

# Keysight Technologies

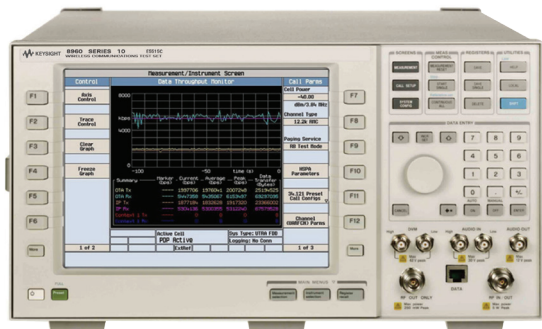
## Tips for Preventing Damage to Communication Test Sets

### Ensure proper grounding

- Always use the three-prong AC power cord supplied with the instrument.
- Proper grounding of the instrument will prevent a build-up of electrostatic charge which may be harmful to the instrument and the operator.
- Do not damage the earth-grounding protection by using an extension cable, power cable or autotransformer without a protective ground conductor.
- Check AC power quality and polarity; typical AC voltage required is 100 V, 120 V, 220 V  $\pm$  10% or 240 V  $\pm$  5%/-10%. Typical expected grounding wire resistance is  $< 1 \Omega$ , the voltage between neutral and ground line is  $< 1$  V. Install uninterruptible power supply [UPS] if necessary.
- For more information, view “Considerations for Instrument Grounding - Application Note”.

### Read the warning labels and specifications

- Do not exceed the values provided in the specifications guide or as indicated by the yellow warning labels on the instrument.
- Refer to the specification guide for conditions required to meet the listed specification. Note information regarding stabilization time, instrument settings and calibration/alignment requirements.
- For example, E5515 RF OUT ONLY (maximum power 250 mW peak), RF IN/OUT (maximum power 5 W peak), Audio Input (30 V peak), Audio Output (12 V peak).



Popular models:  
E5515A/B/C/T

### Avoid overpowering the test set

- Avoid front end damage by having some idea of the signal level to be measured with the test set. Overpowering the front end can damage the front end components.
- Before turning on or turning off the connected equipment or the DUT, reduce the signal level to the minimum safety level. This should help to prevent unexpected voltage swell or sag affecting the input or output of analyzer. Properly apply a DC block, limiter or external attenuator as needed. For more info visit [www.keysight.com/find/mta](http://www.keysight.com/find/mta)
- For example, the Keysight Technologies, Inc. 11867A RF limiter is available to provide input protection. It will reflect signals up to a level of 10 W average power and 100 W peak power. 11867A will provide input protection, within the specified frequency range for the attenuator and mixer for many spectrum analyzer applications.
- 11742A blocking capacitor blocks DC signals below 45 MHz and passes signals up to 26.5 GHz. Ideal for use with high frequency oscilloscopes or in biased microwave circuits, it will suppress low frequency signals that can damage expensive measuring equipment.

### Protect the RF input connector

- Be careful not to bend, bump or flex any device under test (DUT) connected to the input of the instrument (such as filters, attenuators, or large cables). This will reduce the amount of strain placed on the input connector and the mounting hardware.
- Ensure externally connected items are properly supported (not freely suspended) from the input.
- Always use torque wrench and gauge tools for connecting RF connectors.
- Do not mix using 50 and 75  $\Omega$  connectors and cables.

## Follow proper RF cable and connector care

- Avoid repeated bending of cables; a single sharp bend can damage a cable instantly.
- Limit the number of connections and disconnections to reduce wear.
- Inspect the connectors prior to use; look for dirt, nicks, and other signs of damage or wear. A bad connector can ruin the good connector instantly.
- Clean dirty connectors to prevent poor electrical connections and damage to the connector.
- For more information, view “Seven Practices to Prevent Damaging Power Meters and Power Sensors - Application Note”.

## Follow electrostatic discharge precautions

- Electrostatic discharge (ESD) can damage or destroy electronic components.
- Whenever possible, conduct testing at a static-safe workstation. Keep electrostatic-generating materials at least one meter away from all components. Before connecting any coaxial cable to an analyzer, momentarily short the center and outer conductors of the cable together.
- Install ESD protective covers on all RF connectors prior to shipping and moving equipment.
- For more information visit the Electrostatic Discharge Association [www.esda.org](http://www.esda.org)

## Check for proper ventilation and humidity

- Periodically check and clean the cooling vents of the instrument.
- Inadequate airflow can result in excessive operating temperatures which can lead to instrument failures.
- Optimal operating temperature is 23 to –5 °C, always keep instrument ambient temperature at < 35 °C.
- When installing the product in a cabinet, the convection air currents in and out of the instrument must not be restricted. The ambient temperature must be less than the maximum operating temperature of the product by 4 °C for every 100 W dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 W, then forced convection must be used.

- For E5515,
  - Air flows from right side to left side (facing front panel). Approximately 170 CFM.
  - If instruments are placed side by side, use an airflow management system to prevent hot exhaust air from one instrument entering adjacent instruments.
  - Unplug the power cord from the instrument when not in use for long periods to prolong the life of the power supply.
- Performance and reliability recommendations for operating temperature ranges are:

Operating ambient temperature range	Expected performance and reliability
+22 to +27 °C	Best
+27 to +35 °C	Acceptable
+35 to +55 °C (+15 to +55 °C is specified operating temp range)	Reduced

## Use proper lifting techniques

- Lift the instrument by the handles when transporting.
- Avoid picking up the instrument with your hand over the front panel. If the instrument slips, damage may occur to the keypad, knob, or input connectors.
- Use a cart or two persons to help move any heavy instrument.

## Use proper packing for transport

Instrument damage can result from using packaging materials other than those specified. Never use styrene pellets in any shape as packaging materials. They do not adequately cushion the equipment and can cause equipment damage by generating static electricity. If possible, retain the original packaging for re-use when shipping the instrument.

## Get the latest information about your product

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