

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Wireless Operations in the 3650-3700 MHz Band)	ET Docket No. 04-151
)	
Rules for Wireless Broadband Services in the 3650-3700 MHz Band)	WT Docket No. 05-96
)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3GHz 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 TO OPPOSITIONS TO
PETITION FOR PARTIAL RECONSIDERATION**

The Satellite Industry Association (“SIA”), pursuant to Section 1.429 of the Commission’s rules, 47 C.F.R. § 1.429, hereby respectfully submits this consolidated Reply to Oppositions to its Petition for Partial Reconsideration in the above-captioned proceeding.¹ The Oppositions to SIA’s Petition² submitted in this proceeding ignore the basic and undeniable fact that the large power differential between immediately adjacent services authorized in the *Order* is a recipe for disaster, particularly considering the

¹ *In the Matter of Wireless Operations in the 3650-3700 MHz Band, Rules for Wireless Broadband Services in the 3650-3700 MHz Band, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3GHz Band, Amendment of the Commission’s Rules With Regard to the 3650-3700 MHz Government Transfer Band, Report and Order and Memorandum Opinion and Order*, 20 FCC Rcd 6502 (2005) (“*Order*”).

² Petition For Partial Reconsideration of the Satellite Industry Association, ET Docket No. 04-151, WT Docket No. 05-96, ET Docket No. 02-380, ET Docket No. 98-237 (filed June 10, 2005) (“SIA Petition”).

unique sensitivity and critical importance of affected satellite operations and the novel characteristics of new operations in the 3650-3700 MHz band. Furthermore, the opponents of SIA's Petition have not demonstrated that the *Order* addresses the very real problem of LNB saturation.

I. THE COMMISSION SHOULD HEED THE OVERWHELMING CALL FOR EXCLUSIVE LICENSING IN THE 3650-3700 MHZ BAND IN ADDITION TO TIGHTENING THE OOB EMISSIONS LIMIT

In their Oppositions to SIA's Petition, both the Wireless Communications Association International and Verizon argue that SIA's concerns over OOB emissions are negated by other petitioners' requests that the Commission impose an exclusive licensing regime in the 3650-3700 MHz band.³ Verizon goes so far as to state that SIA's concern over OOB interference "is moot if the Commission grants the petition of the majority of Petitioners to replace its 'light licensing' approach with one that relies primarily on 'exclusive use' licensing."⁴ WCAI and Verizon are incorrect.

As SIA explained in its Opposition,⁵ the petitions filed in this docket overwhelmingly demonstrate that the *Order's* "quasi-licensing" scheme will actually *discourage* investment in the 3650-3700 MHz band by potential service providers. Thus, SIA agrees with the majority of petitioners that the Commission should adopt "exclusive

³ The Wireless Communications Association International, Inc., Consolidated Opposition and Comments To Petitions For Reconsideration, ET Docket No. 04-151, WT Docket No. 05-96, ET Docket No. 02-380, ET Docket No. 98-237, at 19 (filed August 11, 2005) ("WCAI Opposition"); Comments of Verizon On Petitions For Reconsideration, ET Docket No. 04-151, WT Docket No. 05-96, ET Docket No. 02-380, ET Docket No. 98-237, at 7 (filed August 11, 2005) ("Verizon Opposition").

⁴ Verizon Opposition at 7.

⁵ Opposition to Petitions for Reconsideration and Comments of the Satellite Industry Association, ET Docket No. 04-151, WT Docket No. 05-96, ET Docket No. 02-380, ET Docket No. 98-237, at 19 (filed August 11, 2005) ("SIA Opposition").

use” licensing for WISP operations. However, SIA’s recognition of the desirability of exclusive licensing in the 3650-3700 MHz band does not negate the very real problem of OOB emissions resulting from WISP and other operations in that band. While the imposition of an exclusive licensing regime potentially might allow for an OOB emission limit somewhat less stringent than -71.25 dBW/MHz, the -43 dBW/MHz limit adopted in the *Order* is plainly inappropriate.⁶

With the proliferation of HDTV, high-order modulation techniques (*e.g.*, 8PSK, 16QAM) are becoming necessary to meet the ever-increasing demand for bandwidth. As SIA demonstrated in its Petition,⁷ the minimum Carrier/Interference (“C/I”) ratio for a typical 8PSK (FEC 5/6) satellite carrier should be at least 22 dB under all circumstances; because the link margin for FSS earth station signals using high order modulation schemes is quite limited, the introduction of adjacent-band high-powered sources of interference would sometimes render FSS earth stations unable to achieve the C/I levels necessary for reliable operations.⁸ The imposition of an exclusive licensing regime in the 3650-3700 MHz band may help to address this problem, but it will not solve the

⁶ Motorola’s argument that SIA’s OOB interference concerns should be ignored because the Commission has already dealt with them misses the mark. SIA asks for reconsideration of the Commission’s decision based on the arguments in SIA’s Petition. If prior consideration of an issue were grounds to deny a petition for reconsideration, then the purpose of 47 U.S.C. § 405 and 47 C.F.R. § 1.429 would be negated.

⁷ SIA Petition at 8-9 and Attachments A and B.

⁸ Contrary to WCAI’s spurious assertion, SIA has submitted evidence in this proceeding—including technical Attachments to its Petition—demonstrating this very point. Additional support for SIA’s position can be found in the letter filed by HBO and Fox, who state unequivocally that the OOB emissions levels specified in the *Order* will “undermine the ability to provide reliable services to the consumers.” Fox Networks and Home Box Office Inc., Letter in Support of SIA Petition, ET Docket No. 04-151, WT Docket No. 05-96, ET Docket No. 02-380, ET Docket No. 98-237, at 2 (filed August 11, 2005) (“Fox/HBO Letter”).

fundamental underlying issue—that the large power differential between immediately adjacent services authorized in the *Order* creates a potentially disastrous situation given the unique sensitivity and critical importance of affected satellite operations and the novel characteristics of new users in the band.

In the *Order*, the Commission specified a formula for OOB emissions suppression of $43 + 10 \log(P)$ dB per MHz, where P is the transmit power of the device expressed in watts. In its Petition for Partial Reconsideration, SIA showed that this OOB emissions level is inadequate and would have a severe negative impact on the FSS earth stations it ostensibly was designed to protect. SIA suggested as an alternative that the OOB emissions level be attenuated in such a way as not to exceed -71.25 dBW/MHz, which is equivalent to the limit applicable to unlicensed devices under Part 15 of the rules, and which the Commission itself proposed in the Notice of Proposed Rulemaking in this proceeding when it was considering authorizing terrestrial wireless devices in the 3650-3700 MHz band on a fully unlicensed basis.⁹ Because the authorization regime that the Commission has adopted in many respects resembles an unlicensed regime, a lower OOB emissions limit remains appropriate.

In order to further substantiate its position, SIA is attaching hereto sample C/I calculations for a typical 8PSK carrier.¹⁰ The calculations clearly show the sensitivity of higher-order modulation schemes such as 8PSK to the introduction of additional noise.

The calculations demonstrate that the 22 dB C/I level is the minimum C/I level at which

⁹ *In the Matter of Wireless Operations in the 3650-3700 MHz Band, Rules for Wireless Broadband Services in the 3650-3700 MHz Band, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3GHz Band, Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band, Notice of Proposed Rulemaking*, 19 FCC Rcd 7545, 7565 ¶ 59 (2004) (“*NPRM*”).

¹⁰ See Annex 1.

sensitive carriers can continue to operate reliably. While SIA has shown that the OOB emissions levels specified in the *Order* carry with them unacceptable risks, SIA's opponents have provided no technical analysis whatsoever to support their claims.

II. THE COMMISSION MUST PROTECT FSS EARTH STATIONS FROM HARMFUL LNB SATURATION

The Comments and Petition submitted by SIA in this proceeding raised serious concerns about how even a single WISP device of the type approved in the *Order* could cause the LNB of a C-band earth station to be driven into saturation.¹¹ The *Order*, however, does not address SIA's LNB saturation evidence – or the issue of LNB saturation – at all.

A. LNB Saturation Is a Significant Problem

As discussed in SIA's Petition for Reconsideration, LNB saturation is an issue that is of vital importance to the satellite industry that must be addressed by the Commission.¹² To put things in perspective, the Power Flux Density ("PFD") of C-band satellite signal at a C-band FSS earth station is around -122 dBW/m^2 , while the PFD of 25 watt device at 500 meters is around -51 dBW/m^2 . Therefore, there is more than 70 dB of disparity between the PFD of a satellite signal and the PFD of a 3650-3700 MHz terrestrial device. Put another way, the signal produced by one of these terrestrial devices at a distance of 500 meters will be 10 million times stronger than a fully saturated, full-transponder satellite signal. No band pass filter can reject a signal from an immediately adjacent band that is 10 million times stronger than the desired signal without adversely affecting performance.

¹¹ SIA Petition at 13-14; Comments of Satellite Industry Association, ET Docket No. 04-151, at 20 and Exhibit 3 (filed July 28, 2004) ("SIA Comments").

¹² SIA Petition at 13-14.

To illustrate this principle, Annex 2 shows a typical frequency response for a C-band LNB, and a typical frequency response for a band-pass filter that is available for use with earth stations. The figures clearly show that LNBs, by design, do not exhibit any filtering around the 3700-4200 MHz band. Band-pass filters, on the other hand, show no attenuation at 3700 MHz, 6 dB of attenuation at 3680 MHz, and only 26 dB attenuation at 3650 MHz. Annex 2 shows that band-pass filters will not be able to combat the disparity in power levels between the desired satellite signals and the interfering signals emanating from terrestrial devices. Even if band pass filters could resolve the LNB overload issue, and they cannot, requiring FSS earth station licensees to retrofit their large installed base of C-band antennas would be expensive in the extreme and would run counter to the principle that redressing interference is the responsibility of the newcomer, not the incumbent. The Commission has yet to grapple with the power level incompatibility issues presented by its allocation and service rules for the 3650-3700 MHz band. These rules, if left unchanged, could expose satellite networks to crippling interference in a prime FSS band.

B. The Commission Must Address the LNB Saturation Issue

In the *Order*, the Commission failed entirely to address the LNB saturation issue raised by SIA in this proceeding. WCAI suggests that the Commission’s failure is of no importance, claiming that FSS earth station sensitivity “should not govern regulatory decisions” regarding WISP operators’ ability to transmit at high power levels and thus potentially cause harmful interference to adjacent services.¹³ WCAI erroneously cites to the Commission’s 2000 *First Report and Order* in Docket 98-237 (which includes the

¹³ WCAI Opposition at 19.

current proceeding) for the insupportable proposition that the Commission has already “rejected calls to impose intrusive regulation and concluded that ‘the signal rejection capability of FSS earth stations would be based upon receivers filtering capabilities,’”¹⁴ and asserts based on this argument that FSS operators should bear the entire risk of LNB saturation—in essence, WCAI claims that “it’s their problem, not ours.” WCAI’s argument is legally and factually incorrect, and asks the Commission to reverse its longstanding practice in instances of cross-service interference of “requiring the newest station to implement the technical solutions necessary to eliminate the interference.”¹⁵

The referenced section of the Commission’s *2000 R&O* does not support WCAI’s argument at all. Paragraph 113 of the *2000 R&O*, cited by WCAI, simply recounts the Commission’s concern as stated in its Further Notice of Proposed Rulemaking that newly authorized base stations in the terrestrial fixed service might cause a greater degree of adjacent band interference to C-band Very Small Aperture Terminals (known as “CSATs”) in the FSS band, as opposed to larger-sized receive units. The Commission had therefore asked whether CSATs should be prohibited in the lowest portion of the 3700-4200 MHz band. In response to unanimous and uncontroversial comments, the *2000 R&O* did not prohibit CSATs in the lower part of the 3700-4200 MHz band because the size of a receive station has no correlation with its ability to reject adjacent band interference—the Commission found that LNBS do the filtering and that an LNB’s

¹⁴ *Id.* (citing *Amendment of the Commission’s Rules With Regard to the 3650-3700 MHz Transfer Band, First Report and Order and Second Further Notice of Proposed Rulemaking*, 15 FCC Rcd 20488, 20532-33 (2000) (“*2000 R&O*”)).

¹⁵ *In the Matter of Resolution of Interference Between UHF Channels 14 and 69 and Adjacent-channel Land Mobile Operations, Report and Order*, 6 FCC Rcd 5148, 5149 (1991).

filtering capability is unrelated to the size of the receive unit itself.¹⁶ This finding in no way supports WCAI's argument, which is essentially that "LNBS are responsible for rejecting cross-system interference and if they can't handle the job -- too bad."

What the 2000 R&O in this docket *did* determine was that "[g]iven the challenging spectrum sharing environment involving the relatively weaker satellite receive signals, we remain concerned about mobile station (*i.e.* roving handset) operations in the 3650-3700 MHz band."¹⁷ For the same reasons presented by SIA in its Petition—the unique sensitivity of FSS receive earth stations and the inability to coordinate use with mobile transmitters—the Commission in 2000 declined to authorize mobile uses in the 3650-3700 MHz band.¹⁸ It is hornbook law that "[a]n agency's view of what is in the public interest may change, either with or without a change in circumstances. But an agency changing its course must supply a reasoned analysis."¹⁹ The *Order* fails to provide a reasoned analysis of how the public interest is now served by the introduction of uncontrollable mobile devices into the 3650-3700 MHz band when it found to the contrary just five years ago. The precedent relied upon by WCAI therefore counsels *in favor of*, rather than against, reconsideration of the issue of LNB saturation.

The coalition of Champaign Urbana Community Wireless Network *et al.* similarly misses the point when it asserts that the protection zone coordination requirement established in the *Order* provides adequate protection against LNB

¹⁶ 2000 R&O at ¶ 113.

¹⁷ *Id.* at ¶ 16.

¹⁸ *Id.* at ¶¶ 15-17.

¹⁹ *Motor Vehicle Manufacturers Association of the United States v. State Farm Mutual Automobile Insurance*, 463 U.S. 29, 57 (1983) (citing *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 852 (1970) (footnote omitted), cert. denied, 403 U.S. 923 (1971)).

saturation.²⁰ The protection zone coordination requirement established in the *Order* applies only to grandfathered extended C-band FSS earth stations in the 3650-3700 MHz band—not to FSS earth stations in the 3700-4200 MHz conventional C-band. The *Order* does not provide protection zones around C-band FSS earth stations at all, much less coordination by WISP operators.

III. CONCLUSION

For the reasons stated in its Petition, Opposition and herein, SIA urges the Commission to modify the *Order* on reconsideration in a manner consistent with SIA's submissions.

Respectively submitted,

SATELLITE INDUSTRY ASSOCIATION



David Cavossa, Executive Director
1730 M Street, NW
Suite 600
Washington, DC 20036

August 22, 2005

²⁰ Oppositions of Champaign Urbana Community Wireless Network, New America Foundation, Educause, Tribal Digital Village, and Free Press, ET Docket No. 04-151, ET Docket No. 02-380, ET Docket No. 98-237, at 4 (filed August 11, 2005). The coalition of Champaign Urbana Community Wireless Network *et al.* also claims that earth stations operating in the 3700-4200 MHz band “should coordinate operations with terrestrial operators in the 3650 MHz band.” *Id.* at 4. As a general matter, however, the Commission does not require coordination between users of *adjacent* bands.

CERTIFICATE OF SERVICE

I, David Cavossa, hereby certify that on this twenty-second day of August, 2005, I caused a copy of the foregoing Reply to be filed with the Secretary via ECFS and served via first-class mail upon the following:

Steve B. Sharkey
Director, Spectrum and Standards Strategy
Motorola, Inc.
1350 I St., NW
Washington, DC 20005

Paul J. Sinderbrand
Wilkinson Barker Knauer, LLP
2300 N St., NW, Suite 700
Washington, DC 20037
Counsel for the Wireless Communications
Association International, Inc.

Harold Feld
Media Access Project
1625 K St., NW, Suite 1000
Washington, DC 20006

Leslie V. Owsley
Verizon
1515 North Court House Road
Suite 500
Arlington, VA 22201



Annex 1

Typical Carrier-to-Interference Calculations for an 8PSK R5/6 Fully-Saturated Carrier

Uplink C/N	24	dB
Downlink C/N ¹	21	dB
Uplink X-pol	24	dB
Downlink X-pol	24	dB
Uplink C/I from Adjacent Satellite #1 ²	25	dB
Downlink C/I from Adjacent Satellite #1 ³	21	dB
Uplink C/I from Adjacent Satellite #2 ²	25	dB
Downlink C/I from Adjacent Satellite #2 ³	21	dB
Suggested C/I level for 3650-3700 MHz Devices	22	dB
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Total C/N	13.2	dB
Required C/N (8PSK, FEC 5/6)	13.0	dB
Margin	0.2	dB

¹ Assuming a satellite downlink e.i.r.p. of 39 dBW and a 4.5 m receive antenna

² Assuming that satellites are spaced at 2°

³ Assuming a 4.5 m receive antenna and an adjacent satellite e.i.r.p. of 39 dBW

Annex 2

Typical Frequency Responses of C-band LNBS and C-band Band-pass Filters

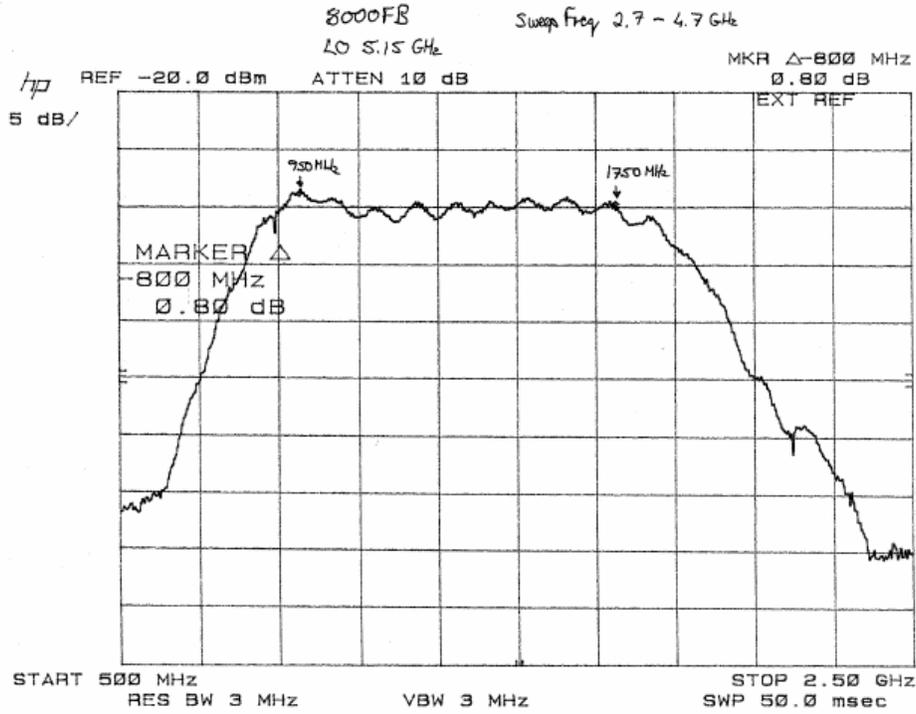


Figure (1) Typical Frequency Response of C-band LNB

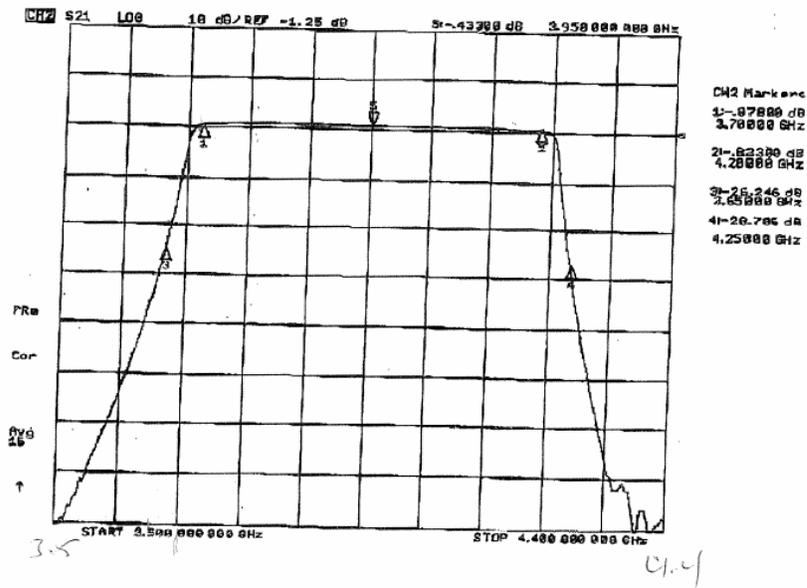


Figure (2) Typical Frequency Response of C-band Band-pass Filter