



**Test Report:** 5W37153


**Applicant:** VTech Engineering Canada Ltd.  
Suite 200 – 7671 Alderbridge Way  
Richmond, B.C., Canada V6X 1Z9

**Equipment Under Test:  
(EUT)** VTech 5825 Base  
5.8GHz Digital Frequency Hopping Spread Spectrum  
Cordless Telephone

**FCC ID:** EW780-5348-00

**In Accordance With:** **FCC Part 15.247, Subpart C**  
**Class 2 Permissive Change**  
FHSS System and Digitally Modulated Radiators  
5725-5850MHz

**Tested By:** Nemko Canada Inc.  
303 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2

**Authorized By:**   
Sim Jagpal, Resource Manager

**Date:** 28 January 2005

**Total Number of Pages:** 28

**Table of Contents**

**Section 1. Summary of Test Results .....3**

**Section 2. General Equipment Specification.....5**

**Section 3. Powerline Conducted Emissions.....6**

**Section 4. 20 dB Bandwidth.....11**

**Section 5. Occupancy Time .....14**

**Section 6. Number of Hopping Channels .....16**

**Section 7. Minimum Channel Separation .....19**

**Section 8. Peak Output Power.....20**

**Section 9. Spurious Emissions .....21**

**Section 10. Block Diagrams .....27**

**Section 11. Test Equipment List .....28**

*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

---

## **Section 1. Summary of Test Results**

### **General**

**All measurements are traceable to national standards.**

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 C63.4-2001. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

**THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.**



TESTED BY: \_\_\_\_\_  
Jason Nixon, Telecom Specialist

DATE: 28 January 2005

Nemko Canada Inc. authorizes the above named company 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.

This report applies only to the items tested.

*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

---

**Summary Of Test Data**

<b>Name Of Test</b>	<b>Para. No.</b>	<b>Result</b>
Powerline Conducted Emissions	15.207(a)	Complied
6dB Bandwidth	15.247(a)(2)	Complied
20 dB Bandwidth	15.247(a)(1)(ii)	Complied
Number of Hopping Channels	15.247(a)(1)(ii)	Complied
Occupancy Time	15.247(a)(1)(ii)	Complied
Minimum Channel Separation	15.247(a)(1)	Complied
Peak Output Power	15.247(b)(1)	Complied
Spurious Emissions (Radiated)	15.247(d)	Complied

**Test Conditions:**

**Indoor**                      Temperature: 23°C  
   Humidity: 48%

**Outdoor**                     Temperature: 5°C  
   Humidity: 42%

*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

---

## **Section 2. General Equipment Specification**

**Manufacturer:** VTech (Dongguan) Electronics and Communications Ltd.

**Model/Serial No. of EUT**      **Base:** M/N: 5825, S/N: None

**Date Received In Laboratory:** January 17, 2005

**Nemko Identification No.:** 1

**Frequency Band of Operation:** 5725-5850MHz

**Frequency Range of EUT:** 5744.736 MHz – 5825.952 MHz

**Peak Output Power (measured):** Base: 27.2dBm

**Number of Hopping Channels:** 95 available (75 chosen for hopping)

**Channel Spacing:** 864kHz

**Modulation:** GFSK

**Antenna Gain(s):** 1dBi

**Changes to RF circuitry:** The following changes were made to the RF circuitry of the 5825 Base as declared by the applicant:  
A new PLO IC replaces original PLO IC + mixer + driver circuitry. A matching new PA is to be used but the output power remains the same.

*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

**Section 3. Powerline Conducted Emissions**

**Para. No.: 15.207(a)**

<b>Test Performed By: Jason Nixon</b>	<b>Date of Test: January 27, 2005</b>
---------------------------------------	---------------------------------------

**Test Results: Pass**

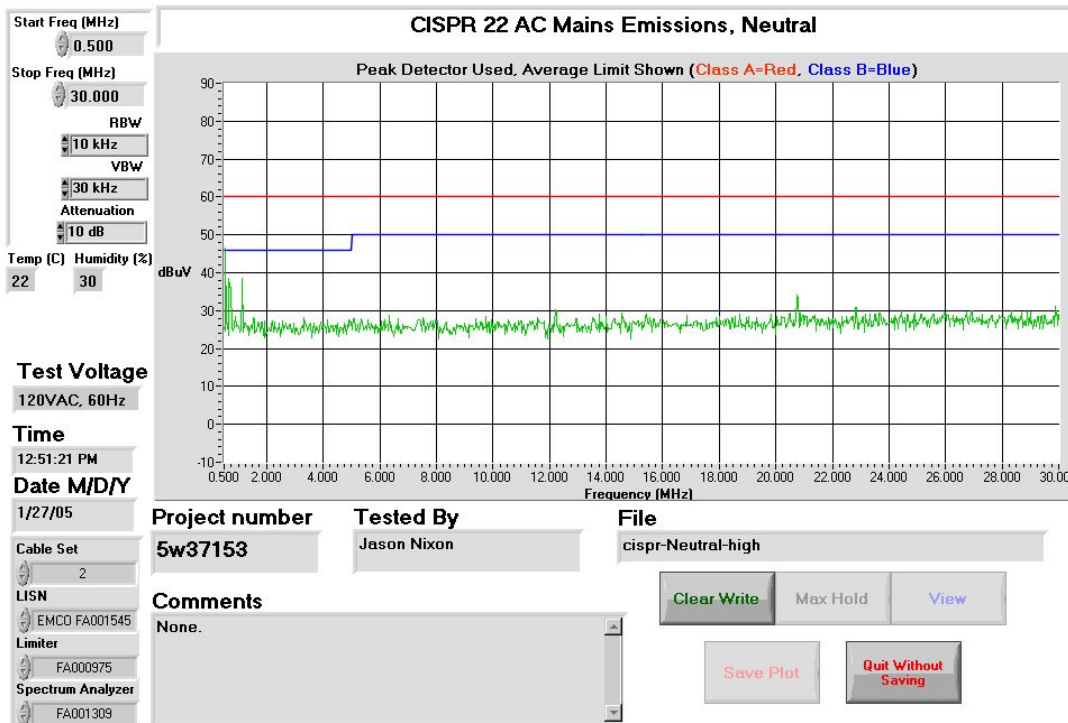
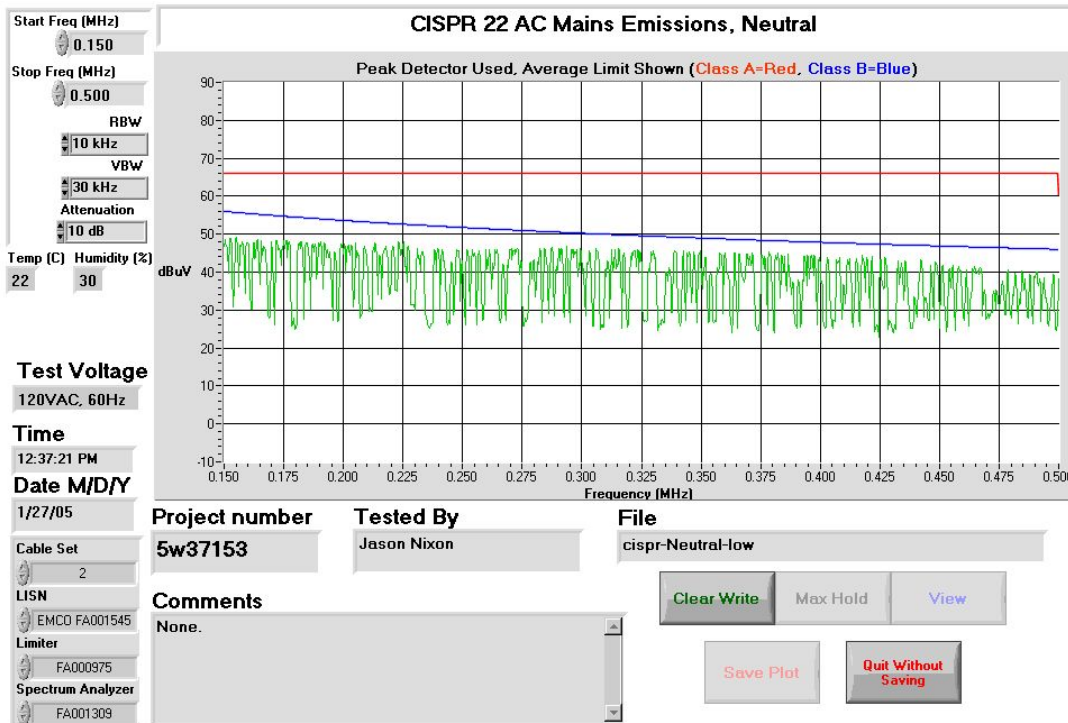
General		
<p>These tests were conducted using measurement procedures of ANSI C63.4-2001. The equipment was tested for conducted emissions from 0.15MHz to 30MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-2001. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.</p>		
Limits For Conducted Disturbance At The Mains Ports: Paragraph No. 15.107 for Class B		
Frequency Range MHz	Limits dB(μV)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50
Notes		
<ol style="list-style-type: none"> <li>The lower limit shall apply at the transition frequency.</li> <li>The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.</li> </ol>		

**Measurement Data:** See attached graph(s) and tabulated data

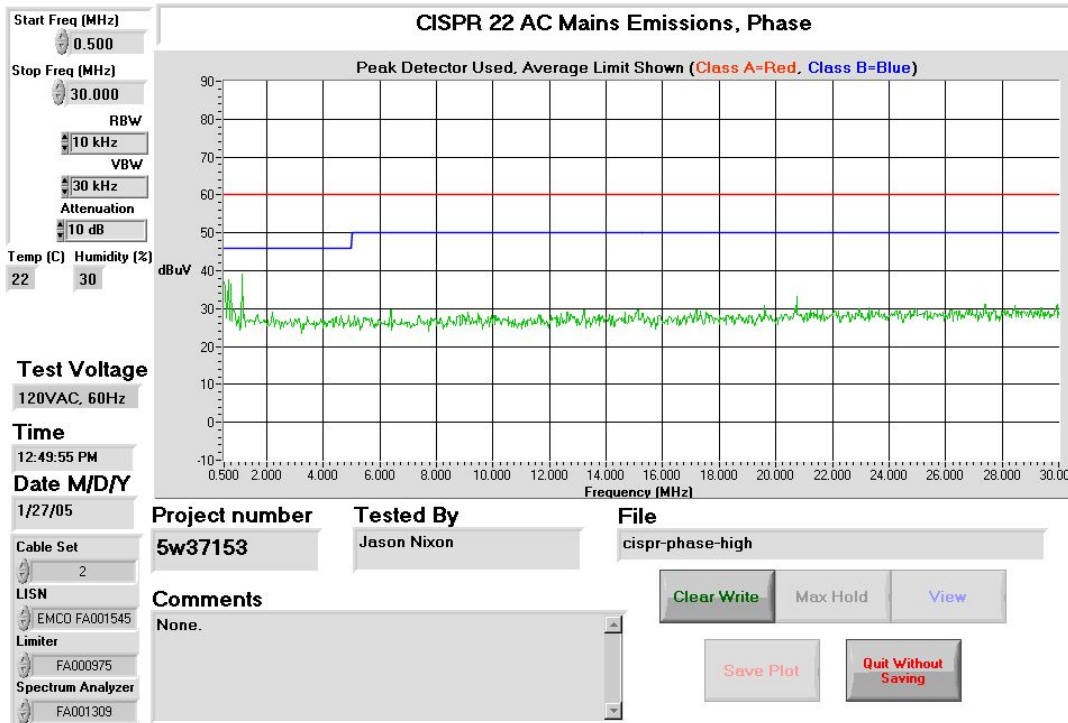
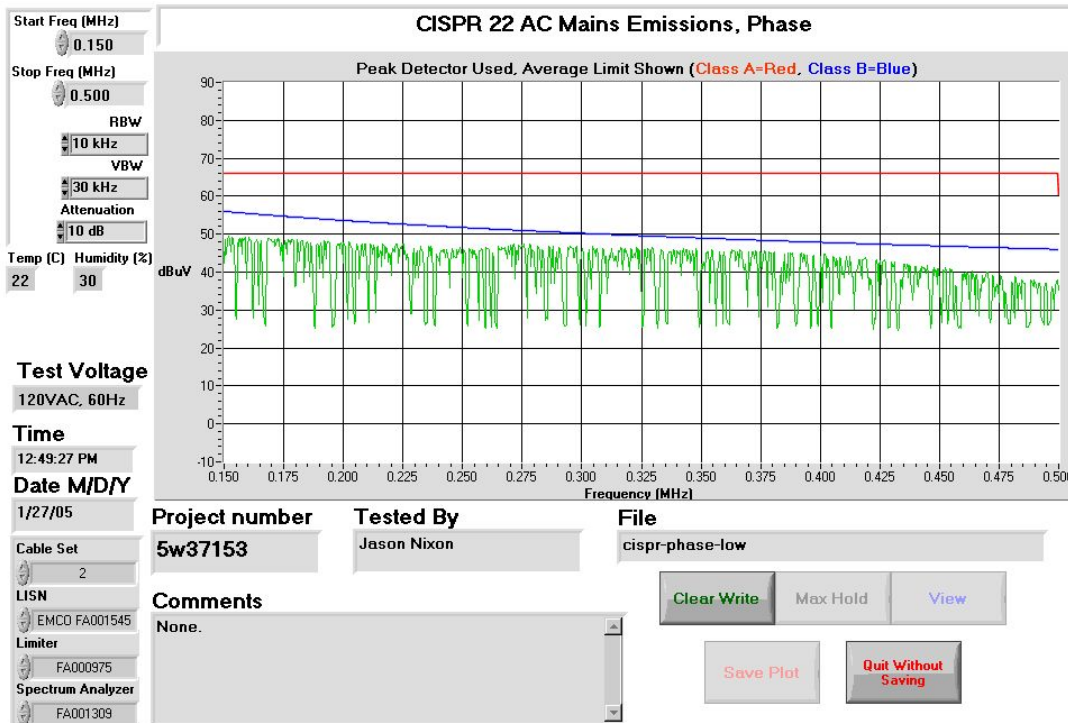
*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

<b>Conductor</b>	<b>Frequency (MHz)</b>	<b>Detector</b>	<b>Emission Level (dBuV)</b>	<b>LISN Loss (dB)</b>	<b>Cable Loss (dB)</b>	<b>Result (dBuV)</b>	<b>Limit (dBuV)</b>	<b>Margin (dB)</b>	
1	Neutral	20.7410	Quasi Peak	28.3	0.40	0.40	29.10	60.0	30.9
			Average	27.6	0.40	0.40	28.40	50.0	21.6
2	Neutral	1.1500	Quasi Peak	11.2	0.00	0.20	11.40	56.0	44.6
			Average	2.3	0.00	0.20	2.50	46.0	43.5
3	Neutral	0.5600	Quasi Peak	25.1	0.00	0.08	25.18	56.0	30.8
			Average	3.6	0.00	0.08	3.68	46.0	42.3

EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone



EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone



*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

---

Set-up Photo



*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

---

**Section 4. 20 dB Bandwidth**

Para. No.: 15.247(a) (1)(ii)

<b>Test Performed By: Jason Nixon</b>	<b>Date of Test: January 22, 2005</b>
---------------------------------------	---------------------------------------

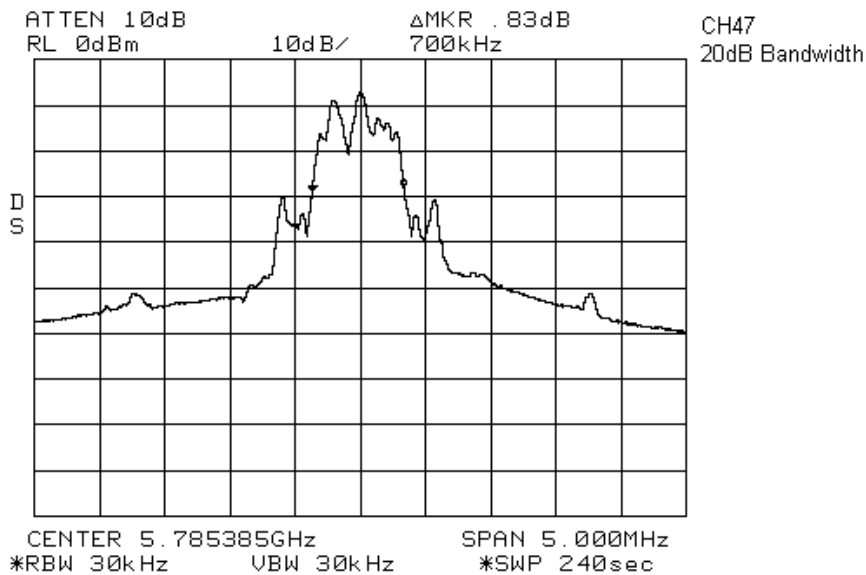
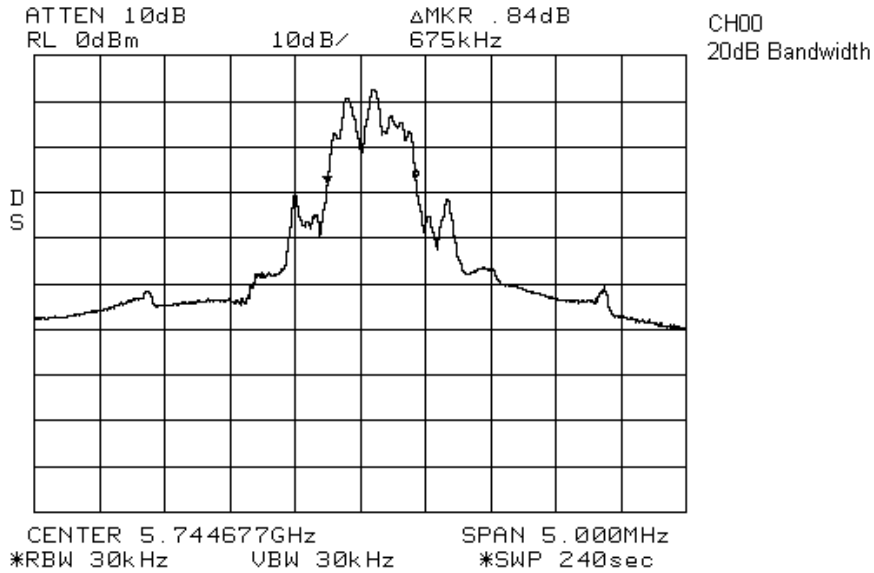
**Limit:**  $\leq 1\text{MHz}$

**Measurement Data:** See Plots

<b>20dB BW (kHz)</b>	<b>Ch. 00</b>	<b>Ch. 47</b>	<b>Ch. 94</b>
<b>Base</b>	675	700	675

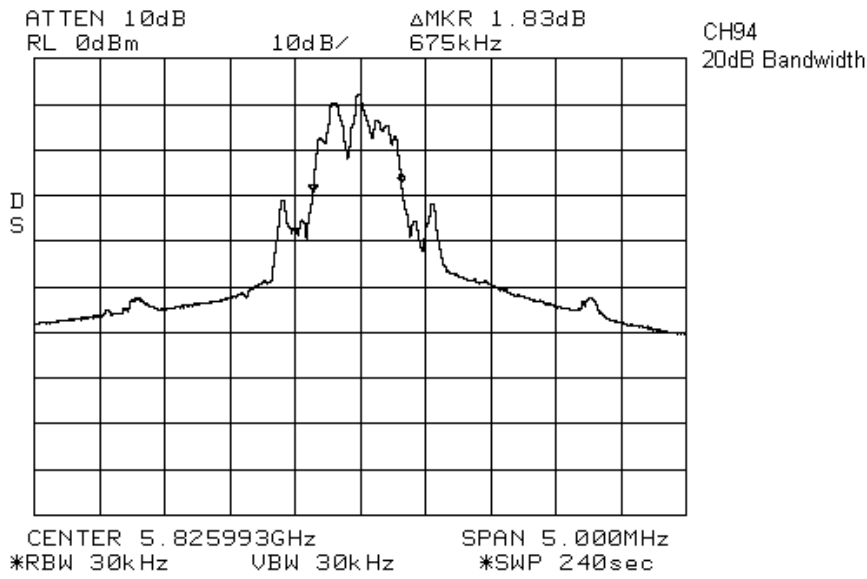
EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

Base



EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

---



*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

---

**Section 5.       Occupancy Time**

**Para. No.: 15.247(a)(1)(ii)**

<b>Test Performed By: Jason Nixon</b>	<b>Date of Test: January 22, 2005</b>
---------------------------------------	---------------------------------------

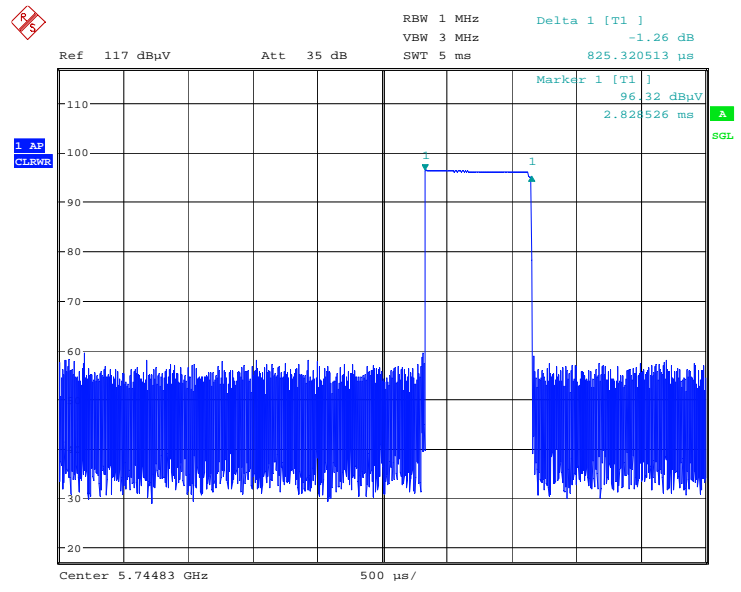
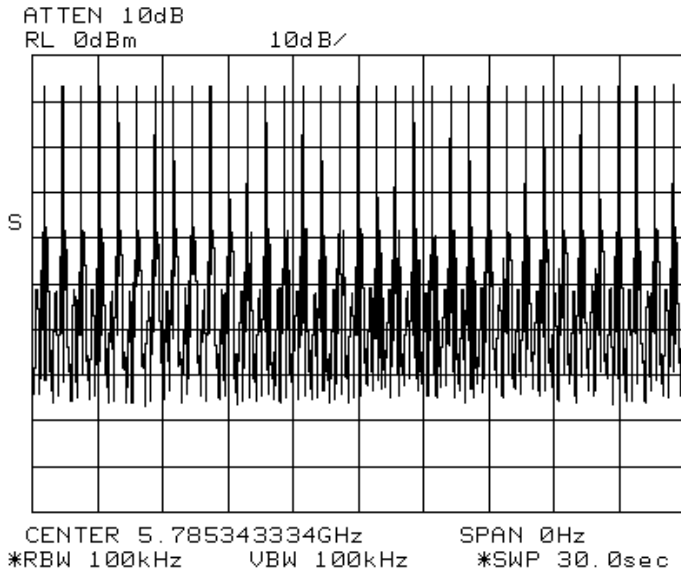
**Limit:**                               400mS/30sec

**Measurement Data:**           See Plots

Base = 28.875mS/30S

EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

Base



On-time of pulse  
 Date: 27.JAN.2005 17:37:24

Time of occupancy = 35 x 0.825msec = 28.875msec/30sec

EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

---

## Section 6. Number of Hopping Channels

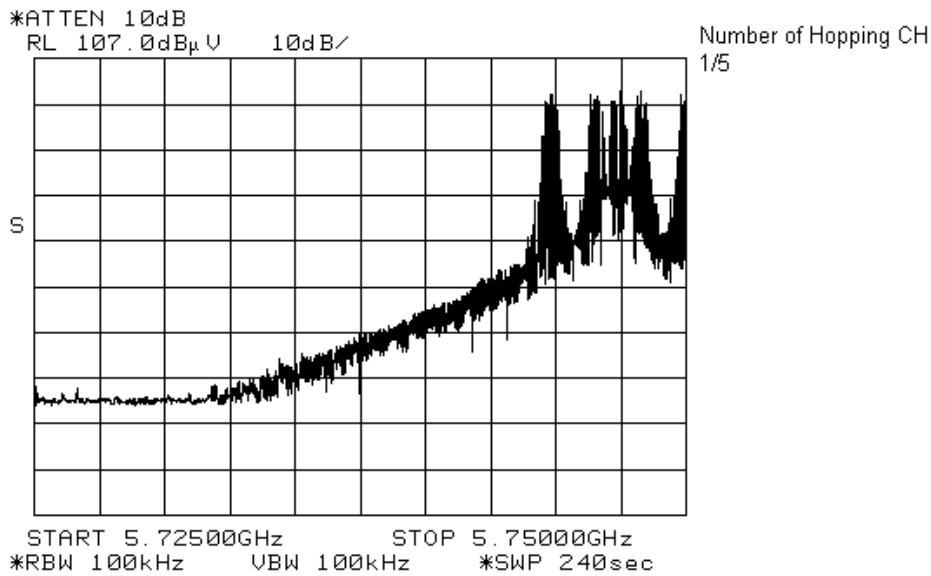
Para. No.: 15.247(a)(1)(ii)

Test Performed By: Jason Nixon	Date of Test: January 22, 2005
--------------------------------	--------------------------------

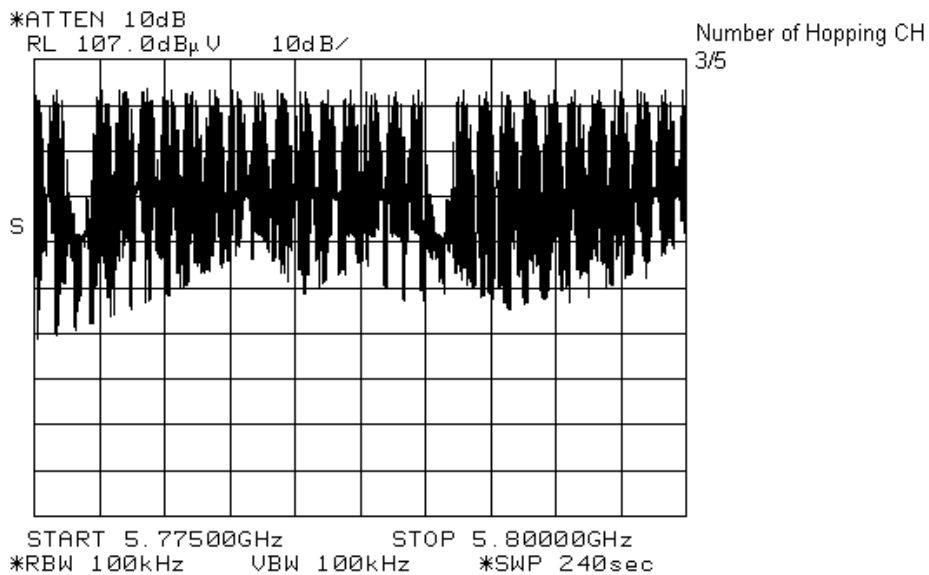
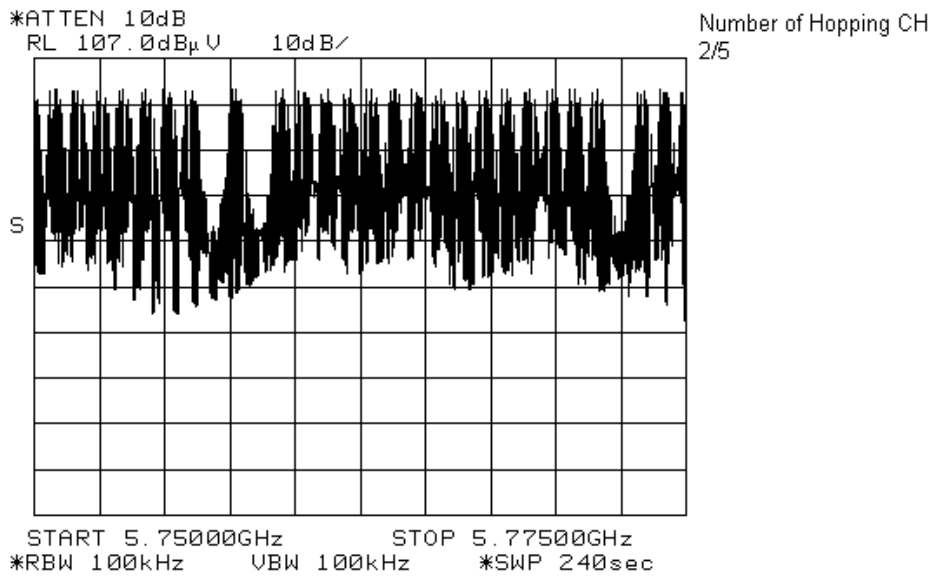
**Limit:** Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

**Measurement Data:** See Plot(s)

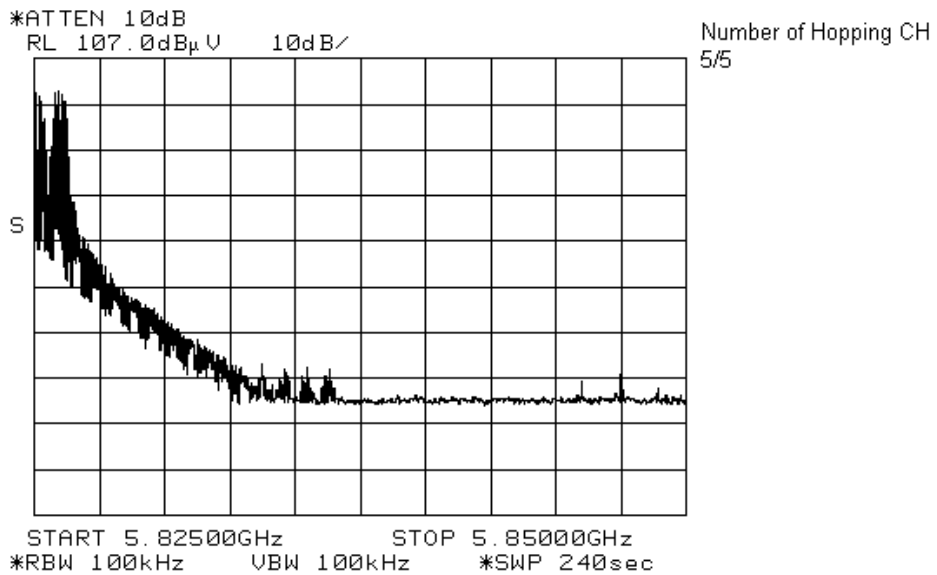
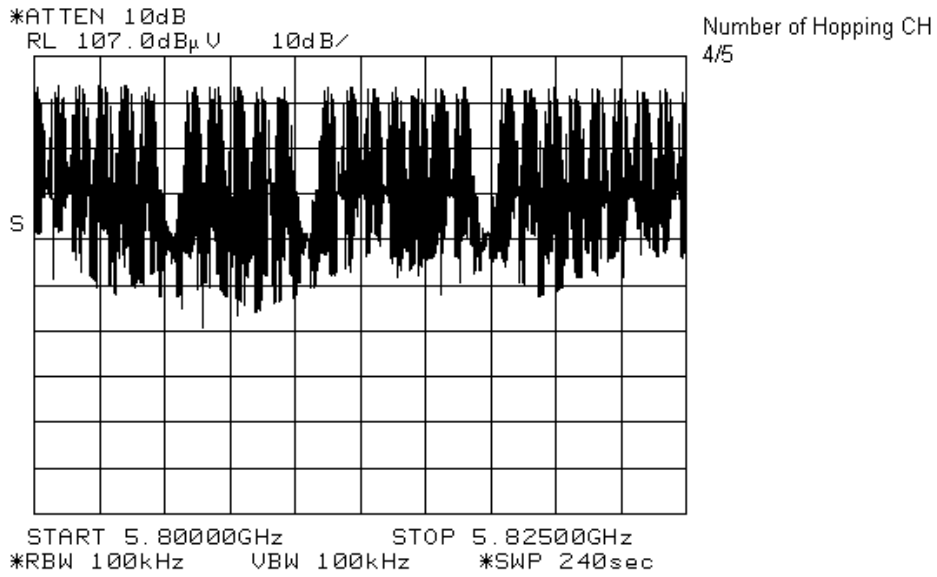
Base = 85



EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone



EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone





EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

**Section 8. Peak Output Power**

Para. No.: 15.247 (b)(1)

<b>Test Performed By: Jason Nixon</b>	<b>Date of Test: January 21, 2005</b>
---------------------------------------	---------------------------------------

**Limit:** 1W

**Test Results:** Complies. The maximum peak output power is:

Base: 123.4dBuV at 3m = 1.479V/m.

**Antenna Gain(s):** Base: 1.0dBi

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

Base = 27.2dBm

**Measurement Data:** See Tabulated Data.

Measurements were made with a Peak detector at 3m using an RBW/VBW of 1MHz.

**Base**

Ch.	Freq.	Pol	ANT.	Rx	Cable loss	Ant Factor	F.S.
		V/H		dBuv	dB	dB/m	dBuV/m
low	5744.473	V	H2	78.8	9.7	34.5	123.0
	5744.473	H	H2	72.0	9.7	34.7	116.4
mid	5785.285	V	H2	78.2	9.8	34.5	122.5
	5785.105	H	H2	64.3	9.8	34.7	108.8
hi	5826.035	V	H2	78.7	10.2	34.5	123.4
	5825.910	H	H2	66.2	10.2	34.7	111.1

*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

---

**Section 9. Spurious Emissions**

**Para. No.: 15.247(d)**

<b>Test Performed By: Jason Nixon</b>	<b>Date of Test: January 27, 2005</b>
---------------------------------------	---------------------------------------

**Limit:** 20dBc/100kHz  
15.205(a), 15.209(a)

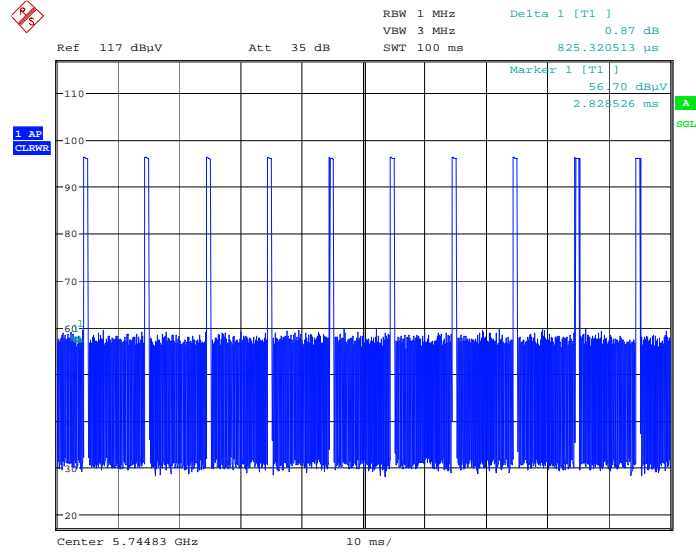
**Measurement Data:** See plots and tabulated data

**Duty Cycle Calculations**

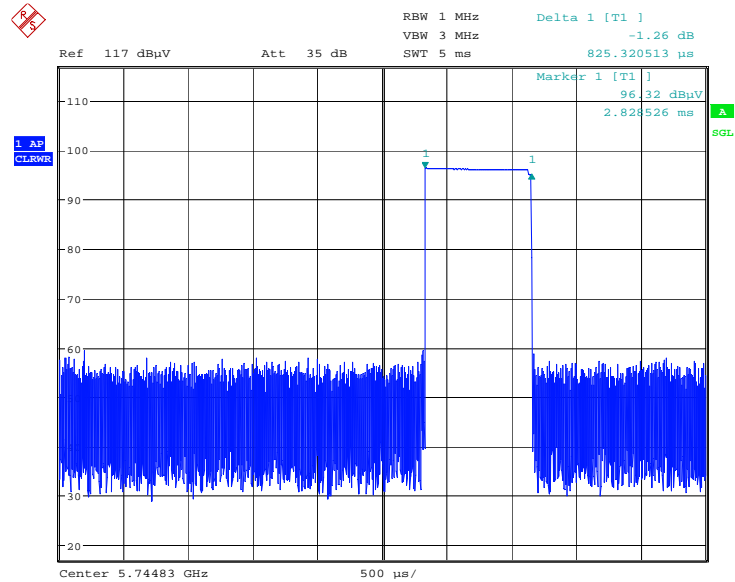
Base:  $20\text{Log}(10 \times 0.825\text{mS}/100\text{mS}) = -21.6\text{dB}$

EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

Base



Dutycycle =  $20\log(10 \times 0.825 / 100) = -21.7$ , therefor Dutycycle = -20dB  
 Date: 27.JAN.2005 17:39:21



On-time of pulse  
 Date: 27.JAN.2005 17:37:24

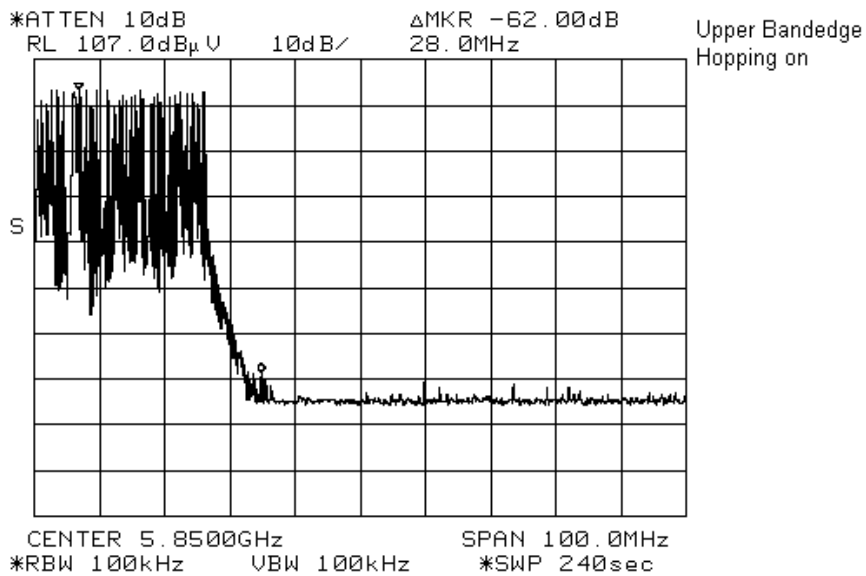
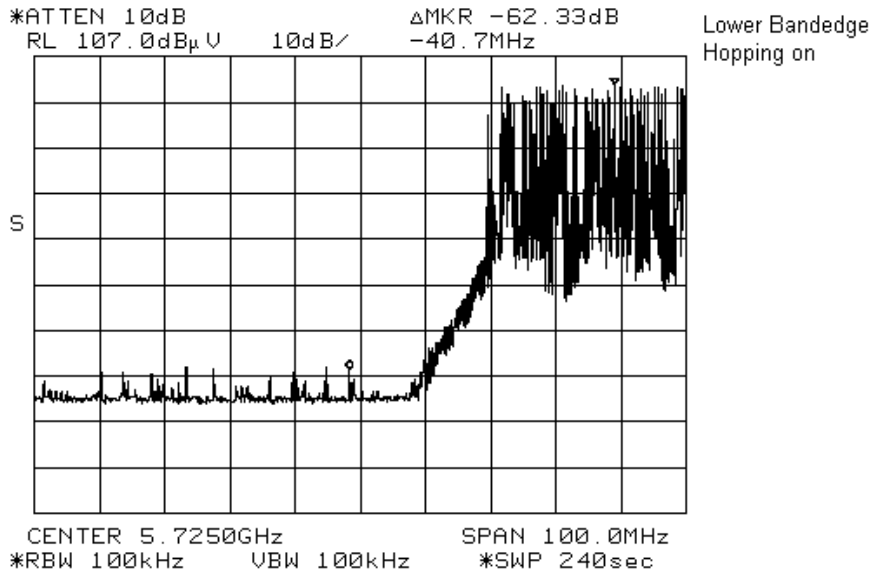
EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

**Radiated Disturbance Test Data: Base**

Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor/Cable Loss (dB)	Amp. Gain (dB)	Duty Cycle Corr. (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
<b>Emissions NON-Restricted Bands</b>									
<b>Low Ch.</b>									
17234.490	V	H2	32.5	42.5	----	----	75.0	102.8	27.8
17234.490	H	H2	36.4	42.3	----	----	78.7	95.0	16.3
<b>Mid Ch.</b>									
17356.132	V	H2	39.8	42.5	----	----	82.3	99.6	17.3
17356.132	H	H2	36.1	42.3	----	----	78.4	88.7	10.3
<b>High Ch.</b>									
17477.923	V	H2	36.4	43.5	----	----	79.9	103.5	23.6
17477.923	H	H2	30.3	43.5	----	----	73.8	90.1	16.3
<b>Emission Restricted Bands</b>									
<b>Low Ch.</b>									
11488.930	V	H1	64.3	44.7	41.7	----	67.3	74	6.7
11489.950	H	H1	64.9	44.7	41.7	----	67.9	74	6.1
11488.930	V	H1	64.3	44.7	41.7	20	47.3	54	6.7
11489.950	H	H1	64.9	44.7	41.7	20	47.9	54	6.1
<b>Mid Ch.</b>									
11570.300	V	H1	65.5	44.7	41.7	----	68.5	74	5.5
11570.500	H	H1	66.4	44.7	41.7	----	69.4	74	4.6
11570.300	V	H1	65.5	44.7	41.7	20	48.5	54	5.5
11570.500	H	H1	66.4	44.7	41.7	20	49.4	54	4.6
<b>High Ch.</b>									
11651.163	V	H1	68.3	44.7	41.7	----	71.3	74	2.7
11651.800	H	H1	67.5	44.7	41.7	----	70.5	74	3.5
11651.163	V	H1	68.3	44.7	41.7	20	51.3	54	2.7
11651.800	H	H1	67.5	44.7	41.7	20	50.5	54	3.5
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole Note 2: Positive Peak detector used Notes: Measurement Receiver =H.P.8564E, RBW/VBW=100kHz for NON-Restricted Bands = R&S FSU, RBW/VBW = 1MHz for Restricted Bands  All Measurements were performed using a Peak Detector  NON-Restricted Band limit was calculated as 20dB below the Fundamental Frequency when measured in a 100kHz RBW/VBW using a peak detector.  The spectrum was searched from 30MHz to 40GHz.  All testing was performed at a measurement distance of 3m.									

EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

20 dB Bandedge  
Base





*EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone*

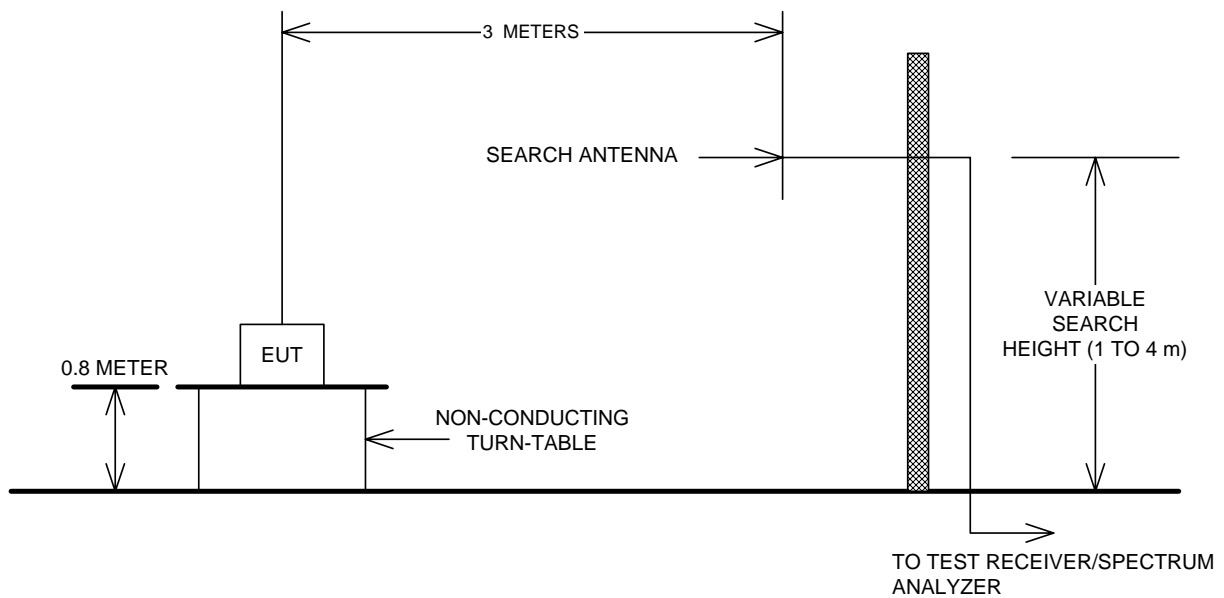
---

Set-up Photo, Base

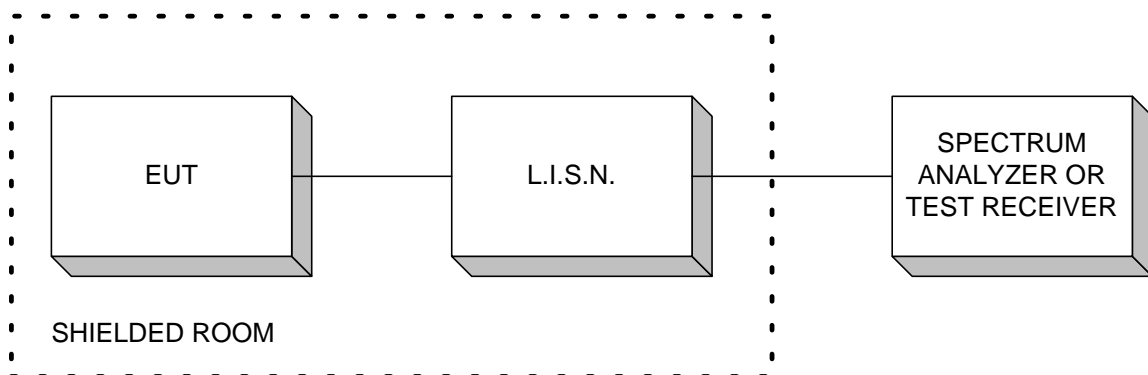


## Section 10. Block Diagrams

### Test Site For Radiated Emissions



### AC Power Line Conducted Emissions



EQUIPMENT: VTech 5825 Base, 5.8GHz Digital FHSS, Cordless Phone

**Section 11. Test Equipment List**

Conducted Disturbance at Mains Test Equipment Used:

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	LISN	EMCO	4825/2	FA001545	Jan. 13/05	Jan. 13/06
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 28/04	May 28/05
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 28/04	May 28/05
1 Year	Transient Limiter	Hewlett-Packard	1194 7A	FA000975	June 10/04	June 10/05

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair

Equipment List - Radiated Emissions

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett Packard	8564E	3943A01798	Dec 22/04	Dec 22/05
1 Year	Spectrum Analyzer	Rohde & Schwarz	FSU	FA001877	May 26/04	May 26/05
1 Year	Biconical (1) Antenna	EMCO	3109	FA000805	April 23/04	April 23/05
1 Year	Horn Antenna #1	EMCO	3115	FA000649	Dec. 22/04	Dec. 22/05
1 Year	Horn Antenna #2	EMCO #1	3115	FA000649	Dec 14/04	Dec 14/05
1 Year	Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 26/04	Aug. 26/05
1 Year	RF AMP	JCA	4-8 GHz	FA001497	18 June 04	18 June 05
1 Year	RF AMP	JCA	2-4 GHz	FA001496	18 June 04	18 June 05
1 Year	RF AMP	JCA	1-2 GHz	FA001498	18 June 04	18 June 05
1 Year	Horn Antenna	EMCO #5	3116	FA001847	19 Jan 04	19 Mar 05
COU	8.2 – 12 GHz Passband Filter	Dorado	WA-90-S	-----	COU	COU
COU	12 – 18 GHz Passband Filter	Dorado	62-SMA	-----	COU	COU
COU	5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU	COU
COU	18.0 – 26.0 GHz Amplifier	NARDA	BBS-1826N612	FA001550	COU	COU
COU	26 – 40.0 GHz Amplifier	NARDA	DBL-2640N610	FA001556	COU	COU

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair