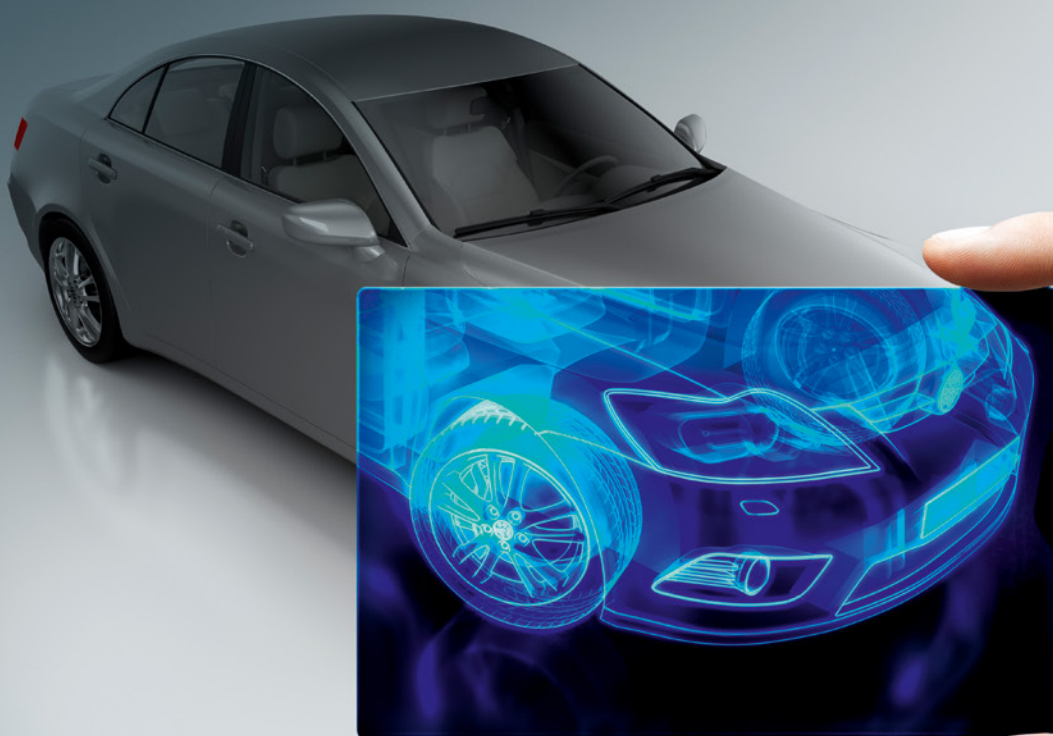


R&S®QAR at a glance

EXCELLENCE IN RADOME AND BUMPER MEASUREMENT

1 WORLD'S
FIRST
Automotive
radome tester



ROHDE & SCHWARZ

Make ideas real



SERVICE LEVEL AGREEMENTS

Every customer has different system and service requirements. In order to serve the diverse needs during R&D and production processes, various service levels are available for the R&S®QAR. Ranging from the basic level featuring a repair coverage up to a guaranteed availability in production, our service contracts can be customized to satisfy your needs.

The four flexible levels of service solutions for the R&S®QAR

<p>Basic</p> <p>Est. maximal downtime: 10 working days</p> <ul style="list-style-type: none"> ▶ Repair within 10 working days 	<p>Standard</p> <p>Est. maximal downtime: 3 working days</p> <ul style="list-style-type: none"> ▶ Spare panel from R&S pool is sent within 3 days 	<p>Advanced</p> <p>Est. maximal downtime: ~ 4 hours (installation of spare panel)</p> <ul style="list-style-type: none"> ▶ R&S spare panel on site ▶ Repair of defective panel within 10 working days 	<p>Premium</p> <p>Est. maximal downtime: ~ 4 hours (installation of spare panel)</p> <ul style="list-style-type: none"> ▶ R&S spare panel on site ▶ Spare panel from R&S pool within 3 working days to avoid "single point of failure"
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Maintenance and Support	Warranty 1 year	Basic est. maximal downtime: 10 WD	Standard est. maximal downtime: 3 WD	Advanced est. maximal downtime: 4 h	Premium est. maximal downtime: 4 h
Repair services in depot	•	10 WD (TAT)	10 WD (TAT)	10 WD (TAT)	not needed
Maintenance releases (software bug fixes)		•	•	•	•
24/7 problem reporting and overview of your requests via online ticketing system		•	•	•	•
24/7 emergency technical phone support		no time defined	6 hours	6 hours	2 hours
Technical training		•	•	•	•
Advanced replacement			3 WD	not needed	3 WD
Constant serial number		•	optional	•	•
Remote error analysis				•	•
Remote system updates				•	•
Local spare panel				•	•
Local spare parts (self-service) incl. refill		optional	•	•	•
Regular review meeting		optional	•	•	•
Status monitoring		optional	optional	optional	optional
Regular maintenance		optional	optional	optional	optional
On site support "Flatrate"		optional	optional	optional	optional
On site support "case by case" (per day for one technician)		optional	optional	optional	optional

Tailored to your needs - an overview of the key elements of R&S®QAR services.

Please contact your local sales representative to learn more about what our service team can do for you.

RADOME MEASUREMENTS

When selecting materials for bumpers and radomes, care must be taken to ensure good signal penetrability in the desired frequency band. The use of low-quality radomes can impair signals to such an extent that angular errors, distortions and strong signal attenuation occur.

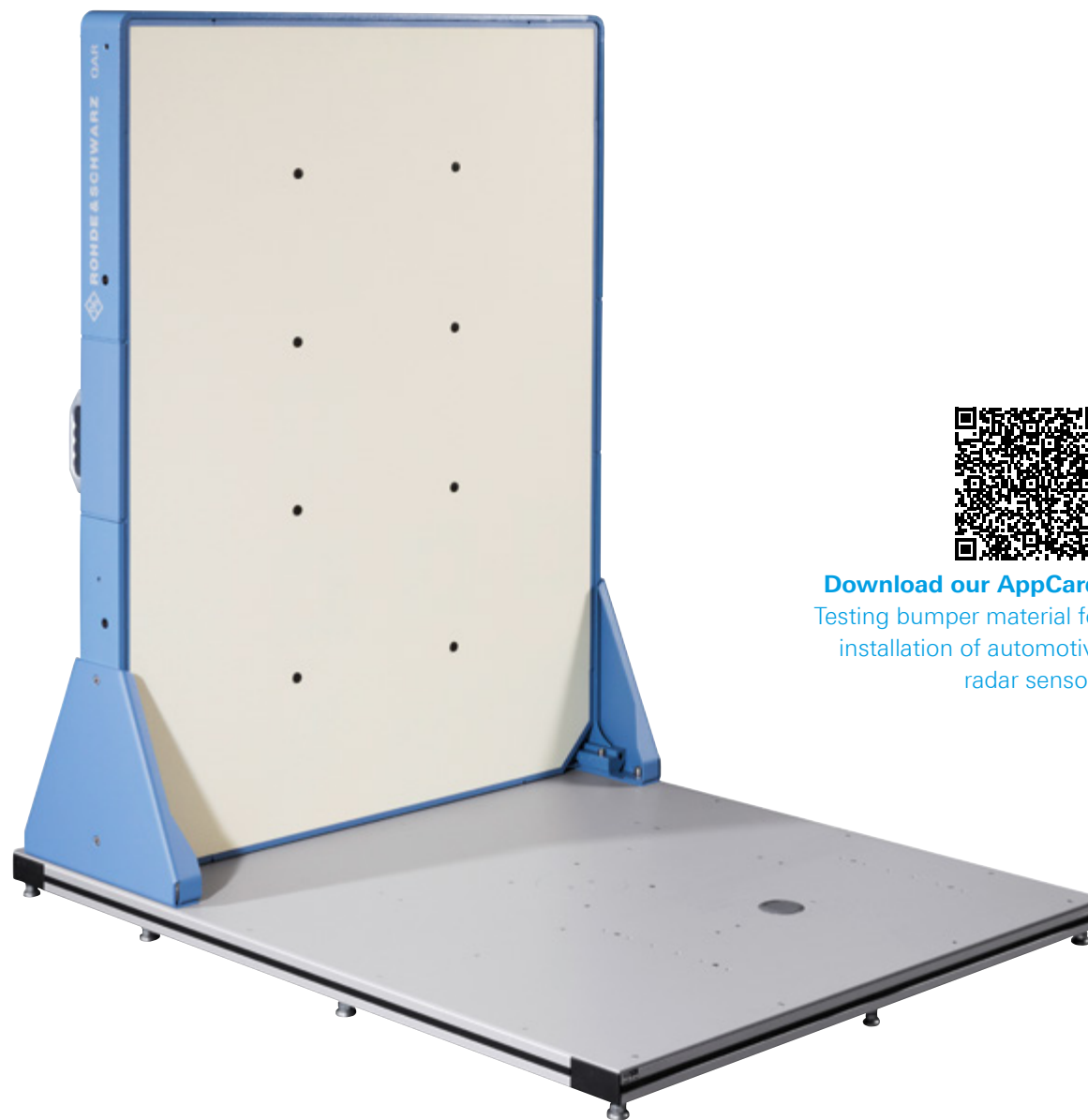
The incoming phase front is bent due to the inhomogeneity of the radome and thus causes an estimation error in the radar. The R&S®QAR provides a unique and powerful way to make this influence of the radomes visible. Fig. 1 shows the effects an inhomogeneous radome has on the linearity of the incoming phase front.

This is where the R&S®QAR is at its best: it measures the inhomogeneity of the reflectivity of the radome independent of the actual radar. This means: every transition between an area of high reflectivity and an area of low reflectivity will potentially cause problems for the radar.

The R&S®QAR makes these transitions visible and helps produce radomes with less impact on angular accuracy. Fig. 2 shows the mapping as described above for an exemplary radome.



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Quality automotive radome tester analyzes your radar integration



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Testing bumper material for installation of automotive radar sensors

BUMPER MEASUREMENTS

There is a huge difference in the manufacturing process for bumpers and design radomes. The latter consist of several layers of different materials and usually come with a shiny, metal-like layer in order to improve the optical appearance. They usually feature an eye-catching design showing the manufacturer's logo using a three-dimensional structure. In contrast, bumpers are usually molded out of a single layer of plastic covered by several layers of paint. Even though all layers of paint are rather thin, they have a significant influence on the transmission loss of the bumper. The composition of a standard bumper is shown in Fig. 4.

In order to check that the transmission loss is equal throughout the radar active area, the transmission loss of the bumper has to be measured at several positions. To save time, all measurements are performed simultaneously. Therefore, the R&S®QAR-Z60 reference reflector is used. It features 102 needles and therefore 102 transmission loss measurement points.

The imaging capabilities of the R&S®QAR are used to analyze the transmission loss at all measurement points. This allows conclusions on the homogeneity of the painting and the material, as well as on the overall radar penetrability of the bumper.

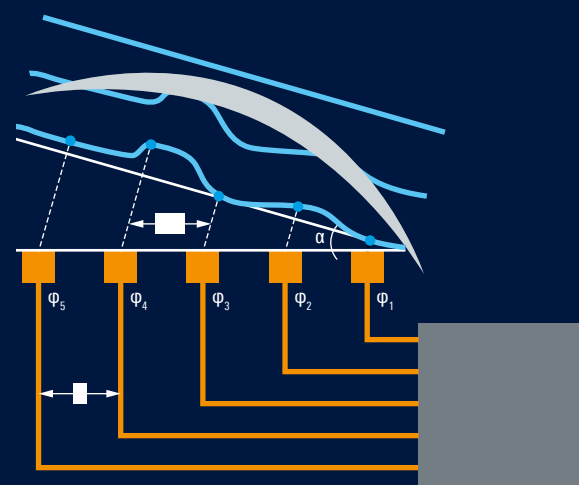


Fig. 1: Distortion of a plane wavefront by an inhomogeneous radome

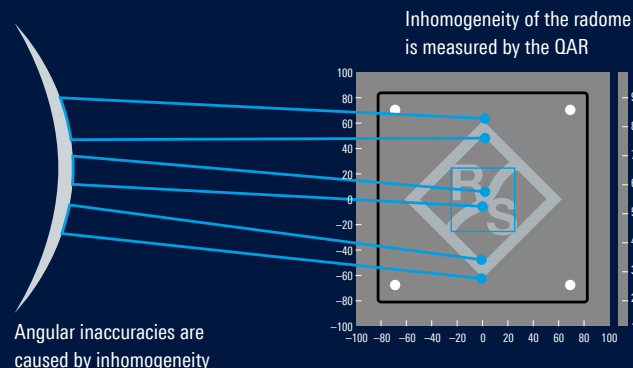


Fig. 2: Mapping of inhomogeneities of the radome to potential boresight errors

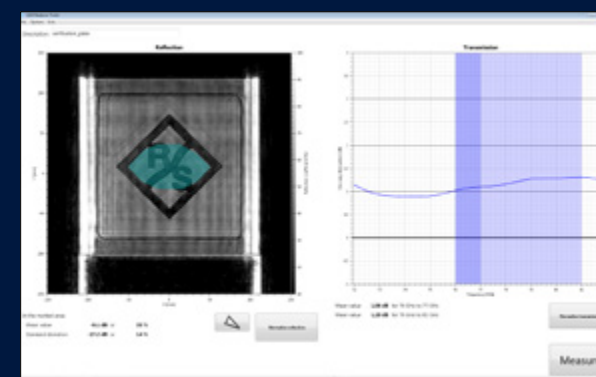


Fig. 3: Software for radome measurements

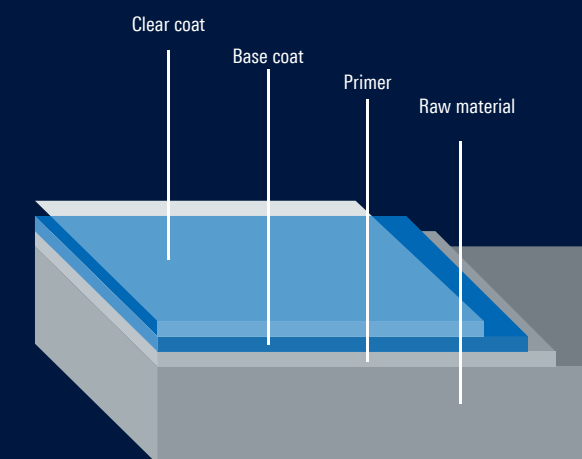


Fig. 4: Composition of a typical bumper

NEW

MOUNTING ACCURACY

There are different ways to mount a radar in a car. The current possibilities are to either hide the radar behind a design radome, use a simple radome integrated in the air intake, or mount it behind the bumper. Usually, the bumper is just clipped onto the car's frame, and one or both of the clips might not be properly tightened. In addition, the radar might not be properly mounted to the frame and is tilted a couple of degrees.

The R&S®QAR can verify the mounting accuracy of automotive radars behind bumpers and radomes without having to remove the cover.

Using the imaging capabilities of the R&S®QAR, we locate the position and orientation of the radar and the bumper and thus ensure that the radar is mounted correctly on the car and is able to look through the specified zone in the radome. The geometrical position of the radar sensor and the bumper is presented to the user in a 3D image and as numerical values.



Download our AppCard:
Determining the mounting position of automotive radar sensors

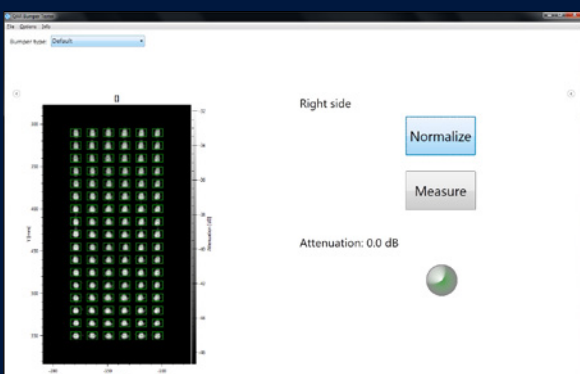
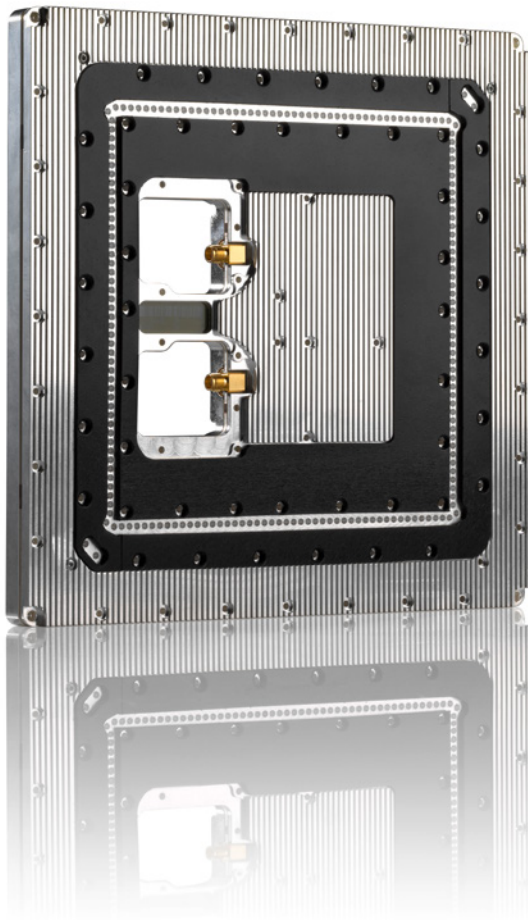


Fig. 5: Software for bumper measurements

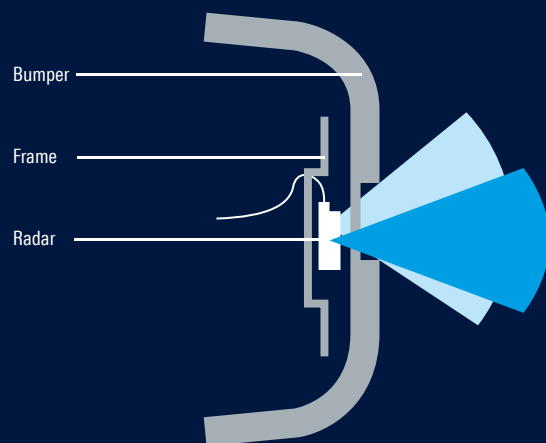


Fig. 6: The radar is mounted to the car's frame and not properly adjusted

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- ▶ Long-term dependability

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