



Engineering Solutions & Electromagnetic Compatibility Services

FCC Part 15.231 Test Data

EUT: 56-0049-03 PINpad 433.92 MHz

for

**Resolution Engineering, Inc.
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Hudson, WI 54016
Contact: Josh Gathje**

**Testing Conducted By
Rhein Tech Laboratories, Inc.
360 Herndon Parkway, Suite 1400
Herndon, VA 20170**

RTL Test Engineer: Jon Wilson

RTL Project/Report Number: 2013094

April 30, 2013

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These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1445.

Testing Represented in Report

The data and limits presented in this report are for peak emissions limiting per 15.231(b)(2) which references 15.35(b), and peak limiting for restricted bands per 15.209(e), which again references 15.35(b)(2), as procured by Resolution Engineering. No average data is presented in this report. The Equipment Under Test (EUT) was the **56-0049-03 PINpad 433.92 MHz (RTL Bar Code 20886)**.

Test Procedure

Radiated fundamental and spurious emissions were tested at three meters. The EUT was tested in the three orthogonal planes with the receive antenna in both polarities. The emissions were maximized per ANSI C63.4:2003 8.3.1.2; that is, the measurement antenna height was varied between 1 and 4 m, and the EUT was rotated through 360° on a rotating turntable until the maximum emissions were found. A resolution bandwidth of 100 kHz was used for frequencies less than 1000 MHz, and a resolution bandwidth of 1 MHz was used for frequencies greater than or equal to 1000 MHz. The video bandwidth was set to a value at least three times greater than the resolution bandwidth.

EUT Disposition

The EUT was adapted to continuously transmit for testing purposes.

15.231 Radiated Emissions Test Data – FCC Limits/3m Distance

| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pass/Fail |
|--------------------------|---------------|------------------------|-------------------------|-------------------------------|-------------------------|----------------|-------------|-----------|
| 433.935 | Peak | V | 66.5 | 29.5 | 96.0 | 100.8 | -4.8 | Pass |
| 867.855 | Peak | V | 41.4 | -5.2 | 36.2 | 80.8 | -44.6 | Pass |
| 1301.775 | Peak | H | 47.1 | 0.3 | 47.4 | 74.0 | -26.6 | Pass |
| 1735.677 | Peak | H | 50.6 | 4.6 | 55.2 | 80.8 | -25.6 | Pass |
| 2169.605 | Peak | V | 56.0 | -18.6 | 37.4 | 80.8 | -43.4 | Pass |
| 2603.525 | Peak | V | 54.2 | -18.5 | 35.7 | 80.8 | -45.1 | Pass |
| 3037.445 | Peak | H | 50.3 | -18.6 | 31.7 | 80.8 | -49.1 | Pass |
| 3471.365 | Peak | H | 66.0 | -17.2 | 48.8 | 80.8 | -32.0 | Pass |
| 3905.285 | Peak | H | 40.0 | -16.8 | 23.2 | 74.0 | -50.8 | Pass |
| 4339.205 | Peak | V | 47.0 | -11.2 | 35.8 | 74.0 | -38.2 | Pass |

** all spurious emissions in the applicable frequency range were investigated, only harmonic emissions were present as noted above*

Radiated Emissions Test Equipment

| Part | Manufacturer | Model | Serial Number | RTL Bar Code | Calibration Due Date |
|---|-------------------------------|---------------------------|---------------|--------------|----------------------|
| Amplifier (20 MHz - 2 GHz) | Rhein Tech Laboratories, Inc. | PR-1040 | 900905 | 900905 | 8/20/13 |
| Bilog Periodic Antenna (25 MHz - 2 GHz) | Schaffner Chase | CBL6112 | 2099 | 900791 | 2/2/14 |
| EMI Receiver RF Section (9 kHz - 6.5 GHz) | Hewlett Packard | 85462A | 3325A00159 | 900913 | 9/20/13 |
| RF Filter Section (100 kHz - 6.5 GHz) | Hewlett Packard | 85460A | 3330A00107 | 900914 | 9/20/13 |
| Spectrum Analyzer | Rohde & Schwarz | FSU | 1166.1660.50 | 901581 | 6/4/13 |
| Amplifier (1 GHz – 26.0 GHz) | Rhein Tech Laboratories, Inc. | PR-1042 | N/A | 901364 | 9/28/13 |
| Horn Antenna (2.0 - 4.0 GHz) | EMCO | 3161-02 | 9804-1044 | 900772 | 4/20/15 |
| Horn Antenna (4.0 - 8.2 GHz) | EMCO | 3161-03 | 9508-1020 | 900321 | 4/20/15 |
| Emissions Testing Software | Rhein Tech Laboratories, Inc. | Automated Emission Tester | Rev. 14.0.2 | N/A | N/A |

Test Personnel:

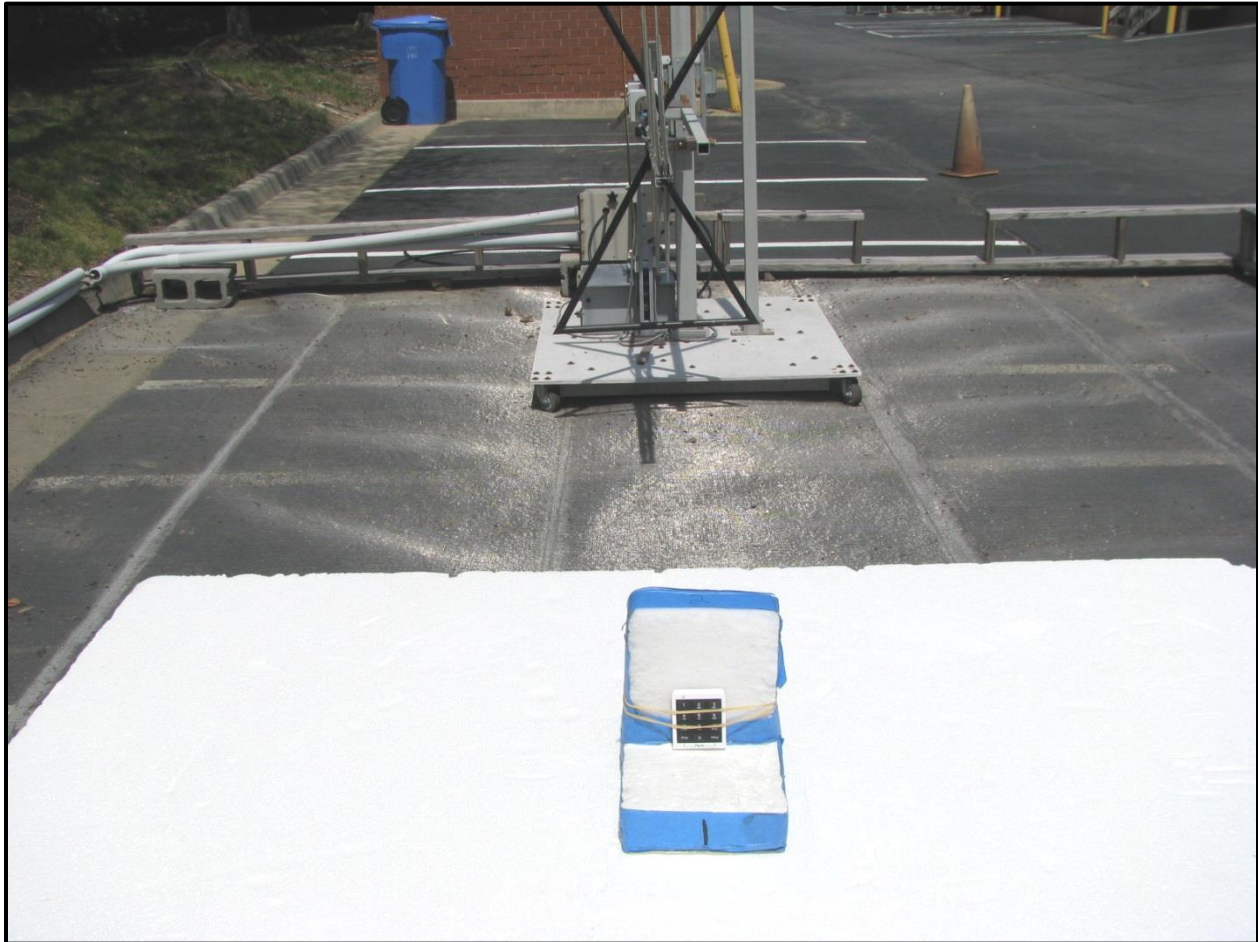
| | | |
|---------------|---|-------------------|
| Jon Wilson |  | April 24-25, 2013 |
| Test Engineer | Signature | Dates of Test |

FCC/IC Cross Reference

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|------------------|-----------------------|
| FCC 15.231(b)(2) | RSS-210 Issue 8 A1.1 |
| FCC 15.35(b) | RSS-Gen Issue 3 7.2.3 |
| FCC 15.205 | RSS-Gen Issue 3 7.2.2 |
| FCC 15.209 | RSS-Gen Issue 3 7.2.5 |

Test Configuration Photograph

Radiated Emissions



EUT Photographs



