Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Unlicensed Operation in the Band 3650-3700 MHz	)	ET Docket No. 04-151
	)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	ET Docket No. 02-380
	)	
Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band	)	ET Docket No. 98-237

REPLY OF THE SATELLITE INDUSTRY ASSOCIATION

The Satellite Industry Association ("SIA") hereby replies to comments in response to the Notice of Proposed Rulemaking ("*NPRM*") in the above-captioned proceeding.[1] In its comments,[2] SIA noted that the *NPRM* proposal to permit unlicensed devices in the 3650-3700 MHz band, commonly known as the extended C-band, provides inadequate interference protection to licensed FSS operations in both the extended C-band and the adjacent conventional C-band (3700-4200 MHz).

The majority of commenters share SIA's concern that unlicensed operation in the extended C-band might not adequately protect co-frequency FSS operations as well as FSS operations above 3700 MHz. Indeed, the comments in this proceeding reveal broad opposition

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[1] *Unlicensed Operation in the Band 3650-3700 MHz, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, and Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band*, Notice of Proposed Rulemaking, 19 FCC Rcd 7545 (2004) (FCC 04-100) ("*NPRM*"), summarized at *Unlicensed Operation of the 3650-3700 Band*, 69 Fed. Reg. 26790 (May 14, 2004) (proposed rule).

[2] *Comments of Satellite Industry Association*, ET Docket Nos. 04-151, 02-380, 98-237 (filed July 28, 2004) ("*SIA Comments*").

from various industry sectors and the spectrum management community to any initiative to introduce unlicensed operations in the 3650-3700 MHz band. Moreover, none of the commenters effectively disputed SIA's demonstration that the outdated constraints and limitations on FSS licensees must immediately be repealed.

Amazingly, a few commenters suggested changes that would *increase* the likelihood that unlicensed devices in the extended C-band would interfere with FSS receivers. Indeed, one group would up-end the FCC's entire regulatory regime by unlawfully shifting the burden of interference avoidance from unlicensed device operators to primary FSS licensees.

Significantly, there has been no groundswell for unlicensed operations in the 3650-3700 MHz band from wireless Internet service providers ("WISPs") or other unlicensed users. Rather, a handful of scattershot commenters offered only qualified support for the Commission's original proposal; a few more suggested alternatives that simply seek to restrict existing licensed users. Considering the lack of any real support for unlicensed operations in the 3650-3700 MHz band, SIA urges the Commission to reject proposals for unlicensed use as contrary to the public interest and instead consider a licensing or registration approach that fully protects existing and future FSS operations.

I. THERE IS SCANT SUPPORT FOR UNLICENSED OPERATIONS IN THE 3650-3700 MHZ BAND

There is a general consensus among commenters that permitting unlicensed access to the extended C-band would not work. Part 15 unlicensed devices may not cause harmful interference or insist on protection from interference from licensed services,[3] and it is quite apparent that the types of devices the FCC envisioned in the *NPRM* are incompatible with this bedrock principle of Part 15. Indeed, the extensive mitigation techniques proposed to protect

[3] 47 C.F.R. §§ 15.5(b); 15.15(c) (2003).

FSS earth stations operating co-frequency and in the adjacent 3700-4200 MHz band, as well as the irreparably flawed suggestion that unlicensed devices might share the band on a "co-primary" basis with primary licensed services, reflects the fundamental incompatibility of the contemplated unlicensed services and primary FSS downlink operations. This incompatibility is exacerbated by proposed EIRP levels 25 times more powerful than those prescribed for the 2.4 GHz band in §15.247(b)(1). As a result, there is a wide consensus among interested parties who evaluated the technical issues that the risk of interference is overwhelming.

The American Petroleum Institute ("API") describes a licensed approach as "highly preferable."[4] Similarly, the Industrial Telecommunications Association ("ITA") endorses licensed over unlicensed use of the band.[5] Intel states "exclusive licensing can better promote quality of service and business certainty."[6] Motorola encourages the Commission to defer any unlicensed authorization until it exhausts the possibility of licensed uses for advanced wireless and fixed backhaul services in the band.[7] And Navini supports licensed use and asserts that an

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[4] *Comments of American Petroleum Institute*, ET Docket Nos. 04-151, 02-380, 98-237, at 4 (filed July 28, 2004) (recommending a site-by-site licensing approach for any spectrum in the 3650 MHz band to be made available for private, internal use by critical infrastructure companies) ("*API Comments*").

[5] *Comments of Industrial Telecommunications Association, Inc.*, ET Docket Nos. 04-151, 02-380, 98-237, at 2-3 (filed July 28, 2004) ("*ITA Comments*"). In particular, the ITA points out that many industry segments will eschew this band if it is allocated to unlicensed devices due to the uncertainty, instability, and quality of service issues associated with unlicensed operations in the band.

[6] *Comments of Intel Corporation*, ET Docket Nos. 04-151, 02-380, 98-237, at 1 (filed July 28, 2004) ("*Intel Comments*").

[7] *Comments of Motorola, Inc.*, ET Docket Nos. 04-151, 02-380, 98-237, at 2-4 (filed July 28, 2004) ("*Motorola Comments*"). Motorola contends that designating the band to unlicensed devices will not yield the desired benefits due to its limited bandwidth and propagation characteristics when compared to the existing unlicensed spectrum in the 2.4 and 5 GHz bands. Motorola also points out that the promise of higher power in the 3650-3700 MHz band might not be as positive as the Commission and some commenters initially concluded because multiple high power devices operating in close proximity would severely limit future use of the bandwidth, preventing deployment of unlicensed devices on a large scale.

unlicensed approach is not the best way to proceed.[8]

As SIA previously demonstrated, a site licensing or registration regime is crucial to successful coordination, accountability and protection of FSS receivers.[9] Comsearch concurs, and encourages registration of unlicensed devices to provide practical ongoing interference protection of licensed FSS receivers and to allow for expansion of FSS facilities.[10] Similarly, Comsearch, IEEE 802 and the Coalition of C-Band Constituents argue that the Commission would be required to mandate additional out-of-band protection for FSS receivers in the adjacent conventional C-band, including protection from front-end overload.[11] Thus, the record reflects that only licensing or registration has any hope of protecting primary FSS receivers.

Importantly, the comments reflect little or no enthusiasm from potential WISP providers or customers, thus evidencing the limited interest in this spectrum for unlicensed devices. For example, the single page comments of High Speed Internet of Wisconsin provide lukewarm support for the NPRM, at best. Neither it nor NYC Wireless supplies any technical analysis.[12] This further undermines the FCC's assumption that the extended C-band is appropriate for unlicensed devices. Given the stark contrast between the primacy of existing FSS operations and the minimal interest in unlicensed use of the band, there is no basis for the FCC to move forward

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[8] *Comments of Navini Networks, Inc.*, ET Docket Nos. 04-151, 02-380, 98-237, at 3 (filed July 28, 2004) ("*Navini Comments*").

[9] Letter from Carlos M. Nalda, Counsel for SIA, to Marlene H. Dortch, ET Docket No. 02-380 (Apr. 8, 2004), at 2.

[10] *Comsearch Comments*, ET Docket Nos. 04-151, 02-380, 98-237, at 8-9 (filed July 28, 2004).

[11] *See id.* at 10-11; *Comments of IEEE 802*, ET Docket Nos. 04-151, 02-380, 98-237, ¶ 23 (filed July 28, 2004) ("*Comments of IEEE 802*"); *see also Comments of the Coalition of C-Band Constituents*, ET Docket Nos. 04-151, 02-380, 98-237 (filed July 28, 2004).

[12] *Comments of NYC Wireless et. al*, ET Docket Nos. 04-151, 02-380, 98-237, at 19-22 (filed July 28, 2004) ("*NYC Wireless Comments*").

with any unlicensed operations in the extended C-band.

II. THE RECORD SHOWS THAT UNLICENSED DEVICES WOULD CAUSE UNACCEPTABLE INTERFERENCE TO LICENSED FSS RECEIVERS IN THE EXTENDED AND CONVENTIONAL C-BANDS

SIA demonstrated that unlicensed devices would interfere with sensitive FSS receivers throughout the C-band.[13] Indeed, SIA's comments warned that the installed base of conventional C-band FSS receivers is particularly susceptible to interference from unlicensed devices in the adjacent extended C-band.[14] Both Comsearch and IEEE 802 acknowledged this issue, and agreed that the FCC must ensure that any new transmitters in the band protect FSS receivers in the adjacent band from front-end overload.[15]

None of the comments undermine these conclusions. For example, NYC Wireless hypothesizes that the Commission's ongoing cognitive radio and interference temperature proceedings might obviate potential interference to FSS in the extended or conventional C-band.[16] But NYC Wireless' conclusory allegations ignore the disagreement over the viability and adequacy of both the cognitive radio and interference temperature proposals.[17] In any case,

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[13] SIA respectfully refers the Commission to the extensive technical analyses included with SIA's comments.

[14] *SIA Comments* at Exhibits 2 and 3.

[15] *Comments of IEEE 802*, ¶ 23; *Comsearch Comments* at 10-11.

[16] *NYC Wireless Comments* at 5.

[17] For example, numerous commenters in the cognitive radio proceeding expressed concern with the Commission's failure to adequately address out-of-band emissions from cognitive radio devices. *See Comments of National Academy of Sciences' Committee on Radio Frequencies*, ET Docket No. 03-108, at 14 (filed May 3, 2004); *Comments of Verizon Wireless*, ET Docket No. 03-108, at 6 & n.10 (filed May 3, 2004); *Comments of Cingular Wireless LLC and BellSouth Corporation*, ET Docket No. 03-108, at 23 (filed May 3, 2004); *Comments of the Cellular Telecommunications & Internet Association*, ET Docket No. 03-108, at 11 (filed May 3, 2004); *Comments of Ericsson Inc.*, ET Docket No. 03-108, at 4, 7, 20 (filed May 3, 2004); *Comments of Wireless Communications Association International Inc.*, ET Docket No. 03-108, at 4, 16-18 (filed May 3, 2004); *Comments of Sirius Satellite Radio Inc. and XM Radio Inc.*, ET Docket No.

such conjecture is premature without additional tests, analysis, experience and a final Commission order in the relevant dockets, followed by further investigation of how such techniques could be adapted in the extended C-band and adjacent bands.

Protecting existing licensees from out-of-band interference is a condition precedent to authorizing additional transmitters in nearby spectrum. For example, Part 27 clearly places the burden of protecting adjacent-band incumbent receivers on Wireless Communications Services ("WCS") operating at 2305-2320 MHz and 2345-2360 MHz.[18] Similarly, the FCC imposes strict out-of-band emission limits on various satellite services transmissions. Therefore, the SIA urges the Commission to afford incumbent FSS earth stations receivers operating in the 3700-4200 MHz band similar interference protection to that afforded terrestrial wireless licensed services.

III. EXCLUSION ZONES MUST BE CALCULATED AS PROPOSED BY SIA TO PROVIDE ADEQUATE PROTECTION TO FSS RECEIVERS

SIA's comments showed that authorizing unlicensed devices up to 25 Watts would require exclusion zones both far larger[19] and less directional[20] than suggested in the *NPRM*. Even considering interference from a single device, Comsearch agrees that the proposed exclusion zone outside the main beam is too small because it must take into account the full satellite arc and not just a 15-degree arc in a fixed direction.[21] However, rather than adopting

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03-108, at 5 (filed May 3, 2004). And despite its support for testing in the extended C-band, even NTIA cautions that the interference temperature-based limits "raise the issue of spectrum saturation and the possible interference problems that could arise if the noise level is permitted to increase across a frequency band." *Comments of The National Telecommunications and Information Administration*, ET Docket No. 03-237, at 65 (filed Aug. 13, 2004).

[18] *See* 47 C.F.R. §§ 27.53, 27.58 (2003).

[19] *SIA Comments* at Exh. 1.

[20] *SIA Comments* at 16-17 & Exh. 1.

[21] *Comsearch Comments* at 4-5.

worst-case assumptions in defining the necessary exclusion zone (which is typical in determining the protection to be afforded to incumbent operations, and essential where the new operations have inferior regulatory status), Comsearch suggests an irregular, complex-shaped exclusion zone based on "[a]ctual operating parameters, especially when considering earth curvature, terrain, and above terrain blockage."[22] Such an approach would force each device instantaneously and accurately to recognize factors difficult, if not impossible, to determine in practice. Comsearch neither justifies the added complexity nor demonstrates the real-world consequences of errors by multiple unlicensed devices.

IEEE 802 speculates that FSS protection zones can be significantly reduced, if not eliminated—conjecture entirely without technical support.[23] Yet, exclusion zones traditionally are used to protect primary and sensitive receivers from interference from unlicensed devices. IEEE 802 provides no data detailing how primary FSS receivers can be protected from harmful interference with smaller or no interference zones.

IEEE 802's ill-defined coordination scheme[24] will not adequately protect licensed, primary FSS receivers. In effect, IEEE 802 proposes to rely on unspecified "*proper link engineering for the fixed point to point mode of operation.*"[25] Neither satellite providers nor satellite customers benefit by trading fixed exclusion zones for vague promises to coordinate in the future. As a minimum, any practical coordination scheme must be predicated on agreement

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22 *Id.* at 6.

23 *IEEE 802 Comments,* ¶ 27.

24 "In response to the Commission's request for comments on FSS protection zones, we believe that, *with proper link engineering for the fixed point to point mode of operation that we propose*, the protection zones could likely be reduced considerably, if not eliminated, with proposed links located near FSS earth stations being engineered and coordinated on a case by case basis." *Id.*, ¶ 27 (citation omitted).

25 *IEEE 802 Comments,* ¶¶ 27-29.

on a trigger, a maximum power level, and confirmation that FSS is primary in any such coordination. IEEE 802's proposal contains no such "ground rules" and is thus an inadequate substitute for established exclusion zones.

Nor does the record support IEEE 802's attempt to "up the ante" to power levels even greater than the 25 W suggested in the *NPRM*. Increased power brings increased interference potential, which could not be accommodated without extending the potential kill radius of an unlicensed device even further. As a result, the unlicensed devices described in the *NPRM* cannot be authorized without thorough study of, and FSS protection from, out-of-band interference, including adoption of an "exclusion zone" mechanism to protect both co-frequency *and* adjacent-band earth station receivers.

IV. THE PROPOSED INTERFERENCE AVOIDANCE SCHEMES ARE UNSUPPORTED AND UNWORKABLE

The *NPRM* discussed a variety of experimental techniques the Commission supposed might reduce interference to FSS. SIA's comments suggested that combining listen-before-talk, GPS geolocation, and RF beacons to minimize their respective weaknesses might, in the future, offer a viable alternative.[26] However, each of the proposed interference avoidance schemes is unproven. Commenters were lukewarm and inconclusive—no particular technique has any substantial support. The record thus supports SIA's suggestion that any unlicensed devices be designed to employ each of the three mechanisms.

The special interest group coalition led by NYC Wireless proffers a plethora of impractical proposals better suited to a law review than to a lawful regulation. For example, NYC Wireless favors beacons but would shift their cost to *FSS licensees* because they received

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[26] *SIA Comments* at 25-26.

"free" access to spectrum.[27] This ignores the fact that unlicensed devices must operate on an unprotected, non-harmful interference basis, and thus are required to bear the burden of interference avoidance vis-à-vis licensed services under longstanding FCC rules,[28] not to mention the fact that unlicensed devices pay nothing for spectrum. The same group insists the First Amendment prohibits requiring unlicensed devices to transmit identification information.[29] This claim both misstates settled law[30] and overlooks the rationale for identification transmissions—to ensure unlicensed devices can meet their obligation to avoid interference.

V. CONCLUSION

For the reasons set forth above and in SIA's previous comments, unlicensed devices in the 3650-3700 MHz band would trigger harmful interference to co-and adjacent-frequency FSS receivers. Yet, unlicensed devices cannot interfere lawfully with licensed operations. The commenters largely oppose unlicensed use of the extended C-band, and the few outliers express only minimal interest in unlicensed operations and at most qualified support for the *NPRM* proposal. Therefore, SIA urges the Commission to review and rule on the long-pending reconsideration and stay motions and reject opening the extended C-band to unlicensed devices.

Should the Commission nevertheless approve unlicensed operation in the band, it should revise the exclusion zones as proposed by SIA and should reject the unsupported and unworkable

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[27] *NYC Wireless Comments* at 6-7. NYC Wireless also disregards the numerous carrier and end-user customers relying on FSS downlinks—whose service could be disrupted by the proposed unlicensed devices.

[28] *See* 47 C.F.R. §§ 15.5(b), 15.15(c) (2003); *SIA Comments* at 24.

[29] *NYC Wireless Comments* at 19-22.

[30] *United States v. O'Brien*, 391 U.S. 367, 377 (1968) ("a government regulation is sufficiently justified if it is within the constitutional power of the Government; if it furthers an important or substantial governmental interest; if the governmental interest is unrelated to the suppression of free expression; and if the incidental restriction on alleged First Amendment freedoms is no greater than is essential to the furtherance of that interest.").

suggestions of NYC Wireless and IEEE 802. It should further define exclusion zones applicable to earth stations operating in the band 3700-4200 MHz in order to prevent front-end overload of FSS receivers. Furthermore, the Commission must adopt rules that give full effect to the intentional regulatory differentiation between primary status of one service (primary FSS services) and the unlicensed status of another, Part 15 operations; unlicensed devices should be permitted to operate only on an unprotected, non-harmful interference basis vis-à-vis existing and future licensed services. SIA believes that additional study is required to define any possible workable regulatory procedures and operational requirements. Moreover, regardless of its decision on sharing in the band, the existing constraints and operational limitations on FSS licensees embodied in footnote US245 and Section 25.202(g)(1) are outdated and should be repealed immediately—not extended or morphed to favor unlicensed devices that bear the regulatory burden to avoid interference.

Respectfully submitted,

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