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BY HAND DELIVERY

Magalie Salas, Esquire
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Re: ET Docket No. 98-156

Dear Ms. Salas:

Enclosed are the original and six copies of the Comments of Sierra Digital Communications, Inc. for filing in the above-referenced docket.

Kindly date-stamp and return the extra copy of this cover letter.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,



Mitchell Lazarus
Counsel for Sierra Digital Communications, Inc.

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Enclosures

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Before the
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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)	
)	
Amendment of Part 15 of the Commission's)	ET Docket No. 98-156
Rules to Allow Certification of Equipment)	RM-9189
in the 24.05-24.25 GHz Band at Field)	
Strengths up to 2500 mV/m)	

COMMENTS OF
SIERRA DIGITAL COMMUNICATIONS, INC.

Sierra Digital Communications, Inc. (Sierra) submits these Comments in response to the Notice in the above-captioned proceeding.¹

A. Adoption of the Proposed Rule Is in the Public Interest.

The Commission has proposed increasing the allowable field strength for unlicensed operation at 24.05-24.25 GHz to 2500 mV/m at 3 meters, provided that antenna gain is at least 33 dBi. For higher gain antennas, output power would have to be reduced to maintain a maximum field strength of 2500 mV/m.

The Commission's proposal will serve the public interest by reducing the cost and delay of initiating some short-range communications links, without causing appreciable interference to other services. In particular, the proposed rule will permit some facilities that presently must be licensed under Part 101 instead to be regulated under Part 15, and hence to avoid the spectrum

¹ Certification of Equipment in the 24.05-24.25 GHz Band, ET Docket No. 98-156, Notice of Proposed Rule Making, FCC 98-209 (released Sept. 1, 1998) (Notice). Sierra filed the Petition for Rule Making in RM-9189 that led to the Notice.

congestion, expenses, delays, frequency coordination, and other inefficiencies that attend the licensing process.

Compared with traditional licensing, the Part 15 regime offers clear benefits to both the public and the Commission. Because only the equipment is regulated, not the service itself, innovations can reach the marketplace quickly. Certification of a new device to offer a new service typically takes just a few weeks, in contrast with the minimum of a year or two for a rulemaking to authorize a new licensed service. Part 15 users can deploy facilities as fast as their needs arise, without having to wait weeks for frequency coordination and application processing. Moreover, the Commission is spared the burdens of granting and renewing licenses and adjudicating disputes among licensees. Part 15 equipment is often suitable for low-cost telecommunications delivery in rural areas, and is an especially attractive option where rough terrain impedes conventional wireline installation. All of these benefits come from the shared use of spectrum that is simultaneously available for higher-powered services.

The concept of permitting highly directional point-to-point operations under Part 15 is not a new one. Indeed, as the Commission notes, the amendment requested here is very similar in principle to a rule adopted last year in ET Docket No. 96-8.² That proceeding eliminated the limit on directional antenna gain for non-consumer, fixed, point-to-point spread spectrum operations in the 5725-5850 MHz band, providing for effectively unlimited EIRP.³ (In contrast, the change proposed here continues to limit EIRP, even for high antenna gains.) Docket No. 96-

² Spread Spectrum Transmitters, 12 FCC Rcd 7488 (1997).

³ 47 C.F.R. § 15.247(b)(3).

8 also greatly eased the restrictions on antenna gain in the 2400-2483.5 MHz band.⁴ The Report and Order explained:

The Commission recognizes the advantages of being able readily to establish radio links capable of transmission distances of 10 km, or greater, without the delays and costs associated with formal frequency coordination and licensing. The ability to establish quickly such transmission links could be critical in emergency situations. Directional antennas can significantly reduce the potential for harmful interference to other radio operations in cases where the location of the directional systems is coordinated and there is a low preponderance of mobile systems.⁵

Exactly the same considerations apply to point-to-point operations in the 24 GHz band. The proposed rule change will achieve the same public-interest benefits of increasing administrative efficiency and reducing unproductive costs and delays, without significantly increasing the potential for harmful interference to other users.

The Commission correctly notes that the proposed rule actually reduces the area over which harmful interference might occur, relative to omnidirectional operation at 250 mV/m under the present rules.⁶ The proposal thus satisfies the condition the Commission adopted in Docket No. 96-8, when it required fixed, point-to-point, spread spectrum transmitters in the

⁴ Id. See also Notice at ¶ 5. As discussed below, power in the 2400-2483.5 MHz band must be reduced by only 1 dB for each 3 dB by which the antenna gain exceed 6 dBi. In the 5725-5850 MHz band, increases in antenna gain do not incur any penalties in power.

⁵ Spread Spectrum Transmitters, 12 FCC Rcd at 7494-95, ¶ 11 (footnotes omitted).

⁶ Comparing directional operation at 2500 mv/m (proposed rule) and omnidirectional operation at 250 mv/m (present rule), the areas subject to harmful interference are equal if the directional beamwidth is 3.6 degrees. (This result is independent of the signal strength specified for the harmful-interference contour.) With a directional antenna gain of 33 dBi, as proposed here, the beamwidth is 3.5 degrees, and the area subject to harmful interference is smaller than it is under the present rule.

2400-2483.5 MHz band to reduce power by only 1 dB for each 3 dB that the antenna gain exceeds 6 dBi. The Commission reasoned, "This action will ensure that the area over which harmful interference can occur is equivalent to what would be caused by a spread spectrum system employing an omnidirectional antenna and operating at the [then] current maximum EIRP of 6 dBW."⁷ The proposed rule protects users sharing the band in exactly the same way, by containing the area over which they may be subject to harmful interference to an extent no greater than at present.

In short, the Commission should adopt its proposal for the same reasons that it changed the spread spectrum rules in ET Docket No. 96-8.

B. The Commission Should Expand its Proposal to Cover 24.000-24.250 GHz, If Necessary Excluding Only 24.048-24.049 GHz.

The Commission excluded 24.00-24.05 GHz from its proposal in order to protect low-power amateur operations on the proposed Phase 3D satellite.⁸ Exclusion of the entire sub-band is unnecessary, because the satellite will operate within the 1 MHz at 24.048-24.049 GHz.⁹ Moreover, as explained below, any interference from point-to-point operations even at these frequencies will be minimal as a practical matter because the satellite receiving antennas will likely be elevated to at least 10 degrees above the horizon, and most likely to at least 30 degrees. In any event, even disregarding these considerations, signals from the amateur satellite will not

⁷ Spread Spectrum Transmitters, 12 FCC Rcd at 7498, ¶ 17.

⁸ Notice at ¶ 11.

⁹ See <http://www.amsat-dl.org/p3dqrq.html>. This web site is maintained by AMSAT, the Amateur Radio Satellite Corporation.

encounter significantly increased interference relative to omnidirectional 250 mV/m operation under the present rules.

The 24 GHz transmitter on the Phase 3D satellite will operate at one watt, and only at the farthest portion of the orbit, which will be 30,000 miles (48,270 km) above ground.¹⁰ Based on information from AMSAT and Sierra's own expertise in microwave frequency communications, Sierra concludes that amateur receivers must be highly directional (beamwidth of 1 degree or less) to have any hope of picking up this signal reliably.¹¹ This reduces the likelihood of

¹⁰ 81 *QST* No. 1 at 29 (Jan. 1997) (orbit); 81 *QST* No. 5 at 30 (May 1997) (24 GHz power levels). The satellite's 24 GHz transmitter will operate only at the farthest part of its highly elliptical orbit to minimize Doppler effects. *Id.*

An amateur radio publication describes the 24 GHz operation in these terms:

In addition to Phase 3D's array of high-power transponders, there is an interesting experimental module designed and built by a group of Belgian amateurs. This is the K-band transponder generating a single watt of RF in the 24-GHz band. . . .

When you're this high in microwave territory, you're well beyond off-the-shelf, plug-and-play experience. For example, you won't find 24-GHz transverters at your favorite Amateur Radio dealer, but they are available if you're willing to shop around. . . .

The transponder is tentatively scheduled to be active during the highest portion of Phase 3D's orbit. Compare the vast distance with the low output power and you have a challenging situation. That's the point, though. The 24-GHz transponder functions much like a cape in the hand of a bullfighter, tempting us to action. Will we dare leave the cozy world of appliance operating and venture into — shudder — microwave homebrewing? *Id.*

The Phase 3D program has experienced "numerous setbacks over the years." 82 *QST* No. 11 at 80 (Nov. 1998). So far as Sierra can determine, no launch date has yet been scheduled.

¹¹ See http://www.amsat.org/amsat/sats/phase3d/K_TX.html#power.

interference to far below that represented by the current rule.¹² The proposed rule requires Part 15 transmitters to be highly directional, and point-to-point communications are invariably close to the horizontal plane. It follows that interference to an amateur satellite receiver can occur only if **all** of these conditions are met simultaneously:

- (1) the satellite is at the horizon,
- (2) the victim receiver lies within the transmitter beam — *i.e.*, within 1.8 degrees of the transmitter axis,
- (3) the axis of the victim receiver is oriented directly toward the transmitter, and
- (4) the receiver is in near proximity with the transmitter, with visible line-of-sight.

As a practical matter, this combination of occurrences is extremely remote. Sierra understands that the Phase 3D system is based on a receive antenna noise temperature of less than 50° K. This requires an antenna elevation of at least 30 degrees.¹³ If the receive antenna were horizontally aligned, so as to become even hypothetically susceptible to interference from point-to-point operations, the antenna noise temperature would go to 290° K, which would make operation impracticable.

Even disregarding antenna elevation, the four factors listed above make actual interference very unlikely. Reducing the odds even further is the fact that the Commission's proposal has no conceivable residential applications. Most amateur stations are located at

¹² Note, however, that even an amateur operator who attempts to receive the 24 GHz satellite signal with a nondirectional antenna will still fare no worse under Sierra's proposal than under the current rules, because of the reduced interference area.

¹³ M.I. Skolnik, Radar Handbook at 2-32 (McGraw Hill 1970).

residential sites. Indeed, if the Commission thinks it necessary, Sierra would support a rule provision that prohibits marketing to consumers and other residential users, limits operation to non-residential sites, and requires devices certified under the rule to be labeled to prohibit use at residential sites.¹⁴

Although the likelihood of interference is extremely remote, any that did occur would necessarily be short-lived. Phase 3D will be a low-earth-orbit satellite with an orbit of 18 hours relative to any fixed location on earth. If the receiving antenna has a reasonably high gain, any interference cannot last more than a few minutes. And of course the Part 15 transmitter would have to mitigate any harmful interference that it caused — by changing frequency, for example, or by ceasing operation if necessary.

In short, Sierra is confident that concerns about interference to signals from the Phase 3D satellite have no foundation in fact. But if the Commission's analysis yields a different result, it can eliminate any possibility of interference by barring point-to-point operations at 24.048-24.049 GHz, the only part of the band in which the satellite will operate.¹⁵ Nothing whatever is gained by closing the rest of the 24.00-24.05 GHz band to point-to-point operations.

¹⁴ The Commission has successfully applied similar distinctions between residential and non-residential applications in the Class A/Class B digital device marketing rules, and in the rules applicable to consumer and non-consumer ISM equipment.

¹⁵ Actual operations will be limited to the 750 kHz at 24,048.000-24,048.750 MHz. See <http://www.amsat-dl.org/p3dqrg.html>.

CONCLUSION

For the reasons given above, the Commission should adopt its proposed rule, and should extend the rule to cover 24.00-24.25 GHz, if necessary excluding 24.048-24.049 GHz.

Respectfully submitted,



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December 7, 1998

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Sierra Digital Communications, Inc.

CERTIFICATE OF SERVICE

I, Delphine I. Davis, a secretary in the law firm of Fletcher, Heald & Hildreth, P.L.C. do hereby certify that a true copy of the foregoing "Comments of Sierra Digital Communications, Inc." was sent this 7th day of December, 1998, by first-class United States mail, postage prepaid, to the following:

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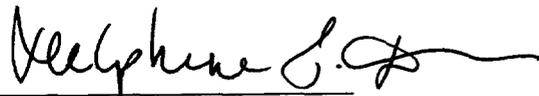
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