

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

In the Matter of)	
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Amendment of Parts 1, 2, 15, 25, 27, 74, 78, 80, 87, 90, 97 and 101 of the Commission’s Rules Regarding Implementation of the Final Acts of the World Radiocommunication Conference (Geneva, 2007) (WRC-07), Other Allocation Issues, and Related Rule Updates)	ET Docket No. 12-338 (Proceeding Terminated)
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Amendment of Parts 2, 15, 80, 90, 97 and 101 of the Commission’s Rules Regarding Implementation of the Final Acts of the World Radiocommunication Conference (Geneva, 2012) (WRC-12), Other Allocation Issues, and Related Rule Updates)	ET Docket No. 15-99
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To: The Commission

**COMMENTS OF THE SOCIETY OF BROADCAST ENGINEERS,
INCORPORATED**

The Society of Broadcast Engineers, Incorporated (“SBE”)¹ hereby respectfully submits its Comments in response to the *Notice of Proposed Rule Making* portion of the *Report and Order, Order, and Notice of Proposed Rulemaking*, FCC 15-50, 30 FCC Rcd. 41835, released April 27, 2015.² The *Notice of Proposed Rulemaking* portion of that document (the “Notice”) seeks comment on, among other things, the ability of Federal and non-Federal aeronautical mobile

¹ SBE is the national association of broadcast engineers and technical communications professionals, with more than 5,000 members worldwide.

² The Notice was published in the Federal Register on July 2, 2015; 80 Fed. Reg. 38316 *et seq.* That publication of the Notice specified a comment date of August 31, 2015. Therefore, these comments are timely filed.

telemetry (AMT) stations³ to share spectrum with incumbent radio services in the 4400-4940 MHz and 5925-6700 MHz bands. In the interest of broadcasters, video producers and other active mobile users of the band 6425-6525 MHz (the “6.5 GHz band”) in avoiding preclusive interference to ongoing video production and broadcast electronic news gathering in that band, SBE states as follows:

1. SBE expresses no view herein with respect to the 4400-4940 MHz band. That band is not used by broadcasters or video production entities. The same is not true with respect to the 6.5 GHz band, which is within the 5925-6700 MHz segment. The 6.5 GHz band is very heavily used by broadcasters on a mobile basis, daily, in virtually all broadcast markets, for electronic news gathering, and for various purposes for event video production. It is used for a number of varied purposes, including portable camera relays to “jumbotron” screens for major sporting events and musical concerts at large venues, indoors and outdoors. It is used for video relay to production trucks at news events, and it is also used for multi-hop relay of video signals from the location of newsworthy events to either a satellite news truck, a fixed receive site or a temporary relay site. The use of this band is unpredictable and the paths, and path lengths, vary hourly. Other than on an intra-service basis, it is difficult to coordinate use of this band with other terrestrial uses.

2. The Notice in this proceeding explains that at WRC-07, the United States was a proponent of global or regional AMT allocations. The United States position then was that there was a large and growing shortfall in the spectrum available for AMT use.⁴ With increasing data rates associated with the testing of new and emerging technologies, the United States believed

³ The Notice explains that aeronautical mobile telemetry for flight testing of aircraft is an aeronautical mobile service (AMS) that transmits from an aircraft station to a receiving station the results of measurements made onboard an aircraft, including those related to the functioning of the aircraft. Examples of AMT data include engine temperature, fluid pressure, and readings from control surface strain gauges.

⁴ See United States of America Proposals for the Work of the Conference, plenary meeting, Document 5-E, February 9, 2007 (*U.S. Proposals for WRC-07*), Agenda Item 1.5, at 9-23. See also *CPM-07 Report*, Chapter 1, at 43-88.

that an additional 650 megahertz may be required for AMT. In the *Report and Order* part of this proceeding, the Commission allocated the band 5091-5150 MHz band to AMT. At WRC-07, it was decided that the mobile service (MS) allocation in the 4400-4940 MHz and 5925-6700 MHz bands could be used for AMT flight test transmissions from aircraft stations in much of ITU Region 2 pursuant to RR 5.440A and RR 5.457C. In addition, these international footnotes state that AMT use shall be in accordance with Resolution 416 (WRC-07)⁵ and shall not cause harmful interference to, nor claim protection from, the fixed-satellite and fixed services.⁶ Resolution 416 places the following operational restrictions on AMT use of the 4400-4940 MHz and 5925-6700 MHz bands: 1) emissions are limited to transmissions from aircraft stations only; 2) AMT is not considered an application of a safety service as per ITU Radio Regulations, Article No. 1.59; 3) the peak EIRP density of a telemetry transmitter antenna shall not exceed – 2.2 dB(W/MHz); 4) transmissions are limited to designated flight test areas, where flight test areas are airspace designated by administrations for flight testing; 5) bilateral coordination of transmitting AMT aircraft stations with respect to receiving fixed or mobile stations is required if the AMT aircraft station will operate within 450 km of the receiving fixed or mobile stations of another administration; and 6) require the use of technical and/or operational measures where appropriate to facilitate sharing with other services and applications in these bands.

3. Though the Commission did not propose earlier to allocate spectrum for AMT use in either the Federal band at 4400-4940 MHz, or in the exclusive non-Federal band at 5925-6700 MHz, it now seeks comment on the ability of Federal and non-Federal AMT stations to share spectrum with the incumbent services in these bands. The Commission states that it believes that

⁵ See ITU Radio Regulations, Volume III, Resolution 416 (WRC-07), titled “Use of the bands 4400-4940 MHz and 5925-6700 MHz by an aeronautical mobile telemetry application in the mobile service.”

⁶ Further, these footnotes state that AMT use *does not preclude the use of the 4400-4940 MHz and 5925-6700 MHz bands by other mobile service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in the Radio Regulations.*

it is appropriate to examine the sharing potential in these bands based on input from NTIA regarding the interference mitigation techniques that could be used to promote such sharing.⁷

The Notice in this proceeding states that NTIA intended for the 4400-4940 MHz and 5925-6700 MHz bands to be considered together as a “package” proposal, and that if the 5925-6700 MHz band was not allocated for AMT use, then NTIA would no longer support a non-Federal AMT allocation in the 4400-4940 MHz band.

4. Therefore, the Notice asks for comment on the proposed allocations for both the 4400-4940 MHz and 5925-6700 MHz bands. It asks whether there are technical approaches, coordination procedures, or analytical techniques that would ensure compatibility with existing services in these bands; what the costs and benefits and advantages or disadvantages are of adding AMT allocations to these bands, and whether or not sharing with AMT is the highest value use of this spectrum.

5. The Notice, at paragraph 212 notes that frequencies in the 5925-6700 MHz band are available for assignment to transmitting earth stations⁸ and to the Part 101 Fixed Microwave Services. However, pursuant to Section 101.147(j) of the Commission’s Rules, use of the 6425-6525 MHz segment is limited to use by stations in the mobile service. This band is co-equally shared with mobile stations licensed under Parts 74 and 78 of the Commission’s rules. These uses include the Local Television Transmission Service (LTTS) (5925-6525 MHz); the television broadcast auxiliary service (BAS) (6425-6525 MHz) and cable television relay service

⁷ NTIA relies on an analysis conducted by the DoD and NASA *prior to WRC-07* which allegedly demonstrated that through a combination of co-frequency avoidance and spatial isolation, it would be possible to find significant amounts of useable spectrum for AMT operations even in heavily congested areas of Fixed Service use. It is unclear that this analysis had any application to the ability of AMT to share with mobile applications such as the Broadcast Auxiliary Service and Part 101 use of the 6.5 GHz segment of the 5925-6700 MHz band. SBE is unaware of any study that has been conducted that would be relevant to such a sharing proposal, or any technical analysis that would establish compatibility between AMT and broadcast auxiliary service (BAS) or other use of the 6.5 GHz band.

⁸ 47 C.F.R. § 25.202(a)(1), (b).

(CARS) stations (6425-6525 MHz).⁹ The 6425-6525 MHz band is allocated to the non-Federal Mobile Service on a primary basis.

6. The Commission notes that the underlying assumptions in the *U.S. Proposals for WRC-07* included frequency avoidance or other measures to ensure compatible operations between AMT and incumbent services, such as requiring use of technical and/or operational measures on AMT. Accordingly, the Notice states (§ 216) that it *would be incumbent on the AMT community to develop techniques that will enable sharing without causing harmful interference to existing stations*.¹⁰ These techniques could include frequency coordination, shared network architectures, dynamic selection of operating frequencies, or spectrum use only in specific geographic areas. For the purposes of this Docket, however, the Commission specifically says that it does not need to determine any technical details necessary for such sharing, but only whether sharing is feasible.¹¹

7. The Notice indicates that NTIA recommendations do not specify how AMT operations would share the 6425-6525 MHz band with the non-Federal mobile service. Nor is

⁹ 47 C.F.R. Part 74, Subpart F (BAS); Part 78 (CARS). Use of the 6425-6525 MHz band for direct delivery of video programs to the general public or multi-channel cable distribution is not permitted. Broadcast network-entities may use this band only for mobile television pickup stations. See, 47 C.F.R. §§ 74.602(a) and (i), 78.18(a)(5).

¹⁰ SBE representatives have preliminarily discussed this matter with the Department of Defense and with the Aeronautical Flight Test Radio Coordinating Council, but to date there have not been any studies produced by either DoD or AFTRCC indicating compatibility in the 6.5 GHz band.

¹¹ The Commission states at paragraph 216 of the Notice that Report ITU-R M.2119, titled "*Sharing between aeronautical telemetry systems for flight testing and other systems operating in the 4400-4940 and 5926-6700 MHz band*" concluded that "sharing is feasible." Actually, that was not one of the conclusions of that ITU-R Report. Instead, the conclusion was as follows:

However, the combined effects of all the local frequency sharing situations with FS/MS stations, radioastronomy observatories, and FSS earth stations may severely limit availability of spectrum resources for introduction and operation of AMT systems in the 4 400-4 940 MHz and 5 925-6 700 MHz bands. This is especially true for flight test zones that are located in areas where the bands are intensively used by systems in other services.

SBE's preliminary conclusion, based on the nature of BAS, CARS and LTTS intense use of the 6425-6525 MHz band is that sharing with AMT is not feasible in the 6.5 GHz band.

SBE aware of any plan that has been put forth that would indicate how such sharing could be done. SBE has preliminarily concluded, absent any evidence to the contrary, that sharing this band with AMT is not feasible. BAS, CARS and LTTS use of this band is not limited to metropolitan areas. It is used for terrestrial video relay from remote locations for electronic news gathering. There may be aeronautical mobile applications done in connection with electronic newsgathering or video production operations from helicopters, but the primary use of the band is for terrestrial video relay from mobile cameras. There are also a vast number of additional terrestrial uses of the band, including as noted above video relay to video screens at large event venues, short-range video relay for video production at automobile racing, political conventions and golf events, just to name a few. These production venues are in urban, suburban, exurban and rural markets and there is no predictable pattern for geographic area of BAS, CARS or LTTS deployment. The ENG uses of the band cannot be planned in advance.

8. It is understood that the RF footprint of flight tests is approximately a 200-mile radius of operation from the test location. With that large an area, it would be impossible to protect the use of the 6.5 GHz band from interference from unpredictable flight paths. The transmitter power from the aircraft is typically 10 watts TPO. The receivers on the ground use tracking antennas, and the occupied bandwidths of the signals reportedly vary between 5-10 MHz but could be up to 20 MHz for some data applications. The tests, SBE understands, are between 2 hours and 12 hours duration, all of which are planned. AMT use of the entirety of the 6425-6525 MHz band over an area of up to 500 miles in diameter with transmitter power levels from aircraft at 10 watts, apparently using omnidirectional transmit antennas, for periods of up to 12 hours is not a use that can be coordinated in advance with real-time, unpredictable terrestrial uses of the same band. Looking at this from the perspective of interference to BAS, CARS and LTTS incumbent

operations at 6.5 GHz, there does not appear any level of compatibility within the geographic footprint areas of the AMT operations. Conversely, since the 35-45 dB AMT tracking receive antennas have typical elevations in the 5-15 degree range, there is an apparent, significant potential for interference to the AMT operations on the ground from the itinerant, mobile terrestrial BAS, CARS and LTTS facilities in certain instances – interference that cannot be avoided without constraining the use of the band by these mobile facilities.

9. Nor should ENG or other BAS, CARS and LTTS operations at 6.5 GHz be constrained in order to accommodate the predicted future needs of AMT. Broadcasters have recently suffered the perfect storm of compromises in the use of microwave spectrum in order to accommodate broadband and other technologies. BAS spectrum at 2025-2110 MHz is severely overcrowded and notwithstanding that now has to accommodate a very significant amount of displaced DoD facilities in order to accommodate recent spectrum auctions. The channels at 2450-2483.5 MHz are compromised by 2.5 GHz BRS/EBS and by other ancillary terrestrial component unlicensed facilities that are proposed and existing in the upper portion of that range. And the 6875-7125 MHz BAS band is now thoroughly compromised by the addition of fixed wireless backhaul that was recently added to that band. To add a preclusive use of 6425-6525 MHz would add to what is now a critical shortage of available, uncompromised ENG spectrum that daily delivers to the public the news and entertainment programming that they are used to receiving and that they deserve. SBE is used to using real time coordination to make effective use and re-use of very limited spectrum but even using the most intensive coordination methods, SBE knows of no way to keep AMT in the 6.5 GHz band from depriving BAS, CARS and LTTS licensees of access to this band in huge geographic areas, some of which (such as, for example, Edwards Air Force

Base or Patuxent River Naval Air Station, whose AMT footprints are such that their footprints will cover Los Angeles, Washington, D.C. and Baltimore.

10. SBE is open to reviewing sharing studies relative specifically to BAS, CARS and LTTS operation at 6.5 GHz but absent such, and in the absence of any indication that AMT operation is consistent with BAS, CARS or LTTS operation in the 6425-6525 MHz band, SBE urges in the strongest terms that AMT access to the 6425-6525 MHz portion of the 5925-6700 MHz band not be permitted. SBE takes no position with respect to the remainder of the 5925-6700 MHz band and therefore interposes no objection to the allocation of 5925-6425 MHz and 6525-6700 MHz to AMT.

Therefore, given the foregoing, the Society of Broadcast Engineers respectfully requests that the Commission make no AMT allocation in the 6425-6525 MHz band at this time.

Respectfully submitted,

**THE SOCIETY OF BROADCAST ENGINEERS,
INCORPORATED**

Joseph Snelson

Joseph Snelson CPBE, 8-VSB
SBE President

Ched Keiler

Ched Keiler, CPBE, CBNT, 8-VSB
Chairman, SBE Government Relations Committee

Christopher D. Imlay

Christopher D. Imlay, CBT
General Counsel

Booth, Freret & Imlay, LLC
14356 Cape May Road
Silver Spring, Maryland 20904-6011
(301) 384-5525 telephone
(301) 384 6384 facsimile
cimlay@sbe.org

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