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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

September 18, 2000

ET Doc. 99-231

HAND DELIVERED
Ms. Magalie Salas, Secretary
Federal Communications Commission
12th Street SW, Room TW-B204
Washington DC 20554

Re: Wi-LAN, Inc.
Application for Review

Dear Ms. Salas:

Enclosed are an original and four copies of the Application for Review filed on behalf of Wi-LAN, Inc.

Please date-stamp and return the extra copy of this filing.

If there are any questions about the filing, place call me directly.

Respectfully submitted,

Mitchell Lazarus
Counsel for Wi-LAN, Inc.

lmdeb

Enclosures

cc: Service List
Eric Godberson, Wi-LAN, Inc.
Leonard R. Raish, Esq.

No. of Copies rec'd 0
List A B C D E

Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Wi-LAN, Inc.,	)	
Application for Certification of an Intentional	)	File No. _____
Radiator Under Part 15 of the Commission's	)	
Rules, FCC ID K4BAP01	)	

TO: The Commission

APPLICATION FOR REVIEW

Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0440

September 18, 2000

Counsel for Wi-LAN, Inc.

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TECHNICAL CERTIFICATION

I have read the foregoing Application for Review of Wi-LAN, Inc.

I certify that the technical statements therein are true and correct to the best of my knowledge and belief.

Ramesh Uppal 15 Apr 2002

(signed) (date)

Ramesh Uppal, Vice President -- Technology
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Before the
Federal Communications Commission
Washington DC 20554

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Wi-LAN, Inc.,	)	
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TO: The Commission

APPLICATION FOR REVIEW

Pursuant to Section 1.115 of the Commission's Rules, Wi-LAN, Inc, hereby requests review of an action taken under delegated authority by the Office of Engineering and Technology (OET) in the above-captioned proceeding.

Wi-LAN seeks relief on the grounds that (1) OET's action is in conflict with the plain language of the Commission's Rules, and (2) OET made an erroneous finding as to an important and material question of fact.[1] In addition, to the extent that OET relies on certain unidentified prior decisions, discussed below, a grant of relief to Wi-LAN may entail overturning the precedential effect of those decisions.[2]

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1 *See* 47 C.F.R. Sec. 1.115(b)(2)(i), (iv).

2 *See* 47 C.F.R. Sec. 1.115(b)(2)(iii).

I. SUMMARY

OET denied Wi-LAN's application (Application) for certification of a low-power, unlicensed transmitter (Device) under the spread spectrum rules.[3] OET subsequently denied Wi-LAN's petition for reconsideration seeking reversal of that decision.[4] Both denials assert the Device does not meet the Commission's definitions of spread spectrum systems.

Specifically, OET claims the Device carries too much data in too little bandwidth -- in other words, that the Device is too spectrally efficient -- to qualify as a spread spectrum system. OET states further that the Device's modulation -- how it places data on the radio carrier -- does not comply with the applicable definitions. In addition, OET refers to prior denials of applications that OET says proposed technologies similar to Wi-LAN's.

OET's objection based on spectrum efficiency has no support in the Rules. As we show below, the Device spreads its signal and its information content in compliance with all requirements set out in the Rules. OET faults the Device for not having a bandwidth "much greater" than necessary to carry its data payload, yet nothing in the Rules mandates that ratio -- or any ratio -- of bandwidth to information carried. The Rules require only that a spread spectrum system "deliberately widen[]" its bandwidth over the minimum necessary, and the Device does that.

OET's second objection, on modulation technique, is also misplaced. We show below that the Device complies in full with the language of the Rule. Moreover, OET routinely certifies

---

[3] Letter from Joe Dichoso, Equipment Authorization Branch, FCC to Eric Godberson, Wi-LAN, Inc. (May 12, 2000) (Application Denial) (copy attached).

[4] Letter from Dale N. Hatfield, Chief, Office of Engineering and Technology, FCC to Mitchell Lazarus (August 18, 2000) (Reconsideration Denial) (copy attached).

another technology, called CCK, that applies the Rule in the same way as does Wi-LAN's Device.

Finally, the Commission must disregard OET's reference to denial of prior applications. OET has neither identified nor described those applications. Indeed, it cannot. The Commission's Rules implementing the Freedom of Information Act prohibit the disclosure of applications that have not been granted. Because Wi-LAN has no access to the applications OET has in mind, Wi-LAN is unable to challenge their precedential value. This is more than a procedural claim. Wi-LAN's patents on its technology make it unlikely that OET in fact has ever turned down a prior application with the technical characteristics that Wi-LAN is relying on here. But the Commission's own Rules bar Wi-LAN from making that showing.

In short, OET's denial of the Application and the Petition for Reconsideration are based on considerations outside the Rules, and hence are arbitrary and capricious. Wi-LAN therefore seeks a reversal of OET's action and immediate grant of the underlying Application.

Urgency. The Device is approved for marketing in Canada and Europe. In today's competitive global marketplace, the applicant's reputation is being damaged because of needless uncertainty created and the potential degradation of market confidence by the delay in U.S. certification. Additional delays pending the review requested here compound the detriment. In addition, significant development expenditures have already been spent by the applicant in reliance on the Commission's Rules. Wi-LAN notes that no other party will be adversely affected by a grant of the Application. To minimize the continuing harm, Wi-LAN asks the

Commission to proceed without public notice and comment,[5] and to grant the underlying Application summarily.[6] Moreover, if the Commission intends to prepare an order, it should not withhold grant of the Application while doing so.

Consultation. Parts of the following are unavoidably technical in nature. As an aid in its decision-making, Wi-LAN encourages the Commission to consult with independent experts with acknowledged credentials in spread spectrum communications technologies. Wi-LAN hereby waives its right to confidentiality in its Application and related materials under Section 0.457(d)(1)(ii) for this limited purpose, and will cooperate fully with any technical advisors the Commission names.

II. ARGUMENT

A. Procedural History

On February 17, 2000, Wi-LAN filed its Application for certification of the Device for unlicensed use under the Commission's direct sequence spread spectrum (DSSS) rules. Wi-LAN supplemented the Application at the Commission's request on April 18 and May 9. The Commission denied the Application by letter dated May 12, 2000 (Application Denial).

On May 26, Wi-LAN filed a timely Petition for Reconsideration of the denial. Following a meeting with OET staff at the Commission's laboratory in Columbia, Maryland on June 7, Wi-LAN filed a timely Supplement to its reconsideration petition on June 12, 2000. Wi-LAN

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[5] Moreover, public notice would necessarily entail disclosure of information in the Application that is presently protected from disclosure pursuant to Section 0.457(d)(1)(ii).

[6] "If the Commission grants the application for review in whole or in part, it may, in its decision: (i) Simultaneously reverse or modify the order from which review is sought . . . ." 47 C.F.R. Sec. 1.115(h)(1).

met again with OET personnel, this time in Washington, on July 10. OET subsequently denied the Petition for Reconsideration by letter dated August 18, 2000 (Reconsideration Denial).

Wi-LAN now seeks Commission review of OET's denial of the Petition for Reconsideration, and a prompt grant of the underlying Application.

B. Description of the Device

The Device transmits and receives data by radio at low power over distances that will support Wide Area Network solutions. It is intended for unlicensed use under Part 15 of the Commission's Rules. Typical applications will include wireless WAN, and wireless Internet access.

As described in the Application and supplemental filings, the Device places data on a radio carrier using a technique Wi-LAN calls "Wideband Orthogonal Frequency Division Multiplexing," or W-OFDM. This technique combines several attributes advantageous to the public. W-OFDM resists incoming interference as well as older spread spectrum methods, and it presents the same low level of interference to other users as does conventional spread spectrum. Yet, where currently authorized spread spectrum systems are limited to data speeds of about 11 megabits/second, W-OFDM can carry several times more data, without taking up any more radio spectrum.

Wi-LAN holds U.S. patents on W-OFDM.[7]

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[7] Wi-LAN holds two U.S. patents for W-OFDM as spread spectrum: No. 5,282,222, *Method and Apparatus for Multiple Access between Transceivers in Wireless Communication using OFDM Spread Spectrum*; and No. 5,555,268, *MultiCode Direct Sequence Spread Spectrum*. The second patent links to the first because W-OFDM is a special case of MC-DSSS, as described and shown in the patent documents.

C. OET's Grounds for Denial

To qualify for certification as a direct sequence spread spectrum system under Part 15 of the Commission's Rules, a device must satisfy two sets of requirements: the technical provisions of Section 15.247, and the definitions of "spread spectrum system" and "direct sequence system" in Section 2.1.

Section 15.247 limits power and antenna gain;[8] requires that transmitted energy be spread over a minimum bandwidth;[9] and specifies a "processing gain" test that demonstrates resistance to incoming interference.[10] OET does not allege noncompliance with any of these requirements.[11]

Rather, OET's grounds for denial turn on the definitions. Both the Application Denial and Reconsideration Denial cite similar grounds:

1. that the Device does not meet the Commission's definition of a spread spectrum system, in that it minimizes the occupied bandwidth necessary to send the information transmitted;[12]

2. that the Device fails to meet the Commission's definition of a direct sequence spread spectrum (DSSS) system because it does not use a high

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[8] 47 C.F.R. Sec. 15.247(b).

[9] 47 C.F.R. Sec. 15.247(a)(2).

[10] 47 C.F.R. Sec. 15.247(e).

[11] The Reconsideration Denial (at 2) emphasizes that compliance with the processing gain and other requirements of Section 15.247 does not in itself establish that the Device is a direct sequence spread spectrum system. Wi-LAN agrees. Wi-LAN claims only that a device qualifies for certification if it complies with Section 15.247 *and* satisfies the definitions.

[12] Application Denial; Reconsideration Denial at 1-2.

speed spreading code and an information data stream to modulate a single RF carrier;[13] and

3. that granting the Application would not be in the public interest, inasmuch as OET has denied other OFDM type systems on similar grounds.[14]

Wi-LAN will show that the characteristics and operation of the Device comply in full with the applicable definitions. OET does not dispute that the Device satisfies the technical rules. Accordingly, the Device satisfies all requirements for certification. Wi-LAN will further show that fundamental fairness requires the Commission to disregard the prior denials that OET cites in support of this one.

D. The W-OFDM System Qualifies for Certification.

1. The device satisfies the definition of a spread spectrum system.

The Reconsideration Denial says:

> We disagree with your conclusion that the W-OFDM transmitter is a DSSS system. After careful evaluation of the operational and technical characteristics of the W-OFDM transmitter, we conclude that the device is not a DSSS transmitter, and does not meet the definition of a spread spectrum system specified in Section 2.1 of the Rules. *A fundamental difference between a W-OFDM system and a DSSS system is that a spread spectrum system utilizes an occupied bandwidth much greater than the bandwidth necessary to transmit the information.* On the other hand, a W-OFDM system does the opposite, by minimizing the occupied bandwidth necessary to send the information transmitted.[15]

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[13] Reconsideration Denial at 2. The Application Denial also charged Wi-LAN with not using a classic correlator to collapse the spread waveform. Wi-LAN responded in its Petition for Reconsideration (at 8) that the Rules do not require use of a classic correlator. OET did not cite this ground in denying the Petition for Reconsideration.

[14] Reconsideration Denial at 2. *See also* Application Denial.

[15] Reconsideration Denial at 1-2 (emphasis added).

The Commission's definition of a spread spectrum system is this:

> A spread spectrum system is an information bearing communications system in which: (1) Information is conveyed by modulation of a carrier by some conventional means, (2) the bandwidth is deliberately widened by means of a spreading function over that which would be needed to transmit the information alone. (In some spread spectrum systems, a portion of the information being conveyed by the system may be contained in the spreading function.)[16]

OET does not allege noncompliance with clause (1) of the definition.[17] OET's objection rests entirely on clause (2). Specifically, OET faults the Device for (in OET's words) not occupying a bandwidth "much greater" than necessary. But the "much greater" language appears nowhere in the Rules. Instead, the Rules require only that the bandwidth of a spread spectrum systems be "deliberately widened" over that required to carry the information alone.

The Device does in fact deliberately widen the bandwidth over that otherwise necessary. The Device's data payload is 27.5 megabits/sec. Radio services that encourage spectrum efficiency commonly achieve 4 or 8 bits/second/Hertz, and advanced systems can do much better.[18] The Device in question initially modulates at 4 bits/second/Hertz, so its payload before spreading occupies 27.5/4 = 6.9 MHz. The actual transmitted signal occupies 25 MHz, which is

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[16] 47 C.F.R. Sec. 2.1.

[17] The Device satisfies the first clause by using 16-QAM (Quadrature Amplitude Modulation), a conventional modulation for conveying digital information on a radio carrier.

[18] The Commission's Rules require some services to meet specified degrees of spectrum efficiency as a condition of operation. For example, certain point-to-point fixed microwave services must achieve minimum efficiencies ranging up to 4.47 bits/second/Hertz. C.F.R. § 101.141(a)(3).

3.6 times as much bandwidth. This satisfies the "deliberately widened" requirement by any reasonable standard.[19]

OET's interpretation of the definition is also at odds with its administrative history. The notion of "spreading" in spread spectrum originally referred not to the spreading of information over bandwidth, but to spreading *energy* over bandwidth, so as to minimize the risk of interference to other users. The First Report and Order that initially authorized spread spectrum justified the relatively high output power of one watt in part by noting "the systems being authorized under these rules will be spreading this energy over a wide bandwidth."[20] Similarly, the Report and Order that next revised the rules explained that minimizing interference to other users "requires that the signal be spread uniformly over the transmission bandwidth."[21] The Rule provision on spreading of energy over bandwidth appears at Section 15.247(a)(2), (d), and OET does not question the Device's compliance.

In short, OET's criterion that the Device's occupied bandwidth be "much greater" than the necessary bandwidth has no foundation in the Rules. Just last year, the Commission considered

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[19] ***Technical note.*** The W-OFDM spreading transform function is applied after the 16-QAM conventional modulation. The bandwidth required for the baseband digital information alone, before spreading, is the 16-QAM symbol rate of 27.5 Mbps, divided by 4 bits/symbol or 6.875 Mbps. The bandwidth is then deliberately widened to 12.5 MHz by means of the spreading function, in conformance with the definition. The total occupied RF bandwidth is 22 MHz, due to direct sequence spreading. This represents an actual increase in bandwidth by a factor of approximately 3.6. This spreading contributes directly to the Device's processing gain.

[20] Spread Spectrum and Other Wideband Emissions, 101 F.C.C.2d 419, 427 (1985).

[21] Spread Spectrum Systems, 5 FCC Rcd 4123 4130 n.2 (1990).

imposing such a requirement, but rejected the idea.[22] OET cannot properly disqualify the Device on this ground.

Rather than define spread spectrum by setting an upper bound on spectrum efficiency, the Commission instead opted for the wiser course of specifying characteristics that give spread spectrum its unique ability to coexist with other users: energy distribution and processing gain. That regulatory strategy freed the industry to maximize benefits to the public, while maintaining the band-sharing advantages of spread spectrum transmission. Wi-LAN should not now be penalized for its success in furthering the public interest.

2. The device satisfies the definition of a direct sequence system.

OET raises a separate objection based on the definition of "direct sequence system":

> Another difference between your system and a DSSS system is seen in the way that their signals are generated. In the case of a DSSS system, a high speed spreading code and an information data stream are used to modulate a single RF carrier. A W-OFDM signal, on the other hand, is generated by separating a high speed serial data stream and sending these separate signals in parallel and concurrently on multiple sub-carriers. As can be seen, the device in question is not a DSSS transmitter. Because of this fact, its operation under Section 15.247 is prohibited . . . .[23]

The Commission's definition of a DSSS system is this:

> A spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high

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[22] The proposal would have prohibited direct sequence systems using fewer than [illegible] chips/symbol -- a way of limiting the useful information carried in a given bandwidth. Spread Spectrum Devices, 14 FCC Rcd 13046, 13050-51 at paras. 13-15 (1999) (Notice of Proposed Rule Making). The Commission proposed instead to require manufacturers using fewer than [illegible] chips/symbol to submit supplementary calculations on processing gain. *Id.* That proposal is still pending.

[23] Reconsideration Denial at 2.

> speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal.[24]

Again, the Device complies.

The first sentence of the definition requires two distinct modulation components: a high speed spreading code and an information data stream. A W-OFDM signal combines a payload information stream, in 16-QAM form, and a high speed spreading code characterized by the Inverse Fast Fourier Transform sequence. This transform sequence is closely analogous to the "chip" sequence used in conventional direct sequence systems, in that it spreads the information symbol stream over a wider bandwidth without adding to the transmitted information payload. Thus, the W-OFDM transform spreading function, combined with the information data, is used to modulate a single RF carrier. The transform spreading function creates multiple sub-carriers, which are spread across the band when modulated with the single RF carrier. This implementation completely satisfies the definition above.

W-OFDM also satisfies the second sentence of the definition. The spreading function necessarily dominates the RF signal because only the transform sequence function is spectrally visible in the transmitted signal. The 16-QAM component is undetectable until after de-spreading via the Fast Fourier Transform sequence function in the demodulator. The W-OFDM transform function is the direct cause of the wide spreading of the transmitted signal, inasmuch as that spreading must be off before the 16-QAM data information stream is apparent.

The Commission routinely certifies Complementary Code Keying (CCK) systems under this definition. Like W-OFDM, CCK uses transforms as spreading functions, rather than a

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[24] 47 C.F.R. Sec. 2.1.

traditional PN-code sequence. We cannot see a principled basis for accepting CCK under the definition while excluding W-OFDM

3. OET's references to precedents cannot be considered in this proceeding.

OET supports its denial of the reconsideration petition by referring to precedents:

> Contrary to your conclusion, we believe that prior denials of requests for other proposed OFDM type systems to be authorized under Section 15.247 are relevant to this proceeding. In the past, we have consistently interpreted that an OFDM type system is not a DSSS system, and therefore cannot be eligible for Certification under Section 15.247. The manufacturers that have proposed the authorization of OFDM type systems under Section 15.247 have been made aware of this fact, and have subsequently designed their systems to operate in other Sections of the Commission's Rules. Arbitrarily allowing an OFDM type system to be authorized under Section 15.247, in light of past precedent would not be in the public interest.[25]

OET's reliance on prior denials is troubling, because Wi-LAN is absolutely barred from ever challenging these precedents. A statutory exception to the Freedom of Information Act provides that agencies need not disclose "trade secrets and commercial or financial information obtained from a person and privileged or confidential."[26] The courts construe this provision to give agencies the discretion to determine whether to withhold the information from public disclosure.[27] The Commission has exercised this discretion by Rule to protect certification

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[25] Reconsideration Denial at 2.

[26] 5 U.S.C. Sec. 552(b)(4).

[27] Worthington Compressors, Inc. v. Costle, 662 F.2d 45, 54 (D.C. Cir. 1981).

applications from disclosure until they are granted.[28] If OET denies an application, however, it remains inaccessible to the public forever.

Wi-LAN is therefore unable even to examine the applications that OET refers to, much less challenge their relevance to this proceeding. Yet Wi-LAN has every cause to think such a challenge would be successful, if allowed. Wi-LAN's patents make it unlawful for anyone else to manufacture a product using similar modulation techniques. For that reason, the prior applications were very likely different in significant respects. Wi-LAN has no opportunity to confirm its well-founded belief that the precedents are inapplicable.

For OET to rest its decision in part on papers available to OET, but not to Wi-LAN, violates the most basic principles of fundamental fairness. The Commission cannot support its denial with earlier ones unless it spells out the technical parallels in detail -- but to do so would violate confidentiality obligations to other applicants. For that reason, the claimed precedents can play no part in this proceeding.

Finally, even a long string of precedents that were squarely on point could not justify an adverse decision here. Wi-LAN has demonstrated that its Device complies with all applicable Rules. That entitles the Device to certification, regardless of how OET may have ruled in the past.

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[28] 47 C.F.R. Sec. 0.457(d)(1)(ii).

E. **The Commission Must Follow Its Own Rules.**

The basic principles of administrative law require an agency to abide by the terms of its own rules. "It is a well-settled rule that an agency's failure to follow its own regulations is fatal to its deviant action."[29]

The rules governing this matter set out criteria for spread spectrum systems. A system is entitled to certification if it meets the definitional requirements of Sections 2.1, along with the energy distribution, processing gain, and other technical requirements of Section 15.247. The Commission must grant or deny applications in accordance with the language of those Rules. In light of the facts set out in the Application, the Rules require certification of the Device.

III. CONCLUSION

The hallmark of spread spectrum is its ability to avoid interfering with other users, and to resist incoming interference, while still achieving a useful range and throughput. The low threat of interference to others results from distributing the transmitted energy over a wide band of frequencies. This has nothing to do with data rates. Robustness against incoming interference is the quality measured by processing gain. In the past, perhaps, designers had to sacrifice throughput to achieve adequate processing gain, and that may have promoted a widespread assumption that spread spectrum systems are necessarily spectrum-inefficient. But the assumption is no longer valid. Wi-LAN engineers found a way to meet all of the requirements of the Commission's Rules while increasing throughput beyond the levels formerly considered achievable.

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[29] Way of Life Television Network, Inc. v. FCC, 593 F.2d 1356, 1359 (D.C. Cir. 1979); Union of Concerned Scientists v. Atomic Energy Comm'n, 499 F.2d 1069, 1082 (D.C. Cir. 1974).

In a time of pressing spectrum shortage, it is ironic for the Commission to reject an otherwise compliant product primarily because it uses spectrum efficiently. The Commission would, on contrary, applaud the development of technology that improves service to the public promotes competition, and uses spectrum well, all while maintaining full compliance with the Rules.

Request for Relief

Wi-LAN asks the Commission to find that OET's grounds for denial of Wi-LAN's application are not supported by the Rules. Wi-LAN further asks the Commission to find that the Device satisfies applicable requirements and qualifies for immediate certification.

Because further delay will multiply the economic harm to Wi-LAN, it asks the Commission to grant certification expeditiously, without public notice, and in advance of any written order.

Respectfully submitted,

Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0440
Counsel for Wi-LAN, Inc.

September 18, 2000

FEDERAL COMMUNICATIONS COMMISSION
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

May 12, 2000

Wi Lan Inc
300-801 Manning Road NE
Calgary, Alberta Canada T2E

Attention: Eric Godberson

Re: Application dated February 17, 2000 and received February 17, 2000
Equipment Class: DSS-Part 15 Spread Spectrum Transmitter
Applicant Name: Wi Lan Inc
FCC ID: K4BAP01

Gentlemen:

The application referenced above is hereby DENIED in accordance with Section 2.919 of the Commission's Rules.

After reviewing the technical description of the EUT, we disagree with your conclusion that it meets the definition of a Direct Sequence Spread Spectrum System (DSSS system), as specified in Section 2.1. It definitely does not meet the intent of the definition of a DSSS system. By nature, a DSSS emission utilizes an occupied bandwidth much greater than the bandwidth necessary to transmit the information. An OFDM type emission, on the other hand, does just the opposite, by minimizing the occupied bandwidth necessary to send the information transmitted.

In addition, processing gain, as it is specifically defined in Section 15.247(e), is the gain realized by the spreading/despreading function, after the received signal is filtered to the information bandwidth. Implied is a classic correlator used to collapse the spread waveform. The fact that an OFDM type system is capable of passing a CW jamming margin test does not make it a DSSS system.

This decision is consistent with the denial of other requests for OFDM type systems to be authorized under Section 15.247 as DSSS systems.

You are cautioned that importation and marketing of equipment in the United States bearing the referenced FCC identifier is prohibited by Section 2.803 of our rules. Violation of this regulation may subject you to penalties provided in Sections 501 and 502 of the Communications Act of 1934, as amended. If you have questions concerning this matter, please contact me at (301) 362-3024.

Sincerely,

Joe Dichoso

Joe Dichoso
Electronics Engineer
Equipment Authorization Branch

Federal Communications Commission
Washington, D.C. 20554

AUG 1 8 2000

In Reply Refer To:
1300F

Fletcher, Heald & Hildreth
11th Floor, 1300 North 17th Street
Arlington, Virginia 22209-3801

Attention: Mr. Mitchell Lazarus

Dear Mr. Lazarus:

This is in reference to your petition for reconsideration filed May 26, 2000 on behalf of Wi-LAN, Inc. (Wi-LAN), requesting reversal of the Office of Engineering and Technology's denial of Wi-LAN's application for Certification of a wideband orthogonal frequency division multiplexing (W-OFDM) transmitter applying under the provisions of Section 15.247 as a spread spectrum transmitter.

You state that the device complies in full with all of the applicable Rules. You indicate that the denial was not supported by the Rules, and therefore was arbitrary and capricious. In addition, you claim that the device appears to have been disqualified due to its higher-than-usual spectral efficiency. You also state that the device satisfies the definition of a spread spectrum transmitter, as indicated in your supplement to the petition filed June 12, 2000. You request that if a grant of Certification is not possible, a waiver to permit marketing of the device pending resolution of the proceeding should be granted promptly.

In support of reversing the denial and granting the application for Certification immediately, the petition for reconsideration also provides arguments that dispute the reasons for which the device was denied. First, you state that the device does in fact meet the criteria in the Commission's Rules for a direct sequence spread spectrum (DSSS) system and is penalized for its spectral efficiency. Secondly, you indicate that the processing gain exhibited by the device, regardless of the fact that it does not use a correlator, satisfies the Commission's requirements and therefore qualifies as a DSSS system eligible for Certification. Finally, you claim that prior denials of other applications for orthogonal frequency division multiplexing (OFDM) type systems are irrelevant to this proceeding and cannot properly bar the immediate grant of the application. You conclude that the Commission's grounds for denial of Wi-LAN's application are not supported by the Rules, and that the Commission should actively encourage the development of technology that improves service to the public, promotes competition, and uses spectrum efficiently.

We disagree with your conclusion that the W-OFDM transmitter is a DSSS system. After careful evaluation of the operational and technical characteristics of the W-OFDM transmitter, we conclude that the device is not a DSSS transmitter, and does not meet the definition of a spread spectrum system specified in Section 2.1 of the Rules. A fundamental difference between a

W-OFDM system and a DSSS system is that a spread spectrum system utilizes an occupied bandwidth much greater than the bandwidth necessary to transmit the information. On the other hand, a W-OFDM system does the opposite, by minimizing the occupied bandwidth necessary to send the information transmitted.

Another difference between your system and a DSSS system is seen in the way that their signals are generated. In the case of a DSSS system, a high speed spreading code and an information data stream are used to modulate a single RF carrier. A W-OFDM signal, on the other hand, is generated by separating a high speed serial data stream and sending these separate signals in parallel and concurrently on multiple sub-carriers. As can be seen, the device in question is not a DSSS transmitter. Because of this fact, its operation under Section 15.247 is prohibited, as Section 15.247(a) limits operation under the provisions of that Section to direct sequence and frequency hopping spread spectrum intentional radiators only. Therefore, the application was denied in accordance with Section 2.919.

Although the device may exhibit processing gain and may comply with the remainder of the requirements listed in Section 15.247, the capability to pass a CW jamming margin test or any other requirement does not change our conclusion that the W-OFDM transmitter is not a DSSS system. The CW jamming margin test is required to show that a DSSS system is capable of complying with the 10 dB processing gain requirement. It is not a test to determine whether or not the device is a DSSS system. We recognize that systems that utilize other modulation types may also pass the CW jamming margin test, as well as meet the other technical requirements of Section 15.247. However, it would not serve the public interest to begin authorizing such systems under Section 15.247 without going through the formal Rule Making process simply because these systems may exhibit qualities that are analogous to spread spectrum systems.

Contrary to your conclusion, we believe that prior denials of requests for other proposed OFDM type systems to be authorized under Section 15.247 are relevant to this proceeding. In the past, we have consistently interpreted that an OFDM type system is not a DSSS system, and therefore cannot be eligible for Certification under Section 15.247. The manufacturers that have proposed the authorization of OFDM type systems under Section 15.247 have been made aware of this fact, and have subsequently designed their systems to operate in other Sections of the Commission's Rules. Arbitrarily allowing an OFDM type system to be authorized under Section 15.247, in light of past precedent would not be in the public interest.

It is a well-established principle that the Commission will waive its rules only if it determines, after careful consideration of all pertinent factors, that such a grant would serve the public interest without undermining the policy which the rule in question is intended to serve. *See WAIT Radio v FCC*, 418 F.2d 1153, 1157 (D.C. Cir. 1969). In discussing the treatment of requests for waivers of established rules, the court in *WAIT Radio* emphasized that the agency's discretion in applying general rules is intimately linked to the existence of "a safety valve procedure" to permit consideration of an application for exemption based upon special circumstances. *Id.* Indeed, the court considered a rule most likely to be undercut if it does not take into account "considerations of hardship, equity, or more effective implementation of overall policy...." *Id.* at 1159.

We find that a grant of the waiver you request would undermine the policy which this Rule is intended to serve, which is to limit operations under Section 15.247 to spread spectrum systems in order to reduce potential interference to other radio services and devices. The waiver request is not supported by any analysis of the potential impact on other radio services and Part 15 devices that operate in the same spectrum used by the subject device. Further, we are not persuaded that any extenuating circumstances exist in this case that justify a waiver of the Rule.

Accordingly, the Petition for Reconsideration requesting reversal of the Office of Engineering and Technology's Denial of Wi-LAN's application for Certification IS HEREBY DENIED and your request for an immediate waiver to permit marketing of the device under Section 15.247 is also DENIED.

Although this denial prohibits authorization of a W-OFDM transmitter in Section 15.247 as a spread spectrum transmitter, we encourage you to consider authorization in other rule parts that do not restrict certain modulation types. For instance, Section 15.249 is a possible alternative for shorter range W-OFDM unlicensed transmitters. Section 15.407 in the Unlicensed National Information Infrastructure rules (UNII Bands) allows up to 1 Watt of output power, if you can design the transmitter to operate in the 5.725-5.825 GHz frequency band. For licensed operation on a variety of frequencies, the Broadband Personal Communication Service (PCS) in Part 24 Subpart E, the Private Land Mobile Radio Services under Part 90, and the Fixed Microwave Services in Part 101 are other possibilities within which a W-OFDM transmitter may be utilized. Wi-Lan may file a petition for rule making if it believes the existing rules are inadequate to accommodate its technology.

We hope this is responsive to your inquiry. If you have any additional questions about this matter please contact Mr. Richard Fabina, Chief, Equipment Authorization Branch at (301) 362-3021.

Sincerely,

Dale N. Hatfield

Dale N. Hatfield
Chief
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