

## FEDERAL COMMUNICATIONS COMMISSION

### 47 CFR Parts 2, 15, 80, 90, 97, and 101

[ET Docket No. 15–99; FCC 15–50]

### WRC–12 Radiocommunication Conference (Geneva 2012)

**AGENCY:** Federal Communications Commission.

**ACTION:** Proposed rule.

**SUMMARY:** In this document, the Commission proposes to implement certain allocation changes from the World Radiocommunication Conference (Geneva, 2012) (WRC–12) and to update related service rules. The Commission took this action in order to conform its rules, to the extent practical, to the decisions that the international community made at WRC–12. This action will promote the advancement of new and expanded services and provide significant benefits to the American people. In addition, the Commission proposes to address several matters that pertain to unresolved issues from a previous Conference.

**DATES:** Comments must be filed on or before August 31, 2015 and reply comments must be filed on or before September 30, 2015.

**FOR FURTHER INFORMATION CONTACT:** Tom Mooring, Office of Engineering and Technology, (202) 418–2450, email: [Tom.Mooring@fcc.gov](mailto:Tom.Mooring@fcc.gov), TTY (202) 418–2989.

**ADDRESSES:** You may submit comments, identified by ET Docket No. 15–99, by any of the following methods:

- *Federal Communications Commission's Web site:* <http://apps.fcc.gov/ecfs/>. Follow the instructions for submitting comments.

- *Mail:* Tom Mooring, Office of Engineering and Technology, Room 7–A123, 445 12th Street SW., Washington, 20554.

- *People with Disabilities:* Contact the FCC to request reasonable accommodations (accessible format documents, sign language interpreters, CART, etc.) by email: [FCC504@fcc.gov](mailto:FCC504@fcc.gov) or phone: 202–418–0530 or TTY: 888–835–5322.

Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 CFR 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- *Electronic Filers:* Comments may be filed electronically using the Internet by accessing the ECFS: <http://fjallfoss.fcc.gov/ecfs2/>.

- *Paper Filers:* Parties that choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

- Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St. SW., Room TW–A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of *before* entering the building.

- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.

- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street SW., Washington DC 20554.

*People with Disabilities:* To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202–418–0530 (voice), 202–418–0432 (tty).

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's *Notice of Proposed Rulemaking*, ET Docket No. 15–99, FCC 15–50, adopted April 23, 2015, and released April 27, 2015. The full text of this document is available for inspection and copying during normal business hours in the FCC Reference Center (Room CY–A257), 445 12th Street SW., Washington, DC 20554. The complete text of this document also may be purchased from the Commission's copy contractor, Best Copy and Printing, Inc., 445 12th Street SW., Room. CY–B402, Washington, DC 20554. The full text may also be downloaded at: [www.fcc.gov](http://www.fcc.gov). People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files,

audio format), send an email to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202–418–0530 (voice), 202–418–0432 (tty).

### Summary of Notice of Proposed Rulemaking

1. In this *Notice of Proposed Rulemaking* (WRC–12 NPRM), the Commission proposes to amend parts 2, 15, 80, 90, 97, and 101 of its rules to implement allocation decisions from the Final Acts of the World Radiocommunication Conference (Geneva, 2012) (WRC–12 Final Acts) and make certain related updates to the service rules. Specifically, the Commission proposes to:

- Allocate the 8.3–11.3 kHz band to the meteorological aids service on a primary basis.
- Allocate the 472–479 kHz band (630 meter band) to the amateur service on a secondary basis.
- Amend the amateur service rules to provide for use of the 135.7–137.8 kHz (2200 meter) and 472–479 kHz (630 meter) bands. Amateur stations would share the band with power line carrier (PLC) systems operated by electric utilities. Amateur stations would be permitted to operate in these bands at fixed locations when separated from electric transmission lines by a specified distance.
- Amend part 80 of the Commission's rules to authorize radio buoy operations in the 1900–2000 kHz band under a ship station license.
- Limit the use of the 495–505 kHz band to the maritime mobile service.
- Allocate seven frequency bands (4.438–4.488 MHz, 5.25–5.275 MHz, 16.1–16.2 MHz, 24.45–24.65 MHz, 26.2–26.42 MHz, 41.015–41.665 MHz, and 43.35–44 MHz) to the radiolocation service (RLS) on a primary basis for Federal and non-Federal use, allocate the 13.45–13.55 MHz band to the RLS on a secondary basis for Federal and non-Federal use, limit the use of these RLS allocations to oceanographic radars, require that these radars not cause harmful interference to, or claim protection from, existing and future stations in the incumbent fixed and mobile services, and amend part 90 of the Commission's rules accordingly.
- Reallocate the 156.7625–156.7875 MHz and 156.8125–156.8375 MHz bands to the mobile-satellite service (MSS) (Earth-to-space) on a primary basis for Federal and non-Federal use to allow for greater probability of vessel tracking, with resulting benefits to maritime safety and security.
- Extend the aeronautical mobile (route) service (AM(R)S) allocation from the 5091–5150 MHz band (adopted in

the WRC-07 R&O) by also allocating the 5000–5091 MHz range to the AM(R)S on a primary basis for Federal and non-Federal use. AM(R)S use of the smaller 5000–5030 MHz range would extend the tuning range for the Aeronautical Mobile Airport Communications System (AeroMACS), with the use of the 5010–5030 MHz band limited to those requirements that cannot be met in the 5000–5010 MHz and 5091–5150 MHz bands. AM(R)S use of the 5030–5091 MHz band would support line-of-sight control links for unmanned aircraft.

- Allocate the 7850–7900 MHz band to the meteorological-satellite service (space-to-Earth) on a primary basis for Federal use.
- Allocate the 15.4–15.7 GHz band to the RLS on a primary basis for Federal use.
- Allocate the 22.55–23.15 GHz band to the space research service (SRS) (Earth-to-space) on a primary basis for Federal and non-Federal use and allocate the 25.5–27 GHz band to the SRS (space-to-Earth) on a primary basis for non-Federal use.
- Delete the aeronautical mobile service allocation from the 37–38 GHz band.
- Encourage operators of fixed stations operating in the 81–86 GHz and 92–94 GHz bands to take all reasonable steps to ensure that their unwanted emissions power in the 86–92 GHz band does not exceed the levels recommended by WRC-12.

In addition, the Commission sought comment on the ability of Federal/non-Federal aeronautical mobile telemetry (AMT) stations to share spectrum with the incumbent services in the 4400–4940 MHz and 5925–6700 MHz bands.

#### *Passive Systems for Lightning Detection (8.3–11.3 kHz)*

2. The Commission proposes to allocate the 8.3–9 kHz and 9–11.3 kHz bands to the meteorological aids (MetAids) service on a primary basis for Federal and non-Federal use, and to limit this MetAids allocation to passive use by adding international footnote (RR) 5.54A to the U.S. Table. The Commission believes that lightning detection systems provide a valuable public benefit and that the adoption of these proposals would serve the public interest by providing interference protection to these passive lightning detection systems, which operate in the MetAids service. The Commission requests comment on these proposals, noting that there is no current allocated use of the 8.3–11.3 kHz band in the United States.

#### **Radio Buoys Operating in the 1900–2000 kHz Band**

3. The Commission proposes to adopt technical requirements in part 80 of the rules for the radio buoys based on the existing part 80 rules and the characteristics of radio buoys that are currently imported and/or marketed pursuant to the part 90 rules. Specifically, the Commission proposes to authorize buoy stations to transmit on any frequency in the 1900–2000 kHz band, provided that the output power does not exceed 10 watts (W) and that the antenna height of the buoy station does not exceed 4.6 meters (15 feet) above sea level. Next, the Commission proposes rules for the use of “sel-call buoys” (*i.e.*, radio buoys that transmit only after receiving a selective calling signal from their associated ship station). Based on the characteristics of sel-call equipment, the Commission proposes to authorize ship stations to transmit selective calling signals on all frequencies in the 1900–2000 kHz band, provided that the output power does not exceed 10 W and that the station’s antenna height not exceed 6 meters (20 feet) above the mast of the ship on which it is installed. Finally, the Commission proposes to amend footnote NG92 to provide for radio buoys that cannot be authorized under the radiolocation service by allocating the 1900–2000 kHz band to the maritime mobile service on a primary basis in Regions 2 and 3, restricted to radio buoy operations on the open sea, and to explicitly state that stations in the amateur, maritime mobile, and radiolocation services located in Region 2 will be protected from harmful interference only to the extent that such radiation exceeds the level that would be present if the offending station were operating in compliance with the technical rules applicable to the service in which it operates. The Commission crafted the proposed footnote to restrict operations to the open sea based on the areas where radio buoys appear to be in use, and because doing so would provide greater protection for amateur stations by excluding radio buoys from “inland waters.” Parties who believe that this geographic area should be extended to include the Chesapeake Bay, Great Lakes, or other inland waters should document why such an extension is warranted. The Commission seeks comment on these proposals.

4. The Commission also seeks comment on alternative approaches that would accomplish its objective of allowing continued radio buoy use by the U.S. high seas fishing fleet. For

example, should the Commission transition new radio buoy use to another MF band, and, if so, how would the costs to manufacturers and operators relate to any benefits that amateur operators may realize from such a transition? Should the Commission add the 1900–2000 kHz band to § 90.248 of its rules, which already authorizes ocean buoy tracking, rather than § 80.375? For future radio buoy equipment, would it be beneficial to authorize different transmitter output power limits in segments of the 1900–2000 kHz band for operations near the coastline? Finally, are there any additional considerations the Commission should take into account regarding radio buoy use in international waters?

5. The Commission notes that, in the context of the WRC-07 proceeding, ITM Marine (ITM) requested that the Commission expand the frequencies available for radio buoy use, and states that its customers have complained that the 1900–2000 kHz band is getting crowded. Based on the Commission’s survey of international spectrum usage and trends, it appears that the proposed designation of 100 kilohertz of MF spectrum may be sufficient for the commercial fishing industry’s requirements. The Commission therefore seeks comment on the level of use of the 1900–2000 kHz band for radio buoys, whether additional spectrum is required for radio buoys, and if there are specific technical measures that will allow the U.S. commercial fishing fleet to make more efficient use of the limited spectrum resources. The Commission also seeks comment on whether it should establish a channeling plan or bandwidth limitations for radio buoys as these may provide for more efficient use of the limited available spectrum.

6. With regard to equipment authorization, the Commission proposes to establish a cutoff date after which new applications for equipment authorization of radio buoys must meet the new part 80 rules in order to receive authorization and that radio buoys authorized under § 90.103(b) prior to that date may continue to be sold and marketed, *i.e.*, this equipment would be grandfathered. The Commission proposes to establish the cutoff date as six months from the effective date of the Report and Order adopted in response to this WRC-12 NPRM. The Commission solicits comment on its proposal.

#### **Amateur 2200 Meter (135.7–137.8 kHz) and 630 Meter (472–479 kHz) Bands**

7. *472–479 kHz Band Allocation.* The Commission proposes to allocate the 472–479 kHz band (630 meter band) to

the amateur service on a secondary basis. The Commission also proposes to add RR 5.80A to the band, which would permit it to allow amateur stations to transmit with an equivalent isotropically radiated power (EIRP) of up to 5 W in most areas of the United States. This proposal would bring the Commission's allocations for the band into harmony with the international allocations. As with the 135.7–137.8 kHz band, the addition of an amateur allocation to this band would provide new opportunities for amateur operators to experiment with equipment, techniques, antennas, and propagation phenomena but with signals having larger bandwidth and higher power. The fact that other allocated services make little use of the band also supports allowing amateurs to have access to this band. The Commission seeks comment on these proposals.

8. The Commission is cognizant of the functions served by PLC systems that operate in the 472–479 kHz band on an unprotected and non-interference basis, such as tripping protection circuits if a downed power line or other fault is detected in the power grid. Nevertheless, the Commission proposes to add an amateur allocation because it is comfortable that amateur radio and utility PLC systems can successfully co-exist in the band. The Commission notes that no reports of harmful interference to the allocated radio services or to PLC systems from experimental amateur operations have been filed with the Commission or with the National Telecommunications and Information Administration (NTIA). The Commission therefore proposes to permit amateur operations in this 472–479 kHz band in a manner that allows for shared use with PLC systems. The Commission seeks comment generally on the sharing of the 472–479 kHz band between PLC systems and the amateur service.

9. *Service Rules for the 135.7–137.8 kHz and 472–479 kHz bands.* The Commission is proposing service rules for the amateur service in the 135.7–137.8 kHz and 472–479 kHz bands with the principal goal of enabling sharing of this spectrum among licensed amateur stations and unlicensed PLC systems. As the demand for radio spectrum has continued to increase, the Commission has sought to make more efficient use of spectrum by providing for sharing of frequency bands for multiple purposes. While the Commission recognizes the importance of PLC systems to the functioning of the electric power grid, it also believes that there are benefits to providing amateurs access to these bands, including providing amateurs

with new opportunities for experimentation. Moreover, PLC systems and the expected amateur use of these bands have characteristics that make coexistence possible. PLC systems are limited to use on transmission lines and, consequently, are not present in most residential neighborhoods where amateur licensees live. The amateur service is expected to use the band mainly for experimental purposes and not for routine and widespread communications activities common in other bands. These attributes give the Commission confidence that, along with appropriate technical rules, amateur stations can harmoniously operate on the same frequency bands as PLC systems.

10. The cornerstone of the proposed technical rules is physical separation between amateur stations and the transmission lines upon which PLC systems may be present. The Commission proposes that amateur stations be permitted to operate in these bands when separated from transmission lines by a specified distance. Such a separation, in conjunction with limits on the amateur stations' transmitted EIRP and antenna heights, will enable PLC systems and amateur stations to coexist in these bands. In addition, the Commission proposes to limit amateur stations to operations at fixed locations only to ensure that this separation distance can be maintained reliably. The Commission seeks comment on this overall framework.

11. In order to develop the necessary and appropriate service rules to meet its goal of providing for the coexistence of amateur services and PLC systems in these bands, the Commission seeks detailed comment on the technical characteristics of both the PLC systems and the amateur stations. This information will allow the Commission to set an appropriate separation distance. Although the Commission in the *WRC-07 NPRM* inquired into the technical rules and methods that would assure coexistence, commenters provided little in the way of concrete information. The American Radio Relay League (ARRL) submitted a technical analysis based on an NTIA technical report supporting an assertion that PLC systems in the 135.7–137.8 kHz band will be sufficiently protected from amateur stations transmitting at an EIRP of 1 W with a separation distance of 1 kilometer (km) from the transmission lines carrying the PLC signals. However, this NTIA technical report is from 1985 and therefore does not account for any subsequent developments.

12. To assist it in determining the optimal separation distance, the Commission invites commenters to submit information on the technical characteristics of PLC systems that are currently being operated by utilities or are likely to be deployed in the future. How tolerant are these PLC systems of signals received from other stations transmitting in the same band? What electric field strength at the location of a transmission line will cause a PLC system operating on that line to malfunction? What types of malfunctions would the electric power grid experience from electrical interference? How many PLC systems are currently operating in the 2200 and 630 Meter bands? Can these existing PLC systems be modified and could new PLC systems be designed to operate in other portions of the 9–490 kHz band, thus avoiding co-channel operation with amateur services? At what power do these PLC systems operate and how long are the transmission lines over which they send signals? At what voltage level do the transmission lines upon which these PLC systems are deployed operate and how does the PLC systems' tolerance of other signals depend on the voltage level? What electric field strengths are produced in the vicinity of transmission lines by the PLC signals traveling over the transmission lines?

13. The Commission likewise invites information on the technical characteristics of amateur stations that are likely to be deployed or have operated under experimental licenses in these two bands. What electric field strength generated by PLC systems operating on transmission lines would impede the operation of amateur stations? A study conducted on a PLC system operating at 1 W at 152 kHz found that the PLC system generated an electric field strength of 20 decibels relative to 1 microvolt per meter (dBµV/m) at 1 km. Would a signal with this field strength interfere with the operation of amateur stations? Given that high-voltage transmission lines generate a significant level of noise at this frequency range, how close to high-voltage transmission lines can amateur stations realistically operate? In recent years, amateur stations have operated in these bands under experimental licenses with most licenses permitting an effective radiated power of between 1 to 20 watts. How close did these amateur stations operate to transmission lines? Did any of these amateur stations receive signals from PLC systems operating on transmission lines? Do the experiences of amateur stations and utilities in other countries and along the

United States border with Canada yield any useful information?

14. If the Commission were to adopt its proposal to permit amateur operations only when separated by a specified distance from transmission lines, when a new transmission line is built close by an amateur station, the station either would have to relocate farther away from the transmission line or cease operating. How should the Commission's rules address the potential for new transmission lines to be constructed closer than the specified distance to pre-existing amateur stations? The Commission does not want to inhibit the ability of either PLC systems or amateur services to grow and expand without imposing unnecessary burdens on either. Is it possible for utilities to refrain from geographically expanding their PLC operations within the relatively small portion of the 9–490 kHz band that the Commission is making available for amateur operations, and is this something utilities would do on their own accord, given the part 15 status of PLC systems? Should the Commission's rules explicitly prohibit utilities from deploying new PLC systems in these bands?

15. The Commission seeks comment on how changes to the structure and design of the electric power system might affect its technical analysis. For example, the modernization of the U.S. power system to provide a more efficient and stable transmission and distribution network, which has been referred to as the "smart grid," requires wide-area monitoring of the electric grid, two-way communications, and enhanced control functions. These communication needs may be met by increased use of PLC systems. Are utilities likely to deploy more PLC systems in these bands in the future to meet the communication needs of the smart grid? Are the characteristics of these PLC systems likely to differ from PLC systems that have been used by utilities in the past? A recently adopted IEEE standard (1901.2–2013) is designed for smart grid applications over distribution lines below 500 kHz. Because these systems operate over the distribution lines to residences and businesses rather than over transmission lines, they are considered carrier current systems rather than PLC systems under the Commission's rules. Unlike PLC systems, carrier current systems may operate on any power line and are not limited to the 9–490 kHz band. However, carrier current systems are subject to limits on radiated power that do not apply to PLC systems. What is the likelihood that carrier current

systems will be deployed over distribution lines and operate in the two frequency bands of concern in this proceeding? Will these systems be used for tasks critical to the functioning of the electric grid, or will they be used for non-critical purposes such as metering? Are amateur stations operating in these bands likely to prevent these carrier current systems from operating or receive harmful interference from these systems?

16. The Commission also seeks comment on the applicability of IEEE 1613–2009—IEEE Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations (IEEE 1613–2009) to its analysis. ARRL claims that PLC systems complying with IEEE–1613 "would virtually guarantee that there would be no interaction between [a]mateur stations and PLC systems," and that compliance with the standard has been required by the Commission's rules since 2002. As background, the Commission's rules require that PLC systems conform to engineering standards promulgated by the Commission and adhere to industry approved standards designed to enhance the use of PLC systems. Is compliance with this IEEE standard required by the Commission's rules (*i.e.* is this an industry approved standard designed to enhance the use of PLC systems)? Would compliance of PLC systems with this standard facilitate the sharing of these bands between amateur stations and PLC systems? Are there PLC systems deployed that do not comply with this standard? Would compliance with this standard obviate the need for amateur stations to maintain a specific separation distance from transmission lines?

17. The Commission recognizes that the separation distance required for PLC systems and amateur stations to coexist will depend on the power at which the amateur stations are permitted to transmit. The Commission proposes that amateur stations in the 135.7–137.8 kHz band be limited to a maximum EIRP of 1 W, as is required by footnote RR 5.67A, and which it adopted in the *WRC-07 R&O*. Is this EIRP limit appropriate for facilitating sharing between PLC systems and amateur stations? For the 472–479 kHz band, the Commission proposes to adopt transmitted power limits consistent with RR 5.80A. Amateur stations will be limited to an EIRP of 1 W in the portion of Alaska within 800 km of the Russian Federation and will be permitted to transmit at up to 5 W EIRP elsewhere. Is this EIRP limit appropriate for PLC

systems and amateur stations to share this band? Should amateur stations be required to reduce their EIRP below 5 W when close to transmission lines and at what distances? The Commission seeks comment on these proposals.

18. The Commission also seeks comment on the practical application of a separation distance requirement, and, specifically, what resources and information amateur radio operators will need to comply with its rules. Amateur licensees will have to determine the location of transmission lines in their vicinity to determine if they are permitted to operate stations using these frequency bands. The amateur licensees will need to differentiate transmission lines from the electric distribution lines that connect distribution substations to customer or house wiring. High voltage transmission lines are typically attached to large steel towers that are easy to identify. However, lower voltage transmission lines are typically attached to wooden poles. Although the wooden poles used for transmission lines are usually taller than the wooden poles used for distribution lines, the Commission recognizes that distinguishing the two types may not always be straightforward. The Commission seeks comment on whether amateur licensees will be able to identify the transmission lines in their locality. If amateur licensees are not able to reliably identify transmission lines, should the Commission require amateurs or ARRL to affirmatively verify the locations of transmission lines with utilities or the Utilities Telecom Council (UTC) before an amateur station begins transmitting?

19. There are several different ways that the Commission could specify the separation distance between the amateur stations and the transmission lines. The Commission could specify the slant-range distance as is defined in the part 15 rules. The slant range distance is the diagonal distance measured from the center of the measurement antenna to the nearest point of the overhead power line. However, calculation of the slant range distance is complicated by the need to know the height of the transmission line at the point closest to the measurement antenna as well as the height of the center of the measurement antenna. For simplicity, the Commission proposes instead to specify the separation distance in terms of the horizontal distance between the transmission line and the amateur station antenna. This is the horizontal (lateral) distance between the center of the amateur station antenna and a vertical projection of the overhead transmission line down to the

height of the center of the amateur station antenna. This distance could be calculated from the coordinates (*i.e.* latitude and longitude) of the amateur station antenna and the coordinates of the nearest point on the transmission line without having to know the heights of the antenna or the transmission line. The Commission seeks comment on this proposal.

20. Lastly, the Commission seeks comment on additional service and operational rules that would be appropriate for amateur operations in these bands. According to ARRL, the tallest antenna that should reasonably be considered for an amateur station is 200 feet, because antennas with greater heights would be required to obtain prior Federal Aviation Administration (FAA) approval and have to comply with FAA painting and lighting requirements. The Commission notes that adopting a maximum antenna height for amateur stations in these bands will aid in sharing of the spectrum with PLC systems by limiting the number of transmission lines that would potentially be in direct line-of-sight of amateur station antennas. The Commission seeks comment on what maximum antenna height, if any, it should adopt for amateur stations in these bands.

21. The Commission also invites comment on whether to adopt transmitter power limits for amateur stations, in addition to the EIRP limits it is proposing. If so, the Commission seeks comment on what the power limits should be. The Commission observes that, in the *2002 Amateur Radio NPRM*, it proposed to limit the maximum transmitter power in the 135.7–137.8 kHz band to 100 W peak envelope power (PEP) because of the possible difficulty of measuring the EIRP of an amateur station in this frequency range. Also, in 1998, ARRL submitted data for the 135.7–137.8 kHz band showing that relatively short antennas can only produce ranges of EIRP that are well below the ITU's 1 W EIRP limit (*i.e.*, 10–40 milliwatts (mW) for a 100 foot antenna and 1–4 mW for a 50 foot antenna) with a transmitter power output of 200 W PEP. The Commission did not consider either power limit at that time, because it decided not to adopt an allocation for amateur operations in this band. Given that the Commission has adopted such an allocation in the *WRC-07 R&O*, do either the *2002 Amateur Radio NPRM* or ARRL's 1998 study provide a basis for determining transmitter power limits now? These transmitter power limits could vary depending on antenna height—*e.g.* the Commission could

allow a 200 W PEP limit for antenna heights not exceeding 30.5 meters while permitting only 100 W PEP for taller antennas. Should the transmitter power limits differ between the 135.7–137.8 kHz band and the 472–479 kHz bands?

22. In response to the *WRC-07 NPRM*, commenters addressed a number of steps that could facilitate amateur use of the 135.7–137.8 kHz band. Amateur operator John H. Davis (Davis) proposed that no amateur station should be automatically controlled to ensure that the amateur operator is able to quickly terminate transmissions if necessary. Davis also suggested that it may be appropriate to also prohibit software-driven modes that determine their own operating frequency without human intervention. Should the Commission adopt Davis's suggestions? ARRL states that there is no rationale for limiting the occupied bandwidth in the 135.7–137.8 kHz band to less than the full 2.1 kilohertz, and that a stricter limit would not be conducive to experimentation with narrowband data emission modes in the future. Should the Commission adopt any bandwidth limitation for either of the frequency bands? In the *WRC-07 NPRM*, the Commission requested comment on whether it should limit operating privileges in the 135.7–137.8 kHz band, *e.g.*, to Amateur Extra Class licensees. None of the commenters believe that such a restriction would better facilitate Amateur/PLC sharing of the band. In particular, the Commission notes that ARRL states that it would be consistent with Commission policy to make this frequency band available to Amateur Extra, Advanced, and General Class licensees. Should the Commission limit operating privileges for these bands in accordance with ARRL's statement? Should the Commission authorize CW (international Morse code telegraphy), RTTY (narrow-band direct-printing telegraphy), and data emissions throughout the 630 and 2200 meter bands as the Commission did in its 2200 meter band proposal in 2002? The Commission also seeks comment on amending § 97.3 by adding definitions for the terms effective radiated power, isotropically radiated power, and LF.

23. *Other Allocated Uses.* Other radio services use the 135.7–137.8 kHz band. In the U.S. Table, the 130–160 kHz band is allocated to the fixed service (FS) and maritime mobile service (MMS) on a primary basis for Federal and non-Federal use. While there are no non-Federal stations in the FS and MMS that are licensed to operate in the 135.7–137.8 kHz band, there is limited Federal use of this band. Specifically, a Federal coast station located in Dixon,

California transmits to ships in the Pacific Ocean on two frequencies that overlap portions of this band. Given that this coast station also transmits on 19 other LF frequencies, the Commission has requested that NTIA consider whether Federal requirements can be met without operating in this narrow (2.1 kilohertz) band. The 126.7–141.7 kHz band is also used to track tagged salmon in the Pacific watershed. The Commission seeks comment on whether it needs to adopt exclusion zones or use other methods to protect these Federal uses of the band. Should the Commission delete the unused non-Federal allocations from this band? To be consistent with the International Table, the Commission also proposes to require that amateur fixed stations operating in the 2200 meter band not cause harmful interference to stations in the FS and MMS that are authorized by other nations and require that these amateur stations take any and all corrective action, if harmful interference is reported to us. The Commission seeks comment on these proposals.

24. Finally, the Commission notes that the 472–479 kHz band has unused Federal MMS and aeronautical radionavigation service (ARNS) allocations. Should the Commission remove these allocations from the Federal Table? To be consistent with the International Table, the Commission proposes that amateur stations transmitting in the 630 meter band not cause harmful interference to, and must accept interference from, stations authorized by other nations in the ARNS and MMS and that the amateur stations must cause no harmful interference to 490 kHz. Should the Commission take any action with regard to the non-Federal MMS allocation in the band? The Commission seeks comment on these issues.

#### **Maritime Issues and Oceanographic Radars**

25. *Maritime Mobile Service Use of the Frequency 500 kHz.* The Commission proposes to reallocate the 495–505 kHz band to the MMS on a primary basis for Federal and non-Federal use. This action is expected to provide spectrum for digital broadcasting of maritime safety and security related information via automated broadcasts in a manner that can coexist with existing services. The Commission requests comment on this proposal.

26. *Oceanographic Radar Applications in the 4–44 MHz Range.* The Commission supports the U.S. objective to provide allocated spectrum for the operation of oceanographic

radars, while minimizing their impact on incumbent fixed and mobile service users. The Commission also agrees that allocating the WRC-12 oceanographic radar bands would better organize and reduce spectrum requirements for these operations. The Commission therefore proposes to allocate the eight WRC-12 frequency bands in the 4–44 MHz range to the RLS for Federal and non-Federal use, limited to oceanographic radar applications.

27. Specifically, the Commission proposes to allocate seven frequency bands (4.438–4.488 MHz, 5.25–5.275 MHz, 16.1–16.2 MHz, 24.45–24.65 MHz, 26.2–26.42 MHz, 41.015–41.665 MHz, and 43.35–44 MHz) to the RLS on a primary basis for Federal and non-Federal use and to allocate the 13.45–13.55 MHz band to the RLS on a secondary basis for Federal and non-Federal use.

28. To minimize the impact on the incumbent fixed and mobile services, the Commission proposes that oceanographic radars may not cause harmful interference to, or claim protection from, existing and future stations in the incumbent fixed and mobile services. As requested by NTIA, the Commission seeks to implement this proposal in the U.S. Table by adding: (1) RR 5.132A to four HF bands (4.438–4.488 MHz, 5.25–5.275 MHz, 13.45–13.55 MHz, and 24.45–24.65 MHz); (2) RR 5.145A to the 16.1–16.2 MHz band; and, (3) a U.S. footnote (tentatively numbered as US132A) to the 26.2–26.42 MHz, 41.015–41.665 MHz, and 43.35–44 MHz bands. Further, the Commission proposes to raise the secondary mobile except aeronautical mobile service allocation in the 5.25–5.275 MHz band to primary status, so that existing and future stations in this service can also be protected from interference from oceanographic radars.

29. The Commission is most concerned about the potential for interference from oceanographic radars in the 4.438–4.488 MHz and 26.2–26.42 MHz bands. Several university-operated stations authorized on frequencies in the 4–44 MHz range under experimental licenses were required to adjust their operations because of interference caused to incumbent stations authorized in the fixed and mobile services. Given these incidents, the Commission notes that operators of oceanographic radars would be required to cease operations if notified that they are causing harmful interference, and operations will not resume until the cause of the harmful interference is corrected.

30. The Commission's proposed rules are based on the conditions specified in Resolution 612 (Rev. WRC-12). The

Commission proposes to amend § 90.103 of its rules to bring the oceanographic radar allocations into immediate effect by listing the eight oceanographic radar bands in the table within paragraph (b), by limiting the station class of these radars to radiolocation land stations, and by restricting the use of these bands by adding new Limitation 3, which would be codified in new paragraph (c)(3). Specifically, the Commission proposes that new paragraph (c)(3) read as follows:

Operations in this band are limited to oceanographic radars using transmitters with a peak equivalent isotropically radiated power (EIRP) not to exceed 25 dBW. Oceanographic radars must not cause harmful interference to, nor claim protection from interference caused by, stations in the fixed or mobile services as specified in § 2.106, footnotes 5.132A, 5.145A, and US132A. See Resolution 612 of the ITU Radio Regulations for international coordination requirements. Operators of oceanographic radars are urged to use directional antennas and techniques that allow multiples of such radars to operate on the same frequency.

Because the power limitation in Resolution 612 is specified in peak EIRP, the Commission also proposes to reflect the part 2 definition of this term in § 90.7 of the Commission's rules.

31. Finally, the Commission proposes to require that licensees of oceanographic radars that currently operate under part 5 of the rules transition their operations to frequencies within an allocated band within five years of the adoption of final rules in this proceeding. The Commission requests comment on all of its proposals.

32. *Improved Satellite-AIS Capability.* The Commission proposes to implement NTIA's recommendations regarding satellite monitoring of Automatic Identification Systems (AIS) equipped ships as follows. First, the Commission proposes to allocate the 156.7625–156.7875 MHz (AIS 3) and 156.8125–156.8375 MHz (AIS 4) bands to the MSS (Earth-to-space) on a primary basis for Federal and non-Federal use. The table entries for the MSS allocations would include the parenthetical additions “(Earth-to-space) (AIS 3)” and “(Earth-to-space) (AIS 4),” which would restrict the use of these MSS allocations to AIS emissions and operations in the Earth-to-space direction. This action would make 50 kilohertz of spectrum available for ship earth stations to transmit maritime AIS messages to space stations in the MSS (Earth-to-space). Designating these additional channels for satellite detection of AIS messages from ship

earth stations would improve vessel tracking and thereby enhance maritime safety and security.

33. Second, as requested by NTIA, the Commission proposes to remove the primary maritime mobile service allocation from the AIS 3 and AIS 4 bands. Consequently, the Commission proposes to remove all references to the frequencies 156.775 MHz and 156.825 MHz from part 80 of its rules. The Commission notes that there is a single licensee, BKEP Materials, LLC, authorized to operate private coast stations at three locations using these frequencies with an output power of 10 watts. During the normal coordination process, the U.S. Coast Guard noted that ITU studies show that even a 1 watt station could cause interference to satellite reception in these bands. The Commission proposes to grandfather this existing MMS use in proposed footnote US52 until the expiration date of these authorizations, set for August 26, 2019. Therefore, the Commission proposes to require that operations on the frequencies 156.775 MHz and 156.825 MHz be terminated upon the expiration of the licenses, and to prohibit the license renewal of operations on these frequencies. The Commission notes that there are an unknown number of ship stations that also operate on these frequencies. The Commission requests comment on ship station usage, and on whether it should alternatively permit this limited MMS use to continue for a longer phase-out period. If so, the Commission alternatively proposes to limit ship and coast stations operating on these channels to a transmitter output power of 1 W. The Commission requests comment on these proposals. In particular, the Commission requests comment on whether these private coast station operations should be relocated to other maritime mobile frequencies no later than August 26, 2019. If such relocation is not attainable by August 26, 2019, what would be the appropriate transition period?

34. Third, the Commission proposes to revise footnote US52 by adding new paragraph (b) to restrict the use of the proposed MSS uplink allocations to long-range AIS broadcast messages from ship earth stations and to codify in the U.S. Table the grandfathering provisions discussed above. Specifically, the Commission proposes that new paragraph (b) read as follows:

Except as provided for below, the use of the bands 156.7625–156.7875 MHz (AIS 3 with center frequency 156.775 MHz) and 156.8125–156.8375 MHz (AIS 4 with center frequency 156.825 MHz) by the mobile-satellite service (Earth-to-space) is restricted

to the reception of long-range AIS broadcast messages from ships (Message 27; see most recent version of Recommendation ITU-R M.1371). The frequencies 156.775 MHz and 156.825 MHz may continue to be used by non-Federal ship and coast stations for navigation-related port operations or ship movement until August 26, 2019.

35. The Commission also notes that satellite reception in the AIS 1 and AIS 2 bands is not protected from adjacent-band terrestrial stations operating in accordance with the terms of their licenses. The Commission seeks comment on whether it should add such a requirement to the AIS 3 and AIS 4 bands.

#### Sharing Between AMT and Incumbent Services in the 4400–4940 MHz and 5925–6700 MHz Bands

36. In this section, the Commission addressed two additional frequency bands that WRC–07 identified for aeronautical mobile telemetry (AMT) for flight testing of aircraft use. Specifically, WRC–07 decided that the mobile service (MS) allocation in the 4400–4940 MHz and 5925–6700 MHz bands may be used for AMT flight test transmissions from aircraft stations in much of ITU Region 2 by adopting RR 5.440A and RR 5.457C. In addition, these international footnotes state that AMT use shall be in accordance with Resolution 416 (WRC–07) and shall not cause harmful interference to, nor claim protection from, the fixed-satellite and fixed services. Resolution 416 places the following operational restrictions on AMT use of the 4400–4940 MHz and 5925–6700 MHz bands: (1) Emissions are limited to transmissions from aircraft stations only; (2) AMT is not considered an application of a safety service as per ITU Radio Regulations, Article No. 1.59; (3) the peak EIRP density of a telemetry transmitter antenna shall not exceed  $-2.2$  dB(W/MHz); (4) transmissions are limited to designated flight test areas, where flight test areas are airspace designated by administrations for flight testing; (5) bilateral coordination of transmitting AMT aircraft stations with respect to receiving fixed or mobile stations is required, if the AMT aircraft station will operate within 450 km of the receiving fixed or mobile stations of another administration; and (6) require the use of technical and/or operational measures where appropriate to facilitate sharing with other services and applications in these bands.

37. Though the Commission did not propose in the WRC–07 NPRM to allocate spectrum for AMT use in the nearly exclusive Federal band at 4400–4940 MHz, or in the exclusive non-

Federal band at 5925–6700 MHz, it is now seeking comment on the ability of Federal/non-Federal AMT stations to share spectrum with the incumbent services in these bands. The Commission believes that it is appropriate to examine the sharing potential in these bands based on input from NTIA regarding the interference mitigation techniques that could be used to promote such sharing.

38. In light of NTIA's concerns and recommendations, the Commission specifically requests comment on the proposed allocations for both the 4400–4940 MHz and 5925–6700 MHz bands. In particular, are there technical approaches, coordination procedures, or analytical techniques that would ensure compatibility with existing services in these bands? What are the costs and benefits and advantages or disadvantages of adding AMT allocations to these bands? Is sharing with AMT the highest valued use of this spectrum or should the Commission consider other potential licensed or unlicensed uses on a shared basis?

39. *5925–6700 MHz.* NTIA recommends that the Commission allocate the 5925–6700 MHz band to the aeronautical mobile service (AMS) on a primary basis for Federal use; allocate the 5925–6425 MHz and 6525–6700 MHz bands to the AMS on a primary basis for non-Federal use; and add the 5925–6700 MHz band to footnote US111. NTIA also recommends that the Commission adopt the following U.S. footnote for operational criteria:

USXX3 [1.5] Use of the band 5925–6700 MHz by aeronautical mobile telemetry (AMT) for flight testing by aircraft stations (see No. 1.83) shall be in accordance with Resolution 416 (WRC 07). Any such use does not preclude the use of these bands by other non-federal mobile service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority. Federal use of the aeronautical mobile service allocation in the band 5925–6700 MHz is limited to aeronautical mobile telemetry for flight test telemetry transmissions by aircraft stations within designated test areas (See US111).

New footnote US111, adopted in the companion WRC–07 R&O, identifies the designated flight test areas.

40. The U.S. Proposals noted that there is a growing need for access to spectrum to support AMT operations. They recognized that the increased complexity and sophistication of modern aircraft necessitates monitoring an ever growing array of sensors and transmitting their data in real time for both safety purposes and helping to control the high costs of conducting flight tests. Working collaboratively

with the federal government and AMT stakeholders will allow for identifying various ways to support these needs, including exploring possible future use of other wireless services to augment the U.S.'s existing AMT capabilities.

41. The Commission notes that the underlying assumptions in the U.S. Proposals for WRC–07 included frequency avoidance or other measures to ensure compatible operations between AMT and incumbent services, such as requiring use of technical and/or operational measures on AMT. Accordingly, it would be incumbent on the AMT community to develop techniques that will enable sharing without causing harmful interference to existing stations. These techniques could include frequency coordination, shared network architectures, dynamic selection of operating frequencies, or spectrum use only in specific geographic areas. It is not necessary at this time to determine the technical details for such sharing. It is only necessary that the Commission determine whether sharing is feasible. To that end, the Commission seeks comment on the underlying assumptions made in Report ITU-R M.2119 which concluded that sharing is feasible. Also, the Commission solicits comment as to what measures might be necessary to ensure the protection from harmful interference of incumbent non-Federal stations in the band. How may the Commission best facilitate collaboration between Federal and non-Federal AMT users and incumbent services to determine appropriate technical conditions for sharing? The Commission also seeks comment on whether increased sharing among non-Federal and Federal fixed microwave users in the 6–7 GHz range of spectrum could provide greater spectral efficiencies that would enable more usable bandwidth for both categories of fixed microwave users and for AMT. The Commission observes that other industry-government collaboration efforts have led to highly successful outcomes, such as in the recent reallocation and sharing of spectrum to support Advanced Wireless Service operations in the 1695–1710 MHz and 1755–1780 MHz bands.

42. The NTIA recommendations do not specify how AMT operations would share the 6425–6525 MHz band with the non-Federal mobile service. The Commission seeks comment on whether sharing this band with AMT is feasible. In considering whether to allocate the 6425–6525 MHz band for AMT use, the Commission solicits comment on how the current mobile service assignments in this band are used. For example, is

land mobile use of this band generally limited to metropolitan areas? Are there any aeronautical mobile applications, e.g., electronic newsgathering (ENG) operations from helicopters, in this band?

43. Finally, the Commission requests comment on several coordination issues. First, should the Commission use the existing process for coordinating federal authorizations for service with the FCC, or should the Commission and NTIA jointly designate a third party coordinator to be responsible for coordinating AMT operations in the 5925–6700 MHz band? Use of a third party coordinator may better protect incumbent operations, increase the speed of service, and provide non-Federal incumbents with an enhanced level of transparency during the coordination process. Second, is the information provided in footnote US111

with the coordinates for the 17 locations where flight testing would occur sufficient to ensure that AMT coordination with existing services in the 5925–6700 MHz band would be successful or is additional information needed?

44. 4400–4940 MHz. NTIA recommends that the Commission allocate the 4400–4940 MHz band to the AMS on a primary basis for non-Federal use, amend footnote US111 to add the 4400–4940 MHz band, and add the two footnotes shown below to the Allocation Table to ensure compatible operations between non-Federal and Federal users in the band.

USXX2 [1.5] Use of the band 4400–4940 MHz by aeronautical mobile telemetry (AMT) for flight testing by aircraft stations (see No. 1.83) shall be in accordance with Resolution 416 (WRC 07). Any such AMT use does not preclude the use of these bands by other

federal mobile service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority. Non-federal use of the aeronautical mobile service allocation in the band 4400–4940 MHz is limited to aeronautical mobile telemetry for flight test telemetry transmissions by aircraft stations within designated test areas (See US111).

USXX4 [1.5] Aeronautical Mobile Telemetry (AMT) operations will, as much as practicable, avoid transmitting in the band 4825–4835 MHz, used for radio astronomy observations of the formaldehyde line, when within line-of-sight of radio astronomy observatories included in the Table below. AMT operations, conducted within 500 km of a radio astronomy observatory other than a Very Long Baseline Array (VLBA) station, or within 200 km of a VLBA station will, as much as practicable, share their schedule and consult with affected radio astronomy observatories through the Electromagnetic Spectrum Management office of the National Science Foundation (*esm@nsf.gov*).

Observatory	Latitude (N)	Longitude (W)
National Astronomy and Ionosphere Center, Arecibo, Puerto Rico .....	18° 21'	66° 45'
National Radio Astronomy Observatory, Green Bank, W.Va. ....	38° 26'	79° 50'
National Radio Astronomy Observatory, Socorro, New Mexico .....	34° 05'	107° 37'
Allen Telescope Array, Hat Creek, Cal. ....	40° 49'	121° 28'
Owens Valley Radio Observatory (Cal. Tech.), Big Pine, Cal. ....	37° 14'	118° 17'
Very Long Baseline Array Stations (VLBA), NRAO:		
Brewster, WA .....	48° 08'	119° 41'
Fort Davis, TX .....	30° 38'	103° 57'
Hancock, NH .....	42° 56'	71° 59'
Kitt Peak, AZ .....	31° 57'	111° 37'
Los Alamos, NM .....	35° 47'	106° 15'
Mauna Kea, HI .....	19° 48'	155° 27'
North Liberty, IA .....	41° 46'	91° 34'
Owens Valley, CA .....	37° 14'	118° 17'
Pie Town, NM .....	34° 18'	108° 07'
Saint Croix, VI .....	17° 45'	64° 35'

45. The Commission seeks comment on NTIA’s proposals for the 4400–4940 MHz band. In particular, are there any additional measures that the Commission should consider to ensure that AMT stations in the 4400–4940 MHz band would operate compatibly with public safety fixed and mobile operations in the adjacent 4940–4990 MHz band? Finally, if the 4400–4940 MHz band were allocated for use by non-Federal AMT licensees, any non-Federal AMT use would be coordinated with Federal agencies through NTIA’s Frequency Assignment Subcommittee process. The Commission seeks comment on this assumption.

**Additional Aviation Services Uses in the 5000–5150 MHz Band**

46. Consistent with NTIA’s request, the Commission proposes to allocate spectrum to the AM(R)S to support line-of-sight control links for unmanned aircraft systems (UAS) and, as discussed below, to provide additional spectrum

for AeroMACS. First, the Commission proposes to add a primary AM(R)S allocation in the 5030–5091 MHz band for Federal and non-Federal use, and to add a reference to RR 5.443C in the U.S. Table, as NTIA requested. The Commission expects that addition of this AM(R)S allocation will help support the anticipated growth of UAS and promote its safe operation. Further, adding RR 5.443C will limit AM(R)S use of the 5030–5091 MHz band to internationally standardized aeronautical systems and help protect adjacent-band radionavigation-satellite service downlinks by limiting the unwanted emissions of AM(R)S stations authorized under this allocation to an EIRP density of –75 dBW/MHz in the 5010–5030 MHz band.

47. Second, the Commission proposes to allocate the 5000–5030 MHz bands to the AM(R)S on a primary basis for Federal and non-Federal use, limited to surface applications at airports that operate in accordance with international

aeronautical standards (*i.e.*, AeroMACS). Consistent with its action in the 5091–5150 MHz band, the Commission proposes to permit aeronautical fixed communications that are an integral part of the AM(R)S system to be authorized in the 5000–5030 MHz band on a primary basis. The Commission would implement these proposals by adding an entry for the primary AM(R)S allocation to the 5000–5010 MHz band within the U.S. Table and by adding a new U.S. footnote, which it tentatively numbers as US115, to the 5000–5010 MHz and 5010–5030 MHz bands. Proposed footnote US115 contains the primary AM(R)S allocation for the 5010–5030 MHz band, limits the use of this allocation to those AeroMACS requirements that cannot be satisfied in the 5000–5010 MHz and 5091–5150 MHz bands, specifies the additional limitations, and authorizes the primary fixed use discussed above. In the *WRC-07 R&O*, the Commission made the 5091–5150 MHz band

available for AeroMACS. The 5091–5150 MHz band is globally harmonized and it is expected to be the main frequency band for deployment of AeroMACS. These proposals would extend the tuning range for AeroMACS to include the 5000–5010 MHz and 5010–5030 MHz bands in the United States. Given that “ITU-R studies conclude that the total identified spectrum requirement to support surface applications at airports is 130 MHz,” the Commission believes that there is a need for this additional spectrum.

48. Third, the Commission proposes to add entries in the U.S. Table for the primary AMS(R)S allocation in the frequency range 5000–5150 MHz. Because these bands are already allocated to the AMS(R)S through footnote US367, the Commission would only be highlighting an existing allocation. The Commission also proposes to add references to two international footnotes (RR 5.443AA, RR 5.443D) in the U.S. Table. The Commission notes that both of these footnotes also contain a new requirement: the use of the AMS(R)S in the 5000–5150 MHz range would be limited to internationally standardized aeronautical systems. The Commission seeks comment on its proposals.

#### **Allocating the 22.55–23.15 GHz and 25.5–27 GHz Bands to the Space Research Service**

49. Consistent with WRC-12 and NTIA’s recommendation, the Commission proposes to modify the U.S. Table to allocate the 22.55–23.15 GHz band to the SRS (Earth-to-space) on a primary basis for both Federal and non-Federal use and to add a reference to RR 5.532A in the U.S. Table. In addition, the Commission proposes to add a primary non-Federal SRS (space-to-Earth) allocation to the companion 25.5–27 GHz band, which currently is allocated to the SRS (space-to-Earth) only for Federal use. The Commission is proposing non-Federal SRS allocations to both of these bands in support of the National Space Policy, which encourages the development of a robust and competitive commercial space sector. This action is consistent with the Commission’s proposal to make spectrum allocated for Federal exclusive use available for use by commercial space launch operators. Finally, the Commission solicits comment on whether there is a need for it to expressly state that the use of the proposed allocations would be “at a limited number of sites.” The Commission requests comment on these proposals.

#### **Passive and Weak Signal Issues**

50. *Deletion of Aeronautical Mobile Service from the 37–38 GHz Band.* As requested by NTIA, the Commission proposes to amend the U.S. Table by excluding the AMS from the 37–38 GHz band. The Commission requests comment on this proposal.

51. *Protecting Passive Sensors in the 86–92 GHz Band.* The Commission proposes to encourage operators of fixed stations transmitting in the 81–86 GHz and 92–94 GHz bands to take all reasonable steps to ensure that their unwanted emissions power in the 86–92 GHz passive band does not exceed WRC-12’s non-mandatory unwanted emissions levels. The Commission also proposes to combine the text of NTIA’s recommended U.S. footnotes into a single footnote, which it tentatively numbers as US162. The Commission requests comment on these proposals.

52. *Passive Use of Bands Above 275 GHz.* As requested by NTIA, the Commission proposes to extend the “not allocated” portion of the U.S. Table to 3000 GHz and to add a reference to the WRC-12 version of RR 5.565 to the new 275–3000 GHz band. This action would update the spectrum identified for use by passive spaceborne sensors in the 275–1000 GHz range.

53. The Commission observes that, as a result of WRC-12’s action, 565 gigahertz—or 78 percent—of the 725 gigahertz of spectrum in the 275–1000 GHz range has been identified for passive service applications in the International Table. However, the Commission believes that it is important to recognize that this frequency range is used and may be used more extensively in the future for experimentation with, and development of, an array of active service applications. The Commission notes that RR 5.565 should not be misconstrued as placing a “reservation” for future passive service allocations in the U.S. Table, which would inhibit commercial development of this spectrum. The Commission encourages the development of active services in the 275–3000 GHz range under part 5 of the rules. Accordingly, the Commission proposes to adopt the following U.S. footnote:

US565 International footnote 5.565 does not establish priority of use in the United States Table of Frequency Allocations, and does not preclude or constrain the allocation of frequency bands in the range 275–3000 GHz to active services at a future date.

The Commission seeks comment on these proposals.

#### **Proposals for New Federal Government Allocations**

54. *Allocating the 7850–7900 MHz Band to the Meteorological-Satellite Service.* NTIA recommends that the 7750–7900 MHz band be allocated to the fixed service and the meteorological-satellite service (MetSat) (space-to-Earth) on a primary basis for Federal use, and that RR 5.461B be listed in the Federal Table, thereby limiting MetSat use of this band to non-geostationary satellite orbit systems. The Commission proposes to modify the U.S. Table to reflect this approach.

55. *Allocating the 15.4–15.7 GHz Band to the Radiolocation Service.* As requested by NTIA, the Commission proposes to allocate the 15.4–15.7 GHz band to the RLS on a primary basis for Federal use and to add references to RR 5.511E and RR 5.511F to the Federal Table. However, because the 15.4–15.7 GHz band is allocated for Federal/non-Federal shared use, and in particular because the new Federal RLS allocation would be required to protect existing and future non-Federal stations in the ARNS from harmful interference, the Commission has reclassified footnote G135 as a U.S. footnote, which it tentatively numbered as US511E. The Commission has also made minor changes to the text of proposed footnote US511E to improve its readability. If adopted, this proposal will provide the additional spectrum needed for new advanced radar systems and increase the image resolution and range accuracy of such systems. The Commission requests comment on these proposals.

#### **Other Matters**

56. The 72–73 MHz and 75.4–76 MHz bands are allocated to the fixed and mobile services on a primary basis for non-Federal use. Footnote NG49 identifies 30 frequencies from 72.02 MHz to 75.60 MHz as being available to former part 90 radio services, subject to the condition that no interference is caused to TV channels 4 and 5 reception. These radio services are now part of the consolidated Industrial/Business Radio Pool. Moreover, all 30 frequencies are listed in the Industrial/Business Pool Frequency Table, which is codified in § 90.35 of the Commission’s rules. The Commission proposes to update and simplify footnote NG49 and to renumber this footnote as NG16. Specifically, the Commission proposes to no longer list the individual frequencies within the footnote. In addition, while the footnote describes pool-specific geographic limitations for all 30 frequencies (e.g., manufacturing facilities, railroad yards

and mills), the Industrial/Business Pool Frequency Table places geographic limits only on the 10 frequencies from 72.44 MHz to 75.60 MHz, and uses the more generalized concept of “the licensee’s business premises.” The Commission proposes to remove the geographic restriction from footnote NG49, but retain the existing part 90 rules. Thus, the effect of the Commission’s proposal is to make the Allocation Table consistent with the existing service rules. The revised footnote, NG16, would read as follows: In the bands 72–73 MHz and 75.4–76 MHz, frequencies may be authorized for mobile operations in the Industrial/Business Radio Pool, subject to the condition that no interference is caused to the reception of television stations operating on channels 4 and 5. The Commission seeks comment on this proposal.

57. The Commission proposes to amend § 2.100 of the rules to state that the ITU *Radio Regulations*, Edition of 2012, have been incorporated to the extent practicable in part 2.

#### Ex Parte

58. This proceeding shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.<sup>1</sup> Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must: (1) List all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made; and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda, or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by

rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

#### Initial Regulatory Flexibility Analysis

59. As required by the Regulatory Flexibility Act (RFA),<sup>2</sup> the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities by the policies and rules proposed in this *WRC Notice of Proposed Rule Making (WRC NPRM)*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments provided on the first page of the *WRC–12 NPRM*. The Commission will send a copy of this *WRC–12 NPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).<sup>3</sup>

##### A. Need for, and Objectives of, the Proposed Rules

60. In the *WRC–12 NPRM*, the Commission proposes to amend parts 2, 15, 80, 90, 97, and 101 of its rules to implement certain of the allocation decisions from the World Radiocommunication Conference (Geneva, 2012) (WRC–12) in the Commission’s Table of Frequency Allocations, and to make certain updates to its service rules. If adopted, these proposals would conform the Commission’s rules, to the extent practical, to the decisions that the international community made at WRC–12 and would promote the advancement of new and expanded services and provide significant benefits to the American public.

##### B. Legal Basis

61. The proposed action is authorized under Sections 4(i), 301, 303(c), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 301, 303(c), 303(f), and 303(r).

<sup>2</sup> See 5 U.S.C. 603. The RFA, see 5 U.S.C. 601–612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Public Law 104–121, Title II, 110 Stat. 857 (1996).

<sup>3</sup> See 5 U.S.C. 603(a).

##### C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply

62. The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.<sup>4</sup> The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”<sup>5</sup> In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.<sup>6</sup> A small business concern is one which: (1) Is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.<sup>7</sup>

*Small Businesses, Small Organizations, and Small Governmental Jurisdictions.* The Commission’s action may, over time, affect small entities that are not easily categorized at present. The Commission therefore describes here, at the outset, three comprehensive, statutory small entity size standards.<sup>8</sup> First, nationwide, there are a total of 28.2 million small businesses, according to the SBA.<sup>9</sup> In addition, a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”<sup>10</sup> Nationwide, as of 2012, there were approximately 2,300,000 small organizations.<sup>11</sup> Finally, the term “small governmental jurisdiction” is defined generally as “governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”<sup>12</sup> Census Bureau data for 2012 indicate that there were 90,056 local governments in the

<sup>4</sup> 5 U.S.C. 603(b)(3).

<sup>5</sup> 5 U.S.C. 601(6).

<sup>6</sup> 5 U.S.C. 601(3) (incorporating by reference the definition of “small business concern” in 15 U.S.C. 632). Pursuant to the RFA, the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the *Federal Register*.” 5 U.S.C. 601(3).

<sup>7</sup> Small Business Act, 15 U.S.C. 632 (1996).

<sup>8</sup> See 5 U.S.C. 601(3)–(6).

<sup>9</sup> See SBA, Office of Advocacy, “Frequently Asked Questions,” [http://www.sba.gov/sites/default/files/FAQ\\_March\\_2014\\_0.pdf](http://www.sba.gov/sites/default/files/FAQ_March_2014_0.pdf) (last visited May 2, 2014; figures are from 2011).

<sup>10</sup> 5 U.S.C. 601(4).

<sup>11</sup> National Center for Charitable Statistics, *The Nonprofit Almanac* (2012).

<sup>12</sup> 5 U.S.C. 601(5).

<sup>1</sup> 47 CFR 1.1200 *et seq.*

United States.<sup>13</sup> Thus, the Commission estimates that most governmental jurisdictions are small.

**Amateur Radio Service.** Because “small entities,” as defined in the RFA, are not persons eligible for licensing in the amateur service, this proposed rule does not apply to “small entities.” Rather, it applies exclusively to individuals who are the control operators of amateur radio stations.

**Wireless Telecommunications Carriers (except satellite).** This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular phone services, paging services, wireless Internet access, and wireless video services.<sup>14</sup> The appropriate size standard under SBA rules is for the category Wireless Telecommunications Carriers. The size standard for that category is that a business is small if it has 1,500 or fewer employees.<sup>15</sup> Under the present and prior categories, the SBA has deemed a wireless business to be small if it has 1,500 or fewer employees.<sup>16</sup> For this category, census data for 2007 show that there were 11,163 firms that operated for the entire year.<sup>17</sup> Of this total, 10,791 firms had employment of 999 or fewer employees and 372 had employment of 1,000 employees or more.<sup>18</sup> Thus under this category and the associated small business size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities that may be affected by its proposed action.<sup>19</sup>

<sup>13</sup> U.S. Census Bureau, Government Organization Summary Report: 2012 (rel. Sep. 26, 2013), [http://www2.census.gov/govs/cog/g12\\_org.pdf](http://www2.census.gov/govs/cog/g12_org.pdf) (last visited May 2, 2014).

<sup>14</sup> See <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517210&search=2007%20NAICS%20Search>.

<sup>15</sup> 13 CFR 121.201, NAICS code 517210.

<sup>16</sup> 13 CFR 121.201, NAICS code 517210. The now-superseded, pre-2007 CFR citations were 13 CFR 121.201, NAICS codes 517211 and 517212 (referring to the 2002 NAICS).

<sup>17</sup> U.S. Census Bureau, Subject Series: Information, Table 5, “Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517210” (issued Nov. 2010).

<sup>18</sup> *Id.* Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with “100 employees or more.”

<sup>19</sup> See [http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN\\_2007\\_US\\_51SSZ2&prodType=table](http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSZ2&prodType=table).

#### *D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities*

63. The *WRC-12 NPRM* does not propose to establish any new reporting or recordkeeping requirements for small entities. The *WRC-12 NPRM* proposes to establish “other” compliance requirement for applicants/licensees. The compliance requirements proposed in the *WRC-12 NPRM* are the same for small and large entities.

64. The *WRC-12 NPRM* proposes that frequencies in the 1900–2000 kHz band be authorized for radio buoy operations under a ship station license provided: (1) The use of these frequencies is related to commercial fishing operations on the open sea. This use is not permitted within the exclusive economic area or territorial waters of a foreign country (unless provided for by an international agreement); and (2) The output power does not exceed 10 watts and the station antenna height does not exceed 4.6 meters (15 feet) above sea level in a buoy station or 6 meters (20 feet) above the mast of the ship on which it is installed.

65. The *WRC-12 NPRM* proposes to limit radiolocations service operations in the 4438–4488 kHz, 5250–5275 kHz, 13.45–13.55 GHz, 16.10–16.20 MHz, 24.45–24.65 MHz, 26.20–26.42 MHz, 41.015–41.665 MHz, 43.35–44 MHz to oceanographic radars using transmitters with a peak equivalent isotropically radiated power that do not exceed 25 dBW. The *WRC-12 NPRM* also proposes that oceanographic radars must not cause harmful interference to, nor claim protection from interference caused by, stations in the incumbent fixed or mobile services. In addition, the proposed rules provide a cross reference to Resolution 612 of the ITU Radio Regulations for the international coordination requirements. These requirements state that each oceanographic radar station shall transmit a station identification (call sign) on the assigned frequency, in international Morse code at manual speed, at the end of each data acquisition cycle, but at an interval of no more than 20 minutes; and that the separation distances between an oceanographic radar and the border of other countries shall be between 80 and 920 kilometers. Finally, the *WRC-12 NPRM* proposes to require that licensees of oceanographic radars that currently operate under part 5 of the rules transition their operations to frequencies within an allocated band within 5 years of the adoption of final rules in this proceeding.

#### *E. Steps Taken To Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered*

66. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.<sup>20</sup>

67. The *WRC-12 NPRM* proposes to authorize commercial fishing vessels to operate radio buoys in the 1900–2000 kHz band under a ship station license. This action is expected to have a positive non-burdensome impact on commercial fishing vessels, many of which are owned by small businesses, by authorizing these entities to operate radio buoys under a ship station license instead of obtaining separate licenses for the radio buoys.

68. The *WRC-12 NPRM* proposes that the 156.7625–156.7875 MHz and 156.8125–156.8375 MHz bands may continue to be used by non-Federal ship and coast stations for navigation-related port operations or ship movement until August 26, 2019. Because of the proposed delayed transition date, the Commission believes that it has minimized the impact on a small business that operates coast stations in these bands to extent practicable.

#### *F. Federal Rules That May Duplicate, Overlap, or Conflict With the Proposed Rule*

69. None.

#### **Paperwork Reduction Act Analysis**

70. This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. In addition, therefore, it does not contain any new or modified “information collection burden for small business concerns with fewer than 25 employees,” pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, see 44 U.S.C. 3506(c)(4).

#### **Ordering Clauses**

71. Pursuant to Sections 1, 4, 301, 302, and 303 of the Communications

<sup>20</sup> See 5 U.S.C. 603(c).

Act of 1934, as amended, 47 U.S.C. 151, 154, 301, 302a, and 303, and § 553(b)(B) of the Administrative Procedure Act, 5 U.S.C. 553(b)(B), this *notice of proposed rulemaking* is hereby *adopted*.

72. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, shall send a copy of this *notice of proposed rulemaking*, including the Initial Regulatory Flexibility Analyses, to the Chief Counsel for Advocacy of the Small Business Administration.

73. Pursuant to applicable procedures set forth in sections 1.415 and 1.419 of the Commission's rules, 47 CFR 1.415, 1.419, interested parties may file comments on this *WRC-12 Notice of Proposed Rulemaking* on or before August 31, 2015, and reply comments on or before September 30, 2015.

**List of Subjects in Parts 2, 15, 80, 90, 97, and 101**

Communications equipment, Radio.

Federal Communications Commission.

**Marlene H. Dortch,**  
*Secretary.*

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR parts 2, 15, 80, 90, 97, and 101 as follows:

**PART 2—FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS**

■ 1. The authority citation for part 2 continues to read as follows:

**Authority:** 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

■ 2. Section 2.100 is revised to read as follows:

**§ 2.100 International regulations in force.**

The ITU *Radio Regulations*, Edition of 2012, have been incorporated to the extent practicable in this part.

■ 3. Section 2.106, the Table of Frequency Allocations, is revised as follows:

■ a. Pages 1–2, 4–5, 7–8, 11–13, 15–16, 18–20, 23, 42, 45, 51, 53–54, 57, 62–63, and 67–68 are revised.

■ b. In the list of United States (US) Footnotes, footnotes US52 and US565 are revised; footnotes US115, US132A, US162, and US511E are added; and footnote US367 is removed.

■ c. In the list of non-Federal Government (NG) Footnotes, footnote NG16 is added, footnote NG49 is removed, and footnote NG92 is revised.

**§ 2.106 Table of Frequency Allocations.**

The revisions and additions read as follows:

\* \* \* \* \*

BILLING CODE 6712-01-P

Table of Frequency Allocations			0-160 kHz (VLF/LF)		Page 1
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
Below 8.3 (Not Allocated)			Below 8.3 (Not Allocated)		
5.53 5.54			5.53 5.54		
8.3-9			8.3-9		
METEOROLOGICAL AIDS 5.54A 5.54B 5.54C			METEOROLOGICAL AIDS 5.54A		
9-11.3			9-11.3		
METEOROLOGICAL AIDS 5.54A			METEOROLOGICAL AIDS 5.54A		
RADIONAVIGATION			RADIONAVIGATION US18		
			US2		
11.3-14			11.3-14		
RADIONAVIGATION			RADIONAVIGATION US18		
			US2		
14-19.95			14-19.95	14-19.95	
FIXED			FIXED	Fixed	
MARITIME MOBILE 5.57			MARITIME MOBILE 5.57		
5.55 5.56			US2	US2	
19.95-20.05			19.95-20.05		
STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)			STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)		
			US2		
20.05-70			20.05-59	20.05-59	

FIXED			FIXED	FIXED	
MARITIME MOBILE 5.57			MARITIME MOBILE 5.57		
			US2	US2	
			59-61		
			STANDARD FREQUENCY AND TIME SIGNAL (60 kHz)		
			US2		
			61-70	61-70	
			FIXED	FIXED	
			MARITIME MOBILE 5.57		
5.56 5.58			US2	US2	
70-72	70-90	70-72	70-90	70-90	Private Land Mobile (90)
RADIONAVIGATION 5.60	FIXED	RADIONAVIGATION 5.60	FIXED	FIXED	
	MARITIME MOBILE 5.57	Fixed	MARITIME MOBILE 5.57	Radiolocation	
	MARITIME RADIONAVIGATION	Maritime mobile 5.57	Radiolocation		
	5.60	5.59			
	Radiolocation				
72-84		72-84			
FIXED		FIXED			
MARITIME MOBILE 5.57		MARITIME MOBILE 5.57			
RADIONAVIGATION 5.60		RADIONAVIGATION 5.60			
5.56					
84-86		84-86			

RADIO NAVIGATION 5.60	RADIO NAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59		
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86-90		86-90		
FIXED		FIXED		
MARITIME MOBILE 5.57		MARITIME MOBILE 5.57		
RADIONAVIGATION		RADIONAVIGATION 5.60		
5.56	5.61		US2	US2
90-110		90-110		
RADIONAVIGATION 5.62		RADIONAVIGATION 5.62 US18		Aviation (87)
Fixed				Private Land Mobile (90)
5.64		US2 US104		
110-112	110-130	110-112	110-130	Private Land Mobile (90)
FIXED	FIXED	FIXED	FIXED	
MARITIME MOBILE	MARITIME MOBILE	MARITIME MOBILE	MARITIME MOBILE	
RADIONAVIGATION	MARITIME RADIONAVIGATION	RADIONAVIGATION 5.60	Radiolocation	
5.64	5.60 Radiolocation	5.64		
112-115		112-117.6		
RADIONAVIGATION 5.60		RADIONAVIGATION 5.60		
115-117.6		Fixed		
RADIONAVIGATION 5.60		Maritime mobile		
Fixed				
Maritime mobile				
5.64 5.66		5.64 5.65		

<p>117.6-126</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>RADIONAVIGATION 5.60</p> <p>5.64</p>		<p>117.6-126</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>RADIONAVIGATION 5.60</p> <p>5.64</p>		
<p>126-129</p> <p>RADIONAVIGATION 5.60</p>		<p>126-129</p> <p>RADIONAVIGATION 5.60</p> <p>Fixed</p> <p>Maritime mobile</p> <p>5.64 5.65</p>		
<p>129-130</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>RADIONAVIGATION 5.60</p> <p>5.64</p>	<p>5.61 5.64</p>	<p>129-130</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>RADIONAVIGATION 5.60</p> <p>5.64</p>	<p>5.64 US2</p>	
<p>130-135.7</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>5.64 5.67</p>	<p>130-135.7</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>5.64</p>	<p>130-135.7</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>RADIONAVIGATION</p> <p>5.64</p>	<p>130-135.7</p> <p>FIXED</p> <p>MARITIME MOBILE</p> <p>5.64 US2</p>	<p>Maritime (80)</p>

135.7-137.8	135.7-137.8	135.7-137.8	135.7-137.8	135.7-137.8	Maritime (80) Amateur Radio (97)
FIXED	FIXED	FIXED	FIXED	FIXED	
MARITIME MOBILE	MARITIME MOBILE	MARITIME MOBILE	MARITIME MOBILE	MARITIME MOBILE	
Amateur 5.67A	Amateur 5.67A	RADIONAVIGATION Amateur 5.67A		Amateur 5.67A	
5.64 5.67 5.67B	5.64	5.64 5.67B	5.64 US2	5.64 US2	Page 2

435-472		435-495	435-472	
MARITIME MOBILE 5.79		MARITIME MOBILE 5.79	MARITIME MOBILE 5.79	
Aeronautical radionavigation 5.77		5.79A	5.79A	
		Aeronautical radionavigation		
5.82	5.78 5.82		5.82 US2 US231	
472-479			472-479	
MARITIME MOBILE 5.79			MARITIME MOBILE 5.79	Maritime (80)
Amateur 5.80A			5.79A	Amateur Radio (97)
Aeronautical radionavigation 5.77 5.80			Amateur 5.80A	
5.80B 5.82			5.82 US2 US231	
479-495	479-495		479-495	
MARITIME MOBILE 5.79 5.79A	MARITIME MOBILE 5.79 5.79A		MARITIME MOBILE 5.79	Maritime (80)
Aeronautical radionavigation 5.77	Aeronautical radionavigation 5.77 5.80		5.79A	
		5.82 US2 US231	5.82 US2 US231	

5.82	5.82			
495-505			495-505	
MARITIME MOBILE			MARITIME MOBILE	Maritime (80) Aviation (87)
505-526.5	505-510	505-526.5	505-510	
MARITIME MOBILE 5.79 5.79A 5.84	MARITIME MOBILE 5.79	MARITIME MOBILE 5.79 5.79A 5.84	MARITIME MOBILE 5.79	Maritime (80)
AERONAUTICAL RADIONAVIGATION	510-525	AERONAUTICAL RADIONAVIGATION	510-525	
	MARITIME MOBILE 5.79A 5.84	Aeronautical mobile	MARITIME MOBILE (ships only) 5.79A 5.84	Maritime (80)
	AERONAUTICAL RADIONAVIGATION	Land mobile	AERONAUTICAL RADIONAVIGATION (radiobeacons) US18	Aviation (87)
			US14 US225	
	525-535		525-535	
526.5-1606.5	BROADCASTING 5.86	526.5-535	MOBILE US221	Aviation (87)
BROADCASTING	AERONAUTICAL RADIONAVIGATION	BROADCASTING	AERONAUTICAL RADIONAVIGATION (radiobeacons) US18	Private Land Mobile (90)
		Mobile		
		5.88	US239	
	535-1605	535-1606.5	535-1605	
	BROADCASTING	BROADCASTING		Radio Broadcast (AM)(73) Private Land Mobile (90)
			535-1605	NG1 NG5
5.87 5.87A	1605-1625		1605-1615	
1606.5-1625	BROADCASTING 5.89	1606.5-1800	MOBILE US221 G127	Radio Broadcast (AM)(73)
FIXED		FIXED	1615-1705	Alaska Fixed (80)
MARITIME MOBILE 5.90		MOBILE		Private Land Mobile (90)
LAND MOBILE		RADIOLOCATION		
5.92	5.90			

<p>1625-1635 RADIOLOCATION 5.93</p>	<p>1625-1705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90</p>	<p>RADIONAVIGATION       5.91</p>	<p>US299</p>	<p>US299 NG1 NG5</p>	
<p>1635-1800 FIXED MARITIME MOBILE 5.90 LAND MOBILE  5.92 5.96</p>	<p>1705-1800 FIXED MOBILE RADIOLOCATION AERONAUTICAL RADIONAVIGATION</p>		<p>1705-1800 FIXED MOBILE RADIOLOCATION  US240</p>	<p>Alaska Fixed (80) Private Land Mobile (90)  Page 4</p>	

Table of Frequency Allocations		1800-3230 kHz (MF/HF)		Page 5	
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
1800-1810	1800-1850 AMATEUR	1800-2000 AMATEUR FIXED MOBILE except aeronautical mobile	1800-2000	1800-2000	Maritime (80) Amateur Radio (97)
5.93					
1810-1850 AMATEUR 5.98 5.99 5.100					
1850-2000	1850-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION	5.97			NG92
5.92 5.96 5.103					
2000-2025	2000-2065 FIXED MOBILE		2000-2065	2000-2065	Private Land Mobile (90)
5.92 5.103					
2025-2045			US340	US340 NG7	

MOBILE except aeronautical mobile (R)				
Meteorological aids 5.104				
5.92 5.103				
2045-2160				
FIXED	2065-2107	2065-2107		
MARITIME MOBILE	MARITIME MOBILE 5.105	MARITIME MOBILE 5.105		Maritime (80)
LAND MOBILE	5.106	US296 US340		
5.92	2107-2170	2107-2170	2107-2170	
2160-2170	FIXED	FIXED	FIXED	Maritime (80)
RADIOLOCATION	MOBILE	MOBILE	MOBILE except aeronautical mobile	Private Land Mobile (90)
5.93 5.107		US340	US340 NG7	
2170-2173.5		2170-2173.5	2170-2173.5	
MARITIME MOBILE		MARITIME MOBILE (telephony)	MARITIME MOBILE	Maritime (80)
		US340	US340	
2173.5-2190.5		2173.5-2190.5		
MOBILE (distress and calling)		MOBILE (distress and calling)		Maritime (80)
5.108 5.109 5.110 5.111		5.108 5.109 5.110 5.111 US279 US340		Aviation (87)
2190.5-2194		2190.5-2194	2190.5-2194	
MARITIME MOBILE		MARITIME MOBILE (telephony)	MARITIME MOBILE	Maritime (80)

Table of Frequency Allocations			3.23-5.9 MHz (HF)		Page 7
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
3.23-3.4			3.23-3.4		
FIXED			FIXED		Maritime (80)
MOBILE except aeronautical mobile			MOBILE except aeronautical mobile		Aviation (87)
BROADCASTING 5.113			Radiolocation		Private Land Mobile (90)
5.116 5.118			US340		
3.4-3.5			3.4-3.5		
AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)		Aviation (87)
			US283 US340		
3.5-3.8	3.5-3.75	3.5-3.9	3.5-4	3.5-4	
AMATEUR	AMATEUR	AMATEUR		AMATEUR	Amateur Radio (97)
FIXED		FIXED			
MOBILE except aeronautical mobile	5.119	MOBILE			
5.92	3.75-4				
3.8-3.9	AMATEUR				
FIXED	FIXED				
AERONAUTICAL MOBILE (OR)	MOBILE except aeronautical mobile (R)				
LAND MOBILE					
3.9-3.95		3.9-3.95			
AERONAUTICAL MOBILE (OR)		AERONAUTICAL MOBILE			

5.123		BROADCASTING		
3.95-4		3.95-4		
FIXED		FIXED		
BROADCASTING		BROADCASTING		
	5.122 5.125	5.126	US340	US340
4-4.063			4-4.063	
FIXED			FIXED	Maritime (80)
MARITIME MOBILE 5.127			MARITIME MOBILE	
5.126			US340	
4.063-4.438			4.063-4.438	
MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132			MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 US82	Maritime (80) Aviation (87)
5.128			US296 US340	
4.438-4.488	4.438-4.488	4.438-4.488	4.438-4.488	
FIXED	FIXED	FIXED	FIXED	Maritime (80)
MOBILE except aeronautical mobile (R)	MOBILE except aeronautical mobile (R)	MOBILE except aeronautical mobile	MOBILE except aeronautical mobile (R)	Private Land Mobile (90)
Radiolocation 5.132A	RADIOLOCATION 5.132A	Radiolocation 5.132A	RADIOLOCATION 5.132A	
5.132B			US340	
4.488-4.65		4.488-4.65	4.488-4.65	
FIXED		FIXED	FIXED	Maritime (80)
MOBILE except aeronautical mobile (R)		MOBILE except aeronautical mobile	MOBILE except aeronautical mobile (R)	Aviation (87)

	US22 US340	Private Land Mobile (90)
4.65-4.7 AERONAUTICAL MOBILE (R)	4.65-4.7 AERONAUTICAL MOBILE (R) US282 US283 US340	Aviation (87)

4.7-4.75 AERONAUTICAL MOBILE (OR)			4.7-4.75 AERONAUTICAL MOBILE (OR)  US340	
4.75-4.85 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	4.75-4.85 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	4.75-4.85 FIXED BROADCASTING 5.113 Land mobile	4.75-4.85 FIXED MOBILE except aeronautical mobile (R)  US340	Maritime (80) Private Land Mobile (90)
4.85-4.995 FIXED LAND MOBILE BROADCASTING 5.113			4.85-4.995 FIXED MOBILE  US340	4.85-4.995 FIXED  US340 Aviation (87) Private Land Mobile (90)
4.995-5.003 STANDARD FREQUENCY AND TIME SIGNAL (5 MHz)			4.995-5.005 STANDARD FREQUENCY AND TIME SIGNAL  US1 US340	
5.003-5.005 STANDARD FREQUENCY AND TIME SIGNAL  Space research				
5.005-5.06 FIXED BROADCASTING 5.113			5.005-5.06 FIXED US22  US340	Aviation (87) Private Land Mobile (90)
5.06-5.25 FIXED			5.06-5.25 FIXED US22	Maritime (80)

Mobile except aeronautical mobile			Mobile except aeronautical mobile	Aviation (87) Private Land Mobile (90)
5.133			US212 US340	
5.25-5.275	5.25-5.275	5.25-5.275	5.25-5.275	Maritime (80) Private Land Mobile (90)
FIXED	FIXED	FIXED	FIXED	
MOBILE except aeronautical mobile				
Radiolocation 5.132A	RADIOLOCATION 5.132A	Radiolocation 5.132A	RADIOLOCATION 5.132A	
5.133A			US340	
5.275-5.45			5.275-5.45	Maritime (80) Aviation (87) Private Land Mobile (90) Amateur Radio (97)
FIXED			FIXED US22	
MOBILE except aeronautical mobile			Mobile except aeronautical mobile	
			US23 US340	
5.45-5.48	5.45-5.48	5.45-5.48	5.45-5.68	Aviation (87)
FIXED	AERONAUTICAL MOBILE (R)	FIXED	AERONAUTICAL MOBILE (R)	
AERONAUTICAL MOBILE (OR)		AERONAUTICAL MOBILE (OR)		
LAND MOBILE		LAND MOBILE		
5.48-5.68				
AERONAUTICAL MOBILE (R)				
5.111 5.115			5.111 5.115 US283 US340	
5.68-5.73			5.68-5.73	
AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR)	
5.111 5.115			5.111 5.115 US340	

5.73-5.9	5.73-5.9	5.73-5.9	5.73-5.9	
FIXED	FIXED	FIXED	FIXED	Maritime (80)
LAND MOBILE	MOBILE except aeronautical mobile (R)	Mobile except aeronautical mobile (R)	MOBILE except aeronautical mobile (R)	Aviation (87)
			US340	Private Land Mobile (90)

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Table of Frequency Allocations

11.175-15.1 MHz (HF)

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International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
11.175-11.275			11.175-11.275		
AERONAUTICAL MOBILE (OR)			AERONAUTICAL MOBILE (OR)		
			US340		
11.275-11.4			11.275-11.4		
AERONAUTICAL MOBILE (R)			AERONAUTICAL MOBILE (R)		Aviation (87)
			US283 US340		
11.4-11.6			11.4-11.6		
FIXED			FIXED		Private Land Mobile (90)
			US340		
11.6-11.65			11.6-12.1		
BROADCASTING 5.134			BROADCASTING 5.134		International Broadcast
					Stations (73F)
5.146					

11.65-12.05 BROADCASTING  5.147			
12.05-12.1 BROADCASTING 5.134  5.146	US136 US340		
12.1-12.23 FIXED	12.1-12.23 FIXED  US340	Private Land Mobile (90)	
12.23-13.2 MARITIME MOBILE 5.109 5.110 5.132 5.145	12.23-13.2 MARITIME MOBILE 5.109 5.110 5.132 5.145 US82  US296 US340	Maritime (80)	
13.2-13.26 AERONAUTICAL MOBILE (OR)	13.2-13.26 AERONAUTICAL MOBILE (OR)  US340		
13.26-13.36 AERONAUTICAL MOBILE (R)	13.26-13.36 AERONAUTICAL MOBILE (R)  US283 US340	Aviation (87)	
13.36-13.41	13.36-13.41	13.36-13.41	

FIXED RADIO ASTRONOMY  5.149		RADIO ASTRONOMY  US342 G115	RADIO ASTRONOMY  US342	
13.41-13.45  FIXED Mobile except aeronautical mobile (R)		13.41-13.45  FIXED Mobile except aeronautical mobile (R)  US340	13.41-13.45  FIXED  US340	Private Land Mobile (90)
13.45-13.55  FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A  5.149A	13.45-13.55  FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A	13.45-13.55  FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A  US340	13.45-13.55  FIXED Radiolocation 5.132A  US340	
13.55-13.57  FIXED Mobile except aeronautical mobile (R)  5.150		13.55-13.57  FIXED Mobile except aeronautical mobile (R)  5.150 US340	13.55-13.57  FIXED  5.150 US340	ISM Equipment (18) Private Land Mobile (90)
13.57-13.6  BROADCASTING 5.134  5.151		13.57-13.87  BROADCASTING 5.134		International Broadcast Stations (73F)

13.6-13.8 BROADCASTING 13.8-13.87 BROADCASTING 5.134  5.151	US136 US340		
13.87-14 FIXED Mobile except aeronautical mobile (R)	13.87-14 FIXED Mobile except aeronautical mobile (R)  US340	13.87-14 FIXED  US340	Private Land Mobile (90)
14-14.25 AMATEUR AMATEUR-SATELLITE	14-14.35	14-14.25 AMATEUR AMATEUR-SATELLITE  US340	Amateur Radio (97)
14.25-14.35 AMATEUR  5.152	US340	14.25-14.35 AMATEUR  US340	
14.35-14.99 FIXED Mobile except aeronautical mobile (R)	14.35-14.99 FIXED Mobile except aeronautical mobile (R)  US340	14.35-14.99 FIXED  US340	Private Land Mobile (90)

<p>14.99-15.005</p> <p>STANDARD FREQUENCY AND TIME SIGNAL (15 MHz)</p> <p>5.111</p>	<p>14.99-15.01</p> <p>STANDARD FREQUENCY AND TIME SIGNAL (15 MHz)</p>	
<p>15.005-15.01</p> <p>STANDARD FREQUENCY AND TIME SIGNAL</p> <p>Space research</p>	<p>5.111 US1 US340</p>	
<p>15.01-15.1</p> <p>AERONAUTICAL MOBILE (OR)</p>	<p>15.01-15.1</p> <p>AERONAUTICAL MOBILE (OR)</p> <p>US340</p>	

Table of Frequency Allocations			15.1-22.855 MHz (HF)		Page 13
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
15.1-15.6			15.1-15.8		International Broadcast Stations (73F)
BROADCASTING			BROADCASTING 5.134		
15.6-15.8					
BROADCASTING 5.134					
5.146			US136 US340		
15.8-16.1			15.8-16.1		Private Land Mobile (90)
FIXED			FIXED		
5.153			US340		
16.1-16.2	16.1-16.2	16.1-16.2	16.1-16.2		
FIXED	FIXED	FIXED	FIXED		
Radiolocation 5.145A	RADIOLOCATION 5.145A	Radiolocation 5.145A	RADIOLOCATION 5.145A		
5.145B			US340		
16.2-16.36			16.2-16.36		
FIXED			FIXED		
			US340		
16.36-17.41			16.36-17.41		Maritime (80)
MARITIME MOBILE 5.109 5.110 5.132 5.145			MARITIME MOBILE 5.109 5.110 5.132 5.145 US82		
			US296 US340		
17.41-17.48			17.41-17.48		

FIXED	FIXED		Private Land Mobile (90)
	US340		
17.48-17.55	17.48-17.9		
BROADCASTING 5.134	BROADCASTING 5.134		International Broadcast Stations (73F)
5.146			
17.55-17.9			
BROADCASTING	US136 US340		
17.9-17.97	17.9-17.97		
AERONAUTICAL MOBILE (R)	AERONAUTICAL MOBILE (R)		Aviation (87)
	US283 US340		
17.97-18.03	17.97-18.03		
AERONAUTICAL MOBILE (OR)	AERONAUTICAL MOBILE (OR)		
	US340		
18.030-18.052	18.03-18.068		
FIXED	FIXED		Maritime (80)
18.052-18.068			Private Land Mobile (90)
FIXED	US340		
Space research			
18.068-18.168	18.068-18.168	18.068-18.168	
AMATEUR		AMATEUR	Amateur Radio (97)
AMATEUR-SATELLITE		AMATEUR-SATELLITE	
5.154	US340	US340	

18.168-18.78	18.168-18.78	
FIXED	FIXED	Maritime (80)
Mobile except aeronautical mobile	Mobile	Private Land Mobile (90)
	US340	

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
22.855-23			22.855-23		Private Land Mobile (90)
FIXED			FIXED		
5.156			US340		
23-23.2			23-23.2	23-23.2	Private Land Mobile (90)
FIXED			FIXED	FIXED	
Mobile except aeronautical mobile (R)			Mobile except aeronautical mobile (R)		
5.156			US340	US340	
23.2-23.35			23.2-23.35		Private Land Mobile (90)
FIXED 5.156A			AERONAUTICAL MOBILE (OR)		
AERONAUTICAL MOBILE (OR)			US340		
23.35-24			23.35-24.45	23.35-24.45	Private Land Mobile (90)
FIXED			FIXED	FIXED	
MOBILE except aeronautical mobile 5.157			MOBILE except aeronautical mobile		
24-24.45			24-24.45		
FIXED			US340		
LAND MOBILE			US340		
24.45-24.6	24.45-24.65	24.45-24.6	24.45-24.65	24.45-24.65	
FIXED	FIXED	FIXED	FIXED	FIXED	
LAND MOBILE	LAND MOBILE	LAND MOBILE	MOBILE except aeronautical mobile	RADIOLOCATION 5.132A	
Radiolocation 5.132A	RADIOLOCATION 5.132A	Radiolocation 5.132A	RADIOLOCATION 5.132A		

5.158					
24.6-24.89		24.6-24.89	US340	US340	
FIXED		FIXED			
LAND MOBILE	24.65-24.89	LAND MOBILE	24.65-24.89	24.65-24.89	
	FIXED		FIXED	FIXED	
	LAND MOBILE		MOBILE except aeronautical mobile		
			US340	US340	
24.89-24.99			24.89-24.99	24.89-24.99	
AMATEUR				AMATEUR	Amateur Radio (97)
AMATEUR-SATELLITE				AMATEUR-SATELLITE	
			US340	US340	
24.99-25.005			24.99-25.01		
STANDARD FREQUENCY AND TIME SIGNAL (25 MHz)			STANDARD FREQUENCY AND TIME SIGNAL (25 MHz)		
25.005-25.01					
STANDARD FREQUENCY AND TIME SIGNAL			US1 US340		
Space research					
25.01-25.07			25.01-25.07	25.01-25.07	
FIXED				LAND MOBILE	Private Land Mobile (90)
MOBILE except aeronautical mobile			US340	US340 NG112	
25.07-25.21			25.07-25.21	25.07-25.21	
MARITIME MOBILE			MARITIME MOBILE US82	MARITIME MOBILE US82	Maritime (80)
					Private Land Mobile (90)
			US281 US296 US340	US281 US296 US340 NG112	

25.21-25.55  FIXED  MOBILE except aeronautical mobile	25.21-25.33  US340	25.21-25.33  LAND MOBILE  US340	Private Land Mobile (90)
	25.33-25.55  FIXED  MOBILE except aeronautical mobile  US340	25.33-25.55  US340	
25.55-25.67  RADIO ASTRONOMY  5.149	25.55-25.67  RADIO ASTRONOMY US74  US342		
25.67-26.1  BROADCASTING	25.67-26.1  BROADCASTING  US25 US340		International Broadcast  Stations (73F)  Remote Pickup (74D)
26.1-26.175  MARITIME MOBILE 5.132	26.1-26.175  MARITIME MOBILE 5.132  US25 US340		Remote Pickup (74D)  Low Power Auxiliary (74H)  Maritime (80)
26.175-26.2  FIXED  MOBILE except aeronautical mobile	26.175-26.2  US340	26.175-26.2  LAND MOBILE  US340	Remote Pickup (74D)  Low Power Auxiliary (74H)

26.2-26.35	26.2-26.42	26.2-26.35	26.2-26.42	26.2-26.42	
FIXED	FIXED	FIXED	RADIOLOCATION US132A	LAND MOBILE	
MOBILE except aeronautical	MOBILE except aeronautical	MOBILE except aeronautical mobile		RADIOLOCATION US132A	
mobile	mobile	Radiolocation 5.132A			
Radiolocation 5.132A	RADIOLOCATION 5.132A				
5.133A					
26.35-27.5		26.35-27.5	US340	US340	
FIXED	26.42-27.5	FIXED	26.42-26.48	26.42-26.48	
MOBILE except aeronautical	FIXED	MOBILE except aeronautical mobile		LAND MOBILE	
Mobile	MOBILE except aeronautical		US340	US340	
	mobile		26.48-26.95	26.48-26.95	
			FIXED		
			MOBILE except aeronautical mobile		
			US340	US340	
			26.95-27.41	26.95-26.96	ISM Equipment (18)
				FIXED	
				5.150 US340	
				26.96-27.23	ISM Equipment (18)
				MOBILE except aeronautical mobile	
				5.150 US340	Personal Radio (95)
			5.150 US340	27.23-27.41	

5.150	5.150	5.150	FIXED MOBILE except aeronautical mobile 5.150 US340	ISM Equipment (18) Private Land Mobile (90) Personal Radio (95)
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	34-35 FIXED MOBILE	34-35	
	35-36	35-36 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
	36-37 FIXED MOBILE US220	36-37 US220	
	37-37.5	37-37.5 LAND MOBILE NG124	Private Land Mobile (90)
37.5-38.25 FIXED MOBILE Radio astronomy	37.5-38 Radio astronomy US342	37.5-38 LAND MOBILE Radio astronomy US342 NG59 NG124	
5.149	38-38.25 FIXED MOBILE RADIO ASTRONOMY US81 US342	38-38.25 RADIO ASTRONOMY US81 US342	

38.25-39	38.25-39.986	38.25-39.5	38.25-39	38.25-39	
FIXED	FIXED	FIXED	FIXED		
MOBILE	MOBILE	MOBILE	MOBILE		
39-39.5			39-40	39-40	Private Land Mobile (90)
FIXED				LAND MOBILE	
MOBILE					
Radiolocation 5.132A					
5.159					
39.5-39.986		39.5-39.986			
FIXED		FIXED			
MOBILE		MOBILE			
		RADIOLOCATION 5.132A			
39.986-40.02		39.986-40			
FIXED		FIXED			
MOBILE		MOBILE			
Space research		RADIOLOCATION 5.132A			
		Space research		NG124	
		40-40.02	40-41.015	40-41.015	ISM Equipment (18)
		FIXED	FIXED		Private Land Mobile (90)
		MOBILE	MOBILE		
		Space research			
40.02-40.98					
FIXED					

MOBILE					
5.150			5.150 US210 US220	5.150 US210 US220	
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Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
40.98-41.015			(See previous page)		
FIXED					
MOBILE					
Space research					
5.160 5.161					
41.015-42			41.015-41.665	41.015-41.665	Private Land Mobile (90)
FIXED			FIXED	RADIOLOCATION US132A	
MOBILE			MOBILE RADIOLOCATION US132A		
5.160 5.161 5.161A			US220	US220	
42-42.5			41.665-42	41.665-42	
FIXED			FIXED		
MOBILE			MOBILE		
42-42.5			42-43.35	42-43.35	
FIXED				FIXED	Public Mobile (22)
MOBILE				LAND MOBILE	Private Land Mobile (90)

Radiolocation 5.132A					
5.160 5.161B	5.161				
42.5-44				NG124 NG141	
FIXED			43.35-44	43.35-43.69	
MOBILE			RADIOLOCATION US132A	FIXED LAND MOBILE RADIOLOCATION US132A  NG124	
5.160 5.161 5.161A				43.69-44	Private Land Mobile (90)
44-47				LAND MOBILE RADIOLOCATION US132A  NG124	
FIXED			44-46.6	44-46.6	
MOBILE				LAND MOBILE  NG124 NG141	
5.162 5.162A			46.6-47	46.6-47	
47-68			FIXED		
BROADCASTING			MOBILE		
	47-50	47-50	47-49.6	47-49.6	Private Land Mobile (90)
	FIXED	FIXED		LAND MOBILE	
	MOBILE	MOBILE		NG124	

		BROADCASTING	49.6-50	49.6-50	
		5.162A	FIXED		
			MOBILE		
	50-54		50-73	50-54	Amateur Radio (97)
	AMATEUR			AMATEUR	
	5.162A 5.166 5.167 5.167A 5.168 5.170				
	54-68	54-68		54-72	Broadcast Radio (TV)(73)
	BROADCASTING	FIXED		BROADCASTING	LPTV, TV Translator/ Booster (74G) Low Power Auxiliary (74H)
	Fixed	MOBILE			
5.162A 5.163 5.164 5.165	Mobile	BROADCASTING			
5.169 5.171	5.172	5.162A			
68-74.8	68-72	68-74.8		NG5 NG14 NG115 NG149	
FIXED	BROADCASTING	FIXED			
MOBILE except aeronautical mobile	Fixed	MOBILE			
	Mobile				
	5.173				
	72-73			72-73	Public Mobile (22)
	FIXED			FIXED	Maritime (80)
	MOBILE			MOBILE	Aviation (87)
5.149 5.175 5.177 5.179				NG3 NG16 NG56	Private Land Mobile (90) Personal Radio (95)

	73-74.6 RADIO ASTRONOMY 5.178		73-74.6 RADIO ASTRONOMY US74 US246	
	74.6-74.8 FIXED MOBILE	5.149 5.176 5.179	74.6-74.8 FIXED MOBILE US273	Private Land Mobile (90)
74.8-75.2 AERONAUTICAL RADIONAVIGATION 5.180 5.181			74.8-75.2 AERONAUTICAL RADIONAVIGATION 5.180	Aviation (87)
75.2-87.5 FIXED MOBILE except aeronautical mobile	75.2-75.4 FIXED MOBILE 5.179		75.2-75.4 FIXED MOBILE US273	Private Land Mobile (90)
	75.4-76 FIXED MOBILE	75.4-87 FIXED MOBILE	75.4-88	75.4-76 FIXED MOBILE NG3 NG16 NG56 Public Mobile (22) Maritime (80) Aviation (87) Private Land Mobile (90) Personal Radio (95)
	76-88 BROADCASTING	5.182 5.183 5.188 87-100	76-88 BROADCASTING	Broadcast Radio (TV)(73)
5.175 5.179 5.187				

87.5-100	Fixed	FIXED			LPTV, TV Translator/ Booster (74G) Low Power Auxiliary (74H)
BROADCASTING	Mobile	MOBILE BROADCASTING			
5.190	5.185			NG5 NG14 NG115 NG149	
	88-100		88-108	88-108	Broadcast Radio (FM)(73) FM Translator/Booster (74L)
100-108	BROADCASTING			BROADCASTING NG2	
BROADCASTING					
5.192 5.194			US93	US93 NG5	
108-117.975			108-117.975		Aviation (87)
AERONAUTICAL RADIONAVIGATION			AERONAUTICAL RADIONAVIGATION		
5.197 5.197A			5.197A US93		Page 20

Table of Frequency Allocations 150.8-174 MHz (VHF) Page 23

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
(See previous page)	(See previous page)		150.8-152.855	150.8-152.855	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)
			US73	US73 NG124	
153-154			152.855-156.2475	152.855-154	Remote Pickup (74D) Private Land Mobile (90)
FIXED				LAND MOBILE NG4	
MOBILE except aeronautical mobile (R)					
Meteorological aids				NG124	

154-156.4875 FIXED MOBILE except aeronautical mobile (R)	154-156.4875 FIXED MOBILE	154-156.4875 FIXED MOBILE	154-156.2475 FIXED LAND MOBILE NG112 5.226 NG22 NG124 NG148	Maritime (80) Private Land Mobile (90) Personal Radio (95)
5.225A 5.226	5.226	5.225A 5.226	156.2475-156.5125 MARITIME MOBILE NG22	Maritime (80) Aviation (87)
156.4875-156.5625 MARITIME MOBILE (distress and calling via DSC)			5.226 US52 US227 US266	
			156.5125-156.5375 MARITIME MOBILE (distress, urgency, safety and calling via DSC)	
5.111 5.226 5.227			5.111 5.226 US266	
156.5625-156.7625 FIXED MOBILE except aeronautical mobile (R)	156.5625-156.7625 FIXED MOBILE		156.5375-156.7625 MARITIME MOBILE	
5.226	5.226		5.226 US52 US227 US266	
156.7625-156.7875 MARITIME MOBILE Mobile-satellite (Earth-to-space)	156.7625-156.7875 MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space)	156.7625-156.7875 MARITIME MOBILE Mobile-satellite (Earth-to-space)	156.7625-156.7875 MOBILE-SATELLITE (Earth-to-space) (AIS 3)	
5.111 5.226 5.228	5.111 5.226 5.228	5.111 5.226 5.228	5.226 US52 US266	
156.7875-156.8125			156.7875-156.8125	

MARITIME MOBILE (distress and calling)			MARITIME MOBILE (distress, urgency, safety and calling)		
5.111 5.226			5.111 5.226 US266		
156.8125-156.8375	156.8125-156.8375	156.8125-156.8375	156.8125-156.8375		
MARITIME MOBILE	MARITIME MOBILE	MARITIME MOBILE	MOBILE-SATELLITE (Earth-to-space) (AIS 4)		
Mobile-satellite (Earth-to-space)	MOBILE-SATELLITE (Earth-to-space)	Mobile-satellite (Earth-to-space)			
5.111 5.226 5.228			5.226 US2 US266		
156.8375-161.9625	156.8375-161.9625		156.8375-157.0375	156.8375-157.0375	
FIXED	FIXED			MARITIME MOBILE	
MOBILE except aeronautical mobile	MOBILE		5.226 US52 US266	5.226 US52 US266	
			157.0375-157.1875	157.0375-157.1875	Maritime (80)
			MARITIME MOBILE US214		
			5.226 US266 G109	5.226 US214 US266	

<p>5000-5010</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>RADIONAVIGATION-SATELLITE (Earth-to-space)</p>	<p>5000-5010</p> <p>AERONAUTICAL MOBILE (R) US115</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA</p> <p>AERONAUTICAL RADIONAVIGATION US260</p> <p>RADIONAVIGATION-SATELLITE (Earth-to-space)</p> <p>US211</p>	<p>Aviation (87)</p>
<p>5010-5030</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B</p>	<p>5010-5030</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA</p> <p>AERONAUTICAL RADIONAVIGATION US260</p> <p>RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.443B</p> <p>US115 US211</p>	
<p>5030-5091</p> <p>AERONAUTICAL MOBILE (R) 5.443C</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443D</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>5.444</p>	<p>5030-5091</p> <p>AERONAUTICAL MOBILE (R) 5.443C</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443D</p> <p>AERONAUTICAL RADIONAVIGATION US260</p> <p>US211 US444</p>	
<p>5091-5150</p> <p>AERONAUTICAL MOBILE 5.444B</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>5.444 5.444A</p>	<p>5091-5150</p> <p>AERONAUTICAL MOBILE US111 US444B</p> <p>AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA</p> <p>AERONAUTICAL RADIONAVIGATION US260</p> <p>US211 US344 US444 US444A</p>	<p>Satellite</p> <p>Communications (25)</p> <p>Aviation (87)</p>

<p>5150-5250</p> <p>FIXED-SATELLITE (Earth-to-space) 5.447A</p> <p>MOBILE except aeronautical mobile 5.446A 5.446B</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>5.446 5.446C 5.447 5.447B 5.447C</p>	<p>5150-5250</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>US260</p> <p>US211 US307 US344</p>	<p>5150-5250</p> <p>FIXED-SATELLITE (Earth-to-space) 5.447A</p> <p>US344</p> <p>AERONAUTICAL RADIONAVIGATION US260</p> <p>5.447C US211 US307</p>	<p>RF Devices (15)</p> <p>Satellite</p> <p>Communications (25)</p> <p>Aviation (87)</p>
<p>5250-5255</p> <p>EARTH EXPLORATION-SATELLITE (active)</p> <p>MOBILE except aeronautical mobile 5.446A 5.447F</p> <p>RADIOLOCATION</p> <p>SPACE RESEARCH 5.447D</p> <p>5.447E 5.448 5.448A</p>	<p>5250-5255</p> <p>EARTH EXPLORATION-SATELLITE (active)</p> <p>RADIOLOCATION G59</p> <p>SPACE RESEARCH (active) 5.447D</p> <p>5.448A</p>	<p>5250-5255</p> <p>Earth exploration-satellite (active)</p> <p>Radiolocation</p> <p>Space research</p>	<p>RF Devices (15)</p> <p>Private Land Mobile (90)</p>
<p>5255-5350</p> <p>EARTH EXPLORATION-SATELLITE (active)</p> <p>MOBILE except aeronautical mobile 5.446A 5.447F</p> <p>RADIOLOCATION</p> <p>SPACE RESEARCH (active)</p> <p>5.447E 5.448 5.448A</p>	<p>5255-5350</p> <p>EARTH EXPLORATION-SATELLITE (active)</p> <p>RADIOLOCATION G59</p> <p>SPACE RESEARCH (active)</p> <p>5.448A</p>	<p>5255-5350</p> <p>Earth exploration-satellite (active)</p> <p>Radiolocation</p> <p>Space research (active)</p> <p>5.448A</p>	
<p>5350-5460</p> <p>EARTH EXPLORATION-SATELLITE (active) 5.448B</p> <p>AERONAUTICAL RADIONAVIGATION 5.449</p> <p>RADIOLOCATION 5.448D</p> <p>SPACE RESEARCH (active) 5.448C</p>	<p>5350-5460</p> <p>EARTH EXPLORATION-SATELLITE (active) 5.448B</p> <p>SPACE RESEARCH (active)</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>5.449</p> <p>RADIOLOCATION G56</p> <p>US390 G130</p>	<p>5350-5460</p> <p>AERONAUTICAL RADIONAVIGATION 5.449</p> <p>Earth exploration-satellite (active) 5.448B</p> <p>Space research (active)</p> <p>Radiolocation</p>	<p>Aviation (87)</p> <p>Private Land Mobile (90)</p> <p>Page 42</p>

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
7145-7235			7145-7190	7145-7235	RF Devices (15)
FIXED			FIXED		
MOBILE			SPACE RESEARCH (deep space) (Earth-to-space) US262		
SPACE RESEARCH (Earth-to-space) 5.460			5.458 G116		
			7190-7235		
			FIXED		
			SPACE RESEARCH (Earth-to-space) G133		
5.458 5.459			5.458 G134	5.458 US262	
7235-7250			7235-7250	7235-7250	
FIXED			FIXED		
MOBILE					
5.458			5.458	5.458	
7250-7300			7250-7300	7250-8025	
FIXED			FIXED-SATELLITE (space-to-Earth)		
FIXED-SATELLITE (space-to-Earth)			MOBILE-SATELLITE (space-to-Earth)		
MOBILE			Fixed		
5.461			G117		

<p>7300-7450</p> <p>FIXED</p> <p>FIXED-SATELLITE (space-to-Earth)</p> <p>MOBILE except aeronautical mobile</p> <p>5.461</p>	<p>7300-7450</p> <p>FIXED</p> <p>FIXED-SATELLITE (space-to-Earth)</p> <p>Mobile-satellite (space-to-Earth)</p> <p>G117</p>
<p>7450-7550</p> <p>FIXED</p> <p>FIXED-SATELLITE (space-to-Earth)</p> <p>METEOROLOGICAL-SATELLITE (space-to-Earth)</p> <p>MOBILE except aeronautical mobile</p> <p>5.461A</p>	<p>7450-7550</p> <p>FIXED</p> <p>FIXED-SATELLITE (space-to-Earth)</p> <p>METEOROLOGICAL-SATELLITE (space-to-Earth)</p> <p>Mobile-satellite (space-to-Earth)</p> <p>G104 G117</p>
<p>7550-7750</p> <p>FIXED</p> <p>FIXED-SATELLITE (space-to-Earth)</p> <p>MOBILE except aeronautical mobile</p>	<p>7550-7750</p> <p>FIXED</p> <p>FIXED-SATELLITE (space-to-Earth)</p> <p>Mobile-satellite (space-to-Earth)</p> <p>G117</p>
<p>7750-7900</p> <p>FIXED</p> <p>METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B</p> <p>MOBILE except aeronautical mobile</p>	<p>7750-7900</p> <p>FIXED</p> <p>METEOROLOGICAL-SATELLITE (space-to-Earth)</p> <p>5.461B</p>

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
15.4-15.43			15.4-15.43	15.4-15.43	Aviation (87)
RADIOLOCATION 5.511E 5.511F			RADIOLOCATION 5.511E 5.511F	AERONAUTICAL	
AERONAUTICAL RADIONAVIGATION			US511E AERONAUTICAL RADIONAVIGATION US260	RADIONAVIGATION US260	
5.511D			US211	US211 US511E	
15.43-15.63			15.43-15.63	15.43-15.63	Satellite  Communications (25) Aviation (87)
FIXED-SATELLITE (Earth-to-space) 5.511A			RADIOLOCATION 5.511E 5.511F	FIXED-SATELLITE (Earth-to-space)	
RADIOLOCATION 5.511E 5.511F			US511E AERONAUTICAL RADIONAVIGATION US260	AERONAUTICAL RADIONAVIGATION US260	
5.511C			5.511C US211 US359	5.511C US211 US359 US511E	
15.63-15.7			15.63-15.7	15.63-15.7	Aviation (87)
RADIOLOCATION 5.511E 5.511F			RADIOLOCATION 5.511E 5.511F	AERONAUTICAL	
AERONAUTICAL RADIONAVIGATION			US511E AERONAUTICAL RADIONAVIGATION US260	RADIONAVIGATION US260	
5.511D			US211	US211 US511E	
15.7-16.6			15.7-16.6	15.7-17.2	Private Land Mobile (90)
RADIOLOCATION			RADIOLOCATION G59	Radiolocation	

5.512 5.513					
16.6-17.1			16.6-17.1		
RADIOLOCATION			RADIOLOCATION G59		
Space research (deep space) (Earth-to-space)			Space research (deep space) (Earth-to-space)		
5.512 5.513					
17.1-17.2			17.1-17.2		
RADIOLOCATION			RADIOLOCATION G59		
5.512 5.513					
17.2-17.3			17.2-17.3	17.2-17.3	
EARTH EXPLORATION-SATELLITE (active)			EARTH EXPLORATION-SATELLITE (active)	Earth exploration-satellite (active)	
RADIOLOCATION			RADIOLOCATION G59	Radiolocation	
SPACE RESEARCH (active)			SPACE RESEARCH (active)	Space research (active)	
5.512 5.513 5.513A					
17.3-17.7	17.3-17.7	17.3-17.7	17.3-17.7	17.3-17.7	
FIXED-SATELLITE (Earth-to-space)	FIXED-SATELLITE (Earth-to-space)	FIXED-SATELLITE (Earth-to-space)	Radiolocation US259 G59	FIXED-SATELLITE (Earth-to-space)	Satellite
5.516 (space-to-Earth) 5.516A	5.516	5.516		US271	Communications (25)
5.516B	BROADCASTING-SATELLITE	Radiolocation		BROADCASTING-SATELLITE	
Radiolocation	Radiolocation			US402 NG163	
5.514	5.514 5.515	5.514	US402 G117	US259	
17.7-18.1	17.7-17.8	17.7-18.1	17.7-17.8	17.7-17.8	
FIXED	FIXED	FIXED		FIXED	Satellite
FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)	FIXED-SATELLITE (space-to-Earth)		FIXED-SATELLITE (Earth-to-space)	Communications (25)

5.484A (Earth-to-space) 5.516 MOBILE	5.517 (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	5.484A (Earth-to-space) 5.516 MOBILE	US334 G117	US271 US334	TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
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Table of Frequency Allocations 21.2-27 GHz (SHF) Page 53

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US532		Fixed Microwave (101)
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B 5.530C 5.530D	21.4-22 FIXED MOBILE 5.530A 5.530C	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B 5.530C 5.530D 5.531	21.4-22 FIXED MOBILE		
22-22.21 FIXED MOBILE except aeronautical mobile			22-22.21 FIXED MOBILE except aeronautical mobile		

5.149	US342	
22.21-22.5	22.21-22.5	
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)	
FIXED	FIXED	
MOBILE except aeronautical mobile	MOBILE except aeronautical mobile	
RADIO ASTRONOMY	RADIO ASTRONOMY	
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)	
5.149 5.532	US342 US532	
22.5-22.55	22.5-22.55	
FIXED	FIXED	
MOBILE	MOBILE	
	US211	
22.55-23.15	22.55-23.15	Satellite Communications (25)
FIXED	FIXED	Fixed Microwave (101)
INTER-SATELLITE 5.338A	INTER-SATELLITE US145 US278	
MOBILE	MOBILE	
SPACE RESEARCH (Earth-to-space) 5.532A	SPACE RESEARCH (Earth-to-space) 5.532A	
5.149	US342	
23.15-23.55	23.15-23.55	
FIXED	FIXED	
INTER-SATELLITE 5.338A	INTER-SATELLITE US145 US278	
MOBILE	MOBILE	

23.55-23.6			23.55-23.6		
FIXED			FIXED		Fixed Microwave (101)
MOBILE			MOBILE		
23.6-24			23.6-24		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340			US246		
24-24.05			24-24.05	24-24.05	
AMATEUR				AMATEUR	ISM Equipment (18)
AMATEUR-SATELLITE				AMATEUR-SATELLITE	Amateur Radio (97)
5.150			5.150 US211	5.150 US211	
24.05-24.25			24.05-24.25	24.05-24.25	
RADIOLOCATION			RADIOLOCATION G59	Amateur	RF Devices (15)
Amateur			Earth exploration-satellite (active)	Earth exploration-satellite (active)	ISM Equipment (18)
Earth exploration-satellite (active)				Radiolocation	Private Land Mobile (90)
5.150			5.150	5.150	Amateur Radio (97)
24.25-24.45	24.25-24.45	24.25-24.45	24.25-24.45	24.25-24.45	
FIXED	RADIONAVIGATION	FIXED		FIXED	RF Devices (15)
		MOBILE RADIONAVIGATION			Fixed Microwave (101)

24.45-24.65	24.45-24.65	24.45-24.65	24.45-24.65		RF Devices (15) Satellite Communications (25)
FIXED INTER-SATELLITE	INTER-SATELLITE RADIONAVIGATION  5.533	FIXED INTER-SATELLITE MOBILE RADIONAVIGATION  5.533	INTER-SATELLITE RADIONAVIGATION  5.533		
24.65-24.75	24.65-24.75	24.65-24.75	24.65-24.75		
FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE	INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE  5.533	INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)		
24.75-25.25	24.75-25.25	24.75-25.25	24.75-25.25	24.75-25.05	RF Devices (15) Satellite Communications (25) Fixed Microwave (101)
FIXED FIXED-SATELLITE (Earth-to-space) 5.532B	FIXED-SATELLITE (Earth-to-space) 5.535	FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE		FIXED-SATELLITE (Earth-to-space) NG535  25.05-25.25 FIXED FIXED-SATELLITE (Earth-to-space) NG535	
25.25-25.5			25.25-25.5	25.25-25.5	RF Devices (15)
FIXED INTER-SATELLITE 5.536			FIXED INTER-SATELLITE 5.536	Inter-satellite 5.536 Standard frequency and time	

MOBILE	MOBILE	signal-satellite (Earth-to-space)	
Standard frequency and time signal-satellite (Earth-to-space)	Standard frequency and time signal-satellite (Earth-to-space)		
25.5-27	25.5-27	25.5-27	
EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536B	EARTH EXPLORATION-SATELLITE (space-to-Earth)	SPACE RESEARCH (space-to-Earth)	
FIXED	FIXED	Inter-satellite 5.536	
INTER-SATELLITE 5.536	INTER-SATELLITE 5.536	Standard frequency and time	
MOBILE	MOBILE	signal-satellite (Earth-to-space)	
SPACE RESEARCH (space-to-Earth) 5.536C	SPACE RESEARCH (space-to-Earth)		
Standard frequency and time signal-satellite (Earth-to-space)	Standard frequency and time signal-satellite (Earth-to-space)		
5.536A	5.536A US258	5.536A US258	

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Table of Frequency Allocations 34.7-46.9 GHz (EHF) Page 57

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
34.7-35.2			34.7-35.5	34.7-35.5	
RADIOLOCATION			RADIOLOCATION	Radiolocation	
Space research 5.550					
5.549					
35.2-35.5					
METEOROLOGICAL AIDS					
RADIOLOCATION			US360 G117	US360	

5.549			
35.5-36	35.5-36	35.5-36	
METEOROLOGICAL AIDS	EARTH EXPLORATION-SATELLITE	Earth exploration-satellite (active)	
EARTH EXPLORATION-SATELLITE (active)	(active)	Radiolocation	
RADIOLOCATION	RADIOLOCATION	Space research (active)	
SPACE RESEARCH (active)	SPACE RESEARCH (active)		
5.549 5.549A	US360 G117	US360	
36-37	36-37		
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)		
FIXED	FIXED		
MOBILE	MOBILE		
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)		
5.149 5.550A	US342 US550A		
37-37.5	37-38	37-37.5	
FIXED	FIXED	FIXED	
MOBILE except aeronautical mobile	MOBILE except aeronautical mobile	MOBILE except aeronautical mobile	
SPACE RESEARCH (space-to-Earth)	SPACE RESEARCH (space-to-Earth)		
5.547			
37.5-38		37.5-38	
FIXED		FIXED	Satellite Communications (25)
FIXED-SATELLITE (space-to-Earth)		FIXED-SATELLITE (space-to-Earth)	
MOBILE except aeronautical mobile		MOBILE except aeronautical mobile	

SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth)  5.547			
38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth)  5.547	38-38.6 FIXED MOBILE 38.6-39.5	38.6-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE NG175	Satellite Communications (25) Fixed Microwave (101)
39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth)  5.547	39.5-40 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US382  G117	39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE NG175  US382	
76-77.5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth)	76-77.5 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth)	76-77 RADIO ASTRONOMY RADIOLOCATION Amateur Space research (space-to-Earth)  US342	RF Devices (15)

		77-77.5	
		RADIO ASTRONOMY	RF Devices (15)
		RADIOLOCATION	Amateur Radio (97)
		Amateur	
		Amateur-satellite	
		Space research (space-to-Earth)	
5.149	US342	US342	
77.5-78	77.5-78	77.5-78	
AMATEUR	Radio astronomy	AMATEUR	
AMATEUR-SATELLITE	Space research (space-to-Earth)	AMATEUR-SATELLITE	
Radio astronomy		Radio astronomy	
Space research (space-to-Earth)		Space research (space-to-Earth)	
5.149	US342	US342	
78-79	78-79	78-79	
RADIOLOCATION	RADIO ASTRONOMY	RADIO ASTRONOMY	
Amateur	RADIOLOCATION	RADIOLOCATION	
Amateur-satellite	Space research (space-to-Earth)	Amateur	
Radio astronomy		Amateur-satellite	
Space research (space-to-Earth)		Space research (space-to-Earth)	
5.149 5.560	5.560 US342	5.560 US342	
79-81	79-81	79-81	
RADIO ASTRONOMY	RADIO ASTRONOMY	RADIO ASTRONOMY	
RADIOLOCATION	RADIOLOCATION	RADIOLOCATION	

Amateur Amateur-satellite Space research (space-to-Earth)  5.149	Space research (space-to-Earth)  US342	Amateur Amateur-satellite Space research (space-to-Earth)  US342	
81-84  FIXED 5.338A  FIXED-SATELLITE (Earth-to-space)  MOBILE  MOBILE-SATELLITE (Earth-to-space)  RADIO ASTRONOMY  Space research (space-to-Earth)  5.149 5.561A	81-84  FIXED US162  FIXED-SATELLITE (Earth-to-space) US297  MOBILE  MOBILE-SATELLITE (Earth-to-space)  RADIO ASTRONOMY  Space research (space-to-Earth)  US161 US342 US389		RF Devices (15) Fixed Microwave (101)
84-86  FIXED 5.338A  FIXED-SATELLITE (Earth-to-space) 5.561B  MOBILE  RADIO ASTRONOMY  5.149	84-86  FIXED US162  FIXED-SATELLITE (Earth-to-space)  MOBILE  RADIO ASTRONOMY  US161 US342 US389		

Table of Frequency Allocations			86-130 GHz (EHF)		Page 63
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
86-92			86-92		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340			US246		
92-94			92-94		
FIXED 5.338A			FIXED US162		RF Devices (15)
MOBILE			MOBILE		Fixed Microwave (101)
RADIO ASTRONOMY			RADIO ASTRONOMY		
RADIOLOCATION			RADIOLOCATION		
5.149			US161 US342		
94-94.1			94-94.1	94-94.1	
EARTH EXPLORATION-SATELLITE (active)			EARTH EXPLORATION-	RADIOLOCATION	RF Devices (15)
RADIOLOCATION			SATELLITE (active)	Radio astronomy	
SPACE RESEARCH (active)			RADIOLOCATION		
Radio astronomy			SPACE RESEARCH (active)		
			Radio astronomy		
5.562 5.562A			5.562 5.562A	5.562A	
94.1-95			94.1-95		
FIXED			FIXED		RF Devices (15)

MOBILE RADIO ASTRONOMY RADIOLOCATION  5.149	MOBILE RADIO ASTRONOMY RADIOLOCATION  US161 US342	Fixed Microwave (101)
95-100  FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE  5.149 5.554	95-100  FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE  5.554 US342	
100-102  EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)  5.340 5.341	100-102  EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)  5.341 US246	
102-105  FIXED MOBILE RADIO ASTRONOMY  5.149 5.341	102-105  FIXED MOBILE RADIO ASTRONOMY  5.341 US342	

Table of Frequency Allocations			200-3000 GHz (EHF)		Page 67
International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
200-209			200-209		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY			RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)			SPACE RESEARCH (passive)		
5.340 5.341 5.563A			5.341 5.563A US246		
209-217			209-217		
FIXED			FIXED		
FIXED-SATELLITE (Earth-to-space)			FIXED-SATELLITE (Earth-to-space)		
MOBILE			MOBILE		
RADIO ASTRONOMY			RADIO ASTRONOMY		
5.149 5.341			5.341 US342		
217-226			217-226		
FIXED			FIXED		
FIXED-SATELLITE (Earth-to-space)			FIXED-SATELLITE (Earth-to-space)		
MOBILE			MOBILE		
RADIO ASTRONOMY			RADIO ASTRONOMY		
SPACE RESEARCH (passive) 5.562B			SPACE RESEARCH (passive) 5.562B		
5.149 5.341			5.341 US342		
226-231.5			226-231.5		
EARTH EXPLORATION-SATELLITE (passive)			EARTH EXPLORATION-SATELLITE (passive)		

RADIO ASTRONOMY SPACE RESEARCH (passive)  5.340 231.5-232	RADIO ASTRONOMY SPACE RESEARCH (passive)  US246 231.5-232	
FIXED MOBILE Radiolocation 232-235	FIXED MOBILE Radiolocation 232-235	
FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation 235-238	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation 235-238	
EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive)  5.563A 5.563B 238-240	EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive)  5.563A 5.563B 238-240	
FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	

240-241	240-241		
FIXED	FIXED		
MOBILE	MOBILE		
RADIOLOCATION	RADIOLOCATION		
241-248	241-248	241-248	
RADIO ASTRONOMY	RADIO ASTRONOMY	RADIO ASTRONOMY	ISM Equipment (18)
RADIOLOCATION	RADIOLOCATION	RADIOLOCATION	Amateur Radio (97)
Amateur		Amateur	
Amateur-satellite		Amateur-satellite	
5.138 5.149	5.138 US342	5.138 US342	
248-250	248-250	248-250	
AMATEUR	Radio astronomy	AMATEUR	Amateur Radio (97)
AMATEUR-SATELLITE		AMATEUR-SATELLITE	
Radio astronomy		Radio astronomy	
5.149	US342	US342	
250-252	250-252		
EARTH EXPLORATION-SATELLITE (passive)	EARTH EXPLORATION-SATELLITE (passive)		
RADIO ASTRONOMY	RADIO ASTRONOMY US74		
SPACE RESEARCH (passive)	SPACE RESEARCH (passive)		
5.340 5.563A	5.563A US246		
252-265	252-265		

FIXED  MOBILE  MOBILE-SATELLITE (Earth-to-space)  RADIO ASTRONOMY  RADIONAVIGATION  RADIONAVIGATION-SATELLITE   5.149 5.554	FIXED  MOBILE  MOBILE-SATELLITE (Earth-to-space)  RADIO ASTRONOMY  RADIONAVIGATION  RADIONAVIGATION-SATELLITE   5.554 US211 US342	
265-275  FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  RADIO ASTRONOMY   5.149 5.563A	265-275  FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  RADIO ASTRONOMY   5.563A US342	
275-3000 (Not allocated)   5.565	275-3000 (Not allocated)   5.565 US565	Amateur Radio (97)

United States (US) Footnotes

\* \* \* \* \*

US52 In the VHF maritime mobile band (156–162 MHz), the following provisions shall apply:

(a) Except as provided for below, the use of the bands 161.9625–161.9875 MHz (AIS 1 with center frequency 161.975 MHz) and 162.0125–162.0375 MHz (AIS 2 with center frequency 162.025 MHz) by the maritime mobile and mobile-satellite (Earth-to-space) services is restricted to Automatic Identification Systems (AIS). The use of these bands by the aeronautical mobile (OR) service is restricted to AIS emissions from search and rescue aircraft operations. Frequencies in the AIS 1 band may continue to be used by non-Federal base, fixed, and land mobile stations until March 2, 2024.

(b) Except as provided for below, the use of the bands 156.7625–156.7875 MHz (AIS 3 with center frequency 156.775 MHz) and 156.8125–156.8375 MHz (AIS 4 with center frequency 156.825 MHz) by the mobile-satellite service (Earth-to-space) is restricted to the reception of long-range AIS broadcast messages from ships (Message 27; see most recent version of Recommendation ITU–R M.1371). The frequencies 156.775 MHz and 156.825 MHz may continue to be used by non-Federal ship and coast stations for navigation-related port operations or ship movement until August 26, 2019.

(c) The frequency 156.3 MHz may also be used by aircraft stations for the purpose of search and rescue operations and other safety-related communication.

(d) Federal stations in the maritime mobile service may also be authorized as follows: (1) Vessel traffic services under the control of the U.S. Coast Guard on a simplex basis by coast and ship stations on the frequencies 156.25, 156.55, 156.6 and 156.7 MHz; (2) Inter-ship use of the frequency 156.3 MHz on a simplex basis; (3) Navigational bridge-to-bridge and navigational communications on a simplex basis by coast and ship stations on the frequencies 156.375 and 156.65 MHz; (4) Port operations use on a simplex basis by coast and ship stations on the frequencies 156.6 and 156.7 MHz; (5) Environmental communications on the frequency 156.75 MHz in accordance with the national plan; and (6) Duplex port operations use of the frequencies 157 MHz for ship stations and 161.6 MHz for coast stations.

\* \* \* \* \*

US115 In the bands 5000–5010 MHz and 5010–5030 MHz, the following provisions shall apply:

(a) In the band 5000–5010 MHz, systems in the aeronautical mobile (R) service (AM(R)S) shall be operated in accordance with international aeronautical standards and are limited to surface applications at airports (*i.e.*, AeroMACS).

(b) The band 5010–5030 MHz is also allocated on a primary basis to the AM(R)S, limited to surface applications at airports that operate in accordance with international civil aviation standards. In making assignments for this band, attempts shall first be made to satisfy the AM(R)S requirements in the bands 5000–5010 MHz and 5091–5150 MHz. AM(R)S systems used in the band 5010–5030 MHz shall be designed and implemented to be capable of operational modification if receiving harmful interference from the radionavigation-satellite service. Finally, notwithstanding Radio Regulation No. 4.10, stations in the AM(R)S operating in this band shall be designed and implemented to be capable of operational modification to reduce throughput and/or preclude the use of specific frequencies in order to ensure protection of radionavigation-satellite service systems operating in this band.

(c) Aeronautical fixed communications that are an integral part of the AeroMACS system in the bands 5000–5010 MHz and 5010–5030 MHz are also authorized on a primary basis.

\* \* \* \* \*

US132A In the bands 26.2–26.42 MHz, 41.015–41.665 MHz, and 43.35–44 MHz, applications of radiolocation service are limited to oceanographic radars operating in accordance with ITU Resolution 612 (Rev. WRC–12). Oceanographic radars shall not cause harmful interference to, or claim protection from, non-Federal stations in the land mobile service in the bands 26.2–26.42 MHz and 43.69–44 MHz, Federal stations in the fixed or mobile services in the band 41.015–41.665 MHz, and non-Federal stations in the fixed or land mobile services in the band 43.35–43.69 MHz.

\* \* \* \* \*

US162 In the bands 81–86 GHz and 92–94 GHz, operators of stations in the fixed service are encouraged to take all reasonable steps to ensure that unwanted emission power in any 100 MHz bandwidth in the band 86–92 GHz, measured at the antenna port, does not exceed the following levels:

Band	Maximum levels (where f in GHz is the center frequency of any 100 MHz)
81–86 GHz ..	–41–14(f–86) dBW for 86.05 ≤ f ≤ 87 GHz and –55 dBW for 87 ≤ f ≤ 91.95 GHz.
92–94 GHz ..	–41–14(92–f) dBW for 91 ≤ f ≤ 91.95 GHz and –55 dBW for 86.05 ≤ f ≤ 91 GHz.

\* \* \* \* \*

US511E The use of the band 15.4–15.7 GHz by the radiolocation service is limited to Federal systems requiring a necessary bandwidth greater than 1600 MHz that cannot be accommodated within the band 15.7–17.3 GHz except as described below. In the band 15.4–15.7 GHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, radars operating in the aeronautical radionavigation service. Radar systems operating in the radiolocation service shall not be developed solely for operation in the band 15.4–15.7 GHz. Radar systems requiring use of the band 15.4–15.7 GHz for testing, training, and exercises may be accommodated on a case-by-case basis.

\* \* \* \* \*

US565 International footnote 5.565 does not establish priority of use in the United States Table of Frequency Allocations, and does not preclude or constrain the allocation of frequency bands in the range 275–3000 GHz to active services at a future date.

\* \* \* \* \*

Non-Federal Government (NG) Footnotes

\* \* \* \* \*

NG16 In the bands 72–73 MHz and 75.4–76 MHz, frequencies may be authorized for mobile operations in the Industrial/Business Radio Pool, subject to the condition that no interference is caused to the reception of television stations operating on channels 4 and 5.

\* \* \* \* \*

NG92 The band 1900–2000 kHz is also allocated on a primary basis to the maritime mobile service in Regions 2 and 3 and to the radiolocation service in Region 2, and on a secondary basis to the radiolocation service in Region 3. The use of these allocations is restricted to radio buoy operations on the open sea. Stations in the amateur, maritime mobile, and radiolocation services located in Region 2 shall be protected from harmful interference only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with the technical rules

applicable to the service in which it operates.

\* \* \* \* \*

**PART 15—RADIO FREQUENCY DEVICES**

■ 4. The authority citation for part 15 is amended to read as follows:

**Authority:** 47 U.S.C. 154, 302a, 303, 304, 307, 336, 544a, and 549.

■ 5. Section 15.113 is amended by revising paragraph (a) to read as follows:

**§ 15.113 Power Line Carrier Systems**

\* \* \* \* \*

(a) A power utility operating a power line carrier system shall submit the details of proposed new systems or changes to existing systems to an industry-operated entity as set forth in

§ 90.35(g) of this chapter. No notification to the FCC is required.

\* \* \* \* \*

**PART 80—STATIONS IN THE MARITIME SERVICES**

■ 6. The authority citation for part 80 continues to read as follows:

**Authority:** Secs. 4, 303, 307(e), 309, and 332, 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303, 307(e), 309, and 332, unless otherwise noted. Interpret or apply 48 Stat. 1064–1068, 1081–1105, as amended; 47 U.S.C. 151–155, 301–609; 3 UST 3450, 3 UST 4726, 12 UST 2377.

■ 7. Section 80.215 is amended by removing note 13 from paragraph (e)(1) and by removing and reserving paragraph (g)(3).

**§ 80.215 Transmitter power.**

\* \* \* \* \*

(e) \* \* \*

(1) Ship stations 156–162 MHz—25 W<sup>6</sup>

\* \* \* \* \*

(g) \* \* \*

\* \* \* \* \*

(3) [Reserved]

\* \* \* \* \*

■ 8. Section 80.373 is amended by revising the portion of the table in paragraph (f) that is titled “Port Operations” by removing the entries for channel designator 75 (156.775 MHz) and channel designator 76 (156.825 MHz) and by removing note 18.

**§ 80.373 Private communications frequencies.**

\* \* \* \* \*

(f) \* \* \*

**FREQUENCIES IN THE 156–162 MHz BAND**

Channel designator	Carrier frequency (MHz) ship transmit	Carrier frequency (MHz) coast transmit	Points of communication (intership and between coast and ship unless otherwise indicated)
<b>Port Operations</b>			
01A <sup>1</sup>	156.050	156.050	
63A <sup>1</sup>	156.175	156.175	
05A <sup>2</sup>	156.250	156.250	
65A	156.275	156.275	
66A	156.325	156.325	
12 <sup>3</sup>	156.600	156.600	
73	156.675	156.675	
14 <sup>3</sup>	156.700	156.700	
74	156.725	156.725	
77 <sup>4</sup>	156.875		Intership only.
20A <sup>12</sup>	157.000		Intership only.
<b>Navigational (Bridge-to-Bridge)<sup>5</sup></b>			
* * * * *			

■ 9. Section 80.375 is amended by adding paragraph (f) to read as follows:

**§ 80.375 Radiodetermination frequencies.**

\* \* \* \* \*

(f) *Radiodetermination frequencies for commercial fishing vessels.* Frequencies in the 1900–2000 kHz band are authorized for radio buoy operations under a ship station license provided:

(1) The use of these frequencies is related to commercial fishing operations on the open sea. This use is not permitted within the exclusive economic area or territorial waters of a foreign country (unless provided for by an international agreement); and

(2) The output power does not exceed 10 watts and the station antenna height does not exceed 4.6 meters (15 feet) above sea level in a buoy station or 6

meters (20 feet) above the mast of the ship on which it is installed.

**Note:** Frequencies in the 1900–2000 kHz band may also be used to transmit data related to commercial fishing and by radio buoy systems that do not use radio direction-finding to locate the radio buoys.

■ 10. Section 80.871 is amended by revising the table in paragraph (d) to remove the entries for channel designator 75 (156.775 MHz) and channel designator 76 (156.825 MHz).

**§ 80.871 VHF radiotelephone station.**

\* \* \* \* \*

(d) \* \* \*

Channel designators	Transmitting frequencies (MHz)	
	Ship station	Coast station
* * *		
15	156.750	156.750
16	156.800	156.800
17	156.850	156.850
* * *		

**PART 90—PRIVATE LAND MOBILE RADIO SERVICES**

■ 11. The authority citation for part 90 continues to read as follows:

**Authority:** Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161,

303(g), 303(r), and 332(c)(7), and Title VI of the Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112–96, 126 Stat. 156.

■ 12. Section 90.7 is amended by adding the following term and definition in alphabetical order to read as follows:

**§ 90.7 Definitions.**

\* \* \* \* \*

*Equivalent Isotropically Radiated Power (EIRP).* The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).

\* \* \* \* \*

■ 13. Section 90.103 is amended by adding and revising the following entries to the table in paragraph (b) and by adding paragraph (c)(3) to read as follows:

**§ 90.103 Radiolocation Service.**

\* \* \* \* \*

(b) \* \* \*

**RADIOLOCATION SERVICE FREQUENCY TABLE**

Frequency or band	Class of station(s)	Limitation
<b>Kilohertz</b>		
4438 to 4488	Radiolocation land	3
5250 to 5275	.....do	3
<b>Megahertz</b>		
13.45 to 13.55	.....do	3
16.10 to 16.20	.....do	3
24.45 to 24.65	.....do	3
26.20 to 26.42	.....do	3
41.015 to 41.665	.....do	3
43.35 to 44.00	.....do	3
420 to 450	Radiolocation land or mobile	21
2450 to 2500	.....do	9, 22, 23

(c) \* \* \*

(3) Operations in this band are limited to oceanographic radars using transmitters with a peak equivalent isotropically radiated power (EIRP) not to exceed 25 dBW. Oceanographic radars must not cause harmful interference to, nor claim protection from interference caused by, stations in the fixed or mobile services as specified in § 2.106, footnotes 5.132A, 5.145A, and US132A. See Resolution 612 of the ITU Radio Regulations for international coordination requirements. Operators of oceanographic radars are urged to use directional antennas and techniques that allow multiples of such radars to operate on the same frequency.

\* \* \* \* \*

**PART 97—AMATEUR RADIO SERVICE**

■ 14. The authority citation for part 97 continues to read as follows:

**Authority:** 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303. Interpret or apply 48 Stat. 1064–1068, 1081–1105, as amended; 47 U.S.C. 151–155, 301–609, unless otherwise noted.

■ 15. Section 97.3(b) is amended by revising the definitions to read as follows:

**§ 97.3 Definitions.**

\* \* \* \* \*

(b) \* \* \*

(1) *EHF* (extremely high frequency). The frequency range 30–300 GHz.

(2) *EIRP* (equivalent isotropically radiated power). The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).

**Note:** Divide EIRP by 1.64 to convert to effective radiated power.

(3) *ERP* (effective radiated power) (in a given direction). The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

**Note:** Multiply ERP by 1.64 to convert to equivalent isotropically radiated power.

(4) *HF* (high frequency). The frequency range 3–30 MHz.

(5) *Hz*. Hertz.

(6) *LF* (low frequency). The frequency range 30–300 kHz.

(7) *m*. Meters.

(8) *MF* (medium frequency). The frequency range 300–3000 kHz.

(9) *PEP* (peak envelope power). The average power supplied to the antenna transmission line by a transmitter

during one RF cycle at the crest of the modulation envelope taken under normal operating conditions.

(10) *RF*. Radio frequency.

(11) *SHF* (super high frequency). The frequency range 3–30 GHz.

(12) *UHF* (ultra high frequency). The frequency range 300–3000 MHz.

(13) *VHF* (very high frequency). The frequency range 30–300 MHz.

(14) *W*. Watts.

\* \* \* \* \*

■ 16. Section 97.15 is amended by adding paragraph (c) to read as follows:

**§ 97.15 Station antenna structures.**

\* \* \* \* \*

(c) Antennas used to transmit in the 2200 m and 630 m bands must not exceed 60.96 meters (200 feet) in height above ground level.

■ 17. Section 97.301 is amended by revising the kHz portion of the tables in paragraphs (b), (c), and (d) to read as follows:

**§ 97.301 Authorized frequency bands.**

\* \* \* \* \*

(b) \* \* \*

Wavelength band	ITU Region 1	ITU Region 2	ITU Region 3	Sharing requirements see § 97.303 (paragraph)
LF	kHz	kHz	kHz	
2200 m	135.7–137.8	135.7–137.8	135.7–137.8	(a), (g).
MF	kHz	kHz	kHz	
630 m	472–479	472–479	472–479	(g).
160 m	1810–1850	1800–2000	1800–2000	(a).
*	*	*	*	*

(c) \* \* \*

Wavelength band	ITU Region 1	ITU Region 2	ITU Region 3	Sharing requirements see § 97.303 (paragraph)
LF	kHz	kHz	kHz	
2200 m	135.7–137.8	135.7–137.8	135.7–137.8	(a), (g).
MF	kHz	kHz	kHz	
630 m	472–479	472–479	472–479	(g).
160 m	1810–1850	1800–2000	1800–2000	(a).
*	*	*	*	*

(d) \* \* \*

Wavelength band	ITU Region 1	ITU Region 2	ITU Region 3	Sharing requirements see § 97.303 (paragraph)
LF	kHz	kHz	kHz	
2200 m	135.7–137.8	135.7–137.8	135.7–137.8	(a), (g).
MF	kHz	kHz	kHz	
630 m	472–479	472–479	472–479	(g).
160 m	1810–1850	1800–2000	1800–2000	(a).
*	*	*	*	*

\* \* \* \* \*

■ 18. Section 97.303 is amended by adding paragraph (g) to read as follows:

**§ 97.303 Frequency sharing requirements.**

\* \* \* \* \*

(g) *In the 2200 m and 630 m bands:*

(1) Power line carrier (PLC) systems are authorized in accordance with 47 CFR 15.113 to operate in the 9–490 kHz range on transmission lines that deliver electric power from generation plants to distribution substations. Amateur stations are restricted to use at permanent fixed locations. The transmitting antenna of amateur fixed stations must be located at a horizontal distance of least [separation distance]

km ([separation distance] mile) from any electric power transmission line. Electric power transmission lines do not include those electric lines which connect the distribution substation to the customer or house wiring.

(2) Amateur stations transmitting in the 2200 m band must not cause harmful interference to, and must accept interference from, stations authorized by the United States (NTIA and FCC) and other nations in the fixed and maritime mobile services, and for amateur stations located in ITU Region 3, this requirement also includes stations authorized by other nations in the radionavigation service. Amateur stations transmitting in the 2200 m band

must make all necessary adjustments—including temporary or permanent termination of transmission—if harmful interference is caused.

(3) Amateur stations transmitting in the 630 m band must not cause harmful interference to, and must accept interference from, stations authorized by the FCC in the maritime mobile service and stations authorized by the United States Government and other nations in the maritime mobile and aeronautical radionavigation services. In particular, amateur stations must ensure that no harmful interference is caused to the frequency 490 kHz. Amateur stations transmitting in the 630 m band must make all necessary adjustments—

including temporary or permanent termination of transmission—if harmful interference is caused.

\* \* \* \* \*

■ 19. Section 97.313 is amended by adding paragraphs (k) and (l) to read as follows.

**§ 97.313 Transmitter power standards.**

\* \* \* \* \*

(k) No station may transmit in the 2200 m band with an equivalent isotropically radiated power (EIRP) exceeding 1 W (0.61 W ERP).

(l) No station may transmit in the 630 m band with an equivalent isotropically radiated power (EIRP) exceeding 5 W (3.049 W ERP). In Alaska, stations in the

630 m band located within 800 kilometers (497 miles) of the Russian Federation may not transmit with an EIRP exceeding 1 W (0.61 W ERP).

**PART 101—FIXED MICROWAVE SERVICES**

■ 20. The authority citation for part 101 continues to read as follows:

**Authority:** 47 U.S.C. 154, 303.

■ 21. Section 101.111 is amended by revising paragraph (d) and adding paragraph (d)(5) to read as follows:

**§ 101.111 Emission limitations.**

\* \* \* \* \*

(d) *Interference to passive sensors.* These limitations are necessary to minimize the probability of harmful interference to reception in the 10.6–10.68 GHz, 31–31.3 GHz, and 86–92 GHz bands onboard space stations in the Earth exploration-satellite service (passive).

\* \* \* \* \*

(5) In the 81–86 GHz and 92–94 GHz bands, licensees of stations in the fixed service are encouraged to take all reasonable steps to ensure that unwanted emission power in any 100 MHz bandwidth in the band 86–92 GHz, measured at the antenna port, does not exceed the following levels:

Band	Maximum levels (where f in GHz is the center frequency of any 100 MHz)
81–86 GHz ...	–41–14(f–86) dBW for 86.05 ≤ f ≤ 87 GHz and –55 dBW for 87 ≤ f ≤ 91.95 GHz.
92–94 GHz ...	–41–14(92–f) dBW for 91 ≤ f ≤ 91.95 GHz and –55 dBW for 86.05 ≤ f ≤ 91 GHz.