

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)
)
Recommendations Approved By The) IB Docket No. 04-286
Advisory Committee For The 2015 World)
Radiocommunication Conference)

To: The Commission

**COMMENTS OF
THE BOEING COMPANY**

The Boeing Company (“Boeing”) provides these comments in response to the Federal Communications Commission’s request for comment on its Public Notice regarding recommendations approved by the 2015 World Radiocommunication Conference Advisory Committee (“WAC”).¹ Boeing is a world-leading developer and manufacturer of aeronautical and satellite systems, both of which are critically dependent on reliable, protected, global spectrum allocations. Several of the Agenda Items under consideration for WRC-15 have the potential to profoundly affect the future of these industries. Boeing therefore has participated actively in the WAC process, including chairing one of the constituent working groups, and it appreciates the opportunity to further elaborate on its recommendations. Specifically, Boeing supports and provides comments the following WAC items:

- WAC Item 110
- WAC Item 113 (View A)
- WAC Item 115 (View A)
- WAC Item 116 (View A)
- WAC Item 118 (View B)

¹ *FCC Seeks Comments on Recommendations Approved by the Advisory Committee for the 2015 World Radiocommunication Conference*, IB Dkt No. 04-286, Public Notice, DA 15-604, (rel. May 21, 2015).

I. WAC ITEM 110: ADOPT A GLOBAL WAIC ALLOCATION

Boeing strongly endorses the draft proposals contained in WAC Item 110 regarding Agenda Item 1.17 to add an Aeronautical Mobile (Route) Service (“AM(R)S”) allocation in the 4200–4400 MHz band in support of wireless avionics intra-communications (“WAIC”).² As Boeing and other major aerospace industry representatives have explained, WAIC will increase the safety and efficiency of aircraft operation by substituting some portion of voluminous aircraft wiring with short range wireless systems.³ WAIC systems are safer because they reduce cabling and mechanical stress on the wires and provide for dissimilar redundancy. WAIC technology also makes aircraft operations more efficient by replacing up to thirty percent of onboard wires with lightweight wireless connections. With the total weight of wiring and fixtures on modern passenger aircraft exceeding six tons, this substantial savings can improve fuel efficiency, thus providing environmental benefits and cost savings to manufacturers and operators. Obviously, given the international nature of aviation, WAIC will only be feasible if the proposed AM(R)S allocation is adopted globally.

It should also be noted that at the recent Conference Preparatory Meeting for WRC-15 (CPM), a global consensus was achieved on this Agenda Item. The CPM Report provides a single Method to resolve Agenda Item 1.17, and WAC Item 110 is aligned with this agreed approach. Therefore, Boeing urges the Commission to support WAC Item 110.

² *Public Notice*, Attachment A at 3.

³ Presentation of the Aerospace Vehicle Systems Institute for Working Parties 5A, 5B, 5C, “Agenda Item 1.17 Wireless Avionics Intra-Communication” (May 23, 2012) (available at <https://www.itu.int/ITU-R/study-groups/docs/workshop-wp5abc-wrc15/WP5ABC-WRC15-P2-5.pdf>).

II. WAC ITEM 113 (VIEW A): PROTECT EARTH SENSING

Boeing supports View A of WAC Item 113, which calls for mandatory limits on IMT emissions to ensure protection of passive earth exploration satellite services (“EESS”) in the 1400–1427 MHz frequency band.⁴ View A concurs with the NTIA proposal regarding this band,⁵ which specifies the maximum unwanted emissions from IMT operations in the adjacent band into the 1400–1427 MHz band, based on the findings of Report ITU-R RS.2336.

As NTIA notes, this spectrum is used for numerous valuable U.S. scientific missions,⁶ in addition to the many U.S. private sector experimental operations being conducted in the band, including both EESS and other developmental and testing programs.⁷ The U.S. aerospace industry has built major components of earth sensing satellites operating in the 1400–1427 MHz band, which were launched by the U.S. or by other administrations.⁸ Thus, failure to support the NTIA proposed limits could compromise important U.S. research and development progress as well as undermine U.S. competitiveness in the satellite industry.

The NTIA proposal also has strategic value in that strong support for protection of the 1400–1427 MHz band would signal U.S. solidarity with efforts to align support for the related goal of No Change to RR 5.343, which provides that “the use of the band 1435–1525 MHz by

⁴ *Public Notice*, Attachment A at 22.

⁵ *Public Notice*, Attachment A at 22; Letter from Paige R. Atkins, Associate Administrator, Office of Spectrum Management, NTIA to Mindel De La Torre, Chief of the International Bureau, Federal Communications Commission (Apr. 1, 2015) (“*NTIA Agenda Item 1.1 Proposal*”).

⁶ *Id.* at 2.

⁷ *See* Office of Engineering and Technology, Experimental Licensing System (displaying dozens of licenses granted in the 1400-1427 MHz band within the past five years).

⁸ *Public Notice*, Attachment A at 22.

the aeronautical mobile service for telemetry has priority over other uses by the mobile service.” Thus, Boeing urges the Commission to adopt View A, consistent with the needs of U.S. public and private sector experimental missions and other U.S. negotiating positions.

III. WAC ITEM 115 (VIEW A): PROTECT RADIO ALTIMETRY AND FSS DOWNLINKS

Boeing also supports View A of WAC Item 115, which advocates for No Change in the 4400–4990 MHz band in all three ITU Radio Regions.⁹ Any change to this band could negatively affect radio altimeters and C-band downlinks for the Fixed-Satellite Service (“FSS”), both of which are inherently global services and must remain harmonized.

As View A explains, the frequency band immediately adjacent to this band (4200–4400 MHz) is the only allocation to the aeronautical radionavigation service that is reserved exclusively for radio altimeters.¹⁰ Radio altimeters are an essential component of the safe operation of aircraft, including precision approach, landing, ground proximity, and collision avoidance systems. In addition, as noted in section 4.1.9.4 of the CPM Report, no studies have been completed regarding protection of radio altimeters from emissions from IMT operating in the frequency band 4400–4900 MHz.¹¹ Thus, the safety of passengers and aircraft cannot be guaranteed if IMT operations are introduced in this adjacent band.

Additionally, Boeing supports No Change to this worldwide allocation to ensure continued global FSS operations in the band, as well as for aeronautical mobile use in the majority of the 4400–4990 MHz band also as detailed in View A of WAC Item 115. The C-

⁹ *Public Notice*, Attachment A at 49.

¹⁰ 47 C.F.R. § 2.106.

¹¹ Report of the CPM on Operational and Regulatory/Procedural Matters to the World Radiocommunication Conference 201 at 58 (“CPM Report”).

band is a mature satellite service spectrum allocation that is intensively used worldwide to support a wide variety of industries, including broadcasting, air traffic management, and disaster response.

Thus, Boeing urges the Commission to ensure global protection for aircraft navigation and C-band FSS by adopting a No Change position on this portion of Agenda Item 1.1. Boeing cautions that proposals such as View B, which would limit No Change to Region 2 only,¹² would be insufficient. Aviation and satellite services are global by nature and effective operation requires harmonized protection across all three ITU Radio Regions as indicated in “resolves 2” of Resolution 233 (WRC-12), which notes the need for harmonization and the protection of existing services.¹³ Harmonization is also seen as “highly desirable” with regard to IMT operation because it will help “achieve global roaming and economies of scale.”¹⁴ Since View B would not provide harmonization for either IMT or satellite and aeronautical services, Boeing urges the Commission to adopt View A on WAC Item 115.

IV. WAC ITEM 116 (VIEW A): PROTECT FSS DOWNLINK

Boeing supports View A of WAC Item 116, which advocates for No Change across all three ITU Radio Regions under Agenda Item 1.1 for the 5925–6425 MHz band.¹⁵ View A notes that no plan currently exists that 1) ensures continued satellite access, 2) protects existing

¹² *Public Notice*, Attachment A at 53.

¹³ *See* Comments of SIA, IB Docket No. 04-286, at 3 (“*SIA Comments*”) (citing Resolution 233 (WRC-12), *Studies on frequency-related matters on International Mobile Telecommunications and other terrestrial mobile broadband applications*).

¹⁴ World Radiocommunication Conference 2015 (WRC-15) Agenda and Relevant Resolutions at 69 (WRC-12 Resolution 233(j)) (available at https://www.itu.int/dms_pub/itu-r/oth/12/01/R1201000014A01PDFE.pdf) (“*WRC-15 Agenda*”).

¹⁵ *Public Notice*, Attachment A at 59.

U.S. satellite receive operations in all three ITU Regions, 3) addresses two-way compatibility issues, and 4) does not constrain future growth for FSS in the 5925–6425 MHz band. Consequently, it would be unwise to contemplate introduction of IMT into the band at this time.

Resolution 233 (WRC-12) calls for “the need to protect existing services when considering frequency bands for possible additional allocations to any service.”¹⁶ As the CPM Report stated with respect to this frequency band, however, ITU-R “studies showed that GSO FSS space networks would be subjected to excessive levels of interference from the aggregate operation of IMT-Advanced (small cell) base stations, irrespective of whether they are deployed outdoors or indoors.”¹⁷

Moreover, it is not clear that IMT operations would be feasible due to existing intensive use of the band by FSS Earth stations. A Draft New Report designated ITU-R [FSS-IMT CBAND UPLINK] speculates that FSS transmitting Earth stations and indoor IMT-Advanced small cells may, under certain conditions, be capable of operating in the same frequencies with no specific separation distance without FSS earth stations causing interference to IMT operations. As SIA notes, however, “the Report recognized that protection of IMT operations from interference could not be assured” in a “typical operating condition” where “the bandwidth of the FSS carrier is larger than the bandwidth of the IMT-Advanced channel or larger than the aggregate bandwidth of the combined IMT-Advanced channels.”¹⁸

As explained above, FSS operations are inherently global and provide service to large areas encompassing the territory of multiple administrations. FSS operations also require a

¹⁶ Resolution 233 (WRC-12), Studies on frequency-related matters on International Mobile Telecommunications and other terrestrial mobile broadband applications.

¹⁷ CPM Report, Section 1/1.1/4.1.13.2.

¹⁸ *SIA Comments* at 6.

high degree of uniformity in order to ensure protection and reliable operation. Indeed, U.S. satellites authorized to receive transmissions in the 5925–6425 MHz band operate at orbital locations serving all three ITU Radio Regions. Therefore, Boeing urges the Commission to adopt WAC Item 116 View A.

V. WAC ITEM 118 (VIEW B): DEVELOP AN EMPIRICAL RECORD AND TAKE EXISTING SERVICES INTO ACCOUNT

Boeing supports View B of WAC Item 118, (Rev.1) which recommends taking the time required to develop the data necessary to analyze the impact of potential allocation changes above 6 GHz, such as the addition of allocations to accommodate IMT, as discussed in Agenda Item 1.10. Specifically, Boeing joins SIA in supporting a two-step approach during the next two WRCs. At WRC-19, delegates should establish IMT station and system characteristics in bands above 6 GHz and during WRC-23, delegates could use these findings to establish protection criteria that take into account actual system characteristics and existing uses.¹⁹

As SIA notes, 5G technology is still in the development stage²⁰ and the system characteristics for above-6 GHz IMT are unclear at this time. Without defined and stable parameters for 5G systems, it will not be possible to perform the compatibility studies necessary to make determinations about possible allocations and sharing scenarios for IMT.

Furthermore, View A does not reflect the balance of interests between new proposed mobile broadband uses and currently existing services. As View A explains, Resolution 233 from WRC-12 called for protection of existing services, and sharing and compatibility studies involving services with existing allocations in both the potential candidate bands and adjacent

¹⁹ *Public Notice*, Attachment A at 95; SIA Comments at 7-9.

²⁰ *SIA Comments* at 8.

bands (taking into account current/planned usage by existing services and studies already performed in the ITU-R).²¹ As written, View A does not reflect the specificity or depth of study of the sharing and compatibility implications for new IMT services. Thus, Boeing recommends that the Commission adopt View B.

VI. CONCLUSION

Boeing urges the Commission to support the adoption of these WAC views as the FCC's recommendations for U.S. proposals to WRC-15 as soon as practicable in order to begin securing the support of other Administrations in advance of the Conference. These proposals will advance the interests of the United States by ensuring a stable and efficient spectrum policy for aerospace and satellite operations. This will serve the public interest by promoting greater investment and spurring the development and deployment of new services to consumers.

Respectfully submitted,

THE BOEING COMPANY

By:



Audrey L. Allison
Senior Director, Frequency Management Services
The Boeing Company
929 Long Bridge Drive
Arlington, VA 22202
(703) 465-3215

Bruce A. Olcott
Preston N. Thomas
Jones Day
51 Louisiana Ave. NW
Washington, D.C. 20001
(202) 879-3630

Its Attorneys

June 11, 2015

²¹ *Public Notice*, Attachment A at 94; *WRC-15 Agenda* at 68.