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December 5, 2001

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Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems
ET Docket No. 98-153
***Ex Parte* Communication**

Dear Ms. Salas:

I am writing on behalf of DaimlerChrysler and the Short Range Automotive Radar Frequency Allocation group ("SARA"), an association of automotive and automobile component manufacturers, to notify you of a series of *ex parte* meetings with FCC Commissioners and staff that occurred on Tuesday, December 4, 2001, concerning issues related to the above-referenced proceeding. A copy of the handout distributed at the meetings is attached hereto as Exhibit A.

The meetings were held to address the use of 24 GHz ultra-wideband ("UWB") automotive radar systems designed to enhance road safety. The DaimlerChrysler and SARA representatives stressed the importance of obtaining a prompt resolution of the UWB proceeding, at least as it relates to approval of 24 GHz radars. Further delay would negatively affect the deployment of these systems and the significant public safety benefits they can provide. Given that none of the 770+ comments in the record has suggested any possibility of interference by UWB 24 GHz radars to GPS or any other spectrum users, the Commission should consider bifurcation of the proceeding if it appears that controversies related to other frequency bands will result in more than a 60 day delay in the release of the UWB Report & Order.

The meeting participants also asked that the Commission authorize 24 GHz radar operations on an unlicensed basis and to clarify that multi-mode systems (i.e., those operating in different modes that comply with different sections of Part 15) are permitted. Moreover, meeting participants stressed that the Commission's

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UWB Report & Order should permit alternate modulation techniques, including both pulsed and non-pulsed systems, in order to ensure technology neutrality and healthy competition among device manufacturers. Finally, for similar reasons the meeting participants asked that the Commission clarify in its UWB Report & Order its treatment of residual carrier emissions in such a way that will not unduly limit the deployment of carrier-based pulsed UWB systems, and discussed a November 14, 2001 *ex parte* notice (attached hereto as Exhibit B) proposing options for achieving that purpose.

Those participating in the meetings at the FCC were Commissioner Michael Copps; Commissioner Kevin Martin; Commissioner Kathleen Abernathy; Peter Tenhula, Senior Legal Advisor to Chairman Powell; Bryan Tramont, Senior Legal Advisor to Commissioner Abernathy; Jordan Goldstein, Senior Legal Advisor to Commissioner Copps; Monica Desai, Legal Advisor to Commissioner Martin; Dr. Gerhard Rollmann and Dr. Volker Schmid of DaimlerChrysler AG; Daniel Selke of Mercedes-Benz USA; Tim McBride and Jake Jones of DaimlerChrysler Corporation; Josef Schuermann of JSConsulting; and Ari Fitzgerald and David Martin of Hogan & Hartson L.L.P., counsel to DaimlerChrysler and SARA.

Respectfully submitted,

Ari Q. Fitzgerald
Counsel for DaimlerChrysler
and SARA

Enclosure
cc (w/enc.): Commissioner Kathleen Abernathy
Commissioner Michael Copps
Commissioner Kevin Martin
Peter Tenhula
Bryan Tramont
Monica Desai
Jordan Goldstein

EXHIBIT A

DAIMLERCHRYSLER

24 GHz Short Range Radar

SARA

Presentation of the Short Range Automotive Radar Frequency Allocation Group:

24 GHz Short Range Radar for Automotive Applications

before the

Federal Communications Commission

December 4, 2001

Audi, BMW, DaimlerChrysler, Fiat, Ford, Jaguar, Opel / GM, Porsche, PSA Peugeot Citroën, Renault, Saab, Seat, Volkswagen, Volvo, A.D.C., Bosch, Delphi, InnoSent, Megamos, Siemens VDO, TRW, Tyco Electronics, Valeo, Visteon.

SARA GROUP

- **ACRONYM:** Short Range Automotive Radar Frequency Allocation

- **CHARTER:**
  - Coordinate Regulatory Requirements for SARA Members
  - Agree on a Common Set of Spectrum Parameters
  - Create Radio Standards to enable Certification
  - Perform or contribute to Compatibility Studies
  - Worldwide harmonization

- **MEMBERS: & Liaisons**
  - Major Car Manufacturers *(Passenger and Truck)*
  - Leading Radio Frequency System, Component Manufacturers
  - Organizations such as ACEA, CLEPA, VDA *(European & Global Auto and Auto Component Mfrs)*

Audi, BMW, DaimlerChrysler, Fiat, Ford, Jaguar, Opel / GM, Porsche, PSA Peugeot Citroën, Renault, Saab, Seat, Volkswagen, Volvo, A.D.C., Bosch, Delphi, InnoSent, Megamos, Siemens VDO, TRW, Tyco Electronics, Valeo, Visteon.

24 GHz Short Range Radar

SARA

SARA Active Members

DAIMLERCHRYSLER, BMW, FIAT, VW, JAGUAR, Porsche, PSA PEUGEOT CITROËN, RENAULT, Audi, tyco / Electronics, M/A-COM, BOSCH, Visteon, DELPHI Automotive Systems, Valeo, SIEMENS VDO Automotive, A.D.C. Automotive Distance Control Systems GmbH

SARA Supporting Members

Ford, SAAB, SEAT, OPEL, SKODA AUTO, VOLVO, megamos, TRW, KELLA, InnoSenT Innovative Sensor Technik, MAN

Audi, BMW, DaimlerChrysler, Fiat, Ford, Jaguar, Opel / GM, Porsche, PSA Peugeot Citroën, Renault, Saab, Seat, Volkswagen, Volvo, A.D.C., Bosch, Delphi, InnoSent, Megamos, Siemens VDO, TRW, Tyco Electronics, Valeo, Visteon.

24 GHz Short Range Radar

SARA

Traffic scenarios

- Accidents and pile-ups on freeways
- Rear-end collisions in dense city traffic
- Parking lot collisions

Need for accident prevention

"A death from vehicle crashes every 13 min. (injury every 14 sec.)
41,200 motor vehicle deaths per year."
(National Safety Council, *Injury Facts,* 1999)

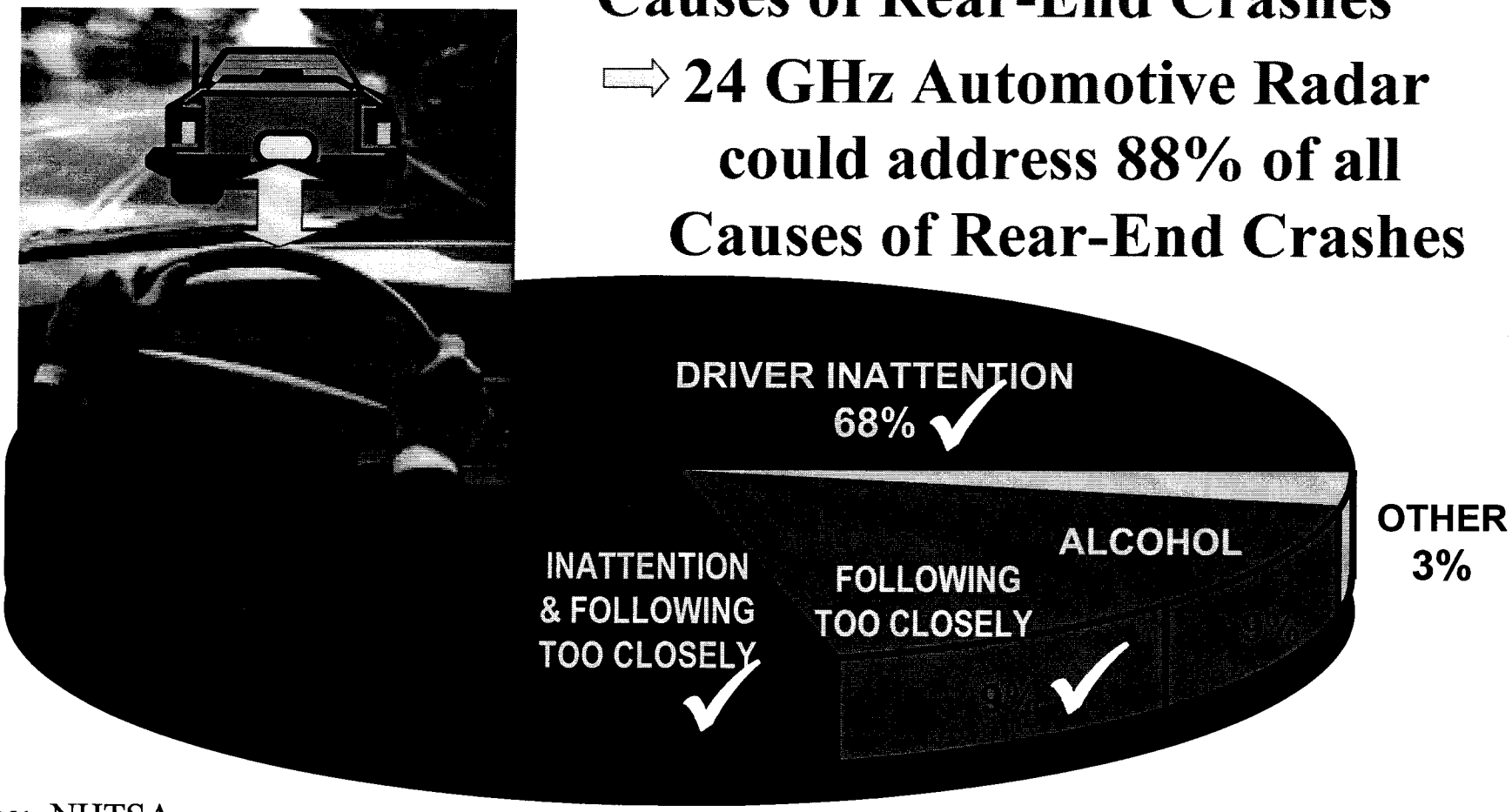
Statement of U.S.A. National Transportation Safety Board Public Meeting - 1 May 2001:

"Develop and implement .... a program to inform the public .... on the benefits, use, and effectiveness of C.W.S. and A.C.C."

(C.W.S. = collision warning system; A.C.C. = adaptive cruise control)

Causes of Rear-End Crashes

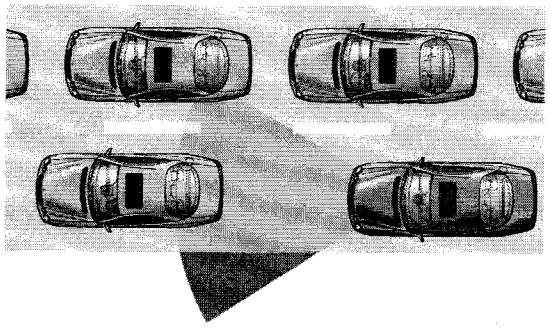
⇨ 24 GHz Automotive Radar could address 88% of all Causes of Rear-End Crashes



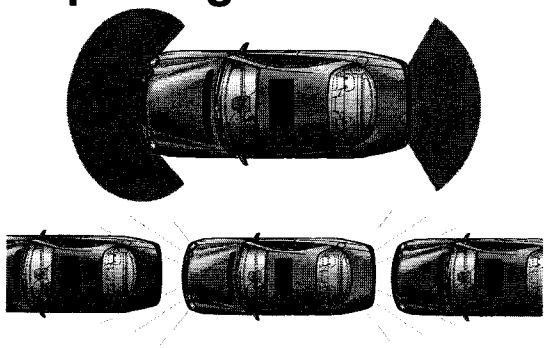
Source: NHTSA

Fields of application

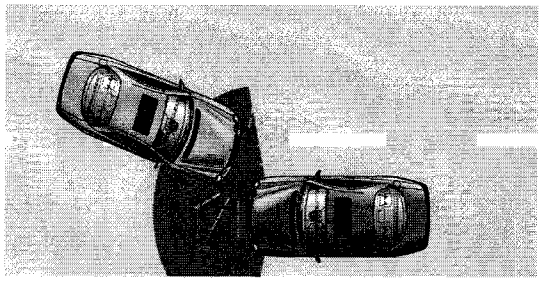
- **dense city traffic**



- **parking situations**



- **PreSafe™**

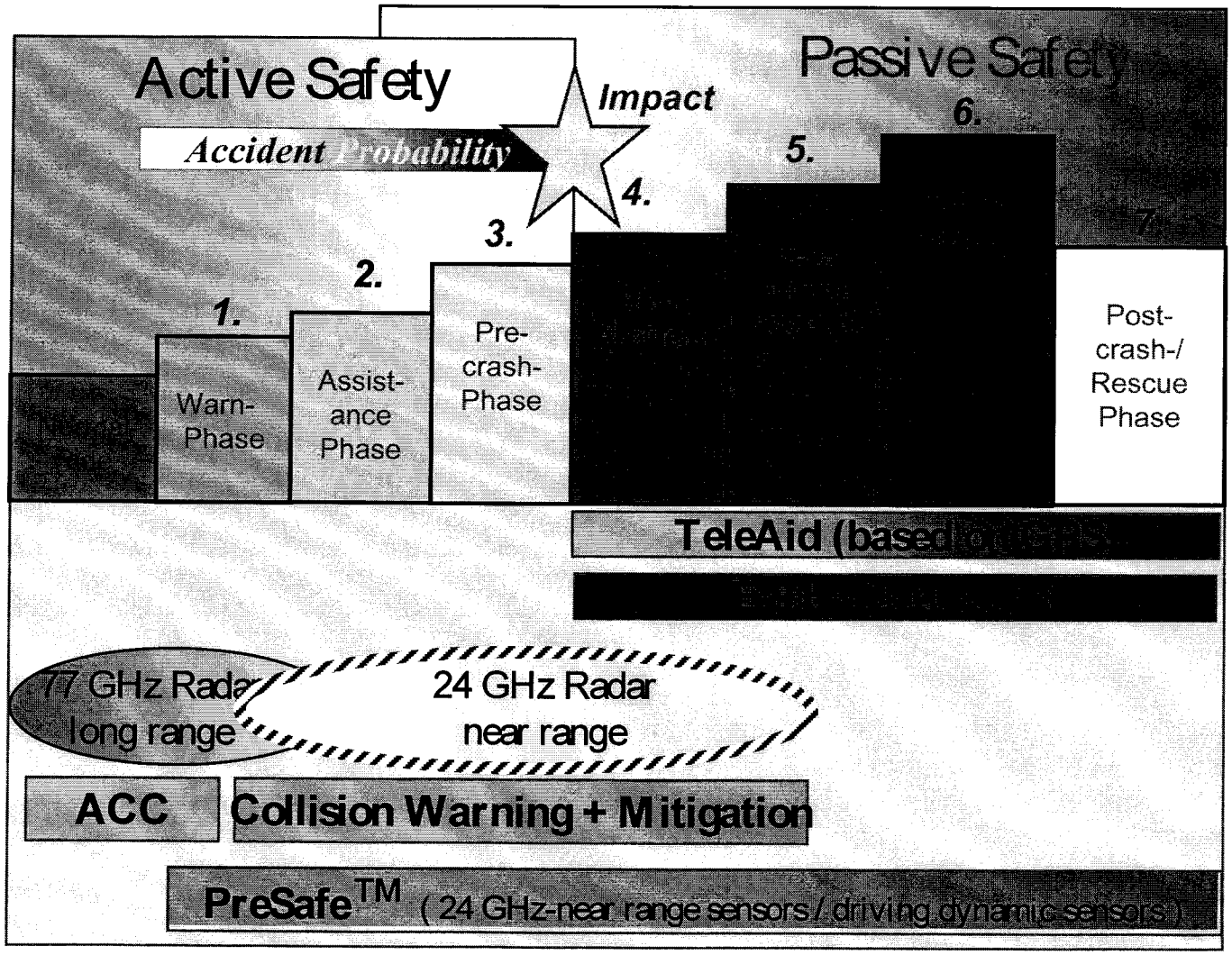


24 GHz Short Range Radar

SARA

Accident scenarios

Active Safety enabled by Radar Sensors



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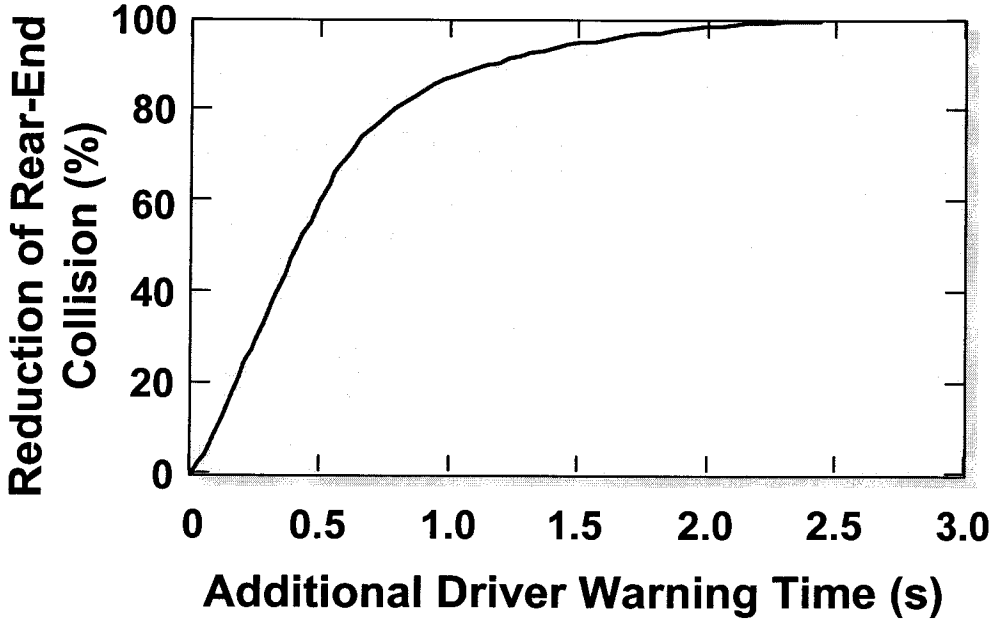
24 GHz Short Range Radar

SARA

- **"Roughly 37 to 74% of rear-end crashes are theoretically preventable by the use of headway detection systems"**
  - **Source:** R. Knipling, et al.; *Assessment of IVHS Countermeasures for Collision Avoidance: Rear End Crashes*, U.S. Dept of Transportation (NHTSA Technical Report HS807-995), Springfield, VA, 1993.
- **"Providing a driver with an additional 1-second of warning time to react can reduce rear-end collisions by nearly 90%"**
  - **Source:** Cited Daimler-Benz investigation, as reported by: Bill Siruru, "Do Collision Warning Systems Reduce Accidents", UTS, Sept/Oct 1998.

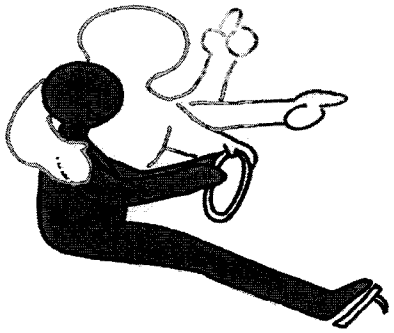


24 GHz Short Range Radar

SARA

Potential benefits
... for public traffic safety

- **sensing of the vehicle's surroundings can provide the driver with a "virtual eye"**
- **semi-autonomous vehicle control may shorten braking distances**
- **additional time for preparation of safety systems (PreSafe™)**



➔ **lower probability of crashes caused by cars with sensors**

➔ **enhanced mitigation of collision effects**

➔ **GPS necessary for E-911, no interference by 24 GHz radar expected**

- This radar system reacts 0.5 seconds faster than a human driver thus allowing 10 meters more braking distance in city traffic

➡ 60% of rear-end collisions could be avoided
(Source: Daimler-Benz study, 1992)

Advantages of 24 GHz

- Integration of moderate antenna sizes into vehicle bumpers because of acceptable attenuation through bumper material
- Permits large BW required for high resolution
- Higher power allowed in 24.0 - 24.25 GHz (Sections 15.245 & 15.249)
- Propagation losses and antenna directivity minimize risk of interference
- Economical MIC design on low cost printed circuit boards
- Affordable
  - -- Availability of off-the-shelf components from multiple sources
  - -- High volume chip production
  - -- Mature automated production processes.
  - -- Significantly lower sensor cost than 77 GHz (multiple sensors required per system)

Disadvantages of 5.8 GHz and 77 GHz

- **5.8 GHz**
  - -- Integration of large antenna sizes into vehicle bumpers not feasible
  - -- 5.0 GHz bandwidth (-20 dB) required for high resolution impractical

- **77 GHz**
  - -- Unacceptable attenuation through bumper material
    (Silver paint = 29 dB loss versus 6 dB at 24 GHz)
  - -- Existing band allocation too narrow to accommodate needed bandwidth
  - -- Cost Prohibitive
    - Low cost packaged components not available
    - Automated assembly processes not mature
    - Assembly tolerances will always result in tighter process tolerances

SARA's Requested Report & Order Decisions

In order to move forward with the development of their 24 GHz automotive radars, the members of SARA respectfully request the FCC to approve:

- **Unlicensed operation** of all 24 GHz automotive radars (FCC licensing would be cost prohibitive and is unnecessary).
- **Operation** of all 24 GHz automotive radars **in the restricted bands** covered under section 15.205 of the FCC's rules (including 23.6-24.0 GHz).
- Elimination of the pulse desensitization correction factor.
- An average emissions limit in UWB or equivalent mode of 500 microvolts/meter as measured at a distance of 3 meters (-41dBm).

Decisions Requested in UWB Report & Order

(continued)

- **Operation of a hybrid device** under:

  A) the emission mask proposed by SARA, or

  B) as a combination of the FCC's UWB emission limits and sections 15.245 and 15.249 of the FCC's rules.

- The **use of alternate modulation systems**, including non-pulsed waveforms, at 24 GHz under the same rules.

- An increase from 20dB to 30dB in the NPRM's proposed limit for UWB mode or equivalent peak to average ratio.

- A minimum bandwidth of 500 MHz, instead of 1.5 GHz.

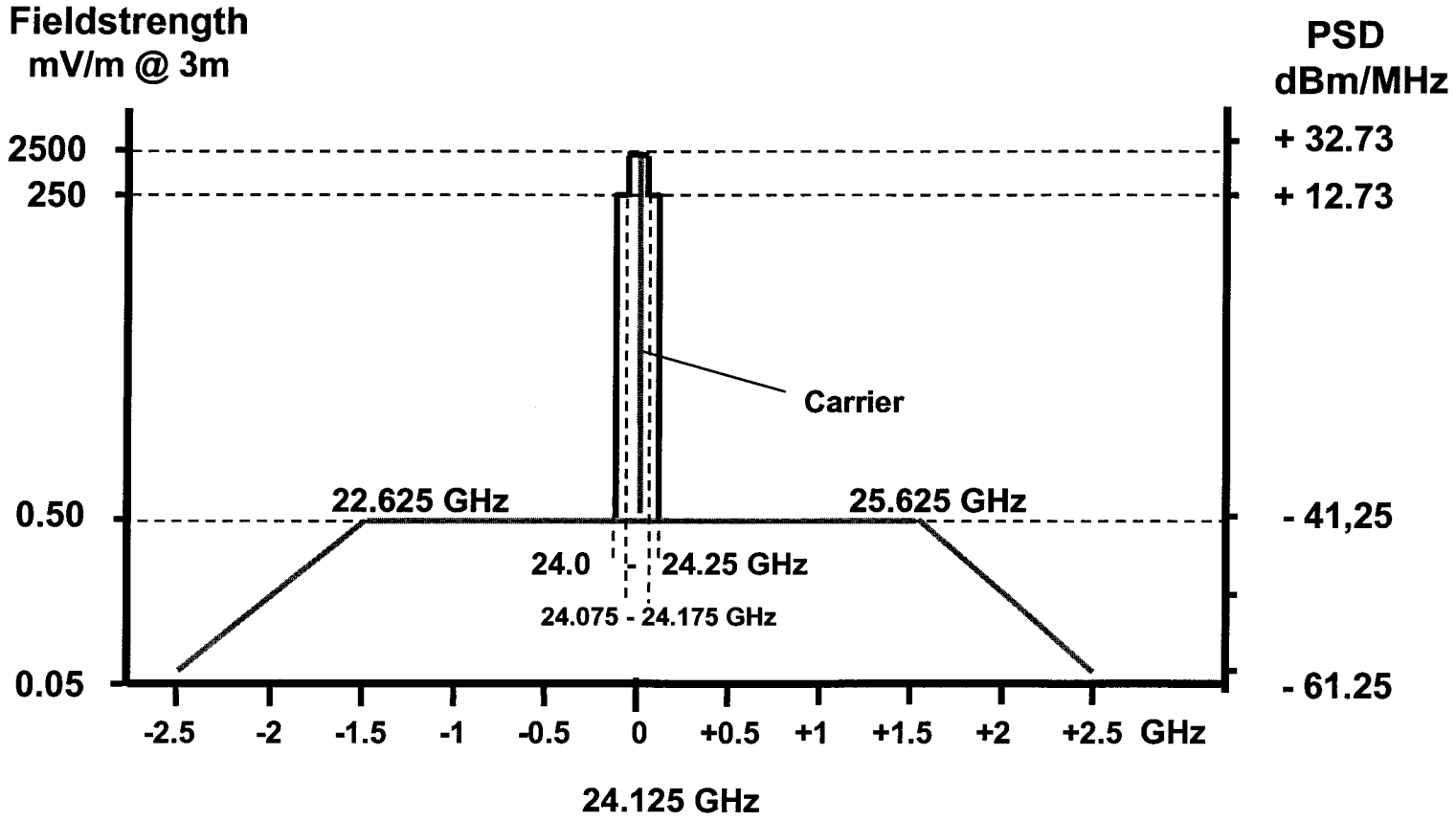
- **Clarification of the treatment of residual carrier emissions**, so as not to restrict carrier-based pulsed UWB systems.

- Release of a FCC Report & Order resolving all these issues by December 2001.

24 GHz Short Range Radar

SARA

PROPOSED SARA TRANSMITTER MASK



Conclusions

- **24 GHz UWB radar technology could improve safety on America's roads**
- **We urge prompt resolution of the UWB proceeding in a manner that allows unlicensed operations in the 24 GHz band**

Please act affirmatively to allow us

to improve Traffic Safety!

EXHIBIT B

FILE COPY

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November 14, 2001

By Hand

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Secretary
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445 Twelfth Street, S.W.
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Re: Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems
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***Ex Parte* Communication**

Dear Ms. Salas:

I am writing on behalf of the Short Range Automotive Radar Frequency Allocation group ("SARA"), an association of automotive and automobile component manufacturers, to notify you of an *ex parte* meeting with staff from the Office of Engineering and Technology ("OET") that occurred on Tuesday, November 13, 2001, concerning issues related to the above-referenced proceeding. A copy of the handout distributed at the meeting is attached hereto.

The meeting was held to address the use of 24 GHz ultra-wideband ("UWB") radar systems designed to enhance road safety. In the meeting, participants explained the operational parameters of the different radar devices proposed by SARA members. SARA's core proposals for inclusion in the Commission's forthcoming UWB Report and Order are set out on pages 12-14 of the attached presentation. In addition to these proposals, SARA particularly seeks clarification on the issues discussed below.

First, SARA does not believe the Commission intends to preclude from operation multimode 24 GHz radar systems that operate in different modes that comply with different sections of Part 15. In this instance, the 24 GHz automotive radars described in this presentation would qualify under rules promulgated in the Commission's UWB Report & Order, under 47 C.F.R. § 15.245, and/or under 47 C.F.R. § 15.249. In an effort to ensure that there is no misunderstanding on this

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point, we believe it is important for the Commission to clarify in its UWB Report & Order both of the following:

- Clarification 1: A 24 GHz radar device that operates for a pre-set time in one mode and a pre-set time in another mode may be authorized under the separate Part 15 rule parts that apply to the different modes.

- Clarification 2: A 24 GHz radar device that operates for an adaptively variable time in one mode and an adaptively variable time in another mode may be authorized under the separate Part 15 rule parts that apply to the different modes.

Second, SARA does not believe the Commission intends to limit the deployment of carrier-based pulsed UWB systems, but SARA believes clarification is necessary regarding the treatment of residual carrier emissions in light of paragraph 43 of the Commission's Notice of Proposed Rulemaking, ET Docket No. 98-153, FCC 00-163 (rel. May 11, 2000) ("NPRM"). Any of the following options would achieve the requested clarification:

- Option 1: Any 24 GHz waveform that is the sum of wideband and narrowband components is acceptable, regardless of how it is produced, provided that its spectral emission properties can be shown to be equivalent to the sum of multiple spectral emissions, each of which individually complies with 47 C.F.R. § 15.245, 47 C.F.R. § 15.249, or [the UWB emission limits to be established in the UWB Report & Order].

- Option 2: 24 GHz ultra-wideband devices with residual carrier emissions need only comply with the absolute peak limit for the emission over its entire bandwidth, and need not comply with the peak signal strength limit measured over a 50 MHz bandwidth.

- Option 3: Ultra-wideband devices with composite waveforms that include both wideband and narrowband components that fall into the 24.0 – 24.25 GHz band need only comply with the absolute peak limit for the emission over the entire wideband bandwith, and need not comply with the peak signal strength limit measured over a 50 MHz bandwidth.

The proposal contained in paragraph 58 of the NPRM does not stand as a bar to the clarifications requested above. In paragragh 58, the Commision

proposed to amend 47 C.F.R. § 15.215(c) to state that "intentional radiators operated under the provisions of 47 C.F.R. §§ 15.217-15.255 or Subpart E of the current regulations must be designed to ensure that the main lobe or necessary bandwidth, whichever is less, is contained within the frequency bands designated in those rule section[s] under which the equipment is operated." The purpose of the proposal was to prevent devices from operating at the higher power levels permitted under certain Part 15 rule sections when operating in UWB mode over a wide bandwidth outside the specific bands identified in Part 15 as suitable for higher powered use. It does not appear that the Commission's proposal was intended to restrict the use of hybrid or multimode devices that comply with discrete Part 15 rule sections (including UWB rule sections) relating to particular modes, or devices that produce composite waveforms that include both wideband and narrowband components.

If the Commission were to grant the proposals delinated in pages 12-14 of the attached presentation and issue the clarifications described above, it would make a significant contribution to improving safety on America's highways. SARA greatly appreciates the willingness of OET staff to meet with SARA to discuss these important issues. Those participating in the meeting at the FCC were Bruce Franca, Acting Chief of OET; Julius Knapp, Deputy Chief of OET; John Reed, Senior Engineer in OET; Josef Schuermann of JSConsulting; Daniel Selke of Mercedes-Benz USA; Tim Frasier and Fred Sejalon of Robert Bosch; Martin Kunert of Siemens VDO Automotive; Nicholas Morenc of Delphi Automotive Systems; Paul Zoratti of Visteon; Jeff Schaefer of M/A-COM; Jeff Krauss, consultant to M/A-COM; and Ari Fitzgerald and David Martin of Hogan & Hartson L.L.P., counsel for SARA.

Respectfully submitted,

Ari Q. Fitzgerald
Counsel for SARA

Enclosure
cc (w/enc.): Mr. Bruce Franca
Mr. Julius Knapp
Mr. John Reed