

# ZA0500A Radar Target Simulator

Customizable radar target simulator with flexible commercial bands for your application needs

## Introduction

The Keysight ZA0500A radar target simulator is designed to simulate targets for radar testing. It supports both 24 to 24.25 GHz and 76 to 81 GHz frequency bands, with a maximum of 4 GHz bandwidth.

The ZA0500A is a scalable and configurable target simulator with the ability to simulate range (delay), Radar Cross Section (RCS), and Doppler effect for relative object speed from 4 to 400 meters [includes a 1-meter Over the Air (OTA) distance between the device-under-test (DUT) and Front-End Module (FEM)].

This analog-technology is offered in customizable options to meet your unique industry requirements.



**Figure 1.** Keysight ZA0500A radar target simulator

# Hardware Components

The ZA0500A consists of the ZA0503A IF baseband and microwave front end modules, ZA0501A and ZA0502A.

The ZA0503A IF baseband box controls delay, RCS, and speed using signal conditioning process.

For the FEM, depending on your frequency band needs, you can choose either the 24 to 24.25 GHz (ZA0501A) or the 76 to 81 GHz (ZA0502A).

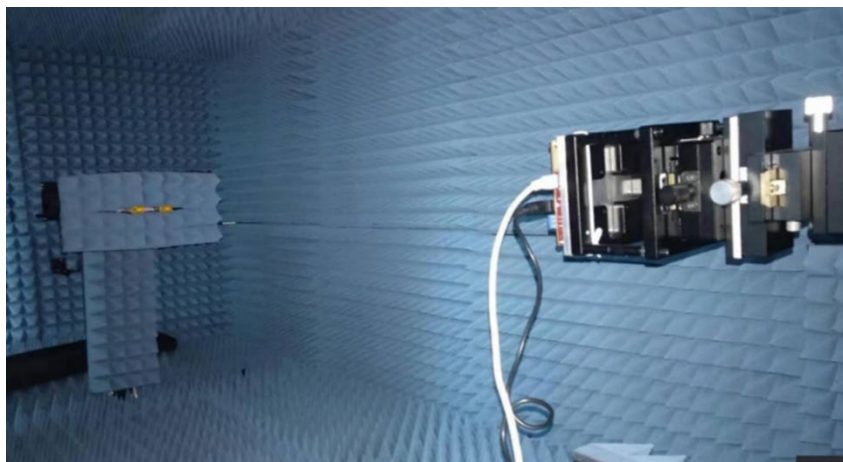


**Figure 2.** Components of the ZA0500A radar target solution (ZA0501A, ZA0502A, and ZA0503A)

The recommended distance between the ZA0500A radar target simulator and the DUT is 1 m. However, the minimum physical distance can be set to 0.5 m to effectively reduce valuable manufacturing floor space.

The ZA0503A IF baseband box controls delay, RCS, and speed with signal conditioning process. The FEM can be switched to either 24 – 24.25 GHz (ZA0501A) or 76 – 81 GHz (ZA0502A) to support different frequency bands. With a remote head, the FEM can be easily integrated to support different Angle of Arrival (AoA).

The ZA0500A provides USB and LAN SCPI interface for remote controlling. You can use sequence methodology to build the scenarios to simulate the real motion targets. A total solution package is available for motion target integration within anechoic chambers.



**Figure 3.** Motion target integration in an anechoic chamber

Figure 4 below shows the configuration solution in more detail.

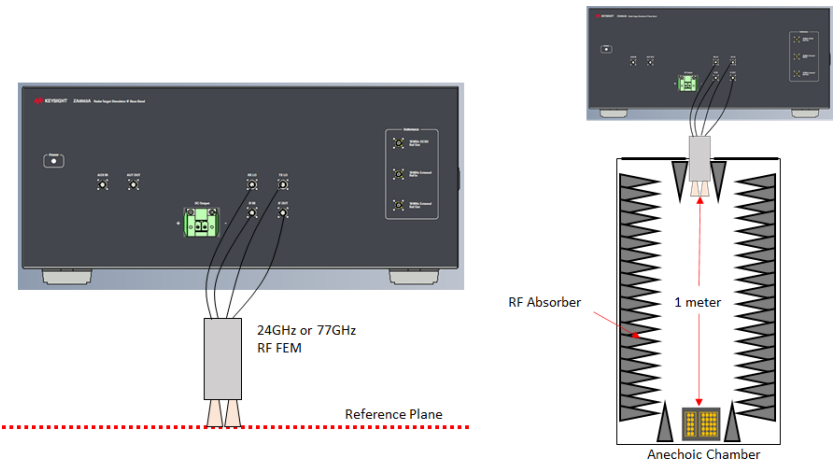


Figure 4. Solution configuration

# Soft Front Panel Software

The ZA0500A solution comes with a soft front panel that allows you to easily configure the settings you need for your radar system.

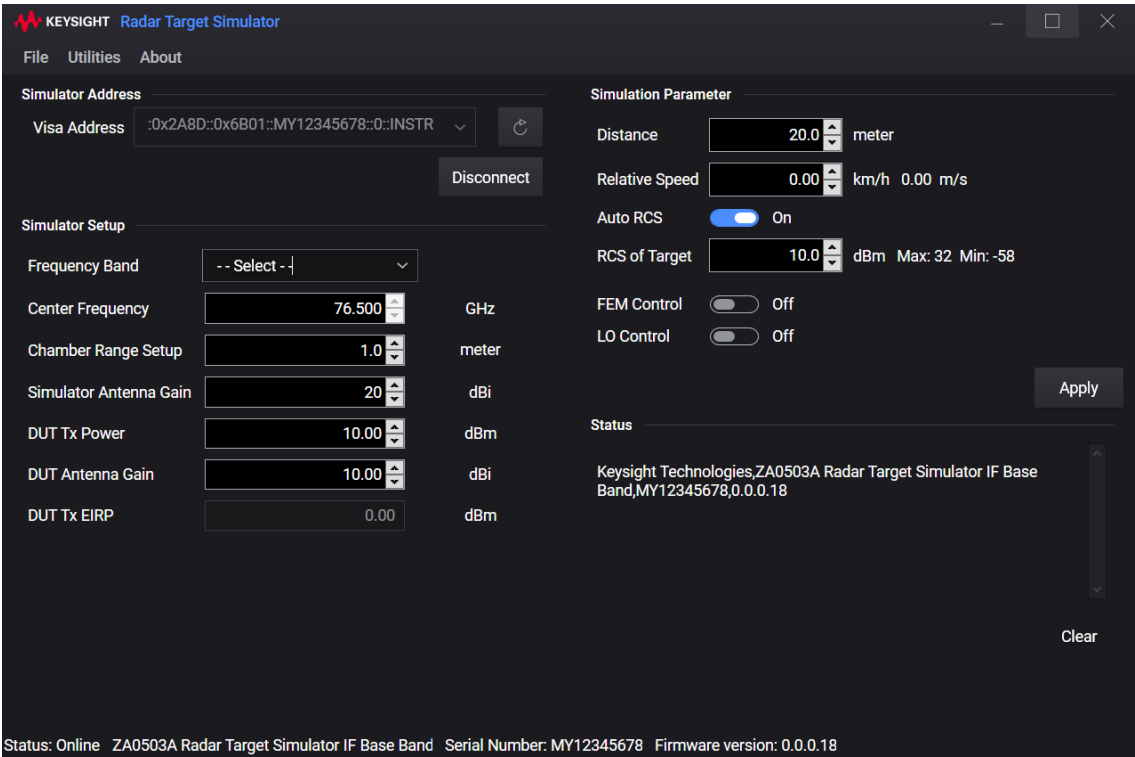


Figure 5. The ZA0500A soft front panel

# Technical Features

## Product features

Scalable solution	Available in 24 – 24.25 GHz or 76 – 81 GHz range Built-in Doppler feature for simulation of target speed Single/Dual horn antenna
Bandwidth	250 MHz bandwidth at 24 GHz 1 GHz bandwidth at 76 to 77 GHz 3 GHz bandwidth at 76 to 79 GHz 4 GHz bandwidth at 77 to 81 GHz
Simulated range	Minimum 4 m (includes 1 m OTA distance between DUT and FEM) Maximum 400 m Range step 0.1 m
Transmit/receive gain control	90 dB with 0.5 dB step
Target speed simulation	Doppler simulation Speed range $\pm 500$ km/h with 0.01 km/h step
Physical test distance	Minimum 0.5 m physical distance from ZA0500A to device-under-test Recommended physical distance: 1 m
Phase noise	-80 dBc/Hz at 10 kHz
Spurious	< -35 dBc
Modulation flatness	Typical $\pm 3$ dB at each band (Max $\pm 3.5$ dB)
No. of simultaneous targets	1 target 1 angle

## Software

Included hardware drivers	No driver is required, GUI is provided
Programming interface	SCPI

### Input ratings

ZA0503A input ratings	100/240 Vac, 50/60 Hz 150 W Max
-----------------------	------------------------------------

### Input/output power and output isolation

Input power ZA0501A/ZA0502A	Max Tx power input: -20 dBm (without antenna) Max Rx power input: -20 dBm (without antenna)
Output power ZA0501A/ZA0502A	Max Tx power output: -10 dBm (without antenna) Max Rx power output: -10 dBm (without antenna)
Output isolation	Tx/Rx isolation output: 60 dB (dual antenna option)

### Dimension and weight

Dimension (mm)	ZA0501A: Approximately 124 (L) x 188 (W) x 101 (H) without antenna ZA0502A: Approximately 124 (L) x 188 (W) x 101 (H) without antenna ZA0503A: Approximately 427 (L) x 350 (W) x 190 (H)
Weight	ZA0501A: Approximately 1.8 kg ZA0502A: Approximately 2.0 kg ZA0503A: Approximately 10.5 kg

# Environmental Conditions

The ZA0500A is designed for indoor use only. The table below shows the general environmental requirements for the ZA0500A.

Environment conditions	Description
Temperature	Operating condition: 18 to 28 °C
Humidity	Operating condition: Up to 80% relative humidity at 28 °C (non-condensing)
Operating environment	Overvoltage Category II, Pollution Degree 2

## Regulatory Information

The ZA0503A complies with the following safety compliances:

- IEC 61010-1/EN 61010-1

## Regulatory markings



This symbol indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.

# Ordering Information

## ZA0500A custom radar target simulator solution set

Part number	Description
ZA0501A	24 to 24.25 GHz front-end module
ZA0502A	76 to 81 GHz front-end module
ZA0503A	IF base band

To place an order or for more information, please contact your local Keysight representative.