Keysight Technologies

Tips for Preventing Damage to Power Sensor and Meter

Avoid overpowering the power sensor

- Avoid burning the power sensor by having some idea of the signal level to be measured with the sensor. Overpowering the sensor can cause damage to the sensing element.
- Before turning on or turning off the connected equipment or the DUT, reduce the signal level to the minimum safety level. This will prevent unexpected voltage swell or sag affecting the input or the output of instrument.
- Properly apply a DC block, limiter or external attenuator as needed. For more info visit **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.

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 power sensor and meter.
- 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,
  - E4412A/E4413A max. power input 200 mW (+23 dBm).
  - E9321A/22A max. power input 200 mW (+23 dBm) average, 1 W (+30 dBm) Peak.

Protect the RF input connector

- Be careful not to bend, bump or flex any device under test (DUT) connected to the input of the analyzer (such as filters, attenuators, or large cables). This will reduce the amount of strain placed on the input connector and the mounted 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.

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 or damage to the connector.
- For Seven Practices to Prevent Damaging Power Meters and Power Sensors view application note.

Popular models: E441X series, E93XX series, 848X series

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Ensure proper grounding

- Always use the three-prong AC power cord supplied with the power meter.
- 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 ± 10% or 240 V +5 %/ –10 %. Typical expected grounding wire resistance is < 1 Ω, 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".

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 instrument, momentarily short the center and outer conductors of the cable together to ground.
- Always put connector cap on the unused power sensor for preventing ESD.
- For more information about electrostatic discharge, contact the Electrostatic Discharge Association **www.esda.org**.

Check for proper temperature and humidity

- Keep power sensor and meter in a clean and dry environment. Temperature for typical storage condition is between –40 °C and 75 °C, humidity < 95 % RH.
- Ensure proper ventilation among racks. Optimal operating temperature is 23 °C to –5 °C, always keep instrument ambient temperature at < 30 °C.
- Cooling vents and fans should be inspected and cleaned frequently.

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