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

In the Matter of	)	
	)	
Spectrum for Broadband	)	GN Docket Nos. 09-47, 09-51, 09-137
	)	
NBP Public Notice #6	)	

COMMENTS OF THE SATELLITE INDUSTRY ASSOCIATION

On September 23, 2009, the Commission released a Public Notice seeking comment on the sufficiency of current spectrum allocations in spectrum bands for broadband purposes.[1] The Satellite Industry Association ("SIA")[2] supports the Commission's efforts to review current spectrum allocations and to determine whether additional spectrum is available for wireless broadband. SIA files these comments to urge the Commission to protect extensively utilized satellite spectrum, both above and below 3.7 GHz.[3]

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[1] Comment Sought on Spectrum for Broadband, NBP Public Notice #6, GN Docket Nos. 09-47, 09-51, 09-137, DA 09-2100 (Sept. 23, 2009) (Public Notice).

[2] SIA is a U.S.-based trade association providing worldwide representation of the leading satellite operators, service providers, manufacturers, launch service providers, remote sensing operators, and ground equipment suppliers. SIA Executive Members include: Artel Inc.; The Boeing Company; CapRock Government Solutions; The DIRECTV Group; Hughes Network Systems, LLC; DBSD North America, Inc.; Integral Systems, Inc.; Intelsat, Ltd.; Iridium Satellite, LLC; Lockheed Martin Corp.; Loral Space & Communications Inc.; Northrop Grumman Corporation; Rockwell Collins; SES World Skies, Inc.; SkyTerra Communications Inc.; and TerreStar Networks, Inc. Associate Members include: ATK Inc.; Comtech EF Data Corp.; DRS Technologies, Inc.; EchoStar Satellite, LLC; EMC, Inc.; Eutelsat Inc.; iDirect Government Technologies; Inmarsat Inc.; Marshall Communications Corp.; Panasonic Avionics Corporation; Spacecom Ltd.; Stratos Global Corp; SWE-DISH Space Corp; Telesat; ViaSat Inc.; and WildBlue Communications, Inc. Additional information about SIA can be found at http://www.sia.org.

[3] The Commission's inquiry includes, but is not limited to, the prime bands below 3.7

As explained below, satellite spectrum is used heavily for a variety of broadband, public safety, voice, data, and video services. Attempting to introduce new, separately operated terrestrial services in this spectrum will cause harmful interference to critical satellite operations and disrupt service for satellite customers. Indeed, satellite operators have already expressed concern about terrestrial use of spectrum adjacent to the 3.7 GHz band causing out-of-band interference and provided supporting technical documentation.[4] Overall, a stable, interference-protected spectrum environment for satellite services is essential if satellites are to continue providing the important public safety, voice, data, and video services they provide today, and if the full potential of satellites as a platform to deliver broadband services to even the most remote populations is to be realized.

I. SATELLITES ARE AN ESSENTIAL PART OF THE NATION'S COMMUNICATIONS INFRASTRUCTURE.

A. Satellites Provide a Wide Range of Communications Services, Including Broadband and Public Safety.

Satellites play a critical and growing role in providing affordable broadband access to all Americans. As of the end of 2008, approximately 842,000 U.S. consumers relied on satellite-delivered broadband.[5] The number of satellite broadband subscribers today is estimated to be over 1 million, many of which are located in the most remote areas of the United States. Satellites, which currently deliver broadband at speeds ranging from 200 kbps to 5 mbps for

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(Continued . . .)
GHz. Public Notice at 1.

[4] *See, e.g., 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 3-5 (filed Aug. 11, 2005).

[5] SIA, State of the Satellite Industry Report 2009, at 19 (June 2009), *available at* http://www.sia.org/news_events/2009_State_of_Satellite_Industry_Report.pdf. ("*2009 State of the Satellite Industry Report*").

fixed offerings, and from 200 kbps to 500 kbps for mobile offerings, will soon be able to deliver even faster service using next-generation satellites.[6] Moreover, the cost of using satellite platforms to serve remote populations is dramatically less than the cost of building terrestrial networks to reach the same populations. Unlike other technologies, the economics of satellite broadband are independent of population density – costs do not increase with the remoteness of the user. This cost advantage of satellite technology also makes it suitable for providing "middle-mile" or backhaul Internet connectivity to local ISPs and community institutions in remote locations.

In addition, satellite services are vital for U.S. public safety and homeland security.[7] Satellites are used for critical public safety services on a day-to-day basis by federal, state, and local governments, public safety agencies and commercial entities.[8] The United States military relies on satellite communications for its worldwide operations. In times when disaster recovery is needed, satellites are often the only means to establish communication links. For example, fixed and mobile satellite service providers played a key role in providing capacity and critical network restoration services following Hurricanes Katrina and Rita that devastated terrestrial communication facilities in the U.S. Gulf Coast in 2005.[9] Satellites have also been used

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[6] Satellite Industry Association, *Satellites: Broadband Access for All Americans* at 3 (Nov. 2008), available at http://www.sia.org/whitepapers/BroadbandPaperFINAL.pdf.

[7] Additionally, satellite providers such as Intelsat, SES, Inmarsat, and Iridium operate global satellite fleets that bring these essential and reliable services to international customers.

[8] Satellite Industry Association, *First Responder's Guide to Satellite Communications*, available at http://www.sia.org/frg_files/FirstResponder%27sGuidetoSatelliteCommunications.pdf.

[9] *See Report and Recommendations of the Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks*, EB Docket No. 06-119 at 10 (June 12, 2006) ("[s]atellite networks appeared to be the communications service least disrupted by Hurricane Katrina").

extensively to meet international emergency and interoperable communications needs.[10]

Beyond the critical public safety services provided by satellite networks, broadcasters and media companies rely heavily on satellite communications, especially the C-band, to deliver video news, sports, and entertainment programming to broadcast locations and cable head-ends that serve millions of households. Satellite communications technology is also used for critical aviation and maritime communications, Internet trunking, data communication, and voice telephony.

B. Satellite Networks are Reliable, Extensively Used, and Efficient.

One of the key reasons for the use of satellite communications and growth of satellite networks is the fact that satellite communications are spectrum efficient and offer high levels of reliability, even approaching 100% in some cases. Customers, and in particular, C-band customers such as cable companies and programmers, demand this high level of reliability because their end-users – *e.g.*, the viewers – expect it and thus their businesses depend on it.

Existing satellite spectrum allocations are extensively utilized in the United States. For example, fixed satellite services are primarily offered in the C-band and Ku-band, and increasingly in the Ka-band.[11] Today there are tens of thousands of earth stations and billions of dollars invested in dozens of operational space station assets operating in these bands. Indeed, the Ka-band is only just coming into its own as a platform for consumer broadband services. Today, the technology serves over one million residential households, many of which are located in the most remote regions of the United States, and there is room in the orbit for additional

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[10] For example, satellites were used to provide emergency communication services in the Philippines, Indonesia and the Samoa Islands in just the last few weeks, as well as in Peru following the earthquake of 2007, in Taiwan after earthquakes severed submarine cable connections in 2006, and in Thailand after the devastating tsunami of 2004.

[11] 47 C.F.R. § 2.106.

systems that should accommodate significant increases in capacity and throughput. Companies have invested (and are investing) billions of dollars in developing the technology and launching the satellites to utilize this spectrum. Mobile Satellite Services ("MSS"), such as positioning determination, asset tracking, global mobile voice and data, meter reading and store and forward services, are typically offered in the L-band and S-band. These MSS operators serve hundreds of thousands of customers, often in remote areas, and provide many critical public safety services. Similarly, next-generation MSS satellites will make innovative public safety, voice, data, and mobile video applications available to ever-smaller devices and handsets.

Satellite spectrum also is used very efficiently in the United States. The Commission's two-degree spacing policy[12] and full frequency reuse requirements[13] enable fixed satellite service spectrum to be re-used many times at multiple orbital locations across the geostationary arc through a combination of orbital separation, spatial separation of satellite beams and/or dual polarization. Innovation in satellite spot beam technology is also enabling more efficient spectrum usage than in previous generation satellites. For example, next-generation MSS satellites have phased-array antennas which, in conjunction with innovative ground based beam forming systems, give these systems flexibility to generate a virtually infinite number of beam configurations over their service areas. In addition, technology advances and improvements are allowing increases in the efficiency with which satellite networks use spectrum. As each generation of satellite system improves its space and ground segment designs, satellite customers will reap the benefits in the form of enhanced service offerings and reduced constituent costs.

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12 *Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions of Part 25 of the Rules and Regulations*, CC Docket No. 81-704, Report and Order, FCC 83-184, 54 RR 2d 577 (1983).

13 47 C.F.R. § 25.210(f).

C. There is Growing Demand for Satellite-Based Services.

Satellite industry revenue trends reflect growing demand for satellite-based services. Despite the recent economic downturn, satellite industry revenues grew 19% in 2008, and have grown at an annualized rate of over 14% between 2003 and 2008.[14] Demand for satellite broadband is also growing. The number of satellite broadband consumers has increased from approximately 622,000 in 2007 to approximately 842,000 in 2008.[15] This year, the number of satellite broadband subscribers is estimated to have grown to over 1 million. Meanwhile, government and public safety demand for satellite services has grown and remains as strong as ever.[16] As demand for the entire range of satellite services increases, the satellite industry will be using its spectrum allocations even more intensively and may need more spectrum to meet customer requirements in the future.[17]

II. ADDING SEPARATE TERRESTRIAL WIRELESS BROADBAND SERVICES TO SATELLITE SPECTRUM, PARTICULARLY IN THE C-BAND, WOULD CAUSE HARMFUL INTERFERENCE AND DISRUPT EXISTING CUSTOMER SERVICE.

If satellites are to continue to play their essential role in the nation's communications infrastructure, the Commission must not authorize separately operated terrestrial wireless

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14 *2009 State of the Satellite Industry Report* at 5.

15 *Id*. at 19.

16 *See, e.g.*, Defense Information Systems Agency, *Commercial SATCOM Update*, at 18 (April 2009) http://www.disa.mil/conferences/2009/briefings/satcom/Commercial_SATCOM_DISA_Conference_2009.ppt (showing growth in U.S. military demand for fixed satellite services and bandwidth from 2000-2007).

17 For example, the International Telecommunication Union ("ITU"), at its next World Radiocommunication Conference ("WRC"), will consider new allocations for broadband MSS spectrum pursuant to WRC-12 agenda item 1.25. The ITU technical Working Parties are currently performing studies to lay the groundwork for the relevant decisions at WRC-12. *See* Resolution 805 (WRC-07), "Agenda for the 2011 World Radiocommunication Conference", ITU Radio Regulations, Edition 2008.

services on either a licensed or unlicensed basis in spectrum allocated for satellite services. As noted above, satellite spectrum is being used extensively and efficiently for a wide range of often critical communications services, including broadband, public safety communications, and video distribution. Allowing such terrestrial operations would harm the ability of satellite operators to maintain their current services and introduce improved services in the future.

While satellites already share some spectrum with separately-operated fixed point-to-point services in certain frequency bands (such as the C-band), the sensitivity of earth station receive antennas makes sharing with terrestrial services, and especially mobile services, exceedingly difficult as these terrestrial services become ubiquitously deployed. Earth station receivers – which are designed to receive signals from space – are extremely susceptible to harmful interference and receiver overload (*e.g.*, causing total loss of service, blackouts, synchronization loss and signal delays) generated by co-frequency transmissions and by out-of-band transmissions from terrestrial services operating in adjacent bands.[18] In the conventional C-band, the sharing of satellite spectrum with fixed microwave point-to-point stations has been possible because of the relatively small number of narrowly-focused beams used in the fixed service. Sharing satellite receive spectrum with ubiquitously deployed, multi-directional fixed or mobile terminals is a completely different matter and highly impractical. In fact, in recognition of the sharing difficulties, the Commission has avoided according true co-primary status to separately-operated satellite and terrestrial services when one service or the other was expected

[18] The vulnerability of earth station receivers to terrestrial interference is illustrated vividly by the case of unlicensed radar detectors operating in the Ku-band that caused harmful interference into VSATs operating in the Ku-band. This led the Commission to devise new rules to limit the power of such unlicensed devices. *See Review of Part 15 and Other Parts of the Commission's Rules*, First Report and Order, 17 FCC Rcd 17003 (2002).

to become ubiquitously deployed.[19]

Importantly, it is well-settled U.S. policy that C-band spectrum must be protected for satellite communications, and limitations on sharing in the C-band have been recognized by the ITU. In the last World Radiocommunication Conference ("WRC 07"), the United States led an effort to prevent the identification of C-band spectrum for additional terrestrial uses such as wireless access and International Mobile Telecommunications ("IMT") systems, which would cause harmful interference to satellite systems and deprive consumers of access to critical satellite services. Specifically, Agenda Item 1.4 addressed whether the 3400-4200 MHz band should be identified for IMT services despite the longstanding primary allocation for fixed-satellite services. WRC 07 expressly decided NOT to adopt a global identification of radio spectrum for IMT services in any part of the 3400-4200 MHz band and adopted explicit provisions to ensure the protection of fixed-satellite services that operate in these frequency bands in the two regions of the world where IMT was identified.

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[19] *See, e.g., Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, Report and Order, 15 FCC Rcd 13430 (2000) (segmenting the Ka-band between satellite and terrestrial services rather than allocating this band on a shared basis); *Wireless Operations in the 3650-3700 MHz Band; Rules for Wireless Broadband Services in the 3650-3700 MHz 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) (re-allocating the 3650-3700 MHz band so that terrestrial services were primary and satellite services were secondary, except for a small number of "grandfathered" satellite earth stations); *Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Direct Broadcast Satellite Licensees and Their Affiliates Applications of Broadwave USA, PDC Broadband Corporation, and Satellite Receivers, Ltd. to Provide A Fixed Service in the 12.2-12.7 GHz Band*, First Report and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 4096 (2000) (affirming the "international system" restriction on limiting the use of the FSS downlink band at 10.7-11.7 GHz by geostationary satellites in order to limit the number of FSS earth stations in the band to enable sharing with widely deployed fixed services).

Thus, the United States and the international community have recognized that ubiquitous terrestrial use of the C-band spectrum would cause interference to existing critical satellite communications services and limit future deployment and innovation in satellite services. Indeed, there seems to be a clear consensus that terrestrial operations will cause interference to satellite services, thereby disrupting and delaying service to customers. The Commission should therefore adhere to well-developed U.S. and international policy and technical showings, and not allow such terrestrial operations in the C-band frequencies allocated for satellite services.

III. CONCLUSION

For the foregoing reasons, SIA urges the Commission not to authorize additional use of satellite spectrum for separately operated terrestrial wireless services. Rather, the Commission must protect satellite spectrum that is being efficiently and heavily utilized in all bands, particularly in the C-band, so that satellite operators can continue to provide critical communications services – including for public safety and U.S. Government purposes. A stable, interference-protected spectrum environment for satellite services is essential if the full potential of satellites as a platform to provide broadband services to even the most remote populations is to be realized.

Respectfully submitted,

The Satellite Industry Association

By: 

Patricia Cooper
President

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