



UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and
Information Administration
Washington, D.C. 20230

Mr. Julius P. Knapp
Chief, Office of Engineering and Technology
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

ACCEPTED/FILED

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Federal Communications Commission
Office of the Secretary

RE: Amendment of Parts 1, 2, 15, 74, 78, 87, 90, and 97 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)

Dear Mr. Knapp:

The National Telecommunications and Information Administration (NTIA) sent several letters to the Federal Communications Commission (FCC) recommending actions to implement the Final Acts for the 2007 and 2012 World Radiocommunication Conferences (WRC-07 and WRC-12).¹ In this letter, NTIA responds to the above-referenced proceeding for the purposes of: (1) addressing issues associated with the allocations intended to support operation of a new airport surface local area network, the Aeronautical Mobile Aircraft Communications System (AeroMACS), in the 5 GHz frequency range; (2) protection of passive operations in the 1400-1427 MHz band; and (3) implementing federal and non-federal aeronautical mobile telemetry (AMT) in the 4400-4940 MHz and 5925-6700 MHz bands.

Allocations for AeroMACS in the 5091-5150 MHz Band

In the preparations for WRC-07, the sharing studies between aeronautical mobile (route) service (AM(R)S) and AMT in the 5091-5150 MHz band were done on the basis of geographic separation, with the understanding that AMT operations would only be operating at remote test ranges. As a result, though a power flux density was adopted to protect AM(R)S from airborne AMT transmissions, no constraints were placed on AM(R)S to protect AMT ground stations.²

¹ See letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), FCC (Aug. 20, 2009); letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), FCC (Sept. 20, 2009); letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), FCC (Jul. 26, 2012); letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), FCC (Feb. 25, 2013); and letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), FCC (Mar. 28, 2013).

² See WRC-12 Final Acts Resolution 418 (REV.WRC-12) Use of the band 5 091-5 250 MHz by the aeronautical mobile service for telemetry applications.

Based on the outcome of WRC-07, the FCC proposed to make the 5091-5150 MHz band available for AMT.³

The Aerospace and Flight Test Radio Coordinating Council (AFTRCC) and the Boeing Company (Boeing) were supportive of the FCC's proposal to make the 5091-5150 MHz band available for AMT use.⁴ Given the critical nature of flight test communications, Boeing urged the FAA to coordinate any AeroMACS deployment with operators of flight test receivers that could suffer harmful interference from co-channel operations in the 5091-5150 MHz band, and asked that the FCC require such coordination at the St. Louis and Seattle-Tacoma international airports.⁵ In its reply comments, AFTRCC supported the Boeing request and urged that coordination also be required at four additional airports where AMT for flight testing of aircraft is conducted.⁶ At the request of the FCC AFTRCC clarified the list of airports where AMT for flight testing will be conducted.⁷

The proposals by AFTRCC and Boeing would require coordination of AM(R)S with AMT operations at six airports. This is a new constraint that was not considered in the International Telecommunication Union Radiocommunication (ITU-R) sector studies in preparation for WRC-07 or WRC-12. Since there is no established framework for the proposed coordination, AMT operations could constrain the deployment of AeroMACS at the six airports specified by AFTRCC and Boeing, which is not acceptable to the FAA. Consequently, NTIA revises its WRC-07 recommendations by proposing that the following footnote be added to the U.S. Table of Frequency Allocations instead of international footnote 5.444B:

US444B In the band 5091-5150 MHz, the following provisions shall apply to the aeronautical mobile service:

- (a) Use is restricted to: (1) Systems operating in the aeronautical mobile (R) service (AM(R)S) in accordance with international aeronautical standards, limited to surface applications at airports, and in accordance with Resolution 748 (Rev. WRC-12) (*i.e.*, AeroMACS); and (2) Aeronautical telemetry transmissions from aircraft stations (AMT) in accordance with Resolution 418 (Rev. WRC 12).
- (b) Consistent with Radio Regulation No. 4.10, airport surface wireless systems operating in the AM(R)S have priority over AMT systems in the band.
- (c) Operators of AM(R)S and AMT systems at the following airports are urged to cooperate with each other in the exchange of information about planned deployments of

³ See Amendment of Parts 1, 2, 15, 74, 78, 87, 90, and 97 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, *Notice of Proposed Rulemaking and Order*, 27 FCC Rcd 14598 (2012) (WRC-07 Final Acts NPRM) at ¶ 68.

⁴ AFTRCC Comments in Response to *WRC-07 Final Acts NPRM* (Feb. 25, 2013) at 5 and Boeing Comments in Response to *WRC-07 Final Acts NPRM* (Feb. 25, 2013) at 4.

⁵ Boeing Comments in Response to *WRC-07 Final Acts NPRM* at 4.

⁶ AFTRCC Reply Comments in Response to *WRC-07 Final Acts NPRM* (Mar. 27, 2013) at 1 (the locations are Wichita, Kansas; Roswell, New Mexico; Charleston, South Carolina; and Palm Beach-Dade, Florida).

⁷ AFTRCC *Ex Parte Statement* in Response to *WRC-07 Final Acts NPRM* (Jan. 21, 2015).

their respective systems so that the prospects for compatible sharing of the band are enhanced: 1) Boeing Field/King County Intl Airport, Seattle, WA; 2) Lambert-St. Louis Intl Airport, St. Louis, MO; 3) Charleston AFB/Intl Airport, Charleston, SC; 4) Wichita Dwight D. Eisenhower National Airport, Wichita, KS; 5) Roswell Intl Air center Airport, Roswell, NM; and 6) William P. Gwinn Airport, Jupiter, FL. Other airports may be addressed on a case-by-case basis.

(d) Aeronautical fixed communications that are an integral part of the AeroMACS system authorized in paragraph (a)(1) are also authorized on a primary basis.

Allocations for AeroMACS in the 5000-5010 MHz and 5010-5030 MHz Bands

As part of the WRC-12 implementation, there is a proposal to allocate the 5000-5010 MHz and 5010-5030 MHz bands on a primary basis to the AM(R)S in support of the AeroMACS system. In addition to the allocation for AM(R)S there is also a requirement for an allocation for fixed service operations in the 5000-5010 MHz and 5010-5030 MHz bands. Although the international allocation table does not include the fixed service in these bands, the work within the ITU-R recognizes that this service was integral to the systems being studied.⁸ Thus, NTIA recommends that the FCC add a footnote to the U.S. Table of Frequency Allocations that would authorize on a primary basis fixed service operations that are an integral part of the AeroMACS system in the 5000-5010 MHz and 5010-5030 MHz bands.

Protection of Passive Operations in the 1400-1427 MHz Band

The 1435-1525 MHz band is allocated to the mobile service on a primary basis for federal and non-federal use, restricted to AMT. The 1400-1427 MHz band is a passive band (*i.e.*, no transmissions are authorized in this band). For AMT stations that operate in the 1435-1452 MHz sub-band, WRC-07 adopted a recommended maximum unwanted emissions level of -28 dBW/27 MHz in the 1400-1427 MHz passive band.⁹ NTIA recommends that the FCC require those AMT stations that do not meet the -28dBW/27MHz unwanted emissions limit attempt to use the 1452-1525 MHz sub-band first. Consequently, NTIA recommends that proposed footnote US338A be revised to read as follows:

US338A In the band 1435-1452 MHz, operators of aeronautical telemetry stations are encouraged to take all reasonable steps to ensure that the unwanted emissions power does not exceed -28 dBW/27 MHz in the band 1400-1427 MHz. Operators of aeronautical telemetry stations that do not meet this limit shall first attempt to operate in the band 1452-1525 MHz prior to operating in the band 1435-1452 MHz.

⁸ Recommendation ITU-R M.1450-5, *Characteristics of broadband radio local area networks* (Feb. 2014).

⁹ See WRC-07 Final Acts, Resolution 750 (WRC-07) Compatibility between the Earth exploration-satellite service (passive) and relevant active services.

Federal and Non-Federal AMT Allocations in the 4400-4940 MHz and 5925-6700 MHz Bands

At WRC-07, the United States was a leading proponent of AMT allocations in several bands, including the 5925-6700 MHz band. In its WRC-07 proposals, the United States stated that with the increasing complexity of aircraft design and pressure to shorten timescales for the development of new aircraft, and the rapidly increasing data rates associated with the testing of new and emerging technologies, as much as an additional 650 megahertz may be required for aeronautical flight test telemetry.¹⁰ The new AMT spectrum will not be used for the protection of life and property, hence new applications will not require the level of protection associated with safety operations in other AMT bands. Consistent with the U.S. proposals to WRC-07 and the outcome of WRC-07, we now propose to move forward with the proposals for the 4400-4940 MHz and 5925-6700 MHz bands.¹¹ Action on these bands had been deferred by our July 26, 2012 letter to the FCC.¹² Based on the continued pressing need for additional spectrum to support AMT, NTIA believes it is the time to address implementing allocations in these bands to support federal and non-federal AMT.

As noted in the U.S. contributions to WRC-07, and the studies performed by the U.S. and submitted to ITU-R Working Party 8B in 2006, sharing between the fixed service (FS) and fixed satellite service (FSS), and AMT operations, while challenging, would be feasible. Further, AMT users will implement technical and operational measures to ensure compatible operations between AMT and the FSS and FS users in the 5925-6700 MHz band.

The operational restrictions contained in WRC-07 Resolution 416 were a result of cooperation and collaboration between DoD, the National Aeronautics and Space Administration (NASA), and industry representatives of the FSS community and were agreed to by the U.S. as able to protect the FSS uplink satellite receivers and result in minimal interference to the FSS (e.g., less than a 3 percent increase in the satellite receiver noise level).¹³ Similarly, the operational restrictions in Resolution 416, in conjunction with measures that can be employed by AMT operators, were developed in cooperation with industry participants in the ITU-R from the

¹⁰ Conference Preparatory Meeting, *CPM Report on technical, operational and regulatory/procedural matters to be considered by the 2007 World Radiocommunication Conference* (Geneva, 2007) at 43, available at <http://www.itu.int/md/R07-CPM-R-0001/en>.

¹¹ See letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), FCC (Aug. 20, 2009). We note that the 4400-4940 MHz and 6425-6525 MHz bands are allocated to the mobile service on a primary basis for federal use and non-federal use, respectively. Thus, NTIA recommends that the 4400-4940 MHz, 5925-6425 MHz, and 6525-6700 MHz bands be allocated to the aeronautical mobile service (AMS) on a primary basis for non-federal use, the 5925-6700 MHz band be allocated to the AMS on a primary basis for federal use, and the use of these new AMS allocations be limited to AMT applications for aircraft testing.

¹² See letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius P. Knapp, Chief, Office of Engineering and Technology (OET), FCC (Jul. 26, 2012).

¹³ See WRC-07 Final Acts Resolution 416 (WRC-07): Use of the bands 4 400-4 940 MHz and 5925-6 700 MHz by an aeronautical mobile telemetry application in the mobile service; Report ITU-R M.2119, *Sharing between aeronautical mobile telemetry systems for flight testing and other systems operating in the 4400-4940 and 5925-6700 MHz band* (Feb. 2007) (ITU-R Report ITU-R M.2119) at 13.

fixed service community, and the U.S. agreed that these measures should enable sharing between AMT and the FS users in the band. NTIA recognizes the burden of finding solutions that avoid interference to the existing FS stations would primarily be on the AMT users, notwithstanding that we would anticipate that both the AMT and FS operators would work together to resolve compatibility challenges. We also recommend the FCC encourage the kind of cooperative dialogue between the FS and FSS community and AMT users that resulted in the U.S. successfully gaining international support for its AMT proposals at WRC-07.

Analysis conducted by DoD and the NASA prior to WRC-07 demonstrated that through a combination of co-frequency avoidance and spatial isolation it is possible to find significant amounts of useable spectrum for AMT operations even in heavily congested areas of FS deployment.¹⁴ Spatial isolation and avoidance of co-frequency operations are commonplace interference avoidance techniques. In addition it may be possible to access unused spectrum between the FS channels (interstitial use of frequency space between FS channels). Interstitial use of spectrum between FS channels, may require development of AMT systems that employ more advanced technologies and capabilities so that in congested areas, spectrum between FS channels can be consolidated to allow AMT access to spectrum with sufficient bandwidth to support AMT operations. Initially, NTIA believes co-channel avoidance and spatial isolation techniques would be the primary means to achieve compatible operations between AMT and FS operations. As more advanced AMT technologies are developed and demonstrated to be effective, it may be possible to coordinate interstitial AMT operation between the FS channels.

NTIA looks forward to our collaborative efforts in completing this important proceeding. If you have any questions, please contact me or Edward Drocella, Chief, Spectrum Engineering and Analysis Division, Office of Spectrum Management at edrocella@ntia.doc.gov or (202) 482-2608.

Sincerely,



Paige R. Atkins
Associate Administrator
Office of Spectrum Management

¹⁴ ITU-R Report ITU-R M.2119 at 37.