

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Amendment of Sections 15.35 and 15.253 of the Commission's Rules Regarding Operation of Radar Systems in the 76-77 GHz Band)	ET Docket No. 11-90 RM-11555
)	
Amendment of Section 15.253 of the Commission's Rules to Permit Fixed Use of Radar in the 76-77 GHz Band)	ET Docket No. 10-28
)	

REPORT AND ORDER

Adopted: July 3, 2012

Released: July 5, 2012

By the Commission:

I. INTRODUCTION

1. In this Report and Order (Order), we are modifying Sections 15.35 and 15.253 of the rules to enable enhanced vehicular radar technologies in the 76-77 GHz band for improved collision avoidance and driver safety¹ and to allow fixed radar applications at airport locations to improve safety for airport personnel and equipment. With respect to Section 15.35, we are eliminating the requirement that vehicular radars decrease power when the vehicle on which the radar is mounted is not in motion.² In addition, we are modifying Section 15.35(b) to specify a new emission limit for 76-77 GHz vehicular radars that will apply to front, side, and rear illuminating vehicular radars. We take this action in response to petitions for rulemaking filed by Toyota Motor Corporation (TMC) and Era Systems Corporation (Era).³

2. We are also modifying Section 15.253 to allow fixed radar applications in the 76-77 GHz band at airport locations. These fixed radars can detect foreign object debris (FOD) on runways and monitor aircraft traffic as well as service vehicles on taxiways and other airport vehicle service areas that have no public access. The modifications to the rules that we are adopting herein will provide more efficient use of the spectrum, and enable the automotive and aviation industries to develop enhanced safety measures for drivers and the general public.

II. BACKGROUND

3. The 76-77 GHz band, which is allocated to the Radio Astronomy service (RAS) and the

¹ Vehicular radars can determine the exact distance and relative speed of objects in front of, beside, or behind a car to improve the driver's ability to perceive objects under bad visibility conditions or objects in blind spots.

² See 47 C.F.R. § 15.253.

³ See petitions for rulemaking filed by Toyota Motor Corporation (TMC) and Era Systems Corporation (Era). See also Amendment of Sections 15.35 and 15.253 of the Commission's Rules Regarding Operation of Radar Systems in the 76-77 GHz band and Amendment of Section 15.253 of the Commission's Rules to Permit Fixed Use of Radar in the 76-77 GHz band, *Notice Of Proposed Rule Making*, ET Dockets No. 11-90 and 10-28, 26 FCC Rcd 8107 (2011) (NPRM).

Radiolocation service on a primary basis and to the Amateur and Space research (space-to-Earth) services on a secondary basis,⁴ is in the region of the radiofrequency spectrum known as “millimeter wave” spectrum. The frequencies above 30 GHz are commonly called millimeter wave frequencies because of their wavelength. At these frequencies, radio propagation decreases more rapidly with distance than at other frequencies and antennas that can narrowly focus transmitted energy are practical and of modest size.⁵ While the limited range of such transmissions might appear to be a major disadvantage for many applications, it does allow the reuse of frequencies within very short distances and, thereby enables a higher concentration of transmitters to be located in a geographical area than is possible at lower frequencies.⁶

4. In 1995, the Commission adopted rules to allow the use of the 76-77 GHz band by vehicular radars on an unlicensed basis.⁷ These provisions were limited to vehicle mounted radars; fixed applications were not permitted.⁸ Section 15.253 of the Commission’s rules, which specifies the technical requirements for operation of unlicensed vehicle-mounted radar systems within the bands 46.7-46.9 GHz and 76-77 GHz,⁹ provides three sets of average power density limits for vehicle-mounted radars, all measured at 3 meters from the exterior surface of the radiating structure: (1) 0.2 $\mu\text{W}/\text{cm}^2$ in any direction when the vehicle is not in motion; (2) 60 $\mu\text{W}/\text{cm}^2$ for forward looking radars when the vehicle is in motion; and (3) 30 $\mu\text{W}/\text{cm}^2$ for side-looking and rear-looking radars when the vehicle is in motion. Each of these average limits had a corresponding peak limit of 20 dB above the average limit. The in-motion limits were based on conservative estimates of the minimum power necessary to provide the range required for the radars to operate effectively.¹⁰ The more restrictive not-in-motion limit was adopted to ensure that human exposure to radiofrequency (RF) radiation would be reduced as much as possible to protect pedestrians that are in close proximity to stopped vehicles.¹¹ At the time these rules were adopted in 1995, maximum permissible limits for human exposure to RF electromagnetic fields had not yet been established and the Commission therefore chose conservative limits for vehicle radars. Subsequent to the adoption of the Section 15.253 rules for vehicular radars in the 76-77 GHz band, the Commission adopted RF human exposure limits for this band that are far less restrictive than the level presumed appropriate in 1995 for not-in-motion vehicular radars, but it has not previously had occasion to revisit this particular rule.¹²

⁴ International footnote 5.149 of Section 2.106 of the FCC’s rules, which applies to the 76-86 GHz frequency range, urges Administrations “to take all practicable steps to protect the radio astronomy service from harmful interference.” See 47 C. F. R. § 2.106. Amateur operations in this band are currently suspended. See 47 C.F.R § 97.303(s).

⁵ See Federal Communications Commission Spectrum Policy Task Force, Report of the Unlicensed Devices and Experimental Licenses Working Group, November 12, 2002, at page 14. <http://transition.fcc.gov/sptf/files/E&UWGFfinalReport.pdf>

⁶ *Id.* See also Amendment of Parts 2 and 15 of the Commission’s Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, *Notice of Proposed Rulemaking*, ET Docket No. 94-124, 9 FCC Rcd 7078 (1994) at para. 8.

⁷ See Amendment of Parts 2, 15, and 97 of the Commission’s Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, *First Report and Order and Second Notice of Proposed Rule Making*, ET Docket No. 94-124, 11 FCC Rcd 4481 (1995) (*40 GHz Report and Order*).

⁸ *Id.*

⁹ See 47 C.F.R. § 15.253. This Order is not adopting any changes to the rules for 46.7-46.9 GHz band.

¹⁰ See *40 GHz Report and Order*, 11 FCC Rcd at 4491-94 (paras. 21-27).

¹¹ *Id.*

¹² See Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, *Report and Order*, ET Docket No. 93-62, 11 FCC Rcd 15123 (1996).

5. On July 21, 2009, the Toyota Motor Corporation (TMC) filed a petition for rulemaking requesting that the Commission modify the emission limits for vehicular radar systems operating within the 76-77 GHz band.¹³ Specifically, TMC requested that the Commission eliminate the in-motion and not-in-motion distinctions in the emission limits for vehicular radar systems and establish a single emission limit that applies in all directions from a vehicle. On September 8, 2009, Era filed comments in CB Docket No. 09-102 requesting that the Commission amend Section 15.253 to permit fixed use of 76-77 GHz radars at airports for monitoring air traffic and airport service vehicles only.¹⁴ Emissions from these fixed radars would not illuminate any public access roads.

6. On May 24, 2011, the Commission issued a *Notice of Proposed Rule Making (NPRM)*¹⁵ in which it sought public comment on proposed amendments to Sections 15.35 and 15.253 of the rules regarding operation within the 76.0-77.0 GHz band. Specifically, the *NPRM* proposed modifications to Section 15.253 to increase the average power density limit to 88 $\mu\text{W}/\text{cm}^2$ at 3 m (average EIRP of 50 dBm) and to decrease the peak power density limit to 279 $\mu\text{W}/\text{cm}^2$ at 3 m (peak EIRP of 55 dBm) regardless of the illumination direction of the vehicular radar, and to eliminate the in-motion and not-in-motion distinction for vehicles equipped with such radars.¹⁶ In the *NPRM*, the Commission also proposed to allow fixed radars to operate in the 76-77 GHz band in addition to vehicular radar systems, and to require that such fixed radar systems meet the proposed limits for vehicular radar systems.¹⁷ A list of parties that filed comments is contained in Appendix A.¹⁸

III. DISCUSSION

7. We find that the 76-77 GHz band is well suited for unlicensed use by vehicular radar technologies and by fixed radar systems limited to airport locations, and are adopting the proposed modifications to Sections 15.35 and 15.253 accordingly. The modifications to the rules that we are

¹³ See Petition for Rulemaking of the Toyota Motor Corporation (filed July 21, 2009), RM-11555 (TMC Petition). See also Public Notice released August 26, (2009, RM-11555, Report No. 2896 (inviting comment on TMC petition).

¹⁴ Era filed comments in a proceeding in which the Commission sought comments on possible revision or elimination of rules, as part of its ten year review of its rules required under Section 610 of the Regulatory Flexibility Act (RFA). See “*FCC Seeks Comment Regarding Possible Revision or Elimination of Rules Under The Regulatory Flexibility Act, 5 U.S.C. 610*”, Public Notice, CB Docket No. 09-102, DA 09-1307, released June 24, 2009. In January 2010, the Office of Engineering and Technology (OET) decided to treat ERA’s comments in the Commission’s ten-year review as a Petition for Rulemaking, and invited comment on starting a rulemaking proceeding to consider ERA’s proposals. *Office of Engineering and Technology Seeks Comment on Era Systems Corporation’s Proposal to Permit Fixed Ground-Traffic Radar at Airports in 76-77 GHz Band*, Public Notice, ET Docket No. 10-28, DA 10-127 (released January 26, 2010). On September 30, 2009, OET granted Era a waiver to allow the installation of up to ten fixed 76-77 GHz Navtech 1800-E radar systems on ground structures at Hartsfield-Jackson Atlanta International Airport. See Era Systems Corporation Request for Waiver of Sections 2.803, 15.201 and 15.253 of the Commission’s Rules, *Order*, DA 09-2145, 24 FCC Rcd 12179 (OET, 2009).

¹⁵ See *NPRM*, *supra* note 2.

¹⁶ Effective Isotropically Radiated Power (EIRP) is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna. 47 C. F. R. § 2.1.

¹⁷ See *NPRM*, *supra* note 2, at 16-18.

¹⁸ Measurement, Control and Automation Association (MCAA) filed comments stating that these proposals will not support level probing radar (LPR) operations and that the Commission should not include LPRs in the present proceeding. See MCAA Comments at 4-6. We note that LPRs are not the subject of this rulemaking but instead are addressed in another proceeding. See Amendment of Part 15 of the Commission’s Rules to Establish Regulations for Tank Level Probing Radars in the Frequency band 77–81 GHz, *Notice of Proposed Rule Making and Order*, 25 FCC Rcd 601 (2010).

adopting herein are intended to foster the development of improved radar systems that will offer significant safety benefits to the public. Studies show that use of collision avoidance technology can prevent or lessen the severity of a significant number of traffic accidents.¹⁹ By modifying our rules for 76-77 GHz radars to align generally with international automotive industry standards, we expect these life-saving devices to be placed on more passenger vehicles by enabling economies of scale. Furthermore, we believe that the changes in power levels and use as discussed below will not result in a significant increase in the potential of interference to other users of the 76-77 GHz band. We note that these rule changes facilitate expanded use of existing technologies and do not appear to impose any new costs. While no party has provided any specific data, these technologies have the potential to help avoid accidents thereby save lives and damage to property.

8. We also find that the use of 76-77 GHz fixed radars at airports for detecting foreign objects on runways, as well as for monitoring aircraft and service vehicles on taxiways and other airport vehicle service areas that have no public access (e.g., gate areas) to be in the public interest and compatible with vehicular radar use. We find that the benefits of allowing fixed radar systems at airports for these applications will improve the safety of the general public and airport personnel without increasing the potential for inference to licensed users. We note that these rule changes enable expanded use of existing technologies and do not appear to impose any new costs. Recent studies estimate the annual direct and indirect cost to U.S. aviation industry caused by the FOD damage to be approximately \$1 billion and \$4 billion, respectively.²⁰ Enhanced technologies for FOD detection and for other airport monitoring services will help prevent accidents and substantially mitigate damage attributable to FOD.

A. Vehicular Radars

9. *Proposal.* In the *NPRM*, the Commission proposed to modify Section 15.253 to eliminate the in-motion and not-in-motion distinction for vehicular radars and to adopt uniform emission limits for forward, side, and rear-looking radars. In lieu of separate emission limits for in-motion and not-in-motion, we proposed to increase the average power density limit to 88 $\mu\text{W}/\text{cm}^2$ at 3 meters (average EIRP of 50 dBm) and to decrease the peak power density limit to 279 $\mu\text{W}/\text{cm}^2$ at 3 meters (peak EIRP of 55 dBm) for vehicular radar systems regardless of the direction of illumination. We also sought comment on TMC's request to modify Section 15.253 to specify a limit on peak EIRP instead of average power density in addition to, or as an alternative to, the limits currently specified in the rules. Furthermore, because we proposed to modify Section 15.253(b) to specify a peak emission limit that is less than 20 dB above the average limit, we also proposed to modify Section 15.35(b) to specify that the 20 dB peak to average limit does not apply to vehicular radars authorized under Section 15.253(b).²¹

¹⁹ The Strategic Automotive Radar Frequency Allocation Group (SARA) cites a number of studies in *ex parte* Comments. According to these studies, up to 74% of all rear-end collisions can be prevented with the use of automatic emergency braking and 20% (i.e. 1.2 million) of passenger car collisions can be avoided by the use of forward collision radars. See SARA *ex parte* filing dated January 2, 2012 at 3-4.

²⁰ Direct cost is the cost associated with repairing FOD damage to the airplane itself (e.g., engine, tire and structural repairs), whereas the indirect cost is related to the air traffic management issues caused by FOD (e.g., runway closure, plane changes, etc.). See Insight SRI, "The Economic Cost of FOD to Airlines" (2008), and "Runway Safety: FOD, Birds, and the Case for Automated Runway Scanning" (2010), available at http://www.fodnews.com/cost_of_fod.pdf and http://insightsri.com/system/files/imce/Freq_and_Cost_of_Bird_Stikes_Sep2009_v02.pdf respectively. See also Brad Bachtel, "Foreign Object Debris and Damage Prevention", AERO, available at http://www.boeing.com/commercial/aeromagazine/aero_01/textonly/s01txt.html.

²¹ See 47 C.F.R. § 15.35(b). This section states that, unless otherwise specified, the peak limit on radio emissions above 1 GHz is 20 dB greater than the average limit.

10. *Comments.* The automotive industry overwhelmingly supports the proposed rules for vehicular radars citing enhanced detecting performance—resulting in improved collision avoidance, driver safety, and convenience—coupled with reduced costs due to global harmonization. However, the National Radio Astronomy Observatory (NRAO) and National Academy of Sciences’ Committee on Radio Frequencies (CORF) raise concerns about increased potential interference to radio astronomy operations if the proposed rules are adopted.

11. NRAO states that interference is inevitable and the destruction of radio astronomy receivers is a serious possibility if these “high-powered” vehicular radars operate in sufficient proximity to radio astronomy sites.²² It further states that GPS-based coordination zones and/or an easily accessible on/off switch would alleviate these dangers but states that it is open to alternative suggestions from the FCC or from industry. NRAO states that fencing roads to keep vehicles away from radio astronomy receivers is an impractical solution given that roads often run directly toward radio astronomy stations as evidenced by the visibility of headlights at observatory sites at night. It argues that vehicular radars may interfere with radio astronomy receivers over distances up to 100 km and that the potential for interference exists with any signal that appears at the victim antenna, not just down its boresight. It states that a single car radar may interfere with radio astronomy observations when seen well off the axis of the radar beam and/or at considerable distances, even in wet air.²³

12. CORF states that the rules increasing the average power density limits for automotive vehicular radars operating in this band should not be enacted unless radar manufacturers are required to work with representatives of the Radio Astronomy service (RAS) community to find solutions that will minimize interference with RAS observations. CORF states that if the Commission authorizes increased average power density limits for automotive radars operating in this band, it should not authorize full-power radar transmissions from a vehicle when that vehicle is not in motion.²⁴

13. The automotive industry strongly disagrees with the NRAO’s assertions that harmful interference will be caused to RAS operations if the average power density limits are increased. It argues that NRAO’s claims are speculative and that NRAO has failed to corroborate its claims with factual support and documented cases of interference.²⁵ It states that NRAO’s interference allegations were contrary to the past ten years of real-world experience with automotive radar systems in the United States and Europe.²⁶ It continues to believe that no significant potential exists for interference from vehicular radar to radio astronomy receivers and there is simply no evidentiary or well-founded policy basis to support NRAO’s proposal to equip vehicles with an on/off switch to protect radio astronomy installations, which would be both unnecessary and costly.²⁷ It states that for safety reasons, a vehicle operator and its occupants cannot be dependent on the functioning of vehicular radar systems that have any possibility of being deactivated.²⁸ Furthermore, it does not support NRAO’s recommendation to create coordination

²² NRAO states that input power required to destroy or permanently impair a radio astronomy detector is measured in tens of mW, about the same power of one of the vehicular radars. Therefore, if the beam from one of these radars were to find its way down or near the boresight of a radio astronomy antenna at close range, permanent physical harm to a radio astronomy detector would result. *See* NRAO Comments, RM-11-555 dated September 18, 2009 at 2.

²³ *See* NRAO Comments at 4-5.

²⁴ *See* CORF *ex parte* filing dated August 08, 2011 at 6-7.

²⁵ *See* TMC Reply at 4 and MBUSA Reply at 2.

²⁶ *See* TMC Reply at 4, MBUSA Reply at 2 and BMW Reply at 1.

²⁷ *See* MBUSA Reply at 2 and SARA *ex parte* filing dated January 02, 2012 at 6-7.

²⁸ An example of such radar-based safety is a PRESAFE Brake system that is designed to prevent or mitigate a forward collision, so disabling the feature would unnecessarily create a safety risk for the vehicle's occupants. *See* MBUSA Reply at 2, BMW Reply at 1 and SARA *ex parte* filing dated January 02, 2012 at 6-7.

zones by incorporating GPS into automotive radar, as this will increase the cost and complexity of radar systems with very little corresponding benefit in terms of reducing the potential for interference.²⁹ It contends that the likelihood of a horizontal emitting beam from a vehicle going directly down the main beam of a vertically oriented antenna is difficult to imagine; as well as the fact that the RAS sites are generally in remote or mountainous areas.³⁰

14. *Decision.* We are modifying Section 15.253 to (1) eliminate the in-motion and not-in-motion distinction for vehicular radars, (2) adopt a single set of emission limits for forward, side, and rear-looking radars, and (3) amend the emission limits for vehicular radars to specify the average and peak radiated emission limits as both EIRP and a power density limit of $88 \mu\text{W}/\text{cm}^2$ at 3 m (average EIRP of 50 dBm) and $279 \mu\text{W}/\text{cm}^2$ at 3m (peak EIRP of 55 dBm), respectively. In light of this, we are modifying Section 15.35(b) to specify that the 20 dB peak limit provision will no longer apply to vehicular radars in the 76-77 GHz band.³¹ Devices operating under the provisions of these rules continue to be subject to the radiofrequency radiation exposure requirements specified in §§1.1307(b), 2.1091 and 2.1093 of the FCC rules, as appropriate.³²

15. We find that the new set of emission limits will not measurably increase potential for interference from vehicular radar systems to RAS operations in the 76-77 GHz band. First, the reduced peak limit we adopt for vehicular radars will increase the level of interference protection afforded to RAS system because it is lower than the current peak limit. Second, the average power limit is being increased by only 1.7 dB from the current maximum for vehicular radars in the 76-77 GHz band, *i.e.*, from 48.3 dBm to 50 dBm. Under worst-case free space conditions a 1.7 dB increase is only a 1.2-fold increase in signal range. The very short distances that these radars operate under, plus the propagation characteristics of the band, translate in practice to a minimal increase in interference potential that we do not believe will yield any increase in actual interference to RAS operations. Because the radio astronomy observatories typically have control over access to a distance of one kilometer from the telescopes to provide protection from interference caused by automobile spark plugs and other uncontrolled RFI sources, the potential for interference caused by the incremental increase in average power limits at that distance (one kilometer) would be negligible.³³ Furthermore, the effect of an increase in average power level of 1.7 dB is negligible when also taking into account the variability in propagation characteristics due to terrain, weather and other propagation factors.³⁴

16. We agree with the automotive industry that given the horizontal direction of vehicular radar beams, the propagation characteristics of terrain and the geographical location of the RAS equipment, the modified emission limits pose no additional risk of interference or damage to the RAS equipment compared to the current rules.³⁵ Accordingly, we believe that there is no need to restrict vehicular radar systems based on coordination zones or to impose requirements for a GPS-aware automatic or a user

²⁹ See ITSA Reply at 2 and TMC Reply at 4.

³⁰ See ASC Reply at 2, TMC Comments at 4 and TMC Reply, RM-11555 dated October 8, 2009 at 5.

³¹ We are modifying our rules to specify average and peak radiated emission limits in equivalent EIRP and power density units so that manufacturers can use either specification to express the emissions from their devices.

³² See 47 C.F.R. § 15.253(f) (referencing 47 C.F.R. §§ 1.1307(b), 2.1091, and 2.1093).

³³ See Amendment of Parts 2, 15 and 97 of the Commission's Rules to Permit the Use of Radio Frequencies Above 40 GHz for New Radio Applications, *Third Memorandum Opinion and Order*, 15 FCC Rcd 10515 (2000) at para. 8 and n.15.

³⁴ Free-Space Path Loss = $32.5 + 20 \log (f_{\text{MHz}}) + 20 \log (d_{\text{km}})$; At $d = 1 \text{ km}$ and $f = 76500 \text{ MHz}$, free-space path loss is approximately 130 dB.

³⁵ See TMC Reply, RM-11555 dated October 8, 2009 at 2 and MBUSA Reply, RM-11555 dated October 8, 2009 at 3.

operated cut-off switch.

17. The National Telecommunications and Information Administration (NTIA) noted that the National Science Foundation (NSF)-sponsored a study documenting measurements performed jointly by representatives from the radio astronomy community and several vehicular radar manufacturers.³⁶ The measurements performed using the University of Arizona's 12 Meter Telescope located at Kitt's Peak examined the impact that vehicular radar emissions would have on radio astronomy installations.³⁷ Emissions of two different vehicular radars manufactured by Robert Bosch GmbH and Continental Corporation were measured in the adjacent 77-80 GHz band. The measurements of the emissions from a single vehicular radar system at two distances (1.7 km and 26.9 km from the radio astronomy installation) indicated that the received signal level at the radio astronomy installation exceeded the protection criteria specified in Recommendation International Telecommunication Union Radiocommunications Sector (ITU-R) RA.769-2.³⁸ The study acknowledges that mitigation factors such as terrain shielding, orientation of the vehicular radar transmitter antenna with respect to the observatory, or attenuation of the vehicular radar transmitter if mounted behind the vehicle bumper were not taken into account and would tend to reduce the distance at which interference occurred.³⁹ NTIA requested that this study be included as part of the public record for this proceeding, and asked that we encourage the radio astronomy community and the vehicular radar manufacturers to continue this cooperative effort to examine and implement mitigation techniques that can be employed to address the potential interference concerns. We recognize the concerns of the radio astronomy community in both the 76-77 GHz band at issue in this proceeding and in the 77-80 GHz band examined in the study. As discussed above, the Commission's rules have permitted vehicular radars to operate in the 76-77 GHz band since 1995. Further, we expect any increase in potential interference in the 76-77 GHz band as a result of the technical rules changes we are making here to be negligible when compared to the overall effect caused by the variability in propagation characteristics due to terrain, weather and other propagation factors.⁴⁰ We have not found anything in the NSF study that suggests that the increase in the potential for harmful interference resulting from these rule revisions will not be negligible. Further, we always encourage cooperation between parties with respect to compatibility of systems that use the radio spectrum, thus we specifically encourage continued cooperation between the radio astronomy community and the vehicular radar industry.

18. Finally, we agree with the commenters that there has been significant growth in the use of automobile radar systems, and we anticipate that these systems will become relatively commonplace within a few years because of consumer demand for increased vehicle safety. We believe that these developments will make automotive safety and convenience more affordable and readily available to the public, as the automotive industry will be able to develop new and improved vehicular radars with no measurable increase in potential interference to licensed services.⁴¹

³⁶ Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration, to Julius Knapp, Chief, Office of Engineering and Technology, Federal Communications Commission (May 23, 2012).

³⁷ National Radio Astronomy Observatory, Electronics Division Technical Note No. 219, *Measurements of Automotive Radar Emissions Received by a Radio Astronomy Observatory* (December 8, 2011) (Joint Study). This joint study is available at <http://www.gb.nrao.edu/electronics/edtn/edtn219.pdf>.

³⁸ Recommendation ITU-R RA.769-2, *Protection criteria used for radio astronomical measurements* (2003).

³⁹ Joint Study at 36.

⁴⁰ See para. 15 above.

⁴¹ See TMC Petition at 2 and SARA *ex parte* filing dated January 02, 2012 at 3-4.

B. Fixed Radar in the 76-77 GHz Band

19. *Proposal.* In the *NPRM*, we proposed to allow the use of fixed radar systems at any location rather than restrict their use to only airport locations, as requested by Era in its petition for rulemaking.⁴² We stated that Era's proposal to limit fixed radar operations to specific locations such as airports or other places where fixed radars would not illuminate public roads may be overly restrictive and could cause unnecessary burdens to the public if implemented. We stated that fixed radars operating at the same maximum power levels as vehicular-mounted radars would be even less likely to interfere with the RAS and Radiolocation services than vehicle-mounted radars because the locations where they are used would not change. We stated that fixed radars should be able to co-exist with vehicular radars because they both would operate with the same power level and use antennas with narrow beamwidths, thus reducing the chances that the signal from one radar would be within the main lobe of the receive antenna of the other. In a worst-case scenario, where two radars are aiming directly at each other, fixed radar should have no more impact on a vehicular radar system than another vehicular system would.

20. We sought comment on whether we should allow unlicensed fixed radar applications to operate within the 76-77 GHz band at the same power levels as those proposed for vehicular radars. We also sought comment on whether there is a need to limit fixed radar applications to specific locations such as airports and/or locations where they are not aimed at publicly accessible roads, or if some alternative criteria would be more appropriate.⁴³

21. *Comments.* The commenters overwhelmingly opposed the use of fixed radar applications in the 76-77 GHz band without regard to location as proposed by the Commission, although some argued that fixed radars could be permitted for airport use only. The opponents cited increased interference potential to vehicular radars and a lack of technical analysis and study for fixed radar in the 76-77 GHz band.

22. The proponents of vehicular radar systems are concerned that significant electromagnetic interference from fixed radar systems may occur that could compromise the safe operation of vehicular radar systems.⁴⁴ They contend that the Commission should wait for the results of ongoing analyses and studies regarding the issue of interference from fixed radar systems in the 76-77 GHz band. One such ongoing study is the European Commission's MOSARIM (More Safety for All by Radar Interference Mitigation) study which should provide a better technical understanding of the risks of inter-radar interference.⁴⁵ Bosch states that the Commission has no record basis for proposing to expand its Part 15 rules to permit unspecified fixed operation in the 76-77 GHz band without substantial operating limitations. It adds that the Commission's proposal is not based on any compatibility studies and is an unjustified and dangerous expansion of the narrow and reasonable operating authority proposed by Era.⁴⁶ Delphi Automotive Systems (Delphi) states that there are a number of applications such as monitoring tunnels, bridges and traffic control that would aim the antenna main beam directly at the roadway thereby increasing the probability of interference to vehicular radars.⁴⁷

23. Xsight urges the FCC to allow the deployment of fixed location radars in the 76-77 GHz

⁴² See *NPRM*, *supra* note 2.

⁴³ See *NPRM*, *supra* note 2.

⁴⁴ See TMC Reply at 5-6, BMW Comments at 1, MBUSA Reply at 2, Bosch Comments at 1 and ITSA Reply at 2.

⁴⁵ See TMC Reply at 5, BMW Comments at 1, MBUSA Comments at 5, Bosch Comments at 7 and ITSA Reply at 2. See also <http://www.mosarim.eu/>.

⁴⁶ See Bosch Comments at 6.

⁴⁷ See Delphi Comments at 2.

band at airports.⁴⁸ It states that the FAA and numerous industry groups have all recognized the threat that foreign object debris (FOD) on taxiways and runways poses to the safety of air travel and that allowing FOD detection systems to operate in the 76-77 GHz band will prevent fatal accidents.⁴⁹ Xsight states that there is no need for the FCC to defer action on this issue and, indeed, the public interest demands swift action to permit companies like Xsight to deploy such technologies at airports as soon as possible.⁵⁰

24. *Decision.* We are modifying Section 15.253 of our rules to allow the operation of fixed radars at airport locations with the same emission limits as those for vehicular radars in the 76-77 GHz band for purposes of detecting foreign object debris on runways and monitoring aircraft and service vehicles on taxiways and other airport vehicle service areas that have no public vehicle access (e.g., gate areas). Limiting the location of fixed radars in this way should prevent them from illuminating public roads, and thus reduce the likelihood of interference to vehicular radars while enabling airports to better monitor airport service vehicles and taxiways and to improve debris detection on the runways.

25. Moreover, airports are challenged with managing increasing congestion on the ground. This rule modification will add to the tools that enhance an airport's ability to determine the location of airplanes and airport ground vehicles that are operating in taxiways and runways. The presence of FOD in an airport's air operations area (AOA) poses a significant threat to the safety of air travel. Foreign object debris on taxiways and runways has the potential to damage aircraft during the critical phases of takeoffs and landings, which can lead to catastrophic loss of life and at the very least increased maintenance and operating costs.⁵¹ This rule modification will help reduce FOD hazards through the implementation of a FOD management program and the effective use of FOD detection and removal equipment.⁵²

26. We disagree with the commenters who state that only vehicular radars should be allowed to operate under the Part 15 rules. We conclude that both vehicular radars and fixed radars at airports, under the limited circumstances we are providing for here, will be able to operate successfully in the 76-77 GHz band. Airport runways, taxiways and other non-public areas at airports are generally not near public roadways, and fixed radars at airports should not illuminate public roadways in the vicinity. With respect to the use of fixed radars outside of airports, we continue to believe that vehicular radars should be able to share the band with fixed radars operating at the same levels and note that there are no conclusive test

⁴⁸ Xsight develops electro-optical and radar sensing technologies for airports and transportation, including FOD detection systems for use on airport runways and taxiways. See Xsight *ex parte* filing dated January 13, 2011.

⁴⁹ See Xsight *ex parte* filing dated October 13, 2011. See also U.S. Department of Transportation, Federal Aviation Administration Advisory Circular No. 105/5210-24.

⁵⁰ The FAA has advised NTIA that although an airport authority could allow unlicensed FOD radars to operate, the FAA would not use the output from those devices because they would not satisfy FAA requirements to support safety operations at airports. Nonetheless, the FAA also advised NTIA of an exception to this position for unlicensed FOD radars if each radar based primary sensor is deployed with at least one other non-radio frequency based primary sensor (e.g., optical sensor) that meets FAA requirements. The FAA stated that it could support the FCC's authorization of such devices for safety operations at airports because two primary sensors of differing technology would maximize detection, reduce false indication, and provide redundancy in the event that one of the types of primary sensor is disabled by external means. See NTIA *ex parte* filing dated November 21, 2011 at 2 and 5.

⁵¹ On July 25, 2000 Air France Flight 4590 crashed shortly after take-off from Charles de Gaulle Airport outside Paris, France. All one hundred passengers and nine crew members, plus four people on the ground, were killed. The official investigation, concluded by France's Bureau Enquetes-Accidents, determined that the catastrophic series of events that caused the Concorde crash were precipitated when FOD on the runway tore a tire, resulting in additional damage to the aircraft. <http://www.guardian.co.uk/uk/2002/jan/17/concorde.world>

⁵² See U.S. Department of Transportation, Federal Aviation Administration Advisory Circular No. 105/5210-24, http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5210_24.pdf (hereinafter AC 105/5210-24).

results indicating that there would be incompatibility issues between the two types of radars. We recognize, however, that no parties have come forward to support fixed radar applications beyond airport locations in this band. Therefore, in the absence of a clear demand, we are not adopting provisions for unlicensed fixed radar operations outside of airport locations in the 76-77 GHz band at this time.

IV. PROCEDURAL MATTERS

A. Final Regulatory Flexibility Analysis

27. The Final Regulatory Flexibility Analysis, required by the Regulatory Flexibility Act, *see* 5 U.S.C. § 604, is contained in Appendix C.

B. Paperwork Reduction Analysis

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

C. Further Information

29. For further information regarding this Report and Order, please contact Aamer Zain, Technical Rules Branch, Policy and Rules Division, Office of Engineering and Technology, Federal Communications Commission, 445 12th Street, S.W., Washington, DC 20554, at 202-418-2437 or via the Internet at Aamer.Zain@fcc.gov.

V. ORDERING CLAUSES

30. Accordingly, IT IS ORDERED, pursuant to Sections 1, 2, 4(i), 301, 302, and 303(f) of the Communications Act of 1934, 47 U.S.C. §§ 151, 152, 154(i), 301, 302a, and 303(f), that this Report and Order is hereby ADOPTED.

31. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Report and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

32. IT IS FURTHER ORDERED that these proceedings, ET Docket No. 11-90 and ET Docket No. 10-28, ARE HEREBY TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Comments

1. Association of Global Automakers
2. Autoliv Active Safety Systems
3. Automotive Safety Council
4. BMW Group
5. Continental Automotive systems
6. Delphi Automotive Systems
7. DENSO Corporation
8. Fujitsu Ten Limited
9. Measurement, Control & Automation Association
10. Mercedes-Benz USA, LLC
11. National Radio Astronomy Observatory
12. Robert Bosch, GmbH
13. Strategic Automotive Radar Frequency Allocation Group
14. Toyota Motor North America
15. Volvo Trucks North America

Reply Comments

1. Association of Global Automakers
2. Autoliv Active Safety Systems
3. Automotive Safety Council
4. BMW Group
5. Continental Automotive systems
6. Intelligent Transportation Society of America
7. Mercedes-Benz USA, LLC
8. National Radio Astronomy Observatory
9. Strategic Automotive Radar Frequency Allocation Group
10. Toyota Motor North America
11. Xsight Systems

Ex Parte Comments

1. Intelligent Transportation Society of America
2. National Academy of Sciences' Committee on Radio Frequencies
3. National Radio Astronomy Observatory
4. National Telecommunications and Information Administration, Dept. of Commerce.
5. Robert Bosch, GmbH
6. Strategic Automotive Radar Frequency Allocation Group
7. Toyota Motor North America
8. Xsight Systems

APPENDIX B**Final Rules**

For the reasons set forth in the preamble, the Federal Communications Commission proposes to amend Part 15 of Title 47 of the Code of Federal Regulations to read as follows:

Part 15 – RADIO FREQUENCY DEVICES

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

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

2. Section 15.35 is amended by revising paragraph (b) to read as follows:

§ Measurement detector functions and bandwidths.

* * * * *

(b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, *e.g.*, see §§ 15.250, 15.252, 15.253(b), 15.255, and 15.509–15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device, *e.g.*, the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

* * * * *

3. Section 15.253 is revised to read as follows:

§ 15.253 Operation within the bands 46.7–46.9 GHz and 76.0–77.0 GHz.

(a) Operation within the band 46.7–46.9 GHz is restricted to vehicle-mounted field disturbance sensors used as vehicle radar systems. The transmission of additional information, such as data, is permitted provided the primary mode of operation is as a vehicle-mounted field disturbance sensor. Operation under the provisions of this section is not permitted on aircraft or satellites.

- (b) The radiated emission limits within the bands 46.7–46.9 GHz are as follows:

- (1) If the vehicle is not in motion, the power density of any emission within the bands specified in this section shall not exceed 200 nW/cm² at a distance of 3 meters from the exterior surface of the radiating structure.
- (2) For forward-looking vehicle mounted field disturbance sensors, if the vehicle is in motion the power density of any emission within the bands specified in this section shall not exceed 60 μW/cm² at a distance of 3 meters from the exterior surface of the radiating structure.
- (3) For side-looking or rear-looking vehicle-mounted field disturbance sensors, if the vehicle is in motion the power density of any emission within the bands specified in this section shall

not exceed $30 \mu\text{W}/\text{cm}^2$ at a distance of 3 meters from the exterior surface of the radiating structure.

(4) The provisions in § 15.35 limiting peak emissions apply.

(c) Operation within the band 76.0–77.0 GHz is restricted to vehicle-mounted field disturbance sensors used as vehicle radar systems and to fixed radar systems used at airport locations for foreign object debris detection on runways and for monitoring aircraft as well as service vehicles on taxiways and other airport vehicle service areas that have no public vehicle access. The transmission of additional information, such as data, is permitted provided the primary mode of operation is as a field disturbance sensor. Operation under the provisions of this section is not permitted on aircraft or satellites.

(d) The radiated emission limits within the band 76.0–77.0 GHz are as follows:

(1) The average power density of any emission within the bands specified in this section shall not exceed $88 \mu\text{W}/\text{cm}^2$ at a distance of 3 meters from the exterior surface of the radiating structure (average EIRP of 50 dBm).

(2) The peak power density of any emission within the band 76–77 GHz shall not exceed $279 \mu\text{W}/\text{cm}^2$ at a distance of 3 meters from the exterior surface of the radiating structure (peak EIRP of 55 dBm).

(e) The power density of any emissions outside the operating band shall consist solely of spurious emissions and shall not exceed the following:

(1) Radiated emissions below 40 GHz shall not exceed the general limits in § 15.209.

(2) Radiated emissions outside the operating band and between 40 GHz and 200 GHz shall not exceed the following:

(i) For field disturbance sensors operating in the band 46.7–46.9 GHz:

$2 \text{ pW}/\text{cm}^2$ at a distance of 3 meters from the exterior surface of the radiating structure.

(ii) For field disturbance sensors operating in the band 76–77 GHz:

$600 \text{ pW}/\text{cm}^2$ at a distance of 3 meters from the exterior surface of the radiating structure.

(3) For radiated emissions above 200 GHz from field disturbance sensors operating in the 76–77 GHz band: the power density of any emission shall not exceed $1000 \text{ pW}/\text{cm}^2$ at a distance of 3 meters from the exterior surface of the radiating structure.

(4) For field disturbance sensors operating in the 76–77 GHz band, the spectrum shall be investigated up to 231 GHz.

(f) Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

(g) Regardless of the power density levels permitted under this section, devices operating under the provisions of this section are subject to the radiofrequency radiation exposure requirements specified in §§ 1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

APPENDIX C

FINAL REGULATORY FLEXIBILITY ANALYSIS

As required by the Regulatory Flexibility Act (RFA),¹ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Notice of Proposed Rulemaking* (NPRM) in this Docket 11-90.² The Commission sought written public comment on the proposals in the NPRM, including comment on the IRFA. As described more fully below, we find that the rules we adopt in the Report and Order will not have a significant economic impact on a substantial number of small entities.³ We did not receive comments from The Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO). We have nonetheless provided this Final Regulatory Flexibility Analysis (FRFA) to provide a fuller record in this proceeding. This FRFA conforms to the RFA.⁴

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

1. On May 24, 2011, the Commission released a NPRM seeking comments regarding petitions for rulemaking filed by Toyota Motor Corporation (TMC) and Era Systems Corporation (Era) requesting modifications to Section 15.253 of the rules for vehicular radar systems operating in the 76-77 GHz band. Vehicular radars can determine the exact distance and relative speed of objects in front of, beside, or behind a car to improve the driver's ability to perceive objects under bad visibility conditions or objects that are in blind spots. Some examples of vehicular radar systems include collision warning and mitigation systems, blind spot detection systems, lane change assist and parking aid systems. The NPRM proposed to eliminate the requirement that vehicular radars decrease power when the vehicle on which the radar is mounted is stopped, or not in motion, and to expand the use of unlicensed 76-77 GHz band radars to fixed infrastructure systems. These modifications to the rules will provide more efficient use of spectrum, and enable the automotive radar application industries and fixed radar applications, operating at airports only, to develop enhanced safety measures for drivers and the general public. In addition, these modifications would make the rules governing the vehicle radars in United States more comparable to those outside the United States and benefit the automotive and aviation industries in terms of enabling new product development and cost reduction

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

2. There were no public comments filed that specifically addressed the rules and policies in the IRFA.

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

3. Pursuant to the Small Business Jobs Act of 2010, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration, 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.

¹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Public Law No. 104-121, Title II, 110 Stat. 857 (1996), and the Small Business Jobs Act of 2010, Public Law No. 111-240, 124 Stat. 2504 (2010).

² NPRM, 26 FCC Rcd 8107.

³ Thus, we could certify that an analysis is not required. See 5 U.S.C. § 605(b).

⁴ See 5 U.S.C. § 604.

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

4. **Small Businesses, Small Organizations, and Small Governmental Jurisdictions.** Our action may, over time, affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three comprehensive, statutory small entity size standards.⁵ First, nationwide, there are a total of approximately 27.5 million small businesses, according to the SBA.⁶ In addition, a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”⁷ Nationwide, as of 2007, there were approximately 1.6 million small organizations.⁸ Finally, the term “small governmental jurisdiction” is defined generally as “governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”⁹ Census Bureau data for 2007 indicate that there were 89,476 local governmental jurisdictions in the United States.¹⁰ We estimate that, of this total, as many as 88,506 entities may qualify as “small governmental jurisdictions.”¹¹

5. **Radio Broadcasting.** This Economic Census category “comprises establishments primarily engaged in broadcasting aural programs by radio to the public. Programming may originate in their own studio, from an affiliated network, or from external sources.”¹² The SBA has established a small business size standard for this category, which is: such firms having \$7 million or less in annual receipts.¹³ According to Commission staff review of BIA Publications, Inc.’s *Master Access Radio Analyzer Database* on March 31, 2005, about 10,840 (95%) of 11,410 commercial radio stations had revenues of \$6 million or less. Therefore, the majority of such entities are small entities.

6. We note, however, that in assessing whether a business concern qualifies as small under the above size standard, business affiliations must be included.¹⁴ In addition, to be determined to be a “small business,” the entity may not be dominant in its field of operation.¹⁵ We note that it is difficult at

⁵ See [5 U.S.C. §§ 601\(3\)–\(6\)](#).

⁶ See SBA, Office of Advocacy, “Frequently Asked Questions,” web.sba.gov/faqs (last visited May 6, 2011; figures are from 2009).

⁷ [5 U.S.C. § 601\(4\)](#).

⁸ Independent Sector, *The New Nonprofit Almanac & Desk Reference* (2010).

⁹ See [5 U.S.C. § 601\(5\)](#).

¹⁰ U.S. Census Bureau, *Statistical Abstract of the United States: 2012*, Section 8, at 267, Table 428.

¹¹ The 2007 U.S. Census data for small governmental organizations indicate that there were 89,476 “Local Governments” in 2007. (U.S. CENSUS BUREAU, *STATISTICAL ABSTRACT OF THE UNITED STATES 2012*, Table 428.) The criterion by which the size of such local governments is determined to be small is a population of 50,000. However, since the Census Bureau does not specifically apply that criterion, it cannot be determined with precision how many of such local governmental organizations is small. Measured by a criterion of a population of 50,000, many specific sub-entities in this category seem more likely than larger county-level governmental organizations to have small populations. Accordingly, of the 89,746 small governmental organizations identified in the 2007 Census, the Commission estimates that a substantial majority is small.

¹² U.S. Census Bureau, 2007 NAICS Definitions, “515112 Radio Stations”; <http://www.census.gov/naics/2007/def/ND515112.HTM#N515112>.

¹³ 13 C.F.R. § 121.201, NAICS code 515112 (updated for inflation in 2008).

¹⁴ “Concerns and entities are affiliates of each other when one controls or has the power to control the other, or a third party or parties controls or has the power to control both. It does not matter whether control is exercised, so long as the power to control exists.” 13 C.F.R. § 121.103(a)(1) (an SBA regulation).

¹⁵ 13 C.F.R. § 121.102(b) (an SBA regulation).

times to assess these criteria in the context of media entities, and our estimate of small businesses may therefore be over-inclusive.

E. Description of Projected Reporting, Record Keeping, and Other Compliance Requirements.

7. Radars operating in the 76-77 GHz band are required to be authorized under the Commission's certification procedure as a prerequisite to marketing and importation, and the Report and Order proposes no change to that requirement. *See* 47 C.F.R. §§ 15.101, 15.201, 15.305, and 15.405. The changes adopted in this proceeding would not change any of the current reporting or recordkeeping requirements. However, it will eliminate the requirement that aD radar must reduce power when a vehicle is not in motion and to establish a single emission limit that applies in all directions from a vehicle. It also expands the use of unlicensed 76-77 GHz band radars to fixed infrastructure systems at airport locations only.

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

8. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.¹⁶

9. At this time the Commission believes that the new rules adopted in this Report and Order are deregulatory in nature, which we expect will simplify compliance requirements for all parties, particularly small entities, and permit the development of improved radar systems. Elimination of requirement for a radar to reduce power when a vehicle is not in motion will simplify equipment design, and establishment of a single emission limit that applies in all directions from a vehicle would allow the development of omni-directional monitoring systems. The allowance of unlicensed fixed radar systems in the 76-77 GHz band at airport locations only along with the unlicensed vehicular radars will improve spectrum efficiency and promote collaboration for shared unlicensed spectrum. We believe that the adopted rules will apply equally to large and small entities. Therefore, there is no inequitable impact on small entities.

G. Report to Congress

10. The Commission will send a copy of the Report and Order, including this FRFA, in a report to Congress pursuant to the Congressional Review Act.¹⁷ In addition, the Commission will send a copy of the Report and Order, including this FRFA, to the Chief, Counsel for Advocacy of the SBA. A copy of the Report and order and FRFA (or summaries thereof) will also be published in the Federal Register.

¹⁶ *See* 5 U.S.C. § 603(c).

¹⁷ *See* 5 U.S.C. § 801(a)(1)(A).