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RADIO SPECTRUM COMMITTEE

Working Document

Subject: Automotive short-range radars: third annual SRR report and request by SARA to review the EC Decision on the use of the 24 GHz band by SRR.

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1. INTRODUCTION

This document addresses the third annual report provided by SARA on the monitoring of the use of the 24 GHz band by automotive short-range radars under Commission Decision 2005/50/EC over the period from June 2007 to May 2008.

It also introduces the information document prepared by SARA (see RSCOM#24 item 12), which requests a fundamental review as provided in the text of the Decision to be initiated.

2. THIRD ANNUAL REVIEW OF THE USE OF THE 24 GHz BAND BY AUTOMOTIVE SRR

Article 5 of the 24 GHz SRR Decision establishes the need to monitor the use of 24 GHz automotive short-range radars, while the Annex describes the data necessary to perform the review of the Decision. The commitment of automotive companies using SRR to provide monitoring information is described in the Explanatory Memorandum to the Decision (RSCOM04-80Rev2) and in the Memorandum of Understanding relating to the implementation of active safety automotive short-range radars (RSCOM04-81Rev2).

Upon presentation of the first draft annual report by SARA in June 2006, the specific modalities on monitoring the 24 GHz band were agreed by RSC and the first annual report accepted. The second annual report prepared by SARA following the agreed guidelines was accepted by the RSC in its October 2007 meeting (RSC#21, see document RSCOM07-61).

The third annual SRR report is in **annex 1** to this document. The key figure in the report is that SRR-equipped cars represent as of mid-2008 approximately 0.01% of the total number of cars operating the EU¹.

This number, formally computed by KBA, the Federal German Motor Transport Authority, is well below the 7% threshold identified as potentially harmful to radio services operating in the 24 GHz range.

In the Commission services' view, the penetration trend in the last three years does not give rise to any concern that the 7% threshold could be reached before the 2013 expiry date of the EC Decision. There is therefore no need to consider remedial action in this respect.

Administrations are invited to give their views on whether the third SARA industry monitoring report pursuant to Art. 5 of EC Decision 2005/EC/50 is acceptable to the RSC.

3. REVIEW OF THE 24 GHz DECISION

Document RSCOM#24 item 12 is a submission by SARA requesting the Commission and the Radio Spectrum Committee to initiate the fundamental review of the automotive short-range radar equipment operating in the 24 GHz radio spectrum band.

Article 5.2 of the Decision states:

¹ To recall, the RSC agreed that a national breakdown of SRR penetration was not required in the first three years of SRR operation in the 24 GHz range.

"... a fundamental review shall be carried out by 31 December 2009 at the latest to verify the continuing relevance of the initial assumptions concerning the operation of automotive short-range radar in the 24 GHz range radio spectrum band, as well as to verify whether the development of automotive short-range radar technology in the 79 GHz range is progressing in such a way as to ensure that automotive short-range radar applications operating in this radio spectrum band will be readily available by 1 July 2013.

...The fundamental review may be triggered by a reasoned request by a member of the Radio Spectrum Committee, or at the Commission's own initiative."

It is clear that while the review was intended to address any harmful interference issues emerging from the operation of SRR (for instance in case the 7% upper limit of SRR penetration was under threat), its scope was not meant to be limited exclusively to such issues. The effectiveness of the current spectrum regulatory framework for enabling active safety SRR applications in the automotive sector should also be subject to consideration after the first few years of operation.

In its document, SARA advocates that neither the 24 GHz band nor the 79 GHz band, as regulated by their respective EC Decisions, are currently able to allow a full take-up of short-range radar safety applications in Europe in the short- to medium-term. It therefore proposes a possible option of "calibrating" the operation of SRR by shifting the operating range to around 26 GHz (between 24.25 and 29 GHz).

The main benefit of this approach is argued by SARA to lie in the removal of the need to limit SRR penetration and therefore its monitoring, as well as the consequent time limit on use of the spectrum. An additional advantage would be that SRR systems would not require automatic switch-off around radio astronomy sites. A shift to the upper frequency has been agreed in the US and is under consideration in other regions.

Before a decision is taken on whether this approach should be pursued in the EU, the technical feasibility of operating SRR applications without harmful interference to other users in the amended frequency range should be explored. A number of applications already operate in the frequencies above 24 GHz in Europe, notably fixed links, fixed satellite services and some military communication systems.

In order to characterise the potential interference environment of a possible operation of SRR above 24 GHz, it is expected that both CEPT and ETSI would need to undertake some dedicated work, possibly framed by Commission mandates. These exploratory activities may require some considerable time to be finalised.

The Commission services will consider carefully the proposal by SARA and the reactions of the members of the RSC. Without prejudice to the discussions in the RSC, the Commission is minded to agree to begin the formal process of fundamental review of Decision 2005/50/EC at the October 2008 meeting of RSC.

The review is the appropriate mechanism to allow the merits of the SARA proposal to be evaluated, as well as give an indication of the cost-benefits of undertaking this approach. The views of affected parties as well as alternative scenarios, such as the state of progress of SRR technology in the 79 GHz range could also be explored in more detail.

Administrations are invited to give their views on the proposal to initiate the fundamental review of EC Decision 2005/EC/50 at RSC#25 (October 2008).

Attached: SARA third annual report on 24 GHz SRR



20 June 2008

To: European Commission

From: Strategic Automotive Radar frequency Allocation group

Subject: Report on the use of the 24 GHz frequency range by automotive short-range radars as of June 2008

The Strategic Automotive Radar frequency Allocation group (SARA)² pledged in a Memorandum of Understanding (MoU) to provide information on 24 GHz ultra-wideband short range radar (SRR) to assist the monitoring required in Commission Decision 2005/50/EC (the Decision).³ This third report is submitted for the period June 2007 to end of May 2008, and has been compiled in accordance with agreed procedures stated in Doc. RSCOM06-54, dated 16 June 2006, from SARA. As detailed below, SARA reports that penetration of SRR-equipped vehicles is about 0.01% of the total number of vehicles in the European Union as of the end of May 2008.⁴

² SARA was formed in 2001 as the Short Range Automotive Radar Frequency Allocation group; its mission to seek global harmonization of regulations and standards to enhance road safety through UWB SRR. In 2007 it reformed as the Strategic Automotive Radar frequency Allocation group, under the same acronym, to continue long term efforts towards effective frequency regulations worldwide for automotive radar in general.

³ Commission Decision of 17 January 2005 on the harmonisation of the 24 GHz range radio spectrum band for the time-limited use by automotive short range radar equipment in the Community, O.J. L 21, 25 January 2005, page 15.

⁴ This report contains no business-confidential information and can be made publicly available.

Overview

Monitoring of SRR implementation is required in Article 5 of the Decision in order to ensure that there is sufficient information to verify that no harmful interference is caused to other users of the 24 GHz band, which primarily is assured by verifying that the total number of vehicles equipped with SRR does not exceed 7% of the total automotive fleet. The type of information required is described in Article 5 and the annex to the Decision, and in sections 17 through 19 of the MoU.

This document is the third annual report to be submitted. Sales of SRR-equipped vehicles are consistent with the assessment submitted by the Commission Services to RSC#15 that

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the uptake of 24 GHz SRR technology, while considered by the Commission as a very useful and instructive commercial demonstration of the concept of active road safety via technology (and of a pro-innovation spectrum policy), has been extremely limited to date.⁵

At this time, two manufacturers have implemented 24 GHz SRR into various model lines in Europe. Due to the regulatory constraints established under the Decision the number of SRR-equipped vehicles remains far below the 7% limit in Europe. As described to RSC#15, “it can already be stated now that the possibility of the 7% threshold for SRR-equipped cars being reached in any Member State by 2013 is very small.”

Current Report on Vehicle Penetration

In its second report, SARA informed the RSCom that the data collecting unit of the Kraftfahrt-Bundesamt (KBA – Federal German Motor Transport Authority) submitted figures for the combined sales of cars equipped with 24 GHz SRR, which showed that cumulatively from the beginning of the program between 22,000 and 24,000 SRR-equipped vehicles had been produced for Europe, as of the end of May 2007. Based on

⁵ RSCOM06-96, 24 November 2006, at un-numbered page 2. In this document, Commission Services concluded that SARA’s proposed approach towards monitoring “is considered fully satisfactory and proportionate to the objective of this activity.”

252 million vehicles in the European automotive fleet, this production represented a fleet penetration of “about 0.008%,” according to the KBA.⁶

In this third report, SARA informs the RSCoM that KBA’s data collecting unit reports that the percentage of penetration of SRR-equipped vehicles in Europe for the reporting period ending 31 May 2008 amounts to approximately 0.01.

SARA believes this level of information is a proportionate response to the requirements for this third year of monitoring, and similar detail would probably be reliable for the next reporting period so long as the magnitude of the penetration remains similar.

SARA has also undertaken further steps to verify this information. SARA conducted a survey in June 2008 of its active members to verify that (1) no company was aware of any installation or sales of 24 GHz ultra-wideband SRR in vehicles sold in the European Union, or CEPT countries in general, in addition to the sales SARA was preparing to report; and (2) no company was aware of any sales of stand alone or aftermarket 24 GHz ultra-wideband SRR equipment in the European Union or CEPT countries in general. Based on this survey and SARA’s general information on the industry status of SRR, we are confident that this report is accurate and verified.

In addition to being consistent with the Commission Services’ own assessment as noted above, these numbers are much lower than market penetration predictions that SARA submitted previously. Based on modeling of the vehicle fleet, historical registration (and deregistration) information; and experience with introduction of other safety-related technology, SARA estimated in the last report that penetration of SRR into the entire automotive fleet would remain under 3% for at least the first three to five years of the program, even if all manufacturers in Europe commenced from the outset to introduce SRR. However, the actual European market figures now make it apparent that the market is not increasing as predicted because this technology has not been widely implemented due to regulatory constraints. Based on ACEA figures, 7% of the European automotive fleet would be approximately 18,270,000 vehicles. The number of SRR-equipped vehicles as of May 2008 is a tiny proportion of this number.

⁶ As SARA pledged in earlier discussion of the monitoring process, this figure represents percentages of the entire European car fleet. In light of the numbers involved, for this report neither SARA nor KBA have attempted to “back out” the number of vehicles that might have left the fleet due to accidents or malfunctions. As noted in the KBA report in annex 1, the European fleet number is taken from the ACEA report, which we believe is the most reliable source of such information.

Technology Developments – 79 GHz SRR

On 8 July 2004, the Commission adopted Decision 2004/545/EC on harmonisation of spectrum for 79 GHz SRR. Member States were to make that spectrum available for SRR by 1 January 2005.

As part of the same survey SARA conducted on 24 GHz implementation, SARA also asked members to supply non-confidential information on 79 GHz development. We caution that some such information is confidential; SARA members do not share this amongst themselves and cannot make it public in any other fora.

In its first two reports SARA provided background details on technology programs focused on development of 79 GHz SRR technology. The KOKON project was the first step towards development of 79 GHz technology and ran until the end of August 2007 – a synopsis of the final report from the project is attached. A successor program named RoCC (Radar on Chips for Cars) will focus on commercialization of 79 GHz technology, starting in middle 2008 and expected to run for three years – early background on RoCC is attached. The goals of the project, broadly stated, are the following:

- Radar on Chip (scalable universally usable radar transceiver for Short, Mid and Long Range)
- Automobile radar technology in 76 – 81 GHz frequency range; especially also SRR in 77-81 GHz range for affordable costs
- Continuation of development of SiGe semiconductor process and MMICs (500 GHz cut-off-frequency, high integration, reduction of power dissipation, better S/N sensitivity)
- Investigations of car integration (bumper, paintings, etc.) and integrated antenna for low cost SRR
- Packaging (feasibility only)

As an indication of issues under study, one SARA member active in the bumper technology sector informed the group of its work with materials and paints. Current testing with conducting and non-conducting materials indicate that 1-2 years of experimental testing will be required to prove applicability for series production. This information indicates that in addition to sensor technology also bumper materials and paints must be developed as part of RoCC.

Other Information

SARA member Daimler A.G. has implemented SRR into certain model lines in its Mercedes-Benz brand. On 10 June, Mercedes-Benz released the attached press information describing accident study calculations showing that the combination of SRR (under the brand name DISTRONIC PLUS) with a brake assist application could reduce an average of 20% of all rear-end collisions in Germany alone. In a further 25% of all collisions, the systems could contribute to a “significant reduction” of the severity of the accident. On motorways, rear-end collisions could be prevented by an average of 36%.

These calculations were developed independently of SARA and by the car manufacturer itself, which must be particularly rigorous in any claims of accident mitigation from specific technology applications. Nevertheless, the manufacturer is sufficiently confident in the results of this technology to issue the attached information.

Mercedes-Benz notes that in Germany alone “there are over 50,000 severe rear-end collisions every year, causing death or serious injuries to around 5,700 people.” SARA suggests that if SRR technology can contribute at a minimum to reducing these collisions by 25%, then there is a compelling Community policy to encourage the widespread adoption of SRR.

Respectfully submitted,

Strategic Automotive Radar frequency Allocation group

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Attachments

1. KBA materials
2. Final Synopsis of report for KOKON program
3. Background slide on RoCC program
4. Mercedes-Benz press information, 10 June 2008

Annex 1 re KBA Report

Page 1

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Subject: Report on the use of the 24 GHz frequency range by automotive short-range radars as of June 2008

Introduction

Art. 5 of the decision 2005/50/EC requires monitoring of the use of 24 GHz frequency range by automotive short-range radars (SRR) in order to ensure that the total number of vehicles equipped with SRR does not exceed 7 % of the total automotive fleet in the European Union.

According to the concession of the Commission the annual reports of the first three years may be based on European fleet figures only.

The first report was submitted to the Commission by the **Short Range Automotive Radar Frequency Allocation group (SARA)** in July 2006 (document RSCOM06-53).

The second report- regarding the period from June 2006 to Mai 2007- was submitted in June 2007 to the Commission by the German Kraftfahrt-Bundesamt (KBA- Federal German Motor Transport Authority) in pursuit of a guaranteed independent and reliable report. As a result of this report the percentage of penetration of SRR-equipped vehicles in Europe amounted to approximately 0.008.

This document presents the third and last annual report, providing information about the level of fleet penetration of vehicles equipped with SRR in Europe. In future Member States (MS) have the obligation to evaluate the percentage on basis of the registered number of vehicles within their respective country and report the results to the Commission.

As already mentioned in earlier correspondence the KBA has been accepted by the Commission and MS as a reliable reporting authority on the percentage as described above and in future as a provider of the collected data transmitted by the manufacturers to interested MS. Up to now only 3 MS took interest in receiving this collected data.

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Annex 1 re KBA Report

- 2 -



Report

Two car manufacturers introduced 24 GHz- SRR into their production line since decision 2005/50/EC entered into force (as SARA mentioned in the first annual report, introduction of SRR into the market started in September 2005). Both manufacturers provided production data of vehicles equipped with SRR to the KBA.

Based on ACEA`s 2008 publication¹, the total number of the European automotive fleet can be approximated as of 261 million vehicles on June, 1st 2008. As a result of the data submitted by the manufacturers the percentage of penetration of SRR-equipped vehicles in Europe for the reporting period ending at May 31,2008 amounts to approximately 0.01.

As already stated in the second report this result stays on the conservative side of estimation considering the fact that ACEA`s European fleet data is incomplete: some of the EU-23-MS (eg. Hungary and Lithuania) have not delivered any data yet, so that the calculated percentage of 0.01 would be even less, if related to a complete EU-23 data basis.

Respectfully submitted,

(Claudia Bückle)

¹ http://www.acea.be/images/uploads/st/20080129_EU%20Motor%20Vehicles%20in%20use%202006.pdf



Responding to the European frequency regulations for SRR, a research project was formed with the name “Automotive High Frequency Electronics KOKON”. The project was funded by Germany. The participating companies were Daimler (Sensor requirements), Bosch and Continental Automotive (System Supplier), Atmel and Infineon (Semiconductor manufacturers).

The project addressed the sensor specification at 79 GHz, the development of chip technology and the development of a first sensor prototype. It lasted from 2004 until 2007.

Executive Synopsis (Taken from Final Statement 25 February 2008)

In the future, great importance will be given to driver assistance and systems for active and passive safety, which help to recognize dangerous situations early and therefore prevent accidents or at least reduce the severity of accidents. Traffic accidents are not an inevitable side effect of traffic and mobility, but in most cases, are consequences of preventable human failure.

If one evaluates only the economic consequences of accidents, then in Germany alone, annual property damages cost approximately 35 billion euros. In addition, according to a study by the ADAC, traffic jams on German highways cause additional economical damage (loss) of approximately a quarter billion euros. Every third traffic jam is caused by an accident.

These facts support the importance of activities to improve passive safety systems and the need for research on active safety and assisting systems in motor vehicles.

Such systems require sensors that are capable of detecting objects surrounding a vehicle. This approach creates an electronic envelope or cocoon (basis for the name of the public funded BMBF project “Kokon”) around the vehicle, which monitors dead angles, recognizes obstacles, activates protection and safety systems, detects pedestrians, protects inferior road users, enables semiautomatic driving in dense traffic (Stop and Go) or platoon driving, and assists in parking situations.

Such an electronic safety cocoon can be created with radar sensors. The first driver assistance systems for automatic distance regulation and obstacle alerts using radar (“intelligent/adaptive cruise control”) are already on the market.

Only with a substantial penetration of such systems in the vehicle fleet can the number of accidents be drastically reduced and substantial economical damage be avoided. A major proven effect of such systems is improved traffic flow and decrease of the risk of traffic jams. The economical and ecological effect deriving from these results could be immense and could preserve sustainable mobility for users of motor vehicles.

* * *

Today’s systems in Europe use Long Range Radar Sensors (LRR) operating in the frequency range 76-77 GHz and Short Range Radar sensors (SRR) in the frequency range 22-26.5 (24) GHz. In Europe the frequency allocation for SRR (UWB SRR in contrast to Narrow Band SRR, operating in the ISM-band 24-24.25 GHz) is limited in time (2013) and fleet penetration. After the middle of 2013 SRR sensors of new cars have to operate in the frequency range 77-81 GHz. In order to maintain the availability of these safety-relevant sensors in the future, two missions arise:

1. Research and development for systems with a threefold higher frequency compared to 24 GHz.
2. Development of a technology which also allows, at a higher frequency, an affordable implementation of the systems. This is a precondition that sensors can be introduced to all vehicle categories and not only in high class cars to increase road safety by their wide-spread introduction, reduce accident rates and offer increased comfort to as many drivers as possible.

One of the semi-conductor technology which fulfills these conditions is Si/SiGe (Silicon and Silicon-Germanium, respectively) technology. This technology is based on semi-conductor "mainstream" silicon that has a physical frequency limit up to 200 GHz and also offers the technological preconditions for an affordable supply of the necessary high frequency components and chips. However, this Si/SiGe-technology has to advance into in a new high frequency range which is not yet existing for mass-market applications, and in consequence requires fundamental research and development.

In parallel, specifications for the sensor used to create the "electronic envelope/cocoon" must be investigated, defined and specified, in order to determine the necessary parameters for the high frequency components and chips. For instance, the integration of HF-components and chips for short and long range radar sensors requires application of nano-electronic technologies and the development of appropriate assembling and connection techniques.

The project "Kfz Höchsthfrequenzelektronik (motor vehicle highest frequency electronic Kokon)", lasted between 1 September 2004 and 31 August 2007. The most important German semi-conductor producers (Infineon, Atmel), the most important German driver assistance developers (Bosch, Continental) and a large German car manufacturer (Daimler) worked together and were supported by competent universities and institutes. Project goal was to develop a demonstrator sample of a Long Range and a Short Range Radar sensor as a basis for transferring 24 GHz UWB SRR technology to 79 GHz with an adequate - but as far as possible reduced - risk.

* * *

Based on the results of Kokon, the following statements can be made:

- With SiGe, specifications for automobile radars to electronic components with an operating frequency of 77 GHz can be fulfilled.
- Compared to currently available GaAs-components, SiGe MMICs (Monolithic Microwave Integrated Circuits) show significant advantages regarding performance, reliability, testing technology and costs.
- SiGe opens new possibilities of integration. Continued advancements based on the results from Kokon should lead to configurable single-chip radars with integrated diagnostic possibilities.
- The use of SiGe makes integrated technologies possible that can fulfill the requirements of automobile manufacturing.

- SiGe MMICs will be used as key components for the next generation of long range radars at Robert Bosch GmbH.

* * *

The results of the Kokon project can be summarized as follows:

- World record for highest frequency electronics with SiGe technology from Infineon Technologies
- World-wide first demonstration of SiGe based HF-front-ends for automotive radar sensor system in the 76-81 GHz band and realization of MMICs
- Demonstration of the world-wide first SiGe based automotive radar technology (77 GHz long range sensor products by Bosch, 79 GHz UWB short range sensor prototypes by Continental)
- Standardization through collective specification of SiGe components.

Altogether the project is to be evaluated as very successful: it involved the entire chain from the semi-conductor, the module and system manufacturer up to the car manufacturer. A large step in the direction of economical SiGe based radar was accomplished.

KoKon developed the basic technology for SiGe sensors in the high frequency range from 76 – 81 GHz including successful demonstration of feasibility of sensor prototypes.

Annex 3 – Background on RoCC

KOKON: Automotive High Frequency Technology at 77/79 GHz

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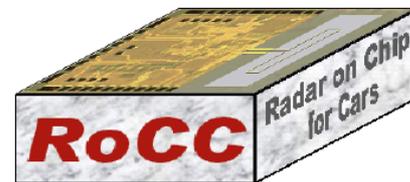
Requirements for future R & D KOKON successor project: RoCC



KOKON ⇒ first step towards availability of mature 79 GHz UWB SRR – Sensors in 2013, to fulfil the requirements of the European 2-Phase solution

RoCC

- Exploiting any potential of **cost reduction**
 - Reduction of **sensor size** and optimization of RF **packaging**
 - Further enhancement of sensor **performance** and **reliability**
 - increased sensitivity
 - higher angular resolution in azimuth
 - possibly resolution in elevation
- physical limits
→ shift to higher operational frequencies



RoCC Partners:

DAIMLER



BOSCH

Continental

Infineon

RoCC ⇔ KOKON



- GaAs => Si / SiGe
- SiGe 200 GHz
- Mehrere Technologieansätze
- HF-Section: 2,5 W
- I/Os „Single Ended“
- erste Ansätze für Built-In Test
- LRR / SRR
- 1 OEM
- 76-81 GHz
-



- Si / SiGe-MMICs => Hochintegration
- SiGe 500 GHz
- Fokussierung auf 1 Si-Basisprozeß
- 0,5 W (Systemintegration)
- voll differentielle Schaltungstechnik
- Selbsttest, -diagnose, -kalibrierung
- Multimode & Multirange
- 2 OEMs
- 76-81 GHz plus Evaluierung >100 GHz
-

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BOSCH

Continental

Infineon

translation on following page

Transition to RoCC from KOKON



- GaAs => Si Si/Ge
 - SiGe 200GHz
 - Several technology approaches
 - ..
 - I/Os
 - First Step for built-in test
 - Long and Short Range Radar
 - 1 OEM participant
 - 78 – 81 GHz
- MMIC high integration
SiGe 500 GHz
focus on 1 Si – basis process
- fully differential circuit technology
self-test, -diagnosis, -calibration
multimode and multirange
2 OEM participants
76 – 81 GHz plus evaluation of >100 GHz



[Recent Mercedes-Benz accident study calculation](#)

Press Information

20 percent fewer rear-end collisions thanks to DISTRONIC PLUS and Brake Assist PLUS

June 10, 2008

Stuttgart – DISTRONIC PLUS and Brake Assist PLUS, the Mercedes-Benz assistance systems based on sophisticated radar technology, make an effective contribution to accident prevention. This is the conclusion reached after an analysis carried out by Mercedes-Benz on the basis of representative accident research data. With the help of this technology an average of one fifth of all rear-end collisions could be prevented in Germany alone. And on motorways, rear-end collisions could be reduced even further: by an average of 36 percent. The Mercedes-Benz systems warn drivers when they are maintaining too little distance from the vehicle travelling in front and provide support in the event of emergency braking.

Engineers working for the Stuttgart-based car manufacturer have developed a procedure which for the first time makes possible a predictive calculation of the usefulness of new safety technologies. For this the specialists have taken into account both official statistics and the analysis of the approximately 16,000 traffic accidents which have so far been studied within the framework GIDAS (German In-Depth Accident Study).

The evaluation of the safety potential offered by the DISTRONIC PLUS and Brake Assist PLUS assistance systems is based on the reconstruction of more than 800 rear-end collisions. The focus of the representative study was the question: how many of those accidents could have been avoided if all the passenger cars had been equipped with this Mercedes-Benz technology?

The results confirmed the great safety effect of the systems: with DISTRONIC PLUS and Brake Assist PLUS an average of more than 20 percent of all rear-end collisions could be prevented. In a further one-quarter of all collisions the systems could contribute to a significant reduction of the severity of the accident.

The greatest safety potential is offered by the interaction of modern radar and braking technology on motorways, where around 36 percent of all rear-end collisions could be avoided.

Around 40 percent of all S-Class saloons equipped with radar technology

The DISTRONIC PLUS proximity control system keeps your vehicle at a previously chosen distance from the vehicle travelling in front and, if necessary brakes your vehicle to a complete standstill, depending on the traffic situation. If the distance to the preceding vehicle narrows down too rapidly, the system warns the driver and calculates the required brake pressure, which is then provided instantaneously by the Brake Assist PLUS system as soon as the brake pedal is depressed. Should the driver disregard the warning, the PRE-SAFE® Brake system performs an emergency partial braking manoeuvre, significantly reducing the severity of the impact.

Since 2005, Mercedes-Benz has offered these radar-based assistance systems for the S-Class, and since 2006 for the CL luxury coupé. Around 40 percent of all German customers buying new S-Class vehicles equip them with this safety technology; while the proportion of CL-Class outfitted with DISTRONIC PLUS and Brake Assist PLUS is even higher, exceeding 80 percent. Since 2005 Mercedes-Benz has delivered a total of more than 45,000 passenger cars featuring these innovative systems.

In order to calculate the safety benefits provided by this technology, Mercedes-Benz specialists make use of relevant data from the individual accidents, such as speed, distance to the other vehicle and driver's braking behaviour. With these data, together with the governing algorithms of DISTRONIC PLUS and Brake Assist PLUS, the individual speed reduction is calculated. The engineers from Mercedes-Benz decided to apply a conservative calculation principle and did not take into account, for example, the additional safety-enhancing effect of the visual and audible distance warnings which prompt the driver to apply the brakes himself if the system determines it can no longer avoid

a collision by itself. The analysis is based on the assumption that the drivers ignore these warnings.

Page 3

In Germany there are over 50,000 severe rear-end collisions every year, causing death or serious injuries to around 5,700 people. Of all the accidents involving personal injury, one in six is a rear-end collision. In the United States this accident type makes up around 30 percent of all serious traffic accidents.

The engineers of the Stuttgart-based car manufacturer continue to work tirelessly on the development of further driver assistance systems aimed at helping to prevent road accidents.

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