Standards Council of Canada
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Portée d'accréditation 75

TM

Test Report:	6W60216
Applicant:	Pro-Active Parc Gutenberg, 13 voie La Cardon Palaiseau, Essone 91120 France
Apparatus:	MOD-K531
FCC ID:	TYQMODK531232
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:	
Date:	March 15, 2006
Total Number of Pages:	21

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:	MOD-K531
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.

TABLE OF CONTENTS

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

MOD-K531 Module

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
1	MOD-K531 Module	——
2	USB/serial adapter	——
5	HP Laptop (PN: DQ871A#ABA)	KRD42200BV

The first samples were received on: February 13, 2006

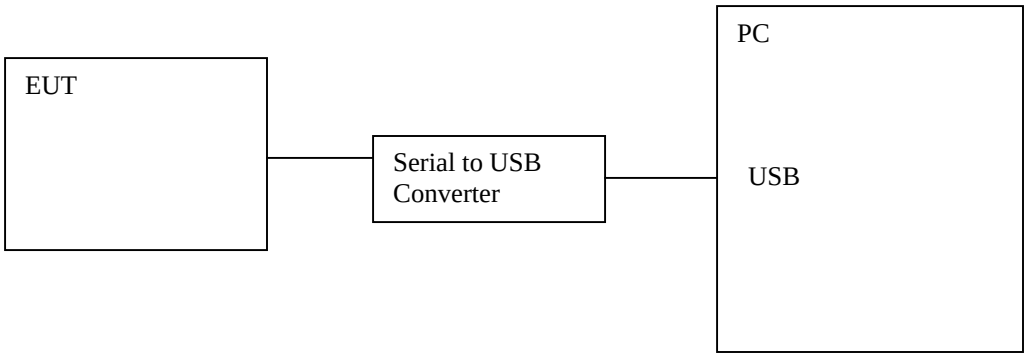
1.3 Theory of Operation

Module emits controlled power at 13.56Mhz to power any MIFARE card within the range. Once a card is detected it is then possible to communicate (read/write) with the card.

1.4 Technical Specifications of the EUT

Manufacturer:	OCM Manufacturing
Operating Frequency:	13.56MHz
Emission Designator	88K2K1D
Modulation:	Amplitude modulated pulses @ 106kbps
Antenna Data:	Integral
Power Source:	5VDC

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 ^{o}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.
LISN	EMCO	4825/2	FA001545	Jan. 30/07
Receiver	Rohde & Schwarz	ESHS 10	FA001918	Feb. 17/07
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 18/06
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 18/06
Transient Limiter	Hewlett-Packard	1194 7A	FA000975	May 25/06
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 27/06
Active Loop Antenna	Rohde & Schwarz	HFH2-Z2	FA000631	May 20/06
Biconical (2) Antenna	EMCO	3109	FA000904	Aug. 26/06
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 29/06

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

The following observation was made during this assessment:

3.5.1 Additional Observation 1

The EUT is applying for modular approval for integration as an OEM product. The EUT was supplied with a USB to Serial adaptor so that the EUT could be communicated with via a PC with a USB port. The EUT also received power from the USB interface.

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	Y	PASS
15.215(c)	20dB Bandwidth	Y	PASS
15.207(a)	Powerline Conducted Emissions	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

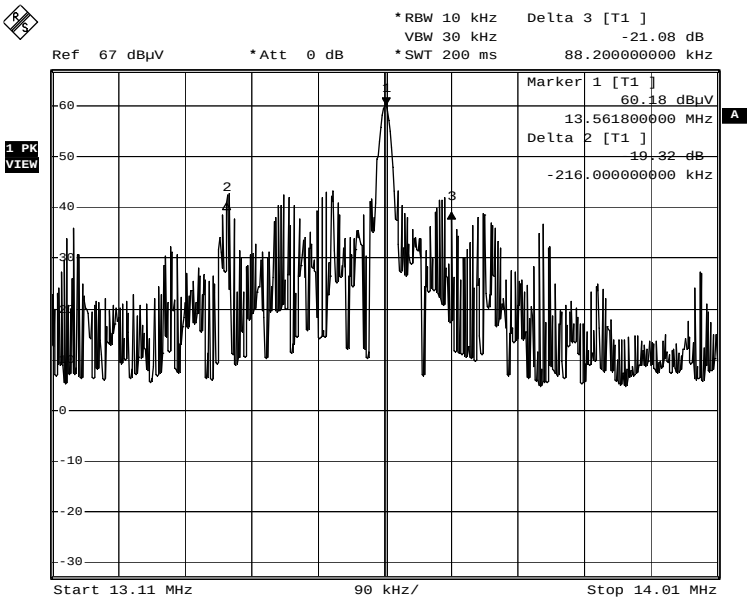
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific 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:**	21
Date:	February 21, 2006	**Humidity:**	12
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Wireless

Test Results: See Attached Plots.

20dB Bandwidth:



20dB Bandwidth

Date: 21.FEB.2006 16:04:48

Clause 15.207(a) Powerline Conducted Emissions

Frequency of Conducted limit (dBmV)

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 Conditions:

Sample Number:	1	**Temperature:**	22
Date:	February 21,2006	**Humidity:**	30
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Shield Room

Test Results: See Attached Table and Plots.

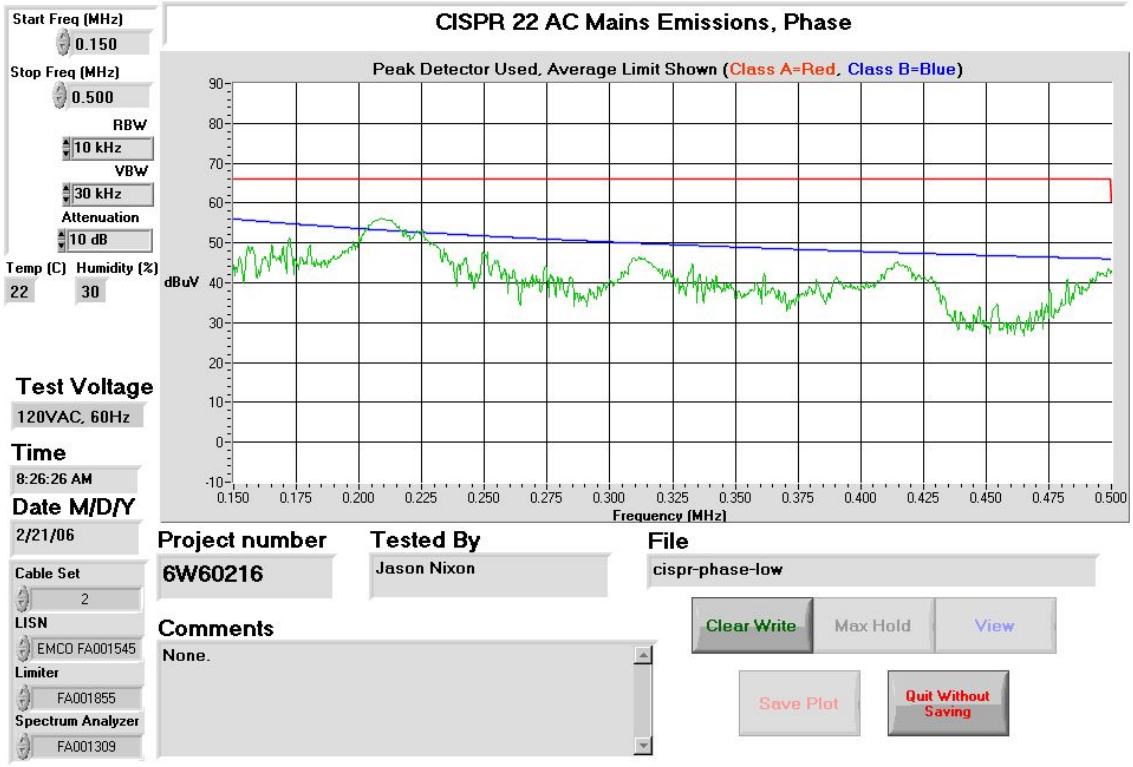
Additional Observations:

The antenna was replaced with a 50ohm dummy load for the tabulated data at 13.56MHz.

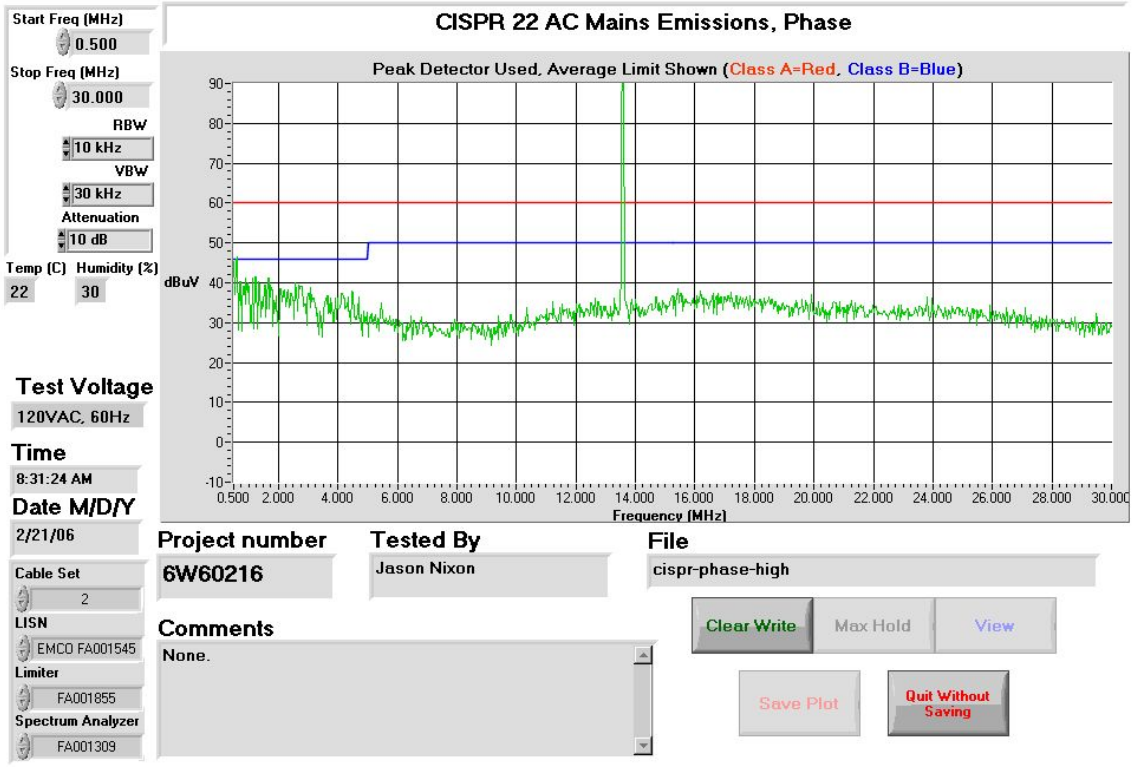
Table 1 – Tabulated AC Powerline conducted Results

Conductor		Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	Phase	0.2089	Quasi Peak	54.5	0.00	0.20	54.70	63.3	8.6
			Average	50.2	0.00	0.20	50.40	53.3	2.9
2	Phase	0.1709	Quasi Peak	45.4	0.00	0.00	45.40	64.9	19.5
			Average	21.4	0.00	0.00	21.40	54.9	33.5
3	Phase	0.2254	Quasi Peak	49.2	0.00	0.20	49.40	62.6	13.2
			Average	34.9	0.00	0.20	35.10	52.6	17.5
4	Phase	0.3118	Quasi Peak	44.3	0.00	0.20	44.50	59.9	15.4
			Average	37.8	0.00	0.20	38.00	49.9	11.9
5	Phase	0.4140	Quasi Peak	42.5	0.00	0.20	42.70	57.6	14.9
			Average	36.8	0.00	0.20	37.00	47.6	10.6
6	Phase	0.6189	Quasi Peak	45.8	0.00	0.00	45.80	56.0	10.2
			Average	41.4	0.00	0.00	41.40	46.0	4.6
7	Phase	13.5600	Quasi Peak	50.6	0.10	0.40	51.10	60.0	8.9
			Average	49.4	0.10	0.40	49.90	50.0	0.1
8	Neutral	0.2078	Quasi Peak	56.1	0.00	0.20	56.30	63.3	7.0
			Average	51.0	0.00	0.20	51.20	53.3	2.1
9	Neutral	0.2271	Quasi Peak	42.8	0.00	0.20	43.00	62.6	19.6
			Average	23.3	0.00	0.20	23.50	52.6	29.1
10	Neutral	0.1777	Quasi Peak	38.7	0.00	0.03	38.73	64.6	25.9
			Average	15.5	0.00	0.03	15.53	54.6	39.1
11	Neutral	0.3120	Quasi Peak	44.3	0.00	0.20	44.50	59.9	15.4
			Average	38.3	0.00	0.20	38.50	49.9	11.4
12	Neutral	0.4163	Quasi Peak	42.4	0.00	0.20	42.60	57.5	14.9
			Average	37.5	0.00	0.20	37.70	47.5	9.8
15	Neutral	0.6189	Quasi Peak	45.2	0.00	0.00	45.20	56.0	10.8
			Average	39.3	0.00	0.00	39.30	46.0	6.7
16	Neutral	13.5600	Quasi Peak	50.3	0.10	0.40	50.80	60.0	9.2
			Average	49.3	0.10	0.40	49.80	50.0	0.2

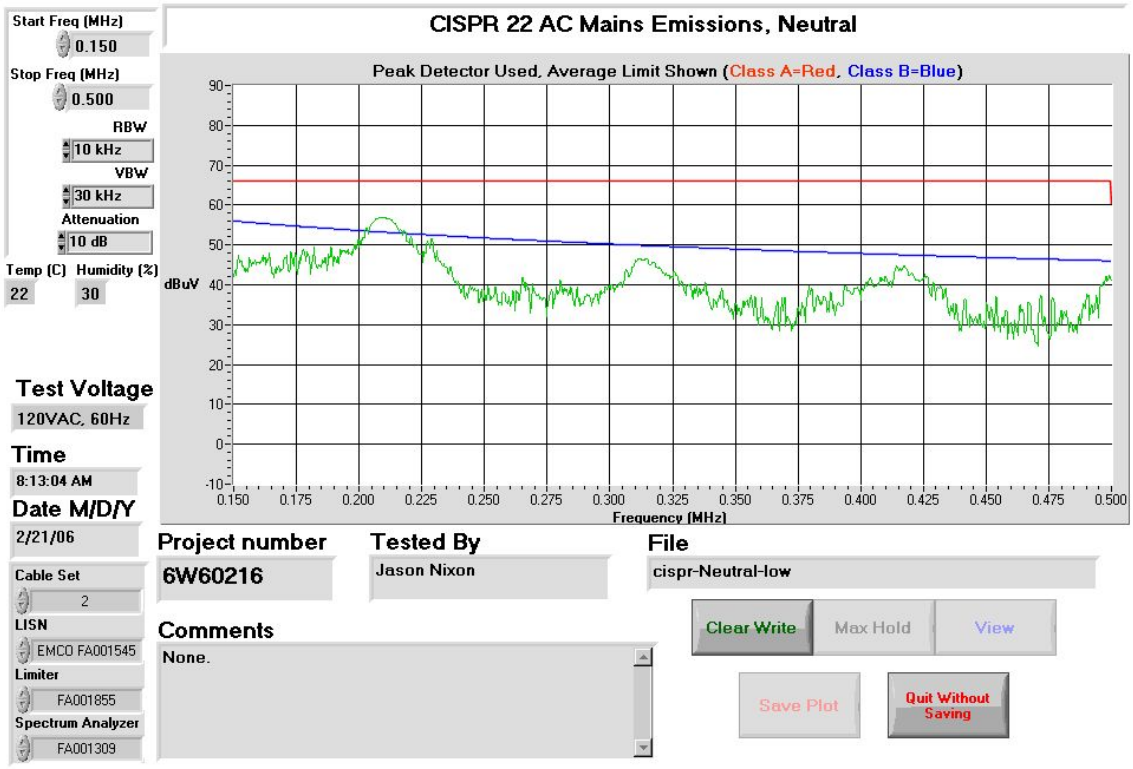
Phase – Low Frequencies



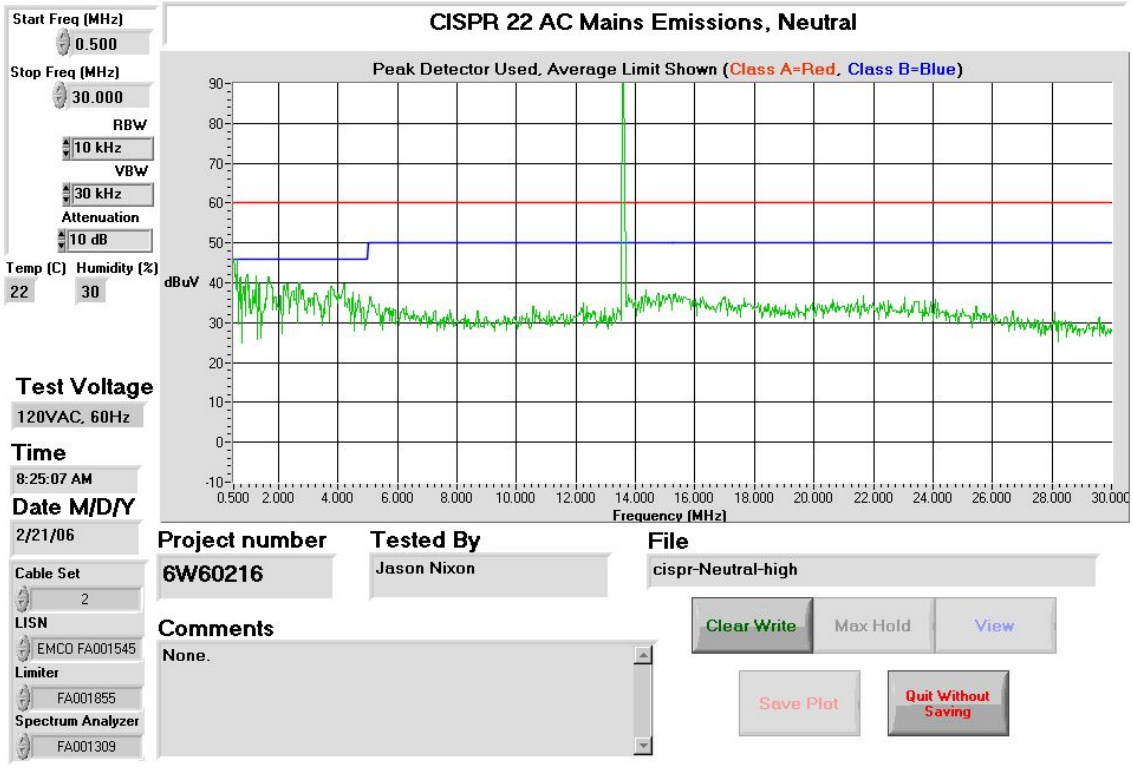
Phase – High Frequencies



Neutral – Low Frequencies



Neutral – High Frequencies



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:**	21
Date:	February 21, 2006	**Humidity:**	12
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Telecom 3

Test Results:

Measured at 3m = 75.1dBuV/m
Correction factor to 30m = -40dB

Field Strength at 30m = 35.1dBuV/m

Limit = 84dBuV/m

Additional Observations:

Measurements were performed using a 10kHz RBW Quasi-peak detector.

The supply voltage was varied by +/-15% and no change was observed in the field strength.

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:**	10
Date:	February 21, 2006	**Humidity:**	56
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	OATS

Test Results: See attached Table

Additional Observations:

The Spectrum was searched from 9kHz to the 1GHz.

The EUT was measured on three orthogonal axis.

All measurements were performed at 3m.

All measurements were performed using a Quasi-peak detector. The RBW is set to 10kHz for emissions below 30MHz and 120kHz for emissions 30MHz to 1GHz.

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
27.12	Loop	-	25.9	-	-	-	-12.9*	29.5	42.4
40.6825	BC2	V	22.1	11.4	N/A	1.3	34.8	40.0	5.2
40.6825	BC2	H	15.1	11.5	N/A	1.3	27.9	40.0	12.1
54.2445	BC2	V	13.7	9.7	N/A	1.5	24.9	40.0	15.1
54.2445	BC2	H	8.8	9.9	N/A	1.5	20.2	40.0	19.8
81.3645	BC2	V	20.7	8.4	N/A	1.7	30.8	40.0	9.2
81.3645	BC2	H	15.1	7.3	N/A	1.7	24.1	40.0	15.9
108.4890	BC2	V	21.7	11.4	N/A	1.8	34.9	43.5	8.7
108.4890	BC2	H	13.7	10.3	N/A	1.8	25.8	43.5	17.8
135.6107	BC2	V	13.7	13.0	N/A	1.9	28.5	43.5	15.0
135.6107	BC2	H	6.4	12.6	N/A	1.9	20.9	43.5	22.7

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

*Measurement has been corrected to 30m using correction from 3m to 30m of 40dB.

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:**	21
Date:	February 21, 2006	**Humidity:**	12
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	OATS

Test Results: See Attached table.

Temp (°C)	Voltage	Freq (Hz)	Freq Delta
-20	Nominal	13561118	90
-10	Nominal	13561129	101
0	Nominal	13561166	138
10	Nominal	13561156	128
20	+15%	13561033	5
20	Nominal	13561028	0
20	-15%	13561018	-10
30	Nominal	13561073	45
40	Nominal	13561038	10
50	Nominal	13561006	-22

Nominal measurement = 13561028Hz
Limit = 0.01% = 1356Hz

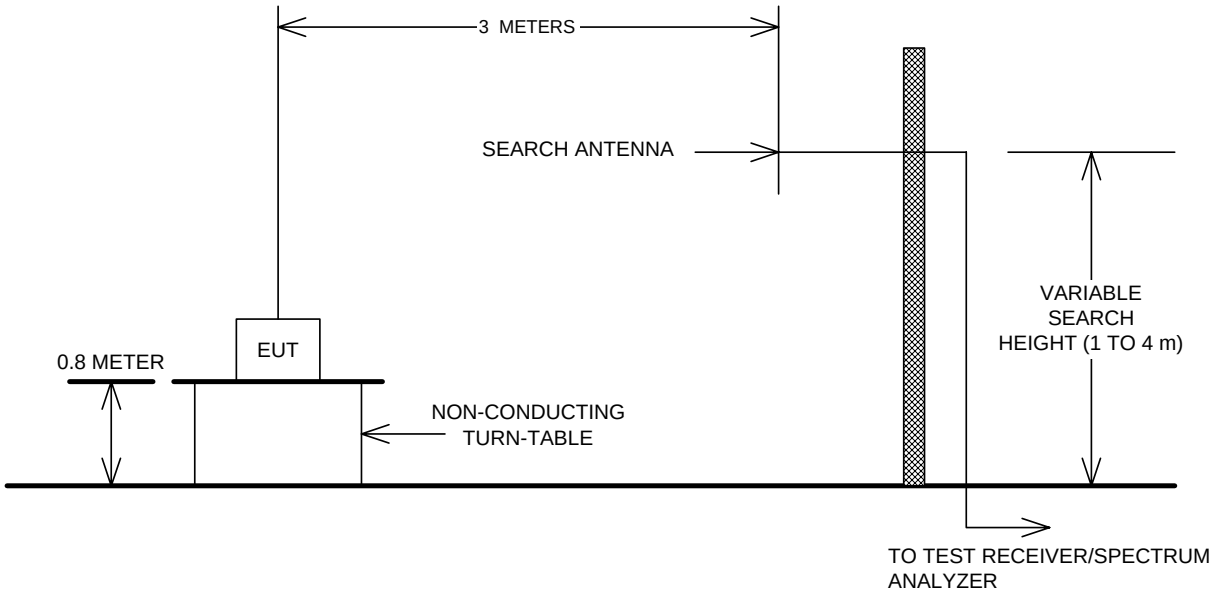
Appendix B : Setup Photographs

Conducted Emissions Setup:

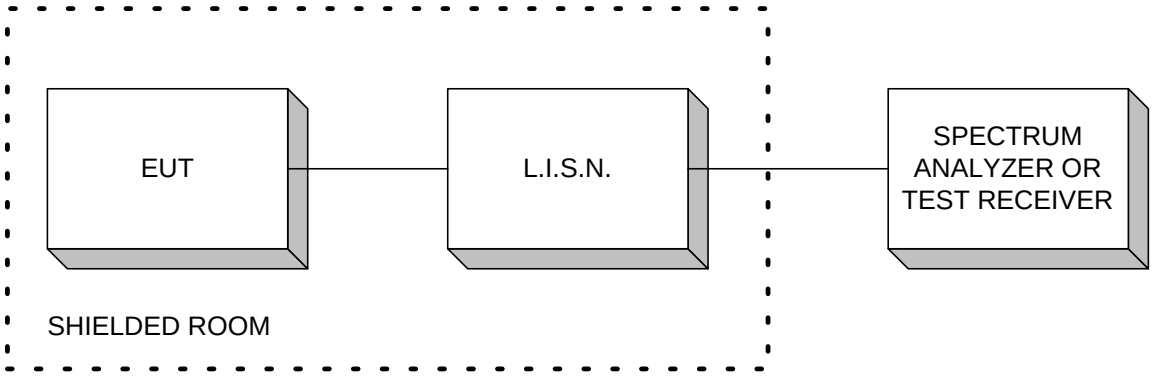
Spurious Emissions Setup:

Appendix C : Block Diagram of Test Setups

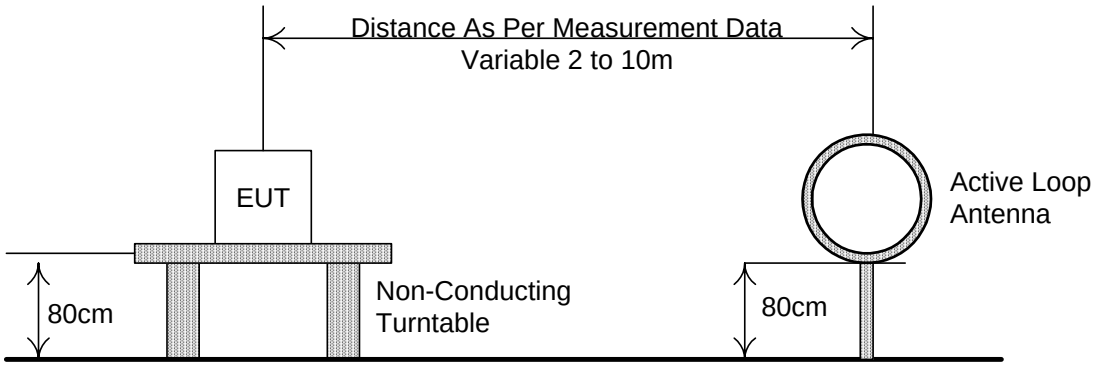
Test Site For Radiated Emissions above 30MHz



Conducted Emissions



Emissions below 30MHz



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

Frequency Stability