

## **335.4-399.9 MHz**

### **1. Band Introduction**

The band 335.4-399.9 MHz is used for a diverse array of land-based, airborne, maritime, and satellite radio communications services by the military forces, National Guard units, Federal Aviation Administration (FAA), Coast Guard (CG), National Aeronautics and Space Administration (NASA), Department of Energy (DOE), and other Federal agencies. Tactical and non-tactical mobile communications, mobile-satellite communications, and air traffic control communications are the most prevalent uses.

The most extensive use of the band is for aeronautical communications systems by military and National Guard forces to provide tactical and non-tactical ground-to-ground, air-to-air, air-ground-air, and air-ship-air communications; the band is also used for Air-Traffic Control (ATC) communications by the military at air bases and aircraft carriers, and by the FAA at civilian airports used by military aircraft. The Coast Guard uses the band on its ships and aircraft to carry out its maritime search and rescue mission and for homeland security; and NASA uses the band for ATC communications on various aircraft.

The military agencies and other Federal agencies use the band 335.4-399.9 MHz for land mobile communications. Digital trunking land mobile radio (LMR) technology is also supported in the upper 19.9 MHz of the band, managed via an allotment plan.

The band 335.4-399.9 MHz is reserved for military uses by North Atlantic Treaty Organization (NATO), its member nations, and other U.S. allies. The band is harmonized among NATO-member nations for secure communications.

### **2. Allocations**

#### **2a. Allocation Table**

The frequency allocation table shown 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)
335.4-399.9 FIXED MOBILE G27 G100	335.4-399.9	

**2b. Additional Allocation Table Information**

**G27** In the bands 225-328.6 MHz, 335.4-399.9 MHz, and 1350-1390 MHz, the fixed and mobile services are limited to the military services.

**G100** The bands 235-322 MHz and 335.4-399.9 MHz are also allocated on a primary basis to the mobile-satellite service, limited to military operations.

### 3. Federal Agency Use

#### 3a. Federal Agency Frequency Assignments Table:

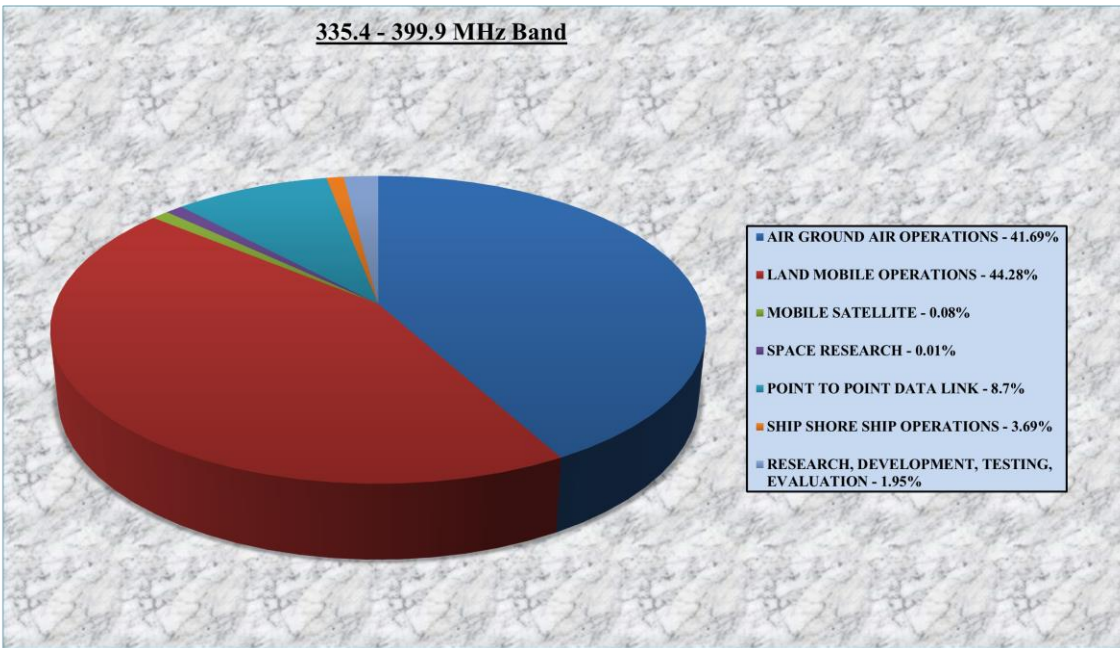
The following table identifies the frequency band, types of allocations, types of applications, and the number of frequency assignments by agency.

*Federal Frequency Assignment Table*

335.4-399.9 MHz Band								
FEDERAL EXCLUSIVE BAND								
AGENCY	FIXED MOBILE							
	TYPE OF APPLICATION							
	AIR GROUND AIR OPERATIONS	LAND MOBILE OPERATIONS	MOBILE SATELLITE	POINT TO POINT DATA LINK	SHIP SHORE SHIP OPERATIONS	SPACE RESEARCH	RESEARCH DEVELOPMENT TESTING	TOTAL
AF	1545	1165		51			129	2890
AR	1233	3136		983			9	5361
CG	85	2			2			89
DHS	322			4				326
DOE	4							4
DOI	99	12						111
FAA	1319							1319
MC	326	557		32			31	946
N	1136	1576	12	139	535		115	3513
NASA	2					1		3
<b>TOTAL</b>	<b>6071</b>	<b>6448</b>	<b>12</b>	<b>1209</b>	<b>537</b>	<b>1</b>	<b>284</b>	<b>14562</b>
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 use for the services listed in the chart legend below for the frequency band 335.4-399.9 MHz. The greatest uses of the band are land mobile operations and air-ground-air operations.



## 4. Frequency Band Analysis By Application

### 4a. Military Uses

The band 335.4-399.9 MHz has been reserved for military operations by NATO and within the individual NATO member countries. The military nature of this band has also been maintained by certain allied and friendly nations outside the NATO alliance such as Australia, Israel, New Zealand, and Saudi Arabia; and by the European Cooperation Partner nations and the Partners for Peace nations.

### 4b. Aeronautical Mobile Air-to-Ground-to-Air Communications and ATC Communications

The military agencies, National Guard units, the Coast Guard, and the FAA are the heaviest users of the band 335.4-399.9 MHz, using the band for critical air-to-ground-to-air communications systems. The military agencies and National Guard units use the

band 335.4-399.9 MHz for various types of aeronautical communications, e.g., for training flights and air-traffic-control functions such as ground control, approach control, enroute aircraft separation, and in-flight refueling services. The Air Force, Army, Navy, and the FAA have thousands of frequency assignments for air-to-ground-to-air communications in the band 335.4-399.9 MHz. Most of these assignments are to ground stations used by the military agencies and National Guard units.

The Coast Guard uses the band on its maritime search-and-rescue aircraft and other aircraft for air-to-ground-to air communications. The military agencies, National Guard units, and the FAA make extensive use of the band 335.4-399.9 MHz which alleviates possible impact of the national airspace civilian air-to-ground-to-air communications operating in the bands within 117.975-137 MHz. Thus, the Federal use of the band 335.4-399.9 MHz for aeronautical communications plays an important part in national defense and security, and to control the nation's airspace.

The band 335.4-399.9 MHz is also used for essential communications by a number of other agencies such as NASA and DOE. NASA uses the band for the Space Shuttle and International Space Station (ISS) communications during Extravehicular Activity (EVA).

#### **4c. Air-Ground-Air and Air-to-Air Aeronautical Mobile Communications**

The military agencies use the band 335.4-399.9 MHz for a major tactical communications system to provide anti-jam, secure, frequency-hopping radio communications for tactical air-to-air, air-to-ground, and ground-to-air communications. The uses include coordination and vectoring of aircraft to targets, and large scale training exercises.

For example, the major radio communications systems are deployed on all rotary wing aircraft, and are used by all operational aviation units, air traffic services, and units. The radio communications system enables interoperability communications among Air Force, Navy, Army, and NATO units.

#### **4d. Ship-to-Shore-to-Ship and Ship-to-Ship Maritime Mobile Communications**

The Navy, Coast Guard, and NASA use the band 335.4-399.9 MHz for tactical and non-tactical operations such as ship-to-air-to-ship and ship-to-ship for clear and secure voice communications. The Coast Guard also uses the band for a secure data communications link.<sup>1</sup>

#### **4e. Land Mobile and Fixed Service Point-to-Point Communications**

The military agencies use the band 335.4-399.9 MHz for tactical and non-tactical land mobile and fixed service point-to-point communications. The most extensive use is by

---

<sup>1</sup> *Spectrum Management for the 21<sup>st</sup> Century, The President's Spectrum Policy Initiative*, Dept. of Commerce, March 2008, at B-16. (The Federal Strategic Spectrum Plan).

## **335.4 – 399.9 MHz**

the Army's Area Common User System (ACUS), consisting of both land mobile and fixed communications systems. The mobile version uses mobile subscriber equipment (MSE) that functions like a cellular communications network, capable of providing communications to many users.

The fixed communications part of the ACUS is a high capacity line-of-sight point-to-point radio system. The radio provides voice and data communications over paths up to 70 miles. The system can use various data rates, with the highest being 34 Mbps, and it has a feature that provides a spectrum scan to detect spectrum congestion to identify frequencies to maximize link availability.

### **4f. Aeronautical Telemetry**

The Navy makes extensive use of the band for aeronautical telemetry, and the Department of Energy also uses the band for this purpose. The Navy uses the band for flight testing of military aircraft. The military agencies also use this band for telemetry systems for rocket testing.

### **4g. Land Mobile Communications**

The Navy, Marine Corps, and Air Force use the band extensively for land mobile communications at various installations and facilities to support activities such as base security. Selected portions of the band are used for radio communications networks employing digital trunking technology for spectrum efficiency.

### **4h. Research and Development, Testing, and Evaluation**

The agencies use the band extensively for research, development, testing, and evaluation of various types of communications and sensing systems. The agencies operate training center instrumentation systems in this band for data links connecting battle simulation systems on participants' platforms (airborne, shipborne, or surface) to central processing facilities.

## **5. Planned Use**

The Navy has launched the next generation mobile satellites, termed the Multiple User Objective System (MUOS) that use the bands 243.525-270.05 MHz and 280-320 MHz. The MUOS is undergoing testing and is not fully operational as of September, 2014. The Navy has awarded contracts for the MUOS, and overall, the MUOS will be \$6.4 billion system. The MUOS enables communications to various terminal devices such as handhelds, laptops, and personal communications units. To support legacy systems, the MUOS will use a narrowband system of 64 kbps/channel and below.<sup>2</sup> The MUOS will use wideband-code-division-multiple-access (WCDMA) technology, the same technology as some forms of the

---

<sup>2</sup> *Mobile User Objective System (MUOS)*, brochure, Navy Communications Satellite Program Office, San Diego, CA, Updated October 2004.

third generation (3G) commercial cellphone technology.<sup>3</sup> The capacity is 4 Mbps per antenna beam. Other than the increased mobile-satellite communications, the planned Federal use of the 225-328.6 MHz band in the foreseeable future will essentially remain the same as the current usage.

---

<sup>3</sup> “The Mobile User Objective System” J.D. Oetting and T. Jen, John Hopkins Applied Physics Lab, Technical Digest, Volume 30, No. 2, 2011. (Document provided to NTIA by Arthur R. DeLeon, Navy Spectrum Management Office.