



Test Report: 5W39796, Issue 2

Applicant: Nortel Networks
3500 Carling Ave.
Nepean, Ontario
K2H 8E9

**Equipment Under Test:
(EUT)** Wireless AP7220

FCC ID: AB6NTE301BA

In Accordance With: **FCC Part 15.247, Subpart C**

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

Authorized By: 
Sim Jagpal, General Manager

Date: 12 April 2005

Total Number of Pages: 68

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EQUIPMENT: Wireless AP7220

Section 1. Summary of Test Results

General

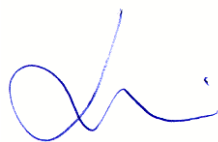
All measurements are traceable to national standards.

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 C63.4-1992. 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: _____
Xu Jin, Wireless Specialist

DATE: 12 April 2005

Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada. The tests included in this report are within the scope of this accreditation. The results apply only to the samples tested.

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This report applies only to the items tested.

Summary Of Test Data

Name Of Test	Para. No.	Result
Powerline Conducted Emissions	15.207(a)	Complies
6dB Bandwidth	15.247(a)(2)	Complies
Peak Output Power	15.247(b)(3)	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	Complies
Spurious Emissions (Radiated)	15.247(c)	Complies
Peak Power Spectral Density	15.247(d)	Complies

Test Conditions:

Indoor Temperature: 23°C
 Humidity: 24%

Outdoor Temperature: 7°C
 Humidity: 23%

Section 2. General Equipment Specification

Manufacturer:	Nortel Networks
Model No.:	NTE301BA
Serial No.:	NNTMENC5T1TB
Date Received In Laboratory:	28 Feb. 2005
Nemko Identification No.:	#6
Operating Frequency(s):	2412-2462MHz 5740-5840MHz
Rated Power (maximum):	2.4GHz Band = 22dBm* 5GHz Band = 21dBm*
Modulation/Access Method:	802.11b/g & 802.11a
Antenna Data:	2.4GHz, 802.11b/g (1) Nearson Whip, S151AM-2450 151 = 4dBi (2) PIFA Integral, NTE30211 = 0dBi 5GHz, 802.11a (1) Integral antenna = 10.7dBi (2) H&S 5600/40/14/0/V = 13dBi (3) Andrews #FPA5150-18-1 = 18dBi (4) Andrews #FPA5150-23PM-1 = 23dBi

* Manufacture's rated power is average power measured using a wide band power meter with a thermocouple detector.

EQUIPMENT: Wireless AP7220

Section 3. Powerline Conducted Emissions**Para. No.: 15.207 (a)****Test Performed By: Xu Jin****Date of Test: Mar. 1, 2005****Test Results:** Complies.**Measurement Data:** See attached graph(s).

Limits For Conducted Disturbance At The Mains Ports Of Class B

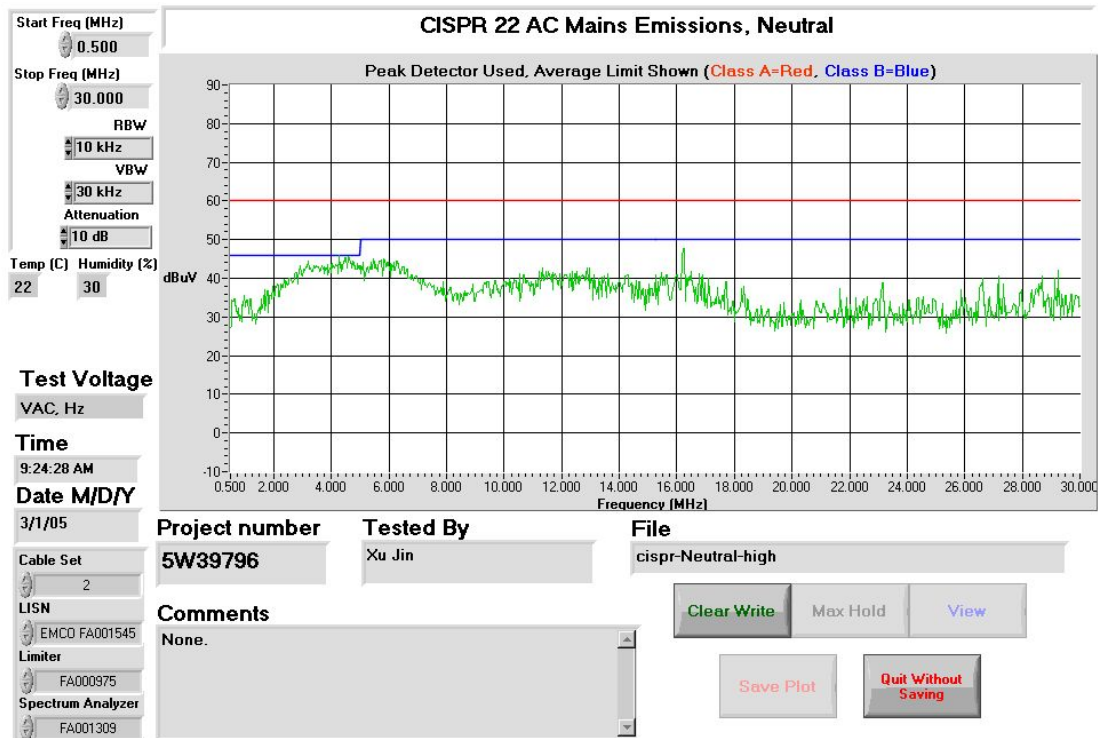
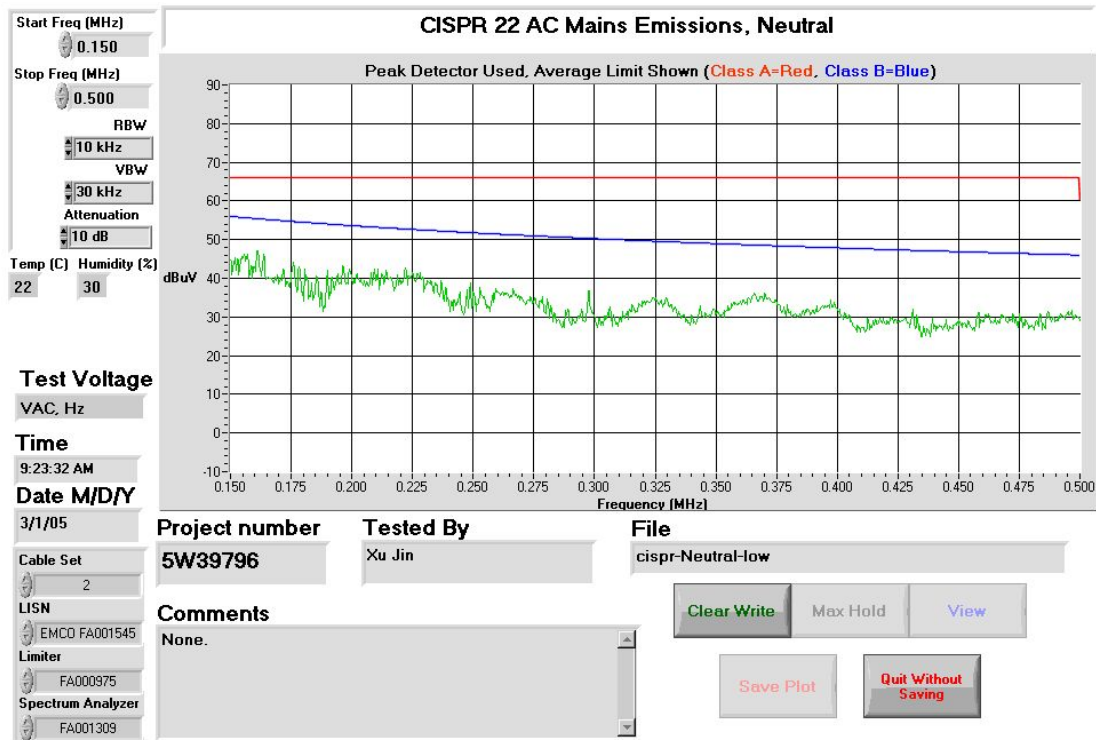
Frequency Range MHz	Limits dB(μV)		Result
	Quasi-Peak	Average	
0.15 to 0.50	66 to 56	56 to 46	Complies.
0.5 to 5	56	46	
5 to 30	60	50	
Note: 1. The lower limit shall apply at the transition frequency. 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz. 3. The test was performed using a peak detector.			

EQUIPMENT: Wireless AP7220

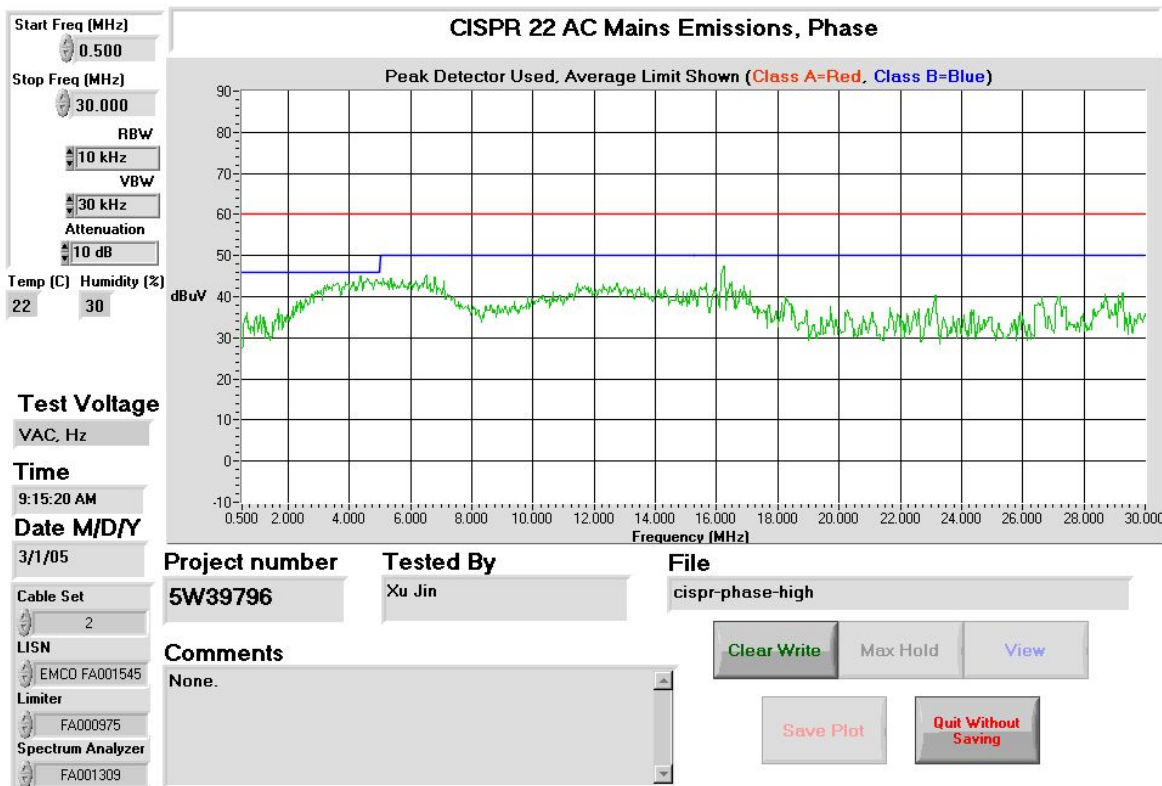
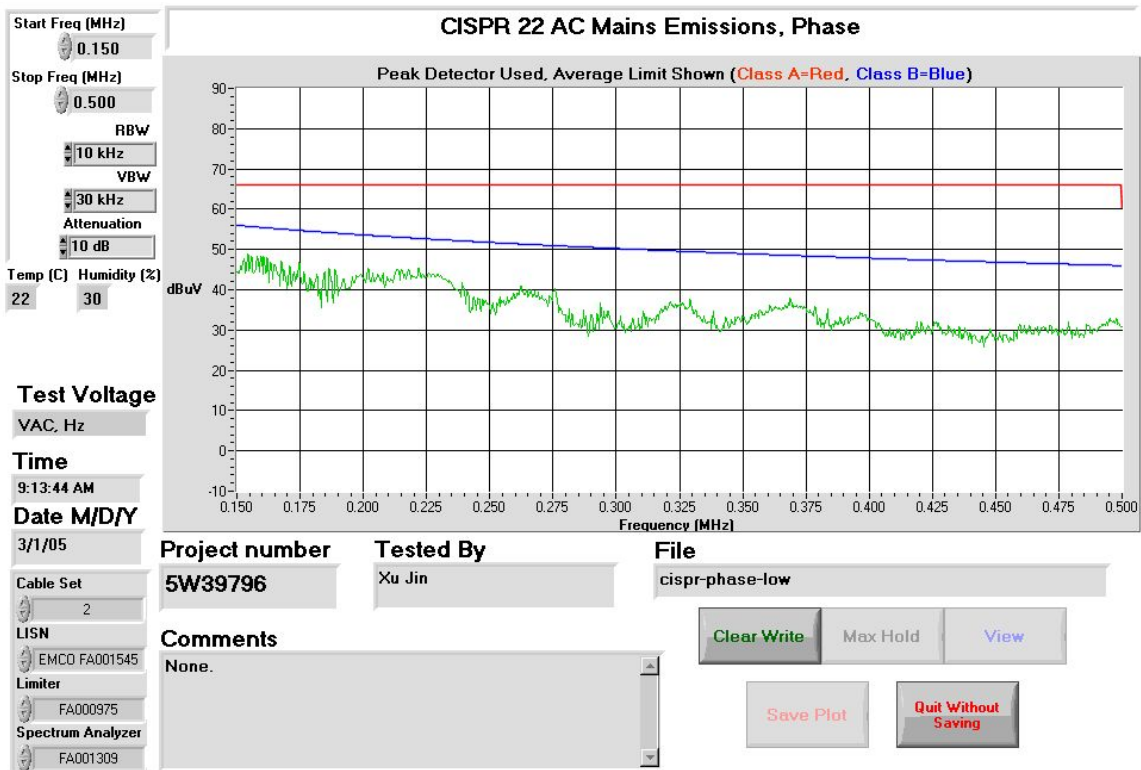
Conducted Disturbance at Mains Detailed Setup Photos:



EQUIPMENT: Wireless AP7220



EQUIPMENT: Wireless AP7220



EQUIPMENT: Wireless AP7220

Section 4. 6dB Bandwidth

Para. No.: 15.247 (a)(2)

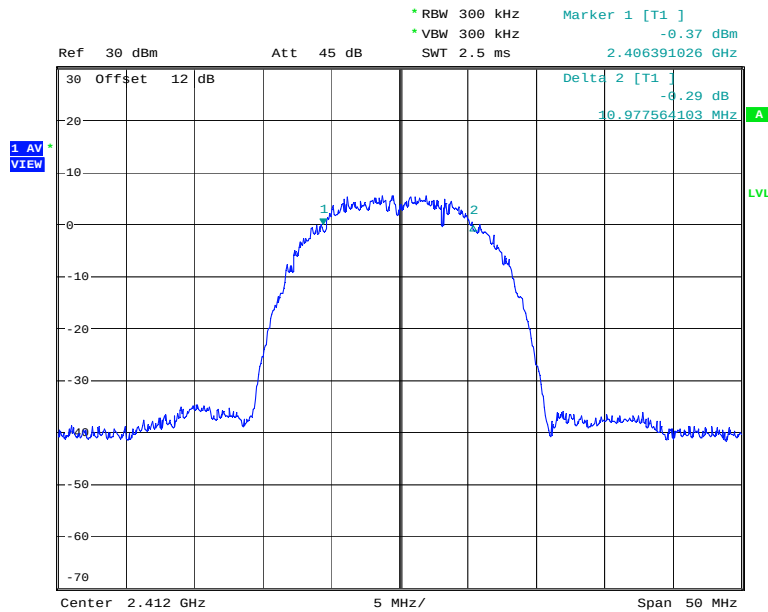
Test Performed By: Xu Jin	Date of Test: 28 Feb. 2005
----------------------------------	-----------------------------------

Limit: $\geq 500\text{kHz}$ **Test Results:** Complies**Measurement Data:** See attached Plots

6dB Occupied Bandwidth			
802.11b	2412MHz	2432MHz	2462MHz
	10.98MHz	10.9MHz	10.58MHz
802.11g	2412MHz	2432MHz	2462MHz
	16.59MHz	16.59MHz	16.67MHz
802.11a	5740MHz	5800MHz	5840MHz
	16.75MHz	16.75MHz	16.75MHz

EQUIPMENT: Wireless AP7220

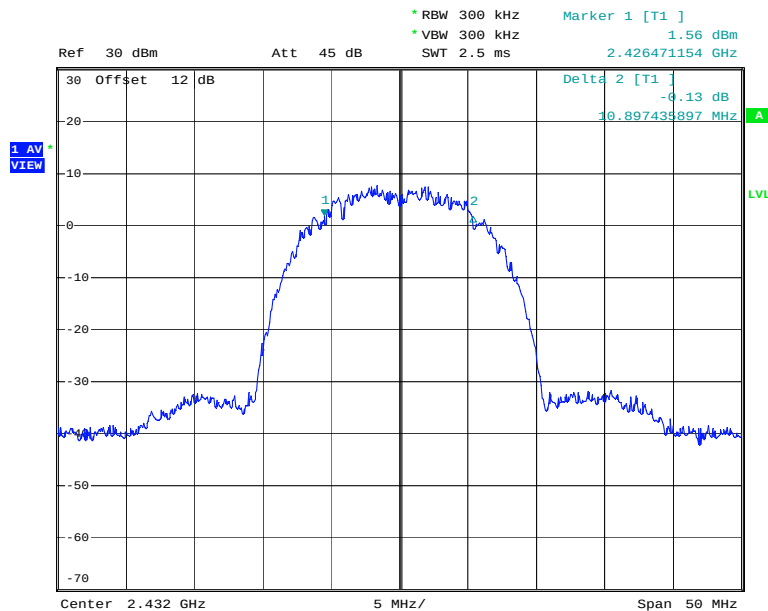
802.11b_Ch1, 2412MHz



802.11b_1

Date: 28.FEB.2005 12:50:21

802.11b_Ch5, 2432MHz

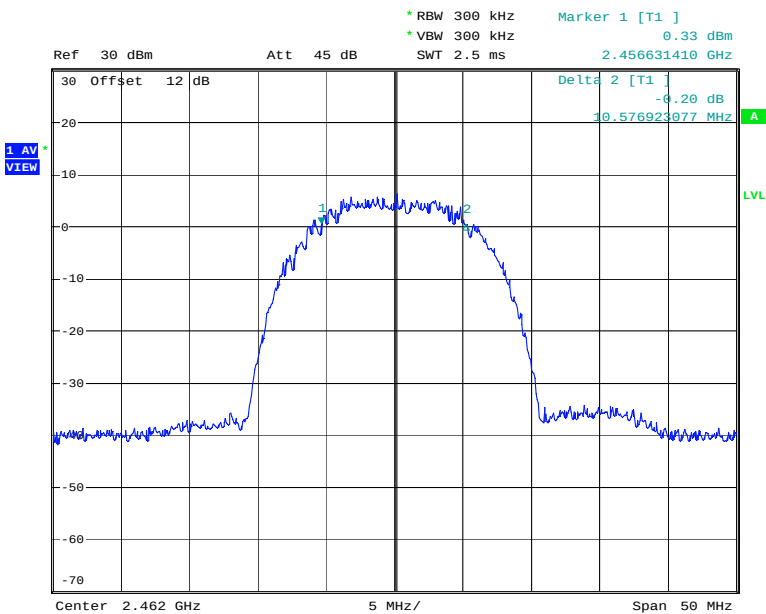


802.11b_5

Date: 28.FEB.2005 12:52:05

EQUIPMENT: Wireless AP7220

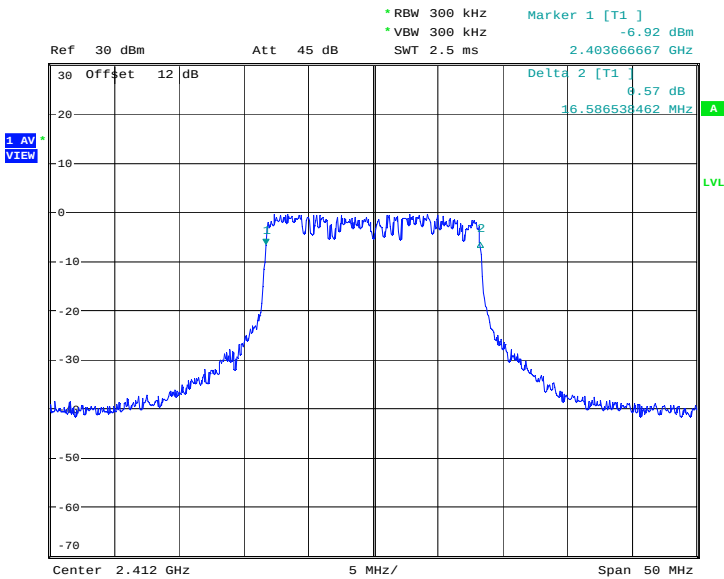
802.11b_Ch11, 2462MHz



802.11b_11
Date: 28.FEB.2005 12:53:36

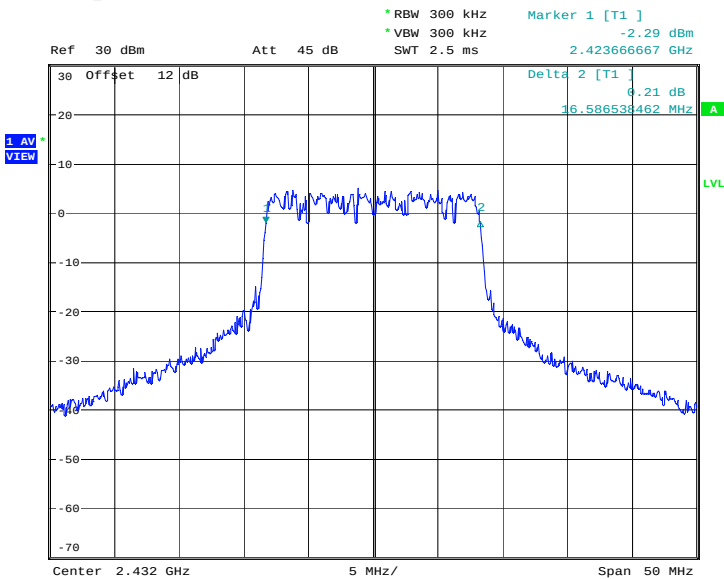
EQUIPMENT: Wireless AP7220

802.11g_Ch1, 2412MHz



802.11g_1
Date: 28.FEB.2005 12:56:55

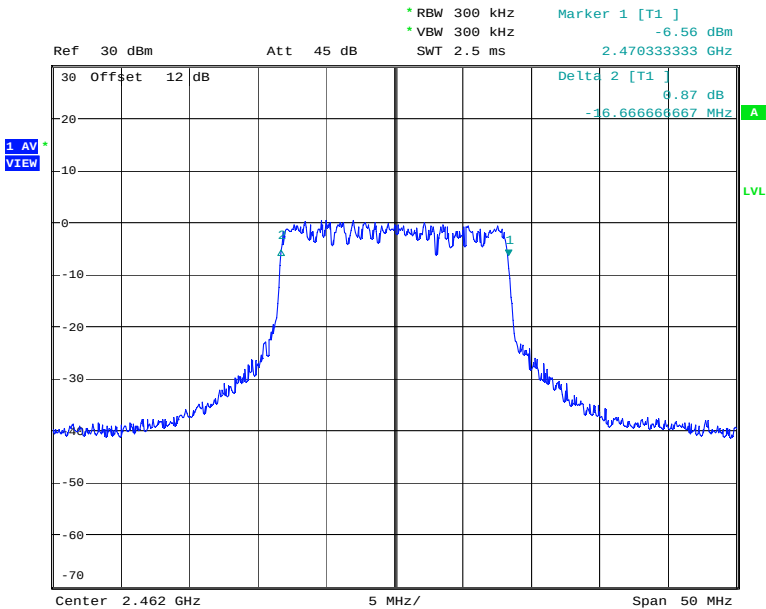
802.11g_Ch5, 2432MHz



802.11g_5
Date: 28.FEB.2005 12:58:52

EQUIPMENT: Wireless AP7220

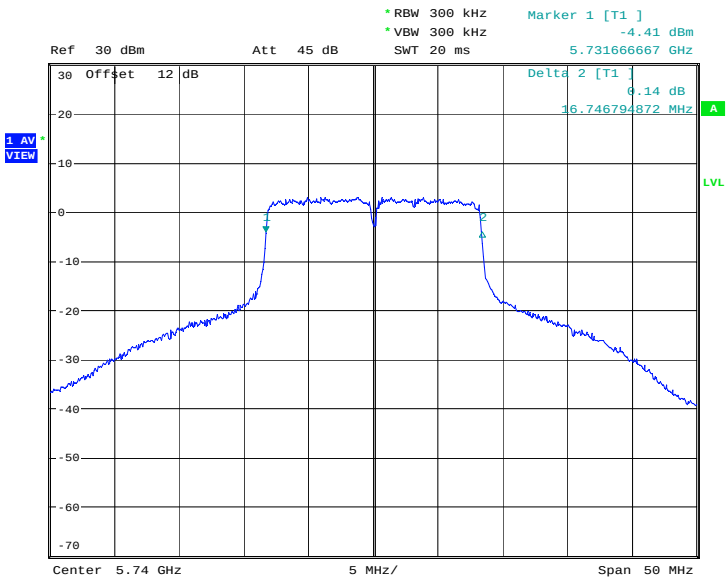
802.11g_Ch11, 2462MHz



802.11g_11
Date: 28.FEB.2005 13:00:19

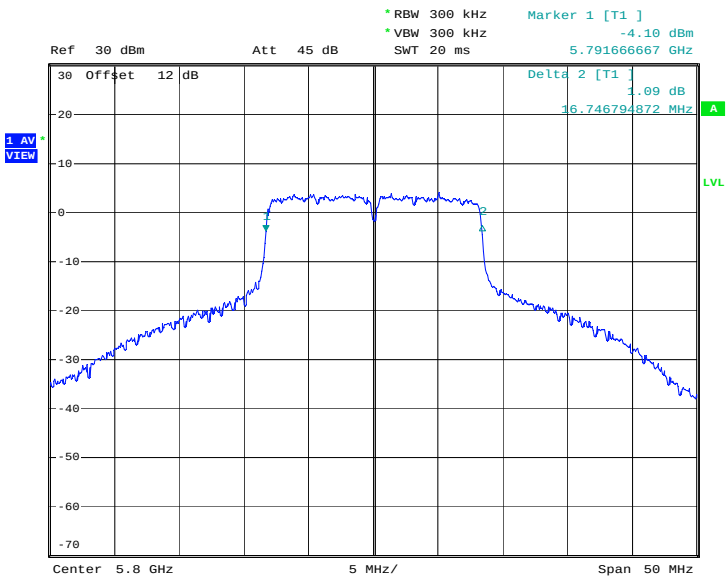
EQUIPMENT: Wireless AP7220

802.11a_Ch148, 5740MHz



802.11a_148
Date: 28.FEB.2005 12:01:10

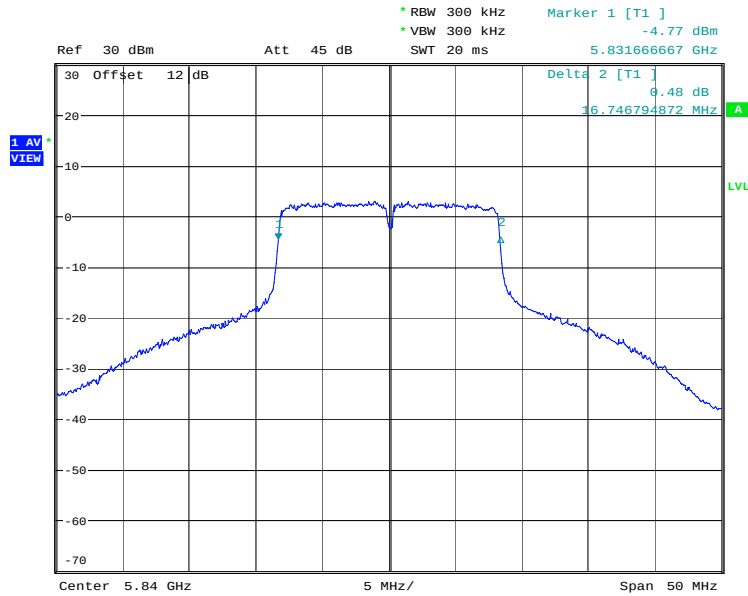
802.11a_Ch160, 5800MHz



802.11a_160
Date: 28.FEB.2005 12:03:31

EQUIPMENT: Wireless AP7220

802.11a_Ch168, 5840MHz



802.11a_168

Date: 28.FEB.2005 12:05:17

EQUIPMENT: Wireless AP7220

Section 5. Peak Output Power

Para. No.: 15.247 (b)(3)

Test Performed By: Xu Jin	Date of Test: 4 Mar. 2005
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Output Power Measurement for 802.11b/g

Test Method: Average output power was measured using sample detector according to the documentation of FCC Publication No.558074 and Public Notice: DA 02-2138.

Standards Limit : 30dBm conducted power + 6dBi antenna = 36.0dBm EIRP

Test Result: Complies

Test Data: Refer to attached tables and graphics

Measured Conducted Power (dBm) at Radio Antenna Port AL1

	802.11b				802.11g				
Data Rate (Mbps)	1	2	5.5	11	6	24	36	48	54
2412MHz	18.09	18.05	18.01	18.05	12.23	12.30	12.44	12.28	12.24
2432MHz	19.43	19.25	19.17	18.97	16.48	16.56	16.24	16.37	16.39
2462MHz	18.63	18.54	18.75	18.40	12.51	12.56	12.72	12.35	12.29

Measured Conducted Power (dBm) at Radio Antenna Port AL2

	802.11b				802.11g				
Data Rate (Mbps)	1	2	5.5	11	6	24	36	48	54
2412MHz	18.21	18.69	18.65	18.13	11.98	12.15	12.12	12.32	12.04
2432MHz	18.46	18.82	18.73	18.58	16.56	16.23	16.42	16.38	16.55
2462MHz	18.32	18.12	18.45	18.08	12.25	12.56	12.32	12.14	12.52

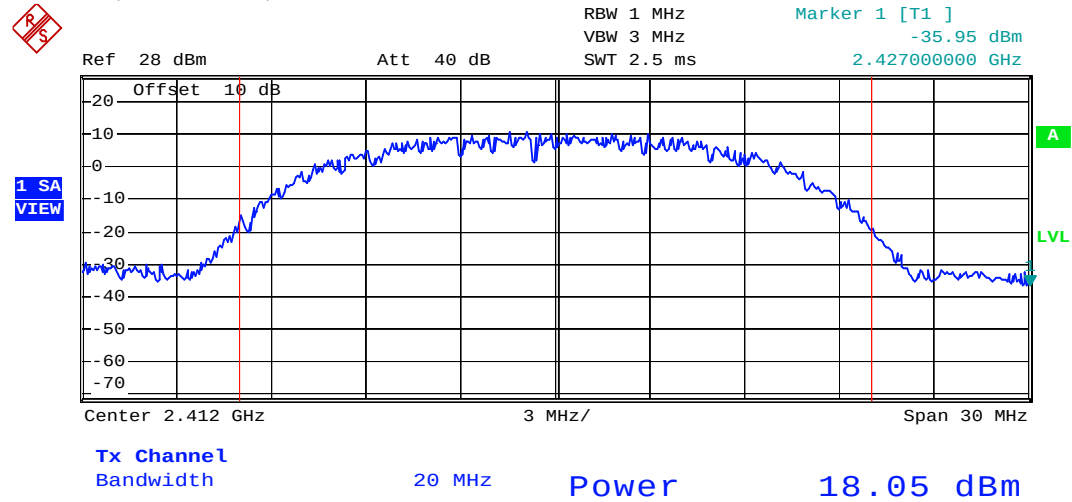
Note: To achieve the restricted band edge requirement, the power at the band edge at 802.11g has been reduced as shown in the table above. The power levels were automatically be set via firmware on selection the channel #1 and #11.

802.11b/g Antenna (1) Nearson Whip Antenna = 4Bi
(2) PIFA Antenna (integral) = 0dBi

802.11b/g Maximum E.I.R.P = 19.43+4.0 = 23.43dBm

EQUIPMENT: Wireless AP7220

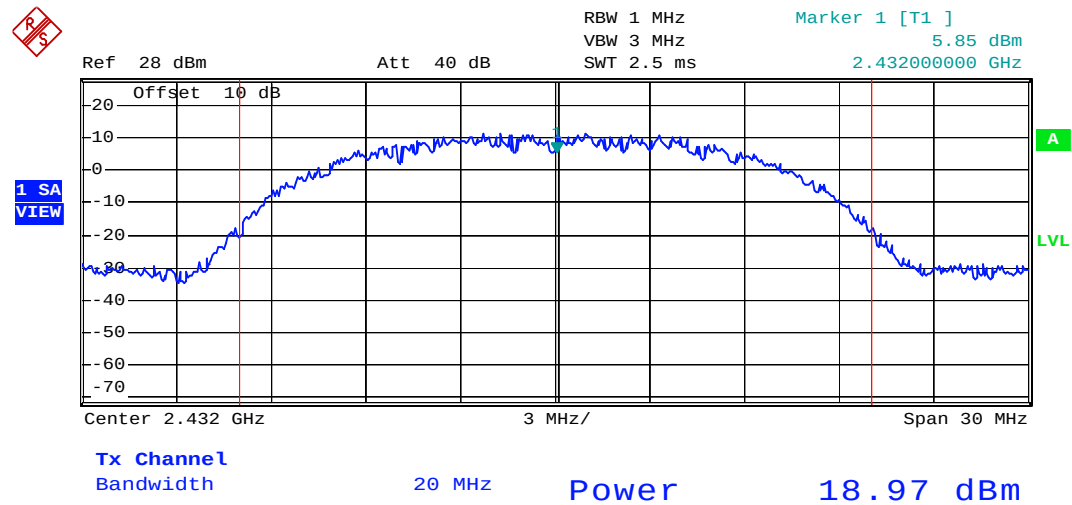
Port AL1
802.11b, 2412MHz, Data Rate 11Mb/s



Date: 8.APR.2005 16:31:40

EQUIPMENT: Wireless AP7220

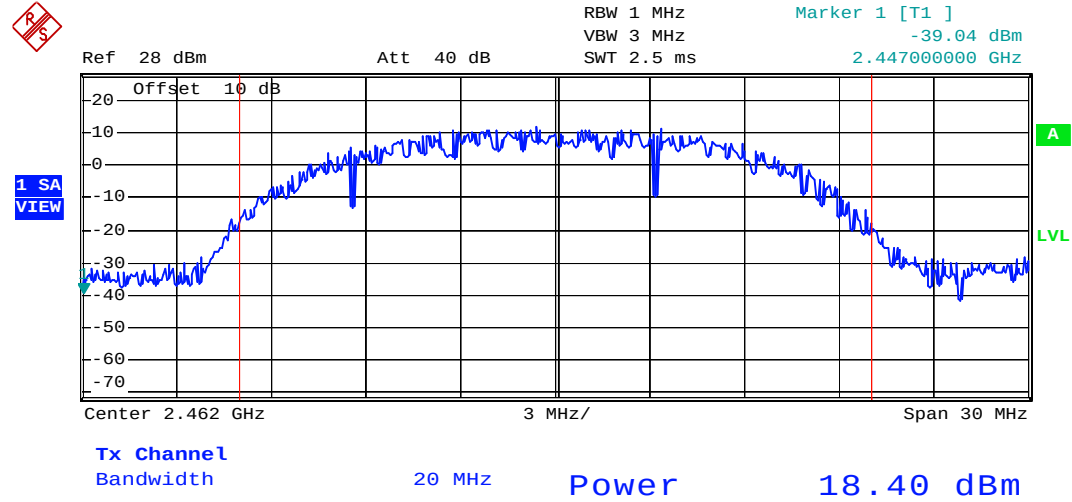
Port AL1
802.11b, 2432MHz, Data Rate 11Mb/s



Date: 8.APR.2005 16:30:49

EQUIPMENT: Wireless AP7220

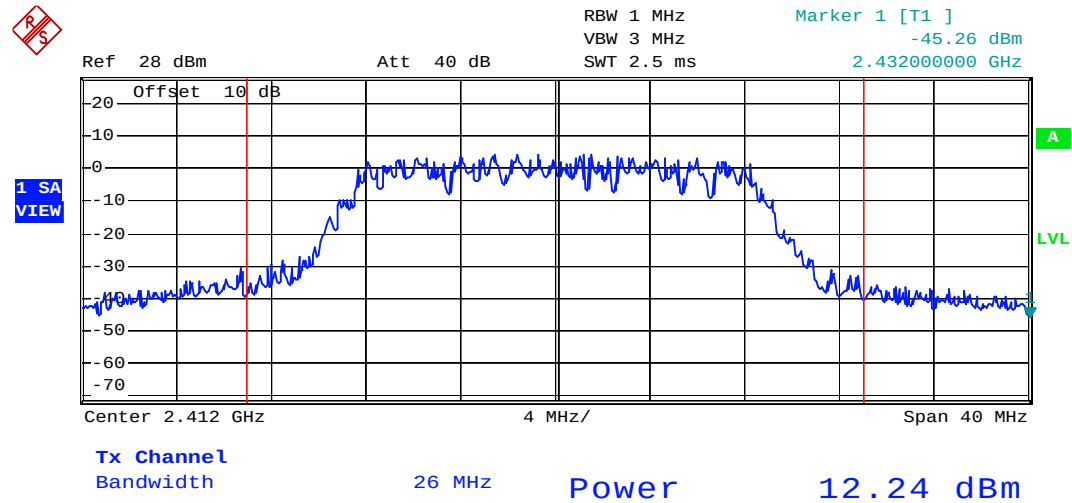
Port AL1
802.11b, 2462MHz, Data Rate 11Mb/s



Date: 8.APR.2005 16:32:47

EQUIPMENT: Wireless AP7220

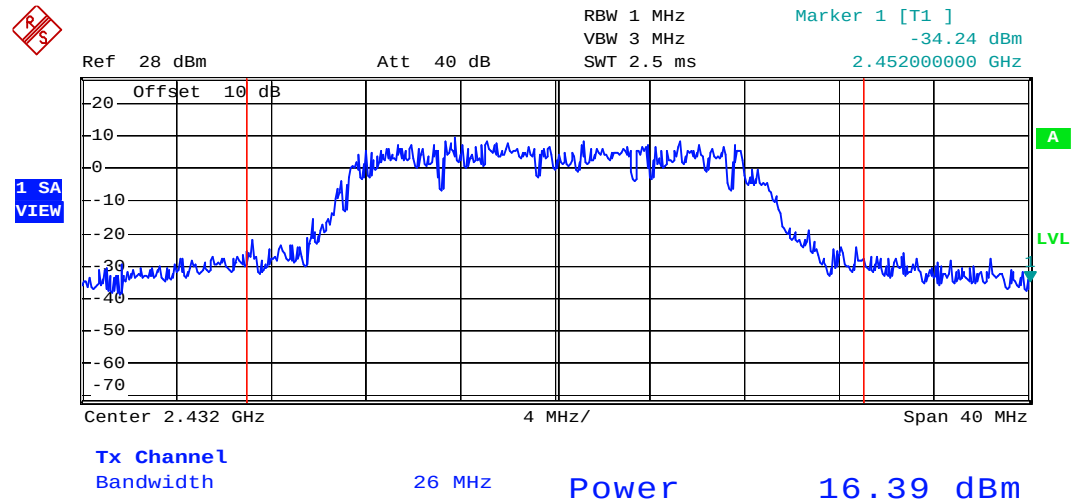
Port AL1
802.11g, 2412MHz, Data Rate 54Mb/s



Date: 8.APR.2005 16:23:30

EQUIPMENT: Wireless AP7220

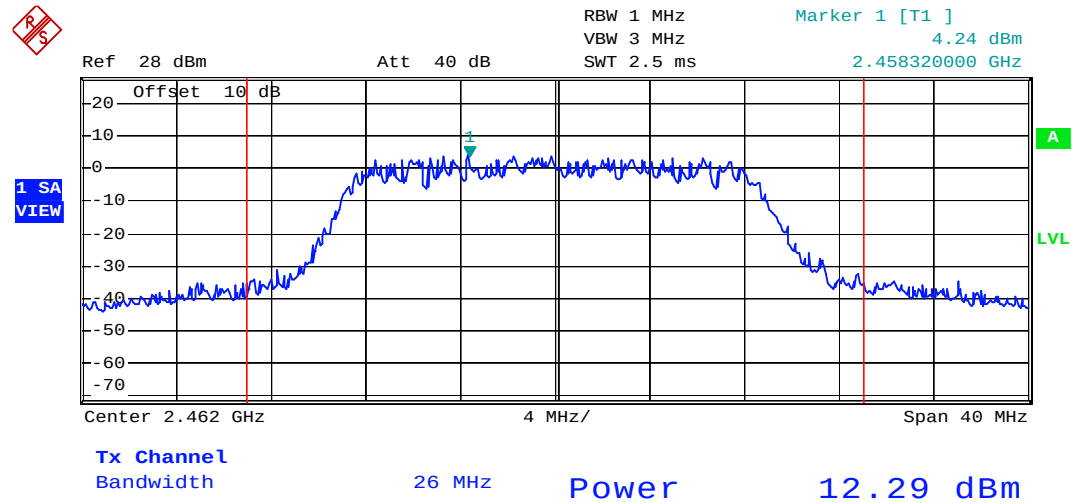
Port AL1
802.11g, 2432MHz, Data Rate 54Mb/s



Date: 8.APR.2005 16:21:52

EQUIPMENT: Wireless AP7220

Port AL1
802.11g, 2462MHz, Data Rate 54Mb/s

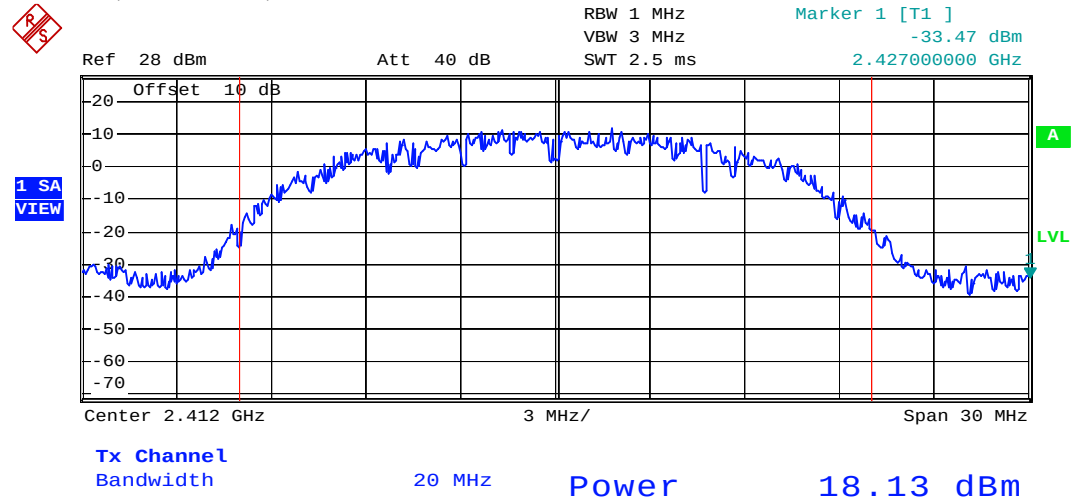


Date: 8.APR.2005 16:18:51

EQUIPMENT: Wireless AP7220

Port AL2

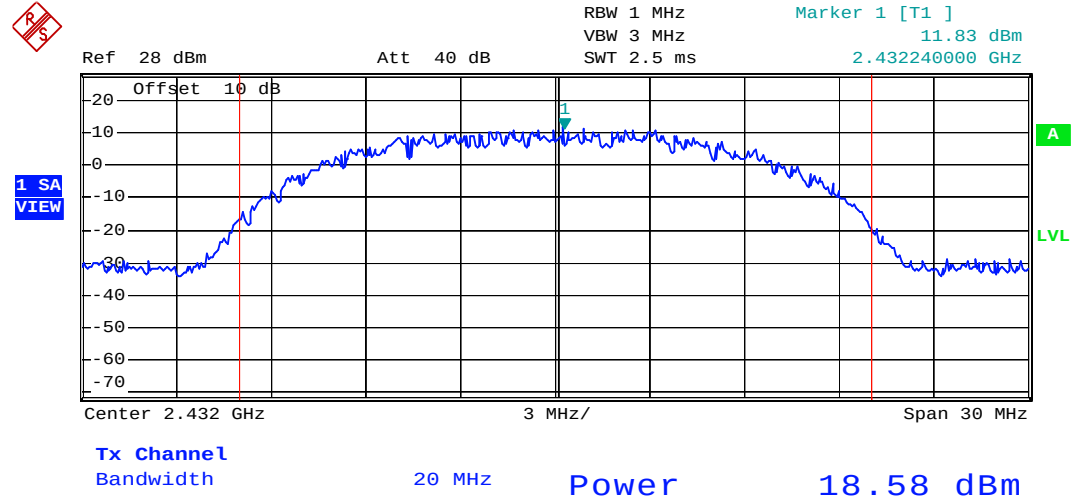
802.11b, 2412MHz, Data Rate 11Mb/s



Date: 8.APR.2005 16:42:32

EQUIPMENT: Wireless AP7220

Port AL2
802.11b, 2432MHz, Data Rate 11Mb/s

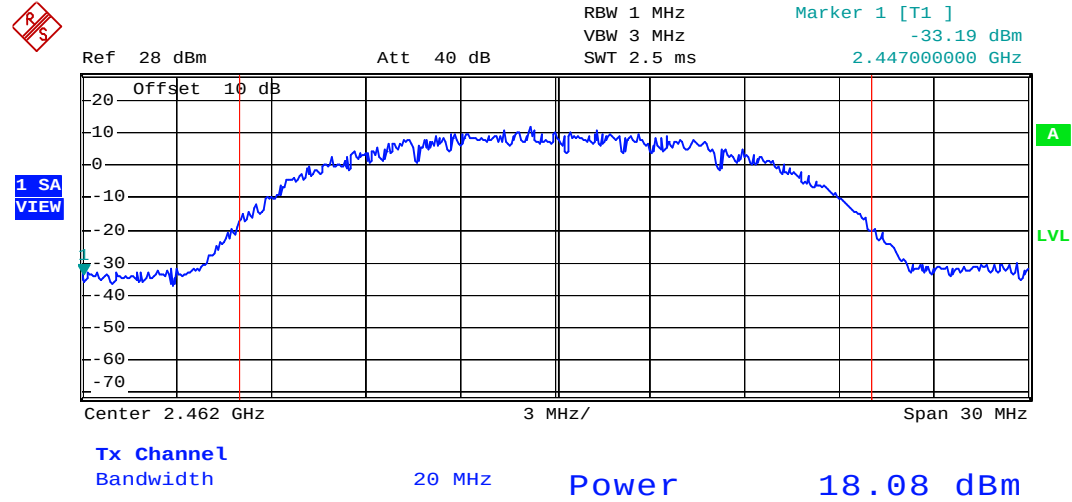


Date: 8.APR.2005 16:44:20

EQUIPMENT: Wireless AP7220

Port AL2

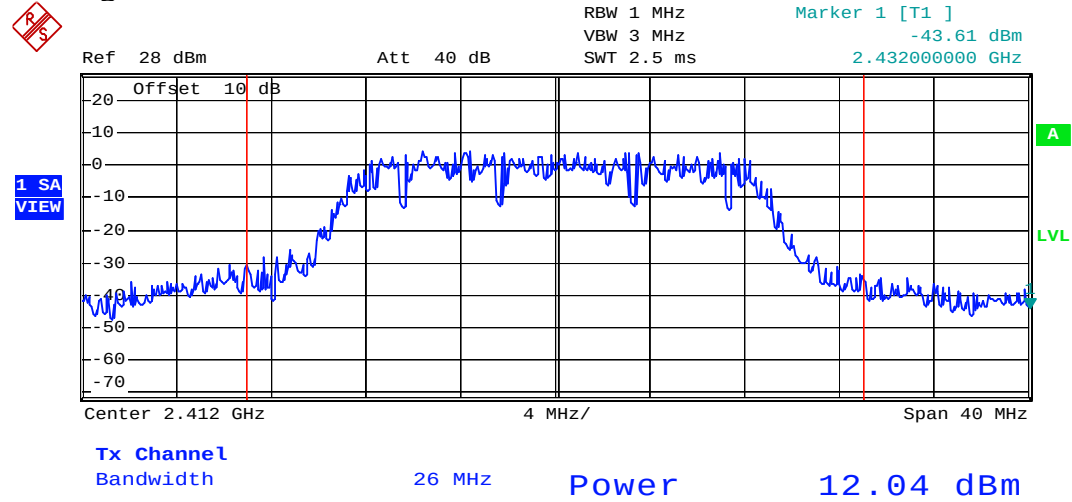
802.11b, 2462MHz, Data Rate 11Mb/s



Date: 8.APR.2005 16:45:31

EQUIPMENT: Wireless AP7220

Port AL2
802.11g, 2412MHz, Data Rate 54Mb/s

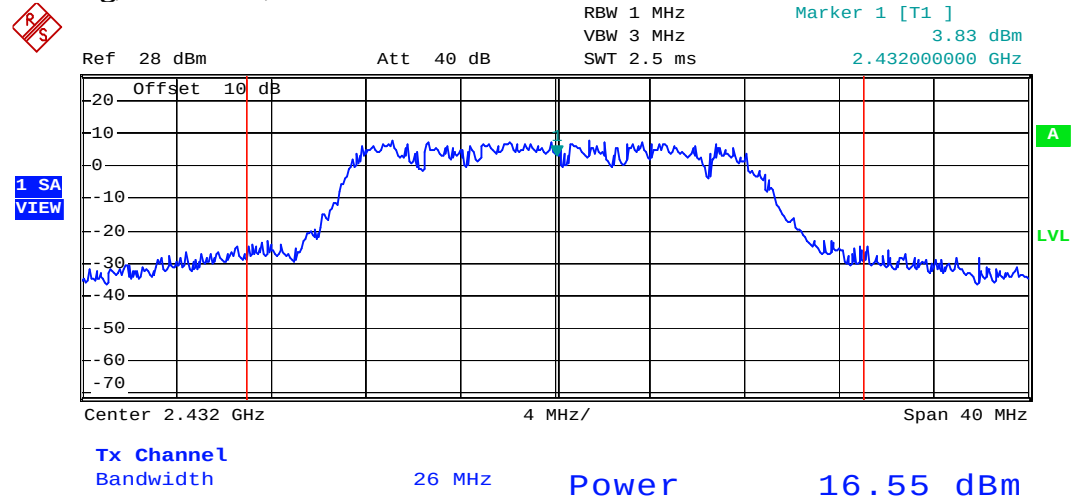


Date: 8.APR.2005 16:49:00

EQUIPMENT: Wireless AP7220

Port AL2

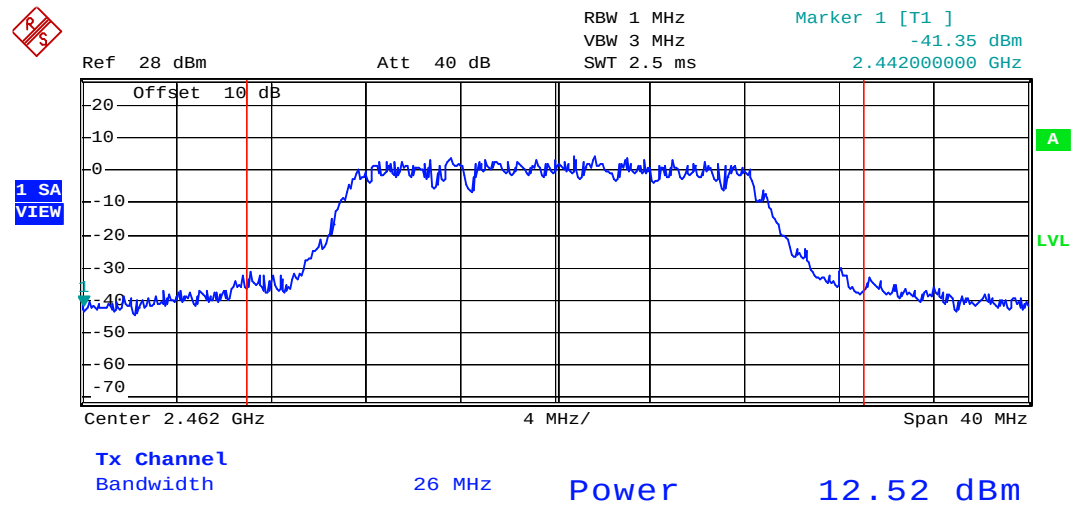
802.11g, 2432MHz, Data Rate 54Mb/s



Date: 8.APR.2005 16:50:27

EQUIPMENT: Wireless AP7220

Port AL2
802.11g, 2462MHz, Data Rate 54Mb/s



Date: 8.APR.2005 16:51:35

EQUIPMENT: Wireless AP7220

Output Power Measurement for 802.11a

Test Method: Peak output power was measured using peak detector on the spectrum analyzer according to FCC “Digital Transmission System Test Procedure”

Standards Limit : P-P operation = 30dBm conducted power + antenna gain.
All other applications:
30dBm conducted power + 6dBi antenna gain = 36dBi EIRP

Test Result: Complies

Test Data: Refer to attached tables and graphics

Measured Conducted Power (dBm) at Auxiliary Port 1

Data Rate (Mbps)	6	24	36	48	54
5740MHz	25.26	25.16	25.26	24.28	23.09
5800MHz	25.85	25.68	25.61	24.43	23.07
5840MHz	25.44	25.43	25.36	24.14	23.17

Measured Conducted Power (dBm) at Auxiliary Port 2

Data Rate (Mbps)	6	24	36	48	54
5740MHz	24.83	24.68	24.62	23.44	22.25
5800MHz	25.30	25.31	24.83	23.29	22.42
5840MHz	24.89	24.74	24.76	23.23	22.57

Manufacturer has declared due to the loss between the radio module and RF switch matrix, there is 1.5 dB power reduction from the radio output terminal to the auxiliary port which is measured at actual testing.

802.11a Antenna

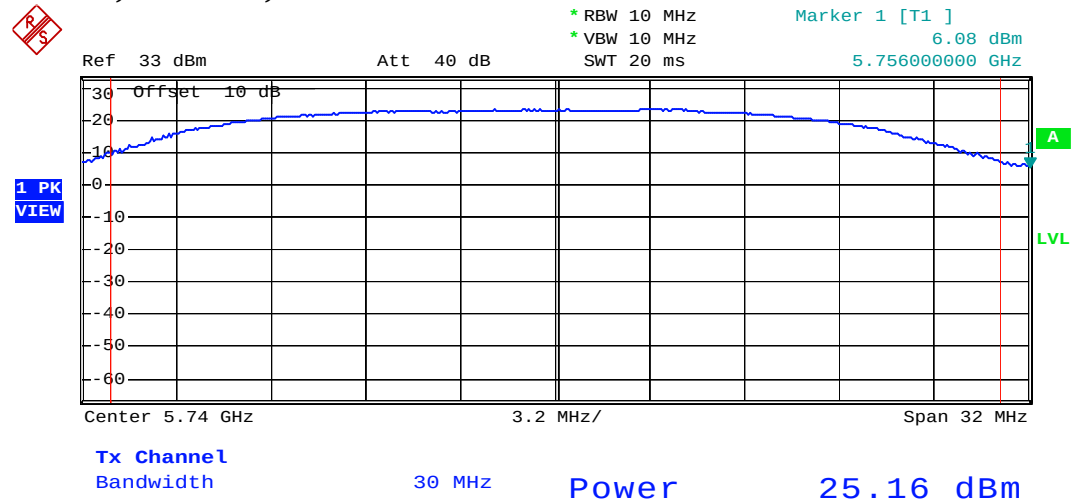
- (1) Integral antenna = 10.7Bi
- (2) H&S SPA 5600/40/14/0/V = 13dBi
- (3) Andrews #FPA5150-18-1 = 18dBi
- (4) Andrews #FPA5150-23PM-1 = 23dBi

- (1) 802.11a Maximum E.I.R.P for Andrews #FPA5150-23PM-1
= 25.85dBm +1.5dB +23dBi = 50.35dBm
- (2) 802.11a Maximum E.I.R.P for Andrews #FPA5150-18-1
= 25.85dBm+ 1.5dB +18dBi = 45.35dBm
- (3) 802.11a Maximum EIRP for H&S SPA antenna operation
=25.85dBm+1.5dB+13dBi=40.35dBm
- (4) 802.11a Maximum E.I.R.P for integral antenna operation
= 25.85dBm+10.7dBi=36.55dBm

EQUIPMENT: Wireless AP7220

Auxiliary Port 1

802.11a, 5740MHz, Data Rate 24 Mb/s

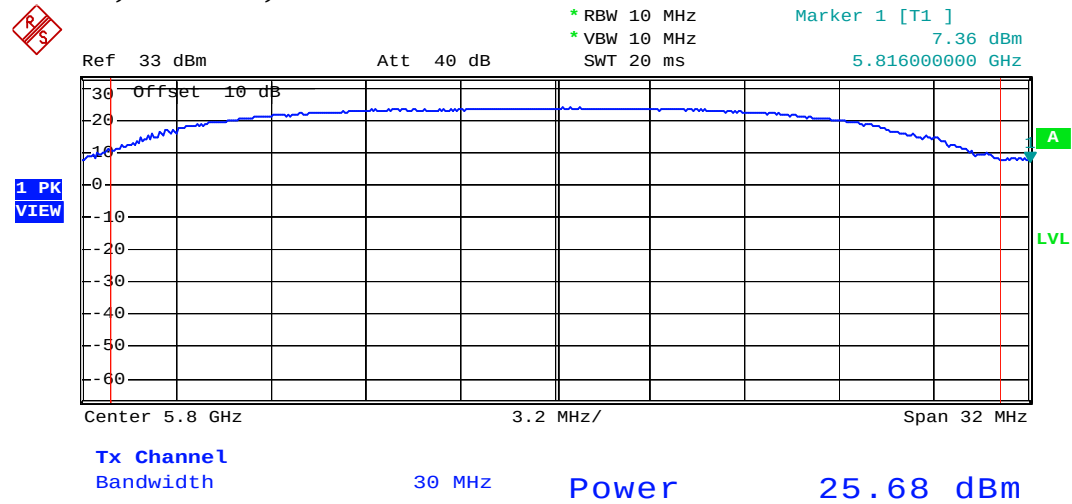


Date: 6.APR.2005 19:49:55

EQUIPMENT: Wireless AP7220

Auxiliary Port 1

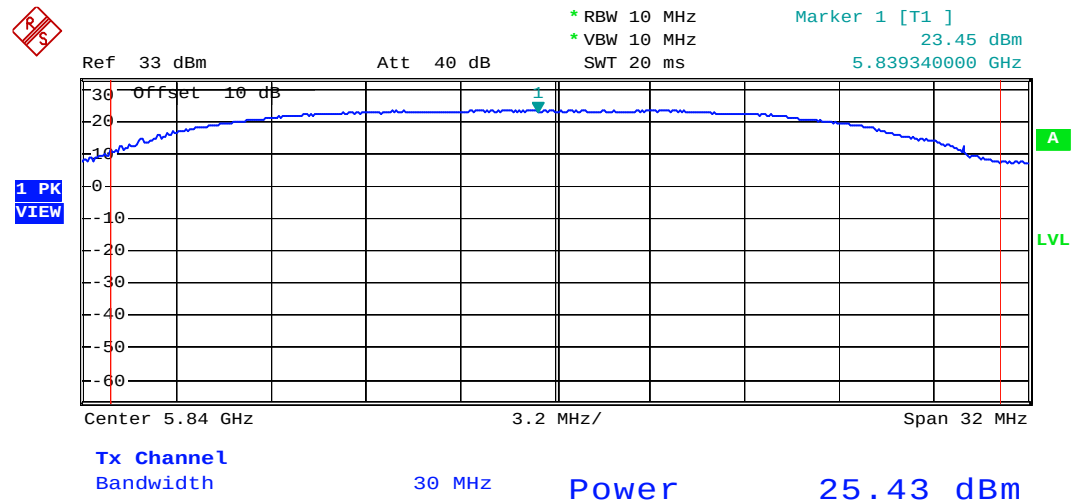
802.11a, 5800MHz, Data Rate 24 Mb/s



Date: 6.APR.2005 19:43:10

EQUIPMENT: Wireless AP7220

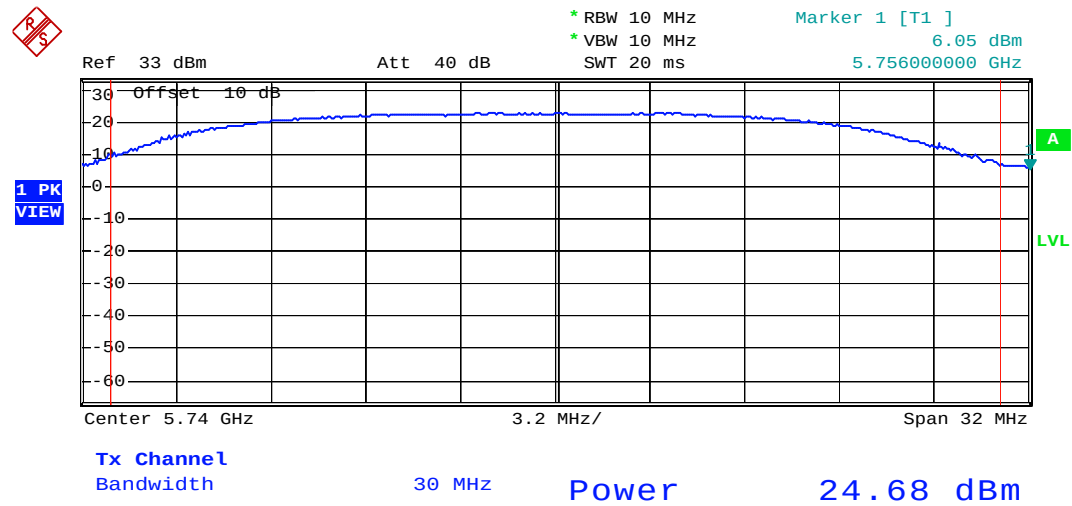
Auxiliary Port 1
802.11a, 5840MHz, Data Rate 24 Mb/s



Date: 6.APR.2005 19:38:27

EQUIPMENT: Wireless AP7220

Auxiliary Port 2
802.11a, 5740MHz, Data Rate 24 Mb/s

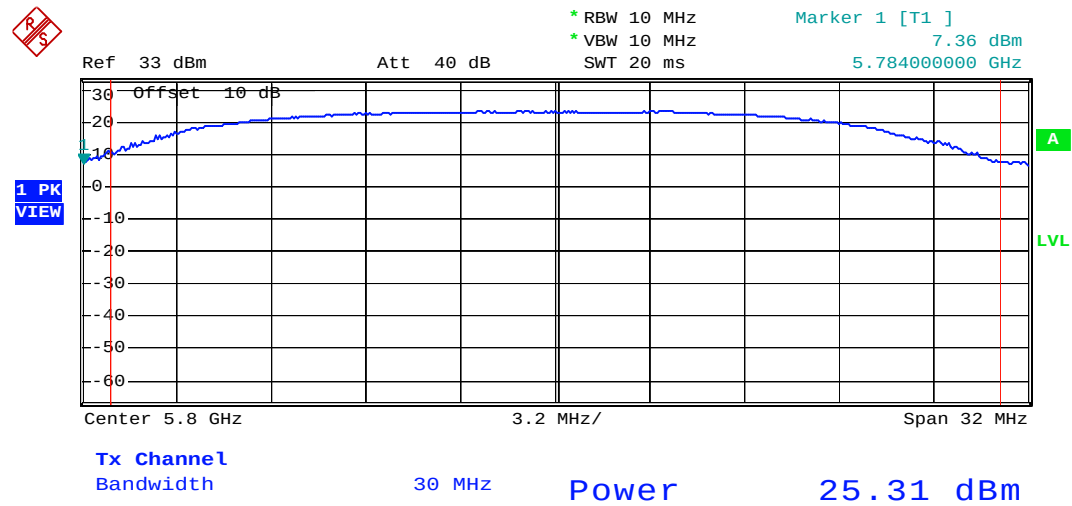


Date: 6.APR.2005 20:09:35

EQUIPMENT: Wireless AP7220

Auxiliary Port 2

802.11a, 5800MHz, Data Rate 24 Mb/s

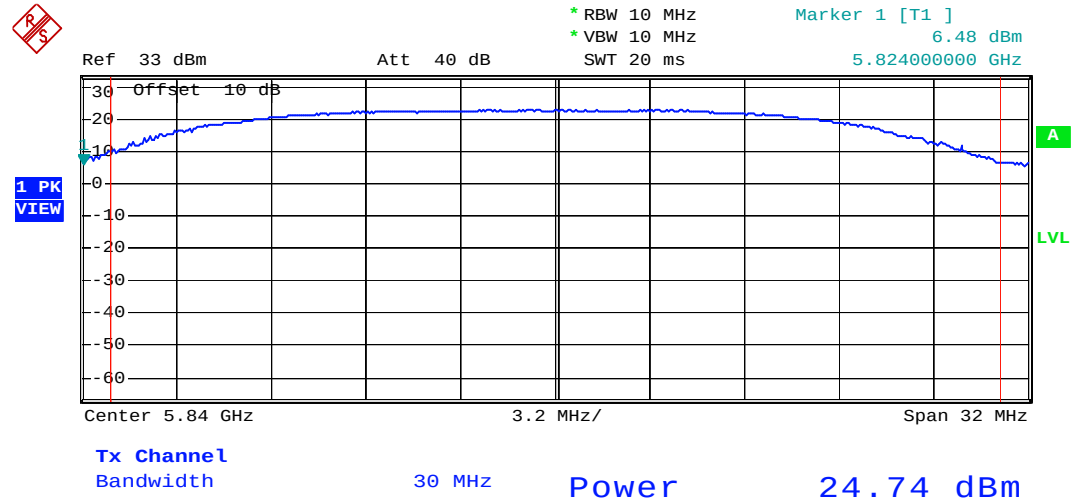


Date: 6.APR.2005 20:14:10

EQUIPMENT: Wireless AP7220

Auxiliary Port 2

802.11a, 5840MHz, Data Rate 24 Mb/s



Date: 6.APR.2005 20:29:30

EQUIPMENT: Wireless AP7220

Output Power Measurement for 2.4GHz and 5GHz Radio Under Extreme Voltage Conditions

Test Method: Average power for selected channels in 2.4GHz radio and 5GHz radio was verified under voltage extreme conditions using a wideband power meter with thermocouple detector.

Extreme Voltage: $\pm 15\%$ of AC Mains

Test Result: No major changed was noticed during the test.
Refer to the attached tables.

	120VAC	Low Voltage Extreme		High Voltage Extreme	
Frequency	Ave. Power	Ave. Power	Deviation	Ave. Power	Deviation
2412MHz	20.23dBm	20.26dBm	+0.1%	20.24dBm	+0.05%
5740MHz	18.78dBm	18.76dBm	-0.1%	18.78dBm	0%

Section 6. Spurious Emissions

Para. No.: 15.247 (c)

Test Performed By: Xu Jin	Date of Test: Mar 3, 2005
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Limit: All the spurs must at least 20dBc down from the fundamental within the authorized band. For the use of UNII band test procedure, the attenuation should be 30dBc from the fundamental.

Radiated emissions that fall in the restricted bands must comply with the 15.209 requirement.

Test Results: Complies

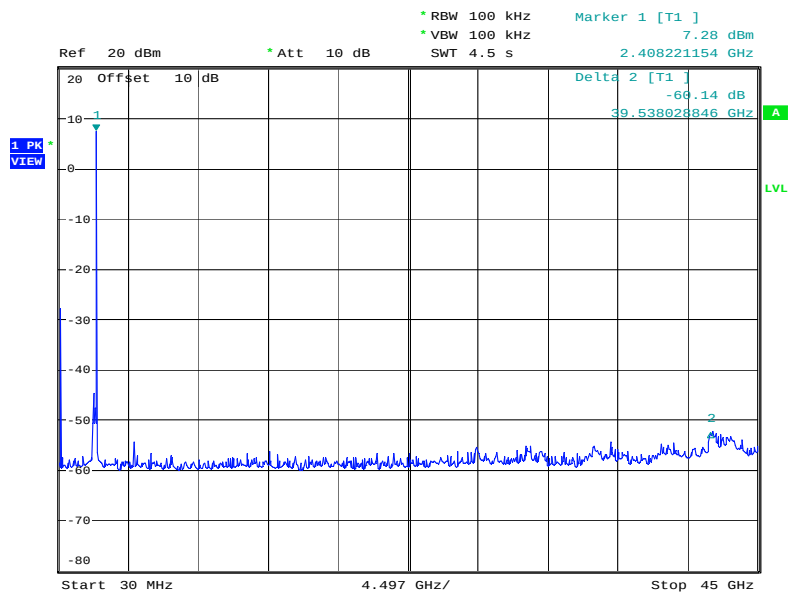
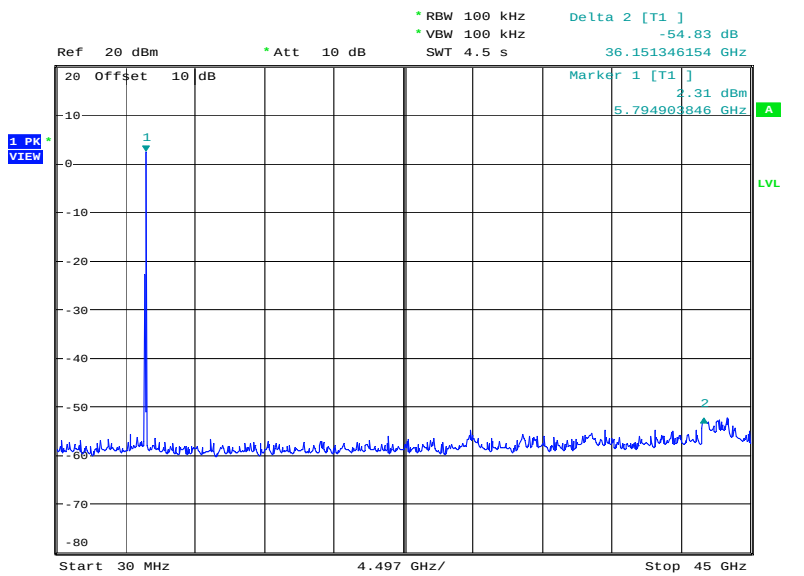
Measurement Data: See attached Plots and table.

Emissions were searched for all possible antenna configurations. For 2.4GHz radio, 0dBi PIFA integral antenna and 4dBi whip antenna was investigated. For 5GHz radio, 10.7dBi integral antenna, 13dBi H&S antenna, 18dBi & 23dBi Andrew antenna had also been investigated.

The DUT was searched to the 10th harmonic and for low, medium and high frequencies at each frequency band. Only worst case was reported, which was found at 2.4GHz radio with whip antenna.

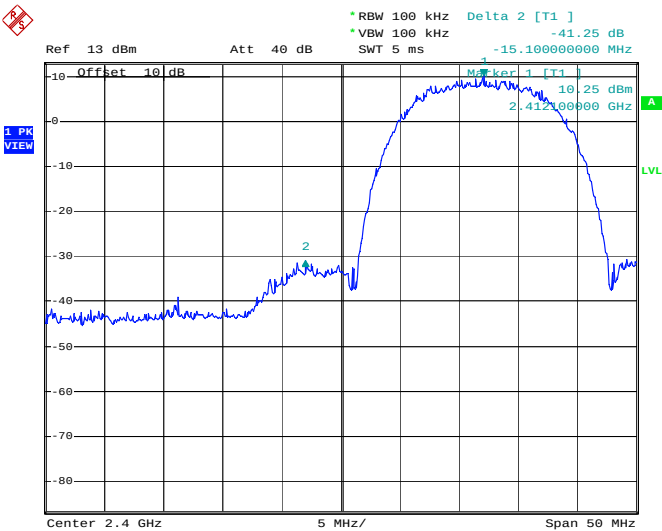
EQUIPMENT: Wireless AP7220

802.11a Conducted Emissions



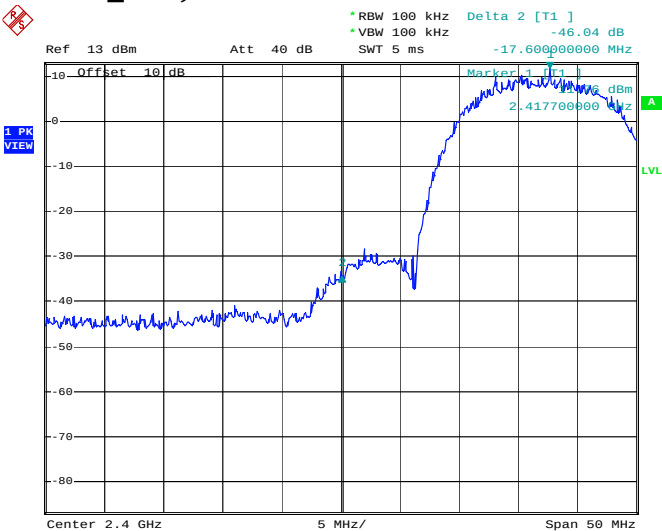
EQUIPMENT: Wireless AP7220

Band Edge Check
802.11b_CH1, 2412MHz



Date: 6.APR.2005 22:00:25

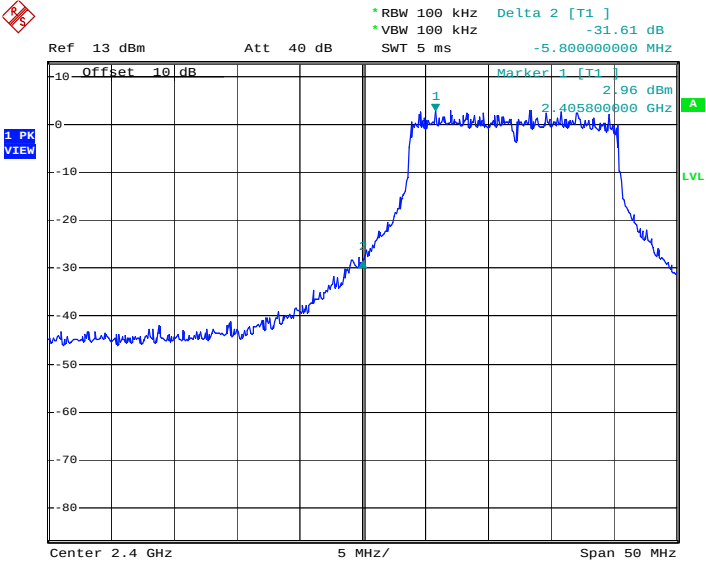
802.11b_Ch2, 2417MHz



Date: 6.APR.2005 22:01:29

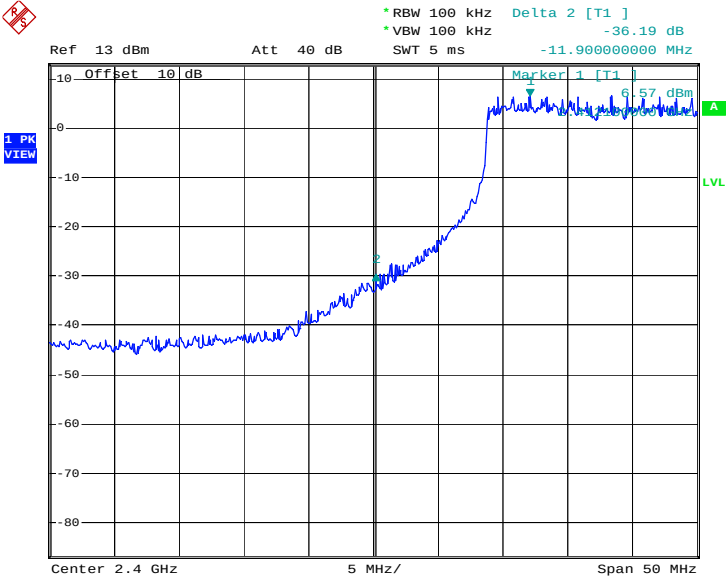
EQUIPMENT: Wireless AP7220

802.11g_Ch1, 2412MHz



Date: 6.APR.2005 22:12:06

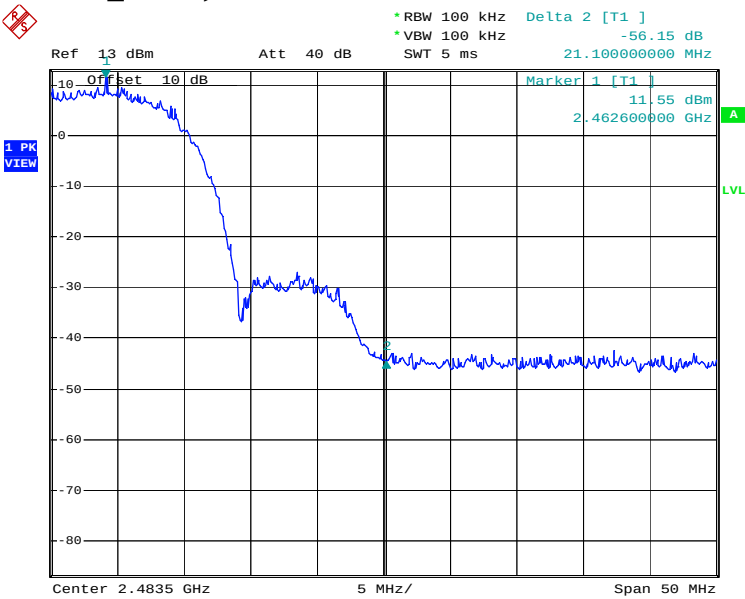
802.11g_CH2, 2417MHz



Date: 6.APR.2005 22:13:16

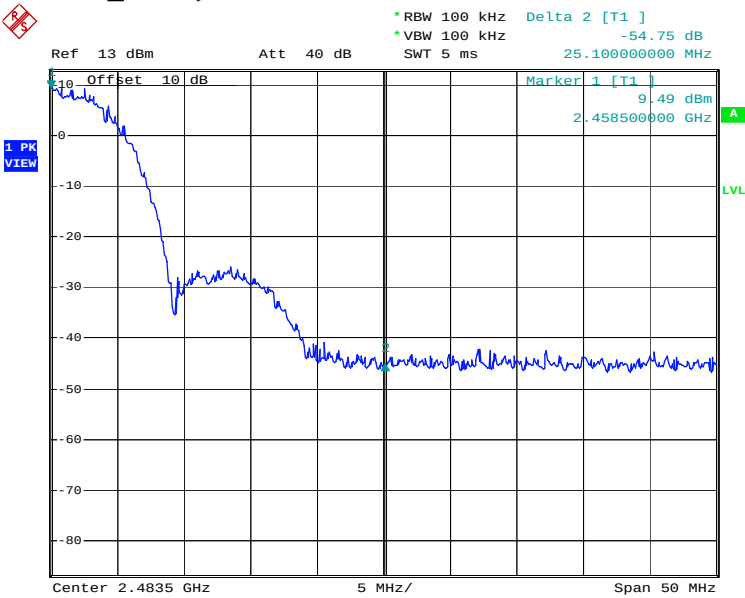
EQUIPMENT: Wireless AP7220

802.11b_CH11, 2462MHZ



Date: 6.APR.2005 22:02:57

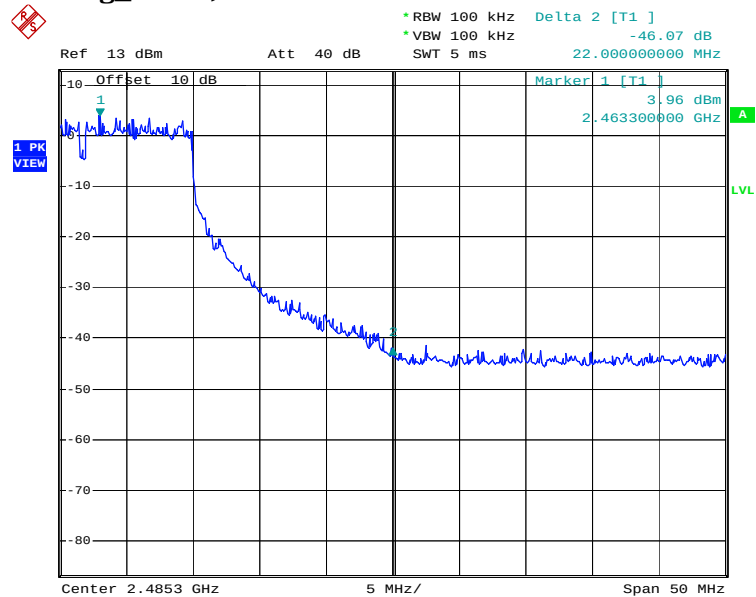
802.11b_Ch10, 2457MHZ



Date: 6.APR.2005 22:07:59

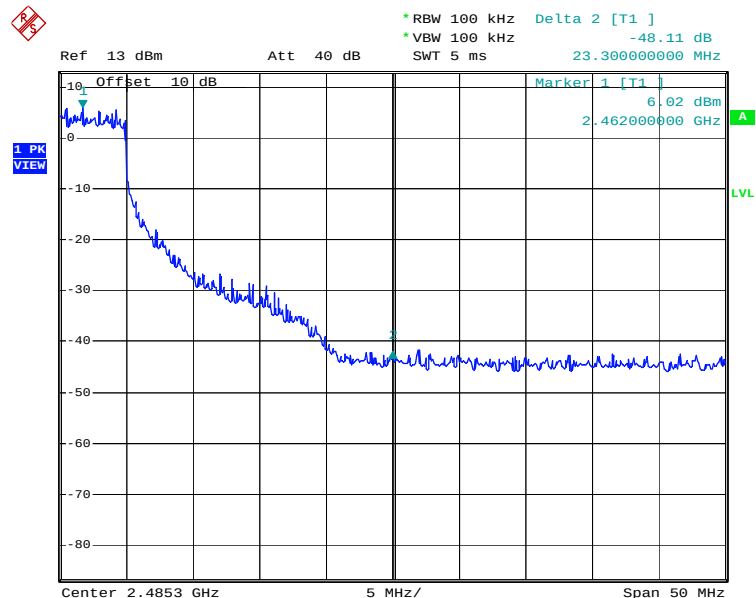
EQUIPMENT: Wireless AP7220

802.11g_CH11, 2462MHz



Date: 6.APR.2005 22:14:31

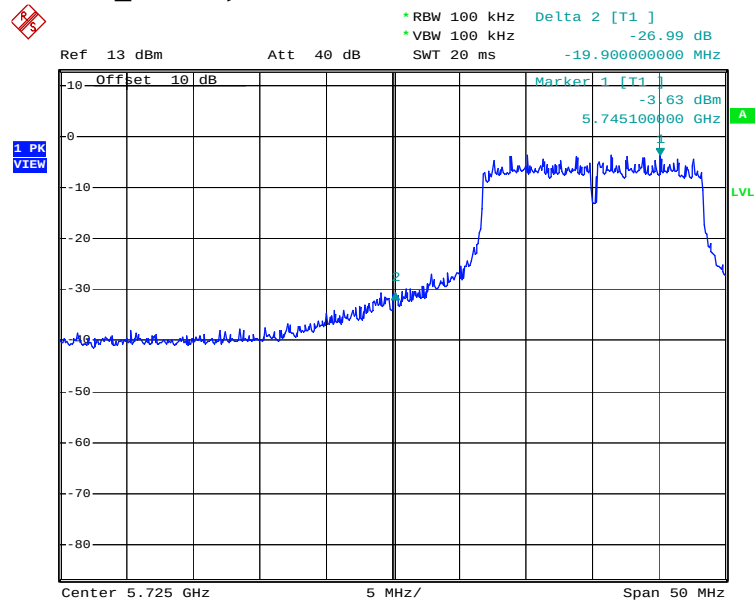
802.11g_CH10, 2457MHz



Date: 6.APR.2005 22:15:37

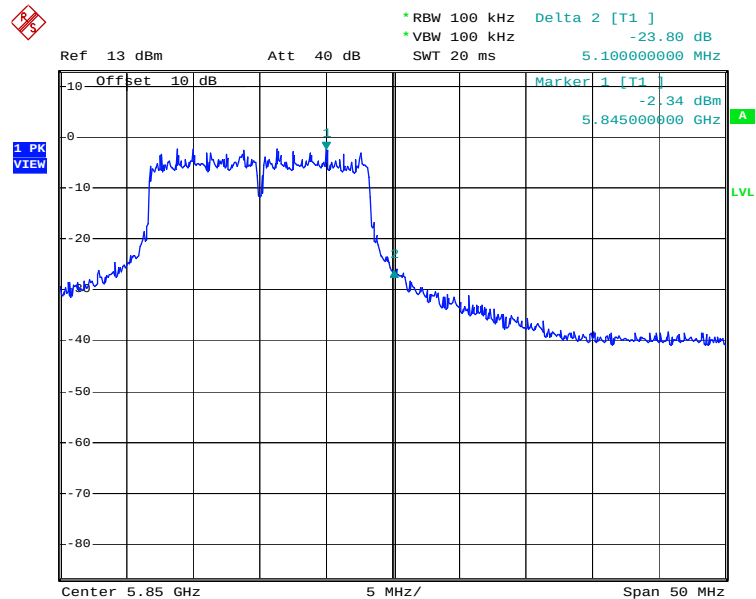
EQUIPMENT: Wireless AP7220

802.11a_CH148, 5740MHz



Date: 6.APR.2005 21:54:27

802.11a_CH168, 5840MHz



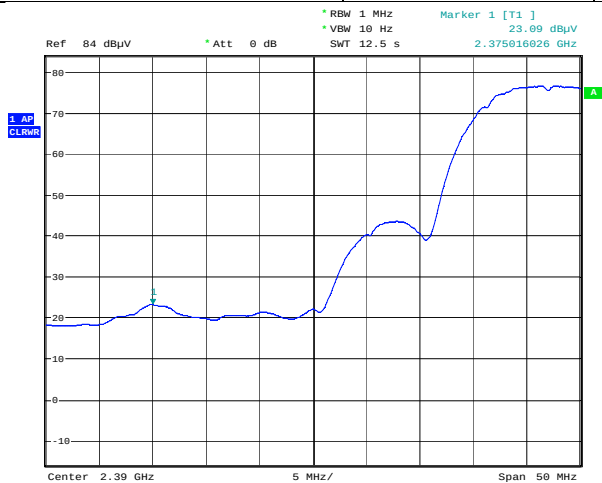
Date: 6.APR.2005 21:52:58

EQUIPMENT: Wireless AP7220

Restricted Band Check

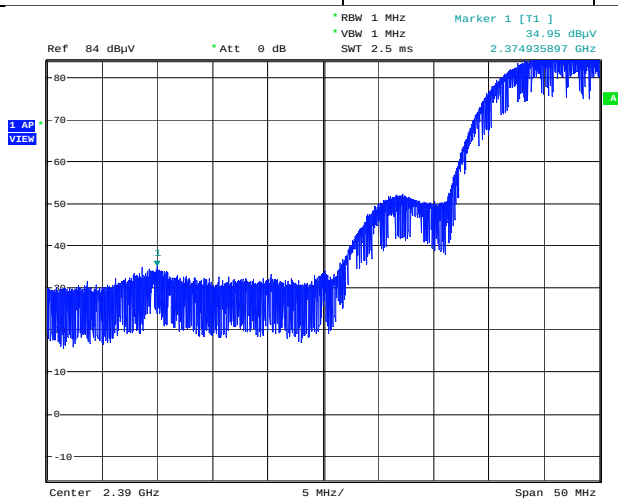
Lower Band Edge, 802.11b_Ch1, 2412MHz

Band Edge Level (Avg) (dB μ v)	Af (dB/m)	Cable Loss(dB)	Emission Level(dB μ v/m)	Limit (dB μ v/m)
23.09	28.3	0.6	51.99	54

802.11b_1
Date: 3.MAR.2005 15:21:08

Lower Band Edge, 802.11b_Ch1, 2412MHz

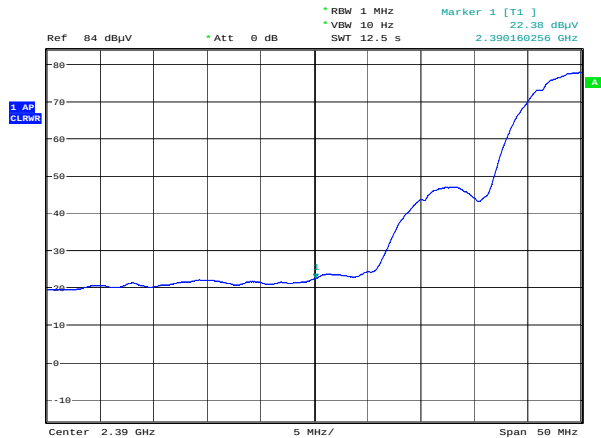
Band Edge Level (PK) (dB μ v)	Af (dB/m)	Cable Loss(dB)	Emission Level(dB μ v/m)	Limit (dB μ v/m)
34.95	28.3	0.6	63.85	74

802.11b_1
Date: 3.MAR.2005 15:22:10

EQUIPMENT: Wireless AP7220

Lower Band Edge, 802.11b_Ch2, 2417MHz

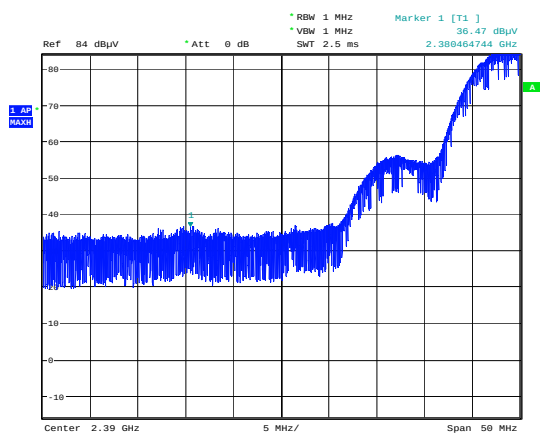
Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
22.38	28.3	0.6	51.28	54



802.11b_2
Date: 3.MAR.2005 15:27:43

Lower Band Edge, 802.11b_Ch2, 2417MHz

Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
36.43	28.3	0.6	65.33	74

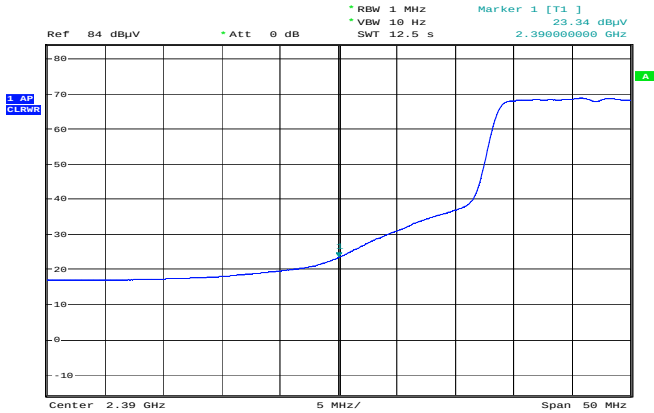


802.11b_2
Date: 3.MAR.2005 15:26:38

EQUIPMENT: Wireless AP7220

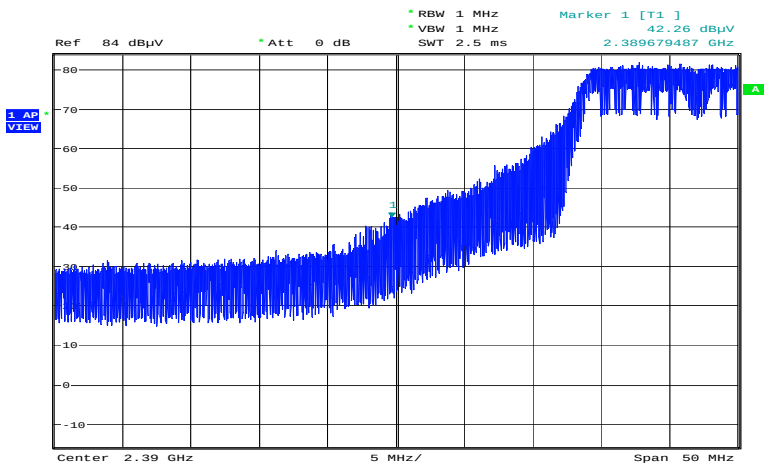
Lower Band Edge, 802.11g_Ch1, 2412MHz

Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
23.34	28.3	0.6	52.24	54



Lower Band Edge, 802.11g_Ch1, 2412

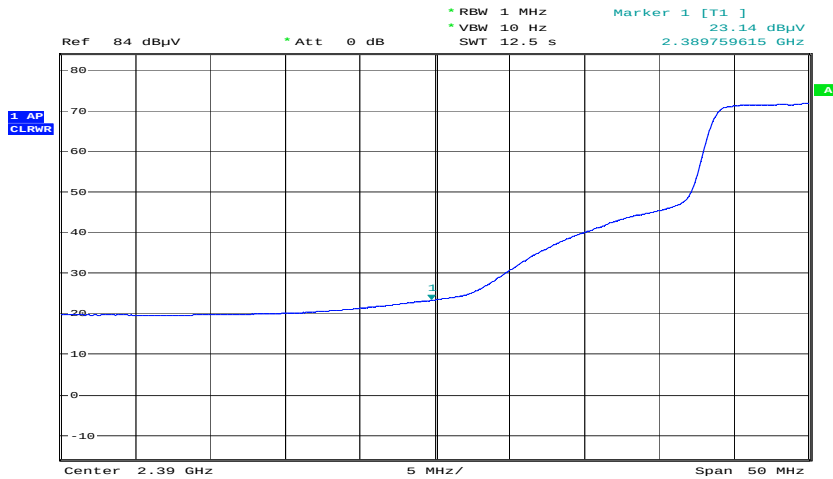
Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
42.36	28.3	0.6	71.26	74



EQUIPMENT: Wireless AP7220

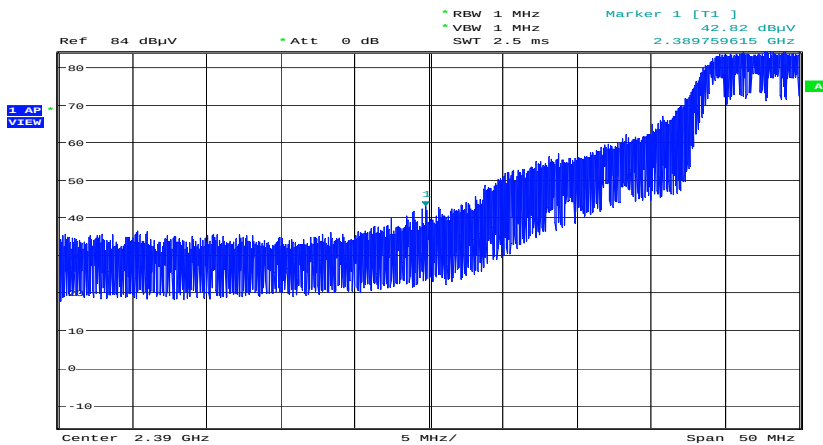
Lower Band Edge, 802.11g_Ch2, 2417MHz

Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
23.14	28.3	0.6	52.04	54



Lower Band Edge, 802.11g_Ch2, 2417MHz

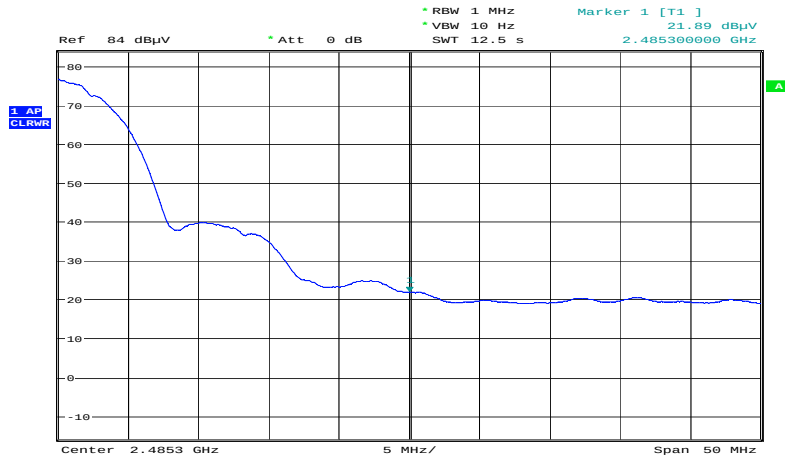
Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
42.32	28.3	0.6	71.22	74



EQUIPMENT: Wireless AP7220

Upper Band Edge, 802.11b_ Ch10, 2457MHz

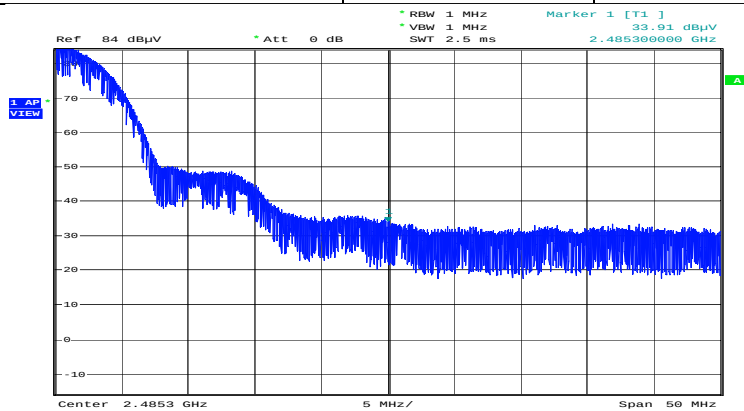
Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
21.39	28.3	0.6	50.29	54



802.11b_10
Date: 3.MAR.2005 15:34:56

Upper Band Edge, 802.11b_ Ch10, 2457MHz

Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
33.91	28.3	0.6	62.81	74

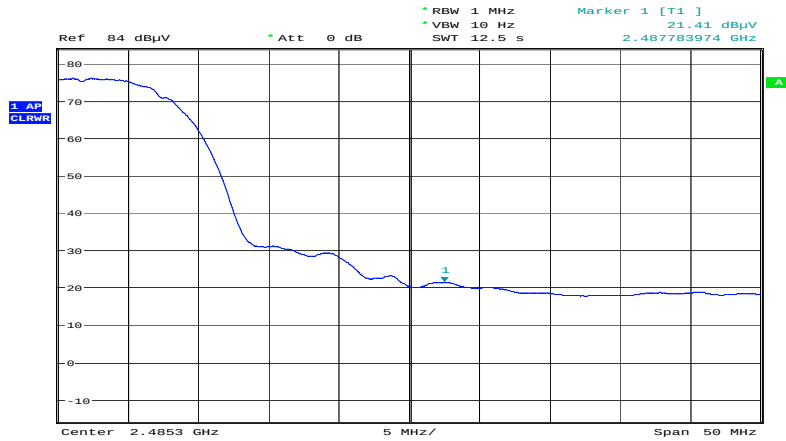


802.11b_10
Date: 3.MAR.2005 15:34:10

EQUIPMENT: Wireless AP7220

Upper Band Edge, 802.11b_ Ch11, 2462MHz

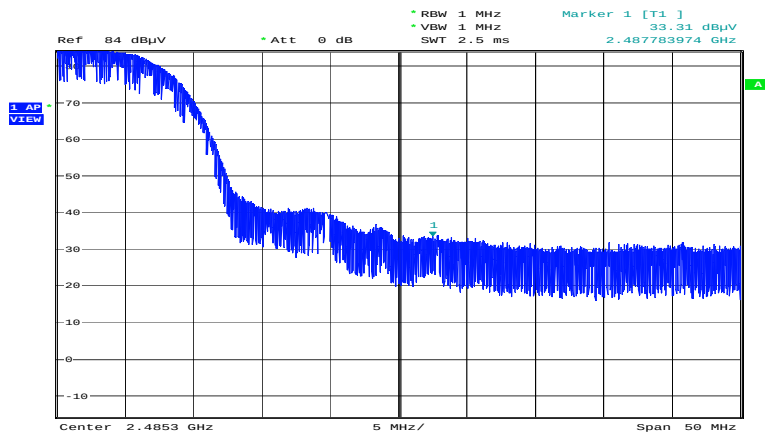
Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
21.41	28.3	0.6	50.31	54



802.11b_11
Date: 3.MAR.2005 15:30:39

Upper Band Edge, 802.11b_ Ch11, 2462MHz

Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
33.31	28.3	0.6	62.21	74

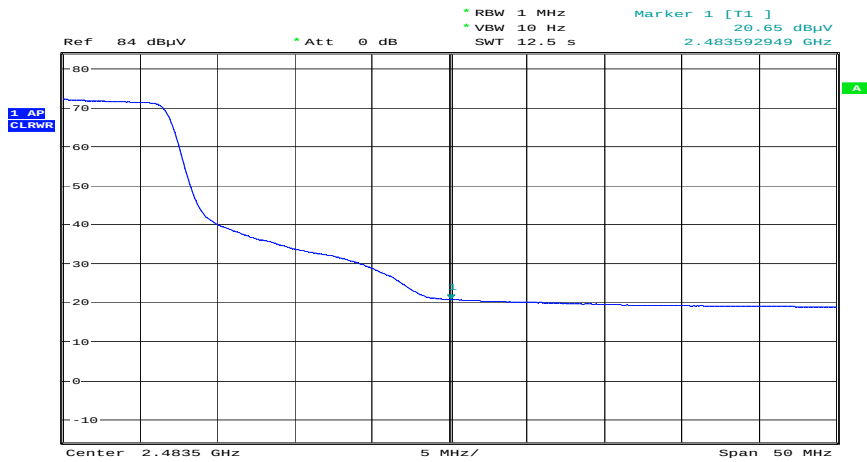


802.11b_11
Date: 3.MAR.2005 15:31:36

EQUIPMENT: Wireless AP7220

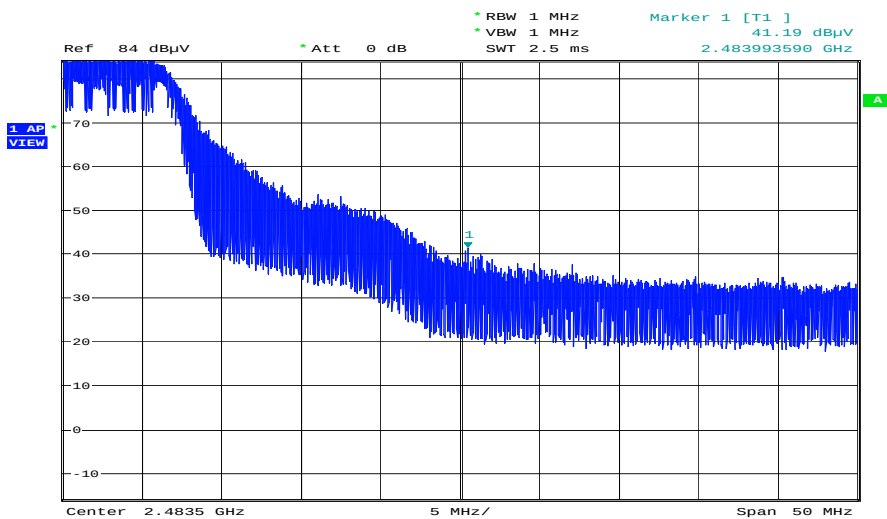
Upper Band Edge, 802.11g_Ch10, 2457MHz

Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
20.65	28.3	0.6	49.55	54



Upper Band Edge, 802.11g_Ch10, 2457MHz

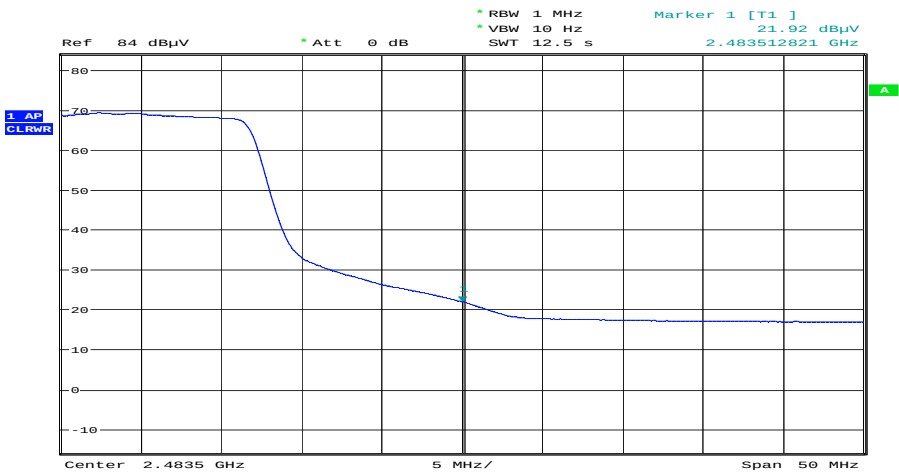
Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
41.19	28.3	0.6	70.09	74



EQUIPMENT: Wireless AP7220

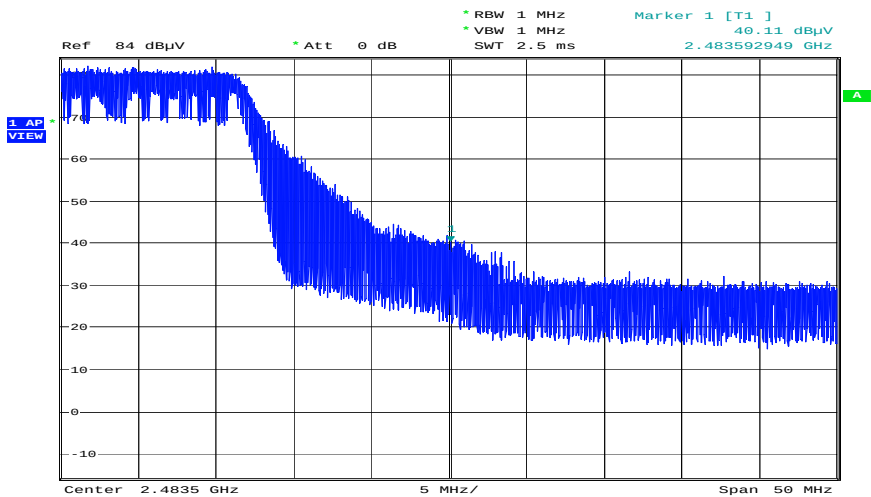
Upper Band Edge, 802.11g_ Ch11, 2462MHz

Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
21.92	28.3	0.6	50.82	54



Upper Band Edge, 802.11g_ Ch11, 2462MHz

Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
40.11	28.3	0.6	69.01	74



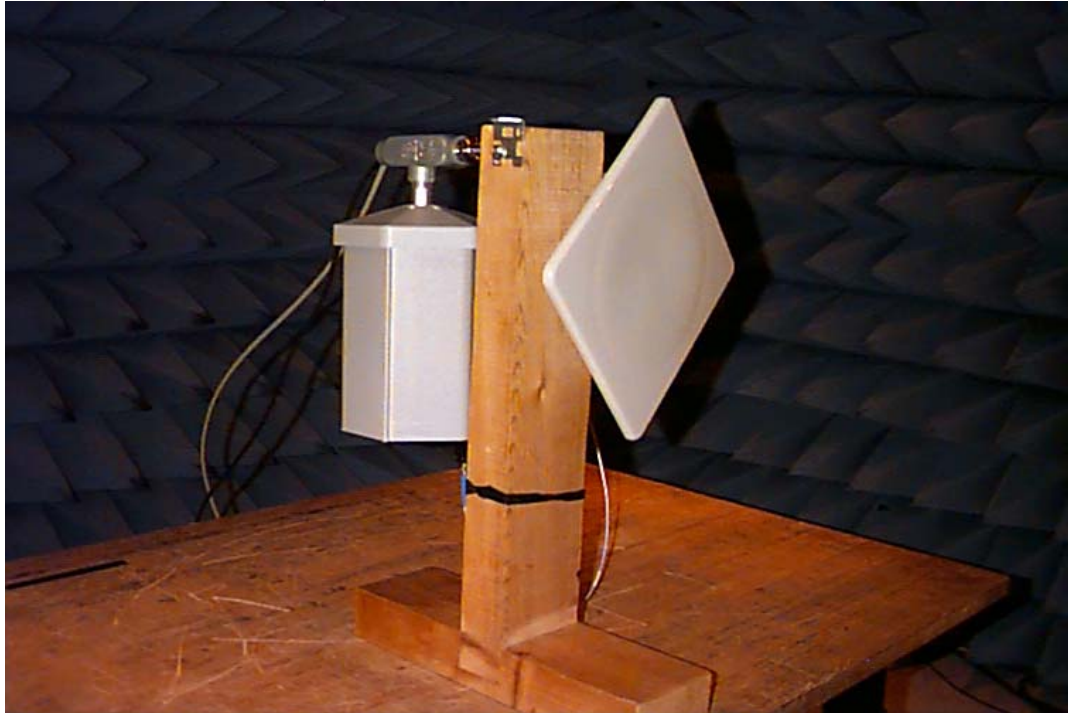
EQUIPMENT: Wireless AP7220

Test Data: Radiated Emissions

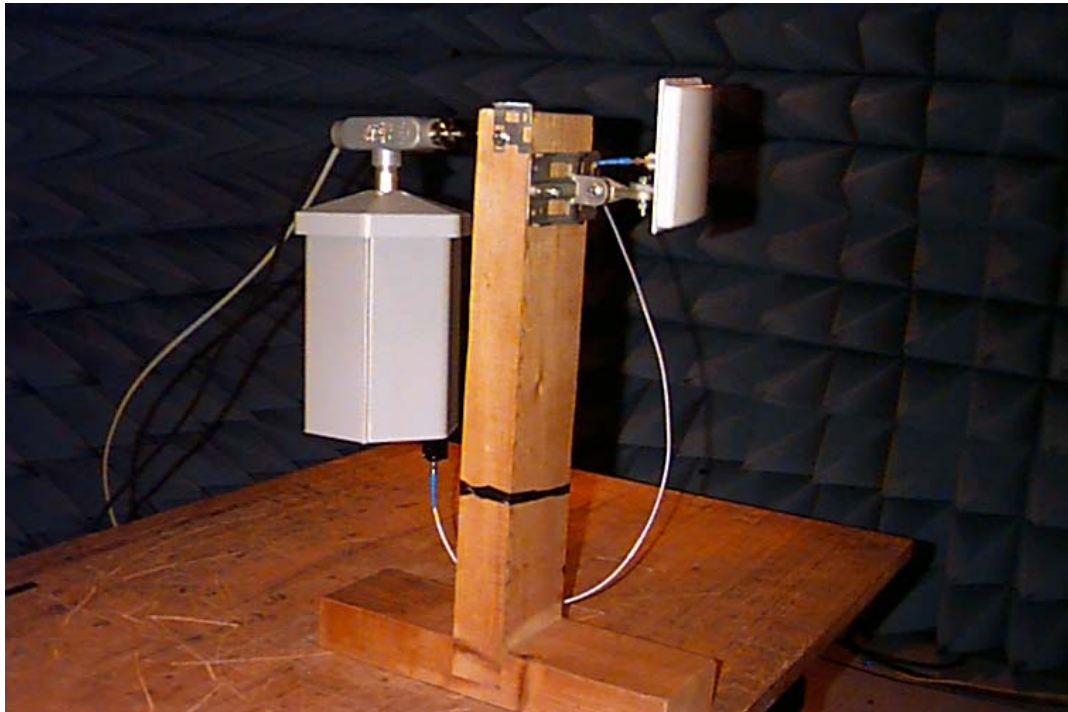
Test Date: Mar 8, 2005										
Engineer's Name: Xu Jin										
Tested as per: Table Top										
Mains Input Voltage: 120VAC							Mains Input Frequency: 60Hz			
Test Distance (meters): 3							Dome: 1			
Freq. (MHz)	Ant.	Pol. V/ H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
33.2000	BC2	H	11.0	12.8	N/A	0.8	24.6	40.0	15.4	Q-Peak
250.0000	BC2	H	18.3	16.7	N/A	2.0	37.0	46.0	9.0	Q-Peak
105.7000	BC2	H	17.0	9.8	N/A	1.3	28.1	43.5	15.4	Q-Peak
107.6000	BC2	V	15.0	10.8	N/A	1.3	27.0	43.5	16.5	Q-Peak
212.4000	BC2	V	14.3	15.7	N/A	1.8	31.8	43.5	11.7	Q-Peak
297.7000	BC2	V	9.3	18.6	N/A	2.3	30.2	46.0	15.8	Q-Peak
4824.0000	Horn1	H	57.3	33.2	53.0	7.3	44.8	54.0	9.2	Average
4824.0000	Horn1	H	65.4	33.2	53.0	7.3	52.9	74.0	21.1	Peak
Legend:										
Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole										
Detector Legend: Q-Peak = 120kHz RBW, Average = 1.0MHz RBW, 10Hz VBW, Peak=1.0MHz RBW, 1.0MHz VBW										

EQUIPMENT: Wireless AP7220

5GHz Andrews Antenna, 23dBi

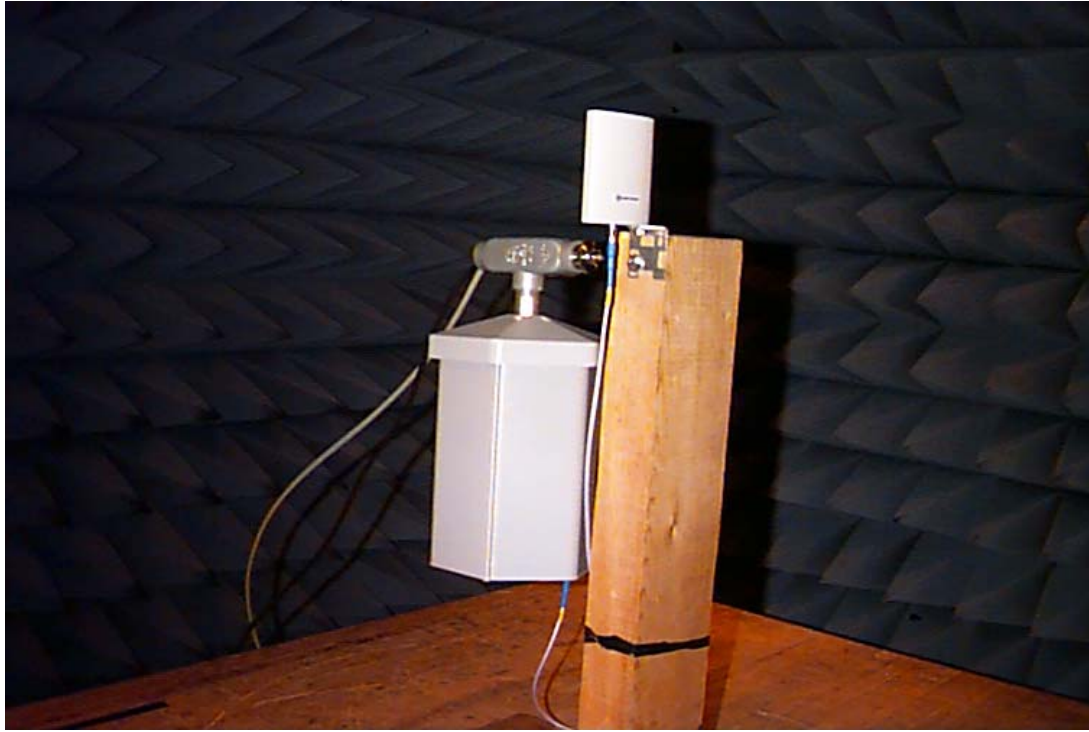


5GHz Andrews Antenna 18dBi

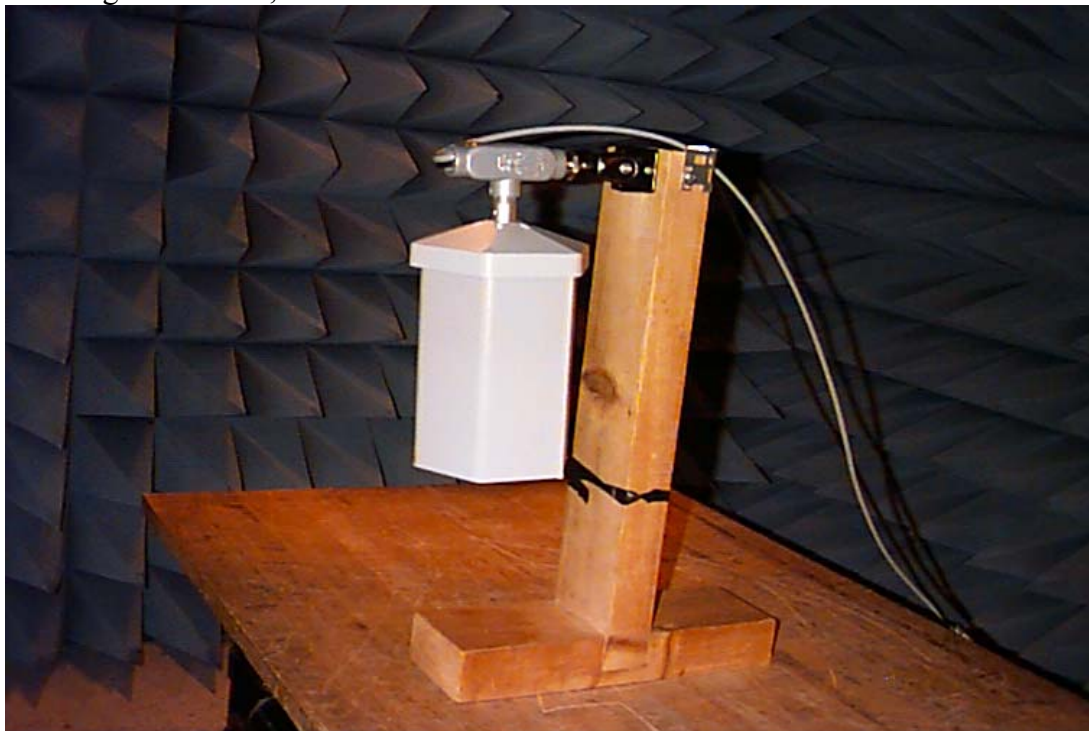


EQUIPMENT: Wireless AP7220

5GHz H&S SPA Antenna, 13dBi



5G Integral Antenna, 10.7dBi



EQUIPMENT: Wireless AP7220

2.4GHz Nearson Whip Antenna, 4dBi



2.4GHz PIFA Antenna (integral), 0dBi



Section 7. Peak Power Spectral Density

Para. No.: 15.247 (d)

Test Performed By: Xu Jin	Date of Test: Mar 4, 2005
----------------------------------	----------------------------------

Limit: +8dBm/3kHz

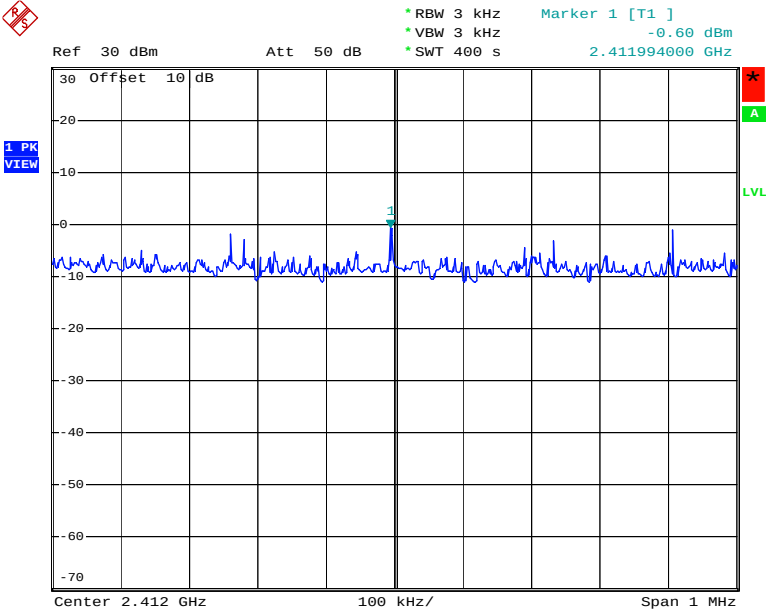
Test Results: Complies

Measurement Data: See Attached Plots

PPSD (dBm/3kHz)			
802.11b	2412MHz	2432MHz	2462MHz
	-0.6	1.63	1.81
802.11g	2412MHz	2432MHz	2462MHz
	-8.14	-3.39	-2.74
802.11a	5740MHz	5800MHz	5840MHz
	-8.68	-7.06	-7.71

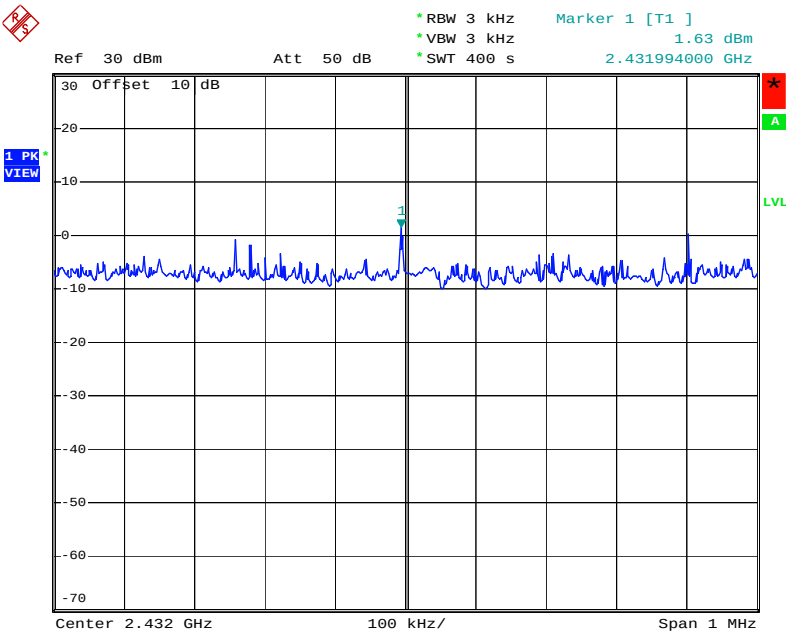
EQUIPMENT: Wireless AP7220

802.11b_Ch1, 2412MHz



Date: 6.APR.2005 16:12:32

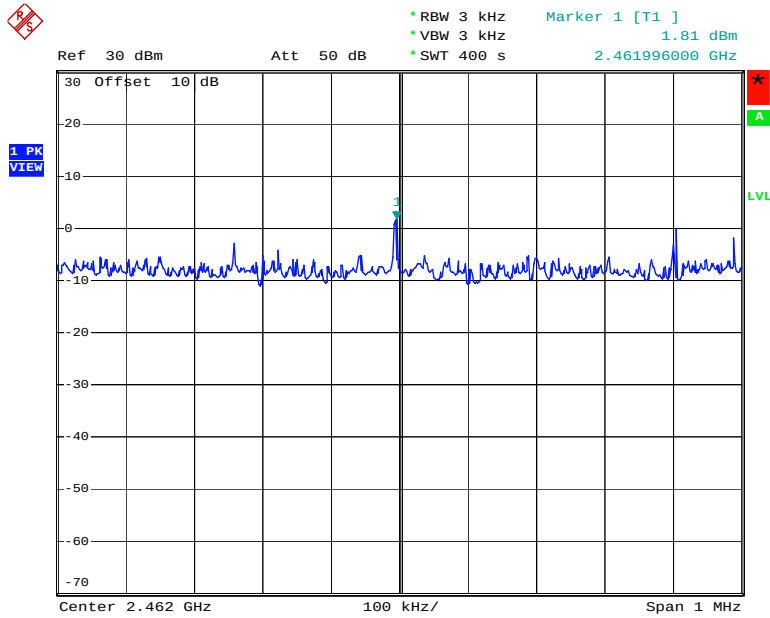
802.11b_Ch5, 2432MHz



Date: 6.APR.2005 16:22:53

EQUIPMENT: Wireless AP7220

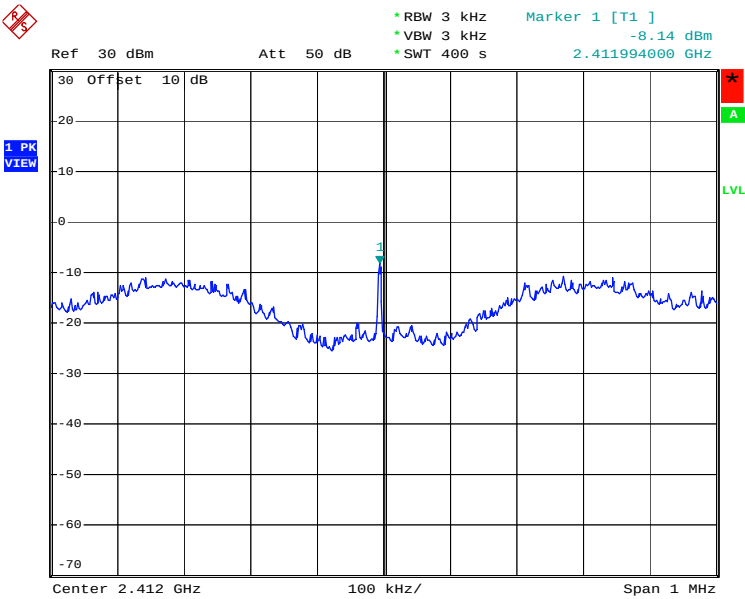
802.11b_Ch11, 2462MHz



Date: 6.APR.2005 16:34:55

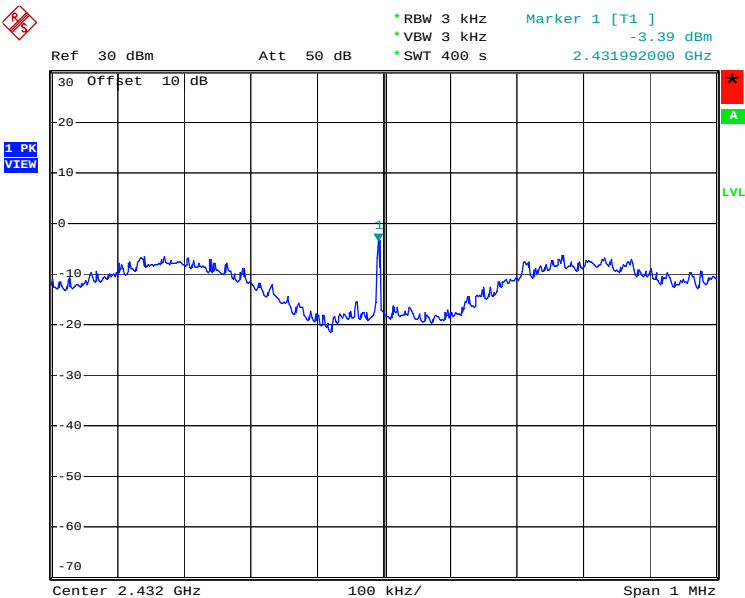
EQUIPMENT: Wireless AP7220

802.11g_Ch1, 2412MHz



Date: 6.APR.2005 16:46:21

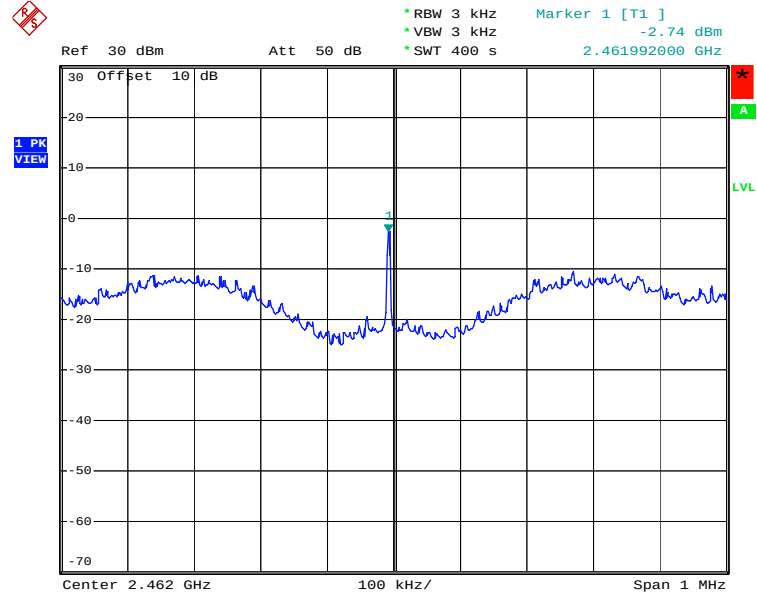
802.11g_Ch5, 2432MHz



Date: 6.APR.2005 16:55:15

EQUIPMENT: Wireless AP7220

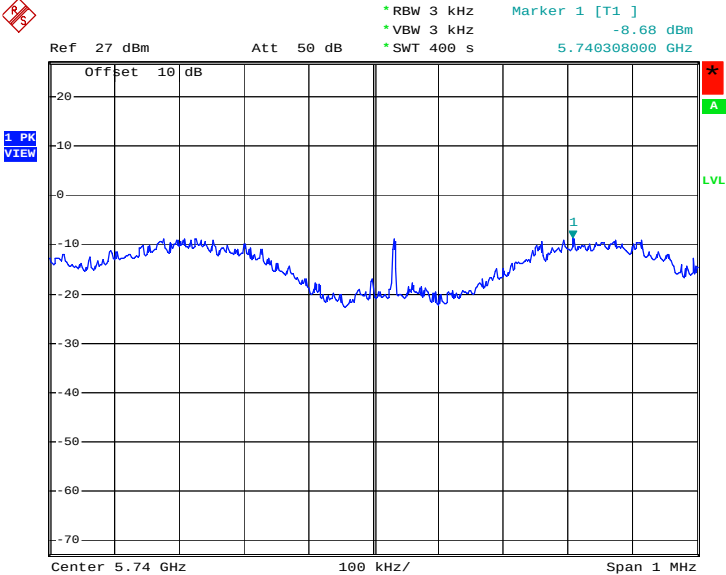
802.11g_Ch11, 2462MHz



Date: 6.APR.2005 17:04:34

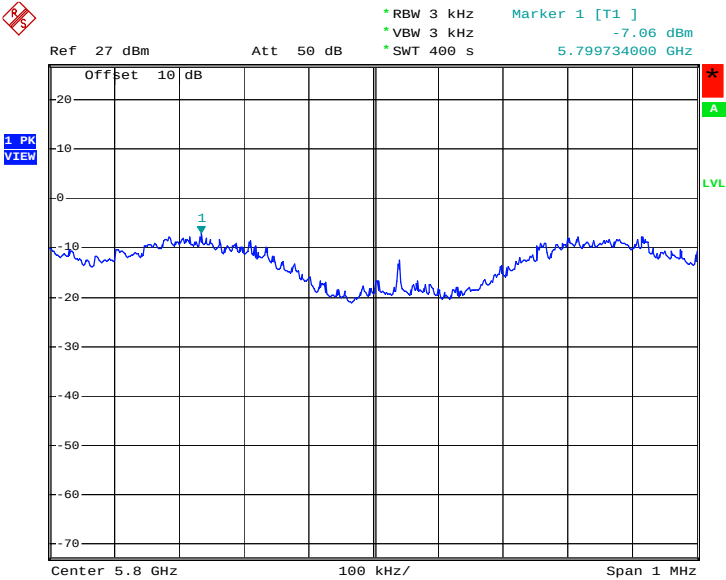
EQUIPMENT: Wireless AP7220

802.11a_Ch148, 5740MHz



Date: 6.APR.2005 17:57:47

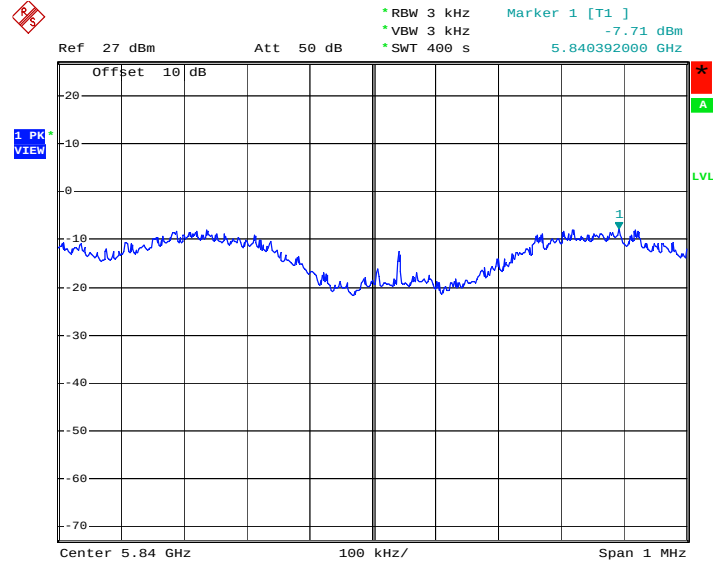
802.11a_Ch160, 5800MHz



Date: 6.APR.2005 18:08:24

EQUIPMENT: Wireless AP7220

802.11a_Ch 168, 5840MHz



Date: 6.APR.2005 18:17:16

Section 8. RF Exposure Evaluation

- (1) Co-location compliance for multiple frequency exposure criteria to the power density exposure limit is detailed in the table(s) below.
- (2) This device will be professionally installed (Fixed) to provide a minimum separation distance of 50cm from all persons for all integral/external antennas, except 100cm for external 23dBi antennas for outdoor operation as detailed in the co-location compliance table below. This device will not be co-located or operated in conjunction with any other antenna or transmitter not described in this application.
- (3) This device contains one 2.4GHz access radio and one 5GHz backhaul radio. This device will only be operated according to the exposure conditions described in this application. End users and installers will be provided with antenna installation and transmitter operating conditions for satisfying RF exposure compliance.

EQUIPMENT: Wireless AP7220

**Co-location Compliance Table for Integrated 802.11b/g & 802.11a Radios
Indoor/Outdoor Operation**

802.11b/g Radio Power Density (mW/cm ²)		802.11a Radio Power Density (mW/cm ²)			Total Density for co-located radios (mW/cm ²)	General Exposure Limit (mW/cm ²)	
0dBi (integral)	4dBi	10.7dBi (integral)	13dBi	18dBi			
0.005045	-----	0.047081	-----	-----	0.052126	1.0	Complies
0.005045	-----	-----	0.079956	-----	0.085001	1.0	Complies
0.005045	-----	-----	-----	0.252843	0.257888	1.0	Complies
-----	0.012672	0.047081	-----	-----	0.059753	1.0	Complies
-----	0.012672	-----	0.079956	-----	0.092628	1.0	Complies
-----	0.012672	-----	-----	0.252843	0.265515	1.0	Complies

2.4GHz, 802.11b/g

(3) Nearson Whip, S151AM-2450 151 = 4dBi

(4) PIFA Integral, NTE30211 = 0dBi

5GHz, 802.11a

(5) Integral antenna = 10.7dBi

(6) H&S 5600/40/14/0/V = 13dBi

(7) Andrews #FPA5150-18-1 = 18dBi

**Co-location Compliance Table for Integrated 802.11b/g & 802.11a Radios
Outdoor Operation**

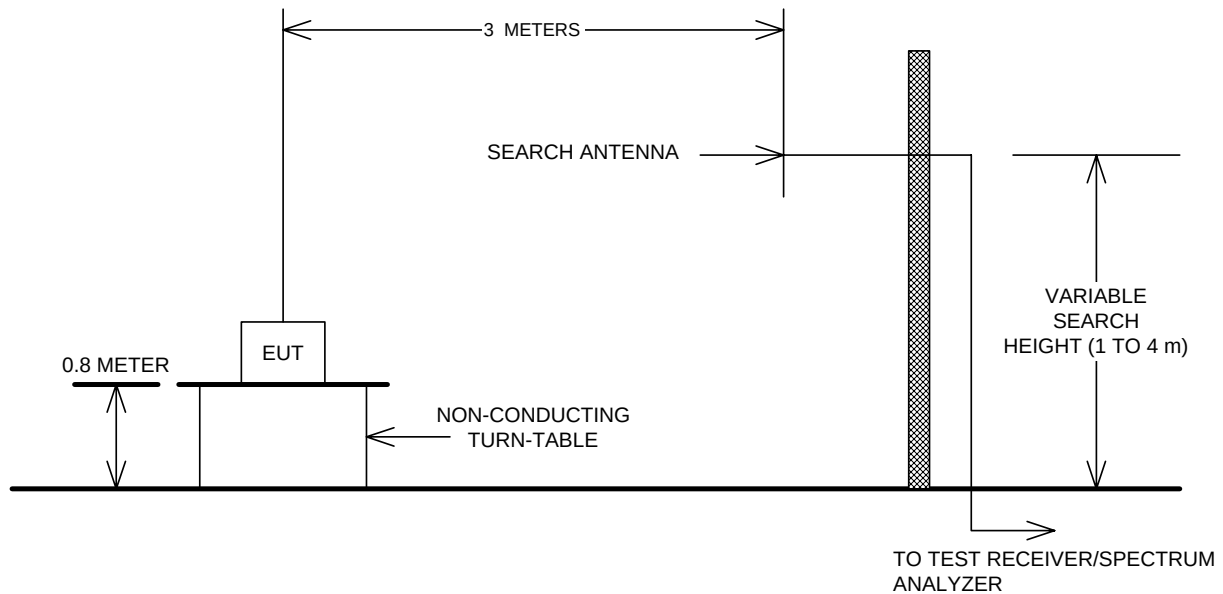
802.11b/g Radio Power Density (mW/cm ²)		802.11a Radio Power Density (mW/cm ²)	Total Density for co-located radios (mW/cm ²)	General Exposure Limit (mW/cm ²)	
0dBi	4dBi	23dBi			
-----	0.012672	0.199890	0.212562	1.0	Complies
0.005045	-----	0.199890	0.204935	1.0	Complies

5GHz, 802.11a

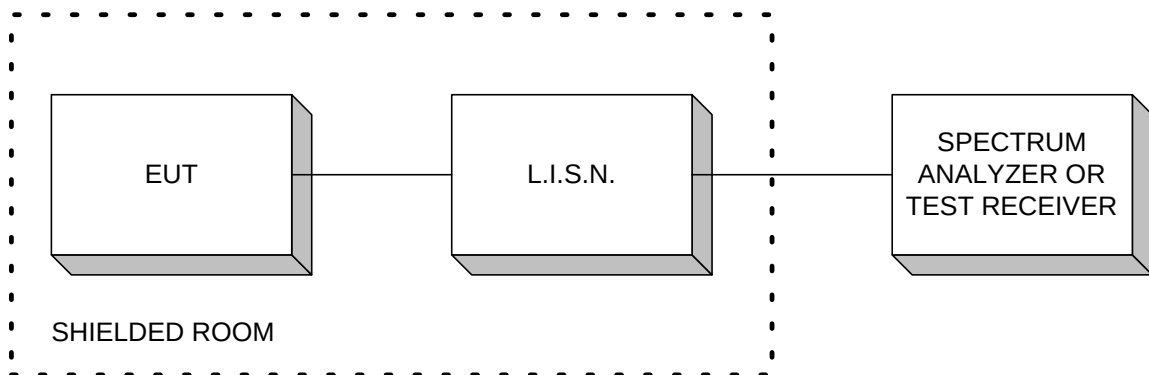
(1) Andrews #FPA5150-23PM-1 = 23dBi

Section 9. Block Diagrams

Test Site For Radiated Emissions

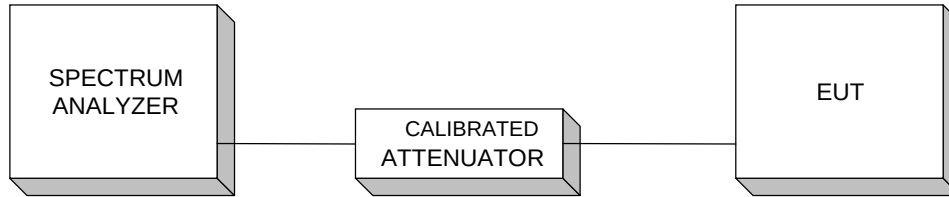


Conducted Emissions

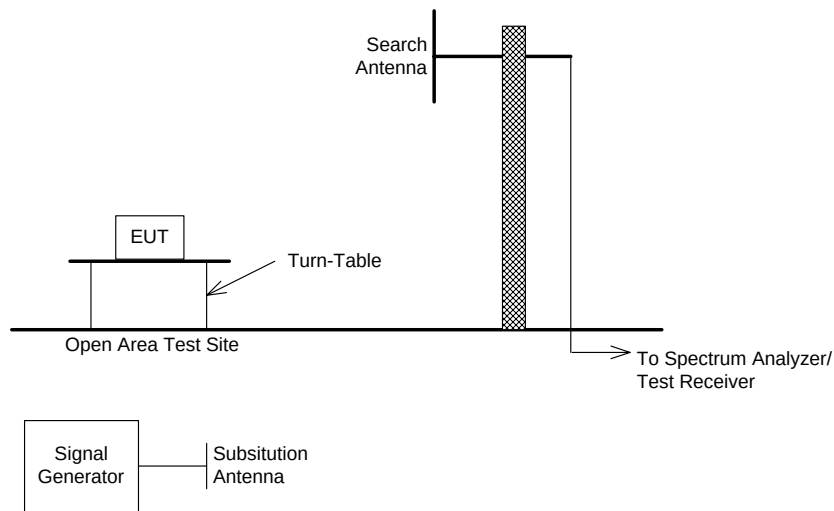


EQUIPMENT: Wireless AP7220

Conducted Measurements



TIA/EIA 603, Signal Substitution Method



*EQUIPMENT: Wireless AP7220***Section 10. Test Equipment List**

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	Horn Antenna #2	EMCO	3115	FA000825	Dec. 10/04	Dec. 10/05
1 Year	Horn Antenna #1	EMCO	3115	FA000649	Dec. 22/04	Dec. 22/05
1 Year	Biconical Antenna #1	EMCO	3109	FA000805	April 23/04	April 23//05
1 Year	Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug 26/04	Aug. 26/05
1 Year	1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June. 18/04	June. 18/05
1 Year	2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	June. 18/04	June. 18/05
1 Year	4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	June. 18/04	June. 18/05
COU	5.0 - 18GHz Amplifier	Narda	DWT-186N23U40	FA001409	COU	COU
COU	18.0 – 26.0 GHz Amplifier	Narda	BBS-1826N612	FA001550	COU	COU
3 Year	Signal Generator	Rohde & Schwarz	SMIQ03	FA001091	April 20/04	Sept. 25/05
1 Year	Signal Generator	Rohde & Schwarz	SMIQ06B	FA001878	May 18/04	May 18/05
1 Year	Power Meter	Hewlett-Packard	E4418B	FA001413	May 25/04	May 25/05
1 Year	High Pass Filter (3.9GHz)	K&L	11SH10-4000	FA001340	COU	COU
1 Year	Power Sensor	Hewlett-Packard	8487A	Fa001908	May 11/04	May 11/05
1 Year	LISN	EMCO	4825/2	FA001545	Jan 13/05	Jan 13/06
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						