5 030 - 5 250 MHz

1. Band Introduction

The 5030-5250 MHz band is composed of 3 sub-bands that are all used for aeronautical radionavigation purposes: 5030-5091 MHz, 5091-5150 MHz, and 5150-5250 MHz. The Air Force uses the 5 030 - 5 091 MHz band for a microwave landing system (MLS) at military bases. The National Aeronautics and Space Administration (NASA) operate active sensor systems in the 5 030 - 5 150 MHz band on a non-interference–basis. The Federal Aviation Administration (FAA) is testing use in a portion of the band for radio local area networks to support air traffic on the surface of airports.

2. Allocations

2a. Allocation Table

The frequency allocation table shown below is extracted from the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management, Chapter 4 – Allocations, Allotments and Plans.

Table of Frequency Allocations

United States Table

Federal Table	Non-Federal Table	FCC Rule Part(s)
5 030 - 5 091 AERONAUTICAL RADIONAVIGATION US260 US211 US367 US444		
5 091 - 5 150 AERONAUTICAL MOBILE US111 US444B AERONAUTICAL RADIONAVIGATION US260 US211 US344 US367 US444 US444A		Satellite Communications (25) Aviation (87)
5 150 - 5 250 AERONAUTICAL RADIONAVIGATION US260 US211 US307 US344	5 150 - 5 250 FIXED-SATELLITE (Earth-to-space) 5.447A US344 AERONAUTICAL RADIONAVIGATION US260 5.447C US211 US307	RF Devices (15) Satellite Communications (25) Aviation (87)

2b. Additional Allocation Table Information

5.444A *Additional allocation:* the band 5 091 - 5 150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A. In the band 5 091 - 5 150 MHz, the following conditions also apply: prior to 1 January 2018, the use of the band 5 091 - 5 150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution 114 (Rev.WRC-12);
–after 1 January 2016, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems;

–after 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service. (FCC)

5.447C Administrations responsible for fixed-satellite service networks in the band 5 150 - 5 250 MHz operated under Nos. 5.447A and 5.447B shall coordinate on an equal basis in accordance with No. 9.11A with administrations responsible for non-geostationary-satellite networks operated under No. 5.446 and brought into use prior to 17 November 1995. Satellite networks operated under No. 5.446 brought into use after 17 November 1995 shall not claim protection from, and shall not cause harmful interference to, stations of the fixed-satellite service operated under Nos. 5.447A and 5.447B

US344 In the band 5 091 - 5 250 MHz, the FCC shall coordinate earth stations in the fixed-satellite service (Earth-to-space) with NTIA (see Recommendation ITU-R S.1342). In order to better protect the operation of the international standard system (microwave landing system) in the band 5 000 - 5 091 MHz, non-Federal tracking and telecommand operations should be conducted in the band 5 150 - 5 250 MHz.

US444 The frequency band 5 030 - 5 150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the frequency band 5 030 - 5 091 MHz, the requirements of this system shall have priority over other uses of this band. For the use of the frequency band 5091 - 5150 MHz, US444A and Resolution 114 (Rev.WRC-12) of the ITU *Radio Regulations* apply.

US444A The band 5 091 - 5 150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis for non-Federal use. This allocation is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A of the ITU *Radio Regulations*. In the band 5 091 - 5 150 MHz, the following conditions also apply:
(a) Prior to January 1, 2018, the use of the band 5 091 - 5 150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution 114 (Rev.WRC-12);
(b) After January 1, 2016, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems; and
(c) After January 1, 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service.

US444B In the band 5 091 - 5 150 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 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.

3. Federal Agency Use

3a. Federal Agency Frequency Assignments Table

The following table identifies the frequency band, types of allocations, types of applications, and the number of frequency assignments by agency.

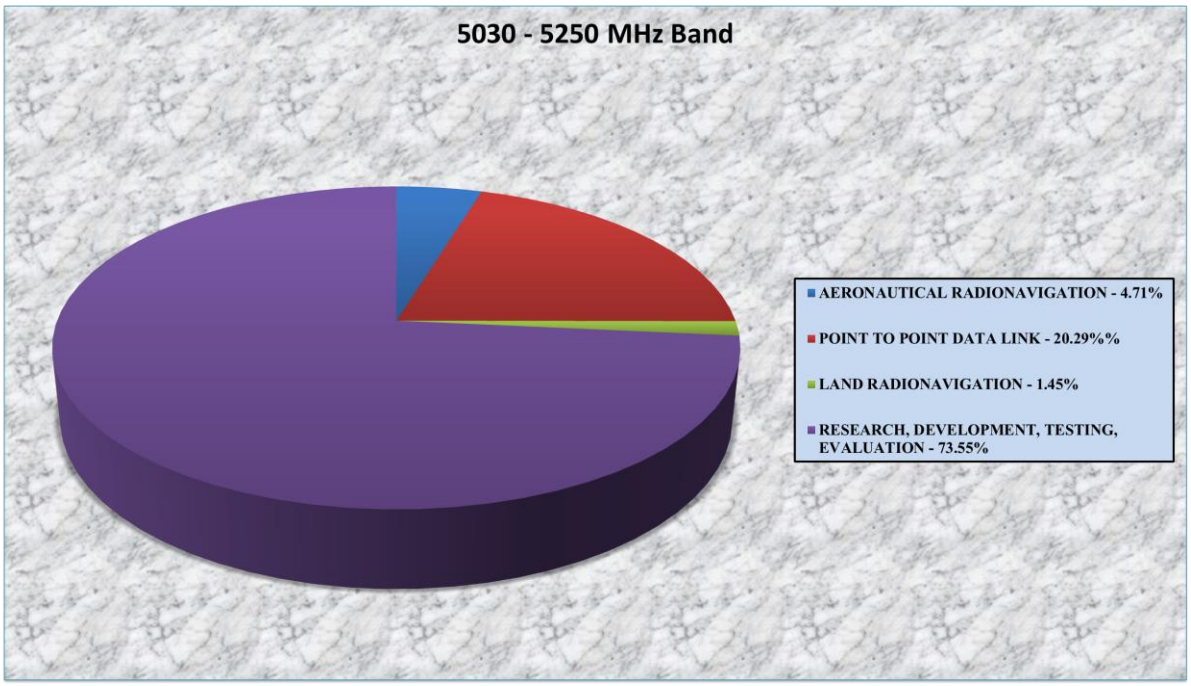
Federal Agency Assignment Table

5030 - 5250 MHz Band					
SHARED BAND					
	AERONAUTICAL MOBILE				
	AERONAUTICAL RADIONAVIGATION				
	FIXED-SATELLITE (Earth-to-space)				
	TYPE OF APPLICATION				
AGENCY	AERONAUTICAL RADIONAVIGATION	POINT TO POINT DATA LINK	LAND RADIONAVIGATION	RESEARCH DEVELOPMENT TESTING EVALUATION	TOTAL
AF	10		3	77	90
AR	1			1	2
DOE				1	1
FAA	2	46		101	149
N		1	1	23	25
NASA		9			9
TOTAL	13	56	4	203	276

The number of actual systems, or number of equipments, may exceed and sometimes far exceed, the number of frequency assignments in a band. Also, a frequency assignment may represent, a local, state, regional or nationwide authorization. Therefore, care must be taken in evaluating bands strictly on the basis of assignment counts or percentages

3b. Percentage of Frequency Assignments Chart

The following chart displays the percentage of frequency assignments for the systems operating in the frequency band 5 030 - 5 250 MHz.



4. Frequency Band Analysis by Application

4a. Aeronautical Radionavigation Service

The Air Force uses the 5 030 - 5 091 MHz band for a transportable version of the MLS, an all-weather precision landing system for tactical purposes and has installed these systems at several Air Force bases. MLS provides precision navigation guidance for alignment and descent of aircraft on approach to a landing by providing azimuth, elevation and distance.

4b. Point-to-Point Data Link

The FAA is operating point-to-point data link systems in this band that are used to support runway safety programs while also providing proof-of-concept data for the Airport Network Location Equipment (ANLE) network.

4c. Research and Development

Sensor Systems

NASA uses the 5 030 - 5 150 MHz band on a non-interference–basis for active sensor systems used in joint programs with the French Agency, Centre National d'Etudes Spatiales (CNES), for space-based observations and measurements of surface topography and ocean wave height.

5. Planned Use

5a. Microwave Landing System (MLS)

The Federal use of MLS is expected to continue for the foreseeable future. No new MLS installations are anticipated.

5b. Aeronautical Mobile (Route) Service (AM(R)S)

The FAA has identified a number of AM(R)S applications for airport surfaces as part of the ANLE network. In general those applications share the characteristics of short-range (a few kilometers maximum) and high bandwidth per airport. Limitation to ground transmission and the geographic separation of airports will likely facilitate airport to airport channel reuse. Testing of ANLE systems has begun at limited locations in the 5 091 - 5 150 MHz band.

The ANLE network is a high integrity, safety communications local area network for the airport area. Combined with an interconnected grid of multilateration sensors ANLE will support, among other things, uploads of routing and electronic flight bag information, scheduling de-icing facilities, and surface mapping to preclude runway incursion and aid in obstacle avoidance. Simple transmitters on surface-moving vehicles allow for the development of a high-fidelity, complete picture of the airport surface environment. In order to speed development and reduce the cost of the ANLE, the system is based on existing Institute of Electrical and Electronics Engineers 802.16e standard.[1]

The United States has adopted a recommendation to implement an allocation at the World Radiocommunication Conference (WRC) in the 5 091 - 5 150 MHz band for aeronautical mobile. This world-wide allocation is limited to: systems operating in the aeronautical mobile (R) service in accordance with international aeronautical standards, limited to surface applications at airports; systems providing aeronautical telemetry from the aircraft station, and systems providing aeronautical security transmissions.

Existing AM(R)S bands are nearing saturation in high traffic areas. Federal agencies are developing new applications and concepts in air traffic management which put further

[1] While the system would be based on the IEEE standards, it is expected that system elements would be tailored for the aviation application. Such tailoring might include bandpass filtering to facilitate sharing with MLS operating in the adjacent band, improved receiver sensitivities, and sectorized antennas.

pressure on existing AM(R)S bands. One emerging application federal agencies have begun coordinating internationally is for the integration of command and control for unmanned aircraft (UA) into air traffic services (ATS) airspace. The United States has allocated the 5 030 - 5 091 MHz band to the AM(R)S as a result of the 2012 World Radiocommunication Conference recommendation.

The FAA also plans to use the 5 030 - 5 091 MHz for a variety of aeronautical applications to include support of Unmanned Aerial Systems (UASs). This band will provide the terrestrial, line-of-sight communications for the command and control of UASs in non-segregated airspace. These flight operations currently take place in segregated airspace, to ensure the safety of the air vehicle and other airspace users[2]. To accomplish integration into non-segregated airspace, UASs will require a high integrity communication link between the UA and remote control center capable of relaying the necessary air traffic control messages and flight critical aircraft information.

[2] Non-segregated airspace is a volume of airspace typically open for general aviation by aviation authorities. Segregated airspace is a volume of airspace where entry is restricted by aviation authorities.