**Before the**

**Federal Communications Commission**

**Washington, D.C. 20554**

|  |  |  |
| --- | --- | --- |
| In the Matter of  Modernizing and Expanding Access to the 70/80/90 GHz Bands | **)**  **)**  **)**  **)** | WT Docket No. 20-133 |

**ERRATUM**

**Released: April 10, 2024**

By the Managing Director and the Chief, Wireless Telecommunications Bureau:

On January 26, 2024, the Commission released a Report and Order and Further Notice of Proposed Rulemaking (*Report and Order and FNPRM*), FCC 24-16, in the above-captioned proceeding. This Erratum replaces **Appendix A** of the *Report and Order and FNPRM* with a new **Appendix A**. The new **Appendix A**, attached to this Erratum, contains non-substantive modifications to the instructional and introductory language for certain sections that are necessary to conform to the publishing conventions of the National Archives and Records Administration’s Office of the Federal Register. It also contains modifications to the codified text, including the following:

1. In sections 0.241(l) and 0.331(g), correcting the frequency ranges from “the 71–86 GHz and 81–86 GHz bands” to “the 71–76 GHz and 81–86 GHz bands.”
2. In the introductory text of section 0.331, revising the final phrase to read: “and also the functions described in paragraphs (e) through (g) of this section.”
3. In sections 0.331(g) and 101.1528(d), adding subject headings immediately following the paragraph letters, respectively, as follows: “(g) *Authority concerning review of certain proposed technologies in the 71–76 and 81–86 GHz bands*.”; and “(d) *Review of certain proposed technologies in the 71–76 and 81–86 GHz bands.*”
4. As a result of changes to **Appendix A**, cross references in paragraph 54 of the *Report and Order and FNPRM* to tables in section 101.1528(c) are updated as follows: on line 4, the cross reference is revised to “Table 3” (from “Table 1”), and on line 7, the cross reference is revised to “Table 4” (from “Table 2”).

FEDERAL COMMUNICATIONS COMMISSION

Mark Stephens

Managing Director

and

Joel Taubenblatt

Chief, Wireless Telecommunications Bureau

# APPENDIX A

**Final Rules**

For the reasons discussed in the document above, the Federal Communications Commission amends 47 CFR parts 0 and 101 as follows:

**Part 0 – Commission Organization**

1. The authority citation for part 0 continues to read as follows:

**Authority:** 47 U.S.C. 151, 154(i), 154(j), 155, 225, and 409, unless otherwise noted.

1. Section 0.241 is amended by adding paragraph (l) to read as follows:

**§ 0.241 Authority delegated.**

\* \* \* \* \*

(l) The Chief of the Office of Engineering and Technology is delegated authority, jointly with the Chief of the Wireless Telecommunications Bureau, to establish and administer a process for review of proposed technologies for point-to-endpoint-in-motion communications to aircraft and ships in the 71–76 GHz and 81–86 GHz bands to ensure compliance with the requirements adopted by the Commission.

1. Section 0.331 is amended by revising the introductory text and adding paragraph (g) to read as follows:

**§ 0.331 Authority delegated.**

The Chief, Wireless Telecommunications Bureau, is hereby delegated authority to perform all functions of the Bureau, described in § 0.131, subject to the exceptions and limitations in paragraphs (a) through (d) of this section, and also the functions described in paragraphs (e) through (g) of this section.

\* \* \* \* \*

(g) *Authority concerning review of certain proposed technologies in the 71–76 and 81–86 GHz bands.* The Chief of the Wireless Telecommunications Bureau is delegated authority, jointly with the Chief of the Office of Engineering and Technology, to establish and administer a process for review of proposed technologies for point-to-endpoint-in-motion communications to aircraft and ships in the 71–76 GHz and 81–86 GHz bands to ensure compliance with the requirements adopted by the Commission. The Chief of the Wireless Telecommunications Bureau is also delegated authority to establish and administer specific procedures to be followed for coordinating and registering aeronautical and maritime stations and their associated transmissions.

**PART 101 – FIXED MICROWAVE SERVICES**

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

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

1. Section 101.63 is amended by revising paragraph (b) to read as follows:

**§ 101.63 Period of construction; certification of completion of construction.**

\* \* \* \* \*

(b) For the 70 GHz, 80 GHz, and 90 GHz bands, the 12-month construction period will commence on the date of each registration of each individual link; adding links will not change the overall renewal period of the license. For each individual link, a licensee who commences operations within the construction period must certify in the third-party link registration database, such as those established pursuant to section 101.1523, that the link is constructed and operational. The certification must be filed within 15 days of the expiration of the applicable construction period for each individual link. If operations have begun using some, but not all, of the authorized transmitters, the certification must show to which specific transmitters it applies. After 15 days of the end of the construction period for each individual link, if the licensee has not certified that the link is constructed and operational, the third-party database managers will delete the registration from the database.

\* \* \* \* \*

1. Section 101.111 is amended by adding paragraph (a)(2)(vi) to read as follows:

**§ 101.111 Emission limitations.**

(a) \* \* \*

(2) \* \* \*

(vi)(A) In order to protect Federal Earth Exploration-Satellite Service (passive), aeronautical and maritime endpoints in motion operating in the 70 and 80 GHz bands must comply with the following limits:

(*1)* Ground-to-air transmissions shall not exceed an unwanted emission level of -38.5 dBW per 100 MHz in any portion of the 86–92 GHz passive band;

*(2)* Air-to-air, ship-to-shore, and aerostat-to-shore transmissions shall not exceed an unwanted emission level of -29.7 dBW per 100 MHz in any portion of the 86–92 GHz passive band.

(B) Any changes to system specifications, operations, or deployment scenarios for aeronautical or maritime end points in motion shall be pre-coordinated with NTIA and affected Federal agencies, and licensees of aeronautical or maritime end points in motion must cooperate fully with any updates to the required unwanted emission limits that may result from these modifications.

\* \* \* \* \*

1. Section 101.113 is amended byadding footnote 14 to the entries of “71,000 to 76,000” and “81,000 to 86,000” in the table of paragraph (a) to read as follows:

**§ 101.113 Transmitter power limitations.**

(a) \* \* \*

\14\ The EIRP limit for fixed and mobile stations used for aeronautical and maritime endpoints in motion is 57 dBW.

\* \* \* \* \*

1. Section 101.115 is amended in the table in paragraph (b)(2) by revising the entries for “71,000 to 76,000 (co-polar)”, “71,000 to 76,000 (cross-polar)”, “81,000 to 86,000 (co-polar)”, and “81,000 to 86,000 (cross-polar)” to read as follows:

**§ 101.115 Directional antennas.**

\* \* \* \* \*

(b) \* \* \*

(2) \* \* \*

**ANTENNA STANDARDS**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency (MHz) | Category | Maximum beamwidth to 3 dB points1 (included angle in degrees) | Minimum antenna gain (dBi) | Minimum radiation suppression to angle in degrees from centerline of main beam in decibels | | | | | | |
| 5° to 10° | 10° to 15° | 15° to 20° | 20° to 30° | 30° to 100° | 100° to 140° | 140° to 180° |
| \* \* \* \* \* \* \* | | | | | | | | | | |
| 71,000 to 76,000 (co‑polar)14 | N/A | 2.2 | 38 | 22 | 28 | 32 | 35 | 37 | 55 | 55 |
| 71,000 to 76,000 (cross‑polar)14 | N/A | 2.2 | 38 | 35 | 35 | 40 | 42 | 47 | 55 | 55 |
| 81,000 to 86,000 (co‑polar)14 | N/A | 2.2 | 38 | 22 | 28 | 32 | 35 | 37 | 55 | 55 |
| 81,000 to 86,000 (cross‑ polar)14 | N/A | 2.2 | 38 | 35 | 35 | 40 | 42 | 47 | 55 | 55 |
| \* \* \* \* \* \* \* | | | | | | | | | | |

\* \* \* \* \*

\14\ Antenna gain less than 50 dBi (but greater than or equal to 38 dBi) is permitted only with a proportional reduction in maximum authorized EIRP in a ratio of 2 dB of power per 1 dB of gain, so that the maximum allowable EIRP (in dBW) for antennas of less than 50 dBi gain becomes + 55-2(50-G), where G is the antenna gain in dBi. In addition, antennas in these bands must meet the following additional standard for minimum radiation suppression: At angles of less than 5 degrees from the centerline of main beam, cross-polar discrimination must be at least 21 dB.

\* \* \* \* \*

1. Effective September 1, 2024, section 101.147 is amended by adding paragraph (z)(3) to read as follows:

**§ 101.147 Frequency assignments.**

\* \* \* \* \*

(z) \* \* \*

(3) Thefollowing channel plans apply to the 71,000–76,000 MHz and 81,000–86,000 MHz bands:

(i) *250 MHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 71250 | 81250 |
| 71500 | 81500 |
| 71750 | 81750 |
| 72000 | 82000 |
| 72250 | 82250 |
| 72500 | 82500 |
| 72750 | 82750 |
| 73000 | 83000 |
| 73250 | 83250 |
| 73500 | 83500 |
| 73750 | 83750 |
| 74000 | 84000 |
| 74250 | 84250 |
| 74500 | 84500 |
| 74750 | 84750 |
| 75000 | 85000 |
| 75250 | 85250 |
| 75500 | 85500 |
| 75750 | 85750 |

(ii) *500 MHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 71375 | 81375 |
| 71875 | 81875 |
| 72375 | 82375 |
| 72875 | 82875 |
| 73375 | 83375 |
| 73875 | 83875 |
| 74375 | 84375 |
| 74875 | 84875 |
| 75375 | 85375 |

(iii) *750 MHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 71500 | 81500 |
| 72250 | 82250 |
| 73000 | 83000 |
| 73750 | 83750 |
| 74500 | 84500 |
| 75250 | 85250 |

(iv) *1 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 71625 | 81625 |
| 72625 | 82625 |
| 74125 | 84125 |
| 75125 | 85125 |

(v) *1.25 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 71750 | 81750 |
| 73000 | 83000 |
| 74250 | 84250 |

(vi) *1.5 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 71875 | 81875 |
| 74375 | 84375 |

(vii) *1.75 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72000 | 82000 |
| 74500 | 84500 |

(viii) *2.0 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72125 | 82125 |
| 74625 | 84625 |

(ix) *2.25 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72250 | 82250 |
| 74750 | 84750 |

(x) *2.5 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72375 | 82375 |

(xi) *2.75 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72500 | 82500 |

(xii) *3 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72625 | 82625 |

(xiii) *3.25 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72750 | 82750 |

(xiv) 3.5 GHz authorized bandwidth.

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 72875 | 82875 |

(xv) *3.75 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 73000 | 83000 |

(xvi) *4 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 73125 | 83125 |

(xvii) *4.25 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 73250 | 83250 |

(xviii) *4.5 GHz authorized bandwidth.*

|  |  |
| --- | --- |
| **Transmit (receive) (MHz)** | **Receive (transmit) (MHz)** |
| 73375 | 83375 |

1. Section 101.1501 is revised to read as follows:

**§ 101.1501 Service areas.**

The 70/80/90 GHz bands are licensed on the basis of non-exclusive nationwide licenses. There is no limit to the number of non-exclusive nationwide licenses that may be granted for these bands, and these licenses will serve as a prerequisite for registering individual point-to-point links. In the 71–76 GHz and 81–86 GHz bands, nationwide non-exclusive licenses also serve as a blanket license for air-to-air and ship-to-ship operations, and as a prerequisite to register ground-to-air (GTA) stations and to operate associated GTA and air-to-ground (ATG) transmissions; and as a prerequisite to register shore stations and aerostat relay stations and to operate associated ship-to-shore, shore-to-ship, shore-to-aerostat, aerostat-to-ship, and aerostat-to-shore transmissions.

1. Section 101.1507 is revised to read as follows:

**§ 101.1507 Permissible operations.**

Licensees may use the 70 GHz, 80 GHz, and 90 GHz bands for any point-to-point, non-broadcast service. Licensees may use the 70 GHz and 80 GHz bands for aeronautical and maritime service as set forth in § 101.1528. The segments may be unpaired or paired, but pairing will be permitted only in a standardized manner (*e.g.*, 71–72.25 GHz may be paired only with 81–82.25 GHz, and so on). The segments may be aggregated without limit.

1. Section 101.1523 is amended by revising paragraph (a), and adding paragraph (e) to read as follows:

**§ 101.1523 Sharing and coordination among non-government licensees and between non-government and government services.**

(a)Each individual point-to-point link must be registered in a third-party database. Registration of aeronautical ground stations, maritime shore stations, and aerostats for operation of aeronautical or maritime links to end points in motion in the 71–76 GHz and 81–86 GHz bands will be in a third-party database after the Wireless Telecommunications Bureau announces by public notice the details of the implementation of a third-party database for such links to endpoints in motion.

\* \* \* \* \*

(e) A licensee must successfully complete the requirements of this section prior to modifying the technical parameters of a registered link. Except for de minimis modifications, any change to the technical data on a link registration will result in a new interference protection date. A modification to link registration in the 71–76 GHz and 81–86 GHz bands is de minimis, and the registration will retain its existing interference protection date and not lose its existing first-in-time rights, if the modification meets all of the following criteria:

(1) The licensee certifies that the modification is necessary to repair or replace equipment specified in the registration that was constructed and operating under the registration;

(2) The modification does not increase the EIRP of a digital system or change the EIRP of an analog system;

(3) The modification does not increase the channel bandwidth;

(4) The modification does not change the power density;

(5) The modification does not increase the receiver sensitivity;

(6) The modification does not increase the antenna beamwidth;

(7) The modification does not increase the antenna gain, except where there is a corresponding reduction transmitter power so that there is no increase in EIRP;

(8) The modification does not involve a change to antenna with less off-axis attenuation at any angle; and

(9) The modification does not change any other technical parameters not mentioned in paragraphs (e)(1) through (e)(8) of this section.

1. Section 101.1528 is added to subpart Q to read as follows:

**§ 101.1528 Requirements for aeronautical and maritime links to, from, or between endpoints in motion.**

(a) *Requirements for aeronautical ground stations and endpoints in motion.*

(1) Air-to-ground transmissions are permitted only in the 71–76 GHz band.

(2) Ground-to-air transmissions are permitted only in the 81–86 GHz band.

(3) Air-to-air transmissions are permitted only between aircraft that are separated by a minimum slant path distance of 50 km.

(4) Transmissions are only permitted to and from aircraft at altitudes between 10,000 ft and 50,000 ft.

(5) Ground stations must operate with a minimum elevation angle of 5 degrees and a maximum elevation angle of 45 degrees.

(6) Ground stations must be located at least 10 km from any existing Non-Federal FSS earth station or Federal facility listed in table 4 to paragraph (c)(2) of this section, absent a coordination agreement with the FSS operator.

(7) Ground stations must be located at least 150 km from the specific Federal facilities and not within the areas listed in table 3 to paragraph (c)(1) of this section, absent a coordination agreement with the Federal operator.

(8) Ground stations must be located at least 10 km from any existing Federal or non-Federal fixed station receiver, absent a coordination agreement with the fixed station operator.

(9) Air-to-air transmissions are permitted in 81–86 GHz subject to the following limitations;

(i) EIRP signal levels radiated along a line between the airborne transmitter and the latitude and longitude of the observatories in table 3 to paragraph (c)(1) of this section, which must be maintained as the airborne transmitter moves, cannot exceed the levels shown in table 1 to this paragraph (a)(9)(i). Within the range of 150 km and 375 km, the maximum allowable EIRP levels for horizontal distances not listed in table below may be approximated by linear interpolation.

**Table 1 to Paragraph (a)(9)(i) - List of Maximum Allowable EIRP levels, in dBW**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Frequency (GHz)** | **Horizontal Distance (km)** | | | | | | | | | |
| 150 | 175 | 200 | 225 | 250 | 275 | 300 | 325 | 350 | 375 |
| 81 | -11.2 | -8.8 | -6.5 | -4.2 | -1.5 | 1.1 | 3.9 | 6.7 | 10 | 13.5 |
| 82 | -11.5 | -9.2 | -6.9 | -4.6 | -2 | 0.5 | 3.2 | 6 | 9.2 | 12.6 |
| 83 | -11.7 | -9.5 | -7.3 | -5 | -2.4 | 0 | 2.7 | 5.4 | 8.6 | 11.9 |
| 84 | -11.9 | -9.7 | -7.5 | -5.3 | -2.8 | -0.4 | 2.3 | 4.9 | 8 | 11.3 |
| 85 | -12.1 | -9.9 | -7.8 | -5.5 | -3 | -0.7 | 1.9 | 4.5 | 7.6 | 10.8 |
| 86 | -12.2 | -10 | -7.9 | -5.7 | -3.3 | -0.9 | 1.7 | 4.2 | 7.3 | 10.5 |

(ii) A licensee of aeronautical end points in motion must have a capability to target specific areas which can be added to a “block list” as part of a dynamic link management system. If air-to-air transmission within the main beam of the radio astronomy receiver cannot be avoided, air-to-air transmissions within the radio horizon of the radio astronomy site (as specified in table 2 to this paragraph (a)(9)(ii)) should not occur.

**Table 2 to Paragraph (a)(9)(ii) - Approximate Radio Horizon, in Horizontal Distance (km)**

|  |  |
| --- | --- |
| **Altitude (m)** | **Approximate Radio Horizon (km)**  **(horizontal distance)** |
| 10,360 | 375 |
| 8,000 | 315 |
| 6,000 | 260 |
| 5,000 | 220 |
| 4,000 | 180 |
| 3,000 | 125 |

(iii) The list of radio astronomy sites may be periodically updated by the NTIA and the FCC. This rule may be superseded by a coordination agreement between the licensee and NSF, in which case the coordination agreement will specify the technical restrictions.

(10) Air-to-air transmissions in the 71–76 GHz band are subject to the following restrictions:

(i) EIRP signal levels shall be limited to 20 dBW/1000 MHz towards each military installation listed in table 4 to paragraph (c)(2) of this section that is within 375 km of the airborne transmitter. This 20 dBW/1000 MHz EIRP applies to the power radiated along a line between the airborne transmitter and the latitude and longitude of the military installations in table 4 to paragraph (c)(2) of this section and must be maintained as the airborne transmitter moves. An EIRP of 57 dBW/1000 MHz is allowed in other directions. The list of military installations in table 4 to paragraph (c)(2) of this section may be periodically updated by the NTIA and the FCC. This rule may be superseded by a coordination agreement between the licensee and the Department of Defense (DoD), in which case the coordination agreement will specify the technical restrictions and allow the licensee and DoD to update the list of protected installations in the agreement. The locations of all aeronautical end-point-in-motion ground stations will be provided to NTIA and DoD as part of the coordination process.

(ii) A licensee of aeronautical end points in motion must have a capability to target specific areas which can be added to a “block list” as part of a dynamic link management system. If air-to-air transmission within the main beam of the radio astronomy receivers associated with the observatories in table 3 to paragraph (c)(1) of this section cannot be avoided, air-to-air transmissions within the radio horizon of the radio astronomy site (as specified in table 2 to paragraph (a)(9)(ii) of this section) should not occur.

(iii) The list of radio astronomy sites may be periodically updated by the NTIA and the FCC. This rule may be superseded by a coordination agreement between the licensee and NSF, in which case the coordination agreement will specify the technical restrictions.

(11) Aeronautical operators must coordinate with Federal operators and register ground-to-air stations, and must not operate such facilities or any associated air-to-ground transmissions until registration has successfully been completed.

(b) *Requirements for maritime shore stations, aerostats, and endpoints in motion.*

(1) Ship-to-shore transmissions are only permitted in the 81–86 GHz band.

(2) Shore-to-ship transmissions are only permitted in the 71–76 GHz band.

(3) Shore-to-aerostat transmissions are only permitted in the 71–76 GHz band.

(4) Aerostat-to-ship transmissions are only permitted in the 71–76 GHz band.

(5) Aerostat-to-shore transmissions are only permitted in the 81–86 GHz band.

(6) Aerostat must not operate above an altitude limit of 1000 ft.

(7) Ship-to-ship communications are limited to ships located more than 30 km offshore, or closer only where the main beam of the transmit antenna is oriented at least 15 degrees away from any point on the shore.

(8) Ship stations and aerostat stations must only operate when there is a minimum separation of 150 km to the specific Federal facilities and not within the areas listed in table 3 to paragraph (c)(1) of this section, absent a coordination agreement with the federal operator.

(9) Shore-to-ship and ship-to-shore transmission must only occur between stations that are located at least 10 km from the Federal military installations listed in table 4 to paragraph (c)(2) of this section, absent a coordination agreement with the Federal operator.

(10) Maritime operators must coordinate with Federal operators and register shore and aerostat transmitters, and must not operate such facilities or any associated ship-to-shore transmissions until registration has successfully been completed.

(c) *Protected Federal sites.*

(1) RAS and VLBA sites:

**Table 3 to Paragraph (c)(1)**

|  |  |  |
| --- | --- | --- |
| **RAS Station Name** | **North**  **Latitude** | **West**  **Longitude** |
| Arizona Radio Observatory (ARO) 12-meter | 31° 57' 11.9" | 111° 36' 53.6" |
| Green Bank Observatory | 38° 25' 59" | 79° 50' 23" |
| Very Large Array (VLA), Socorro, NM | 34° 04' 44" | 107° 37' 06" |
| Owens Valley Radio Observatory (OVRO), Big Pine, CA | 37° 14′ 02″ | 118° 16′ 55″ |
| Haystack Observatory, Westford, MA | 42° 37' 24'' | 071° 29' 18'' |
| National Radio Astronomy Observatory, Very Long Baseline Array Stations | | |
| Brewster, WA | 48° 07' 52" | 119° 41' 00" |
| Fort Davis, TX | 30° 38' 06" | 103° 56' 41" |
| Hancock, NH | 42° 56' 01" | 71° 59' 12" |
| Kitt Peak, AZ | 31° 57' 23" | 111° 36' 45" |
| Los Alamos, NM | 35° 46' 30" | 106° 14' 44" |
| Mauna Kea, HI | 19° 48' 05" | 155° 27' 20" |
| North Liberty, IA | 41° 46' 17" | 91° 34' 27" |
| Owens Valley, CA | 37° 13' 54" | 118° 16' 37" |
| Pie Town, NM | 34° 18' 04" | 108° 07' 09" |
| Saint Croix, VI | 17° 45' 24" | 64° 35' 01" |
| National Radio Quiet Zone | Rectangular area between latitudes 37°30' N and 39°15' N, and longitudes 78°30' W and 80°30' W. | |
| Next-generation Very Large Array (ngVLA) | Rectangular area between latitudes 31°22'1.9" N and 34°23'10" N, and longitudes 109°1'53.4" W and 103°4'39" W | |

(2) Military installations:

**Table 4 to Paragraph (c)(2)**

|  |  |  |
| --- | --- | --- |
| **Military Installation** | **Latitude** | **Longitude** |
| Redstone Arsenal, AL………………………………………………  Fort Huachuca, AZ………………………………………………….  Yuma Proving Ground, AZ…………………………………………  Beale AFB, CA……………………………………………………...  Camp Parks Reserve Forces Training Area, CA……………………  China Lake Naval Air Weapons Station, CA……………………….  Edwards AFB, CA…………………………………………………..  Fort Irwin, CA………………………………………………………  Marine Corps Air Ground Combat Center, CA……………………..  Buckley AFB, CO…………………………………………………...  Schriever AFB, CO………………………………………………….  Fort Gordon, GA……………………………………………………  Naval Satellite Operations Center, GU……………………………...  Naval Computer and Telecomm Area Master Station, Pacific, HI…  Fort Detrick, MD……………………………………………………  Nellis AFB, NV……………………………………………………..  Nevada Test Site, NV……………………………………………….  Tonapah Test Range Airfield, NV…………………………………..  Cannon AFB, NM…………………………………………………...  White Sands Missile Range, NM……………………………………  Dyess AFB, TX……………………………………………………...  Fort Bliss, TX……………………………………………………….  Fort Sam Houston, TX………………………………………………  Goodfellow AFB, TX……………………………………………….  Kelly AFB, TX……………………………………………………...  Utah Test and Training Range, UT…………………………………  Fort Belvoir, VA…………………………………………………….  Naval Satellite Operations Center, VA……………………………... | 34° 41' 42" N  31° 33 '18" N  33° 01' 02" N  39° 06' 41" N  34° 43' 00" N  35° 41' 05" N  34° 54′ 58″ N  35° 16' 22" N  34° 13' 54" N  39° 42' 36" N  38° 48' 12" N  33° 25' 14" N  13° 34' 55'' N  21° 31' 16" N  39° 26' 08" N  36° 14' 29" N  38° 33' 41" N  37° 47' 56" N  34° 23' 23" N  32° 56' 38" N  31° 10' 10" N  31° 48' 45" N  29° 26' 34" N  31° 26' 05" N  29° 22' 51" N  40° 12' 00" N  38° 43' 08" N  36° 34' 00'' N | 086° 39' 04" W  110° 20' 59" W  114° 15' 05" W  121° 21' 36" W  121° 54' 08" W  117° 41' 19" W  117° 56′ 07″ W  116° 41' 05" W  116° 03' 42"W  104° 45' 29"W  104° 31' 32" W  082° 09' 09'' W  144° 50' 50'' E  157° 59' 57" W  077° 25' 38" W  115° 03' 03" W  116° 42' 30" W  116° 46' 51" W  103° 19' 06" W  106° 25 '11" W  099° 41' 01" W  106° 25' 17" W  098° 26' 33" W  100° 24' 11" W  098° 34' 40" W  112° 54' 00" W  077° 09' 15" W  076° 14' 00'' W |

# 

(d) *Review of certain proposed technologies in the 71–76 and 81–86 GHz bands.* Prior to registration of any aeronautical or maritime links—to, from, or between endpoints in motion—each licensee must demonstrate, in accordance with the process to be established by the Wireless Telecommunications Bureau and Office of Engineering and Technology, *see* 47 CFR §§ 0.241(l), 0.331(g) of this title, that its technologies for point-to-endpoint-in-motion communications to aircraft and ships are capable of meeting specific technical and operating requirements set forth in this section.