



FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 2, 15, 90, and 95

[ET Docket No. 19-138; FCC 20-164; FR ID 17510]

Use of the 5.850-5.925 GHz Band

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Federal Communications Commission (Commission) adopts revised rules to repurpose the lower 45 megahertz of the 5.850-5.925 GHz band (5.9 GHz band) for the expansion of unlicensed mid-band spectrum operations, while retaining the upper 30 megahertz of spectrum in the 5.9 GHz band for intelligent transportation system (ITS) operations. Splitting the 5.9 GHz band between unlicensed and ITS uses is intended to optimize use of the spectrum resources in the 5.9 GHz band to fully and effectively serve the American people, providing access to additional spectrum for unlicensed use to help meet the growing demand for wireless broadband, while retaining spectrum for ITS use to meet current and future ITS needs within the transportation and vehicular-safety related ecosystem. The Commission modified the *First Report and Order* and *Order of Proposed Modification* released on November 20, 2020, with an Erratum released on December 11, 2020. The Commission released a Second Erratum on February 9, 2021. The corrections from these errata are included in this document.

DATES: Effective [INSERT DATE 60 DAYS AFTER DATE OF FEDERAL REGISTER

PUBLICATION], except for § 90.372, which is delayed indefinitely. The Commission will publish a document in the **Federal Register** announcing the effective date for § 90.372. The incorporation by reference of certain publications listed in the rules is approved by the Director of the Federal Register as of [INSERT DATE 60 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION].

FOR FURTHER INFORMATION CONTACT: Jamie Coleman, Chief, Spectrum Policy Branch, Office of Engineering and Technology, at (202) 418-2705 or Jamie.Coleman@fcc.gov. For information regarding the PRA information collection requirements contained in this PRA, contact Nicole Ongele, Office of Managing Director, at (202) 418-2991 or Nicole.Ongele@fcc.gov.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *First Report and*

Order and Order of Proposed Modification, ET Docket No. 19-138, FCC 20-164, adopted November 18, 2020, and released November 20, 2020. This document is available by downloading the text from the Commission's web site at <https://docs.fcc.gov/public/attachments/FCC-20-164A1.pdf>. When the FCC Headquarters reopens to the public, the full text of this document also will be available for public inspection and copying during regular business hours in the FCC Reference Center, 45 L Street, NE, Washington, DC 20554. 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).

Final Regulatory Flexibility Analyses

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.” As required by the RFA, an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Notice of Proposed Rulemaking (NPRM)* (85 FR 6841, Feb. 6, 2020). The Commission sought written public comment on the proposals in the *NPRM*, including comments on the IRFA. No comments were filed addressing the IRFA. Accordingly, the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in this *First Report and Order* on small entities. This present FRFA conforms to the RFA.

Paperwork Reduction Act

The requirements in § 90.372 constitute new or modified collections subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. They will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. OMB, the general public, and other Federal agencies will be invited to comment on the new or modified information collection requirements contained in this proceeding. In addition, the Commission notes that, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), the Commission previously sought, but did not receive, specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. The Commission describes impacts that might affect small businesses, which includes more businesses with

fewer than 25 employees, in the FRFA.

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 this *First Report and Order* and *Order of Proposed Modification* to Congress and the Government Accountability Office pursuant to 5 U.S.C. 801(a)(1)(A).

Synopsis

I. INTRODUCTION

1. To help meet the burgeoning demand for wireless broadband as the American public and businesses increasingly rely on Internet connectivity, the Commission continuously evaluates spectrum use and its rules in efforts to enable more efficient spectrum use through a variety of methods, including authorizing unlicensed operations. For the past two decades, the entire 75 megahertz that makes up the 5.9 GHz band has been reserved for use by Dedicated Short Range Communications (DSRC) in the ITS radio service for transportation and vehicle safety-related purposes. During that time, the DSRC-based service has evolved slowly and is being used in certain traffic-related projects but has not been widely deployed within the consumer automobile market. In short, DSRC-based ITS has not lived up to the original promise of achieving the ITS goals identified when the spectrum was allocated – leaving valuable mid-band spectrum underused.

2. Meanwhile, numerous technologies that operate outside the 5.9 GHz band have been or are being developed and deployed to improve transportation safety and efficiency and provide certain services envisioned for DSRC. Recently, Cellular Vehicle-to-Everything (C-V2X) based technology, which uses a different radio technology standard that is incompatible with DSRC-based operations, has gained momentum as a means of providing transportation and vehicle safety-related communications. On December 12, 2019, the Commission adopted the *NPRM* in this proceeding to consider the most efficient and effective use of the 5.9 GHz band spectrum.

3. In the *First Report and Order*, the Commission adopted rules to authorize unlicensed use in the lower 45 megahertz of the band (5.850-5.895 GHz) and retain the upper 30 megahertz of the band

(5.895-5.925 GHz) for ITS service applications. As of the effective date of the *First Report and Order*, unlicensed indoor operations are permitted in the 5.850-5.895 GHz portion of the 5.9 GHz band, under specified power and other technical limitations designed to protect incumbent ITS service and federal radar operations from harmful interference. The Commission decided to consider requests for unlicensed outdoor operations in the 5.850-5.895 GHz band through the Commission's existing regulatory process for individualized and temporary access to spectrum, to be coordinated with the National Telecommunications and Information Administration (NTIA) to ensure that federal incumbents are protected from harmful interference. The Commission implemented a period of one year from the effective date of the *First Report and Order* for the ITS licensees to transition all operations into the 5.895-5.925 GHz portion of the band, and issued an *Order of Proposed Modification* that provides the procedures under section 316 of the Communications Act for the Commission to modify all ITS licenses to the revised bandplan. The Commission further adopted rules designating C-V2X technology as the ITS delivery system once the Commission adopts a deadline and the transition to the revised ITS band is complete. Pending resolution of the transition of ITS operations to C-V2X, ITS licensees will be able to continue their DSRC-based operations or, alternatively, to seek to deploy C-V2X-based operations through the Commission's existing regulatory processes.

II. DISCUSSION

A. Dividing the 5.9 GHz Band for Unlicensed Operations and for ITS

4. Since the Commission first designated the 5.9 GHz band for ITS services in 1999, transportation and vehicular safety-related technologies have evolved significantly, as have demands for access to mid-band spectrum, particularly for unlicensed operations. In the *First Report and Order*, the Commission found the public interest would be best served by dividing the 5.9 GHz band to address the needs of both ITS and unlicensed users. Based on its evaluation of these changed circumstances, the Commission determined that reconfiguring the 5.9 GHz band to designate 45 megahertz (at 5.850-5.895 GHz) for new unlicensed use and retaining 30 megahertz (at 5.895-5.925 GHz) for ITS applications would ensure the quickest path towards the most efficient and effective use of the 75 megahertz of spectrum, based on current and future needs.

5. *Unlicensed Operations in the Lower 45 Megahertz of the 5.9 GHz Band.* As proposed in

the *NPRM*, the Commission decided to make the 45 megahertz at 5.850-5.895 GHz available for unlicensed operations. The Commission found that the availability of spectrum for unlicensed use is more critical than ever, especially after the COVID pandemic has increased reliance on unlicensed technologies like Wi-Fi as more households turn to in-home connectivity for distance learning, teleworking, and social networking. The Commission found the lower 45 megahertz (5.850-5.895 GHz) portion of the 5.9 GHz band is particularly valuable for unlicensed operations, which, when added to the adjacent spectrum available for Unlicensed National Information Infrastructure (U-NII) devices below 5.850 GHz, will allow for increased high-throughput broadband unlicensed applications in spectrum that is a core component of today's unlicensed ecosystem.

6. Based on the record, the Commission also found unlicensed use in the lower 45 megahertz of the 5.9 GHz band likely would be available to American consumers shortly after the rules in this proceeding become effective. Software or firmware upgrades to much of the Wi-Fi equipment already deployed and operating would allow consumers to access the 5.9 GHz band relatively quickly, a benefit that would not be possible in any other band.

7. *Safety-Related ITS in the Upper 30 Megahertz (5.895-5.925 GHz) of the 5.9 GHz Band.* Based on its consideration of the record, the Commission decided to continue making the upper 30-megahertz portion (5.895-5.925 GHz) of the 5.9 GHz band available for ITS. The Commission determined that this decision would ensure availability of enough spectrum for ITS licensees to continue existing operations and deploy those same services at scale. The Commission concluded, as supported by many commenters, that continuing to reserve the entire 5.9 GHz band for possible additional services by ITS licensees would not be the most efficient or effective use of the band, nor was it in the best public interest to do so. The Commission agreed with commenters' assertions that the original concept for DSRC use of the band had not come to fruition, and changes to the 20+ year old band plan were essential to maximizing the use of this spectrum for the public's greatest well-being, particularly Americans in rural areas that lack adequate broadband access.

8. *30 megahertz for ITS.* The Commission determined to retain 30 megahertz of spectrum for ITS services based on the following factors: (1) the failure of the 5.9 GHz band to be used ubiquitously for the broad range of ITS applications that were originally anticipated; (2) the strong public

interest benefits that would accrue by allowing unlicensed use in 45 megahertz of the 5.9 GHz band; and (3) the need for dedicated 5.9 GHz spectrum to support core vehicular safety applications. Although ITS proponents preferred that the Commission continue to allocate the entire 75 megahertz of the 5.9 GHz band for ITS, the Commission agreed with the commenters contending that 30 megahertz of spectrum is the appropriate amount of spectrum for ITS in the band. Based on the record, the Commission found that 30 megahertz would support the provision of the core vehicle-safety related ITS functions foreseen when the Commission originally provided for ITS services in the band, including for vehicle-to-vehicle (V2V) basic safety applications such as basic safety messages, for personal safety message applications, and for vehicle-to-infrastructure (V2I) applications.

9. The record demonstrated that with 30 megahertz, incumbent licensees would be able to provide on a widescale basis the same types of ITS services that, up until now, have been developed and deployed on a limited basis, and would preserve ITS licensees' ability to expand their existing safety-related services to millions more vehicles. The Commission found that 30 megahertz also would be sufficient for the basic safety applications of the next generation of ITS – C-V2X; it agreed with assertions in the record that with this 30 megahertz of spectrum made available for C-V2X-based ITS, automakers, technology providers, and service providers would be able to effectively use the spectrum for vehicle safety-related applications. Furthermore, the Commission decided that ITS services in the 5.9 GHz band should not duplicate information (e.g., important roadway information) that is already readily available via other sources, such as commercial cellular services, nor should excess 5.9 GHz spectrum continue to be reserved for applications that can be or have already been provided using other spectrum bands or alternative technology.

10. The Commission was not persuaded that more than 30 megahertz is needed for potential new applications that extend beyond the types of safety-related services currently being offered by DSRC licensees pursuant to the Commission's rules, especially given that the 75 megahertz in the 5.9 GHz band has been underused for many years. DSRC service has not been widely deployed, potential future advanced applications are still under development and have not been deployed, and widespread commercial deployment would at best still be years away, if it occurs at all. The Commission found that the quickest, most efficient way to realize its goals of greater spectrum efficiency was to divide the band

into two separate spectrum segments rather than subjecting the band to additional testing to determine appropriate sharing techniques. Furthermore, the Commission found that preserving 30 megahertz for ITS use in the 5.9 GHz band would comport with the use many other countries have designated for this band and allow global harmonization. It found that each jurisdiction appears to have made an individual policy choice that it has determined to be most appropriate for its circumstances, and that there are potential harmonization benefits in retaining some dedicated spectrum for ITS in this frequency range, particularly in the upper 20 megahertz. The Commission concluded that its plan to introduce C-V2X in the band, in conjunction with other administrations' support for such use within the 5.9 GHz band, should facilitate economies of scale in the production and deployment of equipment and, ultimately, provision of the core safety functions originally contemplated for the band.

11. The Commission disagreed with ITS proponents who insisted that the entire band be preserved for future ITS developments that could make use of the entire 75 megahertz in the 5.9 GHz band and that argued that more than 30 megahertz should be reserved to accommodate future advanced ITS safety-related services that are under development. Given the significant advances that have been made in automotive connectivity using a variety of means in different spectrum bands outside of 5.9 GHz, an ever-greater portion of the overall valuable spectrum resource is being used to support automotive-related functions, including those related to safety. Viewed from this perspective, the Commission was not persuaded by arguments that the entire 5.9 GHz band is needed for ITS in order to ensure that possible future developments can be accommodated, even if it is possible that such future developments could potentially provide some additional safety benefits. In summary, the Commission concluded that although it is possible that ITS might ultimately make use of the entire 75 megahertz if it continued to be set aside for ITS, such a decision would not optimize use of this valuable spectrum, and the credibility of such arguments was lacking given that these same arguments have been advanced by ITS proponents for years with no discernable change in the marketplace. The Commission believed that the ITS messaging system must work to prioritize and deliver messages more efficiently in the 30 megahertz that will be available for ITS, such as by adjusting message timing to provide multiple types of messages on a single channel to provide the same level of safety to vehicles as can be done on the existing spectrum. Finally, the Commission concluded that targeting the upper 30 megahertz for ITS use (and transitioning that spectrum

to C-V2X over time) will enable the United States to lead in the wireless sector as it has in others, since it was not aware of any widespread ITS deployments that use the full 75 megahertz that proponents say is needed to maintain U.S. leadership, and it appears the United States is not the only country where the long-time promises of ITS have failed to bear fruit.

12. *Transitioning ITS out of the 5.850-5.895 GHz Portion of the 5.9 GHz Band.* The Commission adopted rules providing up to one year from the effective date of the *First Report and Order* for ITS services to cease operating in the 5.850-5.895 GHz band. Based on the record, the Commission decided that this is a sufficient and reasonable amount of time for ITS licensees to take the necessary steps to transition from the lower 45 megahertz of spectrum and to engage in the same types of operations in the upper 30 megahertz that they were conducting in the band, since there have only been limited ITS deployments with relatively few installed transmitters. The Commission concluded that because the majority of the installed base was being used in trials for roadside units (RSUs) at known locations, it should be simple to identify and modify that equipment. Furthermore, the Commission did not expect its decision to delay the introduction of on-board units (OBUs) since, under normal vehicle development cycles, it would expect at least two years before such equipment could be deployed in vehicles in large numbers. The Commission concluded that its action would accommodate the needs of incumbent licensees and provide sufficient time to consolidate their operations in the upper portion of the band, while enabling unlicensed system operators to begin taking advantage of the 5.850-5.895 GHz portion of the band with indoor deployments as soon as possible. The Commission directed the Wireless Telecommunications Bureau (WTB) to automatically remove all frequencies in the 5.850-5.895 GHz portion of the band that remain on any ITS license (individually licensed RSUs and OBUs that are licensed-by-rule) at a reasonable time after the transition deadline.

13. The Commission added a notification requirement consistent with the transition deadline of one year from the effective date of the *First Report and Order* as a condition on ITS part 90 licenses. This condition requires licensees to certify by that deadline that they have ceased operating in the 5.850-5.895 GHz portion of the band. Any licensee that does not transition to the upper 30 megahertz of spectrum in the 5.895-5.925 GHz segment of the 5.9 GHz band, as evidenced by failure to file the required notification advising the Commission of its transition, will have their license terminated

automatically without specific Commission action. The Commission directed the WTB to establish the procedural requirements of the notification process via Public Notice. The Commission found that the notification requirement would ensure clearing of the lower 45 megahertz of spectrum and provide transparency to all stakeholders regarding the status of the band.

14. The Commission revised its rules to prohibit new ITS applications for the 5.850-5.895 GHz portion of the 5.9 GHz band. The Commission did not terminate any license or any licensee's renewal expectancy and found that this transition plan treats each licensee in a consistent manner. The Commission directed the WTB to modify the existing license freeze consistent with the decisions it adopted to allow licensees to register new RSUs to operate only within the modified ITS band of 5.895-5.925 GHz. Licensees may, at any time prior to the end of the one-year transition period, modify their currently existing RSU location registrations on their own motion to delete frequency usage in the lower 45 megahertz, so that the remaining RSU registrations on their licenses would reflect only the 5.895-5.925 GHz frequencies. By no later than the transition date, licensees are required to cease all operations in the 5.850-5.895 GHz, including portable RSUs not subject to registration requirements, as any ITS operation in the band on or after that date would violate the Commission's rules and the terms of the modified licenses. Existing ITS licensees that currently operate on channels in the 5.850-5.895 GHz portion of the 5.9 GHz band may move any of their DSRC-based operations to channels in the 5.895-5.925 GHz portion of the band at any time before they are required to cease operations in the 5.850-5.895 GHz portion.

15. The Commission declined to adopt a specific mechanism for funding the transition because it did not propose a compensation mechanism in the *NPRM*, and thus did not provide parties an adequate opportunity to comment on such a mechanism.

B. Unlicensed Operations in the 5.850-5.895 GHz Band

16. As proposed in the *NPRM*, the Commission designated 45 megahertz in the 5.850-5.895 GHz portion of the 5.9 GHz band (the U-NII-4 band) for unlicensed operations to expand the unlicensed ecosystem by providing additional spectrum adjacent to the upper edge of the 5.725-5.850 GHz (U-NII-3) band for unlicensed devices. Based on its review of the pertinent technical and legal issues and an examination of the record, the Commission adopted a staged approach to effectuate the band-repurposing

actions taken. To optimize use of the 5.850-5.895 GHz band by unlicensed operations as soon as possible with full consideration of the need to protect ITS and federal incumbent operations in this band, the Commission permitted immediate indoor unlicensed operations to operate across the entire 5.850-5.895 GHz portion of the 5.9 GHz band. The Commission limited unlicensed use to indoor operations in recognition of the potential that ITS licensees may currently be operating in portions of the 5.850-5.895 GHz band in particular geographic areas, as well as the need to protect federal incumbents operating in particular geographic zones in the 5.850-5.895 GHz band. The Commission declined to allow full-power unlicensed outdoor operations at this time. Instead, such use across the band will be allowed at a later time, after ITS operations have ceased to operate in the 5.850-5.895 GHz band and after the Commission has adopted rules that will ensure protection of federal operations from these outdoor operations.

17. *Technical and Operational Rules for Unlicensed Operations – Indoor Unlicensed Operations to Protect Federal Incumbents and ITS Operations while ITS Remains in the 5.850-5.895 GHz Band.* As proposed in the *NPRM*, the Commission placed the U-NII-4 band (5.850-5.895 GHz) unlicensed device rules in part 15, subpart E along with the existing U-NII rules and subject to all the general part 15 operational principles. Based on NTIA's analysis and recommended equivalent isotropically radiated power (EIRP) spectral density limit of 20 dBm/MHz to protect federal radar operations in the 5.850-5.895 GHz band, for unlicensed operations in the 5.850-5.895 GHz band, the Commission limited indoor access point EIRP spectral density to 20 dBm/MHz with a maximum EIRP of 36 dBm over the bandwidth of operation (e.g., 33 dBm/20 MHz and 36 dBm/40 MHz). The Commission determined that when the U-NII-4 band was combined with U-NII-3 band spectrum, indoor access point EIRP can scale to 36 dBm for 80 and 160 megahertz channels. Under this framework, operators relying on indoor U-NII-4 devices will be able to operate at the highest power levels the Commission permits for U-NII devices (i.e., 36 dBm EIRP) using wider channels to maximize throughput and utility of the band. At the same time, the limit on power spectral density across all possible U-NII device bandwidths will ensure that Department of Defense (DoD) radars and ITS operations are protected from harmful interference. The Commission concluded that the 20 dBm/MHz EIRP spectral density limit it was adopting for unlicensed operations in the 5.850-5.895 GHz band to protect incumbent federal operations would similarly protect DSRC-based V2V and V2I operations in the band from co-channel harmful

interference during the transition period.

18. In response to the NTIA's suggestions to further reduce the potential for harmful interference to federal radar operations in the band, the Commission adopted rules to ensure that indoor use only devices are not deployed outdoors. Specifically, the Commission required that indoor access point devices cannot be weather resistant; that access points have integrated antennas, or otherwise prohibit the capability of connecting other antennas to the devices, which will prevent substituting higher gain directional antennas and make the devices less capable or suitable for outdoor use; and prohibited these access points from operating on battery power (except for back-up power in case of a power outage). It also required that the access points be marketed for indoor use only and include a label attached to the equipment and included in the device's user manual stating that "FCC regulations restrict operation to indoor use only." The Commission found that these requirements would make outdoor operations impractical and unsuitable.

19. The Commission also permitted devices such as Wi-Fi extenders and mesh networking equipment intended to work in conjunction with an indoor access point, referred to as subordinate devices in the Commission's rules, to operate at the same power levels as an indoor access point, provided that they comply with all of the requirements the Commission set forth for those devices (i.e., the device cannot be weather resistant, must have an integrated antenna and cannot have the capability of connecting other antennas, cannot be capable of operating on battery power, and must include a label regarding proper usage) and the end unit obtains its own equipment certification. Under these requirements, modules do not qualify for higher power. Such devices may be used as part of a mesh network but may only be used within a single structure and not to connect separate buildings or structures. The Commission believed that such relief was a reasonable accommodation to keep most popular consumer devices less complex and more affordable without increasing the potential of harmful interference to incumbent licensees as these devices would be installed and used in manner analogous to an access point. To keep the potential for causing harmful interference low, the Commission required client devices to operate under the control of an access point, and limited client device's power spectral density and maximum transmit power to 6 dB below the power permitted for the access point.

20. *Out-of-Band Emissions (OOBE) Limits.* Based on support in the record, the Commission

imposed the same level of OOB protection from U-NII-4 devices that it had previously adopted for U-NII-3 devices. However, in doing so, it took advantage of building attenuation, as well as other factors, to provide flexibility and maximum utility to American consumers. Specifically, the Commission adopted indoor unlicensed device OOB limits of 15 dBm/MHz at 5.895 GHz, decreasing linearly to -7 dBm/MHz at 5.925 GHz for U-NII-4 devices, or devices that operate across a single channel that spans the U-NII-3 and U-NII-4 bands. The record supported these protection levels, which are the same as the current OOB limits for U-NII-3 devices after accounting for building attenuation. The Commission was not persuaded that the more restrictive OOB limits suggested by ITS proponents were needed to protect DSRC operations since those limits were more restrictive than the U-NII-3 OOB limits, which the Commission previously affirmed would protect DSRC operations and have proven to be effective for protection of incumbent operations in the 5.9 GHz band. The Commission also adopted its proposal to apply the existing U-NII-3 OOB limits at the lower edge of the U-NII-3 band for U-NII-4 devices, or devices that operate across a single channel that spans the U-NII-3 and U-NII-4 bands. The Commission concluded that these limits would protect adjacent-band ITS operations from harmful interference due to unlicensed operations in the U-NII-4 band while also supporting separate U-NII-3 and U-NII-4 bands, and would provide flexibility to design U-NII-3 equipment under the less stringent OOB rules at the upper edge of the band as well as for devices to operate across the U-NII-3 and U-NII-4 bands using the widest channel bandwidths permitted under the IEEE 802.11p-2010 standard.

21. The IEEE 802.11p-2010 standard referenced in this rulemaking is formally known as: IEEE Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 6: Wireless Access in Vehicular Environments. The standard specifies the extensions to IEEE Std. 802.11 for wireless local area networks (WLANS) providing wireless communications while in a vehicular environment and describes the functions and services that allow an IEEE 802.11(TM)-compliant device to communicate directly with another such device outside of an independent or infrastructure network. The standard provides valid type and subtype combinations, to/from distribution system combinations in data frames, time advertisement frame body, element IDs, default enhanced distributed channel access parameter set

for station operation if dot11OCEnabled is true, encoding of the timing capabilities field, optional enhanced receiver performance requirements, management information base attribute default values/ranges, emissions limits sets, behavior limits sets, transmit power level by regulatory domain, and spectrum mask data for 10 megahertz channel spacing. Other provisions include orthogonal frequency division multiplexing specifications for the 5 GHz band, frame formats, and the medium access control sublayer functional description.

22. *Measurement Procedures.* Consistent with its decision in *Unlicensed Use of the 6 GHz Band, Report and Order*, 85 FR 31390 (May 26, 2020) (*6 GHz Report and Order*) that the OOB limit adopted to protect adjacent *ITS* services at the top of the 5.9 GHz band should be verified using a root mean square (RMS) detector or other appropriate techniques for measuring average power, the Commission decided that an RMS detector may be used to conduct 5.9 GHz unlicensed device OOB measurements. The Commission concluded that because RMS measurements represent the continuous power being generated from a device, as opposed to peak power, which may only be reached for short periods of time, an RMS measurement is more appropriate for ensuring that U-NII devices' potential for causing harmful interference to adjacent-band operations is significantly minimized. The Commission stated that it would provide guidance on this procedure to the test labs and telecommunications certification bodies which conduct equipment approval measurements and equipment approval oversight.

23. *Outdoor Unlicensed Operations.* Although the Commission decided not to permit across the board outdoor unlicensed operations in the 5.850-5.895 GHz portion of the 5.9 GHz band before *ITS* operations move out of the band, it decided to allow limited outdoor unlicensed operations in certain specified locations in the band through either the special temporary authority or other existing regulatory processes where such operations would not cause harmful interference to any incumbent operations.

24. *Protection of Other Incumbents in the 5.850-5.895 GHz Band.* The Commission declined to adopt SES Americom's and Intelsat's suggestion for an aggregate power limit from unlicensed devices to be enforced through use of an Automatic Frequency Coordination (AFC) system to protect Fixed Satellite Service space station receivers from harmful interference. The Commission believed that because the space station receivers are limited to geostationary orbits, approximately 35,800 kilometers above the equator, it was unlikely that relatively low-powered unlicensed devices would cause harmful

interference to the space station receivers, especially since such devices are not expected to radiate significant power skyward. The Commission also believed that U-NII devices operating in the U-NII-4 band would not cause harmful interference to amateur operations in the 5.9 GHz band due to the relatively low power with which U-NII devices would operate as compared to amateur stations, which are permitted to operate with as much as 1.5 kW (62 dBm) peak envelope power. The Commission dismissed amateur commenters' concerns the Commission was reallocating the spectrum from the Amateur Service to unlicensed operations as beyond the scope of the proceeding, since part 15 devices do not operate pursuant to an allocation, and in any case, the Commission did not propose to remove the Amateur Service allocation from the 5.9 GHz band.

C. ITS in the 5.895-5.925 GHz Band

25. To promote the most effective use of the upper 30 megahertz of spectrum in the 5.9 GHz band, the Commission determined that the ITS service should be based on use of one technology, and concluded that C-V2X technology would provide the best means of achieving its goals for ITS in the coming years. In the *First Report and Order*, the Commission provided technical flexibility to enable ITS licensees currently using DSRC-based technology to operate in this 30-megahertz ITS band until the time ITS services must operate using C-V2X technology. Because the Commission believed that many, if not most, of the active ITS licensees would want to transition to C-V2X technology as soon as possible to speed development and deployment of ITS services, it decided to permit, through its waiver process, the deployment of C-V2X technology during the transition period in a manner that would not interfere with existing DSRC-based operations.

26. *ITS Operations using C-V2X Technology.* Based on consideration of the technology-related issues in the record, including the advantages of both DSRC and C-V2X, the Commission concluded that the public interest would be best served by adopting C-V2X as the sole ITS delivery technology and phasing out the existing DSRC technology. In making this decision, the Commission observed that DSRC had not enjoyed widespread deployment as the mandated ITS technology in the U.S. At the same time, momentum both domestically and globally appears to be shifting toward the use of C-V2X for ITS. International deployment and uses of DSRC remain in flux and many automakers and developers are moving toward C-V2X. China has adopted C-V2X in lieu of DSRC, and the European

Union is exploring whether to implement policies to create a path for C-V2X Direct deployment in Europe. By designating C-V2X for ITS delivery, the Commission concluded that the U.S. is positioning itself as a global leader to be at the forefront of continued C-V2X technology development as it becomes more globally harmonized.

27. The Commission stated that the following factors advocated in the record shaped its view: C-V2X Direct technology outperforms DSRC on reliability, range, and resilience to interference, which in turn will help improve non-line-of-site capabilities to promote safety benefits; during times of peak congestion, C-V2X functionality can offload less time-critical V2V, V2I, and vehicle-to-pedestrian communications to the cellular network, thereby supporting safety-critical communications; C-V2X is better for achieving network effects insofar as cost efficiencies support deployment on a more accelerated basis; new vehicles are now generally equipped with C-V2X network mode chipsets; C-V2X technology can leverage cellular networks and thereby reduce the infrastructure cost associated with deploying vehicle-to-everything (V2X) communications; and because C-V2X operates on both 20- and 10-megahertz channels, it could support throughput throughout the 30 megahertz of spectrum that would be available.

28. The Commission concluded that choosing C-V2X as the sole ITS connected vehicle technology in the U.S. is the best decision for promoting more robust ITS deployment in the 5.9 GHz in the coming years. While each technology has the capability of providing safety-related ITS services, the Commission was persuaded that C-V2X promises a more efficient and effective use of the spectrum through its ability to achieve greater network effects and leverage cellular networks to reduce infrastructure costs. The Commission was not convinced that the limited examples of recent DSRC deployments in other countries outweighed the U.S. automotive industry's focus on deploying C-V2X technology, or that those limited deployments portended a significant growth in DSRC deployments here in the U.S. The Commission was confident that its action would expedite and expand the deployment of ITS safety benefits while ensuring efficient use of spectrum.

29. The Commission rejected claims by the Institute for Policy Innovations that ITS was an idea whose time has passed and that vehicle connectivity was not critical to potential automotive safety benefits. The Commission reasoned that by reducing the size of the ITS band, future ITS deployment

could be focused on deploying critical vehicular safety applications and take its position as part of a larger framework of technology solutions currently available to make road travel safer for the American people. The Commission also rejected arguments from various local entities, state departments of transportation, and others that the Commission should conduct testing in coordination with the U.S. DOT, both with C-V2X and DSRC technology, to fully understand the potential coexistence with other co-primary users in the band. Instead, the Commission stated that it was choosing a single technology for the entire ITS band that it determined would be best suited for ITS in the coming years, and that further delay would not serve the American public. Rather, it would be best to move forward with a revised 5.9 GHz band plan which supports C-V2X technology so that these vehicle safety-related applications could be fully deployed quickly. Based on the record, the Commission believed that opting to permit a single technology – C-V2X – in the revised band plan best serves the American public.

30. *Transitioning to C-V2X Operations in the ITS Band.* The Commission decided to modify existing ITS licenses to allow operation only in the 5.895-5.925 GHz band. The Commission required licensees to transition out of the 5.850-5.895 GHz segment of the band within one year of the effective date of the *First Report and Order*, and designated C-V2X technology as the ITS delivery system once the Commission adopts a deadline and the transition to the revised ITS band is complete.

31. To enable a smoother and more rapid development and deployment of C-V2X-based ITS operations in the near term, the Commission decided to permit any existing or future part 90 ITS licensee to operate C-V2X-based RSUs in the 5.895-5.925 GHz band within its geographic license area by requesting and obtaining a waiver of the Commission's rules, subject to specific conditions. Each such ITS licensee would be required to coordinate its C-V2X-based RSU operations with any existing licensee within that same geographic area to ensure that no C-V2X-based RSUs would interfere with any DSRC-based RSUs that operate in the 5.895-5.925 GHz band. Under this approach, the Commission will also condition C-V2X operations on complying with specific technical rules (e.g., power and OOB limits consistent with current DSRC-based rules), and the requirement that these operations must comply with any final rules that the Commission adopts for C-V2X operations. The Commission directed the WTB and the Public Safety and Homeland Security Bureau (PSHSB) to issue a public notice within 30 days of the effective date of the *First Report and Order* to establish and provide further clarity on a streamlined

waiver process for providing ITS licensees authority to operate RSUs with C-V2X-based technology in the 5.895-5.925 GHz band in the near term. Because OBUs are licensed by rule under part 95 of the Commission's rules, manufacturers will need waivers to obtain equipment certification of C-V2X-based OBUs as well as a waiver to permit such device operation prior to the Commission adopting final rules for C-V2X-based OBUs. The Commission encouraged parties interested in pursuing development, installation, and use of C-V2X-based OBUs in advance of final rules to discuss their equipment with the WTB, the PSHSB, and the Office of Engineering and Technology to determine the appropriate course of action to enable the expeditious roll-out of these devices on vehicles in a manner that is consistent with existing technical rules and that will not cause harmful interference to DSRC-based operations that have not yet transitioned to C-V2X operations.

32. *Protecting Federal Operations.* The Commission agreed with NTIA's recommendation that sharing between ITS and Government operations in the 5.895-5.925 GHz band is possible if proper coordination of RSUs is performed, and thus adopted NTIA's recommendation. Coordination of OBUs is not needed.

D. Statutory Considerations

33. *Relocating DSRC to the upper 30 megahertz.* Under its authority under sections 301, 309, and 316 of the Communications Act, the Commission decided to modify all existing ITS licenses to specify the 5.895-5.925 GHz portion of the 5.9 GHz band for ITS operations following the one-year transition period. Under the terms of the modified licenses, the authority to operate in the lower 45 megahertz will expire at the end of this one-year period. As per 47 U.S.C. 316, the Commission provided for a 30-day protest period before these modifications can become final. The Commission found that these modifications were consistent with its statutory authority, supported by judicial and Commission precedent, and would serve the public interest, convenience, and necessity.

34. The Commission found that relocating DSRC operations to the upper 30 megahertz of the 5.9 GHz band was within the Commission's authority under section 316 of the Communications Act. Section 316 gives the Commission authority to modify, by rulemaking or adjudications, any license either for a limited time or for the duration of the term thereof, if in the judgment of the Commission such action would promote the public interest, convenience, and necessity. Courts have held that the Commission's

authority to “modify” licenses under section 316 does not confer on the Commission the ability to affect a “fundamental change” to those licenses. This means that the Commission can permissibly exercise its authority under section 316 if (1) it finds that doing so serves the “public interest” and (2) the modification is not so sweeping as to amount to “fundamental change” to the licenses being modified.

35. The Commission found that this modification is manifestly in the public interest because the modification will make room for valuable new unlicensed uses in the lower 45 megahertz of the band, while providing existing DSRC licensees sufficient spectrum to provide substantially the same basic vehicular safety services they now provide. This modification is therefore consistent with the long line of Commission actions changing or reducing frequencies where it has found doing so in the public interest.

36. The Commission also found that the record supported its conclusion that relocating DSRC licensees to the upper 30 megahertz of the band will not meaningfully interfere with the ability of incumbents to provide the same types of safety-related services that they are currently offering. The Commission concluded that the 30 megahertz would accommodate basic ITS services for not only the limited number of vehicles currently equipped with DSRC as currently allowed for under the Commission’s rules (e.g., certain fleet vehicles, which are mostly involved in pilot projects) but also for additional commercial vehicles (e.g., fleet vehicles, trucks, cars) that might incorporate DSRC-based equipment and that could become available for American consumers on a wider basis across the country in the future – notwithstanding current trends by many manufacturers for introduction of the new C-V2X technology.

37. Further, the Commission concluded that the transition path it was adopting in the *First Report and Order* was designed to accommodate a transition that minimizes any potential disruption to DSRC operations because it is technically feasible for ITS to operate on 30 megahertz in the upper part of the band by reconfiguring DSRC-based devices by updating firmware and/or software. The Commission did not require existing licensees to vacate use of channels in the lower 45-megahertz immediately; instead it gave incumbent licensees one year to develop and implement a transition path out of that portion of the 5.9 GHz band. The Commission found that these accommodations were particularly reasonable in light of the minimal current deployment of DSRC.

38. At bottom, the argument that the Commission’s action amounts to a “fundamental

change” rests on the assertion that it will upend the future plans of DSRC licensees to provide certain advanced ITS services, which some commenters argue require the use of the full 75 megahertz currently allocated to DSRC licensees. But the record—including the history, current deployment of basic safety-related DSRC-based ITS services, and status of future plans for these advanced services—is unconvincing that relocation to the upper 30 megahertz will upend any concrete business plans of DSRC licensees. As the D.C. Circuit explained in detail in *Teledesic LLC v. Federal Communications Commission* (275 F.3d at 84), in managing spectrum “[t]he Commission correctly conceives of its role in prophetic and managerial terms”—it must “predict the effect and growth rate of technological newcomers on the spectrum, while striking a balance between protecting valuable existing uses and making room for . . . new technologies.” In making this determination, the Commission concluded that the potential deployment of future advanced DSRC-based ITS services that may or may not develop years into the future is too uncertain and remote to warrant the further reservation of spectrum for their deployment. After 20 years, with no widescale deployment of even the basic vehicle safety applications that have been available for years, the Commission cannot reasonably justify the protection of such possible future deployment of advanced ITS service at the expense of proven and market-ready technologies that stand ready to make use of the lower 45 megahertz.

39. *Transition to C-V2X.* The Commission determined that it has the authority under Title III of the Communications Act to transition operations in the upper 30 megahertz from DSRC to C-V2X. The Commission found that transitioning to C-V2X is in the public interest and noted that the exercise of its authority under Title III to transition operations to a new technology is consistent with past Commission actions modifying technical operational rules and mandating the use of newer technologies to maximize spectral efficiency. Licenses in the 5.9 GHz band are for the provision of ITS services, for which the Commission has required the use of DSRC technology. In revising its rules to require ITS licensees to use C-V2X technology, the Commission decided it was acting pursuant to its broad Title III spectrum management authority and consistent with its obligation to “generally encourage the larger and more effective use of radio in the public interest.”

40. In response to commenters’ claims that if the Commission adopts a band plan that provides no spectrum for ITS licensees using DSRC technology, then the licenses effectively would be

revoked and thus the Commission would exceed its section 312 authority, the Commission found that its decisions do not represent a termination of DSRC licenses. Instead, licensees will continue to be able to provide the same vehicular safety services on the upper 30 megahertz of the band that they provide under the current ITS band designation, and the ultimate transition from DSRC to C-V2X would similarly not result in any change in or reduction of vehicular-safety services. Licensees that operate under the new technical rules will maintain the same renewal expectancy they have today. The Commission also provided flexibility for ITS licensees to choose to migrate to C-V2X technologies in the upper 30 megahertz sooner than required by its rules if the C-V2X operation would not interfere with any existing ITS licensee that continues to use DSRC-based technology before it ultimately transitions to C-V2X.

41. *Other statutory considerations.* Contrary to commenters' assertions, the Commission concluded that re-designating spectrum it originally set aside for ITS is not in conflict with any role assigned to it by Congress in the Transportation Equity Act for the 21st Century (TEA), nor does the action infringe on the Department of Transportation's (DOT's) ability to continue to administer the ITS program. The Commission reasoned that in the TEA, Congress directed the Commission to consider, in consultation with the Secretary of the U.S. DOT, spectrum needs for the operation of ITS, including spectrum for the dedicated short-range vehicle-to-wayside wireless standard. However, the TEA did not require that the Commission designate the 5.9 GHz band – or any band – for ITS, only that the Commission consider doing so. The TEA directed the Commission to complete rulemaking on ITS spectrum by January 1, 2000, which it did. That was all that Congress required for the Commission to achieve its statutory duties. By contrast, the Communications Act gives the Commission broad authority to ensure the efficient use of spectrum in the public interest. The Commission found that the action it was taking on the spectrum it designated for ITS was being done pursuant to its general authority to act in the public interest, convenience, and necessity, which, as the D.C. Circuit has explained, is the sort of spectrum management issue for which the Commission's authority is at its zenith. (47 U.S.C. 303, *Teledesic*, 275 F.2d at 79).

42. The Commission disagreed with ITS America's claims that adopting the Commission's proposal to reduce the amount of ITS spectrum in the 5.9 GHz band would not satisfy the requirements of section 1 of the Communications Act as it relates to the Commission's responsibility to manage spectrum

to ensure safety-of-life and property through the use of wire and radio communications. The Commission found that the record shows significant support for ensuring safety of life and property through the use of ITS in the upper 30 megahertz of the band, allowing it to repurpose the lower 45 megahertz of the band for unlicensed operations. The Commission also disagreed with ITS America's suggestion that section 1 of the Communications Act binds the Commission so that it may only modify 5.9 GHz licenses consistent with U.S. DOT's recommendations, finding that ITS America appears to misunderstand the role Congress afforded the Commission to oversee non-federal use of spectrum (including state and local governmental spectrum), whether for public safety or commercial purposes.

E. Benefits and Costs: Economic Analysis

43. The Commission reviewed the benefits of repurposing the lower 45 megahertz of the 5.9 GHz band for unlicensed use and the direct costs associated with transitioning existing ITS licensees to the upper 30 megahertz of the band. The evidence led to the conclusion that the benefits, in terms of new economic activity, are well above the costs. The Commission expected to realize substantial benefits by expanding Wi-Fi capacity. Even using a highly conservative approach to calculate benefits, the Commission anticipated a present value of approximately \$6 billion in benefits in each of the years 2023-2025, or \$17.2 billion over that time frame. The Commission also noted that unlicensed use of the 5.9 GHz band may lead to benefits well beyond 2025, which underscores the conservative nature of its estimates. At the same time, by preserving the upper 30 megahertz for ITS, the Commission permitted current and future licensees to continue to offer such service in the band. The Commission therefore took into consideration the one-time transaction costs associated with incumbent licensees transitioning their operations to the upper 30 megahertz of spectrum and determined that these costs are significantly less than the present value of the benefits. Specifically, the Commission limited cost considerations to the costs of transitioning existing licensees to the upper 30 megahertz of the 5.9 GHz band.

44. *Benefits of Unlicensed Spectrum in the Lower 45 Megahertz of the 5.9 GHz Band.* Proponents of the Commission's proposal generally referred to a RAND Corporation study (RAND 5.9 GHz Study), which found that repurposing the 5.9 GHz band for unlicensed use could generate between \$82.2 billion and \$189.9 billion in economic welfare per year, or the substantially lower benefits estimate of approximately \$28 billion between 2022 and 2025 put forth by WiFiForward (2020 WiFiForward

Study), to argue that costs related to the automotive industry were small by comparison. Conversely, advocates for ITS argued that unlicensed benefits put forth in these studies were outweighed by those of retaining the band for ITS. While few commenters disputed the benefits put forth by RAND and WiFiForward, below, the Commission presented its own estimate, which errs toward underestimating benefits by using an approach that likely overcounts prospective usage of the 6 GHz band and omits various consumer benefits as well as benefits that could be achieved prior to 2023 or after 2025.

45. Other commenters supporting the Commission's proposal referred to the economic value of Wi-Fi in general and the numerous use cases that Wi-Fi enables. Commenters argued that increased Wi-Fi capacity will allow new data-intensive Internet of Things applications and complement 5G development by facilitating the off-loading of a growing percentage of mobile traffic. Other Wi-Fi benefits include its importance to education, medicine, smart agriculture, and industry. Commenters asserted that benefits from repurposing the 5.9 GHz band would arise from the increased Wi-Fi capacity attendant with the creation of additional channels—including an 80-megahertz channel and a 160-megahertz channel.

46. The Commission evaluated the economic benefits of dedicating the lower 45 megahertz of the 5.9 GHz band for unlicensed use by estimating the expected contribution to Gross Domestic Product (GDP) resulting from additional Wi-Fi traffic once this spectrum is made available to augment existing Wi-Fi capacity. Additional Wi-Fi capacity is valuable as future U.S. Wi-Fi demand is expected to greatly increase. The additional, wider channels made possible by repurposing spectrum in the 5.9 GHz band will allow more devices to connect at a given time. The additional traffic will produce new productive economic activity, including through additional online transactions between Internet users and additional transactions between Internet users and Internet service providers (ISPs), which together comprise the added value of additional spectrum. The Commission focused here on the additional GDP created by transactions between ISPs and their customers since estimating additional online transactions between Internet users is difficult due to lack of data. Thus, the Commission's estimate is conservative, capturing the economic value to the ISPs directly (i.e., producer surplus), while ignoring consumer surplus gains.

47. Wi-Fi traffic occurs on discrete channels of 20-megahertz, 40-megahertz, 80-megahertz

and potentially 160-megahertz bandwidth. Larger bandwidths improve the speed of traffic on the bands and additional channels increase the aggregate capacity of Wi-Fi. The Commission's baseline calculation of the increase in traffic is based on the idea that the additional 45 megahertz of 5.9 GHz spectrum will, when combined with spectrum from the 5.725-5.850 GHz (U-NII-3) band, enable Wi-Fi users to access an additional 160-megahertz channel and 80-megahertz channel, two additional 40-megahertz channels, and three additional 20-megahertz channels in addition to channels that are already available, including those in the 6 GHz band. This will give consumer devices additional channels to establish connections to mitigate congestion. Because Wi-Fi traffic is expected to greatly increase and strain capacity today and in the future, the Commission assumed that the additional 5.9 GHz spectrum will be fully used by consumers. Moreover, the Commission's finding that benefits outweigh costs does not require full use of the U-NII-4 band. This implies that the Commission can estimate additional traffic for channels of a specific bandwidth as a proportion of new Wi-Fi channels that this spectrum would create relative to existing channels of that bandwidth. For example, there are already two 80-megahertz channels used commonly by Wi-Fi. The additional spectrum would allow use of one additional 80-megahertz channel. Assuming that this new channel would be fully used, traffic would increase by 50% based on the proportion, one new channel to two old channels. Using this and reasonable assumptions on the distribution of traffic across Wi-Fi channels of different bandwidths, the Commission calculated that Wi-Fi traffic would increase by 8.4%. The Commission's traffic distribution assumptions are specified in Electronic Communications Committee, ECC Report 302, at 22 (May 29, 2019), <https://docdb.cept.org/download/cc03c766-35f8/ECC%20Report%20302.pdf>. The Commission noted that although there are means to augment capacity other than through additional spectrum, such as with greater investment in infrastructure, its result maintains as long as capacity remains a bottleneck to service quality.

48. To calculate additional GDP, the Commission multiplied 8.4% by an extrapolation of U.S. Wi-Fi traffic to determine additional traffic per year in gigabytes (GBs). *See* CISCO, VNI Complete Forecast Highlights, United States - 2022 Forecast Highlights, at 1-2 (2018). The Commission then multiplied this figure by an estimate of the average ISP revenue generated by an additional GB of traffic. Specifically, the Commission used projections of the price per GB for fixed U.S. broadband plans based

on the Consumer Price Index (CPI) for “Internet services and electronic information providers” and a baseline price estimate from the Commission’s 2018 International Broadband Data Report. *See* U.S. Bureau of Labor Statistics, Databases, Tables & Calculators by Subject, *Internet Services and Electronic Information Providers*, https://data.bls.gov/timeseries/CUUR0000SEEE03?output_view=data (last visited Oct. 27, 2020); *International Comparison Requirements Pursuant to the Broadband Data Improvement Act*, GN Docket No. 17-199, Sixth Report, 33 FCC Rcd 978, 1035, Table 3 (IB 2018). The Commission estimated benefits only through 2025 to avoid relying on current data for projecting too far into the future, but noted that because its estimates incorporate existing sources of unlicensed spectrum, including in the 6 GHz band, it believed that the benefits of repurposing the 5.9 GHz band would continue beyond 2025. Moreover, although the Commission anticipated that benefits could arise earlier, it did not calculate benefits prior to 2023 to allow time for devices to be updated and adopted by consumers. Using a discount rate of 7%, the Commission’s conservative approach led to a present value of approximately \$6 billion in benefits in each of the years 2023-2025, or \$17.2 billion over that time frame. If the Commission instead discounted by 3%, the present value of benefits over 2023-2025 is \$19.3 billion. Alternatively, discounting by 7%, but relying instead on the Census Bureau’s national revenues data for fixed Internet services, the Commission estimated a present value of benefits of \$34.8 billion over 2023-2025.

49. *Costs of Repurposing the Band to Limit ITS Use to the Upper 30 Megahertz of the 5.9 GHz Band.* Various commenters claimed that the costs of reducing the spectrum dedicated for ITS substantially outweigh the benefits of dedicating 45 megahertz for unlicensed operations. However, rather than quantifying costs specific to the reduction in ITS, most commenters pointed to the economic impact caused by automobile collisions in aggregate throughout the United States each year. Commenters generally referred to U.S. DOT estimates of the economic impact of lives lost and injuries resulting from police-reported vehicle crashes in the United States as well as other studies and statistics that were not ITS-specific. Some commenters, however, referred to ITS-specific analyses, including to National Highway Traffic Safety Administration (NHTSA) estimates of economic cost savings associated with V2V and other studies.

50. Commenters also argued that repurposing ITS spectrum would lead to costs associated

with traffic congestion, fuel consumption, and auto emissions, but in most instances, did not connect these costs to ITS. Certain commenters referred to annual traffic reductions and reduced carbon dioxide emissions associated with V2X, while others claimed that the repurposing could inhibit technology advancements, including in truck platooning, road weather information technologies, and logistics.

51. More generally, commenters expressed concern that repurposing spectrum in the 5.9 GHz band would delay the spread of ITS applications in the United States. Relatedly, Alliance for Automotive Innovation asserted that “[w]ithin 5 years, a total of at least 5 million radios on vehicles and roadway infrastructure will have been deployed, including any previous V2X deployment,” but only if the entire 5.9 GHz band is preserved for ITS.

52. Finally, ITS advocates argued that existing ITS licensees would face a transition cost above \$500 million, with specific reference to U.S. DOT estimates of infrastructure and equipment replacement, engineering, and related costs. Commenters also claimed that substantial investments in research, development, and testing would be lost as a result of the Commission’s proposed rule.

53. In response, various commenters argued that the Commission’s proposal leaves sufficient spectrum to meet automotive needs and that references to economic valuations based on the sum of U.S. police-reported vehicle crashes erroneously suggest that 100% of crashes and congestion will be avoided if all 75 megahertz in the 5.9 GHz band is dedicated to ITS. Commenters also noted claims about advanced ITS-based applications that could permit congestion-related and environmental benefits were speculative and that automotive technologies could use other licensed or unlicensed spectrum for many of the non-safety-of-life services that automakers contend would rely on ITS. Proponents of the Commission’s proposal agreed that there would be costs associated with moving ITS licensees from the lower 45 megahertz, but that these were overstated by the U.S. DOT and should not include sunk costs that cannot be recouped regardless of Commission action.

54. In conducting the Commission’s analysis of benefits and costs, an underlying objective was to identify benefits and costs causally related to the Commission action being undertaken. As such, the Commission can credit economic losses only if they would be expected to result from repurposing the 5.9 GHz band; we cannot (and should not) attempt to attribute losses to this proceeding that would have occurred regardless of our rule changes. Thus, the Commission rejected cost quantifications based on

enumerations of the economic harms resulting from police-reported vehicle crashes in the U.S. that are not specifically tied to changes to ITS spectrum.

55. In general, commenters have provided very limited information that would allow the Commission to quantify any costs associated with a reduction in ITS spectrum. Certain commenters pointed to analyses, such as in the *NHTSA V2V NPRM* (82 Fed. Reg. 3854), seeking to quantify specific safety benefits of ITS to argue that such benefits may be diminished by the Commission. The Commission found that benefits attributed to ITS in these studies are likely overstated and inappropriate to view as costs resulting from the Commission's proposal. As discussed above, the Commission found that the 30 megahertz of spectrum that is being retained for ITS applications is sufficient to support many ITS applications. For example, in estimating the benefits of a proposal to mandate DSRC-based vehicle-to-vehicle (V2V) communications, the *NHTSA V2V NPRM* found that substantial benefits could be achieved using 10 megahertz of ITS spectrum, 20 megahertz less than the spectrum that we retain for ITS. Additionally, NHTSA analysis forecasted benefits based on the state of technology in the 2010-2013 base period, which likely substantially overestimates the benefits of DSRC in later years, when reliance on complementary or substitute safety systems (e.g., based on cameras, lasers, and radars) would likely be far more widespread than in 2010-2013. Because commenters neither showed that hypothetical ITS benefits described in the NHTSA and other studies would be lost as a result of the Commission's actions, nor established that such benefits are accurately calculated, the Commission rejected comments advancing quantifications from these studies.

56. More generally, the Commission did not believe that this proceeding will lead to cognizable costs due to automobile collisions that may be linked to its actions. Commenters argued that certain advanced features, including those pertaining to life and property, may require additional bandwidth. NHTSA's own prior analysis suggests, however, that V2V safety applications that could eliminate a large proportion of crashes may require much less spectrum. And while commenters speculated about certain additional benefits (i.e., to pedestrians), they did not demonstrate whether such benefits would arise nor quantified the incremental benefit given the V2V safety applications that would be expected to be preserved. Further, commenters did not demonstrate that advanced applications, even if presumed to offer additional safety benefits, need to rely on ITS spectrum or would be largely obviated by

developing safety features outside ITS.

57. Commenters also claimed various benefits of ITS from non-safety applications. As explained above, the Commission declined to rely upon estimates of use of ITS spectrum for applications like road weather information technologies that are more appropriately provided using other spectrum bands not dedicated for safety-of-life applications. Moreover, the Commission found that commenters did not effectively demonstrate that advanced ITS features would reduce congestion or environmental or other costs that are not directly related to safety. The Commission noted that 30 megahertz of spectrum is sufficient to support many ITS applications and existing studies do not show that more spectrum would give rise to additional benefits. For example, whereas commenters claimed that commercial platooning systems are expected to improve fuel efficiency by 7.25%, other public estimates of these impacts are lower, and there may be offsetting congestion, safety, and other concerns that could diminish the benefits from this technology (if not eliminate them entirely), leading certain truck manufacturers to reconsider its use.

58. Nor did the Commission view the transition by existing DSRC licensees to the upper 30 megahertz in the 5.9 GHz band to be a substantial cause of delays to deployment of basic ITS applications in the foreseeable future. First, as other commenters pointed out, the Commission noted that C-V2X has had no spectrum dedicated to its deployment, but this has not prevented rapid innovation in that technology, which in part necessitated this proceeding. Second, the band plan proposed by Alliance for Automotive Innovation suggests that a transition by DSRC licensees would have been necessitated, even if the Commission's rules proceeded exactly as AAI envisioned. The Alliance for Automotive Innovation proposal initially stipulated a transition of DSRC licensees from the upper 20 megahertz of the 5.9 GHz band to make way for C-V2X. The proposal then stipulated a second transition after five years, following selection of a single technology (either DSRC or C-V2X) with a ten-year phaseout period for the technology that does not prevail. Because there is no guarantee that DSRC would prevail, this would forestall its transition by several years, even assuming it was ultimately determined to be the prevailing technology—an assumption we find unconvincing for the reasons discussed above. Moreover, the Commission found that AAI's proposed commitment to deploy 5 million radios if the entire 5.9 GHz band is preserved for ITS is not enforceable, and importantly, represents a relatively modest ITS

deployment that is not necessarily at variance with deployments that might be anticipated without the proposal. The proposed commitment and band plan do not contemplate the additional length of time necessary to deploy the prevailing technology nor the time that it would take for sufficient adoption by consumers to have meaningful benefits, a timeframe during which alternative safety applications may substantially diminish the incremental benefits achievable from ITS. For these reasons, the Commission declined to credit claims that its actions could impose costs stemming from delays in ITS deployment.

59. Finally, the Commission believed that the U.S. DOT's estimate of transitioning existing licensees was at the high end of total ITS transition costs, and was, in any event, well below the Commission's estimated benefits of repurposing the 5.9 GHz band for unlicensed use. In particular, the U.S. DOT confounded the costs of transitioning to the upper 30 megahertz of the 5.9 GHz band with those of transitioning to C-V2X. However, the latter cost is necessitated by market factors, including substantial support for the C-V2X technology by proponents of ITS, coupled with a general understanding that a single interoperable ITS standard best promotes public safety. For instance, the Alliance for Automotive Innovation noted that the selection of a single technology would put the auto industry in a position that maximizes benefits for road travelers. Moreover, existing DSRC licensees have recently begun to employ C-V2X on an experimental basis, telling the Commission that the transition to C-V2X is already ongoing. Thus, the Commission viewed it as inappropriate to include as part of the transition calculation, costs of transitioning to C-V2X. Additionally, in general, expenses on research, development, and testing referenced by ITS proponents represent typical examples of sunk costs that are irrecoverable irrespective of any action that we take. Specifically, the Commission agreed with comments noting that expenses on grants and research projects referenced by the U.S. DOT, represent typical examples of such sunk costs, which it declined to recognize.

60. *Robustness of baseline analysis.* In addition to applying different revenue projections and discount rates to its baseline traffic assumptions, the Commission found that its analysis was robust to several variations of its model. In particular, the Commission repeated its calculations accounting for additional U-NII-2 channels, though it noted that most Wi-Fi use occurs within the 2.4 GHz, U-NII-1, and U-NII-3 bands. Accounting for U-NII-2 decreased the Commission's estimate to a present value GDP contribution of \$13.6 billion over the years 2023-2025. As in the Commission's baseline model, this

valuation assumes that the 6 GHz channels would be used at the time that 5.9 GHz spectrum would also become available. If the Commission alternatively assumed that 6 GHz spectrum would not be available during 2023-2025, its estimates of the contribution of 5.9 GHz spectrum for unlicensed rises to at least a present value GDP contribution of \$53.1 billion over the years 2023-2025. Finally, in the Commission's baseline analysis, it assumed that 5.9 GHz spectrum would be fully used by consumers, which led to its baseline weighted traffic increase of 8.4%. Relaxing this assumption, suppose instead that, conservatively, the increase in traffic were only 1%. Using the Commission's lowest estimates of the value of this traffic still led to a present value GDP contribution of \$2 billion over 2023-2025, which is still higher than expected one-time transition costs.

61. *Alternative Estimates of Unlicensed Spectrum Value in the Record.* In the *NPRM*, the Commission noted that the RAND 5.9 GHz Study attempted to value additional traffic expected to result from repurposing the entire 5.9 GHz band for unlicensed use. Although commenters generally did not dispute RAND's assessment, per the *NPRM*, the Commission had reservations with these valuations. The RAND evaluation of additional traffic was the sum of extra value from the additional number of gigabytes (GBs) transmitted times an average broadband price per GB, plus the cost to consumers of new Wi-Fi-using devices that RAND found would have to be purchased to support this new traffic. While the Commission agreed that the availability of additional unlicensed spectrum in the 5.9 GHz band will create additional traffic, it found that RAND's device-based component likely overstated benefits because it assumes that Wi-Fi devices in use are substantially limited by capacity constraints, and thus, any increase in Wi-Fi capacity would generate new traffic that would be accommodated entirely by the purchase of new devices. The Commission anticipated that existing Wi-Fi devices will handle most of the additional traffic, focusing instead on the value of the extra traffic itself based on its calculation above. Additionally, unlike the RAND 5.9 GHz Study, the Commission incorporated 6 GHz spectrum into its analysis.

62. The Commission also previously addressed another approach to evaluating unlicensed use: estimating the GDP increase due to the resulting broadband speed increase. An alternative quantification in the RAND 5.9 GHz Study as well as the 2020 WiFiForward Study of the value of repurposing 5.9 GHz both relied on such estimates but based on different data. The Commission did not find an appropriate way to address its concerns regarding this estimate in either comments to this

proceeding, the public record, or in the academic literature, and so declined to include a benefit of speed increases in its analysis.

III. INCORPORATION BY REFERENCE

63. Sections 90.375, 90.379, and 95.3189 of the final rules provide that DSRC Roadside Units (RSUs) and DSRC On-Board Unit (OBU) transmitter types operating in the 5895-5925 MHz band must comply with the technical standard Institute of Electrical and Electronics Engineers (IEEE) 802.11p-2010. The OFR has regulations concerning incorporation by reference. 1 CFR part 51. These regulations require that, for a final rule, agencies must discuss in the preamble to the rule the way in which materials that the agency incorporates by reference are reasonably available to interested parties, and how interested parties can obtain the materials. Additionally, the preamble to the rule must summarize the material. 1 CFR 51.5(b).

64. In accordance with the OFR's requirements, the discussion in section III.B. of this preamble summarizes the required provisions of IEEE 802.11p-2010. Interested persons may obtain a copy of IEEE 802.11p-2010, either through IEEE's website or by mail at the address provided in § 90.395 and 95.3189 the rule. A copy of the standard may also be inspected at the FCC's main office.

IV. FINAL REGULATORY FLEXIBILITY ANALYSIS

A. Need for, and Objectives of, the First Report and Order

65. There is growing demand for Wi-Fi and other unlicensed applications' access to mid-band spectrum to provide low-cost wireless connectivity in countless products used by American consumers. To meet this demand, the Commission adopted rules to repurpose the 5.850-5.895 GHz portion of the 5.9 GHz band, which when added to the adjacent spectrum available for U-NII devices below 5.850 GHz, will allow for increased high-throughput broadband unlicensed applications in spectrum that is a core component of today's unlicensed ecosystem. At the same time, the Commission recognized that the 5.9 GHz band plays an important role in supporting ITS safety-related transportation and vehicular communications. Therefore, the Commission retained 30 megahertz of spectrum in the 5.895-5.925 GHz portion of the 5.9 GHz band for use by the ITS radio service. In addition, it required ITS licensees to transition its technology from the DSRC standard to the C-V2X standard.

66. To promote unlicensed use of the 5.850-5.895 GHz band as soon as possible, the

Commission allowed immediate access for unlicensed indoor operations (at specified low power levels) across the 5.850-5.895 GHz band. While the Commission will not permit unlicensed outdoor operations across the 5.850-5.895 GHz band at this time, requests to allow for outdoor unlicensed operations would be considered through the Commission's existing regulatory process to be coordinated with the NTIA to ensure that federal incumbents are protected from harmful interference.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

67. No comments were filed that specifically addressed the rules and policies proposed in the IRFA.

C. Response to Comments by the Chief Counsel for Advocacy of the Small Business Administration

68. Pursuant to the Small Business Jobs Act of 2010, which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments. The Chief Counsel did not file any comments in response to the proposed rules in this proceeding.

D. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

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

70. *Small Businesses, Small Organizations, Small Governmental Jurisdictions.* The Commission's actions, over time, may affect small entities that are not easily categorized at present. The Commission therefore described here, at the outset, three broad groups of small entities that could be directly affected herein. First, while there are industry specific size standards for small businesses that are

used in the regulatory flexibility analysis, according to data from the Small Business Administration's (SBA) Office of Advocacy, in general a small business is an independent business having fewer than 500 employees. These types of small businesses represent 99.9% of all businesses in the United States, which translates to 30.7 million businesses.

71. Next, the type of small entity described as a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field." The Internal Revenue Service (IRS) uses a revenue benchmark of \$50,000 or less to delineate its annual electronic filing requirements for small exempt organizations. Nationwide, for tax year 2018, there were approximately 571,709 small exempt organizations in the U.S. reporting revenues of \$50,000 or less according to the registration and tax data for exempt organizations available from the IRS.

72. Finally, the small entity described as a "small governmental jurisdiction" is defined generally as "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand." U.S. Census Bureau data from the 2017 Census of Governments indicate that there were 90,075 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States. Of this number there were 36,931 general purpose governments (county, municipal and town or township) with populations of less than 50,000 and 12,040 special purpose governments - independent school districts with enrollment populations of less than 50,000. Accordingly, based on the 2017 U.S. Census of Governments data, the Commission estimated that at least 48,971 entities fall into the category of "small governmental jurisdictions."

73. *Radio Frequency Equipment Manufacturers (RF Manufacturers)*. Neither the Commission nor the SBA has developed a small business size standard applicable to Radio Frequency Equipment Manufacturers (RF Manufacturers). There are several analogous SBA small entity categories applicable to RF Manufacturers -- Fixed Microwave Services, Other Communications Equipment Manufacturing, and Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing. A description of these small entity categories and the small business size standards under the SBA rules are detailed below.

74. *Fixed Microwave Services*. Microwave services include common carrier, private-

operational fixed, and broadcast auxiliary radio services. They also include the Upper Microwave Flexible Use Service, Millimeter Wave Service, Local Multipoint Distribution Service (LMDS), the Digital Electronic Message Service (DEMS), and the 24 GHz Service, where licensees can choose between common carrier and non-common carrier status. There are approximately 66,680 common carrier fixed licensees, 69,360 private and public safety operational-fixed licensees, 20,150 broadcast auxiliary radio licensees, 411 LMDS licenses, 33 24 GHz DEMS licenses, 777 39 GHz licenses, and five 24 GHz licenses, and 467 Millimeter Wave licenses in the microwave services. The Commission has not yet defined a small business with respect to microwave services. The closest applicable SBA category is Wireless Telecommunications Carriers (except Satellite) and the appropriate size standard for this category under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1000 employees or more. Thus under this SBA category and the associated size standard, the Commission estimates that a majority of fixed microwave service licensees can be considered small.

75. The Commission does not have data specifying the number of these licensees that have more than 1,500 employees, and thus is unable at this time to estimate with greater precision the number of fixed microwave service licensees that would qualify as small business concerns under the SBA's small business size standard. Consequently, the Commission estimates that there are up to 36,708 common carrier fixed licensees and up to 59,291 private operational-fixed licensees and broadcast auxiliary radio licensees in the microwave services that may be small and may be affected by the rules and policies discussed herein. The Commission noted, however, that the microwave fixed licensee category includes some large entities.

76. *Other Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing communications equipment (except telephone apparatus, and radio and television broadcast, and wireless communications equipment). Examples of such manufacturing include fire detection and alarm systems manufacturing, intercom systems and equipment manufacturing, and signals (e.g., highway, pedestrian, railway, traffic) manufacturing. The SBA has established a size standard for this industry as all such firms having 750 or fewer employees.

U.S. Census Bureau data for 2012 show that 383 establishments operated in that year. Of that number, 379 operated with fewer than 500 employees and 4 had 500 to 999 employees. Based on this data, the Commission concluded that the majority of Other Communications Equipment Manufacturers are small.

77. *Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment. The SBA has established a size standard for this industry of 1,250 employees or less. U.S. Census Bureau data for 2012 show that 841 establishments operated in this industry in that year. Of that number, 828 establishments operated with fewer than 1,000 employees, 7 establishments operated with between 1,000 and 2,499 employees and 6 establishments operated with 2,500 or more employees. Based on this data, the Commission concluded that a majority of manufacturers in this industry are small.

78. *Wireless Telecommunications Carriers (except Satellite).* This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless internet access, and wireless video services. The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms employed fewer than 1,000 employees and 12 firms employed of 1,000 employees or more. Thus, under this category and the associated size standard, the Commission estimated that the majority of Wireless Telecommunications Carriers (except Satellite) are small entities.

79. *Automobile Manufacturing.* This U.S. industry comprises establishments primarily engaged in (1) manufacturing complete automobiles (i.e., body and chassis or unibody) or (2) manufacturing automobile chassis only. The SBA has established a size standard for this industry, which is 1,500 employees or less. 2012 U.S. Census Bureau data indicate that 185 establishments operated in

this industry that year. Of this number, 162 establishments had employment of fewer than 1,000 employees, and 11 establishments had employment of 1,000 to 2,499 employees. Therefore, the Commission estimated that the majority of manufacturers in this industry are small entities.

80. *Internet Service Providers (Non-Broadband)*. Internet access service providers such as dial-up Internet service providers, VoIP service providers using client-supplied telecommunications connections and Internet service providers using client-supplied telecommunications connections (e.g., dial-up ISPs) fall in the category of All Other Telecommunications. The SBA has developed a small business size standard for All Other Telecommunications which consists of all such firms with gross annual receipts of \$35 million or less. For this category, U.S. Census Bureau data for 2012 show that there were 1,442 firms that operated for the entire year. Of these firms, a total of 1,400 had gross annual receipts of less than \$25 million. Consequently, under this size standard, a majority of firms in this industry can be considered small.

81. *Internet Service Providers (Broadband)*. Broadband Internet service providers include wired (e.g., cable, DSL) and VoIP service providers using their own operated wired telecommunications infrastructure fall in the category of Wired Telecommunication Carriers. Wired Telecommunications Carriers are comprised of establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies. The SBA size standard for this category classifies a business as small if it has 1,500 or fewer employees. U.S. Census Bureau data for 2012 show that there were 3,117 firms that operated that year. Of this total, 3,083 operated with fewer than 1,000 employees. Consequently, under this size standard the majority of firms in this industry can be considered small.

82. *Cable System Operators (Telecom Act Standard)*. The Communications Act of 1934, as amended, also contains a size standard for small cable system operators, which is “a cable operator that, directly or through an affiliate, serves in the aggregate fewer than one percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000.” As of 2019, there were approximately 48,646,056 basic cable video subscribers in the United States. Accordingly, an operator serving fewer than 486,460 subscribers shall be deemed a

small operator if its annual revenues, when combined with the total annual revenues of all its affiliates, do not exceed \$250 million in the aggregate. Based on available data, the Commission found that all but five cable operators are small entities under this size standard. The Commission noted that it neither requests nor collects information on whether cable system operators are affiliated with entities whose gross annual revenues exceed \$250 million. Therefore, the Commission was unable at this time to estimate with greater precision the number of cable system operators that would qualify as small cable operators under the definition in the Communications Act.

E. Requirements for Small Entities Description of Projected Reporting, Recordkeeping, and Other Compliance

83. In the *First Report and Order*, the Commission adopted rules that require ITS licensees to cease use of the 5.850-5.895 GHz band one year following the effective date of the *First Report and Order*, operate in only the 5.895-5.925 GHz band thereon, and acknowledge compliance with that requirement with the Commission. The Commission expects that all the filing, recordkeeping, and reporting requirements associated with the adopted rules will be the same for large and small businesses. In addition, the Commission believed that this rulemaking, by expanding the availability of unlicensed devices in the 5.850-5.895 GHz band, would provide an advantage to small entities, as these entities would benefit from being able to access this spectrum over a wide geographic area and frequency range without the complication or cost of needing to obtain a license. On balance, this would constitute a significant benefit for small businesses.

F. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

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

85. In repurposing the 5.850-5.895 GHz band for unlicensed use, the Commission expects to

realize substantial benefits by expanding Wi-Fi capacity for small and large entities alike. At the same time, by preserving 30 megahertz of spectrum in the 5.895-5.925 GHz band for ITS use, the rules adopted in the *First Report and Order* will be sufficient for the current and future ITS licensees to continue to offer such service in the band. The Commission believes that it has streamlined these rules appropriately to afford small entities new opportunities to access that spectrum in a cost-effective manner. The Commission found that the public interest is best served by addressing the needs of both ITS and unlicensed users for access to distinct parts of the 5.9 GHz band. The adopted rules for unlicensed indoor operation in the 5.850-5.895 GHz band are designed to prevent the unlicensed devices from causing harmful interference to the licensed ITS services operating in the band prior to the deadline for ceasing use of the 5.850-5.895 GHz band. Consequently, the Commission does not expect that the current and future licensees in the band, including small entities, would experience a significant economic impact from additional unlicensed use of the spectrum that would be permitted under the adopted rules.

86. The regulatory burdens, such as filing applications on appropriate forms, are necessary in order to ensure that the public receives the benefits of 5.9 GHz band in a prompt and efficient manner and apply equally to large and small entities, thus without differential impact. The Commission will continue to examine alternatives in the future with the objective of eliminating unnecessary regulations and minimizing any significant impact on small entities.

V. ORDERING CLAUSES

87. Accordingly, it is ordered that, pursuant to the authority found in sections 1, 4(i), 301, 302, 303, 309, 316, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 154(i), 301, 302, 303, 309, 316, and 332, and § 1.411 of the Commission's rules, 47 CFR 1.411, that the *First Report and Order* and *Order of Proposed Modification* are hereby adopted.

88. It is further ordered that the rules and requirements as adopted herein are adopted, effective sixty (60) days from the date of publication in the **Federal Register**, with the exception of § 90.372, which contains new or modified information collection requirements that require review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act. The Commission directs the Wireless Telecommunications Bureau to establish and announce the effective date of § 90.372 in a document published in the **Federal Register** after the Commission receives OMB approval.

89. It is further ordered that, pursuant to sections 309 and 316 of the Communications Act of 1934, as amended, 47 U.S.C. 309 and 316, in this *Order of Proposed Modification*, the Commission modifies all ITS licenses in the 5.9 GHz band pursuant to the conditions specified in the *First Report and Order*. Specifically, the Commission modifies the licenses of all DSRC incumbents to add authorization to operate in the 5.895-5.925 GHz band to any RSU registrations currently lacking authority to do so. In addition, the Commission will modify all DSRC licenses to provide that after the end of the sunset period their authorizations will be limited to the 5.895-5.925 GHz band. These modifications will be effective 60 days after publication of this *Order of Proposed Modification* in the **Federal Register**; provided, however, that in the event that any ITS licensee, or any other licensee or permittee who believes that its license or permit would be modified by this action, seeks to protest these modifications, such license modifications specified herein and contested by the licensee or permittee shall not be made final as to such licensee or permittee unless and until the Commission orders otherwise. Pursuant to section 316(a)(1) of the Communications Act of 1934, as amended, 47 U.S.C. 316(a)(1), publication of this *Order of Proposed Modification* in the **Federal Register** shall constitute notification in writing of the Commission's Order proposing the modification of the ITS licenses, and of the grounds and reasons therefore, and those licensees and any other party seeking to file a protest pursuant to section 316 shall have 30 days from the date of such publication to protest such Order.

90. It is further ordered that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, shall send a copy of this *First Report and Order* and *Order of Proposed*

Modification, including the Final Regulatory Flexibility Analysis, to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. 801(a)(1)(A).

List of Subjects

47 CFR Part 2

Radio, Telecommunications.

47 CFR Parts 15, 90, and 95

Communications equipment, Incorporation by Reference, Radio, Telecommunications.

FEDERAL COMMUNICATIONS COMMISSION.

Marlene Dortch,

Secretary.

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2, 15, 90, and 95 as follows:

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

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

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

2. Amend § 2.106 by revising footnote “NG160” to read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

* * * * *

NG160 In the band 5895-5925 MHz, the use of the non-federal mobile service is limited to operations in the Intelligent Transportation Systems radio service.

* * * * *

PART 15—RADIO FREQUENCY DEVICES

3. 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.

Subpart E—Unlicensed National Information Infrastructure Devices

4. Revise § 15.401 to read as follows:

§ 15.401 Scope.

This subpart sets out the regulations for Unlicensed National Information Infrastructure (U-NII) devices operating in the 5.15-5.35 GHz, 5.47-5.895 GHz bands, and 5.925-7.125 GHz bands.

5. Amend § 15.403 by revising the definitions for “Indoor Access Point”, “Subordinate Device”, and “U-NII devices” to read as follows:

§ 15.403 Definitions.

* * * * *

Indoor Access Point. For the purpose of this subpart, an access point that operates in the 5.850-5.895 GHz

or the 5.925-7.125 GHz band, is supplied power from a wired connection, has an integrated antenna, is not battery powered, and does not have a weatherized enclosure. Indoor access point devices must bear the following statement in a conspicuous location on the device and in the user's manual: FCC regulations restrict operation of this device to indoor use only.

* * * * *

Subordinate Device. For the purpose of this subpart, a device that operates in the 5.850-5.895 GHz band or in the 5.925-7.125 GHz band under the control of an Indoor Access Point, is supplied power from a wired connection, has an integrated antenna, is not battery powered, does not have a weatherized enclosure, and does not have a direct connection to the Internet. Subordinate devices must not be used to connect devices between separate buildings or structures. Subordinate devices must be authorized under certification procedures in part 2 of this chapter. Modules may not be certified as subordinate devices.

* * * * *

U-NII devices. Intentional radiators operating in the frequency bands 5.15-5.35 GHz, 5.47-5.895 GHz, and 5.925-7.125 GHz that use wideband digital modulation techniques and provide a wide array of high data rate mobile and fixed communications for individuals, businesses, and institutions.

6. Amend § 15.407 by:

- a. Revising paragraphs (a)(3), (12) and (b)(4) introductory text;
- b. Redesignating paragraphs (b)(5) through (10) as paragraphs (b)(6) through (11);
- c. Adding new paragraph (b)(5); and
- d. Revising paragraph (e).

The revisions and additions are as follows:

§ 15.407 General technical requirements.

* * * * *

(a) * * *

(3) *For the band 5.725-5.895 GHz:* (i) For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output

power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(ii) For an indoor access point operating in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 20 dBm e.i.r.p. in any 1-megahertz band. In addition, the maximum e.i.r.p. over the frequency band of operation must not exceed 36 dBm. Indoor access points operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 36 dBm.

(iii) For client devices operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 14 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm. Client devices operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 30 dBm.

(iv) For a subordinate device operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 20 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 36 dBm.

(v) In the 5.850-5.895 GHz band, client devices must operate under the control of an indoor access point. In all cases, an exception exists for transmitting brief messages to an access point when attempting to join its network after detecting a signal that confirms that an access point is operating on a particular channel. Access points may connect to other access points. Client devices are prohibited from connecting directly to another client device.

NOTE 1 TO PARAGRAPH (a)(3): The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby

Government radar systems that could affect their operation.

* * * * *

(12) Power spectral density measurement: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.895 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in all other bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

* * * * *

(b) * * *

(4) For transmitters operating solely in the 5.725-5.850 GHz band:

(5) For transmitters operating solely in the 5.850-5.895 GHz band or operating on a channel that spans across 5.725-5.895 GHz:

(i) For an indoor access point or subordinate device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of 15 dBm/MHz and shall decrease linearly to an e.i.r.p. of -7 dBm/MHz at or above 5.925 GHz.

(ii) For a client device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of -5 dBm/MHz and shall decrease linearly to an e.i.r.p. of -27 dBm/MHz at or above 5.925 GHz.

(iii) For a client device or indoor access point or subordinate device, all emissions below 5.725 GHz shall not exceed an e.i.r.p. of -27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.

* * * * *

(e) Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

* * * * *

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

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

Authority: 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7), 1401-1473.

Subpart B—Public Safety Radio Pool

8. In § 90.20 amend the table in paragraph (c)(3) by revising the table heading, removing the entry for “5850-5925” and adding in its place an entry for “5895-5925” to read as follows:

§ 90.20 Public Safety Pool.

* * * * *

(c) * * *

(3) * * *

Table 1 to § 90.20- Public Safety Pool Frequency Table

Frequency or band	Class of station(s)	Limitations	Coordinator
* *	* *	* *	*
5895-5925	Base or mobile	86	Not applicable.
* *	* *	* *	*

* * * * *

Subpart C—Industrial/Business Radio Pool

9. In § 90.35 amend the table in paragraph (b)(3) by revising the table heading, removing the entry for “5850-5925” and adding in its place an entry for “5895-5925” to read as follows:

§ 90.35 Industrial/Business Pool.

* * * * *

(b) * * *

(3) * * *

Table 1 to § 90.35- Industrial/Business Pool Frequency Table

Frequency or band	Class of station(s)	Limitations	Coordinator
--------------------------	----------------------------	--------------------	--------------------

* *	* *	* *	*
5895-5925do	90, 91	Not applicable.
* *	* *	* *	*

* * * * *

Subpart G—Applications and Authorizations

10. Amend § 90.149 by revising paragraph (b) to read as follows:

§ 90.149 License term.

* * * * *

(b) Non-exclusive geographic area licenses for DSRCS Roadside Units (RSUs) under subpart M of this part in the 5895-5925 MHz band will be issued for a term not to exceed ten years from the date of original issuance or renewal. The registration dates of individual RSUs (see § 90.375) will not change the overall renewal period of the single license.

11. Amend § 90.155 by revising paragraph (i) to read as follows:

§ 90.155 Time in which station must be placed in operation.

* * * * *

(i) DSRCS Roadside Units (RSUs) under subpart M of this part in the 5895-5925 MHz band must be placed in operation within 12 months from the effective date of registration (see § 90.375) or the authority to operate the RSUs cancels automatically (see § 1.955 of this chapter). Such registration date(s) do not change the overall renewal period of the single license. Licensees must notify the Commission in accordance with § 1.946 of this chapter when registered units are placed in operation within their construction period.

Subpart H—Policies Governing the Assignment of Frequencies

12. Amend § 90.175 by revising paragraph (j)(16) to read as follows:

§ 90.175 Frequency coordinator requirements.

* * * * *

(j) * * *

(16) Applications for DSRCS licenses (as well as registrations for Roadside Units) under subpart M of this

part in the 5895-5925 MHz band.

* * * * *

Subpart I—General Technical Standards

13. Amend § 90.203 by redesignating paragraph (a)(2) as paragraph (a)(3) and adding new paragraph (a)(2) to read as follows:

§ 90.203 Certification Required.

* * * * *

(a) * * *

(2) Effective [INSERT DATE ONE YEAR PLUS 60 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION], an equipment approval may no longer be obtained for DSRCs equipment (RSUs and OBUs) operating under the provisions of this part.

* * * * *

14. Amend § 90.205 by revising paragraph (q) to read as follows:

§ 90.205 Power and antenna height limits.

* * * * *

(q) 5895-5925 MHz. Power and height limitations are specified in subpart M of this part.

* * * * *

15. In § 90.210 amend table 1 to § 90.210 by revising the entry for “5850-5925” and footnote 4 to read as follows:

§ 90.210 Emission masks.

* * * * *

Table 1 to § 90.210—Applicable Emission Masks

Applicable Emission Masks Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
* *	* * *	* *
5895-5925 ⁴		
* *	* * *	* *

* * * * *

⁴ DSRCS Roadside Units in the 5895-5925 MHz band are governed under subpart M of this part.

* * * * *

16. In § 90.213 amend table 1 to § 90.213(a) by revising footnote 10 to read as follows:

§ 90.213 Frequency stability.

(a) * * *

Table 1 to § 90.213(a)—Minimum Frequency Stability

* * * * *

¹⁰ Frequency stability for DSRCS equipment in the 5895-5925 MHz band is specified in subpart M of this part. For all other equipment, frequency stability is to be specified in the station authorization.

* * * * *

Subpart M—Intelligent Transportation Systems Radio Service

17. Amend subpart M by revising the undesignated center heading following § 90.365 to read as follows:

* * * * *

Regulations Governing the Licensing and Use of Frequencies in the 5895-5925 MHz Band for Dedicated Short-Range Communications Service (DSRCS)

* * * * *

18. Add § 90.370 to subpart M to read as follows:

§ 90.370 Permitted frequencies.

(a) Dedicated Short-Range Communications Service (DSRCS) systems are permitted to operate in the 5895-5925 MHz band.

(b) DSRCS authorizations granted prior to the **[INSERT DATE 60 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]** may remain on existing frequencies in the 5850-5895 MHz band until **[INSERT DATE ONE YEAR PLUS 60 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**, at which time they may only operate in the 5895-5925 MHz band.

(c) Frequencies in the 5895-5925 MHz band will not be assigned for the exclusive use of any licensee;

Channels are available on a shared basis only for use in accordance with the Commission's rules. All licensees shall cooperate in the selection and use of channels in order to reduce interference. This includes monitoring for communications in progress and any other measures as may be necessary to minimize interference.

(d) Licensees of Roadside Units (RSUs) suffering or causing harmful interference within a communications zone, as defined in § 90.375 of this part, are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height and direction, additional filtering, or area or hours of operation of the stations concerned. The use of any channel at a given geographical location may be denied when, in the judgment of the Commission, its use at that location is not in the public interest; use of any such channel may be restricted as to specified geographical areas, maximum power, or such other operating conditions, contained in this part or in the station authorization.

19. Amend § 90.371 by revising paragraphs (b) and (c) to read as follows:

§ 90.371 Dedicated Short Range Communications Service.

* * * * *

(b) DSRCS Roadside Units (RSUs) operating in the band 5850-5925 MHz shall not receive protection from Government Radiolocation services in operation prior to the establishment of the DSRCS station. Operation of DSRCS RSU stations within the radius centered on the locations listed in the table below must be coordinated through the National Telecommunications and Information Administration.

Table 1 to § 90.371(b)--Coordination Locations

Location	Latitude	Longitude	Coordination Zone Radius
Anclote, Florida	28-11-18	82-47-40	45
Cape Canaveral, Florida	28-28-54	80-34-35	47
Cape San Blas, Florida	29-40-31	85-20-48	47
Carabelle Field, Florida	29-50-38	84-39-46	36
Charleston, South Carolina	32-51-48	79-57-48	16
Edwards, California	34-56-43	117-54-50	53
Eglin, Florida	30-37-51	86-24-16	103
Fort Walton Beach, Florida	30-24-53	86-39-58	41
Kennedy Space Center, Florida	28-25-29	80-39-51	47
Key West, Florida	24-33-09	81-48-28	12
Kirtland AFB, New Mexico	34-59-51	106-28-54	15

Kokeepark, Hawaii	22-07-35	159-40-06	5
MacDill, Florida	27-50-37	82-30-04	47
NV Test Training Range, Nevada	37-18-27	116-10-24	186
Patuxent River, Maryland	38-16-55	76-25-12	6
Pearl Harbor, Hawaii	21-21-17	157-57-51	16
Pillar Point, California	37-29-52	122-29-59	36
Poker Flat, Alaska	65-07-36	147-29-21	13
Port Canaveral, Florida	28-24-42	80-36-17	19
Port Hueneme, California	34-08-60	119-12-24	24
Point Mugu, California	34-07-17	119-09-1	18
Saddlebunch Keys, Florida	24-38-51	81-36-22	29
San Diego, California	32-43-00	117-11-00	11
San Nicolas Island,	33-14-47	119-31-07	195
Tonopah Test Range,	37-44-00	116-43-00	2
Vandenberg, California	34-34-58	120-33-42	55
Venice, Florida	27-04-37	82-27-03	50
Wallops Island, Virginia	37-51-23	75-30-41	48
White Sands Missile	32-58-26	106-23-43	158
Yuma, Arizona	32-54-03	114-23-10	2

(c) NTIA may authorize additional station assignments in the federal radiolocation service and may amend, modify, or revoke existing or additional assignments for such service. Once a federal assignment action is taken, the Commission's Universal Licensing System database will be updated accordingly and the list in paragraph (b) of this section will be updated as soon as practicable.

20. Delayed indefinitely, add § 90.372 to subpart M to read as follows:

§ 90.372 DSRCS notification requirement.

(a) DSRCS licensees authorized pursuant to 90.370(b) must notify the Commission that as of the transition deadline of **[INSERT DATE ONE YEAR PLUS 60 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**, they have ceased operating in the 5.850-5.895 GHz portion of the band. This notification must be filed via ULS within 15 days of the expiration of the transition deadline.

(b) Continued operation in the 5.850-5.895 GHz portion of the band after the transition deadline, will result in automatic termination of that licensee's authorization without specific Commission action.

21. Amend § 90.375 by revising paragraphs (a) and (c) to read as follows:

§ 90.375 RSU license areas, communication zones, and registrations

(a) Roadside Units (RSUs) in the 5895-5925 MHz band are licensed on the basis of non-exclusive geographic areas. Governmental applicants will be issued a geographic area license based on the geographical area encompassing the legal jurisdiction of the entity. All other applicants will be issued a

geographic area license for their proposed area of operation based on county(s), state(s) or nationwide.

* * * * *

(c) Licensees must operate each RSU in accordance with the Commission's rules and the registration data posted on the ULS for such RSU. Licensees must register each RSU for the smallest communication zone needed for the intelligent transportation systems application using one of the following four communication zones:

Table 1 to § 90.375(c) – Communication Zones

RSU class	Maximum output power (dBm)¹	Communications zone (meters)
A	0	15
B	10	100
C	20	400
D	28.8	1000

¹ As described in the IEEE 802.11p-2010 (incorporated by reference, see § 90.395).

22. Revise § 90.379 to read as follows:

§ 90.379 Technical standards for Roadside Units

DSRCS Roadside Units (RSUs) operating in the 5895-5925 MHz band must comply with the technical standard Institute of Electrical and Electronics Engineers (IEEE) 802.11p-2010 (incorporated by reference, see § 90.395).

23. Amend § 90.383 by revising the introductory text and paragraph (b) to read as follows:

§ 90.383 RSU sites near the U.S./Canada or U.S./Mexico border.

Until such time as agreements between the United States and Canada or the United States and Mexico, as applicable, become effective governing border area use of the 5895-5925 MHz band, authorizations to operate Roadside Units (RSUs) are granted subject to the following conditions:

* * * * *

(b) Authority to operate RSUs is subject to modifications and future agreements between the United States and Canada or the United States and Mexico, as applicable.

24. Add § 90.395 to subpart M to read as follows:

§ 90.395 Incorporation by reference.

Certain material required in this section is incorporated by reference into this subpart with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the address of the FCC's main office indicated in 47 CFR 0.401(a) and is available from the sources indicated in this section. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email fedreg.legal@nara.gov or go to www.archives.gov/federal-register/cfr/ibrlocations.html.

(a) Institute of Electrical and Electronics Engineers (IEEE), 3025 Boardwalk Drive, Suite 220, Ann Arbor, MI 48108, 1-855-999-9870, www.techstreet.com/ieee.

(1) IEEE 802.11p-2010, IEEE Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 6: Wireless Access in Vehicular Environments, 15 July, 2010; into §§90.375(c), 90.379.

(2) [Reserved]

(b) [Reserved]

PART 95 – PERSONAL RADIO SERVICES

25. The authority citation for part 95 continues to read as follows:

Authority: 47 U.S.C. 154, 303, and 307.

Subpart L—DSRCS On-Board Units

26. Revise § 95.3101 to read as follows:

§ 95.3101 Scope.

This subpart contains rules that apply only to On-Board Units (OBUs) transmitting in the 5895-5925 MHz frequency band in the Dedicated Short-Range Communications Services (DSRCS) (see § 90.371 of this chapter).

§ 95.3159 [Removed and Reserved]

27. Remove and reserve § 95.3159.

28. Revise § 95.3163 to read as follows:

§ 95.3163 OBU frequencies.

DSRCS On-Board Units (OBUs) are permitted to operate in the 5895-5925 MHz band.

29. Revise § 95.3167 to read as follows:

§ 95.3167 OBU transmit power limit.

- (a) The maximum output power for portable DSRCS On-Board Unit (OBU) transmitter types is 1.0 mW.
- (b) The power limits in paragraph (a) of this section may be referenced to the antenna input, so that cable losses are taken into account.
- (c) For purposes of this section, a portable unit is a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

30. Revise § 95.3189 to read as follows:

§ 95.3189 OBU technical standard.

- (a) DSRCS On-Board Unit (OBU) transmitter types operating in the 5895-5925 MHz band must be designed to comply with the technical standard Institute of Electrical and Electronics Engineers (IEEE) 802.11p-2010.
- (b) 802.11p-2010, IEEE Standard for Information technology – Local and metropolitan area networks – Specific requirements – Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 6: Wireless Access in Vehicular Environments, 15 July 2010 is incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the address of the FCC’s main office indicated in 47 CFR 0.401(a) and is available from Institute of Electrical and Electronics Engineers (IEEE), 3025 Boardwalk Drive, Suite 220, Ann Arbor, MI 48108, 1-855-999-9870, www.techstreet.com/ieee. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email fedreg.legal@nara.gov or go to www.archives.gov/federal-register/cfr/ibrlocations.html.

Appendix A to Part 95 [Amended]

31. Amend the table in appendix A to part 95 by removing the entry for “95.1509 – ASTM E2213-03 DSRC Standard”.