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EIA STANDARD

TP-80A

**Low Frequency Shielding
Effectiveness
Test Procedure for Electrical
Connectors and Sockets**

EIA-364-80A

(Revision of EIA-364-80)

September 2020



Electronic Components Industry Association

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(From Standards Proposal No. 5453.06, formulated under the cognizance of the CE-2.0 Committee on EIA National Connector and Socket Standards.)

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TEST PROCEDURE No. 80A
LOW FREQUENCY SHIELDING EFFECTIVENESS TEST PROCEDURE
FOR
ELECTRICAL CONNECTORS AND SOCKETS

(From EIA Standards Proposal No. 5453.06, formulated under the cognizance of the CE-2.0 Committee on EIA National Connector and Socket Standards, and previously published in EIA-364-80.)

1 Introduction

1.1 Scope

This test procedure describes two methods to measure the shielding transfer impedance of mated cable connectors in the frequency range 10kHz to 100MHz, (method A), and a connector located between a bulkhead panel and a shielded cable from 30 MHz to 500 MHz, (method B).

1.2 Object

1.2.1 Method A

This method involves measuring the current excited on the outside of the shell and the open circuit voltage developed on a connector contact/wire. This method is primarily for circular connectors. It is possible that it may be used for non-circular connectors, however the equations may not (directly) apply. For this method, the transfer impedance is defined as:

$$Z_{\tau}(\omega) = V_{Contact}(\omega) / I_{Outside}(\omega)$$

NOTE — Half the voltage developed travels to the analyzer input, the other half travels to the 50 ohm load.

1.2.2 Method B

This method involves measuring the voltage excited on the outside of the shell when a known current is impressed on the inside conductors.

1.3 Definitions

1.3.1 Units (dB-ohm)

Measured results shall be reported in dB from one ohm, (zero dB is one ohm). More negative values represent better performance. Positive results indicate poorer performance.

1.3.2 Shielded conduit

Any conductor or conductors enclosed by a solid conducting sheath.

1.3.3 Shielded enclosure

A housing, screen, or other object that is intended to substantially reduce the effect of electric or magnetic fields upon devices or circuits on one side of the shield. Examples include cases, cabinets, airframes, etc.

1.3.4 Test item

A general term used to refer to either a shielded cable and/or connector.

1.4 Abbreviations and symbols

dB	Decibels
f	Frequency in hertz
$I_{\text{Outside}}(\omega)$	Connector shell current induced on the outside of the shell as a function of frequency (ω)
kHz	Kilohertz
MHz	Megahertz
Ω	Ohms
RF	Radio frequency
$V_{\text{Contact}}(\omega)$	Open circuit pin/contact voltage as a function of frequency (ω)
ω	Frequency in radians/sec ($2\pi f$)
$Z_{\tau}(\omega)$	Transfer impedance (in ohms) as a function of frequency (ω)

2 Test resources

2.1 Equipment

2.1.1 General test equipment

The following equipment or equivalent shall be used for these measurements. Characteristics are described in 2.1.1.1 through 2.1.1.4 for the items that have particular requirements as follows:

- signal source;
- RF amplifier;
- 200 ohm loads (non-inductive);
- 50 ohm loads;
- analyzer(s), network or spectrum;
- shielded cable and connectors;
- current probe.

2.1.1.1 Signal source

The signal source shall be an RF generator(s) with an output frequency of 10 kHz to 100 MHz, (method A), or 30 MHz to 500 MHz, (method B). The signal source may be part of the network analyzer(s).