



Test Report: 5W40808

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

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

FCC ID: AB6NTE301BA

In Accordance With: **FCC Part 15.407, Subpart E**

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



Authorized By: Sim Jagpal, General Manager

Date: 30 March 2005

Total Number of Pages: 54

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EQUIPMENT: Wireless AP7220

Section 1. Summary of Test Results

General

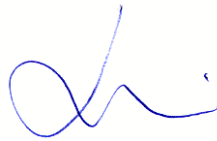
All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15.407, Subpart E. 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: 30 March 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.

EQUIPMENT: Wireless AP7220

Summary Of Test Data

Name Of Test	Para. No.	Result
Powerline Conducted Emissions	15.207(a)	Complies
Emission Bandwidth	15.403(i)	Complies
Peak Conducted Transmit Output Power	15.407(a)(2)	Complies
Spurious Emissions	15.407(b)	Complies
Peak Power Spectral Density	15.407(a)(2)	Complies
Peak Excursion Measurement	15.407(a)(6)	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:	8 Feb. 2005
Nemko Identification No.:	#6
Operating Frequency(s)	5250MHz-5350MHz
Rated Power (maximum):	19.0dBm
Modulation/Access Method:	802.11a
Antenna Data:	(1) Integral antenna = 10.7dBi (2) H&S 5600/40/14/0/V = 13dBi

EQUIPMENT: Wireless AP7220

Section 3. Powerline Conducted Emissions

Para. No.: 15.207 (a)

Test Performed By: Xu Jin**Date of Test:** Mar. 10, 2005**Test Results:** Complies.**Measurement Data:** See attached graph(s).

Limits For Conducted Disturbance At The Mains Ports Of Class B

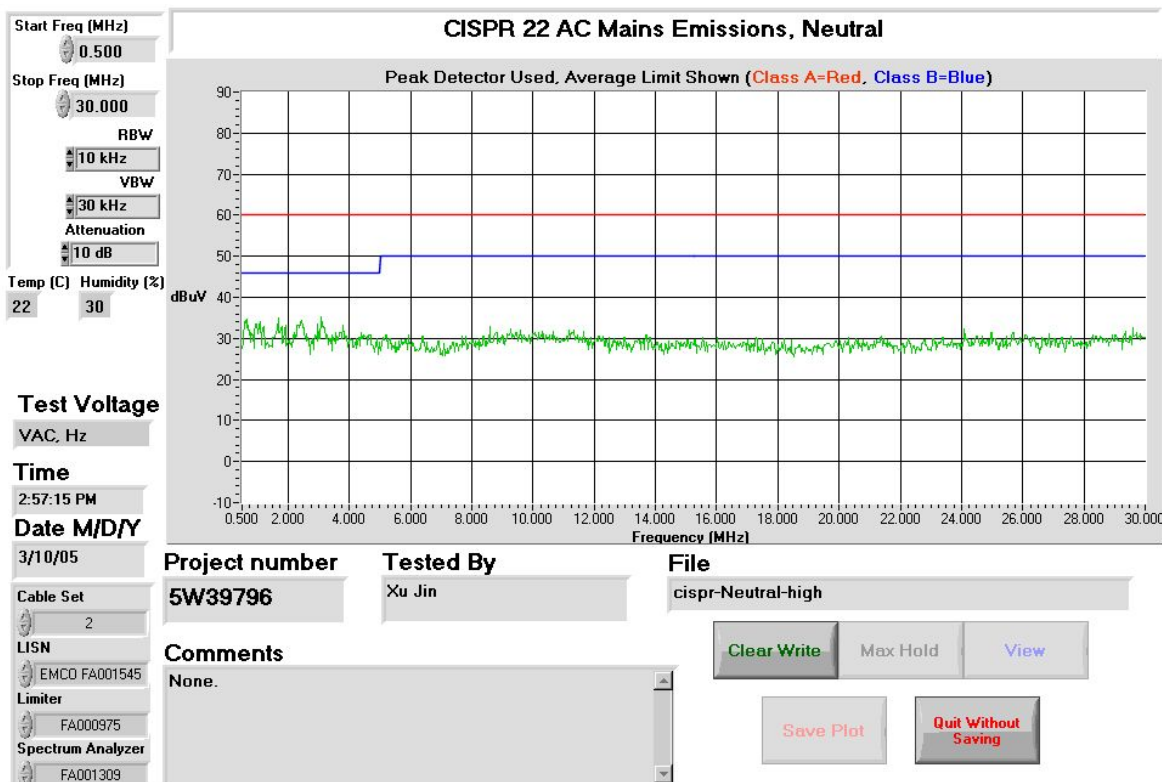
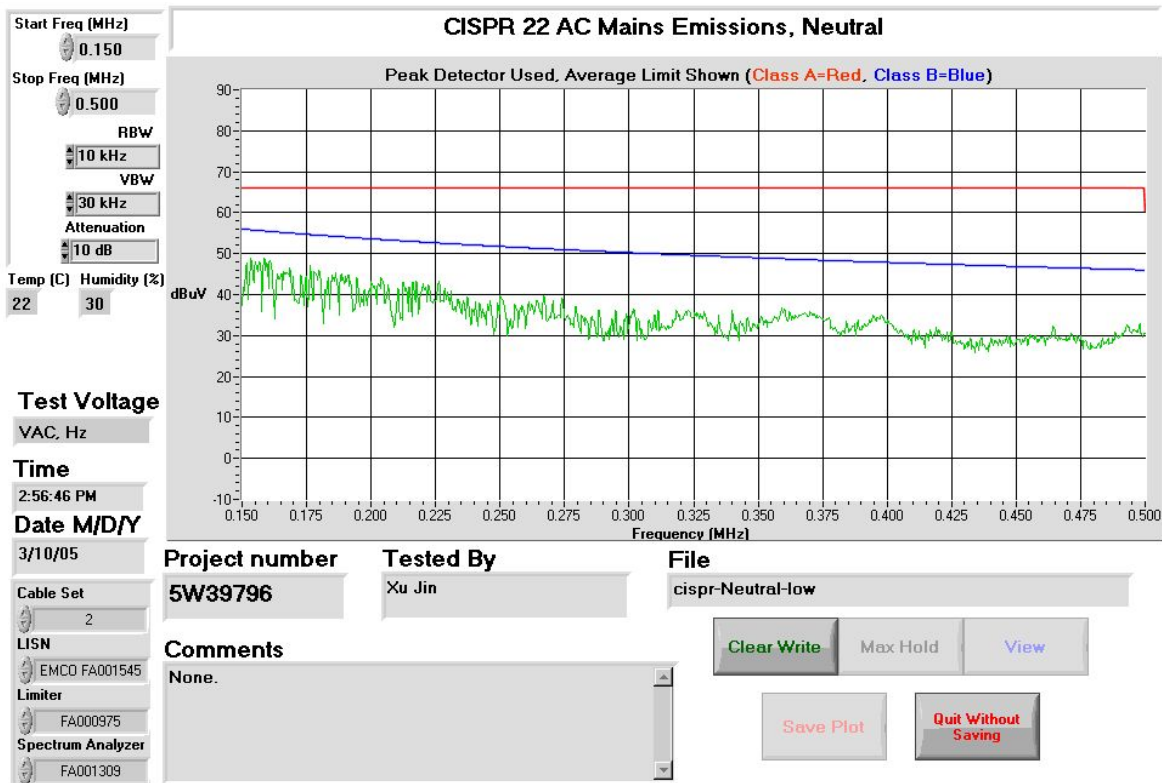
Frequency Range MHz	Limits dB(μV)		Result
	Quasi-Peak	Average	
0.15 to 0.50	66 to 56	56 to 46	Complies.
0.5 to 5	56	46	
5 to 30	60	50	
Note: 1. The lower limit shall apply at the transition frequency. 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.			

EQUIPMENT: Wireless AP7220

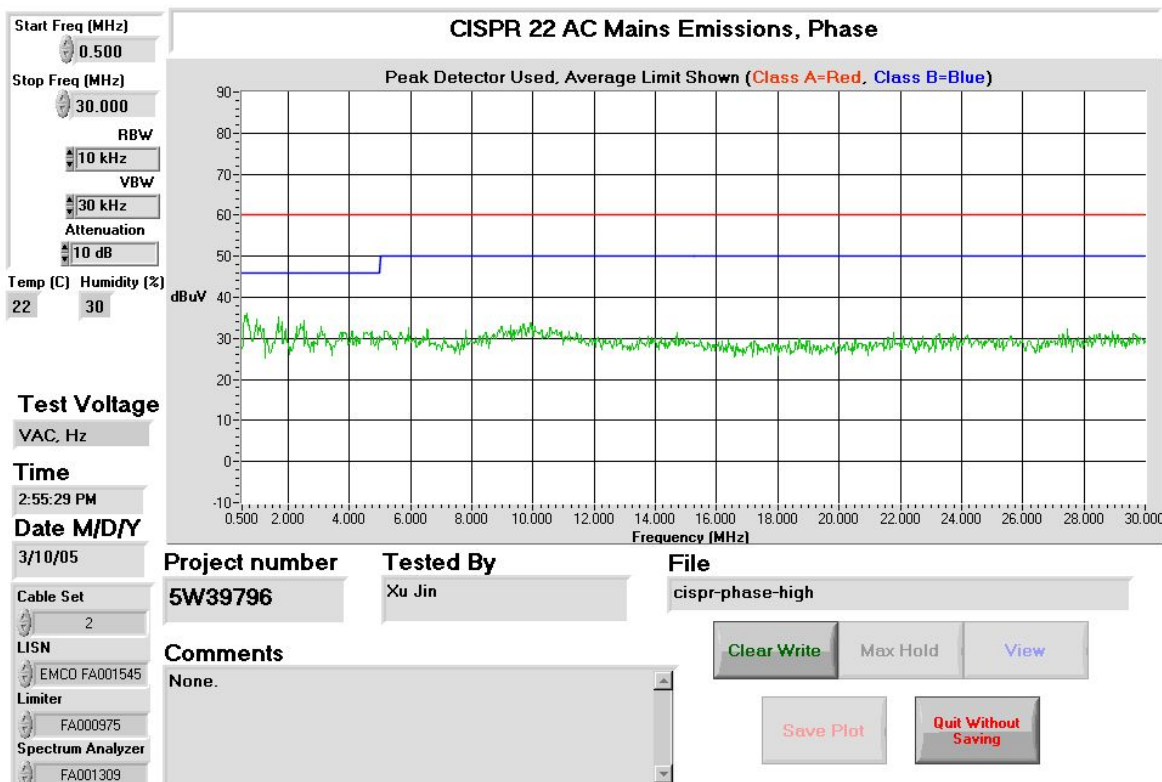
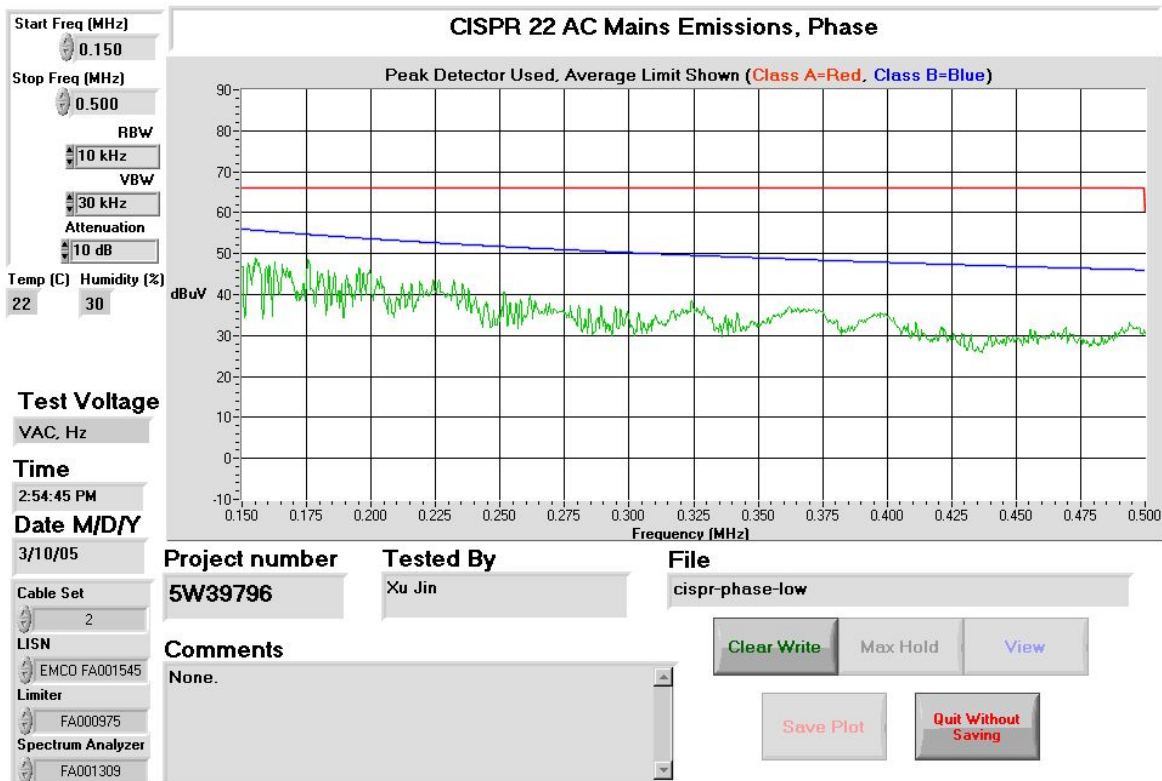
Conducted Disturbance at Mains Detailed Setup Photos:



EQUIPMENT: Wireless AP7220



EQUIPMENT: Wireless AP7220



EQUIPMENT: Wireless AP7220

Section 4. Emission Bandwidth

Para. No.: 15.403(i)

Test Performed By: Xu Jin	Date of Test: Mar 11, 2005
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Test Results: Complies

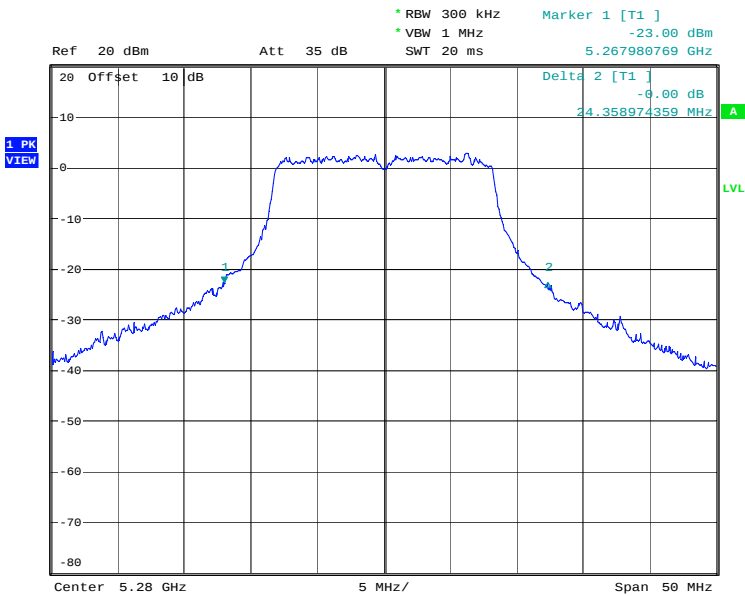
Measurement Data: See attached Plots

26dB Bandwidth (MHz)

Data Rate	5280MHz	5300MHz	5320MHz
6-24 Mb/s	24.36	25.88	24.20
54 Mb/s	23.24	24.12	23.72

EQUIPMENT: Wireless AP7220

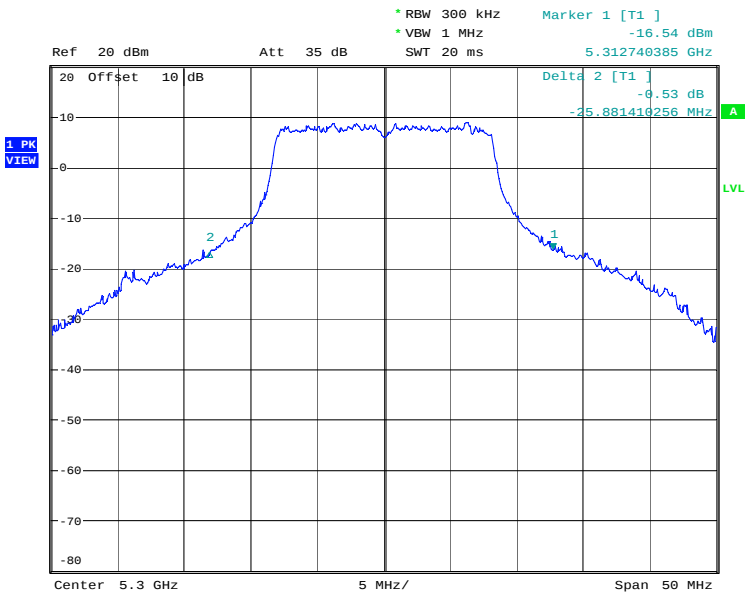
6-24Mb/s
Ch_5280MHz



802.11a_CH56
Date: 11.MAR.2005 09:59:47

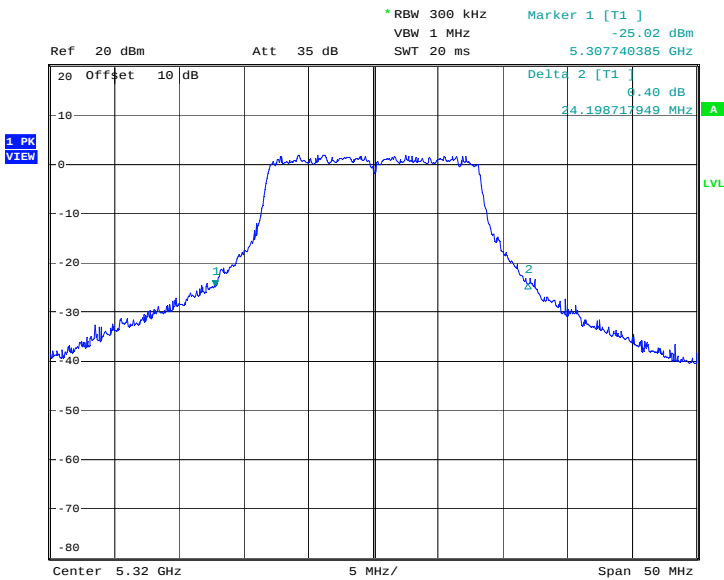
Ch60_5300MHz

EQUIPMENT: Wireless AP7220



CH60
Date: 11.MAR.2005 10:09:01

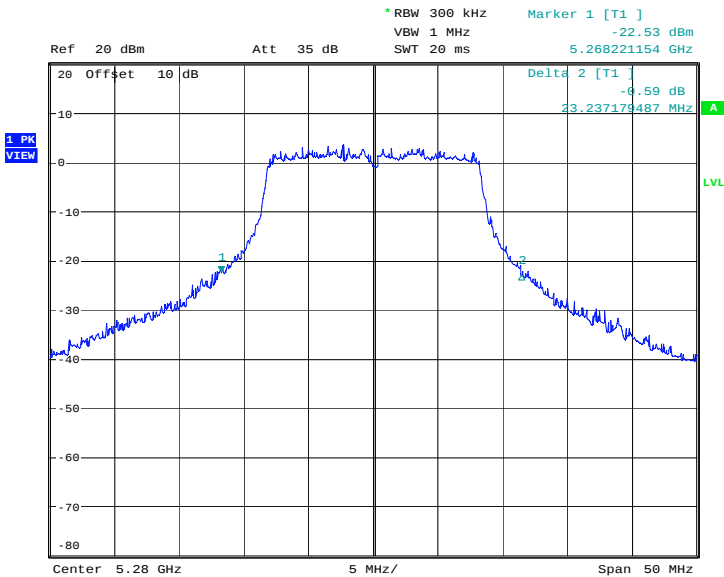
Ch64_5320MHz



CH64
Date: 11.MAR.2005 10:13:53

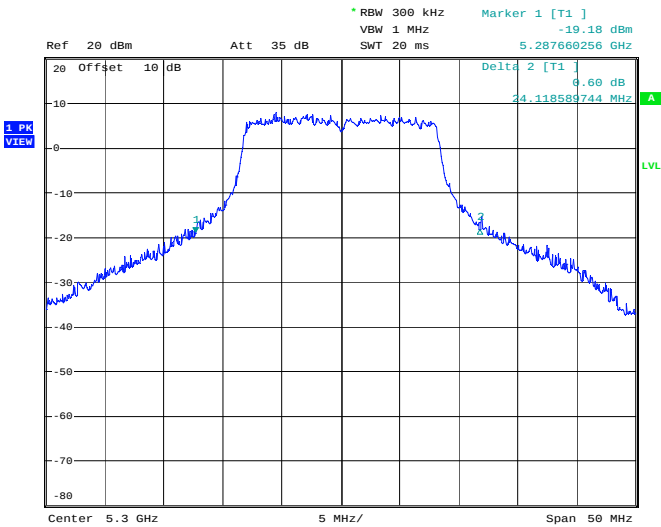
EQUIPMENT: Wireless AP7220

54 Mb/s
Ch56_5280MHz



CH56
Date: 11.MAR.2005 10:28:13

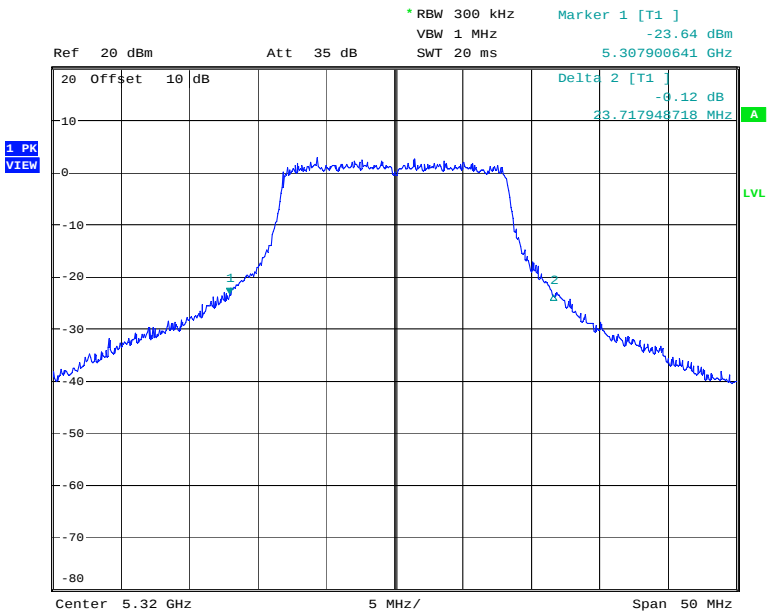
Ch60_5300MHz



CH60
Date: 11.MAR.2005 10:32:20

EQUIPMENT: Wireless AP7220

Ch64_5320MHz



CH64
Date: 11.MAR.2005 10:35:46

EQUIPMENT: Wireless AP7220

Section 5. Peak Conducted Transmit Output Power**Para. No.: 15.407 (a)(2), Ref: DA: 02-2138 Method. 1**

Test Performed By: Xu Jin	Date of Test: Mar.11, 2005
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Limit: Lesser of 250mW or $11\text{dBm} + 10 \log B$, where $B=25.88\text{Mhz}$ **Test Results:** Complies**Measurement Data:** See attached tables and graphics

Note:

To achieve the restricted band requirement, the power levels at the band edge were reduced as reported in the table. The power levels will automatically be set via firmware on selection of the channel #56(5280MHz) and #64 (5320MHz).

EQUIPMENT: Wireless AP7220

Measured Conducted Power (dBm) at Auxiliary Port 1

Data Rate (Mbps)	6-24	36	48	54
5280MHz(CH56)	6.72	6.56	6.21	6.43
5300MHz(CH60)	12.95	12.87	12.75	11.29
5320MHz(CH64)	6.87	6.62	6.30	6.20

Measured Conducted Power (dBm) at Auxiliary Port 2

Data Rate (Mbps)	6-24	36	48	54
5280MHz(CH56)	6.77	6.8	6.85	6.28
5300MHz(CH60)	12.75	12.71	12.06	10.85
5320MHz(CH64)	6.22	5.95	5.92	6.42

Note:

Manufacturer has declared due to the loss between the radio module and RF switch matrix, there is 1.5 dB power reduction from the actual antennal terminal to the conducted measuring port.

To achieve the restricted band requirement, the power levels at the band edge were reduced as reported in the table. The power levels were automatically be set via firmware on selection of the channel #56(5280MHz) and #64 (5320MHz).

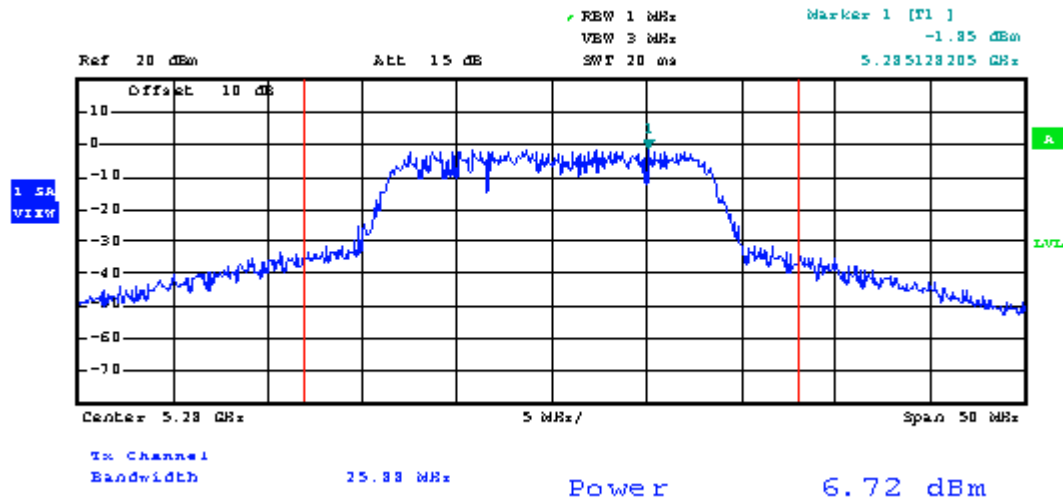
Limit:

- (1) Conducted Power Limit for Integral antenna 10.7dBi
24dBm-(10.7dBi-6dBi)=19.3dBm
- (2) Conducted Power Limit for H&S SPA 5600/40/14/0/V, 13dBi
24dBm-(13dBi-6dBi)=17dBm

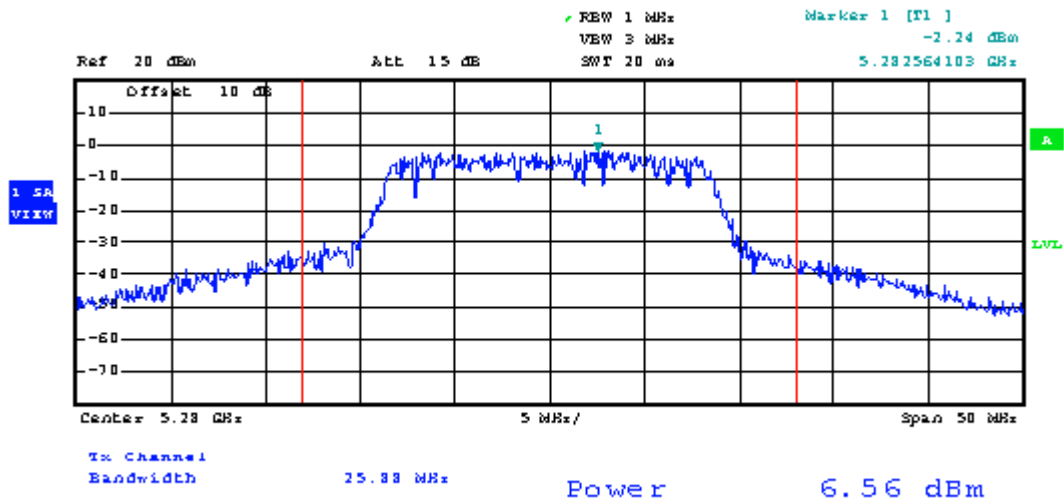
EQUIPMENT: Wireless AP7220

Aux1

5280MHz_6-24Mb/s

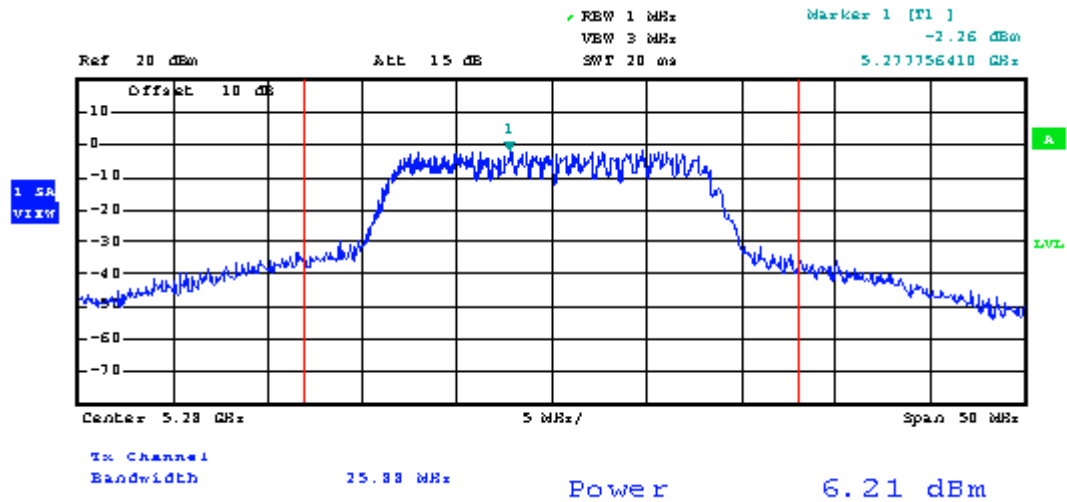


5280MHz_36Mb/s

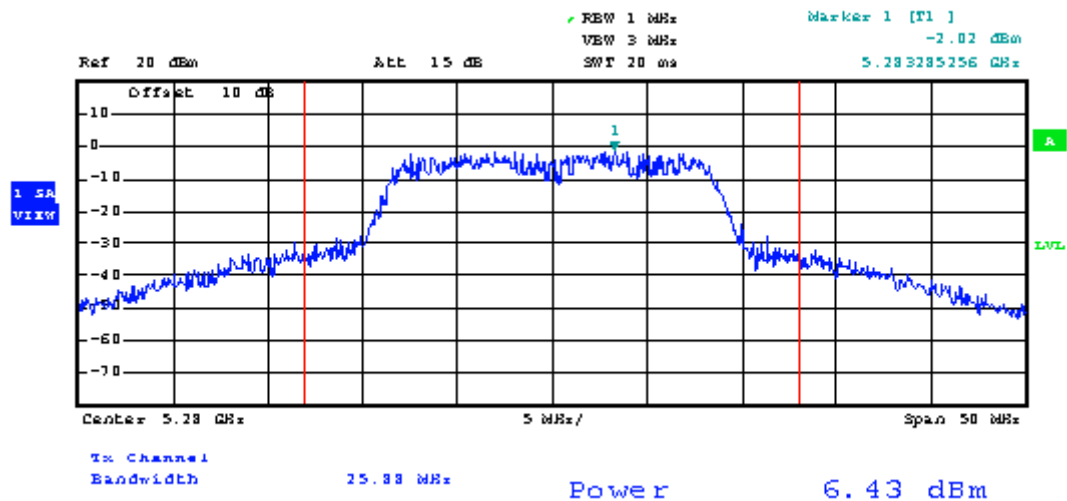


EQUIPMENT: Wireless AP7220

5280MHz_48Mb/s

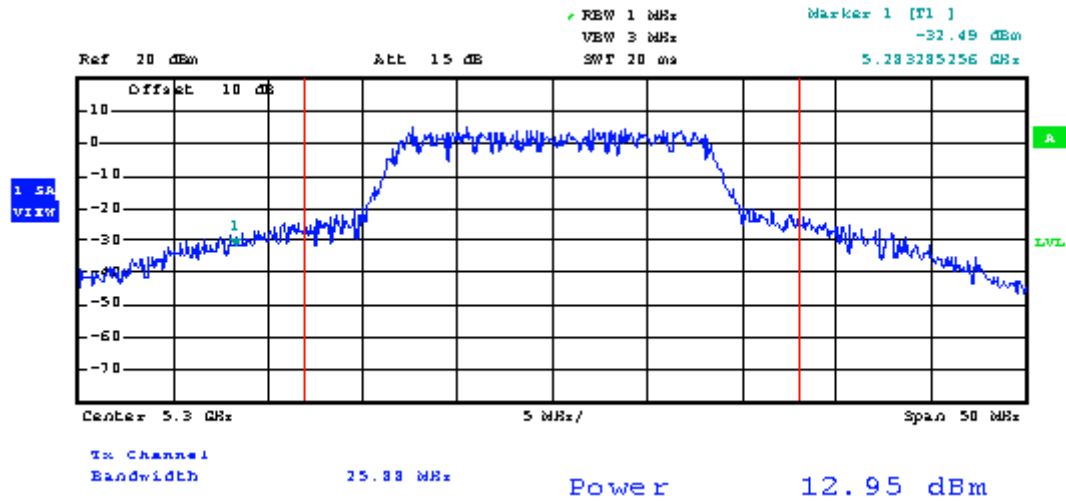


5280MHz_54Mb/s

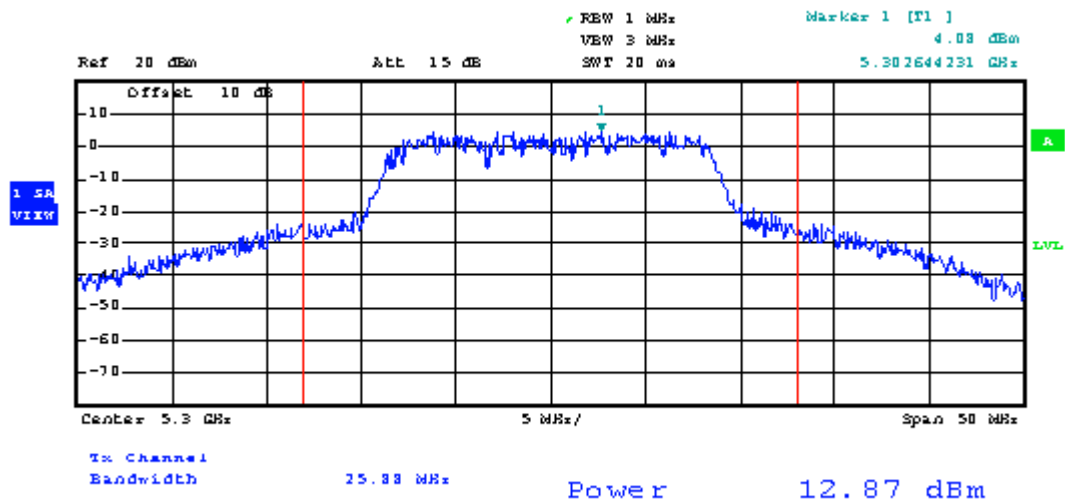


EQUIPMENT: Wireless AP7220

5300MHz_6-24Mb/s

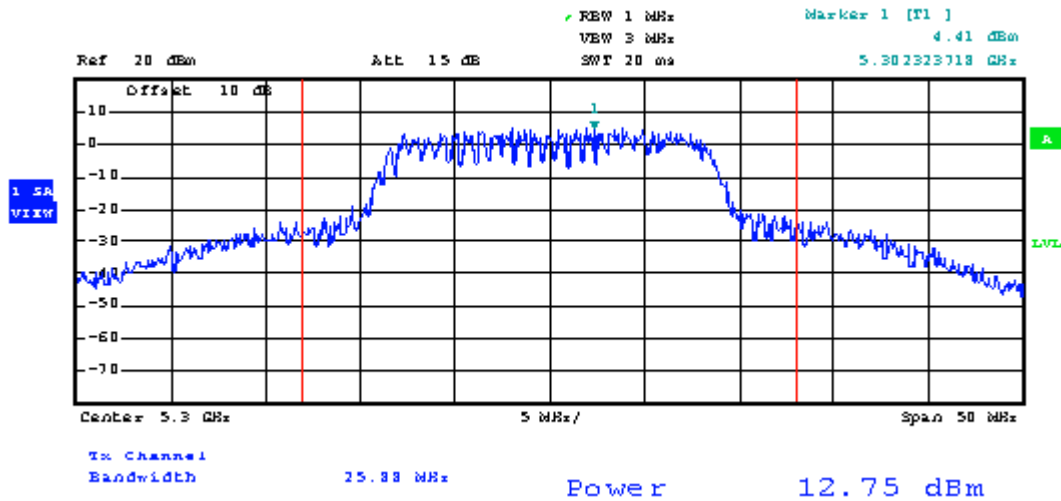


5300MHz_36Mb/s

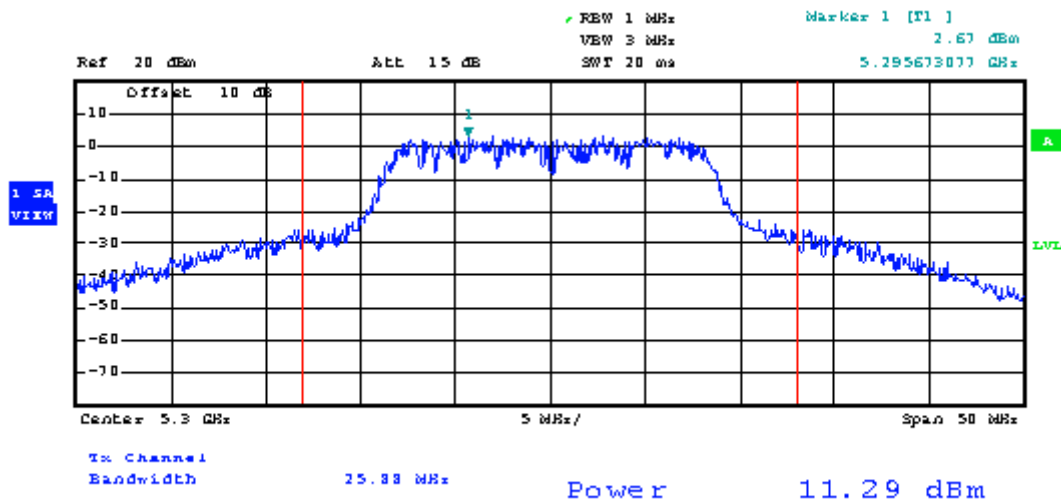


EQUIPMENT: Wireless AP7220

5300MHz_48Mb/s

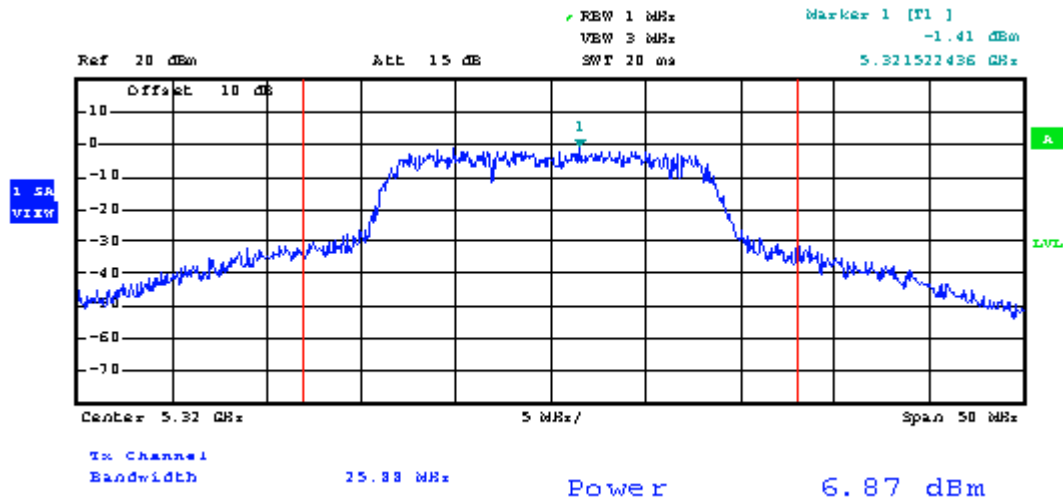


5300MHz_54Mb/s

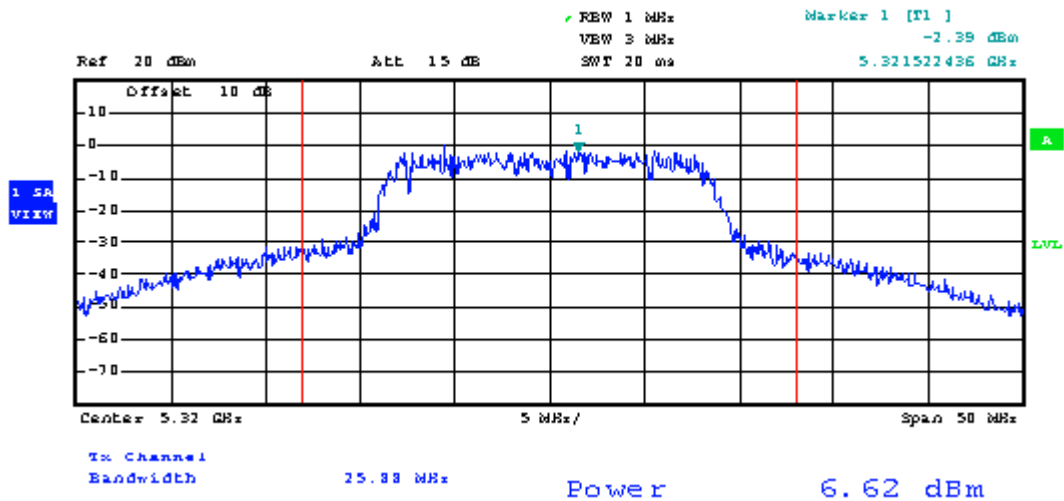


EQUIPMENT: Wireless AP7220

5320MHz_6-24Mb/s

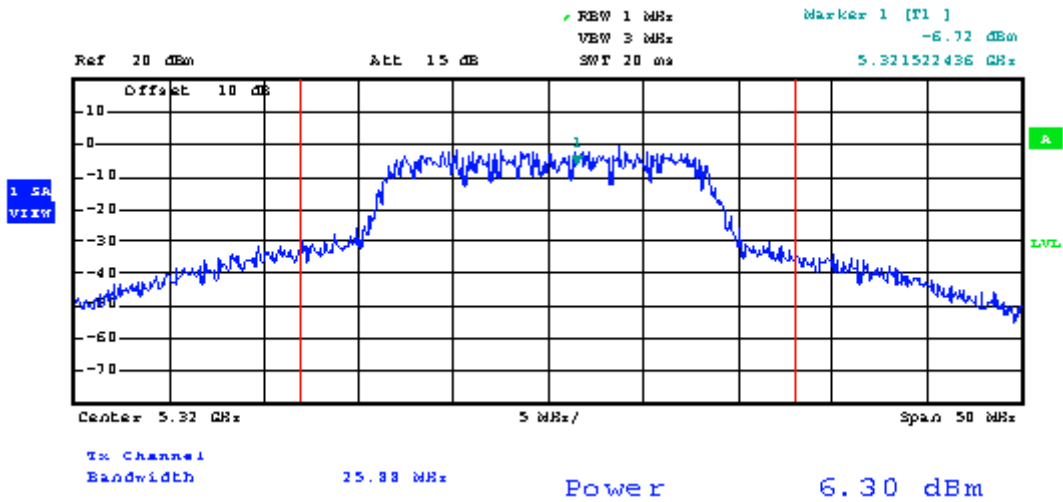


5320MHz_36Mb/s

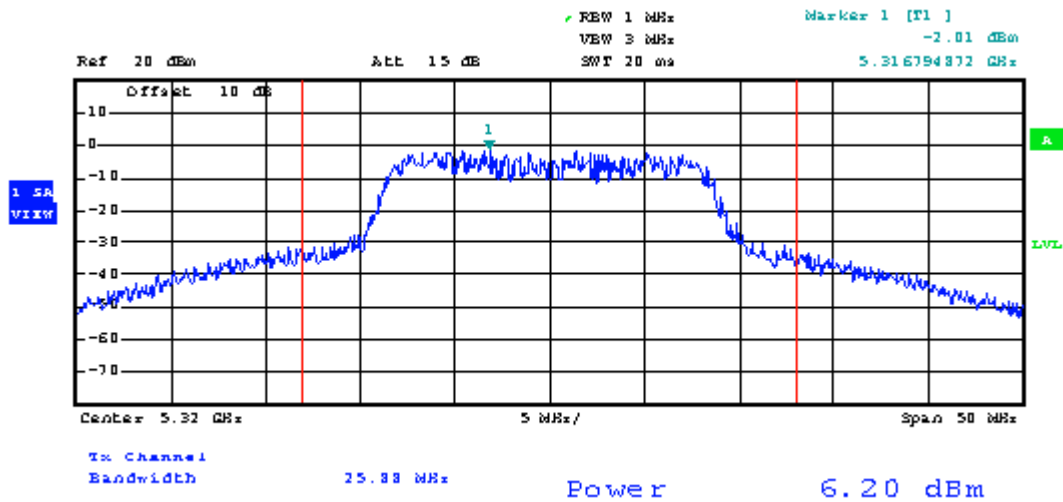


EQUIPMENT: Wireless AP7220

5320MHz_48Mb/s



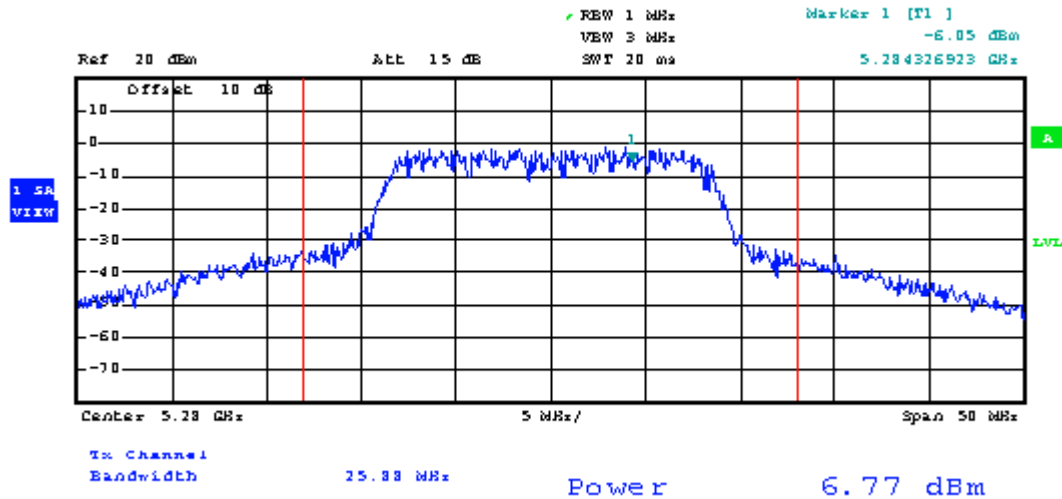
5320MHz_54Mb/s



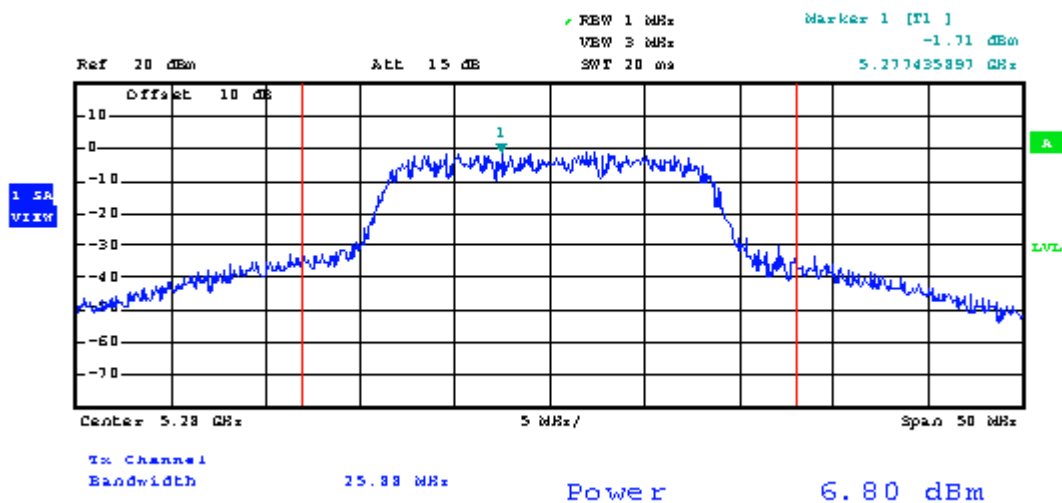
EQUIPMENT: Wireless AP7220

Aux2

5280MHz_6-24Mb/s

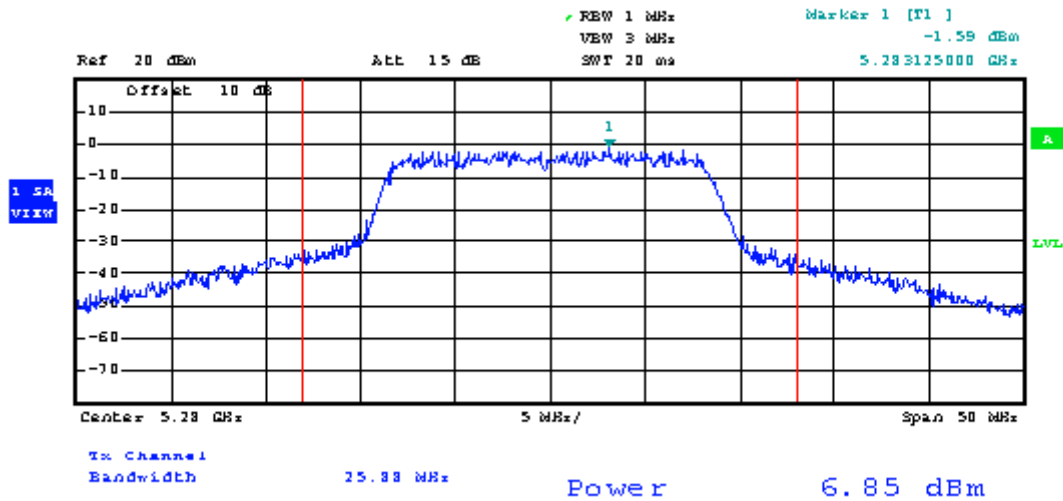


5280MHz_36Mb/s

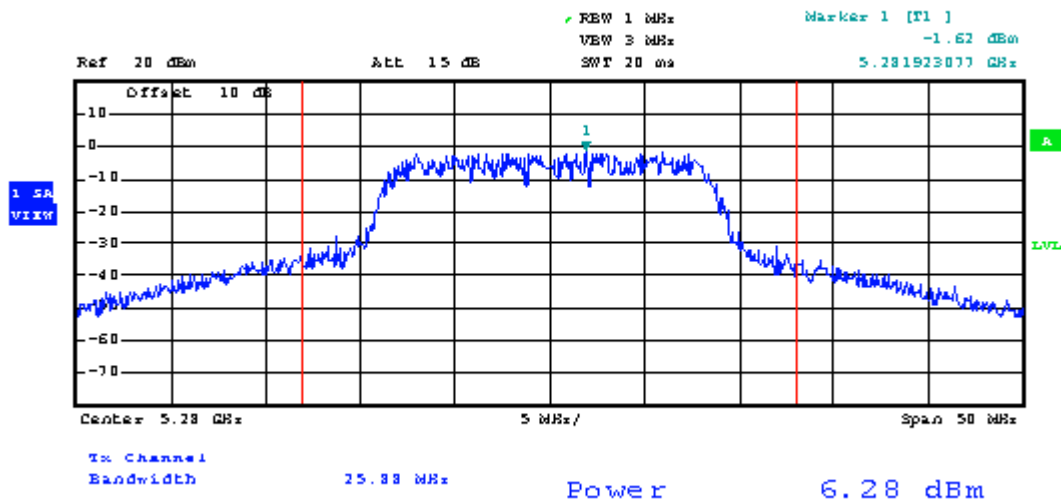


EQUIPMENT: Wireless AP7220

5280MHz_48Mb/s

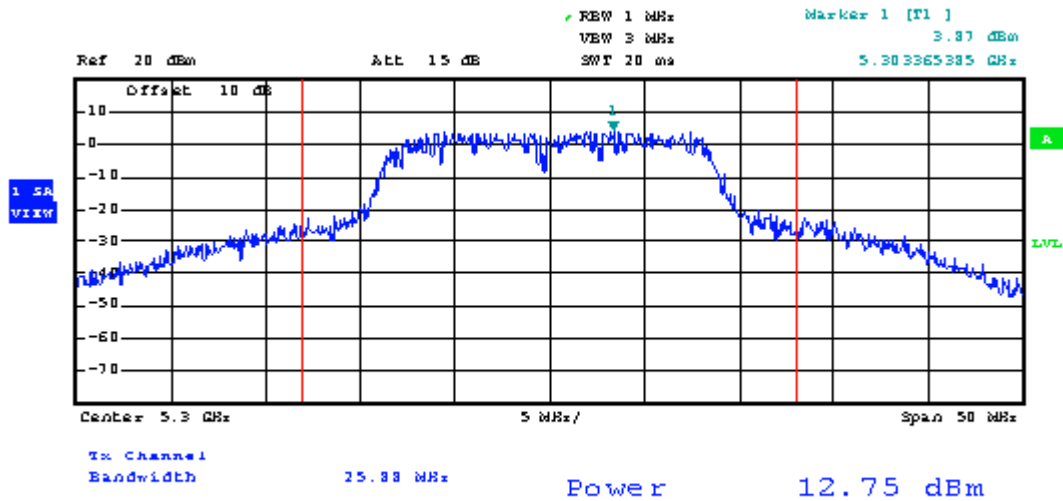


5280MHz_54Mb/s

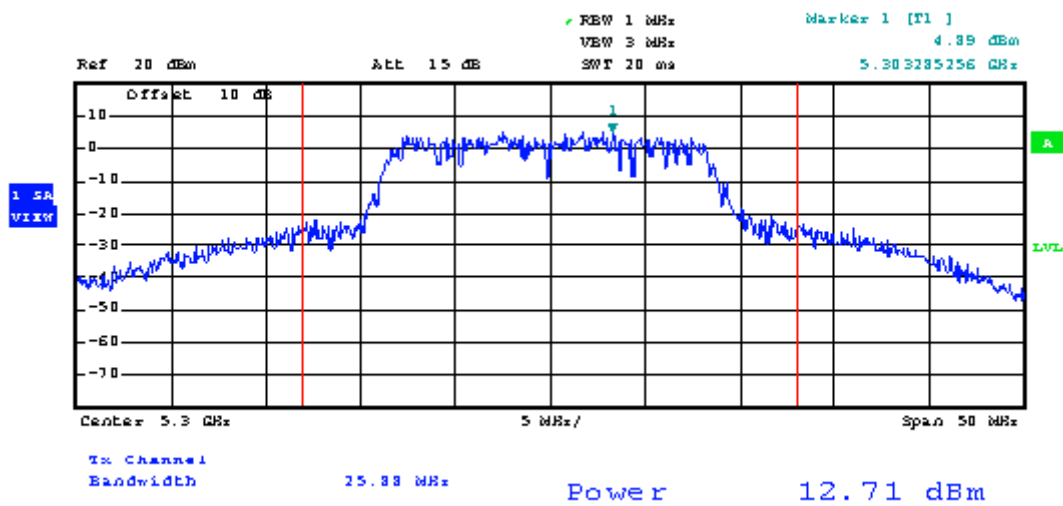


EQUIPMENT: Wireless AP7220

5300MHz_6-24Mb/s

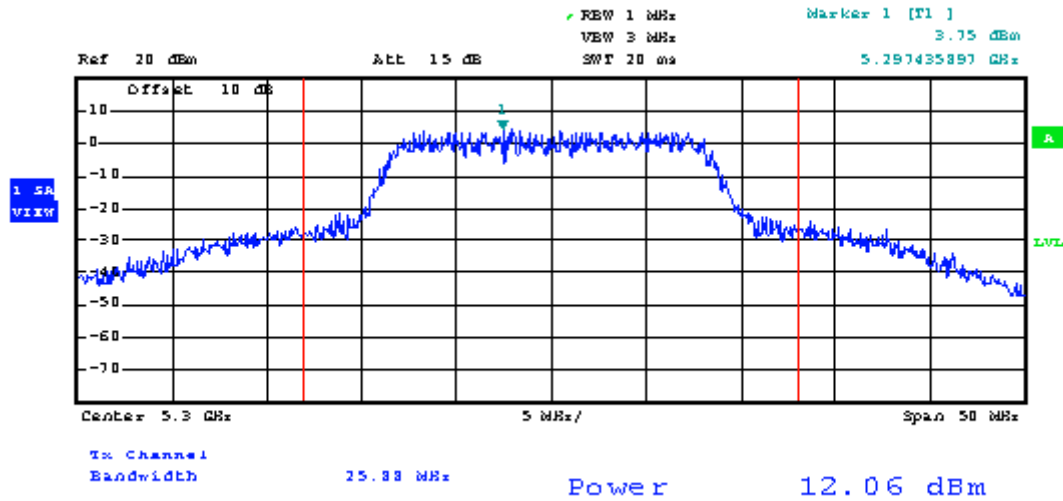


5300MHz_36Mb/s

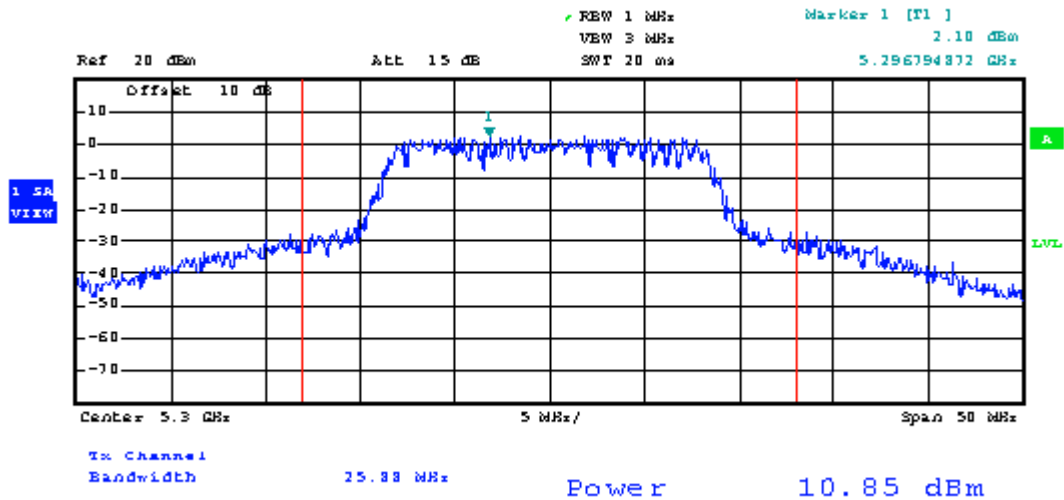


EQUIPMENT: Wireless AP7220

5300MHz_48Mb/s

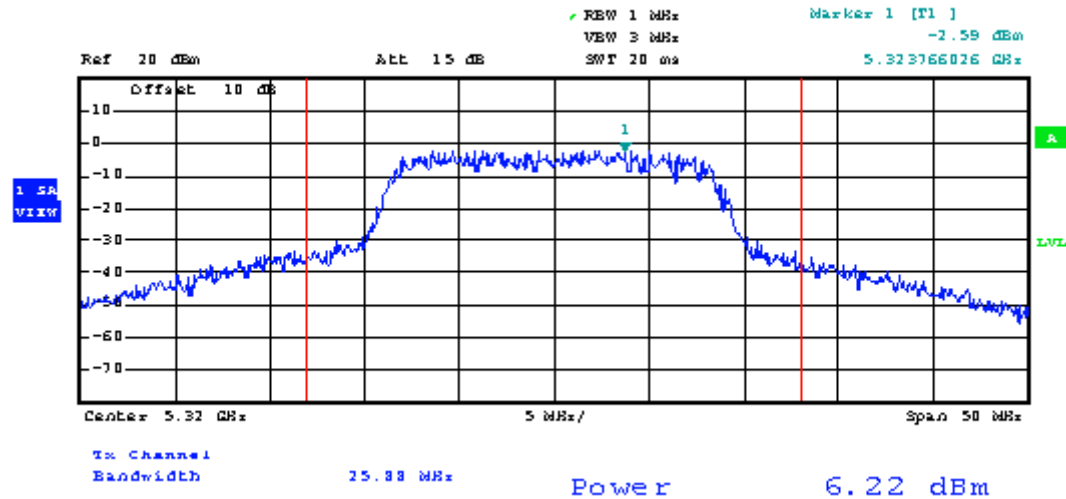


5300MHz_54Mb/s

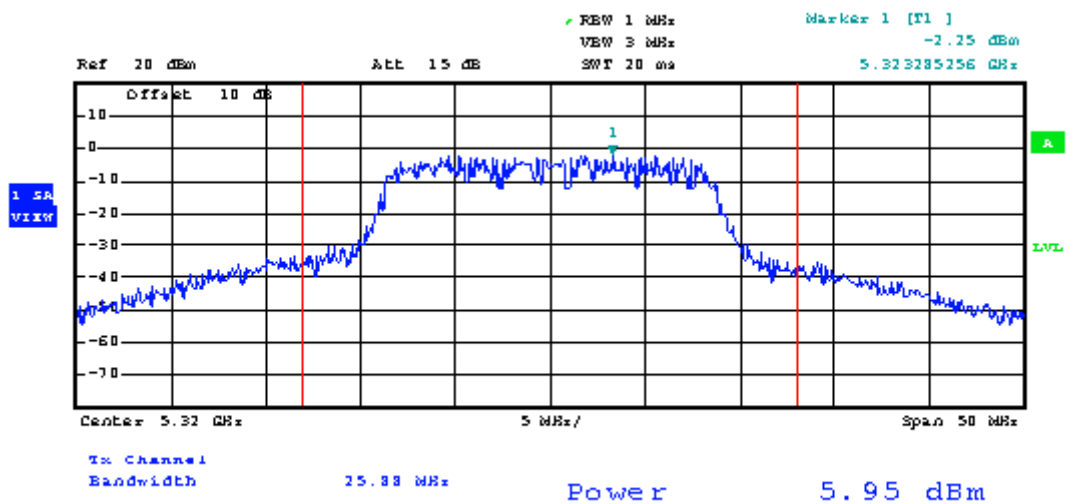


EQUIPMENT: Wireless AP7220

5320MHz_6-24Mb/s

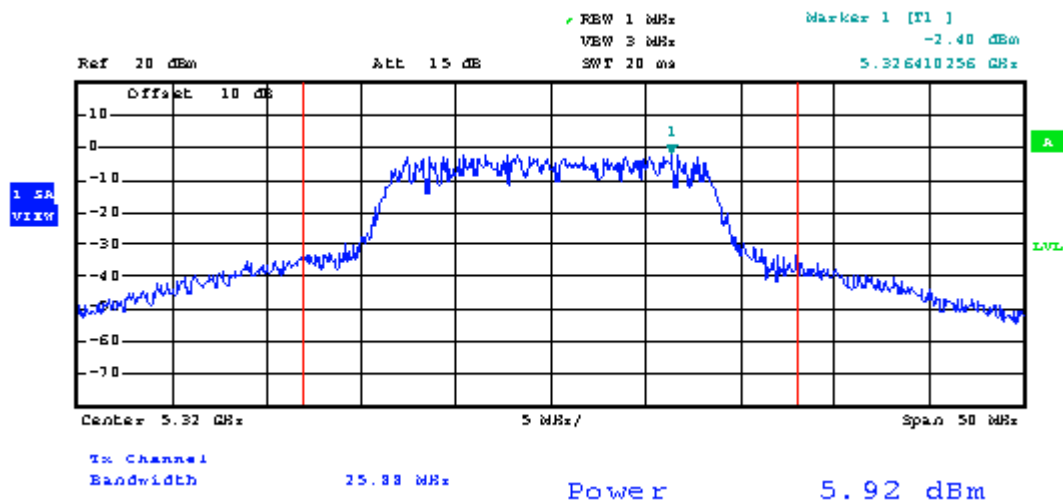


5320MHz_36Mb/s

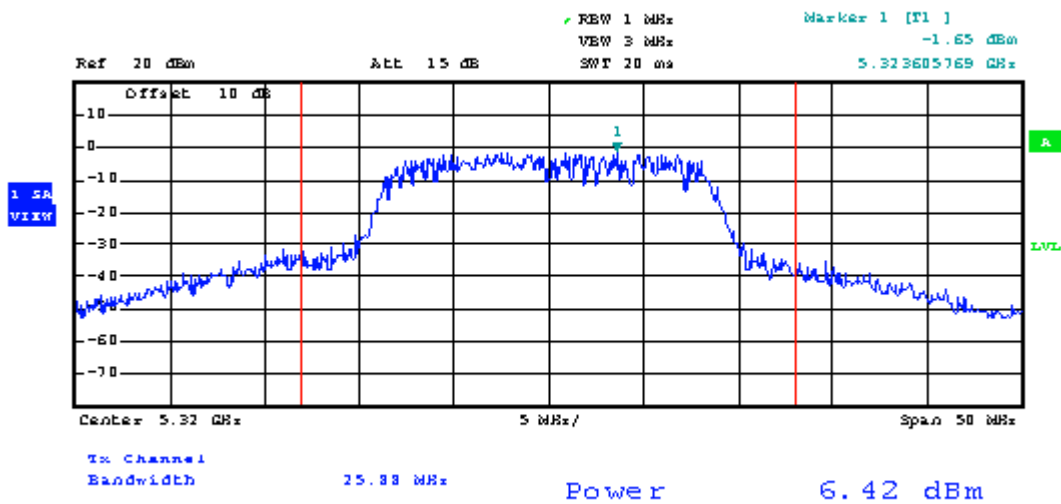


EQUIPMENT: Wireless AP7220

5320MHz_48Mb/s



5320MHz_54Mb/s



EQUIPMENT: Wireless AP7220

Section 6. Spurious Emissions

Para. No.: 15.407(b)(2)(7)

Test Performed By: Xu Jin	Date of Test: Mar 11, Feb.2005
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Limit: -27dBm/MHz
Radiated Emissions that fall in the restricted bands must
comply with 15.209

Test Result: Complies

Measurement Data: See attached plots and table.

Note:

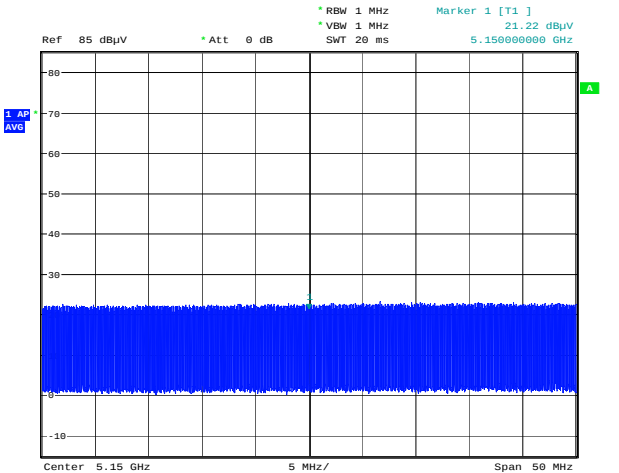
(1). Emissions were searched for all possible worst configurations. Worst-case data has been presented.

(2). The DUT was searched to from 30MHz the 10th harmonic of the EUT. Worst emissions were reported.

EQUIPMENT: Wireless AP7220

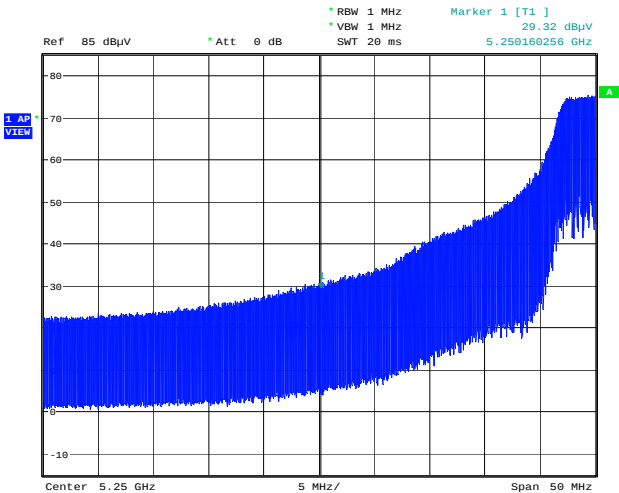
Band Edge Check _Ch56, 5280MHz

Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
21.22dBuV	-47.04	10.63	1	-37.41	-27.0



802.11a_CH56
Date: 10.MAR.2005 13:01:59

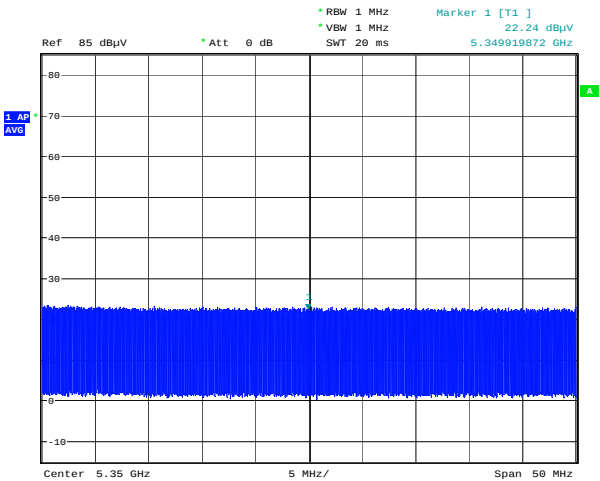
Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
29.32dBuV	-38.94	10.63	1	-29.31	-27.0



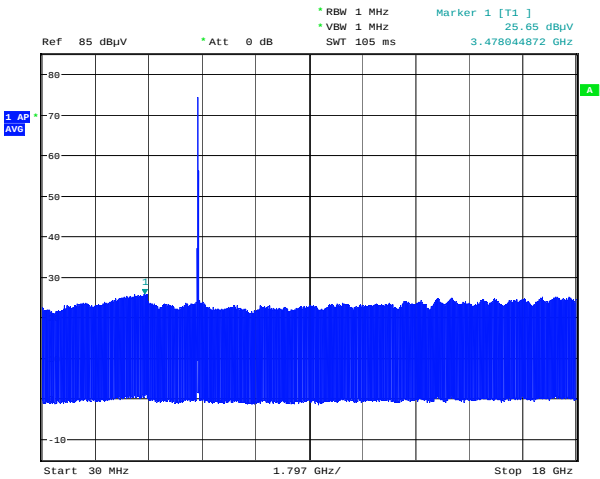
802.11a_CH56
Date: 10.MAR.2005 13:00:42

EQUIPMENT: Wireless AP7220

Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
22.24dBuV	-46.02	10.63	1	-36.39	-27.0



802.11a_CH56
Date: 10.MAR.2005 13:03:12

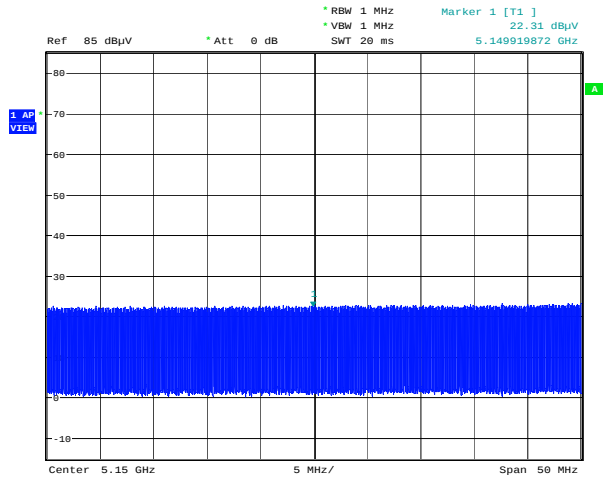


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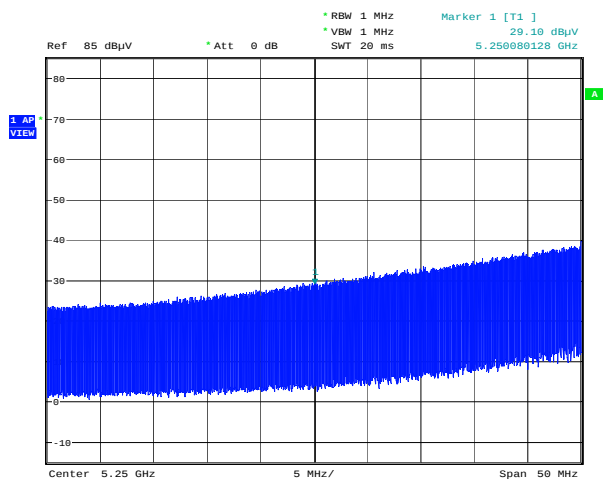
EQUIPMENT: Wireless AP7220

Band Edge Check _Ch60, 5300MHz

Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
22.31dBuV	-45.94	10.63	1	-36.32	-27.0

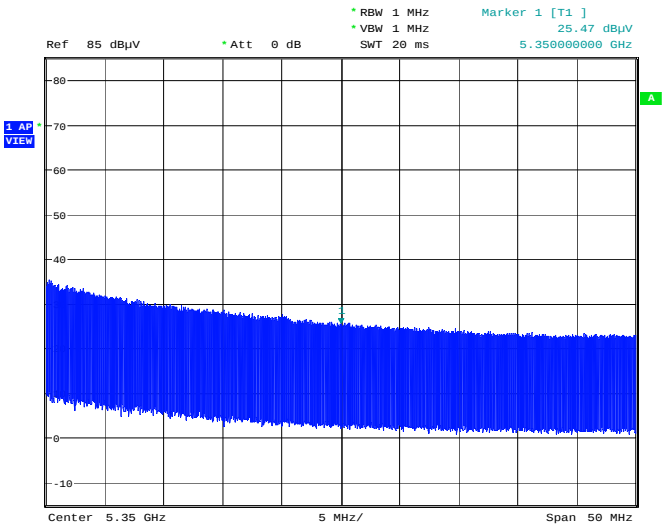
802.11a_CH60
Date: 10.MAR.2005 13:09:28

Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
29.10dBuV	-39.16	10.63	1	-29.53	-27.0

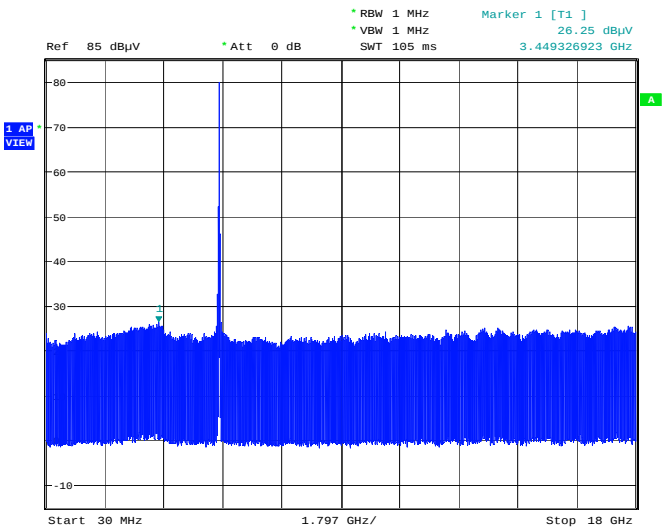
802.11a_CH60
Date: 10.MAR.2005 13:10:28

EQUIPMENT: Wireless AP7220

Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
25.47	-42.76	10.63	1	-33.16	-27.0



802.11a_CH60
Date: 10.MAR.2005 13:11:35

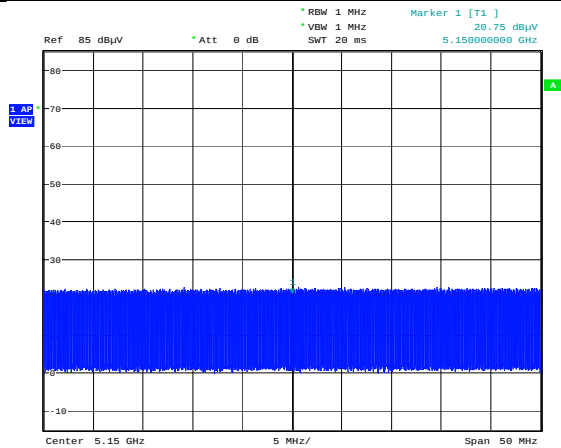


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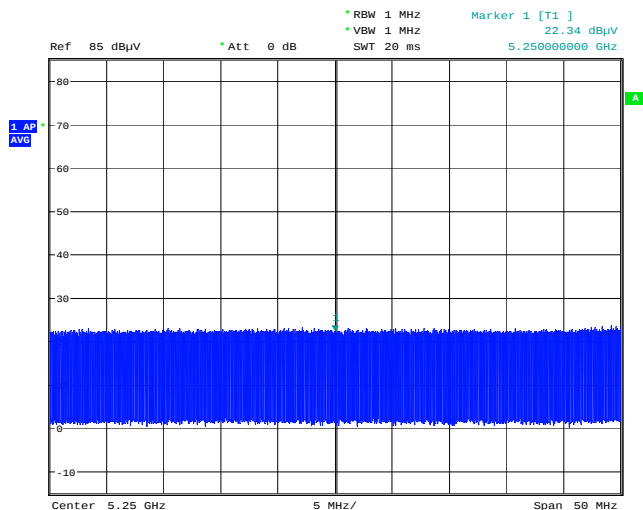
EQUIPMENT: Wireless AP7220

Band Edge Check _Ch64, 5320MHz

Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
20.75dBuV	-47.51	10.63	1	-37.88	-27.0

802.11a_CH64
Date: 10.MAR.2005 13:16:03

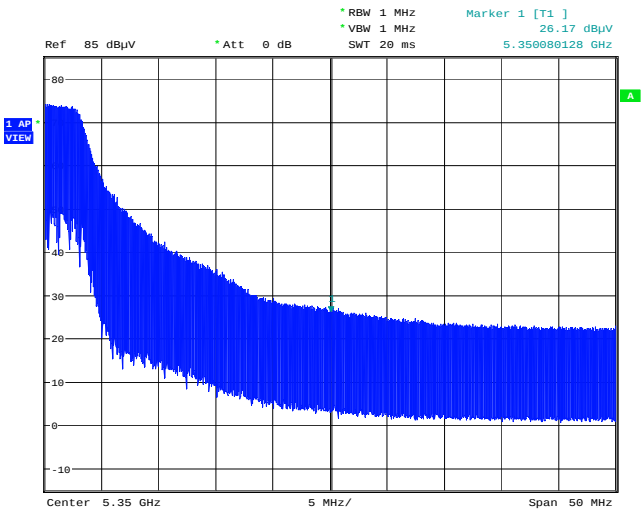
Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
22.34dBuV	-45.92	10.63	1	-36.29	-27.0

802.11a_CH64
Date: 10.MAR.2005 13:17:02

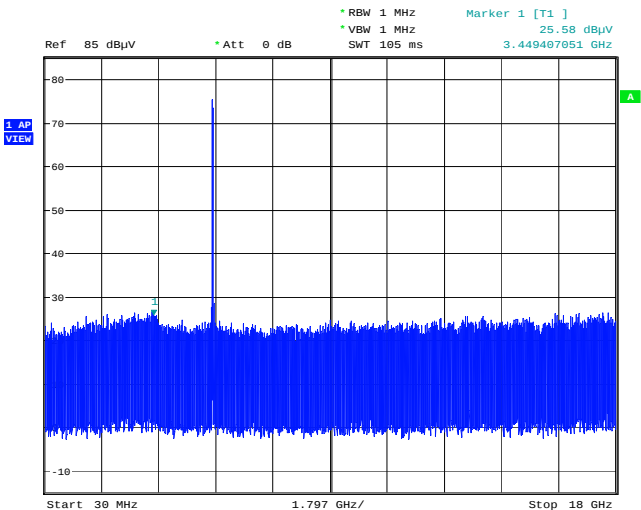
Band Edge Level (dBuV)	Signal Substitution Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Emission Power Level(dBm)	Limit (dBm)
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EQUIPMENT: Wireless AP7220

26.17dBuV	-42.09	10.63	1	-32.46	-27.0
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802.11a_CH64
Date: 10.MAR.2005 13:19:00



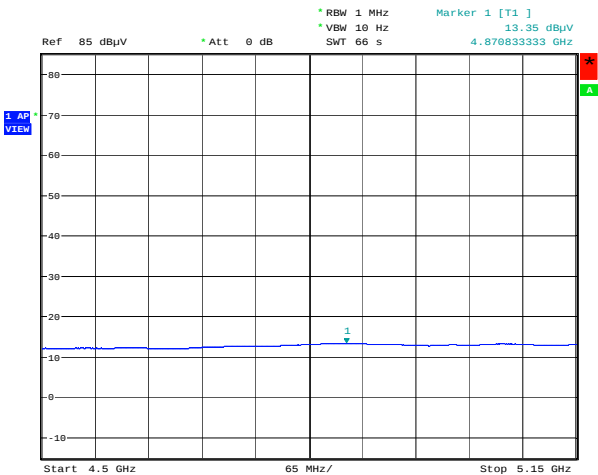
802.11a_CH64
Date: 10.MAR.2005 13:20:16

Restricted Band
Ch56, 5280MHz

Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
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EQUIPMENT: Wireless AP7220

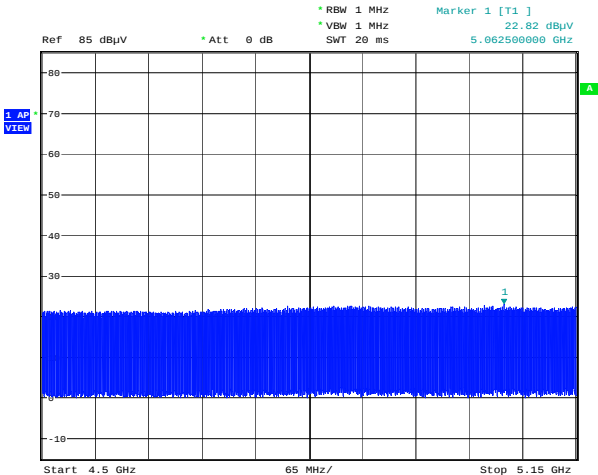
			)	
13.35	34.1	1	48.45	54



802.11a_CH56
Date: 10.MAR.2005 13:31:57

Ch56, 5280MHz

Band Edge Level (PK) (dBµv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBµv/m)	Limit (dBµv/m)
22.82	34.1	1	57.92	74



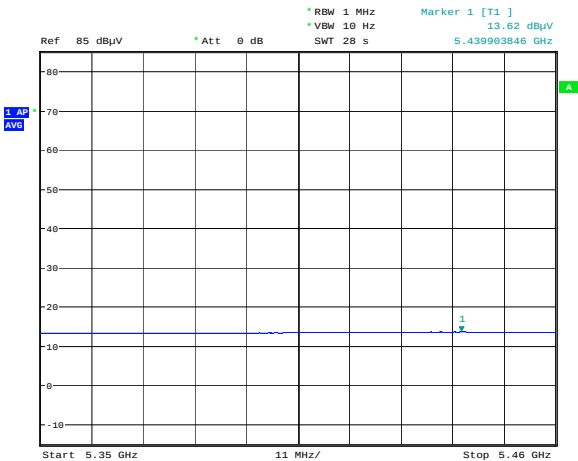
802.11a_CH56
Date: 10.MAR.2005 13:32:46

Ch56, 5280MHz

Band Edge Level (Avg)	Af	Cable	Emission	Limit
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EQUIPMENT: Wireless AP7220

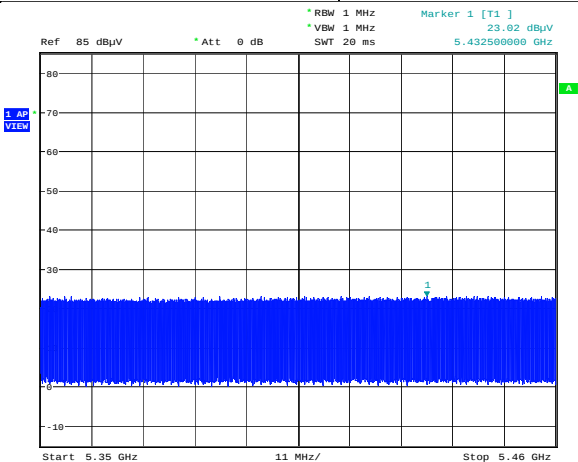
(dBμv)	(dB/m)	Loss(dB)	Level(dBμv/m)	(dBμv/m)
13.62	34.1	1	48.72	54



802.11a_CH56
Date: 10.MAR.2005 13:35:53

Ch56, 5280MHz

Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
23.02	34.1	1	58.12	74

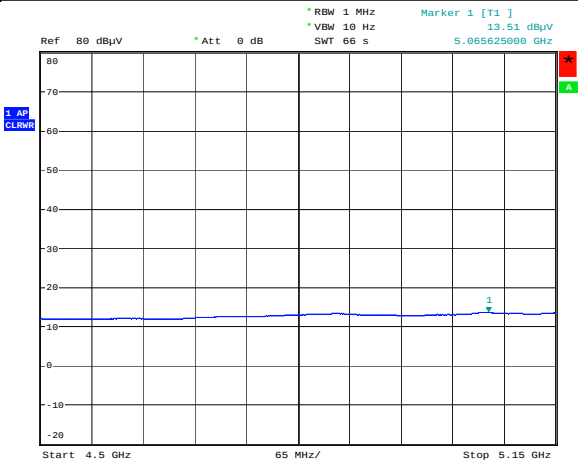


802.11a_CH56
Date: 10.MAR.2005 13:34:01

Ch60, 5300MHz

EQUIPMENT: Wireless AP7220

Band Edge Level (Avg) (dBµv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBµv/m)	Limit (dBµv/m)
13.51	34.1	1	48.61	54

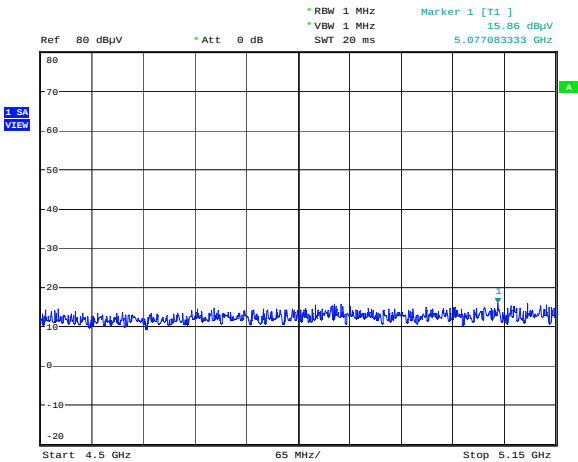


802.11a_CH60
Date: 10.MAR.2005 09:19:35

Ch60, 5300MHz

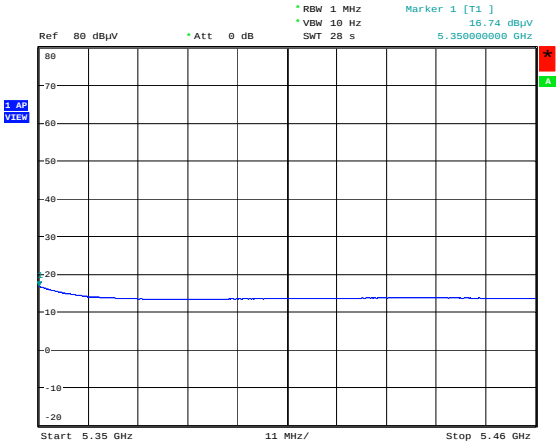
Band Edge Level (PK) (dBµv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBµv/m)	Limit (dBµv/m)
15.86	34.1	1	50.96	74

EQUIPMENT: Wireless AP7220



Ch60, 5300MHz

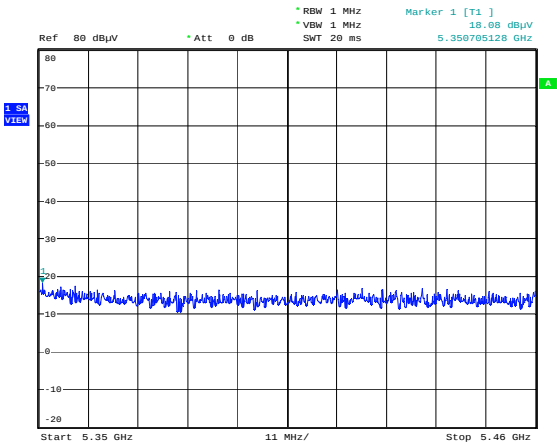
Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
16.74	34.1	1	51.84	54



Ch60, 5300MHz

Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
18.08	34.1	1	53.18	74

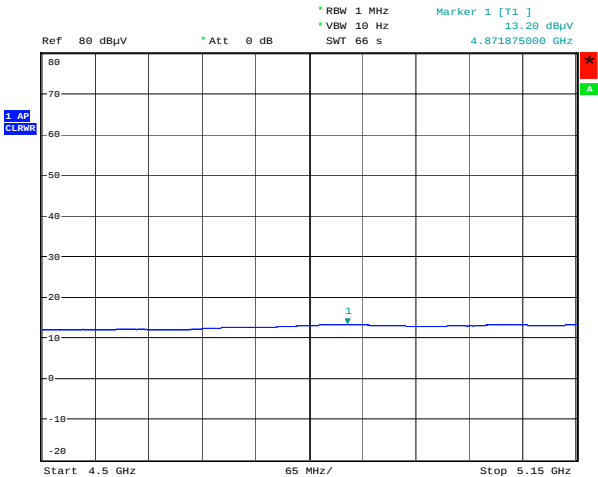
EQUIPMENT: Wireless AP7220



802.11a_CH60
Date: 10.MAR.2005 09:17:36

Ch64, 5320MHz

Band Edge Level (Avg) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
13.20	34.1	1	48.3	54



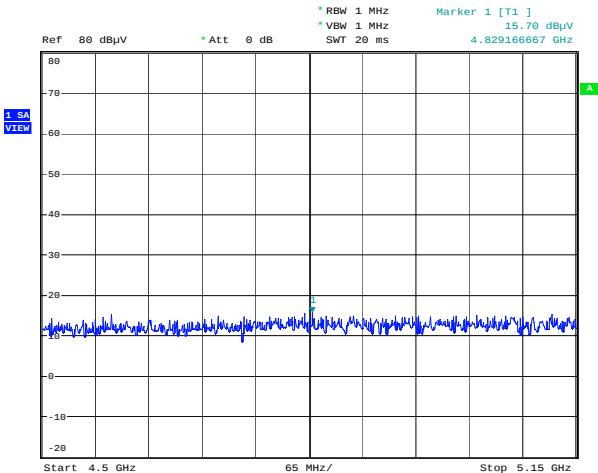
802.11a_CH64
Date: 10.MAR.2005 09:23:49

Ch64, 5320MHz

Band Edge Level (PK) (dBμv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBμv/m)	Limit (dBμv/m)
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EQUIPMENT: Wireless AP7220

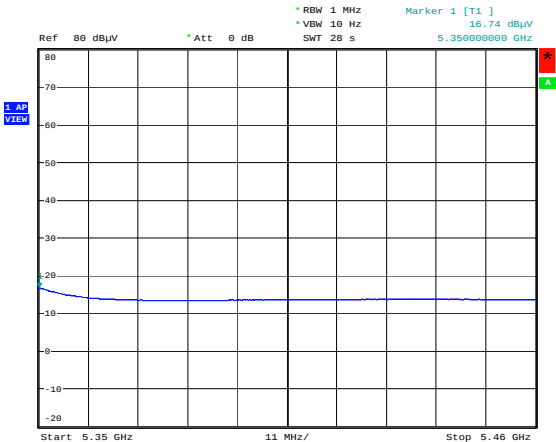
			)	
15.70	34.1	1	50.8	74



802.11a_CH64
Date: 10.MAR.2005 09:24:26

Ch64, 5320MHz

Band Edge Level (Avg) (dBµv)	Af (dB/m)	Cable Loss(dB)	Emission Level(dBµv/m)	Limit (dBµv/m)
16.74	34.1	1	51.84	54



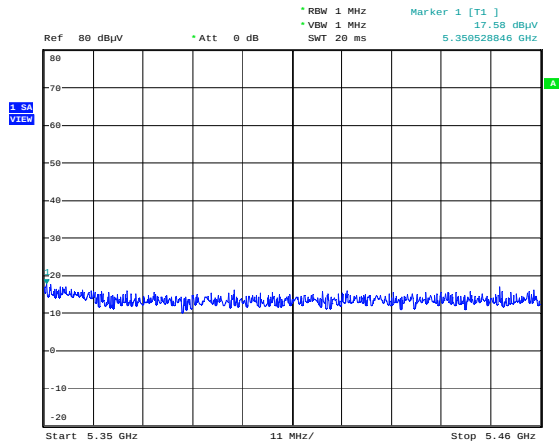
802.11a_CH64
Date: 10.MAR.2005 09:25:53

Ch64, 5320MHz

Band Edge Level (PK)	Af	Cable	Emission	Limit
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EQUIPMENT: Wireless AP7220

(dB μ V)	(dB/m)	Loss(dB)	Level(dB μ V/m)	(dB μ V/m)
17.58	34.1	1	52.68	74



802.11a_CH64

Date: 10.MAR.2005 09:26:30

Radiated Emission Test Data

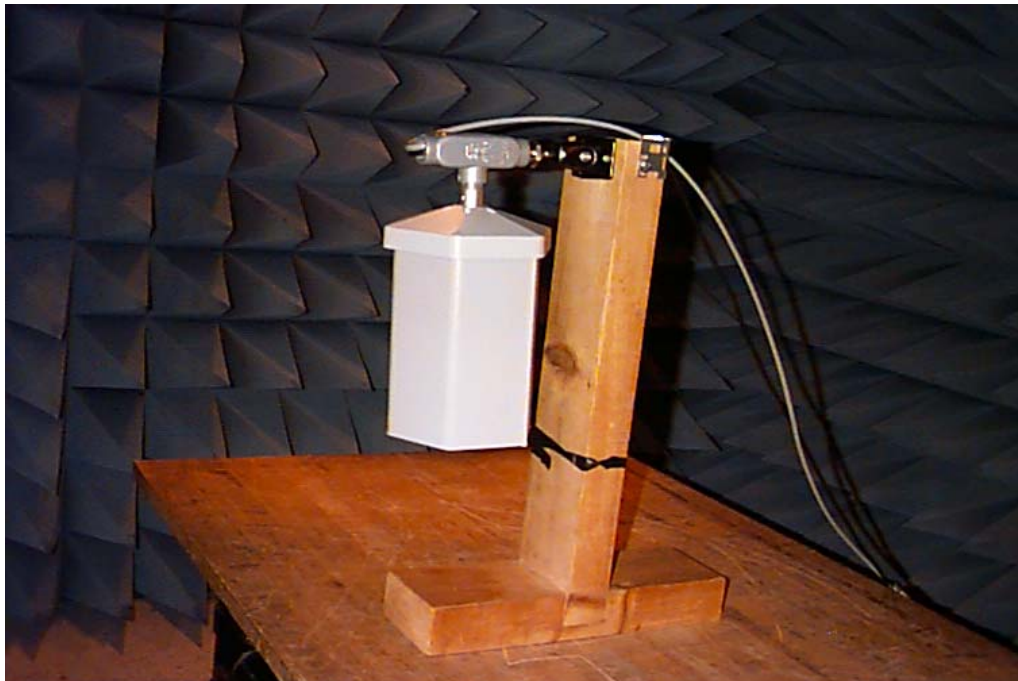
Test Date: Mar 14, 2005										
Engineer's Name: Xu Jin										
Tested as per: Table Top										
Mains Input Voltage: 120VAC							Mains Input Frequency: 60Hz			
Test Distance (meters): 3							Dome: 1			
Freq. (MHz)	Ant.	Po l. V/ H	RCVD Signal (dB μ V)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
33.2000	BC2	V	8.0	11.1	N/A	0.7	19.8	40.0	20.2	Q-Peak
61.0000	BC2	V	9.1	7.3	N/A	0.9	17.3	40.0	22.7	Q-Peak
67.8000	BC2	V	29.0	7.7	N/A	1.0	37.7	40.0	2.3	Q-Peak
75.0000	BC2	V	18.5	6.9	N/A	1.0	26.4	40.0	13.6	Q-Peak
250.0000	BC2	V	16.3	16.2	N/A	1.8	34.3	46.0	11.7	Q-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										

EQUIPMENT: Wireless AP7220

5GHz H&S SPA Antenna, 13dBi



5G Integral Antenna, 10.7dBi



EQUIPMENT: Wireless AP7220

Section 7. Peak Power Spectral Density

Para. No.: 15.407(a)(2), Ref: DA: 02-2138 Method. 2

Test Performed By: Xu Jin	Date of Test: Mar 11, 2005
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General Limit: 11dBm/MHz**Test Results:** Complies**Measurement Data:** See Attached Plots**PPSD Measurement Data (dBm/MHz)**

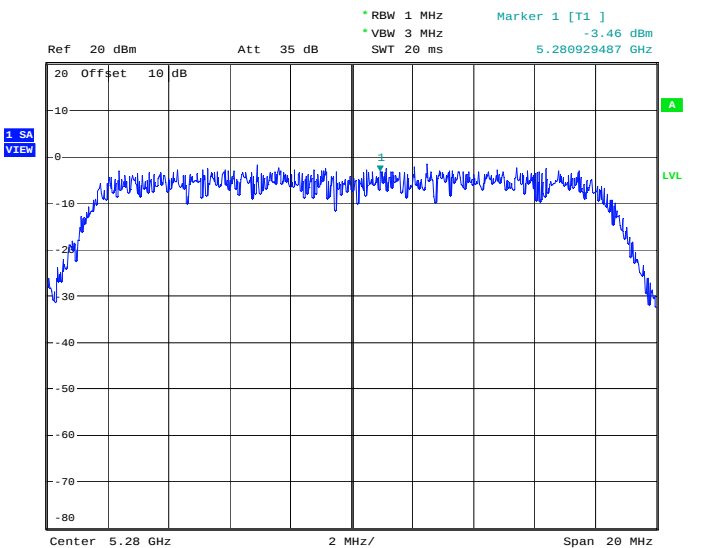
Data Rate	5280MHz	5300MHz	5320MHz
6-24 Mb/s	-3.46	3.62	-2.09
54 Mb/s	-1.75	2.51	-1.66

Limit

- (1) Conducted Power Limit for Integral antenna 10.7dBi
11dBm-(10.7dBi-6dBi)=6.3dBm
- (2) Conducted Power Limit for H&S SPA 5600/40/14/0/V antenna, 13dBi
11dBm-(13dBi-6dBi)=4dBm

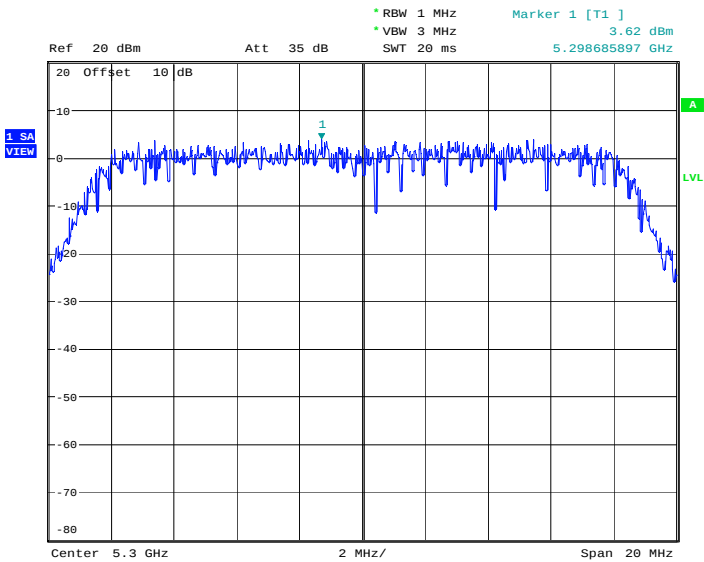
EQUIPMENT: Wireless AP7220

6-24Mb/s
5280MHz



CH56
Date: 11.MAR.2005 13:53:08

5300MHz



CH60
Date: 11.MAR.2005 13:56:41

5320MHz

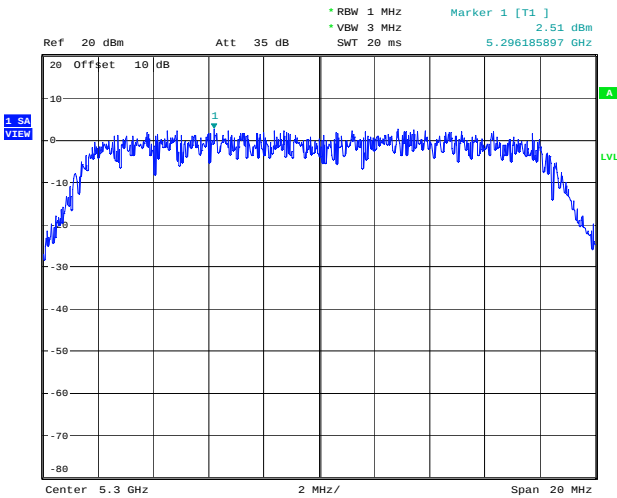


54Mb/s
5280MHz



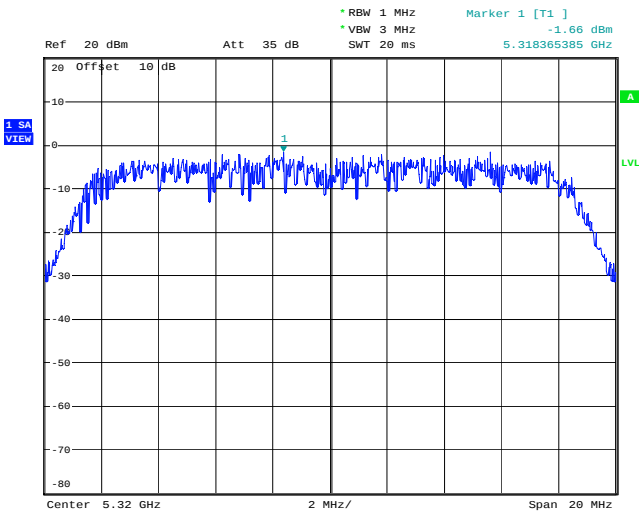
EQUIPMENT: Wireless AP7220

5300MHz



CH60
Date: 11.MAR.2005 14:12:23

5320MHz



CH64
Date: 11.MAR.2005 14:13:28

EQUIPMENT: Wireless AP7220

Section 8. Peak Excursion Measurement

Para. No.: 15.407(a)(6), Ref: DA: 02-2138

Test Performed By: Xu Jin	Date of Test: Mar 11, 2005
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Limit: $\leq +13\text{dB}$

Test Results: Complies

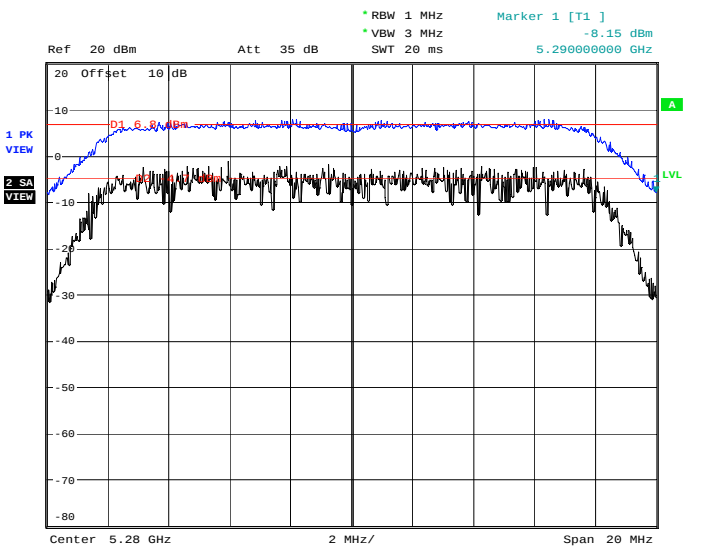
Measurement Data: See Attached tables and plots.

Peak Excursion Measurement Data(dB)

Data Rate	5280MHz	5300MHz	5320MHz
6-24 Mb/s	11.5	11.9	11.3
54 Mb/s	11.5	11.6	11.6

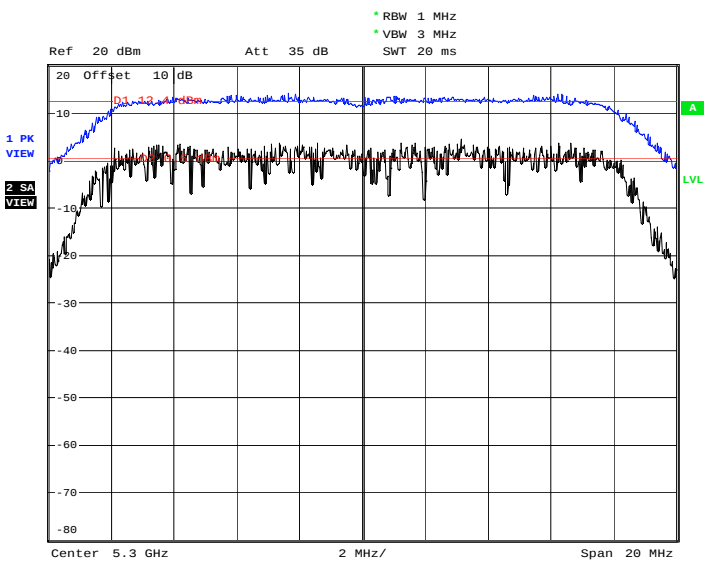
EQUIPMENT: Wireless AP7220

6-24Mb/s
5280MHz



CH56
Date: 11.MAR.2005 14:32:31

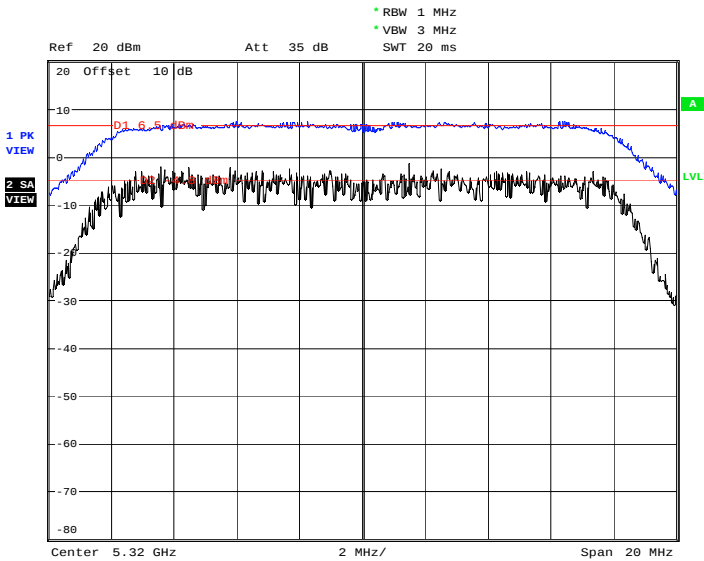
5300MHz



CH60
Date: 11.MAR.2005 14:49:38

EQUIPMENT: Wireless AP7220

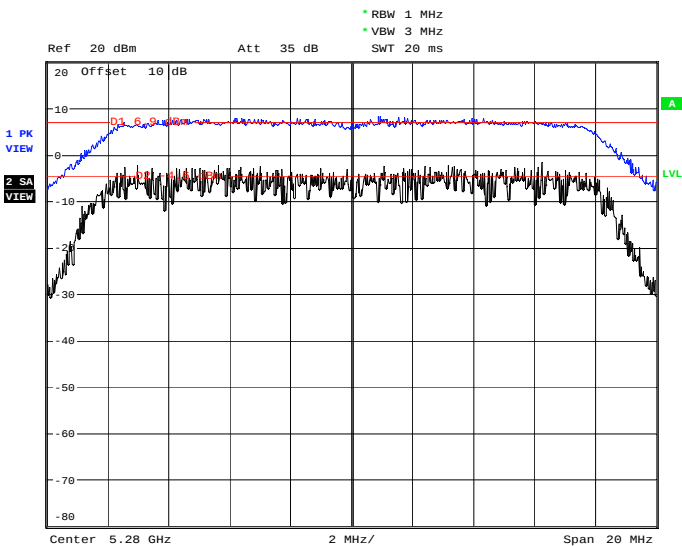
5320MHz



CH64
Date: 11.MAR.2005 15:01:21

54Mb/s

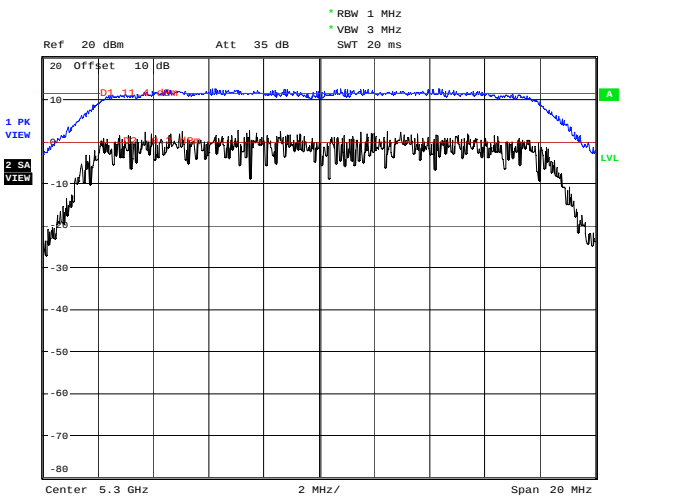
5280MHz



CH56
Date: 11.MAR.2005 14:46:00

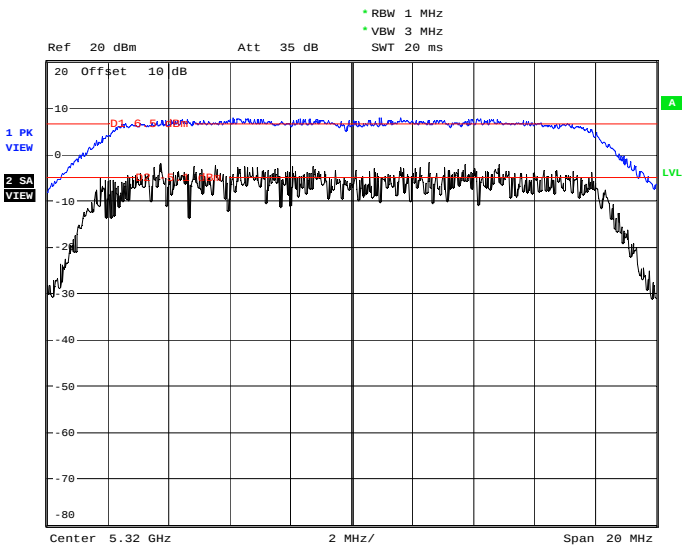
EQUIPMENT: Wireless AP7220

5300MHz



CH60
Date: 11.MAR.2005 14:55:56

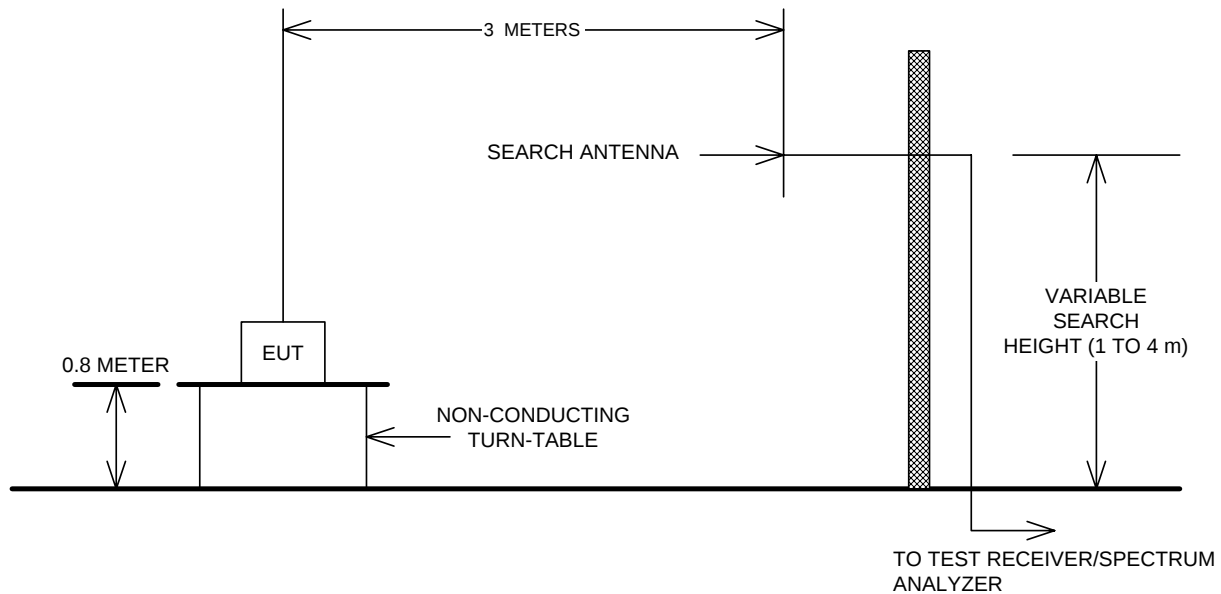
5320MHz



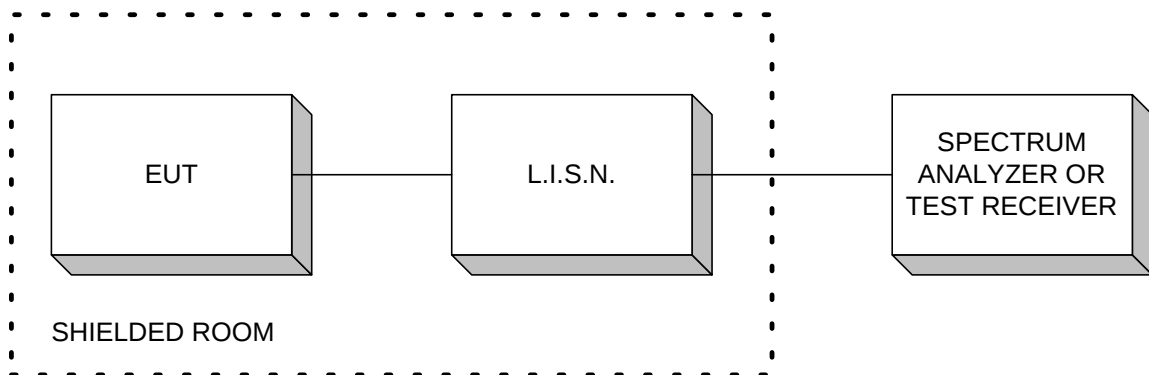
CH64
Date: 11.MAR.2005 15:02:49

Section 9. Block Diagrams

Test Site For Radiated Emissions

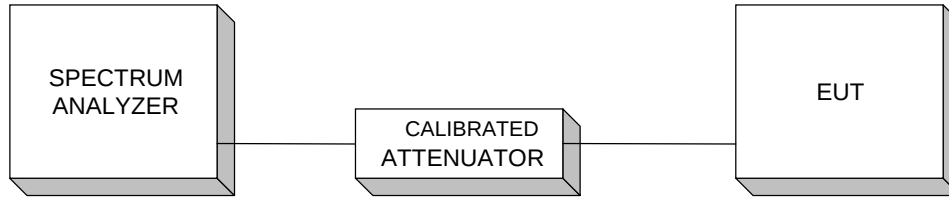


Conducted Emissions

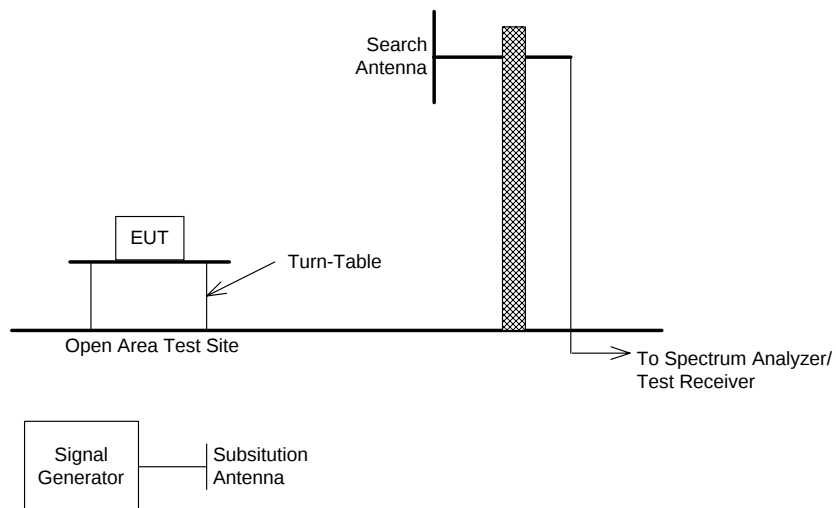


EQUIPMENT: Wireless AP7220

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	Power Sensor	Hewlett-Packard	8487A	Fa001908	May 25/04	May 25/05
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
1 Year	High Pass Filter (3.9GHz)	K&L	11SH10-4000	FA001340	COU	COU
Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair						