Automotive RADAR Production Test System

YEA Engineering Automotive RADAR Production Test System (YEA-ARPT) allows Automotive Tier 1 suppliers to test the RADARs at the End-of-Line after their production - ensuring quality of each produced unit. YEA-ARPT allows to perform a variety of tests, including signal-level measurements, static and dynamic obstacle simulation as well as RADAR calibration, but at the same time utilizes minimum production-floor footprint due to its vertical design.

YEA-ARPT provides the following functionality:

- RX Antenna Array Calibration
- TX Signal Effective Isotropic Radiated Power (EIRP) Measurement
- TX Signal Occupied Bandwidth (OBW) Measurement
- Static Obstacle Simulation (independently variable Distance, Velocity, RCS, Azimuth Angle and Elevation Angle
- Scenario Simulation for Functional Test (AEB, ACC, BSD, RCTA, etc.)

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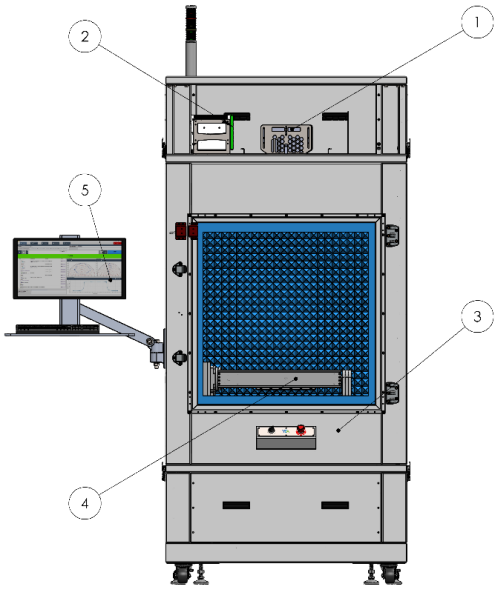
The Automotive RADAR Production Test System consists of the following main items:



1. NI Vehicle RADAR Test System (VRTS) for Obstacle Simulation
2. NI Vector Signal Transceiver (VST) for Measurements
3. YEA Anechoic Chamber
4. YEA 2-axis Rotation System
5. YEA Auto-RADAR Test Software Suite

The Key Specifications of the System are given below:

Parameter	Value
RADAR Frequency Range (for Obstacle Simulation)	76 to 81 GHz
RADAR Instantaneous Bandwidth	up to 4GHz
RADAR Frequency Range (for TX Signal Measurement)	75 to 82 GHz
EIRP Measurement Maximum Value (for Linear Operation)	+30 dBm
OBW Measurement Maximum Value	4 GHz (sweeping mode), 1 GHz (instantaneous mode)
TX Antenna Radiation Pattern Measurement Ranges (Azimuth and Elevation)	-90° to 90°
Number of Simulated Obstacles	1 (scalable up to 4)
Obstacle Distance Simulation Range	3.5 m to 300 m
Obstacle Velocity Simulation Range	0 to ± 500 km/h
Obstacle RADAR Cross-Section (RCS) Simulation Range	105 dB (50 dB, minimum)
Obstacle Azimuth Angle Simulation Range	-90° to 90°

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Obstacle Elevation Angle Simulation Range	-90° to 90° (typical -15° to 15°)
Scenario Simulation	User-Defined, within the Obstacle Simulation Ranges
RADAR under Test (RUT) Loading Type	Manual / Automatic
Anechoic Chamber Internal Dimensions (W x H x D)	915 x 1336 x 866
Anechoic Chamber Orientation	Vertical
Anechoic Chamber External Dimensions (W x H x D)	1223 x 1615 x 1163
Anechoic Chamber Frequency Range	18 GHz – 110 GHz
Anechoic Chamber Internal Reflectivity	-55 dB
Anechoic Chamber Shielding Effectiveness	>70 dB (est.)
2 axis Rotation System Rotation Range	-90° to 90°
RUT Maximum Dimensions (W x H x D)	Center of rotation ±150mm
RUT Maximum Weight	> 5Kg

Typical RUT Test Time with RX Antenna Calibration, TX Signal EIRP and OBW Measurements, TX Antenna Radiation Pattern Measurements, Obstacle Simulation and Scenario Simulation is <3 minutes (depending on user-selectable settings. System allows full-parallel Obstacle Simulation and TX Signal Measurements to minimize Test-Time.

Additional features of the System include:

- RUT Presence-Detection on the Mechanical Holder
- Chamber Door Open/Close Sensor
- Chamber Door Lock (in case the mmWave radiation is turned on)
- Signal Tower
- Connectivity to RUT via CAN and UDS
- Connectivity to external systems via USB, Ethernet and CAN

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