

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Amendments of Parts 1, 2, 15, 90, and 95 of the Commission's Rules to Permit Radar Services in the 76-81 GHz Band)	ET Docket No. 15-26
)	
Amendment of Part 15 of the Commission's Rules to Permit the Operation of Vehicular Radar Services in the 77-78 GHz Band)	RM-11666
)	
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
)	
Amendment of the Commission's Rules to Permit Radiolocation Operations in the 78-81 GHz Band)	WT Docket No. 11-202
)	

**COMMENTS OF THE FORMER
STRATEGIC AUTOMOTIVE RADAR FREQUENCY ALLOCATION GROUP,
CATERPILLAR, DELPHI AUTOMOTIVE, AND GENERAL MOTORS COMPANY**

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Table of Contents

INTRODUCTION AND SUMMARY	2
DISCUSSION	3
I. VEHICULAR RADAR CAN OPERATE IN THE 76-81 GHZ BAND WITHOUT CAUSING INTERFERENCE TO OTHER SERVICES.	3
II. LICENSING VEHICULAR RADAR SERVICES BY RULE UNDER PART 95 WOULD PROVIDE BOTH FLEXIBILITY AND PROTECTION.	8
III. THE FCC SHOULD CONTINUE TO ALLOW NEW WIDEBAND AND ULTRA-WIDEBAND 24 GHZ VEHICULAR RADAR EQUIPMENT CERTIFICATIONS. ..	9
IV. THE FCC SHOULD CLARIFY THAT IT WILL NOT PHASE OUT THE ABILITY TO SECURE NEW 24 GHZ NARROWBAND VEHICULAR RADAR EQUIPMENT CERTIFICATIONS UNDER SECTIONS 15.245 AND 15.249.	11
V. THE FCC SHOULD NOT ALLOW ANY NEW FIXED OPERATIONS IN THE 76-81 GHZ BAND BEFORE CONFIRMING THAT THEY WILL NOT INTERFERE WITH VEHICULAR RADAR.	12
VI. EXTENDING THE AMATEUR RADIO SERVICE SUSPENSION TO THE ENTIRE 76-81 GHZ BAND WOULD HELP AVOID HARMFUL INTERFERENCE TO VEHICULAR RADAR.	14
VII. FOREIGN OBJECT DEBRIS DETECTION OPERATIONS SHOULD REMAIN SUBJECT TO SITE-BASED LICENSING UNDER PART 90.	16
CONCLUSION	17

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The former Strategic Automotive Radar Frequency Allocation Group (the “Former SARA Group”),¹ Caterpillar, Delphi Automotive, and General Motors Company submit these comments in response to the Notice of Proposed Rulemaking (“NPRM”) in the above-captioned

¹ SARA was a consortium of automotive suppliers and manufacturers formed in 2001 to promote worldwide frequency allocations for automotive radar, including the development of technology standards. Its members included Autoliv, BMW, Bosch, Continental AG, Daimler, Hella, and TRW. These comments are being submitted by a coalition that includes all former members of SARA, except Bosch. SARA worked extensively to develop 24 GHz short-range vehicular radar (“SRR”) technology in the U.S. and Europe and has been heavily involved in the European SRR transition from 24 GHz to 79 GHz wideband and ultra-wideband. *See, e.g.*, Press Release, SARA, Important Automotive Safety Development (Aug. 1, 2011).

dockets.² In the NPRM, the Federal Communications Commission (“FCC” or “Commission”) seeks comment on, among other things, accommodating vehicular radar technologies in the 76-81 GHz band under Part 95 of the Commission’s rules.³

INTRODUCTION AND SUMMARY

The Former SARA Group, Caterpillar, Delphi Automotive, and General Motors Company enthusiastically support the Commission’s proposal to expand vehicular radar use in the 76-81 GHz band. This proposed expansion would facilitate the deployment and safe operation of life-saving applications like autonomous braking and would not cause harmful interference to other services, such as the Radio Astronomy Service (“RAS”), which currently operate in the band. In addition, the proposed expansion is consistent with current efforts to create a globally harmonized spectrum allocation for vehicular radars in the 76-81 GHz band. However, key modifications to the Commission’s proposals would help ensure that this expansion of vehicular radar operations supports the important public interest benefits the Commission envisions.

First, the Commission should leave undisturbed the ability to obtain new equipment certifications for wideband (FCC rule section 15.252) and ultra-wideband (FCC rule section 15.515) vehicular radars operating in the 22-29 GHz (“24 GHz”) band. Maintaining this ability would provide automobile manufacturers and suppliers with greater flexibility and would not overburden the 24 GHz band. The proposal to prohibit new wideband and ultra-wideband 24 GHz vehicular radar equipment certifications after thirty days following publication of the

² *Amendment of Parts 1, 2, 15, 90 and 95 of the Commission’s Rules to Permit Radar Service in the 76-81 GHz Band et al.*, Notice of Proposed Rulemaking and Reconsideration Order, FCC 15-16 (rel. Feb. 5, 2015) (“NPRM”).

³ *See id.* at ¶ 2.

Commission's order in the Federal Register would not leave stakeholders with sufficient time to adapt and is a far shorter phase out period than those established in other parts of the world.

Second, the Commission should clarify its intent not to prohibit new narrowband 24 GHz vehicular radar equipment certifications under sections 15.245 and 15.249 of its rules.

Third, the Commission should ensure that the benefits of expanding vehicular radar's use within the 76-81 GHz band are not undermined by allowing other, potentially incompatible services to also operate within the band. In particular, the Commission should not allow any new fixed radar operations in the 76-81 GHz band before first confirming that they will not cause harmful interference to vehicular radar. The European Conference of Postal and Telecommunications Administrations ("CEPT") is currently engaged in testing that focuses on this precise issue, and its report should be available later this year. In addition, the Commission should extend its suspension of amateur radio operations to the entire 76-81 GHz band and retain site-based licensing for foreign object debris detection ("FOD") operations under Part 90 of its rules.

DISCUSSION

I. VEHICULAR RADAR CAN OPERATE IN THE 76-81 GHZ BAND WITHOUT CAUSING INTERFERENCE TO OTHER SERVICES.

The Commission proposes to provide vehicular radar applications with expanded access to the 76-81 GHz band.⁴ In particular, the Commission proposes to grant SRR applications access to an additional 4 gigahertz of spectrum located immediately above the spectrum band currently used for long-range vehicular radar ("LRR"). This proposed change, when combined

⁴ See NPRM at ¶¶ 25-44.

with the current allocation for LRR in the 76-77 GHz band, would permit the operation of vehicular radars throughout the 76-81 GHz band.⁵

This Commission's proposal is sound, as vehicular radar is well-suited to operate in the 76-81 GHz band without causing interference to other services. For instance, the very short-range nature of SRR signals (the fact that the signal drops off at short distances) reduces the likelihood of interference to other services.⁶ Moreover, the exceptionally high frequency re-use capabilities of 76-81 GHz band spectrum also reduce the likelihood of interference.⁷ For example, at these frequencies, radio propagation losses increase more rapidly with distance than at lower frequencies, which allows a higher concentration of transmitters to be located in a given geographic area.⁸

In fact, after extensive analysis, the Commission has determined that the risk of interference from vehicular radars to RAS operations in the 76-81 GHz band is "very negligible."⁹ In particular, the Commission found that the horizontal direction of vehicular radar beams, the propagation characteristics of the spectrum, and the remote geographical locations of RAS sites all mitigate the risk of harmful interference.¹⁰ The Commission has also noted that

⁵ NPRM at ¶ 28.

⁶ See Petition for Rulemaking of Robert Bosch LLC, RM-11666, at 9 (filed May 15, 2012) ("Bosch Petition").

⁷ See *id.*

⁸ See NPRM at ¶ 31.

⁹ NPRM at ¶ 21; 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*, Report and Order, 27 FCC Rcd 7880 ¶¶ 15-16 (2012) ("*Vehicular Radar R&O*").

¹⁰ See *Vehicular Radar R&O* at ¶ 16.

Radio Astronomy observatories typically have control over an area of at least a one kilometer radius around the RAS telescopes, which further reduces the risk of interference.¹¹

In the NPRM, the Commission seeks comment on the 2011 National Science Foundation (“NSF”) study that examined the potential impact of vehicular radars on Radio Astronomy installations.¹² While there are several aspects of the study which make it less useful in evaluating the potential for vehicular radar/RAS coexistence, it is clear that several factors will serve to reduce to a very acceptable level the potential that harmful interference will ever occur. As the study mentions, terrain shielding, the low probability of line of sight, and the attenuation of the fascia surface behind which vehicular radars are mounted will all serve to reduce the probability of interference and the range at which interference could occur.¹³ Moreover, the fact that the additional allocated spectrum will be largely utilized for SRR applications (which are by definition shorter range than already-approved LRR applications) should mitigate further the potential for interference caused by opening up the band to broader usage.

Experience also confirms that vehicular radar operations are compatible with other services authorized to use the 76-81 GHz band. Vehicular radars have been operating in the 76-77 GHz band in the U.S. for nearly 20 years without any documented cases of harmful interference being caused to other services in the band, including RAS.¹⁴ Vehicular radars have

¹¹ See *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 al.*, Report and Order, 27 FCC Rcd 7880 ¶ 15 (2012).

¹² See NPRM at ¶ 34; see also National Radio Astronomy Observatory, *Measurements of Automotive Radar Emissions Received by a Radio Astronomy Observatory (2011)*, available at <http://www.gb.nrao.edu/electronics/edtn/edtn219.pdf>.

¹³ See NPRM at ¶ 34.

¹⁴ See, e.g., Letter from Ari Q. Fitzgerald, Counsel, SARA, to Marlene H. Dortch, Secretary, FCC, ET Docket Nos. 11-90, 10-28, at 2-3 (filed Jan. 2, 2012) (“SARA Jan. 2, 2012 Ex Parte Letter”); *Amendment of Parts 2, 15, and 97 of the Commission’s Rules to Permit Use of Radio*

also operated in the 76-77 GHz band in Europe since the late 1990s without any reports of harmful interference.¹⁵ Vehicular radar's proven track record of sharing spectrum with RAS and other services in the 76-77 GHz band strongly suggests that it can successfully share the 77-81 GHz band as well. As the Commission observes, "the same principles that already allow successful shared operations in the 76-77 GHz band should apply in the larger 76-81 GHz range."¹⁶

Additionally, the proposed allocation is consistent with current efforts to create a globally harmonized spectrum allocation for vehicular radars in the 76-81 GHz band.¹⁷ For example, 2012 World Radiocommunication Conference ("WRC-2012") Resolution 654 calls for a primary allocation to the radiolocation service in the 77.5-78 GHz band, the only portion of the 76-81 GHz band not currently allocated globally for radiolocation,¹⁸ for automotive applications.¹⁹ This resolution will be considered at the 2015 World Radio Conference ("WRC-15") in November 2015.²⁰ ITU Recommendations ITU-R M.1452-2 and ITU-R M.2057 also support

Frequencies Above 40 GHz for New Radio Applications, First Report and Order and Second Notice of Proposed Rulemaking, 11 FCC Rcd 4481 ¶ 17 (1996) (making the 76-77 GHz band available for use by vehicular radar systems).

¹⁵ See, e.g., Comments of Delphi Automotive Systems, ET Docket Nos. 11-90, 10-28, at 1-2 (filed July 14, 2011).

¹⁶ See NPRM at ¶ 33.

¹⁷ See, e.g., Bosch Petition at 2-3; Davide Brizzolara, *Future Trends for Automotive Radars: Towards the 79 GHz Band*, ITU NEWS, Jan.-Feb. 2015, <https://itunews.itu.int/en/3935-Future-trends-for-automotive-radars-Towards-the-79GHz-band.note.aspx>.

¹⁸ See 47 C.F.R. § 2.106.

¹⁹ World Radiocommunication Conference, Resolution 654: Allocation of the Band 77.5-78 to the Radiolocation Service to Support Automotive Short-Range High-Resolution Radar Operations, (2012), https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000A0023PDFE.pdf;

²⁰ See 2015 World Radio Conference Agenda, Item 1.18 (2012), *available at* http://www.itu.int/dms_pub/itu-r/oth/12/01/R12010000014A01PDFE.pdf.

allocating the 76-81 GHz band for vehicular radar operations.²¹ Meanwhile, other international bodies—such as the European Commission, the Australian Communications and Media Authority, and Japan’s Ministry of Internal Affairs and Communications—have already approved the use of the band for vehicular radar.²²

Moreover, as the Commission recognizes, providing vehicular radar with expanded access to the 77-81 GHz band will serve the public interest in light of “the extensive catalogue of enhanced features supported by SRR and the expectation that their deployment will become more widespread.”²³ These include potentially life-saving applications such as autonomous braking, collision warning, lane departure warning, blind spot detection, and airbag arming.²⁴ As discussed in prior SARA filings, numerous research studies provide compelling evidence that such applications can significantly reduce vehicle collisions, automobile-related injuries, and automobile-related fatalities.²⁵ A Commission decision that allows vehicular radar suppliers and automobile manufacturers to take advantage of the economies-of-scale that result from the harmonization of the U.S.’s 76-81 GHz vehicular radar allocation with vehicular radar allocations in the rest of the world would make those life-saving devices less expensive and cause them to be more widely deployed on lower cost, as well as luxury, vehicles.

²¹ See ITU-R, Recommendation M.1452, Millimeter Wave Vehicle Collision Avoidance Radars and Radiocommunication Systems for Intelligent Transport System Applications (2012), http://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.1452-2-201205-I!!PDF-E.pdf; ITU-R, Recommendation M.2057, Systems Characteristics of Automotive Radars Operating in the Frequency Band 76-81 GHz for Intelligent Transport Systems Applications (2014), http://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.2057-0-201402-I!!PDF-E.pdf.

²² See, e.g., Davide Brizzolara, *Future Trends for Automotive Radars: Towards the 79 GHz Band*, ITU NEWS, Jan.-Feb. 2015, <https://itunews.itu.int/en/3935-Future-trends-for-automotive-radars-Towards-the-79GHz-band.note.aspx>.

²³ NPRM at ¶ 30.

²⁴ See, e.g., NPRM at ¶ 26; Bosch Petition at 3-4.

²⁵ See, e.g., SARA Jan. 2, 2012 Ex Parte Letter at 3-4.

II. LICENSING VEHICULAR RADAR SERVICES BY RULE UNDER PART 95 WOULD PROVIDE BOTH FLEXIBILITY AND PROTECTION.

The Commission's proposal to license vehicular radar services in the 76-81 GHz band by rule under Part 95 is also sound.²⁶ As the Commission recognizes, the Part 95 licensed-by-rule regime may be more appropriate for vehicular radar operations than the Part 15 unlicensed regime because unlicensed use would not offer interference protection to the safety-related vehicular radar applications that are likely to be deployed throughout the 76-81 GHz band.²⁷ Vehicular radar operations should be afforded interference protection because, if operated without interference, they can substantially reduce injuries and death due to automobile collisions.²⁸ In fact, the Commission has even described vehicular radar as "as essential to passenger safety as air bags for motor vehicles."²⁹

Part 95 offers many of the same benefits as Part 15. For instance, like Part 15 unlicensed users, Part 95 licensed users do not need to obtain individual licenses from the Commission. Unlike Part 15, however, Part 95 offers users formal interference protection. Under Part 15, unlicensed users may not cause interference to licensed services and must accept interference from licensed and unlicensed users. By contrast, under Part 95, primary licensed users are protected from interference from, and are permitted to cause interference to, secondary users.

Vehicular radar services are also appropriate for regulation under Part 95 because they involve low-power, short-range services with multiple shared channels where users can avoid

²⁶ See, e.g., NPRM at ¶ 38.

²⁷ See NPRM at ¶ 68.

²⁸ See, e.g., SARA Jan. 2, 2012 Ex Parte Letter at 3-4; NPRM at ¶ 26; Bosch Petition at 3-4.

²⁹ *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, First Report and Order, 17 FCC Rcd 7435 ¶ 18 (2002).

congestion fairly easily.³⁰ Accordingly, the Commission's proposal appropriately classifies vehicular radar as a citizens band radio service and licenses the operation of such devices by rule under Part 95.³¹

III. THE FCC SHOULD CONTINUE TO ALLOW NEW WIDEBAND AND ULTRA-WIDEBAND 24 GHZ VEHICULAR RADAR EQUIPMENT CERTIFICATIONS.

The Commission proposes to prohibit the certification of new wideband and ultra-wideband vehicular radars that do not operate in the 76-81 GHz range starting 30 days after the date its final rules in this proceeding are published in the Federal Register.³² The Commission proposes to implement this proposal by modifying sections 15.37, 15.252, 15.253, and 15.515 of its rules.³³ While well-intentioned, the Commission's proposal leaves far too little time for stakeholders to adapt and is not necessary to promote spectrum efficiency.

The Commission's proposal to eliminate the ability to secure new wideband and ultra-wideband 24 GHz vehicular radar equipment certifications 30 days after publication of final rules would leave automobile manufacturers and suppliers with far too little time to transition. Although wideband and ultra-wideband vehicular radars do not currently use the 16.2-17.7 GHz or 46.7-46.9 GHz bands, they do extensively use the 24 GHz band. The Commission underestimates this use, asserting that only three 24 GHz wideband and ultra-wideband vehicular radar equipment certifications currently exist.³⁴ In fact, there are currently far more 24 GHz

³⁰ See *Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.915 Band (5.9 GHz Band)*, Notice of Proposed Rulemaking and Order, 17 FCC Rcd 23136 at ¶ 54 (2002).

³¹ See NPRM at ¶ 39 n.89; 47 U.S.C. § 307(e).

³² See NPRM at ¶ 44.

³³ See *id.*

³⁴ See NPRM at ¶ 43.

wideband and ultra-wideband vehicular radar equipment certifications in place.³⁵ Moreover, production cycles in the automotive industry require longer lead times than in other industries regulated by the Commission. Automobile manufacturers are already finalizing their plans for model year 2022 vehicles, and some may already be contemplating use of new 24 GHz wideband or ultra-wideband vehicular radar in those vehicles.

The Commission's proposal is also inconsistent with phase-out periods in place in other parts of the world. For example, in 2005, the European Commission established an initial eight year phase out period for certifications of new 24 GHz wideband and ultra-wideband vehicular radar equipment.³⁶ Then, in 2011, the European Commission extended that sunset by an additional five years.³⁷ Now, new 24 GHz wideband and ultra-wideband vehicular radar equipment can be certified in the European Union until 2018.³⁸ To allow for an additional transition period, the 2018 sunset date in Europe was even extended by four additional years for vehicles that use 24 GHz wideband and ultra-wideband vehicular radars and for which a type-approval application had been granted before 2018, at which point automobile manufacturers and suppliers will have enjoyed a transition period of roughly *17* years.³⁹

³⁵ The Commission does not appear to include in its calculation vehicular radar equipment certified under section 15.515.

³⁶ See European Commission, Decision 2005/50/EC (Jan. 17, 2005), *available at* <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005D0050&from=EN>; Press Release, European Commission, Anti-Crash Radars: Commission Enables Cars to Be Equipped with Road Safety Technology (Jan. 18, 2005), *available at* http://europa.eu/rapid/press-release_IP-05-54_en.htm?locale=en (“Beyond 2013 . . . new automotive radar applications will be required to use another frequency band.”).

³⁷ See European Commission, Decision 2011/485/EU (July 29, 2011), *available at* <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:198:0071:0072:EN:PDF>.

³⁸ See *id.*

³⁹ See CEPT Electronic Communications Commission Decision (04)10 at 3 (amended Jun. 1, 2012 and corrected Mar. 6, 2015), *available at* <http://www.erodocdb.dk/docs/doc98/official/pdf/ECCDec0410.pdf>.

By contrast, the proposed *thirty day* phase out period seems shockingly short. Instead, the Commission should decline to disturb the ability to certify new 24 GHz wideband and ultra-wideband vehicular radar equipment. Doing so would allow automobile manufacturers and their equipment suppliers greater flexibility as they transition to the 76-81 GHz band. Moreover, there is currently no pressing need to eliminate wideband and ultra-wideband vehicular radar use of the 24 GHz band, given that current vehicular radar usage is limited to low-power, unlicensed Part 15 operations under strict technical rules that require the devices to avoid causing interference to higher-powered operations in the band.⁴⁰

IV. THE FCC SHOULD CLARIFY THAT IT WILL NOT PHASE OUT THE ABILITY TO SECURE NEW 24 GHZ NARROWBAND VEHICULAR RADAR EQUIPMENT CERTIFICATIONS UNDER SECTIONS 15.245 AND 15.249.

Although the Commission’s proposed rule changes appear to affect only vehicular radar equipment certified under sections 15.252, 15.253, and 15.515, the Commission sweepingly states in the NPRM that it “intend[s] to prohibit the certification of new vehicular radars that do not operate in the 76-81 GHz range.”⁴¹ Meanwhile, many manufacturers of narrowband 24 GHz vehicular radars rely on sections 15.245 and 15.249 of the Commission’s rules for equipment certification. Indeed, every major U.S. automobile manufacturer has installed narrowband 24 GHz vehicular radar in their automobiles based on those rules. We assume that the Commission does not propose to phase out the ability to certify new narrowband 24 GHz vehicular radar

⁴⁰ See, e.g., 47 C.F.R. §15.515 (requiring that “on or after January 1, 2014” Ultra-wide band 24 GHz vehicular radar systems “attenuate any emissions within the 23.6-24.0 GHz band that appear 30 degrees or greater above the horizontal plane” by 35 dB); 47 C.F.R. . § 15.5(b) (providing that unlicensed operation under Part 15 “is subject to the conditions that no harmful interference is caused and that interference must be accepted that may be caused by the operation of an authorized radio station”).

⁴¹ NPRM at ¶ 44.

equipment under sections 15.245 and 15.249, but request that the Commission clarify its proposal to eliminate any uncertainty. The certification of new 24 GHz narrowband vehicular radar equipment has not been phased out in Europe or anywhere else in the world.

V. THE FCC SHOULD NOT ALLOW ANY NEW FIXED OPERATIONS IN THE 76-81 GHZ BAND BEFORE CONFIRMING THAT THEY WILL NOT INTERFERE WITH VEHICULAR RADAR.

The Commission seeks comment on whether to allow fixed infrastructure radar to operate within the 76-81 GHz range and proposes to allocate a single one gigahertz band for such use.⁴² The Commission suggests that “a bandwidth of 1 gigahertz or less would appear to be sufficient for these fixed radars” and proposes to allow their operation in the 76-77 GHz band.⁴³ However, the Commission should refrain from allowing new fixed radar operations in the 76-81 GHz band until it is established that they can coexist in that band with vehicular radars.

Serious concerns exist regarding the ability of fixed infrastructure and vehicular radar to share the 76-81 GHz band without interference. Throughout this and other proceedings, the automobile industry has warned that fixed infrastructure radar can interfere with vehicular radar in a way that would create serious safety concerns for motorists.⁴⁴ Moreover, as the Commission acknowledges, the More Safety for All by Radar Interference Mitigation (“MOSARIM”) study has suggested that vehicular radars and fixed infrastructure radars are, in fact, incompatible.⁴⁵ Among other things, the MOSARIM study concluded that fixed roadside radar systems are “a

⁴² See NPRM at ¶ 55.

⁴³ See *id.*

⁴⁴ See, e.g., Alliance of Automobile Manufacturers, Inc., Opposition, ET Docket Nos. 11-90 and 10-28, RM-11555 (filed Dec. 3, 2012); Delphi, Opposition, ET Docket Nos. 11-90 and 10-28 (filed Dec. 3, 2012); Comments of Toyota, ET Docket Nos. 11-90 and 10-68, RM-11555, at 6-9 (filed July 18, 2011).

⁴⁵ See NPRM at ¶ 53; see also, e.g., Robert Bosch, Opposition, ET Docket No. 10-28, RM-1190, at 2-3 (filed Dec. 11, 2012).

significant interference threa[t] to automotive radars.”⁴⁶ Meanwhile, it is unclear whether a new fixed radar allocation in the 76-81 GHz band is needed.

Consequently, the Commission should decline to allow fixed infrastructure radars to operate in the 76-81 GHz band until follow-up testing is completed. Although the MOSARIM study considered fixed infrastructure radar to vehicular radar interference, it did not focus on or examine that issue extensively. Instead, the MOSARIM study was designed to primarily test vehicular radar to vehicular radar interference. However, follow-up testing is underway that, unlike the MOSARIM study, will focus primarily on the potential for interference between fixed infrastructure radar and vehicular radar.⁴⁷ Specifically, CEPT is preparing theoretical studies and a measurement campaign to assess the potential for coexistence between fixed and vehicular radars.⁴⁸ CEPT’s Electronic Communications Committee’s (“ECC”) Working Group on Spectrum Engineering (“SE24”) was scheduled to begin this testing in March 2015 and anticipates that a final report will be available in December 2015.⁴⁹ In view of the work underway, the Commission should not issue any decisions allowing new fixed radar applications in the 76-81 GHz band until the final report has been released and the Commission has had an opportunity to review and evaluate comments regarding that report. In that way, the Commission’s ultimate conclusions regarding the possibility of fixed radar/vehicular radar

⁴⁶ See, e.g., The MOSARIM Consortium, *Results of Interference Tests Between Automotive Radar Systems and Navtech Traffic Monitoring System*, at 11 (Nov. 30, 2012), available at <https://assrv1.haw-aw.de/index.php/dataexchange/func-startdown/1319>.

⁴⁷ See CEPT Electronic Communications Committee, SRDMG#61 Results (Apr. 7, 2014, 4:24 p.m.), <http://www.cept.org/ecc/groups/ecc/wg-fm/srdmg/page/srdmg61-results-2-4-april-2014> (confirming that these tests will “only be performed on fixed transport infrastructure radars operating in 76-77 GHz with regard to the co-existence with vehicular radars”).

⁴⁸ See, e.g., CEPT Electronic Communications Committee, Outcome of the 80th Meeting of SE24 (Dec. 10, 2014, 5:00 p.m.), <http://www.cept.org/ecc/groups/ecc/wg-se/se-24/page/outcome-of-the-80th-meeting-of-se24>.

⁴⁹ See *id.*

coexistence in the 76-81 GHz band would be better informed and more likely to have considered the myriad coexistence challenges involved.

If, however, the Commission declines to wait for the outcome of this additional testing before allowing fixed infrastructure radar to operate in the 76-81 GHz band, it should at least allocate fixed infrastructure radar to a one gigahertz frequency range other than the 76-77 GHz band. Some of the most critical vehicular radar applications, such as emergency braking systems, operate in the 76-77 GHz band. The Commission should avoid risking interference to these applications to the maximum extent possible. In addition, to whatever extent fixed infrastructure radar is allowed to operate in the 76-81 GHz band, it should have an allocation that is subordinate to vehicular radar's and be required to disclose its location to minimize the risk of harmful interference. For instance, fixed infrastructure radar could be allowed on an unlicensed basis under Part 15 of the Commission's rules or as a secondary authorized service, and be subject to a site-based licensing or registration requirement.

VI. EXTENDING THE AMATEUR RADIO SERVICE SUSPENSION TO THE ENTIRE 76-81 GHZ BAND WOULD HELP AVOID HARMFUL INTERFERENCE TO VEHICULAR RADAR.

The Commission seeks comment on extending the suspension of 76-77 GHz amateur radio operations to the entire 76-81 GHz band, tentatively concluding that there is no technical reason to treat the 76-77 GHz and the 77-81 GHz bands differently.⁵⁰ We agree that there is no technical reason to treat the 76-77 GHz and the 77-81 GHz bands differently in this context and accordingly support the Commission's proposal.

⁵⁰ See NPRM at ¶ 63.

Although Robert Bosch, LLC (“Bosch”) has stated that it is “unconcerned” about interference from Amateur Radio stations to SRRs,⁵¹ we believe that the findings of the Commission and European regulators should be considered. The Commission, for example, has found “evidence of potential interference conflicts between the amateur-satellite service and vehicular radar systems.”⁵² Because amateur stations are operated by hobbyists who can deploy anywhere and are permitted great flexibility in the type of antenna and the power they use, the Commission explained, amateur stations can be expected to cause interference to or receive interference from passing vehicular radar devices.⁵³ Similarly, the ECC has cautioned that the use of SRR may be incompatible with Amateur Radio service.⁵⁴ As a result, the ECC positioned Amateur Radio service in a different band: the 75.5-76.0 GHz band.⁵⁵

Thus, the available evidence suggests that the risk of interference to vehicular radar systems from Amateur Radio operations may be significant throughout the 76-81 GHz band. The Commission should, like the ECC, allow the Amateur Radio service to operate in the 75.5-76 GHz or in a comparable band instead of risking interference with vehicular radar systems by allowing it to operate in the entire 76-81 GHz band.

⁵¹ Bosch Petition at 28.

⁵² *See Amendment of Part 2 of the Commission’s Rules to Realign the 76-81 GHz band and the Frequency Range Above 95 GHz Consistent with International Allocation Changes*, Report and Order, 19 FCC Rcd 3212, 3218, ¶ 18 (2004).

⁵³ *See id.*

⁵⁴ *See* Electronics Communications Committee, Decision (04)03, at 3 (2004), *available at* <http://www.ero-docdb.dk/Docs/doc98/official/Pdf/ECCDec0403.pdf>.

⁵⁵ *See id.*

VII. FOREIGN OBJECT DEBRIS DETECTION OPERATIONS SHOULD REMAIN SUBJECT TO SITE-BASED LICENSING UNDER PART 90.

The Commission proposes to consolidate foreign object debris (“FOD”) detection radar operations in the 76-81 GHz band, reasoning that the limited geographic use of FOD detection radars, along with their utilization of narrow beams and the propagation characteristics of the millimeter wave bands, yields a negligible risk of interference potential between vehicular and FOD detection radars.⁵⁶

Although the Commission is correct that the limited geographic use of FOD detection radars limits their potential for interference, this mitigating factor will not be present in all circumstances. For example, in at least in some areas, FOD detection radars at airports will operate near enough to roadways to pose an interference risk to vehicular radars. Thus, even if FOD radar operations remain limited to airports, it will be necessary to know where the FOD radars are located to ensure that they are not positioned so close to roads that they cause harmful interference to vehicular radars.

Consequently, FOD detection radars should remain subject to site-based licensing under Part 90 of the Commission’s rules. If FOD radar operations are allowed to occur in the 76-81 GHz band under the Commission’s Part 95 rules, other users of the 76-81 GHz band will not have a reliable way of determining where those FOD radar operations are located. However, if FOD radar operations continue under Part 90, then the 76-81 GHz band’s other users will be able to determine FOD radars’ locations and respond appropriately.

⁵⁶ See NPRM at ¶¶ 35, 46-48 (“The narrow beams utilized by the FOD detection radars, the geographic location of operations, and the very high path losses in this region of the spectrum, should mitigate any potential interference.”).

CONCLUSION

The Commission's proposals to expand vehicular radar use in the 76-81 GHz band are fundamentally sound, and the parties to these comments support their adoption. However, the Commission should leave undisturbed current rules that allow new 24 GHz wideband and ultra-wideband vehicular radar equipment certifications, and clarify that its current rules allowing equipment certifications for new narrowband 24 GHz vehicular radar will not be changed. In addition, the Commission should ensure that the benefits of expanding vehicular radar's use within the 76-81 GHz band are not undermined by allowing other, incompatible services to also operate within the band.

Respectfully submitted,

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