

## Standards Working Group IEEE 802

Local and Metropolitan Area Network Standards Committee  
Homepage at <http://grouper.ieee.org/groups/802/>



October 2, 1999

Magalie R. Salas, Esquire  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> St. SW  
Washington DC 20554

Reply to: Vic Hayes, Chair, IEEE P802.11  
Lucent Technologies Nederland B.V.  
Zadelstede 1-10  
3431 JZ Nieuwegein, the Netherlands  
phone: +31 30 609 7528  
fax: +31 30 609 7556  
e-mail: v.hayes@ieee.org

Re: Amendment of Part 15 of the Commission's Rules for Spread Spectrum  
Devices, ET Docket No. 99-231

Dear Ms. Salas:

IEEE 802, the IEEE<sup>1</sup> LAN/MAN Standards Committee ("the Committee") is writing in regard to ET Docket No. 99-231: Amendment of Part 15 of the Commission's Rules for Spread Spectrum Devices.

This letter supports the CW jammer test, together with the additional requirement for mathematical justification for systems utilizing codes with less than 10 chips as proposed in paragraph 15 and advises the Commission of our concerns regarding an alternative Gaussian noise test as proposed in paragraph 14.

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<sup>1</sup> The Institute of Electrical and Electronics Engineers, Inc. (IEEE) is an international professional organization, based in the US, with more than 325,000 members representing a broad segment of the computer, communications, and power and energy industries.

## **Introduction**

Two working groups of the Committee, 802.11 on Wireless Local Area Networks (“WG WLAN”) and 802.15 on Wireless Personal Area Networks (“WG WPAN”) held an Interim Meeting in San Rosa, CA, 13 – 17 September 1999. WG WLAN, based on submissions<sup>2</sup> from its membership, decided to respond to the proposed changes in the test requirements for Direct Sequence Spread Spectrum systems.

The vote of the WG WLAN to submit this document to the FCC was 18 Yes, 0 No and 0 Abstain. WG WPAN unanimously passed a motion to support WLAN. At the Letter Ballot among the full WG WLAN the decision was approved by 69 Yes, 2 No, 3 Abstain. . The Committee’s Executive Committee voted to submit this document by a vote of 11 Yes, 1 No and 2 Abstain.

## **Testing methods**

The Commission has asked for comments concerning the testing methods proposed in the Notice to qualify the processing gain requirement of Direct Sequence Spread Spectrum Systems.

Members of the Committee have performed extensive analysis and technical trade-off studies that were discussed at the IEEE 802.11 Interim Meeting (Santa Rosa, 13 – 17 September 1999) to ensure that its 2.4 GHz high data rate waveform adheres to the processing Gain requirement of at least 10dB.<sup>3</sup> As a result of these studies, it has concluded that the processing Gain test using the CW jamming test as proposed in paragraph 15 of the Notice is a valid method to confirm the processing gain requirement.

The CW jamming margin test was introduced as a “technology neutral” means of assessing the effective performance of spread spectrum systems. This test has performed its intended

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<sup>2</sup> All papers are available at URL

[http://grouper.ieee.org/groups/802/11/Documents/index.html#FCC\\_NPRM\\_99-231](http://grouper.ieee.org/groups/802/11/Documents/index.html#FCC_NPRM_99-231)

function very well. Today systems delivering data rates of 11 Mbit/s are on the market. These systems are backed by a technical standard developed under the auspices of the IEEE. IEEE 802.11 High Rate systems operate in the same spectrum envelope as their 1 and 2 Mbit/s precursors and can be successfully and reliably tested with the CW jamming margin test.

The CW jammer test, together with the additional requirement for mathematical justification for systems utilizing codes with less than 10 chips, is a sufficient method to confirm the processing gain requirement. After considering alternate tests, including the proposed Gaussian Noise approach as proposed in paragraph 14 of the **Notice**, the Committee has concluded that the CW test is the most technically sound means of verifying compliance with the processing gain requirement.

While evaluating a Gaussian jamming signal testing method the Committee found that it requires a complex definition and measurement process so it does not become prone to errors.

In specific, the characteristics of the Gaussian signal, including the filters used in generating and measuring it, must be clearly defined. In addition, measurement equipment must be properly set up and calibrated to give the correct results. Implementation loss of the system under test plays a more prominent role in a Gaussian jamming margin test than it does with a CW jamming margin test and must be carefully defined.

The Committee supports maintaining the well-defined CW jamming margin test as the processing gain test. In practice, this simple test has proven adequate to prevent misuse of the rules without preventing significant advancement of the technology. It is in the interests of the users and of the industry to maintain the current test methods and so assure a stable basis for further technological advances.

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<sup>3</sup> All papers are available at URL [http://grouper.ieee.org/groups/802/11/Documents/index.html#FCC\\_NPRM\\_99-231](http://grouper.ieee.org/groups/802/11/Documents/index.html#FCC_NPRM_99-231)

Any additional alternative processing gain compliance tests must include the same level of detail as provided for the existing CW jamming margin test. This is the only practical means of minimizing the risk of interpretations that might invalidate the jamming margin test as an effective means of demonstrating compliance with the Commission's Rules.

### **Summary**

In summary, the Committee supports the CW jammer test, together with the additional requirement for mathematical justification for systems utilizing codes with less than 10 chips as proposed in paragraph 15 of the Notice and advises the Commission of our concerns regarding an alternative Gaussian noise test as proposed in paragraph 14.

Respectfully,

James T. Carlo ([jcarlo@ti.com](mailto:jcarlo@ti.com))  
Chair, IEEE 802 LAN/MAN Standards  
Texas Instruments  
9208 Heatherdale Drive  
Dallas TX 75234, USA

Vic Hayes ([vichayes@lucent.com](mailto:vichayes@lucent.com))  
Chair, IEEE 802.11, Wireless LANs  
Lucent Technologies  
Zadelstede 1-10  
3431 JZ Nieuwegein, the Netherlands

Bob Heile ([bheile@bbn.com](mailto:bheile@bbn.com))  
Chair, IEEE 802.15, Wireless PANs  
GTE Internetworking Technologies  
733 Concord Ave  
Cambridge MA 02138, USA

cc:

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Commissioner Harold Furchtgott-Roth  
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Deborah Rudolph, IEEE, USA  
Dr. Ned Sauthoff, IEEE, USA