

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

MAR 1 1995

FEDERAL COMMUNICATIONS COMMISSION  
DEPARTMENT OF COMMERCE

In the Matter of )  
 )  
Amendment of Parts 2 and 15 of the )  
Commission's Rules to Permit Use )  
of Radio Frequencies Above 40 GHz )  
For New Radio Applications )

ET Docket No. 94-124  
RM-8308

To: The Commission

REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay League, Incorporated (the League), the national non-profit association of amateur radio operators in the United States, by counsel and pursuant to Section 1.415 of the Commission's Rules (47 C.F.R. §1.415), hereby respectfully submits its reply comments in response to the Notice of Proposed Rule Making (the Notice), FCC 94-273, 9 FCC Rcd. 7078, released November 8, 1994. The Notice proposes to make available a total of 16 GHz of spectrum in the frequency range between 47.2 GHz and 153 GHz for commercial use, on a shared basis with existing and future government users, and 2 GHz of spectrum in the 40.5 to 42.5 GHz band for non-government users. The League's interest in this proceeding has been in connection with the possible provisions for vehicular field disturbance sensor systems at 76-77 GHz, as part of the Intelligent Vehicle Highway Systems currently being developed by automotive manufacturers. In the interests of the Amateur Service relative to its allocations in this frequency range, the League states as follows:

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1. The Comments in this proceeding, all of which have been reviewed by the League, principally concern frequency bands other than the 76-77 GHz band currently under consideration for vehicular anti-collision radar systems. The League has no comment concerning frequency bands under consideration for LMDS or other services in frequency bands other than 76-77 GHz.

2. Comments in this proceeding concerning the use of the millimeter-wave bands for vehicular radar fall into two categories. The first, and perhaps the most significant, are those of numerous automobile manufacturers who suggest that the bands for vehicular radar should be uniform worldwide, to facilitate entry of United States Companies into global markets. The theory was stated in the Comments of the Office of Spectrum Management, NTIA, dated February 8, 1995:

Finally, both NTIA and the Commission should closely monitor the ongoing development of international allocations and technical standards for spectrum above 40 GHz, and proceed accordingly. U.S. firms will become more competitive in global markets, with ensuing benefits to the public, if U.S. spectrum allocations and technical standards are in harmonization with the international marketplace...

(NTIA Comments, at 3).

For a number of reasons, apparently the major automobile manufacturers have established the 59-61 GHz band as being optimum for vehicular anti-collision radar. Honda R&D, Ltd. and Honda R&D North America, Inc. have, for example, specifically requested that the 60-61 GHz band be made available for vehicular radar. A report

by CCIR<sup>1</sup> stated that the amount of signal attenuation in that band caused by oxygen molecules at land surface is at its greatest. This means that the possibility of interference and crosstalk is at its minimum for vehicular radars at the frequencies 60-61 GHz.

3. Honda has also completed studies with respect to the use of 60 GHz millimeter-wave radar for automobiles. Reduced interference, the opportunity for common use of parts, and the fact that there are 60 GHz systems already in place causes Honda to suggest that the 60-61 GHz band provides a good opportunity worldwide for the development of anti-collision radar. Other international automobile companies focus also on 60-61 GHz for vehicular radar, rather than 76-77 GHz. Fujitsu-Ten Limited, a manufacturer of automotive electronic devices, has been developing vehicular radars since 1972. It and other companies have explored the 50 to 70 GHz bands for millimeter wave radars due to the oxygen absorption qualities of those segments, which in turn encourages frequency re-use and minimizes interference. In Japan, the 60 GHz band is to be used for wireless LANs and broadcasting field pick-up systems, and for vehicular radars. Given the economies of scale, the band provides an opportunity for rapid development of low cost vehicular radars. Fujitsu's conclusion is that using common frequencies in Japan and the United States could enhance efficiency in vehicular radar development, and that extended target markets would allow economies of scale by higher volume production. This in turn will enable low-

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<sup>1</sup> See, CCIR Report 719-3, Report of the CCIR, Annex to V, 1990).

cost, reliable vehicular radars to be supplied to the United States market.

4. Similar comments, urging use of the 60-61 GHz band for vehicular radars, were filed by the Association for Promotion of Millimeter-Wave Development and Utilization (APMDU), which urges allocation of the 59-64 GHz band; Research and Development Center for Radio Systems (60-61 GHz); Toyota Motor Corporate Services of North America, Inc. (60-61 GHz); and the Mitsubishi Electric Corporation (60-61 GHz). While the League stated in its comments that it had no objection to the shared use of the 76-77 GHz band between amateurs and vehicular radar systems, it would appear from the comments that a better allocation plan would be to utilize the 60-61 GHz band for the same purpose instead, for the reasons set forth in these comments.

5. The other principal comment with respect to the use of shared amateur spectrum by vehicular radars at 76-77 GHz is that at least some of the proponents thereof do not believe that compatible sharing is possible. In the Notice, at paragraph 29, footnote 30, the Commission noted that the 76-77 GHz band is allocated to the Amateur Service on a secondary basis. Neither the allocation, or the Part 97 Service Rules, are to be changed by this proceeding. This was acknowledged in the comments of General Motors Corporation/GM Hughes Electronics, which provided a reasonable interference study calculation<sup>2</sup> showing the narrow boresight of the

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<sup>2</sup> See, the Comments of General Motors Corporation/GE Hughes Electronics, at pp 11-12, and Appendix B thereof.

radar antenna and the substantial power levels that the radar can tolerate at angles of arrival of an interfering signal outside a very narrow radar antenna beamwidth. This, indeed, would indicate substantial compatibility between fixed and mobile amateur use of 76-77 GHz and vehicular radar systems.

6. Other comments, however, are not so optimistic, and urge exclusive use of the 76-77 GHz band for vehicular radar, notwithstanding the rather clear statement of the Commission's intent contained in the Notice. For example, the Comments of the American Automobile Manufacturer's Association (AAMA) state, in part, as follows:

AAMA recognizes that the electromagnetic spectrum is a resource that should be shared wherever possible. However, in the implementation of devices that build on existing safety systems, it is imperative that the current level of driver safety not be degraded.

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The initial radar devices are expected to include items such as Intelligent Cruise Control which will offer the vehicle driver added comfort and convenience not available with today's cruise control systems. Other devices are expected to add to the driver comfort and convenience as well as enhanced safety during normal vehicle operation. AAMA proposes that vehicle radar systems be the only devices operating in the specified bands until further information is gained concerning interference effects of other users of the electromagnetic spectrum.

AAMA does not demonstrate that there is any incompatibility between amateur operation in the band and vehicular radar. If there is a significant potential for malfunction of a vehicular radar device from a properly operating amateur station in the same band at 76-77 GHz, then the Commission should not proceed with the allocation in any shared amateur band. This concern of AAMA would suggest that

other bands might be considered for vehicular radar instead of 76-77 GHz, such as the 60-61 GHz band, as requested by the numerous manufacturers whose comments are discussed hereinabove.

7. The comments of the Millimeter Wave Advisory Group (mmWAG) are to the same effect. In the proposed allocation table offered as a counterproposal to that set forth in the Notice, mmWAG suggests that the Commission designate, among other bands, 76-77 GHz for exclusive use by vehicular radar. The explanation offered is that mmWAG recommends that vehicular radar applications have the "exclusive use of these vehicular radar bands and use only these bands", explaining that "we feel that vehicular radar systems, licensed or unlicensed, cannot share a band with other applications."<sup>3</sup> Neither AAMA nor mmWAG offered any technical study to support their contentions. General Motors, on the other hand, submitted a thorough interference analysis, noting that the other users of the proposed vehicular radar bands would not be a likely source of interference to the radars. It would be incumbent on AAMA and mmWAG to demonstrate incompatibility, since the only evidence now in the record is that there is not a compatibility problem. However, sharing compatibility should be assessed prior to finalizing any allocation plan that involves the 76-77 GHz band. Because there are independent reasons why the 60-61 GHz band should be considered for vehicular radar instead, the League suggests that the Commission may wish to consider the latter as a useful alternative which would obviate the need for further proceedings to

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<sup>3</sup> See the comments of mmWAG, at 3-4.

establish compatibility between vehicular radar and other applications, such as amateur radio.

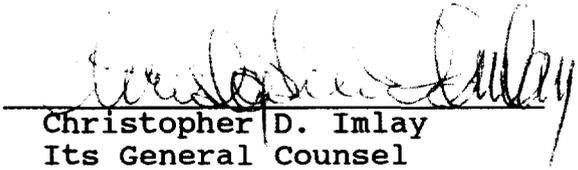
Therefore, the foregoing considered, the American Radio Relay League, Incorporated respectfully requests that the Commission take these reply comments into account in any final action in this proceeding; it should consider the 60-61 GHz band a better choice than 76-77 GHz for vehicular radars; it must in any event correct the proposed changes to the table of frequency allocations contained in the Notice, as per the League's comments in this proceeding filed January 30, 1995; and it should reaffirm its intention that amateur use of the 76-77 GHz allocation not be affected by any vehicular radar use thereof, in this proceeding or otherwise.

Respectfully submitted,

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March 1, 1995

CERTIFICATE OF SERVICE

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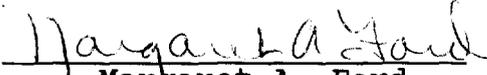
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