Before the
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
Washington, DC 20230

In the Matter of	)	
	)	
United States Spectrum Management Policy for the 21st Century	)	Docket No. 040127027-4027-01
	)	

COMMENTS OF THE SATELLITE INDUSTRY ASSOCIATION

March 18, 2004

The Satellite Industry Association (SIA) submits these comments in response to the National Telecommunications and Information Administration's ("NTIA") Notice of Inquiry ("*NOI*") regarding U.S. spectrum management policy for the 21st Century.[1] SIA is a U.S.-based national trade association representing the leading U.S. satellite manufacturers, system operators, service providers, and launch service companies. SIA serves as an advocate for the U.S. commercial satellite industry on regulatory and policy issues common to its members. With its member companies providing a broad range of manufactured products and services, SIA represents the unified voice of the U.S. commercial satellite industry.[2] SIA responds herein to those issues in the NOI that directly impact its membership and on which there is a consensus view of the membership.

Introduction and Background

On May 29, 2003, President George W. Bush issued an Executive Memorandum announcing the Administration's initiative to address the need for a comprehensive review of the U.S. spectrum management policy for the 21st Century.[3] Pursuant to this announcement, the Secretary of Commerce, through the NTIA, initiated a process to develop recommendations. This *NOI* is but one of several steps in the process to date, and SIA applauds the efforts of NTIA and the other federal agencies participating in this

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[1] *See United States Spectrum Management Policy for the 21st Century*, Notice of Inquiry, Docket No. 040127027-4027-01, 69 Fed. Reg. 4925 (Feb. 2, 2004).

[2] SIA Executive Members include: The Boeing Company; Globalstar, L.P.; Hughes Network Systems, Inc.; ICO Global Communications; Intelsat; Iridium Satellite LLC, Lockheed Martin Corp.; Loral Space & Communications Ltd.; Mobile Satellite Ventures; Northrop Grumman Corporation; PanAmSat Corporation; and SES-Americom. SIA's Associate Members include Eutelsat, Inmarsat, New Skies Satellites Inc, and Verestar Inc.

[3] *See Spectrum Policy for the 21st Century,* Memorandum for the Heads of Executive Departments and Agencies, 69 Fed. Reg. 1568 (Jan. 9, 2004) ("Executive Memorandum").

process. The *NOI* raises a myriad of procedural, technical and policy issues affecting both government and commercial spectrum-based industries.

First Objective

Although the *NOI* opens by highlighting the bifurcated spectrum management system currently in place in the United States, SIA does not propose any structural recommendations with respect to the U.S. Government's organization of spectrum management activities at this time. While there may well be some efficiencies in restructuring the jurisdictional responsibilities, SIA is more focused on ensuring that certain critical principles – transparency, predictability, and certainty -- are adhered to regardless of any structural reforms that may or may not occur as a result of this initiative.

However, SIA does believe that the principle of transparency would be greatly served by the simple combination of the NTIA and Federal Communications Commission (FCC) US Table of Allocations into one comprehensive Table of Allocations, providing a single reference source for the interested public.

SIA believes that exclusive allocations are an appropriate spectrum management tool that should be available to both the FCC and NTIA for their respective constituencies; however, it is not appropriate to generalize this concept, and therefore, decisions to make or maintain exclusive allocations should continue to be addressed on a case-by-case basis. While SIA is generally aware that the FCC has delegated some of its spectrum management responsibilities to band managers or frequency coordinators, it does not see any benefit to extending this process to intersystem satellite coordination.

Satellite operators are licensed on a nationwide basis, and have a readily identifiable and known quantity of licensees with which they need to coordinate. However, where a satellite allocation and subsequent licensees are introduced into a band where there are incumbent terrestrial wireless licensees, a frequency coordinator may be needed and may be useful for purposes of coordinating a relocation exercise if relocation is needed

In considering the NOI's first objective, SIA urges NTIA to incorporate into any of its future broadband initiatives the key role that satellites play in serving the telecommunications needs of both the U.S Government and the commercial sector. In particular, SIA notes that satellite-delivered broadband services are essential to rural, un-served, and underserved consumer broadband users, including tribal communities, and are uniquely suited to achieve the goal of broadband deployment that is fast, ubiquitous, competitive, and available to everyone. Both terrestrial wire-line and terrestrial wireless service providers have fallen short in providing the services so urgently needed by communities in rural America. In many rural areas, satellite services have proven to the most attractive, and sometimes only, option available to those seeking multi-channel video, broadband internet, advanced data, and essential business telecommunications services.

SIA believes that satellite systems also present the only practical near-term alternative to provide broadband services in rural and other underserved areas. Satellite systems have nationwide coverage areas and are able to offer high-quality, ubiquitous service as soon as the satellite system is launched and operational. As such, satellite systems offer instantaneous deployment to low-population density and low-income areas that may not have enough demand to motivate a terrestrial build-out. In addition, satellites offer ubiquitous service at prices that are distance insensitive, in contrast to the distance-based prices that are characteristic of many terrestrial networks. These advantages allow satellite operators to provide first- and last-mile connectivity more cost-effectively than terrestrial systems, which have historically focused their deployment on high-density urban areas.

Indeed, SIA believes that broadband service satellite systems are likely to be the *only* broadband technology available for a significant portion of small businesses and consumers in the United States. Large portions of the United States are not now, and may never be, served by either cable or DSL due to the cost of wiring those remote areas, or because of technical limitations due to distance from the telephone company's central office. Even where DSL has been deployed, many DSL customers have lost access to broadband service when their service provider has ceased operations or declared bankruptcy. In this environment, many consumers have limited, if any, terrestrial alternatives. Satellite technology does not require access to the local telephone exchange or laying cable in low-density areas. By targeting a satellite beam toward a particular region of the United States, satellite-based services can reach every square mile of that region, even the most isolated areas. A number of satellite companies provide high-speed Internet services that reach all U.S. residents today, and new, even more sophisticated systems are under development.

The satellite industry's success in delivering critical services is premised on another essential principle of spectrum management -- certainty in regard to long-term access to a stable spectrum environment. The importance and ubiquity of satellite services to rural and remote users make it essential that no changes are made to the terms under which satellite systems share spectrum with terrestrial networks in rural areas. Therefore, SIA opposes any attempt to allow 'rural' high-power terrestrial operations by separate terrestrial system operators in bands shared with or adjacent to satellite bands because it would greatly constrain the ability to provide flexible and innovative satellite services in those same areas. These constraints on the ability of satellite operators to provide service in rural areas could harm the very businesses and consumers who have limited or no alternatives for their telecommunications needs. Federal, state, local, and tribal users would suffer as a result.

Satellite broadband systems provide a necessary means to serve those users who are, and will likely remain, un-served by terrestrial service providers. The U.S. Government should ensure the deployment of advanced services to all Americans by making adequate spectrum available for satellite-based systems to meet the unanswered needs for high-speed Internet services in underserved and un-served areas.

Unlike other sectors of the communications industry, the satellite services industry is inherently international. Since its inception, the industry has participated in international spectrum activities. As a result, SIA believes that its members are in a unique position to affirm the importance of the Department of State's role as the lead negotiator of the United States in such activities – whether bilateral, regional or multilateral. Nonetheless, SIA acknowledges that the preparatory process can sometimes appear unwieldy. But the process of late has been operating well, particularly with respect to preparations for ITU and CITEL meetings and conferences. However, this positive story is dependent upon all three agencies working together cooperatively and having sufficient resources, resolve, and continuity of staff, as well as a measure of transparency and accountability.

With respect to preparation for World Radiocommunication Conferences (WRCs)and CITEL, SIA believes that keys to the United States great success at WRC-03 should be replicated in the planning for future conferences. These keys include:

- Early development of U.S. proposals for negotiation with Region 2 countries in CITEL leading to early approval of Inter-American Proposals (IAPs) to WRC;
- Emphasis on the importance of CITEL and other regional groups leading to US representation on the CITEL delegation for nearly all regional group meetings – Conference of European Posts and Telecommunications (CEPT), Asia Pacific Telecommunity (APT) as well as Eastern European, African, and Arab regionally preparatory groups. SIA believes that some senior level U.S. Government participation in the American regional preparatory process may be appropriate and necessary;
- Early selection of U.S. Government spokespersons for each agenda item
- Timely involvement and appointment of an Ambassador, preferably with some degree of substantive knowledge;
- Importance of federal government representatives' participation in the FCC WRC Advisory Committee (WAC) process;
- A process for the effective and timely resolution of disputes on draft U.S. proposals;
- Consistent participation of highly-experienced government staff on the United States delegation to the ITU Study Groups, Conference Preparatory Meetings, and the WRC;

- Training for the entire delegation on each agenda item, as well as on underlying themes, protocol and rules of procedure; and
- Bilateral and other outreach activities with foreign administrations.

To build on the success of the United States at the last WRC, SIA suggests that these additional improvements be considered by NTIA:

- As NTIA's parallel WRC preparatory process is a government-only process generally, NTIA should present an issues briefing, or a series of issues briefings, for interested parties from the public. SIA recommends that this occur as early in the WRC preparatory process as possible;
- NTIA should continue its observer role in WAC activities, and even to expand upon it slightly. In particular, NTIA should designate liaisons from its Radio Conference Subcommittee (RCS), to be responsible for attending each of the Industry Working Groups (IWG's), and ensure that those liaisons are able to share with industry the progress of comparable WRC issues in the IRAC process. This two-way exchange may facilitate greater commonality of outputs from both the IRAC and WAC processes;
- In light of the recent MoU between the NTIA and FCC establishing regular meetings between the agencies, these meetings should regularly review the status of US WRC preparations (*e.g.*, status of US preliminary views and proposals). Moreover, SIA, encourages the NTIA to engage at senior levels in the important regional meetings addressing WRC proposals. SIA also thinks it would be extremely beneficial for the

NTIA Assistant Secretary to ensure that his/her senior level counterparts in the IRAC agencies have a commensurate understanding of the WRC and the issues;

- SIA supports establishment of early timelines for resolution or decision-making with respect to non-consensus issues. Moreover, we believe the Department of State can have an important role in this process, as it has in the past, to bridge any impasse. However, SIA also supports the interim step, used with success during the last cycle, of inviting the interested private sector parties to meet with the interested government agencies to see if a greater understanding of the perspectives of either party can lead to a mutually satisfactory compromise;
- SIA encourages NTIA to facilitate, to the extent possible, effective coordination between the domestic and international activities that are related to conference preparatory technical work, the RCS, and the WAC;
- SIA believes that there could be improved scheduling between the study groups and the WAC meetings to maximize participation in both, and minimize impact on resources, given that many participants (government and industry) come from outside of the Washington, D.C. area;
- With respect to appointment of the United States head of delegation, SIA believes that the lack of continuity in any senior (SES or political) level role in the WRC does create a hurdle for the United States. Fortunately, the United States has generally overcome such self-created discontinuities, but SIA recommends that ways be explored to avoid them. One option is to create a permanent (SES level) senior Vice-Chair at the Department of State tasked to ensure continuing international relationships in the WRC interims and through the regional group meetings;

- SIA believes the role of the Ambassador could be enhanced in several ways. First, SIA suggests that the position have a one-year term starting 4-6 months prior to CPM-2, enabling the Ambassador to be better educated on the issues, the politics, the regional bodies, and the institution so as to be able to meaningfully attend the CPM in part or in whole. Second, we support dedicated funding for WRC outreach and travel which would facilitate the Ambassador's mission to obtain international support for US objectives at the WRC;
- SIA supports the early formation of a core delegation among the USG in order to provide an opportunity for team-building. SIA also supports consideration of a private industry representative liaison to that core delegation – the chair or vice-chair of the WAC. At a minimum, the core delegation should be formed prior to the CPM-2 to enhance the US performance there;
- SIA recommends that the nominated delegation be formed as early as possible, perhaps prior to the CPM-2; however, a nominated delegation does not and should not supplant the need for an accredited delegation to be in place no later than 3-4 months prior to the conference so that the United States can deal with positions/fallback in an appropriate manner subject to accredited delegation strictures, such as confidentiality. SIA notes that the final strategies and positions are often developed at the last minute with great time pressure. Moreover, it is not appropriate to substitute the "nominated" delegation for the role of the accredited delegation given the lack of obligations associated with being a member of the former.

The above comments have been focused on spectrum management activities facilitated by the ITU Radiocommunication Sector (ITU-R), as well as related CITEL work. However, it is important not to overlook other international activities underway that have the potential of rewriting how the ITU is structured and managed, which could have far-reaching impact on current international spectrum management policies and procedures. The next ITU Plenipotentiary Conference, scheduled to occur in 2006, will further consider proposals tabled in 2002 to "reform" the Union's structure, functioning, and management. A number of Working Groups, operating under the direction of the ITU Council, have recently been established to conduct preparatory studies for the Plenipotentiary Conference. It is imperative that there be effective United States leadership and participation, including a meaningful role for the U.S. private sector, in these activities. The United States' involvement in these and related CITEL preparatory activities has not proven to be quite as rigorous, transparent, or consistent, and could benefit from application of several of the measures described above.

Second Objective

The satellite industry has flourished over the past decade due to technological advances that have translated into more efficient satellite and earth station antennas, higher-order modulation techniques, analog to digital conversion, use of smaller antennas, new coding, and multiple access techniques. All these developments contributed to increasing the technical, economic, and functional efficiency of satellite systems and, in SIA's view, they are predicated upon the principles of predictability and certainty in the spectrum management process.

These technological advances have been used to increase the "internal efficiency" of satellite systems themselves approaching the theoretical bounds of information density but requiring ever quieter system and external noise. It is noted however that several rulemakings being currently conducted by the FCC seem to equate spectral efficiency to the addition of new users from different services into the same frequency band – these have the effect of noise and would serve limit the potential for further improvement in efficiency and services by satellites.

The examples below illustrate the significant advances that satellite systems have been achieving with respect to technical, economic, and functional efficiency. Satellite systems are among the most sensitive of communications links to be found anywhere and have invested $100Ms in R&D to operate with as little unused margin as possible. The following examples show that addition of new and different users should not be deemed as the only possible measure of spectral efficiency and that "internal efficiency" should be carefully taken into account in any assessment of spectral efficiency.

The conversion of TV signals from analog to digital has allowed the transmission of 6 TV channels in a 36-MHz transponder instead of typically 1 TV channel per transponder. This increase in "technical efficiency", has led to the distribution of more TV channels, creating more choices for the end user, and thus greater "functional efficiency". Substituting digital carriers for TV/FM carriers further increases "technical efficiency" by eliminating a very interfering type of emission that typically precludes use of about 15% of the spectrum allocated to a TV/FM carrier with the same polarization in the adjacent satellite. This progression is far from slowing - the most recent advances in data compression and spectrum efficient modulations now allow the transmission of 2 HDTV channels per 36-MHz transponder.

Other significant examples of increases in “technical efficiency” are: developments in satellite antenna technology allowing multiple frequency reuse through space isolation (multiple beams); advanced coding and higher-order modulation techniques (e.g. 8PSK, 16-QAM) allowing significant increases in data rate within the same spectrum resource (higher bit/s/Hz); and demand assignment techniques that maximize the number of satellite users that can access a given resource.

One of the key elements in the success of DTH/DBS lies in the technology developments that achieved lower receiver noise temperatures, and thus allowed the use of smaller end user antennas (i.e. increase in “functional efficiency”). If, instead of allowing the use of smaller antennas, these technological advances had been limited by an earlier interference temperature standard intended to accommodate g new services in the same spectrum (*e.g*. unlicensed devices) the booming growth of DBS and DTH (i.e. economic efficiency) would have been stopped.

The next steps in satellite evolution, with larger and thus higher gain antennas in space, will further reduce terminal size and increase system capacity and data rates but make the satellites themselves more sensitive to terrestrial noise sources. These examples demonstrate that a careful assessment must be conducted before the adding of uncontrolled users from different services becomes the approach of choice for increasing spectral efficiency.

Unfortunately, increasing the "internal efficiency" of existing services makes it more difficult to accommodate additional dissimilar and uncontrolled signals, while trying to accommodate additional signals would constrain further improvements in the "internal efficiency" of existing services. The satellite system developments described above, therefore, will generally lead to systems less able to accommodate additional users in the band.

For example, higher-order modulation schemes increased data rates are more “technically efficient,” but are also more susceptible to interference. Smaller earth station antennas, crucial for products that are aimed at residential users (i.e. increased functional and economic efficiency), add to the noise sensitivity in downlink bands. Finally, continued improvement in satellite efficiency through spot beams adds to the system interference sensitivity in uplink bands. Satellite operators will continue to be incentivized by their $100Ms commitments to invest in technology advances that make extremely efficient use of the spectrum.

Third Objective

SIA would also like to take this opportunity to applaud again the Congress’ decision to prohibit the auction of spectrum used for international satellite systems. Such a prohibition is essential to the continued growth and success of the U.S. satellite industry. Section 647 of the Open-Market Reorganization for the Betterment of International Telecommunications Act (“ORBIT Act”) prohibits the FCC from assigning “by competitive bidding orbital locations or spectrum used for the provision of international or global satellite communications services.” In enacting Section 647 of the ORBIT Act, Congress recognized that global and international satellite systems operated by U.S. industry provide numerous benefits to both the developed and developing worlds, making available a seamless global network facilitating commerce, advancing global security, distributing U.S.- produced programming, and providing instant infrastructure where geography or local economic factors present barriers to communication.

Congress also recognized that the complex and time consuming process of deploying viable international satellite systems requires operators to secure rights in many countries rather than just one license in the United States. Section 647 was premised upon the understanding that if the United States were to employ auctions to grant licenses for international satellite services, other countries would inevitably follow suit. The result would be a cascading series of sequential auctions, which would be disruptive to the already lengthy planning process for the development of satellite networks, and would have a potentially devastating effect upon the delivery of, and access to, global satellite services.

Sequential auctions in dozens of countries would not only add greatly to the upfront costs, but would create a staggering level of regulatory and business uncertainty. Faced with multiple consecutive auctions, satellite operators would have no idea whether they would be able to win a sufficient number of licenses in an adequate number of countries to piece together a coverage area that would justify the costs of constructing networks. Furthermore, the investment community would have no way of determining in advance the ultimate financial commitment because the costs would be incalculable.

Satellites are a highly spectrum-efficient way to provide voice, video, and data services throughout the world. Continued advances by U.S. industry in satellite and receiver technologies over the past few decades have allowed satellite systems to provide greater overall capacity, achieve a higher level of frequency reuse, and foster the growth of applications by a wide range of satellite users. All of these advances have taken place in an environment where U.S. and global regulators have recognized the value that international satellite systems can bring to the world if they are not burdened by potentially devastating auctions in multiple countries.

In the four years since Congress adopted Section 647 of the ORBIT Act, the statutory provision has remained a vital component to the successful growth and operation of international satellite communications networks, providing important manufacturing, employment, and export opportunities for the U.S. satellite, information, and technology industries.

SIA would also like to take this opportunity to refer with concern to the growing trend for national governments to impose new types of "spectrum fees" and new administrative burdens on satellite operators that are often advanced under the banner of "spectrum efficiency". In other instances, fees have been justified as a mechanism for introducing equity with respect to local operators that acquired rights through auctions. This negative consequence of auctions underscores the importance of their elimination. Spectrum fees function most often as a form of indirect taxation of satellite services and will be self-defeating for the industry, the public, and governments alike.

The global satellite industry provides substantial public benefits to both the developed and developing world, and providing instant infrastructure where geography or economy are barriers to communication. Satellites, through their ability to enable ubiquitous access regardless of the quality of local infrastructure, offer an effective means for nations and peoples to benefit from participation in the "Information Society."

SIA believes that the imposition of spectrum fees that are not proportionate to costs associated with strictly essential regulatory or administrative functions runs counter to public interest policies aimed at increasing satellite services through pro-competitive, market-driven efforts. Furthermore, spectrum fees not only unnecessarily increase the price of satellite capacity, but also substantially increase the level of business uncertainty. Even the suggestion that such measures could be imposed is a deterrent to business plans, and will likely hinder, if not deter, the roll-out of new and advanced services to end-users.

If countries begin to implement special fees applicable to the provision or use of satellite capacity, satellite operators and service providers will need to adjust their prices accordingly. When one nation establishes a fee for spectrum use or access, other administrations are encouraged to follow suit. This has certainly proved to be the case with the United States having been the first to auction terrestrial wireless licensed spectrum, but closely followed by countries in all regions of the world. Since satellite technology inherently allows for the coverage of multiple countries and regions within a given footprint, one nation's actions can lead to a cascade of similar fees with serious negative implications. These fees will have a potentially devastating effect upon the ability to deliver broadband, voice, video, and other services throughout the world.

SIA believes that efforts to promote efficient spectrum use must also take into account the technological differences between terrestrial wireless and space-based platforms. In the case of satellites, spectrum efficiency must take into account the unique capabilities of satellites to reach all users throughout a region regardless of location and the capacity of satellite systems to use and re-use spectrum in an efficient manner. Satellite systems have extremely high up-front infrastructure costs that provide a natural market incentive to be spectrum efficient. The purchase, launch, operation, and cost of insurance for a single geosynchronous satellite is highly capital-intensive, with up-front costs in excess of US $200 million dollars. Non-geostationary systems can be even more expensive depending on the number of satellites in the constellation.

By inserting additional costs and complexity into the business and operational planning processes of the satellite industry, spectrum fees and similar non-cost-based measures will:

- Increase the regulatory uncertainty and costs to operate satellite systems;
- Increase costs to the consumer;
- Inhibit the provision and delivery of satellite services;
- Delay the rollout of new services and advanced technology throughout the world; and
- Fail, in practice, to promote increased market or spectrum efficiency.

Considering the implications of each nation's actions in the context of an inherently global industry, SIA strongly urges the NTIA, the Department of Commerce, and more broadly the Administration, to discard any notion of spectrum fees for licensed services, as well as any regulatory measures that disproportionately affect the provision of satellite capacity and services; the only exceptions should be for costs properly incurred in the licensing process.

The NOI also requests comment on issues relating to the framework pursuant to which proposals for spectrum use by new technologies and services should be evaluated. SIA believes that it is critical to implement standards for determining the impact of any proposed new technology or service on existing operations in the spectrum at issue. Specifically, SIA wishes to comment on the general interference standard that should be applied to protect existing services, and how criteria should be developed to ensure that the general interference standard is met in each sharing or co-existence scenario.

In order to ensure protection of existing systems, it is necessary to define the level of protection these systems are to be provided. Current rules typically refer to two broad categories of interference--"harmful interference" and "acceptable or permissible interference." There are established definitions for "harmful interference," "permissible interference" and "accepted interference" in both international and domestic rules.[4] While permissible or unacceptable interference is often quantified, harmful interference is only defined in a qualitative manner. Permissible interference is a level allowed under the Radio Regulations or NTIA's or the Commission's Rules. The term acceptable interference is used in the coordination of frequency assignments between administrations and, in some cases, in the definition of limits to protect against unacceptable interference.

Sometimes these terms are used interchangeably in domestic regulations and licensing; however, given the significant difference in the level of interference described, it is important to ensure the use of the appropriate term domestically. In particular, harmful interference is an extreme level of interference that "seriously degrades, obstructs or repeatedly disrupts" the operations of a communications system. Harmful interference is rarely seen when properly functioning radio equipment is used in a frequency band by services or systems that operate on a co-primary basis in accordance with technical parameters and operational conditions designed to facilitate co-frequency

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[4] See Article 1 of the ITU Radio Regulations. See, e.g., 47 C.F.R. §§ 1.907, 5.5, & 15.3(m) (definitions of "harmful interference" in the Commission's rules); 47 C.F.R. § 2.1(c) (definition of accepted interference for purposes of the Commission's rules). See also XYZ of NTIA's rules. "Accepted interference" is the term actually defined, although it is used inter-changeably with "acceptable interference."

operations. At the same time, it is clear that just because interference between such services or systems in a band does not rise to the high level of "harmful interference" it cannot be reasonably concluded that the interference is subjectively acceptable or tolerable to the victim service or users.

For all the reasons given above, in the absence of specific technical and operational requirements, an undefined notion of "harmful interference cannot be used as a benchmark to establish the conditions for spectrum sharing between users of the same spectrum. More specifically, when defining the aggregate level of interference that unlicensed devices can produce to a licensee of the same spectrum, the use of harmful interference as a reference is completely inappropriate. Given the qualitative definition of harmful interference, a licensee cannot be reasonably expected to accept interference from unlicensed devices that places its operation at the threshold of being seriously degraded, obstructed or repeatedly disrupted.

The key is to find ways to ensure that the level of interference between systems in the same service and between licensed systems in different co-primary services or between licensed and unlicensed services is not and will not be at a level that will result in the interruption or degradation of one of the services using the band. Therefore, the level of interference that is appropriate for allowance from one service into another is always less than harmful interference[5]. The term acceptable interference should be used when quantifying the level of interference that one system is allowed to produce into another system, whether in the same service or in different services.

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[5] Given these circumstances, SIA is concerned that the Commission's application of a harmful interference standard to unlicensed Part 15 devices, *see, e.g.*, 47 C.F.R. § 15.5(b), may have the paradoxical effect of permitting these devices to cause a greater degree of interference than primary services that are subject to the permissible interference standard.

In the ITU, a system that is operating at the pre-determined "permissible" interference level is presumed to be causing a level of interference that other systems in the same service or systems in other services can tolerate. In situations where frequency sharing between systems is accomplished through coordination, the permissible level of interference is generally a trigger for coordination, and a higher level of interference is often accepted in bilateral negotiations between affected administrations. The object of most spectrum sharing rulemaking proceedings should be to identify the level of permissible interference.

As noted above, the terms acceptable, permissible and harmful interference, are already internationally and domestically widely accepted. NTIA should, when adopting or defining protection requirements, use the terms permissible or acceptable interference, in order to ensure the continued operation of existing systems at the desired quality of service.

The next step is to determine criteria to ensure that only acceptable levels of interference are caused to existing services. While it may seem desirable to define a single, global criterion, or certain type of criterion, that could be used in all frequency bands, SIA believes that it is necessary to evaluate on a case-by-case basis each sharing scenario to determine the appropriate criteria to protect the existing services using the particular frequency band. Each frequency band has a unique interference and operating environment that needs to be evaluated on its individual merits.

Fourth Objective

Within the national security/emergency preparedness (NS/EP) context, satellite communication systems and services are crucial to both the public and private sectors for numerous reasons. Satellites provide services and applications to its customers that include broadcast and cable telecommunications companies, television networks, financial institutions, major retailers, utilities, emergency personnel, first responders, schools, hospitals, Internet service providers, consumers, as well as, Federal, state, and local government agencies.

Moreover, the Federal Government is increasingly reliant upon the commercial satellite infrastructure for data, voice, and video communications services. Commercial satellites support many significant services for the Federal Government, including communications, navigation, remote sensing, and imaging. Commercial satellites also support activities important to Government missions, such as digital audio communications, television broadcasts, and cable television broadcasts. They provide voice and data communications, including international phone calls from remote locations, and locations without an adequate telecommunications infrastructure.

The national security and homeland security communities use commercial satellites for critical activities, such as direct or back-up communications, emergency response services, continuity of operations during emergencies, military support, and intelligence gathering. Furthermore, commercial satellites support simple applications of daily activities such as mobile and fixed communications, truck fleet management, credit card validations, high-speed Internet traffic, weather reports, and television and radio services.

Commercial satellite services are only one component of our national communications system. For NS/EP missions, the advantages of using satellites include: (1) they have ubiquitous coverage; (2) they can access remote locations and locations without an adequate or in some instances without any telecommunications infrastructure; (3) they offer cost effective point-to-multipoint communications, with a relay node – the spacecraft – that is difficult to negate due to being in space; (4) they are a reliable alternative to backup the public-switched network and the wireless network; and (5) they support the restoration of terrestrial critical infrastructures, including telecommunications and utilities (e.g., oil, gas, electricity, and water).

Protected and priority services for terrestrial wireless and wire-line communications currently exist, but the availability of such services in the satellite realm, and their use by Government agencies, is considerably more limited. Unlike terrestrial services, FSS offerings allow for preemption in the event of a failure of the satellite capacity; however, many Government customers do not typically take advantage of such services by purchasing protected service with attendant preemption rights. One of the reasons may be that many people in the Government do not understand the nuances of these services, simply because they have not been explained. Another reason is that agency procurement processes do not allow for agencies to procure satellite services in this way. This reduces availability and efficiency. These same agency procurement processes do not allow the Government to compete effectively for commercial SATCOM capacity.

The Government's ability to use protected services may be limited by the earth station equipment in use for NS/EP services, which would need to have the ability to potentially change frequency, polarity, or satellite assignments on short notice to access the restoration capacity. It is therefore important to ensure that Government earth station facilities used for NS/EP services have adequate flexibility to be effective during emergencies.

With respect to protection and priority issues, satellite services differ from terrestrial-delivered services in their comparative insensitivity to geography. As examples, a fixed satellite link serving rural education within a continental United States (CONUS) satellite beam could readily be reassigned to support a disaster recovery application in a different place in the country; and an MSS provider could divert switched capacity from one portion of the country to another to support a disaster recovery contingency. This geographic versatility is a tremendous asset in the development of prospective NS/EP service protection plans, in that satellite capacity can be used to restore terrestrial based services.

The FCC has historically taken steps to ensure that spectrum is available for public safety functions both by allocating spectrum specifically for licensing to public safety agencies and by allocating spectrum for a variety of commercial radio services that can be accessed by public safety organizations. This diversity in licensing of radio services available for public safety use guards against all communications channels being disrupted at the same time.

For example, FSS and MSS systems proved critical for the relief efforts following the terrorist attacks on September 11, 2001. Local terrestrial-based communications systems were overwhelmed following the attacks in New York City and the Washington Metropolitan area. Several satellite systems donated equipment and airtime for the rescue and recovery efforts.

Several features of satellite systems offer advantages for public safety, law enforcement, and emergency response organizations. Each satellite system provides communications through its satellites and gateway earth stations. The satellites themselves are less vulnerable to disruption from the earth than terrestrial networks, and there are generally redundancies in the earth station network. Accordingly, satellite systems offer a high degree of reliability, which is needed for public safety communications.

Satellite systems offer nationwide service throughout the United States. Therefore, satellite systems make communications available in emergency situations where terrestrial phone service is not available, either because there is no phone service at the site of the emergency, or because the impact of the emergency disrupted existing terrestrial phone service. MSS phones, for example, provide a mobile phone number that allows public safety staff to reach personnel in the field. Even if terrestrial services are operational, an office may not know the location or numbers of phones near on-site personnel, nor whether the site of the emergency will be within reach of terrestrial networks or emergency dispatch systems. Such concerns do not apply to MSS systems.

MSS handsets or portable devices/phones also offer universality for public safety organizations that may not use a single common terrestrial communication or dispatch system. If multiple public safety organizations respond to the same emergency site, satellite phones can overcome differences in the various units' communications capabilities.

Commercial satellite systems offer methods to extend and complement communications services in rural, underserved, and un-served areas. For example, wire-line and wireless services do not reach vessels at sea. But, MSS systems can provide maritime communications with the same networks that cover the continental United States. With FSS or MSS capability, vessels can have one or more unique telephone numbers at which they can be contacted by persons on land and persons on other ships. The same number can be used to reach the vessel whether it is in the North Atlantic or the Gulf of Mexico. In an emergency, calls can be made from the vessel directly to the nearest distress and rescue agency. Furthermore, FSS and MSS systems enable Internet connections in rural and remote areas of the US.

It is not always possible to predict why or when a certain form of communications service will be needed. It is possible, however, to provide and plan for diversity in radio services. Nonetheless, the US Government should continue to provide adequate spectrum allocations for licensing for specific public safety uses.

Conclusion

SIA urges NTIA to take the above comments into account as it develops its report to the President on reforms to improve the U.S. Spectrum Management Policy for the 21st Century.

Respectfully submitted,

SATELLITE INDUSTRY ASSOCIATION

By: /s/ Richard Dalbello

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