Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Comments of WCA Engineering Committee on TG2 Coexistence Practices Document**
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Re:	Regarding call for comments on IEEE 802.16.2-00/01-r9, “Coexistence of Broadband Wireless Access Systems”.
Abstract	This document provides comments on the TG2 Coexistence Practices Document.
Purpose	To provide TG2 with input for the commenting process.
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Comments of WCA Engineering Committee on TG2 Coexistence Practices Document

This document contains a set of comments from WCA engineering committee (WCAec) on the coexistence practices document produced by TG2. The items included in this contribution although do not provide replacement text but they point to specific pages in the TG2 document and provide general guidelines for the required changes. WCAec is requesting TG2 to consider the following changes. Comments are all Technical.

Comment 1

[Starting Page #]
Pg. 72-74, Pg. 95-99.

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Annexes need to be updated and Recommendations need to be revised

[Reason for Edit]

There are several inconsistencies in the coexistence document. Some of these are:

- The recommended values and suggestions are inconsistent with the analyses and assumptions contained in the Annexes;
- The analyses in some of the Annexes are inconsistent with the FCC and ITU rules and recommendations. The FCC rules are in full operation and a full review of those technical rules, and related regulatory rules, is required in the presence of U.S. 38.6-40.0 GHz licensees before changes should be recommended. Similarly, coordination with the ITU format needs to be more fully discussed.

- Several assumptions used in the analyses are not representative of operational broadband fixed wireless systems; and
- There is no methodology provided in the document to assist the operators to translate psfd values into dBms.

Comment 2

[Starting Page #]
18

[Detailed Description of Proposed Insertion, Deletion, Change]

Make the necessary change

[Reason for Edit]

Please note that the assumption of very low remote terminal (subscriber) height with respect to very high hub (central station) radio height is not valid. This is not the case in many real world situations, and has an impact on the distance-spacing requirements provided in this section. So, the example is not representative enough.

Comment 3

[Starting Page #]
19

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Make the necessary change

[Reason for Edit]

There are situations where direct end-user-to-end-user traffic does exist. This factor should not be ignored when making assumptions about the network.

Comment 4

[Starting Page #]
20

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Make the necessary change

[Reason for Edit]

Assumption is made that hubs always provide 360-degree, omni-directional coverage. This should be changed to, “up to 360 degrees of coverage.” Also note that inter-cell links cannot usually be “in-band.” They often will have to be low-frequency wireless links in order to support the inter-hub distances. The assumption may not be generic, and only an exception.

Comment 5

[Starting Page #]
25

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Make the necessary change

[Reason for Edit]

Assumption is made that all PTP systems use uplink power control. This is not the case. Many PTP and some PMP radios that are currently in use do not have this feature. Power control cannot be made a requirement, but an option only.

Comment 6

[Starting Page #]
25-26

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

The statistical interference model needs to be updated to be more accurate.

[Reason for Edit]

Although this section provides a good description of the available interference sources individually, not enough attention is provided to discussing the effects of all interference scenarios occurring concurrently. No explanation is given as to whether the interference is statistically additive. There should be an estimation that is more accurate. In addition, there is no reason to believe that all interferers would not be statistically additive: there are possibly multiple interferers emanating from multiple sources (PMP, PTP, satellite) from multiple paths. They will be statistically additive.

Noted here again:
One interferer at 6 dB below noise floor increases the noise floor 1 dB.
Two interferers, each at 6 dB below noise floor, increases noise floor 2 dB.
Three interferers, each at 6 dB below noise floor, increases noise floor 2.5 dB.
Five interferers, each at 6 dB below noise floor, increases noise floor 3.5 dB.
Ten interferers, each at 6 dB below noise floor, increases noise floor 5.5 dB.

Comment 7

[Starting Page #]
30

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Recalculate the target EIRP spectral density values, and provide a range of values based on assumptions.

[Reason for Edit]

The numbers used to generate the target EIRP spectral density numbers are not valid. Specifically, STS antenna gains can be significantly higher than those stated: up to 44 dBi for 2-ft. dishes. Moreover, smaller beamwidth sector antennae can have gains up to 23 dBi. Since power spectral density EIRPs are provided, then power level densities for other bandwidths than 28 MHz should be provided as well (e.g., 50 MHz channel bandwidth for 39 GHz band, or subsequent subchannel bandwidth, e.g., 10 MHz).

Comment 8

[Starting Page #]
33

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Information on equipment specifications should include appropriate disclaimers. It should be mentioned that the parameters are typical examples of equipment parameters used to analyze the interference environment.

[Reason for Edit]

Recommendations concerning equipment specifications for such items as power control fall well outside the scope of this document.

Comment 9

[Starting Page #]
49

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

State the CW requirement and cite the source of information.

[Reason for Edit]

Where does the CW interference requirement come from?. What is the source of this information?

Comment 10

[Starting Page #]
51

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Delete all discussions on using radio horizon as the distance trigger, and use a more reasonable model that results in 16 km as the distance trigger.

[Reason for Edit]

We fail to see the logic in using radio horizon distance as a distance trigger. This factor does not take into account propagation or radio equipment characteristics, and therefore results in a highly conservative value of 60 km.
Section 7.1.2 states that "propagation effect, and power flux density levels" should be used to determine the coordination trigger distance, but they are ignored: the only factor in deciding this distance appears to be the radio horizon.

Comment 11

[Starting Page #]
52

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

All text implying requirement on operators to provide network coverage maps, etc., should be deleted.

[Reason for Edit]

Requiring operators to provide network coverage maps to competitors is not a standard procedure, for obvious reasons. Indeed, the FCC does not impose such a requirement on broadband fixed wireless operators in the U.S.

Comment 12

[Starting Page #]
64-65

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Make the necessary change.

[Reason for Edit]

It should be noted that the IFL cables transmit more than just the IF payloads; control and telemetry information and mains power are also transmitted at other frequencies as well.

Comment 13

[Starting Page #]
72-74

[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Use radio equipment parameters that are representative of BWA networks. Mention how PSFD B is derived. Include a caveat stating that psfd may not be the appropriate coordination trigger. Refer to a new Annex YYY (to be developed) that will provide the methodology to translate psfd values into signal level (dBm) values, and vice versa.

[Reason for Edit]

The radio equipment specifications used in Annex B are not representative of what current technology supports. For example, the typical receiver noise figure of 6 dB is not a representative number, many radios currently in use have noise figures up to 10 dB, and in some cases of older equipment, 12 dB. In the psfd calculations for the 20-30 GHz range, a distance of 60 km was used, which we have already stated is not an appropriate number to use. In the 30-40 GHz range analysis, inappropriate specifications were used: hub antenna gains can be as high as 23 dBi, remote antenna gains can reach 44 dBi, and noise figures can exceed 10 dB. As a result, not only do we feel that the Interference Objectives stated in the table on page 74 are incorrect, but that the psfd values are inappropriate as well. Moreover, there is no explanation of how the PSFD B values in this table were obtained.

(We used the ITU WRC-2000, GSO, maximum, low-angle psfd value of –127 dBW/MHz/m2.

-127 dBW/MHz/m2
-8 dB (difference in gain from m2 to 2-ft. dish antenna)
-3 dB (conversion between circular-to-rectangular polarization)
-1 dB (atmospheric loss)
+30 dB (dBW to dBm)
+11 dB (typical PMP bandwidth of 12.5 MHz)
+11 dB (I/N)

= -87 dBm.

This is the same value we propose in our comments to NSMA.

Comment 14

[Starting Page #]
76
[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Indicate where the results indicated here are used in the report.

[Reason for Edit]

Simulation results indicate that 40 km is a good hub-to-hub spacing, but this number is not used elsewhere when proper spacing requirements are provided.

Comment 15

[Starting Page #]
89-94
[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Modify Annex D to indicate all findings based on ITU-R Recommendations or delete it.

[Reason for Edit]

Annex D does not refer to any findings based on ITU recommendations. Annex D “Work of Other Bodies” should be deleted. The relevant works of other bodies may be referenced and contained in the bibliography, however the inclusion of text in an Annex implies an endorsement of the external works. In particular, the regulations created by Industry Canada are not applicable to operators in the UK or the US. Likewise, if such references are to be maintained, a thorough effort should be made to include language from the FCC and similar agencies from other countries.

Comment 16

[Starting Page #]
95-99
[Starting Line #]

[Detailed Description of Proposed Insertion, Deletion, Change]

Radio specifications and parameters should be more representative of BWA networks, in Annex E.

[Reason for Edit]

We feel again that the radio specifications provided in Annex E are not valid numbers and may in part be based on radio path availability that do not coincide with requirements of high density BWA networks.

Comment 17

[Starting Page #]
15

[Starting Line #]
32

[Detailed Description of Proposed Insertion, Deletion, Change]

Recommendation 4 :

Delete.

[Reason for Edit]

This recommendation goes beyond the intended purpose of a standard to specify inter-system co-existence criteria. Such policy issues as the current recommendation that “the incumbent/first-to-deploy carrier should have equal responsibility with carriers that deploy systems at a subsequent time,” are outside the scope of this organization. Further, this idea is at odds with current FCC and NSMA ideology. Forcing an incumbent operator to alter its existing network design while maintaining service to its customers could not be feasibly achieved. Moreover, the recommendation that operators should share all relevant system design parameters to its competitors is not a commercially acceptable proposition and is also outside the scope of work of this group.

Comment 18

[Starting Page #]
32

[Starting Line #]
26

[Detailed Description of Proposed Insertion, Deletion, Change]
Make necessary changes.

[Reason for Edit]

Section 6.1.1.5 describes a “typical” in-band point-to-point link in the 28 GHz band, makes assumptions regarding the specific parameters, then draws a conclusion that all “In-band Inter-cell link stations” should meet or exceed this power spectral density number. This section does not take into account transmitters in other frequency bands or with other modulation schemes or bandwidths. This type of radio is not a BWA system and each deployment of such a system will have to be evaluated on its own merits and specific technical parameters.

Comment 19

[Starting Page #]
54

[Starting Line #]
19

[Detailed Description of Proposed Insertion, Deletion, Change]
Make necessary changes.

[Reason for Edit]

Section 8 describes the use of statistical simulations to predict the probability of interference; this is uncommon in frequency coordination arts; no specific, commonly available and consistent tools are available for engineers to economically set up and run simulations. Neighboring engineers should have reasonable access to standardized tools. This section provides only encouragement to run simulations, and does not add significant value to the recommended practice. This section should be deleted.

Comment 20

[Starting Page #]
7 2

[Starting Line #]
1

[Detailed Description of Proposed Insertion, Deletion, Change]
Make necessary changes.

[Reason for Edit]

Annex B, “Power Spectral Flux Density (psfd) calculations contains some of the most valuable information in a BWA spectrum engineering practice. In this section of the document, step-by-step calculations are described which engineers can apply to specific real or proposed designs. In the current form, however, the Annex makes assumptions about specific frequencies, transmit powers and antenna gains and then draws conclusions for broad ranges of frequencies. As a specific example, the calculation given on page 72 assumes an operating frequency of 27272 MHz (wavelength = 0.011) and a receive antenna gain of 20 dB. From this example, a conclusion is drawn for the frequency range of 20 to 30 MHz. Without changing other parameters, the variation in frequency results in a 2 dB difference in the calculated psfd. An assumption that the victim receiver will have an antenna gain of 20 dB is perhaps conservative when considering typical hub antenna gains offered today, but this is after all an assumption and a guess. Engineers should use the best available information and should not as standard practice blindly assume an arbitrary antenna gain. This same fault of assumption and conclusion also applies to the 30-40 GHz portion of this Annex.

Comment 21

[Starting Page #]
75

[Starting Line #]
1

[Detailed Description of Proposed Insertion, Deletion, Change]
Make necessary changes.

[Reason for Edit]
Annex C “Description of Calculation and Simulation Methods” should be deleted. While interesting and potentially useful to some operators, these results do not provide operators or engineers with guidance regarding how precisely to conduct a standard, repeatable simulation that would be mutually understood and agreed to by multiple parties in a coordination effort. Relevant works such as this should be externally published and referenced in the bibliography.

Comment 22

[Starting Page #]
34

[Starting Line #]
8

[Detailed Description of Proposed Insertion, Deletion, Change]
Make necessary changes.

[Reason for Edit]

In section 6.1.4.1 and other locations, quoted excerpts from draft CEPT or ETSI documents should be deleted as the referenced documents are not approved. References to other standards or documents should contain adequate information to refer the reader to the alternate text and not seek to duplicate the information.