



Test Report: 6W62985.2

Applicant: VTECH Telecommunications Ltd.
23/F. Tai Ping Industrial Center, Block 1
57 Ting Kok Road
Tai Po, N.T.
Hong Kong, China

Apparatus: mi6866 Base

FCC ID: EW780-5656-00

In Accordance With: FCC Part 15 Subpart C, 15.247
Class II Permissive Change
FHSS System and Digitally Modulated Radiators
902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz

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

Authorized By: 
Jin Xu, Wireless Test Specialist

Date: March 29, 2006

Total Number of Pages: 22

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:	mi6866 Base
Specification:	FCC Part 15 Subpart C, 15.247 Class II Permissive Change
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.

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Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

mi6866 Base

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
1	mi6866 Base	FCC Sample#1
3	Vtech small charger	——
5	5.8 GHz Digital portable phone	FCC Sample #1B
7	Component Telephone power supply class 2 MN:SY-09060	——
8	Component Telephone power supply class 2 MN:U090020D12	——

The first samples were received on: March 13, 2006

1.3 Theory of Operation

The mi6866 base is used with a mi6866 handset as a cordless phone. The base transmits at 5.8GHz and receives from the handset at 2.4GHz.

1.4 Technical Specifications of the EUT

Manufacturer: Vtech (Dongguan) Electronics and Communications Ltd.

Operating Frequency: TX: 5744.736 -> 5825.952MHz
RX: 2401.056 -> 2482.272MHz

Peak Output Power: 28.38dBm (0.689W)

Rated Power: 26.5dBm (0.447W)

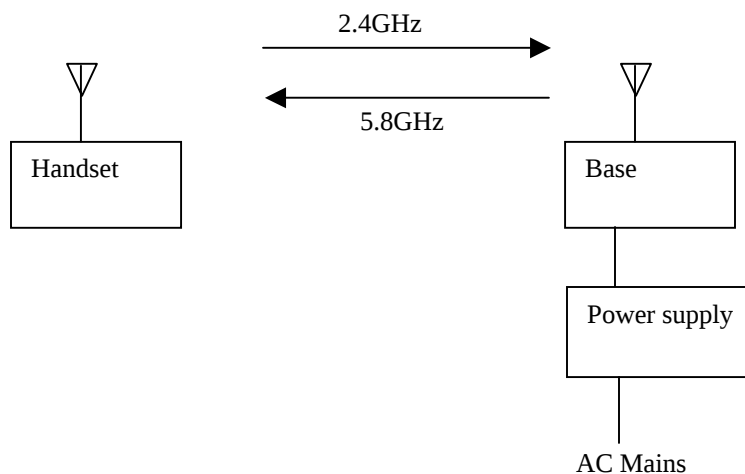
Modulation: GFSK

Antenna Data: 2dBi gain

Antenna Connector: Integral

Power Source: 120VAC 60Hz

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, 15.247

FHSS System and Digitally Modulated Radiators
902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz

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	Hewlett-Packard	8565E	FA000981	Sept. 15/06
Biconical (1) Antenna	EMCO	3109	FA000805	April 22/06
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 29/06
Horn Antenna #2	EMCO	3115	FA000825	Dec. 16/06
Horn Antenna #1	EMCO	3115	FA000649	Jan. 12/07
18.0 – 40.0GHz Horn Antenna	EMCO	3116	FA001847	April 25/06
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	July 14/06
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	July 14/06
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	July 14/06
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU
18.0 – 26.0 GHz Amplifier	NARDA	BBS-1826N612	FA001550	COU
26 – 40.0 GHz Amplifier	NARDA	DBL-2640N610	FA001556	COU
LISN	EMCO	4825/2	FA001545	Jan. 30/07
Receiver	Rohde & Schwarz	ESHS 10	FA001918	Feb. 17/07
Transient Limiter	Hewlett-Packard	1194 7A	FA000975	May 25/06
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 18/06
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 18/06

COU – Cal On Use

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

The following technical judgement was made during this assessment:

3.2.1 Technical Judgement 1

The following changes were made to the RF circuitry for a Class II permissive change:

- 2 Layer PCB was used instead of 4 layer
- RF Transceiver IC (U2) is changed to die form
- Single piece shield can is used rather than cover and frame

It was judged that only the Fundamental and Harmonic Field Strengths would be affected by this change.

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
15.207(a)	Powerline Conducted Emissions	Y	PASS
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.247(a)(1)	Frequency hopping systems	N	
15.247(a)(1)(i)	Frequency hopping systems operating in the 902-928 MHz band	N	
15.247(a)(1)(ii)	Frequency hopping systems operating in the 5725-5850 MHz band	N	
15.247(a)(1)(iii)	Frequency hopping systems operating in the 2400-2483.5 MHz band	N	
15.247(a)(2)	Systems using digital modulation techniques	N	
15.247(b)(1)	Maximum peak output power of Frequency hopping systems operating in the 2400-2483.5 MHz band and 5725-5850 MHz band	Y	PASS
15.247(b)(2)	Maximum peak output power of Frequency hopping systems operating in the 902-928 MHz band	N	
15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands	N	
15.247(b)(4)	Maximum peak output power	N	
15.247(c)(1)	Fixed point-to-point Operation with directional antenna gains greater than 6 dBi	N	
15.247(c)(2)	Transmitters operating in the 2400-2483.5 MHz band that emit multiple directional beams	N	
15.247(d)	Radiated Emissions Not in Restricted Bands	Y	PASS
15.247(e)	Power Spectral Density for Digitally Modulated Devices	N	
15.247(f)	Time of Occupancy for Hybrid Systems	N	

Notes:

Appendix A : Test Results

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, 3	Temperature:	22
Date:	March 14, 2006	Humidity:	12
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Shielded Room

Test Results: See Attached Plots and table

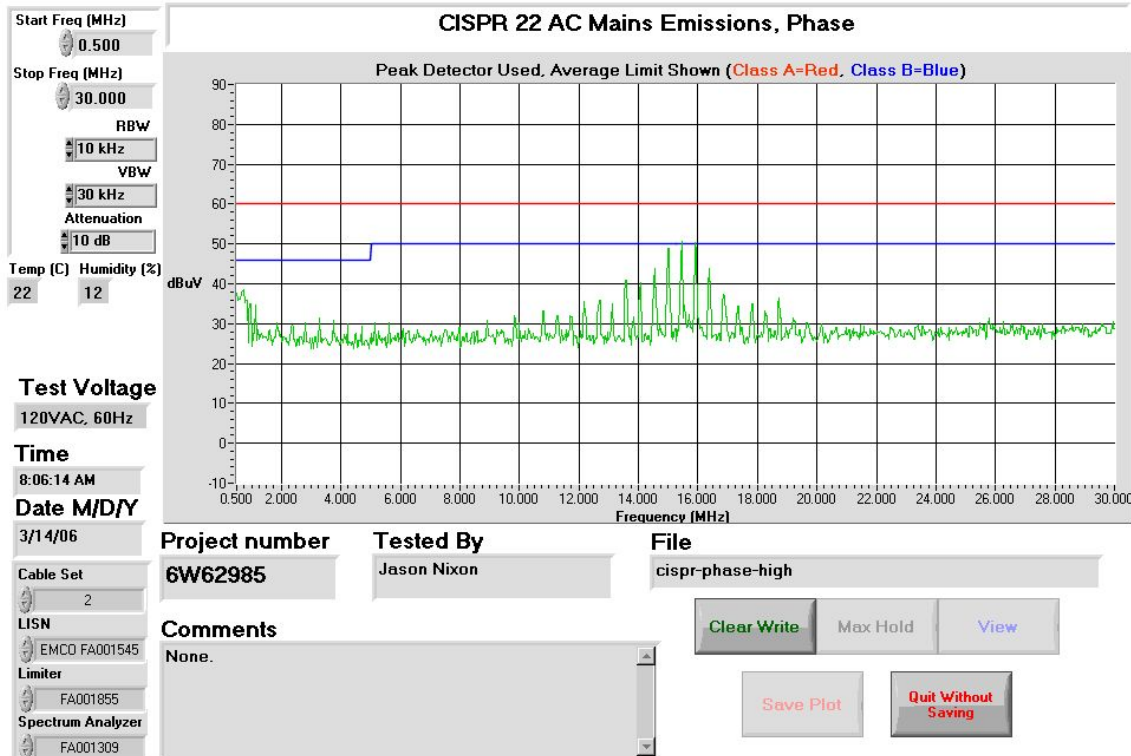
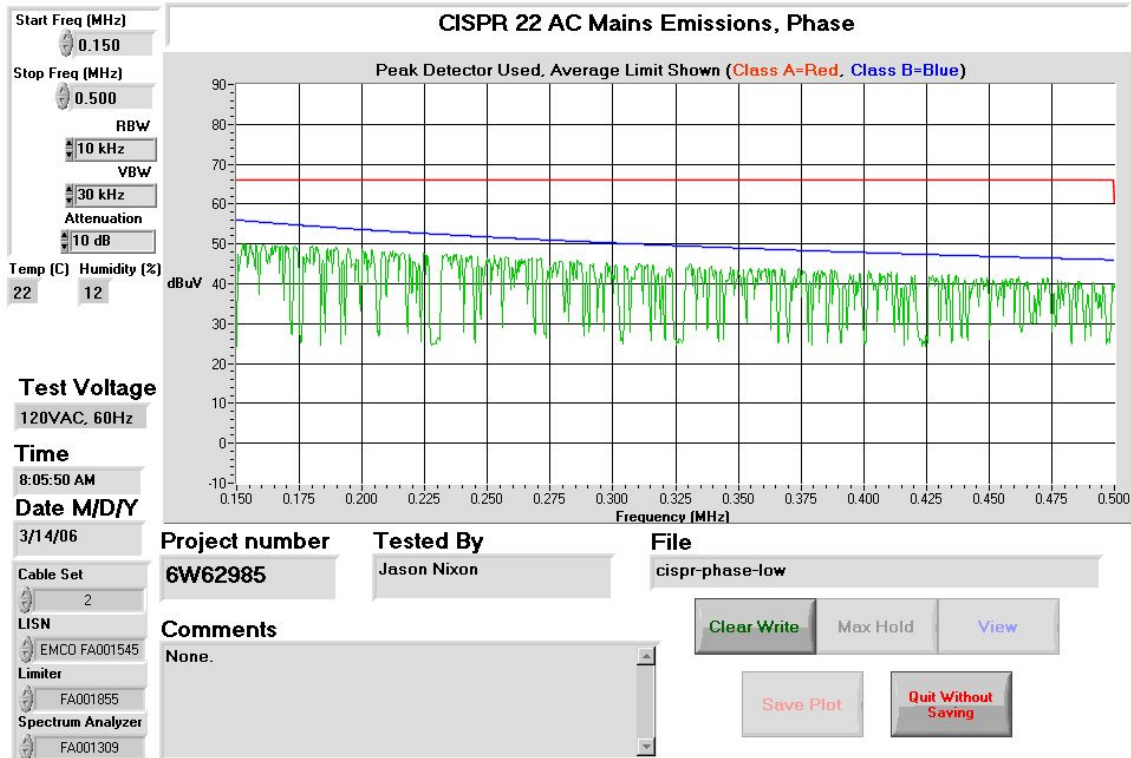
Additional Observations:

All Plots were performed using a Peak detector and compared to the average limit.

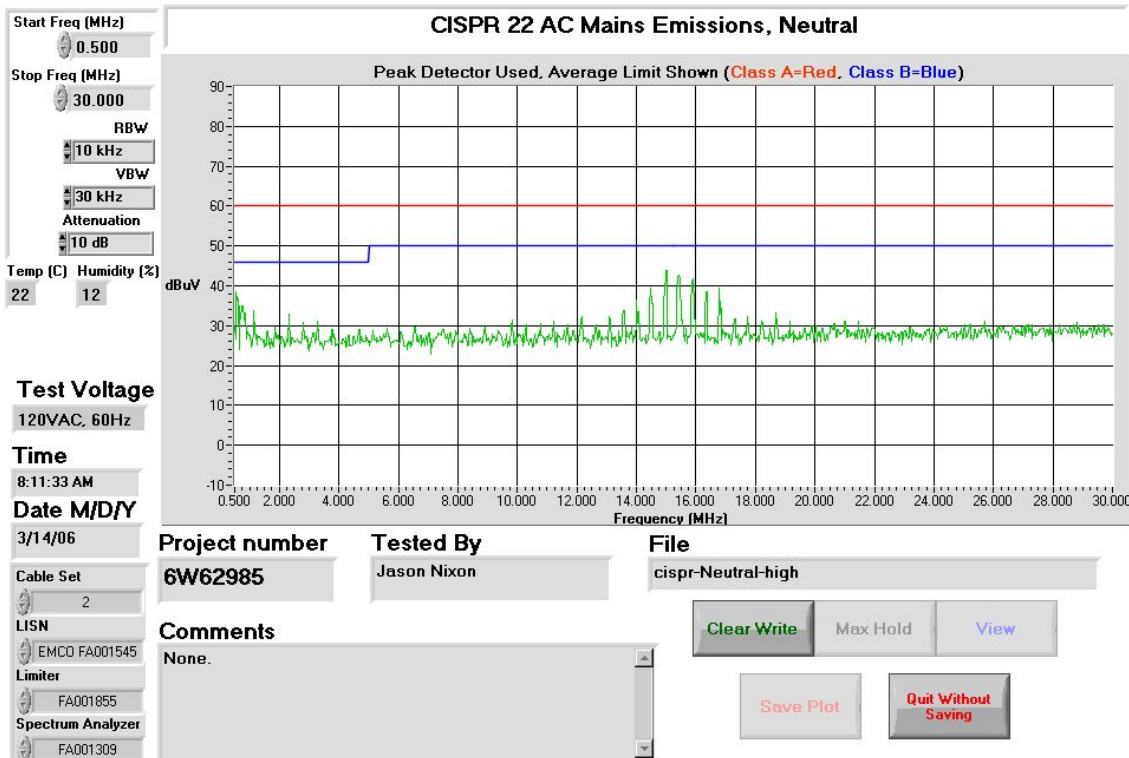
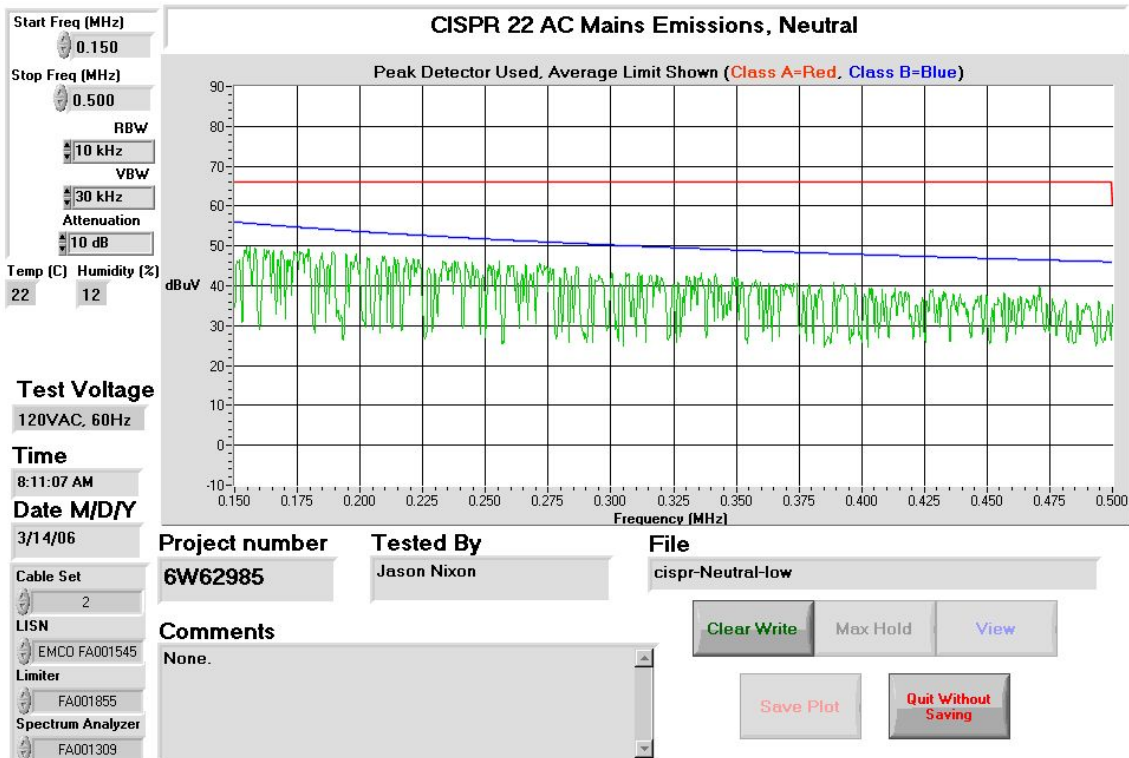
BASE

	Conductor	Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	Phase	15.4569	Quasi Peak	46.5	0.20	0.40	47.10	60.0	12.9
			Average	35.6	0.20	0.40	36.20	50.0	13.8
2	Phase	15.8999	Quasi Peak	48.0	0.20	0.50	48.70	60.0	11.3
			Average	32.5	0.20	0.50	33.20	50.0	16.8
3	Phase	15.0104	Quasi Peak	39.3	0.20	0.41	39.91	60.0	20.1
			Average	17.1	0.20	0.41	17.71	50.0	32.3
4	Neutral	0.1608	Quasi Peak	40.3	0.00	0.18	40.48	65.4	24.9
			Average	9.6	0.00	0.18	9.78	55.4	45.6
5	Neutral	15.4571	Quasi Peak	38.6	0.20	0.40	39.20	60.0	20.8
			Average	21.2	0.20	0.40	21.80	50.0	28.2
6	Neutral	0.1971	Quasi Peak	36.5	0.00	0.19	36.69	63.7	27.0
			Average	8.2	0.00	0.19	8.39	53.7	45.3

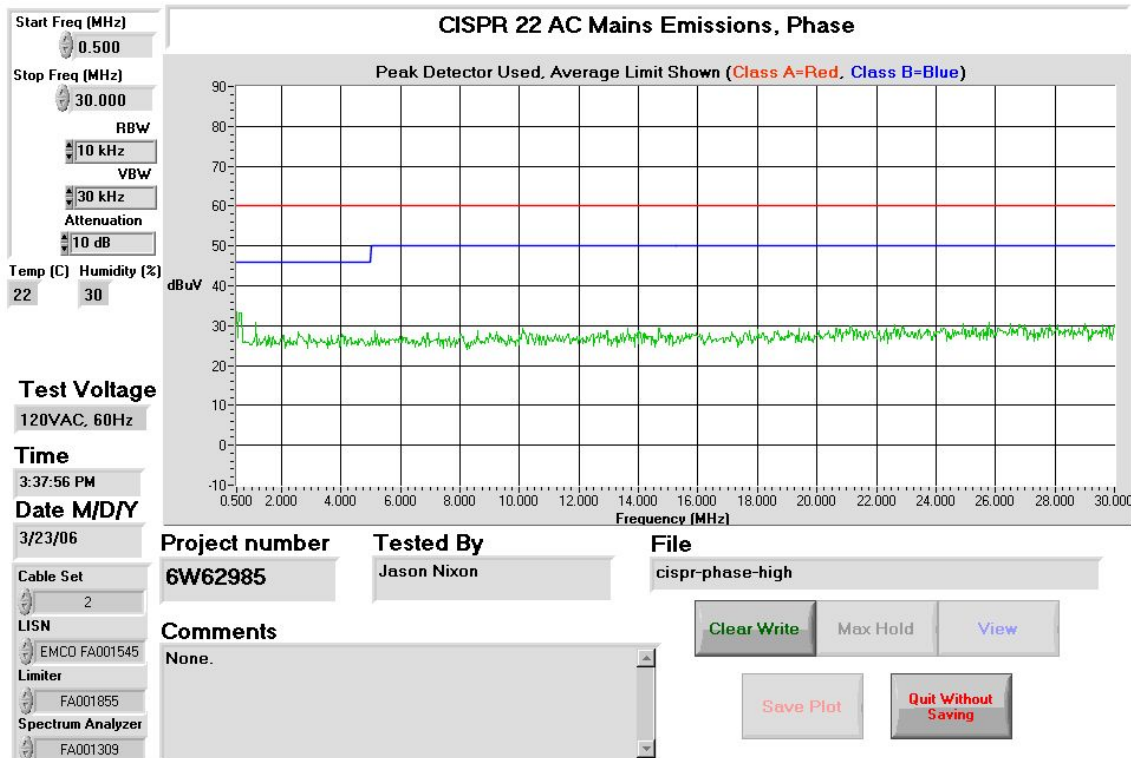
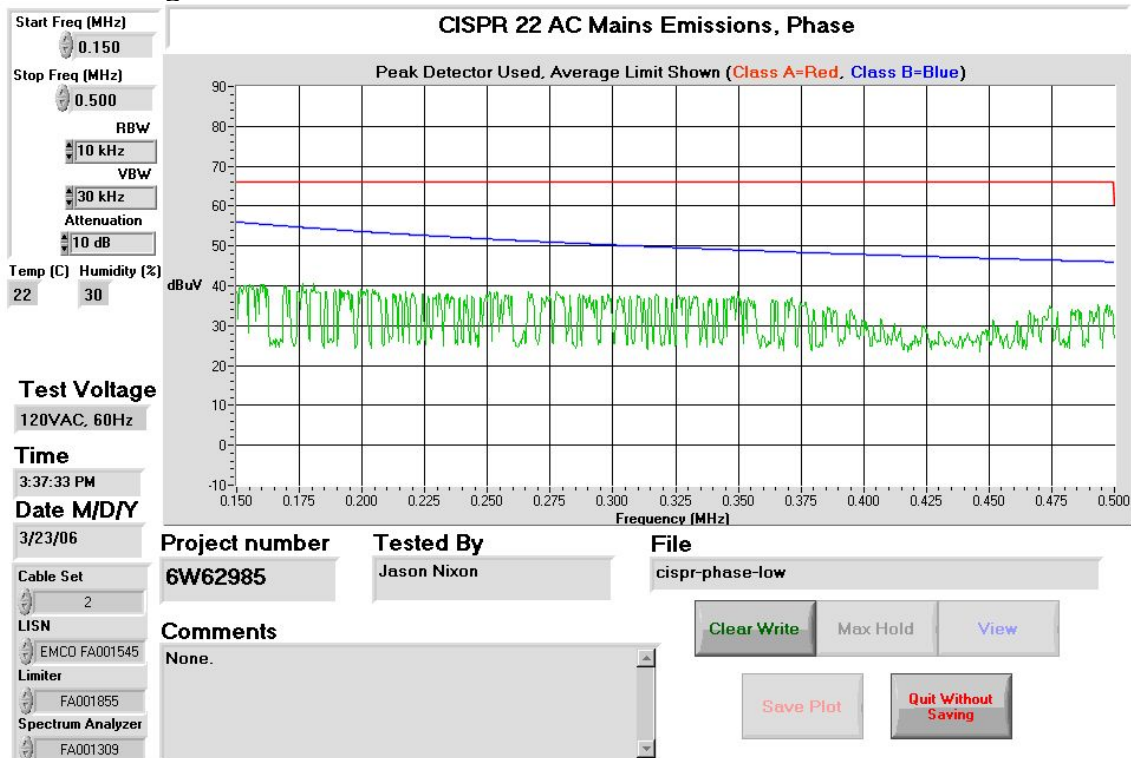
Phase – Base



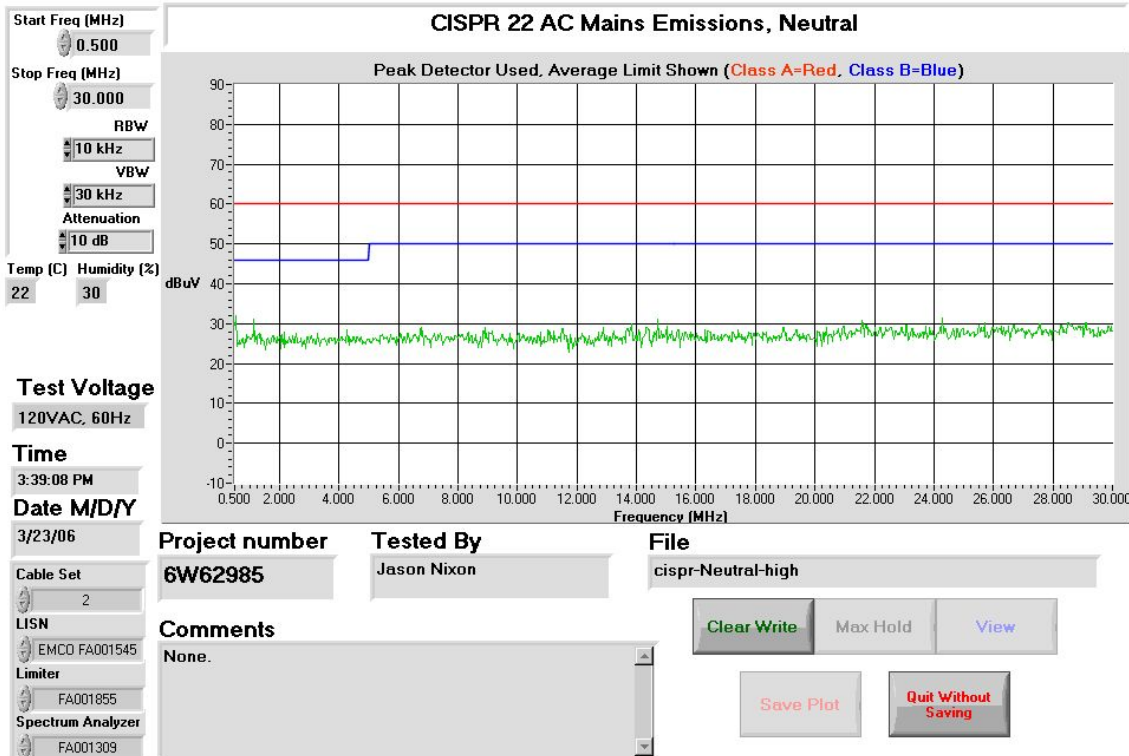
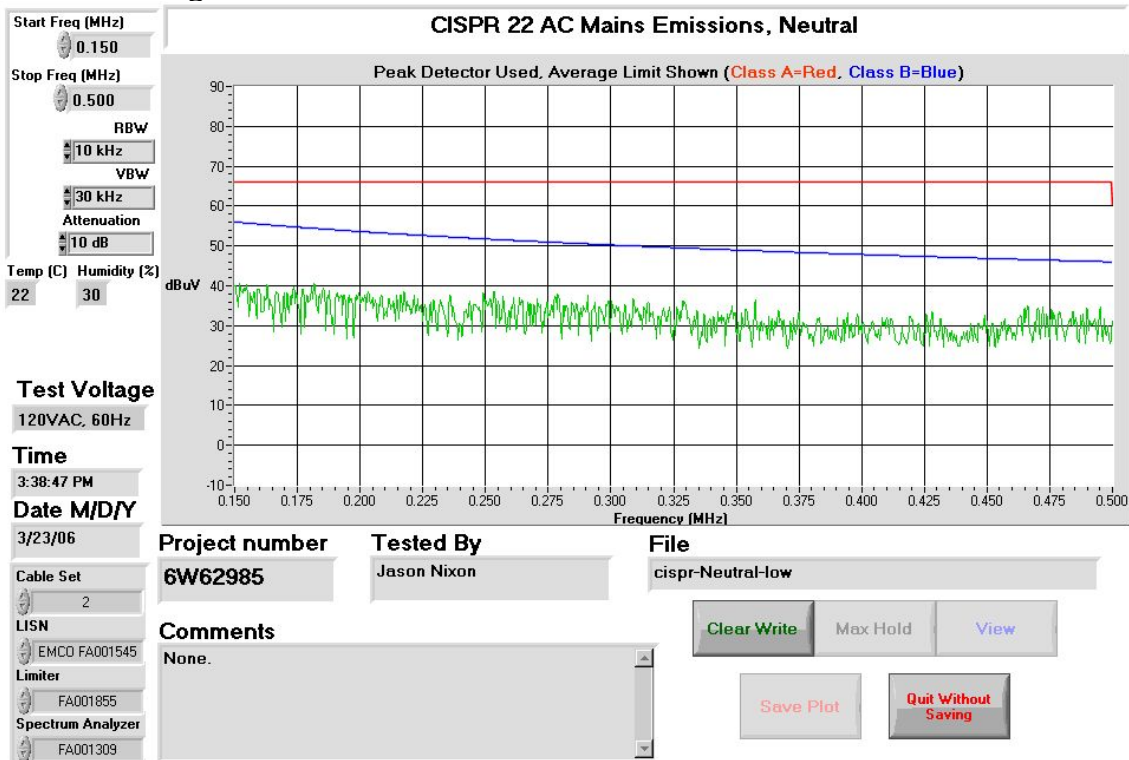
Neutral – Base



Phase – Charger



Neutral – Charger



Clause 15.209(a) Radiated Emissions within Restricted Bands

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	1001	3
88-216	1502	3
216-960	2003	3
Above 960	500	3

Test Conditions:

Sample Number:	1	Temperature:	12
Date:	March 23, 2006	Humidity:	36
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to 40GHz.

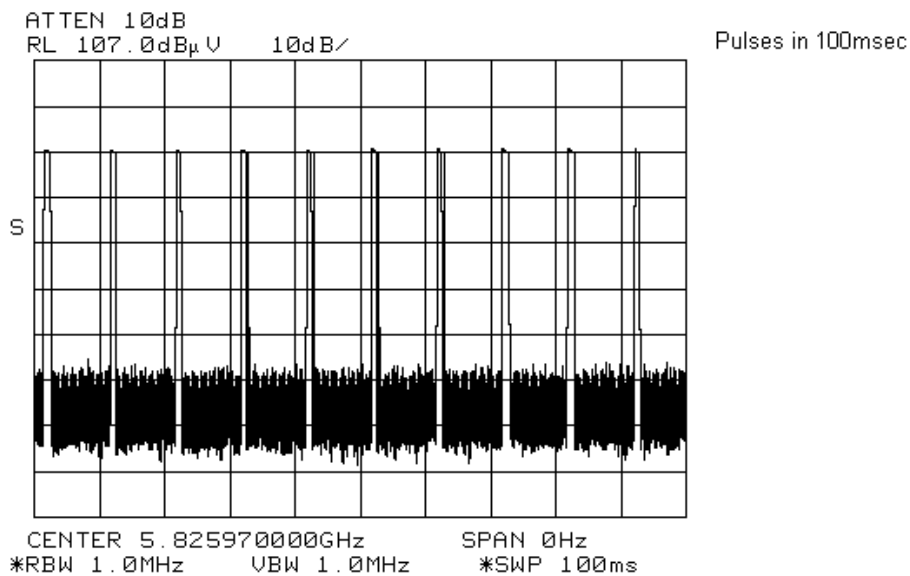
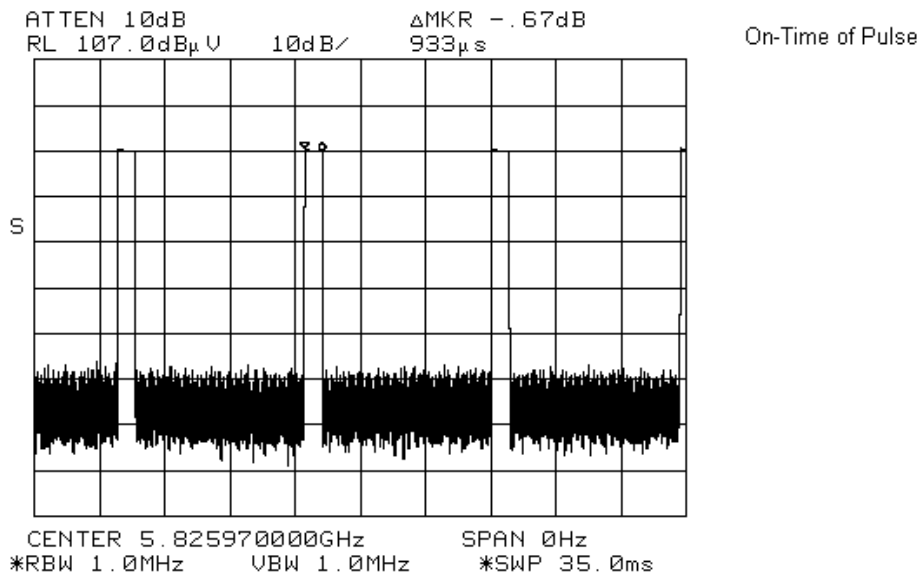
These results apply to emissions found in the Restricted bands defined in FCC Part 15 Subpart C, 15.205.

Measurements were performed at 3m and at 1m. All measurements, which were performed at 1m, were corrected to 3m.

Measurements below 1GHz were performed using a Peak detector with a 100kHz RBW/VBW and above 1GHz was performed using a Peak detector with a 1MHz RBW/VBW Peak Detector.

Frequency (MHz)		Antenna	Polarity	RCVD Signal (dBuV)	Ant. Factor (dB/m)	Amp. Gain / Cable Loss (dB)	Duty Cycle Corr.	Distance Correction	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	11489.600	Horn2	V	55.8	39.5	35.3	20.6	9.5	50.5	74	23.5	Peak
									29.9	54	24.1	Average
2	11489.600	Horn2	H	53.0	39.3	35.3	20.6	9.5	47.4	74	26.6	Peak
									26.8	54	27.2	Average
3	22979.200	18-40GHz Horn	V	55.2	45.1	36.7	20.6	9.5	54.1	74	19.9	Peak
									33.5	54	20.5	Average
4	22979.200	18-40GHz Horn	H	53.7	45.0	36.7	20.6	9.5	52.5	74	21.5	Peak
									31.9	54	22.1	Average
5	11570.800	Horn2	V	51.8	39.5	35.3	20.6	9.5	46.5	74	27.5	Peak
									25.9	54	28.1	Average
6	11570.800	Horn2	H	51.2	39.3	35.3	20.6	9.5	45.6	74	28.4	Peak
									25.0	54	29.0	Average
7	11651.800	Horn2	V	51.2	39.5	35.3	20.6	9.5	45.8	74	28.2	Peak
									25.2	54	28.8	Average
8	11651.800	Horn2	H	51.7	39.3	35.3	20.6	9.5	46.1	74	27.9	Peak
									25.5	54	28.5	Average

Duty Cycle:



$$\text{Duty cycle correction} = 20\log((0.933 \times 10)/100) = -20.6\text{dB}$$

Clause 15.247(b)(1) Maximum peak output power of Frequency hopping systems operating in the 2400-2483.5 MHz band and 5725-5850 MHz band

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Test Conditions:

Sample Number:	1	Temperature:	10
Date:	March 13, 2006	Humidity:	35
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results:

Measured output power = 28.38dBm

Maximum output power = 28.38dBm + 2dBi = 30.38dBm EIRP

Limit = 36dBm EIRP

Note: The EUT was modified by the manufacturer to perform conducted measurements.

Radiated Output Power:

Ch.	Freq.	Pol V/H	ANT.	Rx dBuV	Ant Factor dB/m	Cable loss dB	F.S. dBuV/m
low	5744.8000	Horn1	V	80.2	34.6	9.8	124.6
	5744.8000	Horn1	H	76.3	34.7	9.8	120.9
mid	5785.4000	Horn1	V	81.2	34.6	9.8	125.6
	5785.4000	Horn1	H	71.8	34.7	9.8	116.4
hi	5825.9000	Horn1	V	79.7	34.6	9.7	124.0
	5825.9000	Horn1	H	71.7	34.7	9.7	116.1

Measured value (V/m) = $10^{(FS/20)} = 1.90546718\text{V/m}$

Antenna Gain (numeric) = $10^{(Ag/10)} = 1.58$

Output Power (W) = $\frac{E^2 R^2}{30G} = 0.6894$

E = Measured Value (V/m)

R = Measurement distance

G = Antenna Gain (numeric)

Additional Observations:

All Measurements were performed at 3m using a 1MHz RBW/VBW.

Clause 15.247(d) Radiated Emissions Not in Restricted Bands

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Conditions:

Sample Number:	1	Temperature:	12
Date:	March 23, 2006	Humidity:	36
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results:

The Limit is calculated as 20dB below the fundamental field strength.
No emissions were detected within 20dB below the limit.

Additional Observations:

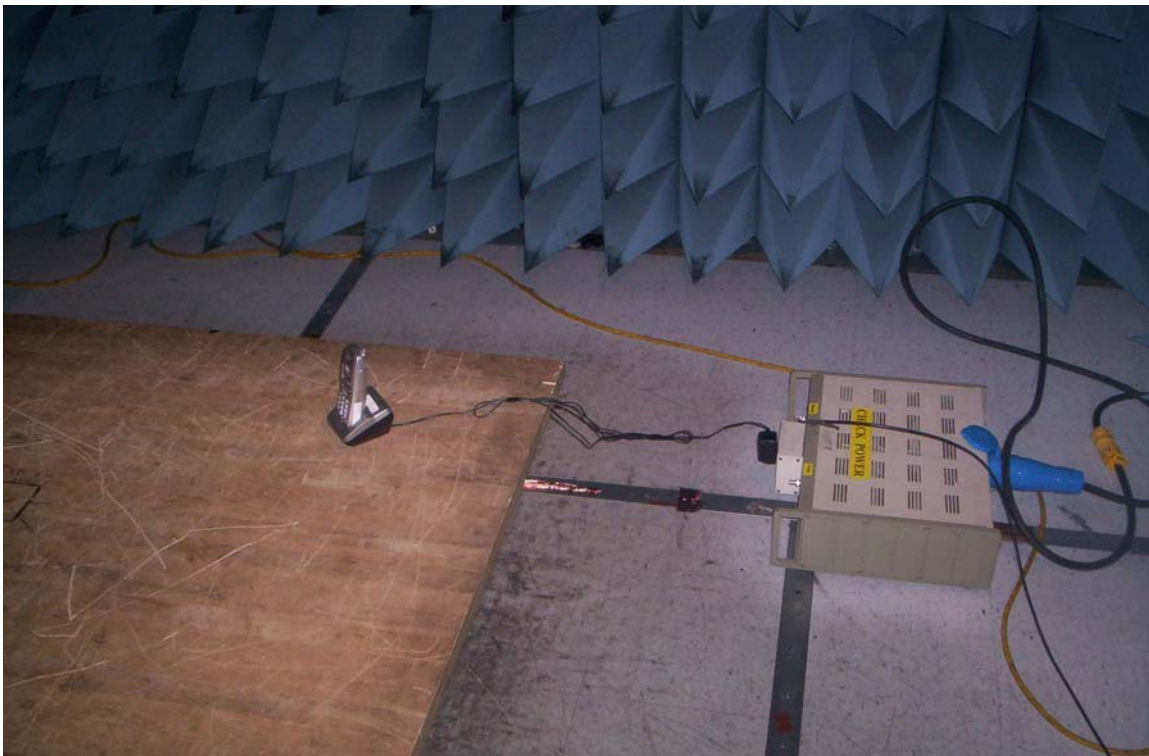
The Spectrum was searched from 30MHz to 25GHz.

Measurements were performed at 3m and at 1m. All measurements, which were performed at 1m, were corrected to 3m.

Measurements below 1GHz were performed using a Peak detector with a 100kHz RBW/VBW and above 1GHz was performed using a Peak detector with a 1MHz RBW/VBW Peak Detector.

Appendix B : Setup Photographs

Conducted Emissions Setup:

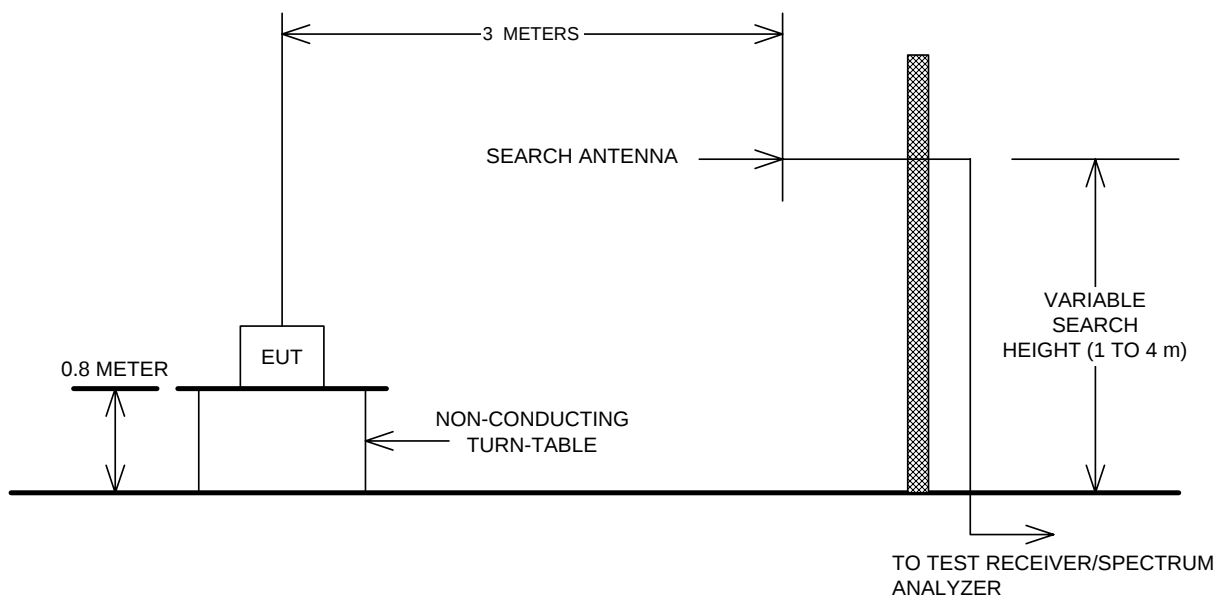


Spurious Emissions Setup:



Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions



Conducted Emissions

