Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

Test Report:	4W33591.1 Issue 2
Applicant:	Vtech Engineering Canada Ltd. Suite 200 -- 7671 Alderbridge Way Richmond, B.C. Canada V6X 1Z9
Equipment Under Test: (EUT)	Vtech MI6823 & MI6863 Cordless Phones
FCC ID:	EW780-5656-00
In Accordance With:	**FCC Part 15.247, Subpart C** FHSS System and Digitally Modulated Radiators 2400 - 2483.5 MHz, 5725-5850MHz
Tested By:	Nemko Canada Inc. 303 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	Sim Jagpal, Resource Manager
Date:	10 February 2005
Total Number of Pages:	37

Table of Contents

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 is 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: _____ DATE: 10 February 2005
Jason Nixon, Telecom Specialist

Summary Of Test Data

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

Test Conditions:

Indoor Temperature: 22°C
Humidity: 20%

Outdoor Temperature: 10°C
Humidity: 50%

Engineering Considerations

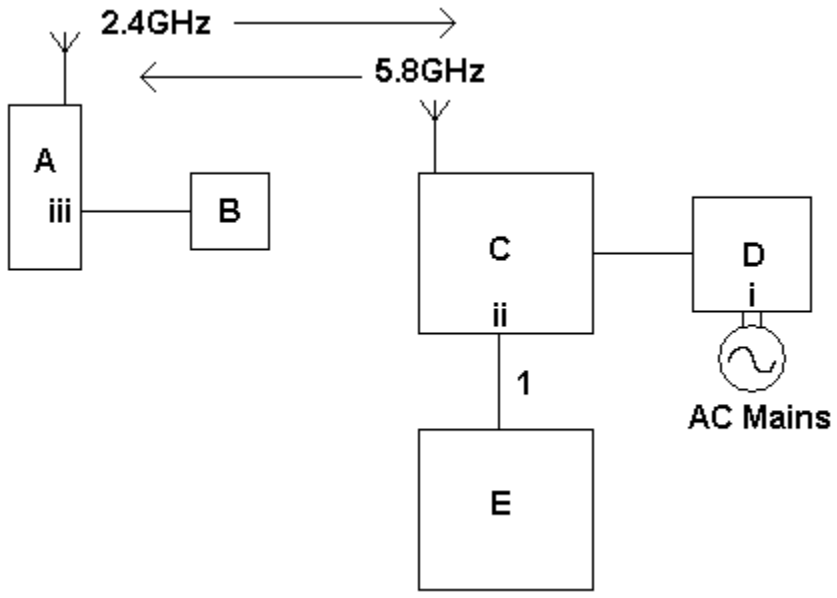
Product Modification	
To achieve compliance the following change(s) were made during compliance testing: None	
Justification	
None	
Deviations	
The following deviations from, additions to, or exclusions from the test specification have been made: None	
Test Report Revision History	
Issue #	Details of changes made to test report
2	Changes required as per CB questions.

Section 2. General Equipment Specification

Manufacturer:	Vtech (Dongguan) Electronics and Communications Ltd.
Model No.:	MI6823 & MI6863 CI
Serial No.:	None
Date Received In Laboratory:	November 16, 2004
Nemko Identification No.:	Refer to Nemko Receiving Report.
Operating Frequency:	BS TX 5744.736 -> 5825.952 MHz
Peak Output Power(ERP):	26.5dBm
Emission Designator	627KF1D
Rated Power:	28.0dBm (Typical)
Modulation:	GFSK
Antenna Data:	The EUT uses a 2dBi integral antenna.

Equipment Configuration:

Equipment Configuration List				
Item	Description	Identification: *(M/N #, S/N #, P/N #, Rev.)*		
(A)	Cordless Handset	None		
(B)	Headset with mini-din cable integral	None		
(C)	Base Unit	M/N: MI6823 or MI6863 CI		
(D)	Component Telephone Class 2 Power Supply	M/N: U080065D (used with the MI6823) M/N: U080085D31 (with the MI6863 CI)		
1. (E)	DC feed	None		
EUT Ports				
Port	Description	Indoor/Outdoor	Type (See Legend)	Qty
i.	AC Mains Input	Outdoor	1	1
ii.	PSTN	Outdoor	3	1
iii.	Headset port	Indoor	4	1
Inter-Connection Cables				
Item	Description	Shielded	Ferrite	Length (m)
(1)	Standard RJ11 telephone cable	No	No	1.5
Legend: 1 = AC Power Input/Output, 2 = DC Power Input/Output, 3 = Telecom, 4 = Non-telecom I/O, 5 = Maintenance, 6 = Fiber Optic				
Notes				
None				



Section 3. Powerline Conducted Emissions

Para. No.: 15.207(a)

Test Performed By: Chris Maidens	**Date of Test: Nov. 18, 2004**

Test Results: Complied

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

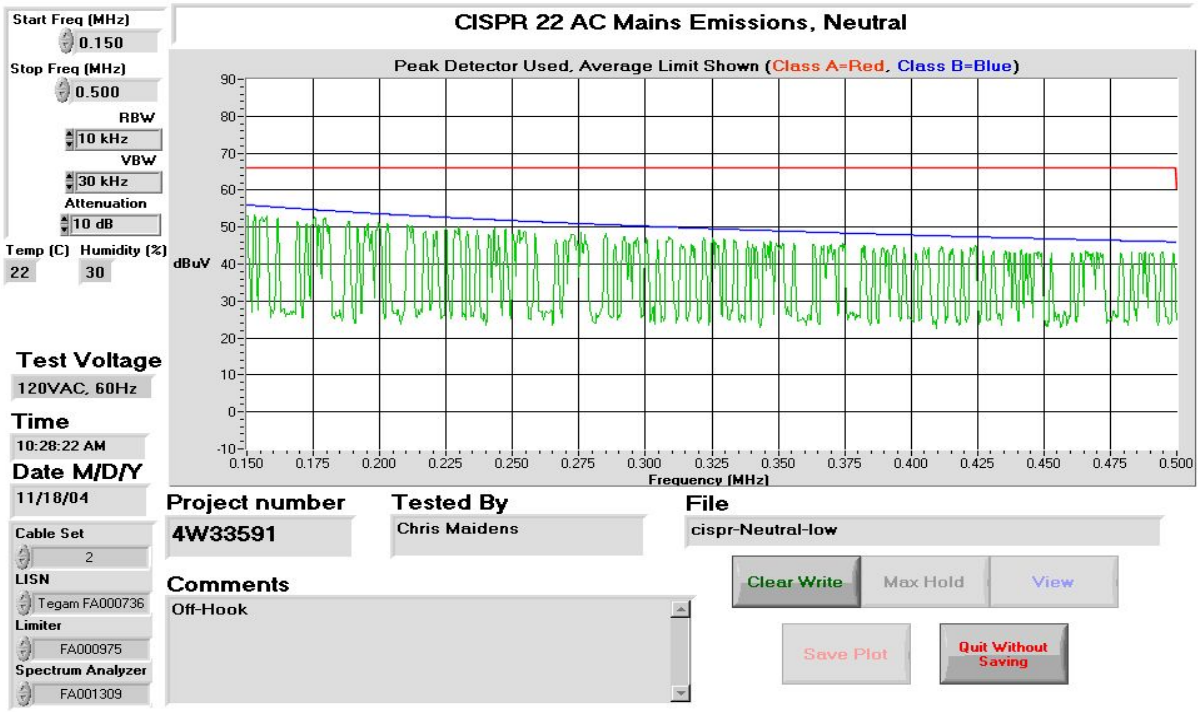
Notes

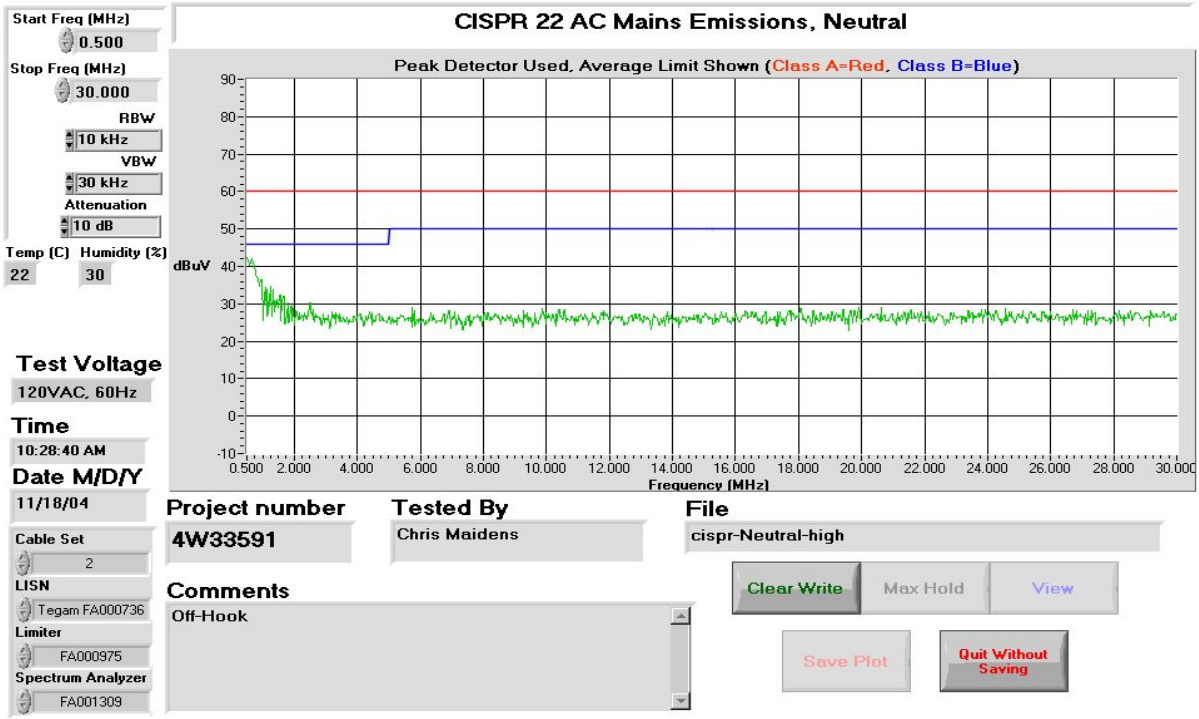
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.

Measurement Data: See attached plots.

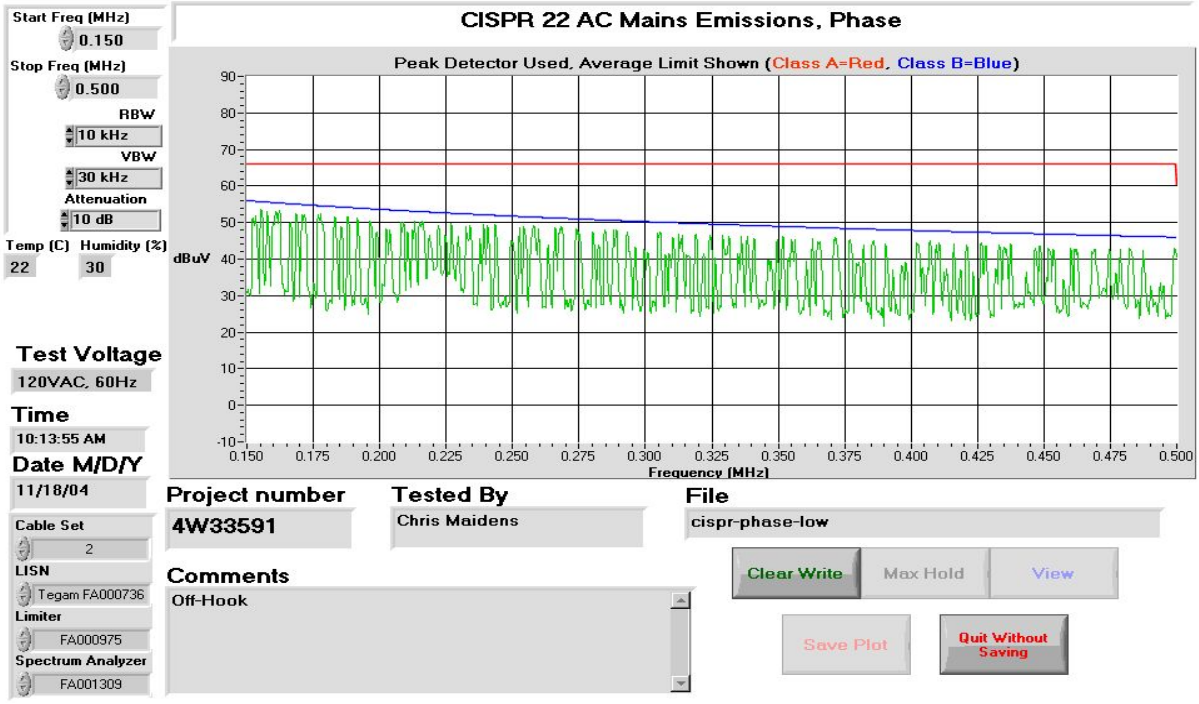
Notes: The EUT was verified in 3 operating states; “charging”, “off-hook” (holding a line)”, and “off charger idle”. Off hook mode was the worst case, therefore it has been reported.

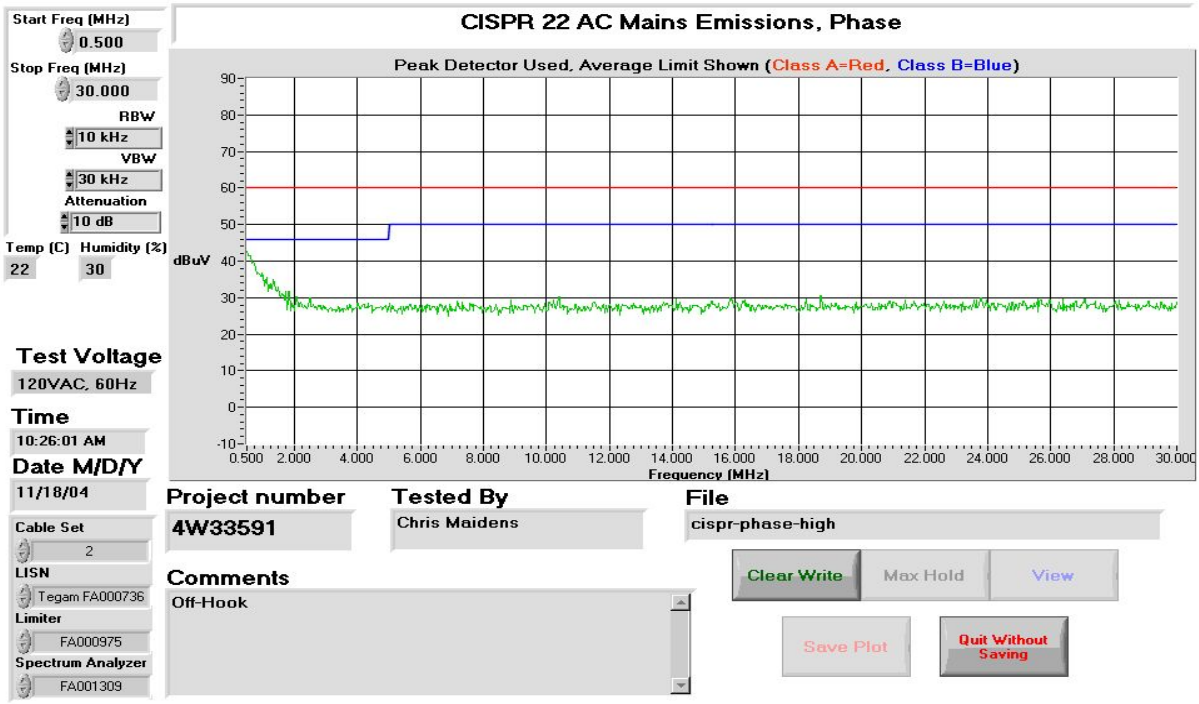
Plots: Mini MI6823



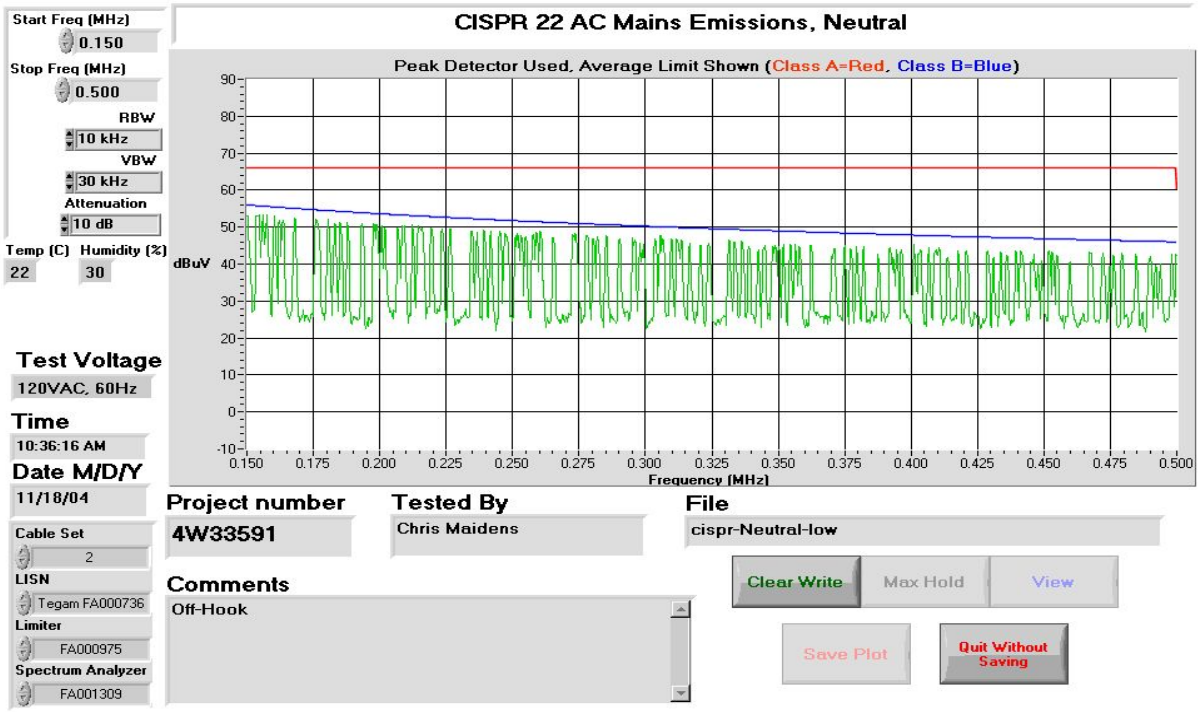


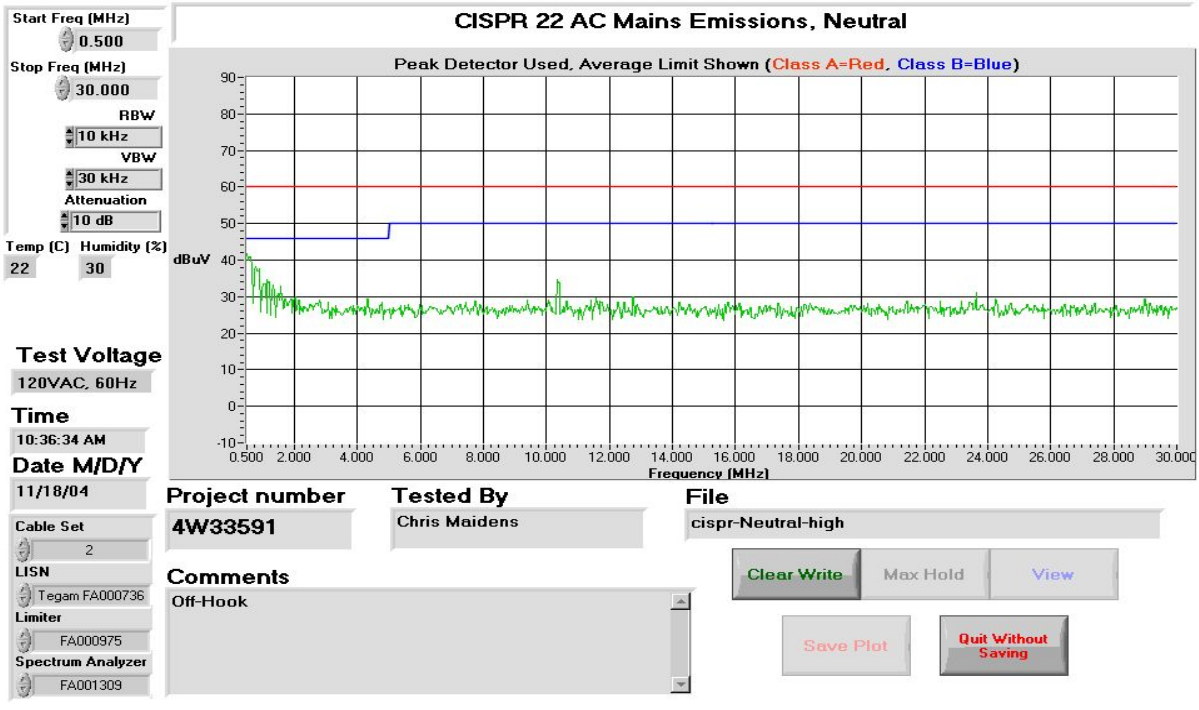
Plots: Mini MI6823 (continued)



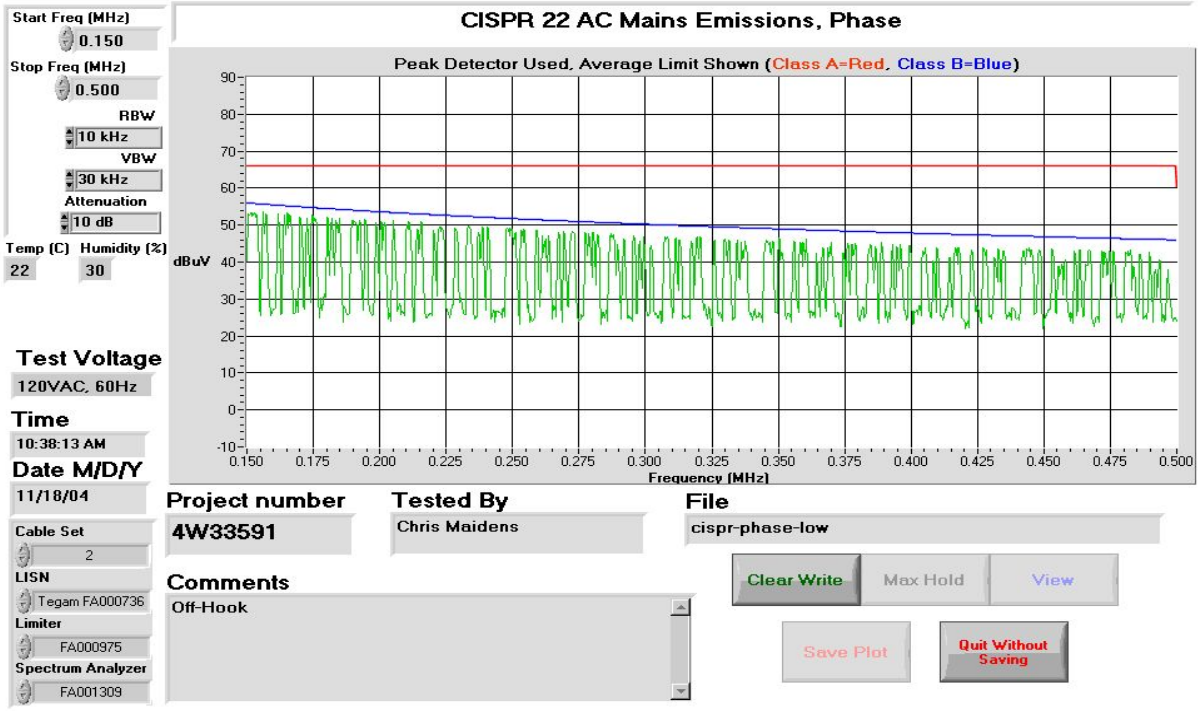


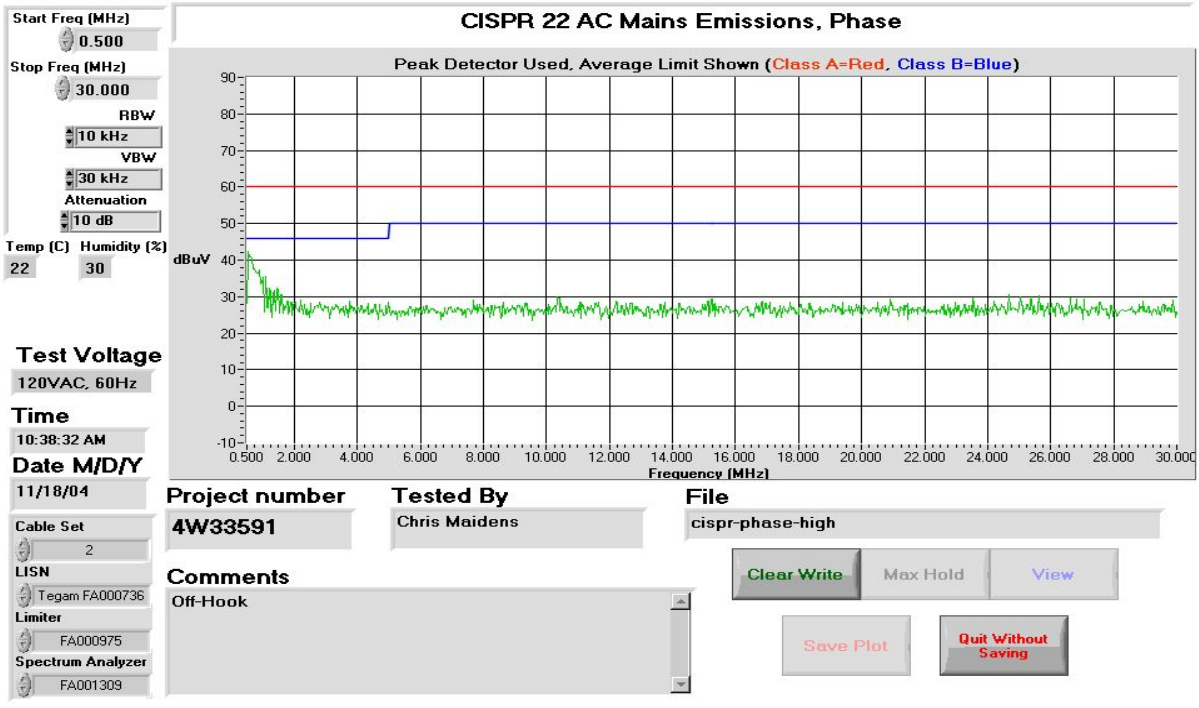
Plots: Mini MI6863 CI



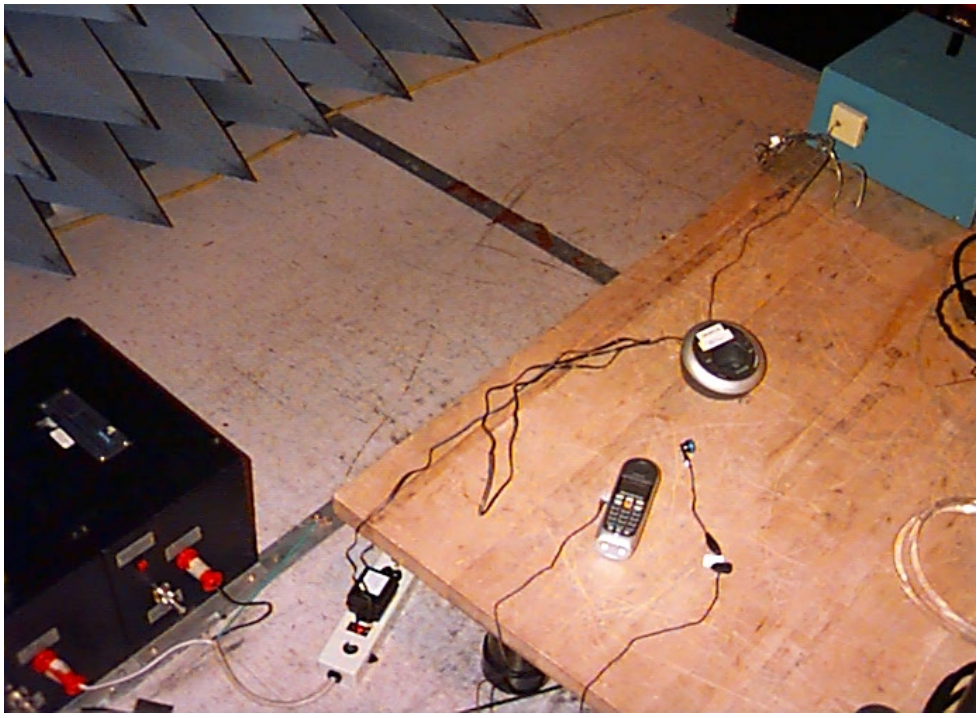


Plots: Mini MI 6863 CI (continued)

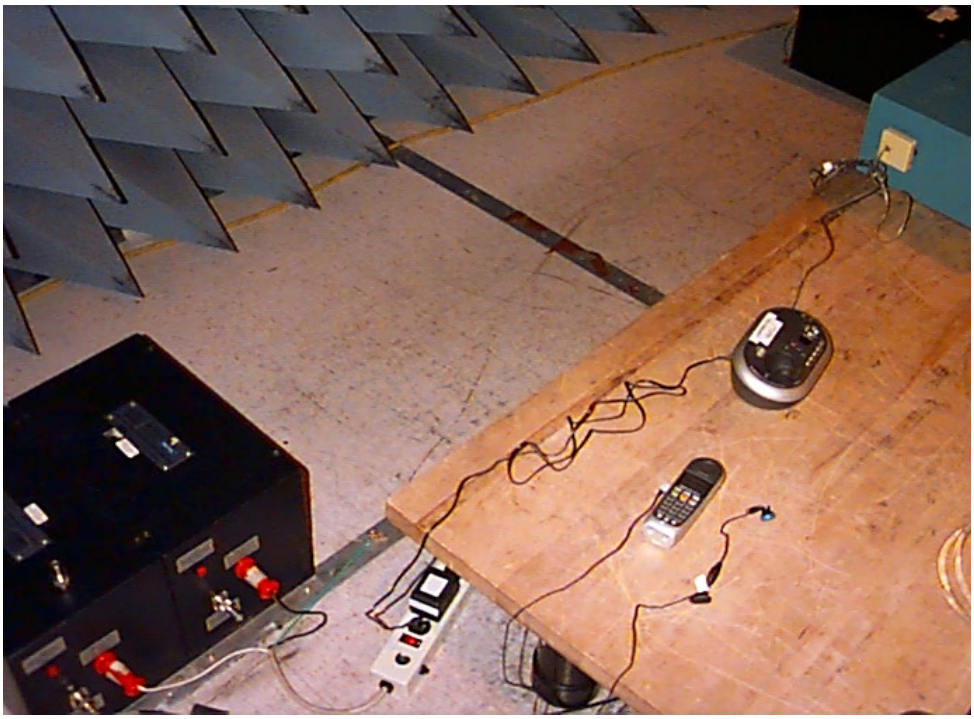




Set-up Photos



Mini MI6823



Mini MI6863 CI

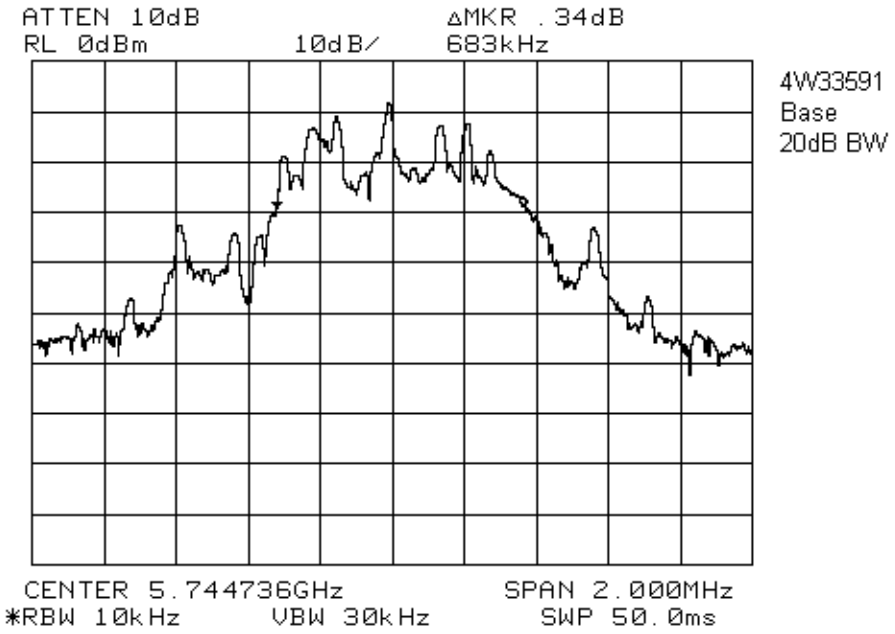
Section 4. 20 dB Bandwidth

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

Test Performed By: Chris Maidens	**Date of Test: Nov. 17, 2004**

Limit: 1MHz

Measurement Data:



Section 5. Occupancy Time

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

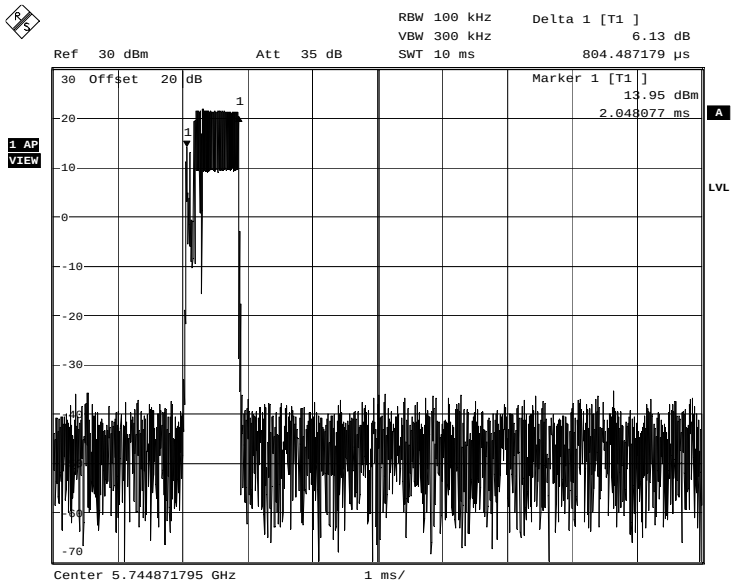
Test Performed By: Chris Maidens	**Date of Test: Nov. 17, 2004**

Limit: For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

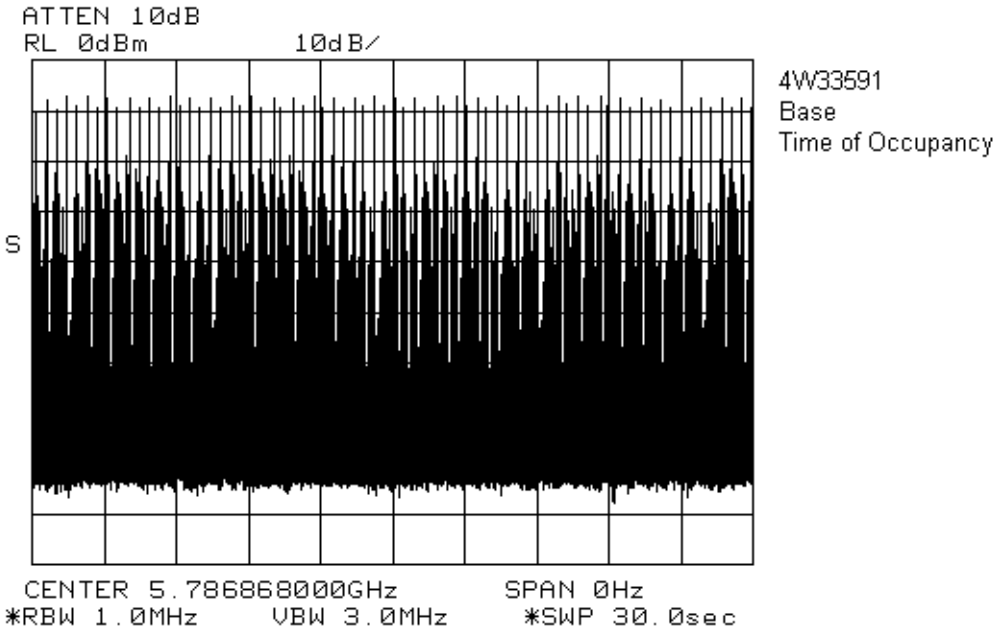
Measurement Data: See Plots

Time of Occupancy = 71 pulses/30sec X 804.5usec = 57.12msec

Base:



On-time
Date: 7.FEB.2005 16:07:46



The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

Section 6. Number of Hopping Channels

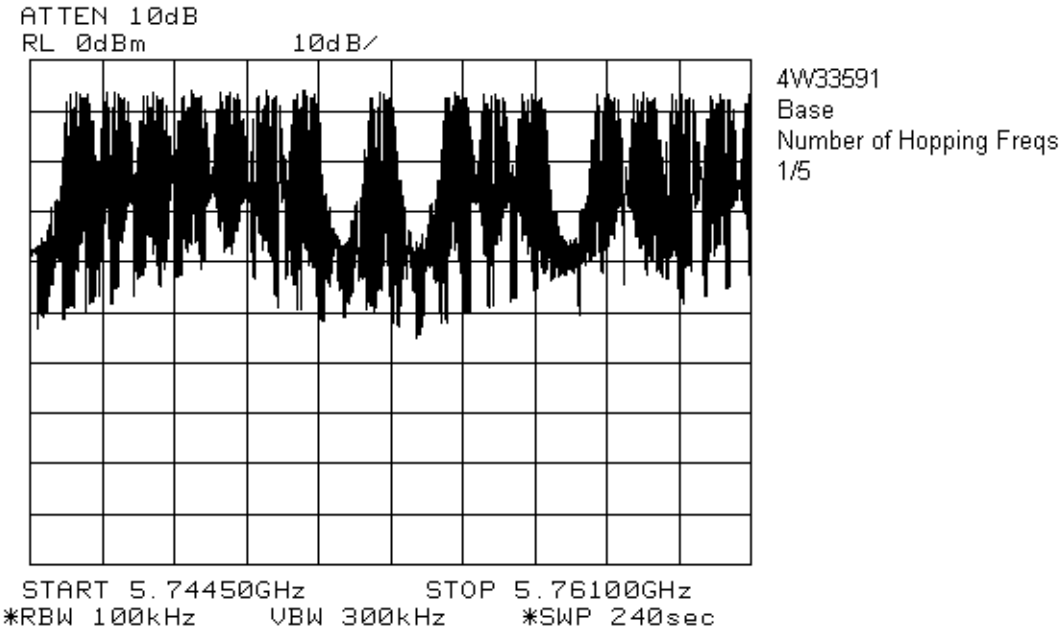
Para. No.: 15.247(a)(1)(ii)

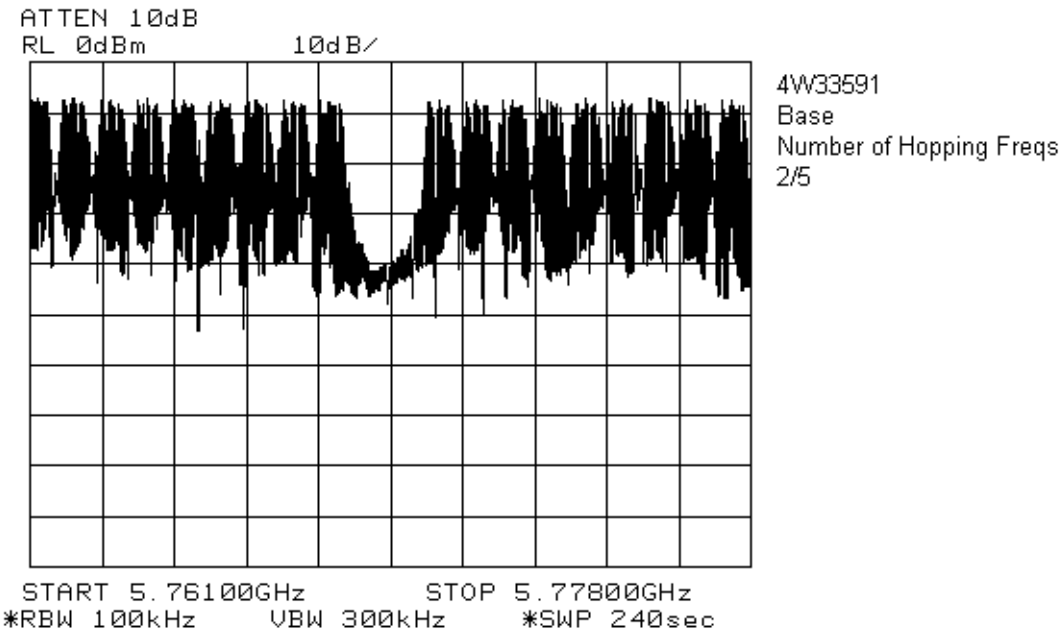
Test Performed By: Chris Maidens	**Date of Test: Nov. 14, 2004**

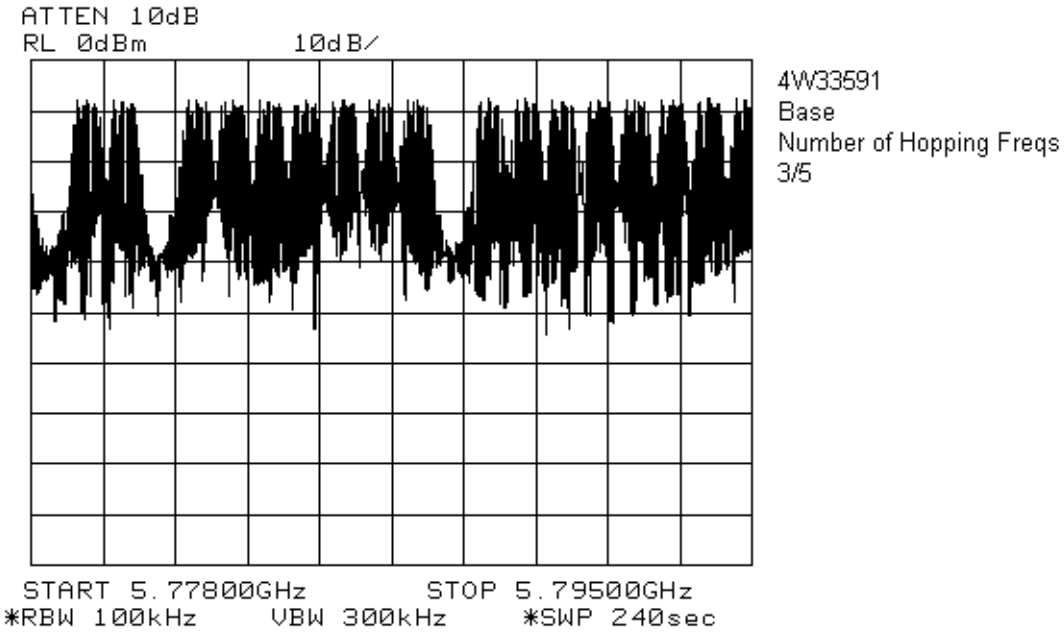
Limit: Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

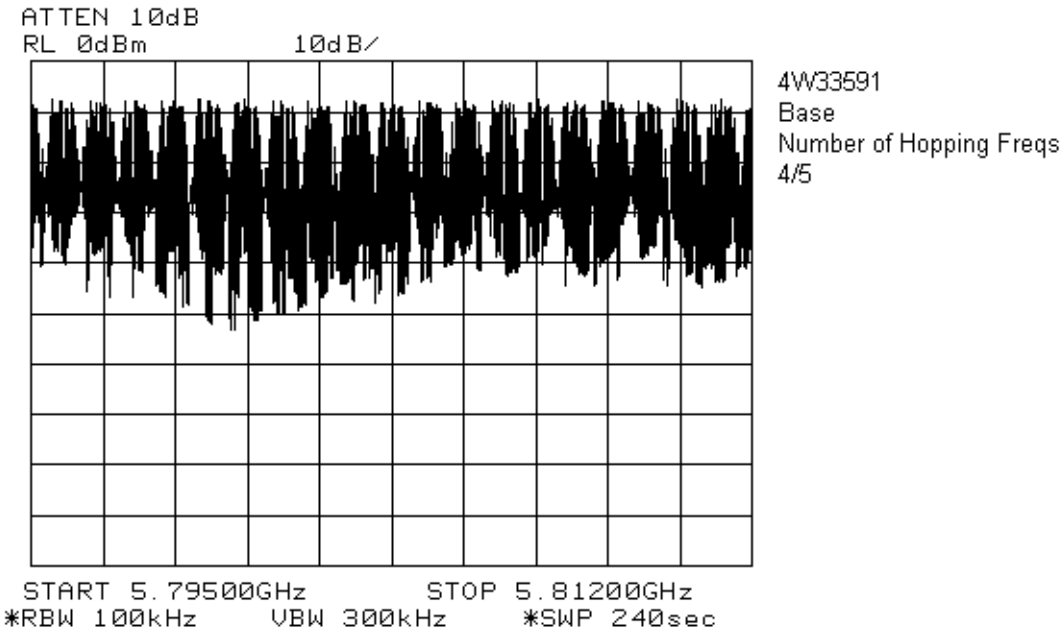
Measurement Data: Base uses 85 channels (See Plots)

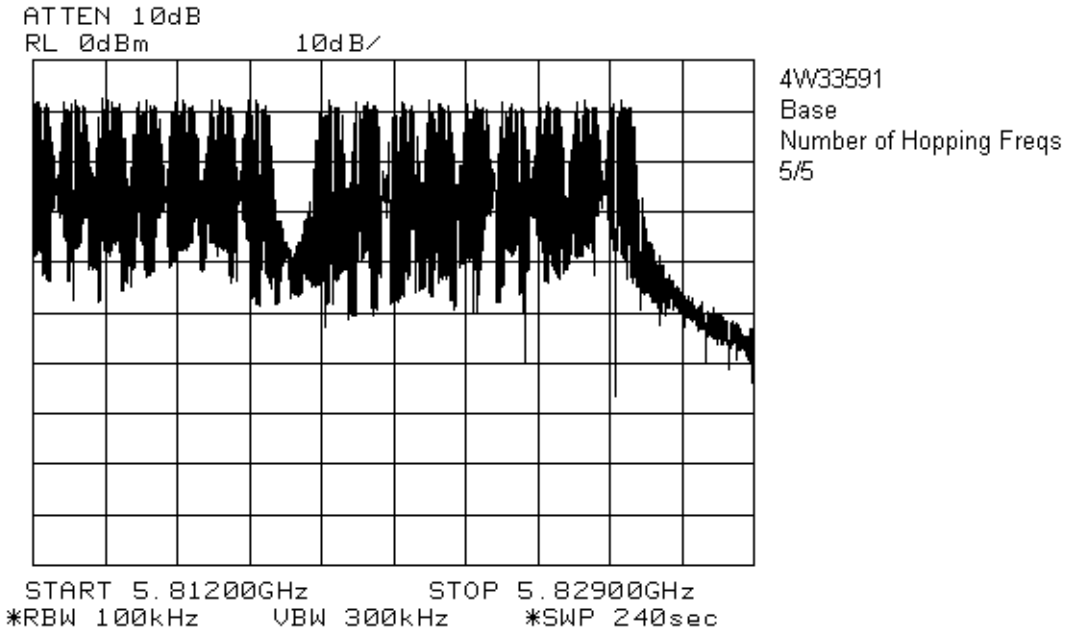
Base:


ATTEN 10dB
RL 0dBm
10dB/
START 5.74450GHz
STOP 5.76100GHz
*RBW 100kHz
VBW 300kHz
*SWP 240sec
4W33591
Base
Number of Hopping Freqs
1/5


ATTEN 10dB
RL 0dBm
10dB/
START 5.76100GHz
STOP 5.77800GHz
*RBW 100kHz
VBW 300kHz
*SWP 240sec
4W33591
Base
Number of Hopping Freqs
2/5


ATTEN 10dB
RL 0dBm
10dB/
START 5.77800GHz
STOP 5.79500GHz
*RBW 100kHz
VBW 300kHz
*SWP 240sec
4W33591
Base
Number of Hopping Freqs
3/5


ATTEN 10dB
RL 0dBm
10dB/
START 5.79500GHz
STOP 5.81200GHz
*RBW 100kHz
VBW 300kHz
*SWP 240sec
4W33591
Base
Number of Hopping Freqs
4/5


ATTEN 10dB
RL 0dBm
10dB/
4W33591
Base
Number of Hopping Freqs
5/5
START 5.81200GHz
STOP 5.82900GHz
*RBW 100kHz
VBW 300kHz
*SWP 240sec

Section 7. Minimum Channel Separation

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

Test Performed By: Chris Maidens	**Date of Test: Nov. 17, 2004**

Limit:

Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

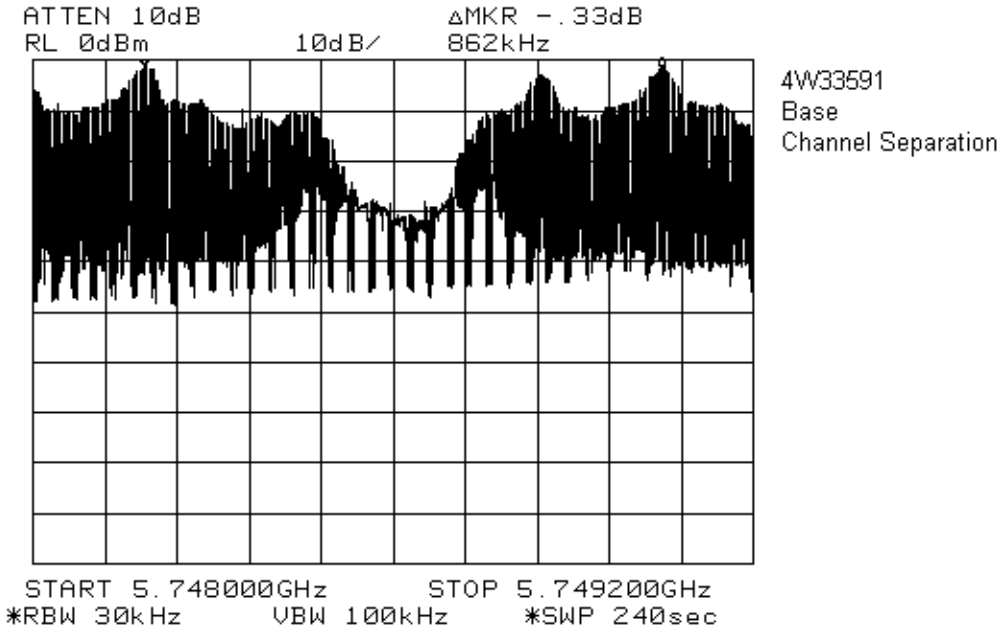
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Measurement Data:

Base: Channel Separation was measured to be 862kHz, which is >683kHz (the 20dB BW of this device)

See Plot on next page.

Base:



4W33591
Base
Channel Separation

Section 8. Peak Output Power

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

Test Performed By: Chris Maidens	**Date of Test: Nov. 18, 2004**

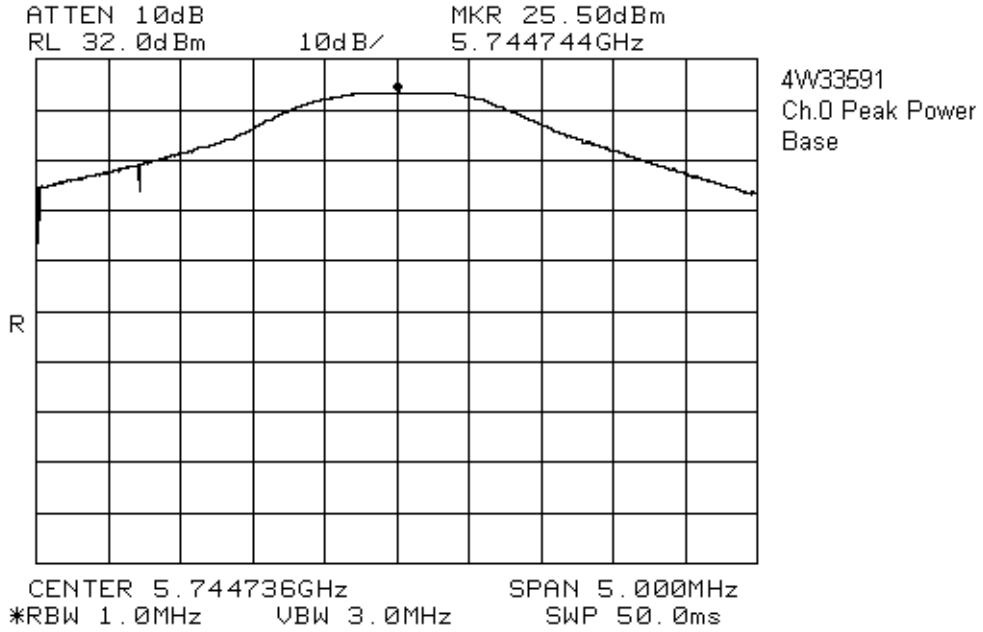
Limit: 1W (30dBm)

Measurement Data:

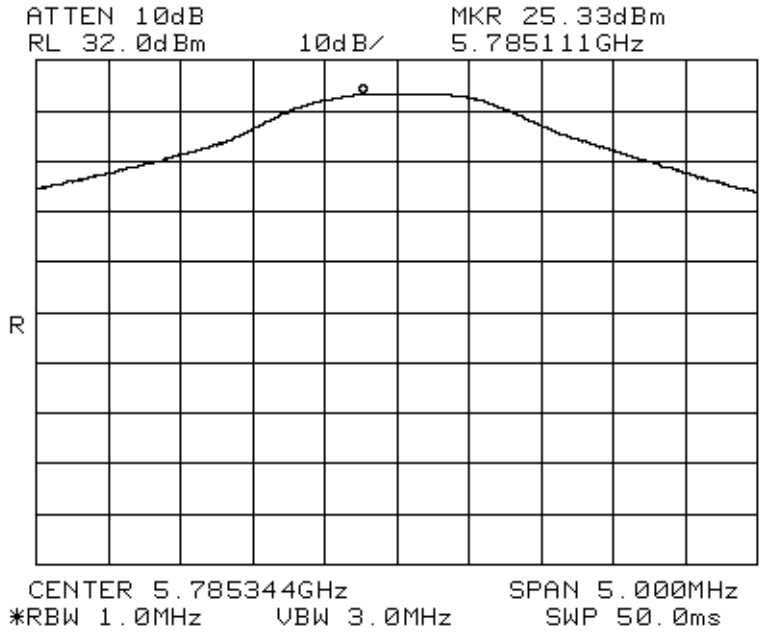
The highest power was 26.5dBm on Channel 94 of the EUT. See conducted plots.

Testing was performed at +/-15% of the supply voltage and no change in the output power was observed.

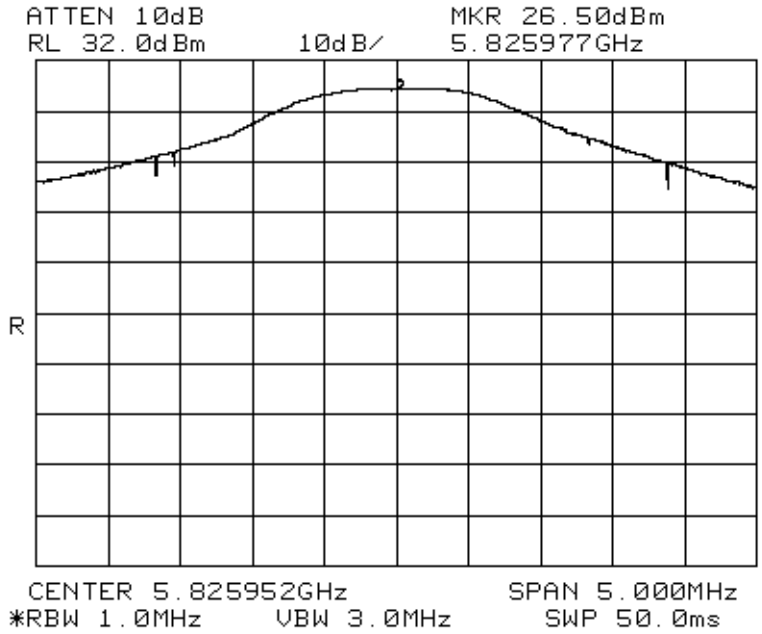
Maximum radiated power = 26.5dBm +2dBi = 28.5dBmEIRP
Maximum allowable radiated power is 36dBmEIRP,
30dBm + 6dBi



Peak Output Power (continued)



4W33591
Ch.47 Peak Power
Base



4W33591
Ch.94 Peak Power
Base

Section 9. Spurious Emissions

Para. No.: 15.247(d)

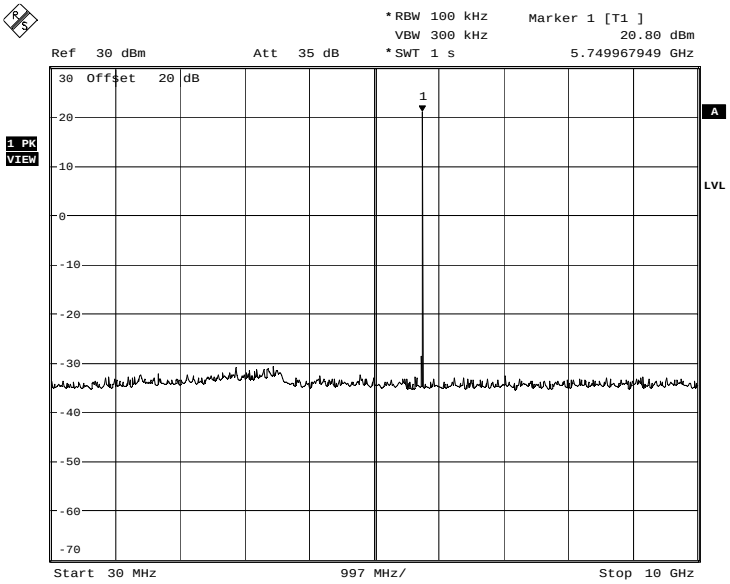
Test Performed By: Chris Maidens	**Date of Test: Dec. 7, 2004**

Limit: 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. 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)).

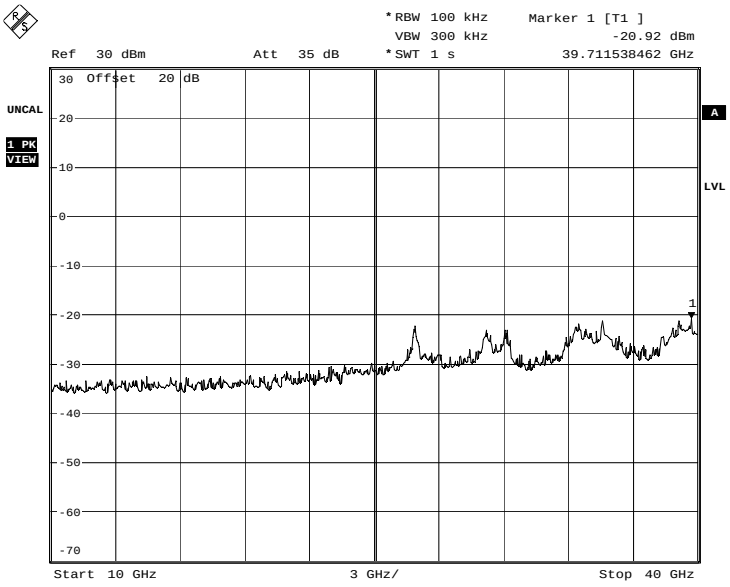
Measurement Data: The spectrum was searched using a sample modified for conducted measurements. Emissions related to the fundamental, which fall within restricted bands, were measured using an unmodified sample for radiated measurements.

The spectrum was searched from 30MHz to 40GHz.

Conducted Emissions CH00

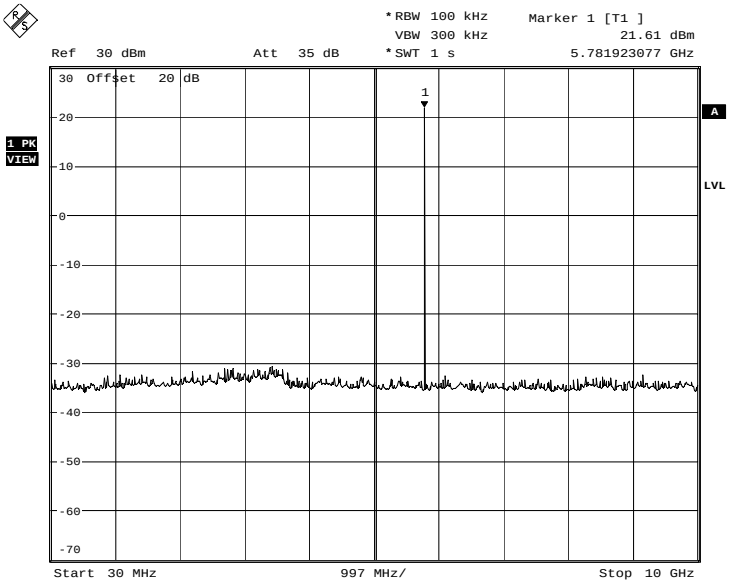


Low Band 30MHz to 10GHz
Date: 7.FEB.2005 15:58:55

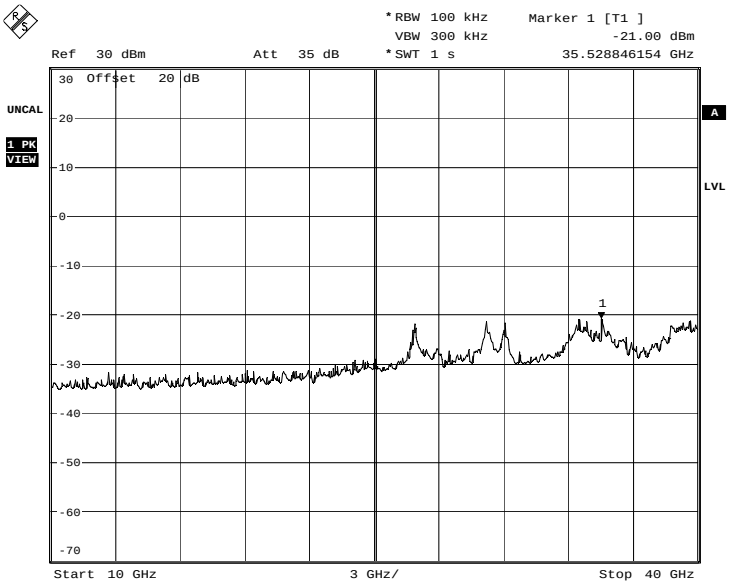


Low Band 10GHz to 40GHz
Date: 7.FEB.2005 16:00:26

Conducted Emissions CH47

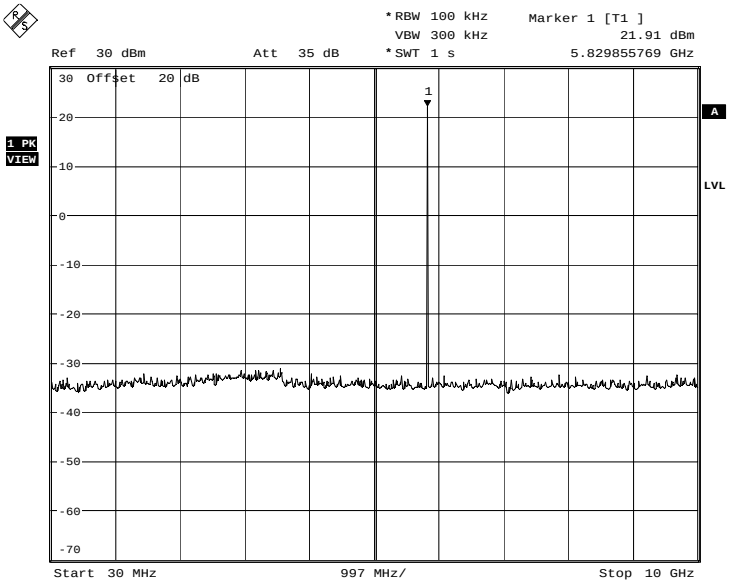


Mid Band 30MHz to 10GHz
Date: 7.FEB.2005 16:02:19

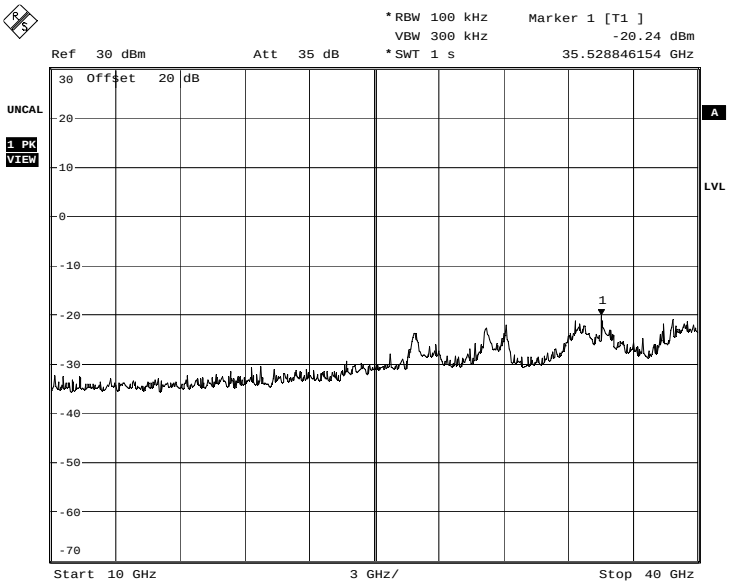


Mid Band 10GHz to 40GHz
Date: 7.FEB.2005 16:01:13

Conducted Emissions CH94



High Band 30MHz to 10GHz
Date: 7.FEB.2005 16:03:35



High Band 10GHz to 40GHz
Date: 7.FEB.2005 16:04:53

Spurious Harmonic Emissions Test Data: Base Station, Peak

Test Date: 25 Jan 2005

Engineer's Name: Jason Nixon

Temperature (C°): 21 | Humidity %: 35

Measurement distance = 1m.

Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain / Passband filter / Cable Loss (dB)	Distance Correction (dB)	Duty Cycle Corr. (-dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
MI6863 CI										
Low Band Ch.00										
11489.472	Hrn 1	V	63.7	39.0	-30.3	-9.5	-	62.9	74	11.1
11489.472	Hrn 1	H	57.3	39.3	-30.3	-9.5	-	56.8	74	17.2
Mid Band Ch.47										
11570.688	Hrn 1	V	61.8	39.0	-30.3	-9.5	-	61.0	74	13.0
11570.688	Hrn 1	H	59.3	39.3	-30.3	-9.5	-	58.8	74	15.2
Mid Band Ch.94										
11651.904	Hrn 1	V	63.0	39.0	-30.3	-9.5	-	62.2	74	11.8
11651.904	Hrn 1	H	59.2	39.3	-30.3	-9.5	-	58.7	74	15.3
MI6823										
Low Band Ch.00										
11489.472	Hrn 1	V	71.0	39.0	-30.3	-9.5	-	70.2	74	3.8
11489.472	Hrn 1	H	65.8	39.3	-30.3	-9.5	-	65.3	74	8.7
Mid Band Ch.47										
11570.688	Hrn 1	V	70.4	39.0	-30.3	-9.5	-	69.6	74	4.4
11570.688	Hrn 1	H	63.8	39.3	-30.3	-9.5	-	63.3	74	10.7
Mid Band Ch.94										
11651.904	Hrn 1	V	70.0	39.0	-30.3	-9.5	-	69.2	74	4.8
11651.904	Hrn 1	H	65.4	39.3	-30.3	-9.5	-	64.9	74	9.1

Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole
Note 2: The EUT was searched up to 10th harmonic of the fundamental

Notes:	Measurement Receiver = R&S FSU, RBW/VBW =1000kHz

Spurious Harmonic Emissions Test Data: Base Station, Average

Test Date: 25 Jan 2005

Engineer's Name: Jason Nixon

Temperature (C°): 21 | Humidity %: 35

Measurement distance = 1m.

Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain / Passband filter / Cable Loss (dB)	Distance Correction (dB)	Duty Cycle Corr. (-dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
MI6863 CI										
Low Band Ch.00										
11489.472	Hrn 1	V	63.7	39.0	-30.3	-9.5	-21.9	41.0	54	13.0
11489.472	Hrn 1	H	57.3	39.3	-30.3	-9.5	-21.9	34.9	54	19.1
Mid Band Ch.47										
11570.688	Hrn 1	V	61.8	39.0	-30.3	-9.5	-21.9	39.1	54	14.9
11570.688	Hrn 1	H	59.3	39.3	-30.3	-9.5	-21.9	36.9	54	17.1
Mid Band Ch.94										
11651.904	Hrn 1	V	63.0	39.0	-30.3	-9.5	-21.9	40.3	54	13.7
11651.904	Hrn 1	H	59.2	39.3	-30.3	-9.5	-21.9	36.8	54	17.2
MI6823										
Low Band Ch.00										
11489.472	Hrn 1	V	71.0	39.0	-30.3	-9.5	-21.9	48.3	54	5.7
11489.472	Hrn 1	H	65.8	39.3	-30.3	-9.5	-21.9	43.4	54	10.6
Mid Band Ch.47										
11570.688	Hrn 1	V	70.4	39.0	-30.3	-9.5	-21.9	47.7	54	6.3
11570.688	Hrn 1	H	63.8	39.3	-30.3	-9.5	-21.9	41.4	54	12.6
Mid Band Ch.94										
11651.904	Hrn 1	V	70.0	39.0	-30.3	-9.5	-21.9	47.3	54	6.7
11651.904	Hrn 1	H	65.4	39.3	-30.3	-9.5	-21.9	43.0	54	11.0

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

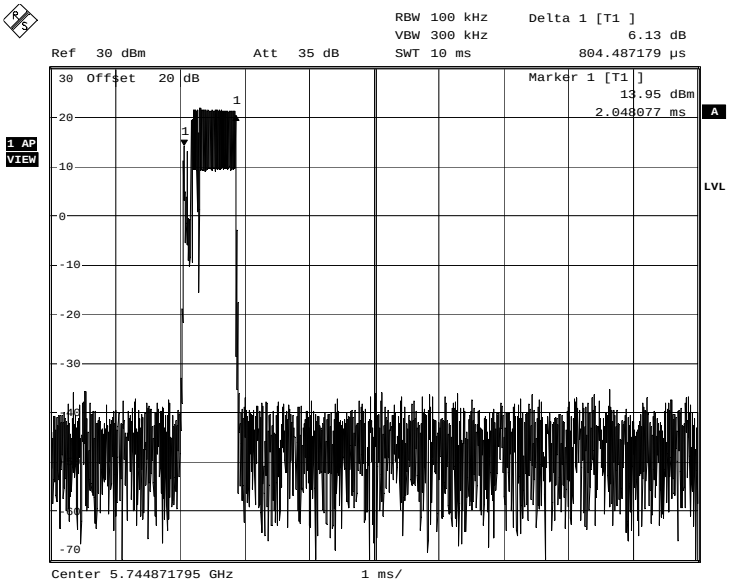
Spurious Emissions Test Data

Test Date: December 10, 2004											
Engineer's Name: Chris Maidens											
Temperature (C°): 13							Humidity %: 30				
Tested as per Table Top											
Test Distance (meters): 3q							Range: Almonte				
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Amp.
186.6240	BL	H	29.3	9.5	N/A	1.7	40.6	43.5	2.9	Q-Peak	N/A
207.3601	BL	V	28.3	10.4	N/A	1.8	40.5	43.5	3.0	Q-Peak	N/A
179.7120	BL	V	26.6	10.4	N/A	1.7	38.7	43.5	4.8	Q-Peak	N/A
196.9919	BL	V	24.5	10.2	N/A	1.7	36.4	43.5	7.1	Q-Peak	N/A
114.0481	BL	V	21.3	12.9	N/A	1.3	35.5	43.5	8.0	Q-Peak	N/A
217.7280	BL	V	24.7	10.2	N/A	1.9	36.8	46.0	9.2	Q-Peak	N/A
171.8164	BL	V	21.6	10.8	N/A	1.6	34.0	43.5	9.5	Q-Peak	N/A
176.2560	BL	V	20.9	10.5	N/A	1.6	33.1	43.5	10.4	Q-Peak	N/A
110.5921	BL	V	17.7	12.8	N/A	1.3	31.9	43.5	11.6	Q-Peak	N/A
124.4160	BL	H	17.2	12.7	N/A	1.4	31.3	43.5	12.2	Q-Peak	N/A
152.0640	BL	V	18.1	11.6	N/A	1.5	31.2	43.5	12.3	Q-Peak	N/A
31.1041	BL	V	9.5	17.5	N/A	0.7	27.7	40.0	12.3	Q-Peak	N/A
164.6575	BL	V	14.9	10.9	N/A	1.7	27.5	43.5	16.0	Q-Peak	N/A
165.8881	BL	V	14.9	10.9	N/A	1.7	27.5	43.5	16.0	Q-Peak	N/A

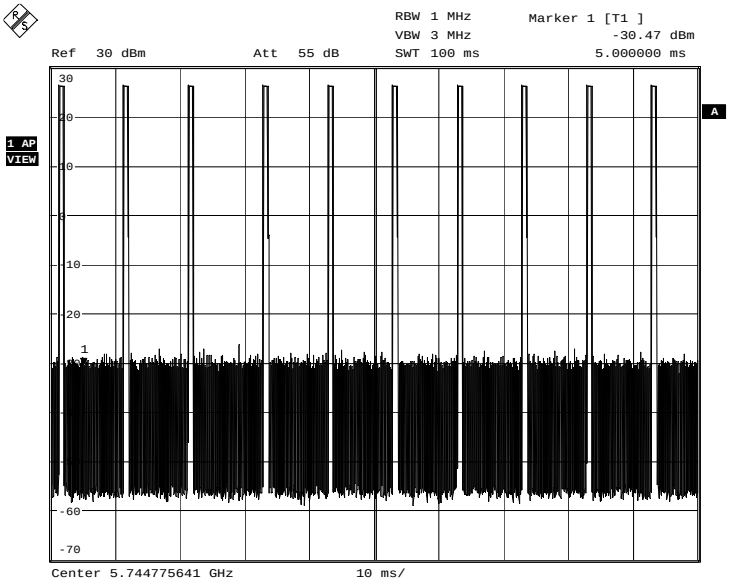
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW

Notes:	1) The spectrum was searched from 30MHz to the 40GHz harmonic 2) The EUT is intended to be used in a fixed horizontal orientation.

Duty Cycle

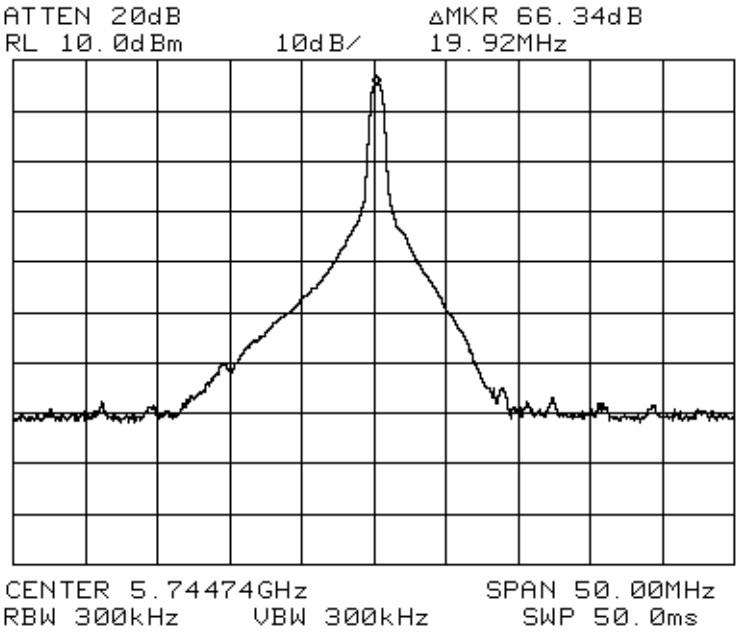


On-time
Date: 7.FEB.2005 16:07:46

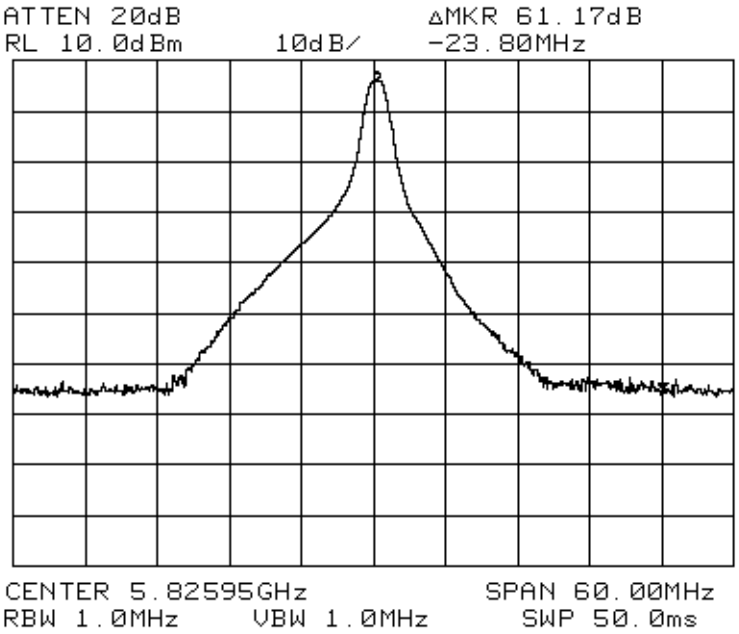


Duty Cycle = 20log((10x804.5usec)/100msec) = -21.9
Date: 9.FEB.2005 10:19:44

Band Edge:

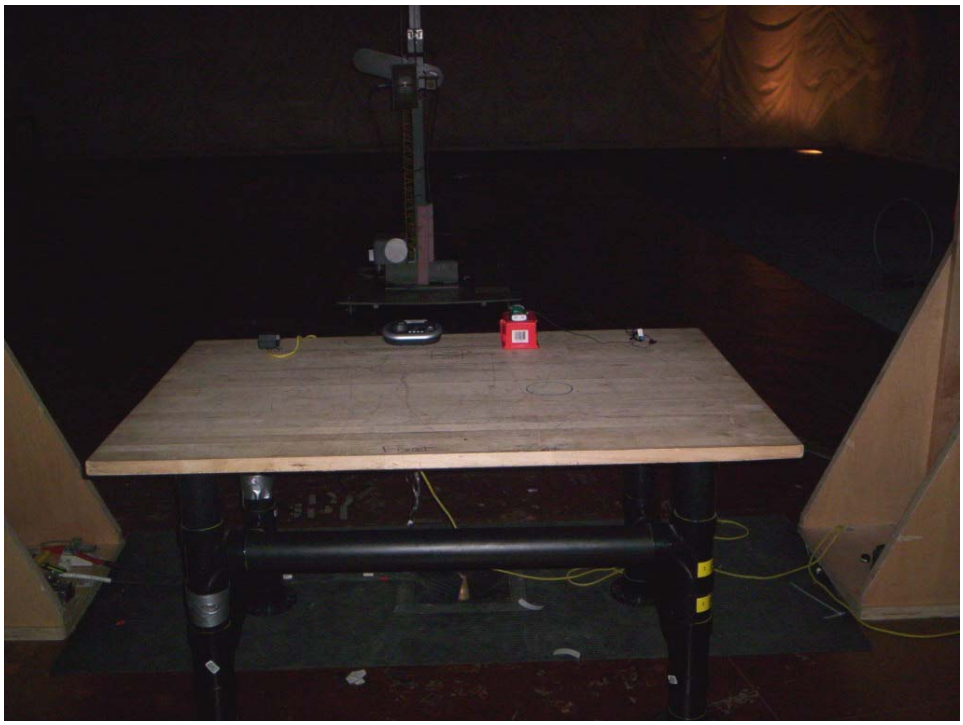


4W33591
Band Edge (lower)
Base



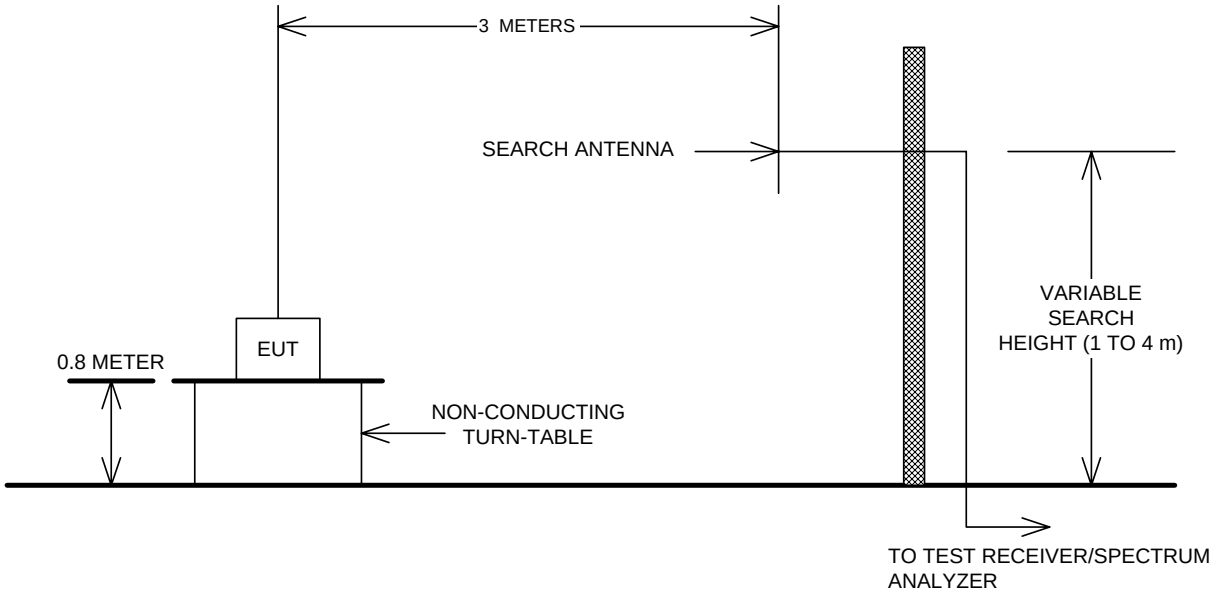
4W33591
Band Edge (upper)
Base

Set-up Photos

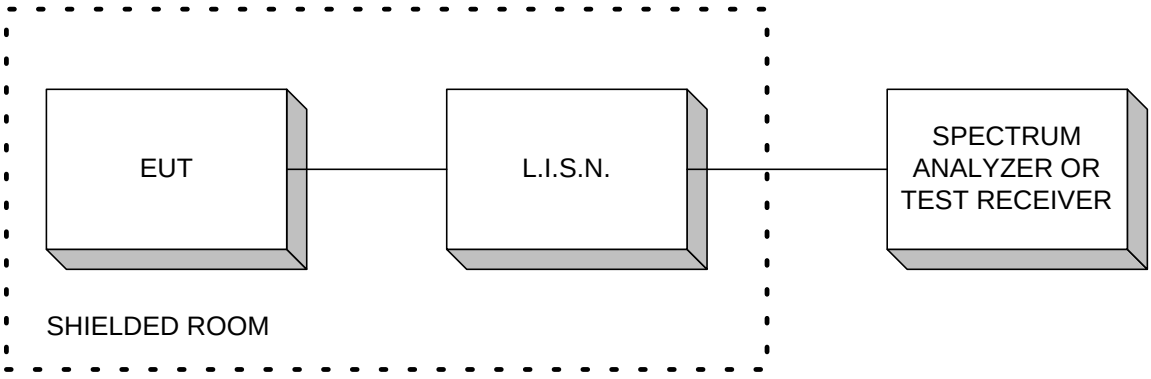


Section 10. Block Diagrams

Test Site For Radiated Emissions



Conducted Emissions



Section 11. Test Equipment List

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Receiver	Rohde & Schwarz	ESVS-30	FA001445	July 07/05
1 Year	Bilog	Schaffner	CBL6112B	FA001503	July 09/05
1 Year	LISN	Tegam	95300-50	FA000986	Jan. 27/05
1 Year	LISN	Tegam	95300-50	FA000987	Jan. 27/05
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 28/05
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 28/05
1 Year	Transient Limiter	Hewlett-Packard	1194 7A	FA000975	June 10/05
1 Year	Spectrum Analyzer	Hewlett-Packard	8564E	FA001367	June 28/05
1 Year	Spectrum Analyzer	Rohde & Schwarz	FSU	FA001877	May 26/05
NCR	Bilog	Schaffner	CBL6112B	FA001504	NCR
1 Year	Horn Antenna #1	EMCO	3115	FA000649	Dec. 22/05
NCR	0.1 – 1300 MHz Amplifier	Hewlett Packard	8447D	FA001748	NCR

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

Section 12. Restricted bands (15.205)

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			