

July 20, 2012

**Re. Bosch Petition for Amendment of Part 15 of the Commission's Rules
RM NO. 11666**

Delphi Automotive (Delphi) is submitting this letter in support of the Bosch petition to amend Part 15 of the Commission's rules to permit operation of vehicular radar systems in the 77-81 GHz band.

Delphi is a leading global supplier of mobile electronics and transportation systems, including powertrain, safety, thermal, electrical/electronic architecture, controls and security systems. Headquartered in Kokomo, Indiana, Delphi's Electronics and Safety Division is a leader and innovator in the design and manufacture of vehicular radar systems and has actively and consistently participated in the rulemaking process for several of FCC's rulemakings affecting such devices in recent years. Delphi has obtained a number of FCC authorizations for sale of non-licensed Part 15 automotive radar products at 10 GHz, 17 GHz, 24 GHz and 76 GHz.

Delphi is also a member of the "CSA 79 GHz Project" and the Strategic Automotive Radar Frequency Allocation (SARA) organization. Delphi Automotive supports the petition for rule making submitted by Robert Bosch, GmbH (Bosch) to modify Section 15.253 of the Commission's rules (47 C.F.R. §1.401) to permit operation of unlicensed, short-range vehicular radar systems in the 77-81 GHz band. This request is necessitated by the need to further improve automotive safety through the use of automotive radar systems.

As explained by Bosch in the request, the applications for automotive radar are expanding from the original introduction of Adaptive Cruise Control to applications that include stop & go, pedestrian detection, motorcycle detection,

collision warning, collision mitigation, blind spot detection, back-up aid, parking aid, lane change assistance, and many more. These new applications are true safety features that are designed to avoid or mitigate collisions, reduce injuries, and save lives. Bosch cites several studies in its petition that show these goals to be realistic.¹

In order to achieve these safety benefits, several factors must be addressed. Improved range resolution is required in order to separate and discriminate between several small closely spaced objects in the radar field of view. Greater bandwidth leads directly to increased range resolution. Up to 4 GHz of bandwidth is required to achieve the range resolution required for these applications.

In the US, there are two frequency ranges in use for automotive radar, the 22 – 24 GHz band (ref 24 GHz) and the 76 – 77 GHz band (ref 76 GHz). The automotive radars operating in the 24 GHz band are Ultra-Wideband Systems (UWB). The 24 GHz band in Europe is being phased out. All wideband short range radar in Europe will migrate to the 77- 81 GHz band (ref 79 GHz) by 2018 for new model certification and all 24 GHz radar are scheduled to cease operation in 2022.

Although there is no deadline for 24 GHz operation in the US, the cessation of the 24 GHz band in Europe will strongly affect the availability of new wide band safety applications for use in the US.

¹ In the request for rulemaking, Bosch cites several references to the safety benefit of automotive radar that were presented at the 21st International Technical Conference on the Enhanced Safety of Vehicles, Stuttgart, held in June of 2009 (www.esv2009.com), the following studies were presented:

(A) Daimler provided a study that showed that with its Brake Assist Plus (collision warning and partial braking) it is possible to prevent 53% of all rear-end collisions that otherwise cause injuries. To support this figure, a comparison of repair parts statistics of cars with and without radar-based functions was made. It could be clearly determined that at speed between 14 and 50 km/h could be reduced by 22%. It was also shown that the impact speed of collisions was reduced (e.g. impact speed between 14 and 45 km/h by 38%). In sum, crashes could be avoided or at least the impact speed can be reduced significantly.

(B) The Swedish Road Administration (SRA) published a study that reduction of collision impact speed by 10% would reduce the risk of fatalities by 30%.

(C) The German Insurers Accident Research (UDV) stated that autonomous partial braking could avoid 12% of all accidents. Systems with autonomous emergency (full) braking could avoid 40% of all kinds of collisions.

Further influencing the need for global harmonization; is the need for sensor suppliers to have a stable spectrum environment for product development and high sales volume to drive down cost. Lack of a harmonized band reduces the sales volume over which development costs must be amortized. The result is an increase in cost not acceptable to the average customer which further limits the potential production volume. Without a harmonized band, widespread implementation of many automotive radar based safety features is jeopardized.

Based on the European decision on 24 GHz, it may be that use of the 77 - 81 GHz band is the only way to obtain a world-wide harmonized band for new safety related automotive radar. The European Commission has already designated use of the 79 GHz band for automotive short range radar² as have Singapore, Australia³ and Russia.⁴ Investigation to the international harmonization has also started in Japan⁵. In addition, Bosch states that at the World Radio communication Conference held in Geneva 2012, an agreement was reached via Resolution 654 that could lead to an international allocation for automotive short range radar at 79 GHz in all three ITU regions.⁶

Another advantage of spectrum allocation for automotive LRR at 76-77 GHz and SRR at 71-81 is the feasibility of a single radar to support long, mid and short range applications. Given the currently available 24 GHz or 76 GHz bands, a suitable single radar solution is not practical or cost effective. The 24 GHz band

² Bosch states that the 77-81 GHz band was designated by the European Conference of Postal and Telecommunications Administrations (CEPT) as early as July 2004 for automotive radar. The European Commission has adopted the decision 2004/545/EC on the harmonization of radio spectrum in the 79 GHz range for the use of automotive radar. The harmonized standard EN 302 264 has been adopted by ETSI for short-range radar (SRR) operating in the 77-81 GHz band.

³ See Bosch request for rule making, footnote 1, page 1.

⁴ Bosch states that in October of 2010, the State Radio Frequency Committee of Russia allocated the 77-81 GHz band for automotive radar.

⁵ Bosch states that in March of 2010, the Ministry of Internal Affairs and Communications (MIC) in Japan has started a study group in the info-Communications Council for the introduction of high-resolution radar in the 77-81 GHz frequency band. In October of 2010, the State Radio Frequency Committee of Russia allocated the 77-81 GHz band for automotive radar.

⁶ See Bosch request for rulemaking page 9, paragraph 10 and Exhibit A.

has the required bandwidth, however, the allowed power is inadequate for long range applications. Additionally, the physical size of the narrow beam antenna required for long range applications negates use on automobiles. The 76 GHz band provides for adequate power, but the bandwidth limits the ability to achieve the required range resolution for short range applications. Bosch also states that due to interference effects from the higher power long range radar, it is likely that the long range applications will continue to operate in the 76-77 GHz band while short range radar will operate in the 77 – 81 GHz band. The proposed 79 GHz band lies adjacent to the existing 76 GHz band. It is highly feasible that a single radar could operate in the 76 GHz band for long range and mid range applications and in the 79 GHz band for short range applications. The same receive and transmit components could be used resulting in a significant price reduction.

Delphi recognizes the need for shared spectrum use. The Bosch petition addresses the sharing issue extensively in its petition, including the results of interference tests performed at the Radio Astronomy Service (RAS) Kitt Peak Radioastronomy Observatory in Tucson AZ.⁷ Bosch addressed the needs of and concerns of Airport Foreign Object Detection (FOD), Tank Level Probe, Radio Astronomy Service (RAS), and Amateur Radio Service (ARS). Delphi supports the conclusions reached by Bosch on these issues.⁸

Additionally, Delphi submitted comments on three recent Commission notices of proposed rulemaking.⁹ In all of these reply comments, Delphi supported the shared use of the 76 GHz band and the 79 GHz band with both LPR and FOD applications. (Delphi recommended that the shared use by FOD applications was via licensed operation rather than non-licensed part 15 operation.) In the reply comments to Dockets 11-202, and 10-23, Delphi urged the commission to

⁷ See Bosch request for rulemaking page22 and Exhibit B.

⁸ See Bosch request for rulemaking Section VII, pages 30 – 32.

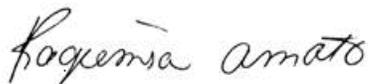
⁹ See Delphi comments to Dockets 11-90 and 10-28 dated July 14, 2011, Dockets 11-202 and 11-185 dated March 15, 2012, and Docket 10-23 dated June 6, 2012

consider the needs of automotive radar in the 79 GHz band.^{10,11} Delphi believes that with careful planning and compromise, a suitable solution to band sharing between RAS, ARS and automotive radar can be found.

Finally, in the Further Notice of Proposed Rulemaking, Docket 10-23, the commission refers to the need for harmonization of technical rules in a global society.¹² In its reply comments to Docket 10-23, Delphi stated “Delphi also agrees with the Commission’s statements of harmonizing requirements with Europe and urges the commission to take automotive radar into account when considering both the TLPR/LPR and the FOD airport applications.” Delphi urges the commission to take the economic aspects of harmonization into account when deciding on the future of automotive radar for safety applications.

Summary: Delphi supports the Bosch petition for rulemaking that requests the allocation of the 77 – 81 GHz band for short-range automotive radar. Delphi believes that frequency band harmonization is a requirement for the development of these automotive safety related products. Delphi also believes that acceptable sharing provisions can be found with RAS and ASR just as they were for FOD and LPR. Delphi urges the commission to issue a formal request for rulemaking as proposed by Bosch.

Respectively submitted,



Ragiemra Amato

Director Government/Technical Affairs

¹⁰ Delphi comments on Docket 10-23 state “Additionally, when finalizing the two NPRMs, the Commission should also take into careful consideration the expansion of automotive safety systems into the 77-81 GHz band, as already allowed in Europe.”

¹¹ Delphi comments on Docket 11-202 state “when finalizing the two NPRMs, the Commission should also take into careful consideration the expansion of automotive safety systems into the 77-81 GHz band, as already allowed in Europe.”

¹² Further Notice of Proposed Rulemaking, Docket 10-23, March 27, 2012, “To the extent practicable, these proposals would also harmonize our technical rules for LPR devices with similar European standards in an effort to improve the competitiveness of U.S. manufacturers in the global economy.