Document under Review: **P802.16.2a/D5-2003**   Ballot Number: **0000475**   Comment Date

Comment # **116**   Comment submitted by: Arthur   Light   Member   2003/02/21

Comment   Type Technical, Satisfied   Starting Page # Gen   Starting Line #   Fig/Table#   Section

Contrary to the comment of Bruce Barrow, the term "dBW/MHz" is both mathetically correct and defensible in that it is defined in several electrical engineering dictionaries; whereas, Mr. Barrow's new term "dBW in 1 MHz" is undefined and incorrect. The term "dBW/MHz" when used to refer to noise or noise-like signals, which have a large frequency occupancy a compared to the bandwidth of the receiver of interest properly refers to the amount of power (W) of the signal/noise in 1 MHz as seen by the receiver. If the signal is truly noise-like, the noise power seen by a receiver of a different bandwidth will vary as the ratio of the receiver bandwidths (10 dB/decade or 3 dB/octave). Under these conditions, the term "dBW/MHz" is perfectly correct. If the interfering signal does not vary as described above, referring to that signal as having noise like characteristics is inaccurate, although as indicated by Mr. Barrow frequently incorrectly used. If a signal is coherent, its power in a receiver bandwidth will not vary as the ratio of receiver bandwidths and the term "dBW/MHz" should not be applied to it. The problemis that many people want to use the term indiscriminately, not that the term has no meaning. The term "dBW in 1 MHz" does not have any meaning and is not defined in section 3.1. The implication is that the signal exists in some 1 MHz but there is no indication about the signal's existance or nature in any other 1 MHz. This solution is worst than the originally perceived problem.

Suggested Remedy

Return to the use of "dBW/MHz," but takes some pains to clarify the difference between a noise-like signal in the measurement bandwidth to which the term properly applies and a non-noise-like signal which is present in a measured 1 MHz of spectrum.

Proposed Resolution   Recommendation: **Rejected**   Recommendation by pw

Although this comment is marked technical, it is considered that it is more of an editorial matter, since it relates to a preference for use of terminology (IEEE SCC14 recommendation versus common usage).

Reason for Recommendation

The revised term "dBW in 1 MHz" is satisfactory for the purposes of the document and is understood to be an acceptable form to IEEE SCC14, whilst the common use term "dBW/MHz" was considered unsatisfactory .

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

After further careful review, it was decided not to accept the proposed change, which would have reversed a decision made following the first sponsor ballot recirculation

Reason for Group's Decision/Resolution

Although the comment is marked as technical, the group considers it more of an editorial issue. The issue was reviewed at length following the first recirculation. Similar issues were raised in the initial sponsor ballot in relation to use of the term "dBW/m^2/MHz" used for psfd values. After further review, the WG concludes that the use of the term "dBW in 1MHz" is technically satisfactory for measurement of power density as used in the recommended practice both for measurement of noise - like signals and for non- uniform signals such as transmitter emission spectra. For broadband wireless systems, a test bandwidth of 1 MHz is appropriate for both types of signal. This is consistent with ITU

terminology for psfd which describes power in "...any 1MHz bandwidth". Whereas we agree that the argument above that relates noise power to bandwidth is correct, we do not believe that the term "dBW in 1MHz" implies a specific 1MHz, rather any 1MHz test bandwidth that may be chosen. On this basis, it is concluded that the current terminology is satisfactory.

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Comment # **117**   **Comment submitted by:** Arthur   Light   2003/02/21

Comment   **Type** Editorial   **Starting Page #** 7   **Starting Line #**   **Fig/Table#**   **Section** 3.2

The term dBW is not defined in section 3.2 Abbreviations

Suggested Remedy

In section 3.2 add definition: dBW -- Decibels with respect to 1 Watt

Proposed Resolution   **Recommendation:**   **Recommendation by**

Reason for Recommendation

Resolution of Group   **Decision of Group:** **Accepted in principle**

The working group recommends that the IEEE project editor implement this change as an editorial improvement.

Document under Review: **P802.16.2a/D5-2003**   **Ballot Number:** **0000475**   **Comment Date**

Comment # 118   **Comment submitted by:**   Arthur   Light   2003/02/21

Comment   Type Editorial   **Starting Page #** 7   **Starting Line #** 26   **Fig/Table#**   **Section** 3.2

The term "dBW/MHz" is not defined in section 3.2

Suggested   Remedy

In section 3.2 add definition: dBW/MHz -- Decibels with respect to 1 Watt as measured in a 1 MHz bandwidth

Proposed   Resolution   Recommendation: **Recommendation by**

Reason for Recommendation

Resolution of Group   **Decision of Group:** **Accepted in principle**

The working group recommends that the IEEE project editor implement the following change as an editorial improvement:

In subclause 3.2 ,add definition "dBW in 1MHz: dB with respect to 1 Watt as measured in a 1 MHz bandwidth".

Reason for Group's Decision/Resolution

The definition was adjusted to conform to the resolution of comment 116

Group's Notes

Group's Action Items

Editor's Notes   **Editor's Actions**

Editor's Questions and Concerns

Editor's Action Items

Document under Review: **P802.16.2a/D5-2003**   **Ballot Number:** **0000475**   **Comment Date**

Comment # **119**   **Comment submitted by:** Arthur   Light   2003/02/21

Comment   **Type** Editorial   **Starting Page #** 7   **Starting Line #** 26   **Fig/Table#**   **Section** 3.2

The definition of "dBi" in section 3.2 is incorrect

Suggested Remedy

Change definition of dBi to read -- "decibels relative to a hypothetical isotropic antenna. This term refers to the gain of an antenna"

Proposed Resolution   **Recommendation:**   **Recommendation by**

Reason for Recommendation

Resolution of Group   **Decision of Group:** **Accepted in principle**

The working group recommends that the IEEE project editor implement this change as an editorial improvement.

Reason for Group's Decision/Resolution

Group's Notes

Group's Action Items

Editor's Notes   **Editor's Actions**

Editor's Questions and Concerns

Editor's Action Items

Document under Review: **P802.16.2a/D5-2003**   **Ballot Number:** **0000475**   **Comment Date**

Comment # **120**   **Comment submitted by:** Arthur   Light   **2003/02/21**

Comment   **Type** Technical, Satisfied   **Starting Page #** 12   **Starting Line #** 33   **Fig/Table#**   **Section** 4.2.2

The following portion of section 4.2.2 -- "For example, consider a receiver with 6 dB noise figure. The receiver thermal noise is -138 dBW in 1 MHz. Interference of -138 dBW in 1 MHz would double the total noise, or degrade the link budget by 3 dB. Interference of -144 dBW in 1 MHz, 6 dB below the receiver thermal noise, would increase the total noise by 1 dB to -137 dBw in 1 MHz, degrading the link budget by 1 dB." This section is more incorrect than the problem with dBW/MHz, which would also be misused in this particular case.

Suggested Remedy

A better solution would be to rewrite this part as -- "For example consider a receiver with a 1 MHz bandwidth and a 6 dB noise figure. At a standard room temperature of 27 degrees Celcius, or 300 Kelvins, the background thermal noise as defined by the product of Boltzmann's constant (k = 1.38 x 10-23 Ws/K), the Kelvin temperature (T = 300K), and the receiver bandwiidth (B = 1 MHz) is 4.15 x 10-15 W, or -144 dBW. The 6 db noise figure is equivalent to multiplying the thermal noise by a factor of four (4), thus raising the receiver's internal noise to 16.56 x 10-15 W. An interfering signal of -138 dBW (16.56 x 10-15 W) in the receiver's passband will raise the receiver noise to (16.56 x 10-15 W + 16.56 x 10-15 W = 33.12 x 10-15 W) -135 dBW or an increase of 3 dB. However, an interfering signal in the receiver's passband at the thermal noise floor of -144 dBW will increase the receiver noise to (16.56 x 10-15 W +4.15 x 10-15 W = 20.71 x 10-15 W) -137 dBW or an increase of 1 dB. Thus an inband interferrer at the thermal noise floor will degrade the receiver by 1 dB and an inband interferrer at the receiver's noise floor will degrade the receiver's sensitivity by 3 dB." In most of the other places within the document where "dBW in 1 MHz" has been substituted for "dBW/MHz," the new term has no meaning and cannot be adjusted for receivers with bandwidths other than 1 MHz; whereas, "dBW/MHz" does have mathematical meaning and can be mathematically adjusted to apply to a receiver of any bandwidth.

Proposed Resolution   Recommendation: **Recommendation by**

Reason for Recommendation

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

After further careful review, it was decided not to accept the proposed change, which would have reversed a decision made following the first sponsor ballot recirculation

Reason for Group's Decision/Resolution

The issue is essentially the same as that raised in comment 116 and the resolution has the same basis. The existing text correctly states that noise measured in a 1 MHz test bandwidth has the stated value. This does not imply that only 1 MHz bandwidth receivers are considered. Refer also to comment 116.

Group's Notes

Group's Action Items

Document under Review: **P802.16.2a/D5-2003**   **Ballot Number:** **0000475**   **Comment Date**

Comment # **121**   **Comment submitted by:** Savoula   Amanatidis   Other   2003/03/05

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

MEMO

TO: Balloting Center
FROM: Savoula Amanatidis
DATE: 5 March 2003
RE: Editorial Coordination of P802.16.2a/D5

I have reviewed P802.16.2a/D5 and it meets all the requirements for Editorial Coordination.

Sincerely,

Savoula Amanatidis
Managing Editor, IEEE Standards Activities

Suggested   Remedy

Proposed   Resolution   Recommendation: **Recommendation   by**

Reason   for   Recommendation

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

No action required

Reason   for   Group's   Decision/Resolution

Group's   Notes
no action required

Group's   Action   Items

Editor's   Notes   Editor's   Actions

Editor's   Questions   and   Concerns

Editor's   Action   Items

Document under Review: **P802.16.2a/D5-2003**   **Ballot Number:** **0000475**   Comment Date

Comment # **122**   **Comment submitted by:** Savoula   Amanatidis   Other   2003/03/05

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

MEMO

TO: Balloting Center
FROM: Savoula Amanatidis
DATE: 5 March 2003
RE: SCC10 Coordination of P802.16.2a/D5

I have reviewed Clause 3 Definitions of P802.16.2a/D5 it meets all the requirements for SCC 10 Coordination.

Sincerely,

Savoula Amanatidis
Managing Editor, IEEE Standards Activities

Suggested Remedy

Proposed Resolution   **Recommendation:**   **Recommendation by**

Reason for Recommendation

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

No action required

Reason for Group's Decision/Resolution

Group's Notes
No action required

Group's Action Items

Editor's Notes   **Editor's Actions**

Editor's Questions and Concerns

Editor's Action Items