Усовершенствованная антенная решетка QAT100

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YOUR CHALLENGE

Radar based advanced driver assistance systems (ADAS) must be rigorously tested. The long-term goal is to create near-infallible object and movement detection systems in order to enable autonomous driving.

Consequently, ADAS test requirements are particularly demanding. The use of benchtop tests or hardware-in-the-loop (HiL) setups in the validation process helps ensure that all ADAS system components work together as intended. There are multiple ways of verifying radar components in such systems:

- The simplest method requires taking the sensor out of the loop and inserting data representing radar targets directly into the system data processing. The major disadvantage of this method is that the radar sensor itself is not included in the system test.
- A more comprehensive test method includes over-the-air simulation of radar objects. This puts the sensor back into the test setup. However, conventional radar test systems are too limited in their capabilities to produce rigorous test results. Only objects coming from a single azimuth direction are simulated; testing more complex scenarios requires physically moving the antennas.

Moving the antennas causes increased wear and tear along with additional inaccuracies due to the required physical movement of the system. Fast-moving lateral targets are extremely challenging because the frontends must be moved at high speeds.

The R&S®QAT100 is a solution for simulating angular moving targets without physically moving any of the antenna components. This solution delivers a massive increase in accuracy and test setup durability along with a huge reduction in test times.

OUR SOLUTION

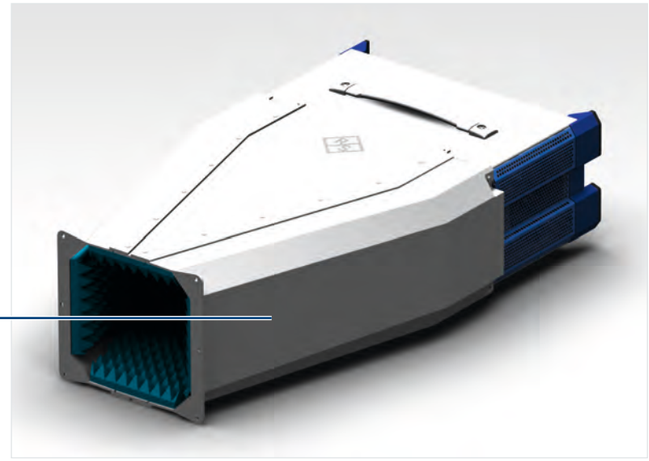
Mastering physical and technical challenges

With up to 2 × 96 individually switchable transmit antennas (with the R&S®QAT-B2 option), the R&S®QAT100 ensures high resolution, high speed and high repeatability. Electronic switching of the antennas does not produce any wear and tear on RF cables or other moving parts.

With its 4 GHz instantaneous bandwidth, support for state-of-the-art automotive radar sensors is ensured.

Shielded environment for better results

The R&S®QAT-Z50 shielding system provides a nearly interference-free RF environment that perfectly suits the R&S®QAT100. Used in lab setups, the optional R&S®QAT-Z50 provides a multipath and reflection-free environment for the radar under test.



Reduced reflections and multipath effects

The small patch antennas together with the absorber covered surface provide a clean RF frontend with very low RCS, reducing the sensor noise floor and suppressing close range targets and potential multipath reflections.

Support for advanced scenarios

Complex driving scenarios require multiple targets. An R&S®QAT100 equipped with the R&S®QAT-B2 option features two lines consisting of four independent segments each. This configuration enables connection of up to eight individually controllable IF paths to a single instrument, combining perfectly with the eight completely independent artificial objects simulated by a fully equipped R&S®AREG800A. Each of the IF paths can be steered freely within a R&S®QAT100 segment.

Scalable number of IF paths and targets

Basic tests do not require point clouds or micro-Doppler simulation, minimizing the amount of external cabling required. The four segments of each line can be either fed individually or through a common connector.

The simulated echoes from a single IF path can then be steered to one or more of the 96 transmit antennas of each TX line of the R&S®QAT100.

High angular resolution and high speed

The antenna spacing of only 3.7 mm provides a high angular resolution for realistic simulation of complex radar scenarios. Thanks to electronic switching of the antennas, it is possible to accurately simulate extremely high angular velocities with complete reproducibility.

Extremely scalable and versatile

Multiple R&S®QAT100 can be combined to increase the field of view. Synchronization of all R&S®QAT100 arrays in a multi-instrument advanced antenna array setup is ensured by the R&S®AREG800A dynamic radar echo generator, enabling simulation of complex ADAS scenarios.

SPECIFICATIONS IN BRIEF

Specifications in brief		
Frequency and bandwidth		
RF frequency range	R&S®QAT100	76 GHz to 77 GHz
		77 GHz to 81 GHz
RF instantaneous bandwidth		4 GHz
Artificial objects		
Object type		dynamic and static
Maximum number of IF paths	with R&S®QAT100	up to 4 with individual azimuth, distance, RCS, Doppler
	with R&S®QAT-B2 option	up to 8 with individual azimuth, distance, RCS, Doppler
Antennas		
Antenna configuration	with R&S®QAT100	96 TX channels
		5 RX channels
	with R&S®QAT-B2 option	192 TX channels
		5 RX channels

ORDERING INFORMATION

Designation	Type	Order No.
Advanced antenna array, base unit, including power cable and quick start guide	R&S®QAT100	1341.0004K02
Second line of 96 transmit antennas for the R&S®QAT100	R&S®QAT-B2	1341.0162.02
Shielding system, length: 50 cm	R&S®QAT-Z50	1341.0156.02

Warranty		
Base unit		3 years
All other items [1]		1 year
Service options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde&Schwarz sales office.
Extended warranty, two years	R&S®WE2	

[1] For options installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.