2200-2290 MHz

1. Band Introduction

Operations in the 2200-2290 MHz band primarily consists of tracking, telemetry, and control data communications for control of spacecraft as well as foreign space agency mission spacecraft. This band is used by Federal agencies to operate space research and Earth exploration-satellite (space-to-Earth) communications to earth stations and return links via the Tracking and Data Relay Satellite System (TDRSS), which provides links between low earth orbiting spacecraft and earth stations. Federal agencies and the military also use this band for terrestrial telemetering operations for aircraft, missile flight testing and for fixed point-to-point microwave relay communications.

2. Allocations

2a. Allocation Table

The frequency allocation table shown below is extracted from the Manual of Regulations & 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)
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircraft) 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392 US303	2200-2290 US303	

2b. Additional Allocation Table Information

5.391 In making assignments to the mobile service in the bands 2025-2110 MHz and 2200-2290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU-R SA.1154, and shall take that Recommendation into account for the introduction of any other type of mobile system.

5.392 Administrations are urged to take all practicable measures to ensure that space-to-space transmissions between two or more non-geostationary satellites, in the space research, space operations and Earth exploration-satellite services in the bands 2 025-2 110 MHz and 2 200-2 290 MHz, shall not impose any constraints on Earth-to-space, space-to-Earth and other space- to-space transmissions of those services and in those bands between geostationary and non-geostationary satellites.

US303 In the band 2285-2290 MHz, non-Federal space stations in the space research, space operations and Earth exploration-satellite services may be authorized to transmit to the Tracking and Data Relay Satellite System subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to authorized Federal stations. The power flux-density at the Earth's surface from such non-Federal stations shall not exceed -144 to -154 dBW/m^2/4 kHz, depending on angle of arrival, in accordance with ITU Radio Regulation 21.16.

3. Federal Agency Use:

3a. Federal Agency Frequency Assignments Table:

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

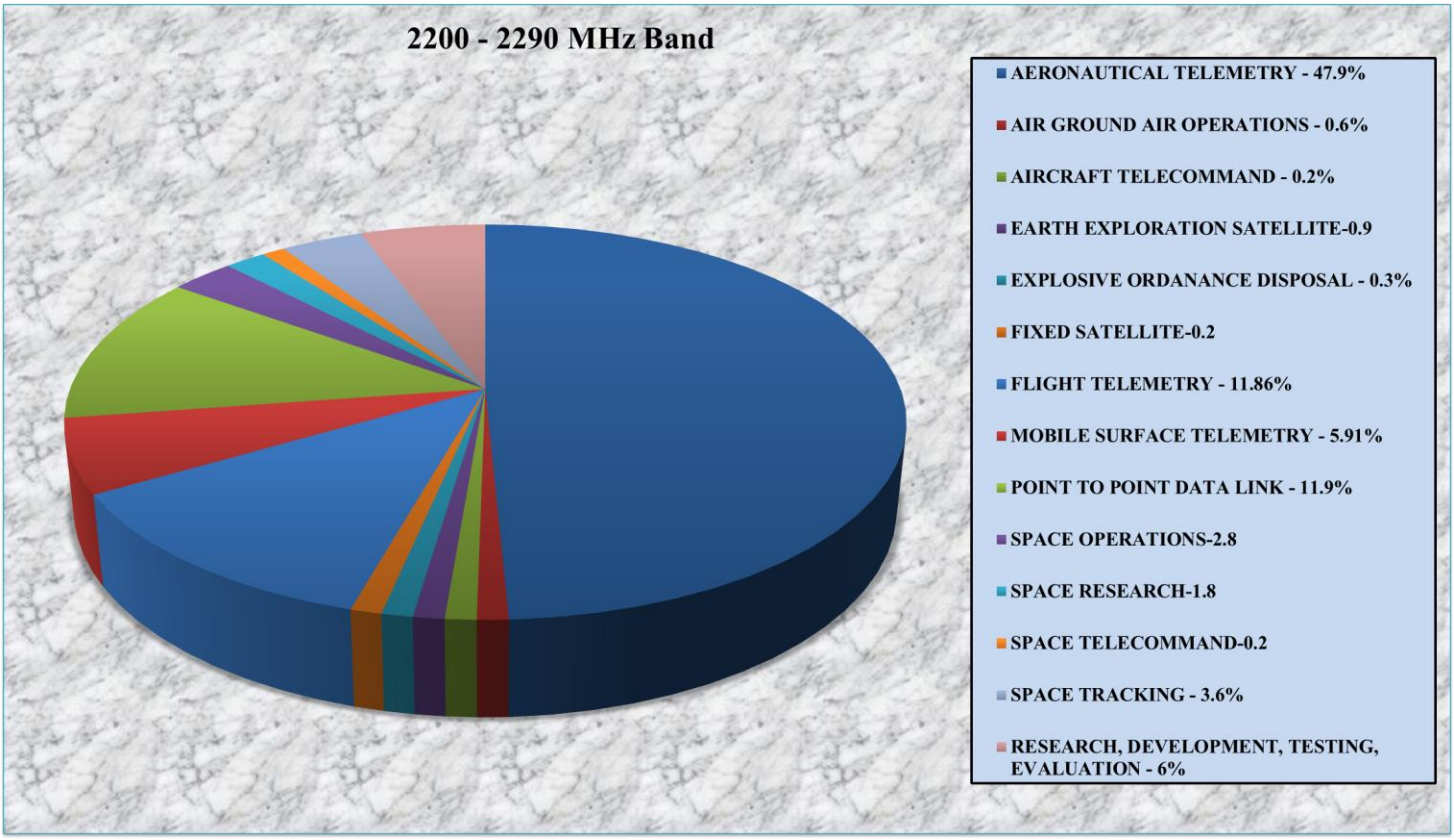
Federal Frequency Assignment Table

2200 - 2290 MHz Band																		
FEDERAL EXCLUSIVE BAND																		
EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only, including aeronautical telemetry, but excluding flight telemetry of manned aircraft) SPACE OPERATION (space-to-space) (space-to-Earth) SPACE RESEARCH (space-to-space) (space-to-Earth)																		
	TYPE OF APPLICATION																	
AGENCY	AERONAUTICAL TELEMETRY	AIR GROUND AIR OPERATIONS	AIRCRAFT TELECOMMAND	EARTH EXPLORATION SATELLITE	EXPLOSIVE ORDNANCE DISPOSAL	FIXED SATELLITE	FLIGHT TELEMETRY	MOBILE SURFACE TELEMETRY	POINT TO POINT DATA LINK	SHIP-SHORE-SHIP OPERATIONS	SPACE OPERATIONS	SPACE RESEARCH	SPACE TELECOMMAND	SPACE TELEMETRY	SPACE TRACKING	RESEARCH DEVELOPMENT TESTING EVALUATION	TOTAL
A									53								53
AF	674	16	1	3	2	2	152	4	4		36	1		114	61	190	1260
AR	79	4					42	11	82							20	238
CG									4								4
DHS		144							31								175
DOC	3	3		2							8			3	3	1	23
DOE	158	148		1			42	127	3		2					1	482
DOI		3							5								8
DOJ		10							68								78
GSA									1								1
MC		10							5							2	17
N	532	26	6		8		10	6		20	1					6	615
NASA	64	50		24		1	49				23	40	5	16	17	13	302
T									7								7
TOTAL	1510	414	7	30	9	3	295	148	263		70	41	5	133	81	233	3263

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 chart displays the percentage of frequency assignments for the systems operating in the frequency band 2200-2290 MHz. The greatest use in the band is flight telemetry.



4. Frequency Band Analysis By Application

The 2200-2290 MHz band is shared by Federal and non-Federal users. Federal users have primary allocations to space research, fixed and mobile services; non-Federal allocations are to space research on a primary basis.

4a. Space Communications

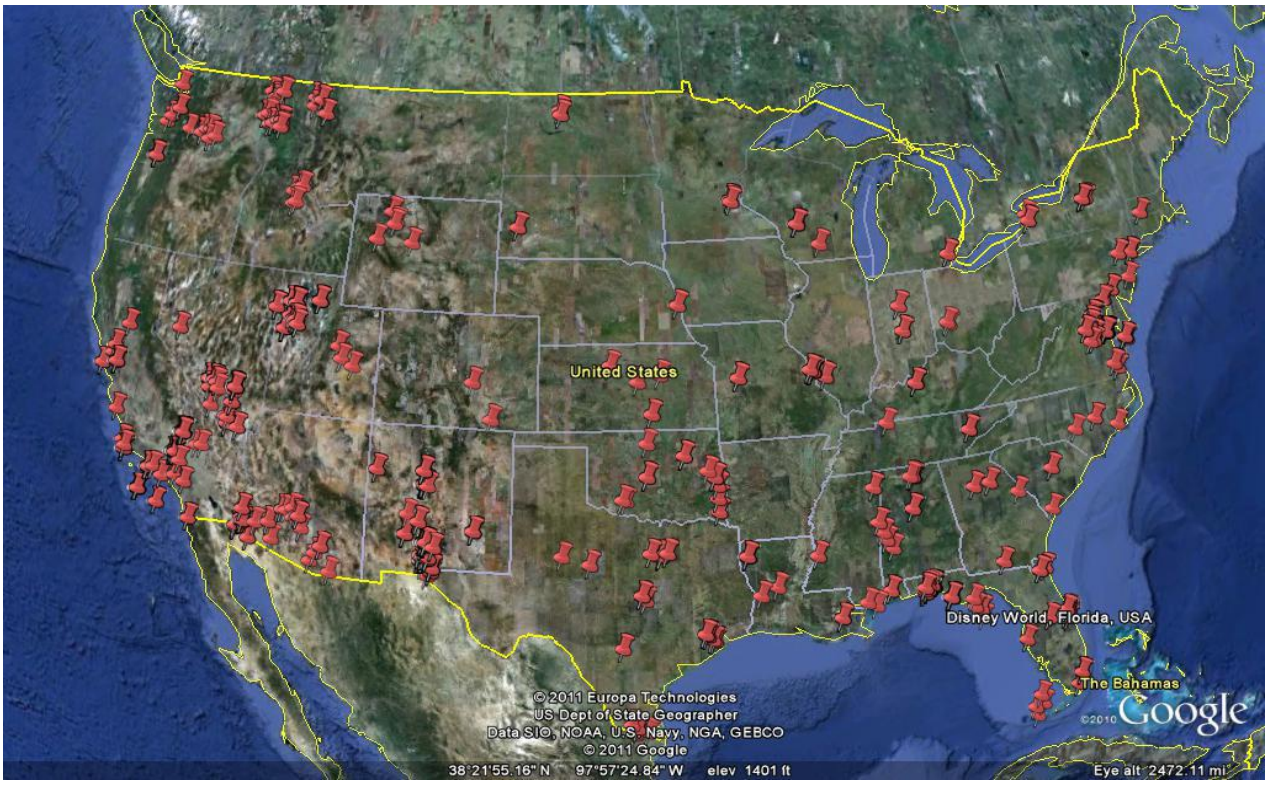
The 2200-2290 MHz band is shared by Federal and non-Federal users. Federal and non-Federal users have primary allocations to space research, on a primary basis. Footnotes give non-Federal entities rights to transmit to the TDRSS satellite on a non-interference basis and give space operations co-equal status with the other primary allocations. Publicly announced users include point-to-point microwave, airborne, mobile, and satellite applications. The 2200-22900 MHz band is heavily used by the Government in space, deep space, and terrestrial telemetry, telecommand and control

applications. NASA uses the band with the TDRSS satellite, and the Air Force uses the band with the Space Ground Link Subsystem (SGLS). It is the primary downlink band for Government satellite systems operating in the 1710-1850 MHz and 2025-2110 MHz uplink bands. NASA and the National Oceanic and Atmospheric Administration (NOAA) use this band to command and control the Geosynchronous Operational Environmental Satellite (GOES) and Polar-Orbiting meteorological satellites.

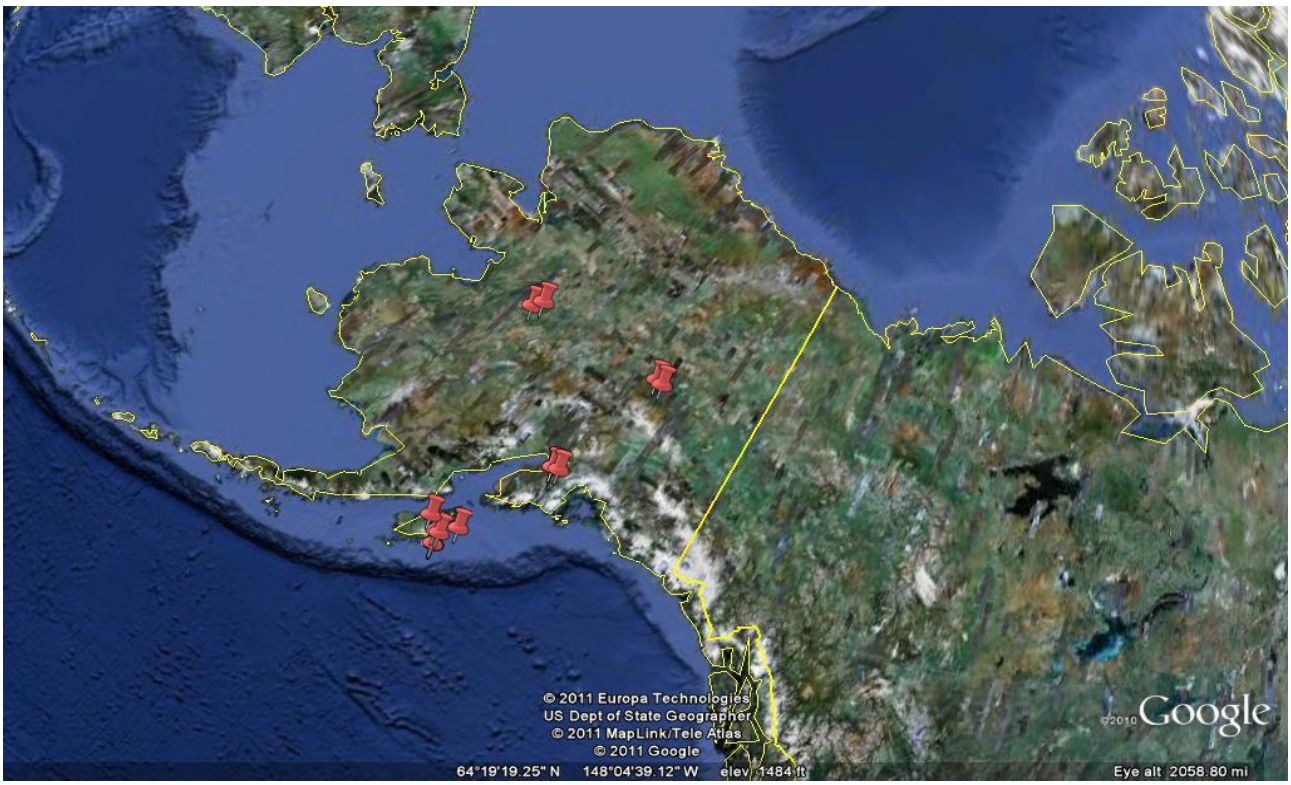
4b. Fixed and Mobile

Federal agency use in this band includes point-to-point microwave, airborne, and mobile applications. The Dept. of Energy's Western Area Power Administration (WAPA) uses this band for point-to-point microwave relay communications to support their hydroelectric power grid system in a number of western states. The DOD also uses this band to support its backbone, radio relay, testing microwave systems, hydrological and construction operations. The overwhelming majority of operations in this band are for telecommand and telemetering applicable to transmission from devices or equipment to central controller. This band is also used in support of weapons testing, environmental testing for setting new telemetry equipment over a specific distance.

2200-2290 MHz



Federal Government Usage in the Continental United States.



Federal Government Usage in Alaslka

Federal Government Usage in Hawaii

5. Planned Use

Flight Test Telemetry

The Department of Defense and commercial aircraft flight testing use the 2200-2290 MHz band. There is a growing concern for lack of spectrum to accommodate the future flight test telemetry operations. NASA, DOD and commercial aircraft manufacturers have large investments in aeronautical flight research and flight test programs. Emerging future requirements will place significantly larger demands on the spectrum used for flight test telemetry. High-resolution digital video and the testing of unmanned aerospace vehicles will increase the demand for spectrum beyond that which can be satisfied by current allocations. It is estimated that an additional 300 MHz will be needed for future flight testing.