# 401–402 MHz

## 1. Band Introduction

The Federal operations in the 401-402 MHz band primarily consist of meteorological-satellite earth stations transmitting in the Earth-to-space direction related to collection of meteorological data associated with the Geostationary Operational Environmental Satellites (GOES) and Polar Orbiting Satellite (POES) systems. In this frequency band, radiosondes operate in the meteorological aids service and space-to-Earth communications links support scientific exploration by spacecraft.

## 2. Allocations

### 2a. Allocation Table

The frequency allocation table shown below is 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 Rule Part(s) |
|---|---|---|
| 401-402<br>METEOROLOGICAL AIDS<br>(radiosonde) US70<br>SPACE OPERATION<br>(space-to-Earth)<br>EARTH EXPLORATION-<br>SATELLITE (Earth-to-space)<br>METEOROLOGICAL-SATELLITE<br>(Earth-to-space)<br><br>US384 US345 | 401-402<br>METEOROLOGICAL AIDS<br>(radiosonde) US70<br>SPACE OPERATION<br>(space-to-Earth)<br>Earth exploration-satellite<br>(Earth-to-space)<br>Meteorological-satellite<br>(Earth-to-space)<br><br>US384 US345 | MEDRadio (95I) |

## 2b. Additional Allocation Table Information

**US70** The meteorological aids service allocation in the band 400.15-406.0 MHz does not preclude the operation therein of associated ground transmitters.

**US345** In the band 401-406 MHz, the mobile, except aeronautical mobile, service is allocated on a secondary basis and is limited to, with the exception of military tactical mobile stations, Medical Device Radiocommunication Service (MedRadio) operations. MedRadio stations are authorized by rule on the condition that harmful interference is not caused to stations in the meteorological aids, meteorological-satellite, and Earth exploration-satellite services, and that MedRadio stations accept interference from stations in the meteorological aids, meteorological-satellite, and Earth exploration-satellite services.

**US384** In the band 401-403 MHz, the non-Federal Earth exploration-satellite (Earth-to-space) and meteorological-satellite (Earth-to-space) services are limited to earth stations transmitting to Federal space stations.

## 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.

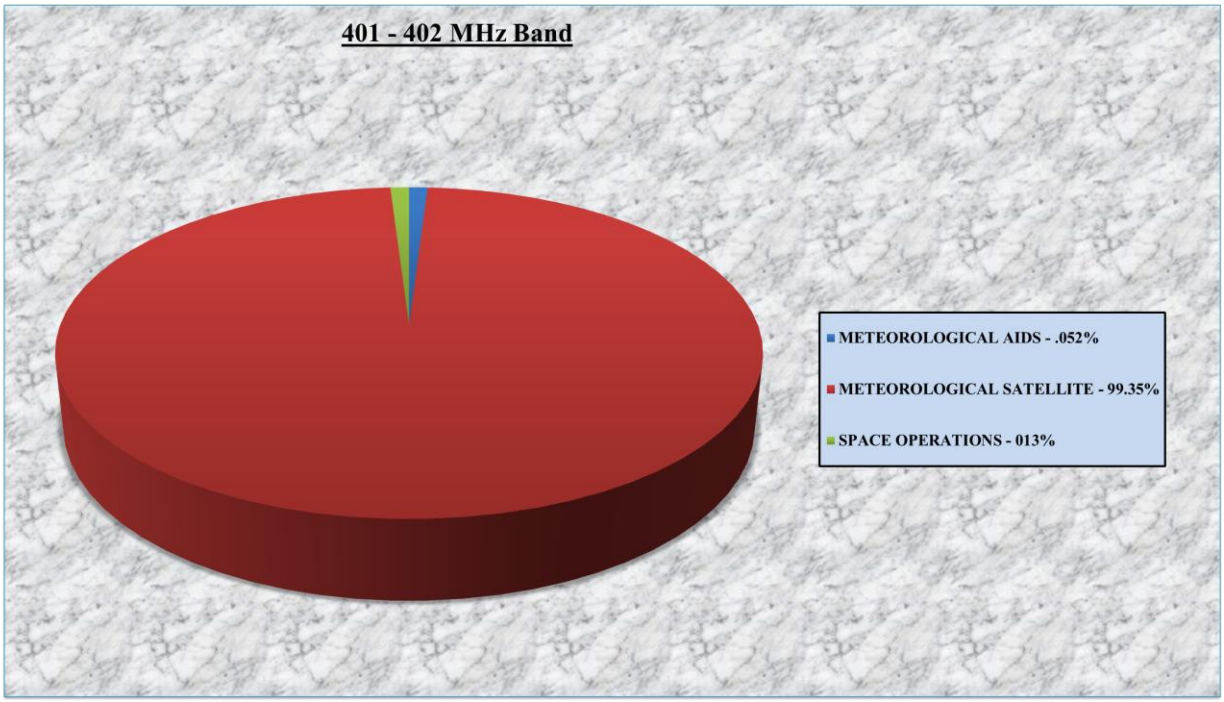
***Federal Frequency Assignment Table***

| 401-402 MHz Band | | | | |
|---|---|---|---|---|
| SHARED BAND | | | | |
| | METEOROLOGICAL AIDS (radiosonde)<br>METEOROLOGICAL-SATELLITE (space-to-Earth)<br>MOBILE-SATELLITE (space-to-Earth)<br>SPACE OPERATION (space-to-Earth) | | | |
| | TYPE OF APPLICATION | | | |
| AGENCY | METEOROLOGICAL AIDS | METEOROLOGICAL SATELLITE | RESEARCH DEVELOPMENT TESTING EVALUATION | TOTAL |
| A | | 22 | | 22 |
| AF | 3 | 10 | 4 | 17 |
| AR | 1 | 3953 | | 3954 |
| DOC | | 438 | | 438 |
| DOE | 6 | 5 | | 11 |
| DOI | | 144 | | 144 |
| DOJ | | 2 | | 2 |
| EPA | | 1 | | 1 |
| MC | 4 | 1 | | 5 |
| N | 11 | 2 | 2 | 15 |
| NASA | | 30 | | 30 |
| NSF | | 1 | | 1 |
| TVA | | 157 | | 157 |
| TOTAL | 25 | 4766 | 6 | 4797 |

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 authnorization. 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 401-402 MHz.




## 4. Frequency Band Analysis By Application

### 4a. Meteorological-Satellite

The Department of Commerce's National Environmental Satellite, Data, and Information Service (NESDIS) operates remote sensing satellites that perform day and night observations of weather (clouds, temperature, and winds), ocean state (sea surface temperature), geological and agricultural features over the entire Earth. Various ground stations transmit these data and other environmental data using the 401-402 MHz band. Ground stations or platforms gather the data from the environment, then GOES and POES as well as commercial satellites re-transmit the information to a central processing center. The meteorological-satellite system also provides for the collection and radio relay of data from fixed, mobile, and transportable environmental observing platforms (ships, aircraft, ocean buoys, and remote surface sites). Figure 1 shows various data collection platforms operations.

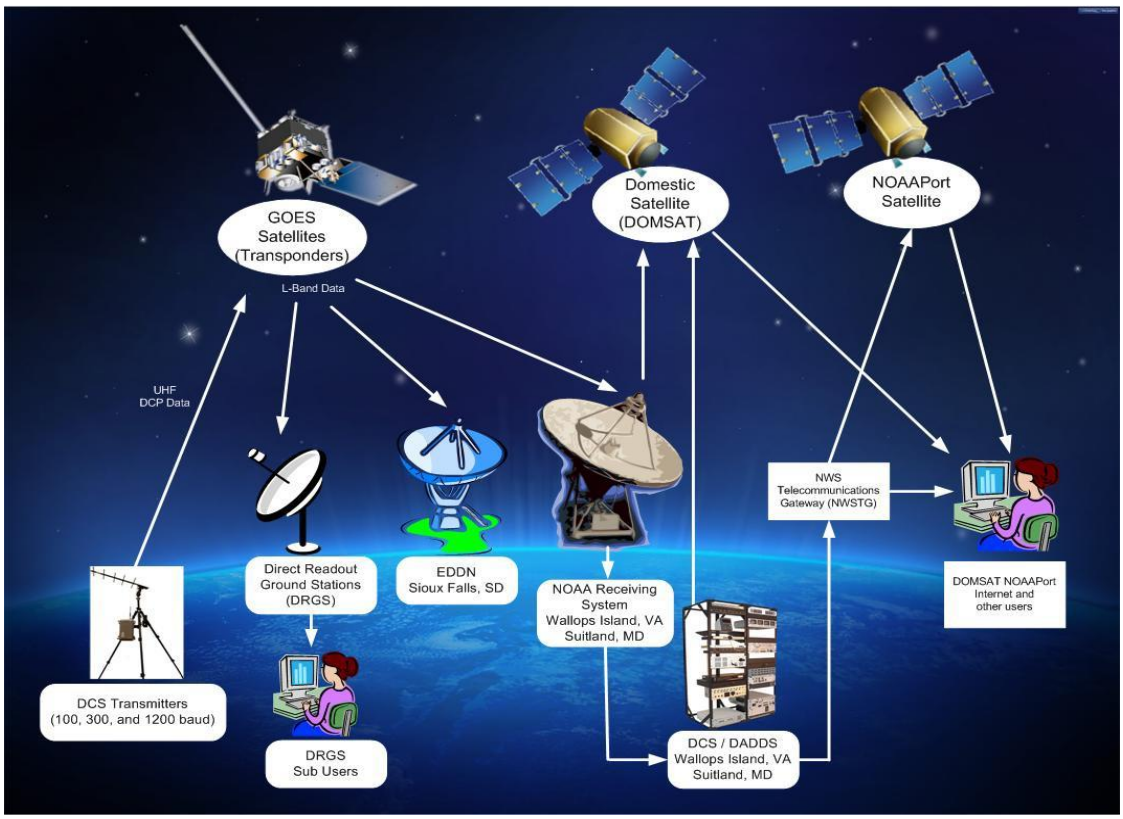



**Figure 1. Data Collection Platform Operations**

The National Oceanic and Atmospheric Administration (NOAA) Data Buoy Center develops and operates environmental data buoys for weather monitoring, prediction, and various other scientific programs. Buoys and Data Collection Platforms (DCPs) transmit weather related data in the band 401-402 MHz to NOAA satellites and back to Earth via downlinks near 1700 MHz. Over 10,000 DCPs currently use data collection radio relay service of the meteorological-satellites. The Department of Defense (DOD), the Department of Interior (DOI), NOAA, other Federal agencies, and the private industry use these observation platforms to obtain data on stream flow and water quality, snow depth, rainfall in remote mountain areas, oceanic measurements from buoys, wind and temperature information. Figure 1 depicts Federal meteorological operations in the 401-402 MHz band.

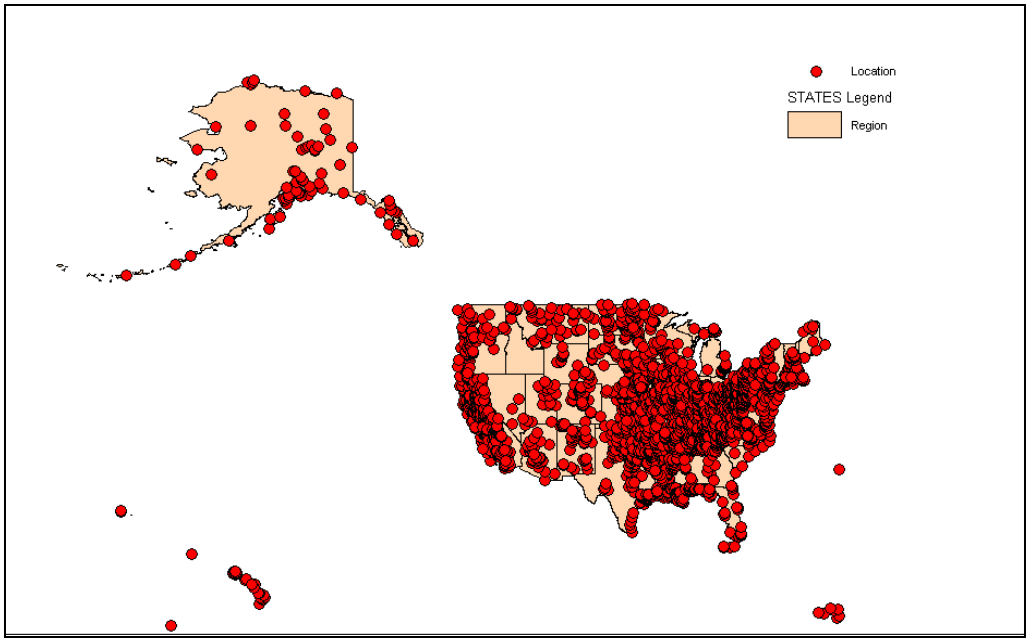



**Figure1. Federal Meteorological-Satellite Operations in the 401-402 MHz Band**

### 4b. Earth Explorations-Satellite

The National Aeronautics and Space Administration (NASA) uses this band for uplink signals in support of various spacecrafts involved in scientific exploration missions. NASA also uses the frequency 401.5856 MHz for space-to-space communications between the Mars Explorer Rovers, MER-1 and MER-2 and the Mars Global Surveyor spacecraft. The rovers transmit robotic geological investigations data to the Mars Global Surveyor spacecraft on non-interference basis.

### 4c. Meteorological Aids

The DOD operates radiosondes in the meteorological aids service on a limited basis. Radiosondes are expendable free-floating balloons transmitting data to the global meteorological community as an essential input to weather models and by researchers for atmospheric and climatologic research.

## 5. Planned Use

The current Federal operations in the 401–402 MHz band will continue for the foreseeable future.