BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the matter of:	
Flexibility for Delivery of Communications by Mobile Satellite Providers in the 2 GHz Band, the L-Band and the 1.6/2.4 GHz Band	IB Docket No. 01-185
Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by Mobile Satellite Service	ET Docket No. 95-18

COMMENTS OF THE AVIATION INDUSTRY PARTIES

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SUMMARY

The Aviation Industry Parties – Aeonautical Radio, Inc. ("ARINC"), the Air Transport Association American ("ATA"), and the International Air Transport Association ("IATA") – oppose the introduction of terrestrial land mobile base stations into the upper L-band mobile-satellite service ("MSS") allocation. Aviation has invested substantially in systems to use AMS(R)S facilities in this band, and aviation's already heavy reliance on this spectrum for aeronautical safety communiations will grow in the future. In response to the terrorist attack on September 11, 2001, aviation is evaluating new systems and procedures to promote the safety and security of the flying public, some of which will make additional demands on upper L-band aeronautical satellite communications. Mobile satellite service provide a unique communications capability to aircraft flying over oceans or in remote areas where ground infrastructure is lacking, and it also provides additional functionality to aircraft in North American airspace. This is no time to impair or limit aviation's access to reliable, interference-free AMS(R)S capacity.

Congress granted the Commision the authority to employ flexible allocations in 1997 with the adoption of Section 303(y) of the Act, but the legislation imposes four conditions on such use: First, such use must comply with international agreements to which the United States is a party. Second, the FCC must find that such used will not cause harmful interference to other users of the spectrum. Third, the FCC must find that flexibility will not deter investment in the band under consideration. Fourth, the FCC must find that the flexible allocation would be in the public interest. The flexible use of the upper L-band for terrestrial land mobile base stations will not meet any of these conditions.

First, terrestrial land mobile base stations are not permitted by the International

Telecommunication Union's Table of Frequency Allocations. Upper L-band is exclusively allocated to the mobile-satellite service. Footnotes to the Table provide some additional uses, but none of these include terrestrial land mobile service.

If land mobile base stations were permitted to operate on the satellite downlink frequencies, harmful inteference could occur to aircraft stations operating hundreds of miles offshore and in domestic air space. The interference could be either co-channel or adjacent channel. The proponents of terrestiral operations in this band can only limit interference by assigning aviation services to separate frequencies, but this approach could severely limit the spectrum needed to support the growth of aeronautical satellite communications and would not address the adjacent channel interference identified by INMARSAT.

Flexibility of use would also create uncertainty in the aviation community as to the availability and quality of communications that will be possible using mobile satellites. This uncertainty would deter aviation's further investment in upper L-band AMS(R)S systems, and no alternative communications meeting aviation's unique requirements will be available in the reasonably near future. Aviation needs assurance that aeronautical-mobile satellite services will have sufficient spectrum resources with adequate protection from interference so that it can make additional investments in the upper L-band. The airlines have already spent hundreds of millions of dollars to equip their aircraft for satellite service in reliance in Commission representations that the service would have the protections from interference required by a safety communication service.

Finally, flexible use would not serve the public interest. Terrestrial land mobile service is currently available in urban areas. These services can be offered by the mobile satellite operations in conjunction with their satellite services. Without flexibility, mobile satellite

service will continue to be available to rural America. INMARSAT and other carriers will provide this service into the future without needing terrestrial base stations in upper L-band. By contrast, opening the allocation to terrestrial land mobile service could actually jeopardize the service to rural America and to the oceanic regions adjacent to North America by diverting the resources of MSS operators from satellite services for rural and oceanic areas to land mobile telephone service to urban areas. The unique service that mobile satellite can provide would be lost or severely compromised.

For these reasons, the FCC should not permit the upper L-band MSS allocation to be used for terrestial land mobile base stations.

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COMMENTS OF THE AVIATION INDUSTRY PARTIES

Aeronautical Radio Inc. ("ARINC"), the Air Transport Association of America ("ATA"), and the International Air Transport Association ("IATA") (collectively referred to as the "Aviation Industry Parties") hereby respond to the Commission's Notice for Proposed Rulemaking released August 17, 2001.[1]

The Aviation Industry Parties, representing the communications interests of the world's aviation community, jointly oppose the FCC's proposal insofar as it would permit licensing terrestrial base stations to provide land mobile service in the upper L-Band MSS/AMS(R)S[2] allocation. These new communications initiatives and current aviation requirements depend upon continued access to interference-free use of the upper L-band MSS allocation with real-time priority and preemptive access to the entire spectrum in the allocation when the need arises. The proposal by Motient Services Inc. *et al.* ("Motient") to add a terrestrial land mobile service to the L-band MSS allocation—a service for which there exists other spectrum allocations—

[1] FCC 01-225, 66 Fed. Reg. 47,621 (Sept. 13, 2001) ("NPRM").
[2] The "upper L-band" has come to mean the bands 1545-1559 MHz and 1646.5-1660.5 MHz.

would increase the risk of interference to critical safety communications with aircraft in flight and diminish the unique spectrum available for aviation systems. Consequently, the insertion of terrestrial services into the upper L-band would discourage aviation investment in, and development of, new technologies and systems for this band. Moreover, United States and international civil aviation authorities are currently exploring a number of alternatives to increase the security and safety of air transportation in the wake of the terrorist attacks of September 11, 2001. Some of these alternatives may require significantly increased reliance upon radio communications with aircraft in flight that must be secure, reliable, and free of interference. Therefore, the proposal for flexible use of the upper L-band is not in the public interest and should be denied as to this band.

ARINC is the communications company of the civil aviation community, owned by members of that community, including United States and foreign air carriers and business aviation interests. It was formed in 1929 efficiently to use the limited spectrum then available for aeronautical communications and to ensure equitable access by all aviation to this safety resource. ARINC has thus far been able to accommodate the phenomenal growth in air transport and civil aviation in spectrum allocations that have actually been reduced over the past five decades.

The ATA is the national trade and service association of the United States airline industry. It currently represents 22 major U.S. passenger and cargo carriers in the U.S. and 4 associate (non-U.S.) carriers.[3] ATA represents its membership by promoting aviation safety, advocating industry positions, conducting designated industry-wide programs, and promoting

[3] ATA's members are Airborne Express, Alaska Airlines, Aloha Airlines, America West Airlines, American Airlines, American Trans Air, Atlas Air, Continental Airlines, Delta Air Lines, DHL Airways, Emery Worldwide, Evergreen International, Federal Express, Hawaiian Airlines, JetBlue Airways, Midwest Express, Northwest Airlines, Polar Air Cargo, Southwest Airlines, United Airlines, United Parcel Service, and US Airways. ATA's associate members are Aeromexico, Air Canada, KLM—Royal Dutch Airlines, and Mexicana Airlines.

public understanding.

The International Air Transport Association ("IATA") is the trade association of the world's scheduled international airline industry. Originally founded in 1919, it now groups together 274 airlines, including the world's largest. These airlines fly over 95 percent of all international scheduled air traffic. The operational objective of IATA is to ensure that Members' aircraft can operate safely, securely, efficiently and economically - under clearly defined and understood rules. IATA works towards these objectives through representation in the relevant international organizations and to work with governments to secure more airways and airport capacity.

I. AVIATION SAFETY REQUIRES CONTINUED INTERFERENCE-FREE ACCESS TO THE UPPER L-BAND MSS SPECTRUM FOR SATELLITE COMMUNICATIONS

Air transportation is a vital part of this nation's economic infrastructure. Last year, some 700 million Americans boarded aircraft in the United States for domestic and international flights. They did so confident that commercial aviation is the safest form of transportation available. A complex system of radio communications and navigation facilities is an important contributor to the safety and efficiency of this passenger and cargo network.

In international airspace and over remote areas of the globe where terrestrial communications may be unreliable or unavailable, aviation relies upon a mixture of satellite and HF radio facilities. Satellite provides faster and more reliable communications than HF and will be increasingly important in the future. Over international routes, ARINC provides civil aviation with HF voice and data communications. It also provides international aeronautical satellite communications over INMARSAT space segment in conjunction with earth stations provided by INMARSAT service providers here and abroad. These facilities also provide aeronautical communications in domestic airspace, and such use is expected to grow as new applications are

developed. Today, an estimated 2,500 aircraft rely upon the INMARSAT-based system for safety-of-life communications. Aviation has already invested hundreds of millions of dollars to be able to use this system based on assurances that adequate spectrum and regulatory protections would be provided to support AMS(R)S requirements for availability, reliability, and integrity.

The terrorist attacks on September 11, 2001, demonstrate that, notwithstanding the substantial investment that aviation has made in enhancing security, additional measures will have to undertaken. Some of these will require increased communications at the airport and substantially increased communications to the aircraft. Under consideration are measures such as slow-scan video from the aircraft, additional real-time monitoring of aircraft parameters, and other changes in operating procedures. These new systems and procedures will require more intensive use of the current spectrum resources used by aviation and increased levels of performance, reliability, and availability for aeronautical communications systems. This is no time to be reducing the availability of safe and reliable communications for aviation.

This tragic event also demonstrates why aviation safety spectrum must be protected. In this time of crisis, the public networks were swamped with calls. Terrestrial systems were disrupted, and public wireless facilities could not handle the volume of traffic offered. Aviation safety communications systems also experienced increased traffic loads, but were able to function because they utilize protected spectrum. With the exception of the L-band MSS allocation, aviation communications are accommodated in exclusive allocations so that the networks can be designed to assure the high degree of availability and integrity required to manage and oversee the safe movement of aircraft in real time. Had these systems used spectrum shared with the terrestrial land mobile services as proposed by Motient, critical safety services would not have been available. The use of communications facilities by aviation that

are shared with non-safety applications, such as in the L-band MSS allocation, is only possible with the stringent requirements for real-time priority and preemptive access provided by footnote US 308,[4] and the efficacy of this type of protection has not been tested under crisis conditions.

Aviation will be making increased demands on the INMARSAT system and the upper L-band spectrum for safety communications. On over-ocean routes and in remote area, HF is the only alternative communication with aircraft, but HF is slow, limited in capacity, and cannot support all of the new applications that are under consideration. For these new applications, the bandwidth and signal to noise characteristics of the INMARSAT satellite link are essential. Nor is there any alternative to the INMARSAT system in the near future. Moreover, the use of INMARSAT's AMS(R)S service in domestic airspace throughout North America will also increase as new applications are implemented. Motient's system is not interoperable with the AMS(R)S system described in the Standards and Recommended Practices ("SARPS") of the International Civil Aviation Organization ("ICAO") and does not provide any significant coverage on over-ocean routes and in remote areas of the world where ground infrastructure is inadequate.

The proposal for flexible use of L-band threatens the continued availability of MSS spectrum for aviation safety applications. Under the Mexico City Agreement,[5] the L-band MSS allocation is subject to annual realignment among the five satellite operators authorized by the United States, Canada, Mexico, Russia, and the United Kingdom based on projected MSS traffic. However, according to the Notice of Proposed Rulemaking, no realignment has been made in recent years, and the operators are either continuing within their previously coordinated spectrum

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[4] 47 CFR §2.106 US 308; *see also* ITU Radio Reg. S5.357A, S5.362.A.
[5] *See* FCC Report No. IN96-16 (June 25, 1996).

or taking new frequencies that might be idle.[6] To the extent that terrestrial land mobile service is accommodated in the MSS allocation, this requirement will take spectrum away from the safety communications. As the FCC has done in the past to protect public safety communications—which develop more slowly, have unique security requirements, and need high levels of availability—the FCC should continue to protect spectrum for AMS(R)S in the upper L-band.[7]

II. FLEXIBLE USE OF THE UPPER L-BANK FOR TERRESTRIAL LAND MOBILE WOULD VIOLATE SECTION 303(Y) OF THE ACT

In 1997, Congress authorized the Commission to employ flexibility in the use of spectrum where the use is consistent with our international agreements and where the Commission finds that such flexibility (1) would not result in harmful interference among users, (2) would not deter investment in communication service and systems in technology development, and (3) is in the public interest.[8] The proposed flexible use meets none of these criteria. It is inconsistent with the ITU Radio Regulations; it would cause harmful interference to other users including aviation safety communications, it would deter investment in new aviation technology and systems, and it would not serve the public interest.

A. Flexible Use of L-Band Is Inconsistent with the ITU Radio Regulations.

Under the International Telecommunication Union ("ITU") Table of Frequency Allocations,[9] MSS operators are not permitted to offer direct communication links from base stations to land mobile units in the L-band MSS allocation. The ITU Radio Regulations allocate the bands 1535-1559 MHz and 1626.5-1660 MHz exclusively to the mobile-satellite service

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[6] The FCC has refused to share the contents of the Mexico Agreement with the Aviation Parties (*see* Robert Butler, 6 FCC Rcd 5414 (1991)), which makes it difficult for aviation or other members of the public to provide meaningful comment on the precise effect that new mobile services will have on the use of this band by safety services.
[7] *See* Refarming Second Report and Order, 12 FCC Rcd 14307 (1997).
[8] 47 USC §303(y).
[9] ITU Radio Reg. Art. 5.

across all three ITU Regions.[10] The few local exceptions to this use are specified in footnotes. A number of countries use L-band for fixed communications on a primary or secondary basis, and these non-MSS uses are provided for in footnotes S5.355 and S5.359. Footnote S5.359 strongly encourages the Administrations involved to limit or eliminate such alternative use of these MSS bands. Sweden uses a portion of the band for aeronautical radionavigation in accordance with footnote S5.363. Finally, a portion of upper L-band may be used for terrestrial aeronautical mobile (R) service to extend to supplement satellite communications (S5.357)—a service that has never been implemented. None of these exceptions admits terrestrial land mobile communications to the band.

The problems encountered by the domestic mobile satellite systems in serving urban areas were anticipated by Motient's predecessors as early as 1985, but no one sought to amend the ITU Radio Regulations to permit such use in the interim period. The introduction of a wholly different type of service into this band, which is intensively utilized by global MSS networks, should have been reviewed by a World Radio Conference, which if found to be appropriate, could have added a footnote with suitable conditions to the allocations. Such action by a competent Conference is unlikely because the concept is inconsistent with the current and planned use of the bands.

In order to permit alternative use of L-band, the FCC must rely upon the provisions that permit states to assign frequencies in derogation of the table international frequency allocations on a non-interference basis.[11] However, as discussed below, the interference potential for terrestrial base stations go hundreds of miles beyond the territory of the United States into adjacent countries and over adjacent oceanic areas. Nonetheless, Congress did not intend that

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[10] Completing the upper L-band, the band 1660-1660.5 MHz is also allocated to MSS on a co-primary basis with the radio astronomy service.

[11] ITU Radio Reg. §4.4.

the requirement that the use conform to U.S. treaty obligations merely be a repeat of the later provision that the FCC must find that the flexible operation will not cause interference. Instead, Congress must have meant that the service proposed be consistent with the ITU Table of Frequency Allocations.

Moreover, the ITU Radio Regulations also require the United States to "recognize that the safety aspects of radionavigation and other safety services required special measures to ensure their freedom from harmful interference" and "take this factor into account in the assignment and use of frequencies."[12] For flexible use of L-band to be consistent with the ITU Convention and Constitution, the Commission must take special measures to assure non-interference with the AMS(R)S operations in this band.

Section 303(y) of the Act requires the flexible use to conform to Article 5 of the ITU Radio Regulations. The proposed flexible use does not. Even if the statute is read to permit flexibility on a non-interference basis, terrestrial operations fail because they would cause interference to aeronautical safety services operating in this band. Thus, the proposed flexible use of upper L-band is not consistent with Section 303(y).

B. Terrestrial Use of L-Band Would Cause Harmful Interference to Aviation Safety Communications.

The introduction of a terrestrial service to the upper L-band would cause interference to aviation safety communications. Commercial air transport aircraft regularly fly at altitudes above 40,000 feet, and the Concorde flies at 70,000 feet.[13] An aircraft at 40,000 feet is within the line of sight for a ground-based transmitter 283 nautical miles away. The Concorde can receive interference from terrestrial stations at a distance of 304 nautical miles. Terrestrial operations in the upper L-band will preclude the use of frequencies of aviation for more than 300

[12] ITU Radio Reg. S 4.10

[13] British Airways and Air France have announced that their Concordes will reenter service on November 7, 2001.

miles offshore.

This increased area in which aircraft can cause and receive interference led the FCC to prohibit the use of cell phones aboard aircraft.[14] Similarly, Motient recognizes that aviation and terrestrial systems cannot co-exist and proposes to reserve channels to meet its aeronautical service requirements.[15] Motient essentially agrees that a separate allocation of frequencies is required to accommodate aviation. INMARSAT, in its Response to Motient delineated the co-channel and adjacent channel interference that would result from terrestrial operations. These calculations of co-channel interference and INMARSAT's experience with adjacent-band mobile operations in Japan clearly establish that interference is a significant problem.[16]

The potential for interference is exacerbated by the lack of a current coordination agreement among the five operators in this band. The five systems will be competing for spectrum on the basis of squatters' rights and will be tempted to encroach on other operators' spectrum, which will increase the chances that interference will occur. Moreover, the lack of intersystem preemption may result in inadequate resources being available for aviation in times of crisis. One system may be filled with public correspondence—important to those using their phones, but not as important as the ability to communicate immediately with an aircraft in flight.

C. Land Mobile Terrestrial Operations in Upper L-Band Could Deter Aviation Investment in New Technology.

Congress recognized that while flexibility in allocations could spur innovation, the uncertainty that it creates might deter investment decisions and actually impede innovation.[17] The uncertainty as to future availability of L-band for aviation and the nature of the possible

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[14] 47 C.F.R §22.925. The FCC has granted a limited waiver of this rule to AirCell, conditioned on low power operations and other measures to minimize disruption to terrestrial cell patterns. AirCell, Inc., 15 FCC Rcd 9622 (2000).

[15] Motient Application, File No. SAT-ASG-20010302-00017, App. A at 35, 38.

[16] *See* Response of INMARSAT Ventures PLC, File No. SAT-ASG-20010302-00017 (May 21, 2001).

[17] *See* 1997-2 US Code Cong. §Admin News at 201.

interference that may result from land mobile systems will have an adverse effect on aviation development. The so-called flexibility might help Motient to sell cell phones, but it will also deter aviation investment in. and development of new technology for, this band and may foreclose the most practicable solutions to aviation security.

D. Flexible Use of the Upper L-Band Is Not In the Public Interest.

While flexible use of the upper L-band would deter aviation investment, cause interference to safety communications, and divert needed spectrum from oceanic communications, it would not add any significant communications capability or new technology. Urban areas are now served by the cellular technology proposed by Motient. Broadband mobile communications will be introduced as part of present and planned land mobile systems. The technology is not new; the service is now available.

In addition, preserving the upper L-band for MSS applications will not deprive rural America of mobile satellite service. The FCC has recently authorized INMARSAT to provide MSS to the domestic United States market.[18] INMARSAT does not claim a need for terrestrial base stations to serve this market as well as the international markets that it currently serves. Service to rural America thus does not depend on Motient's proposal. Indeed, to the extent that MSS resources—whether economic, spectral, or management—are diverted to the provision of cellular service to urban areas, Motient's current service to rural America might suffer.

Moreover, the problem associated with MSS coverage in urban areas was well understood by the Commission and by Motient's predecessors in the rulemaking that led up to this allocation. The Commission recognized Celsat's solution—dual mode phones—as a practical alternative to terrestrial use of the MSS allocations.[19] This solution is not new to

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[18] Comsat Corp., File No. ITC-97-222 *et al.*, FCC 01-272, released Oct. 9, 2001.
[19] NPRM ¶27.

Celsat; Motient's predecessors recognized the limitations of satellite communications in urban areas and proposed to use existing terrestrial cellular communications facilities in areas in which the satellite signal was blocked.[20] In this fashion, the MSS and terrestrial facilities are more efficiently used and the MSS operator is freed of the expense of creating and operating a redundant terrestrial system.

The FCC also recognizes the temptation of the MSS operator to concentrate on the larger terrestrial land mobile market to the detriment of the MSS market.[21] The Commission proposes that MSS operators must provide and maintain 100% satellite coverage of the United States, plus Puerto Rico and the Virgin Islands, as a condition for terrestrial operations. This requirement does not, however, meet aviation safety needs. The required coverage should include the Atlantic and Pacific Ocean regions, as well as the continental United States.

Even with these coverage requirements, the temptation will be great for the MSS operator to abandon or minimize its efforts to provide MSS and to concentrate on cellular service. At the end of the day, the hundreds of millions of dollars invested by aviation in the development of this service and the equipage of its aircraft would be for naught.

III. CONCLUSION

The terrorist attack on the United States will require additional security measures by the world's aviation community. Measures currently under consideration may require increased reliance on communications, including AMS(R)S communications in the upper L-band. The "flexibility" to employ terrestrial land mobile base stations in this band would not be consistent with the FCC's authority under Section 303(y) and is unnecessary given the alternatives available to the MSS systems to provide terrestrial service using existing terrestrial systems and

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[20] *See, e.g.,* Land Mobile Satellite Allocation Order, 2 FCC Rcd. 1825, 1843 (1986).
[21] NPRM ¶41.

the availability of alternative MSS networks to serve remote areas of the United States. Terrestrial land mobile operations in the upper L-band would degrade both the availability and quality of AMS(R)S facilities available for aviation safety and deter aviation investment in these facilities and new technologies that would rely upon L-band MSS. Insofar as the upper L-band is concerned, flexible use should not be permitted.

Respectfully submitted,

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