

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, DC 20554

In the Matter of

Amendment of the Commission's Rules with )  
Regard to Commercial Operations in the 1695- ) GN Docket No. 13-185  
1710 MHz, 1755-1780 MHz, and 2155-2180 )  
MHz Bands )

To: The Commission

**COMMENTS OF  
THE BOEING COMPANY**

The Boeing Company (“Boeing”) provides these comments in response to the Commission’s Notice of Proposed Rulemaking (“NPRM”) regarding spectrum for the Advanced Wireless Service (“AWS-3”).<sup>1</sup> Boeing is the world’s largest aerospace company and a world leader in space and satellite operations, including the development of commercial human spaceflight. Boeing is also a trusted developer and manufacturer of commercial and military aircraft. Boeing understands from long experience that reliable access to spectrum is a key prerequisite for innovators who develop new products and for the customers who depend on them. As a result, Boeing has a significant interest in proceedings that affect spectrum critical to on-orbit spaceflight operations and flight testing programs, such as the 2025-2110 MHz band used for the Tracking and Data Relay Satellite Service (“TDRSS”) and the 2360-2395 MHz band used for Aeronautical Mobile Telemetry (“AMT”). Boeing therefore joins with other

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<sup>1</sup> *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands, GN Docket No. 13-185, Notice of Proposed Rulemaking and Order on Reconsideration, FCC 13-102 (rel. July 23, 2013) (“NPRM”).*

representatives of the aerospace industry to caution the Commission that the drive for additional commercial wireless spectrum cannot be allowed to disrupt the many, varied, and vital services currently operating in these bands.

Boeing recognizes the importance of providing adequate spectrum for commercial wireless operations to keep pace with the demand for mobile service, and generally supports the Commission's proposals for the 1695-1710 MHz, 1755-1780 MHz, 2020-2025 MHz, and 2155-2180 MHz bands that form the AWS-3 band. Such expansion, however, must not come at the expense of the United States' scientific and industrial leadership in cutting-edge aerospace development. Boeing therefore urges the Commission to refrain from considering any high-density commercial wireless allocation in the 2025-2110 MHz TDRSS band or the 2360-2395 MHz AMT band.

#### **I. TDRSS PLAYS A CRITICAL ROLE IN CURRENT AND FUTURE SPACE OPERATIONS AND MUST BE PROTECTED FROM INTERFERENCE**

The TDRSS service has been in operation for more than 30 years and continues to be a "critical lifeline" in an incredibly wide variety of scientific, commercial, and military missions.<sup>2</sup> The programs supported by TDRSS include dozens of platforms for Earth science<sup>3</sup> and space science research.<sup>4</sup> TDRSS is also a portion of the critical communications path for Federal and

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<sup>2</sup> *TDRS: Communicating Critical Data*, Goddard Space Flight Center (available at <http://www.redorbit.com/news/video/space/2/1112754102/tdrs-communicating-critical-data-12262012/>).

<sup>3</sup> *Id.* (noting that Earth science missions supported by TDRSS include AQUA, AURA, EO-1, GPM, Landsat-5, Landsat-7, LDCM, NPP, OCO-2, SMAP, SORCE, SPTR, TERRA, TRMM).

<sup>4</sup> *Id.* (noting that space science missions supported by TDRSS include AIM, high-atmosphere instrument balloons, CINDI, FGST, Galex, HST, MMS, NuStar, RBSP, the SCan Test, SDA, Swift, THEMIS, TIMED, and WISE).

commercial launch operations<sup>5</sup> and the International Space Station (“ISS”),<sup>6</sup> as well as near-future commercial manned spaceflight operations planned by Boeing and other United States commercial space companies. In short, TDRSS will continue to be a critical workhorse of United States scientific and commercial progress for the foreseeable future. Although its longstanding service makes it easy to take these communications for granted, reliable access to TDRSS is a fundamental assumption of current and planned space operations for commercial and Federal users. In turn, the availability, capacity, and proven operational history of TDRSS depends on reliable, interference-free access to the 2025-2110 MHz band, and the Commission should ensure that its spectrum allocation decisions protect this critical spectrum.

Boeing supports the comments of NTIA and AIA in their unequivocal statements that high-density terrestrial operations in the 2025-2110 MHz band could significantly disrupt this critical service and cannot be permitted. As the NPRM acknowledges, a NASA Feasibility Assessment shows that “high-density terrestrial base stations or user equipment operating co-frequency in the 2025-2110 MHz band will exceed established protection criteria for the TDRSS spaceborne receivers.”<sup>7</sup> The comments of AIA explain that “sharing for bands 2025-2110 MHz...is unacceptable to AIA due to ongoing satellite operations already in those bands.”<sup>8</sup> Boeing also explained, in comments in the Commission’s proceeding on the commercial use of

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<sup>5</sup> *Id.* Most major United States launch vehicles rely on TDRSS support, including the United Launch Alliance Atlas V, the Boeing Delta IV, the Orbital Sciences Corporation Minotaur IV & V, and the Space-X Falcon 9, among others.

<sup>6</sup> *See id.* In addition to communications with the ISS itself, TDRSS supports the critical resupply vehicles that serve the station, including the Orbital Sciences Corporation Cygnus vehicle, the Space-X Dragon 2, the European Space Agency’s ATV missions, the Japanese HTV-3

<sup>7</sup> NPRM, ¶ 21.

<sup>8</sup> *Comments of AIA*, GN Docket 13-185 at 3 (Sep. 16, 2013).

space, that “TDRSS is a critical communications link for both Federal and commercial on-orbit operations. The Commission should therefore refrain from authorizing such AWS-3 operations unless it establishes service rules or license conditions sufficient to protect these TDRSS operations.”<sup>9</sup> Boeing joins with NTIA and AIA in renewing these concerns here.

Despite the intensive and important uses of this band, CTIA appears to seek “full and complete clearing” of Broadcast Auxiliary Service (“BAS”) and the Federal space services from the upper 15 MHz of the band (*i.e.* 2095-2110 MHz).<sup>10</sup> CTIA claims that the Commission should work with NTIA and Federal users to “understand the need” for NASA and other Federal users to have access to the entire 2025-2110 MHz band.<sup>11</sup> The critical need, however, is already evident in the record. As explained at length by NTIA, AIA, and Boeing, space operations require the entire 2025-2110 MHz band, including the 2095-2110 MHz subband, to support critical TDRSS communications with Federal and commercial satellites and space stations, and will be an integral element of commercial manned spaceflight programs undertaken by United States companies in the near future.

Although CTIA seeks sharing of the band, which the NASA study has demonstrated to be unfeasible, CTIA suggests that complete clearing of the band “should be the goal.”<sup>12</sup> Of course, to the extent that this subband is used by TDRSS or by systems that communicate with TDRSS, such clearing is impossible. It goes without saying that in-orbit hardware cannot be modified to accommodate such a change, and the vital programs that rely on TDRSS communication cannot

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<sup>9</sup> *Comments of The Boeing Company*, ET Docket No. 13-115 at 15 (Aug. 30, 2013).

<sup>10</sup> *Id.*

<sup>11</sup> *CTIA Comments* at 13.

<sup>12</sup> *Id.*

be disrupted, either by reallocation or by the operation of high-density terrestrial operations in the band. Therefore, the Commission should continue to support this critical and longstanding service, and refrain from authorizing high-density terrestrial services in any part of the 2025-2095 MHz band.

## **II. AERONAUTICAL MOBILE TELEMETRY SPECTRUM SERVES SENSITIVE FLIGHT TEST PROGRAMS AND IS NOT A CANDIDATE FOR SPECTRUM SHARING WITH COMMERCIAL WIRELESS SERVICE**

Boeing supports the comments of the Aerospace & Flight Test Radio Coordinating Council (“AFTRCC”) noting that the 2360-2395 MHz Aeronautical Mobile Telemetry (“AMT”) band is not an appropriate candidate for reallocation or sharing with commercial wireless services.<sup>13</sup> The NPRM notes that the Society of Broadcast Engineers has suggested that portions of the 2360-2390 MHz may be studied for commercial wireless use instead of the 2025-2110 MHz band, which supports BAS and TDRSS, among many other services.<sup>14</sup> As AFTRCC recently explained in the commercial use of space proceeding, however, “spectrum requirements for flight test telemetry have increased dramatically due to more comprehensive flight test procedures and the use of high-data rate telemetry links during test operations.”<sup>15</sup> Flight test operations require exceedingly low noise and high reliability that is incompatible with high-density commercial operations. Indeed, the flight test community recently agreed to spectrum sharing with the Medical Body Area Networks (“MBANs”) service to accommodate increased demand for spectrum while also ensuring that critical flight test operations are protected. Boeing

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<sup>13</sup> *Comments of Aerospace and Flight Test Radio Coordinating Council Coordinating Council*, GN Docket 13-185 (Sept. 16, 2013).

<sup>14</sup> *NPRM*, ¶ 21.

<sup>15</sup> *Comments of Aerospace and Flight Test Radio Coordinating Council Coordinating Council*, ET Docket No. 13-115 (Aug. 30, 2013).

agrees that the 2360-2395 MHz band is not a suitable candidate for commercial wireless service, and the Commission should decline SBE's suggestion to study the AMT band for that purpose.

### III. CONCLUSION

Keeping pace with the growth of commercial wireless service need not, and should not, come at the cost of compromising the reliability of critical aerospace operations. Essential space operations such as TDRSS use the entire 2025-2110 MHz band, including the upper 15 MHz, to support important scientific research, government programs, and cutting-edge human commercial spaceflight development. The Commission should heed the unequivocal recommendations of NASA and the aerospace industry that no high-density commercial operations should be introduced into this intensively used spectrum. Similarly, the highly sensitive flight test operations in 2360-2395 MHz AMT band require low interference and close coordination, which are not possible with high density commercial operations. The Commission should therefore also decline suggestions to investigate portions of the AMT band for commercial wireless use.

Respectfully submitted,

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