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

In the Matter of Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum For Government and Non-Government Use in the Radionavigation-Satellite Service	ET Docket No. 02-305 RM-10331

To: The Commission

COMMENTS OF THE BOEING COMPANY

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SUMMARY

The Commission should employ a general overarching principle with respect to many of the spectrum allocation decisions addressed this proceeding – whenever possible, the Commission should align the spectrum allocations in its domestic table of frequency allocations with the Final Acts of International Telecommunication Union, ("ITU") World Radiocommunication Conferences ("WRCs"). Harmonized global spectrum allocations benefit consumers and U.S. industry, particularly with respect to satellite services that can be provided on a global basis.

In supporting global spectrum harmonization, Boeing is not suggesting that the Commission should rubberstamp the decisions of recent WRCs. Boeing recognizes that some circumstances may require national provisions that diverge from international allocations in order to accommodate domestic policies and priorities. Most, if not all, of the spectrum allocation issues addressed in this proceeding, however, involve international allocations that were either supported, or sponsored, by the United States. Accordingly, their prompt incorporation into the domestic table would appear to be appropriate.

L-Band MSS Allocation

The Commission should move forward with the domestic adoption of a generic L-band allocation for the Mobile-Satellite Service ("MSS"). The Commission should also replace footnote US308 with a reference to Radio Regulations 5.357A and 5.362A. The Commission strongly supported the creation of a generic MSS allocation at WRC-97 and its domestic adoption can facilitate flexible and more efficient spectrum use, while protecting fully the safety of aeronautical communications services.

Aeronautical Telemetry Allocations

The Commission should eliminate the secondary aeronautical telemetry allocations in both the 1525-1535 MHz and the 2320-2345 MHz bands. The domestic introduction of other services into each of these bands has made them unusable for flight test operations.

The Commission should also recognize that the amount of spectrum available for flight test operations in the United States has become very limited. Therefore, the Commission should make a concerted effort to refrain from encumbering any remaining aeronautical telemetry spectrum allocations in the future.

1164-1215 MHz Band RNSS Allocation

The Commission should adopt a domestic allocation for the Radionavigation Satellite Service ("RNSS") over the entire 1164-1215 MHz band in order to facilitate spectrum sharing between multiple RNSS networks. Allocating the entire band to RNSS would be consistent with the principle that the Commission should, whenever appropriate, align its domestic frequency table with international allocations.

Boeing acknowledges that the 1164-1215 MHz band is already allocated in the United States for the aeronautical radionavigation service ("ARNS") and is part of the spectrum used for aircraft Distance Measuring Equipment ("DMEs"). The United States is proposing that WRC-03 adopt power limits on RNSS operations, however, that will protect adequately ARNS in the band. It is widely anticipated that these limits will achieve a consensus among participants at WRC-03. The Commission should acknowledge this anticipated consensus by adopting in its domestic regulations an RNSS allocation for the entirety of the 1164-1215 MHz band along with a coordination

requirement for RNSS networks that ensures the aggregate epfd from all systems does not exceed –121.5 dBW/m2/MHz in the band.

14.0-14.5 GHz Band Secondary MSS Allocation

The Commission should create a secondary allocation in the 14.0-14.5 GHz band for MSS (Earth-to-space) except AMSS, as adopted by WRC-97. In adopting a secondary MSS allocation that lacks an AMSS allocation, however, the Commission should expressly acknowledge the work that has been accomplished in the ITU study group process in demonstrating that a prohibition on AMSS is no longer necessary. In this regard, the United States has submitted a proposal to WRC-03 calling for the removal of the AMSS prohibition so that all forms of MSS, including AMSS, can be used to provide services to consumers on a secondary basis in the 14.0-14.5 frequency range.

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To: The Commission

COMMENTS OF
THE BOEING COMPANY

The Boeing Company ("Boeing"), by its attorneys and pursuant to Section 1.415 of the Commission's Rules, 47 C.F.R. § 1.415 (2001), respectfully submits these Comments in response to the above-captioned Notice of Proposed Rule Making ("*NPRM*") regarding, *inter alia*, domestic adoption of the Final Acts of International Telecommunication Union ("ITU") World Radiocommunication Conferences ("WRCs").

I. INTRODUCTION

Boeing is participating in this proceeding in its role as the world's largest manufacturer of commercial satellites and provider of launch services; as the global leader in the design and manufacture of commercial and military aircraft; and also as a satellite network licensee and service provider. Boeing relies on spectrum resources for a

variety of industrial functions and commercial purposes. Boeing holds more than six hundred FCC authorizations covering more than thirty thousand licensed emitters operating in more than six thousand frequency segments.

Boeing is the world's largest manufacturer of satellites and has produced state-of-the-art space and communications systems for military, commercial and scientific uses since 1961. These systems supply communications and meteorological observations for domestic and international customers and meet many of the military and scientific space system requirements of the U.S. government. Included among Boeing's products are communications satellites that support Mobile Satellite-Service ("MSS") systems in many of the bands allocated to that radio service.

Boeing is authorized by the Commission to launch and operate its own MSS network in the 2 GHz MSS band. Boeing also holds blanket FCC licenses for its Connexion by Boeing service, which operates in the Aeronautical Mobile-Satellite Service ("AMSS") in the United States on a non-conforming basis in the Ku-band. In addition, Boeing holds authorizations from other administrations to provide AMSS on aircraft in other regions of the world. Boeing has pending before the Commission applications to operate non-geostationary satellite networks ("NGSO") in order to provide fixed-satellite service ("FSS") in the Ku-band and augmentation services for the global positioning system ("GPS") in the GPS L1 and L5 bands.

Boeing also uses a number of spectrum allocations for the manufacture, testing and initial operation of commercial airplanes. For example, flight test spectrum is utilized to ensure the safety and reliability of new aircraft. Boeing installs and tests numerous communication and navigation systems in each aircraft in order to make them

compliant with the regulations of the FAA and other domestic and international aeronautical regulatory agencies. Moreover, Boeing also utilizes spectrum authorizations that support numerous Department of Defense programs for the development and testing of manned and unmanned military systems.[1]

II. AS A GENERAL PRINCIPLE, THE COMMISSION SHOULD STRIVE TO ADOPT DOMESTIC RULES THAT ARE CONSISTENT AND COMPATIBLE WITH THE INTERNATIONAL RADIO REGULATIONS

Many of the issues in this proceeding have a common thread; that is, to consider whether or not the U.S. should implement provisions that have been adopted by previous WRCs. On this question, we suggest a general principle that the Commission give appropriate recognition to the benefits that would be obtained through such alignment. It is a simple fact that radio communications do not stop at international borders. Instead, sovereign administrations have recognized since the early days of radio that coordination of spectrum allocations between countries is beneficial to all involved by helping to avoid harmful interference and to facilitate the manufacture of reception and transmission equipment that can be utilized in multiple regions. Enabling manufacturers to develop devices that can be sold in multiple countries promotes economies of scale that can lower prices and benefit consumers.

[1] Boeing holds spectrum assignments to fulfill government contracts involving such equipment as Fighters (F15, F/A-18E/F, F22), Transports (C-40, C-32A, Air Force One), Electronic Systems (Airborne Warning and Control System or AWACs), ABL (Airborne Laser), DREEM (Drone RF Electronic Enhancement Program), Cargo (C17), Helicopters (AH64D, RAH-66), Trainers (T-45TS), Missiles (JDAM (Joint Direct Attack Munition), CALCM (Conventional Air-Launched Cruise Missile)), UCAV (Unmanned Combat Air Vehicle), and various military systems such as JTRS (Joint Tactical Radio System), FCS (Future Combat Systems) and NMD (National Missile Defense).

Satellite systems, owing to their ability to cover large areas, often implicate cross-border, international coordination considerations. Terrestrial, aeronautical and maritime mobile radio services also involve terminals that can roam between jurisdictions, if the necessary spectrum allocations are appropriately harmonized. The Commission can benefit each of these radio communications services (and, along with them, U.S. industry and consumers) by harmonizing to the extent possible spectrum allocations between the U.S. and other countries through the prompt domestic adoption of international spectrum allocation decisions made at ITU WRCs.

Furthermore, in light of the important social and economic benefits that can be achieved through global spectrum harmonization, the Commission should adopt a policy of aligning its domestic allocations with the final acts of each ITU WRC as promptly as administratively feasible. Some of the spectrum allocation changes proposed in this *NPRM* are based on decisions made at WRC-97 more than half a decade ago. Far from controversial, most of the spectrum allocation issues discussed in the *NPRM* involve international spectrum allocation changes that the U.S. supported, and even championed, during international conferences.

Permitting lengthy delays between the completion of each WRC and the initiation of domestic harmonization efforts creates the potential for confusion in the international community about U.S. positions on issues currently under study for future WRCs. For example, two of the allocation issues addressed in the *NPRM* – the adoption of a RNSS allocation at 1164-1215 MHz and a secondary MSS allocation at 14.0-14.5 GHz – are the subject of recent studies that have led to U.S. proposals for WRC-03. The Commission must be careful to reflect accurately in any order released in this proceeding the current

U.S. position on these study items in order to ensure that other countries aligned with the U.S. do not misconstrue the Commission's order in this proceeding as a change in U.S. policy. Such misunderstandings could seriously undermine the international consensus that the U.S. delegation to WRC-03 will be relying upon at the conference in order to ensure the furtherance of U.S. interests.

Of course, in the future, the best solution would be to reliably complete the domestic harmonization process for the final acts of each WRC well in advance of the subsequent WRC. Such an approach would ensure that confusion and misunderstanding in the international community do not result.

At the same time, Boeing recognizes that some circumstances may require national provisions that diverge from international allocations in order to accommodate domestic policies and priorities. Boeing is not suggesting that the Commission blindly follow a strategy of harmonization that favors international conformity at the expense of important national requirements. Boeing observes, however, that most of the spectrum allocation issues presented in this proceeding appear to involve potentially beneficial harmonizations of international spectrum use, with, in most cases, little apparent impact on unique U.S. interests.

III. THE COMMISSION SHOULD COMPLETE IMPLEMENTATION OF INTERNATIONAL RULES RELATED TO THE MOBILE-SATELLITE SERVICE AT L-BAND

For many years the Commission has consistently supported the adoption of generic L-band MSS allocations that accommodate a range of communications requirements in a flexible and economic manner. That approach has been appropriately balanced through footnotes and regulatory provisions that ensure priority and preemption

for distress and safety-related communications operating in the band. Boeing therefore supports the Commission's proposal to change the domestic table of frequency allocations as indicated in Table 1 of the *NPRM*.[2]

The Commission requests comments on the need for retaining footnote US308 to the U.S. allocation table vis-à-vis related provisions (RR 5.357A and RR 5.362A) in the ITU Radio Regulations. Considering that the U.S. participated in the development of the aforementioned Radio Regulation provisions and that these provisions generally embrace the scope of US308, it would appear to be appropriate to remove US308 and instead incorporate by reference Radio Regulations 5.357A and 5.362A in the domestic table.

IV. THE COMMISSION SHOULD RECOGNIZE THAT THE SPECTRUM AVAILABLE FOR AERONAUTICAL TELEMETRY OPERATIONS IS BEING CONSTRAINED EXCESSIVELY

The Commission requests comment in its *NPRM* on whether it should eliminate the secondary aeronautical telemetry allocation in the band 1525-1535 MHz and leave in place a secondary aeronautical telemetry allocation in the 2320-2345 MHz band.[3] Boeing is a heavy user of aeronautical telemetry spectrum, performing flight test operations as a part of its commercial and governmental aircraft manufacturing and in the performance of many of its government defense contracts.

Despite Boeing's heavy use of flight test spectrum, Boeing believes the Commission should eliminate the secondary aeronautical telemetry allocations in both the 1525-1535 MHz and the 2320-2345 MHz bands. While the *NPRM* notes that Boeing is a

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[2] *See NPRM* ¶¶ 16, 20.

[3] *See id.*

licensee of flight test spectrum in the 2320-2345 MHz band,[4] the simple fact is – neither band remains usable for flight test operations due to Commission decisions to permit other services to operate in the same spectrum.

As the Commission correctly observes, there are currently no non-Federal Government flight test operations in the 1525-1535 MHz band because of potential interference from MSS operations in the band. Aeronautical telemetry is critical for the safe operation of aircraft, both with respect to the safety of aircraft flight crews and the general public. Any use of the 1525-1535 MHz band for aeronautical telemetry purposes is not advisable from a safety of flight consideration.

For the same reason, the Commission's allocation and licensing of the Satellite Digital Audio Radio Service ("DARS") in the 2320-2345 MHz band makes that band unusable for aeronautical flight testing. Accordingly, there appears to be no apparent basis for the Commission's tentative decision to preserve a secondary allocation for aeronautical telemetry in the band. Furthermore, aeronautical telemetry in the 1525-1535 MHz band cannot be relocated to the 2310-2385 MHz band, but rather should be relocated to the already crowded, but unconstrained 2360-2385 MHz spectrum segment.

In modifying these aeronautical telemetry allocations, the Commission proposes to relocate Federal Government flight test operations that are currently in the 1525-1535 MHz band to other frequency bands. Boeing supports this relocation, noting that non-Federal Government flight test operations have already been moved to the 1435-1525 MHz band.

Boeing observes, however, that there has been significant erosion in the amount of spectrum allocated to flight test operations in the past decade. As a result, commercial

[4] *See id.* ¶ 46 n.66.

and governmental flight test operations in the United States are confined to very limited spectrum segments. Any further erosion of flight test spectrum could compromise critical testing that is necessary to validate new and derivative aircraft to meet certification requirements, along with the timely delivery of U.S. defense systems. Therefore, the Commission should resist strongly any efforts to eliminate any additional aeronautical telemetry allocations beyond those that are discussed in the instant *NPRM*. Furthermore, the Commission should not encumber any of the remaining flight test spectrum allocations in the domestic table by allowing any additional services to introduce new sources of interference that constrains aeronautical telemetry operations in the United States.

V. THE COMMISSION SHOULD ADOPT AN ALLOCATION IN THE DOMESTIC TABLE FOR THE RADIONAVIGATION SATELLITE SERVICE FOR THE ENTIRE 1164-1215 MHz BAND

The Commission proposes in its *NPRM* to adopt a domestic allocation for Radionavigation Satellite Service ("RNSS") over the band 1164-1189 MHz to accommodate previously identified GPS L5 spectrum requirements.[5] Boeing agrees that, at a minimum, the proposed domestic allocation must be made to facilitate this important potential service. The Commission should also take the additional step of providing domestic provisions for RNSS over the entirety of the 1164-1215 MHz band as adopted by WRC-2000.

[5] *See id.* ¶¶ 32-37 & 39-41.

Previously, Boeing filed comments expressing its support for the full L5 allocation.[6] Since that time, Boeing's position has not wavered. Boeing is aware that the NTIA recommended that only a portion of the band (1164-1188 MHz) be allocated to RNSS and requested the Commission to "defer" action on the rest of the allocation.[7] NTIA indicated that a partial allocation would be adequate because the GPS "only intends to use 1164-1188 MHz for RNSS, at this time."[8]

While the United States may not have any plans to utilize the upper portion of the L5 spectrum for GPS in the immediate future, allocation of the entire band for domestic RNSS use could facilitate spectrum sharing between multiple satellite systems. In addition to Boeing's proposal for a satellite-based GPS augmentation service,[9] other countries are actively attempting to develop RNSS networks that would seek to use portions of the spectrum on a global basis. In fact, United States government agencies are actively working with foreign administrations to assure interoperability and compatibility of these new RNSS networks with GPS and GNSS. Failure to allocate the entire band would send a mixed message to those administrations that have indicated plans to utilize that spectrum. In order to enable all of these proposed systems to operate

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[6] *See Letter from John B. Hayhurst, President, Boeing Air Traffic Management, to Ed Thomas, Chief, FCC Office of Engineering and Technology*, (June 25, 2002) (addressing FCC RM-10331).

[7] *Letter from William T. Hatch, Associate Administrator, Spectrum Management, NTIA, to Bruce Franca, Acting Chief, Office of Engineering and Technology, Federal Communications Commission*, at Attachment 1 (July 18, 2001).

[8] *Id.*

[9] *See id.*, Attachment 2, at 2.

on a cooperative basis, the Commission should adopt a domestic allocation that mirrors the international allocation and maximizes the spectrum available for RNSS.

Furthermore, adoption of the full allocation would be consistent with the general principle that the Commission should align its domestic allocations with international allocations whenever such alignment does not result in any unique harm to domestic considerations. The United States has frequently encouraged other ITU member administrations to support international spectrum allocations for satellites and other services regardless of whether those administrations had any unique vested interest in the allocation in question. Recognizing the global economic and social benefits that can be achieved through harmonized spectrum allocations, the Commission should apply the same principle in this case. No reason exists for the Commission to refrain from adopting the full international allocation as established by WRC-2000. Therefore, the Commission should set an example for the international community by aligning its domestic spectrum allocation for the 1164-1215 MHz band with the international frequency table.

Boeing acknowledges that the 1164-1215 MHz band is already allocated in the United States for the aeronautical radionavigation service ("ARNS") and is part of the spectrum used for such important services as aircraft Distance Measuring Equipment ("DMEs"). Evolving studies in the ITU preparatory arenas leading to WRC-03, however, are showing a clear path to accommodating both RNSS and ARNS in this part of the

spectrum.[10] Thus, although WRC-2000 adopted measures that were provisional in nature regarding the level of protection that RNSS must provide to ARNS systems, the RNSS allocation itself was not provisional.[11] Instead, appropriate power limits to protect ARNS can be expected to be adopted by WRC-03.

The Commission should recognize the advance stages of work and consensus that already exist in the ITU study group process and incorporate this work into its domestic regulations. Specifically, the Commission should adopt the RNSS allocation for the entirety of the band 1164-1215 MHz along with a coordination requirement for RNSS networks that ensures the aggregate epfd from all systems does not exceed –121.5 dBW/m2/MHz in the band, consistent with US proposals to WRC-03.[12] Such a regulatory requirement would protect adequately ARNS in the 1164-1215 MHz band,

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[10] Working Party 8D adopted a draft new recommendation (ITU-R M.[RNSS1] on protection criteria for ARNS with respect to aggregate emissions from RNSS space services in the band 1164-1215 MHz. It also adopted a draft new recommendation (ITU-R M.[RNSS2]) on the methodology for calculating aggregate interference from all RNSS systems in order to protect ARNS in the band. When the CPM met in November, it recommended to WRC-03 a universally agreed value for aggregate epfd to protect ARNS systems from RNSS and converged on a single recommended regulatory process to coordinate among RNSS systems to ensure that the aggregate epfd value is not exceeded, in practice. *See CPM Report to the 2003 World Radiocommunication Conference (WRC-03)*, § 1.2 (Nov. 29, 2002) ("*WRC-03 CPM Report*").

[11] WRC-2000 provisionally decided that the *provisional* value of aggregate *power flux density* for protection of ARNS systems from interference from RNSS systems would be -115 dBW/m2/MHz. *See* ITU Radio Regulation 5.328A (WRC-2000). Subsequent studies have refined the calculation method and recommended that the level of protection be –121.5 dBW/m2/MHz as a maximum aggregate *equivalent power flux density (epfd)* – the latter term derives from a methodology applicable to interference calculations involving non-geostationary satellite systems as are prevalent in the RNSS. *See WRC-03 CPM Report*, § 1.2.1.2.1.

[12] See US Proposals to the World Radiocommunication Conference (WRC-03) on agenda item 1.15, referring to Resolution 605. Assuming that WRC-03 adopts the US proposal, it may be possible for the Commission to simply incorporate the appropriate references from the Radio Regulations in its Rules.

permitting the Commission to allocate the entire band to RNSS on a consistent basis with the international community.

VI. IN ADOPTING A SECONDARY MSS ALLOCATION IN THE 14.0-14.5 GHz BAND, THE COMMISSION SHOULD ACKNOWLEDGE CURRENT EFFORTS TO BROADEN THE ALLOCATION TO INCLUDE AMSS

Boeing supports the Commission's proposal to create a secondary allocation in the 14.0-14.5 GHz band for MSS (Earth-to-space) except AMSS.[13] As the Commission observes, the United States championed this proposal at WRC-97 because it permits the provision of new types of satellite services to consumers without causing harmful interference to other authorized spectrum users in the band.

In adopting a secondary MSS allocation that lacks an AMSS allocation, however, the Commission should expressly acknowledge the work that has been accomplished during the past six years in demonstrating that continued maintenance of a prohibition on AMSS is unnecessary in the band. Specifically, pursuant to Resolution 216 (Rev. WRC-2000) and Agenda Item 1.11 of WRC-03, domestic and international study groups have determined that appropriately designed AMSS systems can operate on a secondary basis in the 14.0-14.5 GHz band without causing harmful interference to other authorized services.

Recognizing these efforts, the United States is submitting a proposal to WRC-03 to remove the prohibition on AMSS that is now included in the international secondary allocation for MSS in the 14.0-14.5 GHz band, thus permitting all forms of MSS, including AMSS, to be provided on a secondary basis in the 14.0-14.5 frequency range. The proposal observes that broadening the secondary MSS allocation to include AMSS

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[13] *See NPRM* ¶ 107.

would be helpful to meet the growing demand for two-way broadband data and communications capabilities for commercial aircraft passengers and crew.

In order to avoid confusion about the position of the United States on Agenda Item 1.11, the Commission should expressly acknowledge these findings and the U.S. proposal in any order released in this proceeding in advance of WRC-03. Without such express acknowledgement, confusion may result among other ITU member administrations regarding the level of commitment of the United States toward the successful adoption of an international allocation at WRC-03 that permits the provision of AMSS on a secondary basis in 14.0-14.5 MHz spectrum.

VII. CONCLUSION

Boeing urges the Commission to promptly adopt that above discussed changes to the United States Table of Frequency Allocations in order to align the domestic allocation table with international spectrum uses and, in doing so, help facilitate growth in the

United States satellite and telecommunications industries through the provision of new communication services throughout the world.

Respectfully submitted,

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