PENALTIES APPLICABLE TO FEDERAL SAVINGS ASSOCIATIONS—Continued

U.S. Code citation	CMP description	Maximum penalty amount (in dollars) [8]
12 U.S.C. 1467(d)	Refusal of Affiliate to Cooperate in Examination	12,249
12 U.S.C. 1467a(r)	Late/Inaccurate Reports:	
	1st Tier	4,899
	2nd Tier	48,992
	3rd Tier	[2] 2,449,575
712 U.S.C. 1817(j)(16)	Violation of Change in Bank Control Act:	
	Tier 1	12,249
	Tier 2	61,238
	Tier 3	[2] 2,449,575
12 U.S.C. 1818(i)(2) [3]	Violation of Law, Unsafe or Unsound Practice, or Breach of Fiduciary Duty:	
	Tier 1	12,249
	Tier 2	61,238
	Tier 3	[2] 2,449,575
12 U.S.C. 1820(k)(6)(A)(ii)	Violation of Post-Employment Restrictions: Per violation	402,920
12 U.S.C. 1832(c)	Violation of Withdrawals by Negotiable or Transferable Instruments for Transfers to Third Parties: Per violation.	3,234
12 U.S.C. 1884	Violation of the Bank Protection Act	356
12 U.S.C. 1972(2)(F)	Violation of Provisions regarding Correspondent Accounts, Unsafe or Unsound Practices, or Breach of Fiduciary Duty:	
	Tier 1	12,249
	Tier 2	61,238
	Tier 3	[2] 2,449,575
15 U.S.C. 78u–2(b)	Violations of Various Provisions of the Securities Act, the Securities Exchange Act, the Investment Company Act, or the Investment Advisers Act:	
	1st Tier (natural person)—Per violation	11,524
	1st Tier (other person)—Per violation	115,231
	2nd Tier (natural person)—Per violation	115,231
	2nd Tier (other person)—Per violation	576,158
	3rd Tier (natural person)—Per violation	230,464
	3rd Tier (other person)—Per violation	1,152,314
15 U.S.C. 1639e(k)	Violation of Appraisal Independence Requirements:	
	First violation	14,069
	Subsequent violations	28,135
42 U.S.C. 4012a(f)(5)	Flood Insurance: Per violation	2,661

[8] The maximum penalty amount is per day, unless otherwise indicated.
[2] The maximum penalty amount for a federal savings association is the lesser of this amount or 1 percent of total assets.
[3] These amounts also apply to statutes that cross-reference 12 U.S.C. 1818, such as 12 U.S.C. 2804, 3108, 3349, 4309, and 4717 and 15 U.S.C. 1607, 1681s, 1691c, and 1692l.

Theodore J. Dowd,
Deputy Chief Counsel, Office of the Comptroller of the Currency.
[FR Doc. 2024–00097 Filed 1–5–24; 8:45 am]
BILLING CODE 4810–33–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA–R09–OAR–2022–0925; FRL–10943–02–R9]

Air Quality Implementation Plan; California; Great Basin Unified Air Pollution Control District; Stationary Source Permits

Correction

In Rule Document 2023–27889, appearing on pages 88255 to 88257 in the issue of Wednesday, December 21, 2023, make the following correction:

§ 52.220 Identification of plan-in part. [Corrected]

■ On page 88257, in the second column, beginning on the thirty-fifth line, the entry ''(ii)'' should read ''(i)''.
■ On the same page, in the same column, beginning on the thirty-eighth line, the entry ''(ii)'' should read ''*(1)*''.

[FR Doc. C1–2023–27889 Filed 1–5–24; 8:45 am]
BILLING CODE 0099–10–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 15

[ET Docket No. 18–295 and GN Docket No. 17–183; FCC 23–86; FR ID 190574]

Unlicensed Use of the 6 GHz Band; and Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Federal Communications Commission (Commission) builds on the 6 GHz band unlicensed rules by permitting very low power (VLP) devices in the U–NII–5 (5.925–6.425 MHz) and U–NII–7 (6.525–6.875 MHz) portions of the 6 GHz band. The Commission will limit VLP devices to low power levels and subject them to other technical and operational requirements that will permit these devices to operate across the United States while protecting incumbent licensed services that operate in the 6 GHz band from harmful interference. The Commission also takes action in a Memorandum Opinion and Order on Remand that addresses a remand from the United States Court of Appeals for the District of Columbia Circuit concerning an issue raised by television broadcasters. The Commission finds that broadcasters' unsubstantiated claims of interference in the 2.4 GHz

band do not warrant any changes to the 6 GHz rules.

DATES: This final rule is effective March 8, 2024. The *Memorandum Opinion and Order on Remand* in the **SUPPLEMENTARY INFORMATION** is effective February 7, 2024.

FOR FURTHER INFORMATION CONTACT: Nicholas Oros of the Office of Engineering and Technology, at *Nicholas.Oros@fcc.gov* or 202–418–0636.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Second Report and Order and Memorandum Opinion and Order on Remand,* ET Docket No. 18–295 and GN Docket No. 17–183; FCC 23–86, adopted on October 19, 2023 and released on November 1, 2023. The full text of this document is available for public inspection and can be downloaded at: *https://docs.fcc.gov/public/attachments/FCC-23-86A1.pdf.* Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format) by sending an email to *FCC504@fcc.gov* or calling the Commission's Consumer and Governmental Affairs Bureau at (202) 418–0530 (voice), (202) 418–0432 (TTY).

Procedural Matters

Regulatory Flexibility Act. The Regulatory Flexibility Act of 1980, as amended (RFA), requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that ''the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.'' Accordingly, we have prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in the *Second Report and Order* on small entities. The FRFA is set forth in Appendix C of the FCC document, *https://docs.fcc.gov/public/attachments/FCC-23-86A1.pdf.*

Paperwork Reduction Act. The Second Report and Order does not contain new or modified information collection requirements 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).

Congressional Review Act. The Commission has determined, and the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, concurs, that this rule is major under the Congressional Review Act, 5 U.S.C. 804(2). The Commission will send a copy of the *Second Report and Order* to Congress and the Government Accountability office, pursuant to 5 U.S.C. 801(a)(1)(A).

Accessing Materials. 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* or call the Consumer & Governmental Affairs Bureau at 202–418–0530 (voice), 202–418–0432 (tty).

Synopsis

1. As discussed in greater detail below, the Commission adopts rules to permit very low power (VLP) devices to operate with up to −5 dBm/MHz effective isotropic radiated power (EIRP) power spectral density (PSD) and 14 dBm EIRP across the U–NII–5 (5.925–6.425 MHz) and U–NII–7 (6.525–6.875 MHz) portions of the 6 GHz band. VLP devices will enable new innovative uses and will provide opportunities to enhance nascent applications, such as augmented reality/virtual reality, in-car connectivity, wearable on-body devices, healthcare monitoring, short-range mobile hotspots, high accuracy location and navigation, and automation. The rules the Commission is adopting are designed to support innovation to bring exciting new applications to market while protecting the important licensed services that operate in the 6 GHz band from harmful interference. At this time, the Commission is limiting VLP devices to the U–NII–5 and U–NII–7 bands because the technical record has mainly focused on the potential for interference to fixed microwave links which are the predominate uses of these portions of the 6 GHz band. The Commission plans on proposing to expand VLP device operation to the U–NII–6 and U–NII–8 portions of the band which support mobile operations.

A. VLP Power Levels and Protection of the Fixed Microwave Services

2. In making this decision to enable this new class of VLP unlicensed devices to operate in the 6 GHz band while protecting licensed incumbent operations from harmful interference, the Commission notes that this policy represents a careful balancing between enabling new services and protecting existing services. In response to comments reflecting incumbents' concerns regarding the potential for harmful interference as well as analysis in the record, the Commission is taking reasonable actions to minimize such potential. The Commission emphasizes the core principle from its *Policy Statement* (FCC 23–27, Apr. 21, 2023) that expresses the notion that data-driven approaches are necessary to promote co-existence. And while the *Policy Statement* generally addresses adjacent channel issues, it notes that many of the technical and policy principles articulated could be applied to co-channel spectrum sharing as well, such as the sharing scenarios in the 6 GHz band. The Commission's decision herein is consistent with its principles. In adopting rules to enable VLP devices to share the 6 GHz band, the Commission has followed this approach in anchoring its decision on an extensive technical record. The Commission recognizes the highly variable nature of the electromagnetic environment and relies on analyses that use a probabilistic approach to evaluating interference risk rather than basing our decision on worst-case examples.

3. In considering the maximum power level for VLP devices, the Commission's goal is to balance competing factors. The Commission aims to permit as much power as possible for these devices so that the maximum benefit can be derived from their operation while minimizing the potential risk of harmful interference to licensed incumbent operations. As described below, the record is replete with many analyses and tests that come to widely different conclusions. These analyses and tests provide a basis for the Commission's understanding of the potential for VLP devices to cause harmful interference under a variety of conditions. As described in detail, the Commission believes based on the technical record that it can permit at this time VLP devices to operate at up to −5 dBm/MHz power spectral density (PSD) and 14 dBm EIRP without presenting a significant risk of harmful interference to the licensed microwave incumbents that share the 6 GHz band.

1. Computer Simulations/Monte Carlo Analysis

4. In considering the technical record, the Commission finds that two computer simulations based on Monte Carlo analysis submitted by Apple, Broadcom, et al. and by Apple provide sufficient support for permitting VLP operation at up to −5 dBm/MHz EIRP power spectral density (PSD) and 14 dBm EIRP across the U–NII–5 and U–NII–7 portions of the 6 GHz band. Relying on computer simulations is in harmony with the Commission's *Policy Statement*'s directive to follow a data-driven approach to spectrum

management rather than placing dispositive weight on worst-case examples that may be rare or never occur in practice. In relying on these computer simulations, the Commission follows the path of its previous decision in adopting rules for unlicensed 6 GHz low-power indoor (LPI) devices. For the LPI rules, the Commission characterized a computer simulation submitted by CableLabs as ''the best evidence in the record of the impact that unlicensed low-power indoor devices will have on incumbent operations.''

5. A well-designed computer simulation can simultaneously model many probabilistic factors that determine whether harmful interference may occur. These factors include VLP device location variability in relation to the microwave receiver, height of the VLP device, whether the VLP device is operating co-channel, the VLP power level, and the radio propagation environment. In examining the potential for harmful interference to occur to microwave links from VLP devices, the characteristics of the microwave links must also be considered. Microwave links use highly directional antennas typically located on tall towers or building rooftops to transmit over distances up to 30 kilometers. Because of the heights of these antennas and their directional nature, VLP devices only present a harmful interference risk if they are located within the main beam of the antenna and are close enough to the microwave receiver that a strong signal can be received. One important factor to consider when modeling interference to 6 GHz microwave receivers is atmospheric multipath fading. Atmospheric multipath fading is caused when stable air masses, such as warm and humid air, lead to stratification of the atmosphere. Atmospheric multipath fades can be very deep—30 dB or more. However, deep fades are rare while more mild fades occur more frequently. For a typical link, fades greater than 30 dB occur, on average, 15 seconds a month while fades greater than 10 dB occur, on average, 37 minutes a month. Because of this fading phenomenon, 6 GHz microwave links are designed with large ''fade margins'' that are typically 25–40 dB. This fade margin provides transmitted power beyond what is needed to maintain the link when no fading is occurring. Thus, the typical microwave link can operate with 5-nines availability (99.999%) despite the presence of fading. Because the links are designed with these large fade margins, even when a VLP device is located directly within the main beam of a microwave antenna at a close enough distance where it might be possible for it to cause harmful interference, the microwave link's operation will not be degraded unless a deep enough fade occurs so that the combination of received signal from the VLP device and fade depth is greater than the link's fade margin. Thus, VLP operation during the more frequent mild fades that occur which only consume a small portion of the fade margin will present only an insignificant harmful interference risk. An examination of the interference potential of VLP devices to microwave links must consider not only the position and transmit power of the VLP devices and the technical characteristics of the microwave links, but also include the effects of fading.

6. A computer simulation submitted by Apple, Broadcom, et al. modeled the effect of VLP devices on two hundred forty-seven (247) fixed microwave links in the San Francisco area. Data from the Commission's licensing database was used to model each microwave link. For each iteration during this simulation, 1,146 VLP devices were randomly placed in the San Fransisco area where the distribution of devices was determined by the population data—*i.e.,* it was more likely that the devices were placed in areas with higher population density. The San Francisco computer simulation indicates that for VLP devices transmitting at −5 dBm/MHz EIRP PSD the probability of the interference to noise power (I/N) ratio exceeding −6 dB was 0.003% and the probability of the I/N exceeding 0 dB was 0.001% over the one million simulation iterations. The simulation specifies that the same probability of exceeding −6 dB I/N results when the VLP PSD is 1 dBm/MHz EIRP, but is correspondingly lower for −8 dBm/MHz and −18 dBm/MHz EIRP PSD levels and higher for the simulations that used 10 dBm/MHz EIRP.

7. In addition to providing statistics on the I/N ratio, the simulation also evaluated the likelihood that the microwave link's fade margin will be exceeded by the combination of the interference power received from the VLP devices and the atmospheric multipath fading. For each of the 247 microwave links in the San Francisco area, the simulation calculated the fade margin by calculating the actual carrier-to-noise (C/N) ratio for the microwave link based on the link's technical parameters and subtracting the C/N ratio needed for the link to operate at the highest data rate listed in the Commission's database for that link. The simulation then determined the probability distribution for the atmospheric multipath fading for each link using the ITU–R P.530–17 model. The simulation then calculated a distribution of the noise floor increase for each link based on the I/N statistics and convolved that with the multipath fading distribution. For VLP devices operating at powers up to 1 dBm/MHz EIRP, the results indicate that the probability of the fade margin being exceeded by the combination of the interference power received from VLP devices plus the multipath fading is not materially different than the probability of the link margin being exceeded solely from multipath fading. According to the simulation results, of the 247 links assessed in the study, the presence of VLP devices transmitting at 1 dBm/MHz EIRP at the ''worst-case'' location for a microwave link would change the probability that the worst-case link will be degraded by 0.3%.

8. The computer simulation submitted by Apple has many similarities to the San Francisco simulation. Apple's simulation modeled VLP to microwave receiver interactions in the Houston, Texas area by modeling a single microwave link while varying the VLP parameters for each simulation run based on the characteristics of microwave links that area. Two hundred twenty-four (224) VLP devices operating at 14 dBm EIRP within bandwidths varying from 20 megahertz to 320 megahertz were randomly placed within 23.49 kilometers of the microwave link on each of 10 million iterations.

9. The Houston simulation found that for VLP devices operating at −5 dBm/MHz EIRP PSD, the −6 dB I/N level was exceeded approximately 0.06% of the time and 0 dB I/N was exceeded approximately 0.01% of the time. For VLP devices operating at 1 dBm/MHz EIRP PSD, the −6 dB I/N level was exceeded approximately 0.085% of the time and 0 dB I/N was exceeded approximately 0.02% of the time. Similar to the San Francisco simulation, the Houston simulation also examined the likelihood that the microwave link's fade margin will be exceeded by the combination of the interference power received from the VLP devices and the atmospheric multipath fading. These results, which were derived for various microwave transmitter heights, show that the presence of VLP devices have no noticeable impact on microwave link reliability compared to atmospheric multipath fading alone. The simulation for the Houston area also indicated that the chance of exceeding −6 dB I/N increased from 0.07% to 0.135% when both VLP and LPI devices were included as compared to just having LPI present. Finally, this simulation also

examined the sensitivity of various inputs to the overall result. Apple claims that the results are sensitive to fixed service receiver antenna height, where higher microwave receiver antenna height above ground level results in a lower potential for impact to the microwave link and that the 35 meter antenna height assumed for the simulation represents a conservative value because such a height is significantly lower than the typical microwave receiver height in the Houston area. Likewise, Apple asserts that the assumed 44 dBi microwave receiver antenna gain and assumed ITU–R F.1245 antenna pattern do not represent typical antenna gains or antenna gain patterns and that more realistic inputs would result in the results showing a lower potential for exceeding −6 dB I/N.

10. AT&T argues that the approximate 0.1% chance that the Houston simulation indicates for the I/N to exceed −6 dB for a VLP device operating at 1 dBm/MHz EIRP PSD implies that 1,300 device deployments in the Houston area would impair the fade margin of a microwave link by more than 1 dB (*i.e.,* produce an I/N greater than −6 dB) at any given moment. This contention is based on several misunderstandings of the Houston Monte Carlo simulation. The approximately 0.1% chance of the I/N being greater than −6 dB means that on 10,000 of these 10 million iterations of the simulation, the calculated I/N at the microwave receiver from all 224 VLP devices was greater than −6 dB; the I/N contribution from any individual VLP device would be much less. As to AT&T's contention that this demonstrates a significant risk to the microwave links, this represents the likelihood that the aggregate signal from all 224 transmitting VLP devices causes the microwave link to receive a signal at greater than −6 dB I/N, which represents a 1 dB reduction in the fade margin of the link. The Commission reiterates that in the *6 GHz Order,* 85 FR 31390 (May 26, 2020), the Commission stated that it was not making a determination that a signal received at greater than −6 dB I/N would constitute ''harmful interference.''

11. These simulations examined the statistical relationship that the combination of the interference power received from VLP devices and atmospheric multipath fading could have on microwave receivers. Both the San Francisco analysis and the Houston analysis considered the summation of microwave receiver noise floor from VLP device transmissions and the occurrence of atmospheric multipath fading. Because atmospheric multipath fading and the signal levels received from the VLP devices are independent phenomenon, in accordance with a well-known statistical theorem the probability distribution of the combination of these two processes is the convolution of the probability distribution of each of the individual processes. The computer simulations used this mathematical convolution process to examine the combination of these two processes and illustrate that the presence of VLP devices does not result in a significant increase in the likelihood that the fade margin of the links will be exceeded by the combination of both atmospheric multipath fading and signals received from the VLP devices. Because the functioning of a microwave link is only interrupted when the combination of multipath fading and received VLP signals exceeds the fade margin, these results show that the presence of VLP devices will not significantly increase the potential for harmful interference to a microwave link over effects due to atmospheric fading alone.

12. AT&T claims the data on fade margin exceedance from the combination of atmospheric multipath fading and VLP devices that the San Francisco Monte Carlo simulation presents is suspect. The Commission believes that Apple, Broadcom, et al. have sufficiently explained how they calculate this data. As they explain, for each link, the available C/N ratio was calculated based on the link's transmitted power, propagation distance, receiver antenna gain, receiver feeder loss, and receiver noise figure and the required C/N ratio was calculated based on the highest order modulation for the link as indicated in the Commission's licensing data. The fade margin is simply the difference between these two C/N ratios. The probability that the fade margin for a link will be exceeded by an atmospheric multipath fade was obtained from ITU–R P.530–17. As to whether some of the link availabilities are excessively low or high, as AT&T claims, the Commission does not find the range of link availabilities indicated by the San Francisco simulation to be unrealistic. As Apple, Broadcom, and Meta indicate, there are many factors that impact the calculated availability of the microwave links. AT&T also suggests that it would be useful for the San Francisco simulation to have listed the links that appear to be more susceptible to VLP interference to help understand what they have in common. Because none of the links appear to have an increased potential for the fade margin being exceeded by the combination of multipath fading and VLP devices operating at the −5 dBm/MHz power level, the information is not necessary to reach a conclusion regarding the potential for harmful interference occurring.

13. For the Commission to have confidence in the results of computer simulations, the assumptions and models that are used must be appropriate. The Commission finds that for both the San Francisco and Houston simulations, the assumptions are not only appropriate, but also represent reasonably conservative estimates of the potential impact on microwave receivers and that using more realistic input assumptions would produce results showing even less potential impact. Nevertheless, the Monte Carlo analyses results are important as they represent an upper bound on what could be expected under real-world conditions with the actual impact likely to be much lower. To reiterate this point, the Commission discusses these assumptions.

14. Each of the simulations randomly distributed a number of VLP devices over the study area for each iteration. The Commission finds that the number of devices placed within the study area for each simulation iteration appears to be based on realistic assumptions. Both simulations assume that all simulated VLP devices will operate outdoors because indoor VLP devices are assumed to not present an interference risk to microwave links. The Commission agrees; such an assumption is consistent with its finding in the *6 GHz Order,* which adopted rules permitting LPI devices to operate with 5 dBm/MHz PSD EIRP and up to 30 dBm EIRP; at least 10 dB more than the Commission is permitting for VLP devices. The San Francisco simulation assumes that for the population within the study area, 6% of people will be outdoors, and that 25% of those people will be using VLP devices. Apple, Broadcom, et al. indicate that 6% is a realistic assumption because EPA and Department of Transportation statistics show that the average American spends 90% of the time indoors and, of the remaining 10%, 4% of the time is spent in vehicles, which leaves 6% with no attenuation of the signal from buildings or vehicles. As this assumption is based on Department of Transportation and Environmental Protection Agency statistics, the Commission finds that it is reasonable. The Commission believes that assuming 25% of people outdoors at any given time will be using a VLP device is a conservative assumption as

even if 25% of the people are simultaneously using devices, many are apt to be operating using licensed spectrum and of the devices operating on an unlicensed basis, they are likely to be spread across the various bands that support unlicensed devices (*e.g.,* U–NII bands 1–5). Apple, Broadcom, et al. acknowledge this by further stating that they assume that 90% of the devices will operate on an unlicensed basis (rather than using licensed spectrum), that 50% of unlicensed devices will be capable of using the 6 GHz band, and that of these devices capable of using the 6 GHz band, 65% will actually be using the 6 GHz band. These appear to be reasonable assumptions. In addition, they assume that VLP devices will actively transmit 2% of the time. While VLP devices are not yet deployed, the Commission finds this assumption reasonable for analytical purposes. Thus, as the number of VLP devices placed in each iteration for the San Francisco simulation appears to be based on reasonable assumptions, the Commission concludes that placing 1,146 devices per iteration was appropriate to model the interference potential of VLP devices.

15. Apple placed 224 VLP devices during each iteration for its Houston area analysis. This number was based on a set of assumptions about VLP device use appear to be reasonable. The analysis places all 224 VLP devices around a single microwave receiver resulting in a similar device density per microwave receiver for I/N computation as the 247 microwave receivers simulated in the San Francisco simulation; noting that the reported I/N for each analysis iteration is an aggregate of the individual I/Ns calculated for each device in that iteration. Even with a similar device density, the Commission finds that the fact that the Houston results show a 20 times increase in the potential for a VLP device to exceed −6 dB I/N is not cause for concern regarding an increase in the potential for actual harmful interference. The I/N probabilities calculated from the Houston analysis results from a worst-case analysis designed to ensure that any possible microwave receiver configuration is accounted for while the San Francisco analysis was predicated on the actual microwave receiver layout and characteristics from the Universal Licensing System (ULS) for that market and thus reflects a more real world analysis. Moreover, the Houston analysis assumed that every VLP device was operating co-channel with the microwave receiver. This situation is unlikely to occur under actual operating conditions. Second, the propagation models estimate clutter losses based on the mean for various statistical categories and are likely to underestimate these losses, especially in cities where tall buildings and urban canyons are likely to block signals from microwave receivers. Third, from a purely mathematical standpoint, it stands to reason that the more devices that are randomly placed around a microwave receiver, the greater the likelihood that the signal level received at the microwave receiver may exceed the interference protection criterion. However, as the Commission believes that the number of VLP devices used in each simulation run for Houston was higher than what would be reasonably expected under actual operating conditions, the Commission believes that the results similarly overestimate the actual number of devices that would exceed −6 dB I/N. And even if the results from the San Francisco and the Houston analyses represent lower and upper bounds, these percentages are sufficiently low as to pose an insignificant risk of harmful interference to microwave links. And fourth, as noted in the *6 GHz Order* and herein, −6 dB I/N is an interference protection criterion and exceeding that metric does not in and of itself represent harmful interference as microwave links are designed with significant fade margin. Lastly, many microwave links rely on multiple receive antennas that are physically separated from one another to provide spatial diversity as a method to mitigate multipath fading. This will make the receivers even more resistant to multipath fading meaning that the likelihood that the fade margin will be exceeded by the combination of fading and VLP interference is even lower than is indicated by the simulation.

16. AT&T points out that for many VLP device use cases there will be at least two and maybe more VLP transmitters exchanging data at the same location. The Commission agrees with AT&T that many VLP device use cases, such as body worn devices and mobile hotspots, involve communication between multiple VLP devices. However, only one of these devices will be transmitting at a time. Furthermore, such usage will usually involve devices located in close proximity, in many cases on the same person's body, sharing the same channel through intermittent transmissions. Thus, these multiple devices can appropriately be considered a single device within the simulation. Moreover, if multiple proximate devices communicate over different channels, then only one of the simulated devices would be co-channel with a given microwave receiver, negating it from consideration within the simulation. Therefore, the Commission does not agree with AT&T that it is necessary for multiple proximate VLP devices communicating with each other to be specifically modeled by the simulations as such use is implicitly accounted for.

17. One of the key parameters in computer simulations is the propagation model used to calculate the signal level received by the microwave receivers from the VLP devices. The Houston simulation uses the exact propagation models that the Commission specified for the automated frequency coordination (AFC) systems that manage access to 6 GHz band spectrum by standard power access points, while the San Francisco simulation departs slightly from this framework. As the Commission concluded that these models are appropriate in preventing harmful interference from standard power devices in this band, the Commission agrees that these models are appropriate for a computer simulation for VLP devices. The San Francisco simulation departs from the Commission's AFC rules. As the difference in the propagation models used in the San Francisco simulation and the Commission's AFC rules produces a more conservative result—*i.e.,* overpredict the possibility of interference—they are not only appropriate for evaluating the potential for exceeding −6 dB I/N, but also act to overprotect microwave receivers beyond the limits the Commission deems appropriate in its rules.

18. Another input modeled within the simulations was attenuation to account for ''body loss'' due to scattering and absorption from a VLP device operating on or near a body or other object (*e.g.,* a VLP device placed on a table). As VLP devices are envisioned to generally be small form factor body worn type devices or devices used in close proximity to people, this is an appropriate input for analysis. Body loss is a random variable and subject to variation due to a multitude of factors, such as whether a device is body-worn or not, what part of the body it is worn on, body type, and whether it is in a pocket. Thus, a body loss value for analytic purposes must reflect not just the body loss itself, but also the wide range of values possible, the varying behavior of VLP device users, and the variety of uses for which VLP devices may be employed. Considering the data placed on the record reflecting widely

varying levels of body loss under different conditions, as well as the general consensus among studies relied on by other regulators, the Commission finds that the computer simulations' assumptions that there would be a mean attenuation of 4 dB for body and/or clutter loss and that this would follow a gaussian distribution is appropriate. The Commission believes that this is a reasonable approach as it is in the range specified by many commenters, is consistent with the measurements made by Meta, and is consistent with what was used by the International Telecommunication Union (ITU) and the European Conference of Postal and Telecommunications Administrations' (CEPT) Electronic Communications Committee (ECC) for interference analysis. While many commenters put data on the record purporting to show losses greater than 4 dB, the Commission notes that this data also shows, in some instances, losses less than this value.

19. Because VLP devices are anticipated to be worn across a wide range of positions on the body or placed on a wide range of surfaces, the Commission believes that use of a gaussian distribution with a 4 dB mean as used by the computer simulations captures the wide range of use cases described by VLP proponents and is appropriate for analytical purposes. Gaussian distributions are commonly used to represent random processes that vary over a range such as far-field body loss. Considering that the body loss measurements submitted by Apple, Broadcom, et al. and Meta have a mean higher than 4 dB and some measured attenuations were much greater than the then 8 dB maximum of the truncated distributions used in the simulations, use of these distribution appears to be a conservative assumption. The Commission does not find merit in AT&T's criticism of the body loss distribution used by the simulations as not being justified or being ''abnormally'' truncated to plus/minus one standard deviation. While AT&T implies the distribution must be ''justified,'' it does not provide any information on what such a justification may entail or how body loss should otherwise be modeled. Use of a truncated distribution is reasonable as this prevents the distribution from unrealistically including a body loss less than 0 dB or incorporating very high body loss values (more than one standard deviation from the mean) which could be viewed as outliers and not realistic while maintaining the 4 dB mean.

20. Both computer simulations assumed that 90% of VLP devices would operate at a 1.5 meter height above ground level. As the simulations are only modeling outdoor VLP devices, the VLP devices that are at greater heights will represent use on building balconies and rooftops. The Commission agrees with Apple, Broadcom, et al. that, assuming that 10% are at heights greater than 1.5 meters appears to be a conservative assumption. For those 10% of VLP devices that are assumed to be above 1.5 meters, both simulations base the height of the device on data for building heights in the cities they are modeling. The Commission concludes that this is a reasonable approach to modeling the VLP device heights.

21. Both simulations used the ITU–R F.1245 antenna pattern to model microwave receiver antennas. This ITU recommendation provides an average antenna pattern to be used in interference assessments. AT&T criticizes the simulations for not using actual antenna patterns for the antennas specified in the Commission's licensing database and suggests that if the actual antenna patterns are not used that ''a better choice would have been to base the antenna pattern on F.699 and the FCC antenna mask in Part 101.115 as has been agreed within the WinnForum'' for the AFC specification.

22. Given that the actual antenna model is not specified for many of the microwave link licensing records in the Commission's ULS database and the added complexity of obtaining and integrating into the simulation antenna patterns for microwave links where the antenna pattern is known, the Commission appreciates why the simulations did not use actual antenna patterns. In addition, as the Houston simulation did not model specific microwave links, using a particular actual antenna pattern would have been completely arbitrary. The Commission does not believe the Monte Carlo simulations using a different antenna pattern than the WinnForum AFC specification detracts from the simulation's accuracy for two reasons. First, because ITU–R F.699 is based on the peak envelope for the side lobes it will overestimate the level of interference from signals received in the side lobes because most actual antennas will have lower side lobe gain. ITU–R F.1245, which is based on the average side lobe levels for microwave antennas, appears to be a more appropriate choice given that the purpose of a Monte Carlo simulation is to determine the typical level of interference experienced by microwave receivers and that the simulations are summing the signals received at the microwave antenna at different arrival angles from multiple VLP devices. Second, the WinnForum AFC specification appears to use a mask based on § 101.115 of the Commission's rules for the side lobes because this permits use of different levels of attenuation for different categories of microwave antennas for angles of arrival outside the main beam of the antenna. Because the goal of the AFC systems is to protect specific fixed microwave receivers from harmful interference from standard power unlicensed devices, trying to more closely match the characteristics of particular classes of antennas is important for this purpose. In a Monte Carlo simulation the goal is to obtain overall statistics on the likelihood of occurrence of harmful interference to all the microwave links rather than determining exclusion zones around specific microwave receivers. Hence, trying to match the characteristics of individual antennas is of less importance. For this purpose, the Commission believes that use of the ITU–R F.1245 pattern, which represents an ''average'' antenna pattern, is a reasonable alternative to using the actual antenna patterns or to following the approach used in the WinnForum AFC specification.

23. AT&T also criticizes the Houston simulation for not using the actual microwave link data available in the Commission's ULS licensing database and instead using different antenna heights and either a 44 dBi antenna gain or antenna gains selected from a distribution whose source was unspecified. While the San Francisco simulation used the data from the ULS for each individual link, the Houston simulation took a different, yet also valid, approach in which it simulated both the range of microwave receiver characteristics (antenna gain, antenna height, etc.) and VLP parameters over 10 million iterations to determine the probability of exceeding −6 dB I/N for any potential VLP to microwave receiver configuration. Contrary to AT&T's assertion, the parameters the Houston simulation used are based on distributions taken from the Commission's ULS licensing database for the Houston market and are based on real-world data representative of the Houston area. By choosing a microwave antenna height at the 10-percentile and a microwave antenna gain at the 90-percentile for the Houston market, the Houston simulation represents a conservative estimate of the potential for harmful interference to occur to microwave links from VLP devices in

the Houston area. While the Commission believes the more complex approach taken by the San Francisco simulation does have some advantages over the approach taken in the Houston simulation, the Houston simulation is a reasonable approach for assessing VLP device operation in the Houston market.

24. The San Francisco simulation used an antenna pattern for all VLP devices that is based on a model of consumer Wi-Fi devices developed by the CEPT SE45 working group. The Houston simulation used an antenna pattern for client devices from the ECC 302 report, which examined the interference potential of unlicensed 6 GHz devices. AT&T states that it has ''previously shown that assumptions made in simulations by [proponents of VLP devices] rely on inaccurate antenna patterns and illogical assumptions regarding [device] positioning.'' In making this broad statement, AT&T refers to its previous discussion of a Monte Carlo simulation for LPI devices conducted by CableLabs. The Commission does not believe AT&T's concerns have validity for the two simulations under consideration here. The Commission finds each of these studies provide independent grounds for its conclusions.

25. Transmit power control is another important parameter that VLP devices will use and was appropriately included in the analyses. For transmit power control the San Francisco simulation used a gaussian distribution with a mean and standard deviation of 3 dB that is truncated at 0 and 6 dB. The Houston simulation used a gaussian distribution with 7 discrete steps from 0 to 6 dB for transmit power control. The Commission believes that transmit power control is likely to be implemented for most VLP devices, such as body worn devices, to save battery power. Consequently, modeling the transmit power control as a random variable in the computer simulations is appropriate. Given the ITU resolution and ECC regulation requiring an average power reduction of 3 dB from transmit power control for U–NII–2A and U–NII–2C devices and that the Commission previously required that U–NII–2A and U–NII–2C devices have the capability for at least 6 dB transmit power control, the Commission believes that the distributions used in the San Francisco and Houston simulations are reasonable approximations for the amount of transmit power control VLP devices are likely to employ for VLP devices.

26. The Houston simulation used a noise figure of 5 dB and a feeder loss of 1.3 dB for the microwave receivers. AT&T claims that the 5 dB noise figure is ''larger than typical'' and suggests that using 4 dB for U–NII–5 and 4.5 dB for U–NII–7 microwave receivers, as in WinnForum's functional requirements document for AFC systems, would be a better choice. AT&T also claims that a 1.3 dB feeder loss may not be appropriate for all cases as many microwave radios are mounted directly to the antenna and have no feeder loss. Apple, Broadcom, and Meta have indicated that the simulation used 2 dB for waveguide feeder loss and 5 dB for the noise figure. While the Commission agrees with AT&T that the noise figure numbers from the WinnForum AFC specification would have been a better choice than the 5 dB that both simulations used, this up to 1 decibel difference is not significant enough to make an appreciable difference in the simulation results. For feeder loss, when no feeder loss is available in the Commission's ULS database and the type of microwave radio is known, WinnForum's AFC specification document indicates that a value of 3 dB be used for radios that are identified as indoor units while no feeder loss should be used for outdoor units. Hence, according to WinnForum's AFC specification, a 1.3 dB or 2 dB feeder loss would be too large for an outdoor radio and too small for indoor radio. As these simulations are designed to model the potential for harmful interference to occur to microwave links in general rather than explore the interference risk of a particular microwave receiver, the Commission believes that employing such an ''in-between'' value for feeder loss is a reasonable approach for a Monte Carlo simulation.

27. In sum, the Commission's review of Apple, Broadcom, et al.'s San Francisco Monte Carlo simulation examining the potential for VLP device interaction with microwave links and the similar Apple simulation for Houston provide a solid basis for concluding that VLP devices can coexist with incumbent services in the 6 GHz band with an insignificant potential for causing harmful interference. In fact, as noted, the Commission believes that the assumptions and thus, the results, err on the side of caution, are conservative, and overestimate the potential for any given VLP device to exceed −6 dB I/N. The worst-case operating scenario occurs when the VLP device is in the main beam of a microwave receiver, at close distance, operating co-channel to the microwave receiver, and not significantly attenuated by terrain, body loss, or blocked by buildings, which is an event that the simulations show will be a rare occurrence.

2. Power Level for VLP Devices

28. The computer simulations show virtually no impact on the microwave links even for VLP devices operating at 1 dBm/MHz EIRP PSD—the Houston and San Francisco simulations indicate that a −6 dB I/N event occurs only at either 0.06% or 0.003% of the time, respectively. The San Francisco results show an identical outcome for VLP devices transmitting at −5 dBm/MHz PSD and for the Houston simulations, a slight decrease in occurrences that −6 dB I/N may be exceeded. Thus, as a conservative initial approach for permitting VLP devices to operate in the U–NII–5 and U–NII–7 portions of the 6 GHz band, the Commission will limit them to a maximum of −5 dBm/MHz PSD EIRP and 14 dBm EIRP at this time. The Commission believes the conservative nature of the analyses resulting in extremely low probabilities for exceeding −6 dB I/N justify this approach which balances the need to provide enough power for VLP devices to ensure manufacturers can provide useful devices with the requirement to protect licensed incumbent operations from harmful interference. This approach recognizes, as pointed out by licensed incumbents, that there are locations where VLP devices operating at these power levels could result in a signal with I/N ratios that may exceed −6 dB I/N. However, Apple, Broadcom, et al. and Broadcom argue that the risk of exceeding that interference protection criterion is low at even higher power levels. Therefore, the Commission believes that it is appropriate to be conservative at this time and permit the VLP devices to operate at no more than −5 dBm/MHz EIRP PSD. The Commission also limits total EIRP to no more than 14 dBm consistent with Apple, Broadcom, et al. and other VLP proponents' comments. While there may be some worst-case locations where harmful interference is possible, the Commission finds the overall risk insignificant. In addition, because (i) the Commission is concluding that VLP devices can operate at −5 dBm/MHz EIRP PSD with an insignificant potential of causing harmful interference to incumbent operations, and (ii) VLP devices are inherently mobile, communications between two VLP devices present no more harmful interference risk than a VLP device communicating with an access point. Thus, the Commission will permit VLP devices operating at this PSD level to directly communicate with each other. The Commission is examining additional steps that it could take to provide additional power or operating

flexibility to VLP devices. However, given that no VLP devices have yet to be deployed, the Commission believes limiting operation to no more than −5 dBm/MHz EIRP PSD is appropriate at this time. Given the conservative PSD limit the Commission is adopting, we are confident that the harmful interference risk is insignificant.

29. Southern Company cautions that to the extent the Commission is relying on computer simulations to inform its decisions for the 6 GHz band, it should require the underlying algorithms used by the simulation to be disclosed to all stakeholders consistent with the Commission's *Policy Statement* on spectrum management. The Utilities Telecom Council (UTC) et al. express similar views, arguing that 6 GHz band unlicensed use proponents relied on simulation information that is not reproducible by any party and that others have not been given the opportunity to review or fully understand the data and simulation methodology. In addition to echoing these views, AT&T suggests that the Commission should require the simulation code to be released consistent with the Commission's *Policy Statement* and the practices of NTIA, which released similar software for evaluation of 3.1 GHz network deployments. Both AT&T and Southern Company also criticize the Commission for not conducting its own computer simulations and instead relying on those submitted by interested parties.

30. While Apple, Broadcom, et al. and Apple have not made their simulation code or the resulting raw data produced by the simulations publicly available, the Commission believes that they have provided sufficient information for knowledgeable engineers to understand the algorithms and models used in the simulations. Both Apple, Broadcom, et al. for the San Francisco simulation and Apple for the Houston simulation provided filings detailing the significant simulation assumptions. Apple has indicated that its simulation was prepared using the widely available and well understood Spectrum Engineering Advanced Monte Carlo Analysis Tool (SEAMCAT) simulation tool, while Apple, Broadcom, et al. indicated that its simulation was implemented using the C++ programming language using well-established Monte Carlo simulation techniques. Through these filings to the record, the Commission believes that Apple, Broadcom, et al. and Apple have provided enough technical details that engineers experienced in radio propagation modeling and coexistence analysis would be able to conduct identical simulations and obtain consistent results. Furthermore, the Commission observes that it is noteworthy that no opponents of VLP deployment have conducted their own simulations to confirm or refute the results. The Commission has no statutory obligation to conduct or commission [its] own empirical or statistical studies. The Commission therefore concludes that the results presented in the filings are adequate to inform its decision. The Commission's decision to authorize VLP devices will encourage innovative methods of using the 6 GHz band and the Commission is exercising its technical judgment in relying on the simulations from Apple, Broadcom, et al. and Apple in reaching this decision. The Commission notes that parties opposing its low-power indoor (LPI) rules raised a similar concern in a challenge to the previously adopted 6 GHz unlicensed rules in the United States Court of Appeals for the District of Columbia Circuit regarding a computer simulation conducted by CableLabs on which the Commission relied. The court rejected that challenge noting that ''requiring agencies to obtain and publicize the data underlying all studies on which they rely would be impractical and unnecessary.'' In accordance with this established precedent, the Commission finds that Apple, Broadcom, et al. and Apple provided ample information on the record such that any interested party could undertake similar analyses and that opponents' challenge on this point is meritless.

31. *Fade margin infringement.* The Fixed Wireless Communications Coalition (FWCC) expresses a strong opinion that unlicensed devices should not be permitted to infringe on the fade margin of microwave links. FWCC claims that it has ''shown that interference from unlicensed (RLAN) operations will cut into the fade margin and leave FS systems vulnerable to data loss and outages.'' FWCC claims that because adding fade margin is expensive, system designers build only the necessary minimum, with a small safety margin, and that any unlicensed interference that encroaches into a microwave link's fade margin will reduce the link reliability.

32. As the Commission stated in the *6 GHz Order* which authorized LPI devices, it ''is not required to refrain from authorizing services or unlicensed operations whenever there is any possibility of harmful interference.'' Instead, ''the Commission may authorize operations in a manner that reduces the possibility of harmful interference to the minimum that the public interest requires, and it will then authorize the service or unlicensed use to the extent that such authorization is otherwise in the public interest.'' There is no prohibition in either previous Commission decisions or legal precedents on the Commission adopting rules that permit VLP devices to occasionally infringe upon the fade margins of microwave links. Instead, the Commission's responsibility is to ensure that the operation of the VLP devices might only impose an insignificant risk of harmful interference occurring to the microwave links to the minimum that the public interest requires. The Commission believes based on the computer simulations, which take into account both the technical characteristics of actual microwave links and reasonable technical assumptions for VLP devices, that the Commission's decision is within the bounds of this principle. Furthermore, noting that the 6 GHz band is populated by both microwave licensees representing commercial and public safety interests, the Commission observes that there is no appreciable difference between the systems operated by those different entities and finds that the rules we are adopting protects both commercial and public safety microwave systems in a comparable manner. Finally, the Commission reiterates that in its recent *Policy Statement,* the Commission noted that ''zero risk of occasional service degradation or interruption cannot be guaranteed'' whether from natural events or other spectrum users.

3. Fixed Infrastructure Prohibition

33. As suggested by Apple, Broadcom, Google, and Meta, the Commission is prohibiting VLP devices from operating as part of a fixed outdoor infrastructure. The Commission notes that no commenters have opposed us adopting this prohibition. This measure is being adopted as an additional means of protecting incumbent operations to ensure that all VLP devices are subject to body and/or clutter loss, to add additional assurance that the simulation assumption that most outdoor devices will operate at 1.5 m above ground level is correct, and to force all devices to be itinerant consistent with the VLP devices simulated in the Monte Carlo analyses. Thus, VLP devices will be prohibited from attaching to outdoor infrastructure, such as poles or buildings, that would make any instances of potential interference more than fleeting. In addition, device mobility results in devices, even if remaining in a general location, constantly changing their orientation due to even subtle body movements.

Such movements can result in widely varying VLP signal levels in any given direction. Thus, the maximum VLP signal level, which is likely to be less than the maximum the Commission's rules permit for a device in the worst-case location and operating co-channel to a microwave system, may only be oriented toward a microwave receiver for a short period of time, which also serves to keep the potential for causing harmful interference to a minimum.

4. Transmit Power Control Requirement

34. The Commission is adopting a requirement that VLP devices employ a transmit power control mechanism that has the capability to operate at least 6 dB below the −5 dBm/MHz EIRP PSD level permitted for VLP devices. Both computer simulations, which the Commission have concluded is the best evidence that the potential for VLP devices to cause harmful interference is insignificant, assume that VLP devices would operate with a transmit power control mechanism with a range up to 6 dB and a mean power reduction of 3 dB. To ensure that actual VLP devices operate consistent with the simulations on which its relying, the Commission adopts this provision to provide confidence that such devices do indeed operate using transmit power control. The Commission is not placing any specific requirements in its rules as to how the VLP device transmit power control algorithm will function, but proof of such functionality must be provided with a device's application for equipment certification. The Commission does not expect that placing this transmit power control requirement will present an undue burden on device manufacturers as such functionality is routinely included in battery-powered device design to conserve battery power. In this connection, Broadcom states that transmit power control is enabled in 100% of its portable products. In addition, Apple, Broadcom, Google, and Meta jointly suggested that the Commission adopt a VLP device transmit power control requirement that would require such devices to reduce their PSD by 3 dB on average. No commenters have opposed us mandating that VLP devices employ a transmit power control mechanism. While AT&T advocates that any limitation on VLP device use that was assumed in the computer simulations, such as average power due to transmit power control, should be subject to a specific rule, the Commission notes that it's adopting a rule requiring VLP devices to have transmit power control capability to reduce power by at least 6 dB. While the exact power distribution that VLP devices will use is unknown at this time, the Commission believes this requirement is reasonable given the diversity in propagation environments in which VLP will operate.

5. Equipment Compliance and Enforcement Matters

35. Consistent with the requirements for most other unlicensed transmitters, the Commission requires 6 GHz VLP transmitters to be approved under the Commission's certification procedure. This procedure requires that the equipment be tested by an accredited laboratory and approved by a designated Telecommunication Certification Body (TCB) to ensure that the equipment complies with all requirements that the Commission is adopting, *e.g.,* maximum power (EIRP and PSD), transmit power control, contention based protocol, which are designed to ensure that the risk of harmful interference to licensed incumbent services is insignificant. As a general matter, only 6 GHz VLP devices certified as compliant by a TCB will be permitted to be imported into and marketed and operated within the United States.

36. For reasons discussed throughout the Report and Order, the Commission is confident that the risk of harmful interference to licensed incumbent services is insignificant, based on the VLP technical rules adopted herein and on the compliance measures in place under the its equipment authorization rules. The Commission also emphasizes that 6 GHz VLP devices, like other part 15 devices, are not permitted to cause harmful interference and that any such interference is actionable for enforcement purposes. Section 15.5(b) of the Commission's rules provides that ''[o]peration of an intentional, unintentional, or incidental radiator is subject to the condition[ ] that no harmful interference is caused.'' In the unlikely event that harmful interference does occur due to VLP operations, § 15.5(c) of the Commission's rules provides that ''[t]he operator of a radio frequency device shall be required to cease operating the device upon notification by a Commission representative that the device is causing harmful interference,'' even if the device in use was properly certified and configured, and that ''[o]peration shall not resume until the condition causing the harmful interference has been corrected.'' Although UTC asks the Commission to ''propose processes and procedures for the identification, reporting and resolution of interference from unlicensed operations as part of [future rulemaking],'' the Commission already have processes and procedures in place under which the Enforcement Bureau investigates complaints of harmful interference and takes appropriate enforcement action, as necessary. These processes and procedures have been effective in identifying and resolving harmful interference to licensed operations in other situations and are available for use in the 6 GHz band as well.

37. Parties that believe particular 6 GHz VLP devices are not compliant with the Commission's rules or are causing harmful interference to licensed incumbent services can contact the Enforcement Bureau, which will address any rule violations, such as impermissible operations or marketing of non-compliant devices, as appropriate.

6. Cumulative Effect of Different Classes of Unlicensed Devices

38. AT&T contends that 6 GHz unlicensed devices have been modeled under the erroneous presumption that each type of device—standard power, LPI, and VLP—can interfere with microwave links up to a threshold of −6 dB I/N, but as there is only one −6 dB I/N margin, the modeling must account for consumption of that margin by all three types of devices. AT&T points out that no computer simulation models the combined impact of all these different types of unlicensed devices. AT&T points to the CEPT computer simulation that addressed 6 GHz devices that did not include standard power devices, simulated LPI devices at a lower power level than the Commission's rules permit, and only assumed 1% of devices located outdoors as illustrating the error in the VLP proponents reasoning.

39. As the Commission stated above, typical microwave link architecture results in 6 GHz band unlicensed devices only presenting a potential interference risk if they are in the microwave antenna's main beam at a close enough distance that a signal of sufficient strength will be received. The AFC systems that control standard power access points' spectrum access will prevent those devices from operating at locations where they present a risk of causing harmful interference. Therefore, the Commission does not believe that it is necessary for unlicensed proponents to provide a study that jointly considers the potential for harmful interference from the cumulative effect of standard power devices and other types of unlicensed 6 GHz devices. Regarding VLP and LPI devices, the Commission again points out that Apple's Monte Carlo analysis

for devices operating in the Houston areas included results for the additive effect of LPI and VLP devices and concluded that the likelihood that there was no material effect on potential microwave degradation due to the presence of both the LPI and VLP devices.

7. Request for Higher Power

40. While supporting comments advocating for a 14 dBm EIRP power level, a subset of VLP device advocates point out that allowing even higher power would enable VLP devices to communicate with higher order modulation, which would enable higher throughputs and lower latencies and request that the Commission authorize up to 21 dBm EIRP. They claim that the 14 dBm EIRP power level would be insufficient for untethered augmented reality/virtual reality, remote surgery, data center wireless flyways, educational applications requiring transmitting high resolution materials, and other demanding applications. They point to the computer simulation conducted by RKF to claim that operation at this power level would not cause harmful interference to licensed stations.

41. As these commenters also support the more modest 14 dBm EIRP power level and the applications cited are more speculative than those generally cited as other use cases for VLP devices, the Commission declines to permit additional power for VLP devices at this time. The Commission also observes that devices delivering many of the cited applications, such as remote surgery, necessitate indoor operation and can be conducted under the LPI device rules that already permit more power than the Commission is permitting for VLP devices. Much of the Commission's decision is based on the computer simulations that are based on a maximum 14 dBm EIRP power level. Due to the undeveloped record on operations with up to aa 21 dBm EIRP, the Commission declines to permit VLP devices to operate at greater than 14 dBm EIRP. The Commission does not plan on seeking comment, however, on whether we can, under certain circumstances, increase the VLP power level without increasing the harmful interference risk to incumbent operations.

8. Request for Lower Power

42. The Ultra Wide Band (UWB) Alliance expresses concern that VLP devices will radiate power uniformly in all directions even though they likely only need the maximum power in a specific direction and that this will result in unnecessary interference to other receivers, including other VLP devices. To address this issue, it suggests that VLP devices meet one of two alternate power limits: (1) a −32 dBm power spectral density with a peak power of 0 dBm; or (2) a −8 dBm power spectral density that is reduced by 2 dB for every dB that the antenna gain is less than 12 dBi as well as a peak power of 14 dBm that is reduced by 2 dB for every dB that the antenna gain is less than 7 dB. The UWB Alliance also suggests that dynamic transmit power control be required for VLP devices as the power needed for on-body locations can vary from nearly free space to over 70 dB. Other commenters such as Nokia, the National Association of Broadcasters (NAB), and AT&T suggest that we only permit VLP if we limit such devices to much lower power than what the Commission proposed.

43. While several commenters request that the Commission only permits VLP devices to operate at lower power, for the reasons already articulated we decline to do so. First, the Commission concludes based on the computer simulations that VLP device operation at −5 dBm/MHz PSD will only pose an insignificant risk of harmful interference to incumbent operations. Additionally, the Commission appreciates the UWB Alliance's concern for improving spectrum efficiency and reducing the potential for interference by proposing rules that would incentivize the use of directional antennas. However, the Commission agrees with Apple, Broadcom, et al. that directional antennas are likely infeasible for small form factor portable devices, particularly when the device's orientation is constantly changing. The Commission does not believe that it would be appropriate to adopt rules that would likely make it impractical to manufacture devices for many of the proposed VLP use cases, such as small portable body-worn devices. As for the UWB Alliance's suggestion to require dynamic transmit power control, as explained above, the Commission is adopting such a requirement on VLP devices. Second, the Commission does not believe that tying the power level for VLP devices to the power levels for low-power indoor devices, as NAB and AT&T suggests, is appropriate, given the fundamental differences between these device classes. VLP devices will inherently be mobile rather than stationary like LPI access points, have smaller form factors, less efficient antennas due to the small form factors, and operate at low power levels to conserve battery. Finally, as the Commission specified in the *6 GHz Order,* ultra-wideband and wideband devices operate under part 15 unlicensed rules, and providing specific accommodations would effectively provide those devices with a level of interference protection to which they are not entitled. Consequently, the Commission believes that the −5 dBm/MHz PSD EIRP and maximum 14 dBm EIRP are appropriate and will result in widespread coexistence within the 6 GHz band among the various devices that operate there. Thus, the Commission is not persuaded to reduce VLP device utility by artificially restricting their power levels to even lower levels.

9. VLP Devices and the AFC

44. Many microwave incumbents advocate that VLP devices should be required to use an AFC system to control spectrum access based on their potential to cause harmful interference to microwave receivers. As the Commission concludes that the risk of harmful interference from VLP devices operating at −5 dBm/MHz is insignificant, the use of AFC systems to control spectrum access by VLP devices is unnecessary. Thus, the Commission sees no reason to impose such a requirement on VLP devices. While there is dispute on the record as to how much it would cost to impose AFC control on VLP devices, there clearly is some cost to imposing such a requirement without a requisite benefit. Furthermore, there will likely be some VLP devices, such as laptop computers that do not have geolocation capabilities and requiring such devices to operate under AFC control would limit the utility of the VLP rules. In addition, neither the standard power or LPI rules support the highly mobile applications envisioned for VLP devices as LPI devices are limited to indoor locations utilizing access points that are supplied power by a wired connection while standard power access points may not be mobile. The Commission does note that consistent with 6 GHz low-power indoor unlicensed devices as well as all client devices, the Commission will require VLP devices to include a contention-based protocol which will act to avoid channels on which incumbent systems are actively transmitting.

10. Link Budget Analysis

45. As discussed in more detail below, a number of commenters submitted link budget analyses that they claim show that harmful interference will result from VLP device operation. The Commission disagrees with CTIA—

The Wireless Association (CTIA), Southern Company, and others regarding the utility of link budget analysis in driving the Commission's decision regarding VLP devices. In determining whether to permit VLP devices to operate in the 6 GHz band, the controlling factor is the potential risk that VLP devices could cause harmful interference to microwave links. This is a function not just of the received power level from a VLP device at a ''worst-case'' location, but also of the likelihood that a device will be at the location at the same time that a severe enough atmospheric multipath fade occurs to overcome the microwave link's fade margin. This question is not one that a link budget analysis alone can answer. A link budget provides a calculation of the power received at a receiver at one instant of time based on deterministic quantities for quantities such as transmitted power level, propagation loss, antenna gain, polarization loss, feeder loss, etc. Such an analysis does not take into account probabilistic quantities such as multipath fading or the likelihood of a transmitting device being in a particular location or transmitting co-channel with a microwave links. One important factor that a link budget analysis cannot consider is the fact that, because the Commission is prohibiting VLP device use for fixed infrastructure purposes, the VLP devices will be mobile and will not remain in potentially problematic locations for significant periods of time. A computer simulation that takes into account the transient nature of VLP use is a better model for determining VLP device interference potential as compared to a link budget analysis. The Commission also disagrees with Southern Company's contention regarding the utility of computer simulations as the number of VLP devices reach the millions. In fact, that is exactly what Monte Carlo simulations are designed to analyze, especially when each device is subject to multiple probabilistic operating conditions. The assumptions used in the San Francisco simulation to determine the number of simultaneously transmitting devices in the San Fransisco area assumed millions of VLP devices present in that area, but that did not mean that all these devices were transmitting simultaneously co-channel. As discussed above, that simulation starts with the 13,066,000 people in the San Francisco area and calculates how many VLP devices will be simultaneously transmitting outdoors in the area based on assumptions as to how many people are outdoors, how many of these people use VLP devices, how many VLP devices are capable of using the 6 GHz band, how many VLP devices actually use the 6 GHz band, and how many VLP devices are actively transmitting at a given moment.

46. As already noted, the Commission believes that Monte Carlo analysis is the most appropriate method for evaluating the potential for VLP devices to exceed −6 dB I/N. Although the link budget analyses provided by commenters conclude that in some instances the I/N caused by a VLP device could exceed that interference protection criterion, these analyses suffer from one of the same fundamental flaws as the AT&T link budget analysis that the Commission rejected in the *6 GHz Order*—that is, they rely on worst-case scenarios that overstate the potential for harmful interference. For example, Southern Company and Edison Electric Institute (EEI) submitted link budget analyses which assumed that all VLP devices are operating in locations within the main beam of the antenna. Nokia submitted a link budget analysis in which it similarly assumed that VLP devices were operating either in buildings directly beneath a microwave receiver and at street level within line-of-sight to a 6 GHz microwave receiver. Furthermore, all the link budget analyses relied on inappropriate assumptions for certain values, such as antenna pattern mismatch, feeder line loss, and propagation model. Moreover, just the mere possibility that under certain circumstances and in certain locations an I/N may rise to a level greater than −6 dB I/N does not translate to any certainty that harmful interference will occur; several other independent factors must also simultaneously occur and the probability of those events occurring is sufficiently low to lead us to the Commission's conclusion that based on the analyses in the record, VLP devices can coexist with incumbent operations in the 6 GHz band with an insignificant risk of causing harmful interference.

11. Interference Studies

47. Several utilities filed field test measurement reports directed at quantifying LPI device interference potential on actual microwave receivers. While the focus of those studies is on LPI devices that are located indoors, some of the results do have implications for understanding the potential for VLP devices to cause harmful interference. CTIA and Southern Company jointly conducted field measurements using a signal generator to emulate both LPI and VLP devices which they claim show the emulated VLP device reduced the microwave link fade margin between 5.2 dB and 10.9 dB. For its test, Evergy used a commercially purchased LPI access point. When the result is adjusted for the power difference between LPI and VLP devices, the test indicates the I/N could be 14.5 dB for a VLP device located next to a window in a school classroom. Other electric utilities also conducted field test measurements: First Energy reports I/N ratios as high as 9.1 dB and Southern Company reports I/N ratios at high as 25.7 dB.

48. Apple, Broadcom, et al. criticize these field tests for using an indirect methodology to measure the reduction in link fade margin and estimating the I/N ratio. Apple, Broadcom, et al. claim the field test methodology is unreliable and produces inconsistent results. They also claim that the test chose worst-case locations and set the LPI access point parameters to reflect only extreme worst-case scenarios with unrealistic data rates. In addition, NCTA—The internet & Television Association (NCTA) suggests that the field test should use a metric based on the microwave link's signal to interference-plus-noise ratio S/(I+N) rather than using an I/N ratio or a reduction in fade margin as an interference metric as the S/(I+N) ratio would take into account the characteristics of the microwave link.

49. The Commission believes Apple, Broadcom, et al. and NCTA express valid points about the field test results, especially regarding the testing methodology. However, as the Commission's focus here is on the potential for VLP devices to cause harmful interference and the field tests were mainly directed to LPI devices, the Commission refrains from opining on how representative the tests are of LPI device use. As for their connection to assessing VLP interference potential, the Commission observes that they too rely on worst-case scenarios that overstate the potential for harmful interference and therefore suffer from the same flaw as the link budget analyses and as the AT&T study that was rejected in the *6 GHz Order.* The field tests purport to measure the I/N ratio at a worst-case location directly within the main beam of a microwave receiver. Furthermore, as these tests do not take into the account the fade margin designed into the microwave link and the occurrence of atmospheric multipath fading, they are of limited utility in determining the likelihood that the microwave links will actually experience harmful interference from a mobile VLP device, which by nature is unlikely to remain at any specific location or in a fixed orientation for a significant interval of time. Thus, these field tests are not

informative with respect to the impact that VLP devices could have on microwave link reliability.

12. Chain of Coincidences Rationale

50. AT&T claims that the VLP device proponents make a flawed argument in claiming that ''a chain of improbable coincidences'' is necessary for interference to occur to microwave links and ''citing indoor use, device positioning, channel overlap, body loss, RLAN antenna gain, transmit power control, fade margin and itinerant use.'' The Commission agrees with AT&T to the extent that it intimates that merely mentioning each of these factors, claiming each is unlikely, and thus deducing that harmful interference is unlikely to occur is of little utility. Consequently, while these assertions may have some merit, the Commission did not rely on them in reaching our conclusions here. Instead, the Commission's conclusions rely heavily on the San Francisco and Houston Monte Carlo simulations, which considered the respective likelihood for different factors that could impact interference potential to quantify the overall risk of harmful interference occurring to 6 GHz microwave links. Based on these analyses, the Commission concludes that the risk is insignificant.

B. Fixed Satellite Services (FSS)

51. The entire 6 GHz band is allocated for the FSS in the Earth-to-space direction. Additionally, portions of the U–NII–7 and U–NII–8 bands are allocated for FSS space-to-Earth (downlink) operations. However, there are no licensed downlink earth stations in the U–NII–7 band. Sirius XM and Globalstar were the only FSS operators to file comments in response to the *Further Notice of Proposed Rulemaking* (FNPRM), 88 FR 43502 (July 10, 2023), but these comments were limited to their operations in the U–NII–8 band.

52. In *6 GHz Order,* the Commission concluded that FSS receivers in space would not receive harmful interference from either 6 GHz standard power or LPI devices. Considering that the satellites receiving in the 6 GHz band are limited to geostationary orbits, approximately 35,800 kilometers above the equator, the Commission found that it is unlikely the relatively low power unlicensed devices would cause harmful interference to the space station receivers. The only restriction that the Commission adopted to protect the satellite receivers was to require that outdoor standard-power access points limit their maximum EIRP above a 30 degree elevation angle to 21 dBm. Because VLP devices are limited to no more than 14 dBm EIRP, for the same reasons, the Commission concludes that no restrictions on VLP devices are necessary to protect FSS Earth-to-space operations.

C. Radio Astronomy Services

53. Incumbent operations in the U–NII–7 band include several radio astronomy observatories, located in remote areas, that observe methanol spectral lines between 6.65–6.6752 GHz. To protect these radio observatories, the National Academy of Sciences' Committee on Radio Frequencies (CORF) requests that we implement exclusion zones for this band, as listed in Allocation Table footnote US385, if VLP devices are able to determine their locations. If the devices are not able to determine their locations, CORF claims that the radio observatories must be protected by notching out the VLP device's transmissions within this band.

54. When the Commission adopted the rules for 6 GHz LPI devices, it did not implement exclusion zones or require the LPI devices to notch out the 6.65–6.6752 GHz band. Because VLP devices will operate at an even lower power than LPI devices, the Commission does not expect them to create an interference problem for the radio observatories. The Commission recognizes the importance of these observations to the scientific community but, as VLP devices will not operate under the control of an AFC system and will not be required to have a geolocation capability, the Commission is not able to adopt exclusion zones around these radio observatories. The radio observatories that receive in the 6 GHz band are in remote locations, and it is unlikely that unlicensed VLP devices will be operating nearby. Furthermore, these observatories can restrict such devices from being used at their facilities. Consequently, the Commission concludes that radio astronomy operations will not be subject to harmful interference from unlicensed VLP devices. Given this conclusion, the Commission cannot justify requiring VLP devices to notch out this band as requested as this would increase device complexity and result in less efficient spectrum use.

D. Emission Mask and Out-of-Band Emission Limit

1. Limits for Very Low Power Devices in the U–NII–5 and U–NII–7 Bands

55. In the *FNPRM,* the Commission sought comment on appropriate power levels and other technical parameters that VLP unlicensed devices in the 6 GHz band should have to meet. The Commission notes that there were no comments regarding the in-band emission mask for 6 GHz VLP devices. The Commission's previous decision in the *6 GHz Order* found that the emission mask originally proposed by RKF engineering, with certain modifications, was necessary to protect incumbent microwave links and other services operating in the adjacent channel to unlicensed devices within the U–NII–5 through U–NII–8 bands. Because 6 GHz VLP devices will operate in two of these same bands and on the same channels as LPI and standard power 6 GHz devices and need to protect the same incumbent operations, the Commission finds that using the same emission mask for VLP devices as adopted for LPI and standard power devices is appropriate. As the incumbent operations' protection requirements have not changed since the Commission's previous decision for this band, using the same mask ensures that those operations are fully protected from unlicensed adjacent channel operations. Moreover, by adopting the same emission requirements, the Commission anticipates that device manufacturers will be able to take advantage of economies of scale regarding filters necessary to meet these requirements which should help to reduce costs. Finally, the Commission takes this opportunity to again point out that the emission specification it's adopting represents the minimum requirement. The Commission encourages device manufacturers, consistent with the recent Commission *Policy Statement,* to design their devices to minimize energy transmitted into adjacent channels.

56. Accordingly, the Commission is requiring emissions from VLP devices in the U–NII–5 and U–NII–7 bands to comply with the transmission emission mask adopted in the *6 GHz Order.* That is, the Commission is requiring the power spectral density to be suppressed by 20 dB at one megahertz outside of an unlicensed device's channel edge, suppressed by 28 dB at one channel bandwidth from an unlicensed device's channel center, and suppressed by 40 dB at one and one-half times the channel bandwidth away from an unlicensed device's channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between the 20 dB and 28 dB suppression levels. At frequencies between one and one and one-half times an unlicensed device's

channel bandwidth from the center of the channel, the limits must be linearly interpolated between the 28 dB and 40 dB suppression levels. Emissions removed from the channel center by more than one and one-half times the channel bandwidth, but within the U–NII–5 and U–NII–7 bands, must be suppressed by at least 40 dB.

2. Emission Limits Outside the U–NII–5 and U–NII–7 Bands

57. The Commission is adopting emissions limits at the edge of the U–NII–5 and U–NII–8 bands for VLP devices that are identical to the emissions limits that the Commission adopted in the *6 GHz Order.* Specifically, the Commission is adopting a −27 dBm/MHz EIRP limit for 6 GHz VLP devices at frequencies below the bottom of the U–NII–5 band (5.925 GHz) and above the upper edge of the U–NII–8 band (7.125 GHz), but will not require it between the sub-bands, *i.e.,* between the U–NII–5 and U–NII–6, the U–NII–6 and U–NII–7, and the U–NII–7 and U–NII–8 bands; those emissions are subject to the emission mask and out-of-band emission (OOBE) limits discussed above. These limits are intended to protect cellular vehicle-to-everything (C–V2X) operations below the 6 GHz band and Federal operations above the band. The Commission previously determined that the −27 dBm/MHz limit will sufficiently protect C–V2X operations from harmful interference from U–NII devices operating in other bands.

58. The Commission notes here that it adopted rules that require Intelligent Transportation System (ITS) licensees to cease use of the 5.850–5.895 GHz band and operate only in the 5.895–5.925 GHz band. In the *5.9 GHz Order,* 83 FR 23281 (May 3, 2021), the Commission also required that dedicated short range communications (DSRC)-based technology operating in the ITS radio service transition to C–V2X-based technology. The FNPRM, 86 FR 23323 (May 3, 2021), in that proceeding addressed transitioning all ITS operations in the revised ITS band at 5.895–5.925 GHz to C–V2X-based technology, including the appropriate timeline for the implementation and codification of C–V2X technical parameters for operation in the 5.895–5.925 GHz band. Since then, the C–V2X proponents requested and the Commission has begun granting waivers to allow immediate C–V2X deployment in the ITS bands prior to the initiation of final rules for CV2X operations.

59. Several parties support the −27 dBm/MHz EIRP emission limit, while other parties make alternative proposals. A group of VLP proponents jointly propose a compromise out-of-band emission limit that would apply at the bottom of the U–NII–5 band. Specifically, they propose that VLP devices comply with a −37 dBm/MHz out-of-band emission limit at 5925 MHz measured by root mean square (RMS) to ensure coexistence when 6 GHz devices are operating in the lowermost channels and that VLP devices prioritize operations in channels above 6105 megahertz.

60. The Commission is not convinced at this time that a more stringent out-of-band emission limit nor operational restrictions suggested by C–V2X proponents are necessary to protect in-vehicle C–V2X devices from harmful interference. The Commission already determined that standard power and LPI 6 GHz devices must comply with this same −27 dBm/MHz out-of-band emission limit and that emissions at or under that limit will protect adjacent band users from harmful interference. C–V2X devices must be designed to successfully operate in an interference-limited environment as they are subjected to co-channel and adjacent channel signals between each other that are higher than the −27 dBm/MHz out-of-band emission limit the Commission is adopting here for 6 GHz unlicensed VLP devices. C–V2X devices have to coexist with other C–V2X devices that operate in close proximity to each other, *e.g.,* other on-board units (within vehicles) and roadside units. Finally, to the extent that commenters raised concerns about harmful interference from aggregate VLP device emissions, the Commission notes that the number of such devices present in any given vehicle is anticipated to be low and because transmissions between VLP devices would occur over very short distances, the transmit power levels and their associated out-of-band emissions are expected to be well below the maximum permitted. Thus, even if multiple out-of-band emissions were aggregated, the total out-of-band emissions in the local area would still be expected to be below C–V2X device's own signal levels. The Commission also believes that maintaining the −27 dBm/MHz emission limit is appropriate in part because the rules for C–V2X operation in the 5.895–5.925 GHz band are the subject of a pending rulemaking proceeding and current C–V2X operations are pursuant to conditional rule waivers.

61. The Commission declines to adopt the −37 dBm/MHz out-of-band emissions limit suggested by some parties. However, the Commission plans on seeking additional information on the potential impact that VLP devices operating in motor vehicles could have on C–V2X performance and whether any modification of the out-of-band emission limit or other technical or operational requirements are appropriate. Likewise, the Commission finds the −60 dBm/MHz out-of-band emission limit suggested by the Alliance for Automotive Innovation (AAI) for application at the U–NII–5 band edge to be too restrictive. In addition, the Commission finds AAI's suggestion to require VLP devices to operate with a 1–2% duty cycle that is averaged over a range of tens of milliseconds is not reasonable. While duty cycle is an important parameter for system operation, the Commission typically does not make rules requiring adherence to specific duty cycle requirements as they may artificially restrict design choices and limit the applications that can be used by the American public. Similarly, the Commission declines to adopt a requirement advocated by Panasonic that VLP devices include sensing technology as it does not believe that such a complex solution is necessary to achieve the protection requirements needed for all users in the band. Moreover, any new sensing technology often requires long development cycles along with extended testing to ensure proper operation, which would only delay the benefits that VLP devices can provide.

62. As discussed above, the Commission remains convinced that the −27 dBm/MHz out-of-band emission level at the lower edge of U–NII–5 will protect C–V2X operations below 5925 MHz and adopt that level for VLP devices. This will create a consistent out-of-band limit for all 6 GHz unlicensed devices throughout the 6 GHz band.

3. Prioritization of Operations on Channels Above 6105 MHz

63. The Commission is mindful of the concerns from the auto industry regarding the potential for harmful interference to automotive safety systems operating below the U–NII–5 band. For example, the proponents of the compromise proposal propose that VLP devices prioritize unlicensed operation in channels above 6105 MHz (*i.e.,* the top edge of the first 160 megahertz wide channel in the Institute of Electrical and Electronics Engineers (IEEE) band plan) before operating below 6105 MHz and that manufacturers submit with their equipment authorization application a declaration that the equipment complies with this prioritization rule.

64. To ensure that safety of life services below the U–NII–5 band are protected from harmful interference, the Commission adopts the suggestion from the compromise proposal to require VLP devices to prioritize spectrum above 6105 MHz. The Commission disagrees with NAB that this is inconsistent with its previous decision not to exclude VLP devices from a portion of the 6 GHz band to protect electronic news gathering (ENG) operations as this requirement does not prohibit operation below 6105 MHz; it merely requires that devices seek to operate in the spectrum above that frequency first before operating below it. Although under this approach, there may be fewer VLP devices operating on the spectrum below 6105 MHz, many devices will still operate on that spectrum and the Commission does not expect abnormal concentrations of VLP devices in U–NII–6 and U–NII–8 where ENG operates as devices would still naturally spread across the available spectrum.

E. Other Matters

65. *Restrictions on Very Low Power Device Use on Aircraft, Boats, and Oil Platforms.* Because VLP access points can operate in motion, unlike standard power and LPI devices that the rules limit to stationary operation, the Commission will permit VLP devices to operate in terrestrial land-based vehicles, including cars, buses, trains, etc. The Commission will also not prohibit VLP device use on boats in contrast to its decision to prohibit standard power and LPI devices from operating on boats. That decision stemmed from a request from the National Academy of Sciences' Committee on Radio Frequencies (CORF) seeking protection for Earth Exploration Satellite Service (EESS) remote sensing operations over oceans. Given that VLP devices will operate at much lower power levels than LPI and standard power devices, and many boaters, particularly recreational boaters operate either on inland lakes and waterways or in close proximity to the coastline, the Commission does not believe that they will present an interference threat to EESS sensing over the oceans. However, the Commission plans on seeking comment on whether any restrictions should be put in place for VLP operation on boats. The Commission will continue to prohibit 6 GHz devices, including VLP devices, from operating on oil platforms because EESS operations in this band mainly include oceanic sensing, and operation of VLP devices on oil platforms could potentially interfere with passive and active sensing operations over the oceans and coastal where these oil rigs tend to be concentrated. The Commission also notes that ocean based oil platforms, are located anywhere from a few hundred meters to a few hundred miles off of the coast where EESS operations are monitoring critical data oceanographic and weather phenomenon. However, the Commission plans on seeking comment on whether this restriction should be eliminated.

66. Consistent with the Commission's decision in the *6 GHz Order* to prohibit standard power and LPI devices from operating in low flying aircraft and unmanned aircraft systems (UAS) (*i.e.,* drones), the Commission similarly prohibits such operation for VLP devices. Use on such platforms presents novel propagation paths and introduces the potential for causing harmful interference to fixed microwave receivers, which are typically located on towers and rooftops. Unlike operation that may occur outside on a balcony above ground level, operation on a low flying aircraft or UAS may not have buildings or other structures nearby to attenuate signals and thus will have a higher probability of having a line-of-sight path to an incumbent receiver location resulting in a higher potential for causing harmful interference. Hence, the Commission will apply the same aircraft restriction to VLP devices as it adopted for LPI and standard power devices. VLP devices will not be permitted on aircraft, except in large aircraft while flying above 10,000 feet. Consistent with the Commission's decision in the *6 GHz Order,* it believes that operating at those altitudes along with attenuation provided by an aircraft's fuselage will keep signal levels to such a low level at incumbents' receivers as to pose an insignificant harmful interference risk. The Commission will permit VLP devices operating on aircraft above 10,000 feet to operate across the 5.925–6.425 GHz band. This is consistent with the *6 GHz Order,* which restricted LPI operation on large aircraft flying above 10,000 feet to the U–NII–5 band to prevent harmful interference to radio astronomy and EESS operations in the U–NII–6, U–NII–7, and U–NII–8 bands. VLP devices will also not be permitted to be used for control of or communications with unmanned aircraft systems.

67. *57–71 GHz Band.* CTIA opposes expanding AFC-free VLP unlicensed operations in the 6 GHz band and instead proposes that unlicensed proponents consider the 57–71 GHz band for VLP operations. We decline to prohibit VLP device operations in the U–NII–5 and U–NII–7 portions of the of the 6 GHz band in favor of the 57–71 GHz band. The Commission's policy has been to provide as much flexibility for spectrum users—both licensed and unlicensed—to use spectrum bands that best meet their needs based on their business case and expected use cases. VLP operations are no different and, as explained in the Second Report and Order, the Commission believes that permitting VLP operations in the 6 GHz band meets that goal. The rules the Commission is adopting provides flexibility for VLP operations while still protecting authorized services from harmful interference. Furthermore, the Commission notes that the 57–71 GHz band has flexible rules for unlicensed operations and that manufacturers could develop similar devices to 6 GHz VLP devices under those rules should they determine that it is both feasible and would meet consumer demand.

68. *LPI and standard power devices as substitute for VLP.* AT&T points to claims by VLP device proponents that 90% of these devices will operate indoors to argue that VLP devices are not necessary to address the use cases purportedly supported by the VLP rules. AT&T also claims that VLP device proponents essentially concede that the burden of adding AFC capability to VLP devices would be minimal, pointing to a filing by Apple, Broadcom, Google, and Meta that discusses implementing exclusion zones for VLP devices.

69. The Commission does not agree with AT&T's rationale that if 90% of VLP use is assumed to be indoors, there is no utility in enabling outdoor VLP device operation. VLP proponents describe portable battery-powered consumer products as a primary use case for these devices, and apportioning significant battery resources to the overhead necessary to operate pursuant to an AFC could reduce utility of these devices to the point that they would be infeasible. In addition, as discussed above, the Commission disagrees with AT&T's assertion that there is no cost to implement an AFC capability in VLP devices. Adding AFC capability to these small battery-powered portable device would likely increase their complexity and, correspondingly, their cost. The Commission also agrees with Apple, Broadcom, and Meta that VLP devices will be suitable for applications that require direct communications between client devices and to support mobility that may require devices to transition between indoor and outdoor use. Therefore, the Commission finds AT&T's contention to be without merit.

70. *Rule Corrections.* The Commission is making two minor changes to § 15.407 to correct cross-references that were

inadvertently not updated when the Commission previously renumbered paragraphs in this section. Specifically, the Commission corrects the cross-reference in the introductory text of § 15.407(b) to reference paragraph (b)(10) rather than paragraph (b)(7), and the Commission corrects the cross-reference in § 15.407(l)(2)(ii) to reference paragraph (b)(7) rather than paragraph (b)(6).

F. Benefits and Cost

71. As discussed above, the Commission adopts rules to permit VLP devices to operate in the U–NII–5 and U–NII–7 portions of the 6 GHz band while protecting the licensed services that operate in the band from harmful interference. Enabling new unlicensed use types in the U–NII–5 and U–NII–7 bands will yield important economic benefits and will allow more extensive use of technologies, such as Wi-Fi and Bluetooth, by American consumers. Consumers are using more and more data, on average, and this is expected to continue to grow significantly. One report estimated that in 2021, the economic benefits associated with Wi-Fi in the United States was valued at almost $979 billion and that by 2025, 40% of Wi-Fi traffic will rely on 6 GHz. Another report estimated that making the 6 GHz band accessible to VLP devices would produce over $39 billion in economic value over five years. Even if the rules that the Commission adopts herein lead to expected benefits of 5% of $39 billion, or approximately $2 billion—a figure the Commission finds to be below the likely benefits of these rules—the expected benefits will be well in excess of the costs that we estimate.

72. Because there are presently no VLP devices in operation, the rules that the Commission promulgate does not have cost implications for the existing unlicensed device ecosystem. And because the harmful interference risk to incumbent operators is insignificant and the Commission is not imposing any specific requirements on any incumbent operator, there is also no cost implication on them. Thus, by promulgating these rules to enable VLP devices to operate in the U–NII–5 and U–NII–7 portions of the 6 GHz band, significant economic benefits will be bestowed on the American public.

Memorandum Opinion and Order on Remand

73. *Introduction.* In this order, the Commission addresses a remand from the United States Court of Appeals for the District of Columbia Circuit concerning the rules that govern the use of unlicensed devices in the 6 GHz band (*AT&T Servs., Inc.* v. *FCC,* 21 F.4th 841 (D.C. Cir. 2021)). After rejecting a number of challenges to the rules, the court of appeals remanded a single narrow issue for further consideration. Specifically, the court directed us to consider whether, in light of broadcasters' claims that they have experienced interference from unlicensed devices in the 2.4 GHz band, a portion of the 6 GHz band should be reserved for mobile broadcast operations. For the reasons set forth below, the Commission concludes that broadcasters' unsubstantiated claims of interference in the 2.4 GHz band do not warrant any modification of our 6 GHz rules.

74. *Background.* In the spring of 2020, the Commission adopted rules to make 1200 megahertz of spectrum available for use by unlicensed devices in the 6 GHz band (5.925–7.125 GHz). Several parties, including NAB, filed petitions for review of the rules in the D.C. Circuit. The court denied the petitions for review ''in all respects save one.'' The sole issue that the court remanded concerned NAB's assertion that ''after the Commission allowed unlicensed access in the 2.4 GHz band, 'a contention-based protocol . . . failed to protect . . . licensed users[,] . . . rendering that band partially unusable.' '' Based on broadcasters' concern that unlicensed devices could create similar problems in the 6 GHz band, NAB had asked the Commission to ''reserve a sliver of [the] 6 GHz band for licensed mobile [broadcast] operation.'' In the court's view, ''the Commission failed adequately to respond to [this] request'' because it ''never responded'' to NAB's concerns about interference in the 2.4 GHz band. ''Given the Commission's failure to respond'' to these concerns, the court concluded that ''further explanation is called for.'' Accordingly, the court ''remand[ed] to the Commission for it to respond to [NAB's] concerns about interference in the 2.4 GHz band.''

75. *Discussion. In* response to the court's remand, the Commission has further examined NAB's claims concerning the 2.4 GHz band, and the Commission finds that those claims lack merit. The record in this proceeding contains no concrete evidence that unlicensed Wi-Fi devices have caused harmful interference to mobile broadcast operations in the 2.4 GHz band. By contrast, the record contains concrete evidence that contention-based protocols would be effective in the 6 GHz band. Consequently, the Commission finds that NAB's claims of interference in the 2.4 GHz band do not warrant any modifications to its 6 GHz rules.

76. In a series of letters filed before the 6 GHz rules were adopted, NAB told the Commission that a contention-based protocol requirement for unlicensed devices in the 2.4 GHz band had not protected broadcasters and that this experience should lead the Commission to conclude that a contention-based protocol likewise would not protect broadcasters from harmful interference in the 6 GHz band. NAB claimed that ''the penetration of Wi-Fi has so polluted the shared portion of the 2.4 GHz band as to render it unusable for'' ENG operations. But NAB offered no specific evidence to support this broad claim. Instead, NAB cited comments filed in this proceeding by the Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS) in February 2019.

77. Although EIBASS asserted in its February 2019 comments that ''part 15 devices have a long history of causing chronic interference to TV BAS [Broadcast Auxiliary Service] operations'' on certain channels in the 2.4 GHz band, it offered only two very specific pieces of evidence regarding this claim: an unsubstantiated account of an incident that allegedly occurred in a single market more than a decade ago and a spectrum analyzer screenshot from a specific location purporting to show that Wi-Fi caused an increase in the 2.4 GHz band noise floor. EIBASS described a presentation made by the BAS frequency coordinator for Phoenix, Arizona, during a conference of broadcast engineers in April 2004. According to EIBASS, the Phoenix coordinator stated during the April 2004 presentation that ''about every six months or so,'' one of the four ENG receive-only sites in the Phoenix area ''becomes unusable'' for certain channels in the 2.4 GHz band ''because of the proliferation of 2.4 GHz WiFi devices at the site.''

78. Even if the Commission were persuaded that broadcasters in the Phoenix area had experienced interference in the 2.4 GHz band nearly two decades ago, as EIBASS claimed, this isolated incident would not convince us that the Commission needs to take additional measures that would affect the entirety of the U.S. to protect broadcasters from harmful interference in the 6 GHz band. Even assuming that harmful interference did in fact occur, the Commission has no way of verifying that Wi-Fi devices caused the problem. If the alleged interference did, in fact, occur, the Commission notes that many unlicensed part 15 non-Wi-Fi devices also operate in the 2.4 GHz band, and

those devices do not use a contention-based protocol. Similarly, industrial, scientific, and medical (ISM) devices operate on a primary basis in the 2.4 GHz band. Because EIBASS does not attribute any alleged harmful interference to any specific Wi-Fi device(s) and does not appear to consider any of the other numerous devices operating in the band without using a contention-based protocol, the Phoenix incident does not support NAB's assertion that a contention-based protocol failed to prevent interference in the 2.4 GHz band.

79. The other evidence that EIBASS provided was a spectrum analyzer screenshot that was captured at an ENG receive-only site in Phoenix in 2013. While this screenshot shows that some type of signal could have been present in the 2.4 GHz band at that time, it does not provide evidence of what devices may be causing any noise floor increase nor that a contention-based protocol would have failed to protect BAS receivers in the band. Moreover, as this screenshot is merely an indication of the spectrum at a single point in time, it offers no indication as to the behavior of a device employing a contention-based protocol when in the vicinity of a BAS transmitter in the band. Given the limited information this screenshot conveys, it provides no grounds to support NAB's assertion that a contention-based protocol had failed to prevent interference in the 2.4 GHz band.

80. Furthermore, even if the devices that EIBASS alleged were causing interference in Phoenix used a contention-based protocol, the Commission cannot determine from the sparse evidence in the record whether those devices were operating in compliance with the Commission's part 15 rules. Notably, the contention based protocol used by Wi-Fi devices is part of the IEEE 802.11 standard and not required by the Commission's rules nor do the Commission's rules limit such devices to indoor locations. Because of the lack of a Commission-mandated requirement for a contention-based protocol or indoor operation on 2.4 GHz devices, and no insight into whether devices in the Phoenix area at the time of the alleged interference were actually using such a protocol or operating indoors, it is impossible to draw any conclusions from those operations and the operations anticipated in the 6 GHz band. Thus, the alleged Phoenix incidents shed no light on the relevant question raised by NAB: that is, whether the purported experience regarding potential harmful interference to BAS devices in the 2.4 GHz band has any relevance to the potential for such interference from LPI devices in the 6 GHz band. Additionally, as an added safeguard and as several commenters note, the 6 GHz rules impose much lower power limits on unlicensed LPI devices than the 2.4 GHz rules do.

81. In contrast to NAB's unsubstantiated claims of harmful interference in the 2.4 GHz band, the record persuades us that ''the risk of harmful interference to indoor electronic news gathering receivers from indoor unlicensed devices'' in the 6 GHz band ''is insignificant.'' A study by Apple, Broadcom, et al. ''simulated the receive power level from electronic news gathering transmitters at 20 unlicensed access points operating within the U.S. House of Representatives chamber. The results of this simulation demonstrate[d] that, even at the lowest electronic news gathering transmit power level, all unlicensed access points would detect the electronic news gathering signal at greater than −62 dBm and therefore not transmit co-channel.'' This study ''confirm[ed]'' that contention-based protocols ''could be used to mitigate interference to indoor electronic news gathering receivers'' in the 6 GHz band.

82. Because the record contains no substantial evidence of harmful interference to broadcast operations in the 2.4 GHz band, the Commission finds no basis for NAB's assertion that a contention-based protocol failed to protect broadcasters from interference in that band, much less under the parameters established for operation in the 6 GHz band. As the Commission noted in the *6 GHz Order,* ''Wi-Fi devices have been deployed'' in the 2.4 GHz band ''in abundance for well over 20 years.'' For most of that time, the 2.4 GHz band was the primary band used by Wi-Fi devices. If (as NAB and others have claimed) interference from Wi-Fi devices prevented broadcasters from using portions of the 2.4 GHz band, the Commission would expect the record to reflect evidence of numerous instances of such interference. Yet apart from an unsubstantiated account of an alleged incident in Phoenix almost two decades ago and a spectrum analyzer screenshot captured in Phoenix more than a decade ago, the record contains no specific evidence that any broadcaster has experienced harmful interference from unlicensed Wi-Fi devices in the 2.4 GHz band. Moreover, neither NAB nor any other party has cited a single complaint filed with our Enforcement Bureau by any broadcaster alleging interference by unlicensed Wi-Fi devices in the 2.4 GHz band. The absence of any such complaints undermines NAB's contention that interference from unlicensed Wi-Fi devices is a serious problem for broadcasters in the 2.4 GHz band.

83. Following the remand, the Society of Broadcast Engineers (SBE) and EIBASS attempted to supplement the record by presenting new evidence of harmful interference in the 2.4 GHz band. Such evidence falls outside the scope of this remand proceeding. The narrow question presented by the court's remand is whether the Commission adequately considered NAB's concerns about interference in the 2.4 GHz band when it adopted the 6 GHz rules. In this context, the relevant record is ''the record before the agency at the time of its decision.''

84. In any event, even assuming that the new evidence proffered by SBE and EIBASS were properly before us, this evidence does not persuade us that Wi-Fi devices have caused harmful interference to broadcast operations in the 2.4 GHz band, much less at the far lower power at which Wi-Fi operations are required to operate in the 6 GHz band. SBE asserts that it conducted an ''informal survey'' in which local frequency coordinators reported ''harmful interference from Wi-Fi systems [in the 2.4 GHz band] . . . in at least 13 markets.'' But as Apple, Broadcom, et al. point out, SBE's ''informal survey'' was ''backed in most cases by no supporting evidence or incident descriptions.'' The only evidence offered by SBE to support its ''informal survey'' is a spectrum plot that purports to show interference in Milwaukee. The Commission agrees with Apple, Broadcom, et al. that this spectrum plot does not constitute ''meaningful technical evidence'' because it contains ''no supporting detail'' concerning how the measurement of interference in Milwaukee was made. In particular, the Commission notes that SBE offers ''no explanation why'' it attributes the alleged interference in Milwaukee ''to Wi-Fi, rather than to the many other technologies operating in the 2.4 GHz band that do not use a contention-based protocol.'' The same is true of EIBASS's comparison of the noise floors for mobile broadcast operations at 2 GHz and 2.5 GHz. Although EIBASS claims that part 15 Wi-Fi devices are responsible for the higher noise floor at 2.5 GHz, the higher noise floor could also be attributable to ''the many other technologies operating in the 2.4 GHz band that do not use a contention-based protocol.''

85. The post-remand submissions by SBE and EIBASS also fail to cite any complaints filed with our Enforcement

Bureau claiming that Wi-Fi devices caused harmful interference to mobile broadcast operations in the 2.4 GHz band. The absence of any such complaints casts further doubt on the assertions made by NAB and its supporters that broadcasters have routinely experienced such interference.

86. In sum, despite NAB's claims that interference issues in the 2.4 GHz band are pervasive and longstanding, the record contains no credible evidence of such interference. The specific incident of alleged interference cited in the record occurred about two decades ago in Phoenix, and it was never reported to the Commission's Enforcement Bureau. EIBASS's sketchy description of the details of that incident does not provide us with enough information to draw any firm conclusions about how—or even whether—interference occurred. The spectrum analyzer screenshot showing an increase in the noise floor in Phoenix more than a decade ago also lacks the details needed to reach a conclusion about whether harmful interference was occurring. Given the absence of any concrete evidence that broadcasters have experienced harmful interference in the 2.4 GHz band or in the 6 GHz band, where LPI devices have been operating since December 2020, and in light of the substantial record evidence demonstrating that there is no significant risk of harmful interference given the constraints under which Wi-Fi devices are required to operate in the 6 GHz band, the Commission rejects NAB's contention that broadcasters' experience with interference in the 2.4 GHz band justifies the reservation of a portion of the 6 GHz band for mobile broadcast operations.

87. *Conclusion.* For the foregoing reasons, the Commission concludes that NAB's unsubstantiated claims of interference in the 2.4 GHz band do not justify any modifications to its 6 GHz rules to provide broadcasters with further protections from harmful interference. The Commission reaffirms that the rules adopted in the *6 GHz Order* eliminate any significant risk of harmful interference to mobile broadcast operations and other incumbent licensed services in the 6 GHz band. Therefore, the Commission declines to adopt NAB's proposal to reserve part of the 6 GHz band for the exclusive use of mobile broadcast operations.

Ordering Clauses

1. Accordingly, *it is ordered,* pursuant to sections 2, 4(i), 302, and 303 of the Communications Act of 1934, as amended, 47 U.S.C. 152, 154(i), 302a, and 303, the *Second Report and Order and Memorandum Opinion and Order on Remand,* is hereby *adopted.*

2. *It is further ordered,* pursuant to sections 4(i), 4(j), 201, 302, and 303 of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), (j), 201, 302a, 303, that the *Memorandum Opinion and Order on Remand* is hereby *adopted.*

3. *It is further ordered* that the amendments of the Commission's rules as set forth in Appendix A of the *Second Report and Order are adopted,* effective 60 days from the date of publication in the **Federal Register**.

4. *It is further ordered* that the *Memorandum Opinion and Order on Remand shall become effective* thirty (30) days after publication in the **Federal Register**.

5. *It is further ordered* that the Office of the Secretary, Reference Information Center, *shall send* a copy of the *Second Report and Order* including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

6. *It is further ordered* that the Office of Managing Director, Performance Program Management *shall send* a copy of the Second Report and Order in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, 5 U.S.C. 801(a)(1)(A).

List of Subjects in 47 CFR Part 15

Communications equipment, Radio, Reporting and recordkeeping requirements.

Federal Communications Commission.

Marlene Dortch,

Secretary.

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR part 15 as follows:

PART 15—RADIO FREQUENCY DEVICES

■ 1. The authority citation for part 15 continues to read as follows:

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

■ 2. Section 15.403 is amended by adding the definition of ''Very low power device'' in alphabetical order, to read as follows:

§ 15.403 Definitions.

* * * * *

Very low power device. For the purpose of this subpart, a device that operates in the 5.925–6.425 GHz and 6.525–6.875 GHz bands and has an integrated antenna. These devices do not need to operate under the control of an access point.

■ 3. Section 15.407 is amended by:
■ a. Removing the headings from paragraphs (a)(1) and (3);
■ b. Redesignating paragraphs (a)(9) through (12) as paragraphs (a)(10) through (13);
■ c. Adding a new paragraph (a)(9);
■ d. Revising paragraphs (b) introductory text, (c), and (d)(1);
■ e. Removing and reserving paragraph (d)(2);
■ f. Revising paragraph (d)(6);
■ g. Adding paragraphs (d)(8) through (10); and
■ h. Revising paragraph (l)(2)(ii).

The revisions and additions read as follows.

§ 15.407 General technical requirements.

(a) * * *

(9) For very low power devices operating in the 5.925–6.425 GHz and 6.525–6.875 GHz bands, the maximum power spectral density must not exceed −5 dBm e.i.r.p in any 1-megahertz band and the maximum e.i.r.p must not exceed 14 dBm.

* * * * *

(b) *Undesirable emission limits.* Except as shown in paragraph (b)(10) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

* * * * *

(c) *Transmission discontinuation requirement.* The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. The provisions in this paragraph (c) are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how the requirement in this paragraph (c) is met.

(d) * * *

(1) Operational restrictions include:

(i) *Oil platforms.* Operation of standard power access points, fixed client devices, very low power devices, and indoor access points in the 5.925–7.125 GHz band is prohibited on oil platforms.

(ii) *Land vehicles.* Operation of standard power access points, fixed client devices, and indoor access points in the 5.925–7.125 GHz band is prohibited on vehicles (*e.g.,* cars, trains).

(iii) *Boats.* Operation of standard power access points, fixed client

devices, and indoor access points in the 5.925–7.125 GHz band is prohibited on boats.

(iv) *Aircraft.* Standard power access points, fixed client devices, very low power devices, and indoor access points in the 5.925–7.125 GHz band are prohibited from operating on aircraft, except that very low power devices and indoor access points are permitted to operate in the 5.925–6.425 GHz bands in large aircraft while flying above 10,000 feet.

(v) *Unmanned aircraft systems.* Operation of transmitters in the 5.925–7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

* * * * *

(6) All U–NII transmitters, except for standard power access points, operating in the 5.925–7.125 GHz band must employ a contention-based protocol.

* * * * *

(8) Very low power devices may not employ a fixed outdoor infrastructure. Such devices may not be mounted on outdoor structures, such as buildings or poles.

(9) Very low power devices must prioritize operations on frequencies above 6.105 GHz prior to operating on frequencies between 5.925 GHz and 6.105 GHz.

(10) Very low power devices operating in the 5.925–6.425 and 6.525–6.875 GHz bands shall employ a transmit power control (TPC) mechanism. A very low power device is required to have the capability to operate at least 6 dB below the maximum EIRP power spectral density (PSD) value of −5 dBm/MHz.

* * * * *

(l) * * *

(2) * * *

(ii) The AFC system must use −6 dB I/N as the interference protection criteria in determining the size of the adjacent channel exclusion zone, where I (interference) is the signal from the standard power access point or fixed client device's out of channel emissions at the fixed microwave service receiver and N (noise) is background noise level at the fixed microwave service receiver. The adjacent channel exclusion zone must be calculated based on the emissions requirements of paragraph (b)(7) of this section.

* * * * *

[FR Doc. 2023–28006 Filed 1–5–24; 8:45 am]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 648

[Docket No. 221223–0282; RTID 0648–XD631]

Fisheries of the Northeastern United States; Summer Flounder Fishery; Quota Transfer From North Carolina to Connecticut

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Temporary rule; quota transfer.

SUMMARY: NMFS announces that the State of North Carolina is transferring a portion of its 2023 commercial summer flounder quota to the State of Connecticut. This adjustment to the 2023 fishing year quota is necessary to comply with the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP) quota transfer provisions. This announcement informs the public of the revised 2023 commercial quotas for North Carolina and Connecticut.

DATES: Effective January 5, 2024.

FOR FURTHER INFORMATION CONTACT: Laura Deighan, Fishery Management Specialist, (978) 281–9184.

SUPPLEMENTARY INFORMATION: Regulations governing the summer flounder fishery are found in 50 CFR 648.100 through 648.111. These regulations require annual specification of a commercial quota that is apportioned among the coastal states from Maine through North Carolina. The process to set the annual commercial quota and the percent allocated to each state is described in § 648.102 and final 2023 allocations were published on January 3, 2023 (88 FR 11).

The final rule implementing Amendment 5 to the Summer Flounder FMP, as published in the **Federal Register** on December 17, 1993 (58 FR 65936), provided a mechanism for transferring summer flounder commercial quota from one state to another. Two or more states, under mutual agreement and with the concurrence of the NMFS Greater Atlantic Regional Administrator, can transfer or combine summer flounder commercial quota under § 648.102(c)(2). The Regional Administrator is required to consider three criteria in the evaluation of requests for quota transfers or combinations: (1) the transfer or combinations would not preclude the overall annual quota from being fully harvested; (2) the transfer addresses an unforeseen variation or contingency in the fishery; and (3) the transfer is consistent with the objectives of the FMP and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The Regional Administrator has determined these three criteria have been met for the transfer approved in this notification.

North Carolina is transferring 30,000 pounds (lb; 13,608 kilograms (kg)) to Connecticut through a mutual agreement between the states. This transfer was requested to ensure Connecticut would not exceed its 2023 quota. The revised summer flounder quotas for 2023 are North Carolina, 3,001,074 lb (1,361,264 kg), and Connecticut, 953,031 lb (432,288 kg).

Classification

NMFS issues this action pursuant to section 305(d) of the Magnuson-Stevens Act. This action is required by 50 CFR 648.102(c)(2)(i) through (iv), which was issued pursuant to section 304(b), and is exempted from review under Executive Order 12866.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: January 3, 2024.

Everett Wayne Baxter,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2024–00149 Filed 1–5–24; 8:45 am]

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