

**Nemko Test Report:** 116031-3TRFWL

**Applicant:** Computerized Security Systems Inc. dba Saflok  
31750 Sherman Ave.  
Madison Heights, MI  
48071

**Apparatus:** RFID Encoder

**FCC ID:** SAPRFIDENC

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

A handwritten signature in blue ink, appearing to read 'Andrey Adelberg'.

**Authorized By:** Andrey Adelberg, EMC/Wireless Specialist

**Date:** February 9, 2009

**Total Number of Pages:** 20

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## Section 1 : 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.

The assessment summary is as follows:

<b>Apparatus Assessed:</b>	RFID Encoder
<b>Specification:</b>	FCC Part 15 Subpart C, 15.225
<b>Compliance Status:</b>	Complies
<b>Exclusions:</b>	None
<b>Non-compliances:</b>	None
<b>Report Release History:</b>	Original Release
<b>Test Location:</b>	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
<b>Registration Number:</b>	176392 (3m Semi-Anechoic Chamber)
<b>Tests Performed By:</b>	Jason Nixon, Wireless/Telecom Specialist
<b>Test Dates:</b>	October 31 to November 21, 2008

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. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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## Section 2 : Equipment Under Test

### 2.1 Identification of Equipment Under Test (EUT)

The following information identifies the EUT under test:

Type of Equipment:	RFID Encoder
Brand Name:	Saflok
Model Name or Number:	74350
Serial Number:	None
FCC ID:	SAPRFIDENC
Nemko Sample Number:	1
Date of Receipt:	October 27, 2008

### 2.2 Accessories

The following information identifies accessories used to exercise the EUT during testing:

Description:	Deskline Terminal
Brand Name:	Saflok
Model Name or Number:	71510
Serial Number:	001478
Nemko Sample Number:	4
Connection Port:	RS232
Cable Length and Type:	0.7m Stereo RCA to Stereo RCA, RS232 Communication Cable

Description:	AC power adapter
Brand Name:	CUI Inc
Model Name or Number:	EPS050100
Serial Number:	EPS050100-P6P
Nemko Sample Number:	12
Connection Port:	DC Power
Cable Length and Type:	1.8m 2 Conductor DC Input Power Cable

### 2.3 EUT Description

The EUT is used to read and program RFID cards to be used in a Hotel environment.

## 2.4 Technical Specifications of the EUT

**Operating Band:** 13.553-13.567MHz

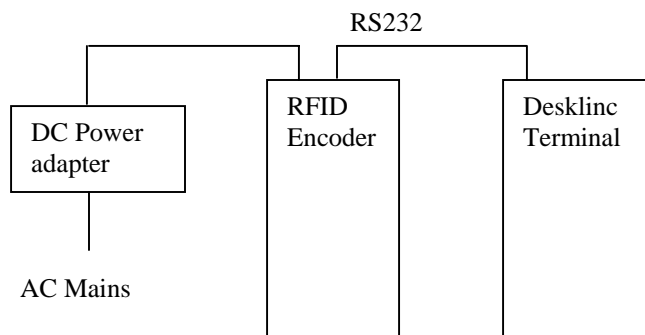
**Operating Frequency:** 13.56MHz

**Modulation:** On/Off Keying

**Antenna Data:** Integral

**Power Supply Requirements:** 120VAC, 60Hz

## 2.5 EUT Setup diagram



## 2.6 Operation of the EUT during testing

The EUT continuously transmits with power applied.

## 2.7 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

## **Section 3 : Test Conditions**

### **3.1 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

### **3.2 Deviations From Laboratory Test Procedures**

No deviations were made from laboratory test procedures.

### **3.3 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

### **3.4 Measurement Uncertainty**

Nemko Canada measurement uncertainty has been calculated using guidance of UKAS LAB 34:2003 and TIA-603-B Nov 7, 2002. All calculations have been performed to provide a confidence level of 95% and can be found in Nemko Canada document MU-003.

### 3.5 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Cal. Date	Next Cal.
Active Loop Antenna	EMCO	6502	FA001686	July 23/08	July 23/09
Spectrum Analyzer	Rohde & Schwarz	FSP40	FA001920	April 14/08	April 14/09
Frequency Counter	HP	5352B	FA001915	Dec 3/07	Dec 3/08
Temperature Chamber	Thermotron	SM-16C	FA001030	NCR	NCR
Multimeter	Fluke	16	FA001831	Jan 14/08	Jan 14/09
Air probe	Fluke	None	FA001248	NCR	NCR
Receiver/Spectrum Analyzer	Rohde & Schwarz	ESU40	FA002071	Nov. 14/07	Nov. 14/08
Bilog	Schaffner	CBL6112B	FA001504	July 25/08	July 25/09
LISN	Rohde & Schwarz	ENV216	FA002023	Sept. 02/08	Sept. 02/09
50 Coax cable	HUBER + SUHNER	None	FA002015	Aug. 05/08	Aug. 05/09
International Power Supply	California Inst.	3001i	FA001021	Jan. 16/08	Jan. 16/09

COU – Calibrate on Use

NCR – No Calibration Required

## 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 Report Summary)

#### 4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.31(e)	Variation of power supply	Y	PASS
15.207(a)	Powerline Conducted Emissions	Y	PASS
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 bands	Y	PASS
15.225(c)	Field Strength in the 13.110-13.410 MHz and 13.710-14.010 MHz bands	Y	PASS
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	





## Appendix A : Test Results

### Clause 15.207(a) Powerline Conducted Emissions

Frequency of Conducted limit (dB $\mu$ V)		
Emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

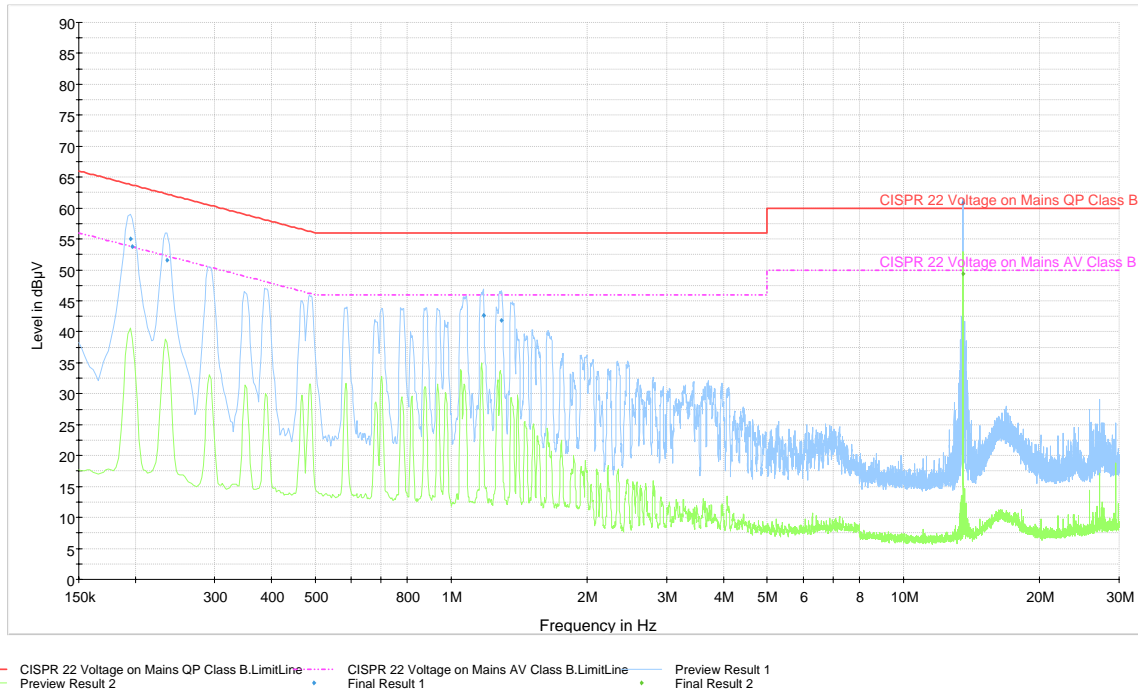
\* Decreases with the logarithm of the frequency.

**Test Results:** Pass

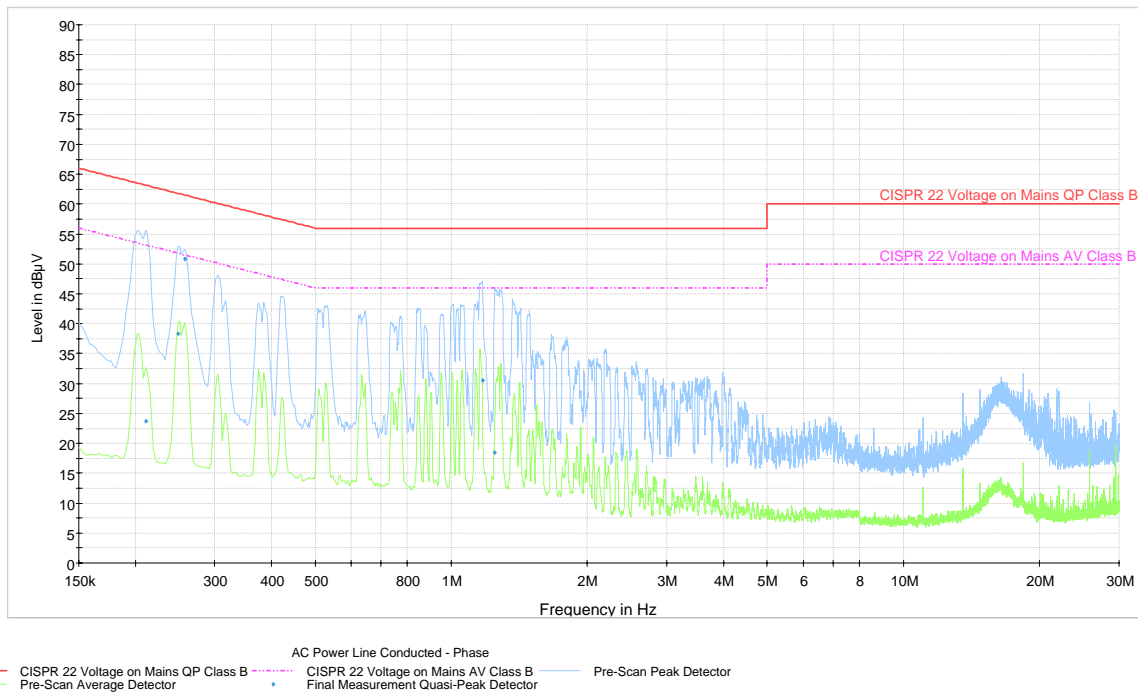
### Additional Observations:

All plots were obtained using a sweeping receiver with an IF of 9kHz using a Peak and Average detector. The plots have been corrected with the cable loss and LISN loss to show compliance.

**Phase – with antenna**



**Phase – with antenna terminated**





**Phase with antenna**

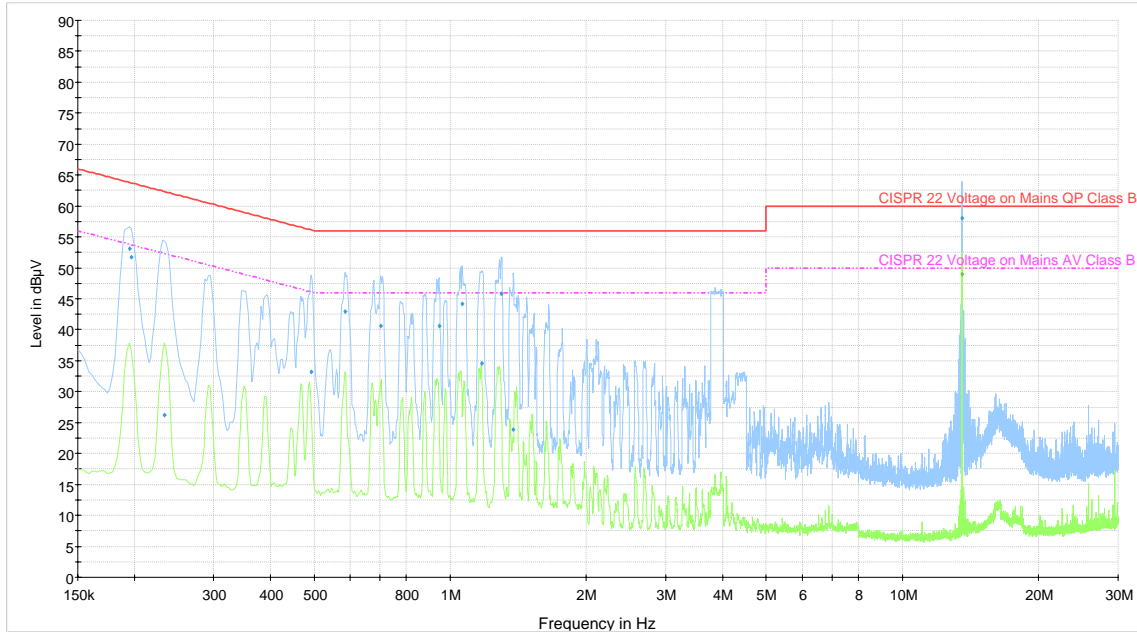
Frequency MHz	QuasiPeak dBμV	Meas. Time ms	Bandwidth Filter kHz		Line	Corr. dB	Margin dB	Limit dBμV
0.1950	54.97	100.00	9.00	On	L1	10.13	8.80	63.82
0.1973	53.80	100.00	9.00	On	L1	10.09	9.90	63.73
0.2355	51.53	100.00	9.00	On	L1	10.03	10.80	62.25
1.1783	42.63	100.00	9.00	On	L1	9.99	13.40	56.00
1.2930	41.91	100.00	9.00	On	L1	10.00	14.10	56.00
13.5595	60.71	100.00	9.00	On	L1	10.44	-0.70	60.00

Frequency MHz	Average dBμV	Meas. Time ms	Bandwidth Filter kHz		Line	Corr. dB	Margin dB	Limit dBμV
13.5595	49.37	100.00	9.00	On	L1	10.44	0.60	50.00

**Phase with antenna terminated**

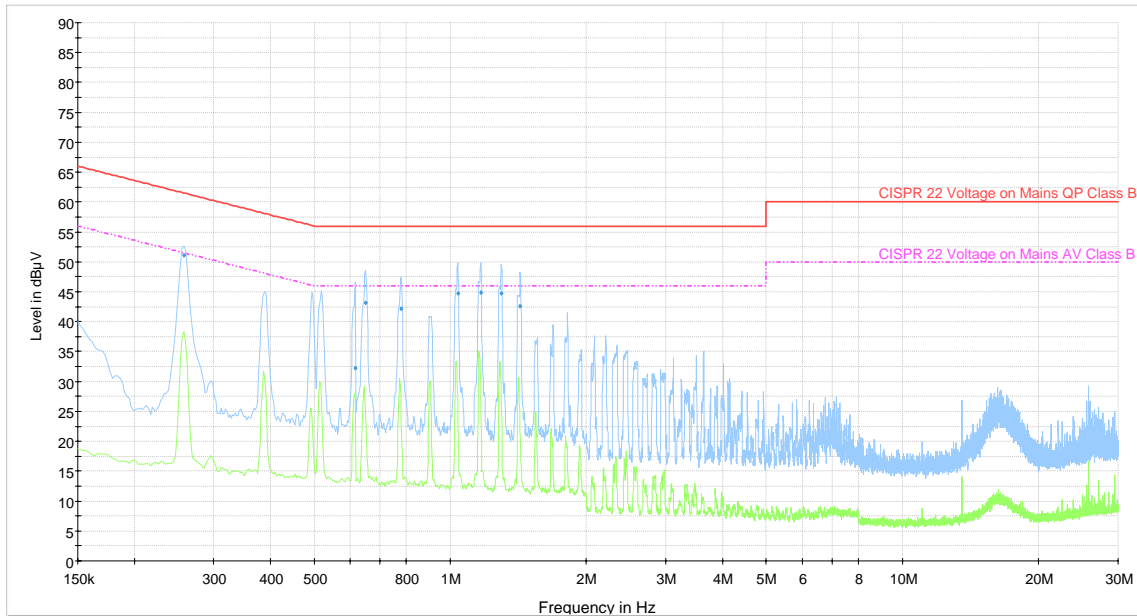
Frequency MHz	QuasiPeak dBμV	Meas. Time ms	Bandwidth Filter kHz		Line	Corr. dB	Margin dB	Limit dBμV
0.2108	23.67	100.00	9.00	On	L1	10.03	39.50	63.18
0.2490	38.31	100.00	9.00	On	L1	10.02	23.50	61.79
0.2580	50.81	100.00	9.00	On	L1	10.02	10.70	61.50
1.1715	30.53	100.00	9.00	On	L1	9.99	25.50	56.00
1.2480	18.51	100.00	9.00	On	L1	10.00	37.50	56.00

**Neutral – with antenna**



— CISPR 22 Voltage on Mains QP Class B.LimitLine   
 - - - CISPR 22 Voltage on Mains AV Class B.LimitLine   
 — Preview Result 1  
— Preview Result 2   
 • Final Result 1   
 • Final Result 2

**Neutral – with antenna terminated**



— CISPR 22 Voltage on Mains QP Class B   
 - - - CISPR 22 Voltage on Mains AV Class B   
 — AC Power Line Conducted - Neutral  
— Pre-Scan Average Detector   
 • Final Measurement Quasi-Peak Detector   
 — Pre-Scan Peak Detector

**Neutral with antenna**

Frequency	QuasiPeak	Meas. Time	Bandwidth Filter	Line	Corr.	Margin	Limit
MHz	dB $\mu$ V	ms	kHz		dB	dB	dB $\mu$ V
0.1950	53.12	100.00	9.00	On	N	10.11	63.82
0.1973	51.68	100.00	9.00	On	N	10.07	63.73
0.2333	26.23	100.00	9.00	On	N	10.01	62.33
0.4920	33.21	100.00	9.00	On	N	10.06	56.13
0.5843	42.90	100.00	9.00	On	N	10.08	56.00
0.7013	40.60	100.00	9.00	On	N	10.09	56.00
0.9443	40.63	100.00	9.00	On	N	10.04	56.00
1.0613	44.24	100.00	9.00	On	N	9.96	56.00
1.1760	34.53	100.00	9.00	On	N	9.97	56.00
1.2975	45.79	100.00	9.00	On	N	9.98	56.00
1.3785	23.93	100.00	9.00	On	N	9.99	56.00
13.5595	58.01	100.00	9.00	On	N	10.46	60.00

Frequency	Average	Meas. Time	Bandwidth Filter	Line	Corr.	Margin	Limit
MHz	dB $\mu$ V	ms	kHz		dB	dB	dB $\mu$ V
13.5595	48.91	100.00	9.00	On	N	10.46	50.00

**Neutral with antenna terminated**

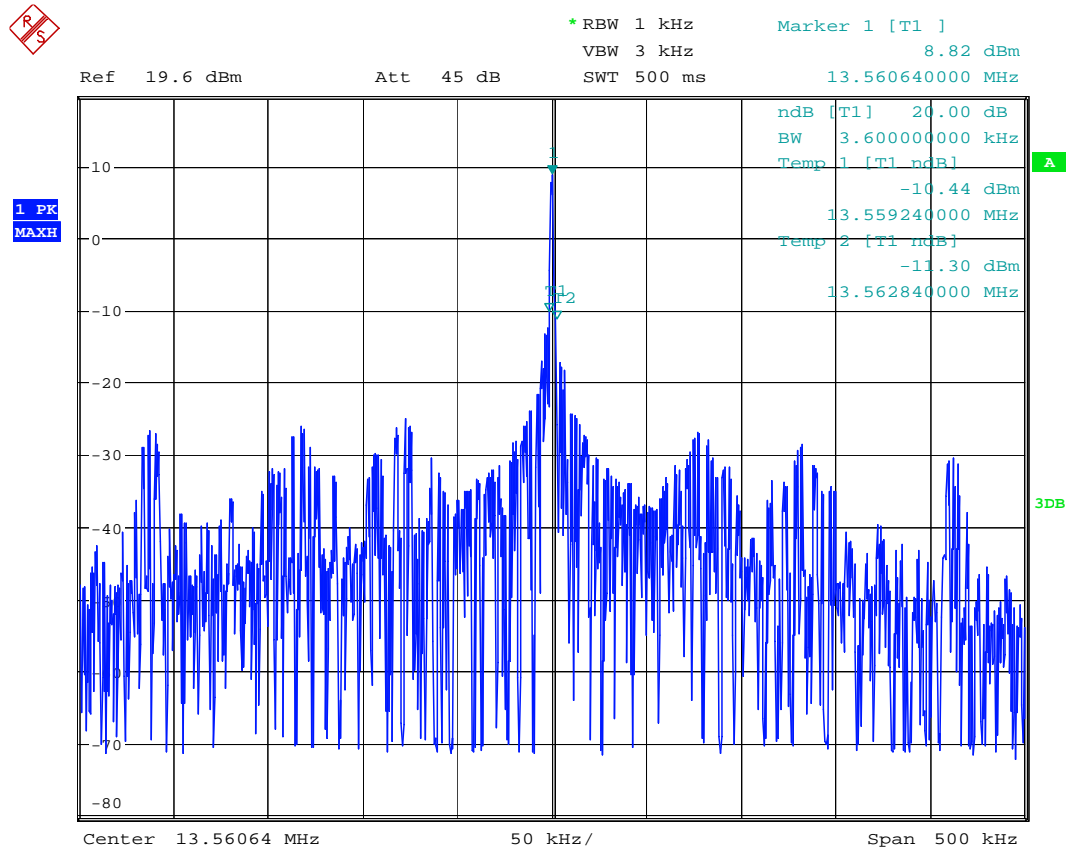
Frequency	QuasiPeak	Meas. Time	Bandwidth Filter	Line	Corr.	Margin	Limit
MHz	dB $\mu$ V	ms	kHz		dB	dB	dB $\mu$ V
0.2580	51.09	100.00	9.00	On	N	10.00	61.50
0.6158	32.22	100.00	9.00	On	N	10.08	56.00
0.6495	43.14	100.00	9.00	On	N	10.08	56.00
0.7778	42.21	100.00	9.00	On	N	10.09	56.00
1.0388	44.65	100.00	9.00	On	N	9.96	56.00
1.1670	44.88	100.00	9.00	On	N	9.97	56.00
1.2975	44.68	100.00	9.00	On	N	9.98	56.00
1.4280	42.61	100.00	9.00	On	N	9.99	56.00

**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 Results:** Pass

**20dB Bandwidth:**



Date: 21.NOV.2008 11:08:51

**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.

**Clause 15.225(b) Field Strength in the 13.410-13.553 MHz and 13.567-13.710 MHz bands**

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.

**Clause 15.225(c) Field Strength in the 13.110-13.410 MHz and 13.710-14.010 MHz bands**

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.

**Test Results:** Pass

Frequency (MHz)	Rcvd Level @ 3m (dB $\mu$ V)	Ant. Factor (dB)	Cable loss (dB)	Emission @ 3m (dB $\mu$ V/m)	Distance Corr. (dB)	Emission @ 30m (dB $\mu$ V/m)	Axis
13.56	47.94	11.2	0.1	59.24	40	19.24	X
13.56	39.37	11.2	0.1	50.67	40	10.67	Y
13.56	47.90	11.2	0.1	59.20	40	19.20	Z

**Additional Observations:**

Measurements were made using a 10kHz Peak detector @ 3m.

The EUT was measured on three orthogonal axis and the loop antenna was rotated 360°.

The power supply voltage was varied +/-15% and there was no change observed.

**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 Results:** Pass

No emissions were detected within 20dB below the limit.

**Additional Observations:**

The Spectrum was searched from 30MHz to the 10<sup>th</sup> Harmonic.

The EUT was measured on three orthogonal axis.

All measurements were performed at 3m.





**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 Results:** Pass

Conditions	Frequency (Hz)	Offset (ppm)
+50°C, Nominal power	13560566	-3.76
+40°C, Nominal power	13560575	-3.10
+30°C, Nominal power	13560608	-0.66
+20°C, +15% power	13560613	-0.29
+20°C, Nominal power	13560617	—
+20°C, -15% power	13560611	-0.44
+10°C, Nominal power	13560651	2.51
0°C, Nominal power	13560653	2.65
-10°C, Nominal power	13560579	-2.80
-20°C, Nominal power	13560602	-1.11

## Appendix B : Setup Photographs

### Conducted Emissions Setup:

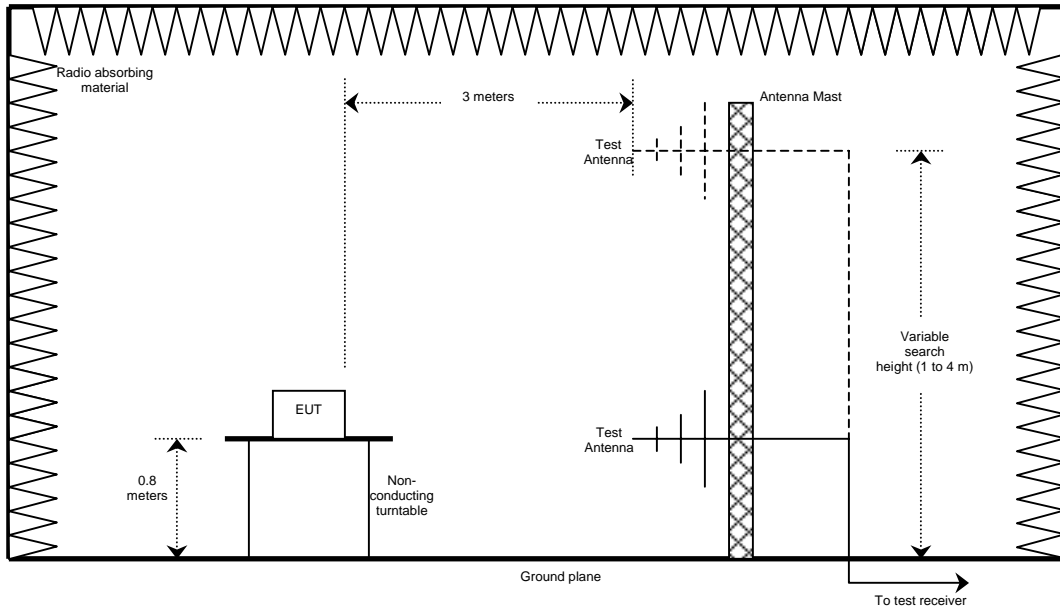


### Spurious Emissions Setup:

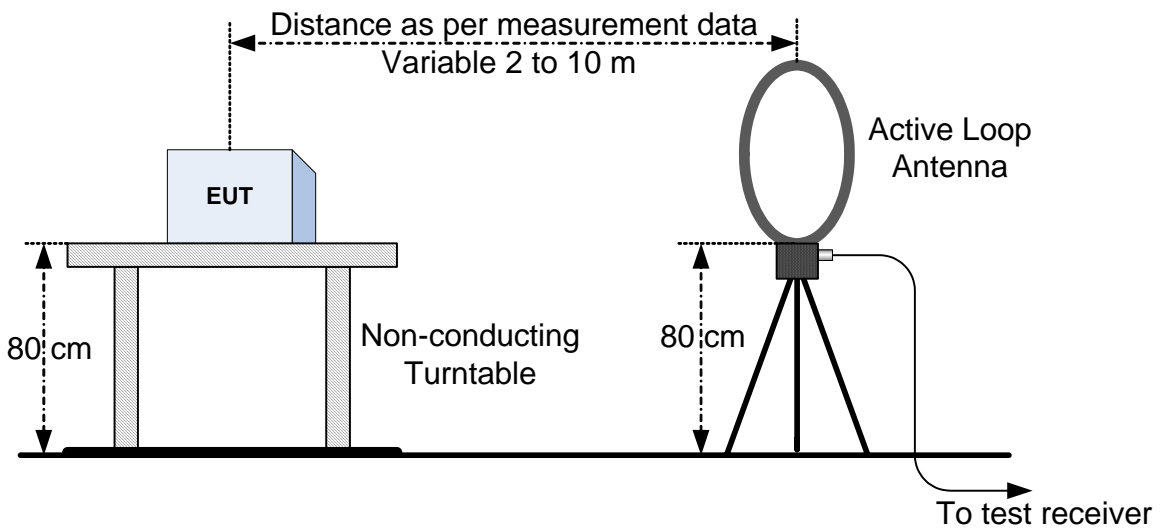


## Appendix C : Block Diagram of Test Setups

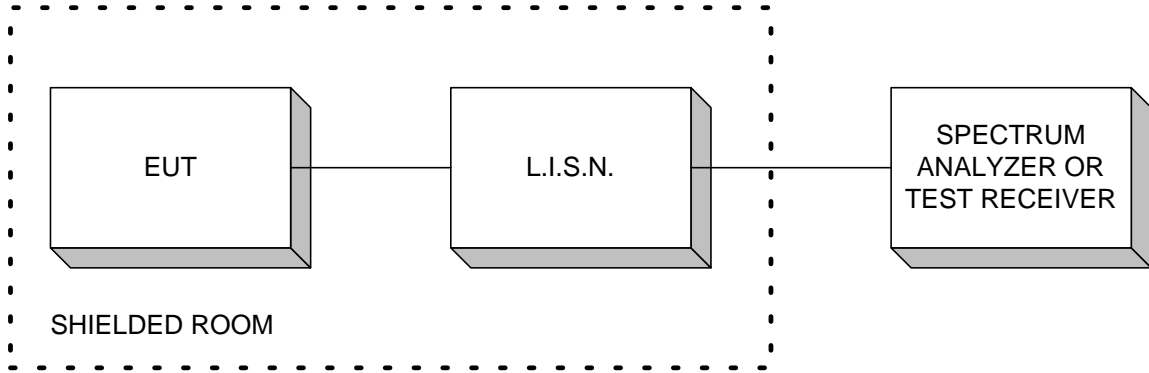
### Radiated Emissions above 30MHz Test Site



### Radiated Emissions below 30MHz Test Site



### Conducted Emissions Test Site



### Frequency Stability

