NOFFZ TECHNOLOGIES

RADAR TEST SYSTEM

UTP 5065 RTS

FOR PRODUCTION/END-OF-LINE & CALIBRATION

PRODUCT

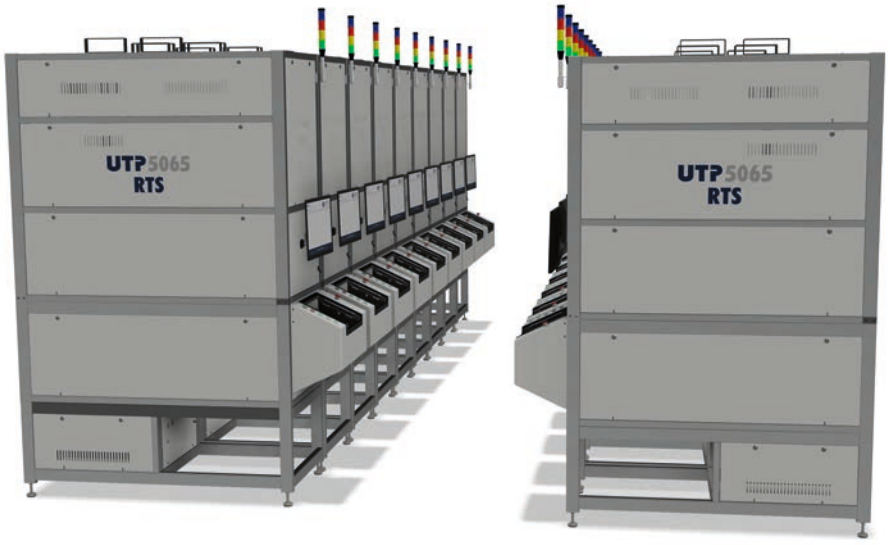
Applications: Testing of Automotive Radar Sensors, Industrial Radar Sensors such as Motion Detectors, Level Measurement and other Radar Components like Antennas, Circuit Boards and Semiconductor Components

FAST › FLEXIBLE › FOCUSED

END-OF-LINE RADAR TEST SYSTEM UTP 5065 RTS

The NOFFZ Radar Test System UTP 5065 RTS is a compact test solution which is especially developed for testing radar sensors. It is designed for use in production as an end-of-line test system with a small footprint. The test platform has a vertical design with housing dimensions of only 800 mm x 1500 mm x 2700 mm. As a result, that setup saves about 70 percent compared to alternative horizontal test solutions.

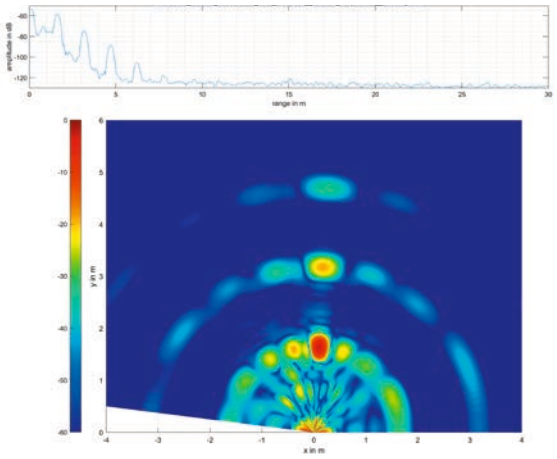
In particular, the test concept is suitable for setting up a production line where the sensor assembly can be fitted both manually or automatically.



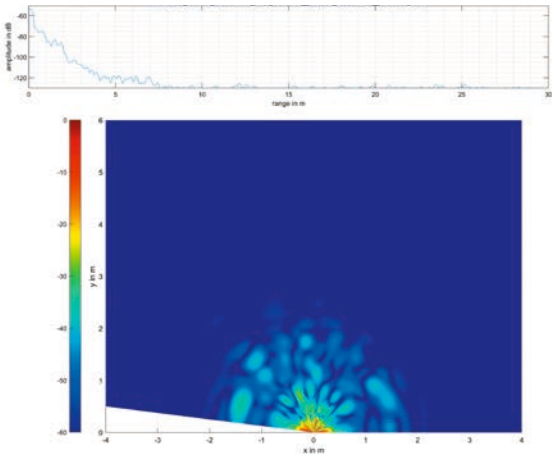
REFLECTION-FREE MEASUREMENT ENVIRONMENT

The biggest advantage of the UTP 5065 is its special test environment.

The NOFFZ measuring chamber is designed to be extremely low-reflection in order to largely suppress interfering signals and multiple reflections. To exclude these unwanted multiple reflections, an evaluation of the test chamber is carried out using raw data analysis. This enables us to achieve the uniform quality of our test systems.



Conventional measuring chamber with multiple reflections



NOFFZ measuring chamber without interference signals

SENSOR TEST PROCESS / WORKFLOW

The measurements and calibrations of test samples (DUT) are performed in a calmed, non-reflective absorber chamber.

Integrated in this test chamber is a radar target simulator. This simulator allows signal delay and conditioning of synthetic targets at different distances with individual target size (radar cross section) and variable relative velocity. The range of the target detection is between <4 m to >400 m.

The device under test is rotated automatically and precisely around the sensor beam center over two axes, in the horizontal direction (Azimuth) and vertically (Elevation) whereby the antenna will be characterized and measured (Figure 1).

In addition, the test item can be moved in the chamber with our compact DUT motion setup (Fig. 1), via goniometer (Fig. 2) or robot controlled (Fig. 3).

To ensure best possible measurement and calibration results, we have developed an alignment tool, which enables precise position synchronisation between radar sensor and radar target simulator.

Advantage: The integrated radar target simulator allows to simulate single or multiple targets in certain distances, object size and velocity in a compact test chamber environment.

Measurements

In addition to the sensor calibration, the following measurments can be performed according to customer requirements:

- **Equivalent Isotropic Radiated Power (EIRIP)**
- **Angle Dependent Signal Analysis**
- **Signal Anomalies**
- **Noise Measurement / Signal to Noise Ration (SNR)**
- **Functional Test**
- **PIN Test**
- **Waveform Analysis**
- **Pulse Width**
- **Occupied Bandwidth**
- **Center Frequency**
- **Time Domain Signal Analysis**
- **Update Rate**
- **Ramp Analysis ...**

Fig. 1: Antenna characterization over two axes in azimuth and elevation

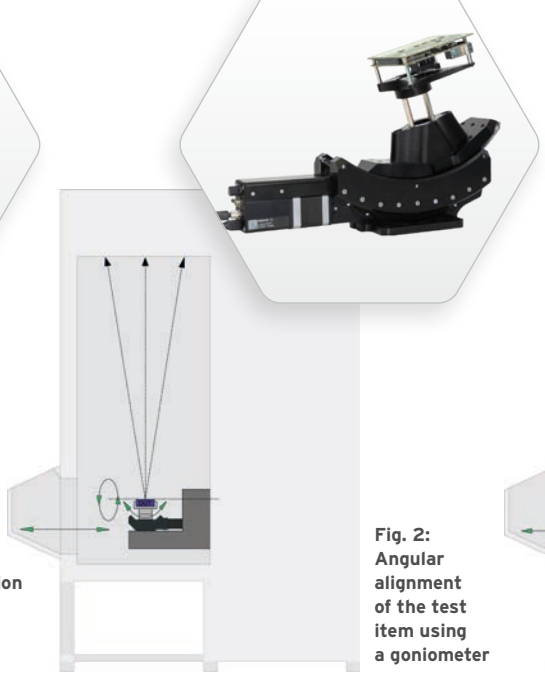


Fig. 2: Angular alignment of the test item using a goniometer

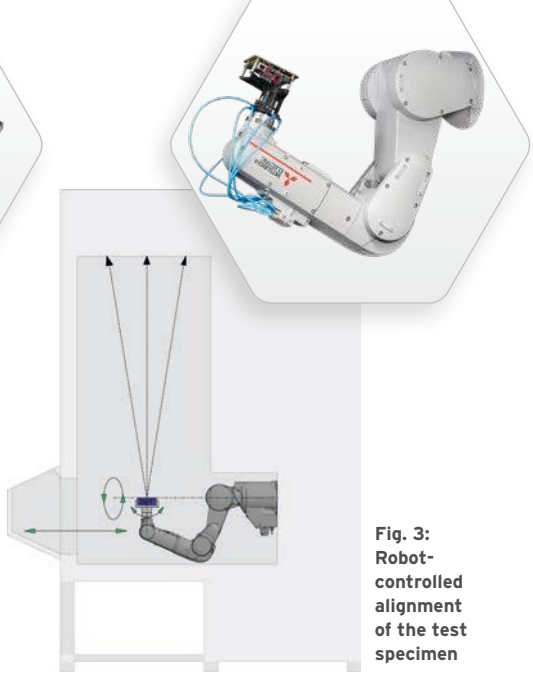


Fig. 3: Robot-controlled alignment of the test specimen

TARGET SIMULATION

For target simulation the radiated radar signal is captured by a horn antenna and converted into a digital or analog optical signal. Defined target distances are realized by digital delay or optical fiber lenghts.

The size of the simulated target is varied by changes of the power level during the return transmission. We realize the relative speed by shifting the frequency of the reflected signal.

The simulation of independent single targets is also possible. For this purpose, the transmitting antennas of the target simulator are arranged at different angles in the chamber.

Advantage: Time-saving testing of Radar Sensors in a compact environment with large target distances and different target parameters.

The integration of radar target simulators from different vendors is possible.

FURTHER APPLICATION AREAS

In addition to testing automotive radar sensors, the UTP 5065 test system is also designed for the following applications:

- Antennas with a frequency range from >6 GHz to over 80 GHz
- Antenna-bound transmitter & receiver units for the areas
  - Industrial radar sensors
  - Infotainment and WIFI
  - LTE, 4G, 5G or other ISM frequency bands
  - OTA applications (Over The Air)

FREQUENCIES

The test application has a simulation bandwidth of up to 5 GHz. The tester can cover frequency ranges between 76 GHz and 81 GHz as well as the ISM frequencies between 24.05 GHz and 24.25 GHz. Further deviating frequencies can be clarified on request.

ADVANTAGES

- Integrated Radar Target Simulator
- High precision bidirectional motion of the radar sensor in azimuth and elevation
- Front or rear operation – to allow manual or automated external DUT handling
- Very compact motion unit for the DUT
- Maximum reduction of reflections in the anechoic chamber
- Small footprint due to narrow vertical design (W 80 cm x D 150 cm x H 270 cm)
- Combining of several testers to a production line
- Simple connection to external automation i. e. pick and place units or robots

TECHNICAL DATA

	UTP 5065 RTS
Main Characteristics	
Application	High volume/Mass production End-of-Line
Automation	Test full automated, external automation on request
Load/Unload	Stand alone and automation / inline ready
- Speed	< 2 s
DUT Interface	All known automotive busses (CAN, FlexRay, Ethernet...)
Motion	Tilt / Tilt (Robot, Goniometer, Gimbal), Rotation (Rotary Stages)
- Motion Control	PLC controlled, closed loop setup Additional external encoders on request
- Axis Motion	Both axis up to ±90° (depends on motion concept)
- Motion Accuracy	< 0.01° position repeatability
Target Simulation	In angular deviating positions
- Targets	Single or multiple target simulations
- Target Range / RCS	Fixed or dynamic Target Range and Radar Cross Section (RCS) simulation
- Target Velocity	Optional
- Target Range	< 4 m ... > 400 m
- Radar Cross Section (RCS)	Variable setup
RF Performance	
Frequency	76 GHz - 81 GHz (24 GHz available on request)
Measurement Capabilities	Time domain (e.g. power) Frequency domain (e.g. OBW)
Anechoic Chamber	High reflection suppression (validated with measurement reports)
Mechanics / Power supply	
Housing Dimensions	800 x 1500 x 2700 mm (W x D x H) / Vertical setup
Weight	Approx. 550 kg
Setup	Vertical / distance between Radar sensor and Target simulator 1.0 m ... 2.5 m depending on customer requirements
Power Supply Voltage	110 / 230 VAC
Software Package (Optional)	
UTP IO	Hardware abstraction layer
UTP TEF	Operator Interface
UTP DataViewer	Statistics, First pass yield
Further available modules	I/O Viewer, I/O Plugins, API for LabVIEW and TestStand, SystemLink

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