

Calibration Report of Geotest GX1164-01 Prog. Resistance Card

MPC Control #:	97014	Serial Number:	97014
Asset ID:	NA	Calibration Date:	March 5, 2019

Resistance Accuracy

Channel 1

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
1 Ω	1.000 Ω	0.245 Ω	1.510 Ω	1.510 Ω	51.0000%	1.755 Ω	PASS	0.000014 Ω
2 Ω	2.000 Ω	1.240 Ω	2.508 Ω	2.508 Ω	25.4000%	2.760 Ω	PASS	0.000028 Ω
4 Ω	4.000 Ω	3.230 Ω	4.501 Ω	4.501 Ω	12.5250%	4.770 Ω	PASS	0.000056 Ω
8 Ω	8.000 Ω	7.210 Ω	8.512 Ω	8.512 Ω	6.4000%	8.790 Ω	PASS	0.00012 Ω
16 Ω	16.000 Ω	15.170 Ω	16.530 Ω	16.530 Ω	3.3125%	16.830 Ω	PASS	0.00023 Ω
32 Ω	32.000 Ω	31.090 Ω	32.485 Ω	32.485 Ω	1.5156%	32.910 Ω	PASS	0.00045 Ω
64 Ω	64.000 Ω	62.930 Ω	64.522 Ω	64.522 Ω	0.8156%	65.070 Ω	PASS	0.00090 Ω
128 Ω	128.000 Ω	126.610 Ω	128.617 Ω	128.617 Ω	0.4820%	129.390 Ω	PASS	0.0016 Ω

Channel 2

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
256 Ω	256.000 Ω	253.970 Ω	256.626 Ω	256.626 Ω	0.2445%	258.030 Ω	PASS	0.0031 Ω
512 Ω	512.000 Ω	508.690 Ω	512.601 Ω	512.601 Ω	0.1174%	515.310 Ω	PASS	0.0062 Ω
1024 Ω	1024.000 Ω	1018.130 Ω	1024.447 Ω	1024.447 Ω	0.0437%	1029.870 Ω	PASS	0.019 Ω
2048 Ω	2048.000 Ω	2037.010 Ω	2048.717 Ω	2048.717 Ω	0.0350%	2058.990 Ω	PASS	0.037 Ω
4096 Ω	4096.000 Ω	4074.770 Ω	4098.543 Ω	4098.543 Ω	0.0621%	4117.230 Ω	PASS	0.074 Ω
8192 Ω	8192.000 Ω	8150.290 Ω	8193.784 Ω	8193.784 Ω	0.0218%	8233.710 Ω	PASS	0.15 Ω
16384 Ω	16384.000 Ω	16300.000 Ω	16388.077 Ω	16388.077 Ω	0.0249%	16470.000 Ω	PASS	0.30 Ω
32768 Ω	32768.000 Ω	32600.000 Ω	32778.527 Ω	32778.527 Ω	0.0321%	32930.000 Ω	PASS	0.59 Ω

Channel 3

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
1 Ω	1.000 Ω	0.245 Ω	1.697 Ω	1.697 Ω	69.7000%	1.755 Ω	PASS	0.000014 Ω
2 Ω	2.000 Ω	1.240 Ω	2.687 Ω	2.687 Ω	34.3500%	2.760 Ω	PASS	0.000028 Ω
4 Ω	4.000 Ω	3.230 Ω	4.689 Ω	4.689 Ω	17.2250%	4.770 Ω	PASS	0.000056 Ω
8 Ω	8.000 Ω	7.210 Ω	8.735 Ω	8.735 Ω	9.1875%	8.790 Ω	PASS	0.00012 Ω
16 Ω	16.000 Ω	15.170 Ω	16.682 Ω	16.682 Ω	4.2625%	16.830 Ω	PASS	0.00023 Ω
32 Ω	32.000 Ω	31.090 Ω	32.694 Ω	32.694 Ω	2.1688%	32.910 Ω	PASS	0.00045 Ω
64 Ω	64.000 Ω	62.930 Ω	64.754 Ω	64.754 Ω	1.1781%	65.070 Ω	PASS	0.00090 Ω
128 Ω	128.000 Ω	126.610 Ω	128.929 Ω	128.929 Ω	0.7258%	129.390 Ω	PASS	0.0016 Ω

Calibration Report of Geotest GX1164-01 Prog. Resistance Card

MPC Control #:	97014	Serial Number:	97014
Asset ID:	NA	Calibration Date:	March 5, 2019

Channel 4

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
256 Ω	256.000 Ω	253.970 Ω	256.668 Ω	256.668 Ω	0.2609%	258.030 Ω	PASS	0.0031 Ω
512 Ω	512.000 Ω	508.690 Ω	512.762 Ω	512.762 Ω	0.1488%	515.310 Ω	PASS	0.0062 Ω
1024 Ω	1024.000 Ω	1018.130 Ω	1024.665 Ω	1024.665 Ω	0.0649%	1029.870 Ω	PASS	0.019 Ω
2048 Ω	2048.000 Ω	2037.010 Ω	2050.343 Ω	2050.343 Ω	0.1144%	2058.990 Ω	PASS	0.037 Ω
4096 Ω	4096.000 Ω	4074.770 Ω	4099.064 Ω	4099.064 Ω	0.0748%	4117.230 Ω	PASS	0.074 Ω
8192 Ω	8192.000 Ω	8150.290 Ω	8193.532 Ω	8193.532 Ω	0.0187%	8233.710 Ω	PASS	0.15 Ω
16384 Ω	16384.000 Ω	16300.000 Ω	16382.988 Ω	16382.988 Ω	0.0062%	16470.000 Ω	PASS	0.30 Ω
32768 Ω	32768.000 Ω	32600.000 Ω	32783.894 Ω	32783.894 Ω	0.0485%	32930.000 Ω	PASS	0.59 Ω

Channel 5

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
1 Ω	1.000 Ω	0.245 Ω	1.549 Ω	1.549 Ω	54.9000%	1.755 Ω	PASS	0.000014 Ω
2 Ω	2.000 Ω	1.240 Ω	2.538 Ω	2.538 Ω	26.9000%	2.760 Ω	PASS	0.000028 Ω
4 Ω	4.000 Ω	3.230 Ω	4.555 Ω	4.555 Ω	13.8750%	4.770 Ω	PASS	0.000056 Ω
8 Ω	8.000 Ω	7.210 Ω	8.577 Ω	8.577 Ω	7.2125%	8.790 Ω	PASS	0.00012 Ω
16 Ω	16.000 Ω	15.170 Ω	16.544 Ω	16.544 Ω	3.4000%	16.830 Ω	PASS	0.00023 Ω
32 Ω	32.000 Ω	31.090 Ω	32.500 Ω	32.500 Ω	1.5625%	32.910 Ω	PASS	0.00045 Ω
64 Ω	64.000 Ω	62.930 Ω	64.330 Ω	64.330 Ω	0.5156%	65.070 Ω	PASS	0.00090 Ω
128 Ω	128.000 Ω	126.610 Ω	128.666 Ω	128.666 Ω	0.5203%	129.390 Ω	PASS	0.0016 Ω

Channel 6

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
256 Ω	256.000 Ω	253.970 Ω	256.615 Ω	256.615 Ω	0.2402%	258.030 Ω	PASS	0.0031 Ω
512 Ω	512.000 Ω	508.690 Ω	512.952 Ω	512.952 Ω	0.1859%	515.310 Ω	PASS	0.0062 Ω
1024 Ω	1024.000 Ω	1018.130 Ω	1024.816 Ω	1024.816 Ω	0.0797%	1029.870 Ω	PASS	0.019 Ω
2048 Ω	2048.000 Ω	2037.010 Ω	2048.918 Ω	2048.918 Ω	0.0448%	2058.990 Ω	PASS	0.037 Ω
4096 Ω	4096.000 Ω	4074.770 Ω	4099.403 Ω	4099.403 Ω	0.0831%	4117.230 Ω	PASS	0.074 Ω
8192 Ω	8192.000 Ω	8150.290 Ω	8192.392 Ω	8192.392 Ω	0.0048%	8233.710 Ω	PASS	0.15 Ω
16384 Ω	16384.000 Ω	16300.000 Ω	16391.369 Ω	16391.369 Ω	0.0450%	16470.000 Ω	PASS	0.30 Ω
32768 Ω	32768.000 Ω	32600.000 Ω	32760.150 Ω	32760.150 Ω	0.0240%	32930.000 Ω	PASS	0.59 Ω

Calibration Report of Geotest GX1164-01 Prog. Resistance Card

MPC Control #:	97014	Serial Number:	97014
Asset ID:	NA	Calibration Date:	March 5, 2019

Channel 7

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
1 Ω	1.000 Ω	0.245 Ω	1.687 Ω	1.687 Ω	68.7000%	1.755 Ω	PASS	0.000014 Ω
2 Ω	2.000 Ω	1.240 Ω	2.689 Ω	2.689 Ω	34.4500%	2.760 Ω	PASS	0.000028 Ω
4 Ω	4.000 Ω	3.230 Ω	4.686 Ω	4.686 Ω	17.1500%	4.770 Ω	PASS	0.000056 Ω
8 Ω	8.000 Ω	7.210 Ω	8.701 Ω	8.701 Ω	8.7625%	8.790 Ω	PASS	0.00012 Ω
16 Ω	16.000 Ω	15.170 Ω	16.688 Ω	16.688 Ω	4.3000%	16.830 Ω	PASS	0.00023 Ω
32 Ω	32.000 Ω	31.090 Ω	32.657 Ω	32.657 Ω	2.0531%	32.910 Ω	PASS	0.00045 Ω
64 Ω	64.000 Ω	62.930 Ω	64.666 Ω	64.666 Ω	1.0406%	65.070 Ω	PASS	0.00090 Ω
128 Ω	128.000 Ω	126.610 Ω	128.822 Ω	128.822 Ω	0.6422%	129.390 Ω	PASS	0.0016 Ω

Channel 8

Function Tested	Nominal	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
256 Ω	256.000 Ω	253.970 Ω	256.587 Ω	256.587 Ω	0.2293%	258.030 Ω	PASS	0.0031 Ω
512 Ω	512.000 Ω	508.690 Ω	512.812 Ω	512.812 Ω	0.1586%	515.310 Ω	PASS	0.0062 Ω
1024 Ω	1024.000 Ω	1018.130 Ω	1024.797 Ω	1024.797 Ω	0.0778%	1029.870 Ω	PASS	0.019 Ω
2048 Ω	2048.000 Ω	2037.010 Ω	2048.439 Ω	2048.439 Ω	0.0214%	2058.990 Ω	PASS	0.037 Ω
4096 Ω	4096.000 Ω	4074.770 Ω	4097.690 Ω	4097.690 Ω	0.0413%	4117.230 Ω	PASS	0.074 Ω
8192 Ω	8192.000 Ω	8150.290 Ω	8195.431 Ω	8195.431 Ω	0.0419%	8233.710 Ω	PASS	0.15 Ω
16384 Ω	16384.000 Ω	16300.000 Ω	16385.793 Ω	16385.793 Ω	0.0109%	16470.000 Ω	PASS	0.30 Ω
32768 Ω	32768.000 Ω	32600.000 Ω	32785.863 Ω	32785.863 Ω	0.0545%	32930.000 Ω	PASS	0.59 Ω

Statements of Pass or Fail Conformance

The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009.

All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCCL Z540.3-2006.

The status of compliance with the acceptance criteria is reported as:

- PASS** - Compliant with specification
- FAIL** - Not compliant with specification.
- FAIL^z** - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.
- PASS^z** - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95% , unless otherwise stated.

This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCCL Z540.3 Method 6-Guard Bands based on Test Uncertainty Ratio.

- End of Calibration Report -