



www.nemko.com



Test Report: 81966-1TRFWL

Applicant: Computerized Security Systems
1950 Austin Drive
Troy, MI
48083 USA

Apparatus: Saflok Quantum RFID

FCC ID: SAPQUANTUMRFID

In Accordance With: FCC Part 15 Subpart C, 15.225
Operation within the band 13.110-14.010 MHz

Tested By: Nemko Canada Inc.
303 River Road
Ottawa, Ontario
K1V 1H2

Authorized By: 
Jin Xu, Wireless Specialist

Date: May 23, 2007

Total Number of Pages: 17

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	Saflok Quantum RFID
Specification:	FCC Part 15 Subpart C, 15.225
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Jason Nixon, Telecom Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

TABLE OF CONTENTS

Report Summary	2
Section 1 : Equipment Under Test	4
1.1 Product Identification	4
1.2 Samples Submitted for Assessment.....	4
1.3 Theory of Operation	4
1.4 Technical Specifications of the EUT	4
1.5 Block Diagram of the EUT.....	5
Section 2 : Test Conditions	6
2.1 Specifications	6
2.2 Deviations From Laboratory Test Procedures	6
2.3 Test Environment	6
2.4 Test Equipment.....	6
Section 3 : Observations	7
3.1 Modifications Performed During Assessment	7
3.2 Record Of Technical Judgements	7
3.3 EUT Parameters Affecting Compliance	7
3.4 Test Deleted.....	7
3.5 Additional Observations	7
Section 4 : Results Summary	8
4.1 FCC Part 15 Subpart C : Test Results	9
Appendix A : Test Results	10
Clause 15.215(c) 20dB Bandwidth.....	10
Clause 15.225(a) Field Strength in the 13.553-13.567 MHz band	11
Clause 15.225(d) Field Strength of any emissions appearing outside of the 13.110-14.010 MHz band	12
Clause 15.225(e) Frequency tolerance of the carrier signal.....	14
Appendix B : Setup Photographs	15
Appendix C : Block Diagram of Test Setups	16

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

Saflok Quantum RFID

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
1	Quantum RFID	None

The first samples were received on: February 27, 2007

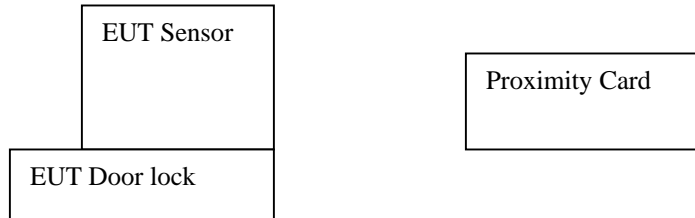
1.3 Theory of Operation

The apparatus is a 13.56MHz RFID reader, which is attached to a secure lock. Whenever a known card is brought in proximity to the reader it will grant access through the door.

1.4 Technical Specifications of the EUT

Operating Frequency: 13.56MHz
Emission Designator PON
Modulation: Pulse Modulated
Antenna Data: Integral

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.225

Operation within the band 13.110-14.010 MHz

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range : 15 – 30 °C
 Humidity range : 20 - 75 %
 Pressure range : 86 - 106 kPa
 Power supply range : +/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSP40	FA001920	Mar 17/07
Temperature Chamber	Thermotron	SM-16C	FA001030	NCR
Fluke	Multimeter	16	FA001831	Jan 10/08
Fluke	Air probe	None	FA001248	NCR
Biconical (1) Antenna	EMCO	3109	FA000805	May 03/07
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Sept. 12/07
Loop Antenna	EMCO	6502	FA001686	Jul 17/07

COU – Calibrate on Use

NCR – No Calibration Required

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart C : Test Results

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 tests.
- N/T Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

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

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.31(e)	Variation of power supply	N	
15.207(a)	Powerline Conducted Emissions	N	
15.215(c)	20dB Bandwidth	Y	PASS
15.225(a)	Field Strength in the 13.553-13.567 MHz band	Y	PASS
15.225(b)	Field Strength in the 13.410-13.553 MHz and 13.567-13.710 MHz MHz bands	N	
15.225(c)	Field Strength in the 13.110-13.410 MHz and 13.710-14.010 MHz bands	N	
15.225(d)	Field Strength of any emissions appearing outside of the 13.110-14.010 MHz band	Y	PASS
15.225(e)	Frequency tolerance of the carrier signal	Y	PASS
15.225(f)	Radio frequency powered tags	N	

Notes:

Appendix A : Test Results

Clause 15.215(c) 20dB Bandwidth

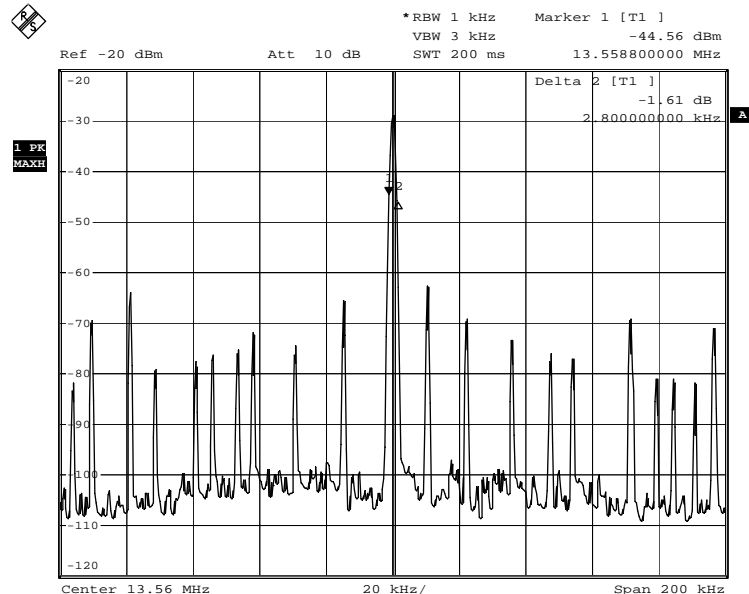
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Conditions:

Sample Number:	1	Temperature (°C):	23
Date:	February 28, 2008	Humidity (%):	14
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results: See Attached Plots.

20dB Bandwidth:



20dB Bandwidth

Date: 28.FEB.2007 11:02:07

Clause 15.225(a) Field Strength in the 13.553-13.567 MHz band

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

Test Conditions:

Sample Number:	1	Temperature (°C):	10
Date:	February 27, 2007	Humidity (%):	43
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results: See Attached table.

Frequency (MHz)	Received (dBuV/m)	Af (dB)	Cable Loss (dB)	Measured @ 1m (dBuV/m)	Measured @ 30m (dBuV/m)	Limit (dBuV/m)	Margin (dB)
13.56	68.86	10.6	0.26	79.72	20.64	84	63.36

Additional Notes:

Measurements were performed at 1m using a Peak detector with 10kHz RBW/30kHz VBW.

The loop antenna was rotated 360° about its axis.

The EUT used fresh new batteries.

Measurements were corrected to 30m using $40\log(1/30) = -59.1\text{dB}$

Clause 15.225(d) Field Strength of any emissions appearing outside of the 13.110-14.010 MHz band

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

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 (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Conditions:

Sample Number:	1	Temperature (°C):	10
Date:	February 27, 2007	Humidity (%):	43
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results: See attached Table

Additional Observations:

The Spectrum was searched from 9kHz to 1GHz.

The EUT used fresh new batteries.

All measurements were performed at 3m using a Peak detector with 10kHz RBW/30kHz VBW below 30MHz, a Peak detector with 100kHz RBW/300kHz VBW above 30MHz

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
176.2900	BC1	V	27.8	13.2	N/A	1.4	42.3	43.5	1.2
176.2900	BC1	H	21.9	12.4	N/A	1.4	35.6	43.5	7.9
216.9604	BC1	V	16.2	14.9	N/A	1.6	32.7	46.0	13.3
216.9604	BC1	H	17.9	14.7	N/A	1.6	34.2	46.0	11.8
230.5236	BC1	V	18.9	16.1	N/A	1.6	36.6	46.0	9.4
230.5236	BC1	H	15.9	15.2	N/A	1.6	32.7	46.0	13.3
244.0848	BC1	V	16.9	16.8	N/A	1.7	35.4	46.0	10.6
244.0848	BC1	H	14.5	15.5	N/A	1.7	31.7	46.0	14.3
257.6436	BC1	V	13.9	16.6	N/A	1.8	32.3	46.0	13.7
257.6436	BC1	H	14.9	16.5	N/A	1.8	33.2	46.0	12.8
271.2035	BC1	V	13.9	17.0	N/A	2.0	32.9	46.0	13.1
271.2035	BC1	H	15.6	16.9	N/A	2.0	34.5	46.0	11.5
284.7620	BC1	V	20.5	17.2	N/A	2.0	39.7	46.0	6.3
284.7620	BC1	H	19.8	17.4	N/A	2.0	39.2	46.0	6.8

Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole

Clause 15.225(e) Frequency tolerance of the carrier signal

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.

Test Conditions:

Sample Number:	1	Temperature (°C):	22
Date:	February 27, 2007	Humidity (%):	12
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

Conditions	Frequency (Hz)	Offset (ppm)
+50°C	13560068	-4.20
+40°C	13560086	-2.88
+30°C	13560116	-0.66
+20°C	13560125	—
+10°C	13560166	3.02
0°C	13560178	3.91
-10°C	13560166	3.02
-20°C	13560148	1.70

Additional Notes:

Limit: +/-0.01% = +/-100ppm

The apparatus is battery powered therefore no supply voltage variation is required.

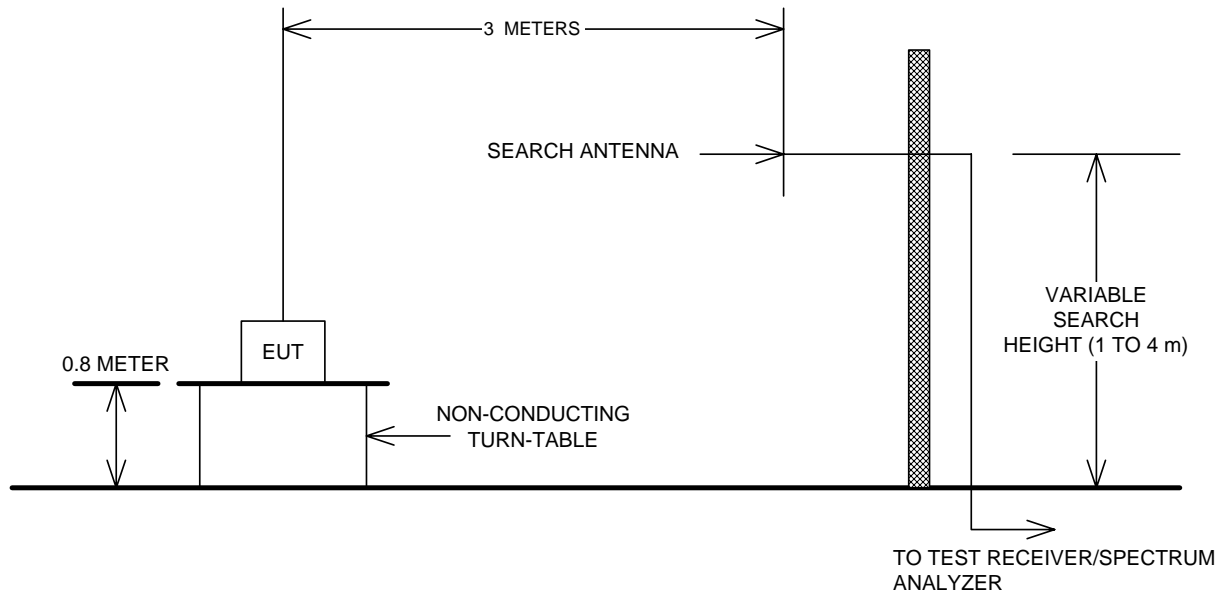
Appendix B : Setup Photographs

Spurious Emissions Setup:

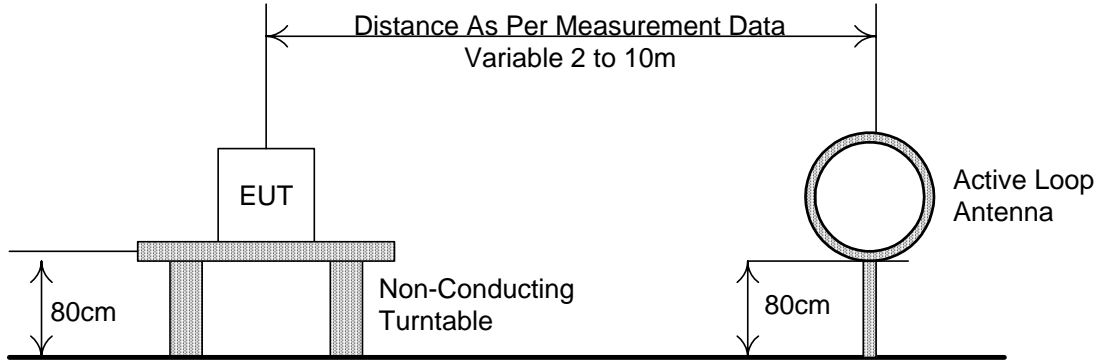


Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions above 30MHz



Emissions below 30MHz



Open Area Test Site – Flat Level Area – Asphalt Surface – Clear Of Obstacles

Frequency Stability

