1400-1427 MHz

1. Band Introduction

Federal agencies use the 1400-1427 MHz band to conduct passive remote sensing from space and radio astronomy research via observations of hydrogen lines.

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)
1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.341 US246		

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 programme for the search for intentional emissions of extraterrestrial origin.

US246 No station shall be authorized to transmit in the following bands:

73-74.6 MHz, 608-614 MHz, except for medical telemetry equipment, 1400-1427 MHz, 1660.5-1668.4 MHz, 2690-2700 MHz, 4990-5000 MHz, 10.68-10.7 GHz, 15.35-15.4 GHz, 23.6-24 GHz, 31.3-31.8 GHz, 50.2-50.4 GHz, 52.6-54.25 GHz, 86-92 GHz, 100-102 GHz, 109.5-111.8 GHz, 114.25-116 GHz, 148.5-151.5 GHz, 64-167 GHz, 182-185 GHz, 190-191.8 GHz, 200-209 GHz, 226-231.5 GHz, 250-252 GHz.

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 Agency Assignment Table

There are no federal frequency assignments in this band.

Passive use does not require authorization. Therefore, assignment counts in passive bands may not represent the use accurately.

3b. Percentage of Frequency Assignments Chart

The following chart displays the percentage of frequency assignments for the systems operating in the frequency band 1400-1427 MHz.

There are no federal frequency assignments in this band.

4. Frequency Band Analysis By Application

4a. Radio Astronomy Service

The NTIA Manual defines Radio astronomy as astronomy based on the reception of radio waves of cosmic origin.[1] The service is unique in that it involves only passive systems. Since the signals received emanate from natural sources, radio astronomers have no control over the power, the frequency, or other characteristics of the emissions. The radio astronomy service use the spectrum based on physical phenomena rather than expected growth, as is the case for most other radio services. Using terrestrial radio telescopes, radio astronomers can observe cosmic phenomena at frequencies ranging from 15 MHz to over 800 GHz. To meet the needs of radio astronomy, frequencies at regular intervals across this range must be protected from interference in the vicinity of the radio astronomy observatories. The basic plan of spectrum management for radio astronomy is to protect small bands across the range for continuum observations, while choosing those bands so they contain the spectral lines of greatest scientific interest.[2] Radio

[1] NTIA Manual §6.1.1 at 6-12.

[2] The preferred frequency bands for continuum and spectral line observations are specified in International Telecommunication Union-Radiocommunication Sector Recommendation RA.314-10.

astronomy has contributed much to the science of astronomy and has produced numerous technical innovations that have benefitted radiocommunications and humankind in general. It has provided information on the atmospheric absorption of radio waves, important in the area of telecommunications and communications technology.[3] The National Science Foundation (NSF) uses the 1400-1427 MHz band for radio astronomy observations of spectral lines emitted by hydrogen. Figures 1 and 2 depict radio astronomy observatory sites in the United States and Possessions.

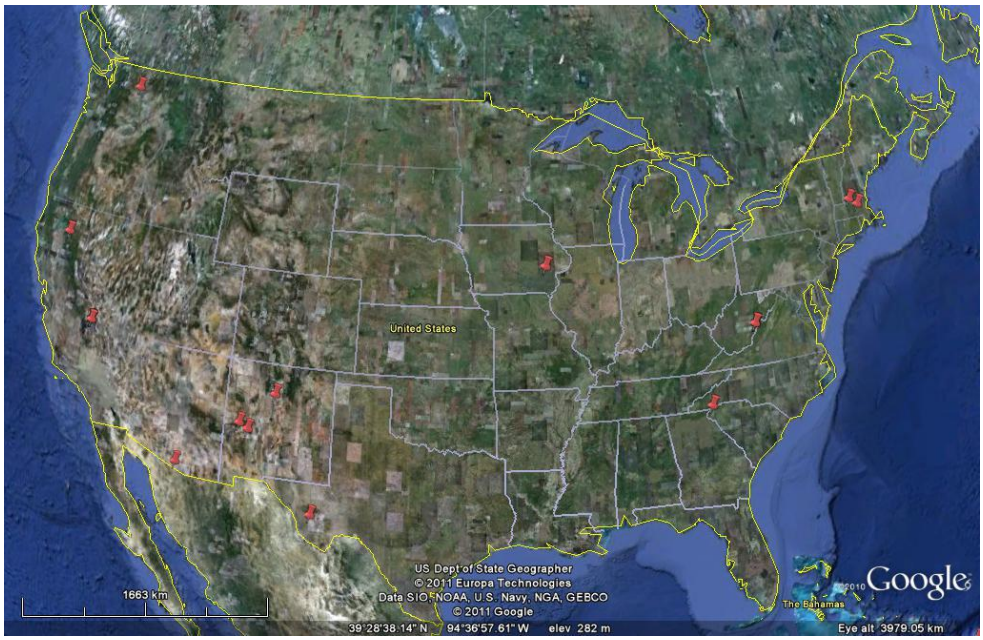

Figure 1. Radio Astronomy Sites in the Continental United States

[3] An overview of applications of astronomical techniques and devices that benefit the public is contained in National Telecommunications and Information Administration, NTIA Report 98-35, *Radio Astronomy Spectrum Planning Options* (April 1998) at Appendix B.

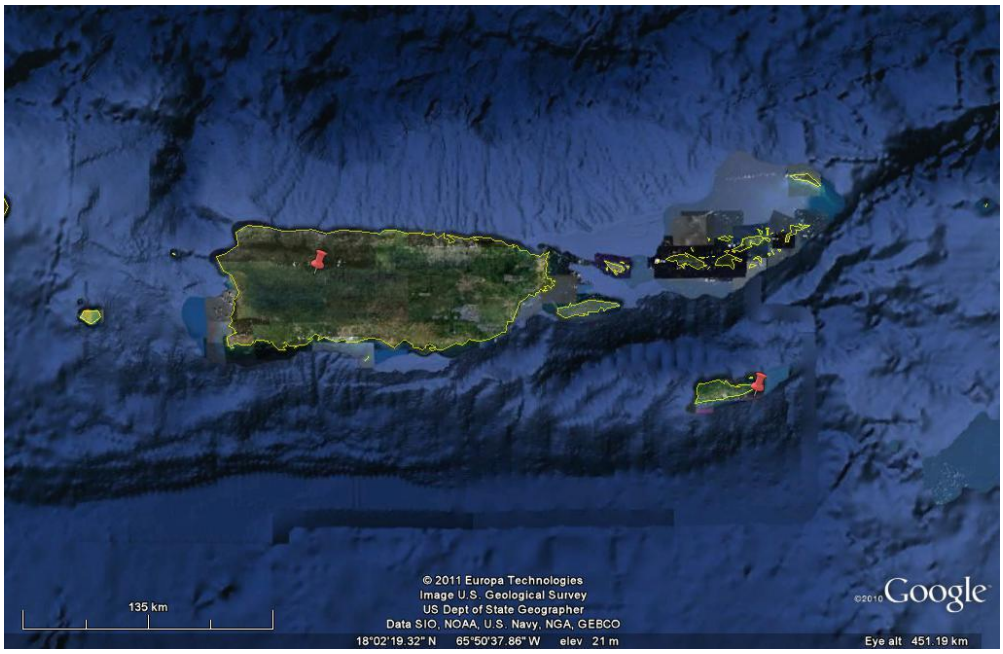

Figure 2. Radio Astronomy Sites in Arecibo, Puerto Rico, and St. Croix, Virgin Islands

4b. Earth Exploration-Satellite (Passive) Service

Systems operating in the Earth exploration-satellite (passive) service use to obtain information relating to the characteristics of the Earth and its natural phenomena from passive sensors on satellites. Radio waves of natural origin are emissions from the ground, air, and water. All objects emit radio waves and the emissions convey information about those objects. Earth exploration-satellite passive sensors receive and measure natural emissions produced by the Earth's surface and its atmosphere. The societal benefits from Earth exploration satellite passive sensing include:

- Weather Prediction: a key input to numerical weather prediction models used globally for weather forecasting.

- Global Warming: concentrations and distributions of atmospheric gases, sea and land ice thickness and change, and ozone measurements are key components to studying and prediction of global warming.

- Severe Weather Events: the prediction of severe weather events requires accurate measurements of rain rates in storms over the oceans, which is only possible with remote sensing satellites.

- Forest Fires: detection of fires through smoke by their microwave radiation.

- Management of Natural Resources: measurements of biomass, deforestation, and water resources through systematic environmental monitoring.

- Volcanoes: used to detect volcanic activity even before eruptions and to track and predict the volcanic fallout effects.

- Shipping: used to track sea ice, ice flows, and ocean storms to steer ships out of harm's way.

- Long Range Climate Forecasts: study of global atmospheric and oceanic events such as El Niño requires sea surface temperature, ocean winds, ocean wave height, and many other components used in the prediction of long-range weather forecasting and climatic trends.

  In the 1400-1427 MHz band, scientists perform passive measurements of ocean salinity, soil moisture, snow liquid content, sea ice thickness, and ocean sea state, for assessing agriculture and fishing, monitoring water resources, and hazard warning for ship routing. The National Aeronautics and Space Administration (NASA) Aquarius is a satellite mission to measure global sea surface salinity. Using measurements performed in the 1400-1427 MHz band Aquarius will resolve missing physical processes that link the water cycle, the climate, and the ocean. In collaboration with NASA, the European Space Agency Soil Moisture and Ocean Salinity mission will perform measurements in the 1400-1427 MHz band to observe soil moisture over the Earth's landmasses and salinity over the oceans.

4c. Space Research (Passive) Service

The Federal government is not using the 1400-1427 MHz band for space research (passive) operations at this time.

5. Planned Use

The Federal Government will continue to perform passive sensing from space and radio astronomy observations in the band 1400-1427 MHz for the foreseeable future.