

# National Measurement Laboratory

## Report of Calibration



Date of Issue: August 12, 2019

Report No.: E190496A

Instrument: Standard Resistor

Manufacturer: xDevs

Model: SL935

Serial Number: 001

Applicant: Illya Tsemenko

Address: [REDACTED]

The result of this calibration, performed by the National Measurement Laboratory, is specified in this report. When the cover and the following 2 pages are separated, the validity of this report no longer exists.



*Shih-Fang Chen*  
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321, Sec. 2, Kuang Fu Rd., Hsinchu, Taiwan 30011, R.O.C.

Report No.: E190496A

Instrument: Standard Resistor

Ambient Temp.:  $(23.0 \pm 1.5) ^\circ\text{C}$

Manufacturer: xDevs

Relative Humidity:  $(45 \pm 10) \%$

Model: SL935

Serial No.: 001

## Calibration Results and Descriptions

### I. Calibration Results

The nominal value is the labeled value of standard resistor. The measurement value of standard resistor is calibrated by direct current resistance system of NML.

Nominal Value	Measurement Value	Relative Expanded Uncertainty
1 $\Omega$	1.000 060 85 $\Omega$	0.17 $\mu\Omega/\Omega$
10 $\text{k}\Omega$	9.999 9739 $\text{k}\Omega$	0.17 $\mu\Omega/\Omega$

### II. Descriptions

#### 1. Date of Calibration

This calibration was performed from August 5, 2019 to August 12, 2019.

#### 2. Calibration Methods

This calibration was carried out according to Instrument Calibration Technique for Direct Current Resistance System <sup>1</sup>. The measurement value is obtained by comparing this standard with the standard resistor of NML using resistance bridge.

#### 3. Standard Used

The standards used in this calibration are the standard resistors with the serial number of 1915095, 1915100, 1914648, and 1914649. The certificate of these standards was issued on June 3, 2019, with certificate number of E190341A by National Measurement Laboratory (NML). The calibration interval of these standards is 1 year.

#### 4. Relative Expanded Uncertainty

4.1 The relative expanded uncertainty was evaluated according to Measurement System Validation Procedure for Direct Current Resistance System <sup>2</sup>.

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4.2 The reported relative expanded uncertainty was obtained by multiplying the relative combined standard uncertainty with a coverage factor  $k = 2$ , corresponding to a level of confidence of approximately 95 %.

## 5. Initial Preparation

5.1 The 4-wire measurement method is used to calibrate the standard resistor. To avoid the errors due to different connecting method and the resistance difference due to different power dissipation, the voltage and current should be wired separately and the power dissipation of the standard resistor should not be more than 0.1 Watt.

5.2 It is suggested that the standard resistor is warmed-up for at least 4 hours under the temperature and humidity controlled before performing the measurements.

## III. References

1. Instrument Calibration Technique for Direct Current Resistance System, 07-3-84-0042, 8<sup>th</sup> ed., Center for Measurement Standards/ITRI, 2019.
2. Measurement System Validation Procedure for Direct Current Resistance System, 07-3-84-0073, 8<sup>th</sup> ed., Center for Measurement Standards/ITRI, 2019.