To: The Commission

REPLY COMMENTS OF
THE BOEING COMPANY

The Boeing Company (“Boeing”) provides these reply comments in response to the Commission’s Notice of Proposed Rulemaking regarding the spectrum needs of wireless microphone users.1 Boeing’s interest in this proceeding is both as a user of wireless microphones,2 and, more importantly, as a world-leading aerospace systems developer and manufacturer that depends on flight test spectrum. Boeing supports the Commission’s proposal for formalizing more routine access to the aeronautical mobile telemetry (“AMT”) spectrum allocation at 1435-1525 MHz for use on a secondary licensed basis by wireless microphones,


2 See Comments of The Boeing Company, WT Docket No. 08-167 et al. (Jan. 25, 2013) (“Boeing Wireless Microphone Comments”).
under carefully coordinated conditions. Boeing opposes, however, the suggestion of CTIA that broadband wireless services could operate in the 1435-1525 MHz AMT spectrum allocation.\(^3\)

As previously explained by the Aerospace and Flight Test Radio Coordinating Council (“AFTRCC”) and by Boeing, co-frequency operation of commercial broadband wireless services is completely incompatible with the extremely low noise and high reliability requirements of flight testing. Thus, although Boeing supports the Commission’s proposal to develop carefully structured co-frequency sharing between AMT and low-power, site-specific uses such as wireless microphones and medical body area networks (“MBANS”),\(^4\) the Commission should not consider any proposals to permit commercial wireless services or other high-power or high-bandwidth services in critical AMT spectrum.

I. COMMERCIAL WIRELESS SERVICE IS INHERENTLY INCOMPATIBLE WITH THE PERFORMANCE DEMANDS OF FLIGHT TESTING OPERATIONS

Flight testing is a safety-of-life operation that requires exceedingly low noise and high reliability, characteristics that are incompatible with interference from co-frequency high-density commercial operations. The Commission has repeatedly recognized aeronautical flight testing as a safety-of-life service. More than twenty years ago, the Commission affirmed that aeronautical flight test and telemetry operations should not share spectrum with uncoordinated devices “because of the threat to safety of life.”\(^5\) The Commission has also recognized that

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\(^3\) Comments of CTIA, GN Docket Nos. 14-166, 12-268, at 43 (Feb. 4, 2015) ("CTIA Comments").


“aeronautical telemetry bandwidth requirements have significantly increased in recent years as aircraft manufacturers collect increasing amounts of data and video concerning the performance of prototype aircraft.”

More recently, NTIA concurred in its draft proposals for the United States to the 2015 World Radiocommunication Conference ("WRC-15") that the AMT band is "critical for aerospace research and development, and aircraft safety standards certification" and that "[f]light testing requires real-time data for the protection of the pilot and aircrew, test aircraft, and people and property on the ground." The NTIA emphasized that flight testing requires "interference-free frequency bands to minimize the chance of disruption to critical safety communications." NTIA also noted that "the use of the band 1435-1525 MHz for aeronautical mobile telemetry (AMT) systems is essential for the aerospace manufacturing industry in the Americas."

Boeing therefore strongly opposes the apparent attempt by CTIA to use this proceeding as an occasion to urge the Commission to examine "suitability" of the 1435-1525 MHz band to

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6 Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258; Amendments to Parts 1, 2, 27 and 90 of the Commission’s Rules to License Services in the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands, WT Docket No. 02-8, Fourth Notice of Proposed Rulemaking, 18 FCC Rcd 13235, 13260, ¶ 52 (2003).

7 FCC Seeks Comment on Recommendations Approved by the Advisory Committee for the 2015 WRC, Public Notice, DA 14-88, Attachment 2 at 7 (Jan. 28, 2014) ("NTIA WRC-15 Draft Proposals") (noting that “[a]dministrations performing such flight testing require transmission of this data in interference-free frequency bands to minimize the chance of disruption to critical safety communications”).

8 Id.
host wireless licensed services. Although, as CTIA notes, the 1435-1525 MHz spectrum is under consideration in international fora for potential use by mobile broadband service, ITU Radio Regulation No. 5.343 specifies that in North and South America, AMT applications have priority over other mobile service uses. Thus, the Commission should ensure that any expansion of access to the L-band by commercial wireless will be on the condition that AMT operations are fully protected. Such protection must account for the high sensitivity and high reliability requirements of AMT operations. As studies by AFTRCC and others have demonstrated, without large and strictly-enforced exclusion zones, the co-frequency sharing of IMT and AMT systems is not practical. NTIA recently reconfirmed this view, noting that “[b]ased on studies submitted in ITU-R, co-frequency sharing between IMT and AMT is not practical. Due to the need for continued use of AMT within Region 2, the band 1435-1525 MHz should not be identified for IMT use in Region 2.” Preserving AMT in this band is consistent with critical existing operations and with the position of the United States in international fora.

As a threshold issue, Boeing questions the estimates of the quantity of new spectrum needed for wireless broadband. Moreover, in contrast to CTIA’s assertion that 1435-1525 MHz is “prime spectrum” that is “ideally suited” for mobile broadband services, it is plain that the

9 CTIA Comments at 43.


12 NTIA WRC-15 Draft Proposals at 7.

13 CTIA Comments at 43.
wireless industry is seeking inroads into countless other bands with equal or greater interest.\textsuperscript{14} Such other bands may tolerate spectrum clearing or sharing arrangements to accommodate additional mobile broadband spectrum, but AMT spectrum cannot.

Nonetheless, Boeing recognizes that making available sufficient spectrum for wireless broadband is a Commission priority. Accordingly, Boeing has supported these efforts where they would not result in co-frequency usage by high power services that would cause interference to AMT. For instance, Boeing previously concurred with recommendations to free up non-Federal AMT allocations at 2310-2320 MHz and 2345-2360 because the existence of co-frequency commercial wireless service “makes the band[s] unusable for flight test operations.”\textsuperscript{15}

The U.S. aerospace community cannot similarly abandon the critical 1435-1525 MHz band, and thus Boeing strongly cautions that any proposal for commercial wireless operations in the L-band must begin from the premise of fully protecting AMT operations and should not consider co-frequency operations. 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.

\textsuperscript{14} See, e.g., Comments of CTIA, GN Docket No. 14-177 et al, at 6 (Jan. 15, 2015) (explaining that “frequency bands above 24 GHz are potentially suitable for advanced mobile services”); Comments of CTIA, GN Docket No. 13-185, at 19 (Sep. 18, 2013) (highlighting the 1755-1780 MHz band as “uniquely valuable” for commercial wireless service); Ex Parte Letter of CTIA, GN Docket No. 09-51, at 2 (Mar. 13, 2013) (identifying the Broadcast Auxiliary Service as singularly “well-positioned… to meet all the key principles for mobile broadband spectrum”).

\textsuperscript{15} Comments of The Boeing Company, ET Docket No. 12-338, at 3 (Feb. 25, 2013).
II. USE OF 1435-1525 MHZ AMT SPECTRUM BY WIRELESS MICROPHONES ON A LICENSED SECONDARY COORDINATED BASIS MAY BE ACCEPTABLE UNDER CERTAIN CIRCUMSTANCES

As a major user of wireless microphones at its various facilities, Boeing understands the need to provide sufficient spectrum to ensure high performance for these devices.\textsuperscript{16} Assuming that the safeguards proposed in the NPRM are adhered to, Boeing agrees with the Commission and the majority of the commenters in this proceeding that wireless microphones can be introduced into the 1435-1525 MHz band on a more routine secondary basis without posing a risk of interference to flight test operations.

As the comments of AFTRCC and wireless microphone manufacturers indicate, any formalized process for wireless microphone use in AMT spectrum must begin from the principle that wireless microphone equipment and rules will “provid[e] AMT operations with full and comprehensive interference protection.”\textsuperscript{17} The key safeguards for this protection would be limitation of use to professional production companies, at specified locations and times, with full prior coordination with federal and non-federal users of AMT spectrum.\textsuperscript{18} Boeing concurs with the Commission’s observation that it is necessary to establish a mechanism, such as an electronic key, to ensure that only authorized, coordinated microphone systems can be operated in flight

\textsuperscript{16} Boeing Wireless Microphone Comments at 4 (explaining Boeing’s extensive use of wireless microphones to facilitate training, strategic planning, and other company functions at Boeing facilities and off-site conference centers across the country).


\textsuperscript{18} NPRM, ¶¶ 177-178; AFTRCC Comments at 2; Comments of Shure Incorporated, GN Docket No. 14-166 and GN Docket No. 12-268, at 38-39 (filed Feb. 4, 2015).
test spectrum.\textsuperscript{19} As the success of the recently established MBANS allocation demonstrates, secondary status sharing with AMT operations can be successful when the secondary use is predictable, circumscribed, and low-power.\textsuperscript{20} Boeing supports the comments of AFTRCC in this regard, and also stands ready to work with the Commission and with wireless microphone manufacturers to explore the appropriate mechanisms to enable licensed secondary operation in the AMT band.

\section*{III. CONCLUSION}

Boeing supports the Commission’s proposal to formalize expanded access to 1435-1525 MHz AMT spectrum for professional wireless microphone users under carefully limited and coordinated circumstances. Such low-power, circumscribed use can be compatible with the exceedingly low noise and high reliability performance required for AMT operations. In contrast, the apparent proposal by CTIA to for high-density commercial operations in AMT spectrum is completely incompatible with AMT operations and should not be considered.

Respectfully submitted,

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\textsuperscript{19} \emph{NPRM}, ¶ 178.

\textsuperscript{20} See generally \emph{MBANS R\&O}.  

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\textsuperscript{19} \emph{NPRM}, ¶ 178.

\textsuperscript{20} See generally \emph{MBANS R\&O}.  

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