



Test Report: 6W62985

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 Handset

FCC ID: EW780-5656-01

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.
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Ottawa, Ontario
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Authorized By: 
Jin Xu, Wireless Test Specialist

Date: March 29, 2006

Total Number of Pages: 19

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 Handset
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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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	5
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 15.209(a) Radiated Emissions within Restricted Bands	10
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	15
Clause 15.247(d) Radiated Emissions Not in Restricted Bands	16
Appendix B : Setup Photographs	17
Appendix C : Block Diagram of Test Setups.....	19

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

mi6866 Handset

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
5	5.8 GHz Digital portable phone	FCC Sample #1B

The first samples were received on: March 13, 2006

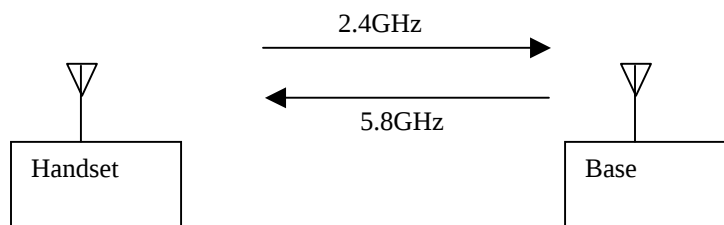
1.3 Theory of Operation

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

1.4 Technical Specifications of the EUT

Manufacturer:	Vtech (Dongguan) Electronics and Communications Ltd.
Operating Frequency:	TX: 2401.056 -> 2482.272MHz RX: 5744.736 -> 5825.952MHz
Peak Output Power:	20.67dBm (0.116W)
Emission Designator	620KF1D
Rated Power:	18.8dBm (0.076W)
Modulation:	GFSK
Antenna Data:	4dBi gain
Antenna Connector:	Integral
Power Source:	3.6VDC Ni-MH Battery

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

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 (U1) 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	N	PASS
15.209(a)	Radiated Emissions within Restricted Bands	Y	
15.247(a)(1)	Frequency hopping systems	N	
15.247(a)(1)(i)	Frequency hopping systems operating in the 902-928 MHz band	N	PASS
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	
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	PASS
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	
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 15.209(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:	5	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 the 25GHz.

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

The EUT was measured on three orthogonal axis. The EUT was tested with fully charged batteries.

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.

CH00

	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	4801.6000	Horn2	V	70.2	33.8	46.2	21.8	0.0	57.7 35.9	74.0 54.0	16.3 18.1	Peak Average
2	4801.6000	Horn2	H	72.8	33.9	46.2	21.8	0.0	60.5 38.7	74.0 54.0	13.5 15.3	Peak Average
3	12005.380	Horn2	V	70.7	39.5	36.0	21.8	9.5	64.7 42.9	74 54	9.3 11.1	Peak Average
4	12005.380	Horn2	H	68.5	39.3	36.0	21.8	9.5	62.3 40.5	74 54	11.7 13.5	Peak Average
5	14406.330	Horn2	V	70.3	41.2	34.0	21.8	9.5	68.0 46.2	74 54	6.0 7.8	Peak Average
6	14406.330	Horn2	H	64.2	40.9	34.0	21.8	9.5	61.6 39.8	74 54	12.4 14.2	Peak Average
7	19208.830	18- 40GHz Horn	V	66.2	44.9	39.3	21.8	9.5	62.3 40.5	74 54	11.7 13.5	Peak Average
8	19208.830	18- 40GHz Horn	H	66.5	44.7	39.3	21.8	9.5	62.4 40.6	74 54	11.6 13.4	Peak Average

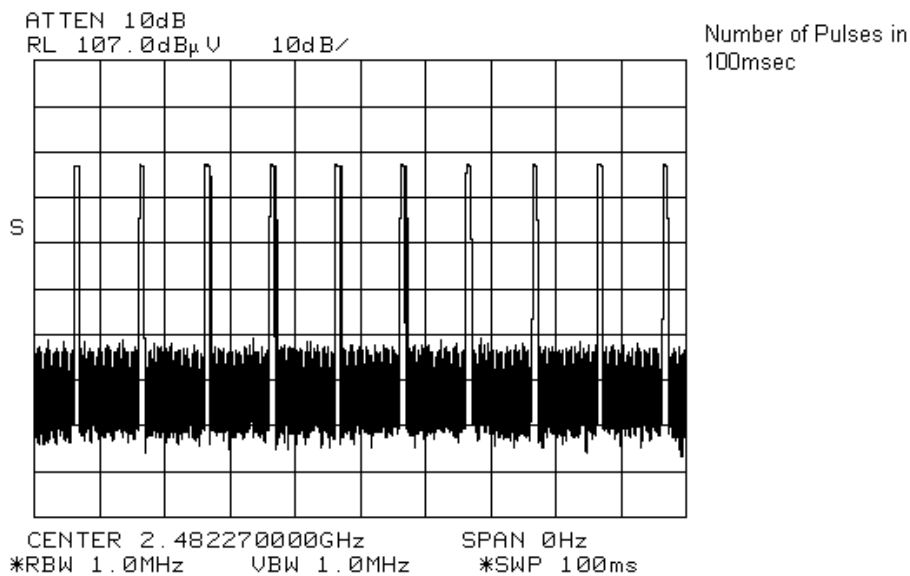
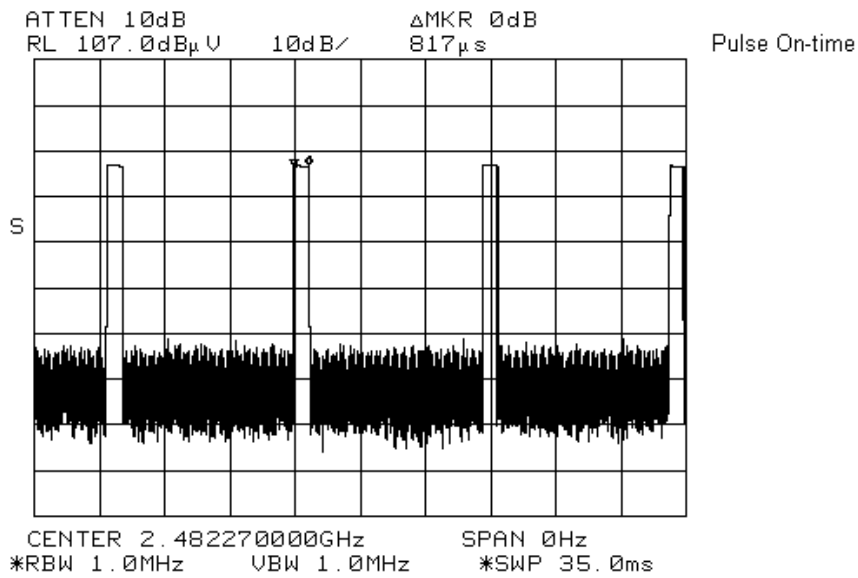
CH47

	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	4884.0000	Horn2	V	70.8	33.8	45.9	21.8	0.0	58.7 36.9	74.0 54.0	15.3 17.1	Peak Average
2	4884.0000	Horn2	H	73.3	33.9	45.9	21.8	0.0	61.3 39.5	74.0 54.0	12.7 14.5	Peak Average
3	7325.0000	Horn2	V	60.8	36.7	43.0	21.8	0.0	54.5 32.7	74.0 54.0	19.5 21.3	Peak Average
4	7325.0000	Horn2	H	60.7	37.0	43.0	21.8	0.0	54.7 32.9	74.0 54.0	19.3 21.1	Peak Average
5	12208.400	Horn2	V	73.3	39.5	36.0	21.8	9.5	67.3 45.5	74 54	6.7 8.5	Peak Average
6	12208.400	Horn2	H	69.3	39.3	36.0	21.8	9.5	63.1 41.3	74 54	10.9 12.7	Peak Average
7	19531.830	18- 40GHz Horn	V	63.5	45.1	39.3	21.8	9.5	59.8 38.0	74 54	14.2 16.0	Peak Average
8	19531.830	18- 40GHz Horn	H	63.2	45.0	39.3	21.8	9.5	59.4 37.6	74 54	14.6 16.4	Peak Average

CH94

	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	4964.0000	Horn2	V	73.3	33.8	45.7	21.8	0.0	61.4 39.6	74.0 54.0	12.6 14.4	Peak Average
2	4964.0000	Horn2	H	74.3	33.9	45.7	21.8	0.0	62.5 40.7	74.0 54.0	11.5 13.3	Peak Average
3	7446.8300	Horn2	V	60.5	36.7	42.8	21.8	0.0	54.3 32.5	74.0 54.0	19.7 21.5	Peak Average
4	7446.8300	Horn2	H	62.3	37.0	42.8	21.8	0.0	56.5 34.7	74.0 54.0	17.5 19.3	Peak Average
5	12411.500	Horn2	V	73.2	39.4	36.0	21.8	9.5	67.1 45.3	74 54	6.9 8.7	Peak Average
6	12411.500	Horn2	H	69.0	39.2	36.0	21.8	9.5	62.7 40.9	74 54	11.3 13.1	Peak Average
7	19858.400	18- 40GHz Horn	V	63.3	45.5	39.3	21.8	9.5	60.0 38.2	74 54	14.0 15.8	Peak Average
8	19858.400	18- 40GHz Horn	H	59.5	45.4	39.3	21.8	9.5	56.1 34.3	74 54	17.9 19.7	Peak Average
9	22340.700	18- 40GHz Horn	V	54.3	45.6	36.3	21.8	9.5	54.1 32.3	74 54	19.9 21.7	Peak Average
10	22340.700	18- 40GHz Horn	H	53.8	45.5	36.3	21.8	9.5	53.5 31.7	74 54	20.5 22.3	Peak Average

Duty Cycle:



$$\text{Duty cycle correction} = 20\log((0.817 \times 10)/100) = -21.8\text{dB}$$

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

Test Results:

Maximum output power = 20.67dBm + 4dBi = 24.67dBm EIRP
Limit = 36dBm EIRP

The output power was measured at +/-15% of the supply voltage and found that there was no change.

Radiated Output Power:

Ch.	Freq.	Pol V/H	ANT.	Rx dBuV	Ant Factor dB/m	Cable loss dB	F.S. dBuV/m
low	2400.8000	Horn1	V	85.3	28.5	4.9	118.8
	2400.8000	Horn1	H	86.1	28.8	4.9	119.8
mid	2442.0000	Horn1	V	86.3	28.6	5.0	119.9
	2442.0000	Horn1	H	84.8	28.9	5.0	118.7
hi	2482.3000	Horn1	V	82.7	28.6	5.1	116.4
	2482.3000	Horn1	H	80.3	28.9	5.1	114.3

Measured value (V/m) = $10^{(FS/20)} = 0.988553094\text{V/m}$

Antenna Gain (numeric) = $10^{(Ag/10)} = 2.512$

Output Power (W) = $\frac{E^2 R^2}{30G} = 0.1167$

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

Test Results: See Attached Table.

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB/m)	Amp. Gain/ Cable Loss (dB)	Distance Correction (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
CH94									
17376.100	Horn2	V	69.2	44.2	26.5	9.5	77.3	96.4	19.1
17376.100	Horn2	H	69.3	44.0	26.5	9.5	77.4	94.3	16.9
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole									
Note 2: Positive Peak detector used									

Additional Observations:

The Spectrum was searched from 30MHz to 25GHz.

The EUT was measured on three orthogonal axis. The EUT was tested with fully charged batteries.

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

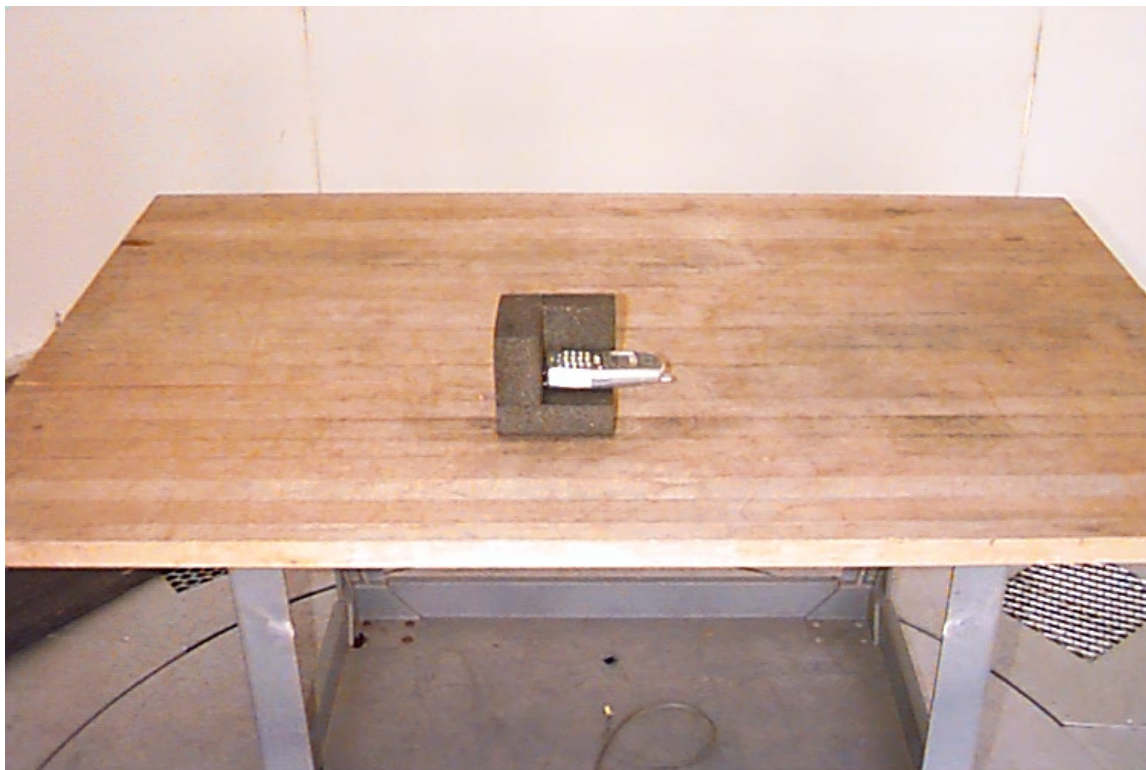
All measurements were performed using a Peak detector with 100kHz RBW/VBW and compared to the Fundamental -20dB.

The Limit is calculated as 20dB below the fundamental field strength. Only emissions within 20dB below this limit have been reported.

Appendix B : Setup Photographs

Spurious Emissions Setup:





Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions

