



# R&S® QAT100 ADVANCED ANTENNA ARRAY

## Electronically steerable frontend for qualifying automotive radar

The perfect choice for

Standalone automotive radar simulation on benchtop (function tests)

Hardware in the loop (HIL) – no mechanical movement

Vehicle-in-the-loop (VIL) tests  
Scalable and immune to vibration

Key specifications	
RF frequency range	76 GHz to 77 GHz, 77 GHz to 81 GHz
RF instantaneous bandwidth	4 GHz
Maximum number of objects (individual azimuth, distance, RCS, Doppler)	▶ Up to 4 – standard ▶ Up to 8 – with R&S®QAT-B2

Key specifications	
Object types	dynamic and static
Amplitude flatness	< ±6 dB in 4 GHz bandwidth
Group delay flatness	< 1.5 ns in 4 GHz bandwidth
Antenna configuration	▶ 5 RX, 96 TX – R&S®QAT-B11 ▶ 10 RX, 192 TX – R&S®QAT-B2 ▶ 96 RX, 96 TX – R&S®QAT-B21
Antenna polarization	linear, 45°
Operating modes	▶ <b>Mode A:</b> controlled via target simulator, e.g. R&S®AREG800A ▶ <b>Mode B:</b> standalone (with R&S®QAT-B5)
Remote control	SCPI

Your benefit	Features
No mechanical movement, vibration immunity results in precise and repeatable measurements	With its switchable transmit antennas, the R&S®QAT100 ensures high resolution, high speed and high repeatability. Electronic antenna switching means no wear and tear on RF cables and other moving parts. 4 GHz instantaneous bandwidth ensures support for state-of-the-art automotive radar sensors in the 76 GHz to 81 GHz frequency range.
Support of advanced scenarios, scalable solution	Antenna spacing of just 3.7 mm provides high angular resolution for realistic simulation of complex radar scenarios. Multiple R&S®QAT100 arrays can be combined to increase the field of view. A target simulator that simulates complex ADAS scenarios enables the synchronization of all R&S®QAT100 arrays in a multi-instrument advanced antenna array setup.
Shielded environment as well as reduced reflections and multipath effects	The R&S®QAT-Z50 and R&S®QAT-Z53 shielding systems provide an almost interference-free RF environment that perfectly suits the R&S®QAT100. Small patch antennas in combination with an 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.
Quickly perform function tests in standalone mode	Equipped with an R&S®QAT-B5 analog stepped delay line (ASDL), the R&S®QAT100 can be operated in standalone mode. In this mode, the R&S®QAT100 can simulate close-range echoes within the delay range, enabling quick and space-saving function tests.



### World's first fully electronically steerable antenna array

The R&S®QAT100 is the first fully electronically steerable antenna array for stimulating automotive radar sensors in the 76 GHz to 81 GHz frequency range. Unlike other frontends, which need to be moved mechanically to simulate targets from a certain angular direction, the R&S®QAT100 simulates radar signals by activating small patch antennas. This makes it possible to simulate quickly moving targets, e.g. cross traffic at an intersection and passing scenarios.



For more information, visit  
[www.rohde-schwarz.com/product/QAT100](http://www.rohde-schwarz.com/product/QAT100)

## R&S®QAT100 frontends

### R&S®QAT-B11: standard frontend

- ▶ 5 receive & 96 transmit antennas
- ▶ Simulation of up to 4 echoes from different directions
- ▶ Can be equipped with R&S®QAT-B2 additional TRX line + 5 RX and 96 TX → 8 echoes in total



### R&S®QAT-B21: MIMO frontend

- ▶ 96 receive & 96 transmit antennas (coupled in pairs for MIMO requirements)
- ▶ Simulation of up to 4 echoes from different directions
- ▶ Optimized for minimum phase error → Validates MIMO radars due to improved spatial resolution of an echo in three-dimensional space



## Shielding and mounting set

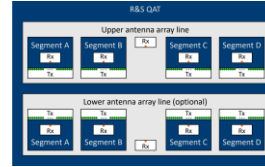


- ▶ **R&S®QAT-Z50 shielding system** – connects with the R&S®QAT100 and shields the radar from the influence of external signals
- ▶ **R&S®QAT-Z51 shielding extension** – extend the distance of the R&S®QAT-Z50 shielding system (not compatible with R&S®QAT-Z53)
- ▶ **R&S®QAT-Z53 shielding system** for three frontends
- ▶ **R&S®QAT-Z6 hinge set** for fixation of multiple frontends (2 hinges)

## Additional TRX line

### R&S®QAT-B2 additional TRX line for standard frontend

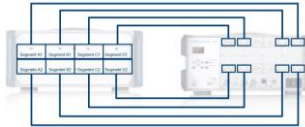
- ▶ Equip R&S®QAT-B11 frontend with a second line of transmit antennas
- ▶ Double the number of IF paths and supported objects → Simulate up to 8 echoes from different directions



With a sum connector, the R&S®QAT100 requires at least two IF lines



With eight IF lines, each segment can be connected to an individual IF path



## Step 1: choose your R&S®QAT100 base model

Model		
R&S®QAT100 advanced antenna array	R&S®QAT100	1341.0004K02 1341.0004.02

Model includes a power cord, getting started manual and one-year warranty

## Step 2: choose your hardware frontend and TRX line extension

Frontend		
Standard frontend	R&S®QAT-B11	1341.0240.11
Additional TRX line for -B11	R&S®QAT-B2	1341.0162.02
Single-line MIMO frontend	R&S®QAT-B21	1341.0240.21

## Step 3: choose your internal module

Module		
Analog stepped delay line	R&S®QAT-B5	1341.0179.02

## Analog stepped delay line

### R&S®QAT-B5 analog stepped delay line (ASDL)

- ▶ Equip R&S®QAT100 with an analog stepped delay line to reduce minimum delay line
- ▶ Allows standalone use of the instrument
- ▶ Combine with a target simulator, e.g. R&S®AREG800A, to emulate moving targets

Feature	Specifications	
Supported number of simultaneous echoes	1	
Minimum instrument delay	< 1.8 m	
Range increment	0.1 m	
Maximum instrument delay	12.9 m	
RF bandwidth supported (with R&S®QAT10)	4 GHz	
Attenuation range	60 dB	
Attenuation resolution	1 dB	

Number of supported options per frontend	R&S®QAT-B11	R&S®QAT-B21
R&S®QAT-B5	1 option	1 option
R&S®QAT-B5 + R&S®QAT-B2	2 options	---

## Step 4: choose your shielding and mounting set

Shielding system		
Shielding system	R&S®QAT-Z50	1341.0156.02
Shielding extension	R&S®QAT-Z51	1341.0185.02
Shielding trio	R&S®QAT-Z53	1341.0191.02

Mounting set		
Hinge set (2 hinges)	R&S®QAT-Z6	1341.0210.02

## Step 5: choose your cables

RF cable		
Pair of RF cables – 1 m	R&S®QAT10	1341.0227.10
Pair of RF cables – 1.5 m	R&S®QAT10	1341.0227.15
Pair of RF cables – 2 m	R&S®QAT10	1341.0227.20

One pair of RF cables – 1 m included as standard