Nemko USA, Inc.
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CERTIFICATION TEST REPORT
PART 15.225C
IC RSS-210

For The RFID Contactless Card Reader
Model: ATC-RF1-1

FCC ID: WHE0017923236
IC: 7772A-ATCRF11

PREPARED FOR:

Semtek I.S. Corporation
12777 High Bluff Drive, Suite 225
San Diego, CA 92130

Prepared on: February 28, 2008

Report Number: 2008 028275 FCC

Project Number: 8275-2

NEx Number: 102674

Total Pages: 23

DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	February 28, 2008	Prepared By: Dustin Chapin
-	February 28, 2008	Initial Release: Alan Laudani

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on February 22, 2008.
- Testing was performed on the unit described in this report on February 22, 2008 to February 28, 2008
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

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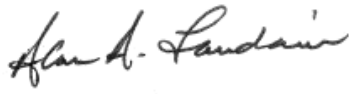
CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4–2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.



Alan Laudani
EMC Engineer

1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLIENT:	Semtek I.S. Corporation 12777 High Bluff Drive, Suite 225 San Diego, CA 92130
CONTACT: E-Mail:	Robert Mos rmos@semtek.com
DATE (S) OF TEST:	February 22, 2008 to February 28, 2008
EQUIPMENT UNDER TEST (EUT):	RFID Contactless Card Reader
MODEL:	ATC-RF1-1
CONDITION UPON RECEIPT:	Suitable for Test
TEST SPECIFICATION:	FCC, Part 15.225, Subpart C Operation within the band 13.110–14.010 MHz.and RSS 210 (Issue 7, June 2007) A2.6 General Section, Operating frequencies: 13.110 – 14.010 MHz

1.2. Test Summary

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

FCC Part 15	*RSS*	*Test Description*	*Compliance Status*
15.225(a)(b)(c)	RSS-210 A2.6 (a)(b)(c)	Field Strength of Emissions within the Band	PASS
	RSS GEN 4.4.1	20dB Bandwidth	PASS
15.225(c)	RSS-210 A2.6(d)	Field Strength of Emissions outside the Band	PASS
15.225(e)	RSS-210 A2.6	Frequency tolerance of the carrier signal	PASS
15.225(f)	RSS-210 2.5	RF Power Tag	NA[1]
15.107 & 15.207(a)	RSS-GEN	Conducted Emissions	PASS
15.109(a)	RSS-GEN	Receiver Spurious Emissions	NA[2]

[1]The RFID Power Tag is non-powered and not subject to testing.
[2]The EUT does not receive RF when not transmitting.
Refer to the test results section for further details.

Alan Laudani
EMC Engineer

2. SYSTEM CONFIGURATION

2.1. Description and Method of Exercising the EUT

The ATC-RF1-1 is a RFID Contactless Card Reader . Its function is to read Mifare supported tags after being attached to a PDA terminal portable device. The EUT was exercised by reading an actual Mifare standard 1K card. If the Tx or Rx function is disrupted as seen / indicated by the PDA or there is loss of functionality, this may be considered a failure.
The RFID reader when attached to the handheld cannot function when plugged into the charging power supply. The application on the Janam terminal specifically prevents the charging of the terminal while performing any RFID functions. The product is designed for field use (un-tethered) only and power for the RFID module is exclusively from the Janam terminal battery.

2.2. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - RFID Contactless Card Reader	Semtek I.S. Corporation Model: ATC-RF1-1 Serial #: Not Applied	None – Snap-On accessory for PDA Terminal
Support – PDA Terminal	Janam Technologies LLC Model: XP20N-1NMLYC00 Serial #: 060103121071600444	None – Internal Battery

2.3. Device Interconnection and I/O Cables

Connection	I/O Cable
EUT to Support	None – Direct Snap-On Contact

2.4. Design Modifications for Compliance

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.

2.5. Technical Specifications of the EUT

Manufacturer: Semtek I.S. Corporation

Operating Frequency: 13.56 MHz in the 13.110 – 14.010 MHz frequency band.

Measured Field Strength: 25.0 dBµV/m @ 30m

Modulation: ASK

Antenna Connector: None

Power Source: Battery in support equipment (XP20N-1NMLYC00 PDA Terminal)

3. DESCRIPTION OF TEST SITE AND ENVIRONMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1987), CISPR 16 and 22 (1985) and ANSI C63.4-2001 documents. The OATS normalized site attenuation characteristics are verified for compliance every year, and registered with the Federal Communications Commission under Registration Number 90579 and Industry Canada under 2040B-1 and 2040B-2.

3.2. Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	17 – 22 ^{o}C
Humidity range	:	29 - 30%
Pressure range	:	87 - 105 kPa

4. DESCRIPTION OF TESTING METHODS

4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document ANSI C63.4–2003, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

4.2. Configuration and Methods of Measurements for Conducted Emissions

Section 7 of ANSI C63.4 determines the general configuration of the EUT and associated equipment, as well as the test platform for conducted emissions testing. Tabletop devices are placed on a non-conducting surface 80 centimeters above the ground plane floor and 40 centimeters from the ground plane wall. The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. The EUT is powered via a Line Impedance Stabilization Network (LISN). The emissions are recorded using the required bandwidth of 9 kHz in the quasi-peak mode. The average amplitude is also observed employing a 10 kHz bandwidth to determine the presence of broadband RFI. When such interference is caused by broadband sources (as defined by the FCC and ANSI Rules), the deviation guidelines contained in Section 11.3.1 of ANSI C63.4 are employed, which allows a correction factor of 13 dB to be subtracted from the quasi-peak reading. The emission levels are then compared to the applicable FCC limits to determine compliance.

4.3. Configuration and Methods of Measurements for Frequency Identification

When performing all testing of equipment, the actual emissions of the EUT are segregated from ambient signals present within the laboratory or the open-field test range. Preliminary testing is performed to ensure that ambient signals are sufficiently low to allow for proper observation of the emissions from the EUT. Incoming power lines are filtered using a 120 dB, 30-ampere; 115/208-volt filter to assist in reducing ambient signals for tests of levels of conducted emissions. Ambients within the laboratory are compared to those noted at the nearby open-field site to discriminate between signals produced from the EUT and ambient signals. In the event that a significant emission is produced by the EUT at a frequency which is also demonstrating significant ambient signals, the spectrum analyzer is placed in the peak mode, the bandwidth is narrowed, the EUT's signal is centered on the analyzer, the scan width is expanded to 50 kHz while monitoring the audio to ensure that only the EUT signal is present, the analyzer is switched to quasi-peak mode, and the level of the EUT signal is recorded.

4.4. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4–2003 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBµV/m
RR = Receiver Reading dBµV
CL = cable loss dB
AF = antenna factor dB/m

Example Frequency = 110MHz
18.5 dBµV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBµV
+15.4 dB/m (antenna factor @ frequency)
36.9 dBµV/m Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

5. Test Results

5.1. Conducted Emissions

Part 15.207(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

7.2.2 The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network. Except when the requirements applicable to a given device state otherwise, for any license-exempt radio-communication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown below. The tighter limit applies at the frequency range boundaries. The conducted emissions shall be measured with a 50 ohm/50 micro-henry line impedance stabilization network

Frequency Range (MHz)	**Conducted Limit (dBuV)**	
	Quasi-Peak	**Average**
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Test Results:

Testing was not applicable as the rf cannot be activated when the PDA's battery is being recharged by charger.

5.1.1. Conducted Emissions Test Data – Transmit Mode

Client	Semtek I.S. Corporation	Temperature		°F
PAN #	8275-2	Relative Humidity		%
EUT Name	RFID Contactless Card Reader	Barometric Pressure		Hg
EUT Model	ATC-RF1-1	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Dustin Chapin	
Basic Standard	Sec. 15.207	Date		
Testing was not applicable as the EUT draws its power from the PDA's battery and cannot transmit in this mode.				

5.1.2. Conducted Emissions Test Data – Receive mode

Test Results:
Testing was not applicable as the EUT has no separate receive mode.

5.2. Radiated Emissions –Receive or Standby Mode

Test Results:
Testing was not applicable as the EUT has no separate receive mode.

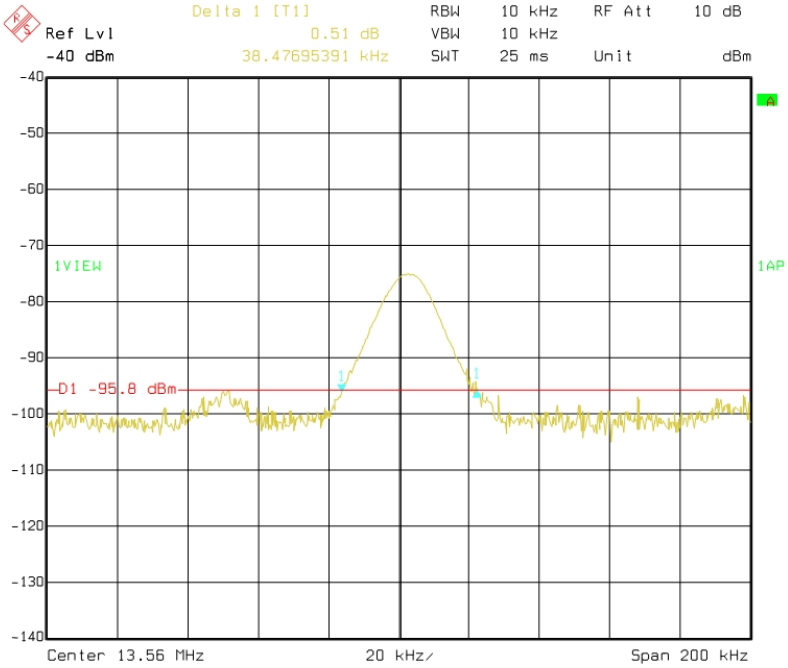
5.3. Bandwidth

RSS-Gen 4.4.1 When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

Sample Number:	ATC-RF1-1	**Temperature:**	16°C
Date:	2/25/08	**Humidity:**	67%
Modification State:	Modulated	**Tester:**	Dustin Chapin
		Laboratory:	SOATS

Radiated measurements were made at 3 meters. The RF fundamental was maximized in the OATS before any reading was made. Analyzer RES BW was set to 10 kHz. A PEAK output reading was noted, a DISPLAY line was drawn 20 dB lower than PEAK level. The bandwidth was determined from where the channel output spectrum intersected the display line. The test RFID card was placed near the EUT to provide a modulated emission. Max peak hold.

Test Results: 20 dB Bandwidth Bandwidth 38.4 kHz



5.4. The field strength of any emissions within the band 13.553–13.567 MHz

15.225(a) The field strength of any emissions within the band 13.553- 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
A2.6 (a) The field strength of any emissions shall not exceed 15,848 microvolts/meter at 30 meters within the band 13.553-13.567 MHz

Sample Number:	ATC-RF1-1	**Temperature:**	16°C
Date:	2/25/08	**Humidity:**	67%
Modification State:	Modulated	**Tester:**	Dustin Chapin
		Laboratory:	SOATS

Test Results:

- The EUT was placed 3m from the receiving loop antenna.
- The EUT is a single channel transceiver at 13.56 MHz.
- The Spectrum Analyzer RES BW was set to 10 kHz, the VBW was set to 10 kHz.
- The EUT's internal battery was freshly recharged.
- Measurements were made along three orthogonal axe.
- The loop antenna was turned 90 degrees to the plane defined between the antenna mast and the EUT vertically and horizontally.
- Peak Hold detector used.

Frequency of Emission (MHz)	Emission Level (dBuV) at 3m	Antenna Factor + Cable Loss	Extrapolation Factor (3 to 30m)	Field Strength (dBuV/m @ 30m)*	Limit (dBuV/m@30m)	Margin (dB)
13.560	27.9	37.1	-40	25.0	84	-59

*Extrapolated field strength = emission level + antenna factor and cable losses + extrapolation factor.
Sample calculation 27.9 + 36.1 + 1.0 – 40 = 25.0 dBuV/m @ 30 m
30 to 3 m extrapolation factor = 40 Log (3/30) = -40 dB
Equipment Used: 711, 552

5.5. Emissions Mask

15.225(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
RSS-210 A2.6 (a) The field strength of any emissions shall not exceed 15,848 microvolts/meter at 30 meters within the band 13.553-13.567 MHz

Test Conditions:

Sample Number:	AR4	**Temperature:**	16°C
Date:	2/25/08	**Humidity:**	67%
Modification State:	Modulated	**Tester:**	Dustin Chapin
		Laboratory:	Nemko NOATS

Test Results

The EUT was placed 3m from the receiving loop antenna. The Spectrum Analyzer RES BW was set to 10 kHz, the VBW was set to 10 kHz. The PDA's internal battery was freshly recharged. Measurements were made along three orthogonal axes with the worst-case result presented in the plots below. The loop antenna was turned 180 degrees to the plane defined between the antenna mast and the EUT vertically and horizontally. Peak Hold detector used.

Set Up for field strength with Extrapolation and Correction Factor

36.1 + 1.0 – 40 = -2.9

Appling Offset: 84 –2.9 = 81.1 dBuV

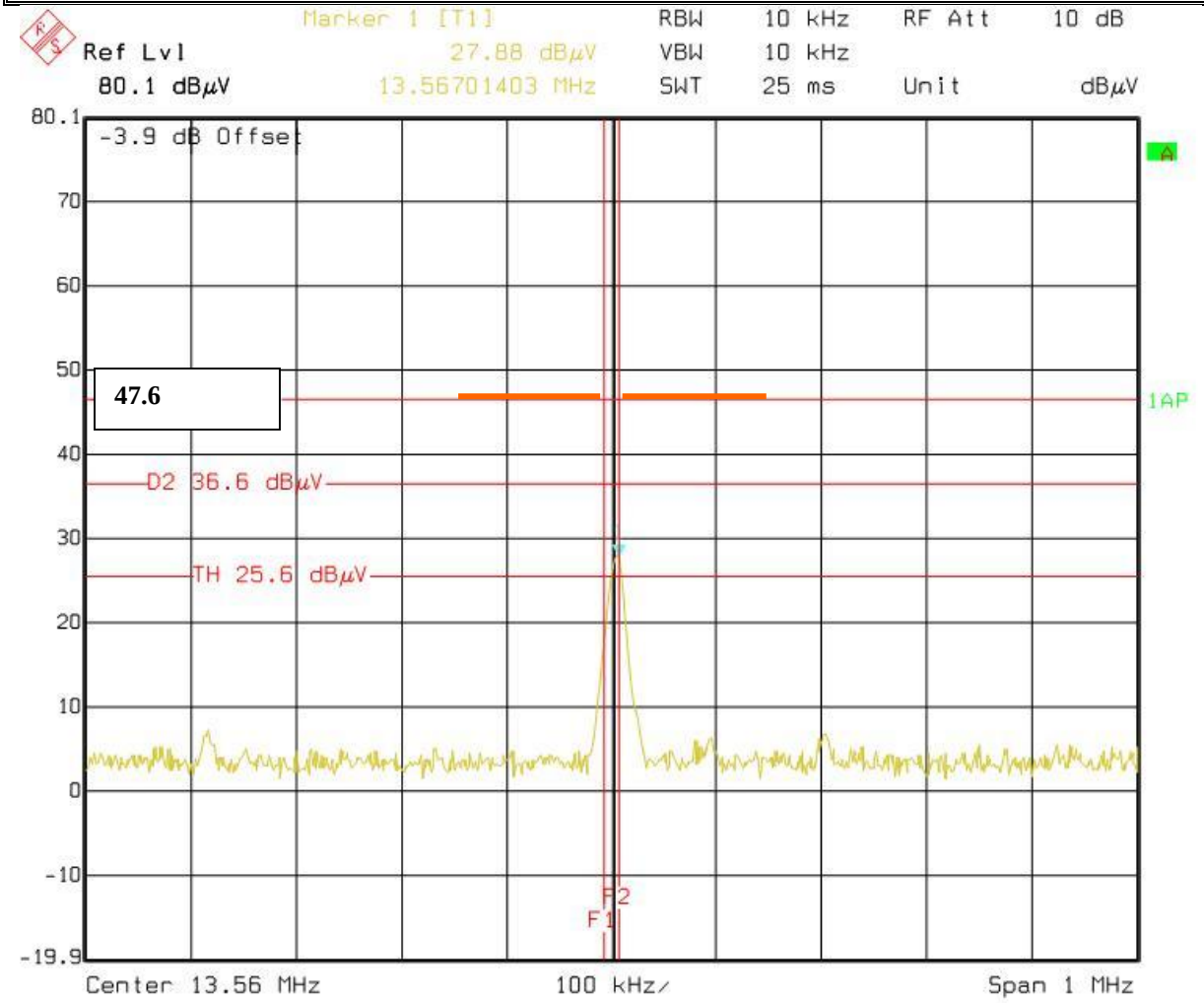
F1 = 13.553 MHz

F2 = 13.567 MHz

Orange lines = 50.5 –2.9 = 47.6

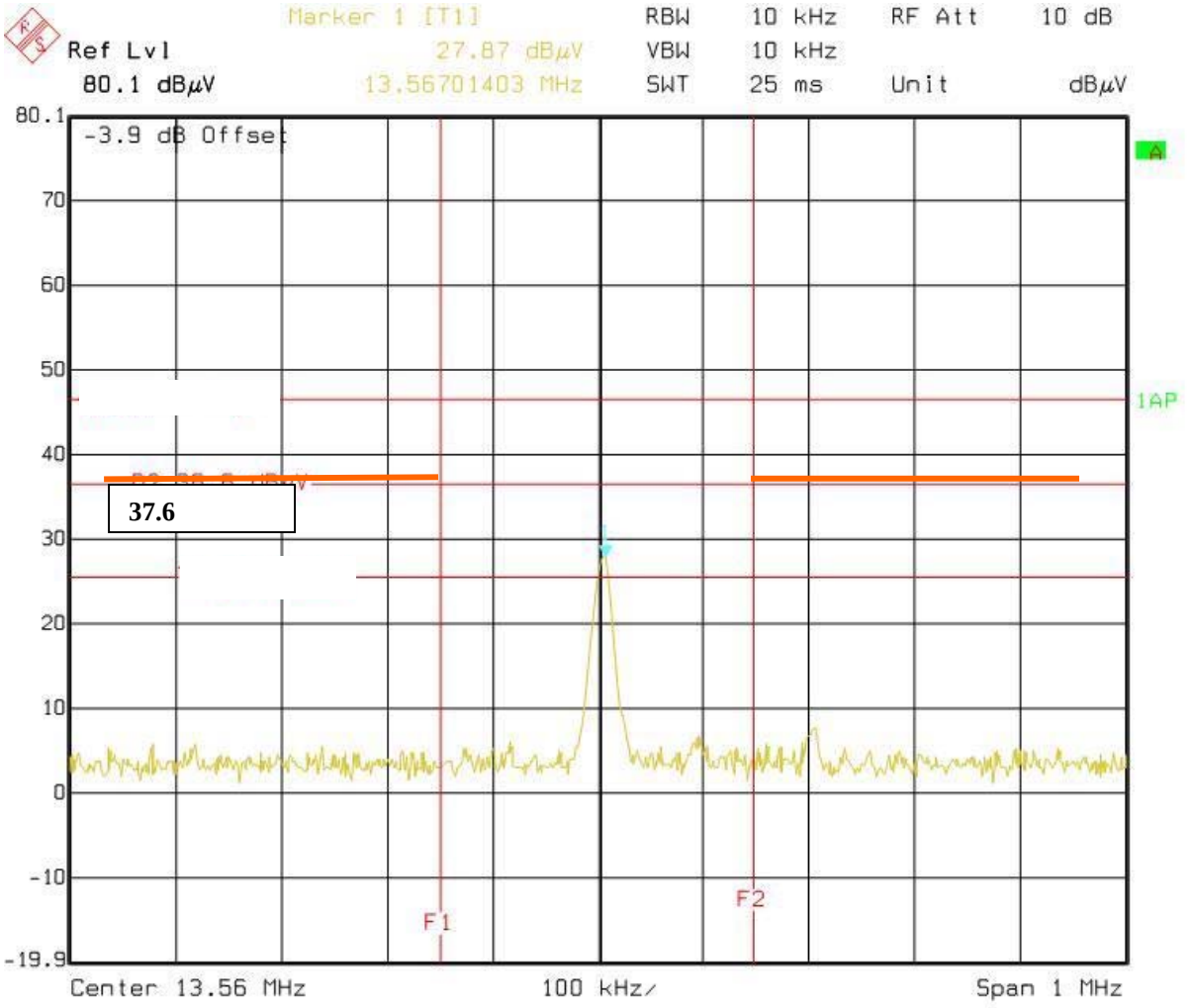
No emissions evident above D1 outside of F1 and F2 so EUT complies.

RSS-210 A2.6 (b) The field strength of any emissions shall not exceed 334 microvolts/meter (50.5 dBuV/m) at 30 meters within the band 13.410-13.553 MHz and 13.567-13.710 MHz. and …
FCC 15.225 (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.



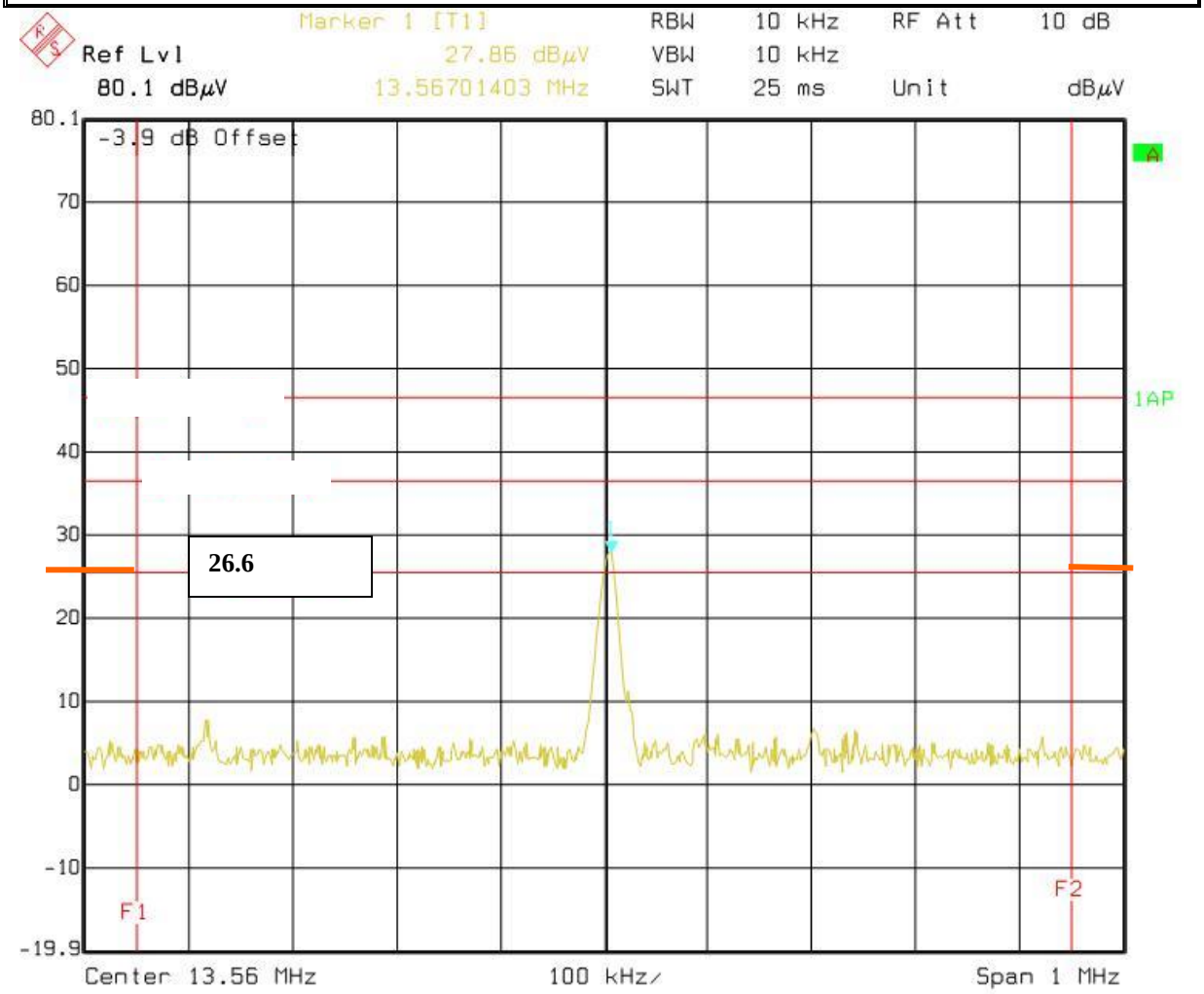
F1 = 13.410 MHz
F2 = 13.710 MHz
Orange lines = 40.5 –2.9 = 37.6
No emissions evident above D2 outside of F1 and F2 so EUT complies.

RSS-201 A2.6 (c) The field strength of any emissions shall not exceed 106 microvolts/meter (40.5 dBuV/m) at 30 meters within the band 13.110-13.410 MHz and 13.710–14.010 MHz
And FCC 15.225(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.



F1 = 13.110 MHz
F2 = 14.010 MHz
Orange lines = 29.5 –3.9 = 26.6
No emissions evident above D1 outside of F1 and F2 so EUT complies.
Emissions were searched from 9 kHz to 10 times the transmit frequency of 13.560 MHz or 136 MHz.
No emissions were detected other than the transmit frequency.

RSS-210 A2.6 (d) The field strength of any emissions shall not exceed 30 microvolts/meter (29.5 dBuV/m) at 30 meters outside the 13.110-14.010 MHz band
And FCC 15.225 (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.



5.6. Out-of-band Emissions

15.209(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/meter)	Measurement Distance (meter)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	3
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

RSS-210 A2.6 (d) The field strength of any emissions shall not exceed 30 microvolts/meter (29.5 dBuV/m) at 30 meters outside the 13.110-14.010 MHz band

And FCC 15.225 (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Sample Number:	ATC-RF1-1	**Temperature:**	16°C
Date:	2/25/08	**Humidity:**	67%
Modification State:	Modulated	**Tester:**	Dustin Chapin
		Laboratory:	SOATS

Test Results:

No emissions observed due to the RF emissions of the card reader other than the fundamental. Digital emissions due to the PDA below.

Additional Observations:

- The Spectrum was searched from 30MHz to the 10th Harmonic, 1000 MHz.
- The EUT was measured on three orthogonal axes. Worst case emissions shown below.
- Radiated Measurements below 1GHz were performed at 3m with a Quasi-Peak detector (RBW 120kHz/VBW 300kHz) while Radiated Peak (RBW 1MHz/VBW 3MHz) and Average (RBW 1MHz/VBW 10Hz) measurements conducted above 1GHz.
- The device has an integral antenna with no conducted measurement capability.

Radiated Emissions Data

Job # :	8275-2	Date :	2/26/08	Page 1 of 1	
NEX #:	102674	Time :	1300		
		Staff :	DC		
Client Name :	Semtek I.S.			EUT Voltage :	Battery
EUT Name :	Contactless Card Reader			EUT Frequency :	NA
EUT Model # :	ATC-RF1-1			Phase:	NA
EUT Serial # :	Not Applied			NOATS	X
EUT Config. :	Continuous Card Detected			SOATS	
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	115	Temp. (°C) :	23		
Log Ant.#:	111	Humidity (%) :	30		
DRG Ant. #	NA	Spec An.#:	711		
Cable LF#:	NOATS	Spec An. Display #:	404		
Cable HF#:	NA	QP #:	421		
Preamp LF#:	902	PreSelect#:	NA		
Preamp HF#	NA				

Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz
Average	RBW:	1 MHz
	Video Bandwidth	10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.

Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
40.67	52.3	48.9	Q	F/R	1.2	52.3	30.8	40.0	-9.2	Pass	
67.80	57.8	58.1	Q	F	2.8	58.1	37.3	40.0	-2.7	Pass	
72.33	57.3	57.6	Q	B/L	1.8	57.6	34.7	40.0	-5.3	Pass	
108.54	50.6	51.4	Q	F	1.7	51.4	33.4	43.5	-10.1	Pass	
122.07	49.4	47.9	Q	F	2.2	49.4	31.4	43.5	-12.2	Pass	
217.00	46.5	38.2	Q	L	1.0	46.5	28.9	46.0	-17.1	Pass	
325.50	39.2	36.3	Q	B/L	1.2	39.2	25.4	46.0	-20.6	Pass	
447.65	53.8	45.6	Q	B/L	1.5	53.8	42.4	46.0	-3.6	Pass	
595.74	49.3	47.2	Q	F/R	1.3	49.3	40.3	46.0	-5.8	Pass	
922.70	41.9	37.3	Q	B	1.2	41.9	39.4	46.0	-6.7	Pass	

5.7. Frequency tolerance of the carrier signal

RSS-210 A2.6 Carrier Frequency Stability shall be maintained to ±0.01% (100 ppm)
RSS-210(e) The frequency tolerance of the carrier signal shall be maintained within ±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.

Sample Number:	ATC-RF1-1	**Temperature:**	21°C
Date:	2/25/08	**Humidity:**	67%
Modification State:	CW or Modulated	**Tester:**	Dustin Chapin
		Laboratory:	Environmental Chamber

Test Results:

Results are tabulated below.
This equipment test was performed using a freshly charged battery
No remote control possible for device and transmitting was continuous throughout the test.
RBW = 1 kHz, Peak Hold refreshed for each measurement after temperature level is stable.
EUT is battery powered, therefore no power input stability results.
Limit: 100 ppm x 13.56 MHz = 1356 Hz

Temperature	Frequency	Frequency Drift		
Degrees C	MHz	Hz	ppm	%
-20	13.560837	39	2.88	0.000288%
-10	**13.560839**	**41**	**3.02**	**0.000302%**
0	13.560830	32	2.36	0.000236%
10	13.560798	0	0.00	0.000000%
20	13.560798	0	0.00	0.000000%
30	13.560796	-2	-0.15	-0.000015%
40	13.560786	-12	-0.88	-0.000088%
50	13.560782	-16	-1.18	-0.000118%

5.8. Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
115	Antenna, Bicon	EMCO	3104	3020	8/28/07	8/28/08
111	Antenna, LPA	EMCO	3146	1382	10/3/07	10/3/08
901	pre amp	Sonoma	310 N	130607	7/10/07	7/10/08
711	Spectrum Analyzer	HP	8568B	2747A04729	2/21/08	2/21/09
404	Spectrum Analyzer Display	HP	85662A	2648A15448	7/27/07	7/27/08
421	Quasi-Peak Adapter	HP	85650A	3145A01672	2/21/08	2/21/09
552	Antenna, Loop	EMCO	ALR-30M	820	8/27/07	8/27/08
926	Frequency Counter	Anritsu	MF2412B	6200229301	1/22/08	1/22/09
N149	Environmental Chamber	Cincinnati Sub-Zero	ZPHS-32-2-2-H/AC	ZP0552665	5/30/2007	5/302008