



FCC PART 15.225
MEASUREMENT AND TEST REPORT

For

S1 Corporation

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Soonhwa-Dong, Jung-Gu
Seoul, Korea 100-130

**FCCID: Q54CDR-0130
Model: CDR-0130**

Report Type: <input checked="" type="checkbox"/> Original Report	Product Type: Smart Card Reader
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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *S1 Corporation*'s product, *FCCID: Q54CDR-0130*, model *CDR-0130* or the "EUT" as referred to in this report is a Smart Card Reader. It is a machine controlling access management and making block mode change in GBMS. Power is supplied by auxiliary power equipment or local controller.

1.2 EUT Photo



Please see additional photos in Exhibit C

1.3 Mechanical Description

The EUT measures approximately 140 mm (L) x 95 mm (W) x 25 mm (H).

** The test data gathered is from production samples, serial number: B1335, provided by the manufacturer.*

1.4 Objective

This Type approval report is prepared on behalf of S1 Corporation in accordance with Part 2, Subpart J, and Part 15 Subpart C of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules, Part 15, sec 15.35, sec 15.203, sec 15.205, sec 15.207, sec 15.209 and sec 15.225.

1.5 Related Submittal(s)/Grant(s)

No Related Submittals.

1.6 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratory, Corp.

1.7 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from ± 2.0 for Conducted Emissions tests and $+4.0$ dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

1.8 Test Facility

The test site used by BACL Corp. to collect measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0).



The current scope of accreditations can be found at
<http://ts.nist.gov/Standards/scopes/2001670.htm>

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2003.

2.2 EUT Exercise Software

Run RFID simulation program provided by customer.

2.3 Special Accessories

EUT was tested with Laboratory AC/DC power source to simulate normal condition.

2.4 Equipment Modifications

No modifications were made to the EUT

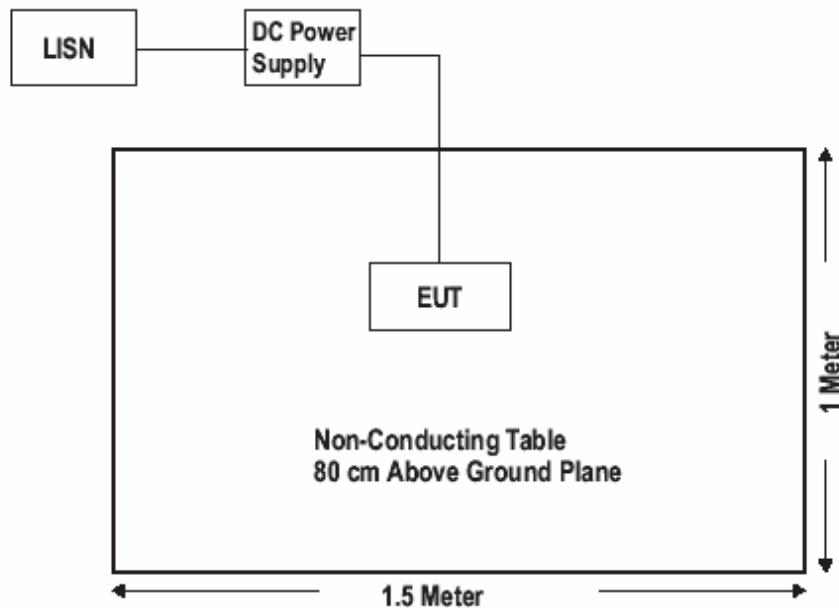
2.5 Remote Support Equipment

N/A

2.6 Local Support Equipment

Manufacturer	Description	Model	Serial Number
HP	DC Power	6236B	2003A05705

2.7 Test Setup Configuration



3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§ 15.35 § 15.205 § 15.209 § 15.225	Radiated Emission	Compliant
§ 15.207	Conducted Emission	N/A
§15.225(e)	Frequency Stability	Compliant

4 § 15.203 – ANTENNA REQUIREMENT

4.1 Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Refer to statement below for compliance.

“The antenna for this device is an integral antenna that the end user cannot access. Furthermore the device is for indoor/outdoor use as detailed in the Users Manual and Operational Description”.

Result: Compliant.

5 § 15.35, § 15.205, § 15.209, § 15.225 - RADIATED EMISSION TEST

5.1 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15 Subpart C limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of test table and bundle when necessary.

The EUT was placed on the center of the back edge on the test table.

5.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Sonoma Instrument	Pre- Amplifier	317	260407	2007-04-26
HP	Analyzer, Spectrum	8565EC	3946A00131	2007-01-24
Com-Power	Active Loop Antenna (10KHz-30MHz)	AL-130	17043	2006-03-15**
Sunol Sciences	30MHz~2GHz Antenna	JB1	A020106-1	2007-05-21
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2007-03-13

* **Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

** 2 year calibration cycle

5.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -4 dB of specification limitation), and are distinguished with a "QP" in the data table.

The EUT was operating at normal to represent worst case during final qualification test. Therefore, this configuration was used for final test data recorded in the following table of this report.

5.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

5.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	43 %
ATM Pressure:	102.1kPa

*Testing was performed by Jerry Wang on 2007-10-03 to 08.

5.6 Summary of Test Results

According to the data in the following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.225. The EUT had the worst margin reading of:

-15.95 dB at 27.124 MHz for FCC 15C
-0.2 dB at 154.80750 MHz in the **Horizontal** polarization for FCC 15B

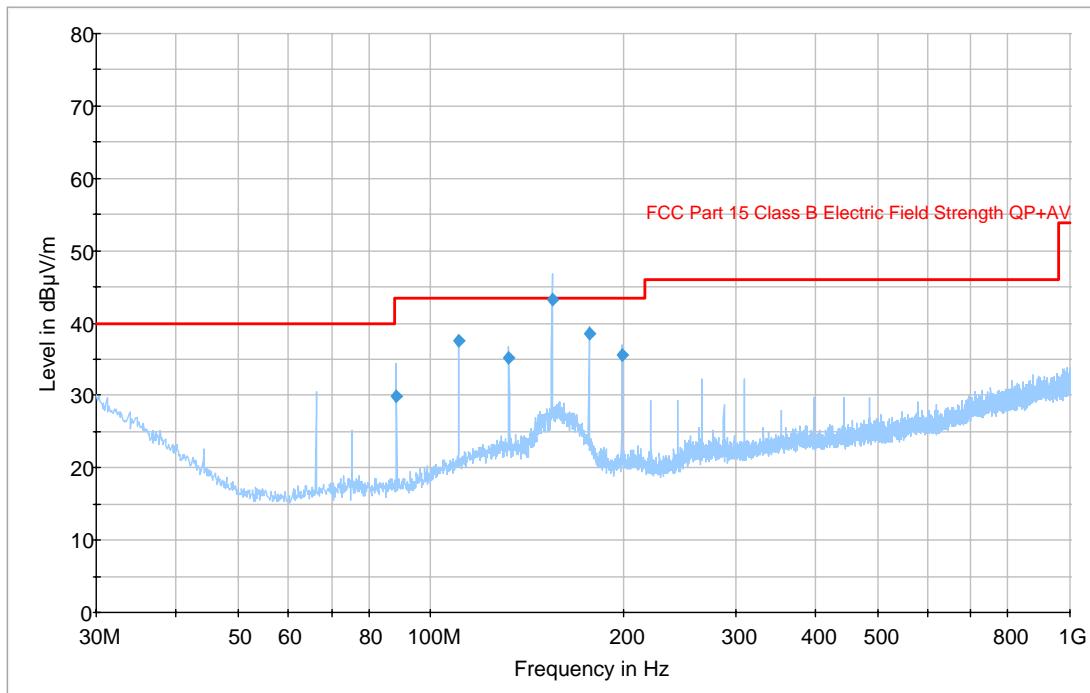
Radiated Emissions Test Result Data @ 3meter

9 kHz to 30 MHz

Frequency (MHz)	Reading (dBuV)	Turntable Degrees	Ant Height (m)	Ant Factor (dB/m)	Cable Loss (dB)	Distance Factor (dB)	Corrected Amp. (dBuV/m)	FCC 15C	
								Limit (dBuV/m)	Margin (dB)
27.124	42.85	30	1.2	10.5	0.2	40	13.55	29.5	-15.95
13.569	59.56	200	1.2	11.2	0.1	40	30.86	50.5	-19.64
13.546	54.74	30	1.2	11.2	0.1	40	26.04	50.5	-24.46
13.410	37.53	180	1.2	11.2	0.1	40	8.83	40.51	-31.68
13.720	34.66	90	1.2	11.2	0.1	40	5.96	40.51	-34.55
13.56	67.88	100	1.2	11.2	0.1	40	39.18	84	-44.82

Radiated Emissions Test Result Data @ 3meter

30 to 1000 MHz



Quasi Peak Measurement

Frequency (MHz)	Quasi-Peak (dB μ V/m)	Antenna Height (cm)	Polarity	Turntable Position (deg)	Corrected Reading (dB)	Limit (dB μ V/m)	Margin (dB)
154.807500	43.3	192.0	H	-8.0	-2.0	43.5	-0.2
88.482500	29.9	218.0	H	199.0	-6.1	43.5	-3.6
176.955000	38.6	134.0	H	359.0	-3.0	43.5	-4.9
110.591250	37.5	273.0	H	2.0	-2.1	43.5	-6.0
199.062500	35.5	149.0	H	33.0	-2.0	43.5	-8.0
132.698750	35.3	214.0	H	-2.0	-1.0	43.5	-8.2

6 § 15.225(e) - FREQUENCY STABILITY MEASUREMENT

6.1 Standard Applicable

According to FCC §15.225(e), the frequency tolerance of the carrier signal shall be maintained within \pm 0.01% of the operating frequency over a temperature variation of -20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

6.2 Test Procedure

6.2.1 Frequency stability versus environmental temperature

The equipment under test was connected to an external AC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

6.2.2 Frequency Stability versus Input Voltage

At room temperature ($25 \pm 5^\circ\text{C}$), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial No.	Calibration Date
HP	Analyzer, Spectrum	8565EC	3946A00131	2007-01-24
Tenney	Oven, Temperature	Versa Tenn	12.222-193	2006-06-21**
Hp	Counter, Microwave Frequency	5342A	2232A06380	2007-01-26

* **Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

** 2 year calibration cycle

6.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	43 %
ATM Pressure:	102.1kPa

*Testing was performed by Jerry Wang on 2007-10-03 to 08.

6.5 Test Results

Condition Voltage (DC)	Temperature (OC)	Ref. Freq. (Hz)	Measured Freq. (Hz)	Freq. Error (Hz)	Limit* (Hz)
24	-20	13560000	13559499	-501	1356
24	-10	13560000	13559654	-346	1356
24	0	13560000	13559846	-154	1356
24	20	13560000	13560834	834	1356
24	30	13560000	13560847	847	1356
24	50	13560000	13560474	474	1356
20.4	20	13560000	13560853	853	1356
27.6	20	13560000	13560789	789	1356

Note: The limit is $\pm 0.01\%$ of the operating frequency, the fundamental of EUT is 13.56 MHz.