



Diamond Engineering

Automated Measurement Systems

Instruction Manual



DE0540 Broadband Reference Antenna

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Introduction

Congratulations on your purchase of our antenna reference horn!

These antennas were engineered for versatility, and most specifically, for full broad band capability. A special dielectric material controls the beamwidth and associated gain. These antenna can likely be tailored to your specific needs by utilizing various lenses.

The lens system for the DE0540 series is designed for aperture frequency gain characteristics (i.e. gain increases with frequency). When used in communications, the gain compensates cable and device frequency losses. The output terminals of the DE0540 are ∞ ohms.

A special modification can be utilized so that the terminal impedance is 50 ohm from DC through 40GHz. This makes it possible use single ended amplifier stages for ultra-low noise operation which eliminates the balanced, more costly LNA. The DE0540 is capable of 50+ watts transmitted power.

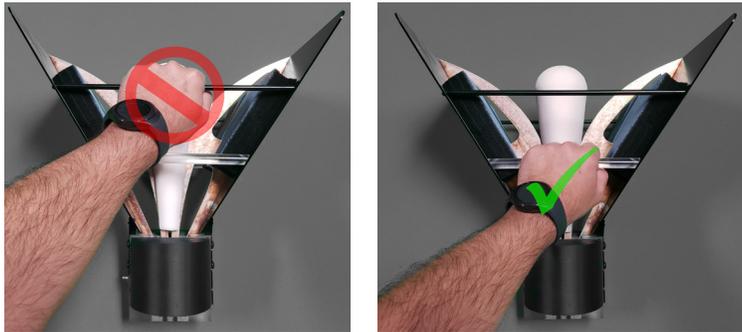


Proper Handling

CAUTION! VERY IMPORTANT!

General Handling

Be sure to always lift the antenna by the designated acrylic handle bars. Picking it up in any other way is likely to negatively effect the calibration. Never pick up the antenna by the aluminum bars nor the large side covers.



Lens Contamination

Never lift the horn by the lens! Even touching it could contaminate it with oils from your fingers. The lens is constructed of special dielectric foam. It is adhered to the horn fins with a low loss silicon compound to keep the lens stable. It's best to not get in the habit of setting the horn face down as an objects could impact the lens. Damaging the lens in any way will likely render it useless. Be very careful.

Connection Handling

The DE0540 utilizes Type K connectors. Always measure your cable or adapters for center pin protrusion. Internally, the K connector pin is flush with the rexolite and the antenna body. This can be damaged by mating with a protruding SMA pin. Be sure to use a connector micrometer on all adapters and cables prior to connecting to the antenna.

Absorber

Be mindful of the absorber. The DE0540 utilizes mode attenuation by using specially layered carbon-based absorber. The alternation or modification of the absorber will not affect the majority of the calibration frequencies; however, some frequencies may be affected. In general, it's best to avoid interaction with the absorber altogether.

Basic Operational Test

Ohm Verification

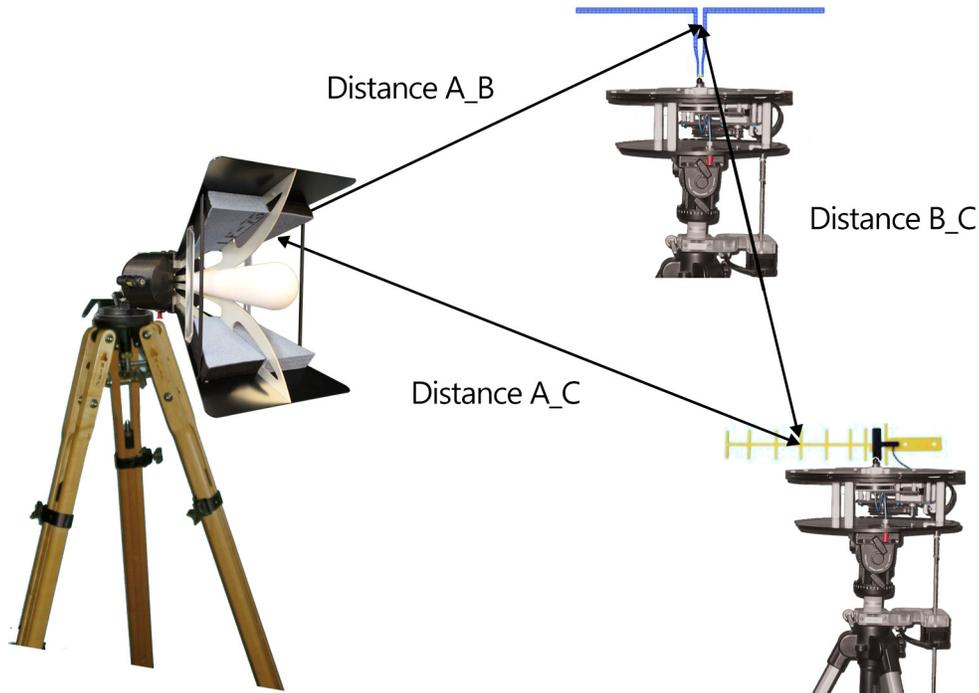
Your DE0540 series horn should measure more than 1 million ohms when measured with a standard ohmmeter. If desired, connect the ohmmeter between the two fins and verify the reading. If your application is low noise, you may directly connect a low noise potentially unstable device directly to the terminals of the horn and achieve the lowest possible antenna noise temperature.



Reference Horn Calibration

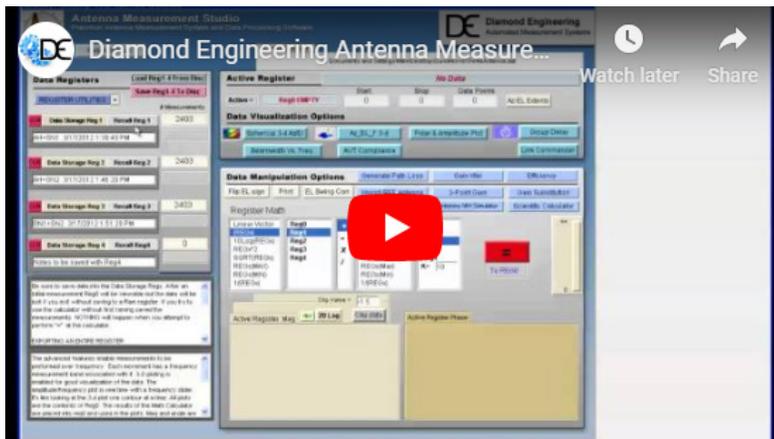
3-point Methodology

The DE0540 horns are calibrated three at one time. The 3-point method eliminates the need for reference and substitution.



The 3-point method reduces the error to the accuracy of the test instrument (typically 1 db). Your DE0540 series is not traceable to the NBS. When performing 3-point calibration measurements it is necessary to apply absorber sheets to the measurement platform and the tripod legs.

A 3-point application video explaining the theory is also available on our website: <https://www.diamondeng.net/3-point-measurements/>



Warranty, Replacement Parts & Contact Information

Warranty Information

The DE0540 is guaranteed for three years on parts and labor from the time it was received by you. If there is a problem with the product please send us a picture or write a very detailed description of the problem. If we determine that you have a faulty unit or bad part, we will ship you a replacement part or unit along with a self-addressed box to send the defective unit back.

Replacement Parts

If you need replacement parts for your unit, please call us or e-mail us for faster response and pricing information. Most repairs are covered under warranty except for damages resulting from obvious abuse or misuse of the product.

Contact Information

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