEs) ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **003** *SC* **3.14** *P* **3** *L* **27** # 152
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...between the base station (BS) and subscriber station ...""

SuggestedRemedy

...between the base station (BS) and the CPE ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **003** *SC* **3.16** *P* **3** *L* **30** # 153
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Formed by ...""

SuggestedRemedy

An element of a frame formed by ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Suggest "A portion of a frame formed by ..."

Cl **003** *SC* **3.17** *P* **3** *L* **31** # 154
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""Defined by the transmission from the BS of a preamble ...""

SuggestedRemedy
Defined by the BS transmission of a preamble ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE. Alternative wording - A repetitive structure starting with the transmission from the BS of a preamble and a SCH followed by a number of consecutive frames.

Cl **003** *SC* **3.18** *P* **3** *L* **33** # 155
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""A duplex scheme ...""

SuggestedRemedy
A duplexing scheme ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **003** *SC* **3.26** *P* **4** *L* **11** # 156
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...the entire access for a ...""

SuggestedRemedy
...the entire access assignments for a ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.
Alternate text - A MAC message that defines access assignments for transmissions from multiple CPEs on the upstream.

Cl **003** *SC* **3.3** *P* **3** *L* **1** # 143
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""A 802.22 cell...""

SuggestedRemedy
An 802.22 cell...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **003** *SC* **3.3** *P* **3** *L* **1** # 144
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...defined as formed by...""

SuggestedRemedy
...formed by...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **003** *SC* **3.3** *P* **3** *L* **2** # 145
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...under control by this 802.22...""

SuggestedRemedy
...under control of the 802.22...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **003** *SC* **3.3** *P* **3** *L* **4** # 146
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
""...SINR quality.""

I believe the FRD (clause 5.3) defines coverage area as that area which can support the minimum data rate to a given CPE.

SuggestedRemedy
...data rate.

Proposed Response *Response Status* **O**

Cl **003** *SC* **3.5** *P* **3** *L* **9** # 147
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...connectivity between subscriber and...""

SuggestedRemedy
...connectivity between a subscriber and...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **003** *SC* **3.9** *P* **3** *L* **15** # 148
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""A MAC message that defines burst start times for both time division multiplex and time division multiple access (TDMA) by a CPE on the downstream.""

SuggestedRemedy
A MAC message that defines CPE downstream burst start times for both time division multiplex and time division multiple access (TDMA).

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.
Alternate text - A MAC message that defines access assignments for transmissions to multiple CPEs on the downstream.

Cl **004** *SC* **4** *P* **4** *L* **13** # 157
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""AES□Advanced Encryption Protocol""

SuggestedRemedy
AES□Advanced Encryption Standard

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.

AES [tab to next cell in table] Advanced Encryption Standard

Cl **006** *SC* **6.1** *P* **6** *L* **18** # 158
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...is regulated by TDM and typically broadcast, while CPEs shall listen only to...""

SuggestedRemedy
... is TDM and typically broadcast, with CPEs listening only to ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.
Alternative language-
The downstream direction (from BS to CPEs) is time and frequency division multiplexed (OFDM) and typically broadcast as a composite signal, with each CPE listening only to those messages addressed to them.

Cl **006** *SC* **6.1** *P* **6** *L* **25** # 159
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""In particular for measurement activities, multicast management type of connections are very suitable as they allow vendor-specific clustering algorithms to be implemented and the measurement load to be shared.""

SuggestedRemedy
Multicast management connections are very suitable for measurement activities as they allow the implementation of vendor-specific clustering algorithms and sharing of the measurement load.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.1** *P* **6** *L* **30** # 160
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...users while at the same time meeting the delay ...""

SuggestedRemedy

...users, meeting the delay ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.1** *P* **6** *L* **33** # 161
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...deterministic basis if it is required.""

SuggestedRemedy

...deterministic basis if required.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.1** *P* **6** *L* **35** # 162
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""On the other hand, data applications are typically more delay tolerant and hence contention may be used to avoid the individual polling these CPEs. Contention is also suitable for saving resources, as it is possible to avoid polling CPEs that have been inactive for a long period of time.""

SuggestedRemedy

Conversely, data applications are typically more delay tolerant, allowing contention to be used rather than polling of individual CPEs. Contention also conserves resources since it avoids polling CPEs that have been inactive for extended periods.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.1** *P* **7** *L* **1** # 163
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""CMAC is connection-oriented, and as such connections are a key components which require active maintenance and thus can be dynamically created, ...""

SuggestedRemedy

CMAC is connection-oriented, so connections are key components that require active maintenance. They can be dynamically created, ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.1.1** *P* **7** *L* **16** # 165
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...with respect to flexibility and, at the same time, efficiency. ""

SuggestedRemedy

...with respect to flexibility and efficiency.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.1.1** *P* **7** *L* **22** # 166
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""...need arises. Hence, it is comprised of one or more PHY/MAC air interface module and a new entity called Spectrum Manager (SM). ""

There is not much detail on the SM. I suppose it is outside the scope of 802.22, but if it is an essential element, we have to make sure it gets described somewhere.

SuggestedRemedy

...need arises. It is comprised of one or more PHY/MAC air interface modules and a new entity called a Spectrum Manager (SM).

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.1.1** *P* **7** *L* **23** # 167

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""CMAC is designed to effectively deal with either single or multiple channels simultaneously, provided these multiple channels are contiguous in frequency domain (hereby called channel bonding).""

SuggestedRemedy

CMAC is designed to effectively manage either a single channel or, optionally, multiple contiguous-in-frequency channels, hereafter referred to as channel bonding.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Alternate language - CMAC is designed to effectively manage either a single channel or, optionally, multiple contiguous channels, hereafter referred to as channel bonding.

Cl **006** *SC* **6.1.1** *P* **7** *L* **25** # 168

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""However, channel availability in the TV bands can be fragmented and the occupation of a channel varies with time. ""

SuggestedRemedy

However, channel availability in the TV bands can be fragmented in both frequency and time.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Alternate wording - However, the availability of contiguous channels in the TV bands will be highly variable and dependent on both geographic location and time.

Cl **006** *SC* **6.1.1** *P* **7** *L* **26** # 169

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Therefore, it is of paramount importance to design an air interface that can also take advantage of channels that are non-contiguously distributed over the entire TV band, and hence provide for increased capacity (hereby called channel aggregation). ""

SuggestedRemedy

Therefore, it is of paramount importance to design an air interface that can also exploit non-contiguously distributed channels over the entire TV band (hereafter called channel aggregation) as another means of providing increased capacity.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.1.1** *P* **7** *L* **3** # 164

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

A connection defines both the mapping between peer convergence processes that utilize the MAC and a service flow (one connection per service flow). For the purposes of mapping to services on CPEs and associating varying levels of QoS, all data communications are in the context of a connection.

""Another concept that is central to CMAC is that of a service flow on a connection. A service flow defines the QoS parameters for the PDUs that are exchanged on the connection, and provide a mechanism for upstream and downstream QoS management. In particular, they are integral to the bandwidth allocation process as a CPE requests upstream bandwidth on a per connection basis (implicitly identifying the service flow). The BS, in turn, grants bandwidth to a CPE as an aggregate of grants in response to per connection requests from the CPE.""

SuggestedRemedy

A connection defines both the service flow (one connection per service flow) and the mapping between peer convergence processes that utilize the MAC.

Service flows define the QoS parameters for the PDUs that are exchanged on the connection, and provide a mechanism for upstream and downstream QoS management. They are integral to the bandwidth allocation process as a CPE requests upstream bandwidth on a per connection basis (implicitly identifying the service flow). The BS, in turn, grants bandwidth to a CPE as an aggregate of grants in response to per connection requests from the CPE.

For the purposes of mapping to services on CPEs and associating varying levels of QoS, all data communications are in the context of a connection.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.1.1** *P* **7** *L* **34** # 170

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The SM has a key role in the overall architecture as it allows the system to take advantage of non-contiguous channels while keeping the simplicity of CMAC (and also of the PHY) and allowing the system to scale (and also evolve) over time. ""

SuggestedRemedy

The SM is a key element in the overall architecture as it enables the system to both exploit non-contiguous channels while minimizing the complexity of CMAC (as well as the PHY) and to scale and evolve over time.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Alternate wording - The SM is a key element in the overall architecture as it enables the system to both exploit non-contiguous channels and to scale and evolve over time while minimizing the complexity of both the CMAC and the PHY.

Cl **006** *SC* **6.1.1** *P* **7** *L* **36** # 171

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It is the entity (which could reside in the management layer - see 1.3) responsible...""

SuggestedRemedy

The SM (which could reside in the management layer - see 1.3) is responsible...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **14** # 175

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The SM has also other capabilities such as taking requests from the various modules. ""

SuggestedRemedy

The SM has other responsibilities such as accepting requests from the various modules.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **16** # 176

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...channel, this is detected ...""

SuggestedRemedy

...channel, it is detected ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **19** # 177

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...and uses the informed response ...""

SuggestedRemedy

...and use the informed response ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **2** # 172

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...associated to each these ...""

SuggestedRemedy

...associated to each of these ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **24** # 178

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...incorporating the SM and the possibility of progressively adding PHY/MAC air ...""

SuggestedRemedy

...incorporating the SM and anticipating expansion through added PHY/MAC air ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **29** # 179

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...while keeping CPEs with low complexity.""

SuggestedRemedy

...while keeping low complexity CPEs.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **3** # 173

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...requirements, ranging (e.g., lower ..."

SuggestedRemedy

...requirements, range (e.g., lower ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **31** # 180

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...be implemented in many ways such as a programmable..."

SuggestedRemedy

...be implemented in a programmable ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **32** # 181

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...device giving high ..."

SuggestedRemedy

...device, permitting high ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **33** # 182

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...could make an efficient use of the radio spectrum as per various criteria ..."

SuggestedRemedy

...could make efficient use of the radio spectrum according to various criteria...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.1.1** *P* **8** *L* **4** # 174
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...dealing with farther away terminals...""

SuggestedRemedy

...serving more remote terminals...

or

...serving more distant terminals...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.10** *P* **102** *L* **15** # 298
Kuffner, Stephen Motorola

Comment Type **ER** *Comment Status* **D**

""...please refer to [5] xxx.""

Is '[5] xxx' identified somewhere? I understand it is probably 802.16-2004, but where is it and why is it just 'xxx'? There are other instances: p.152 l.5, p.160 l. 20, p.265 l. 17.

I also find [2] xxx, [3] xxx and [4] xxx, but no [1].

SuggestedRemedy

Check and correct, or delete as appropriate, missing, incomplete, unused, or inaccurate references.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.11** *P* **102** *L* **43** # 299
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...may be handled on a space-available basis.""

SuggestedRemedy

...may be handled on an as-available basis.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.12.1.1** *P* **105** *L* **12** # 302
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The scheduler (which is implementation dependent) at the BS shall do its best to allocate upstream bandwidth to the CPE that respects the CPE's traffic constraints.""

SuggestedRemedy

The scheduler at the BS shall do its best to respect the CPE's traffic constraints when allocating upstream bandwidth.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.12.1.1** *P* **105** *L* **7** # 300
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It may contain a payload otherwise.""

SuggestedRemedy

Subsequent requests may contain a payload.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.12.1.1** *P* **105** *L* **9** # 301
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...one or more IE that ...""

SuggestedRemedy
...one or more IEs that ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.12.1.2** *P* **105** *L* **33** # 303
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...a subset of Ranging codes ...""

SuggestedRemedy
...a subset of Ranging Codes ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.13.1** *P* **109** *L* **4** # 304
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
""FDD is also supported.""

Most effort seems focused on TDD. Are we really supporting FDD?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.13.4** *P* **110** *L* **9** # 305
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""Information contained in both the DS-MAP and US-MAP messages pertain to the current frame ...""

SuggestedRemedy
Information contained in both the DS-MAP and US-MAP messages pertains to the current frame ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.13.5** *P* **110** *L* **23** # 306
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...defined by the EIRP profile, which constraints the power radiated on channel adjacent to the channel of a TV operation, up to +/- 15. ""

SuggestedRemedy
...defined by the EIRP profile, which constrains the power radiated on channel due to TV operation on up to +/- 15 adjacent channels.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.13.5** *P* **110** *L* **24** # 307

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The present contribution presents the method to determine the power constraint for a single CPE transmitting in 6 MHz in the presence of multiple TV operations in adjacent channels, according to the EIRP profile and the estimated or known distance of the CPE to the noise-protected or Grade B contours of nearby TV stations. The method is applied at the base station, from the collective knowledge of channel sensing, CPE locations, TV operation database information. Note that this transmit power constraint is a maximum transmit power constraint. Other constraints can be build up on top of that constraint to decrease the maximum transmit power, but in no case can the maximum transmit power determined by this method be exceeded.""

SuggestedRemedy

The method to determine the power constraint for a single CPE transmitting in 6 MHz in the presence of multiple TV operations in adjacent channels, according to the EIRP profile and the estimated or known distance of the CPE to the noise-limited or Grade B contours of nearby TV stations, is described in the following clauses. The method is applied at the base station, using channel sensing results, CPE locations, and TV operation database information. Note that this transmit power constraint is a maximum transmit power constraint. Other constraints can be added to this constraint to decrease the maximum transmit power, but the maximum transmit power determined by this method may not be exceeded.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.13.5.2** *P* **111** *L* **1** # 309

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Figure 19:
""TV operation in band N?"" first decision point

SuggestedRemedy

TV operation in channel N?

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note to Editor - numerous other instances of the use of the terminology "TV band" occur in the document where the term should be "TV channel" ... Search for all instances of "TV band" and replace with "TV channel" as appropriate.

Cl **006** *SC* **6.13.5.2** *P* **111** *L* **6** # 308

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

This first paragraph appears to be informative. Should it be labeled as such?

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Unclear whether informative or normative.

Additionally, the comment resolution committee notes that the entire section contains a lot of numbers/limits that we believe need to be thoroughly reviewed and accepted by the WG as a whole.

Finally, the issues of aggregation of power particularly needs further evaluation.

Cl **006** *SC* **6.13.5.2** *P* **112** *L* **1** # 310

Kuffner, Stephen Motorola

Comment Type **ER** *Comment Status* **D**

Figure 19: equation block ""Limit max transmit power as a function of distance""

The equation is not properly rendered

SuggestedRemedy

Fix figure so that it is completely readable.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** SC **6.13.5.2** P **112** L **12** # 311
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Table 223□-Individual CPE maximum transmit power constraint from each individual TV operation, assuming 6 MHz CPE signal bandwidth. The values in bold are then reported in Table 224.""

SuggestedRemedy

This Table caption should be kept with the table. This happens in numerous locations throughout the spec, such as the immediately following table 224.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Unclear whether informative or normative.

Additionally, the comment resolution committee notes that the entire section contains a lot of numbers/limits that we believe need to be thoroughly reviewed and accepted by the WG as a whole.

Cl **006** SC **6.13.5.2** P **113** L **4** # 312
Kuffner, Stephen Motorola

Comment Type **TR** *Comment Status* **X**

""If the CPE is only using 1.5 MHz, then its maximum transmit power can be increased by times (up to 4W EIRP).""

The number of ""times"" is not specified for the power increase. Why does a CPE get to increase its power if it is only using a portion of the channel?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** SC **6.13.5.2** P **113** L **6** # 313
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...if the whole band is occupied by multiple CPEs ...""

SuggestedRemedy

...if the entire channel is occupied by multiple CPEs ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Unclear whether informative or normative.

Additionally, the comment resolution committee notes that the entire section contains a lot of numbers/limits that we believe need to be thoroughly reviewed and accepted by the WG as a whole.

Cl **006** SC **6.13.6** P **114** L **26** # 314
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...as well as tools specific for AAS (see specific PHY sections), ...""

The ""AAS"" terminology does not appear to be used in the corresponding PHY sections (8.10.x.x). Should the terminology use be consistent?

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to editor(s) - terminology should be defined and used consistently throughout the document.

Cl **006** SC **6.13.6.2** P **115** L **9** # 315
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""...aiming the adaptive array at its direction. ""

What is the joining latency for AAS?

SuggestedRemedy

...aiming the adaptive array in its direction.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.13.6.3** *P* **115** *L* **15** # 316
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...with enough energy so it can decode the SCH, DS-MAP and DCD messages.""

SuggestedRemedy

...with enough energy that it can decode the SCH, DS-MAP and DCD messages.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.14** *P* **117** *L* **22** # 317
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Here we discuss the decision a CPE has to make in order to resolve collision in the upstream direction for both Request and Initial Ranging.""

SuggestedRemedy

CPEs must use the following procedures to resolve collisions in the upstream direction for both Request and Initial Ranging.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.14** *P* **117** *L* **44** # 318
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...consider a CPE whose initial backoff window is 0 to 15 and assume it randomly selects the number 11.""

SuggestedRemedy

...consider a CPE with an initial backoff window of 0 to 15 and assume it randomly selects the number 11.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15** *P* **119** *L* **10** # 320
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Hence, the first task a CPE must perform once it attempts to join a network is to scan the set of channels it is programmed to and capable of. ""

SuggestedRemedy

Hence, the first task a CPE must perform when attempting to join a network is to scan the set of channels allowed by its regulatory domain and hardware capabilities.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15** *P* **119** *L* **18** # 321
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""1. Scan channels searching for a BS through the SCH transmission from BSs.""

SuggestedRemedy

1. Scan channels searching for a BS SCH transmission.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15** *P* **119** *L* **19** # 322
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""2. Once SCH is received, ascertain that the use of the channel(s) is permitted (i.e., does not interfere with incumbents)""

SuggestedRemedy

2. Once the SCH is received, ascertain whether the use of the channel(s) is permitted (i.e., does not interfere with incumbents).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15** *P* **119** *L* **23** # 323
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""5.□Perform ranging and Negotiate basic capabilities.""

SuggestedRemedy

5.□Perform ranging and exchange basic capabilities.

also change in Figure 23

Proposed Response *Response Status* **W**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

Cl **006** *SC* **6.15** *P* **119** *L* **24** # 324
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""6.□Authorize CPE and Perform key exchange.""

SuggestedRemedy

6.□Authorize CPE and perform key exchange.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15** *P* **119** *L* **3** # 319
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""As we can see, the definition of an incumbent safe bootstrap phase is critical for cognitive radio systems. ""

SuggestedRemedy

Thus an incumbent-safe bootstrap phase is critical for cognitive radio systems.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15** *P* **120** *L* **3** # 325
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Note that each these steps taken by the CPE consist of a set of actions and error verification.""

SuggestedRemedy

Note that each of these steps taken by the CPE consist of a set of actions and error verification.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15** *P* **120** *L* **4** # 326
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In the following subsections, we provide a more detailed view of these steps and their individual responsibilities.""

SuggestedRemedy

The following subsections provide a more detailed view of these steps.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15.1** *P* **120** *L* **11** # 328
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The WRAN BS starts by consulting the TV usage database and the regional WRAN information base to find potentially empty channels. To ensure these channels are indeed empty, it performs sensing to find one or more empty channels. The WRAN BS begins its service on channels found vacant.""

A WRAN shouldn't be constrained to operate only on empty channels. WRANs may operate on channels occupied by licensed incumbents provided they are outside of the interference range, and on channels occupied by other unlicensed systems provided the interference floor allows tolerable operation. Channels occupied by other WRANs can be negotiated for partial use.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.15.1** *P* **120** *L* **7** # 327

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""WRAN systems may have to reinitialize for example if there is a situation that no TV channel is found empty during WRAN operation due to which it has to shut down.""

SuggestedRemedy

WRAN systems may have to reinitialize if they are occasionally shut down due to an absence of locally available channels. footnote: A channel is considered locally available if there are no licensed operations within the interference range of the WRAN system.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15.2** *P* **120** *L* **14** # 329

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The CPE shall have non-volatile storage in which the last operational parameters are stored and shall first try to reacquire this downstream channel.""

SuggestedRemedy

The CPE shall have non-volatile storage in which the last operational parameters are stored and shall first try to reacquire the last known downstream channel.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15.3** *P* **122** *L* **2** # 330

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""To improve the joining latency in case a long superframe is in use by the BS, the CPE shall use energy detection to help ascertain about the presence/absence of an 802.22 BS in a particular channel. If the energy detected is below the detection threshold, the CPE can safely move to the next channel.""

Aren't all superframes 160 ms? What constitutes a long superframe?

The detection dwell time should be at least one frame long in case there is no scheduled traffic and only the preamble and FCH are transmitted.

Why ""shall""? Is this a shall in the FRD? Why energy detection? Shouldn't this be decided by the sensing tiger team?

SuggestedRemedy

To improve the joining latency, the CPE may use energy detection to ascertain the presence/absence of an 802.22 BS in a particular channel. If the energy detected is below the acquisition threshold, the CPE can safely move to the next channel. The detector should dwell on the channel for at least a single frame duration (10 msec) to account for traffic variability.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.15.3** *P* **122** *L* **8** # 332

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""...the MAC should disregard the channel and, if permitted (e.g., by the DFS model parameters), send a short control message to the BS...""

Unless I'm misunderstanding the DFS portion of the FRD (15.1.2), we get 100 msec aggregate closing time over a 2 sec duration to close out communications on a channel at the present power level (could be the time to backoff the power level too, not just terminate). So why the ""if permitted...""?

SuggestedRemedy

...the MAC should disregard the channel and send a short control message to the BS... . The aggregation of the short control messages shall not exceed 100 ms of transmissions by the WRAN system before remedying the interference condition (i.e., changing channels, backing off transmit power, terminating transmissions, etc.)

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.15.3** *P* **122** *L* **9** # 331
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...send a short control message to the BS indicating that is using a channel occupied by an incumbent.""

SuggestedRemedy

...send a short control message to the BS indicating that it is using a channel occupied by an incumbent at levels above the sensing threshold at that CPE's location.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15.5.1** *P* **126** *L* **15** # 333
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The CPE shall put together a RNG-REQ message ...""

SuggestedRemedy

The CPE shall assemble a RNG-REQ message ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15.5.1** *P* **126** *L* **20** # 334
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The CPE shall set its initial timing offset to the amount of internal fixed delay equivalent to collocating the CPE next to the BS.""

SuggestedRemedy

Ranging is the process whereby each CPE adjusts its initial timing offset to compensate for the propagation delay between itself and the BS such that all CPE transmissions arrive in correct time syncronization at the BS.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note - believe the original text was actually technically flawed

Note to editor(s) - Additionally, the previous sentence in the original text "Ranging adjusts each CPE's timing offset such that it appears to be co-located with the BS." has been merged into the remedy, eliminating the need for both sentences.

Cl **006** *SC* **6.15.5.1** *P* **127** *L* **3** # 335
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...and RSS is the measured RSSI, by the CPE, as described in the PHY.""

SuggestedRemedy

...and RSS is the RSSI measured by the CPE, as described in the PHY (see Clause 8.8).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.15.5.1** *P* **127** *L* **48** # 337
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...unless the status of the RNG-RSP message is success, in which case ...""

SuggestedRemedy

...unless the status of the RNG-RSP message is Success, in which case ...

or

...unless the status of the RNG-RSP message is success, in which case ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Understood intention is to either CAP names of states, functions, etc. ("Continue") or alternatively italicize them (the "or" in the remedy). Editor(s) should review document and IEEE-SA Style Guide and make such things consistent.

Cl **006** *SC* **6.15.5.1** *P* **127** *L* **6** # 336
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In the case that the receive and transmit gain of the CPE antennae are substantially different ...""

I think by convention insects have antennae and radios have antennas.

Will the MAC know the antenna gains, cable losses, etc.? It's not like an encapsulated device where antenna and circuit board traces are well understood. Does this force professional installation?

SuggestedRemedy

In case the receive and transmit gain of the CPE antennas are substantially different ...

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.15.5.1** *P* **128** *L* **28** # 339
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...it shall make some provision for aging out the old CIDs that went unused.""

SuggestedRemedy

...it shall make some provision for purging old unused CIDs.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Question/note to Editor(s) - should the remedy include text indicating that purged CIDs are "recycled"???

Cl **006** *SC* **6.15.5.1** *P* **128** *L* **4** # 338
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In particular, state machines and the applicability of retry counts and timer values for the ranging process are defined in Table 247.""

SuggestedRemedy

State machines and the applicability of retry counts and timer values for the ranging process are defined in Table 247.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16** *P* **128** *L* **38** # 340
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In this section, it is described the several features of CMAC when operating under multiple channels.""

SuggestedRemedy

This section details several features of the CMAC for operating over multiple channels.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.1** *P* **128** *L* **39** # 341
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""6.16.1 Operation under Multiple TV Channels""

SuggestedRemedy

6.16.1 Operation over Multiple TV Channels

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.1** *P* **128** *L* **40** # 342
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""...conclude that it is safe to do it so, the BS may group multiple contiguous TV channels ...""

SuggestedRemedy

...conclude that it is safe to do so, and the BS has determined that at least some of its presently associated CPEs are capable of channel bonded operation, the BS may group multiple contiguous TV channels ...

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.1** *P* **128** *L* **48** # 343
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Once the superframe preamble and SCH are repeatedly transmitted in each channel, the BS shall immediately commence ...""

""repeatedly"" makes it sound like it's a temporal repetition. Clause 8.3.2.1 indicates 4x spreading.

SuggestedRemedy

After the superframe preamble and a 4x-spread SCH are transmitted in each individual channel, the BS shall immediately commence ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.1** *P* **129** *L* **3** # 344
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""...the BS has the freedom to schedule DS and US traffic that spans any number of TV channels.""

I thought that bonding was limited to 3 channels, and not ""any number"".

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.2** *P* **129** *L* **12** # 346
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This is needed as to seek better self-coexistence with other overlapping 802.22 cells. ""

SuggestedRemedy

This facilitates self-coexistence with other overlapping 802.22 cells.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.2** *P* **129** *L* **9** # 345
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...change in the number of logical channels available at PHY and hence ...""

SuggestedRemedy

...change in the number of logical channels available at the PHY and hence ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **129** *L* **16** # 349
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Channel Grouping and Matching

Is the basic idea here that CPEs are grouped into individual channels rather than requiring them to operate over multiple channels simultaneously (that is, channel aggregation at the base station only, and not requiring CPEs to be able to aggregate channels?

The discussion appears to focus on FDD, but I gather it also applies to TDD, correct?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.3** *P* **129** *L* **19** # 348

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It is applicable only when there is more than one protocol stack available at the BS (see 6.1.1).""

SuggestedRemedy

It is applicable only when there is more than one protocol stack available at the BS (see 6.1.1), such as when channel aggregation is used.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that the entire section 6.1 contains substantial descriptions of optional features as if they were mandatory. One example is the multiple PHY/MAC figure with a Spectrum Manager. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.3** *P* **129** *L* **22** # 347

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""First of all, we note that some excessive MAP overhead is required ...""

SuggestedRemedy

First of all, note that some excess MAP overhead is required ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **130** *L* **14** # 352

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Depending on the time-varying channel condition, it can be reported to BS via BLM-REP message so that its own active set 1 can be updated.""

I'm a little confused about the antecedant of the ""it"" which is getting reported here. Can it be elaborated?

SuggestedRemedy

Depending on the time-varying channel condition, it can be reported to the BS via a BLM-REP message so that its own active set 1 can be updated.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note to author(s) and editor(s) - The comment resolution committee is also confused about the antecedant of the ""it"" which is getting reported here and would like to see "it" be elaborated?

Cl **006** *SC* **6.16.3** *P* **130** *L* **17** # 353

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Figure 32 shows our new signal field for DS-MAP Prefix, which is appended right before the DS-MAP. ""

SuggestedRemedy

Figure 32 shows the signal field for the DS-MAP Prefix, which is inserted immediately before the DS-MAP.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **130** *L* **21** # 354

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Another aim of channel grouping ...""

SuggestedRemedy

Another purpose of channel grouping ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **130** *L* **22** # 355
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...channel switching when a CPE find a channel with better quality...""

SuggestedRemedy

...channel switching when a CPE finds a channel with better quality...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **130** *L* **5** # 350
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Furthermore, channel matching is to select active set 1 for individual CPE (see 6.21.4). ""

SuggestedRemedy

Channel matching is to select active set 1 for individual CPEs (see 6.21.4).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **130** *L* **5** # 351
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In Figure 30, we find that CPE 2 and CPE 3 belong to the same channel group. We note that channel grouping is associated to channel matching in the sense that each channel group shares the same channel matching result. ""

SuggestedRemedy

Figure 30 shows that CPE 2 and CPE 3 belong to the same channel group. Note that channel grouping is associated with channel matching in the sense that each channel group shares the same channel match.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **131** *L* **1** # 356
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In other words, it is important to determine the channel that warrants a quality, as the system throughput is directly determined by the channel quality. ""

SuggestedRemedy

Please clarify the meaning of the phrase ""determine the channel that warrants a quality"".

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.3** *P* **131** *L* **2** # 357
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""To this end, we need to address the procedures of selecting the active set 1 for individual CPEs in the downstream and upstream (""Channel matching"" procedure), and selecting a group of CPE's assigned to the same channel (""Channel grouping"" procedure). ""

What is the purpose of this sentence? It introduces the need to address procedures but is not followed up by any text on procedures for selecting active set 1.

SuggestedRemedy

If the sentence is needed, the ""we"" should be eliminated. If it is supposed to point to Clause 6.21.4, then it should do that.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Alternate wording suggestion - "It is necessary to address the procedures for selecting the active set 1 for individual CPEs in the downstream and upstream (""Channel matching"" procedure), and selecting a group of CPE's assigned to the same channel ("Channel grouping" procedure). "

Comment - If it is supposed to point to Clause 6.21.4, then it should do that.

Cl **006** *SC* **6.16.3** *P* **131** *L* **5** # 358

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Even though there is no incumbent user detection, channel matching and channel grouping procedures shall be performed whenever there is more than one stack, so as to maximize the system utilization (average throughput) while minimizing the system cost with the constraints on guard band for FDD operation, co-channel interference, cross-talk in transceiver, and so on.""

SuggestedRemedy

Please clarify the meaning of the phrase ""Even though there is no incumbent user detection..."" ???

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment resolution committee agrees with the question - thought incumbent user detection was a "given."

Also - However, we note that the entire section 6.16.3 appears to depend on the existence of multiple PHYs/MACs and a Spectrum Manager as currently shown in 6.1
For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Finally, is the Standard going to support FDD or not?

Cl **006** *SC* **6.16.4.1** *P* **131** *L* **16** # 363

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

We need to be aware that propagation anomalies could be mistaken for a hidden incumbent scenario. In this case, energy from a TV station that is very distant (100's of miles away) can propagate under special circumstances and appear in other areas. In such a case the BS wouldn't have to change channels to avoid interfering, though it still may choose to change channels if the anamolous signal is causing strong interference to fringe CPEs.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.4.1** *P* **131** *L* **17** # 359

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The BS sensed some channels and it recognized channel x was available, or BS just started the service based on its database information. ""

SuggestedRemedy

Delete the sentence - it's unnecessary.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.4.1** *P* **132** *L* **1** # 360

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...incumbent system radio area ...""

SuggestedRemedy

...incumbent system coverage area ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.4.1** *P* **132** *L* **2** # 361

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""BS cannot recognize this situation because of no information. Also, some incumbent users have experienced interference from the WRAN system. ""

SuggestedRemedy

The BS cannot recognize this situation because it has no access to the information. Meanwhile, some incumbent users may be experiencing interference from the WRAN system.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.4.1** *P* **132** *L* **6** # 362

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The hidden Incumbent case occurs when a BS starts the service the BS changes the service channel. Candidate channel broadcasting by BS and sensing reports for the candidate bands by CPEs can reduce the possibility of hidden incumbent system.""

The first sentence needs to be clarified. The second sentence should reference Clause 6.21.4 for a definition of candidate channels.

SuggestedRemedy

Candidate channel broadcasting by the BS and CPE sensing reports for the candidate channels can reduce the possibility of a hidden incumbent situation. (See Clause 6.21.4 for a definition of candidate channels.) This is further elaborated in the following section.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment to author(s) and editor(s) - In general the comment resolution committee feels that the entirety of 6.16.4.1 could be refined and clarified.

Cl **006** *SC* **6.16.4.2** *P* **132** *L* **13** # 365

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

The outband signalling would at first seem to be an inefficient use of spectrum if it is constantly idling on other channels to provide a means of backup communications for hidden incumbent situations. But that might be the price that has to be paid to coexist safely in licensed spectrum. If the spectrum is available, then there is no real harm and it might as well be exploited, but the cost of a second transceiver in the BS may be objectionable. What if spectrum starts getting squeezed in the area and outband channels cannot be found?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.4.2** *P* **132** *L* **14** # 364

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""To address the hidden incumbent system case, BS periodically broadcasts Outband signal including the information on current channel in some of other unoccupied channels (e.g., candidate channels). The Outband signal is a control signal on the band other than current band. This broadcast signal follows the same PHY and MAC frame architecture (not to necessitate additional protocol or PHY module). When some CPEs cannot decode the BS's current service channel, the CPEs try to sense other channels to locate the BS signal. If CPEs receive an explicit out-band broadcast signal, the CPEs recognize the current service channel id. If the current channel was already sensed and was found to be not decodable at the CPEs, then the CPE sends a report to the BS using the upstream in outband. After receiving the report, BS changes its service channel to other available band because BS notices the existence of the hidden incumbent in the current service band. Figure 34 shows the explicit outband signaling for hidden incumbent case detection.""

SuggestedRemedy

To address the hidden incumbent situation, the BS periodically broadcasts an outband signal containing the current channel information in some other unoccupied channels (e.g., candidate channels). The outband signal is a control signal on a channel other than current channel. This broadcast signal follows the same PHY and MAC as a normal communications channel. If some CPEs cannot decode the BS's current service channel, the CPEs try to sense the candidate channels to locate the BS outband signal. If CPEs receive an explicit outband broadcast signal, the CPEs recognize the current service channel ID. If the current channel was already sensed and found to be undecodable at the CPEs, then the CPE sends a report to the BS using the upstream in an outband channel. After receiving the report, the BS changes its service channel to the other available channel since it has become aware of the hidden incumbent in the current service channel. Figure 34 shows the explicit outband signaling for hidden incumbent situation detection.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment to author(s) and editor(s) - In general the comment resolution committee feels that the entirety of 6.16.4.2 could be refined and clarified.

Cl **006** *SC* **6.16.4.2** *P* **133** *L* **20** # 369

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""First method is that BS allocates explicit resource in the outbands to each CPE after CPE initialization procedure. BS recognizes CPEs that want to send the reports and then allocates dedicated resource (upstream burst). This method requires additional overhead. ""

If I understand correctly, each active CPE gets assigned a DS/US-MAP location. If there are a lot of active CPEs, how many resources are required? Why isn't the outband channel treated like any other channel with ranging, BW requests and scheduling? Could this be a good app for fractional BW use if there is limited spectrum in the area? However, if there is a problem, chances are this outband signalling channel might become the new primary communications channel, so you might not want others sharing it with fractional BW.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.4.2** *P* **133** *L* **4** # 366

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Explicit out-band broadcast signal follows the usual PHY and MAC frame architecture like in the service channel. Figure 35 shows the frame structure of explicit outband broadcast signal. The SCH includes a flag to indicate that the current MAC frame is for regular service or for outband broadcast signal. DS-Burst includes service channel information, such as service channel numbers and candidate channel numbers.""

SuggestedRemedy

The explicit out-band broadcast signal follows the same PHY and MAC frame architecture as the service channel. Figure 35 shows the frame structure of the explicit outband broadcast signal. The SCH includes a flag to distinguish whether the current MAC frame is for regular service or for outband broadcast service. The DS-Burst includes service channel information, such as service channel numbers and candidate channel numbers.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment to author(s) and editor(s) - In general the comment resolution committee feels that the entirety of 6.16.4.2 could be refined and clarified.

Cl **006** *SC* **6.16.4.2** *P* **133** *L* **9** # 367

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""When a CPE receives an outband signal, given that the current service channel was not decodable by the CPE, then the CPE sends ""Hidden incumbent report"" to BS using the US-Burst in the outband. Hidden incumbent report can indicate ""the current service channel x is not decodable"" and/or ""the current service channel x is used by an incumbent system"" if the CPE can recognize incumbent signal. Also, the report can include sensing result for some other channels.""

SuggestedRemedy

When a CPE receives an outband signal, given that the current service channel was not decodable by the CPE, the CPE sends a hidden incumbent report to the BS using the US-Burst in the outband frame. The hidden incumbent report can indicate ""the current service channel x is not decodable"" and/or ""the current service channel x is used by an incumbent system"" if the CPE can identify the incumbent signal. Also, the report can include sensing results for other channels.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment to author(s) and editor(s) - In general the comment resolution committee feels that the entirety of 6.16.4.2 could be refined and clarified.

Cl **006** *SC* **6.16.4.2** *P* **138** *L* **19** # 368

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""BS can allocate upstream resource for CPE's ""Hidden incumbent report"" using one of the following two methods. First method is that BS allocates explicit resource in the outbands to each CPE after CPE initialization procedure. BS recognizes CPEs that want to send the reports and then allocates dedicated resource (upstream burst). This method requires additional overhead. Second method is that BS divides US resource into US-Burst slots for all unknown CPEs according to maximum hidden incumbent report size. The allocated US-Burst slots are indicated in the US-MAP. When a CPE sends the hidden incumbent report, the CPE randomly selects a US-Burst, and then the CPE sends the report with the selected US-Burst.""

SuggestedRemedy

The BS can allocate upstream resources for a CPE's hidden incumbent report using one of the following two methods. First, the BS can allocate explicit resources in the outband channels to each CPE after the CPE initialization procedure. The BS recognizes CPEs that want to send the reports and then allocates dedicated resources in the upstream burst. This method requires additional overhead. Second, the BS can divide US resources into US-Burst slots for all unknown CPEs according to maximum hidden incumbent report size. The allocated US-Burst slots are indicated in the US-MAP. When a CPE sends the hidden incumbent report, the CPE randomly selects a US-Burst, and then the CPE sends the report in the selected US-Burst.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment to author(s) and editor(s) - In general the comment resolution committee feels that the entirety of 6.16.4.2 could be refined and clarified.

Cl **006** *SC* **6.16.5** *P* **134** *L* **1** # 370

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

The support for single channel CPE method seems inefficient. Seems like a lot to go through if there are only one or two single channel devices out there.

SuggestedRemedy

A better method may be to have all of the frame management slots such as the ranging, UCS, and BW request slots, located in a single physical channel as would be done for single channel. When a single channel device acquires a SCH, it is informed that the system is bonded and which TV channel in the bonding is assigned to single channel devices, e.g. always the lowest frequency channel. The preamble would need to be modified so that the same one can be used by both single channel and multi-channel CPEs. The DS/US-MAP and FCH would also have to be located in the single channel physical channel. This seems like it's mostly a scheduler problem.

Then single channel devices could always be assigned to the lowest freq channel of the bonding where the FCH, MAPs and ranging/UCS/requests are located. Single channel devices get priority in assignment to resources in that channel; if there are resources remaining after they are assigned, then bonded channel devices could also be scheduled onto that physical channel.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.5** *P* **134** *L* **1** # 371

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Could we just make channel bonding into channel aggregation of contiguous channels when multiple contiguous channels are available and single channel devices are present? It could still be easier for the transceiver to handle (i.e., the CPE wouldn't have to transceive on multiple different freqs simultaneously like in distributed aggregation). It is not fair to the channel bonding capable devices, but why should it be unfair to the single channel devices?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** SC **6.16.6** P **135** L **4** # 390
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

With DFH, if a hidden incumbent situation shows up on an operating channel for a CPE, it just has to wait for the next hop in the pattern to alert the BS to the situation. Question is, will it always know the next hop in the pattern? The pattern could change if the WRAN discovers another problem on the next hop in the pattern. How does the CPE re-synchronize to the hopping pattern? Does it have to reaquire from the start, or can it go to its last successful channel and wait there? Perhaps the WRAN could project what it expects the next hop in the pattern to be if everything stays as is. If something changes on that channel's availability, perhaps there should be yet another backup channel. How do coordinating WRAN systems resynchronize their hopping patterns when something like this happens?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** SC **6.16.6.1** P **135** L **21** # 372
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Sensing shall be performed as reliably and as timely as specified in [3];
""The impact of sensing on data transmissions shall be limited to an acceptable level such that QoS requirements as specified in [3] can be satisfied. Satisfying application QoS requirements can be relaxed according to the supported applications.""

[3] is not identified in the document. I understand it is probably the FRD but where is that explicitly stated?

SuggestedRemedy

Provide correct reference.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** SC **6.16.6.1** P **135** L **36** # 373
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Guard Band = - ceil(Number_of_Bonded_Channels/2)""

Is this really supposed to be negative? Also, Fig 37 caption should be on the same page as the figure.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** SC **6.16.6.2** P **136** L **10** # 375
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In Figure 38, we illustrate the WRAN operations applying the DFH technique with simultaneous sensing and data transmissions. Note that although we deal with the case that the WRAN system operates on a single channel ...""

SuggestedRemedy

Figure 38 illustrates WRAN operations applying the DFH technique with simultaneous sensing and data transmissions. Note that although this case shows the WRAN system operating on a single channel ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** SC **6.16.6.2** P **136** L **18** # 376
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The time axel of the WRAN operations ...""

SuggestedRemedy

The time axis of the WRAN operations ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.2** *P* **136** *L* **4** # 374
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In this section we specify the operation principle of Dynamic Frequency Hopping (DFH), ""

SuggestedRemedy

This section specifies the operation of Dynamic Frequency Hopping (DFH),

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.6.3** *P* **137** *L* **13** # 377
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We specify in this section the Channel Setup ...""

SuggestedRemedy

This section specifies the Channel Setup ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.6.3.1** *P* **137** *L* **29** # 378
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...which the integrated channel open transmission time is up to 100 ms.""

SuggestedRemedy

...which the aggregate channel open transmission time is up to 100 ms.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.3.1** *P* **137** *L* **32** # 379
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This timing requirement for channel setup has to be satisfied so as to initiate reliable communications on a new channel or a channel that is not effectively maintained.

""Channel Availability Check
""Channel Move Messaging
""Hardware Switching Time""

The purpose of these bullet items is not clear.

SuggestedRemedy

Provide appropriate descriptive information for each of the 4 bullet items in the sub-clause.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.3.2** *P* **137** *L* **41** # 380
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...periodic channel maintenances shall be performed ...""

SuggestedRemedy

...periodic channel maintenance shall be performed ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.3.3** *P* **137** *L* **46** # 381
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We specify the channel setup and maintenance mechanism (procedure) that satisfies the timing requirements for frequency switching and minimizes the frequency switching latency, as follows.""

SuggestedRemedy

The channel setup and maintenance procedure that satisfies the timing requirements for frequency switching and minimizes the frequency switching latency is as follows:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.3.3** *P* **138** *L* **11** # 383
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...channel maintenances for all CPEs ...""

SuggestedRemedy

...channel maintenance for all CPEs ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.3.3** *P* **138** *L* **13** # 384
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We identify a channel as well-maintained if the above condition ...""

SuggestedRemedy

A channel is identified as well-maintained if the above condition ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.3.3** *P* **138** *L* **2** # 382
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We refer to this channel cluster as Cluster A.""

SuggestedRemedy

This channel cluster is referred to as Cluster A.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.4** *P* **138** *L* **31** # 385
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In this subsection, we specify the principle and operations of clean sensing for WRAN systems operating in Dynamic Frequency Hopping mode.""

SuggestedRemedy

This subsection specifies the principle and operations of clean sensing for WRAN systems operating in Dynamic Frequency Hopping mode.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Also, "clean" sensing needs to be defined or explained if it's not before it's used.

Cl **006** *SC* **6.16.6.4.1** *P* **139** *L* **10** # 386
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""A Quiet Time period shall be larger than the minimum sensing time ...""

SuggestedRemedy

A Quiet Time period shall be longer than the minimum sensing time ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.16.6.4.2** *P* **139** *L* **19** # 387

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Coordination among WRAN systems for Operation Phase Shifting""

SuggestedRemedy

Coordination among WRAN systems for Phase Shifting Operation

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.6.5** *P* **139** *L* **27** # 388

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Their frequency hopping might have taken place before they are able to detect such conflicting situation.""

SuggestedRemedy

Their frequency hopping might have taken place before they were able to detect such a conflicting situation.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.6.5** *P* **140** *L* **15** # 391

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""All WRAN systems shall, if possible, monitor the DFH announcements from neighboring systems at all time. ""

How are inter-system DFH announcements exchanged? Are they over the air? What is their format? Is there a throughput impact from monitoring DFH announcements at all times?

SuggestedRemedy

All WRAN systems shall, if possible, monitor the DFH announcements from neighboring systems at all times.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.6.5** *P* **140** *L* **4** # 389

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""To avoid frequency hopping collision, we specify a scheme called DFH/CA (collision avoidance), which is illustrated in Figure 42 and Figure 43.""

SuggestedRemedy

A scheme called DFH/CA (collision avoidance) is specified to avoid frequency hopping collisions, and is illustrated in Figure 42 and Figure 43.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.6.5** *P* **141** *L* **26** # 392

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""On the other hand, if the received DFH announcement has the same frequency selection as the WRAN system has just announced, and if the time stamp of its own announcement is earlier than the time stamp of the received one, the WRAN system can hop to the selected frequency in the next operation period after the waiting period is expired.""

This would seem to require some universal time base. What universal time are the time stamps based on?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.6.5** *P* **141** *L* **3** # 393

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Otherwise, if the time stamp of its own announcement is equal to or later than the time stamp of the receive announcement for the same frequency selection, the WRAN system shall not hop to the selected but conflicting frequency in the next operation period.""

Doesn't the WRAN then have to make another choice and announce it before it hops to the new channel?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.16.7** *P* **142** *L* **12** # 395

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Is the definition of active set 1 and 2 used here consistent with the definition in Clause 6.21.4.1? I find I am confused by the definitions and think they could be improved.

SuggestedRemedy

Answer the question and improve the definitions.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

DFH is optional.

For clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.7** *P* **142** *L* **4** # 394

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This contribution is devised to support a distributed sensing scheme which is the requirement of FRD (Section 15.1.5).""

SuggestedRemedy

This section describes a means to support a distributed sensing scheme as required by the FRD ([3], Section 15.1.5).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

However, we note that this section 6.1 contains substantial descriptions of optional features as if they were mandatory, including references to themultiple PHY/MAC architecture with a Spectrum Manager of 6.1. Alternative means of channel aggregation/load balancing could (and maybe should?) occur at the 802.1d bridging level.
Therefore, for clarity in the document, a basic single channel system should be described and, at the appropriate points, provide the "hooks" for options that are agreed to be part of the Standard by the WG and then point to the details of options in Annexes to the main document.

Cl **006** *SC* **6.16.7.1.1** *P* **142** *L* **25** # 396

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Distributed sensing is an efficient approach for on-channel sensing when channel aggregation is used. However, the description is hard to follow and much editorial work is required.

SuggestedRemedy

Rewrite/refine the section to make it read better and more clearly describe Distributed Sensing (the section title should also be modified to "Distributed" rather than "Distributive"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.2** *P* **8** *L* **40** # 183

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...by which the BS and CPE each verify the identity of the other.""

SuggestedRemedy

...by which the BS and CPE verify each other's identity.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.2** *P* **9** *L* **1** # 184

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...16-bit CID, thus allowing a ...""

SuggestedRemedy

...16-bit CID, allowing a ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.2** *P* **9** *L* **13** # 185

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...required only for managed CPE, and ...""

SuggestedRemedy

...required only for managed CPEs, and ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.2** *P* **9** *L* **24** # 186

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...purposes. Despite of that, since the original ...""

SuggestedRemedy

...purposes. Since the original ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.21.1.4** *P* **163** *L* **22** # 452

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Detection during normal operation is not clear for on-channel detection. Does this only work for incumbent signals much stronger than the normal traffic? Is the system looking for on-channel incumbents during normal operation? Or does this still rely on opportunistic sensing?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.4.1** *P* **164** *L* **9** # 397

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""...in the next frame (and optionally in subsequent frames) right after the end of the quiet period the BS shall limit its downstream transmissions to the minimum necessary, and devote most of its frame allocation for upstream traffic. Not only that, to guarantee that most CPEs get a chance to reliably contact the BS with a measurement report, the BS shall divide the entire upstream bandwidth allocation into at most two parts (not necessarily of equal size): dedicated per CPE upstream allocation and UCS notification slots.""

How many resources are required for CPEs to make their sensing reports? Initial reports? More detailed reports? Note the more detailed reports still have to fit within the aggregate transmission limit of 100ms. Also, BS retries (line 33) would have to fall within this aggregate limit.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.4.1** *P* **165** *L* **18** # 398

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The use of both of these types of notification schemes will provide a quick and reliable report from the CPEs to the BS to be made in the first stage, and allow the BS to dedicate, in a second stage, more upstream bandwidth resources for a full report only to those CPEs who claim having detected the presence of incumbents.""

Couldn't there be a lot of contention in the UCS slots if an incumbent shows up? Wouldn't the presence of energy alone in the UCS slots be an indication that something is wrong on the channel and that the BS needs to immediately schedule a quiet period?

Also, can't UCS just be blindly used assuming frame timing and ranging are still valid? Will UCS allocations change on a regular basis?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.4.2.1** *P* **166** *L* **3** # 399

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In case no other CPEs report the same UCS with incumbents, the BS may conclude that a measurement report by a single CPE is not reliable and may disregard it. On the other hand, if multiple CPEs report the same coexistence situation in the same Channel Number, then the BS may take one of the measures discussed above in order to resolve the issue.""

Shouldn't this depend on the spatial distribution of CPEs? If the CPE is in an area were they are very sparsely distributed, a report of an incumbent detection should be taken seriously and another sensing period should be scheduled. If CPEs are in a very densely distributed area, a report from one but not others can probably be ignored. The impact on probability of missed detection needs to be considered.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.4.2.2** *P* **166** *L* **8** # 400

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Does a CPE take its own initiative to double check an incumbent detection to minimize false alarms, or does it just go ahead and report whenever it detects? Pehaps something like a 2 out of 3 detections before reporting? Need to study impact on probability of detection.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.4.2.2.2** *P* **166** *L* **39** # 401
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""As specified in 8, the PHY has available a subset of Incumbent Codes that shall be used for contention-based CDMA UCS Notification. ""

I see no indication of such codes in the PHY Clause (8). Perhaps the ""8"" here is referring to MAC subclause 6.8.4?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.5** *P* **167** *L* **37** # 402
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Every CPE shall perform this procedure according to the DFS model defined in the FRD, which in its present version specifies a repetition period of execution equal to 6 seconds (i.e., 20% of the Channel Availability Check Time).""

Doesn't the CPE have to scan +/- 15 channels (in UHF - there aren't that many in VHF) within 2 sec to determine if any licensed activity has commenced? It also has to scan its co- and 2 adjacent channels every 2 sec.

How does it scan the 36 UHF channels (assuming they are all available)? Does it dwell on each one for 6/36 of a second = 167 ms and then not revisit it again within the remainder of the 6 seconds, or does it just visit each channel long enough to make a detection? That is, if a CPE can only sense during a DS of 10ms frame, or for about 5ms, does it just do that once per channel or multiple times over say 16 total frames (167 ms / 10ms frames)?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.5** *P* **167** *L* **41** # 403
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Finally, IDRP also incorporates a mechanism to overcome the situation that may occur and which leads to an erroneous perception from the BS that incumbents occupy all channels, and hence causes the interruption of all transmissions in a cell. ""

I'm confused by this sentence. Why is the perception erroneous? Is it because the CPEs are reporting false alarms?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.5** *P* **168** *L* **3** # 454
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Figure 63:
After the ""Channels left?"" decision, there's a box ""Select a candidate channel as per the optimization criteria""... what is the optimization criteria?

Further down this chain, ""Did I receive a occupied channel notification from a CPE in this selected channel?"" and ""Wait for CPE free channel notification"" - how does a CPE notify the BS if the answer to ""channels left?"" was ""no""? Is the BS operating anywhere?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.5** *P* **169** *L* **1** # 453

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Figure 64 questions:
1. The ""Is channel N in-band?"" decision has ""no"" going back to ""operational"". But couldn't there be an impact on EIRP due to the EIRP profile and the fact that this new incumbent is not in-band? If the EIRP is significantly cut back due to its presence, a channel change might be required to continue to serve the operator's more remote customers. Same w/ Fig. 63.

2. The junction after the ""yes"" on the ""is channel N in-band"" decision is confusing and should be redrawn.

3. Don't the ""backup channel information available?"" yes/no branches really both have to do the same thing? Scan for both incumbents and BS beacons?

4. Does the ""no"" output of the ""did I detect the incumbent service in channel N?"" go to the ""backup channel information available?"" decision?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.5.1** *P* **170** *L* **1** # 405

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Is this incumbent detection recovery method complementary to outband signaling or another option to use instead of outband signaling?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.5.1** *P* **170** *L* **11** # 404

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Figure 66 shows five possible the incumbent appearance scenarios:

- Case 0: When IU detected by both BS and CPE
- Case 1: When IU detected by both BS and CPE
- Case 2: When IU in downstream detected by BS
- Case 3: When IU in upstream detected by CPE
- Case 4: When IU in downstream detected by CPE""

What distinguishes Case 0 from Case 1? Is Case 1 supposed to be ""When IU detected in upstream by BS""?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.5.1** *P* **172** *L* **4** # 406

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Figure 70. If a CPE isn't reporting, it could be due to some other reason besides incumbent interference such as power failure, storm or other damage to antenna, etc. The system wouldn't have to switch frequencies if this is the case. However, if the spectrum is available there is no harm to switching freqs provided an equivalent Tx power can be used.

Also, CH_SCAN_* messages don't show up in Table 24. I don't find them described anywhere. What are they?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.7.1** *P* **174** *L* **8** # 407
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In case no SCH is received for such duration of time, the CPE shall assume that no 802.22 system is operating in the channel. Despite of that, it shall continuously scan the desired channel in search for SCH transmissions as a BS may erroneously attempt to initiate transmission in this channel at any time.""

How does the CPE continuously scan the desired channel when nearby microphones, perhaps multiple, are operating co-channel? Does it only operate at the beginning and then shut down? What if a new WRAN system or some other unlicensed system comes later and scans the channel?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.1.7.2** *P* **174** *L* **27** # 408
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

If all of the BSs in Fig. 75 are operating in the same area, how are they effectively sensing when their quiet periods are not lined up? Wouldn't real CPEs be exposed to the same environment? Shouldn't the quiet periods be synchronized?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.1.2** *P* **178** *L* **18** # 455
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

How is contention among coexistence beacons resolved?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.1.2** *P* **178** *L* **2** # 409
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In CBP, 802.22 entities (i.e., CPEs and BSs) are capable of transmitting beacons (see 6.6.1.2) which provide its recipients enough information to achieve satisfactory and good coexistence amongst overlapping 802.22 cells. These beacons are intended for inter-cell communication and carry specific information about a CPE's cell of attachment and downstream/upstream bandwidth allocations with the BS.""

How are CPE beacons transmitted to other cells if fixed directional antennas are used?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.1.2** *P* **178** *L* **20** # 410
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In other words, during this time CPEs shall use the contention access mechanism (see 0) to gain access to the ...""

Bad reference, seems to point to 6.13.5. Another reference to see ""0"" occurs on line 25, but that one points to 6.18. Are these the right references? The line 20 ""see 0"" is supposed to discuss the contention access mechanism, yet 6.13.5 is about transmit power control. Where is CBP contention discussed?

SuggestedRemedy

Eliminate "In other words," and start with "During this time ..."

...(see 6.13.5)

Check/correct all references and answer all questions in the comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.21.2.1.2** *P* **178** *L* **30** # 411

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""A CPE shall only be locked to the BS whenever it is scheduled to receive/send data from/to the BS (indicated through the US-MAP and DS-MAP messages). At all other times during the frame, the CPE shall be listening to the medium and searching for a coexistence beacon.""

How does it hear a beacon from another cell if it is hearing DS from the BS or US from other CPEs?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.1.2** *P* **178** *L* **38** # 412

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Essentially, the Passive Mode defines a time where the CPEs shall not perform any transmission but simply listen to the medium on the look out for CBP packets and, possibly, BS SCH beacons.""

What is the duration of a CBP and this associated quiet period? From Fig 78 it looks like it is at least several bauds.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.1.2** *P* **178** *L* **42** # 413

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""It is important to note that to increase the effectiveness of CBP, downstream/upstream bandwidth allocations made by BS to CPEs in a certain frame shall not change for a number of consecutive frames. ""

What does this mean? Are CPEs assigned resources on multiple consecutive frames even if they don't need them? How many frames? What is the impact on availability of resources for the scheduler to work with?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.1.2** *P* **178** *L* **48** # 414

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""That is, the BS shall always allocate bandwidth to a CPE using approximately the same combination of slot and logical channel. By doing so, this will reduce the number of coexistence beacons that need to be transmitted by this CPE, since its neighbors would already have the information regarding the allocations as these have not been changed by the BS.""

How rigid is this? What is the throughput change threshold that makes it worthy of transmission of a CBP so that the scheduler may expand the allocation? Is QoS compromised?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.1.2** *P* **179** *L* **1** # 415

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The BS, in turn, will implement so-called ""interference-free"" scheduling algorithm, which schedules the various upstream/downstream traffic from/to CPEs in such a way that these allocations do not intersect with the allocations of this CPE's interfering CPEs.""

Where is interference-free scheduling explained? I understand we don't cover schedulers in PHY/MAC, but should we at least give guidance here? How is this realized? How do the BSs negotiate the resources allocated to one CPE over the other? Who's QoS takes precedence? What if multiple CPEs from both systems in an overlap region have differing QoS needs? How is the rest of the cell impacted?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.2** *P* **179** *L* **28** # 416

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""CMAC incorporates inter-BS communication by allowing both BSs and CPEs to detect and receive SCH transmissions from other collocated BSs. In case of the BS, it may either periodically listen to or even schedule downstream/upstream per frame quiet periods (i.e., Coexistence in Passive Mode - see 6.8.2.1.1 and 6.8.4.1.1) with the goal of detecting SCH frames transmitted by other BSs within its transmission range.""

I need clarification on this. If the frames of nearby systems are synchronized (you wouldn't want one system's CPE Tx'ing while a neighbor CPE from another cell is Rx'ing), how can a BS both listen to another BS's SCH and transmit its own? If scheduling a quiet period during its SCH, it has to transmit its own SCH some time later; don't they get out of sync, especially if there are numerous overlapping cells?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.3** *P* **179** *L* **46** # 417

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Or, we may ask the WRAN systems to be supportive of each other and share the resources they have acquired for free.""

It's unlicensed spectrum... free is implicit.

SuggestedRemedy

Or, WRAN systems may be expected to be supportive of each other and share the resources they have acquired.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.3.1** *P* **180** *L* **7** # 418

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Upon reception of the resource request, the neighboring WRANs respond through CBP with their active and candidate sets. The union of candidate sets from the neighbor BSs forms the grand candidate set for the renter. The transaction is completed by sending the channel number chosen and the amount of renting time to the neighbor WRANs and receiving the acknowledgement from the offerer.""

I understand exchanging active sets, but can any BS ""reserve"" a candidate channel? If a system is not transmitting on a channel, isn't it available for any other system to use? Does a system wishing to use an unoccupied (candidate) channel have to notify other local systems how long it intends to use this unused channel? Won't BSs discover the occupation of their former candidate channel through regular scanning?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.3.4** *P* **180** *L* **27** # 419
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Figure 79 illustrates the On-Demand Spectrum Contention (ODSC) algorithm, which is an optional feature in the MAC.""

ODSC is indicated as being optional. Is the 6.21.2.3.1 renter/offeror algorithm mandatory? It is not identified either way.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.2.3.4** *P* **180** *L* **34** # 420
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...which are described in detail throughout Section6.""

SuggestedRemedy

... which are described in detail throughout Clause 6.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.21.2.3.4.1** *P* **182** *L* **25** # 421
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

How is ODSC partitioned? On a frame by frame basis? Superframe basis?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3** *P* **186** *L* **14** # 422
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""For out-of-band measurements, quiet periods are not necessary and hence the BS can allow, if desired, a certain level of autonomy to the CPE to decide when to perform these measurements.""

...well, sort of. If neighboring WRANs are operating on these channels, we cannot sense those channels for incumbents unless the occupying WRAN has a quiet period while we're visiting that channel.

We should say that to keep CPEs low complexity, they may not be able to sense off-channel during upstream communications. Note that this would pretty much limit sensing techniques to those requiring less than about 5 ms with 50% U/D split. Even if a CPE isn't scheduled to transmit, his neighbor might be, which could interfere with his sensing depending on receiver dynamic range (unless this is accounted for with location-based scheduling).

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3** *P* **186** *L* **20** # 423
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Immediately after the end of a quiet period longer than one frame size, the BS shall transmit a preamble for the purpose of resynchronization of all CPEs in the cell and for channel estimation (see 8 for further details).""

If the quiet period is an integer number of frames, won't it automatically be followed by a preamble from the next frame? Is the case mentioned here for when the quiet period ends in what would have been the middle of another frame? We don't start a new frame phase, do we? What happens to neighboring cells that have been sync'd (or do they all have he same quiet period and so restart a new frame at the same time)? Can we even use a partial frame that starts late to maintain frame phase?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3.1** *P* **186** *L* **24** # 424

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Due to the possibility of multiple overlapping 802.22 cells, it is desirable that the quiet periods of a cell be synchronized as much as possible with its overlapping cells.""

Quiet periods can strictly only be synchronized at one point (I think two BSs can be sync'd on the bisector of the line connecting the Bss). For two BSs separated by a 30km radius, their quiet periods could be e.g. sync'd at the 15km midpoint but be out of sync by 100usec at the edges of their 30km cells. Whether this is a significant problem depends on the duration of the quiet period.

Actually it can be worse than this because the neighboring cells impact the quiet period until their influence drops more than 6dB below the noise floor (for a 1dB noise floor uncertainty). If a CPE can operate at 30 km at e.g. 3dB SNR, then the WRAN emissions have to drop another 9 dB to have negligible influence; at e.g. 40dB/decade propagation that corresponds to .225 range decades beyond 30km or 50km influence. Thus the quiet period of a CPE out here starts 167 usec later than for a CPE near the BS.

SuggestedRemedy

This, along with multipath effects (channel ""ringing"") should be mentioned as impacting the quiet period.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3.1** *P* **186** *L* **31** # 425

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The BS who receives information about other collocated 802.22 cells (either directly or reported by CPEs), shall use a random mechanism to attempt synchronization of quiet periods, which will considerably mitigate the ping-pong effect. For example, consider that BS1 received information about SCH2 transmitted by a collocated BS2. ""

Is ""nearby"" intended here instead of ""collocated""?

SuggestedRemedy

Wouldn't a better way be to exchange the quiet period start time in absolute time (if BSs have some kind of universal absolute time, that is)? The BSs could all go quiet at the same absolute time, and the CPEs could wait~160 usec for influence from neighboring cells to die out (actual propagation times could be calculated since all locations are known, but probably better to pick some minimum time for propagation effects to settle out, maybe even 200 usec, and extend the quiet period by that amount of time).

If CPEs know their location relative to all area BSs, they could calculate when their quiet time would start or how long the minimum quiet period needs to be, though this wouldn't account for channel ringdown due to multipath.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3.2** *P* **187** *L* **21** # 426

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""With this in mind, here we introduce a mandatory mechanism that efficiently addresses this issue. It is based on a two-stage sensing approach: fast sensing and fine sensing. The fast sensing is done before the fine sensing, and typically uses a quick and simple detection algorithm such as energy detection.""

This should not be mandatory if one implementation, DFH, can operate without it.

Regarding p. 188, line 14, fast sensing has to be sensitive enough to detect the signal at the required SNR (possibly negative), otherwise it doesn't buy anything. If there is no detectable energy change there, the signal of interest may be below the fast sensing threshold and a longer sensing period may be required. If there is detectable energy there, a sensing period has to be scheduled to analyze and postively ID. If some external spur or noise level is spoofing the fast detector to regularly schedule a fine sensing period, does the system start to ignore the fine sensing results? If so, what are the consequences? Could this be a subtle denial of service?

Note the fast sensing could be impacted by the propagation effects mentioned in my comment (#308) on Clause 6.21.3.1.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3.2** *P* **190** *L* **1** # 427

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""To overcome this problem, we use the synchronization mechanism described in 6.21.5, and which results in the scenario depicted in Figure 86. By doing this, overlapping cells will synchronize not only their frames but also their quiet periods. This will ensure that the result of the fast sensing is highly efficient, since all secondary networks will quiet the channel at the same time and only the signal from the primary user remains in that channel.""

Quiet periods can strictly only be synchronized at one point (I think two BSs can be sync'd on the bisector of the line connecting the BSs). For two BSs separated by a 30km radius, their quiet periods could be e.g. sync'd at the 15km midpoint but be out of sync by 100usec at the edges of their 30km cells. Whether this is a significant problem depends on the duration of the quiet period.

Actually it can be worse than this because the neighboring cells impact the quiet period until their influence drops more than 6dB below the noise floor (for a 1dB noise floor uncertainty). If a CPE can operate at 30 km at e.g. 3dB SNR, then the WRAN emissions have to drop another 9 dB to have negligible influence; at e.g. 40dB/decade propagation that corresponds to .225 range decades beyond 30km or 50km influence. Thus the quiet period of a CPE out here starts 167 usec later than for a CPE near the BS.

SuggestedRemedy

This, along with multipath effects (channel ""ringing"") should be mentioned as impacting the quiet period.

I make the same comment on clause 6.21.3.1.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3.2.1** *P* **190** *L* **16** # 429

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""This is not the case, for example, if such sensing is performed during the TTG window as shown in Figure 87, as overlapping networks have different ratios between upstream and downstream traffic.""

How can it be? If overlapping TDD networks have different T/R splits, then one network's CPE can be transmitting while his neighbor (belonging to the other network) is listening. I think overlapping cells have to agree on a T/R split; it can be dynamic, but it has to be agreed and used by all overlapping parties. Who gets to decide is another question...

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.3.2.1** *P* **190** *L* **16** # 428

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Therefore, this guarantees that during this time fast sensing can be performed.""

Guarantees is a pretty strong word, especially since quiet periods can only be synchronized at one point in space.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.4.1** *P* **194** *L* **32** # 430

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Each channel set is defined as follows:

□-- Active set 1: a set of used channels for a certain CPE
□-- Active set 2: a set of used channels for a certain BS""

p. 195 line 5: Additionally, in TDD case, Active set1 and Active set2 are not distinguishable.

I gather, based on the TDD note, that this means that the upstream and downstream channels constitute active set1 and active set 2, respectively.

SuggestedRemedy

Each channel set is defined as follows:

□Active set 1: a set of upstream channels for a certain CPE
□Active set 2: a set of downstream channels for a certain BS

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Again, are we really supporting FDD???

If not, or if FDD is optional, things that are FDD specific should either be purged from the document or moved to an annex on the FDD option.

Cl **006** *SC* **6.21.4.1** *P* **195** *L* **10** # 431

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""These individual sets are updated after every quiet period either at a periodic interval or aperiodic interval.""

Is it the quiet period that is either periodic or aperiodic, or the update?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.4.2** *P* **195** *L* **18** # 457
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

The null set is not well specified.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.4.3** *P* **197** *L* **1** # 456
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Figure 93: Why is Tmax reduced at the end? Is it to bring it back to some nominal value?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.5.1** *P* **198** *L* **8** # 432
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...superframes shall have the same and fixed length in terms of time, or at a minimum shall be an integral multiple of each other. Individual frames within a superframe shall also have the same and fixed size, and at a minimum shall be an integral multiple of each other such as shown in Table 27. This will facilitate not only in establishing synchronization amongst overlapping cells, but, most importantly, in keeping it with very low overheads.""

There is only one superframe size, 160ms. There is only one frame size, 10ms.

SuggestedRemedy

...superframes shall have the same and fixed length in terms of time. Individual frames within a superframe shall also have the same fixed size of 10 ms. This will facilitate not only in establishing synchronization amongst overlapping cells, but, most importantly, in keeping it with very low overheads.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.21.5.2** *P* **198** *L* **38** # 449
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...derived from [0, NSIQP], where NSTQP is the Number of Superframes within an Incumbent Quiet Period. ""

I believe NSTQP is a typo, unless it is another type of quiet period.

SuggestedRemedy

Either clarify if NSTQP is another type of quiet period, and if so, elaborate. If it's a typo, correct the acronym.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.21.5.2** *P* **199** *L* **7** # 450
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Figure 94 depicts the relationship between the Transmission Offset (see Table 8) and Reception Offset (see Table 164) fields for a frame of size FS (in units of symbols). These fields are key for establishing synchronization between two overlapping 802.22 cells.""

Table 164: p. 73, FS = 7 bits, references Table 1.
Table 1: p. 12, FS = 4 bits, frames per superframe.

This section is a little confusing. What is FS in the equations on p. 199? Is it the size of frames in symbols as indicated on p. 199 or the superframe size in frames as indicated in Table 1 and alluded on p. 198 line 38? Frames per superframe and frame duration code are both fixed. However, if FS is number of symbols per frame, won't that change depending on the chosen cyclic prefix (31 for 1/16, 26 for 1/4)? Reception offset in Fig 94 looks like it is in symbols.

SuggestedRemedy

If two parameters have the same name, the frames per superframe should be e.g. FSF in stead of FS.

Please answer the questions in the comment and provide clarification and remove any inconsistencies/ambiguities.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.21.6.1.1** *P* **202** *L* **46** # 451
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Note that since the BS receives feedback from CPEs regarding their measurements outcome, the BS can easily implement an internal procedure to create physical clusters based on the measurements reported. ""

Are physical clusters channel specific? A collection of (not necessarily nearby) CPEs might sense the same levels on one channel but different levels on another channel, especially if the TV transmitters are in different locations.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.21.6.2** *P* **204** *L* **1** # 458
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The k-means clustering algorithm shall be used for implementing clustering in a 802.22 cell.""

Why is this a ""shall""? Maybe clustering can be impoesd, but does a clustering algorithm need to be mandated in this PHY/MAC standard? If this is something done internal to the BS, can't they use whatever algorithm they want?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.3** *P* **9** *L* **30** # 187
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""...employed in CMAC is depicted in Figure 3, where it can be seen that it is comprised of three main...""

I believe the number of frames is now fixed at 16, so now there are only two elements.

SuggestedRemedy

...employed in CMAC, depicted in Figure 3, is comprised of two main ...

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.3** *P* **9** *L* **35** # 188
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""□A PHY preamble - see 8
""□A Superframe Control Header (SCH) - see 6.5.1
""□A number of frames - see 6.4""

SuggestedRemedy

""□A PHY preamble - see 8
""□A Superframe Control Header (SCH) - see 6.5.1

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.3** *P* **9** *L* **38** # 189
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...TV channel it is currently using for communication with its associated CPEs. ""

SuggestedRemedy

...TV channel currently utilized for communication with associated CPEs.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.3** *P* **9** *L* **39** # 190
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Any device tuned to any of these TV channels and who synchronizes and receives the SCH, is able to obtain the information it needs in order to establish communication with the transmitter (in this case, the BS).""

SuggestedRemedy

A CPE tuned to any of these TV channels that can synchronize and receive the SCH is able to obtain the information it needs to establish communication with the BS.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.3** *P* **9** *L* **41** # 191
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""During the lifetime of a superframe, multiple MAC frames are transmitted which may span multiple channels and hence can provide better system capacity, range and data rate. During each MAC frame, the BS has the responsibility to manage the upstream and downstream direction, which may include ordinary data communication, measurement activities, coexistence procedures, and so on.""

SuggestedRemedy

Over the duration of a superframe, multiple MAC frames are transmitted. During each MAC frame, the BS has the responsibility of managing the upstream and downstream, which may include ordinary data communication, measurement activities, and coexistence procedures.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The text "which may span multiple channels and hence provide better system capacity, range and data rate." was deleted as it is specific to the proposed, optional, channel bonding scheme and should be dealt with in an annex if the WG decides to accept this option.

Cl **006** *SC* **6.3** *P* **9** *L* **46** # 192
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Excluding the superframe preamble and SCH, the superframe shall have a fixed and pre-determined size of 16 frames (see Table 27 for a list of frame sizes).""

I don't believe we need Table 27 anymore. There is only one frame size, 10ms.

SuggestedRemedy

The superframe shall have a fixed and pre-determined size of 16 frames plus the superframe preamble and the SCH.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.4** *P* **10** *L* # 195
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Figure 4, sliding coexistence slots need to be corrected in this drawing

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.4** *P* **10** *L* **4** # 193
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...important component to an efficient ...""

SuggestedRemedy

...important component of an efficient ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **10** *L* **6** # 194
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...either downstream of upstream traffic.""

SuggestedRemedy

...either downstream or upstream traffic.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **16** # 201
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...PHY synchronization, channel estimation, and so on. ""

SuggestedRemedy

..PHY synchronization and channel estimation.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **2** # 197
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The boundary between these two segments is adaptive, and so the control of the downstream and upstream capacity can be easily done.""

How does this adaptive boundary impact coexistence? When multiple systems are coexisting, who controls the adaptive boundary? Is a single boundary negotiated? Do different cells get to assert their boundary and ""take turns""?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.4** *P* **11** *L* **2** # 196
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The boundary between these two segments is adaptive, and so the control of the downstream and upstream capacity can be easily done. ""

SuggestedRemedy

The boundary between these two segments is adaptive, so the channel capacity can easily be partitioned between downstream and upstream traffic.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **24** # 202
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""... most robust well-known modulation/coding. ""

SuggestedRemedy

... most robust modulation/coding.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **27** # 203
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In the upstream direction, if a CPE does not have any data to be transmitted in its US allocation ...""

SuggestedRemedy

If a CPE does not have any data to be transmitted in its US allocation ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **32** # 204
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...to request upstream bandwidth allocation ...""

SuggestedRemedy

...to request an upstream bandwidth allocation ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **33** # 205
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...incumbents, while the SSS ...""

SuggestedRemedy

...incumbents, and the SSS ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **36** # 206
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Another important aspect to consider in the frame structure design is good coexistence with ...""

SuggestedRemedy

The frame structure must be designed to support coexistence with ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **37** # 207
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It is common sense that self-coexistence is a key issue for the performance of any wireless technology which intends to operate...""

SuggestedRemedy

Self-coexistence is a key attribute of any wireless technology intended to operate..

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **40** # 208
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Furthermore, since these BSs ...""

SuggestedRemedy

Since these BSs ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **6** # 198
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...notification, and possibly coexistence purposes and...""

SuggestedRemedy

...notification, possibly contention intervals for coexistence purposes, and...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **8** # 199
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...fixed size (MAC) slots, which are, in turn, an integral number of modulation symbols (currently ...""

SuggestedRemedy

...fixed size MAC slots which are an integral number of modulation symbols long (currently ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **11** *L* **9** # 200
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""As we shall see later, the definition of slots ...""

SuggestedRemedy

The definition of slots ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **15** # 211
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...it is capable to, first, perform ...""

SuggestedRemedy
...it is available to perform ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **16** # 212
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...(see 6.21.1.5), then receive CBP ...""

SuggestedRemedy
...(see 6.21.1.5), receive CBP ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **17** # 213
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""In addition, a frame synchronization mechanism is defined so that multiple collocated 802.22 cells can efficiently communicate with each other. These and other schemes make the coexistence mechanisms to be highly effective.""

SuggestedRemedy
A frame synchronization mechanism is defined so that multiple overlapping 802.22 cells can efficiently communicate with each other. These and other schemes make the coexistence mechanisms highly effective.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **21** # 214
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...has the possibility to use the SSS ...""

SuggestedRemedy
...has the option of using the SSS ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **22** # 215
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...listening for beacons (from nearby CPEs associated to other BSs) or transmitting beacons.""

SuggestedRemedy
...listening for beacons from nearby CPEs associated to other BSs, or transmitting beacons.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **23** # 216
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...a high degree flexibility in terms of coexistence is ...""

SuggestedRemedy
...a high degree of coexistence flexibility is ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **31** # 217
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...22 cell and brings with it many benefits including the support for channel bonding, support for quiet periods, support for AAS CPEs""

SuggestedRemedy

...22 cell including support for channel bonding, quiet periods, AAS CPEs…

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - If channel bonding option is dropped by the WG, this section will need cleanup.

Cl **006** *SC* **6.4** *P* **12** *L* **33** # 218
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...systems employing beacon signals, better self-coexistence, and so on.""

SuggestedRemedy

...systems employing beacon signals, and better self-coexistence.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **35** # 219
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The ST field serves the purpose of better coexistence ...""

SuggestedRemedy

The ST field facilitates coexistence ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **37** # 220
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The CT serves to identify the purpose for the transmission of the SCH. In CMAC...""

SuggestedRemedy

The CT identifies the purpose of the SCH transmission. In the CMAC...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **40** # 221
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...support CBP which is employed to implement better self-coexistence...""

SuggestedRemedy

...support the CBP which is employed to implement self-coexistence...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **41** # 209
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In view of these aspects, 802.22 is faced with a major challenge that may severely impact its success, namely, self-coexistence. Moreover, given the experiences in other WGs where their approach is to consider coexistence only after the standard has been approved (i.e., coexistence as an afterthought), here it is advocated that for coexistence to be really effective it has to be included as a key design goal of the air-interface, and not as an afterthought as it is often the case.""

SuggestedRemedy

For coexistence to really be effective, it has to be included as a fundamental, inherent requirement in the design of the air-interface.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.4** *P* **12** *L* **5** # 210
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The SSS window (depicted in Figure 4) can appear in either the downstream or upstream part of a frame ...""

Is this still true?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.5.1** *P* **13** *L* **1** # 222
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

In Table 1, notes of superframe control header format:
""...transmitted with well-known modulation/coding ...""

SuggestedRemedy

...transmitted with robust modulation/coding ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.1** *P* **13** *L* **12** # 225
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 1, NC notes:
""In the basic mode, NC = 2 (i.e., two additional TV channels). This translates into a total of 3 physical channels being bonded.""

SuggestedRemedy

For example, NC = 2 corresponds to two additional TV channels, for a total of 3 bonded physical channels.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - If channel bonding option is dropped by the WG, this section will need cleanup.

Cl **006** *SC* **6.5.1** *P* **13** *L* **5** # 223
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 1, FS and FDC entries, are superfluous and should be eliminated.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.5.1** *P* **13** *L* **7** # 224
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 1, TTQP notes: ""...of time it will take for the ...""

SuggestedRemedy

...of time until the ..

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.1** *P* **14** *L* **1** # 226
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 1, AW present notes:
""...is present in the superframe structure as part of the first frame.""

SuggestedRemedy

...is present in the first frame of the superframe structure.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.1** *P* **14** *L* **3** # 227
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 1, GIF size:
Is 1 bit sufficient to represent the various guard interval factors? I count 4 cyclic prefix options: 1/32, 1/16, 1/8, and 1/4. Don't we need 2 bits?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.5.2** *P* **14** *L* **7** # 228
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...the length of the four (DS-MAP, US-MAP, DCD, UCD) critical downstream bursts that may ...""

SuggestedRemedy

...the length of the four critical downstream bursts (DS-MAP, US-MAP, DCD, UCD) that may ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.2** *P* **15** *L* **2** # 229
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Location and profile... ""

SuggestedRemedy

The location and profile...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.2** *P* **15** *L* **5** # 230
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 4, frame control header format notes:
""Transmitted with well-known modulation/coding...""

SuggestedRemedy

Transmitted with robust modulation/coding

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.2** *P* **15** *L* **5** # 231
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 4, Repetition Indication notes:
This needs an explanantion. Should this reference clause 8.3.2.2?

SuggestedRemedy

Answer the question and correct/clarify text and reference if necessary.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.3** *P* **15** *L* **13** # 233
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 5, BSID notes:
""Address that uniquely identifies the BS to which this CPE is associated with""

SuggestedRemedy

"Address that uniquely identifies the BS with which this CPE is associated"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.5.3** *P* **15** *L* **9** # 232

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...the CPE who has transmitted ...""

SuggestedRemedy

...the CPE which transmitted ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6** *P* **16** *L* **1** # 234

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The MAC PDUs is illustrated ...""

SuggestedRemedy

The MAC PDU is illustrated ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6** *P* **16** *L* **5** # 235

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The payload information may vary in length, so that a MAC PDU may represent a variable number of bytes. ""

SuggestedRemedy

"The payload information may vary in length, so a MAC PDU may consist of a variable number of bytes."

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6.1** *P* **16** *L* **17** # 236

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...is used by the CBP protocol with the intention of inter-cell communication and to foster appropriate self-coexistence amongst overlapping 802.22 BS,""

SuggestedRemedy

...is used by the CBP for inter-cell communication and to facilitate self-coexistence amongst overlapping 802.22 BSs,

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6.1** *P* **16** *L* **21** # 237

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In the following subsections we present the MAC headers, ...""

SuggestedRemedy

The following subsections present the MAC headers ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6.1.1** *P* **16** *L* **1** # 238

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 6, UCS notes:
""Used by the CPE to indicate the BS about an urgent coexistence situation with incumbents in the channel(s) currently being used by the BS.""

SuggestedRemedy

Used by the CPE to alert the BS to an urgent coexistence situation with incumbents in the channel(s) currently being used by the BS.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6.1.2** *P* **18** *L* **1** # 239
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""CPE beacons are inter-cell packets used by CBP only and which are transmitted with the goal of improving self-coexistence amongst overlapping 802.22 cells.""

SuggestedRemedy

CPE beacons are inter-cell packets used only by CBP which are utilized for improving self-coexistence amongst overlapping 802.22 cells.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note to author(s) and editor(s) - The FCC has already latched on to "CBP" as "Contention-based Protocol" (3650-3700 MHz band ruling) and the comment resolution committee suggests that this concept be renamed somehow to result in a clear definition and different acronym to avoid confusion.

Cl **006** *SC* **6.6.1.2** *P* **18** *L* **15** # 241
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...belonging to other 802.22 BSs and who receive a coexistence beacon, ...""

SuggestedRemedy

...belonging to other 802.22 BSs that receive a coexistence beacon, ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6.1.2** *P* **18** *L* **16** # 242
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""These beacon IEs shall be the only type of information present in the payload of a beacon PDU, that is, no other information other than beacon IE shall be present in the payload.""

SuggestedRemedy

These beacon IEs shall be the only information present in the payload of a beacon PDU.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6.1.2** *P* **18** *L* **4** # 240
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Since their goal is to improve self-coexistence...""

SuggestedRemedy

Since their purpose is to improve self-coexistence...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.6.1.3.1** *P* **19** *L* **15** # 243
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 10, Type size and notes:
""Indicates the type of the bandwidth request header
000 = incremental
001 = aggregate""

Why 3 bits? Wouldn't 1 suffice? Is it only so that, when combined with BR (21 bits) it will fill 3 bytes?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.7** *P* **21** *L* **8** # 244
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Table 15Table 15 describes ...""

SuggestedRemedy

Table 15 describes ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8** *P* **23** *L* **13** # 245
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In the following sections we describe each of the management messages shown in Table 24.""

SuggestedRemedy

The following sections describe each of the management messages shown in Table 24.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.1.1** *P* **25** *L* **9** # 246
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 26, Action Frame Number notes:
""Integer value grater than or equal...""

SuggestedRemedy

Integer value greater than or equal...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.1.1** *P* **26** *L* **6** # 247
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 26, Action Duration notes:
""If this field is set to a value different from 0 (zero): It indicates the duration (expressed in slots), not including the Action Frame Number. Once this duration is over, normal ..".

SuggestedRemedy

If this field is set to a non-zero value, it indicates the duration (expressed in slots), not including the Action Frame Number. Once this duration has elapsed, normal ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.1.1** *P* **26** *L* **6** # 248
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 26, Action Duration notes:
""If this field is set to 0 (zero): it serves to indicate CPEs that the first quiet period ...""

SuggestedRemedy

If this field is set to 0 (zero), it indicates to CPEs that the first quiet period ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.1.1.1** *P* **27** *L* **2** # 249
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Frame duration code.

This is not necessary, the frame duration is fixed.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.1.2** *P* **27** *L* **12** # 250
Kuffner, Stephen Motorola

Comment Type **TR** *Comment Status* **X**

""Table 29, FEC code type notes:
Spreading
(0ffset)QPSK;(0ffset)16-QAM; (0ffset)64-QAM;
Coding rates : ¢;2/3; ¥
RS+CC/CC; CTC codes
Detailed specification TBD.""

What is meant by ""offset"" in relation to the constellation sizes?
Doesn't RS+CC indicate concatenated Reed-Solomon and Convolutional codes? We don't have this in our system, do we?

SuggestedRemedy

CTC codes should not be mentioned. Either mention ""optional advanced coding techniques"" or mention all options (CTC, LDPC, SBTC).

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.10** *P* **53** *L* **1** # 268
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 112, Operation: Why 1 byte reserved and only 1 bit used?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.15.3.3.2** *P* **56** *L* **8** # 269
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...quantized in 1 dBm steps ranging ...""

Relative steps are in dB, not dBm. A 1 dBm step would be a step of 1.258 mW.

SuggestedRemedy
...quantized in 1 dB steps ranging ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.15.3.3.4.2** *P* **57** *L* **12** # 271
Kuffner, Stephen Motorola

Comment Type **TR** *Comment Status* **X**
Table 125, CTC is called out. Does RS stand for ""Reed Solomon""? If so, that should be cut.

SuggestedRemedy
Since optional, CTC should fall in the ""reserved"" catagory. RS should be cut if Reed Solomon.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.15.3.3.4.3** *P* **57** *L* **14** # 270
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...for upstream transmission A bit value ...""

SuggestedRemedy
...for upstream transmission. A bit value ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.15.3.3.4.3** *P* **57** *L* **16** # 272
Kuffner, Stephen Motorola

Comment Type **TR** *Comment Status* **X**
Table 126, CTC is called out. Does RS stand for ""Reed Solomon""? If so, that should be cut.

SuggestedRemedy
Since optional, CTC should fall in the ""reserved"" catagory. RS should be cut if Reed Solomon.

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.15.3.3.4.4** *P* **58** *L* **1** # 273
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 127: Are we using ""PUSC, FUSC and AMC"" language in our spec?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.21** *P* **59** *L* **12** # 274
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In this section we present the mandatory channel management messages supported by CMAC.""

SuggestedRemedy

This section presents the mandatory channel management messages supported by CMAC.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note to author(s) and editor(s) - If channel bonding option is dropped by the WG, this section will need cleanup.

Cl **006** *SC* **6.8.21.3** *P* **61** *L* **4** # 275
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Note that addition of channel(s) to the BS operation can also be implemented through the SCH by having the BS specify a different and larger value for Channel Number and Number of Channels.""

SuggestedRemedy

Note that channels can be added to the BS operation through the SCH by having the BS specify a different value for Channel Number and a larger value for Number of Channels.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - If channel bonding option is dropped by the WG, this section will need cleanup.

Cl **006** *SC* **6.8.21.3** *P* **61** *L* **7** # 276
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In other words, this message allows the addition of channel(s) to be immediate or else to be scheduled at the earliest.""

SuggestedRemedy

Thus, this message allows the addition of channel(s) to be either immediate or scheduled at the earliest opportunity.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note to author(s) and editor(s) - If channel bonding option is dropped by the WG, this section will need cleanup.

Cl **006** *SC* **6.8.21.7** *P* **63** *L* **2** # 277
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 140, Duration notes:
""...but Transaction ID != Transaction ID of the already scheduled quiet period...""

Is the ""!"" supposed to be there? There is another instance a few paragraphs down in the same ""duration notes"" column.

SuggestedRemedy

...but Transaction ID = Transaction ID of the already scheduled quiet period...

Proposed Response *Response Status* **W**

PROPOSED REJECT.

Note the use of "!" as in "!=" is the boolean NOT and from reviewing the context that is what is intended.

Cl **006** *SC* **6.8.22** *P* **66** *L* **3** # 278
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...component for many features of the protocol including for guaranteeing incumbent system protection at all times.""

SuggestedRemedy

...component for many features of the protocol including guaranteeing incumbent system protection at all times.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.22** *P* **66** *L* **6** # 279
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We start this discussion in 6.8.22.1 by presenting the bulk ...""

SuggestedRemedy

This is discussed in 6.8.22.1 with presentation of the bulk ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.22** *P* **66** *L* **7** # 280
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...BS to one or multiple CPEs, and...""

SuggestedRemedy
...BS to one or more CPEs, and...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.22.1.1** *P* **72** *L* **27** # 281
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""Also, we can see from Table 146 that various timing parameters are associated with measurement requests.""

SuggestedRemedy
Table 146 also shows that various timing parameters are associated with these measurement requests.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.22.3** *P* **71** *L* **4** # 282
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...and serves to confirm the receipt ...""

SuggestedRemedy
...and confirms the receipt ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.22.3.1.2** *P* **73** *L* **4** # 283
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...beacons that are originated at its own cell.""

SuggestedRemedy
...beacons that are originated within its own cell.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.22.3.1.2** *P* **74** *L* **1** # 284
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
Table 165: Link Margin
""In dBm""

Link margin is a dB measurement, not a dBm measurement

SuggestedRemedy
In dB

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.22.3.1.5** *P* **76** *L* **4** # 285
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...report shall only be sent if the Security Key of the WMB device is valid...""

SuggestedRemedy
...report shall only be sent if the WMB device is authenticated through validation and acceptance of its Security Key …

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - Suggest that "WMB device" (Wireless Microphone Beacon Device) be changed globally to LPL device (Low Power Licensed Device) beacon, since there are more LPL devices than just wireless microphones that must be protected.

Cl **006** *SC* **6.8.24** *P* **79** *L* **11** # 288
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Alternatively, a BS may de-register a CPE which does not return in the negotiated time.""

SuggestedRemedy

A BS may de-register a CPE which does not return in the negotiated time.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.24** *P* **79** *L* **12** # 286
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...the CPE would have to go through the initialization steps all over again before gaining access to the network.""

SuggestedRemedy

...the CPE would have to repeat the initialization steps before regaining access to the network.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.24** *P* **79** *L* **16** # 287
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...and a CPE could determine their location information provided it can obtain the location from at least three other BSs. ""

SuggestedRemedy

...and a CPE could determine its location provided it could obtain the location from at least three other BSs.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) - The remedy is purely editorial.
This clause raises a technical question in the minds of the comment resolution committee. Does this really mean three BSs in addition to the primary BS that the CPE is associated with, or a total of three BSs including the primary BS?
It would seem that in the rural areas that .22 is intended to serve, it will likely be very uncommon to have a situation where 3-4 BSs are available to a CPE ... Please explain this entire concept to the WG in more detail.

Cl **006** *SC* **6.8.28** *P* **84** *L* **1** # 290
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...of its latest, pending Key Request...""

SuggestedRemedy

...of its latest pending Key Request...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.28** *P* **84** *L* **1** # 289
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 193, PKM Identifier:
""An CPE shall keep track of ...""

SuggestedRemedy

A CPE shall keep track of ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **006** *SC* **6.8.28.1** *P* **86** *L* **4** # 291
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Code: 3""

SuggestedRemedy

Table 195 Message Code: 3

or

PKM Message Code: 3

Same for line 20 p. 86 and line 4, p. 87 and so on...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to editor(s) - "Code:3" in isolation is confusing. Select one of the formats suggested in the remedy or propose another to eliminate the ambiguity/confusion.

Cl **006** *SC* **6.8.28.16** *P* **94** *L* **13** # 296
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...attribute is a com-pound attribute containing all ...""

SuggestedRemedy
...attribute is a compound attribute containing all ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.28.16** *P* **94** *L* **9** # 295
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""This value is one greater than that of older generation. ""

SuggestedRemedy
This value is one greater than that of the previous generation.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.28.17** *P* **94** *L* **39** # 297
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
Table 212, HMAC Digest/CMAC Digest contents:
""...is available from previ-ous double...""

SuggestedRemedy
...is available from previous double...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.28.3** *P* **87** *L* **1** # 292
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...with an PKM RSA-Reject ...""

SuggestedRemedy
...with a PKM RSA-Reject ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.28.4** *P* **87** *L* **15** # 293
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...if the value of Auth Result Code is failure, ...""

SuggestedRemedy
...if the value of Auth Result Code is Failure, ...

or

...if the value of Auth Result Code is failure, ...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.

Understood intention is to either CAP names of states, functions, etc. ("Failure") or alternatively italicize them (the "or" in the remedy). Editor(s) should review document and IEEE-SA Style Guide and make such things consistent.

Cl **006** *SC* **6.8.28.4** *P* **87** *L* **22** # 294
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""The SigCPE indicates an RSA signature over all the other attributes in this message, and the CPE's private key is used to make an RSA signature.""

SuggestedRemedy
The SigCPE indicates an RSA signature over all the other attributes in this message, with the CPE's private key being used to generate the RSA signature.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.3** *P* **30** *L* **12** # 251
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...the characteristics of a upstream physical channel.""

SuggestedRemedy
...the characteristics of an upstream physical channel.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.3** *P* **30** *L* **14** # 252
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 37, backoff parameters:
Eight backoff parameters have 8 bits allocated, with the 4 highest order bits set to zero.
Why can't these be halved so as to use only 32 bits instead of 64 bits?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.3.1.1** *P* **32** *L* **4** # 253
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 39, periodic ranging backoff start and end notes:
Again, 8 bits allocated where only 4 are used. Why not pack these into one byte?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.3.2** *P* **33** *L* **5** # 254
Kuffner, Stephen Motorola

Comment Type **TR** *Comment Status* **X**

Table 41, FEC notes:
""Combination of:
Spreading
(0ffset)QPSK;(0ffset)16-QAM; (0ffset)64-QAM;
Coding rates : ¢;2/3; ¥
RS+CC/CC; CTC codes
Detailed specification TBD.""

What does ""offset"" mean?
Doesn't RS+CC indicate concatenated Reed-Solomon + Convolutional code? We don't have that, do we?

SuggestedRemedy

CTC codes should not be mentioned. Either mention ""optional advanced coding techniques"" or mention all options (CTC, LDPC, SBTC).

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.4.1** *P* **34** *L* **20** # 255
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""If the end of the US frame has been reached, the allocation shall continue at the next channel at first symbol (defined by the allocation start time field) that is not allocated with 0 <= UIUC <= 5.""

SuggestedRemedy

If the end of the US frame has been reached, the allocation shall continue on the next sub-channel at the first symbol (defined by the allocation start time field) that is not allocated with 0 <= UIUC <= 5.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to editor(s) - "allocation start time field" is a descriptor.
Please consult the style guide and adopt consistent formatting for such descriptors throughout the entire document.
For example, would "Allocation_Start_Time_Field" be acceptable formatting for such descriptors?

Cl **006** *SC* **6.8.7.3.2** *P* **40** *L* **18** # 259
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 56: Why 1 byte reserved yet only uses 1 bit?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.7.3.3** *P* **40** *L* **21** # 260
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 57: Why 1 byte reserved yet only uses 1 bit?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.7.3.7.10** *P* **43** *L* **8** # 256
Kuffner, Stephen Motorola

Comment Type **TR** *Comment Status* **X**
""Antenna gain in dB... ""

How does the MAC know? Does it also know cable losses and receiver gain between antenna and detector? Does this force professional installation?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.8.1** *P* **43** *L* **14** # 258
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""This message is sent either by a CPE or BS and as to create a new service flow,...""

SuggestedRemedy
This message is sent by either a CPE or a BS to create a new service flow,...

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.8.1** *P* **43** *L* **14** # 257
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...message is shown in Table 72Table 72Table 72. ""

SuggestedRemedy
...message is shown in Table 72.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **006** *SC* **6.8.8.10.10** *P* **49** *L* **9** # 262
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 93: what is vendor specific QoS?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.8.10.13** *P* **50** *L* **5** # 263
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 96: tolerated jitter has 4 bytes, units are Ms.

Even if this is supposed to be usec, 2^32 * 1e-6 = 4295 sec, a lot of jitter. What's the right value? Would this even still be considered jitter?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.8.10.14** *P* **50** *L* **8** # 264
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 97: maximum latency has 4 bytes, units are Ms.

Even if this is supposed to be usec, 2^32 * 1e-6 = 4295 sec, a lot of latency. What's the right value? 2^24 * 1e-6 = 16.8 sec, still pretty long.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.8.10.19.1** *P* **51** *L* **13** # 265
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 102: Why 1 byte reserved yet only 1 bit used?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.8.10.19.6** *P* **52** *L* **11** # 266
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 107: Why 1 byte reserved yet only 1 bit used?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.8.10.5** *P* **48** *L* **5** # 261
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**
Table 88: Why 1 byte reserved yet only appears to use 3 bits?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **006** *SC* **6.8.9** *P* **53** *L* **3** # 267
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""...to adjust the power level of multiple CPEs simultaneously.""

SuggestedRemedy
...to simultaneously adjust the power level of multiple CPEs.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **007** *SC* **7** *P* **208** *L* **9** # 459
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""The security sublayer is in many respects inspired by the IEEE 802.16e/D12 draft [7] xxx, ... also several more instances in lines 37 - 40 and following pages.""

These need to be defined somewhere...

SuggestedRemedy
Drop the narrative "inspired by" language and provide in-line definitions of terms used rather than requiring the reader to reference other documents for definitions.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **007** *SC* **7.5** *P* **210** *L* **43** # 460
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""7.5 Protection Against Deny of Service and Other Attacks""

SuggestedRemedy
7.5 Protection Against Denial of Service and Other Attacks

also in subsequent lines

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **008** *SC* **8** *P* **211** *L* **36** # 464
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**
""The specification provides a flexible system that uses a vacant TV channel or a multiple of vacant TV channels to provide wireless communication over a large distance (up to 100 Km).""

SuggestedRemedy
The specification provides a flexible system that uses a single or optionally multiple vacant TV channels to provide wireless communication over a large distance (up to 100 Km).

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.

Channel bonding and aggregation are being considered as options. If neither is accepted, this will need to be cleaned up.

Cl **008** *SC* **8** *P* **211** *L* **39** # 465

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The PHY specification is based on OFDMA scheme and some of the system parameters are provided in Table 226.""

SuggestedRemedy

The PHY specification is OFDMA-based. Some of the system parameters are provided in Table 226.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8** *P* **211** *L* **42** # 461

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 226:
""Service Coverage -- Typical range 33km""

In the remarks column perhaps we should state the caveat ""For default 4W EIRP and 300 m BS HAAT"" per Gerald's WRAN reference model spreadsheet.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8** *P* **211** *L* **42** # 462

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 226:
""Service coverage -- Typical range 33 km""

Does this mean 33 km is the range to provide 4.8 Mbps (the ""minimum"" in the data rate row of the same table)? The FRD defines service coverage as that which provides 1.5 Mbps DS, 384 kbps US:

FRD Clause 5.3 Service Capacity
The required minimum peak throughput rate at edge of coverage SHALL be 1.5 Mbit/s per subscriber in the forward direction and 384 kbit/s per subscriber in the return direction. The capacity of the base station will need to be higher to provide service to a number of subscribers in this P-MP system.

SuggestedRemedy

By using 3x repetition coding on the 4.8 Mbps minimum, we could reach even more remote CPEs at the FRD rate. We're advertising DSL and greater data rates in the press; may as well deliver this case to economically serve the most remote customers. If we don't have a repetition coding mode, perhaps we should.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8** *P* **212** *L* **1** # 463

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 226
""Data rate -- Maximum: 72.6 Mbps""

I believe this value is for 3 bonded channels. The maximum value should be for a single channel. In the remarks column, the bonded channel value could be pointed out.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.1.1** *P* **212** *L* **11** # 466
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""carrier centre frequency""

SuggestedRemedy

carrier center frequency

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.1.1.1** *P* **212** *L* **18** # 467
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The time-domain signal is generated by taking the inverse Fourier transform of the length NFFT vector. The vector is formed by taking the constellation mapper output and inserting pilot and guard tones.""

Order of sentences

SuggestedRemedy

A length NFFT transmit vector is formed by taking the constellation mapper output and inserting pilot and guard tones. The time-domain signal is generated by calculating the inverse Fourier transform of the transmit vector.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - Please review the entirety of 8.1 for consistency and correctness of presentation and grammar.

Please review the use of the term "guard tones" throughout the document with an eye towards clarity and conistency of use.

Cl **008** *SC* **8.1.1.1** *P* **212** *L* **21** # 468
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Fast Fourier Transform (FFT) algorithm is usually used to implement Fourier transform and its inverse.""

SuggestedRemedy

The Fast Fourier Transform (FFT) algorithm is usually used to implement the Fourier transform and its inverse.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.1.1.2** *P* **213** *L* **13** # 469
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The DS and US may have different allocation of sub-carriers.""

SuggestedRemedy

The DS and US may have different sub-carrier allocations.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.1.1.2** *P* **213** *L* **19** # 470
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The 6 MHz and 12 MHz version of the symbol are generated by nulling out sub-carriers outside the corresponding bandwidths.""

SuggestedRemedy

The 6 MHz single channel spectrum representation of the symbol, along with optional 12 and 18 MHz bonded-channel representations, are generated by nulling out the guardband sub-carriers.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Channel bonding is being considered as an option. If channel bonding is not accepted, this will need to be cleaned up.

Cl **008** *SC* **8.1.2.2** *P* **214** *L* **19** # 471
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 228: FFT size options.

What exactly are the benefits of the optional 1K and 4K FFT sizes? Are they primarily for different cell sizes? I can see how larger cells with longer delay spreads might be more efficient with a longer symbol so the CP is a smaller fraction of the baud. But why a smaller FFT if CP for 2K can already be dropped to 1/32?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.1.2.2** *P* **214** *L* **27** # 472
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...are provided for the 2K basic FFT mode.""

Also heading 8.1.2.3 2K basic FFT mode

SuggestedRemedy

...are provided for the mandatory 2K FFT mode.

heading 8.1.2.3 Mandatory 2K FFT mode

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.1.2.3.1** *P* **215** *L* **3** # 473
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...the bandwidth of a single TV band (6, 7 or 8 MHz). The inter-carrier spacing remains same when multiple TV bands are bonded and is equal to the corresponding single TV band inter-carrier spacing. Table 230 Shows the proposed ...""

SuggestedRemedy

...the bandwidth of a single TV channel (6, 7 or 8 MHz). The inter-carrier spacing is the same for both single and bonded channel operation. Table 230 shows the proposed ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Channel bonding is being considered as an option. If channel bonding is not accepted, this will need to be cleaned up.

Cl **008** *SC* **8.1.2.3.2** *P* **215** *L* **10** # 474
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""TFFT/32, TFFT/16, TFFT/8 and TFFT/4. ""

SuggestedRemedy

TFFT/32, TFFT/16, TFFT/8 or TFFT/4.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.1.2.3.4** *P* **216** *L* **1** # 475
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In this case, it is efficient to use the fractionally vacant bandwidth of the TV channel. ""

Fractional BW operation may or may not be allowed for operating co-channel with incumbents, depending on the local regulations. It may find more applicability in outband signaling and in sharing of a TV channel with other unlicensed users when spectrum opportunities are scarce.

Note that the FCC proposes location-based protection for co-primary licensed land mobile operations in the TV spectrum, so co- or adjacent channel operation to land mobile should be considered with the same restrictions as co- or adjacent channel operation to TV.

SuggestedRemedy

When local regulations permit co-channel operation with narrowband licensed incumbents, the spectrum may be more efficiently utilized with fractional channel use.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.1.2.3.4** *P* **216** *L* **16** # 477
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Are paragraphs from p. 216 line 16 through p. 217 line 17, and Figures 106 through 108, needed in the standard? They seem to be additional justification for the mode, which need not be included in the standard, though it could be in an informative section.

SuggestedRemedy

Fractional bandwidth usage is being considered as an option.
If the fractional bandwidth option is accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement it and move the "meat" of the implementation details to an annex/appendix as with other options.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.1.2.3.4** *P* **216** *L* **7** # 476

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""As shown in Figure 105, when the narrowband incumbent user is used in channel, the rest of vacant channel can be used for other CR users with guard band from the narrowband incumbent users. Here the neighboring TV channel of incumbent TV channel will be not used as WRAN systems including fractional usage mode and channel bonding mode. Moreover, if wireless microphones are in operation in single channel, the WRAN systems will have to clear the entire channel.""

SuggestedRemedy

As shown in Figure 105, when a narrowband user is present in-channel, the rest of the channel can be used for other CR users with guard band from the narrowband users. Note fractional bandwidth would not be used to encroach on channels adjacent to TV operations. If narrowband licensed incumbents are operating in a channel, the WRAN systems will have to clear the entire channel and perhaps the adjacent channels if mandated by local regulations.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Fractional bandwidth usage is being considered as an option.
If the fractional bandwidth option is accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement it and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.1.2.3.4** *P* **217** *L* **22** # 479

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In fractional bandwidth usage, the resolution of fractional bandwidth is 1 MHz., that is, 1, 2, 3, 4, 5, 6, 7, and 8 MHz. The number of used sub-carriers is proportional to the used fractional bandwidth. For single TV channel, the common sampling frequency is used. So the sub-carrier spacing is the same for all fractional bandwidth for fixed FFT size.""

SuggestedRemedy

The resolution for fractional bandwidth use is 1 MHz, corresponding to signal widths of 1, 2, 3, 4, 5, 6, 7, and 8 MHz. The number of used sub-carriers is proportional to the used fractional bandwidth. For a single TV channel, the common sampling frequency is used, so the sub-carrier spacing is the same for all fractional bandwidth with fixed FFT size.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Fractional bandwidth usage is being considered as an option.
If the fractional bandwidth option is accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement it and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.1.2.3.4** *P* **218** *L* **3** # 480

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...and there are also the eight possible start position of fractional bandwidth. In this case, as shown in Figure 110, for fractional BW of 1 MHz, all start position can be assigned. For fractional BW of 2 MHz, all start position except 8-th start position can be assigned. In the same manner, finally for fractional BW of 8 MHz, only 1st start position can be assigned. Therefore the total number of fractional bandwidth mode to detect is 36 which is the colored zone in Figure 110.""

Question: can use use color in the standard document? Many figures use color.

SuggestedRemedy

...and there are also eight possible starting positions. As shown in Figure 110, for a fractional BW of 1 MHz, all starting positions can be assigned. For fractional BW of 2 MHz, all starting positions except the 8th can be assigned. Finally, for fractional BW of 8 MHz, only the first starting position can be assigned. Therefore the total number of fractional bandwidth modes to detect is 36 as indicated by the shaded zone in Figure 110.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Fractional bandwidth usage is being considered as an option.
If the fractional bandwidth option is accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement it and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.1.2.3.4** *P* **218** *L* **8** # 478

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Figure 109

How are eight 1MHz channels plus two null bands fit into an 8MHz TV channel? Would 6 and 7MHz channels use eight narrower channels (e.g. .75 MHz for 6 MHz, .875 MHz for 7 MHz), or would they use fewer 1MHz channels?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10** *P* **257** *L* **4** # 570

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It is well known that the robustness, data-rate and/or range of a WRAN system can be improved by the use of multiple antennae at either the transmitter or the receiver or both. Multiple antennae techniques are optional in this proposal. The following methods of multiple-antenna usage are under consideration at this time.

SuggestedRemedy

It is possible that the robustness, data-rate and/or range of a WRAN system may be improved by the use of multiple antennas at either the transmitter or the receiver or both. Multiple antenna techniques are optional in this standard.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.1** *P* **257** *L* **15** # 572

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Let us assume a multiple-antenna system with NT transmit antennae and NR receive antennae. We will assume that there is only one data stream being transmitted, and that the beamforming vector is defined to be Q.""

SuggestedRemedy

Assume a multiple-antenna system with NT transmit antennas and NR receive antennas. Assume that there is only one data stream being transmitted, and that the beamforming vector is defined to be Q.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.1** *P* **257** *L* **34** # 573
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This proposal ensures equal transmitted power from each antenna by ...""

SuggestedRemedy

The following approach ensures equal transmitted power from each antenna by ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.1** *P* **257** *L* **9** # 571
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Replace ""antennae"" with ""antennas"" in lines 9, 11, 15.

SuggestedRemedy

Respond to the comment with appropriate edits.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.10.2** *P* **258** *L* **24** # 574
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This is provided by default on a downstream frame to allow for coherence demodulation. ""

SuggestedRemedy

This is provided by default on a downstream frame to allow for coherent demodulation.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.2.1** *P* **258** *L* **38** # 575
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""CPEs must be equipped with at least two receive antennas.""

Why must CPEs be equipped with at least 2 receive antennas for DS SDMA? Are they required to remove interference (line 25, p. 261)?

In TDD, how would this compare with methods based on UL channel sounding?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.2.1.2** *P* **259** *L* **13** # 434
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""User k computes the following matrix ""

extra spaces

SuggestedRemedy

User k computes the following matrix

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.2.1.2** *P* **259** *L* **7** # 433

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Users 1 and 2 perform the following operations (for conciseness, we only present the case of one user, denoted as user k):...""

SuggestedRemedy

Users 1 and 2 perform the following operations (for conciseness, only the case of one user, denoted user k, is presented):

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.2.1.2** *P* **260** *L* **1** # 437

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Should this be Hk,21 = H*k,12 or is Hk,22 = H*k,12 correct?

Would much of the equation content and weight setting that follows be informative only?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.2.1.4** *P* **260** *L* **33** # 435

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

equations for A1, A2 and G (and V1, V2 following page) are not properly rendered.

SuggestedRemedy

Correct equation rendering

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.2.1.4** *P* **261** *L* **3** # 436

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We express then explicitly as (eqn) vectors with complex elements:""

SuggestedRemedy

They can be expressed explicitly as (eqn) vectors with complex elements:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.2.1.5** *P* **261** *L* **22** # 439

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Should the second part of this equation use M2 instead of M1?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.2.1.5** *P* **261** *L* **7** # 438
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...downstream sounding pilots symbols are transmitted within the same sub-channel.""

SuggestedRemedy

""...downstream sounding pilot symbols are transmitted within the same sub-channel.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.2.2.1** *P* **262** *L* **26** # 440
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In particular with a single receive antenna at the CPEs, conventional downstream SDMA would provide better performance. ""

How much difference is there between the single antenna SDMA performance and the multi-antenna CL-SDMA performance?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.3** *P* **264** *L* **24** # 441
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Are this section and the accompanying figure informative?

SuggestedRemedy

Move informative material to an annex.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.4** *P* **265** *L* **13** # 442
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Will there be enough scattering in the 802.22 channel to support effective MIMO techniques?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.4** *P* **265** *L* **15** # 443

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In FDFR scheme, the two opportunities in MIMO channels, diversity and multiplexing are jointly attained at the same time in a scheme. The original FDFR scheme [5] xxx is designed for square matrices and in need of complex processing both at the transmitter and at the receiver sides.""

SuggestedRemedy

Diversity and multiplexing are jointly attained using FDFR schemes. The original FDFR scheme [5] xxx is designed for square matrices and needs complex processing at both the transmitter the receiver.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

What is the "xxx"? Is this a TBD? Please resolve.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.4** *P* **265** *L* **24** # 444

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...where we show a transmission matrix for three antennas and block size 7 is used.""

SuggestedRemedy

...where a transmission matrix for three antennas and block size 7 is shown.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.4** *P* **266** *L* **3** # 445

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""6 zero-positions corresponding to rate loss ...""

SuggestedRemedy

Six zero-positions corresponding to rate loss ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.1** *P* **266** *L* **15** # 446

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The modulated data symbols of the l-th user is first weighted ...""

SuggestedRemedy

The modulated data symbols of the l-th user are first weighted ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.1** *P* **266** *L* **28** # 447

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In general, downstream channel covariance matrix of the l-th user is...""

SuggestedRemedy

In general, the downstream channel covariance matrix of the l-th user is

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.2** *P* **267** *L* **22** # 576

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The transmitter combines beamforming and CDD (see D.1).""

SuggestedRemedy

The transmitter combines beamforming and cyclic delay diversity (""CDD"", see D.1).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.2** *P* **268** *L* **6** # 448

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""For xxx, the transmitted signal of the l-th user ...""

What is xxx?

SuggestedRemedy

Resolve the identity or value of xxx

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.2** *P* **269** *L* **6** # 577

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We consider the case with 2 beamformers per user. ""

SuggestedRemedy

Consider the case with 2 beamformers per user.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.3** *P* **270** *L* **19** # 579

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The magnitude of the relatively delay of the beamformed channel is now (eqn). Hence, if we choose D1,1 and D2,l such that (eqn), then the CP duration becomes sufficient in preventing IBI.""

SuggestedRemedy

The magnitude of the relative delay of the beamformed channel is now (eqn). If D1,1 and D2,l are chosen such that (eqn), then the CP duration becomes sufficient to prevent IBI.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.3** *P* **270** *L* **4** # 580

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

It would seem that in the limit, this approach could eliminate the need for any cyclic prefix at all by pre-equalizing the channel. What keeps us from being able to do that? Beam isolation? Number of rays in the power-delay profile?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.5.3** *P* **270** *L* **7** # 578

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""However, we exploit the fact that different DOAs may be associated with different delays. Using beamforming, we may combined beamforming, diversity/spatial multiplexing and channel delay management. ""

SuggestedRemedy

The fact that different DOAs may be associated with different delays can be exploited, using beamforming combined with diversity/spatial multiplexing and channel delay management.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.5.4** *P* **271** *L* **8** # 581

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Both clause 8.10.5.4 and 8.10.5.5 apply to techniques more general than beamforming alone and should be moved up to a higher sublayer, e.g. 8.10.7.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.6** *P* **278** *L* **3** # 584

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

It's not clear to me what's ""virtual"" about this. It makes it sound like the single-antenna CPEs are enjoying some multiple antenna transmitter benefit. This appears to be upstream SDMA, which is a reasonable method to include. More detail is needed on requirements and how it would be enabled.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.10.6** *P* **278** *L* **4** # 582

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Although some CPEs may only each have a single transmit antenna, a virtual multiple transmit antenna system may be implement at the CPEs to increase the spectral efficiency of the system.""

SuggestedRemedy

Although some CPEs may have only a single transmit antenna, a virtual multiple transmit antenna system may be implemented at the CPEs to increase the spectral efficiency of the system.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.10.6** *P* **278** *L* **7** # 583

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""As an example, we consider a system with 2 transmitting CPEs and 1 BS.""

SuggestedRemedy

As an example, consider a system with 2 transmitting CPEs and 1 BS.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.2** *P* **220** *L* **2** # 481

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Table 234 defines the different gross data rates (using a single TV channel of 6 MHz bandwidth) and their associated parameters.""

What is meant by gross data rate? Since the calculation appears to account for pilots (1536 data subcarriers), wouldn't this be a net data rate (or maybe channel information rate is better) rather than a gross data rate?

Should we have a repetition coding mode to provide 1.5 Mbps per the FRD clause 5.3?

SuggestedRemedy

Table 234 defines the different PHY modulation and coding modes and their corresponding single channel (6 MHz bandwidth) net data rates.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.2** *P* **220** *L* **6** # 484

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Table 234:
Ranging as discussed in Clause 6.17 mentions monitoring the CINR and comparing the average value against the allowed range of operation (p. 144, line 19). Perhaps Table 234 or a new table should indicate the CINR thresholds or otherwise give guidance for these PHY modes using the mandatory convolutional code.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.2** *P* **220** *L* **6** # 482
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Table 234:

The table indicates transformation matrices for PHY modes 1 and 3.

SuggestedRemedy

There needs to be a reference to Clause ""8.6.1 Transformed OFDMA modulation"" in the table column header; it's not covered until 18 pages later.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3** *P* **220** *L* **7** # 483
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Since data rates are covered in clause 8.2, perhaps the following clause should be on modulation, followed by coding, followed by transformation matrices, followed by frame structure. Frame structure seems like an interruption here.

SuggestedRemedy

Restructure the flow of the document as suggested in the comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - Please consider the flow/readability of this area of the document and restructure if/as required to maximize readability.

Cl **008** *SC* **8.3.1** *P* **221** *L* **10** # 487
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

We should identify which PN sequence modulates the I and which modulates the Q. I gather that they are I and Q in the order shown in this sentence but it should be specified.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.1** *P* **221** *L* **10** # 486
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The generator polynomials of the pseudo random sequence generator are given as (eqn) (shown in Figure 113) and (eqn).""

SuggestedRemedy

The generator polynomials of the pseudo-random sequence generators are (eqn) (shown in Figure 113) and (eqn).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3.1** *P* **221** *L* **12** # 488
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Figure 113 shows the pseudo noise generator for PREF.""

It shows one of them. Which is it?

SuggestedRemedy

Clarify if this is the I generator or the Q generator and provide a similar figure illustrating the structure of the other generator.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note - the understanding of the comment resolution committee is that (as of 092006) OFDMA parameters are still not totally resolved and that these generators may change based on the resolution of OFDMA parameters.

Cl **008** *SC* **8.3.1** *P* **221** *L* **14** # 490
Kuffner, Stephen Motorola

Comment Type **ER** *Comment Status* **D**

""The first 32 output bits generated by the generator are 0000 ...""

SuggestedRemedy

The first 32 output bits generated by the (I/Q?) generator are 0000 ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comments 485-488

Cl **008** *SC* **8.3.1** *P* **221** *L* **15** # 489

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...corresponding reference preamble symbols are given as PREF(-2592:2561) = ...""

SuggestedRemedy

...corresponding reference preamble symbols are given as PREF(-2592:-2561) = ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3.1** *P* **221** *L* **8** # 485

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""PREF can be generated by using length-8192 pseudo random sequence generators and by forming the QPSK symbols by mapping the first 5184 bits of these sequence to the I and Q components respectively. ""

SuggestedRemedy

The QPSK symbols that compose PREF are generated from the first 5184 bits of two different length-8191 psuedorandom sequences by mapping the bits into the I and Q components.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note - the understanding of the comment resolution committee is that (as of 092006) OFDMA parameters are still not totally resolved and that the PREF PN generators may change based on the resolution of OFDMA parameters.

Cl **008** *SC* **8.3.1.1** *P* **221** *L* **16** # 493

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Note that the preamble symbols are transmitted at 3 dB higher power compared to the control and payload symbols"".

What does this mean regarding EIRP? Don't we have to comply with a regulatory EIRP cap in the US? Does it mean we're transmitting the preamble at 8W EIRP, or that we're transmitting the control and payload at 2W EIRP?

SuggestedRemedy

I'm not saying we shouldn't do this but we should square it with the Commission first by asking for some kind of variance and we should also consider it in our interference range analyses. Is the frame preamble also transmitted with a 3dB boost? Then we'd have to ask for at most 7.5% duty cycle at this higher power (2 bauds over a 10 ms frame)

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.1.1** *P* **222** *L* **13** # 492

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

I'm trying to understand why only +/- 756 subcarriers are used (1513 including DC) in the superframe preamble. Doesn't this only span 5.062 MHz, while the modulation uses 1728 subcarriers and spans 5.785 MHz? Why the difference? If a frame 0 preamble doesn't have to follow a superframe preamble in single channel applications (PP bit in SCH), doesn't that mean the superframe preamble is used for channel estimation in frame 0? Shouldn't it then span the modulation domain?

Is this to match the 28 middle subchannels used in the SCH?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.1.1** *P* **222** *L* **28** # 494

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""For both the short training sequence and the long training sequence, the DC sub-carrier should be mapped to the center frequency of a single TV band. The superframe preamble is transmitted/repeated in all the available bands.""

""Repeated"" makes it sound like temporal repetition. ""Available"" makes it sound like it is transmitted in every channel not occupied by an incumbent.

SuggestedRemedy

For both the short training sequence and the long training sequence, the DC sub-carrier should be mapped to the center frequency of a single TV channel. The single-channel bandwidth superframe preamble is transmitted in all active channels, including bonded and aggregated channels.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to editor(s) - if channel bonding and/or aggregation are not adopted as options this will need some clean-up.

Cl **008** *SC* **8.3.1.1** *P* **222** *L* **4** # 491

Kuffner, Stephen Motorola

Comment Type **ER** *Comment Status* **D**

""The duration of superframe preamble is Tsuperframe preamble = 746.666 ms (assuming ...""

SuggestedRemedy

The duration of superframe preamble is Tsuperframe preamble = 746.666 us (assuming ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3.1.2** *P* **223** *L* **14** # 495

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The duration of superframe is relatively large ...""

SuggestedRemedy

The duration of the superframe is relatively long ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3.1.2** *P* **223** *L* **19** # 496

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In order to save system resources, the BS may optionally choose not to transmit the short training sequence in the frame preamble under certain conditions.""

such as...? Can we give guidance to the BS controller folks?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.1.2** *P* **223** *L* **24** # 497

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""In addition to the superframe preamble, the use of the short and long preamble is mandatory immediately after the end of a quiet period whenever the size of this quiet period is longer than one frame size. This implies that after a quiet period longer than one frame size, a new superframe or frame transmission is always initiated.""

Are there 4 preambles required after a quiet period, since just using ""short and long preamble"" in the frame preamble section would assume the frame preambles as the antecedent? Is this only required if there is channel bonding and the frame preamble is different than the SCH preamble?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.2.1** *P* **224** *L* **13** # 499

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The SCH is transmitted using the basic data rate mode.""

Table 234 indicates that the SCH is transmitted with a spreading factor of 4 (PHY mode 0). Is this the ""basic data rate mode""?

SuggestedRemedy

The SCH is transmitted using PHY mode 0 (see Table 234).

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.2.1** *P* **224** *L* **14** # 500

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The 15-bit randomizer initialization sequence shall be set to all 1s (i.e. 1111 1111 1111 111). ""

Is the SCH always transmitted with the mandatory convolutional code, regardless of the capabilities of the CPEs?

SuggestedRemedy

The initialization sequence of the 15-bit randomizer of Figure 124 (Clause 8.5) shall be set to all ones (i.e., 1111 1111 1111 111).

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.2.1** *P* **224** *L* **18** # 501

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The super frame control header is transmitted in all the sub-channels. Since the superframe control header has to be decoded by all the CPEs in the range of the BS, the SCH has to be repeated in all the bands.""

The use of sub-channels and bands here is confusing. Does sub-channels refer to a single TV channel out of a bonded channel combination, or the 48 data-carriers sub-channel? Even if it means the 48 data-carriers sub-channels, the two end ones are not used (line 25) so ""all the sub-channels"" is misleading.

SuggestedRemedy

Since the superframe control header has to be decoded by all CPEs in the range of the BS, the SCH has to be transmitted in all TV channels used, including bonded or aggregated channels.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to editor(s) - if channel bonding and/or aggregation are not adopted as options this will need some clean-up.

Cl **008** *SC* **8.3.2.1** *P* **224** *L* **21** # 502

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The 42 bytes of the SCH are encoded ...""

What happens when the SCH is only 19 bytes long as in line 10, or some intermediate value? Is it padded to 42 bytes? Otherwise the spreading factor of 4 would not seem to span the central 28 subchannels. If it is padded, that should be indicated in line 10 and in Table 1.

SuggestedRemedy

The maximum 42 bytes of the SCH are encoded ...

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.2.1** *P* **224** *L* **24** # 503

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""This will result in 1344 symbols occupying 28 sub-channels (see 8.4.1 for the definition of sub-channel). This will free up 2 sub-channels on each of the band-edges, which are therefore defined as guard sub-channels. The additional guard sub-carriers at the band-edges will enable the CPEs to better decode the SCH""

Are these physical sub-channels band or distributed? The fact that the guard subcarriers are at the band edges makes it sound like these are band subchannels (consecutive subcarriers). Yet the reference 8.4.1 is distributed subcarrier permutations.

What are the guard subchannels guarding? Also, why does having guard subchannels enable the CPE to better decode the SCH? Is it just that it's a different sequence?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.3.2.1** *P* **224** *L* **9** # 498

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It also includes a variable number of IEs, due to which the length of SCH is also variable (with a minimum of 19 bytes and a maximum of 42 bytes).""

Note the SCH will get shorter (by 12 bits) with the removal of the FS and FDC information since frames and superframes are fixed.

SuggestedRemedy

Since it also includes a variable number of IEs, the length of the SCH is variable (with a minimum of 19 bytes and a maximum of 42 bytes).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note the SCH will get shorter (by 12 bits) with the removal of the FS and FDC information since frames and superframes are fixed. Additional cleanup appears necessary.

Cl **008** *SC* **8.3.2.2** *P* **225** *L* **4** # 505

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Is the FCH always coded with the mandatory convolutional code?

SuggestedRemedy

State clearly (somewhere logical) that the mandatory convolutional code is used for FCH and other information that all CPEs must copy.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3.2.2** *P* **225** *L* **40** # 504

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The length of FCH is 6 bytes and it contains among others the length (in bytes) information for DS-MAP, US-MAP, DCD and UDC. The FCH shall be sent in the first two sub-channels in the symbol immediately following the preamble symbols.""

SuggestedRemedy

The length of FCH is 6 bytes and it contains among other things the length (in bytes) of the DS-MAP, US-MAP, DCD and UCD. The FCH shall be sent in the first two sub-channels in the symbol immediately following the preamble symbols.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3.2.3** *P* **225** *L* **17** # 506

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Each CPE will use it allocated sub-channels to send the BCH in the symbol immediately following the US preamble symbols. ""

SuggestedRemedy

Each CPE will use its allocated sub-channels to send the BCH in the symbol immediately following the US preamble symbols.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.3.2.4** *P* **225** *L* **29** # 507

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""These fields are transmitted using the base data rate mode.""

SuggestedRemedy

This should be identified as one of the PHY modes (e.g. PHY mode 1).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.4** *P* **225** *L* **40** # 508

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""According to channel quality information, BS determines the type of sub-channel. Figure 117 shows the hierarchy of the sub-channel type.""

SuggestedRemedy

The BS determines the type of sub-channel based on channel quality information. Figure 117 shows the hierarchy of the sub-channel types.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.4** *P* **226** *L* **12** # 510
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The bands in good state are selected for data transmission to provide the multi-user diversity. ""

Isn't diversity only provided if the scattered adjacent type is used?

SuggestedRemedy

The groups(?) with favorable propagation are selected for data transmission to provide mulitple users with diversity.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.4** *P* **226** *L* **13** # 511
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""This type of sub-channel requires more feedback information than distributed sub-carrier allocation type. For the band-type sub-channel, the multiple bins are allocated to each user. For the scattered-type sub-channel, only one bin is allocated to each user. Where the bin denotes a group of adjacent sub-carriers.""

What feedback information is required for adjacent modes? Why is only one bin per band allocated to each user in scattered type? Doesn't it depend on how many resources they require?

SuggestedRemedy

This type of sub-channel requires more feedback information than the distributed sub-carrier allocation type. For the band-type sub-channel, the user is allocated a contiguous set of bins, where the bin denotes a group of adjacent sub-carriers. For the scattered-type sub-channel, multiple discontiguous bins are allocated to each user(?).

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.4** *P* **226** *L* **4** # 509
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""For sub-channel type with distributed sub-carrier permutation, each sub-channel consists of distributed sub-carriers within an OFDM symbol. And only the average CINR over all sub-carriers is required. It is suitable for the users with high frequency selectivity or far distant users. Figure 118 shows the time and frequency domain variation and sub-carrier allocation method for distributed type sub-channel.""

SuggestedRemedy

For sub-channel types with distributed sub-carrier permutations, each sub-channel consists of distributed sub-carriers within an OFDM symbol. Only the average CINR over all sub-carriers is required to be fed back to the BS. This method is suitable for users with highly frequency selective propagation channels or more distant users. Figure 118 shows the time and frequency domain variation and sub-carrier allocation method for distributed type sub-channels.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.4.1.2** *P* **228** *L* **14** # 512
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

What is the minimum US resource allocation? Is it a single subchannel? If a CPE doesn't need to fill an entire US frame over a single subchannel, can another CPE finish out the US frame on that subchannel? This seems to be indicated by e.g. Figure 87. Are the US steps in blocks integer steps of a single subchannel?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.4.2** *P* **230** *L* **1** # 515
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

How is the adaptive or variable pilot pattern announced? Would it be in the SCH? Is the ""nominal"", presumably most robust pilot pattern used for SCH, FCH, MAPs, etc, while the adaptive patterns are used exclusively for increasing throughput on traffic?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.4.2** *P* **230** *L* **5** # 513

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""To determine the sub-optimal period between pilots in the sub-carrier and symbol direction, we need to consider the Doppler spread and the maximum delay spread of the wireless channel. ""

SuggestedRemedy

The Doppler spread and the maximum delay spread of the wireless channel need to be considered to determine the most efficient spacing between pilots in the frequency and time dimensions.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.4.2** *P* **230** *L* **7** # 514

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""As the WRAN channel has the characteristics of the frequency-selective but slow fading, the pilot symbol spacing is sparse but the pilot sub-carrier spacing is dense.""

SuggestedRemedy

Since the WRAN channel is a slowly fading frequency-selective channel, the pilot symbol (time) spacing is sparse but the pilot sub-carrier (frequency) spacing is dense.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.5** *P* **230** *L* **18** # 516

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Channel coding includes data scrambling, convolutional coding/duo-binary convolutional turbo coding, puncturing, bit interleaving and constellation mapping. Figure 122 shows the mandatory channel coding process. ""

SuggestedRemedy

Channel coding includes data scrambling, coding, puncturing, bit interleaving and constellation mapping. Figure 122 shows the mandatory channel coding process.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.5.1** *P* **231** *L* **9** # 517

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

Figure 124:
The output of the upper left XOR gate will be scrambled data, but the label indicates unscrambled data.

SuggestedRemedy

Fix the labeling in the figure.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.5.2** *P* **231** *L* **16** # 518

Kuffner, Stephen Motorola

Comment Type **ER** *Comment Status* **D**

""Convolutional code is mandatory and there are two additional optional modes.""

SuggestedRemedy

Convolutional code is mandatory and there are three additional optional modes.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

There are 3 optional codes under consideration.

This text will possibly need revision, depending on the decision of the WG on optional codes.

Cl **008** *SC* **8.5.2.1.1** *P* **231** *L* **20** # 519

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Figure 126 shows the pictorial depiction of the generator polynomials.""

SuggestedRemedy

Figure 126 shows a functional diagram of the generator polynomial implementation.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.5.2.1.1** *P* **232** *L* **3** # 520
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This implies that for the case of ...""

SuggestedRemedy

This means that for the case of ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.5.2.1.2** *P* **232** *L* **12** # 521
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...different rates that can be derived from the output of rate 1/2 convolutional coder ...""

SuggestedRemedy

...different rates that can be derived from the output of the rate 1/2 convolutional coder ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.5.2.2.1** *P* **233** *L* **2** # 522
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It is illustrated in Figure 20.""

SuggestedRemedy

It is illustrated in Figure 127.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.5.2.2.1** *P* **233** *L* **21** # 523
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The function PI(j) that gives the natural address i of the considered couple, when reading it at place j for the second encoding, is given in 8.5.2.2.2.""

I don't see the referenced function in the referenced clause.

SuggestedRemedy

Supply correct reference clause number.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Turbo coding is being considered as an optional coding scheme in this standard.

If turbo coding is accepted as an optional coding scheme by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **008** *SC* **8.5.2.2.4** *P* **234** *L* **18** # 524
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Three code rates are defined here (more code rates can be defined if required): R = ¢, 2/3, and ¥. ""

Doesn't the coder have to support the convolutional coding rates? Isn't a rate 5/6 needed?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.5.3** *P* **238** *L* **15** # 526

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

NCBPC is not defined in the document. I can see that it is number of coded bits per carrier (or perhaps subcarrier would be better), but it needs to be defined. Also used on p. 239, table 243.

SuggestedRemedy

Define NCBPC as number of coded bits per subcarrier.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.6.1.1** *P* **238** *L* **21** # 525

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

The ""8.6.1.1 Data modulation"" should not be underneath the ""8.6.1 Transformed OFDMA modulation"" topic but should precede it.

SuggestedRemedy

Move Data modulation clause before Transformed OFDMA clause and renumber document accordingly.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.6.1.1.1** *P* **239** *L* **14** # 530

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

What is the performance advantage of the transformed OFDMA modulation? Has it been tested in the various channel models and the performance been compared to non-transformed simulation results (for the same data set and noise generator initial state)?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.6.1.1.1** *P* **239** *L* **17** # 527

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It is still possible to restore the date even when some of the sub-carriers experience deep fade.""

SuggestedRemedy

It is still possible to restore the data even when some of the sub-carriers experience a deep fade.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.6.1.1.1** *P* **240** *L* **1** # 528

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Hadarmard transformation matrix is given by the following Equation:""

SuggestedRemedy

The Hadamard transformation matrix is given by the following Equation:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.6.1.1.1** *P* **240** *L* **16** # 531

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The spreading matrix for SCH is defined 8.3.2.1.""

It is not really defined there. It is said to be spread by a factor of 4 (p. 224, line 23), but it doesn't detail the nature of this spreading. Is it simply 4x repetition in the frequency domain? Is it Hadamard transformed prior to that repetition? Is the 4x data spread by a 4x larger Hadamard matrix?

SuggestedRemedy

The spreading matrix for SCH is defined in 8.3.2.1.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.6.1.1.1** *P* **240** *L* **6** # 529
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

The H2 portion of the equation is not properly rendered due to the paragraph style.

SuggestedRemedy

Perhaps ""IEEEStds equation variable list"" can be modified here to have an ""at least"" line spacing instead of an ""exactly"" line spacing in the paragraph style.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.7.1** *P* **240** *L* **26** # 532
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The transmitter and receive center frequency tolerance should be within +-2 ppm.""

SuggestedRemedy

The BS transmit and receive center frequency tolerance shall be no worse than +-2 ppm.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

WG may wish to consider whether there would be a benefit in tightening this tolerance somewhat.

Cl **008** *SC* **8.8.1** *P* **241** *L* **15** # 535
Kuffner, Stephen Motorola

Comment Type **TR** *Comment Status* **X**

""In the two step approach, multiple unoccupied channel candidates are first determined by energy detection method.""

Also figs 131 and 132. We haven't yet determined that energy detection is the best way to do fast sensing.

SuggestedRemedy

In the two step approach, multiple unoccupied channel candidates are first determined by e.g. an energy detection method.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.1** *P* **241** *L* **17** # 534
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The swapping time is more important than the sensing sensitivity at this stage. ""

...scanning...?

SuggestedRemedy

The scanning time is more important than the sensitivity at this stage.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.8.1** *P* **241** *L* **18** # 536
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Then Fine/Feature sensing is performed for the selected channel for identifying the type of incoming signal. Also at this stage, very low power narrowband signal can be detected. If any signal is detected the given channel, then MAC will select another candidate channel for fine/feature detection until finding unoccupied channel.""

We have to be careful to note that a licensed signal can be detected on a channel and still be available for use, provided the unlicensed network is outside of the interference range. We also have to be careful that an unlicensed signal can be mistaken for a licensed signal, and also be careful with anomalous propagation.

SuggestedRemedy

Then Fine/Feature sensing is performed on the selected channel for identifying the type of incoming signal. Very low power narrowband signals can also be detected at this stage. If any postively identified licensed signal is detected to be above threshold on the given channel, then the MAC will select another candidate channel for fine/feature detection until finding a satisfactory channel.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.1** *P* **241** *L* **7** # 533

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""The sensing system comprised of (i) a wideband antenna, (ii) a wideband RF front-end for down converting received signal (iii) signal detection block to process the signals and detect the presence of interested signal or identify the signal types.""

SuggestedRemedy

The sensing system is comprised of (i) a wideband antenna, (ii) a wideband RF front-end for down converting received signal, and (iii) a signal detection block to process the signals and detect the presence of signals or identify the signal types.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.1** *P* **242** *L* **3** # 537

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Even while in communication, the sensing block is working to find other unoccupied channels, check if there is any attempt on the channel currently being used from a primary user and detecting the selected channel by request from base station for distributed sensing purposes. There could be many different type of detection methods that can be applied for the sensing block.""

SuggestedRemedy

Even while in communication, the sensing block can be working to find other unoccupied channels (providing its sensitivity is not impaired by said communication), checking whether a primary user is attempting to establish communications on the currently-used channel, or sensing the selected channel by request from the base station for distributed sensing purposes. There could be many different types of detection methods utilized by the sensing block.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.2** *P* **241** *L* **7** # 541

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Are all sensing schemes in Clause 8.8.2 and 8.8.3 informative? If informative, should they be labeled as such? Do they belong in an appendix? Will we be standardizing the sensing scheme or just setting the absolute detection powers (not SNRs) and minimum detection time and method of reporting the sensing results?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.2.1** *P* **242** *L* **12** # 539
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Equation (13)

B, presumably physical bits in the A/D converter, is not defined for this equation. Vc is poorly defined. Is the A/D input clipping -Vc to Vc or 0 to Vc?

If B bits of quantization over +/- Vc, then quantization is 2Vc/2^B = Vc/2^(B-1). If the signal has an RMS value of E quantization cells, then the variance is

E^2 Vc^2 / 2^(2(B-1)) = 4E^2 * Vc^2/2^2B,

and the power is this variance over R. If unipolar, the mean of Vc^2/4 has to be subtracted off of the variance.

Where does the scale factor 1.2567e4 come from? It corresponds to~41dB (~35dB if the 4 in front of the E^2 is accounted for bipolar input range).

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.2.1** *P* **242** *L* **27** # 540
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

The value of delta set by the BS will depend on the required precision of the measurement and on the variance of the envelope of the signal being measured. We have not stated the required precision, so how does the BS know how to set this parameter?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.2.1** *P* **242** *L* **9** # 538
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The RSSI measurement shall be reported in units of dBm. ""

To what accuracy and precision? This can make a big difference in implementation.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.3.1** *P* **243** *L* **29** # 542
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""The noise power can simply be estimated form the thermal noise adjusted for any other gain of the RF front-end. Alternatively, the CPE can also periodically estimate its input noise power using a vacant channel or by disconnecting the antenna.""

The suggested alternatives may be of limited utility, depending on environment and receiver design. Sensing noise power on a vacant channel will not necessarily reflect the noise power on the channel of interest, depending on the environmental noise, RF gain flatness, noise figure flatness, etc. Likewise, disconnecting the antenna does not reflect the environmental noise component, which can be significant at lower frequencies, and the antenna impedance can result in a different LNA noise figure than a termination (though the antenna impedance is somewhat isolated from the LNA by the cable losses...).

SuggestedRemedy

The noise power can simply be estimated from the thermal noise adjusted for any other gain of the RF front-end.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.3.2** *P* **244** *L* **1** # 543

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Upon request by the BS, the CPE shall identify the type of the signal seen at its input, example ATSC TV, DVB-T, Part 74 devices. The following subsections describe some of the method to be used for this signal feature detection.""

These methods have not been determined to be the methods to be used.

SuggestedRemedy

Upon request by the BS, the CPE shall identify the type of the signal seen at its input, for example ATSC TV, DVB-T, or Part 74 devices. The following subsections describe some of the methods that can be used for this signal feature detection.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.3.2.1** *P* **244** *L* **21** # 545

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""In the presence of frequency selective multipath between the detecting device the transmitter of the signal being detected, the expected spectrum is not known. ""

SuggestedRemedy

Frequency selective multipath between the detecting device and the transmitter distorts the expected spectrum.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.8.3.2.1** *P* **244** *L* **5** # 544

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""This fact is used to detect if there is enough energy in a part of a spectrum.""

SuggestedRemedy

This attribute is used to determine if the observed power spectral density indicates the presence of a microphone. Note this method cannot distinguish whether the observed microphones are entitled to Part 74 protections.

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.3.2.2** *P* **244** *L* **34** # 546

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""After the necessary frequency correction, ...""

SuggestedRemedy

After acquiring the signal, ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.2.2** *P* **245** *L* **16** # 547

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Peak detection is performed on y1 and y2: if there is an outstanding peak appearing in either y1 or y2, we make a decision that the ATSC DTV signal is present. Alternatively, we can compute the maximum value between the absolute value of y1 and y2, i.e., y = max(|y1|, |y2|), and use y for peak detection.""

SuggestedRemedy

Peak detection is performed on y1 and y2: if there is an outstanding peak appearing in either y1 or y2, a decision is made that the ATSC DTV signal is present. Alternatively, the maximum of the absolute values of y1 and y2, i.e., y = max(|y1|, |y2|), can be computed and used for detection.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.2.2** *P* **246** *L* **7** # 548

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Denote the output of the IIR filter as z(k), similarly as PN511 detection, a running mean and variance of z(k) can be computed, given as:""

SuggestedRemedy

Denoting the output of the IIR filter as z(k), a running mean and variance of z(k) can be computed (as was done with PN511 detection), and is given as:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.2.3** *P* **246** *L* **25** # 549

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This allows 14 possible carrier offsets for a given channel. As NTSC transmission is discontinued, the number of channel offsets should decrease to two, with a tolerance of 10 Hz.""

These two remaining offsets should be specifically called out.

SuggestedRemedy

This allows 14 possible carrier offsets for a given channel. See Table 245. As NTSC transmission is discontinued, the number of channel offsets should decrease to two, with a separation of 19.403 kHz +/- 10 Hz.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.2.3** *P* **247** *L* **43** # 550

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""It is also possible to use two synchronized tuners to constantly lock to a DTV channel while looking for other DTV channels.""

This is an implementation issue.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.3.3** *P* **249** *L* **11** # 551

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We say that x(n) is cyclostationary with period P if its autocorrelation function Rx(n,k) is P-periodic, i.e.:""

Will all of this become informative text?

SuggestedRemedy

x(n) is said to be cyclostationary with period P if its autocorrelation function Rx(n,k) is P-periodic, i.e.:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.3** *P* **250** *L* **10** # 553
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Further we note that a ...""

SuggestedRemedy

Further note that a ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.3** *P* **250** *L* **14** # 554
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""...where signal xj(n) has cycle frequency j, we can extract the CSD (eqn) from...""

SuggestedRemedy

...where signal xj(n) has cycle frequency j, the CSD (eqn) can be extracted from...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.3** *P* **250** *L* **18** # 555
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""For a large class of signals, we can determine what the cycle frequency is. We now consider a simple example of a BPSK signal and specify its cycle frequency.""

SuggestedRemedy

For a large class of signals, the cycle frequency can be determined. Consider a simple example of a BPSK signal with a specified cycle frequency.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.3** *P* **250** *L* **2** # 552
Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We define the cyclic autocorrelation function (CAF) as:...""

SuggestedRemedy

The cyclic autocorrelation function (CAF) is defined as:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.3** *P* **250** *L* **29** # 556

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""Thus to detect a BPSK signal with known characteristics, one only has to analyze the CSD at = 2fc+kTb.""

SuggestedRemedy

Thus to detect a BPSK signal with known characteristics, the CSD need only be analyzed at 2fc+kTb.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.3** *P* **250** *L* **32** # 557

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""To gain an intuition into how cyclostationarity based detection works, let us revisit the problem of binary hypothesis testing. We want to determine whether the signal of interest to be detected s(k), that is transmitted over a channel with channel impulse response h(k) in the presence of additive white Gaussian noise (AWGN) n(k), is present or not on the basis of the measured received signal x(k). That is, we want to determine which of the following hypothesis is true:""

SuggestedRemedy

To gain an intuition into how cyclostationarity based detection works, consider the problem of binary hypothesis testing. The objective is to determine whether a signal s(k) was transmitted over a channel h(k) in the presence of additive white Gaussian noise (AWGN) n(k) based on the received signal x(k). That is, the receiver must select one of the following hypotheses:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.3** *P* **250** *L* **40** # 558

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""It is easy to show that we have the following relation:""

SuggestedRemedy

The following relation is easily shown:

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.4** *P* **251** *L* **28** # 559

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""This is however not the purpose of this document to discuss these methods. However, some further details are needed to deeply specify the expected performance of the signal detection.""

SuggestedRemedy

Discussion of these methods is not the purpose of this document. However, some further details are needed to specify the expected performance of the signal detection.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.3.4** *P* **252** *L* **10** # 560

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Apparently they can put their video carrier anywhere between minus 10 kHz and plus 10 kHz in relation to the standard carrier frequency.""

Do we have more concrete wording we can put in here?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.4.1.1** *P* **253** *L* **9** # 561

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""Parameters for one typical example for this application are as follows:""

I understand this is just an example, but why not just use the same clock and FFT as the communications channel (i.e., 6 MHz x 8/7 clock)?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.4.1.1** *P* **254** *L* **6** # 562

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

...two comparison methods used for DTC and NTSC signals in the above can be applied.

SuggestedRemedy

...two comparison methods used for DTV and NTSC signals in the above can be applied.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section and subsequent sections on other possible sensing schemes may delve too far into the realm of being unnecessarily implementation-specific.

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **008** *SC* **8.8.4.1.1** *P* **254** *L* **8** # 563

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

This is not a sufficient condition for identifying the presence of a legal wireless microphone. It can be spoofed by non-Part 74 microphone usage and even other unlicensed usage that fits this spectral description. It may not even be a necessary condition if the microphone is unmodulated (a carrier or at least narrow band modulation from background noise).

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.8.4.1.2** *P* **254** *L* **14** # 564

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

I'm not sure what is being proposed here. Is this method proposing performing a wide band FFT and identifying occupied channels as consecutively-filled bins?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.9.1** *P* **256** *L* **5** # 565

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""All the CPEs shall be be synchronized with the BS using the superframe preamble. ""

SuggestedRemedy

All the CPEs shall be synchronized with the BS using the superframe preamble.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.9.1** *P* **256** *L* **5** # 566

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""It is required that all the US transmissions shall be received at the BS within 25% of the minimum guard interval.""

Is this 25% of the minimum guard interval (i.e., 1/4 of 1/32 CP, or 1/128 of a FFT time, 2.33 usec for 6MHz channel w/ 2K FFT), or 25% of the used guard interval (depending on what the system is presently using)? If it is 1/128 of a symbol time, maybe that should be specifically stated.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.9.1** *P* **256** *L* **8** # 567

Kuffner, Stephen Motorola

Comment Type **E** *Comment Status* **D**

""We define a two-step synchronization process:...""

SuggestedRemedy

A two-step synchronization process is defined, consisting of ...

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **008** *SC* **8.9.1.2** *P* **256** *L* **17** # 568

Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

""During this phase, the CPE can synchronize the carriers in phase and frequency to the RF upstream channel by using phase locked techniques to synchronize the local oscillator driving the CPE to the reference clock transmitted by the BS.""

This sentence is confusing. Is this about acquiring frequency lock and frame timimg from the preamble training sequences? Is the BS transmitting a reference clock or does this refer to the preamble?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **008** *SC* **8.9.1.3** *P* **256** *L* **21** # 569
Kuffner, Stephen Motorola

Comment Type **T** *Comment Status* **X**

Target tolerances (also table 246)

These tolerances need to be better defined. Are they required of the CPE to perform initial ranging? For normal operation?

If Cs = 3348 Hz, and e.g. delta f/Cs = .03, this means delta f = .03 x 3348 = 100 Hz, so does this mean the CPE has to acquire the BS frequency to within 100 Hz error before transmitting? If multiple access carriers are interlaced on the upstream (with distributed subcarriers), should their tolerance be allowed to vary with code rate since neighboring subcarriers could be using different code rates?

delta t is quoted as Ts/10, but in 8.9.1 a value of Ts/128 is implied for ranging timing (1/4 of 1/32 CP). What does delta t mean here?

synchronization accuracy, delta A in dB... what is this?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **01** *SC* **1.3** *P* **1** *L* **17** # 704
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

Reference model is missing.

SuggestedRemedy

Include Reference Model

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Duplicates another comment.

Either text (and figures, if required) should be inserted or the empty clause should be deleted.

Cl **03** *SC* **3.12** *P* **3** *L* **23** # 804
Chouinard, Gerald Communications Rese

Comment Type **E** *Comment Status* **X**

Text improvement.

SuggestedRemedy

Add the words ""to be processed"" to clarify the definition:
MAC PDU: The smallest unit of transmission/reception to be processed by the MAC. ...

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.13** *P* **3** *L* **25** # 805
Chouinard, Gerald Communications Rese

Comment Type **E** *Comment Status* **X**

CPEs are used in this standard, not SSs.

SuggestedRemedy

Change the text to read:
An identifier shared between the base station (BS) and subscriber stationa CPE...

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.13** *P* **3** *L* **25** # 796
Chouinard, Gerald Communications Rese

Comment Type **ER** *Comment Status* **X**

CPEs are used in this standard, not SSs.

SuggestedRemedy

Change the text to read:
... and one or more of its CPEs

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.16** *P* **3** *L* **32** # 809
Chouinard, Gerald Communications Rese

Comment Type **T** *Comment Status* **X**

Definition of Sub-frame is not precise enough.

SuggestedRemedy

Add the following text:
Formed by a number of bursts sent in the same channel direction.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.17** *P* **3** *L* **33** # 814
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

Definition of Superframe is not precise enough.

SuggestedRemedy

Modify the definition to read:
Superframe: Group of 16 frames initiated by the transmission from the BS of the superframe preamble and the super-frame control header (SCH).

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.18** *P* **3** *L* **35** # 806
Chouinard, Gerald Communications Rese

Comment Type **E** *Comment Status* **X**

Should the TDD transmissions share the same ""frequency"" or the same TV channel?

SuggestedRemedy

Change the word ""frequency"" for TV ""transmission channel"".

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.19** *P* **4** *L* **1** # 815
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

The 802.22 standard will be based on the OFDMA scheme for the upstream with its 2-dimensional mapping of the information in frequency and time rather than the TDMA scheme which uses only the time dimension. The definition needs to be changed accordingly.

SuggestedRemedy

Change definition 3.19 as follows:
Orthogonal Frequency Division Multiple Access (OFDMA) burst: A contiguous portion of the upstream using PHY parameters, determined by the Upstream Interval Usage Code (UIUC), that remain constant for the duration of the burst. OFDMA bursts are separated by gaps in transmission and initiated with preambles if subsequent bursts are from different transmitters.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.20** *P* **4** *L* **7** # 816
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

The 802.22 standard will be based on the OFDM scheme for the downstream with its 2-dimensional mapping of the information in frequency and time rather than the TDM scheme which uses only the time dimension. The definition needs to be changed accordingly.

SuggestedRemedy

Change definition 3.20 as follows:
Orthogonal Frequency Division Multiplex (OFDM) burst: A contiguous portion of the downstream using PHY parameters, determined by the Downstream Interval Usage Code (DIUC), that remain constant for the duration of the burst. OFDM bursts are separated by gaps in transmission and usually by upstream OFDMA bursts, and are initiated by preambles.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.22** *P* **4** *L* **13** # 807
Chouinard, Gerald Communications Rese

Comment Type **E** *Comment Status* **X**
Definition of TV channel needs improvement.

SuggestedRemedy
Add text as follows:
TV channel: Refers to a specific physical TV Channel in the TV broadcast frequency bands as defined by TV broadcast communication standards.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.24** *P* **4** *L* **16** # 798
Chouinard, Gerald Communications Rese

Comment Type **ER** *Comment Status* **X**
Improve definition of UCD to align with 3.7.

SuggestedRemedy
Change definition as follows:
Upstream channel descriptor (UCD): A medium access control (MAC) message that describes the PHY characteristics of an upstream channel.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.25** *P* **4** *L* **18** # 808
Chouinard, Gerald Communications Rese

Comment Type **E** *Comment Status* **X**
Align UIUC definition with that of DIUC in 3.8.

SuggestedRemedy
Modify definition as follows:
Upstream interval usage code (UIUC): An interval usage code specific to an upstream. See also: interval usage code.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.26** *P* **4** *L* **20** # 799
Chouinard, Gerald Communications Rese

Comment Type **ER** *Comment Status* **X**
Align the US-MAP definition with the use of OFDMA and its 2-dimensional mapping.

SuggestedRemedy
Modify the definition as follows:
Upstream map (US-MAP): A MAC message on the downstream that defines the logical channels (frequency) and slots (time) to be used by CPEs to transmit their upstream burst.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.3** *P* **3** *L* **4** # 812
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**
Extent of cell coverage needs to be defined with respect to service availability

SuggestedRemedy
Add the following text the the definition:
"" ...given minimum SINR quality for a given service availability expressed in terms of % location and % time.

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.6** *P* **3** *L* **10** # 802
Chouinard, Gerald Communications Rese

Comment Type **E** *Comment Status* **X**
Add acronym to the definition like in other cases.

SuggestedRemedy
Downstream (DS):

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.7** *P* **3** *L* **11** # 803
Chouinard, Gerald Communications Rese

Comment Type **E** *Comment Status* **X**
Spell out MAC to align with definition 3.24.

SuggestedRemedy
Downstream channel descriptor (DCD): A medium access control (MAC) message ...

Proposed Response *Response Status* **O**

Cl **03** *SC* **3.9** *P* **3** *L* **15** # 813
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**
Change definition of Downlink Map to correspond to the 2-dimensional mapping in the OFDMA scheme rather than only the TDMA scheme and to align with 3.26.

SuggestedRemedy
New text:
New definition:
Downstream map (DS-MAP): A MAC message on the downstream that defines the logical channels (frequency) and the slots (time) to be used by CPEs to decode the downstream burst addressed to them.

Proposed Response *Response Status* **O**

Cl **04** *SC* **6.16.3** *P* **130** *L* **24** # 625
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**
Given that the MAP length is so small compared with the whole frame length and MAP is not transmitted in each frame, why is MAP overhead for specifying multi-channel allocation very large?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **05** *SC* *P* **6** *L* **1** # 777
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**
Do we need this?

SuggestedRemedy
Discuss the need or not for a convergence sublayer, and write/remove this section accordingly.

Proposed Response *Response Status* **O**

Cl **05** *SC* *P* **6** *L* **1** # 705
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **X**
Packet Convergence Sublayer missing.

SuggestedRemedy
Include Packet Convergence Sublayer.

Proposed Response *Response Status* **W**
Duplicates another comment.

Either text (and figures, if required) should be inserted or the empty clause should be deleted.

Cl **06** *SC* **15** *P* **119** *L* **16** # 790
Caldwell, Winston FOX

Comment Type **TR** *Comment Status* **X**
Need more descriptive and detailed Network Entry and Initialization Procedure.

SuggestedRemedy
Need to have further discussions and gain better understanding of the procedure the CPE needs to follow to enter the network and to initialize.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.1** *P* **6** *L* **25** # 810

Chouinard, Gerald Communications Rese

Comment Type **T** *Comment Status* **X**

""In particular for measurement activities, multicast management type of connections are very suitable, as they allow vendor-specific clustering algorithms to be implemented (do we want this in a standard?) and the measurement load to be shared.""
Do we need to support vendor-specific clustering in the standard?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.1.1** *P* **7** *L* **25** # 817

Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

Text in the ""Reference Architecture"" needs to be aligned with the FRD mandatory and optional requirements. Text was re-written for better logical flow.

SuggestedRemedy

New text:
The major goals in defining a suitable reference architecture for 802.22 WRANs, based on cognitive radio, are related to flexibility and efficiency. With this in mind, the reference architecture model depicted in Figure 1 is proposed. The MAC natively supports IP while convergence sublayers (CSs) may be included if other network layer technologies need to be supported.

The unique and distinctive characteristic of this architecture is that it needs to cover for the fact that the spectrum availability in the TV bands can be fragmented, i.e., some TV channels can be occupied by incumbents in an area while others can be available for WRAN transmission, and this availability can vary in time (e.g., wireless microphone operation). It is therefore of paramount importance to design an air interface that is frequency agile and can adjust to the fragmented and time-variable spectrum availability while avoiding interference to the TV band incumbent services. This is done through the use of cognitive radio techniques whose required functional capabilities are established in this standard. In particular, the CMAC will need to keep track of multiple TV channels to know which of these channels are occupied by incumbents and which can be used for WRAN transmission to allow for dynamic frequency selection to avoid interference to incumbents on a real-time basis.

Furthermore, it would be useful that the WRAN systems be scalable so that their capacity can be expanded over time, as the need arises. [This addresses an optional requirement, see 10.2.1.2 of the FRD.] This can be done by either base station antenna sectorization, TV channel aggregation when a number of TV channels distributed over the TV band could be used in the area and/or TV channel bonding when contiguous TV channels are available in the area. The latter two options require that a number of PHY/MAC air interface modules are operated in parallel along with a common Spectrum Manager (SM) module.

These important characteristics are supported by the architecture as shown in Figure 1.

The SM has a key role in the overall architecture as it is the central point at the base station where all the information on the spectrum availability resulting from the distributed sensing (see section YY) is gathered and decisions on which TV channel is to be used by the PHY are made. The SM has also other capabilities such as taking requests from the MAC/PHY module. For example, if an interference situation arises (e.g., with incumbents or other 802.22 cells) during normal operation in the channel, this is detected by the MAC which shall then be capable of taking appropriate actions to resolve the issue such as switching channels. In order to do this, the MAC may inquire the SM about the most suitable channel (or set of channels) to switch to (e.g., based on several criteria including the number of CPEs with which it is dealing with, the average CPE range, traffic type), and uses the informed response from the SM to perform the switching operation.

The SM can also allow the system to take advantage of non-contiguous channels while keeping the simplicity of CMAC (and also of the PHY) and allowing the system to scale (and also evolve) over time. In other words, the SM can allow for an effective channel aggregation mechanism to be implemented by assigning the identified free channels for use by the various MAC/PHY modules (similar to a resource allocator). To allow a greater level of flexibility, the SM can assign channels (possibly disjoint unless directional antennas are used) to the MAC/PHY modules based on several criteria such as number of terminals associated to each of these modules, traffic requirements, ranging (e.g., lower frequency channels could be assigned to the module dealing with farther away terminals), and so on. Figure 2 gives an example of possible channel assignments to a set of arbitrary modules.

Figure 2□- Illustrative diagram of spectrum allocations. Channels 1 and 5 are in use by overlapping 802.22 cells, while channels 2-4 are allocated to PHY/MAC 1 (i.e., channel bonding is used and thus it achieves 3 times as much bandwidth as a single channel) and channels 6-7 are assigned to PHY/MAC 2. Also, proper frequency separation is enforced in order to protect incumbent services.

Since BSs can be more complex while CPEs should possess very low complexity, 802.22 BSs should support the architecture of Figure 1. In other words, the capacity at the BS is augmented by increasing the number of PHY/MAC modules. However, from the CPE side, only a single MAC/PHY module would be incorporated with no need to implement a SM, as CPEs are fully under control of the BS. With this arrangement, it would be possible to design the system with capacity scalability while keeping a low complexity for the CPEs.

In the case of the channel bonding option, the CMAC and PHY at both the base station and the CPEs needs to be designed to effectively deal with either single or multiple channels simultaneously to allow throughput concatenation.

From a practical implementation point of view, the SM could be implemented in many ways ranging from high level software program to programmable logic devices providing for high system flexibility. Algorithms could be developed within the SM that could make an efficient use of the radio spectrum as per various criteria (outlined above), while the overall architecture would still provide a MAC and PHY with complexity comparable to existing wireless systems.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.1.1** *P* **7** *L* **31** # 682

Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

The drawing shows 1 MAC per PHY. This limits what can be done for an individually connection. Prefer 1 MAC per set of aggregated channels.

SuggestedRemedy

Consider implementation of ONE MAC per set of aggregated channels

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.1.1** *P* **8** *L* **10** # 706

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

Replace ""it is achieved"" with ""it uses"" in the caption for Figure 2.
Also on Lines 11 and 12, because the frequency scale and separation scale between channels is not shown, it is not clear how the proper frequency separation is observed in the deployment shown in Figure 2. This could be achieved by renumbering the channels, including incumbent channels, to stress the frequency separation.

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Figure caption should be revised to be brief and the explanation should be moved "in-line" into the text of the section.

Figure should be re-drawn to some scale to allow better visual interpretation of what it's intended to convey.

Cl **06** *SC* **6.10** *P* **102** *L* **14** # 592

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

HARQ provides an efficient way to improve system error performance; it has been adopted in IEEE 802.16. Also, it's meaningful to introduce HARQ to IEEE 802.22 according to its existing frame structure and coding scheme. Currently, the HARQ in 802.22 is very similar to that in 802.16. However, unlike 802.16, the HARQ for 802.22 should be able to provide robust link performance in the presence of interference due to the 802.22 operations.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.10** *P* **102** *L* **14** # 716

Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

See lines 14-15. ARQ Mechanism. Consider referencing appropriate sections of 802.16.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

Comment resolution committee believes that the 802.22 Standard should be a "stand-alone" document that does not require the reader to hop back and forth to another large, complex document in order to see information that should be "in-line" and in context for ease of use.

Cl **06** *SC* **6.10** *P* **102** *L* **15** # 122

Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **D**

ARQ Mechanism refers to ""xxx"" clause of 802.16.

SuggestedRemedy

Add the reference, if references to 802.16 are OK (and I believe that is the case). If not, insert the specification.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment resolution committee believes that the 802.22 Standard should be a "stand-alone" document that does not require the reader to hop back and forth to another large, complex document in order to see information that should be "in-line" and in context for ease of use.

Cl **06** *SC* **6.11.1** *P* **103** *L* **6** # 25

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Traffice constaints of CBP is not an efficient and fair method of WRAN systems coexistence.

SuggestedRemedy

Shall consider better methods for ""interference free"" scheduling and coexistence.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.12.3.3** *P* **108** *L* **17** # 692

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

PE Bit should be PM Bit.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.13.1** *P* **110** *L* **9** # 824

Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

A decision should be taken to no longer support the FDD mode since all the technologies proposed are for TDD.

SuggestedRemedy

Remove the second sentence: ""FDD is also supported.""

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.3** *P* **111** *L* **7** # 825

Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

US-MAP should be defined in terms of the 2-dimensional structure of the OFDMA scheme, that is sub-channels (frequency) and slots (time).

SuggestedRemedy

Add the following phrase to the end of the paragraph: ""and the logical channels used for each upstream burst.""

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.5** *P* **112** *L* **10** # 826

Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

Although the CPE operating co-channel or adjacent channels (N+/-1) with a TV station would not be allowed to be located inside the protected contours, it could be located inside the keep-out distances if its EIRP towards the protected contour is reduced to the proper level to avoid interference.

SuggestedRemedy

The first paragraph should read:
A CPE is not allowed to operate on the same channel or either of the first adjacent channels of a TV operation within the Grade B or noise-protected contour. However it can operate co-channel at up to 4 W EIRP toward the protected contours, provided that it is located farther than 10 km from the noise-protected contour of an ATSC TV operation, or 4.7 km away from the Grade B contour of an NTSC TV operation. It can also operate adjacent channel up to 4 W EIRP toward the protection contours, provided that it is located farther than 155 m from the noise-protectd contour of an ATSC TV operation, or 44 m away from the Grade B contour of an NTSC TV operation. These 'keep-out distances' will reduce if the allowed maximum transmit EIRP at the CPE is reduced. The rule to be applied is that the above maximum distances can be reduced by a factor of 'a*log' with the reduction in EIRP in dB, 'a' being the accepted path loss exposent. In practice, the base station will, through geolocation, know the distance of the CPE to the protected contours and the azimuth of its antenna and will be able to calculate the required reduction in the maximum CPE TPC range to allow its operation. If the CPE can still establish a communication with the base station at such lower EIRP, the CPE will be allowed to associate.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.5** *P* **112** *L* **24** # 827

Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

The CPE operating on alternate channels relative to a TV station would not be allowed operate at full EIRP outside the protected contours and inside the protected contours if its maximum on-axis EIRP meets the EIRP profile.

The EIRP profile defines the maximum EIRP limit for the CPRE, not the power limit.

TV channels should be used instead of TV bands (TV bands refer to the low-VHF, high-VHF and UHF bands in North-America and Bands I, III and IV in the rest of the world.

SuggestedRemedy

The second, third and fourth paragraphs should read:
On alternate channels, the CPE is allowed to operate outside the protected contours without other constraints than the 4 W maximum EIRP. It can also operate inside these contours as long as it meets a maximum on-axis transmit EIRP constraint, defined by the EIRP profile, which defines the maximum radiated EIRP as a function of the separation of the TV channel used with the channel of a TV operation, up to +/- 15.

The method to determine the EIRP constraint for a single CPE transmitting in a 6 MHz channel in the presence of multiple TV operations in adjacenton alternate channels, according to the EIRP profile and the estimated or known distance of the CPE to the noise-protected or Grade B contours of nearby TV stations. The calculation described in this method will be carried out at the base station, from the collective knowledge of channel sensing, CPE locations, TV operation database information. Note that this EIRP constraint is a maximum transmit power constraint. Other constraints can be build up on top of that constraint to further decrease the maximum transmit power, but in no case can the maximum EIRP determined by this method be exceeded.

The maximum transmit power EIRP is determined sequentially as follows:

À Determine the maximum EIRP for each CPE on each TV channel from the constraint of a single TV operation: fill in Table 223 cell by cell, using the flowchart of Figure 19.
À Determine the maximum EIRP for each CPE on each TV channel from the constraints of all TV operations: fill in Table 224 using Table 223.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.5** *P* **113** *L* **30** # 828

Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

The CPE operating on co- and adjacent channels (N+/-1) and are close to the TV protected contours need to reduce their EIRP towards the protected contours as a function of this distance.

SuggestedRemedy

Change the paragraph as follows:
thatAs indicated above, no co-channel and first adjacent channel operation is allowed within the noise-protected/Grade B contours by any CPE. However operation outside the noise-protected/Grade B contours is allowed if the maximum EIRP from the CPE in the direction of these contours is reduced by the amount indicated by the following formula:
Reduction in allowed maximum EIRP (dB)= a * log(d0 / dk)+ Discrim
Where:
D0: actual distance of the CPE to the contour
Dk: reference distance given above for the channel arrangement
A= path loss exponent
Discrim: minimum CPE transmit antenna discrimination toward the contour

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.5** *P* **114** *L* # 829

Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

The CPE operating on co- and adjacent channels (N+/-1) and are close to the TV protected contours need to reduce their EIRP towards the protected contours as a function of this distance. Figure 19 needs to be modified accordingly.

SuggestedRemedy

Change Figure 19 as follows:
- Change TV band for TV channel
- Change power for EIRP
- Remove the keep-out distances in the initial tests
- Include EIRP scaling for co- and adjacent channels within keep-out distances.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.5** *P* **110** *L* **18** # 717
Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

Section 6.13.5 describes a method to constrain CPEs to a maximum transmit power to protect TV incumbents. It has the flavor of a contribution (in fact, the words ""present contribution"" are used on line 24). I assume this is only one method by which the maximum power constraint can be derived, but I think this algorithm should be discussed by the group before being adopted as part of the standard (i.e., the implications of the example shown in Figure 19 and Tables 223 and 224 should be clearly understood.)

SuggestedRemedy

Discuss and resolve.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.5.2** *P* **111** *L* **13** # 718
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

Is part of reference 3 ([3]) missing? (why ""xxx""?)
Same on Line 17 for Reference 4.

SuggestedRemedy

Clean up reference.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.13.5.2** *P* **111** *L* **13** # 123
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Reference to ""xxx"".

SuggestedRemedy

Fix the reference.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.13.5.2** *P* **111** *L* **17** # 124
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Reference to ""xxx"".

SuggestedRemedy

Fix the reference.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.13.5.2** *P* **112** *L* **2** # 3
Ang, Chee Wei Institute for Infocomm

Comment Type **ER** *Comment Status* **D**

The equation depicted in a box in Figure 19 is not clear. The box is labeled ""limit max transmit power as a function of distance"".

SuggestedRemedy

Update as required.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.13.6** *P* **114** *L* **3** # 595
Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

This comment relates to the MAC AAS support which is described in section 6.13.6. More specifically, this comment focuses on the following two points:
1. In the current draft, the beamforming algorithm is not specified.
2. In upstream, the polling strategy for BW requesting of the CPEs in the extended coverage (section 6.13.6.5) is not efficient. This is because BS shall waste time polling the AAS-CPEs which do not have BW request and the CPEs do have a BW requesting may wait for quite a long time before the BS poll them. It may be meaningful to design an efficient BW requesting mechanism for UL.

SuggestedRemedy

To remedy the comment 2, the BS can maintain N fixed beams and capture the bandwidth request from CPE using all the beams simultaneously. The N fixed beams shall cover the whole cell hence each AAS-CPE may belong to one of these beams. When an AAS-CPE sends a bandwidth request, BS shall receive N copies by N beams. There is always one beam which can decode the bandwidth request correctly.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.13.6.3** *P* **116** *L* **8** # 26

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Figure 21 is based on the optional channel bonding feature, hence it is appropriate for the mandatory case where single channel is in use by the system.

SuggestedRemedy

Modify Figure 21 to reflect the mandatory single channel case.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Options, if accepted by the WG, will be in annexes to improve flow and readability of the document for the mandatory features.

Cl **06** *SC* **6.14** *P* **118** *L* **4** # 590

Chang, Soo-Young Huawei Technologies

Comment Type **E** *Comment Status* **D**

In this page, the draft describe ""The CPE shall now increase its backoff window by a factor of two, as long as it is less than the maximum backoff window. The CPE shall randomly select a number within its new backoff window and repeat the deferring process described above"". If the new backoff window of CPE is more larger than maximum backoff window, how do it go on contention process. I think the draft must narrate it.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment resolution committee asks the author of this section to edit for more clarity as to how the contention process works.

Cl **06** *SC* **6.15** *P* **118** *L* **37** # 600

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

Before a CPE can be serviced by a BS, it needs to enter the network and negotiate its capabilities with the BS. This may involve many tasks (e.g., sensing channels) and frame exchanges between the CPE and the BS, and this whole procedure is hereby referred to as network entry and initialization. More importantly, during this process the CPE needs to ensure that before it first transmits to the BS, its communication will not cause harmful interference with incumbents. In other words, the network entry and initialization process has to be designed to be what is hereby referred to as incumbent safe, which essentially means that incumbent system protection shall be guaranteed.
1 Solution to Some Scenarios
1.1 Different Frequency Channels Assigned in the Overlapping Area
In this case, since more than two frequency channels are assigned in the overlapping area, there is no interference in the overlapping area and a CPE can select a service BS as in the following steps:

If BS1 power > BS2 power, then CPE selects BS1 as a service BS.
If BS1 power < BS2 power, then CPE selects BS2 as a service BS.
If BS1 power equal to BS2 power, then CPE selects a service BS by choosing a pre-determined one.

1.2 A Frequency Channel Assigned in the Overlapping Area
In this case, we can explain the procedure with the following instance:

(1) There is no interference though CPEs are operated in the common frequency Channel.
Although a common frequency channel is assigned, there may not be interference. For example, they use different subcarriers from one another. In this case, a CPE can select its service BS according to the solution described in Section 1.1.

(2) A requency channel is assigned to CPEs and there exists interference
The CPE can't decode US-MAPs. In this case, the CPE needs to decode BS preamble signals. In the overlapping area, the BS preamble can be decoded for the following four cases:

a) Preamble signals are not coincident and PN codes are different
b) Preamble signals are not coincident and PN codes are the same
c) Preamble signal are coincident and PN codes are different
d) Preamble signal are coincident and PN codes are the same

where the PN code refers to pseudo random sequence and this PN code can be generated by using pseudo random sequence generators.

Although the interference is serious in the overlapping area, a CPE can decode preamble signals for the above four cases.

After a CPE decodes PN codes, it should send INReq (Interference Notification Request) to BSs in last slot of the first frame of one superframe, notify BSs of interference condition.

After notification, the CPE begins to scan all frequency bands. After BSs receive INReq, BSs should send INRsp(Interference Notification Response) messages to CPEs through other channel(s) and notify CPE that BSs will set up connection with CPEs by using this channel. Then two BSs will finish synchronization and co-existence through this CPE. Once BSs finish co-existence, they can adjust own frequencies to eliminate interference. After interference elimination, a CPE can select a service BS according to the solution described in Section 1.1.

BS periodically broadcasts Out-band signal including the information on current channel in some of other unoccupied channels (e.g., candidate channels). The Out-band signal is a control signal on the band other than current band. This broadcast signal follows the same PHY and MAC frame architecture (not to necessitate additional protocol or PHY module). When some CPEs cannot decode the BS's current service channel, the CPEs try to sense other channels to locate the BS signal. If CPEs receive an explicit out-band broadcast signal, the CPEs recognize the current service channel id. If the current channel was already sensed and was found to be not decodable at the CPEs, then the CPE sends a report to the BS using the upstream in out-band. After receiving the report, BS changes its service channel to other available band and renews connection with CPE.
1. Solve the problem that certain CPE selects service BS when there are not active CPEs in the same frequency overlapping area.
2. Provide detailed solution that certain CPE select service BS based on different scenario in same frequency overlapping area.
3. This proposal can satisfy greatly requirement that CPE selects service BS correctly even if there is serious interference in same frequency overlapping area.
It is not needed that BS broadcasts control information periodically in occupied channel, which will increase spectrum efficiency and save bandwidth and not affect other CPEs service QoS.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.15** *P* **119** *L* **18** # 27

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

SCH is designed for the optional channel bonding, hence not appropriate for the mandatory single channel case.

SuggestedRemedy

Modify SCH appropriately.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

Comment resolution committee appreciates the comment, but concludes that, at this time, we don't know what modifications are "appropriate."

We feel that further discussion on this topic is necessary with all interested parties present to participate and make some firm decisions in this area.

Once necessary decisions have been reached by the WG as a whole, the meaning of "appropriate" will become clearer and any necessary modifications can be made.

Cl **06** *SC* **6.15** *P* **119** *L* **5** # 28

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Figure 22 and the associated text have no consideration with respect to the Keep-out Region of either BS or CPE to the DTV protection contour.

SuggestedRemedy

Modify Figure 22 and the associated text with consideration with respect to the Keep-out Region of both BS and CPEs to the DTV protection contour.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Further review by the WG is required to arrive at a complete and accurate resolution of where in the document and how the concept of the keep out region is addressed to assure that all requirements are met.

Cl **06** *SC* **6.15** *P* **129** *L* **30** # 624

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The multiple channel support should be an optional feature.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.15.1** *P* **120** *L* **6** # 591

Chang, Soo-Young Huawei Technologies

Comment Type **E** *Comment Status* **D**

WRAN is an unlicensed system, so its intialization must be complex process which include channel sensing, power boosting etc. It must protect the incumbent system not to interfered, so I think we must be stated detailed intialization process in our criterion.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment resolution committee agrees that the initialization process must be explictly and rigorously defined in the Standard.

We ask the author(s) of applicable sections of the document to review and, if necessary, edit them to assure that complete details on the initialization process are presented.

Cl **06** *SC* **6.15.1** *P* **120** *L* **7** # 593

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

This comment relates to the BS initialization procedure which is described in section 6.15.1. The current initialization procedure may cause severe interference to the incumbent users due to the following drawbacks:
1. The BS can only select the operating channel based on the sensing result of its own since the CPEs cannot report their sensing result to the BS before initialization. Based on the function requirement of WRAN, the channel entry time for a CPE is within 10 seconds, while the permitted channel move time is 2 seconds. In other words, in the worst case the BS should wait for 10 seconds before receiving channel measurement report from its CPEs, however, the maximum tolerance time for interfering incumbent users is 2 seconds. Therefore, before the CPEs are able to report, the incumbent users may be interfered illegally.
2. The CPEs harmfully interfered by the incumbent users may not be able to enter the network. This is the hidden incumbent problem. Even when the initialization is finished, the CPEs harmfully interfered by the incumbent users may not be able to synchronized to the BS, hence, they still can not report the BS about the incumbent users.
Hence, it may be meaningful to design a new initialization procedure with better incumbent protection.

SuggestedRemedy

The BS can increase the power in the initialization procedure gradually: it starts the initialization procedure in a small region with small power, if no incumbent users are found, it increases the power and operates the initialization procedure in a larger region, so on and so forth.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.15.3** *P* **122** *L* **6** # 29

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

With a ""shall"", the text ""the CPE shall perform sensing not only in the set of channels indicated in the SCH, but also in all other affected channels"" implies optional channel bonding feature is used as mandatory.

SuggestedRemedy

Modify the text to eliminate implied mandatory use of Channel bonding.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include channel bonding as an option.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.15.3** *P* **122** *L* **6** # 30

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The FRD requires that ""The first time a CPE is turned on, it MUST start by sweeping the RF range in which it is to operate to identify the presence of incumbent operations, as well as to access information from the WRAN networks accessible in the area."" However, the procedure specifies the a CPE shall start with searching for SCH, and then scan channels of N+-15, where N is the working channel of the target BS.

SuggestedRemedy

Modify the CPE initialization procedure to satisfy the FRD.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.15.5.1** *P* **128** *L* **45** # 623

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Here the draft says that ""Within the RNG-RSP message shall be the Basic and Primary Management CIDs assigned to this CPE."". In page 129, line 16, the drafrt says that ""For multichannel support, the CPE shall attempt initial ranging on every suitable upstream channel before moving to the next available downstream channel."". Does BS allocate basic, primary management CIDs in each channel of multiple channel support?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16** *P* **128** *L* **30** # 719

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

See Lines 30-36. This paragraph leads one to believe that channel aggregation can only be used with non-contiguous channels when, in fact, it can also be used with contiguous channels, just as channel bonding. Since the group has not made a decision if any or both of these optional features (channel aggregation and bonding) will be included, this paragraph should be rewritten.
Also on Page 128, Line 38. Rewrite sentence as ""In this section, several features of CMAC when operating under multiple channels are described.""

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include channel bonding and/or channel aggregation as options.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16** *P* **128** *L* **30** # 31
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

This sentence - ""An important mandatory feature of CMAC is the capability to take advantage of the simultaneous availability of multiple vacant TV channels, be these contiguous or not."" is false and misleading. Either channel aggregation and channel bonding, as indicated in the same paragraph, are all optional features, so indeed the ""important mandatory feature"" of multiple channel support is optional.

SuggestedRemedy

Modify the text indicating that multiple channel suport is optional.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.1** *P* **128** *L* **41** # 720
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

Rewrite as, ""it is safe to do so.""

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accepted to make text more gramatically correct.

Note that this section deals with multiple channel operation (channel aggregation and channel bonding) which are being considered as options.

If neither option is accepted by the WG, the entire section should be deleted.

If either or both options are accepted by the WG, the section should simply detail the "hooks" for the options and the details of the option(s) should be moved to an annex(es).

Suggest sensing be approached in the main body of the standard as a "black box sensing function" and that implementation-specific examples be moved to an informative annex(es).

Cl **06** *SC* **6.16.1** *P* **128** *L* **42** # 32
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Considering the following text - ""When in the multiple channel mode of operation, the BS shall transmit in each TV channel the SCH frame preceded by the superframe preamble as shown in Figure 3. Within the SCH the BS shall indicate which TV channels are being grouped together, which will allow CPEs to detect the multiple channel mode of operation."" The so called ""multiple channel mode"" in fact implies the optional ""channel bonding"" mode with the specially designed SCH in the text. As a matter of fact, ""multiple channel mode"" shall include channel aggregation and dynamic frequency hopping (DFH), hence the text describing multiple channel support with SCH is not appropriate to support all other multiple channel modes.

SuggestedRemedy

Eliminate/modify the ""channel bonding"" oriented description/procedure in the text and accommadate other types of multiple channel operation such as channel aggregation and dynamic frequency hopping.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.2** *P* **129** *L* **12** # 33
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

""the MAC shall never change the MAC frame size"" - this makes optional ""channel bonding"" mandatory.

SuggestedRemedy

Any ""channel bonding"" oriented descriptions (text, figures, terminologies, etc.) must be made optional.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.3** *P* **129** *L* **16** # 693
Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

This overly complicated ""grouping"" concept is a very good reason why not to have a separate MAC per PHY when doing channel aggregation.

SuggestedRemedy

Consider having a single MAC when doing channel aggregation

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.3** *P* **129** *L* **16** # 34
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

This section, ""channel grouping and matching"", is designed for FDD mode, which is not specified in the spec.

SuggestedRemedy

it has to clarify if FDD is supported and how it is supported if it is supported.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.3** *P* **129** *L* **16** # 35
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

No definition for termologies such as ""active set"", FA, Spectrum Manager, etc.
Not clear how ""channel grouping and matching"" would benefit overhead reduction.

SuggestedRemedy

Need more information to be convienced.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.4.1** *P* **131** *L* **16** # 36
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The so called ""Hidden Incumbent Scenarios"" should not exist, given the fact that keep-out distances of BS and CPE to the DTV protection contour are enfored.

SuggestedRemedy

This feature as described in subclause 6.16.4 would not be appropriate.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.4.2** *P* **132** *L* **13** # 694
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

What is meant by incumbent? The text describes inability to decode the DL on the service channel, not the fact that the CPE refrained from transmitting because it detected a TV or part 74 device. So, which is it - interference or incumbents?

SuggestedRemedy

Clarify meaning

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Cl **06** *SC* **6.16.4.2** *P* **134** *L* **19** # 627
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

Should a CPE use only one outband frame to notify the hidden incumbent interference or more than one outband frame? Since no reply from BS is sent back to the CPE, how can the CPE know that this message is transmitted successfully with high possbility? Are any simulation results to support this method and optimal outband frame number being used?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.5** *P* **134** *L* **1** # 37
HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

This feature is to support optional channel bonding. So it shall make it clear that this feature is also optional.

SuggestedRemedy

Replace ""shall"" with ""may"" or words along the line indicating the optional nature of this feature.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include channel bonding and/or channel aggregation as options.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16.5** *P* **134** *L* **28** # 695

Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

This is such an overly difficult way to do things. It really shows how aggregation is much better and simpler than bonding.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.6** *P* **135** *L* **4** # 38

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

DHF text and figures need to be refine.

SuggestedRemedy

More editorial work on the DHF text and figures.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include DFH as an option.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16.6.1** *P* **135** *L* **36** # 721

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

There appears to be a minus sign in front of the ceiling function. What does a negative guard band mean?

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Author(s) should clarify.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include channel bonding and/or channel aggregation as options.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16.6.2** *P* **136** *L* **18** # 722

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

Replace ""axel"" with ""axis"". Also on line 40 ""àDFH Operation Period is as follows"".

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Accept correction of "axis".

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include DFH as an option.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16.6.5** *P* **141** *L* **14** # 664

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

DFH decision announcement messages should be defined.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.7** *P* **142** *L* **23** # 40

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

The text of the ""out-band distributive sensing scheme for active set 2"" feature needs to be refined.

SuggestedRemedy

Editorial work on the text of this feature. Paragraphs such as ""conclusion"" need to be removed or modified.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

This relates to a proposed optional feature.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include an option in the Standard.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16.7** *P* **142** *L* **23** # 39

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

The ""out-band distributive sensing scheme for active set 2"" assume channel aggregation, hence it shall indicate that this feature is optional.
In addition, the scheme will increase the probability of false alarm by reporting incumbent appearances out side the interference arrange of a WRAN device.

SuggestedRemedy

Modify the text to indicate this feature is optional.
Address the issue of over-protection (increased Pfa).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

This relates to a proposed optional feature.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include an option in the Standard.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16.7** *P* **142** *L* **4** # 696

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

""This contribution..."" needs to be rewritten as part of the standard.
Also, on lines 9-10, this is a very problematic statement that aggregation requires multiple MACs which further requires the horrible grouping concept of 6.16.3. This needs to be cleared up before it moves to letter ballot because it will be 10 times harder to fix then.

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

This relates to a proposed optional feature.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include an option in the Standard.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.16.7.1.1** *P* **142** *L* **26** # 723
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

""In this subsection,à""

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The sentence was gramatically awkward, but the comment resolution committee feels it can be eliminated entirely if the following sentence "Figure 45 shows a hidden node problem." is modified to read "Figure 45 shows an example of a hidden node problem."

Additionally, if channel aggregation is not accepted as an option, this section would logically be deleted.

Cl **06** *SC* **6.16.7.1.1** *P* **143** *L* **28** # 651
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

CH3 is included in active1 set and active2 set at the same time which is not correct.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.16.7.2** *P* **144** *L* **7** # 697
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

""Conclusions"" in the middle of a standard.

SuggestedRemedy

Omit or absorb into preceding section

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Cl **06** *SC* **6.19** *P* **149** *L* **12** # 698
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

See lines 12-19. Whoever made the changes from 802.16 here, confused multicast services and multicast polling groups. It's in explanatory text, so it's not a huge problem but could confuse someone.

SuggestedRemedy

Change ""In CMAC, multicast groups are used not only for their traditional application of data delivery (e.g., streaming), but also for sending management commands to a set of CPEs."" To ""In CMAC, multicast groups are used not only for their traditional application of grouping CPE's for more efficient contention-based polling, but also for sending management commands to a set of CPEs."" And change ""Another possible use of multicast connections is for CBP (see 6.21.2.1)."" To ""Another possible use of multicast groups is for CBP (see 6.21.2.1).""

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.2** *P* **10** *L* **15** # 800
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

""CPE serving multiple tenants in an office building ""

Do we really want to support multi-subscriber CPEs? Isn't this supposed to be similar to ADSL/cable type broadband service?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.20** *P* **152** *L* **5** # 125
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Reference to ""xxx"".

SuggestedRemedy

Fix the reference.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.20** *P* **152** *L* **5** # 724

Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

Reference appropriate QoS sections from 802.16.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

Comment resolution committee believes that the 802.22 Standard should be a "stand-alone" document that does not require the reader to hop back and forth to another large, complex document in order to see information that should be "in-line" and in context for ease of use.

Cl **06** *SC* **6.20.5** *P* **156** *L* **49** # 725

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

Replace ""an CPE"" with ""a CPE"". Ditto for lines 51 and 52

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.20.9** *P* **160** *L* **20** # 126

Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Reference to ""xxx"".

SuggestedRemedy

Fix the reference.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.21** *P* **160** *L* **25** # 41

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

CBP is questionable to be claimed as an efficient self-coexistence method for overlapping 802.22 cells. CBP also could not provide fair accesses to the spectrum for the coexisting 802.22 cell.

SuggestedRemedy

Need more debate and proof-of-concept on CBP as the baseline self-coexistence method.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21** *P* **176** *L* **13** # 601

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

The IEEE 802.22 takes the proactive approach (as specified in its Requirements Document) and mandates that the MAC shall include self-coexistence protocols and algorithms as part of the initial standard conception and definition.

SuggestedRemedy

WRAN system utilizes cognitive radio technologies to identify vacant frequency bands to communicate. Therefore when many CPEs need to make use of confined frequency resources, it makes WRAN system cell be overloaded. To reduce this cell load, BS needs to move some CPEs in this overlapping area to another neighbor cell. Thus before load balancing, BSs can provide the functions to CPEs in the overlapping area to synchronize and to co-exist.

When CPEs inside overlapping area of multiple BSs, they need notify S-BS whether they can be serviced by other BSs. This procedure will be performed in two stages: initial ranging stage and normal operation stage. At initial ranging stage, CPEs may send BSs Id which covers the CPE to S-BS. At normal operation, CPEs shall send this information to S-BS aperiodically. S-BS and CPEs shall reserve this data list and update it periodically.

When there are new CPEs to access network, if their bandwidth allocation requests exceed this cell bandwidth limit, S-BS shall redirect CPEs in overlapping area to other collocated cells. First S-BS need judge how many CPEs can be serviced by other BSs through collocated BSs load information. Then S-BS shall negotiate with C-BS. S-BS sends Load Shunt Request (LS-REQ) to C-BS. This request includes number of load and number of subcarriers. After C-BS receives this request, a response message will be feed back S-BS.

1 Proposed Solution
1.1 CPE's candidate BS Notification
CPE can notify S-BS BS list which can be this CPE's candidate servicing BS in initial ranging stage and normal operation stage.

BS ID notification message is sent to S-BS by CPE within overlapping area, which can notify S-BS that number of BS can service it. S-BS and CPE need reserve this data list and update it.

In initial ranging stage, after CPE finishes synchronization, ranging,negotiation,authorization and registration, CPE will send BS ID notification message to S-BS in optional initialization steps to indicate S-BS that how many C-BS can service CPE and C-BS ID.

In normal operation stage, C-BS can adjust its coverage area to avoid interfering incumbent user so number of CPE within overlapping area will be different. So in normal operation CPE also sends this message to S-BS aperiodically so that S-BS can update data list.

1.2 Load balance negotiation

When S-BS is overloaded, it needs to send LS-REQ message to C-BS through bridge CPEs in the overlapping area, which includes the numbers of shunt CPEs,Number of subcarriers and slots need be borrowed. After C-BS receives this message from S-BS, it shall calculate the numbers of it own vacant channels then it selects channels from the set of vacant channels according to S-BS's request and sends IDs of these channels to S-BS. Then it sends LS-RSP message to S-BS through bridge CPEs in the overlapping area. After S-BS receives feedback information from C-BS, it sorts all the information from other cells in ascending order. If the numbers of CPE shunt are smaller than the largest number of vacant channels, S-BS selects a cell with the largest number of vacant channels as a target cell. If the numbers of CPEs shunt are bigger than the largest number of vacant channels, S-BS selects a target cell according to the numbers of vacant channels from highest to lowest. Then S-BS will redirect CPE within overlapping area to target C-BS.

S-BS sends LSReq message to C-BS through inter-BS communication mechanism to request CPE belonging to S-BS to access network of C-BS.

C-BS sends LSRsp message to S-BS through inter-BS communication mechanism to identify whether C-BS can load CPE belonging to S-BS.

1.3 CPE Redirect
After S-BS receives LS-response and finishes choose of target cell, it shall start redirection procedure. S-BS shall communicate with C-BS through shunt CPEs to finish this procedure, which is named inter-cell communication. To address the reliable inter-cell communication, we present a novel inter-cell communication scheme where the reliability of communication can be guaranteed.
The inter-cell communication proposal can reference to STM proposal ""22-06-0111-02-0000_STM-MOT-ConnectionBased-InterBS-Comm"".

After these CPEs finish redirection procedure, they will release their channels used before redirecting and pause connection with S-BS until load balance process of S-BS is completed. This procedure solves overload problem of S-BS. Also, when the numbers of CPEs shunt are bigger than the largest number of vacant channels, the same procedure can be adopted. The only difference is that S-BS needs to communicate with multiple cells synchronously.

1.4 Conclusion
1.□S-BS can compare load status of its own cell with other C-BS and select flexibly target cell. While to solve overload, this proposal can achieve the purpose of utilizing frequency resource greatly.
2.□Before shunt, S-BS will keep service with shunt CPEs, which will not interrupt CPEs service and can assure CPEs service continuity and QoS.
3.□Extra cost is not needed to increase and S-BS can directly utilize CPEs in overlapping area to finish synchronization and signaling alternation~

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.1** *P* **161** *L* **25** # 42

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Should ""t<=1"" be a typo?

SuggestedRemedy

Should it be ""t>=1""?

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Comment resolution committee believes that "t>=1" is editorially correct in this context.

However, we note that this section is unduly implementation specific (implies required use of a separate sensing receiver) and should be revised to be far less implementation specific.

Cl **06** *SC* **6.21.1.2** *P* **162** *L* **21** # 699

Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

Change ""attempt retransmission or measurement report messages"" to ""attempt retransmission of measurement report messages""

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.21.1.3** *P* **163** *L* **13** # 43

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Only TV services and Part 74 services are considered as incumbent. How about other types of licensed services in the TV bands, such as public safety servics?

SuggestedRemedy

Shall include all other types of licensed services in the TV bands worldwise, such as public safety.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4** *P* **163** *L* **18** # 700

Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

Change ""sense the medium as to determine"" to ""sense the medium to determine""

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.21.1.4.1** *P* **164** *L* **7** # 44

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

If the quiet time is long enough, e.g. close to 20ms, and the subsequent frames are devoted for measurement report, the overall service interruption time could be longer than 20ms which is not acceptable for VoIP or other timing sensitive applications. So a dedicated quiet period notification phase with frames immediately follows the quiet period shall not be mandated, and more flexible reporting scheme shall be allowed.

SuggestedRemedy

A dedicated quiet period notification phase with frames immediately follows the quiet period shall not be mandated, and more flexible reporting scheme shall be allowed.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4.1** *P* **164** *L* **7** # 46

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How the BS acknowledge the measurement reports sent by a CPE?

SuggestedRemedy

Need further specifications.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4.1** *P* **165** *L* **12** # 45
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

It is not convincing how these two type of UCS notification windows could improve the reliability and performance of the system.

SuggestedRemedy

Need elaborations.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4.1** *P* **165** *L* **15** # 701
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

Limiting the UCS grant, in the contention-based case, to at most a MAC header contradicts page 166 lines 33 and 34 where a single report is allowed.

SuggestedRemedy

Resolve contradiction

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.21.1.4.2** *P* **165** *L* **23** # 49
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

If the the quiet period notification phase ends when the BS has acquired a reliable picture of the measurement outcome in its cell, it doesn't make sensng to have urgent situations being reported (if such situation happens, it means the picture is NOT reliable enough).

SuggestedRemedy

Please explain how to define ""reliability"" in this context and why urgent situation would still occur given a reliable reporting result.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4.2.1** *P* **165** *L* **43** # 47
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

What only ""a small amount of sensitive traffic (e.g. voice)"" is considered in this context? What if the ""amount of sensitive traffic"" is not ""small""?

SuggestedRemedy

Shall have a much more robust solution than what is specified in this subclause.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4.2.1** *P* **166** *L* **2** # 48
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How can the BS disregard an urgent measurement report from a CPE if this is the only report? This is dangerous!!

SuggestedRemedy

The BS shall never disregard an urgent measurement report from a CPE even if this is the only report from CPEs.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4.2.2** *P* **166** *L* **15** # 50
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How reliable is it to use UCS slot for reporting in the congestive reporting situation?

SuggestedRemedy

Please explain.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.4.2.2.2** *P* **166** *L* **35** # 51
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**
Why should CDMA UCS notification be supported?

SuggestedRemedy
CDMA UCS notification can be eliminated.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.5** *P* **167** *L* **9** # 52
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**
Incumbent Detection Recovery protocol is too complex.

SuggestedRemedy
It shall be modified with a simplified scheme.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.5.1** *P* **170** *L* **15** # 702
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**
Should read ""When IU in upstream detected by BS.""

SuggestedRemedy
See comment

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **06** *SC* **6.21.1.5.1** *P* **170** *L* **3** # 53
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**
The section is not consistent with the spec in 6.21.1.5 at all. The procedures are too complex. No idea how these two different approaches can be merged.

SuggestedRemedy
Shall consider simple but effective recovery schemes.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.5.1** *P* **171** *L* **15** # 629
Chu, Liwen STMicroelectronics

Comment Type **E** *Comment Status* **D**
case 1 is the same as case 0 which is not correct.

SuggestedRemedy
change case 1 according to figure 66.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Note to editor(s) - essentially the same as comment 702

Cl **06** *SC* **6.21.1.5.1** *P* **171** *L* **5** # 628
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**
The draft says that ""). There are three types of notification: Explicit, Implicit and Short implicit."". It seems that the explicit method is message notification method and implicit method is backup channel method. What is short implicit method?

SuggestedRemedy
Give the definition of short implicit method.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.6** *P* **173** *L* **2** # 54
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**
Dynamic Frequency Hopping (DFH) is a control method of DFS hence it shall be included in this subclause.

SuggestedRemedy
Add DFH.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.7** *P* **173** *L* **8** # 55

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

This section, ""class B CPE for the protection of part 74 services"", is out of the scope of 802.22.

SuggestedRemedy

Remove this section from 802.22 standard.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.1.7.1** *P* **175** *L* **6** # 668

Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

Here the dradt says that "". Upon initialization, this CPE shall scan the desired channel for a multiple number of the maximum superframe size in search for SCH packets transmitted by 802.22 BSs."". What does ""multiple number"" mean?

SuggestedRemedy

Clarify it.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2** *P* **176** *L* **13** # 596

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

This comment relates to the current inter-cell communication mechanisms which are described in section 6.21.2.1 (CBP) and section 6.21.2.2 (inter-BS communication). Although there are two mechanisms proposed to address the inter-cell communication, none of they can provide a reliable communication link between BSs.

The drawbacks of the inter-BS communication scheme are list in the following:

1. It is only used for broadcasting SCH among different cells. In other words, no information rather than SCH can be transported by this scheme.
2. While BS is broadcasting SCH, BSs and CPEs of the collocated the cells may not be free to detect this SCH. This is especially true when the superframes of different cells are synchronized.
3. Even the collocated CPEs or BSs are free to detect the broadcast SCH; they may not know what the right channel is.

The drawbacks of the Coexistence Beacon Protocol are summarized in the following:

1. If one entity (CPE or BS) of one cell (say Cell1) is transmitting a CBP packet to another cell (say Cell 2), it cannot make sure whether there is any entities from Cell 2 waiting for this packet. CPEs and BS of Cell 2 may not be free to detect this CBP packet while it's been transmitting.
2. Even CPEs or BS of Cell 2 are free to detect the CBP packet transmit by Cell 1, they may not know on which channel in which time slot this CBP packet is transmitted.
3. There may be many overlapping cells belonging to different operators. Even CPEs or BS of Cell 2 know the operational channels of all the overlapping cells, they may not know in advance that Cell 1 is transmitting a CBP packet to them. Hence, it's possible that they are scheduled to detect other cells rather than Cell 1.

Due to the above drawbacks, it may be meaningful to design a reliable inter-cell communication mechanism.

SuggestedRemedy

Say if the BS1 in Cell1 wants to communicate with BS2 in Cell2, we can select some CPE in the overlapped region of Cell1 and Cell2 as a bridge CPE which conveys the message from BS1 to BS2 or from BS2 to BS1.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2** *P* **176** *L* **24** # 56
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

It is not convincing that the CBP and inter-BS communication can address appropriate self-coexistence amongst collocated 802.22 cells.

SuggestedRemedy

These two schemes shall be carefully verified and proven. If needed, they shall be modified or replaced by more effective schemes in order to address the self-coexistence requirements.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **2** # 57
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

It is not convincing CBP shall be a mandatory coexistence feature due to its limitations and unsatisfactory efficiency.

SuggestedRemedy

CBP needs to be revised or replaced.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **2** # 58
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Consider the following text - ""The CBP is a best-effort protocol based on coexistence beacon transmissions."" It follows the best-effort model, successful reception of coexistence beacons is not guaranteed. Reliability and Efficiency are big issues for addressing a variety of coexistence requirements.

SuggestedRemedy

CBP needs to be revised or replaced.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 68
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Regarding CBP:
How multi-channel inter-BS communications are facilitated? More serious reliability and efficiency issue can be raised.

SuggestedRemedy

Address the issues.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 63
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The spec defines a time where the CPEs shall not perform any transmission but simply listen to the medium for CBP packets and, possibly, BS SCH beacons. This is achieved by synchronized BSs.
Question: This is to schedule a time window for all beacons to be transmitted. Again, reliable? Efficient? How about the transmission delay?

SuggestedRemedy

Address the questions.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 71
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Regarding CBP:
Require static BW allocations for CPEs, meaning BW allocation for CPEs shall not be changed for consecutive a number of frames.
Another issue is that it requires guard band in the coexistence window due to propagation delay.

SuggestedRemedy

Address the issues.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 69
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Regarding CBP:
Beaconing during normal operations? Issues include interferences to other cells and unknown TX time make it difficulty to receive CBP packets.

SuggestedRemedy

Address the issues.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 65
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Traffic contraint of CBP requires that Downstream/upstream bandwidth allocations made by BS to CPEs in a certain frame shall not change for a number of consecutive frames.
Question: This requirements bring in undesirable limitations. Can we do better job providing flexibility?

SuggestedRemedy

Address the issue and question.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 64
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Traffic contrait of CBP: CBP allow that future upstream bandwidth reservation requests can contain time allocation constraints, for example, a CPE can specify: ôGive me 100Kb of airtime, but not between T1 and T2ö.
Question: Is this fair? what if it is always unacceptably large between T1 and T2 (no room for spectrum sharing for other WRANs)?

SuggestedRemedy

Address the question.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 67
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Regarding CBP:
This is a Best Effort, Contention Based Beaconing Mechanism, that has inherent reliability and efficiency issues.

SuggestedRemedy

Addess the issues.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **176** *L* **32** # 70
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Regarding CBP:
Beaconing during coexistence time window?
It makes sense but it could be very likely to have collisions.
Beaconing during quiet period?
Does not look feasible because of synchronized quiet periods and interference to sensing, etc.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **177** *L* **1** # 703
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

Change ""To cope up with"" to ""To cope with""

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.21.2.1** *P* **177** *L* **3** # 62
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Consider the following text - ""CPEs do not continuously stay locked to a BS"".
How about the interference issue when a beacon is transmitted while CPEs in other cells are transmitting/receiving?

SuggestedRemedy

Address the question.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **177** *L* **3** # 61
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Consider the following text - ""CPEs do not continuously stay locked to a BS"".
In fact, a CPE would have to perform more work, such as out-of-band sensing and in-band sensing, rather than being dedicated to CBP listening. This would decrease the probability CBP beacons can be received by CPEs.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **177** *L* **3** # 60
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Consider the following text - ""CPEs do not continuously stay locked to a BS"".
Does a CPE searches CBP packets in other channels? In essence, the question is how the multi-channel CBP communications can be facilitated, in other words, how to facilitate that a transmission on a channel can be received by another WRAN that is operating on anther channel? This would add more uncertainties to the inter-BS communications.

SuggestedRemedy

Address the questions.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1** *P* **177** *L* **3** # 59
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Consider the following text - ""CPEs do not continuously stay locked to a BS"". Simulations on this? How much time has a CPE need to monitor for beacons in order to achieve the satisfactory reception?

SuggestedRemedy

Provide convincing simulation results.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.1.2** *P* **179** *L* **19** # 669
Chu, Liwen STMicroelectronics

Comment Type **E** *Comment Status* **D**

Here the draft says that ""In other words, during this time CPEs shall use the contention access mechanism (see 0) to gain access to the medium and transmit the coexistence beacon."". What does ""see 0"" mean?

SuggestedRemedy

Clarify it.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Fix broken reference. (see comment 410)

Change
"In other words, during this time CPEs shall use the contention access mechanism (see 0) to gain access to the medium and transmit the coexistence beacon."
to
"During this time CPEs shall use the contention access mechanism (see 0) to gain access to the medium and transmit the coexistence beacon."

Cl **06** *SC* **6.21.2.3** *P* **179** *L* **42** # 72
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Renting/offering, etiquette, on-demand spectrum contention, and credit-token based protocol shall be integrated.

SuggestedRemedy

Integration can be done based on the discussions among STMciroelectronics, Motorola, and Samsung.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.3.4** *P* **182** *L* **16** # 661
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

The algorithm of ""contention for exclusively owning the selected channel"" should be provided to make fair share among cells contending for the same channel.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.3.4.1** *P* **183** *L* **32** # 663
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

What should a request BS do if one of the contention response messages is not received?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.3.4.1** *P* **183** *L* **32** # 662
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

inter-BS messages for ODSC self-coexistence should be defined.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.3.5** *P* **184** *L* **33** # 670
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

No messages are defined for credit tokens based rental protocol.

SuggestedRemedy

Provide the message definations for credit token rental protocol.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.2.4** *P* **185** *L* **6** # 66
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Regarding Inter-BS Communications using CBP, it specifies that BS may either periodically listen to or even schedule downstream/upstream per frame quiet periods with the goal of detecting SCH frames transmitted by other BSs within its transmission range. Another possibility is that a BS receives CBP packets (either during normal operation or during quiet periods).
Questions: How can a CBP packet be received/transmitted during a quiet period, considering quiet periods of all collocated WRANs are synchronized?
How can a beacon be detected in a reliable way if the time of beacon transmissions is unknown to other BSs?
So it seems that it only makes sense to TX/RX coexistence beacons during the synchronized coexistence time slots (intervals).

SuggestedRemedy

Address the issues and questions.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3** *P* **186** *L* **20** # 76
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How long is the time for resync and channel estimation? This time, together with reporting time, DFS signaling time, and quiet sensing time, add into the service interruption time.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3** *P* **186** *L* **3** # 73
HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

These sentences are not consistent: ""In case of in-band incumbent measurements, these shall always be performed when the BS schedules quiet periods in the cell. This is not to say, however, that CPEs shall only sense the spectrum during scheduled quiet period. Whenever not engaged in communication with its BS during normal cell operation, CPEs shall perform out-of-band sensing first, and then opportunistic in-band sensing (see 6.21.3.3). ""

SuggestedRemedy

""In case of in-band incumbent measurements, these shall always be performed when the BS schedules quiet periods in the cell"" should be removed.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment resolution committee agrees that the referenced sentences are inconsistent or contradictory.

However, we note that this section is unduly implementation specific (implies required use of a separate sensing receiver) and should be revised to be far less implementation specific.

Cl **06** *SC* **6.21.3** *P* **186** *L* **5** # 75
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Out-of-band sensing should also been performed whenever it is possible, regardless of the BS is communicating with its CPEs or not. This is true, for example, CPEs can simultaneously perform sensing in the DL when they're receiving.

SuggestedRemedy

Address the comment.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3** *P* **186** *L* **5** # 74
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Considering the following text - ""Whenever not engaged in communication with its BS during normal cell operation, CPEs shall perform out-of-band sensing first, and then opportunistic in-band sensing (see 6.21.3.3). ""

Out-of-band sensing should also been performed whenever it is possible, regardless of the BS is communicating with its CPEs or not.

SuggestedRemedy

modify the text.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.1** *P* **186** *L* **31** # 77
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Why don't we simply consider GPS for sharing a common clock among coexisting WRAN systems?

SuggestedRemedy

Consider using GPS for WRAN systems synchronization.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **15** # 78

HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

One of the motivation of DFH. DFH shall be moved to the ""coexistence"" section (6.21) instead of ""multiple channel support"" (section 6.16).

SuggestedRemedy

DFH shall be moved to the ""coexistence"" section (6.21) instead of ""multiple channel support"" (section 6.16).

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Commenter has indicated that the primary motivation for DFH is coexistence, however DFH is currently (092106) a proposed optional feature.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include an option in the Standard.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **21** # 79

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Considering the efficiency and effectiveness issues, the Two Stage Mechanism for Quiet Period Management shall not be mandatory.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **31** # 80

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How can energy detection in micro seconds achieves the sensing requirement of -116dBm and the required(Pd, Pfa) performance? Reality is likely that energy sensing would never feasible for such stringent sensing requirements.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **31** # 83

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

For relatively weak signals (e.g. below the noise floor), it doesn't make sensing to have fast sensing because it doesn't help. Fine sensing is always needed in many situations.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **37** # 81

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

If the energy in the affected channel is always below the threshold, Can we conclude that the channel is incumbent free such that the fine sensing can be cancelled? It seems not making sense.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **39** # 82

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

At lease quiet time for 1 chnanel is needed if there is any doubt. Fine sensing quiet time would be 24ms/channel!!! QoS issue is still unsolved.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **45** # 85
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Dynamicall y appearance of fine sensing doesn't actually resolve the QoS requirement issue. Quiet periods of more than 20ms are still needed in many situations.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **187** *L* **48** # 84
HU, Wendong STMicroelectronics

Comment Type **T** *Comment Status* **X**

Why 3 orders?

SuggestedRemedy

Address the question.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **188** *L* **1** # 86
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Fine sensing shall not ends at the end of the channel detection time because extra time is needed to be reserved for sensing reporting on the same channel.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **188** *L* **10** # 87
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

This would only make sense if the incumbent signal is strong enough most of the time. Otherwise, fast sensing will never help for both incumbent protection and WRAN QoS.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **188** *L* **25** # 653
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

here the standard says that ""It is done primarily over in in-band channels, and the outcome of these measurements determine the need and the duration of the upcoming fine sensing."". This is controdictory with synchronization among overlapped cells (some cells do not need fine sensing and some cells need fine sensing).

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2** *P* **190** *L* **1** # 88
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How to synchronize ""dynamically allocated"" fine sensing periods of overlapping WRANs? Imagine some WRANs need fine sensing but others don't. How can fine sensing be effective conducted for those WRANs that need it when others who don't need it are transmitting data?

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.2.2** *P* **191** *L* **7** # 89
HU, Wendong STMicroelectronics

Comment Type **ER** *Comment Status* **D**

Figure 87 needs to be changed for single channel operation instead of channel bonding.

SuggestedRemedy

Change the figure 87.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The figure does appear to illustrate the use of channel bonding and should be changed to address the mandatory single channel system.

This relates to a proposed optional feature.

A number of sections of the document will need to be modified, depending on the WG's decision whether or not to include an option in the Standard.

Options that are included will be moved to annexes to make the main body of the document more readable with respect to the mandatory features.

Cl **06** *SC* **6.21.3.2.3** *P* **191** *L* **9** # 90
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

What criteria is used for the decision?

SuggestedRemedy

Specify the criteria that are used to decide if fine sensing is need.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.3** *P* **191** *L* **17** # 91
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

With quiet period allocated within a channel detection time (2s), channel can be vacated with guarantee within the required time limit. Why do we need extra effort to vacate channel faster than what is acturally needed?

SuggestedRemedy

Address the issue and question.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.3** *P* **191** *L* **23** # 92
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How to synchronized sensing frames of overlapped WRANs so that clean sensing is guaranteed?

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.3** *P* **191** *L* **26** # 93
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

""Note that the Channel Detection Time Interval need not be of fixed duration. The sensing duration also need not occupy exactly one frame."" - Why is this important?

SuggestedRemedy

Address the question.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.3** *P* **192** *L* **19** # 94
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Actually out-of-band sensing can be conducted when a CPE is receiving.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.3.3** *P* **193** *L* **5** # 615
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

The following condition to activate opportumistic sensing can protentially increase packet delay:
----""the frame at which the backlogged traffic (both US and DS) is less than the remaining capacity in the current superframe""

SuggestedRemedy

Disable this condition to do opportumistic sensing.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.4** *P* **194** *L* **14** # 654
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Since the explicit channel management mode provides more flexible (unicast/multicast/broadcast, being sent out at any time) and the same spectrum utilization (broadcast). The 802.22 do not need embedded channel management mode.

SuggestedRemedy

remove embedded channel management mode from the draft.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.4** *P* **194** *L* **2** # 95
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

""this can be done through clustering"" - Why is clustering mentioned in particular?

SuggestedRemedy

Address the question.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.4.1** *P* **194** *L* **34** # 96
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Active set 1 and set 2: Channels used for BS and CPEs can be different only when optional features such as channel aggregation and channel bonding are employed.

SuggestedRemedy

Such categorization would only make sense as optional. Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.4.2** *P* **196** *L* **18** # 655
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The channel in the sets other than occupied set should become useless as incumbent service appears.

SuggestedRemedy

modify 1) accordingly.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.4.2** *P* **196** *L* **23** # 656
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

If there is any channel in the null set and candidate set becomes idle, a channel with best quality is selected as a candidate channel.

SuggestedRemedy

Add this to the conditions of transition.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.4.2** *P* **196** *L* **23** # 657

Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

This item should be redefined. Otherwise the candidate channel set will include only one channel with best quality.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.4.3** *P* **196** *L* **4** # 97

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How effective is it that a WRAN detect the collision, given a 33km coverage radius and much longer interference radius of a WRAN? It could interfere but not be able to detect the existence of another WRAN in the neighborhood. It may be able to detect but the response time could be quite long given a long propagation delay of the signal. If collision happens, interference may not be acceptable for WRANs. When a WRAN backoff when it detects a collision, its services have to be interrupted and such service interruption way hurt the QoS of the WRAN.

SuggestedRemedy

Address the issues.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.5** *P* **196** *L* **3** # 602

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

For the requirement of co-existence among WRAN systems in an overlapped coverage area, synchronization among these base stations (BSs) should be performed within an overlapped coverage area(refer to draft 6.21.5).
Compliance with the Functional Requirement Document, and Req. No. are 9(3),123(3),125(3),145(3),147(3),152(3),198(3),199(3),200(3).

In this suggestion,the synchronization schemes for two cases - between two BSs and among multiple BSs - in an overlapped coverage area are introduced.

1) Synchronization between two base stations
In 802.22 draft, detailed description about synchronization between two adjacent BSs is provided. In this section, only a complementary method for synchronization slide scheduling using time offsets extracted from received beacon signals is suggested.

If a synchronization algorithm is applied to CBPs received directly by a BS itself and CBPs received through a relaying bridge CPE, the synchronization result for one case will be different from that for the other case. If a BS performs synchronization using CBPs received directly by itself, signals from different BSs arrive at this BS simultaneously, but at each CPE signals from different BSs will not arrive simultaneously. Hence, to achieve better synchronization at CPEs located between two adjacent BSs, compensation should be made according to the size of coverage of a BS.

2) Synchronization among multiple base stations
A WRAN is a license exempted system and it can be explored without strict network planning. In fact, it is not known beforehand or not planned so that overlaps of two BSs do not exist. When many BSs are working in a small area, for example 5 BSs in a small area, some of them may be overlapped and some of them may not. Synchronization is necessary for overlapping BSs, and consequently synchronization among all BSs is necessary. Here the problem is how to design a mechanism with which rapidly and with limited number of steps synchronization among all the BSs can be achieved.

A coverage scenario can be considered as follows. In this case five BSs form a cycle with overlapped area between adjacent two BSs. In this scenario, a different priority is assigned to each BS. When the priority of BS A is higher than that of BS B, synchronization adjustment is only performed to BS B and nothing is done to BS A when we assume that each BS has a priority as in the following:

priority(A,B,C,D,E)=(3,1,4,2,5).

For the case mentioned above, the procedure of adjustment can be illustrated as below:

Step 1: since BS B has the highest priority, a synchronization operation is carried out at BS A and BS C, while BS B works as a reference. Since the priority of BS D is higher than that of BS A, BS E should carry out a synchronization operation using signals from BS D as references.

Step 2: since each BS adjusts with synchronization results according to the procedure mentioned in the above first step, if base stations A, B and C are in a synchronized state and so are base stations D and E. More synchronization adjustment will not occur in this case once synchronization is established between base station groups ABC and DE. Therefore, the simple principle in the first step is not adequate.

One simple solution for this problem is that, after the first step, during procedure in the second step, BS should notify to other BSs if synchronization is established between itself and its neighbor BSs when it is negotiating with other BSs. In the scenario above, BS B has the highest priority. Hence, in the second step of synchronization negotiation, BSs D and E will recognize that base stations C and A are synchronized with a BS of higher priority. Then, base stations D and E should synchronize with BSs C and A so that they can be synchronized with BSs with higher priorities. After this step, all BSs will become synchronized.

A synchronization priority of each BS can be set according to some parameters of the BS such as its MAC address or IP address, while a larger address brings a higher priority.

Our scheme needs to modify the section 6.21.5 of draft and add one message named Inter-cell synchronization request (i.e. ICSR, as shown in the following) to CBP MAC PDU.

1.1) Synchronization Initialization
Based on the idea and principle mentioned above, here we introduce a synchronization method for multi-BS cases. Firstly, we assign two constants for each BS:
Syn_Pri: synchronization priority of a BS, given by the manufacturer or other.
High_Syn_Pri: highest synchronization priority of a BS, used for storing the highest priority which the BS is being synchronized to. High_Syn_Pri and Syn_Pri will be set to an equal value when they are initializing.

1.2) Synchronization Negotiation
When there are active CPEs in an overlapped area between BSs and these CPEs have ICSR from the other BS in quiet periods (QPs) scheduled by their BS, BS can perform synchronization operations using these active CPEs as bridges. That is, ICSR message can be relayed to a neighboring BS through bridge CPEs. When a BS is close enough to the neighboring BS, ICSR messages can also be received by the neighboring BS directly.

In the ICSR message, we define:
Syn_Pri: n*8 bits; Synchronization priority, can be set with MAC address, IP address etc. of BS.
Reception Offset:16 bits; Indicates the offset (in units of slot duration) relative to the start of the first slot of the PHY PDU (including preamble) frame where the beacon was received. The time instants indicated by the Reception Offset values are the reception times of the first slot of the beacon including preamble (if present).

secondary synchronization: 8 bit; 0 = Indicate the BS that send this ICSR message is not a secondary synchronization base station;1 = Indicate the BS that send this ICSR message is a secondary synchronization base station.

BS send ICSR message to neighbor BS to negotiate synchronization and help finishing synchronization with each other.

The current BS may receive ICSR messages from other BSs or CPEs which belongs to them. The current BS can select a BS with the highest priority to perform synchronization according to the field of üSyn Pri in all its received ICSR message. If High_Syn_Pri of the current BS is not less than Syn Pri, the BS can enter a synchronization tracking stage. Otherwise, current BS should establish synchronization with the BS which sent the ICSR message with highest Syn Pri field.

1.3) Establishment of Synchronization
The same procedure can be applied as described in Section 6.21.5.2 Establishing Synchronization of draft. For detailed information on this procedure, refer to this section of the reference.

1.4) Confirmation and Tracking of Synchronization
Details of confirmation and tracking of synchronization can be seen in Section 6.21.5.3 of draft. In this reference, for tracking of synchronization, only a ICSR message with a synchronization priority equals to High_Syn_Pri should be tracked. If tracking of synchronization is lost, it is only required for the BS to set High_Syn_Pri to its own Syn_Pri.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.5** *P* **197** *L* **3** # 98

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The ""Synchronization of Overlapping BSs"" precedure is too complex and has limitations. Suggest to use GPS for synchronizing the BS by sharing a common clock.

SuggestedRemedy

Suggest to use GPS for synchronizing the BS by sharing a common clock.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.5.2** *P* **199** *L* **28** # 658
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The standard should provide text that before and after synchronization, BS should select different frequency for the self-coexistence quiet period.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.6** *P* **201** *L* **32** # 99
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The ""Clustering"" procedure and algorithm are too complex to implement and have limitations. Algorithm shall not be standardized.

SuggestedRemedy

Address the issue.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.21.6.2** *P* **206** *L* **1** # 659
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Since clustering algorithm is only implemented in each BS. No cooperations are required among neighboring BSs, BS and CPEs. It is a totally implementation issue. So it is not necessary to indicate a mandatory algorithm.

SuggestedRemedy

clearly says that the standard do not need to define a clustering algorithm and the k-means clustering algorithm is a informative algorithm.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.3** *P* **10** *L* **30** # 818
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

The proposed superframe structure addresses section 10.2.1.2 of the FRD which says: ""Where spectrum is available, it may be useful for a WRAN system to use more than one TV channel (contiguous or not) to increase the capacity of the transmission link ...""

SuggestedRemedy

Remove the word ""mandatory"" from the phrase: ""The mandatory superframe structure employed in CMAC is depicted in Figure 3 ...""

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.3** *P* **10** *L* **41** # 811
Chouinard, Gerald Communications Rese

Comment Type **T** *Comment Status* **X**

The claim that channel bounding provides better system capacity, range and data rate is not founded. There is however a marginal increase in throughput.

SuggestedRemedy

Modify the sentence to read: ""During the lifetime of a superframe, multiple MAC frames are transmitted which may or may not span multiple channels."" and remove the phrase: ""and hence can provide better system capacity, range and data rate.""

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.3** *P* **10** *L* **46** # 819
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

Change the paragraph to reflect a proposal where the inclusion of the superframe preamble would be almost transparent to the common CPEs that do not sustain channel bonding.

SuggestedRemedy

Re-write the paragraph as follows:
The superframe shall have a fixed and pre-determined size of 16 frames (see Table 27 for a list of frame sizes). The superframe preamble shall take the place of the normal frame preamble, followed by the superframe control header (FCH) and the first frame control header (FCH). This is needed to guarantee that overlapping 802.22 BSs can efficiently coexist and share resources through the numerous coexistence mechanisms described in 6.21.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.3** *P* **9** *L* **29** # 15
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The specified Superframe structure is designed for the optional channel bonding feature.

SuggestedRemedy

The specified Superframe structure shall be optional or redeisgned for mandatory features.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.4** *P* **12** *L* **3** # 820
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

The contention intervals for coexistence purpose should be scheduled at the end of the frame rather than at the end of the downstream PHY PDU so that it is independent of the upstream/downstream capacity partitioning and that adaptive TDD can be used.

SuggestedRemedy

The second and third sentences of the paragraph should read as follows:
""The downstream subframe consists of only one downstream PHY PDU. An upstream subframe consists of one or multiple upstream PHY PDUs, each transmitted from different CPEs, and contention intervals scheduled for initialization (e.g., initial ranging), bandwidth request, urgent coexistence situation (UCS) notification, and possibly coexistence purposes.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.4** *P* **10** *L* **10** # 103
Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Channel bonding is an option feature in the draft. In cases where channel bonding is not implemented, the superframe preamble and SCH field are unneeded. A preamble similar to 802.16, using FCH for the downstream, is suitable. If the receiver detects the optional presence of the superframe preamble he can interpret the SCH field correctly and decide whether and how the channel bonding feature will work across channels.

SuggestedRemedy

Make the superframe structure optional.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.4** *P* **10** *L* **3** # 17
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Self-coexistence slots shall not be slided and shall be in fixed sized and well-known/synchronized locations in the frame.

SuggestedRemedy

Self-coexistence slots shall not be slided and shall be in fixed sized and well-known/synchronized locations in the frame.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.4** *P* **10** *L* **3** # 16
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Sliding self-coexistence slots shall be only appeared in the US subframe and located in between the US and DS subframes. Figure 4 has error.

SuggestedRemedy

Sliding self-coexistence slots shall be only appeared in the US subframe and located in between the US and DS subframes. Fix such error in Figure 4.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.4** *P* **10** *L* **4** # 2
Ang, Chee Wei Institute for Infocomm

Comment Type **ER** *Comment Status* **D**

Figure 4 shows the frame structure where the self-coexistence slots are located between the DS and US subframes. As discussed, this window is to be moved to the last part of a frame.

SuggestedRemedy

Change figure 4 and associated text in line 4 of page 11.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.4** *P* **11** *L* **36** # 105
Vlantis, George STMicroelectronics

Comment Type **T** *Comment Status* **X**

Delete paragraph beginning at Line 36 of page 11 and ending on Line 2 of Page 2. There is no normative nor informative content--just proselytzation.

SuggestedRemedy

Delete the paragraph.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.4** *P* **11** *L* **37** # 104
Vlantis, George STMicroelectronics

Comment Type **E** *Comment Status* **D**

Replace the phrase ""It is common sense that self-coexistence..."" with ""Self-coexistence..."" Assumptions about the readers state of mind don't belong in a specification.

SuggestedRemedy

Replace the phrase ""It is common sense that self-coexistence..."" with ""Self-coexistence...""

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.4** *P* **12** *L* **15** # 707
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **D**

See Lines 15-19. This paragraph describes operation of CPEs that perform out-of-band measurements and in-band sensing, but the language is such that it is not clear whether this is just describing the operations or requiring that these operations be performed (as should be the case). If the latter, the paragraph should be reworded accordingly using SHALLs and SHOULDs where needed. Also, on line 15 ""capable to"" should be replaced by ""capable of"".

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Comment resolution committee also feels that this section needs to provide a clearer description of how CBP works and how security issues are addressed.

(also need to consider different name/acronym than CBP)

Cl **06** *SC* **6.5.1** *P* **14** *L* # 822
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

In Table 2, we seem to concede that 802.11, 802.15 and 802.16 will be allowed to operate in the TV bands!

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.5.1** *P* **14** *L* # 821
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

In Table 1, here are commnets on a number of parameters:
FS: If it is always 16, why signaling it?
TTQP: If quiet period is less than 9 usec, this is not needed since the FCH could signal that its frame period is a 'quiet period'.
DQP: If the standardized quiet period time is 9 usec, there is no need for this.
PP: Superframe preamble should always replace the frame preamble of the first following frame for simplicity in the case of no-bonding.
NC: With 2 bits, there is no room for future wider bandwidth with more bonded channels.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.5.1** *P* **12** *L* **29** # 18
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Super frame control header, designed for optional featurs such as channel bonding, shall be optional or re-designed for single channel operations.

SuggestedRemedy

Super frame control header, designed for optional featurs such as channel bonding, shall be optional or re-designed for single channel operations.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.5.1** *P* **12** *L* **29** # 671

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

To keep a simple frame structure, the superframe control header should be removed.

SuggestedRemedy

Remove superframe control header.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.5.1** *P* **13** *L* **1** # 683

Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

Superframes are a bad idea. They use a lot of resources, without accomplishing anything that can be accomplished within a normal 802.22(16) frame and deviate from an 802.16 based system. The systems shown in Table 2 will not modify themselves to waste this bandwidth for 802.22.

Also, on the last two rows, this page - CN and NC only allow definition of channel bonding, not channel aggregation.

SuggestedRemedy

Modify superframes along the lines suggested by Runcom in PHY discussions.
Modify CN and NC definitions to allow for channel aggregation

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.5.1** *P* **14** *L* **0** # 585

Chang, Soo-Young Huawei Technologies

Comment Type **E** *Comment Status* **D**

Some modifaction to ""Table 1-Superframe control header format""
GIF field in this table is described as follows:
GIF□
1 bit
Guard Interval Factor
Specifies the GIF used by the PHY in the frame transmissions of this superframe. Pre-determined values are:
4 = Default mode used for superframe transmission

GIF field has one bit, it can not be equal to 4.

SuggestedRemedy

GIF field in this table is described as follows:
GIF□
1 bit
Guard Interval Factor
Specifies the GIF used by the PHY in the frame transmissions of this superframe. Pre-determined values are:
0 = Default mode used for superframe transmission~

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

It appears that GIF needs to be 2 bits to allow specification of the 4 guard intervals.

Cl **06** *SC* **6.5.1** *P* **15** *L* **5** # 586

Chang, Soo-Young Huawei Technologies

Comment Type **E** *Comment Status* **D**

Some puzzle for ""Table 4-Frame control header format""
""Repetition Indication"" field in Table 4 has no notes to interpret it.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Repetition Indication field needs description.

Cl **06** *SC* **6.5.2** *P* **15** *L* **5** # 684
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **X**

The Notes section for DS-MAP Length, US-MAP Length, DCD length, UCD Length should say ""Size in bytes"", not bits.

SuggestedRemedy

See comment

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.5.3** *P* **15** *L* **13** # 685
Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

The burst control header is an unnecessary deviation from 802.16 based systems.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.5.3** *P* **15** *L* **9** # 587
Chang, Soo-Young Huawei Technologies

Comment Type **E** *Comment Status* **D**

It is not necessary for CPE's every upstream subframe to contain its associated BS. We suggest to make its associated BS field to be optional field. BS can record every CPE's associated BS.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED REJECT.

802 architecture requires 48 bit MAC addresses be used for both source and destination.

Cl **06** *SC* **6.6.1.1** *P* **17** *L* **1** # 686
Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

The UCS and CN field should be in a subheader. An urgent coexistence situation shouldn't occur every frame and shouldn't need to be reported in more than a single MAC PDU in a frame.

SuggestedRemedy

Use of a subheader will make this much more efficient.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.6.1.2** *P* **19** *L* # 823
Chouinard, Gerald Communications Rese

Comment Type **TR** *Comment Status* **X**

Table 8: With respect to the transmission offset, the coexistence beacon seems to be a frame by itself!! If not, should the slot for the coexistence beacon be at the end of the frame? Therefore, the slot number should be counting from the last slot of the 10 ms frame? This information should be given in the SHC to signal the CPEs where to find the coesistence beacon. It does not help having it included in the Beacon MAC header.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.6.1.2** *P* **17** *L* **3** # 19
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

CBP Beacons, base station beacons are designed for CBP (coexistence beaconing protocol), which is not an efficient and fair coexistence method.

SuggestedRemedy

Coexistence beacons shall be re-designed for general coexistence algorithms and methods such as spectrum contention and credit token renting protocols.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.6.1.2** *P* **18** *L* **16** # 647

Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

here the draft tell us that ""These beacon IEs shall be the only type of information present in the payload of a beacon PDU, that is, no other information other than beacon IE shall be present in the payload."" Since CBP can also carry other information such as credit token, this is not correct.

SuggestedRemedy

Clearly say that CBP carry inter-cell information IE which include beacon IE instead of beacon IE.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.6.1.2** *P* **18** *L* **20** # 687

Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

The Ending DS Allocation Slot and the Ending US Allocation Slot fields are 7 bits, causing the Beacon MAC Header to be 2 bits short of an integer number of bytes. These fields should be increased to 8 bits each or 2 reserved bits should be added.

SuggestedRemedy

See comment

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.7** *P* **21** *L* **8** # 708

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **X**

""Table 15"" is repeated. Also in Table 15 below, Element IDs 144 and 143 use ""Vendor"" and ""Vender"", respectively. Just use ""Vendor"".

SuggestedRemedy

See comment.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.1.2** *P* **27** *L* **12** # 709

Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **X**

Table 29 shows that Offset QPSK, 16-QAM and 64-QAM may be used. Note that ""Offset"" appears to be spelled with a ""0"" (zero) at the beginning. Also, ""Offset"" is indicated in parentheses. Does this mean that standard and Offset modulation will be used? This needs clarification. This comment also applies to Table 41 on Page 33.

SuggestedRemedy

Clarify meaning

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.1.2** *P* **27** *L* **12** # 139

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

In Table 29, FEC code type and modulation type fields are not specified. Add BCC and LDPC coding types. Define the values and remove the ""TBD"".

SuggestedRemedy

All of the above.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.15.3.3.2** *P* **56** *L* **7** # 114

Vlantis, George STMicroelectronics

Comment Type **E** *Comment Status* **D**

First sentence is a fragment. Replace ""The maximum available..."" with ""This field indicates the maximum available..""

SuggestedRemedy

Replace ""The maximum available..."" with ""This field indicates the maximum available..""

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.8.15.3.3.2** *P* **56** *L* **7** # 712

Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

See lines 7-9. ""The maximum power parameters are reported in dBm and quantized in 1 dBm steps ranging from -64 dBm to 64 dBm"". It should be 1 dB steps, not 1 dBm steps.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.8.15.3.3.4.1** *P* **57** *L* **4** # 713

Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

See lines 4-5. Even though 2K FFT is mandatory, Table 124 should indicate how this mandatory mode is set.
Also on Line 12, Table 125. CPE demodulator modes include CTC and RS. What about just CC (convolutional code)? Same comment for Table 126 (CPE Modulator)

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.2** *P* **27** *L* **14** # 599

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

Referring to Section 6.8.2, it states ""If the length of the DS-MAP message is a non-integral number of bytes, the length field in the MAC header is rounded up to the next integral number of bytes. The message shall be padded to match this length, but the CPE shall disregard the four pad bits"". However, since byte-processing is always preferable, the 4 pad bits can be removed.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.2.1.1** *P* **29** *L* **1** # 688

Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

See Lins 1-10. DIUCs are used for indicating downstream usages, not upstream usages. So, if a DIUC is being used to allocate SSS for the CPE to transmit CBP packets, this should be made more clear.

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Additional note to editor(s) - In the sentence " ...
where the intention is to sense for the presence of other co-located 802.22 cells in the area." we believe that "co-located" should really be "co-channel."

Cl **06** *SC* **6.8.2.1.2** *P* **29** *L* **13** # 616

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

No definition of how to use ""DS-MAP extended IE"" can be found from the draft.

SuggestedRemedy

Provide the definition of how to use ""DS-MAP extended IE"" can be found from the draft (from 802.16).

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.2.1.2.1** *P* **29** *L* **16** # 617

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

No definition of how to use ""DS-MAP Dummy IE"" can be found from the draft.

SuggestedRemedy

Provide the definition of how to use ""DS-MAP Dummy IE"" can be found from the draft (from 802.16).

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.21.1** *P* **60** *L* **6** # 690

Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

The next few messages only apply to channel bonding. We should modify them to work for aggregation as well.

SuggestedRemedy

See comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note that the messages referred to deal with multiple channel operation (channel bonding and, per the comment, channel aggregation) which are being considered as options.

If either or both options are accepted by the WG, the messages should be modified appropriately and moved to the annex(es) relating to the option(s).

If neither option is accepted by the WG, the messages should be deleted.

Cl **06** *SC* **6.8.21.3** *P* **60** *L* **16** # 614

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Here the draft says that ""Note that termination of operation in a channel can also be implemented through the SCH by having the BS specify a different value for Channel Number and Number of Channels."". Since the draft provides embedded and explicit channel management methods and SCH has large latency, this should not be allowed.

SuggestedRemedy

Clearly say that SCH can not be used as channel termination.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.21.3** *P* **61** *L* **9** # 613

Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Here the draft says that ""Note that addition of channel(s) to the BS operation can also be implemented through the SCH by having the BS specify a different and larger value for Channel Number and Number of Channels."". Since the draft provides embedded and explicit channel management methods and SCH has large latency,, this should not be allowed.

SuggestedRemedy

Clearly say that SCH can not be used as channel addition

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.21.7** *P* **62** *L* **11** # 691

Khalona, Ramon Nextwave Broadband

Comment Type **T** *Comment Status* **X**

Since the quiet period is measured in slots not frames, wouldn't it be better to simply modify the existing report request mechanism rather than use a completely new message?

SuggestedRemedy

Not sure. Discuss

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.21.9** *P* **65** *L* **14** # 677

Song, Myung Sun ETRI

Comment Type **T** *Comment Status* **X**

Change to channel state information as 4 bit representation.

To satisfy the FRD Section 15.1., which described role of ""channel list"", Draft v.0.1 covers the item in Section 6.21.4 and corresponding MAC messages in Section 6.8. The FRD requires BS should manage the channel list such as Active, Candidate, Occupied, and Disallowed channel sets. This channel list is minimally updated whenever channel situation are changed. To inform to a CPE this change, the Draft v.0.1 send to CPE CHO-UPD message by BS. However CHO-UPD represents only channel occupancy situation. As shown in table144, CHO-UPD represents 6 occupancy status. But in CPE side, it is required more information for all channel status. Because CPE should sense by using the different mechanism for each channel sets(Active, Candidate etc.). Basically based on the Draft v.0.1 can be done those different mechanism by using BLM-REQ message. However if CPE knows all channel list, then CPE acts more clearly based on the list. Thus, 1bit overhead allows great advantage as represent for channel list in detail.

In Draft v.0.1 can support those channel lists as follows:
1.Active set (Used by WRAN users) are listed after listening SCH
2.Candidate set(Backup Channels) are listed after listening DCD

Both SCH and DCD can listen at the CPE initialization stage. At this stage, it is needed that what channels are used by other WRAN and Occupied by IU. Therefore, after initialization, CPE have insufficient channel information. To fill up the rest channel list,
BS should send the Channel Occupancy Update(CHO-UPD) message to CPE. Then, CPE update occupied channel information by the message. In this case, modified channel state information gives more information to CPE as we expected.

SuggestedRemedy

It is recommendable to change Table 143, 144 to modified two tables in the attachment.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.22** *P* **66** *L* **2** # 598

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

This comment relates to the current MAC management messages which is described in section 6.8.22

The MAC management messages in the current draft do not address discontiguous channels, which will impose a heavy overhead penalty on the systems that need to specify such kinds of channels for sensing. Specifically, a lot of overhead is needed to specify discontinuous to sense. In particular, one BLM-REQ message can only facilitate one continuous set of channels. Therefore, N BLM-REQ messages with almost identical contents are required to specify N discontiguous channel intervals for sensing, which add a lot of overheads to the system.

It is possible that the incumbents are not fixed TV incumbents but only strong incumbent signals which may leave after some time (e.g. a television station's remote-news van, which is dispatched to somewhere in the WRAN cell and sends a signal back to the station). In this case, the base station does not have a priori information of its presence from the database. But due to the strong signal of the incumbent, only few CPEs are sufficient to detect its presence very reliably. Most of the CPEs can save the sensing period to sense the other channels whose statuses are more uncertain. In this case, BS needs to specify discontiguous channels

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.22.1.1** *P* **68** *L* **2** # 618

Chu, Liwen STMicroelectronics

Comment Type **ER** *Comment Status* **X**

Table 146 does not illustrate an example of the format of single measurement requests, which are carried in the body of BLM-REQ management messages. Actually it illustrates the format of single measurement requests.

SuggestedRemedy

delete ""an example of"" from the sentence.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.23** *P* **77** *L* **13** # 21

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The Scheduling Contraint is to spectified to support CBP which is not an efficient and fair method for self coexistence and spectrum sharing.

SuggestedRemedy

The scheduling contraint feature shall not be specified as mandatory.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.23.2.1.2** *P* **79** *L* **3** # 589

Chang, Soo-Young Huawei Technologies

Comment Type **E** *Comment Status* **D**

Some puzzle for ""Table 177-Frequency SUB format""
Frequency SUB must be continual logical channel. It has no similar structural of Time SUB.

SuggestedRemedy

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

There appear to be some "cut and paste" errors in the SUBs. (example Frequency SUB last field description appears to be a duplicate of the one above.)

Request the author(s) to review, correct, and use consistent terminology (e.g. perhaps sub-channels instead of "logical channels")

Cl **06** *SC* **6.8.25** *P* **80** *L* **2** # 23

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Frame synchronization of WRAN systems benefits WRAN self-coexistance. Using frame sliding, however, complicates the process of frame synchronization by iteratively exchanging CBP packets and computations, and has limitation that only BSs that can reliably exchange control messages are able to synchronize.

SuggestedRemedy

GPS shall be used instead such that all BSs are synchronized without the above mentioned limitations and complexity. Frame slide message is not needed.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.25** *P* **80** *L* **2** # 22

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Frame slide message is transmitted by BS only. This constrains message exchange among base stations, however, base stations may not reliably hear one another even though self-coexistence is needed, i.e. they have overlapping coverage areas.

SuggestedRemedy

Frame slide message shall be able to be transmitted by CPEs as well, which behave as relays.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.28** *P* **83** *L* **12** # 119

Vlantis, George STMicroelectronics

Comment Type **T** *Comment Status* **X**

Subclause 6.8.28 and it's children subclauses 6.8.28.1 to 6.8.28.20 use a number of security acronyms that are not defined anywhere in the draft, not is a reference given to where the acronyms are defined. Examples: PAK, EIK, EAP, AK, AKID, AAS, EAP etc.

SuggestedRemedy

Please provide definitions and explanations to the RSA acronyms or provide a suitable citation to the References.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.28.10** *P* **90** *L* **9** # 118

Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**

Security Negotiation Parameters of Table 205: ""ConfirCPE"" is not defined anywhere in the draft. ""(See 11.8.4)"" references a subclause does not exist in the draft.

SuggestedRemedy

Clarify the contents of the ""Security Negotiation Parameters"".

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.28.19** *P* **95** *L* **22** # 115
Vlantis, George STMicroelectronics

Comment Type **E** *Comment Status* **D**
Typo. Replace ""Code: 21P"" with ""Code:21"".

SuggestedRemedy
Replace ""Code: 21P"" with ""Code:21"".

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Cl **06** *SC* **6.8.28.9** *P* **90** *L* **1** # 116
Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**
Security Negotiation Parameters of Table 204: ""ConfirCPE"" is not defined anywhere in the draft. ""(See 11.8.4 xxx)"" references a subclause does not exist in the draft.

SuggestedRemedy
Clarify the contents of the ""Security Negotiation Parameters"".

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.28.9** *P* **90** *L* **1** # 117
Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**
PKM configuration settings of Table 204: Reference to subclause ""11.9.37 xxx"" does not exist in the draft.

SuggestedRemedy
Clarify the contents of the ""PKM configuration settings"".

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.30** *P* **97** *L* **3** # 24
HU, Wendong STMicroelectronics

Comment Type **E** *Comment Status* **D**
DFH Messages is needed to be filled in in this section.

SuggestedRemedy
Fill in DFH messages.

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.

DFH is currently proposed as an option for consideration by the WG.

If DFH is accepted by the WG, the messages should be filled in appropriately and moved to the annex relating to the option.

If DFH is not accepted by the WG, the placeholder should be deleted.

Cl **06** *SC* **6.8.30** *P* **97** *L* **4** # 120
Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**
Subclause 6.8.30 is blank except for a ""TBD"".

SuggestedRemedy
Dynamic Freqency Hopping (DFH) messages (and DFH Community messages) need to be added.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.4.1** *P* **35** *L* **0** # 588
Chang, Soo-Young Huawei Technologies

Comment Type **E** *Comment Status* **D**
Some puzzle for ""Table 43□-US-MAP information elements""
The ""Channel Offset"" field in Table 43 is subchannel number or has other meaning. It needs to be explained clearly.

SuggestedRemedy

Proposed Response *Response Status* **W**
PROPOSED ACCEPT.

Request that author(s) provide the necessary text to fill in the blank fields in the rightmost column of the US-MAP table.

Cl **06** *SC* **6.8.4.1.1** *P* **36** *L* **4** # 689
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **X**

Rather than say the UIUCs have the same applicability as their DIUC counterparts, their meaning should be spelled out, for a handful of reasons:
a. There are UIUCs that have no DIUC counterpart.
b. The descriptions of the DIUC counterparts are inadequate.
c. Standards change - just because you may be able to figure out a UIUC by looking at the DIUC today doesn't mean that will be true 2 years from now.

SuggestedRemedy

See comment

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.8.1** *P* **43** *L* **14** # 710
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **X**

""Table 72"" appears three times.
Also, on lines 14-16 the meaning of the second sentence in this paragraph is not clear. Reword.

SuggestedRemedy

See comment

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.8.8.10.19.3** *P* **52** *L* **2** # 711
Khalona, Ramon Nextwave Broadband

Comment Type **ER** *Comment Status* **X**

Entries in Table 104 show a ""10u granularity"". Does this mean 10 microseconds? Same applies to Tables 105, 106 and 108.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.88.22** *P* **66** *L* **17** # 20
HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Measurements management is designed for contigueous channels only.

SuggestedRemedy

Measurement management shall be modified for supporting non-contigueous channel set as well.

Proposed Response *Response Status* **O**

Cl **06** *SC* **6.9.4.1.2** *P* **100** *L* **20** # 714
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

Text inside the blocks of Figure 12 (""Packing with Fragmentation"") is barely readable. Consider reformatting.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **06** *SC* **6.9.5** *P* **102** *L* **1** # 715
Khalona, Ramon Nextwave Broadband

Comment Type **E** *Comment Status* **D**

CRC Calculation. Consider referencing appropriate section of 802.3.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Comment resolution committee believes that the 802.22 Standard should be a "stand-alone" document that does not require the reader to hop back and forth to another large, complex document in order to see information that should be "in-line" and in context for ease of use.

Cl **06** *SC* **figure 34** *P* **134** *L* # 626
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

Does this figure mean that the BS broadcast in different outband channels at the same time? If yes, how can a BS broadcast in different outband channels at the same time? If no, make the figure more clear.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **figure 63** *P* **169** *L* # 648
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

It is difficult to understand figure 63. There are the following problems:
1) connect two input events/messages directly,
2) connect decision criterion and input event/signal directly.
3) not clear which timer is used.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **figure 64** *P* **170** *L* # 649
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

It is difficult to understand figure 64.

SuggestedRemedy

1) Use label feature of SDL to make it understandable.
2) clearly says which timer is used.

Proposed Response *Response Status* **O**

Cl **06** *SC* **figure 65** *P* **171** *L* # 650
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

It is difficult to understand figure 65:
1) No input event/signal activate the state transition,

SuggestedRemedy

1) Add the input event/signal to activate the state transition.
2) clearly says what timer is used.

Proposed Response *Response Status* **O**

Cl **06** *SC* **figure 73** *P* **174** *L* # 666
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

It is not clear how to combine figure 73 and figure 63.

SuggestedRemedy

modify eather figure 63 or figure 73 to make them more understandable.

Proposed Response *Response Status* **O**

Cl **06** *SC* **figure 74** *P* **174** *L* # 667
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

It is not clear how to combine figure 74 and figure 64.

SuggestedRemedy

modify eather figure 64 or figure 74 to make them more understandable.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 1** *P* **13** *L* # 635
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

It is difficult to parse the SCH.

SuggestedRemedy

reorganize the SCH fields to make message parsing more easier.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 1** *P* **13** *L* # 632
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

FS field is not needed since the superframe shall have a fixed and pre-determined size of 16 frames as defined in L46, P9.

SuggestedRemedy

Delete FS field from

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 1** *P* **13** *L* # 633
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

SCH only support channel bonding. The support of channel aggregation is not supported.

SuggestedRemedy

SCH provide the support of channel aggregation.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 1** *P* **13** *L* # 634
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

In SCH, some felds are used for superframe control. Some fields are used for CBP. These fields should be replaced by two IEs: SCH IE and CBP IE. Fields used by SCH and CBP are fixed fields. This can decrease SCH related message length.

SuggestedRemedy

reorganize SCH according to SCH IE and CBP IE.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 162** *P* **73** *L* # 622
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

The time unit of ""Duration"" is not clear.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 162** *P* **73** *L* # 620
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

What does the frame number of ""start frame"" means: The frame number in a super frame or the absolute frame number? If it is the absolute frame number, how to calculate the number? if it is the frame number in a super frame, how to describe the situation report in a superframe other than the sensing frame?

SuggestedRemedy

clarify it.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 162** *P* **73** *L* # 621
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

""start frame""in table 162 has 8 bits length, but ""start frame""in table 164 has 16 bits length. Which one is correct?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 21** *P* **22** *L* # 641
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

It is not clear what do ""REQ-REQ"" and ""REQ-RSP"" mean.

SuggestedRemedy

Provide the meaning of ""REQ-REQ"" and ""REQ-RSP"".

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 225** *P* **176** *L* # 652
Chu, Liwen STMicroelectronics

Comment Type **ER** *Comment Status* **X**

It is difficult to parse this message.

SuggestedRemedy

reorganize the fields to make message parsing more easiler.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 25** *P* **25** *L* # 643
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

It is not clear what does ""n"" mean.

SuggestedRemedy

Add the meaning of ""n"" to the table.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 26** *P* **25** *L* # 644
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

Channel IE shall not include PHY specific Downstream_Burst_Profile since it is channel generic IE.

SuggestedRemedy

remove Downstream_Burst_Profile from chanel IE and put this information to the following PHY specific Downstream_Burst_Profileáset.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 26** *P* **26** *L* # 619
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

What does the field ""frame number"" mean: The frame number in a super frame or the absolute frame number?

SuggestedRemedy

clarify it.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 30** *P* **27** *L* # 645
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**

It is not clear what does ""n"" mean.

SuggestedRemedy

Add the meaning of ""n"" to the table.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 37** *P* **31** *L* # 646
Chu, Liwen STMicroelectronics

Comment Type **ER** *Comment Status* **X**
It is not clear what does ""n"" mean.

SuggestedRemedy
Add the meaning of ""n"" to the table.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 5** *P* **15** *L* # 636
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**
It is not clear what is the meaning of ""Repetition Indication"".

SuggestedRemedy
Provide the meaning of the field ""Repetition Indication"".

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 6** *P* **16** *L* # 637
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**
Current generic MAC header can only support 1 UCS channel report, whcih is not enough for channel aggregation and channel bonding. The fixed UCS field can also make generic MAC header longer.

SuggestedRemedy
Add UCS subheader and remove fixed UCS fields from generic MAC header.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 8** *P* **18** *L* # 665
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**
the ""frame number"" field is the frame number in a superframe, only 4 bits are required for this purpose.

SuggestedRemedy
The length of ""frame number"" use 4 bits. A reserved 4-bit field is added after ""frame number"" field.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 8** *P* **18** *L* # 638
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**
Since backup channels should be disjoint channels, channel number+number of channels is not a good structure.

SuggestedRemedy
use number of channel+channel numbers to indicate backup channels.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 8** *P* **18** *L* # 639
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**
It is difficult to parse the message.

SuggestedRemedy
Add two 1-bit reserved fields or update the size of ""Ending DS Allocation Slot"" and ""Starting US Allocation Slot"" as 8 bits.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 9** *P* **19** *L* # 642
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**
Beacon IE used for inter-BS communication includes channel number which is defined in one cell. The same channel number in different cells may have different meaning.

SuggestedRemedy
Include the real channel frequency instead of chanel number in beacon IE.

Proposed Response *Response Status* **O**

Cl **06** *SC* **table 9** *P* **19** *L* # 640
Chu, Liwen STMicroelectronics

Comment Type **T** *Comment Status* **X**
It is difficult to parse the message.

SuggestedRemedy
put COS field after Direction field.

Proposed Response *Response Status* **O**

Cl **07** *SC* *P* **207** *L* **8** # 778
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**
This section seems to be far from complete.

SuggestedRemedy
Start from the 802.16 spec and fill in this section accordingly.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7** *P* **208** *L* **9** # 127
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
Reference to ""xxx"".

SuggestedRemedy
Fix the reference.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.2** *P* **208** *L* **37** # 128
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
3 references to ""xxx"" on Lines 37-38.

SuggestedRemedy
Fix the 3 references.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.2.1** *P* **209** *L* **29** # 129
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
Reference ""xxx"" to Draft 12 of 802.16e. Should reference the published draft.

SuggestedRemedy
Fix the reference, and refer to the published draft.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.2.2** *P* **209** *L* **35** # 130
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
Fix ""xxx"" reference is lines 35, 37, 42, and 45.

SuggestedRemedy
Fix the 4 references.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.3** *P* **10** *L* **12** # 131
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
Reference to ""xxx"".

SuggestedRemedy
Fix the reference.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.4.1** *P* **210** *L* **22** # 132
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
3 references to ""xxx"" in lines 22, 25, 26.

SuggestedRemedy
Fix the 3 references.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.4.2** *P* **210** *L* **35** # 133
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
2 references to ""xxx"" in Lines 35 and 38.

SuggestedRemedy
Fix the references.

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.4.2** *P* **211** *L* **29** # 660
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**
here the standard says that ""All MAC management messages shall be sent in the clear to facilitate registration, ranging, and normal operation of the MAC."". But Line 2 in page 222 says that ""all critical management packets are digitally signed, and their integrity is checked by the receiver before further use: there is thus no mean for an attacker to craft such a packet.""

So I have the following questions:
1) does 802.22 provide security to the MAC management packets?
2) if yes what are the defination of critical management packets?
3) does 802.22 provide partial protection of a management packet to guarantee the security and provide enough information for new CPEs to join the cell?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **07** *SC* **7.5** *P* **211** *L* **20** # 100
Vlantis, George STMicroelectronics

Comment Type **E** *Comment Status* **D**
The word ""fear"" should be replaced with ""threat"", ""concern"", ""issue"", or some other word that does relate to human emotion.

SuggestedRemedy
Replace ""fear"" with ""concern"".

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - The entire clause 7.5 appears to be informative rather than normative and should either be modified to provide only necessary normative text or, if the WG deems it necessary, moved to an informative annex. (both could also be done at the WG's discretion)

Cl **07** *SC* **7.5** *P* **211** *L* **29** # 101
Vlantis, George STMicroelectronics

Comment Type **E** *Comment Status* **D**
The word ""fear"" should be replaced with ""threat"", ""concern"", ""issue"", or some other word that does relate to human emotion.

SuggestedRemedy
Replace ""fear"" with ""concern"".

Proposed Response *Response Status* **W**
PROPOSED ACCEPT IN PRINCIPLE.

Note to author(s) and editor(s) - The entire clause 7.5 appears to be informative rather than normative and should either be modified to provide only necessary normative text or, if the WG deems it necessary, moved to an informative annex. (both could also be done at the WG's discretion)

Cl **07** *SC* **7.5** *P* **211** *L* **33** # 134
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**
Reference to ""xxx"".

SuggestedRemedy
Fix the reference.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.1.2.3.3** *P* **214** *L* **16** # 673

Song, Myung Sun ETRI

Comment Type **T** *Comment Status* **X**

We recommend the number of used subcarriers of 1680. And we think that the fixed WRAN system does not require so many pilot subcarriers.
The number of used subcarriers should be determined considering the bandwidth efficiency. In general, the band efficiency is designed to be in the range of 83-95%. The number of pilot subcarriers should be determined considering the performance of channel estimation and synchronization tracking.

SuggestedRemedy

Change 1728 to 1680 as used subcarrier.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.1.2.3.4** *P* **215** *L* **7** # 676

Song, Myung Sun ETRI

Comment Type **T** *Comment Status* **X**

The fractional BW will always be used in the adjacent channel, not co-channel, to narrowband IUs. And delete the Figure 105.
We can prevent the interference to narrowband incumbent users in co-channel. And the conventional full BW filtering can be used in the fractional BW operation.
The figure 105 can be explained using the Figure 106. So we can delete the Figure 105.

SuggestedRemedy

The fractional BW with sufficient guard band will always be used in the adjacent channel, not co-channel, to narrowband IUs.Here the neighboring TV channel...

Delete Fig.105.
Change Fig.106 and 107 to modified two Figures in the attachment.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.1.2.3.4** *P* **217** *L* **2** # 680

Song, Myung Sun ETRI

Comment Type **TR** *Comment Status* **X**

The PN sequence can be generated by using polynomial generator.
If we use the polynomial generator to make PN sequence instead of table, it does not need to store this table.

SuggestedRemedy

To generate PN sequence a polynomial can be used also.
One example can be found in this ETRI presentation.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.1.2.3.4** *P* **218** *L* **13** # 102

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

It is not clear whether the PN sequences for the preambles in Table 233 meet the PAPR requirements of the PHY.

SuggestedRemedy

State the PAPR for the PN sequences.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.10** *P* **257** *L* **4** # 110
Vlantis, George STMicroelectronics

Comment Type **E** *Comment Status* **D**

Replace ""It is well known that the..."" with ""The..."". Assumptions about the readers state of mind don't belong in a specification.

SuggestedRemedy

Replace ""It is well known that the..."" with ""The...".

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to editor(s) - Proposed response to essentially identical comment from Steve Kuffner on this clause, changing text and recommending that the entire section be moved to an annex(es) if multiple antenna options are accepted by the WG.

Text was as follows: Multiple antenna techniques are optional in this standard.
If the multiple antenna techniques are accepted by the WG, provide a section, at an appropriate location, briefly describing the option and the "hooks" necessary to implement them and move the "meat" of the implementation details to an annex/appendix as with other options.

Cl **08** *SC* **8.10.1** *P* **257** *L* **8** # 597
Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

This comment relates to the current point-to-point multiple antenna options which is described in section 8.10.1.
The existing schemes do not fully utilize the limited feedback. We can make use the limited feedback to do the following things, which are not considered in the current draft:
1. Power adaptation
2. Rate adaptation
3. Mode selection (spatial multiplexing / spatial diversity)
Furthermore, the design does not take into potential spatial correlation between antennas. This is important for 802.22 because antennas are likely to be correlated when the operating frequency is low.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.10.2.1.4** *P* **260** *L* **34** # 111
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**

Equations on Line 34 and 35 are unintelligible. Equation Editor hiccups with matrices.

SuggestedRemedy

Fix the equations.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.10.2.1.4** *P* **261** *L* **1** # 112
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**

Equations on Line 31 unintelligible. Equation Editor hiccup with matrices.

SuggestedRemedy

Fix the equation.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.10.2.1.6** *P* **261** *L* **34** # 113
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**

W_k,s is missing a circumflex accent (hat).

SuggestedRemedy

Add circumflex accent (hat) to W_k,s on Line 34.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.10.4** *P* **265** *L* **17** # 136
Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**

Reference to ""xxx"".

SuggestedRemedy

Fix the reference.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.10.5.2** *P* **267** *L* **6** # 137

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Clarify the condition ""For xxx, the...""

SuggestedRemedy

Clarify the meaning of ""xxx"" or replace ""For xxx, the..."" with ""The...""".

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.10.5.4.4** *P* **275** *L* **18** # 594

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

This comment is related to the sounding sequences currently described in Section 8.10.5.4.4. The current standard draft suggests two possible candidates for sounding sequences, namely, the Golay sequences and the Generalized Chirp-Like (GCL) sequences. However, both candidates have their limitations.
Although the peak-to-average-power ratio (PAPR) of all Golay sequences are no more than 3dB, their lengths are restricted to a power of 2 times a constant (which is equal to the length of the seed sequence used). Therefore the allowable lengths of the sounding allocation blocks are restricted accordingly. Furthermore, the crosscorrelation level between two Golay sequences and hence the resultant adjacent cell interference may not be acceptably small.
Sets of GCL (actually, Zadoff-Chu) sequences have optimal periodic autocorrelation and periodic crosscorrelation properties, and exist for all prime lengths. However, depending on the required set size (determined by the number of interfering cells), the minimum and maximum PAPR values of GCL sequences in the required set may differ a lot, especially for not too large sounding allocation blocks. Therefore, the channel estimation accuracy and the resultant packet error rate of those cells assigned the worst GCL sequence may be much worse than those cells assigned the best GCL sequence.

SuggestedRemedy

By modifying the general class of unified Perfect Root of Unity (PRUS) sequences which include the class of GCL sequences as a special case, our preliminary result suggests that sounding sequences with PAPR lower than both the Golay sequences and GCL sequences can be obtained. In general, there is a need to determine the allowable lengths of the sounding allocation blocks and the required set size so that the performance of different sounding sequences can be compared.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.2** *P* **219** *L* **5** # 681

Song, Myung Sun ETRI

Comment Type **TR** *Comment Status* **X**

We had submitted a contribution on adaptive spreading scheme in the last meeting. ETRI's adaptive spreading scheme is proposed to have robust performances around the edge of large WRAN cell.

SuggestedRemedy

Technical discussion will be necessary to include adaptive spreading scheme not only SCH but also normal data transmission.
Refer to Doc.22-06-0145-00-0000.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.3.1.1** *P* **220** *L* **26** # 674

Song, Myung Sun ETRI

Comment Type **T** *Comment Status* **X**

There is no need to transmit the short training symbol. Long training symbol is enough. Integer frequency offset can be recovered using preamble or pilot. So it is not necessary to transmit such 5 repetitions of the short training sequence.

SuggestedRemedy

The format of the superframe preamble is shown in Figure 114. The superframe preamble is 1 symbols in duration and 2 repetitions of the long training sequence. The guard interval is ...

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.4** *P* **224** *L* **36** # 678

Song, Myung Sun ETRI

Comment Type **TR** *Comment Status* **X**

We think that the mixed resource composition should be newly added to improve the performance of subchannelization based on the last presentation of ETRI in San Diego.

SuggestedRemedy

More discussions will be necessary.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.4.1** *P* **226** *L* **10** # 679

Song, Myung Sun ETRI

Comment Type **TR** *Comment Status* **X**

We think that the fixed WRAN system does not require so many pilot subcarriers. And it is not necessary to transmit the pilots in every OFDMA symbol.
Through the simulations about OFDMA parameters, we know that it is not necessary to transmit the pilots in every OFDMA symbol. In a certain sense, it does not need to transmit the pilots at all.

SuggestedRemedy

Probably it is necessary to reduce the number of pilot.
Details depend on simulation result to be presented in this meeting.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.5.2.3** *P* **234** *L* **24** # 106

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Replace this paragraph, which is reference to the 802.16e LDPC code with the correct text in the ""Verbatim 802.16e LDPC Specification"" section of the submission doc. #22-06-0160-00-000. Subclause 8.4.9.2.5 through 8.4.9.5.3 of the submission should replace 8.5.2.3 in the 802.22 draft.

Subclause 8.4.9.2 of this submission should be inserted in subclause 8.5.2 ""Forward Error Correction (FEC)"" on page 23 line 16 of the 802.22 draft.

Annex H of the submission should be added as an annex to the 802.22 draft.

SuggestedRemedy

Follow the editorial instructions below. Renumber the subclause, equations, figures and tables, as need.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.5.2.3** *P* **234** *L* **24** # 107

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Once the text from ""Verbatim 802.16e LDPC Specification"" section of the submission doc. #22-06-0160-00-000 has been completed. The issues indicated in the ""Known Shortcomings"" section of this submission should be addressed. See the submission for details. There are a few editorial issues. The technical issues that need to be resolved are: the definition of the TLV parameters for BCC, Turbo Codes and LDPC; the appropriateness of the concatenation rules if the 802.22 OFDMA scheme is sufficiently different that 802.16e; and whether to delete the specification of multiple transmit antenna cases, based on 802.22 capabilities.

SuggestedRemedy

Address the issues in the ""Known Shortcomings"" section of submission, doc. #22-06-0160-00-000, after the verbatim text is added.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.6.1.2** *P* **239** *L* **18** # 675

Song, Myung Sun ETRI

Comment Type **T** *Comment Status* **X**

The pilots are mapped using BPSK constellation mapping, not QPSK.
In general, the preamble and pilot are modulated using BPSK modulation. We think that there is no reason to use QPSK modulation for preamble and pilot.

SuggestedRemedy

The pilots are mapped using BPSK constellation mapping.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.8** *P* **239** *L* **32** # 603

Chang, Soo-Young Huawei Technologies

Comment Type **TR** *Comment Status* **X**

In a channel detection time of WRAN system, three fast sensing quiet periods(QPs) and one consequent fine sensing QP are scheduled periodically. During these quiet periods, all transmitting of BSs and CPEs are stopped for interference detection. In the two stage of quiet period, to make detection more correctly, data fusion should be used, i.e. all detection result should be feed back to BS, then according to these result and the local detection of the BS final judgment can be attained using some algorithms of data fusion.

In practical systems, fast sensing is always based on energy detections. Setting of threshold is very important for sensing detection, in practical systems the following cases exist:
1)Relative location of CPEs to LU system are different, some CPEs (for example, they are closed to LU system) have better receiving channel conditions, so interference of LU can be detected easily; some CPEs (for example, they are far form LU system) have worse receiving channel conditions, so interference of LU can be detected hardly.
2)Different CPEs have different geographical environments, for example, some are in rooms, or some are outside, and for the latter, signals of LU systems can be detected with larger probability.
3)Different CPEs have different physical performances, for example some have sensing module with better RF performance. In addition, if using directional antenna, CPEs with right directions of antenna will detect LU system more easily.
4)Different CPEs have different external environment, for example, some CPEs have worse background noise or larger interferences from other RU systems, and all these will affect detection of LU system.
As mentioned above, each CPE have different reliability of interference detection, if interference detection report feedback by different CPEs are treated coequally, report with lower reliability will bring negative influence to the result of data fusion.

Compliance with the Functional Requirement Document, and Req. No. are 206(1).

For a CPE with comparatively poor sensing performance(whether because of itself or external environment), using the same detection threshold as the CPEs with better sensing performance may cause defeating of LU detection, and its judgment may cause decreasing of missing detection probability of the BS.

On the other hand, For a CPE with comparatively good sensing performance(whether because of itself or external environment), using the same detection threshold as the CPEs with poor sensing performance may cause increasing of detection probability, but its judgment may cause decreasing of missing detection probability of the BS.

For the two kinds of CPEs above, the threshold de interference detection should be modified. Otherwise, modification can not be of no limit. For instance, a CPE is far from DTV transmitter, and can not detect its signals, the result here would be defeated to detect the LU (DTV), but meanwhile, the threshold should not be reduced endless. In this case, a lowest threshold should be broadcast or set by the manufacture according to performance of the device. Also, the threshold should not be increased endless, a largest threshold should be also broadcast or set by the manufacture.

The largest threshold and lowest threshold can be determined by detection probability requirement of CPE: for example choose the threshold corresponding to detection probability of 98% as the lowest threshold, and the threshold corresponding to detection probability of 85% as the largest threshold. The largest threshold and lowest threshold can also be determined by false alarm probability requirement of CPE: for example choose the threshold corresponding to false alarm probability of 15% as the lowest threshold, and the threshold corresponding to false alarm probability of 0.01% as the largest threshold. The change step of threshold modifying denoted by úThreshold_Step can be set by the BS or manufacture according to the performance of CPE.

Process of interference detection of WRAN systems include 3 steps: 1) fast sensing (always energy detection); 2) fine sensing (feature detection); 3) channel switch. In the following, we briefly explain how Adaptive configuration of Incumbent signal detection threshold modification to be realized.

Fast sensing:
In a Channel Detection Time (period), 3 fast sensing quiet periods are scheduled by BS. In every fast sensing QP, the CPE could select a TV channel to perform energy detection. There are many method of energy detection, and the simplest method is to compute the energy of received signal in the corresponding bandwidth. More details of algorithms about fast sensing are in draft.

In fast sensing stage, CPE can confirm result of BS data fusion of none existence of LU system according to if fine sensing QP was scheduled. If interference was detected by CPE locally, then it should decrease its detection threshold in acceptable range. But then, if detection reliability is not very large, CPE need not modify its threshold in this stage.

Fine sensing:
When interference has been detected in fast sensing stage, to confirm type of LU signal, a fine sensing QP will be scheduled by BS. Because fine sensing span long time, reliability of detection in this stage is quite high.

Channel switch:
When type of LU system has been confirmed, BS can schedule channel switch of its cell to avoid interfering LU system.
(1)BS can notify its CPEs for channel switching through CHS-REQ message which contains target channels switching to. Cause of switching should be also known, so switch cause field of 8 bits is added to CHS-REQ message. CPEs can switch to specified channel after receiving the message.
cause field in the CHS-REQ message:
Bit0úØ1: DTV detected, channel switch needed
Bit1úØ1: Part 74detected, channel switch needed
Bit2úØ1: for DFH requirement, channel switch needed
Other bits: reserved.

(2)To ensure being received by every corresponding CPEs, BS can request CPEs to respond by CHS-RSP message.

If switching is because of LU system occupying current channel, since fast sensing, fine sensing and data fusion are performed beforehand, large probability of reliable channel switch can be assured.

CPE can judge if there is interference of LU systems from CHS-REQ message send by BS. When there is no CHS-REQ messages received or not existing of LU is indicated in received CHS-REQ message, and if interferences are detected locally, CPE should increase its detection threshold in acceptable range. Otherwise, when existence of LU is indicated in CHQ-REQ message, and if no interference is detected locally, CPE should decrease its detection threshold in acceptable range.

In conclusion, detection threshold modification logic can be illustrated in the following, wherein, sensing judgment of WRAN is obtained combining fast sensing results and fine sensing results.
Let A denote sensing judgment of WRAN, B denote Energy detection result of CPE, x denote interference exist, and y denote No interference.
When A=x and B=x, no modification of threshold;
When A=x and B=y, decrease threshold in an acceptable scale;
When A=y and B=x, increase threshold in an acceptable scale;
When A=y and B=y, no modification of threshold

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.8.3.1** *P* **243** *L* **31** # 121

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

How to report confidence of detection is a ""TBD"".

SuggestedRemedy

Define how the CPE shall report its confidence of detection.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.8.3.3** *P* **250** *L* **11** # 135

Vlantis, George STMicroelectronics

Comment Type **ER** *Comment Status* **X**

Reference to ""xxx"".

SuggestedRemedy

Fix the reference.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.9.2** *P* **257** *L* **1** # 108

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Subclause 8.9.2 ""Ranging"" is blank.

SuggestedRemedy

Specify the parameters.

Proposed Response *Response Status* **O**

Cl **08** *SC* **8.9.3** *P* **257** *L* **2** # 109

Vlantis, George STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Subclause 8.9.3 ""Power Control"" is blank.

SuggestedRemedy

Specify the parameters.

Proposed Response *Response Status* **O**

Cl **16** *SC* **16.6.1** *P* **128** *L* **48** # 14

HU, Wendong STMicroelectronics

Comment Type **TR** *Comment Status* **X**

Superframe, and SCH are ""channel bonding"" oriented. The text enforce a ""shall"" which is not appropriate for any ""channel bonding"" oriented description.

SuggestedRemedy

Any ""channel bonding"" oriented descriptions (text, figures, terminologies, etc.) must be made optional.

Proposed Response *Response Status* **O**

Cl **6.13.** *SC* *P* **109** *L* **6** # 775

Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Currently, the spec is only defined for TDD (e.g., frame, control messages, etc.). There are no details or support for FDD.

SuggestedRemedy

Decide if FDD is going to be supported or not. If so, much work has to be done as to accomodate this duplexing scheme. If not, we need to clean up the text.

Proposed Response *Response Status* **O**

Cl **6.13.** *SC* *P* **110** *L* **18** # 612

Mazzarese, David Samsung Electronics

Comment Type **T** *Comment Status* **X**

FRD 195(4) and FRD 168 (4) mandate a limit of maximum transmitted EIRP on channels adjacent to a TV channel operation when the CPE is located inside the TV protected contour. Section 6.13.5 requires udpating based firstly on the most recent calculations on required separation distances to meet the D/U ratios at the TV protected contour, and secondly on a more accurate description of the decision process (flowchart and tables) and language suitable to describe requirements in technical specifications. Changes are also required to precisely identify mandatory and optional features of TCP for maximum transmitted EIRP.

SuggestedRemedy

Proposed text changes are included in the submission 22-06-01xx-00-0000_Proposed_text_changes_to_P802-22_D0.1_Final_Section_6_13_5.doc

Proposed Response *Response Status* **O**

Cl **6.13.** *SC* *P* **110** *L* **18** # 1

Mazzarese, David Samsung Electronics

Comment Type **T** *Comment Status* **X**

FRD 195(4) and FRD 168 (4) mandate a limit of maximum transmitted EIRP on channels adjacent to a TV channel operation when the CPE is located inside the TV protected contour. Section 6.13.5 requires udpating based firstly on the most recent calculations on required separation distances to meet the D/U ratios at the TV protected contour, and secondly on a more accurate description of the decision process (flowchart and tables) and language suitable to describe requirements in technical specifications. Changes are also required to precisely identify mandatory and optional features of TCP for maximum transmitted EIRP.

SuggestedRemedy

Proposed text changes are included in the submission 22-06-01xx-00-0000_Proposed_text_changes_to_P802-22_D0.1_Final_Section_6_13_5.doc

Proposed Response *Response Status* **O**

Cl **6.15** *SC* *P* **118** *L* # 766

Cordeiro, Carlos Philips

Comment Type **ER** *Comment Status* **X**

There are a number of subclauses in this section that have not been included. This section is incomplete.

SuggestedRemedy

Use the 802.16 spec as a starting point and update this section with all the needed subclauses.

Proposed Response *Response Status* **O**

Cl **6.15** *SC* **Figure 23** *P* **121** *L* **1** # 795

Caldwell, Winston FOX

Comment Type **TR** *Comment Status* **X**

A section needs to be added detailing the Set up Connections block referred to in Figure 23.

SuggestedRemedy

Add section.

Proposed Response *Response Status* **O**

Cl **6.15** SC **Figure 23** P **121** L **1** # 794
Caldwell, Winston FOX

Comment Type **TR** *Comment Status* **X**

A section needs to be added detailing the Perform Registration block referred to in Figure 23.

SuggestedRemedy

Add section.

Proposed Response *Response Status* **O**

Cl **6.15** SC **Figure 23** P **121** L **1** # 793
Caldwell, Winston FOX

Comment Type **TR** *Comment Status* **X**

A section should be added detailing the Perform Key Exchange block referred to in Figure 23.

SuggestedRemedy

Add section.

Proposed Response *Response Status* **O**

Cl **6.15** SC **Figure 23** P **121** L **1** # 792
Caldwell, Winston FOX

Comment Type **TR** *Comment Status* **X**

A section detailing the Authorize CPE block referred to in Figure 23 should be added.

SuggestedRemedy

Add section.

Proposed Response *Response Status* **O**

Cl **6.15.** SC P **122** L **6** # 779
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Sentence needs to be corrected

SuggestedRemedy

Replace it with ""After having received an SCH in a channel, the CPE shall perform not only in-band sensing on channels indicated in the SCH, but also out-of-band sensing (...) as to meet the oub-of-band emission mask""

Proposed Response *Response Status* **O**

Cl **6.15.** SC P **122** L **8** # 780
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Correct sentence

SuggestedRemedy

Change from ""incumbent operation"" to ""in-band incumbent operation""

Proposed Response *Response Status* **O**

Cl **6.16** SC P **128** L **30** # 760
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

This section is about optional features

SuggestedRemedy

Replace 'mandatory' by 'optional'

Proposed Response *Response Status* **O**

Cl **6.16** SC P **128** L **38** # 761
Cordeiro, Carlos Philips

Comment Type **T** *Comment Status* **X**

This is about optional features

SuggestedRemedy

Replace 'mandatory' by 'optional'

Proposed Response *Response Status* **O**

Cl **6.16.** SC P **135** L **4** # 781
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

A key requirement in 802.22 is that CPEs and the BS shall perform sensing. Contrary to CPEs, however, BSs have 100% duty cycle. In this scenario, how will the BS be able to perform sensing?

When transmitting, the BS will certainly be unable to perform sensing due to RF front-end overload. When receiving data from CPEs the BS COULD attempt to perform sensing, however the major problem here is that the US subframe changes in length (i.e., it is not something that can be predicted as to its length) and will in most cases not exceed 2-3 ms (due to the 70%/30% DS/US ratio, and a 10ms frame).

Therefore, it is unclear how the DFH scheme can meet the incumbent protection requirements and, as a consequence, be implemented. It looks as if quiet periods will be required anyhow.

SuggestedRemedy

This problem is very critical and needs to be resolved.

Proposed Response *Response Status* **O**

Cl **6.16.** SC P **144** L # 768
Cordeiro, Carlos Philips

Comment Type **ER** *Comment Status* **X**

There is no need for a 'Conclusion' section here

SuggestedRemedy

Delete this section

Proposed Response *Response Status* **O**

Cl **6.20** SC P **152** L # 767
Cordeiro, Carlos Philips

Comment Type **ER** *Comment Status* **X**

There are a number of subclauses missing in this section.

SuggestedRemedy

Use the 802.16 spec as a starting point and update this section with all the required text.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **170** L # 776
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Needs integration.

SuggestedRemedy

Integrate this section with the previous one.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **179** L **3** # 769
Cordeiro, Carlos Philips

Comment Type **ER** *Comment Status* **X**

As it was many times discussed over telcos, emails and face-to-face, CBP is the mandatory mode on top of which all mechanisms presented under this subclause are to operate. This is not clear from this write-up and hence needs to be included.

SuggestedRemedy

1) Include the following paragraph:
""The CBP protocol is the mandatory and default self-coexistence protocol on top of which the mechanisms described in this section are implemented. In addition to the basis resource sharing functionality of CBP, it can also be used to negotiate which (if any) of the schemes described in this section are supported by the different 802.22 systems.""

2) Include a figure that depicts the self-coexistence architecture. I have the figure available.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **180** L # 771
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

There is no specification for this scheme. How does it work? What are the frame exchanges?

SuggestedRemedy

It needs to be specified and integrated with the CBP protocol.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **180** L # 772
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Is this an implementation issue?

SuggestedRemedy

In case this is about implementation, this section should be delted. Otherwise, the algorithm has to be specified.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **180** L # 770
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

There is no specification for this scheme. How does it work? What are the frame exchanges?

SuggestedRemedy

It needs to be specified and integrated with the CBP protocol.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **180** L # 773
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

This section has the same problem of sections 6.21.2.3.1 and 6.21.2.3.2.

SuggestedRemedy

It needs to be specified and integrated with the CBP protocol.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **183** L # 774
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

This section has the same problem of sections 6.21.2.3.1, 6.21.2.3.2, and 6.21.2.4.

SuggestedRemedy

It needs to be specified and integrated with the CBP protocol.

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **186** L **4** # 762
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

It is not 'transmit a preamble'

SuggestedRemedy

Replace 'preamble' by 'both the short and the long training sequences'

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **187** L **17** # 763
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Specific numbers should not be mentioned

SuggestedRemedy

- Replace 'a few' by 'in the order of'
- Delete entirely '(e.g., 20usec ....)'

Proposed Response *Response Status* **O**

Cl **6.21.** SC P **197** L **6** # 764
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

This section is no longer required given that all of the assumptions have been fully addressed and overcome.

SuggestedRemedy

Delete section 6.21.5.1

Proposed Response *Response Status* **O**

Cl **6.4** SC **Figure 4** P **10** L # 754
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Figure 4 needs to be updated to indicate the Self-coexistence window at the end of the frame

SuggestedRemedy

I have the updated figure

Proposed Response *Response Status* **O**

Cl **6.8.2** SC P **73** L **6** # 759
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Sentence is not fully complete

SuggestedRemedy

add 'and/or BSs' right after 'other CPEs'

Proposed Response *Response Status* **O**

Cl **6.8.2** SC **Table 143** P **65** L # 757
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

The CHO-UPD does not provide priority amongst channels. This should be added to the table.

SuggestedRemedy

Under the for() loop, add a 2 bit 'Priority' field that can take the following values: i) Low; ii) Medium; iii) High; vi) Undefined.

Proposed Response *Response Status* **O**

Cl **6.8.2** SC **Table 151** P **69** L # 758
Cordeiro, Carlos Philips

Comment Type **T** *Comment Status* **X**

Since the Threshold value may change over time and is dependent on factors such as CPE distribution, it would be important to amend this table to allow for the specification of this possibily time varying threshold.

SuggestedRemedy

Include a 'Threshold' (15 bits) and 'Threshold valid' (1) bit in this table.

Proposed Response *Response Status* **O**

Cl **6.8.2** SC **Table 30** P **28** L # 755
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

Message is always in integer number of bytes

SuggestedRemedy

Delete Padding Nibble of 4 bits

Proposed Response *Response Status* **O**

Cl **6.8.2** *SC* **Table 32** *P* **28** *L* # 756
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**
Message is always an integer number of bytes

SuggestedRemedy
Delete padding nibble of 4 bits

Proposed Response *Response Status* **O**

Cl **8.1.1** *SC* *P* **213** *L* **11** # 745
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **X**
Pilot positions are not defined.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **8.1.2** *SC* *P* **216** *L* **1** # 746
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **X**
The group should make decision whether ""Fractional bandwidth usage"" is a mandatory or optional feature.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **8.10** *SC* *P* **257** *L* # 751
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **X**
Multiple antenna options should be trimmed down to a few decent schemes.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **8.3** *SC* **8.3.1** *P* *L* # 783
Sofer, Eli Runcom

Comment Type **TR** *Comment Status* **X**
Superframe and frame preambles-
Suprerframe and Frame preabmles have limited number of sequences and are not identical in format which poses more difficulties in implementatio.

SuggestedRemedy
Superframe and Frame preambles should be identical in format (and differ in sequence). The durationof these preambles should be fixed to 1 OFDM symbols

Proposed Response *Response Status* **O**

Cl **8.3** *SC* **8.3.1** *P* *L* # 784
Sofer, Eli Runcom

Comment Type **TR** *Comment Status* **X**
1st Frame Preamble is designated as optional and follows immediately the Superframe preamble

SuggestedRemedy
The optional 1st frame preamble should be eliminated, since it follows immediately the Superframe preamble and thus is expendable

Proposed Response *Response Status* **O**

Cl **8.3** *SC* **8.3.1.2** *P* *L* # 786
Sofer, Eli Runcom

Comment Type **TR** *Comment Status* **X**
Limited PN sequences-
The draft allows the generation of only 1 preamble, while the 802.16 offers a large number of different sequences.

SuggestedRemedy
Different PN sequences should be adopoted as adopted in 802.16, has many advantages for example, differentiation between groups of CPE`s or among different Base Stations.

Proposed Response *Response Status* **O**

Cl **8.3** *SC* **8.3.1.2, 8.3.1.3** *P* *L* # 785
Sofer, Eli Runcom

Comment Type **TR** *Comment Status* **X**

PN sequence PAPR-
The PAPR in the proposed preamble significantly exceeds the PAPR of the 802.26.Secificly,the PAPR isn the proposed preamble is in the range of 8dB-12dB, while that in the 802.16 is in the vicinity of 4.2dB.

SuggestedRemedy

Use of 802.16 PN sequences is preferable and were selected following exhaustive research.

Proposed Response *Response Status* **O**

Cl **8.3** *SC* **8.3.2.1.1** *P* *L* # 788
Sofer, Eli Runcom

Comment Type **TR** *Comment Status* **X**

Pilots location-
The DS preamble offers the required pilot density for channel estimation, thus, in the DS, preamble based estimation is possible. The situation in the US is different, since the US preamble is Optional.

SuggestedRemedy

1. We should either locate sufficient pilots within the US for the Users, or use US peamble as mandatory.
2. Propose to merely change the location of the pilots so that the union of pilots from two consequent symbols satisfy Nyquist. This allows adequate channel estimation in the US (US Preamble may be left Optional)

Proposed Response *Response Status* **O**

Cl **8.3** *SC* **8.3.2.1.1** *P* *L* # 787
Sofer, Eli Runcom

Comment Type **TR** *Comment Status* **X**

pilots location-
The pilots in the draft do not meet the Nyquist sampling criterion neither in the DS nor in the US. This means that pilots could not be used efficiently for channel estimation.

SuggestedRemedy

If pilots are located within the frame for channel estimation, they should meet Nyquist. Otherwise (ifthe estimation is based on the preamble), far less pilots are to be located within the frame, for synchronization only.

Proposed Response *Response Status* **O**

Cl **8.3.1** *SC* *P* **222** *L* **24** # 765
Cordeiro, Carlos Philips

Comment Type **TR** *Comment Status* **X**

It is not 'short and long preamble'

SuggestedRemedy

Replace it by 'short and long training sequences'

Proposed Response *Response Status* **O**

Cl **8.4** *SC* *P* **225** *L* **37** # 747
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **X**

Subdivide ""Adjacent subcarrier permutation"" into ""Band"" and ""scattered"" types may increase overheads. It is not clear whether it is worthy of doing so considering the performance gain is limited.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **8.5** SC P **230** L **17** # 748
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **X**

Which advanced channel coding schemes are to be included in the standard is still open.

SuggestedRemedy

Setup coding tiger team (maybe later since less urgent) to compare performance / complexity of differenct schemes.

Proposed Response *Response Status* **O**

Cl **8.8** SC P **240** L **32** # 749
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **X**

Channel sensing schemes are yet to be compared. Most, if not all, of them are trying to sense whetehr certain channels are occupied. There is mot mechanism to differentiate whether the channels are occupied by imcumbents or other unlicensed users / WRANs.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **8.9** SC P **256** L **3** # 750
LEI, Zander Zhongding Institute for Infocomm

Comment Type **TR** *Comment Status* **X**

LO accuracy for CPE is not defined expressly in terms of ppm (whereas BS is). Low cost CPEs shall be allowed in WRANs.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **99** SC P L # 630
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

The formal description of MAC behaviors using SDL must follow ITU SDL's semantics and grammer.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **99** SC P L # 631
Chu, Liwen STMicroelectronics

Comment Type **TR** *Comment Status* **X**

CMAC put coexistence in pretty important position. Inter-cell communication play a important role in CMAC. The inter-cell communication must be encrypted to guarantee security. Current draft does not support this kind of security.

SuggestedRemedy

Provide authentication, encryption to the inter-cell communication.

Proposed Response *Response Status* **O**

Cl **99** SC P **i** L **2** # 5
Murray, Peter Motorola

Comment Type **E** *Comment Status* **D**

Upon examining other drafts documents it appears that each subject, e.g. Cognitive Radio: MAC: Phy: Starts a new line in the title.

SuggestedRemedy

Follow normal practice.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note to editor(s) - make sure that document fully complies with the IEEE Style Guide

Cl **99** *SC* **Contents** *P* *L* # 791
Caldwell, Winston FOX

Comment Type **TR** *Comment Status* **X**

Need a new Section in the Draft describing Network Prohibition and Exit Procedures (like Nework Access and Initialization) in a problematic event, such as an incumbent signal is detected or the CPE has moved.

SuggestedRemedy

Add Section

Proposed Response *Response Status* **O**

Cl **99** *SC* **Contents** *P* *L* # 789
Caldwell, Winston FOX

Comment Type **TR** *Comment Status* **X**

Need to add a Section in the Draft to define and describe the various modes of network entry and operation

SuggestedRemedy

Add Section

Proposed Response *Response Status* **O**

Cl **Annex** *SC* *P* **288** *L* # 782
Cordeiro, Carlos Philips

Comment Type **ER** *Comment Status* **X**

Do we need all these Annexes in the main spec?

SuggestedRemedy

Put these annexes aside in a separate document, and leave the main document cleaner.

Proposed Response *Response Status* **O**

Cl **Annex** *SC* **C** *P* **290** *L* **1.7** # 7
Murray, Peter Motorola

Comment Type **E** *Comment Status* **D**

Figure C5 and Figure C6:
Wording in some boxes are not readable due to box sizes.

SuggestedRemedy

Adjust box dimensions

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Note to editor(s) - insure that all text in figures and tables is completely readable.

Cl **Annex** *SC* **Table E.1** *P* **299** *L* **6** # 138
Vlantis, George STMicroelectronics

Comment Type **E** *Comment Status* **D**

Last line: ""Amen!"" without a ""Hallelujah!"".

SuggestedRemedy

Replace ""Amen!"" with ""Amen, Hallelujah!"" or delete the ""Amen!"".

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note to editor(s) - Remove all attempts at humor from the document :-)