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June 16, 2015

VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Room TW-A325
Washington, D.C. 20554

Re: Promoting Spectrum Access for Wireless Microphone Operations, GN Docket No. 14-166; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, GN Docket No. 12-268

Notice of *Ex Parte* Presentation

Dear Ms. Dortch:

On June 12, 2015, Daniel Robinson, of Northrop Grumman and President of the Aerospace and Flight Test Radio Coordinating Council, Inc. ("AFTRCC"), Danny Hankins of Textron and President Emeritus of AFTRCC, Joe Cramer of Boeing, Marc Ehudin of Textron, Don Tyree of Lockheed Martin, and Edward A. Yorkgitis, Jr. of Kelley Drye & Warren, LLP, counsel for AFTRCC, (collectively, the "AFTRCC representatives") met with John Leibovitz, Chad Breckinridge, Chris Helzer, John Schauble, Stephen Buenzow, Chris Andes, and Simon Banyai of the Wireless Telecommunications Bureau, Gary Epstein of the Incentive Auctions Task Force, and Julius Knapp, Paul Murray, Ira Keltz, Geraldine Matise, Hugh Van Tuyl, and Serey Thai of the Office of Engineering and Technology.[1] In the meeting, the AFTRCC representatives discussed the positions of AFTRCC in the above-referenced proceedings as set forth in its comments and reply comments.

[1] Messrs. Robinson, Hankins, Hoehn, Schauble, Buenzow, Andes, and Banyai participated by telephone.

The AFTRCC representatives noted the importance of wireless microphones in its member companies' business operations and of making sure there is adequate spectrum in the future for wireless mikes. They explained that AFTRCC remains open to wireless mikes being licensed on a secondary basis in the Federal/Non-Federal shared 1435-1525 MHz band which is allocated to aeronautical mobile telemetry ("AMT") on a primary basis, an allocation option identified by the Commission in its *Notice of Proposed Rulemaking* in the above-referenced dockets. This is a critical band for real time safety-of-life AMT during both commercial and military flight testing. Sharing with wireless mikes could be acceptable *provided that* rules are developed which ensure operation only at specific times and places that are coordinated through AFTRCC (and the federal government) in advance. The AFTRCC representatives reviewed the critical role of AMT and interference-free operation in safe, successful, and timely flight testing.

The AFTRCC representatives also explained the long history of the Commission in protecting flight testing operations in the 1435-1525 MHz band, going back more than three decades, and the current efforts of U.S. representatives in preparation of the 2015 World Radio communication Conference ("WRC-15") to preserve the band for primary operation for AMT relative to other mobile operations. That protection is memorialized in International Telecommunication Union Radio Regulation ("ITU RR") footnote 5.343, and AMT protection criteria are reflected in Recommendation ITU-R M.1459 (confirmed by the Commission in several recent proceedings). The AFTRCC representatives noted that the Commission, therefore, should not take heed of CTIA's suggestion that the Commission refrain from making any allocation decisions in the 1435-1525 MHz band regarding wireless mike operation until the band has been thoroughly studied for suitability to host commercial mobile radio service ("CMRS") operation. The AFTRCC representatives explained that, on the basis of studies by the ITU Joint Task Group 4-5-6-7 demonstrating the infeasibility of sharing between AMT and CMRS, which were appropriated predicated on ITU-R M.1459 and the nature of AMT operations in the United States, the United States has developed its position that RR 5.343 in Region 2 should be retained to protect the flight safety aspects of AMT operations from domestic and cross-border interference. More recently, in the February 2015 Inter-American Telecommunication Commission ("CITEL") meeting, the U.S. secured sufficient support for an Inter-American Proposal ("IAP") for No Change for the AMT priority in Region 2 over other mobile services (RR 5.343). This IAP has been supported by five administrations in addition to the U.S., in return for which the U.S. has lent its support to an IAP for a Region 2 identification for International Mobile Telephony ("IMT") coupled with a recognition that, in the United States, the 1435-1525 MHz band is used extensively for AMT and the U.S. has no intention of implementing IMT in the band. The final CITEL meeting before WRC-15 is in August in Ottawa, Canada, at which the U.S. will work to secure finalization of these IAPs.

The AFTRCC representatives identified the following basic conditions for secondary, licensed wireless mike operation in the 1435-1525 MHz band:

- Only professional users as proposed in the *Notice of Proposed Rulemaking* would be eligible for licensed operation in the 1435-1525 MHz band; unlicensed operation would not be permitted within the restricted safety-of-life band.

- In addition to obtaining a license, prior to operation for a specific time period (which could be days or even considerably longer) and place, the user would have to request and successfully complete coordination from AFTRCC (and the federal government); in response to questions from Commission staff, the AFTRCC representatives explained that wireless mikes that are tunable across the entire 1435-1525 MHz band would in general be more easily coordinated than wireless mike equipment that was restricted to only certain portions of the band because the demands and requirements of both commercial and military flight testing are variable across the band.

- Immediately prior to commencing operation pursuant to successful coordination, a user would have to register and authenticate the equipment through an automated mechanism at the coordinated location; where coordination is obtained for a longer period , registration and authentication would have to be repeated regularly, no less than once per day.

- All wireless mike equipment operating in the band should be designed, as demonstrated during the Commission equipment authorization process, to have deactivation controls that cannot be defeated by the user such that operation cannot commence absent a successful registration and electronic authentication at a coordinated time and place, and that operation will cease where periodic registration and authentication does not occur.

AFTRCC reiterated its concerns that, because of the potential for resale and repurposing of wireless microphone equipment by users other than professional entities, an automated control mechanism integrated into the equipment combined with geolocation capability and controls allowing operation only after registration and authentication would be essential. The AFTRCC representatives allowed that, apart from geolocation capability being fully integrated into the equipment, other solutions, such as a wireless tether to a smart phone or tablet equipped with GPS capability and an application for authentication, could potentially be adequate, depending upon their design and architecture. But AFTRCC stressed that manual entry of coordinates cannot be the basis of an acceptable solution because of the potential for abuse and spectrum interference to flight testing operations, endangering both life and property

in the air and on the ground, as well as the potential for costly delays to flight testing and production schedules of the aerospace companies conducting such testing.

Attached is a copy of written materials provided by AFTRCC to the Commission participants during the meeting.

Please contact the undersigned if there are any questions or if you require further information.

Respectfully submitted,

Edward A. Yorkgitis, Jr.

Counsel for Aerospace and Flight Test Radio Coordinating Council, Inc.

Attachment

cc: John Leibovitz
Chad Breckinridge
Chris Helzer
John Schauble
Stephen Buenzow
Chris Andes
Simon Banyai
Gary Epstein
Julius Knapp
Paul Murray
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Geraldine Matise
Hugh Van Tuyl
Serey Thai

Aerospace and Flight Test Radio Coordinating Council, Inc. (AFTRCC)

Presentation in
GN Docket No. 14-166
Wireless Microphone Proceeding

June 12, 2015

Aerospace and Flight Test Radio Coordinating Council Members

AFTRCC
AEROSPACE & FLIGHT TEST RADIO COORDINATING COUNCIL

Bell Helicopter TEXTRON
BOEING
Gulfstream A GENERAL DYNAMICS COMPANY
NORTHROP GRUMMAN Electronic Sensors & Systems Sector
L3 communications Integrated Systems
National Security Technologies LLC Vision • Service • Partnership
BOMBARDIER LEARJET
Hawker Beechcraft
Cessna A Textron Company
LOCKHEED MARTIN
SPIRIT AEROSYSTEMS
QUASONIX
ISA Integrated Systems and Aerostructures Sector
L3 Telemetry East
L3 communications Communication Telemetry - East
LOCKHEED MARTIN Enterprise Information Systems
Raytheon
Sikorsky A United Technologies Company
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Honeywell
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SAT CORPORATION An Integral Systems Company www.sat.com
Agilent Technologies

Characteristics of Telemetry in the 1435-1525 MHz Band

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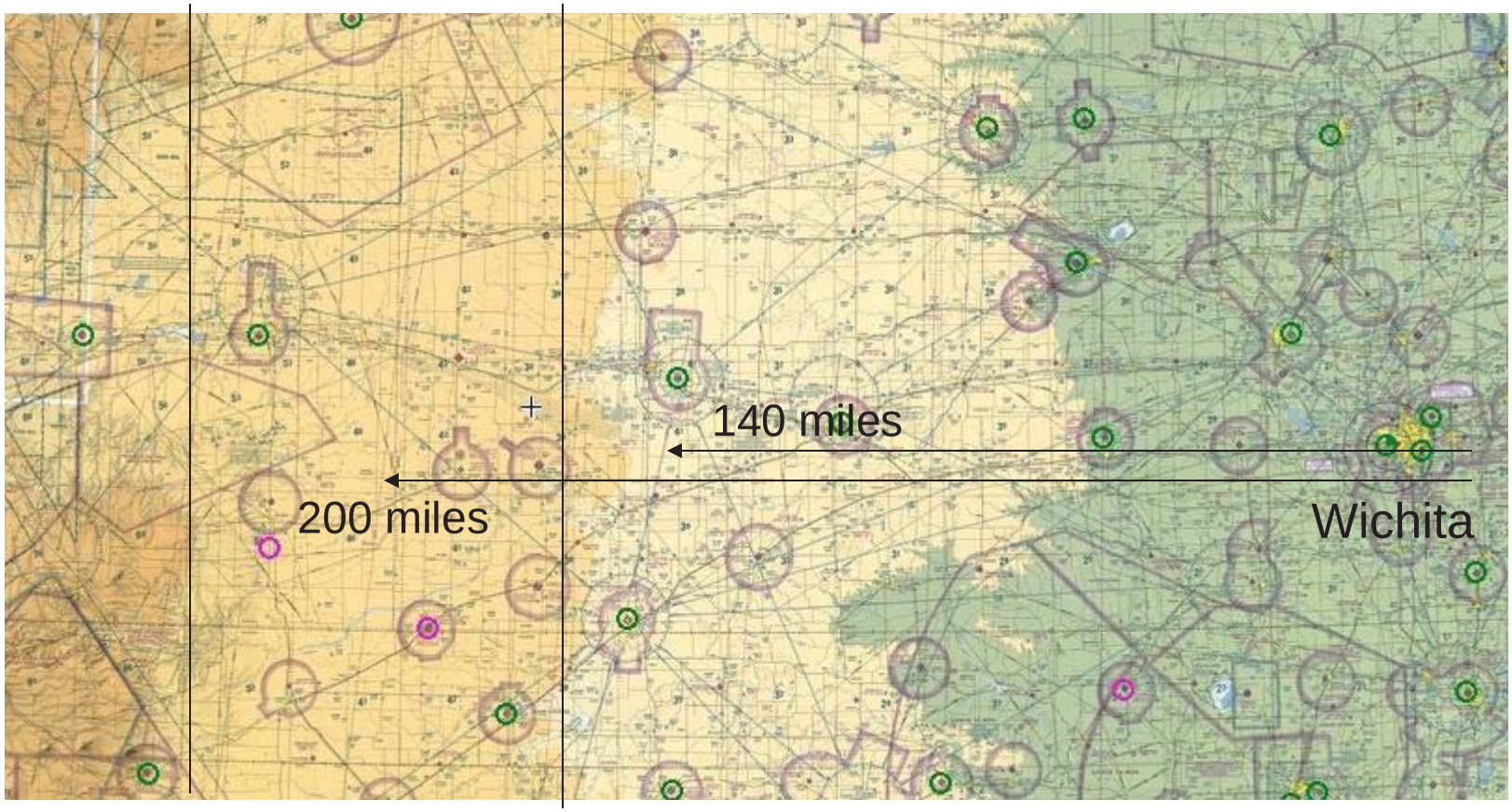
- Band utilized for testing aircraft and missiles.
- Telemetry and video transmitted from test vehicles over distances of 200 miles to highly sensitive, high-gain parabolic antennas, typically mounted on towers, buildings, or mobile vans.
- Telemetry measures a multitude of parameters from engine temperature, to fluid pressures, to vibration levels, to name a few.
- Data and video are telemetered to ground engineers who 1) monitor the performance of the aircraft on a real-time basis and 2) warn the pilot of any trouble detected.
- Signal levels are weak and subject to dramatic fades due to maneuvers of test aircraft and multipath.
- Interference-free telemetry is vital to flight safety in an inherently dangerous operation, as well as to aerospace industry productivity.
- Hence, 1435-1525 MHz is a Restricted Band off-limits to fundamental emissions of all other services. Rule 15.205(a).

Impact to Flight Testing



Maximum operational distance near Wichita of 200 miles is reduced to 140 miles if interferers double the noise floor.

FCC Has Repeatedly Recognized Protected Status for Flight Test Band

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- Recognized that flight testing is a "safety service" which must be protected "from harmful interference that could result in loss of life."[1/]
- Determined that telemetry bands should be classified as "Restricted" and protected from fundamental emissions of unlicensed devices -- agency stressed that the telemetry bands 1435-1525 and 2360-2390 MHz "involv[e] safety of life." [2/]

[1/] *In the Matter of Amendment of Part 2 of the Commission's Rules Regarding Implementation of the Final Acts of the World Administrative Radio Conference, Geneva,* 1979, FCC 84-306, 98 FCC 2d 905, 906 (1984).

[2/] *In the Matter of Revision of Part 15 of the Rules Regarding the Operation of Radio Frequency Devices Without an Individual License,* 4 FCC Rcd 3493, 3502 (1989). *See also* 47 C.F.R. §15.205(a) (1435-1626 MHz is a restricted band).

FCC Has Repeatedly Recognized Protected Status for Flight Test Band (cont.)

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- Recognized potential cost to manufacturers and the taxpayer from even brief telemetry drop-outs is significant:

  "[F]light test, telemetry, and telecommand operations are vital to the U.S. aerospace industry to produce, deliver, and operate safe and efficient aircraft and space vehicles."[3/]

  "[S]haring of [flight test] frequencies with unlike services is difficult at best because *schedules of telemetry flight tests are unpredictable and delays costly. Further, interference cannot be tolerated*. For example, in the event of a crash the telemetry data may be the only means available to determine the cause of the crash. In this case, *interference to the telemetry transmission could be disastrous*."[4/]

[3/] *Second Notice of Inquiry in GEN. Docket No. 89-554, In the Matter Of An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum,* FCC 90-316, 5 FCC Rcd 6046, 6060, ¶101 (1990).

[4/] *Amendment of the Frequency Allocation and Aviation Services Rules (Parts 2 and 87) to Provide Frequencies for Use by Commercial Space Launch Vehicles*, 5 FCC Rcd 493, 495 (1990)

U.S. Has Protected Flight Test Bands Internationally

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- Prior to WRC-03, the sharing possibilities between the L-band AMT Operation and Mobile Satellite Service downlinks were studied intensively.
- Section 2.8.1.2.1(b) to the CPM Report for WRC-03 stated: "Studies submitted to the ITU R show, in accordance with Recommendation ITU-R M.1459, that GSO MSS and aeronautical mobile telemetry are fundamentally incompatible under co-coverage scenarios, and that sharing is not feasible without causing harmful interference to AMT operations. . . . [T]he fundamental asymmetry in the competing links precludes sharing if an MSS satellite is within line of sight of an AMT ground station and exceeds the protection levels in Recommendation ITU-R M.1459. Without meeting the protection levels in Recommendation ITU-R M.1459, GSO MSS satellites in Region 1 and 3 visible to AMT ground stations in Region 2 will interfere with AMT operations."

U.S. Has Protected Flight Test Bands Internationally (cont'd)

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- RR 5.343 provides that, "in Region 2, the use of the band 1435-1525 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service."
- In its preparations for WRC-15, the U.S. position has been to reject calls to make all or a portion of 1435-1525 MHz available for mobile commercial service, *i.e.*, International Mobile Telephony ("IMT"), proposing "to retain [RR 5.343] in Region 2 in order to protect the flight safety aspects of AMT operations from domestic and cross-border interference." [5/]
- In February 2015 CITEL meeting, the U.S. secured an Inter-American Proposal ("IAP") supporting No Change for the AMT priority in Region 2 over other mobile services (footnote 5.343) (supported by Canada, Brazil, Costa Rica, Mexico, and Colombia, in addition to the U.S.); in return, the U.S. has supported the IAP for a Region 2 identification for IMT -- <u>coupled</u> <u>with</u> a statement that "In the United States, the 1435-1525 MHz band is used extensively for Aeronautical Telemetry (AMT); consequently, the United States has no intention of implementing IMT in the 1427-1518 MHz band."
- Final CITEL meeting before WRC-15 is in August.

5/ United States of America Proposals for the Work of the Conference, Agenda Item 1.1, WRC 2015, found at http://www.ntia.doc.gov/files/ntia/publications/ai_1.1_1435- 1535_mhz_usa_proposal_2014-02-13.pdf (last accessed February 3, 2015).

AFTRCC Open to a Properly Crafted Secondary Allocation to Wireless Microphones in L-Band

- NPRM proposes, “as one option,” making the 1435-1525 MHz AMT Band available for use by wireless microphones on a secondary licensed basis
- AFTRCC has no objection in principle to a secondary allocation for the licensed use of wireless microphones where there is need for large number of microphones, *provided that* rules are adopted
  - Limiting licenses to a class of professional users
  - Making prior coordination by AFTRCC (and federal government) at specific places and for specific times mandatory
  - Requiring an *integrated control mechanism* that ensures wireless mike equipment can only operate when and where coordinated and confirmed at time of set up and periodically thereafter
- Point of sale requirements helpful but inadequate to ensure operation limited to eligible users and only after coordination
- Existing equipment that operates pursuant to STAs must be updated to be eligible for licensing under the new framework

Other Comments

- **CTIA**: 1.4 GHz is under consideration in international fora for potential use by mobile broadband services; the Commission should not act with respect to 1435-1525 MHz until it has been "fully examined" for suitability to host CMRS.
  - But the U.S. recognizes the incompatibility of AMT and CMRS and has worked in preparation for WRC-15 to secure an IAP supporting No Change for the AMT priority in Region 2 over other mobile services (RR 5.343)
- **Shure**: No specific issue raised concerning AFTRCC recommendations; recognizes that any future wireless mike operations in L-Band must be coordinated to ensure protection for critical AMT services. Open to joint efforts toward a workable and "reasonable" regulatory framework.
- **Sennheiser**: Agrees with need for prior coordination at specified locations/times but manual input of coordinates should be sufficient; integrated control mechanism would be expensive
  - But manual entry would be prone to error and abuse and it offers no protection against ignorance of the rules; opposed to requiring location capability within equipment; integrated control mechanism could take advantage of existing technologies