



Test Report:

5W37404 Issue 2

Applicant:

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

**Equipment Under Test:
(EUT)**

Vtech Ip 8100-2
5.8GHz FHSS Base Unit

FCC ID:

In Accordance With:

FCC Part 15.247, Subpart C
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, General Manager

Date:

22 April 2005

Total Number of Pages:

33

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EQUIPMENT: Vtech Ip 8100-2, Base Unit

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.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE
TEST SPECIFICATIONS HAVE BEEN MADE.

See “ Summary of Test Data”.

TESTED BY: Glen Westwell, Wireless Specialist

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This report applies only to the items tested.

EQUIPMENT: Vtech Ip 8100-2, Base Unit

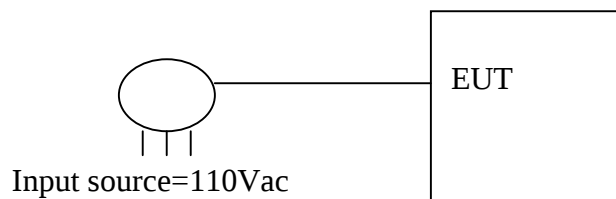
Summary Of Test Data

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

Test Conditions:

Indoor Temperature: 23°C
 Humidity: 42%

Outdoor Temperature: -12°C
 Humidity: 30%

Test Set Up Diagram

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 2. General Equipment Specification

Manufacturer:	Vtech Engineering
Model No.:	Ip 8100-2
Serial No.:	2881
Date Received In Laboratory:	20 Jan 2005
Band of Operation:	5725-5850MHz
Operating Frequency of EUT:	5744.736-5825.952MHz
Peak Output Power (Rated):	27.0dBm
Modulation:	GFSK
Antenna Gain:	3dBi

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 3. Powerline Conducted Emissions

Para. No.: 15.207(a)

Test Performed By: Glen Westwell	Date of Test: 20 Jan. 2005
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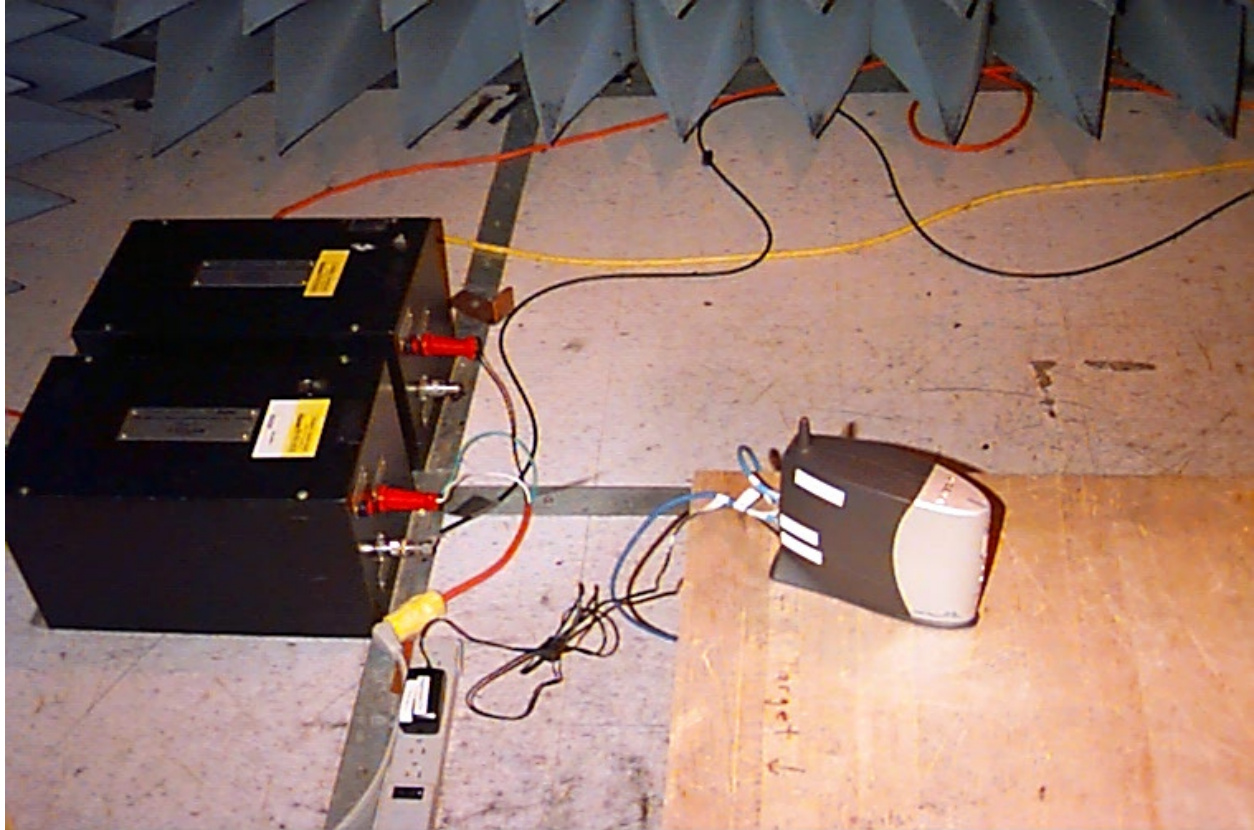
Test Results: Complies.

General		
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.		
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		
1. The lower limit shall apply at the transition frequency. 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.		

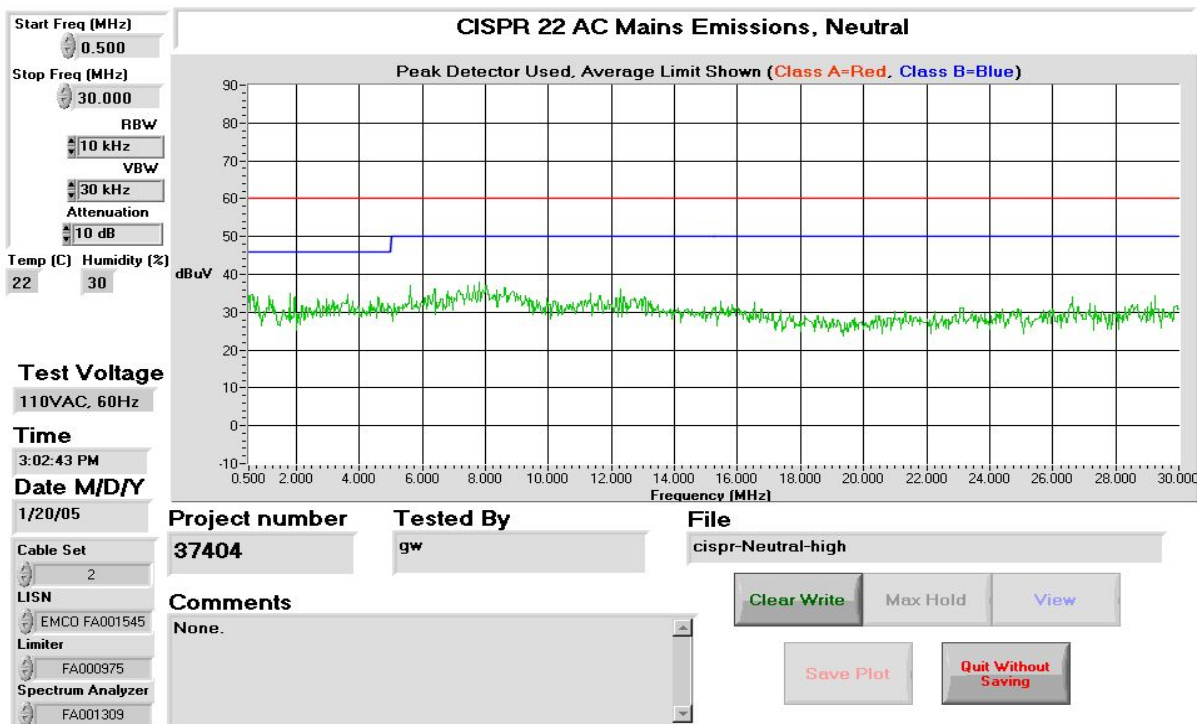
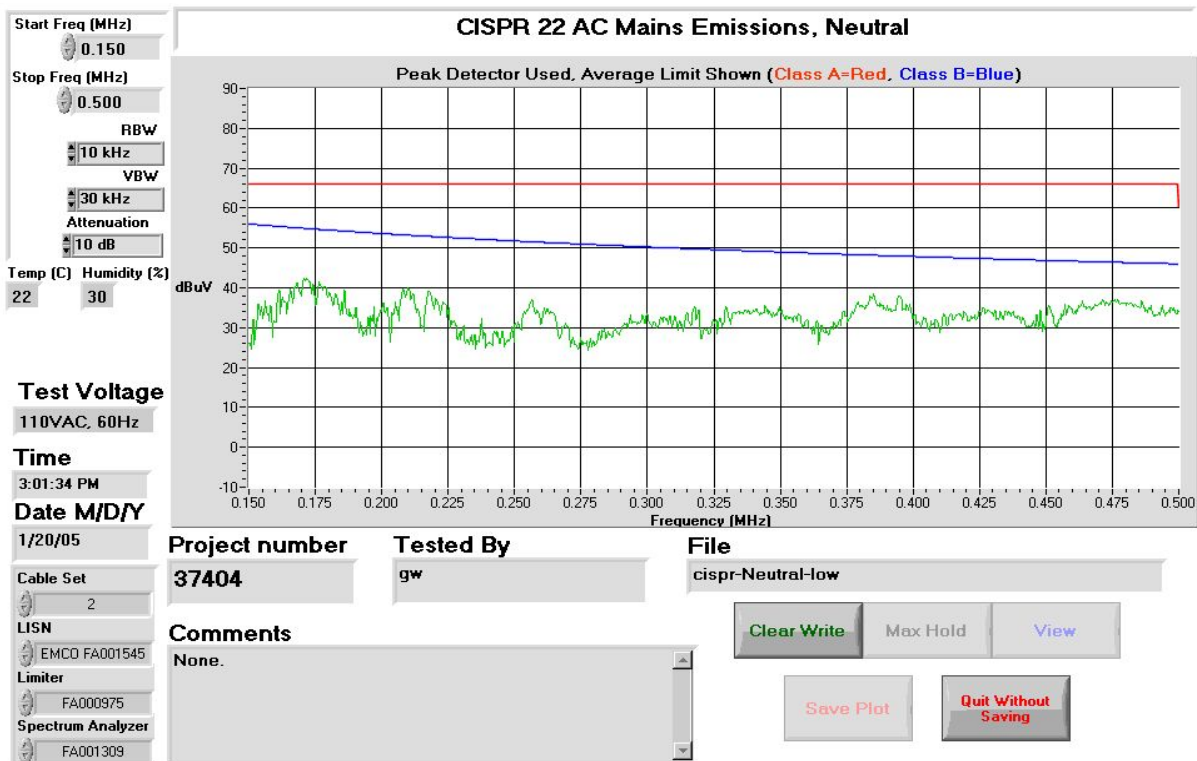
Measurement Data: See attached graph(s).

EQUIPMENT: Vtech Ip 8100-2, Base Unit

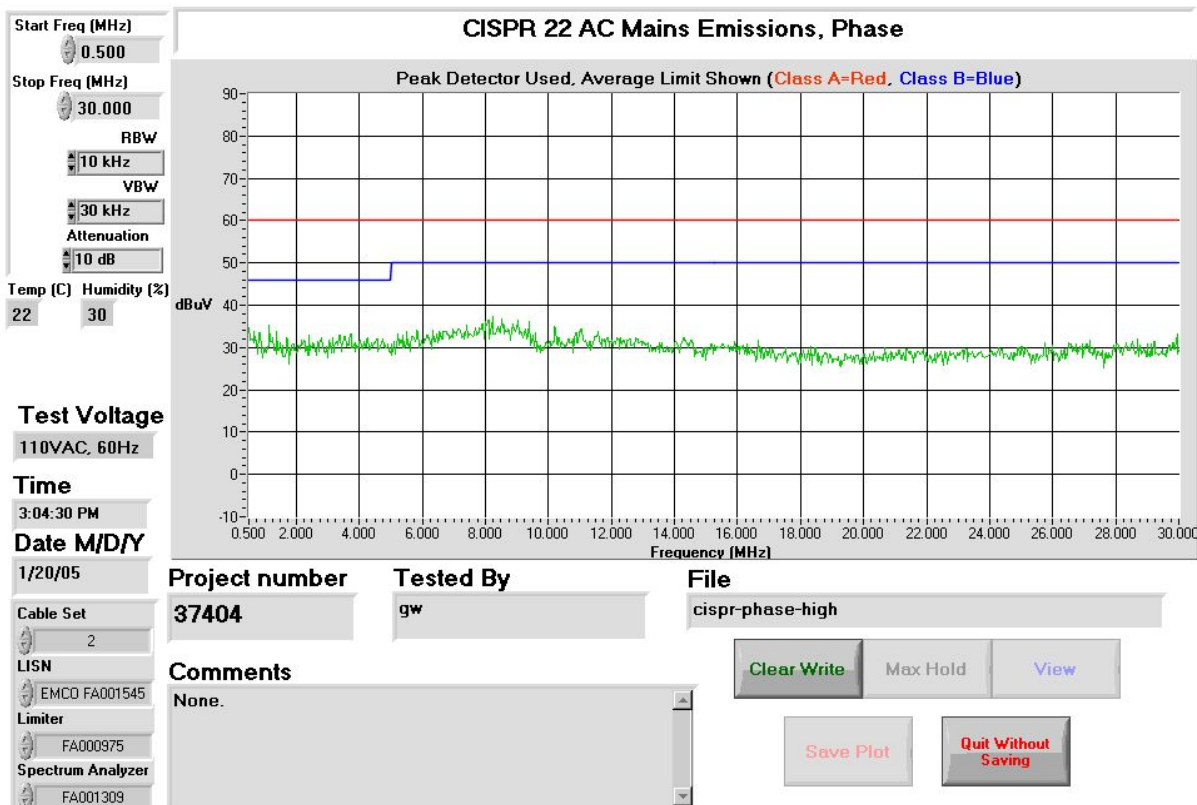
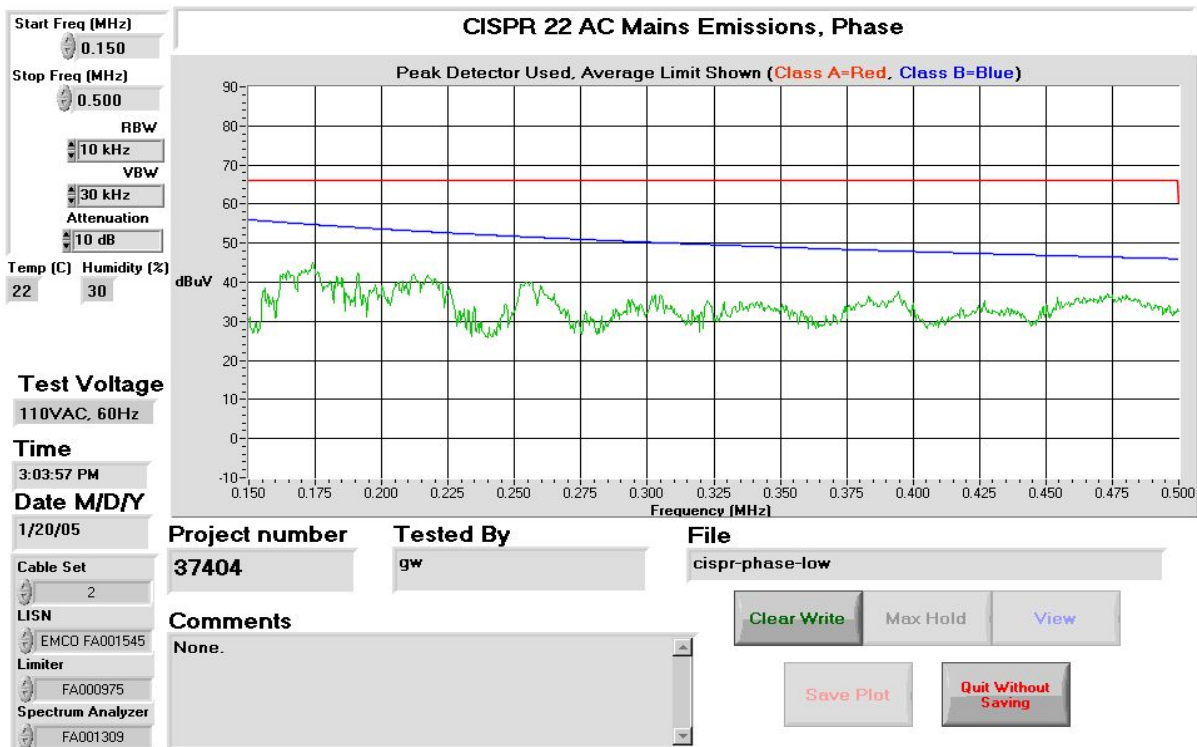
Set-up Photo



EQUIPMENT: Vtech Ip 8100-2, Base Unit



EQUIPMENT: Vtech Ip 8100-2, Base Unit



EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 4. 20 dB Bandwidth

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

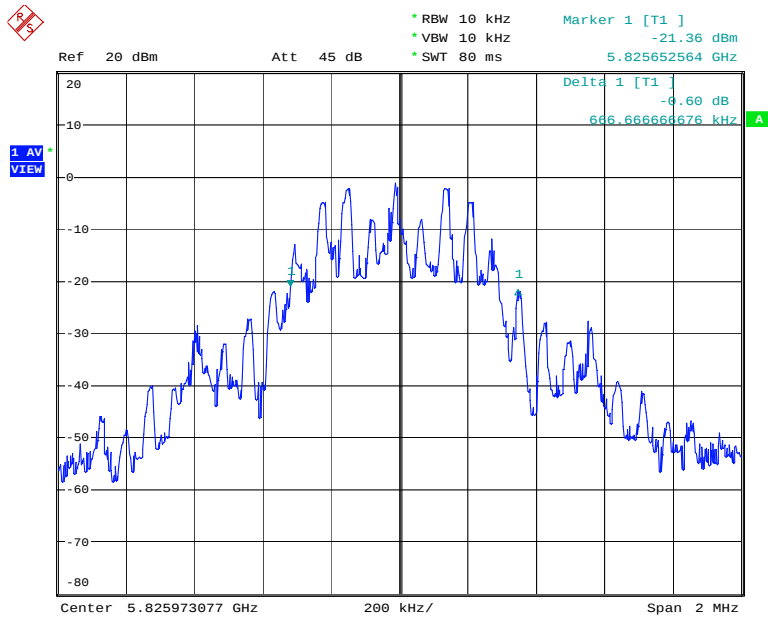
Test Performed By: Glen Westwell	Date of Test: 25 Jan 2005
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Limit: $\leq 1\text{MHz}$

Measurement Data: Complies, see attached plot

OBW = 666.7kHz

EQUIPMENT: Vtech Ip 8100-2, Base Unit



Long pulse width
Date: 26.JAN.2005 12:11:10

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 5. Occupancy Time

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

Test Performed By: Glen Westwell	Date of Test: 25 Jan. 2005
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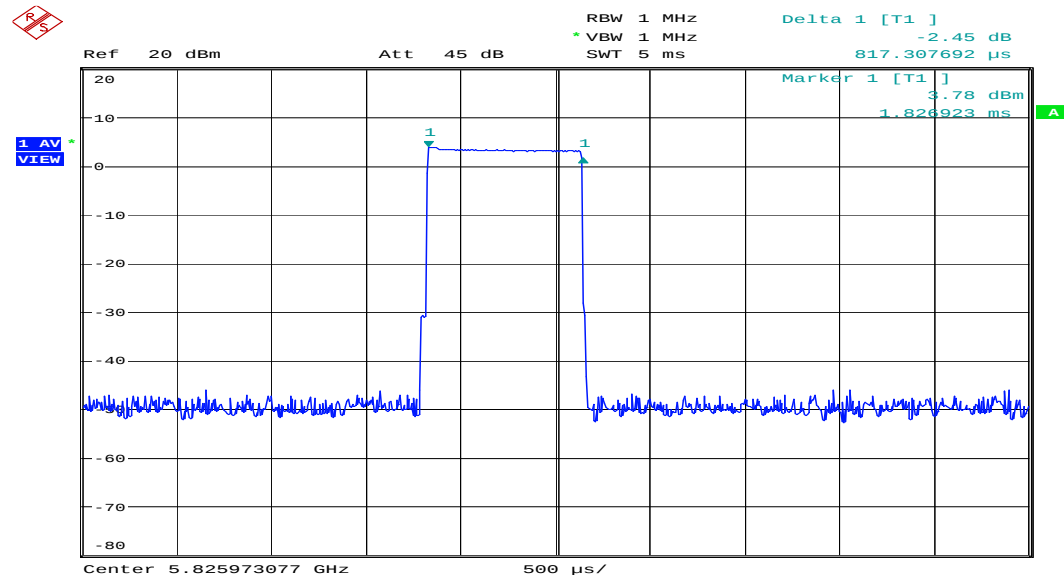
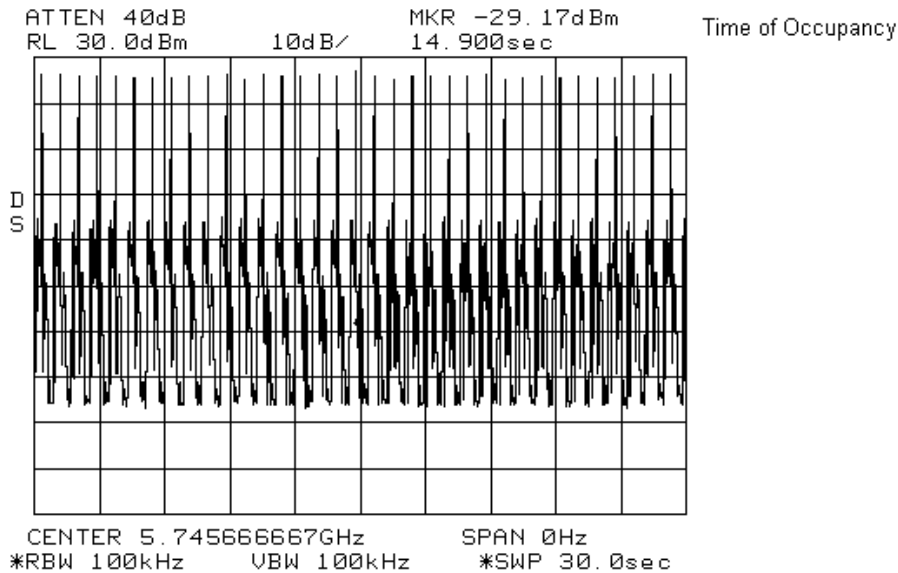
Limit: **0.4s/30s period**

Measurement Data: Complies. See attached plots.

Time of Occupancy = 0.035s/30s

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Time of Occupancy



Long pulse width
Date: 26.JAN.2005 12:15:30

Time of Occupancy = 35 x 817.3uS/30s = 0.029s/30s period.

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 6. Number of Hopping Channels

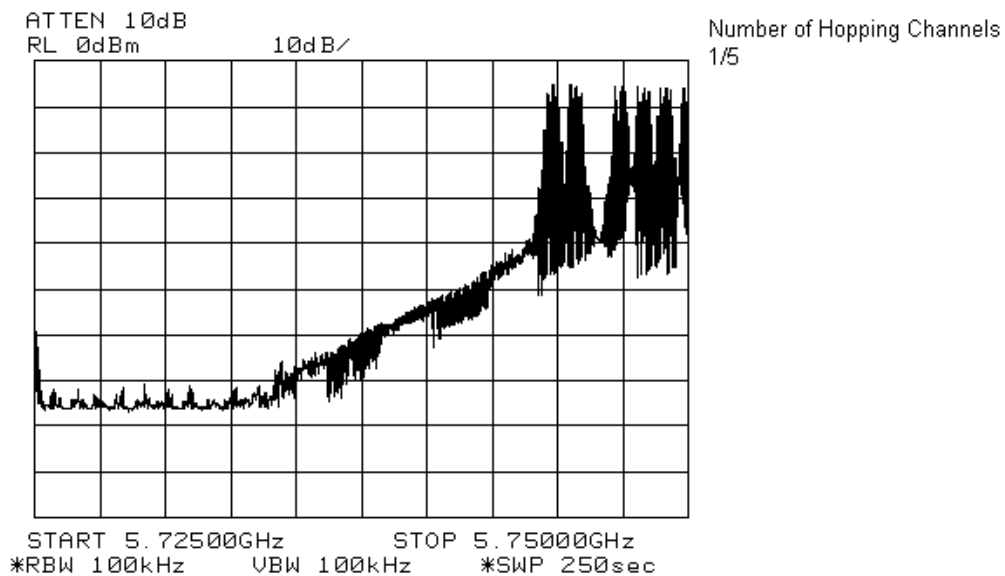
Para. No.: 15.247(a)(1)(ii)

Test Performed By: Glen Westwell	Date of Test: 25 Jan. 2005
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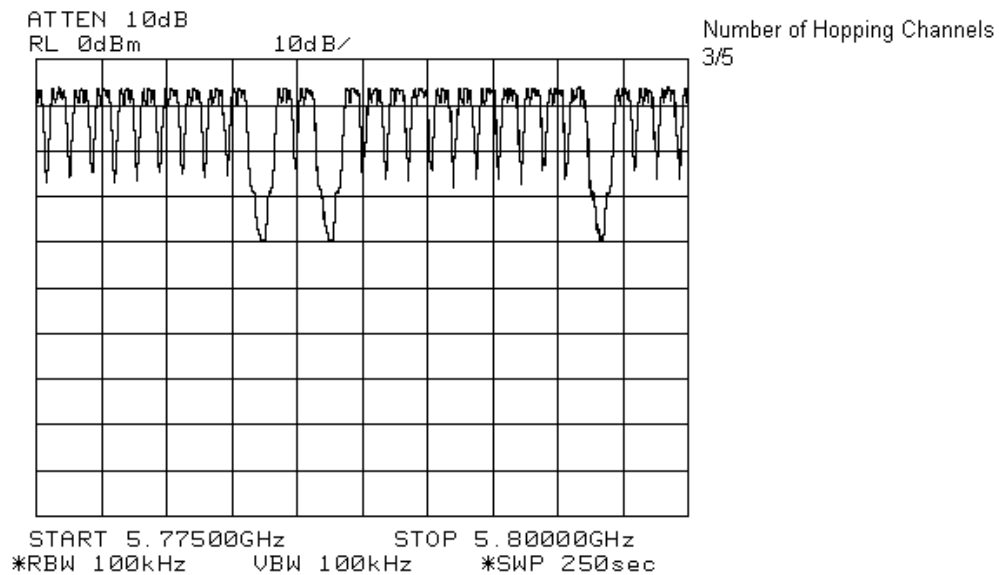
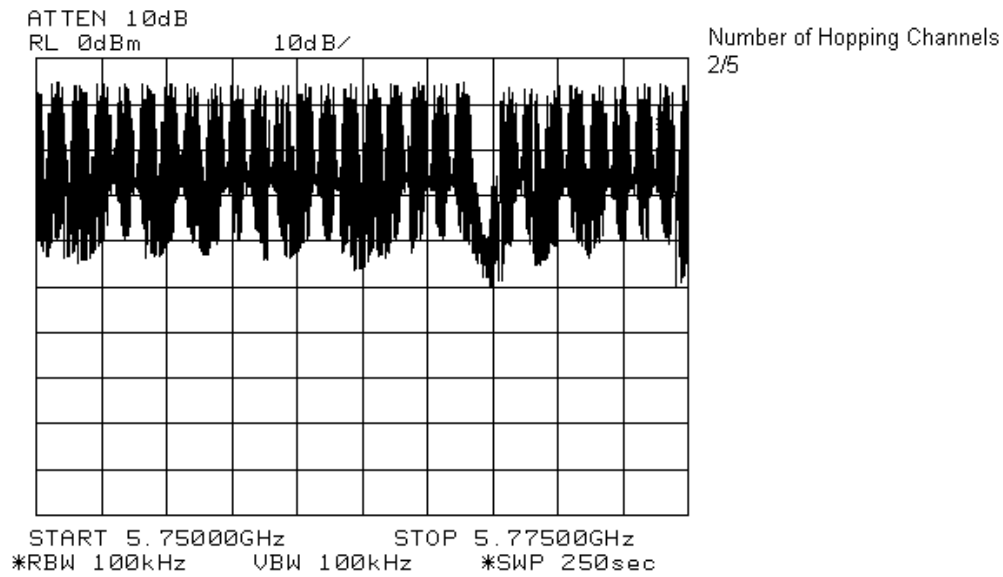
Limit: Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

Measurement Data: Complies, See Plot(s)

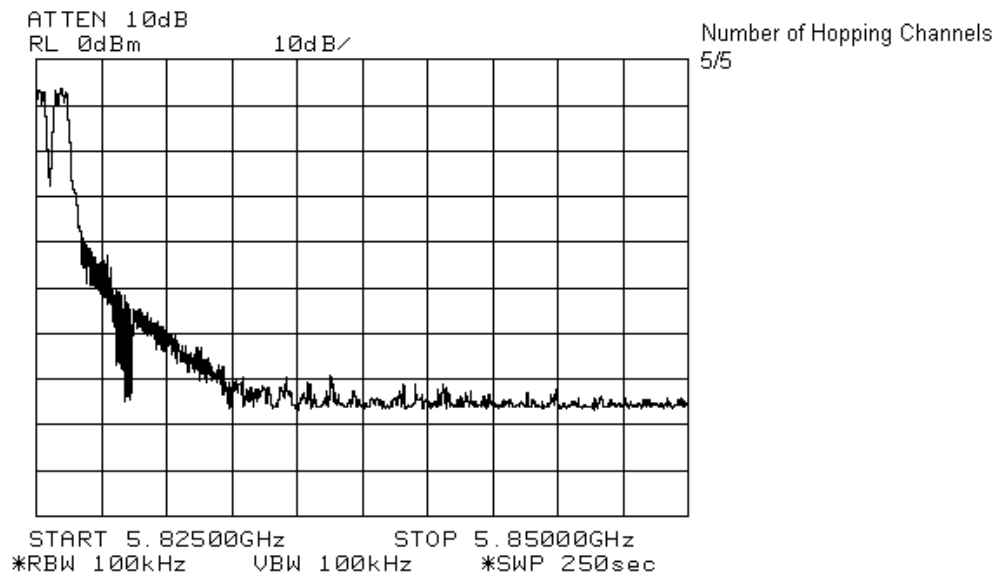
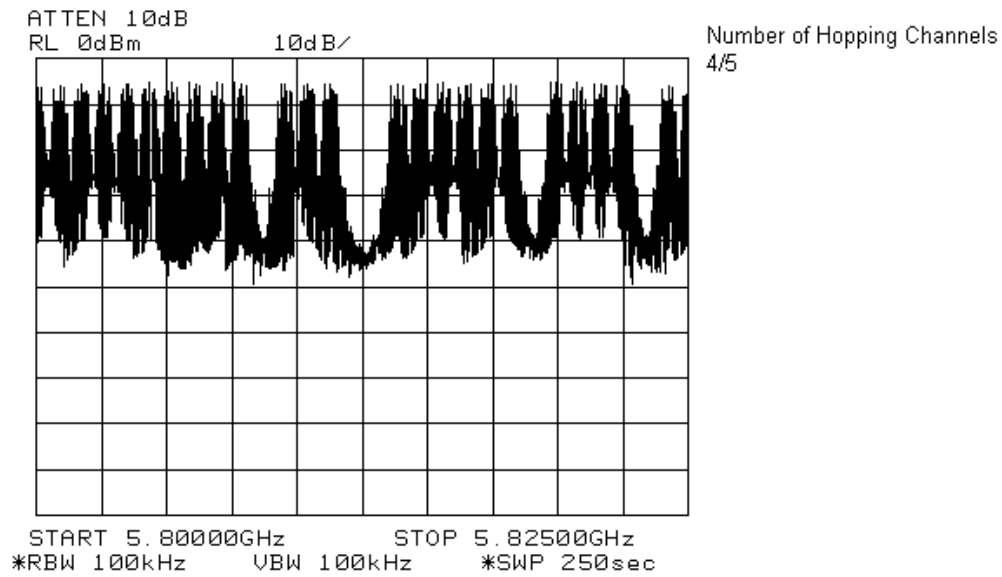
Number of Hopping Channels: 85



EQUIPMENT: Vtech Ip 8100-2, Base Unit



EQUIPMENT: Vtech Ip 8100-2, Base Unit



EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 7. Minimum Channel Separation

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

Test Performed By: Glen Westwell	Date of Test: 26 Jan. 2005
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Limit: >20dB bandwidth

Measurement Data: Complies, See Plot.

20dB Bandwidth = 666.7kHz
Channel Separation = 870.2kHz



Long pulse width
Date: 25.JAN.2005 16:37:47

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 8. Peak Output Power

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

Test Performed By: Glen Westwell	Date of Test: 26 Jan. 2005
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Limit: 1W

Measurement Data: See Tabulated Data & Plots.

Measured output power = 27.36dBm

Maximum output power = 27.36 + 3dBi = 30.36dBm EIRP

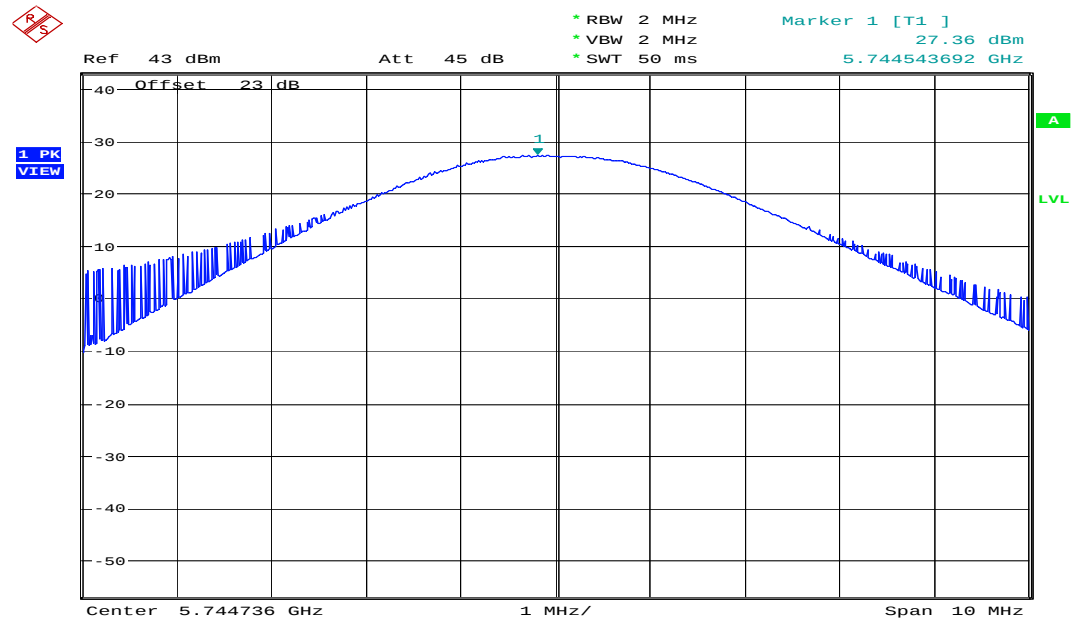
Limit = 36dBm EIRP

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

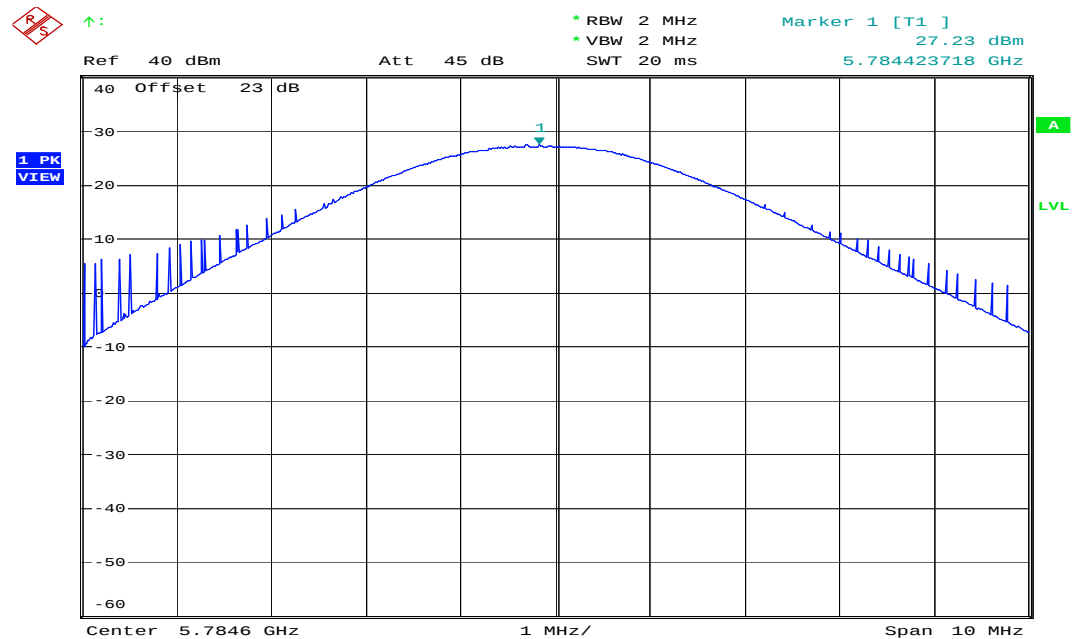
Note: The EUT was modified by the manufacturer to perform conducted measurements.

Low	0.55W
Mid	0.53W
High	0.46W

EQUIPMENT: Vtech Ip 8100-2, Base Unit

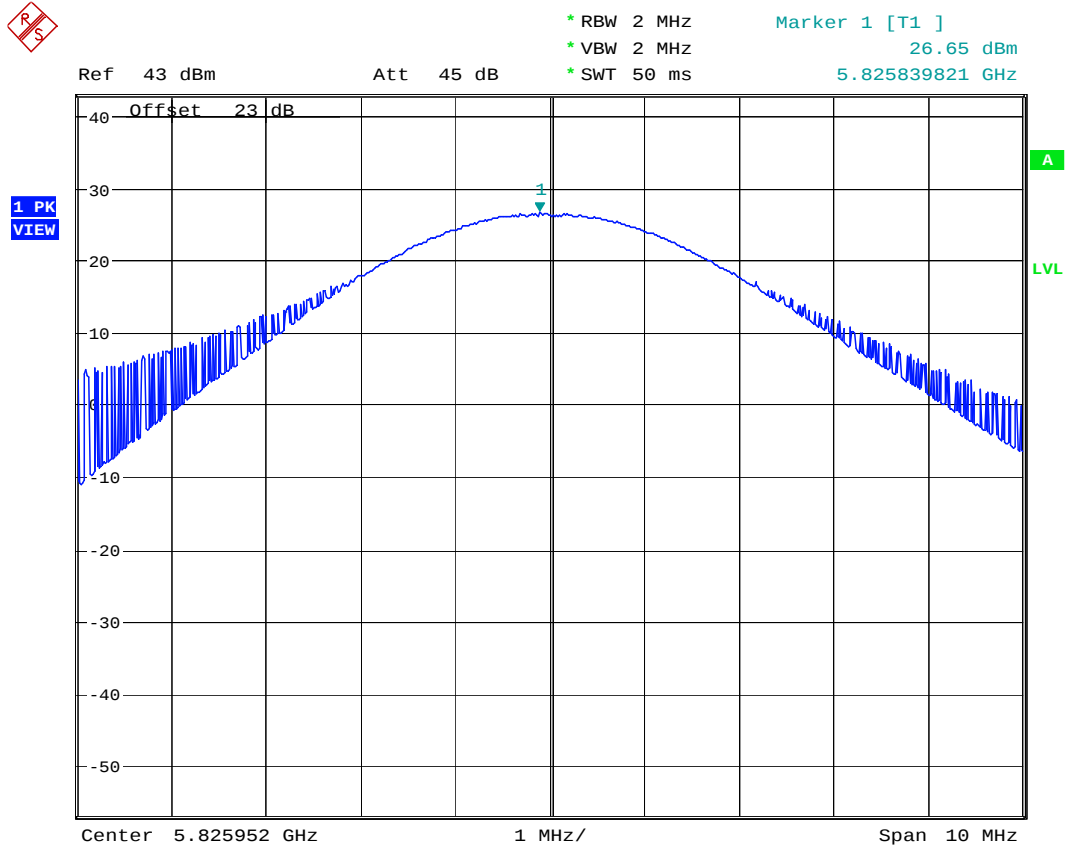


Long pulse width
Date: 26.JAN.2005 14:10:47



Long pulse width
Date: 26.JAN.2005 15:16:21

EQUIPMENT: Vtech Ip 8100-2, Base Unit



Long pulse width

Date: 26.JAN.2005 13:54:27

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 9. Spurious Emissions

Para. No.: 15.247(d)

Test Performed By: Glen Westwell	Date of Test: 25 Jan 2005
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Limit: 15.247(d), 15.209(a), 15.205(c)

Measurement Data: Complies, see attached plots and tables

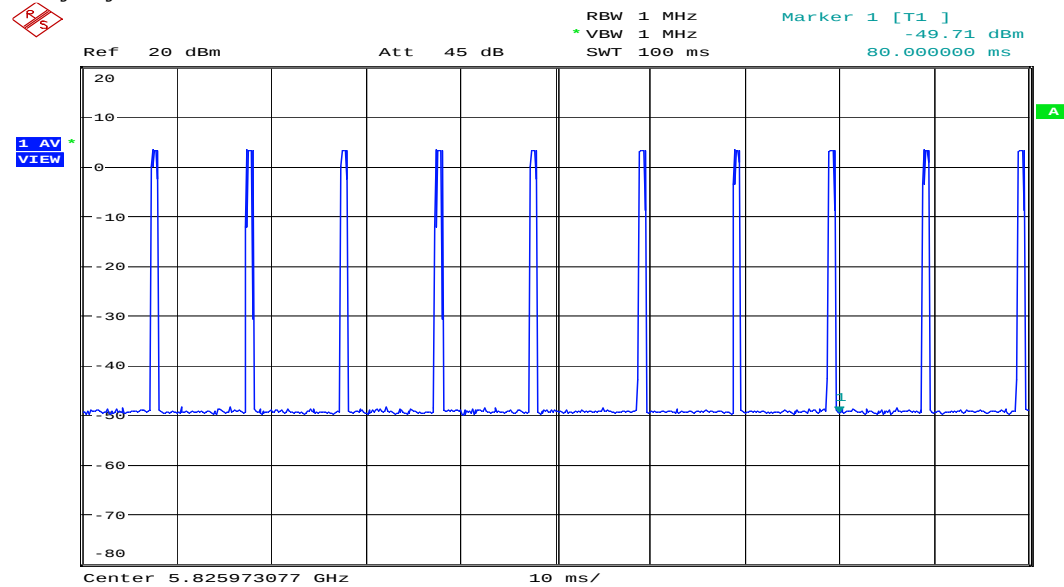
Duty Cycle Correction: $20\log(8.2\text{mS}/100\text{mS}) = -21.7\text{dB}$

All Non-Restricted Band spurious emissions related to the fundamental were tested at the antenna port using a specially modified sample for conducted measurements.

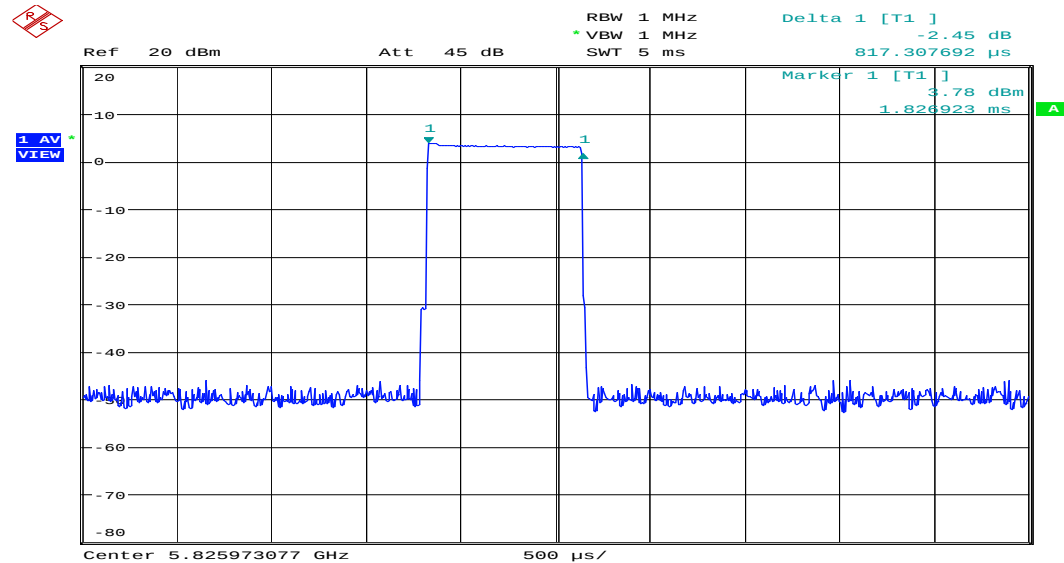
All Restricted Band spurious emissions related to the fundamental were measured as a radiated measurement.

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Duty Cycle Plots



Long pulse width
Date: 26.JAN.2005 12:14:18



Long pulse width
Date: 26.JAN.2005 12:15:30

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Spurious Harmonic Emissions Test Data: Base Station, Peak

Test Date: 28 Jan 2005										
Engineer's Name: Glen Westwell										
Temperature (C°): 21						Humidity %: 35				
Measurement distance = 3m.										
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (-dB)	Passband filter / Cable Loss (dB)	Duty Cycle Corr. (-dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
Low Band Ch.1										
11489.472	Hrn 1	V/H	62.3	39.2	41.7	5.5		65.3	74	8.7
17234.208	Hrn 1	V/H	62.8	42.0	41.0	6.6		69.1	74	4.9
22978.944	Hrn 5	V/H	56.0	45.5	43.0	7.3		65.8	74	8.2
Mid Band Ch.41										
11570.688	Hrn 1	V/H	60.4	39.2	41.7	5.5		63.4	74	10.6
17356.032	Hrn 1	V/H	64.5	42.0	41.0	6.6		72.1	74	1.9
23141.376	Hrn 5	V/H	56.8	45.5	43.0	7.3		66.6	74	7.4
Mid Band Ch.81										
11651.904	Hrn 1	V/H	58.2	39.2	41.7	5.5		61.2	74	12.8
17477.856	Hrn 1	V/H	62.1	42.0	41.0	6.6		69.7	74	4.3
23303.808	Hrn 5	V/H	54.4	45.5	43.0	7.3		64.2	74	9.8
4802.12	Hrn 2	V	47.5	33.7	-	-	9.5*	71.7	74	2.3
4802.12	Hrn 2	H	46.3	34.1	-	-	9.5*	70.9	74	3.1
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole										
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW										
Note 3: The EUT was searched up to 10th harmonic of the fundamental										
Notes:		Measurement Receiver = R&S FSU, RBW/VBW =1000kHz								
		*includes a distance correction from 1m to 3m								

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Spurious Harmonic Emissions Test Data: Base Station, Average

Test Date: 28 Jan 2005										
Engineer's Name: Glen Westwell										
Temperature (C°): 21							Humidity %: 35			
Measurement distance = 3m.										
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (-dB)	Passband filter / Cable Loss (dB)	Duty Cycle Corr. (-dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
Low Band Ch.1										
11489.472	Hrn 1	V/H	62.3	39.2	41.7	5.5	-20	45.3	54	8.7
17234.208	Hrn 1	V/H	62.8	42.0	41.0	6.6	-20	49.1	54	4.9
22978.944	Hrn 5	V/H	56.0	45.5	43.0	7.3	-20	45.8	54	8.2
Mid Band Ch.41										
11570.688	Hrn 1	V/H	60.4	39.2	41.7	5.5	-20	43.4	54	10.6
17356.032	Hrn 1	V/H	64.5	42.0	41.0	6.6	-20	52.1	54	1.9
23141.376	Hrn 5	V/H	56.8	45.5	43.0	7.3	-20	46.6	54	7.4
Mid Band Ch.81										
11651.904	Hrn 1	V/H	61.1	39.2	41.7	5.5	-20	41.2	54	12.8
17477.856	Hrn 1	V/H	75.0	42.0	41.0	6.6	-20	49.7	54	4.3
23303.808	Hrn 5	V/H	62.3	45.5	43.0	7.3	-20	44.2	54	9.8
4802.12	Hrn 2	V	47.5	33.7	-	-	-29.5*	51.7	54	2.3
4802.12	Hrn 2	H	46.3	34.1	-	-	-29.5*	50.9	54	3.1
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW Note 3: The EUT was searched up to 10th harmonic of the fundamental										
Notes:		Measurement Receiver = R&S FSU, RBW/VBW =1000kHz * includes a distance correction from 1m to 3m.								

*EQUIPMENT: Vtech Ip 8100-2, Base Unit***Spurious Emissions Test Data: Base Station, Peak**

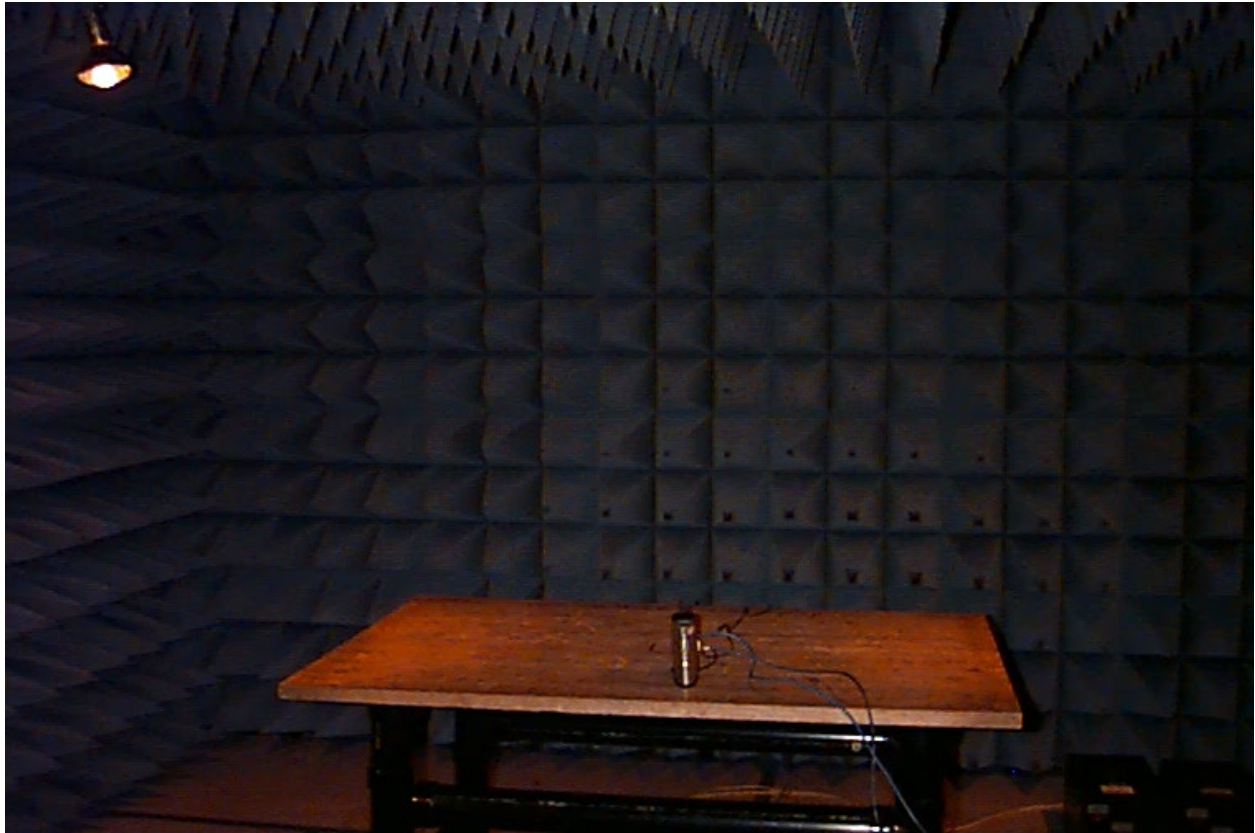
Test Date: 25 Jan 2005										
Engineer's Name: Glen Westwell										
Temperature (C°): -7						Humidity %: 35				
Measurement distance = 3m.										
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (-dB)	Passband filter / Cable Loss (dB)	Duty Cycle Corr. (-dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
50.0000	BL	V	26.6	8.2		1.0		35.8	40.0	4.2
50.0000	BL	H	13.2	9.0		1.0		23.2	40.0	16.8
150.0000	BL	V	21.0	11.9		1.6		34.5	43.5	9.0
150.0000	BL	H	21.3	11.5		1.6		34.4	43.5	9.1
175.2000	BL	V	13.1	10.9		1.6		25.6	43.5	17.9
175.2000	BL	H	22.7	10.3		1.6		34.6	43.5	8.9
375.0000	BL	V	19.7	15.8		2.4		37.9	46.0	8.1
375.0000	BL	H	26.3	15.9		2.4		44.6	46.0	1.4
500.0000	BL	V	15.7	17.8		2.7		36.2	46.0	9.8
500.0000	BL	H	17.5	18.3		2.7		38.5	46.0	7.5
625.0000	BL	V	18.5	19.8		3.2		41.5	46.0	4.5
625.0000	BL	H	20.4	19.4		3.2		43.0	46.0	3.0
750.0000	BL	V	14.1	20.6		3.4		38.1	46.0	7.9
750.0000	BL	H	16.2	20.7		3.4		40.3	46.0	5.7
1000.0000	BL	V	12.2	21.5		3.9		37.6	54.0	16.4
1000.0000	BL	H	11.2	22.7		3.9		37.8	54.0	16.2
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole										
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW										
Note 3: The EUT was searched up to 10th harmonic of the fundamental										
Notes:		Measurement Receiver = R&S FSU, RBW/VBW =1000kHz								
		R&S ESVS30, RBW/VBW =120kHz								

EQUIPMENT: Vtech Ip 8100-2, Base Unit

Set-up Photo

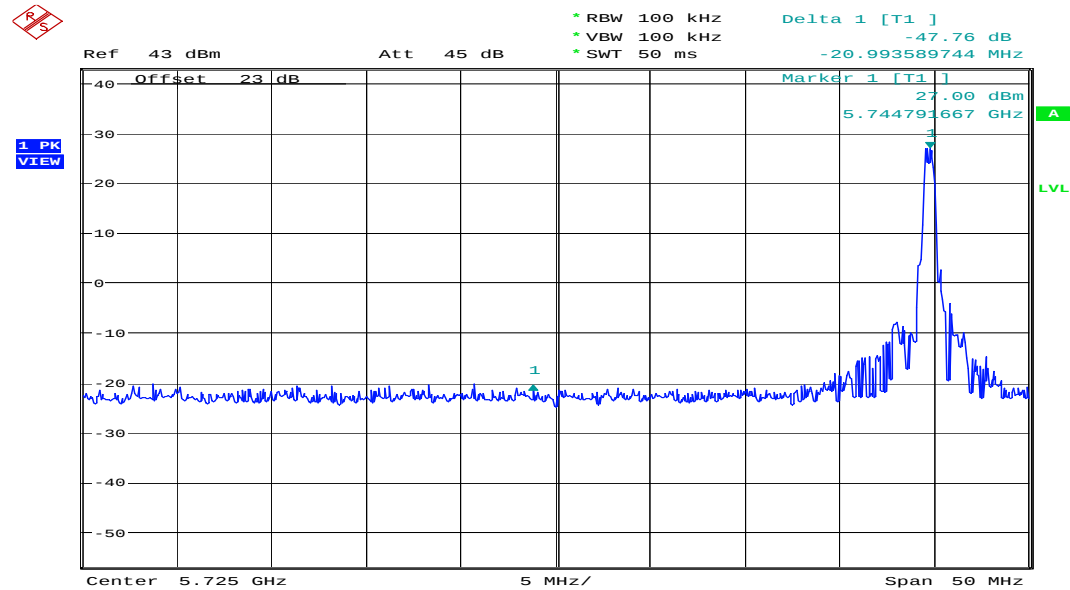


EQUIPMENT: Vtech Ip 8100-2, Base Unit

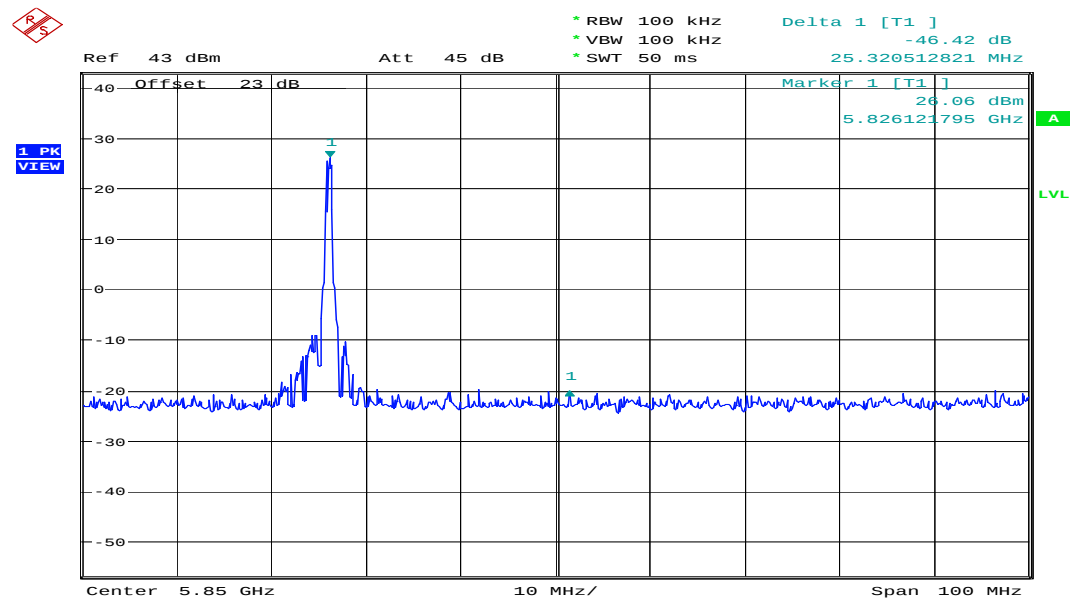


EQUIPMENT: Vtech Ip 8100-2, Base Unit

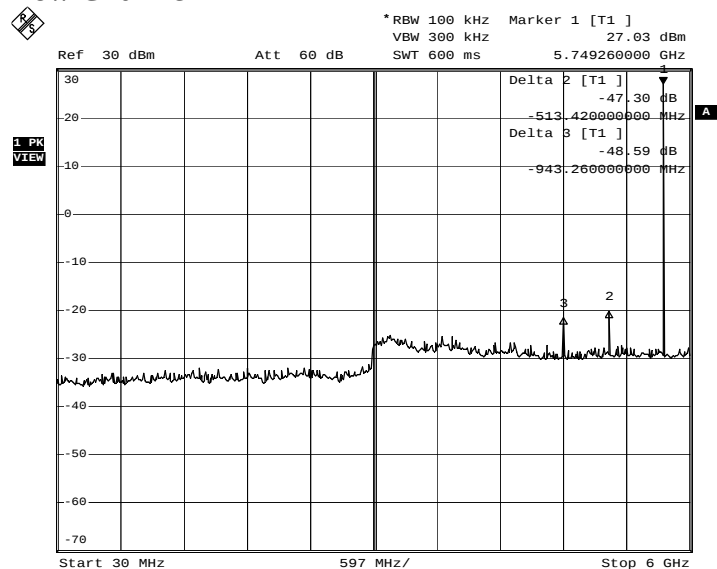
20dBc Bandedge



Long pulse width
Date: 26.JAN.2005 14:12:05

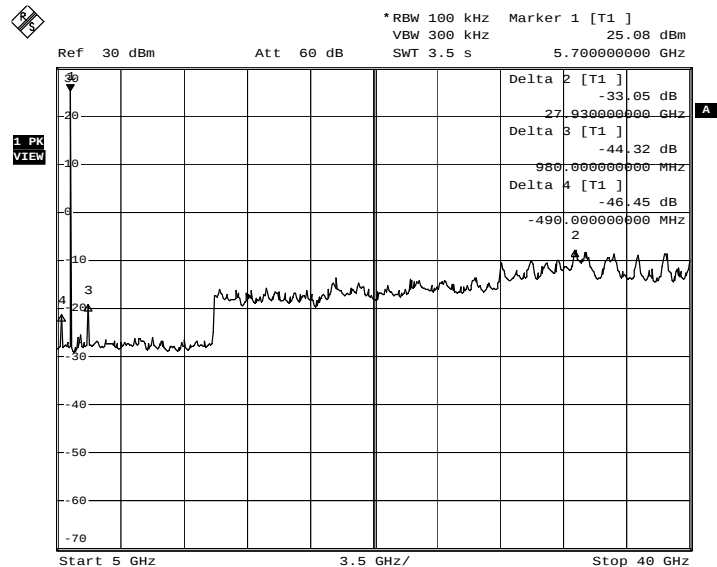


Long pulse width
Date: 26.JAN.2005 13:56:17

*EQUIPMENT: Vtech Ip 8100-2, Base Unit***Non-Restricted Band Spurious Emissions
Low Channel**

low channel - Conducted Emissions from 30MHz to 6Ghz

Date: 27.APR.2005 16:01:24

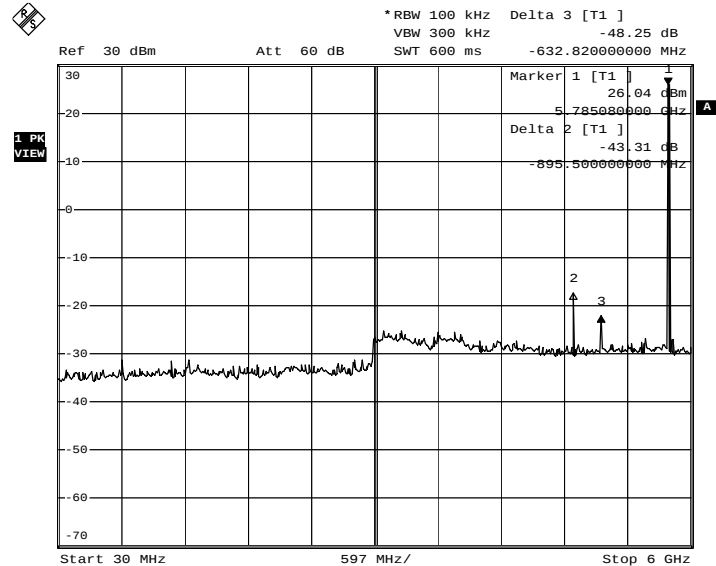


Low channel - Conducted Emissions from 5GHz to 40Ghz

Date: 27.APR.2005 15:55:29

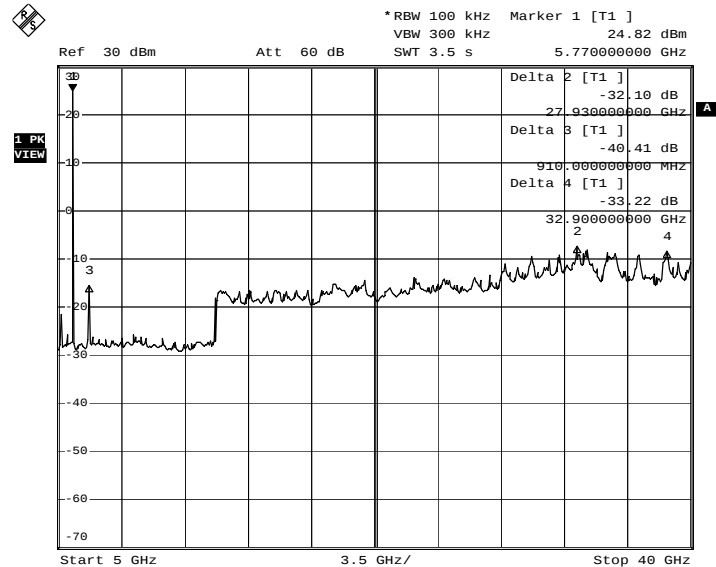
EQUIPMENT: Vtech Ip 8100-2, Base Unit

Mid channel



Mid channel - Conducted Emissions from 30MHz to 6Ghz

Date: 27.APR.2005 16:02:31

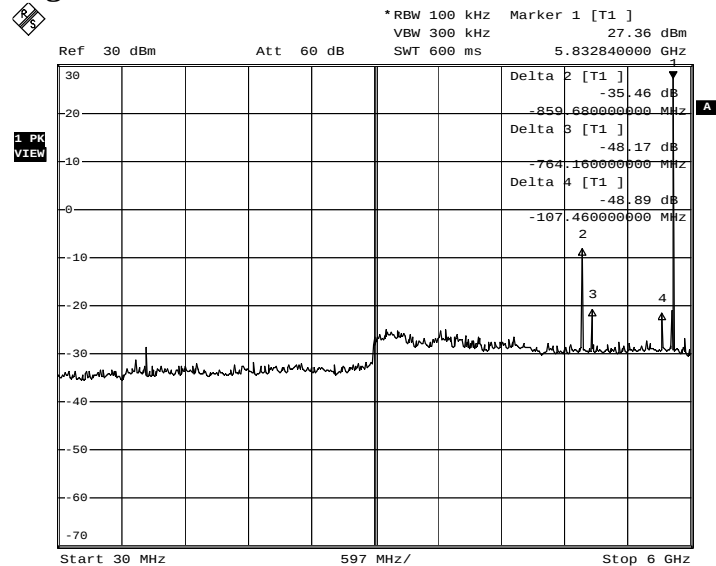


Mid channel - Conducted Emissions from 6GHz to 40Ghz

Date: 27.APR.2005 16:04:41

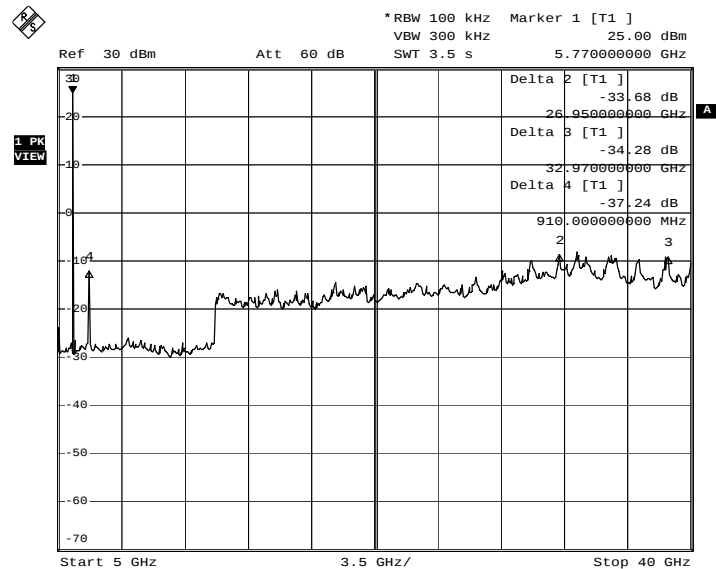
EQUIPMENT: Vtech Ip 8100-2, Base Unit

High Channel



High channel - Conducted Emissions from 30MHz to 6Ghz

Date: 27.APR.2005 15:58:31



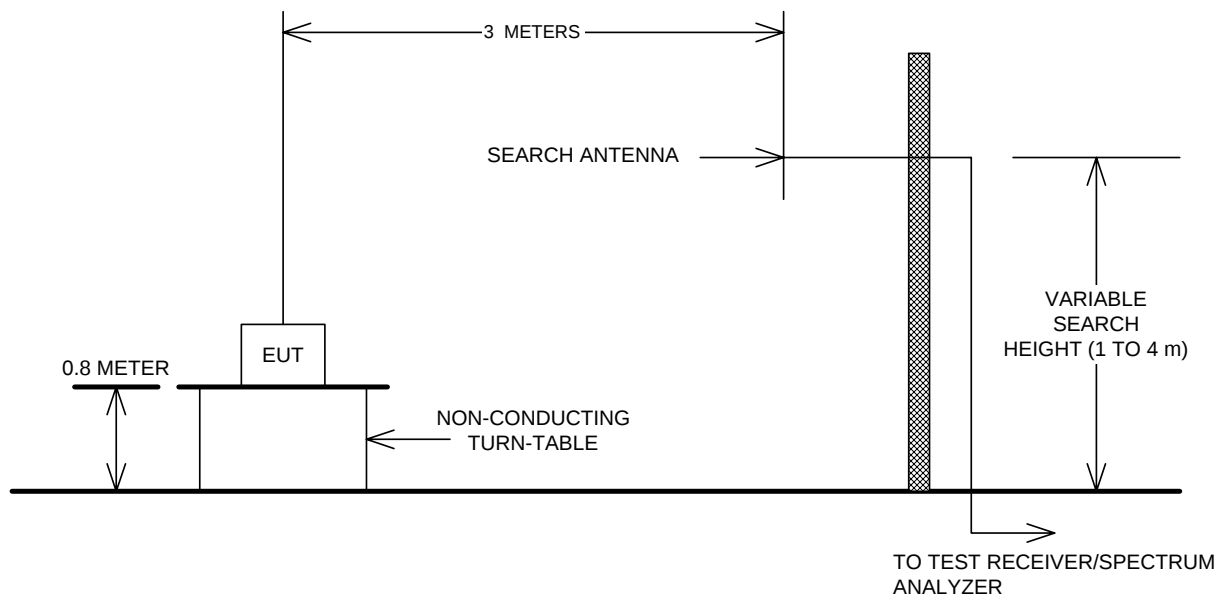
High channel - Conducted Emissions from 6Ghz to 40Ghz

Date: 27.APR.2005 16:06:02

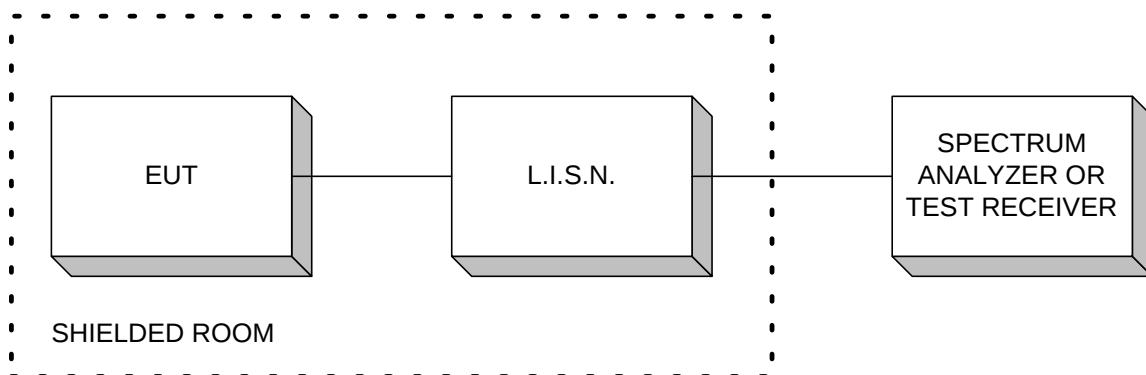
EQUIPMENT: Vtech Ip 8100-2, Base Unit

Section 10. Block Diagrams

Test Site For Radiated Emissions



Conducted Emissions



*EQUIPMENT: Vtech Ip 8100-2, Base Unit***Section 11. Test Equipment List**

Equipment List - Radiated Emissions

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Rhode & Schwarz	FSU46	FA001877	26 May 04	26 May 05
1 Year	Signal Generator	Rohde & Schwarz	SMR40	FA001879	28 May 04	28 May 05
1 Year	Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 26/04	July 26/05
1 Year	Horn Antenna	EMCO #5	3116	FA001847	19 Jan 04	19 Apr 05
1 Year	Horn Antenna #1	EMCO	3115	FA000649	Dec. 18/04	Dec. 18/05
1 Year	Biconical (1) Antenna	EMCO	3109	FA000805	April 23/04	April 23/05
COU	9.6 – 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
1 Year	LISN	FCC	FCC-LISN-50-100-1-02	FA001775	April 29/04	April 29/05
1 Year	LISN	FCC	FCC-LISN-50-100-1-02	FA001777	April 29/04	April 29/05
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001432	May 25/04	May 25/05
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001432	May 25/04	May 25/05
NCR	Biconlog	EMCO	3146	FA000815	NCR	NCR
Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair						