

Application Note

Defibrillator Pad Testing to ANSI/AAMI DF80:2003 using the 7600 Plus Precision LCR Meter

Summary:

The 7600 Plus Precision LCR Meter can be used to meet the requirements of ANSI/AAMI DF80:2003 Section 107.1.1 AC Small signal impedance. The AC signal levels and results appear to be appropriate for testing pads in a production environment in accordance with Section 107.1.1.

The 7600 Plus is a single piece of equipment and requires minimal operator interaction and training to perform the testing required by section 107.1.1. The large LCD display and automatic calculation of Z should reduce operator error and improve data collection. The 7600 Plus also offers RS232 interface for automation if required.



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ANSI/AAMI DF 80:2003 Test Setup

Test was setup in accordance with ANSI/AAMI DF80:2003 Section 107.1.1 AC Small signal impedance. Section 107.1.1 specifies additional U.S. requirements for testing defibrillator pads. There is a requirement for testing 12 samples at both 10Hz and 30kHz. The 10 Hz impedance, for any of the electrode pairs when connected gel-to-gel and at a signal level not exceeding 100 microamperes (μA) peak-to-peak, shall not exceed 3 kohms. The impedance is also measured at 30 kHz and shall be less than 5 ohms under the same signal conditions.

The 7600 Plus Precision LCR Meter was used to perform this testing. The 7600 Plus was configured for a signal level of 20mV RMS so that the peak to peak current level would not exceed the limit of 100uA. Tests were performed at frequencies of 10Hz and 30kHz.

Testing was performed using 7600 Plus LCR Meter Serial Number 08391272

Configuration of LCR Meter

Slow Measurement Speed = 1 measurement/second

Range = Locked to Range 33

Signal Level = 20mV

Frequency = 10Hz or 30kHz

Defibrillator Pads were placed back to back and connected together. A set of Kelvin cables were connected to the two wires from the defibrillator pads. A Fluke 189 Multimeter was used to monitor AC Current in IH lead to verify compliance of < 100uA p-p.



7600 Plus Connected to DF Pads



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Current Measurement using Fluke 189 Multimeter

Results:

Current Applied to pads at 10Hz and 30kHz is approximately 33 μ A RMS which equates to 93 μ A p-p. See picture below

Measurement results from LCR

10Hz : Z = 3.668054 ohms

30kHz: Z = 2.516205 ohms



The 7600 Plus was able to perform measurements at both frequencies of 10Hz and 30kHz and the required signal level of less than 100 μ A p-p. The 7600 Plus makes it easy and repeatable for operators to collect all of the required test results. The 7600 Plus also has the ability to perform a sweep across a frequency range or current range for applications in R&D and production, for testing other medical devices such as feed-throughs and TENS/MNES pads.

