

1435-1525 MHz

1. Band Introduction

The Department of Defense (DOD), the National Aeronautics and Space Administration, and the Department of Energy operate aeronautical mobile telemetry systems in the band 1435-1525 MHz. The aeronautical mobile telemetry systems are used for flight testing of manned and unmanned aircraft, missiles, and space vehicles, and associated communications such as range safety, chase aircraft, and weather data. The DOD uses the 1435-1525 MHz band to support aeronautical mobile telemetry (AMT) in the flight testing of aircraft, spacecraft, and missiles at test ranges and test facilities. The commercial aviation industry also uses this band for aeronautical flight testing at facilities across the United States. In order to relieve congestion experienced in other AMT bands, the 1435-1525 MHz band will be used to support the growing need for wideband AMT systems.¹ The Aerospace and Flight Test Radio Coordinating Council (AFTRCC) is recognized by the Federal Communications Commission and National Telecommunications and Information Administration as the non-government coordinator for assignment of flight test frequencies in the 1435-1525 MHz band.

2. Allocations

2a. Allocation Table

The frequency allocation table shown below was extracted from the 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 Part(s)
1435-1525 MOBILE (aeronautical telemetry)		Aviation (87)
5.341 US78		

2b. Additional Allocation Table Information

5.341 In the bands 1400-1727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a program for the search for intentional emissions of extraterrestrial origin.

¹ The 2360-2390 MHz band is used in conjunction with the 1432-1525 MHz band for AMT functions.

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US78 In the mobile service, the frequencies between 1435 and 1525 MHz will be assigned for aeronautical telemetry and associated telecommand operations for flight testing of manned or unmanned aircraft and missiles, or their major components. Permissible usage includes telemetry associated with launching and reentry into the Earth's atmosphere as well as any incidental orbiting prior to reentry of manned objects undergoing flight tests. The following frequencies are shared with flight telemetry mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz.

3. Federal Agency Use

3a. Federal Agency Frequency Assignments Table

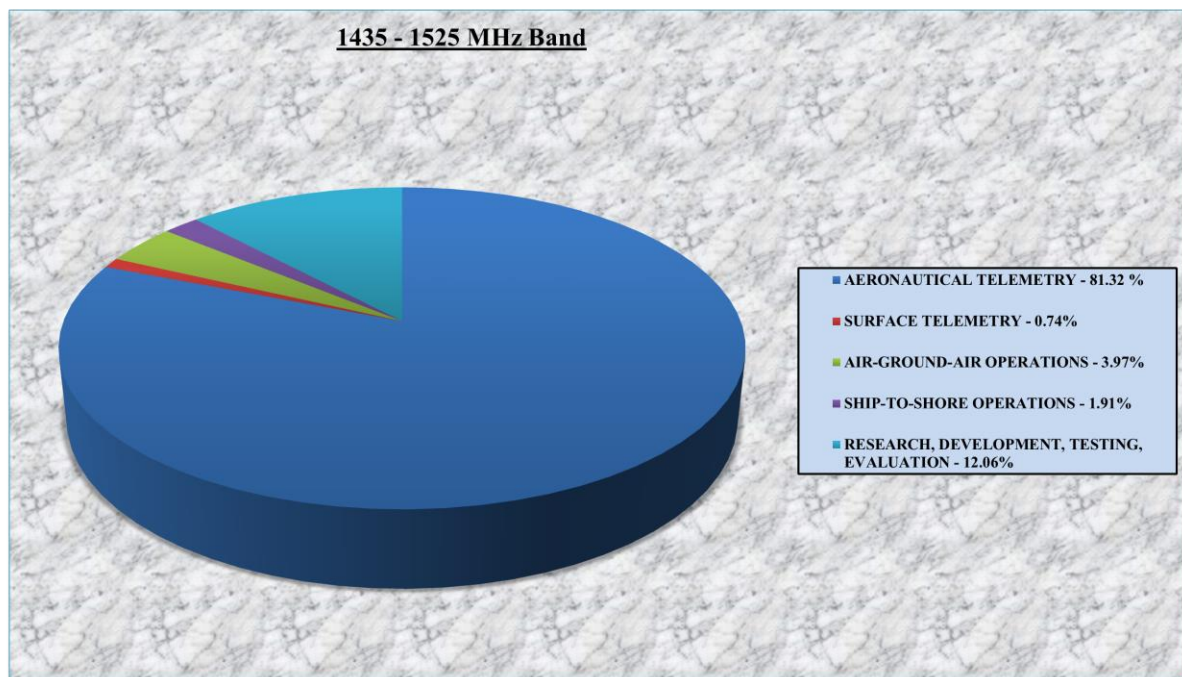
The following table identifies the frequency band, type(s) of allocation(s), types of applications, and the number of frequency assignments by agency.

Federal Frequency Assignment Table

1435-1525 MHz Band						
SHARED BAND						
AGENCY	MOBILE (aeronautical telemetry)					
	TYPE OF APPLICATION					
	AERONAUTICAL TELEMETRY	SURFACE TELEMETRY	AIR-GROUND-AIR OPERATIONS	SHIP-SHORE-SHIP OPERATIONS	RESEARCH DEVELOPMENT TESTING EVALUATION	TOTAL
AF	178		16		15	209
AR	35					35
DOE	30					30
N	302		11	13	67	393
NASA	8	5				13
TOTAL	553	5	27	13	82	680
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 of assignments.						

3b. Percentage of Frequency Assignments Chart

The following pie chart displays the percentage of frequency assignments for various types of systems operating in the frequency band 1435-1525 MHz.



4. Frequency Band Analysis By Application

AMT systems are used for flight testing of manned and unmanned aerospace vehicles. Vehicles are tested to their design limits, thus making safety of flight dependent on the reliability of information received on a real-time basis. An AMT flight test system generally consists of airborne instrumentation and transmitting equipment and ground receiving and monitoring stations. Within the International Telecommunication Union-Radiocommunication sector (ITU-R), Recommendation M.1459 has been developed specifying the technical characteristics of a representative AMT transmitter, receiver and antenna that can be used for computing interference to AMT systems.² These characteristics are typical of systems used by Federal agencies. Channel assignments are made in 1 MHz increments. Typical frequency assignments have emission bandwidths of 1, 3 and 5 MHz with wider bandwidths used for video and other complex measurements. The airborne transmitter antenna is omnidirectional and the ground-based receive station uses a

². Recommendation ITU-R M.1459, *Protection Criteria for Telemetry Systems in the Aeronautical Mobile Service and Mitigation Techniques to Facilitate Sharing with Geostationary Broadcasting-Satellite and Mobile-Satellite Services in the Frequency Bands 1452-1525 MHz and 2310-2360 MHz* (2000) ("ITU-R M.1459").

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high gain directional antenna with a mainbeam gain on the order of 20-40 dBi. The band is predominantly utilized for data transmissions relating to the testing of the aircraft or major components of the air vehicle, along with some additional use for research, development, testing and evaluation (RDT&E).

The DOD is the major Federal user of the band with NASA and DOE also having a few assignments. While these assignments are distributed throughout the country, the majority of assignments are concentrated in California, Maryland, Florida, Nevada, and New Mexico. All of the assignments in Maryland are located at the Patuxent River Naval Air Station. Likewise, all of the assignments in New Mexico are to stations located at the White Sands Missile Range. Similarly, all the New Jersey assignments are to stations located at one location, Lakehurst. The majority of the assignments in Nevada are for operations at the Nevada Test and Training Range. NASA uses some assignments for pre-flight checks of balloon/payload telemetry (ground/ground) and flight (air/ground) support. Other assignments are used in support of the EH-60 aircraft instrumentation data, during flight testing at or below 6,000 feet. DOE assignments are used for ground telemetry checkout of airborne package prior to flight and during flight. At the Patuxent River Naval Air Station and a number of other sites, use of the band from early morning into the evening is particularly intense.

Average power for assignments in the band 1435-1525 MHz varies from 2 watts up to 100 watts.

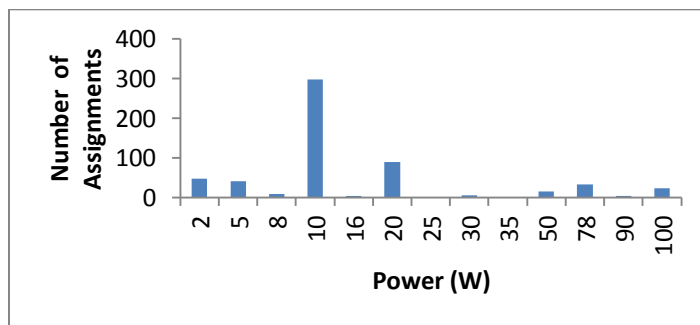


Figure 1. Distribution of Transmitter Power Levels in the Band 1435-1525 MHz

Transmitter bandwidths range from 100 Hertz to 40 MHz. The distribution of bandwidths is shown in Figure 2.

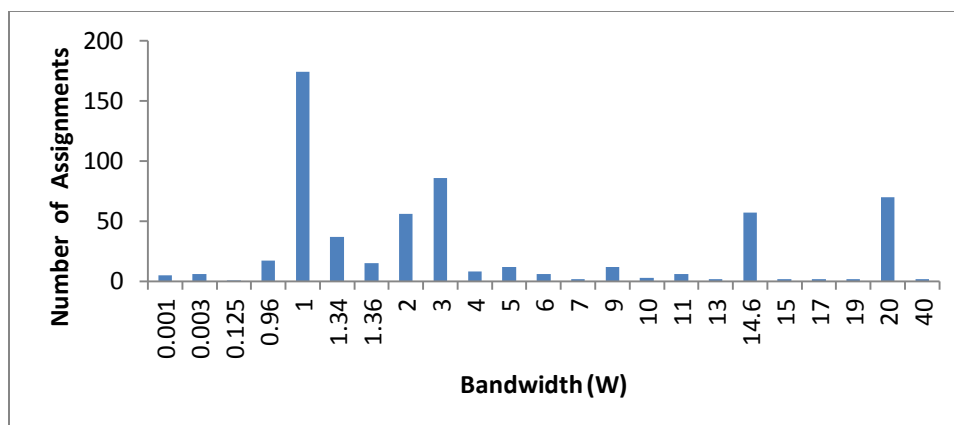
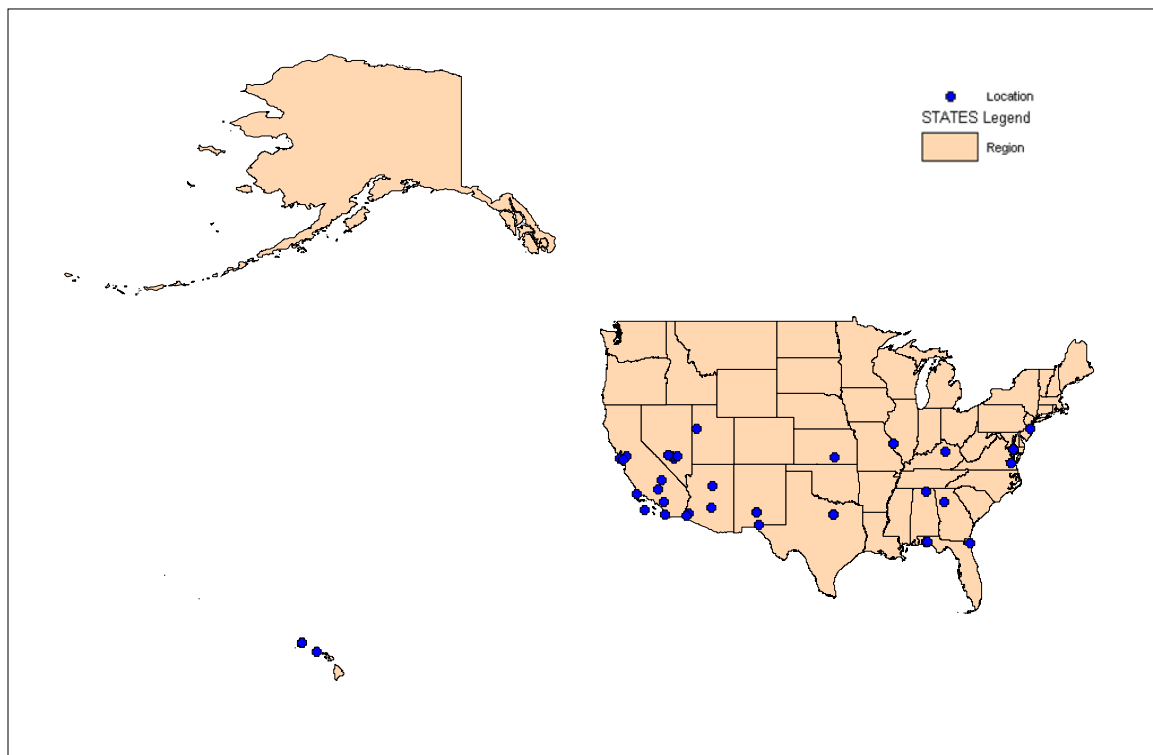


Figure 2. Distribution of transmitter Bandwidths in the Band 1435-1525 MHz

Geographic Distribution of Frequency Assignments for the 1435-1525 MHz band.



Many of the stations are sited in proximity to one another, and thus the associated frequency assignment records have the same or nearly identical latitude and longitude. Therefore, some of the locations shown above represent multiple assignments.

5. Planned Use

All indications are that the use of AMT in the future is expected to increase. The number of parameters monitored during a test and data rates are also expected to increase. Given the importance of AMT to support flight testing requirements and the increasing bandwidth requirements, the Federal Government use of this band is expected to increase for the foreseeable future.