SPORTON International Inc.
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FCC RADIO TEST REPORT

Applicant's company	**Buffalo Inc.**
Applicant Address	15, shibata Hondori 4-chome, Minami-ku, Nagoya 457-8520,Japan
FCC ID	**FDI-09101540-0**
Manufacturer's company	**Askey computer Corporation.**
Manufacturer Address	10F, No.119, ChienKang RD., Chungho, Taipei, Taiwan, R.O.C.

Product Name	Access Point
Brand Name	Buffalo
Model Name	WHR-HP-AG108
Test Rule Part(s)	47 CFR Part 15.407
Test Freq. Range	5150 ~ 5350MHz
Receive Date	Mar. 14, 2006
Test Date	Mar. 28, 2006
Submission Type	Original Equipment

Statement

Test result included is only for the 802.11a (5150 ~ 5350MHz) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart E**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Lab Code: 200079-0

Table of Contents

History of This Test Report

Original Issue Date: Mar. 28, 2006

Report No.: FR631417

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Access Point
Brand Name	:	Buffalo
Model Name	:	WHR-HP-AG108
Applicant	:	Buffalo Inc.
Test Rule Part(s)	:	47 CFR Part 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Mar. 14, 2006 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Prepared By:	Technical Acceptance By:	Reviewed By:
Mandy Liang / Specialist	Steven Lu / Engineer	Wayne Hsu / Supervisor

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	2.3	AC Power Line Conducted Emissions	Complies	3.74 dB
4.2	4.7.2(1)/(3)	26dB Spectrum Bandwidth	Complies	-
4.3	4.7.2(1)/(3)	Maximum Conducted Output Power	Complies	1.37 dB
4.4	4.7.2(1)/(3)	Power Spectral Density	Complies	5.3 dB
4.5	4.7.2(6)	Peak Excursion	Complies	8.07 dB
4.6	4.7.3	Radiated Emissions	Complies	2.78 dB
4.7	4.7.3	Band Edge Emissions	Complies	1.00 dB
4.8	4.7.7	Frequency Stability	Complies	-
4.9	2.2	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.26dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.71dB	Confidence levels of 95%
Power Spectral Density	±0.71dB	Confidence levels of 95%
Peak Excursion	±0.71dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	±6.25×10-7	Confidence levels of 95%
Radiated Emissions/ Band Edge Emissions	±3.72dB	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Power Type	Power Adapter
Interface Type	RJ45
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54/108)
Frequency Range	5150 ~ 5350MHz
Channel Band Width (99%)	11a: 17.44 MHz
Conducted Output Power	11a: 14.10 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

3.2. Accessories

Power	Brand	Model	Rating
Adapter 1	BUFFALO	US100523	100-120VAC, 5VDC

3.3. Table for Filed Antenna

For 2.4GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	WHUYA	MGR-OS-56A	Dipole Antenna	Reversed-SMA	6.00
2	ASKEY	-	Printed Antenna	NA	1.50

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	WHUYA	MGR-OS-56A	Dipole Antenna	Reversed-SMA	8.00
2	ASKEY	-	Printed Antenna	NA	1.50

3.4. Table for Carrier Frequencies

Frequency Allocation for 802.11a

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	Turbo 42	5210 MHz
	40	5200 MHz	Turbo 50	5250 MHz
	44	5220 MHz		
	48	5240 MHz		
5250~5350 MHz Band 2	52	5260 MHz	Turbo 58	5290 MHz
	56	5280 MHz		

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
	60	5300 MHz		
	64	5320 MHz		

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Conducted Emission	Normal Link	6Mbps	64	1
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Max. Conducted Output Power Power Spectral Density Peak Excursion	Band 1/BPSK Band 2/BPSK	6Mbps	36/52/64	1
	Band 1 Turbo/BPSK Band 2 Turbo/BPSK	12Mbps	42/50/58	1
Radiated Emission Below 1GHz	BPSK	6Mbps	64	1
Radiated Emission Above 1GHz Band Edge Emission	Band 1/BPSK Band 2/BPSK	6Mbps	36/52/64	1
	Band 1 Turbo/BPSK Band 2 Turbo/BPSK	12Mbps	42/50/58	1
Band Edge Emission	Band 1/BPSK Band 2/BPSK	6Mbps	36/64	1
	Band 1 Turbo/BPSK Band 2 Turbo/BPSK	12Mbps	42/58	1
Frequency Stability	Un-modulation	-	52	1

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-
CO04-HY	Conduction	Hwa Ya	101377	IC 4088	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook * 3	DELL	PP01L	DoC
Printer	EPSON	LQ-300	DoC
Modem	ACEEX	DM-1414	DoC

3.8. Table for Parameters of Test Software Setting

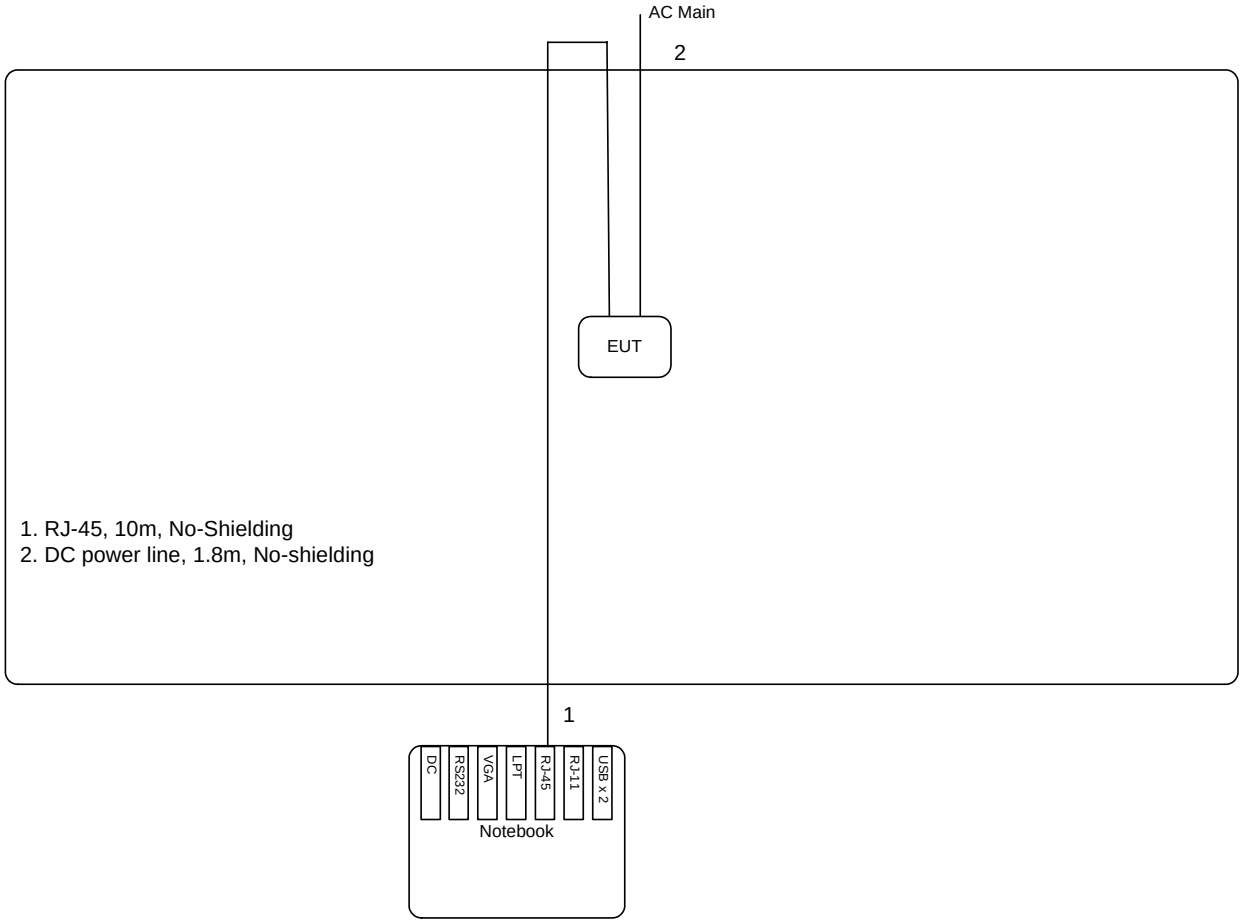
During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters of IEEE 802.11a

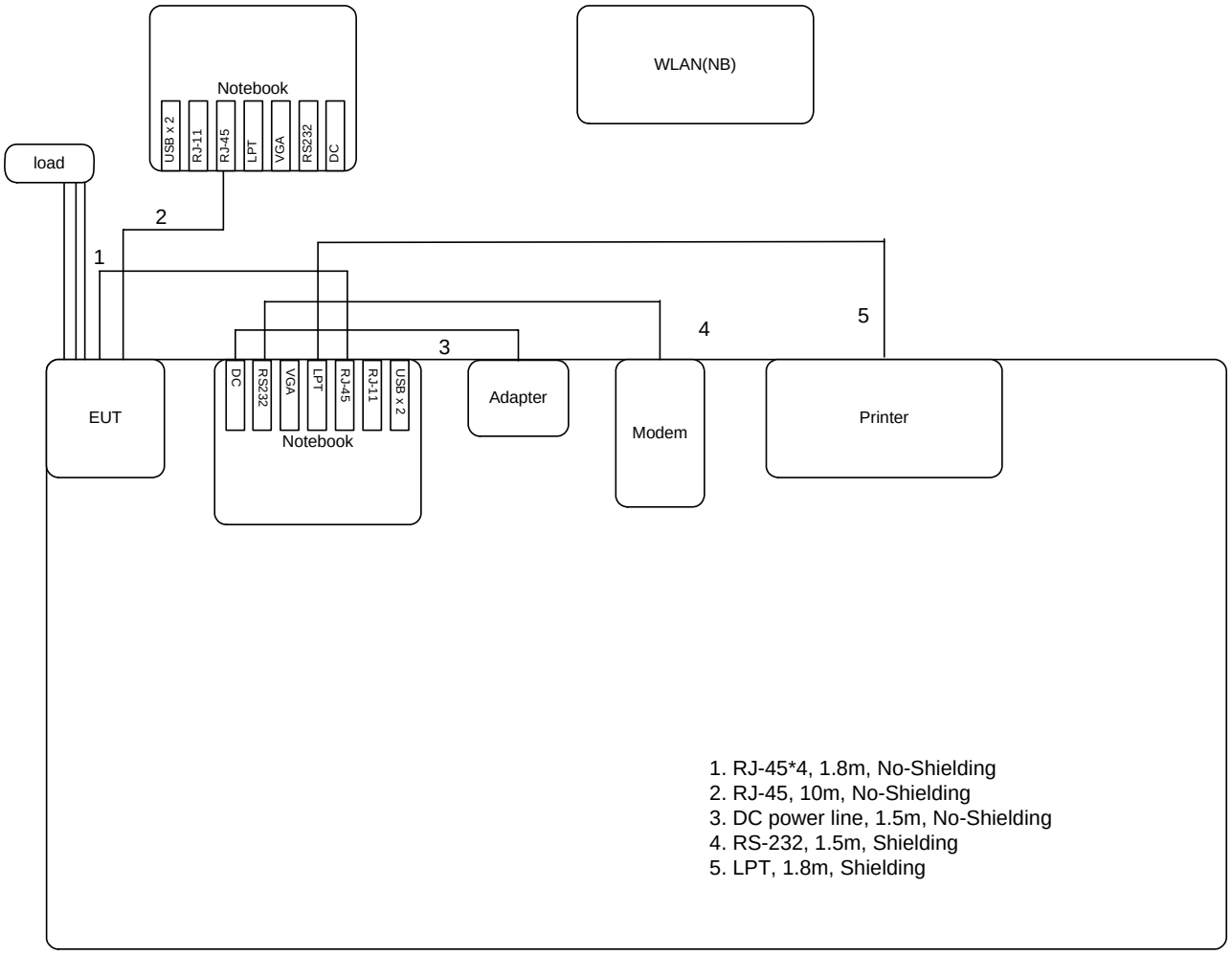
Test Software Version	ART_V48_Build13		
Frequency	5180 MHz	5260 MHz	5320 MHz
IEEE 802.11a	7	7	7
Frequency	5210 MHz	5250 MHz	5290 MHz
IEEE 802.11a Turbo	7	7	7

3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration



3.9.2. AC Power Line Conduction Emissions Test Configuration



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For a Low-power Radio-frequency Device which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

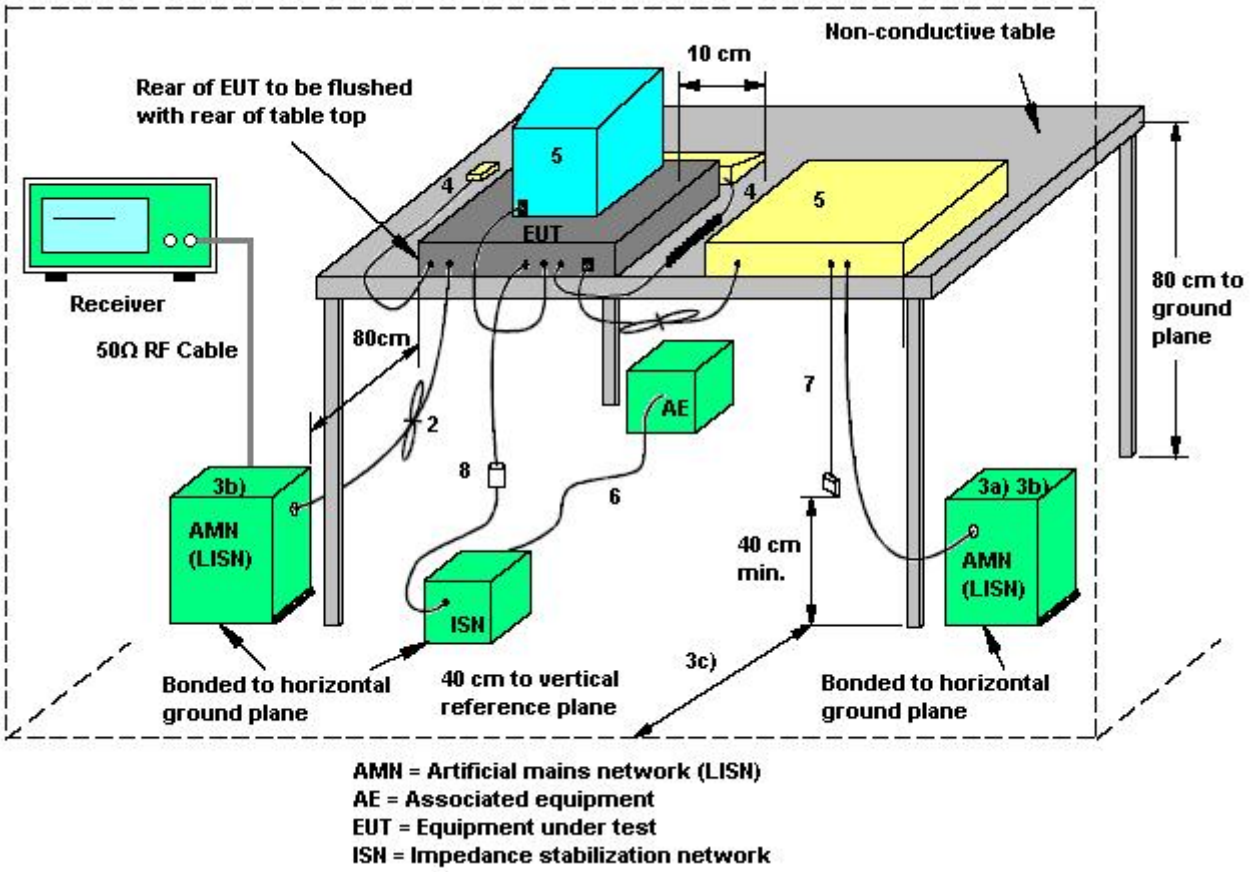
Please refer to section 5 in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



1. If cables, which hang closer than 40 cm to the horizontal metal groundplane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
2. Excess mains cord shall be bundled in the centre or shortened to appropriate length.
3. EUT is connected to one artificial mains network (AMN). All AMNs and ISNs may alternatively be connected to a vertical reference plane or metal wall.
4. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
5. AMN and ISN are 80 cm from the EUT and at least 80 cm from other units and other metal planes.
6. Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
7. Cables of hand operated devices, such as keyboards, mouses, etc. shall be placed as for normal usage.
8. Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
9. I/O signal cable intended for external connection.
10. The end of the I/O signal cables which are not connected to an AE may be terminated, if required, using correct terminating impedance.
11. If used, the current probe shall be placed at 0,1 m from the ISN.

4.1.5. Test Deviation

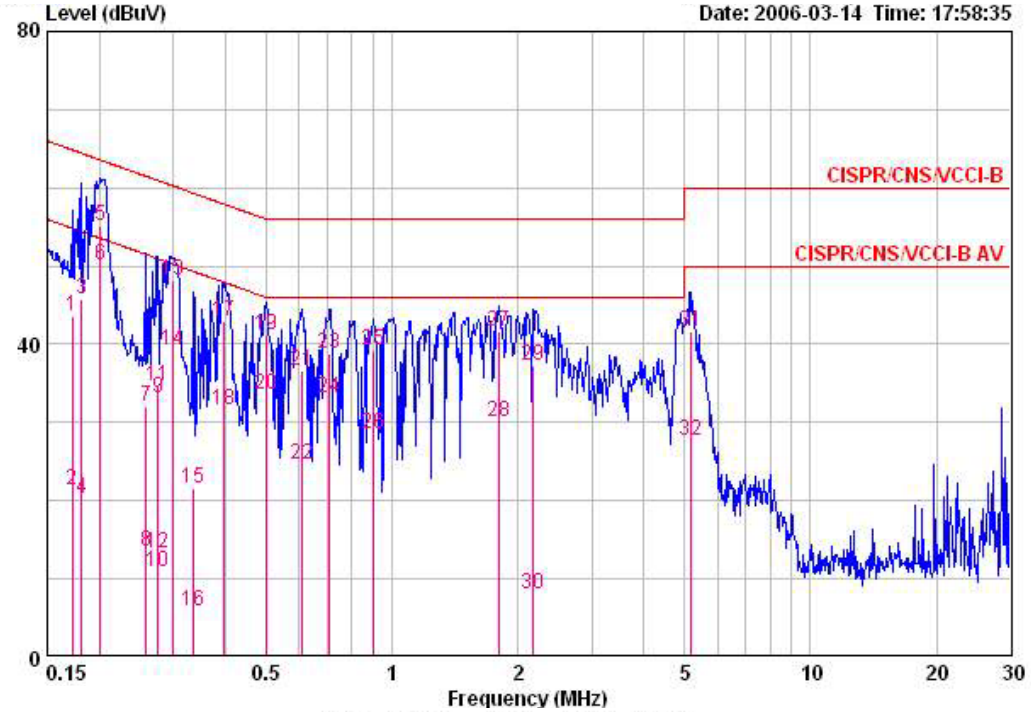
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

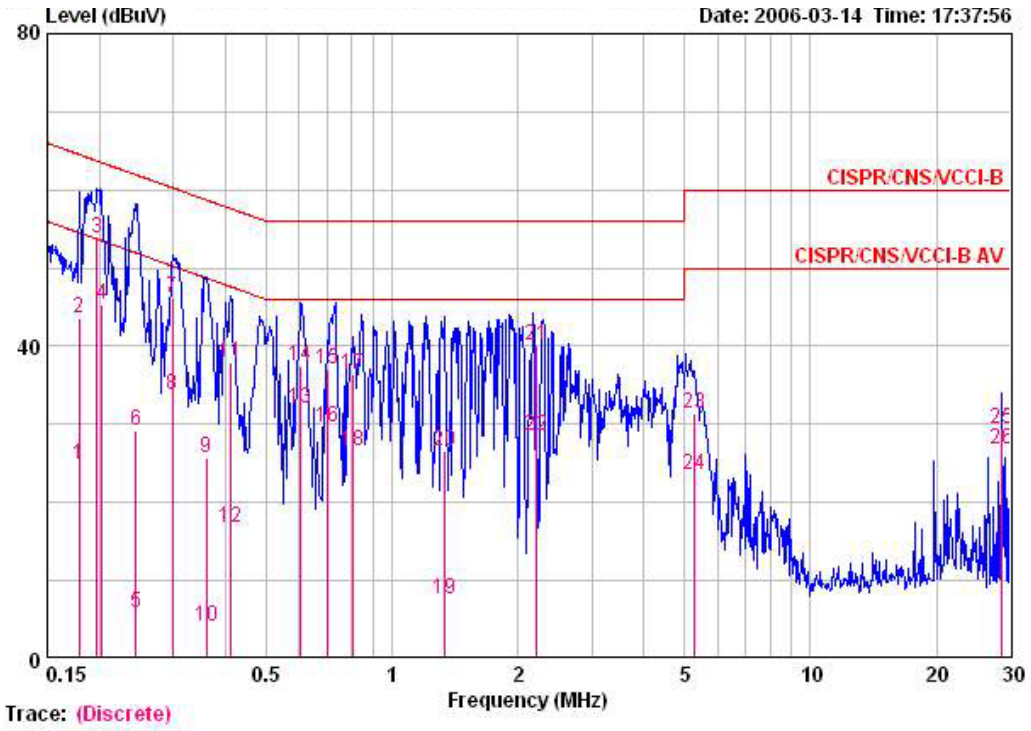
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	19℃	Humidity	67%
Test Engineer	Evelyn Shih	Phase	Line
Configuration	Normal Link / Ant. 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17215	43.61	-21.25	64.86	41.55	1.86	0.20	QP
2	0.17215	21.31	-33.55	54.86	19.25	1.86	0.20	AVERAGE
3	0.18152	45.78	-18.63	64.42	43.99	1.59	0.20	QP
4	0.18152	20.34	-34.07	54.42	18.55	1.59	0.20	AVERAGE
5	0.20075	55.07	-8.51	63.58	53.58	1.29	0.20	QP
6 @	0.20075	50.11	-3.47	53.58	48.62	1.29	0.20	AVERAGE
7	0.25888	31.96	-29.51	61.47	30.86	0.90	0.20	QP
8	0.25888	13.58	-37.89	51.47	12.48	0.90	0.20	AVERAGE
9	0.27587	33.15	-27.79	60.94	32.11	0.84	0.20	QP
10	0.27587	10.86	-40.08	50.94	9.82	0.84	0.20	AVERAGE
11	0.27587	34.56	-26.38	60.94	33.52	0.84	0.20	QP
12	0.27587	13.25	-37.69	50.94	12.21	0.84	0.20	AVERAGE
13	0.30069	48.15	-12.07	60.22	47.15	0.80	0.20	QP
14	0.30069	39.17	-11.05	50.22	38.17	0.80	0.20	AVERAGE
15	0.33385	21.60	-37.75	59.35	20.70	0.70	0.20	QP
16	0.33385	5.94	-43.41	49.35	5.04	0.70	0.20	AVERAGE
17	0.39763	42.93	-14.97	57.90	42.13	0.60	0.20	QP
18	0.39763	31.51	-16.39	47.90	30.71	0.60	0.20	AVERAGE
19	0.49937	41.24	-14.77	56.01	40.64	0.40	0.20	QP
20	0.49937	33.61	-12.40	46.01	33.01	0.40	0.20	AVERAGE
21	0.61075	36.61	-19.39	56.00	36.01	0.40	0.20	QP
22	0.61075	24.74	-21.26	46.00	24.14	0.40	0.20	AVERAGE
23	0.70542	38.89	-17.11	56.00	38.29	0.40	0.20	QP
24	0.70542	33.04	-12.96	46.00	32.44	0.40	0.20	AVERAGE
25	0.89917	39.20	-16.80	56.00	38.70	0.30	0.20	QP
26	0.89917	28.60	-17.40	46.00	28.10	0.30	0.20	AVERAGE
27	1.800	41.69	-14.31	56.00	41.23	0.30	0.16	QP
28	1.800	30.09	-15.91	46.00	29.63	0.30	0.16	AVERAGE
29	2.167	37.35	-18.65	56.00	36.85	0.30	0.20	QP
30	2.167	8.07	-37.93	46.00	7.57	0.30	0.20	AVERAGE
31	5.194	41.58	-18.42	60.00	40.98	0.30	0.30	QP
32	5.194	27.62	-22.38	50.00	27.02	0.30	0.30	AVERAGE

Temperature	19℃	Humidity	67%
Test Engineer	Evelyn Shih	Phase	Neutral
Configuration	Normal Link / Ant. 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17866	24.92	-29.63	54.55	23.20	1.52	0.20	AVERAGE
2	0.17866	43.50	-21.05	64.55	41.78	1.52	0.20	QP
3	0.19758	53.95	-9.77	63.71	52.59	1.16	0.20	QP
4	0.20255	45.34	-8.17	53.51	43.97	1.17	0.20	AVERAGE
5	0.24422	5.99	-45.96	51.95	4.93	0.86	0.20	AVERAGE
6	0.24422	29.11	-32.84	61.95	28.05	0.86	0.20	QP
7	0.29869	46.19	-14.08	60.28	45.38	0.61	0.20	QP
8	0.29869	33.79	-16.48	50.28	32.98	0.61	0.20	AVERAGE
9	0.35955	25.66	-33.08	58.74	24.86	0.60	0.20	QP
10	0.35955	4.14	-44.60	48.74	3.34	0.60	0.20	AVERAGE
11	0.41048	37.97	-19.67	57.64	37.37	0.40	0.20	QP
12	0.41048	16.88	-30.76	47.64	16.28	0.40	0.20	AVERAGE
13	0.60431	31.97	-14.03	46.00	31.47	0.30	0.20	AVERAGE
14	0.60431	37.49	-18.51	56.00	36.99	0.30	0.20	QP
15	0.70231	37.08	-18.92	56.00	36.58	0.30	0.20	QP
16	0.70231	29.57	-16.43	46.00	29.07	0.30	0.20	AVERAGE
17	0.80526	36.48	-19.52	56.00	35.98	0.30	0.20	QP
18	0.80526	26.59	-19.41	46.00	26.09	0.30	0.20	AVERAGE
19	1.331	7.57	-38.43	46.00	7.14	0.30	0.13	AVERAGE
20	1.331	26.53	-29.47	56.00	26.10	0.30	0.13	QP
21	2.210	40.02	-15.98	56.00	39.57	0.25	0.20	QP
22	2.210	28.55	-17.45	46.00	28.10	0.25	0.20	AVERAGE
23	5.275	31.30	-28.70	60.00	30.70	0.30	0.30	QP
24	5.275	23.56	-26.44	50.00	22.96	0.30	0.30	AVERAGE
25	28.684	29.36	-30.64	60.00	28.41	0.35	0.60	QP
26	28.684	26.71	-23.29	50.00	25.76	0.35	0.60	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits. But resoluation bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

4.2.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RB	300 kHz
VB	1000 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.

4.2.4. Test Setup Layout

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 99% Occupied Bandwidth

Temperature	20℃	Humidity	63%
Test Engineer	Rush Kur	Configurations	802.11a / Turbo a / Ant.1

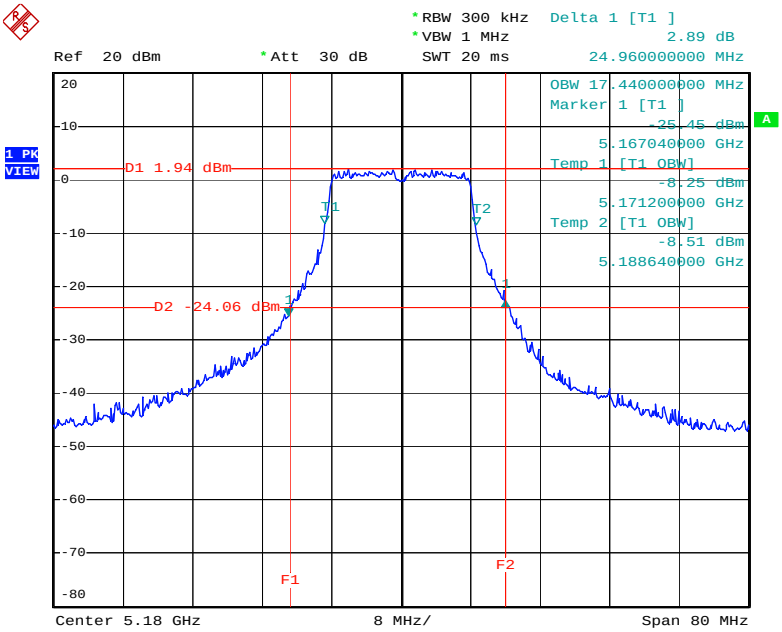
Configuration IEEE 802.11a

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.96	17.44
52	5260 MHz	25.12	17.44
64	5320 MHz	24.80	17.44

Configuration IEEE 802.11a Turbo

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
42	5210 MHz	46.20	33.6
50	5250 MHz	46.60	33.6
58	5290 MHz	47.00	33.6

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5180 MHz



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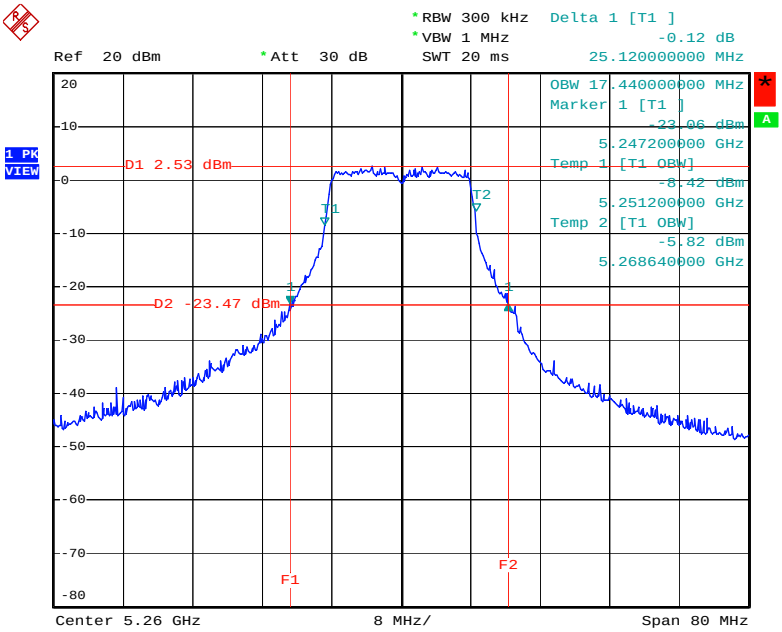
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5260 MHz



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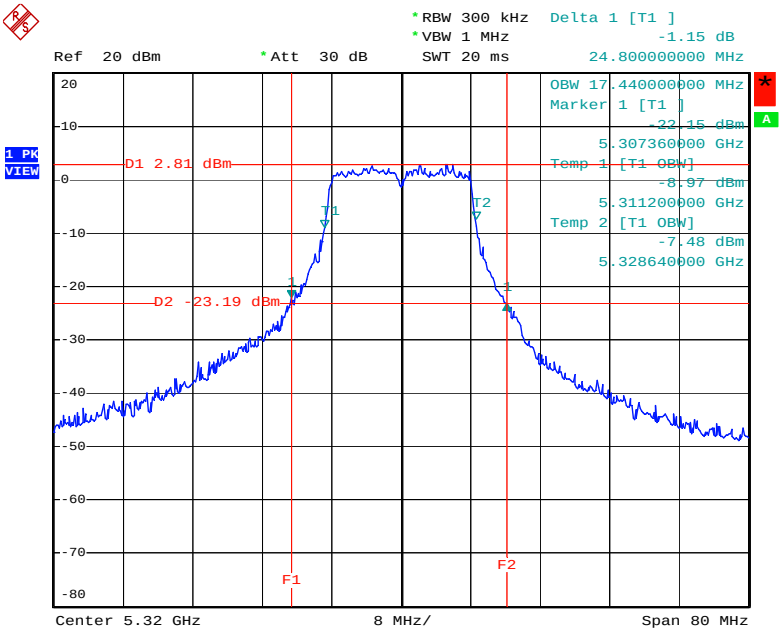
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5320 MHz



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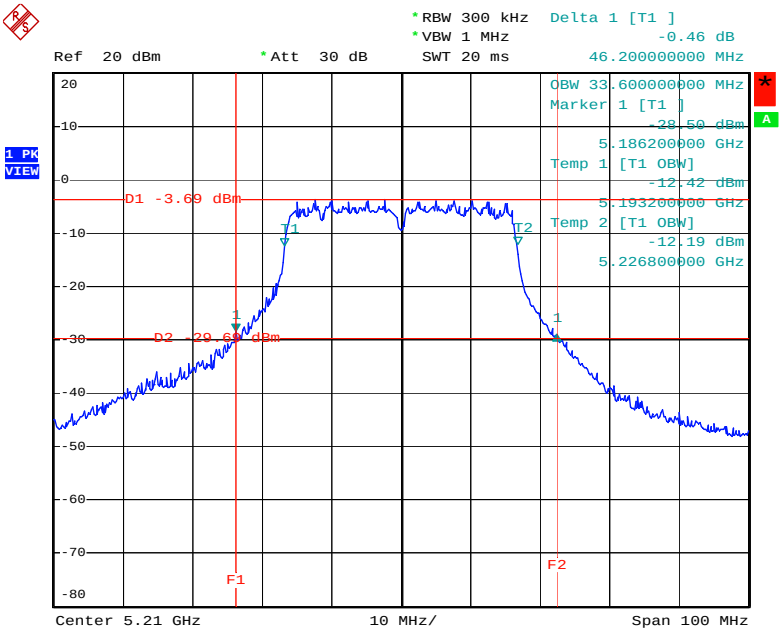
26 dB Bandwidth Plot on Configuration IEEE 802.11a Turbo / 5210 MHz



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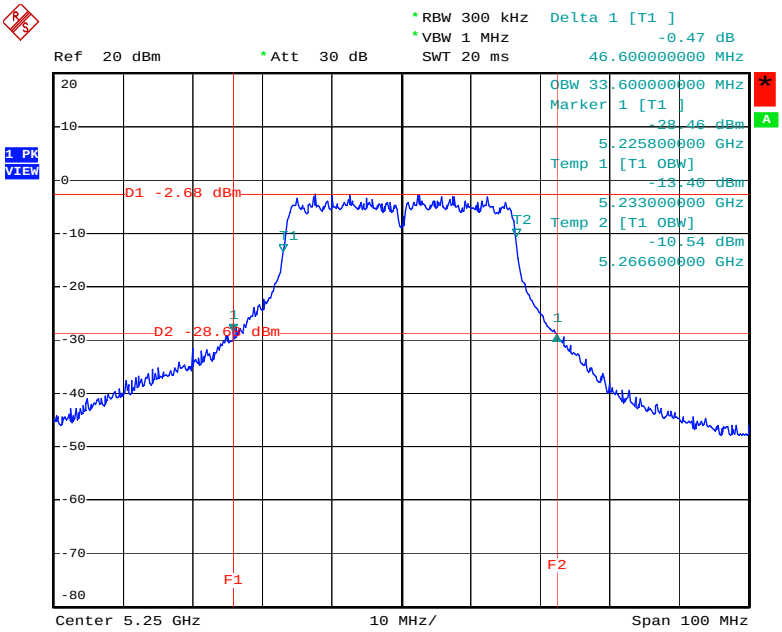
26 dB Bandwidth Plot on Configuration IEEE 802.11a Turbo / 5250 MHz



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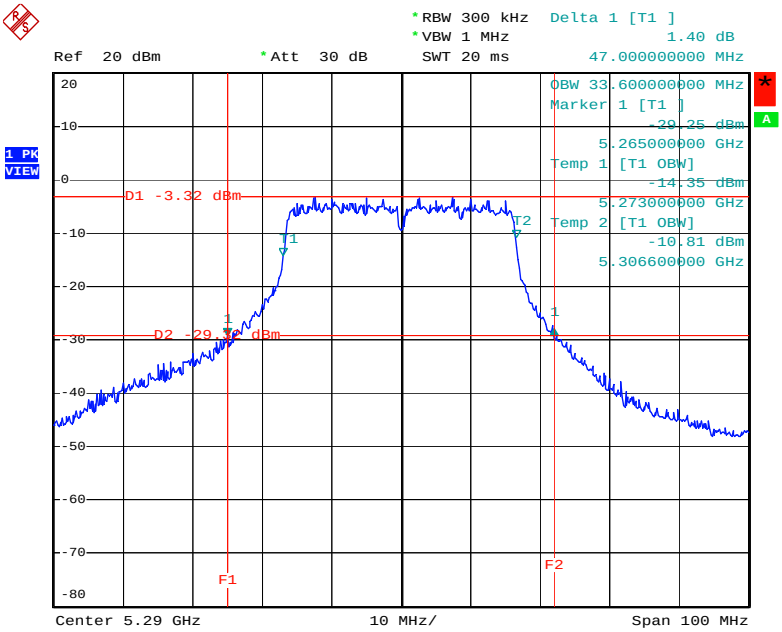
26 dB Bandwidth Plot on Configuration IEEE 802.11a Turbo / 5290 MHz



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4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

For the band 5.25~5.35 GHz , the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W (30dBm) or 17 dBm + 10log B. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

4.3.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	300 kHz
Detector	Sample
Trace	Max Hold
Sweep Time	60s

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with method #3 of FCC Public Notice DA-02-2138.

4.3.4. Test Setup Layout

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	20℃	Humidity	70%
Test Engineer	Rush Kur	Configurations	802.11a / Turbo / Ant. 1

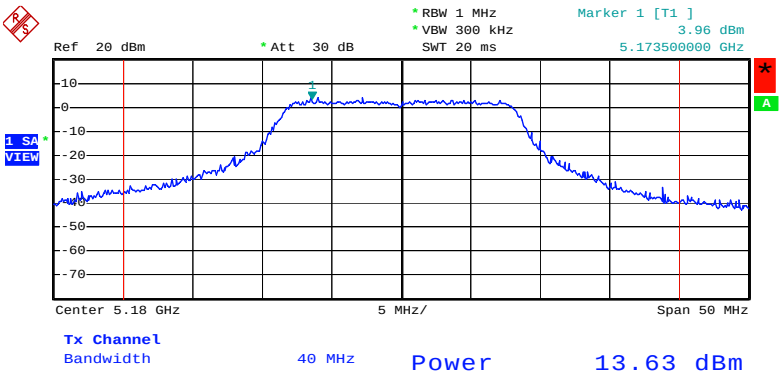
Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.63	15.00	Complies
52	5260 MHz	13.95	22.00	Complies
64	5320 MHz	14.10	22.00	Complies

Configuration IEEE 802.11a Turbo

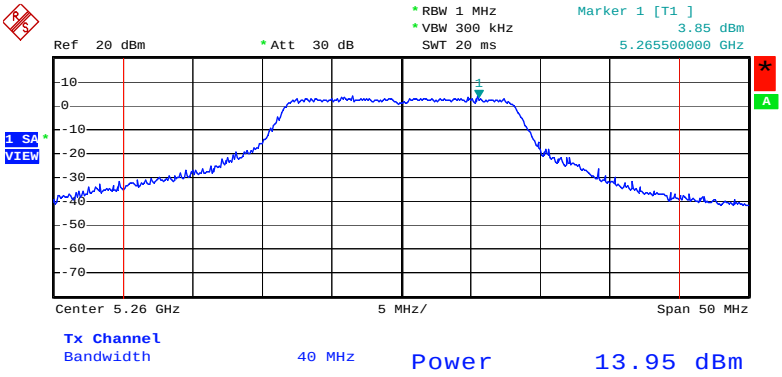
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
42	5210 MHz	10.03	15.00	Complies
50	5250 MHz	10.76	15.00	Complies
58	5290 MHz	10.91	22.00	Complies

Channel Output Power Plot on Configuration IEEE 802.11a / 5180 MHz



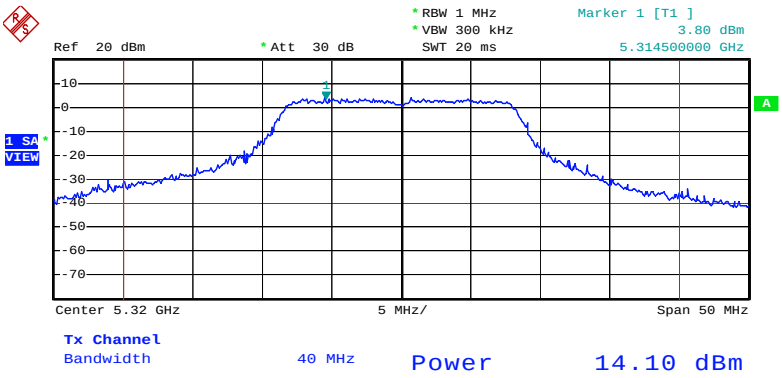
Date: 21.MAR.2006 06:07:20

Channel Output Power Plot on Configuration IEEE 802.11a / 5260 MHz



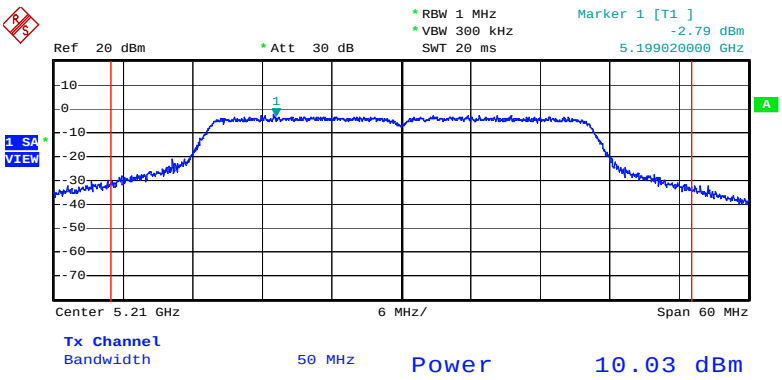
Date: 21.MAR.2006 06:06:42

Channel Output Power Plot on Configuration IEEE 802.11a / 5320 MHz



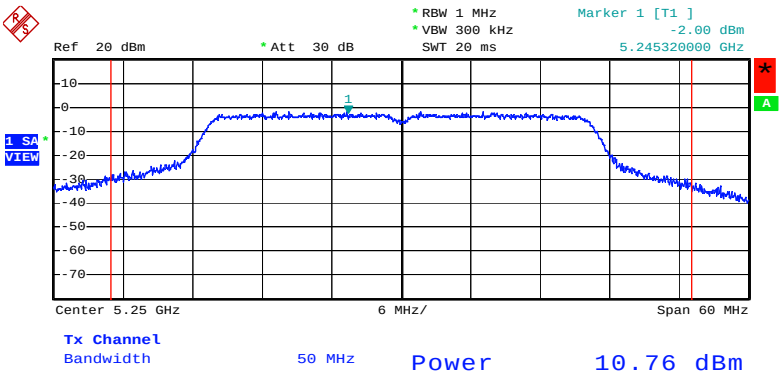
Date: 21.MAR.2006 06:06:07

Channel Output Power Plot on Configuration IEEE 802.11a Turbo / 5210 MHz



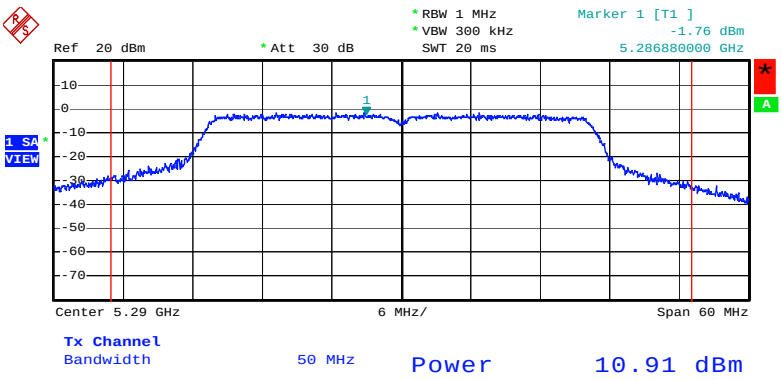
Date: 20.MAR.2006 20:55:47

Channel Output Power Plot on Configuration IEEE 802.11a Turbo / 5250 MHz



Date: 20.MAR.2006 20:56:35

Channel Output Power Plot on Configuration IEEE 802.11a Turbo / 5290 MHz



Date: 20.MAR.2006 20:57:17

4.4. Power Spectral Density Measurement

4.4.1. Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	2
5.25~5.35 GHz	9

4.4.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser.
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 3000kHz. Set Detector to Peak, Trace to Max Hold. Mark the frequency with maximum peak power as the center of the display of the spectrum.

4.4.4. Test Setup Layout

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	20℃	Humidity	70%
Test Engineer	Rush Kur	Configurations	802.11a / Turbo

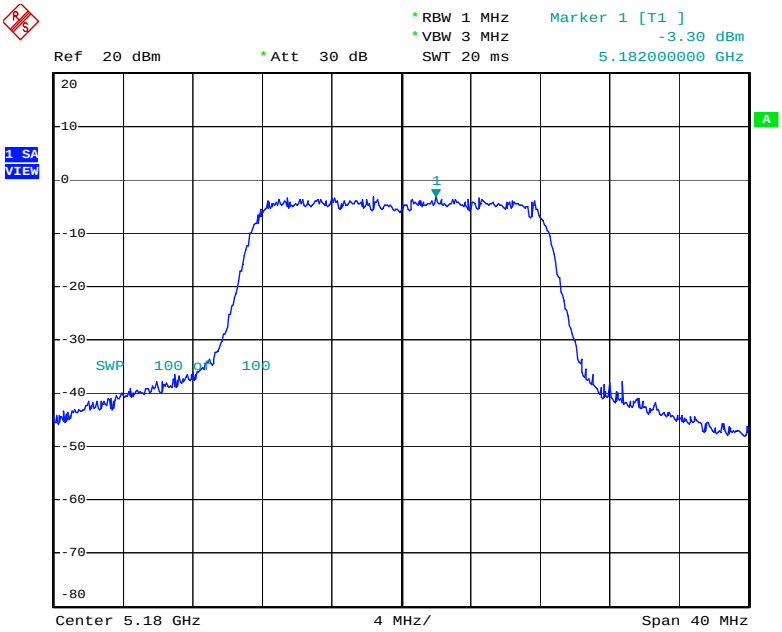
Configuration IEEE 802.11a

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-3.30	2.00	Complies
5260 MHz	-2.62	9.00	Complies
5320 MHz	-2.25	9.00	Complies

Configuration IEEE 802.11a Turbo

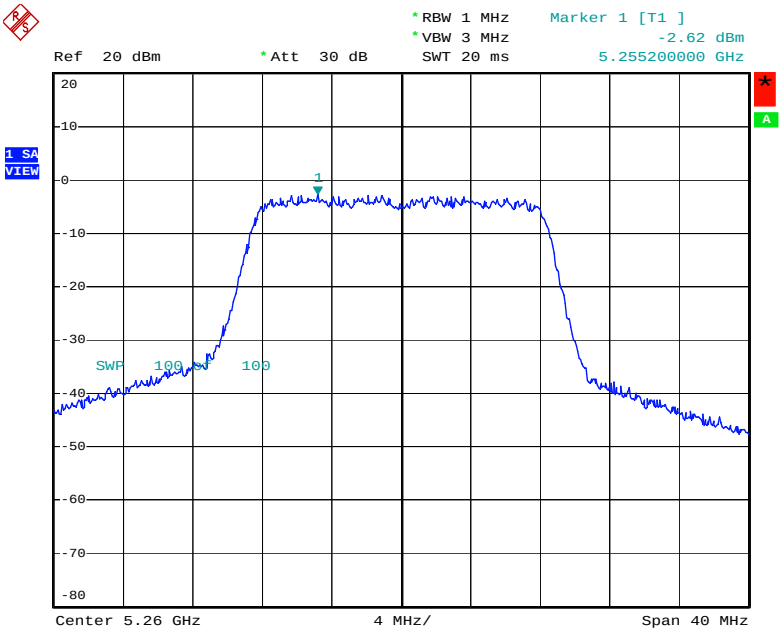
Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5210 MHz	-8.70	2.00	Complies
5250 MHz	-7.84	9.00	Complies
5290 MHz	-8.73	9.00	Complies

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



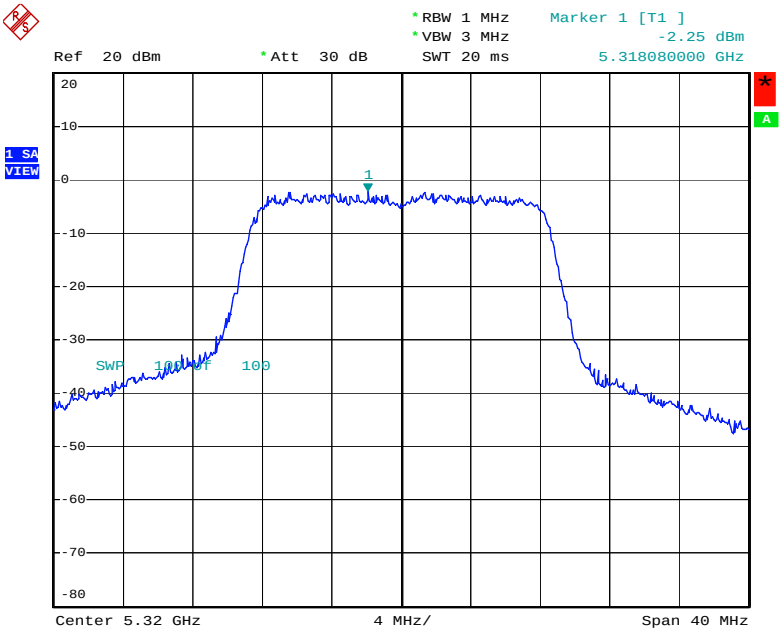
Date: 21.MAR.2006 06:02:47

Power Density Plot on Configuration IEEE 802.11a / 5260 MHz



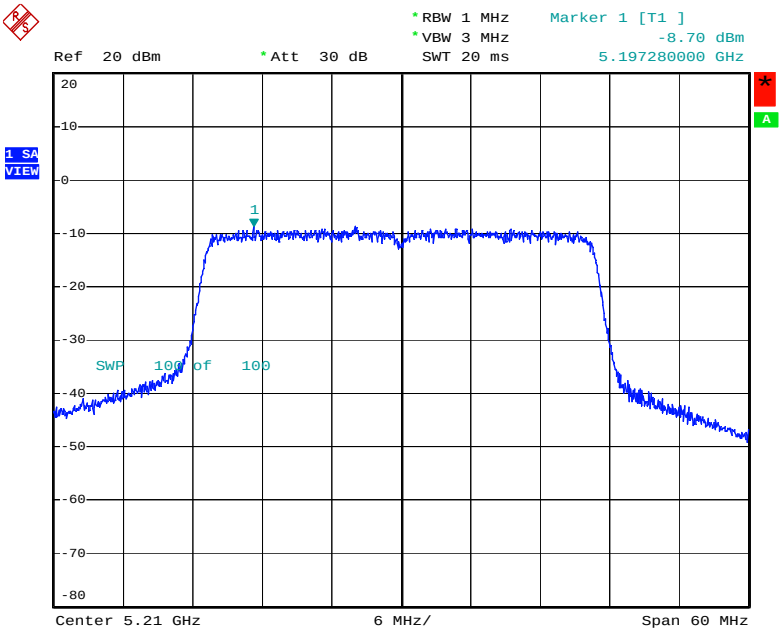
Date: 21.MAR.2006 06:03:13

Power Density Plot on Configuration IEEE 802.11a / 5320 MHz



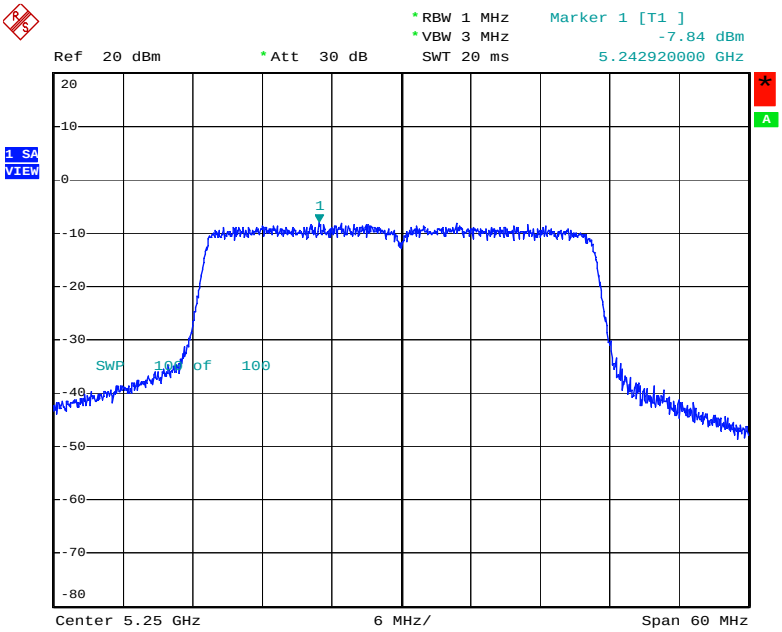
Date: 21.MAR.2006 06:03:49

Power Density Plot on Configuration IEEE 802.11a Turbo / 5210 MHz



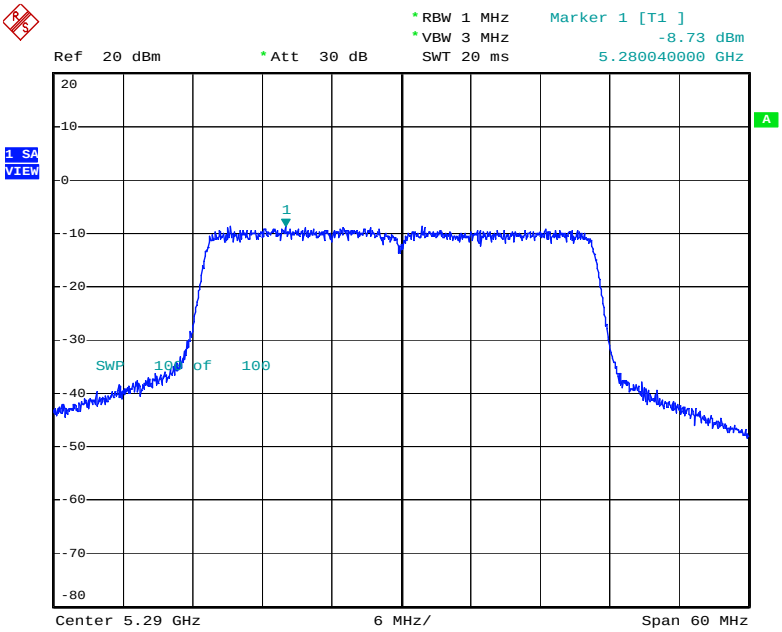
Date: 20.MAR.2006 20:59:16

Power Density Plot on Configuration IEEE 802.11a Turbo / 5250 MHz



Date: 20.MAR.2006 20:58:53

Power Density Plot on Configuration IEEE 802.11a Turbo / 5290 MHz



Date: 20.MAR.2006 20:58:28

4.5. Peak Excursion Measurement

4.5.1. Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.

4.5.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz (Peak Trace) / 1000 kHz (Average Trace)
VB	3000 kHz (Peak Trace) / 300 kHz (Average Trace)
Detector	Peak (Peak Trace) / Sample (Average Trace)
Trace	Max Hold
Sweep Time	60s

4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser.
2. Set the spectrum analyzer span to view the entire emissions bandwidth. The largest difference between the following two traces (Peak Trace and Average Trace) must be ≤ 13 dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and maxhold settings.
4. Average Trace: Method #3—video averaging with max hold--and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to "free run". Set RBW = 1 MHz. Set VBW ≥ 1/T (IEEE 802.11a VBW = 300kHz ≥ 1/4 μ s). Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode . Set max hold. Allow max hold to run for 60 seconds.

4.5.4. Test Setup Layout

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Peak Excursion

Temperature	20℃	Humidity	65%
Test Engineer	Rush Kur	Configurations	802.11a / Turbo

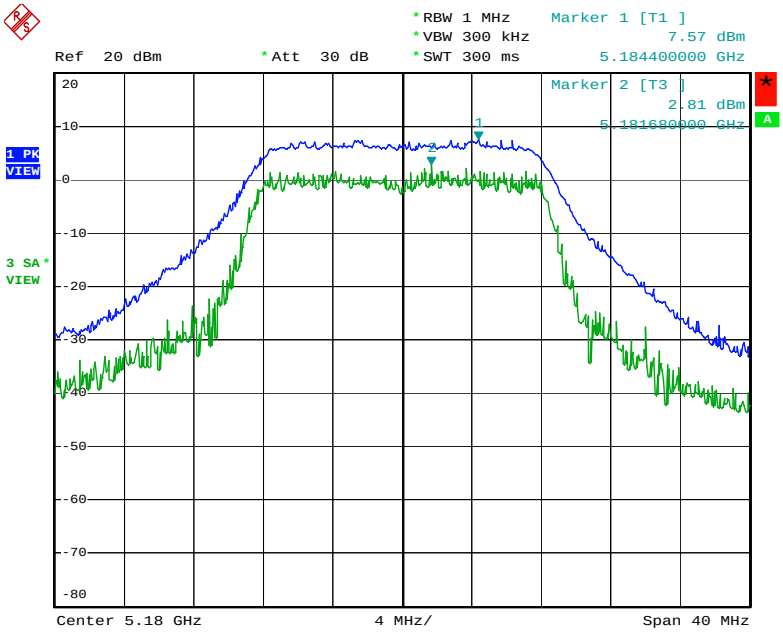
Configuration IEEE 802.11a

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	4.76	13	Complies
5260 MHz	4.64	13	Complies
5320 MHz	4.93	13	Complies

Configuration IEEE 802.11a Turbo

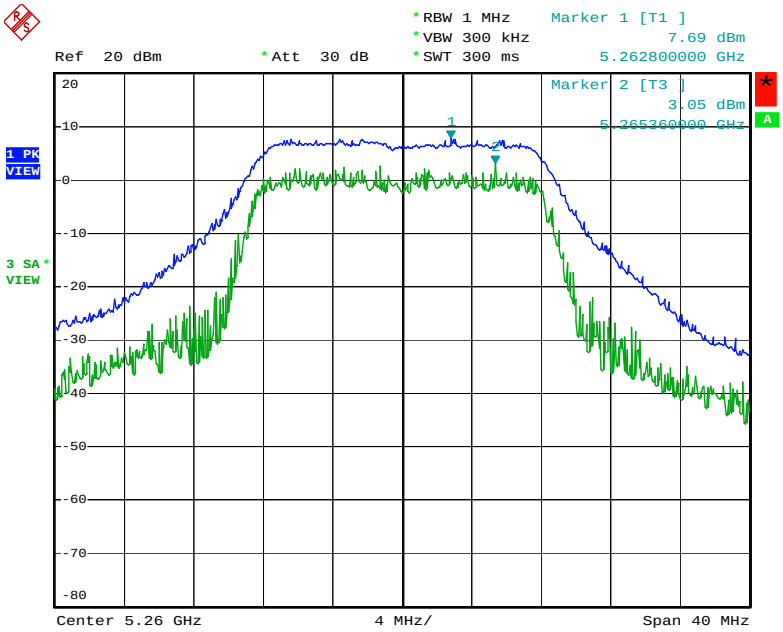
Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5210 MHz	4.06	13	Complies
5250 MHz	3.77	13	Complies
5290 MHz	3.74	13	Complies

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



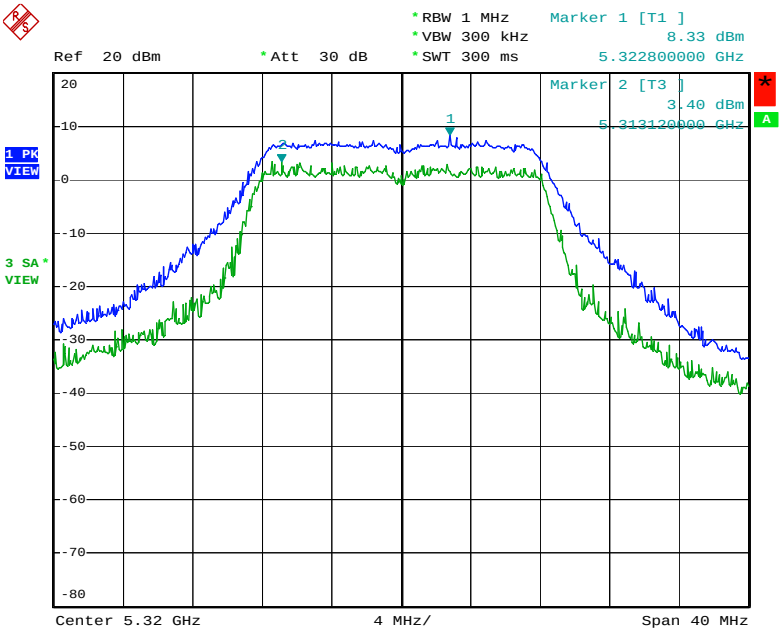
Date: 21.MAR.2006 06:01:44

Peak Excursion Plot on Configuration IEEE 802.11a / 5260 MHz



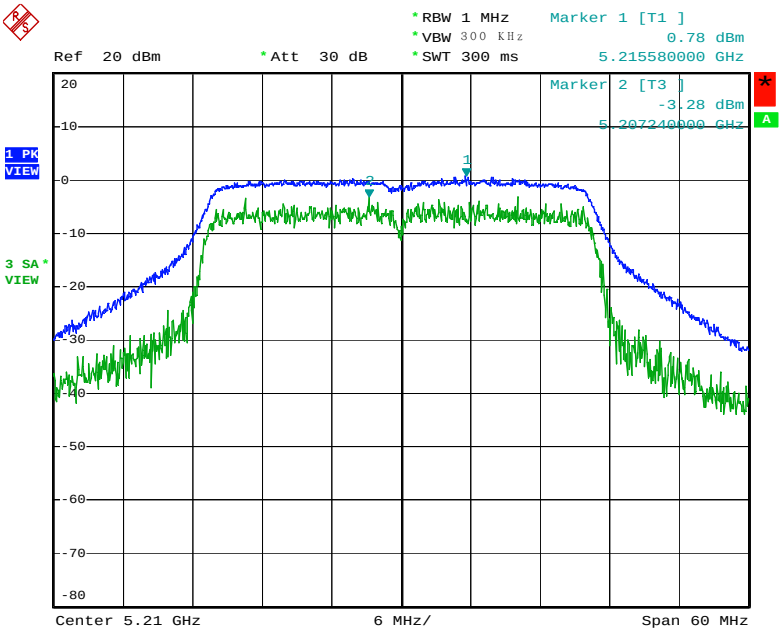
Date: 21.MAR.2006 06:00:47

Peak Excursion Plot on Configuration IEEE 802.11a / 5320 MHz



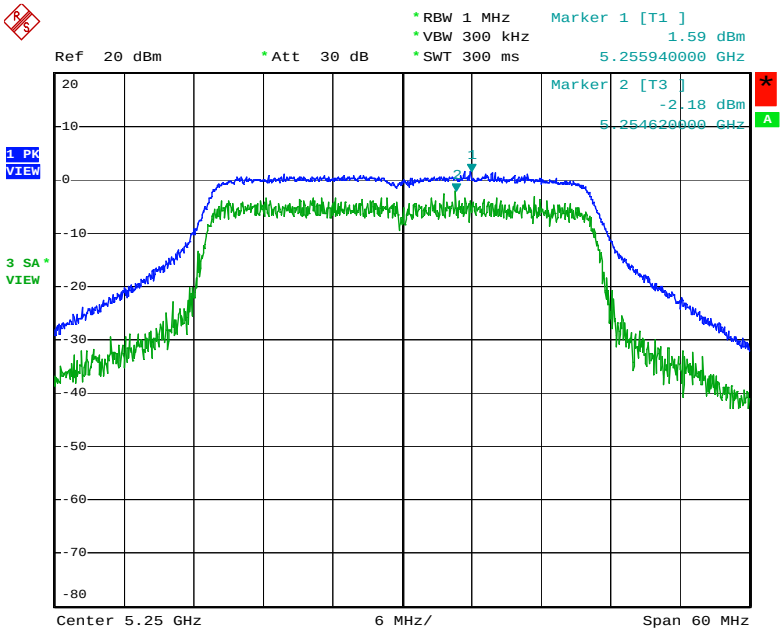
Date: 21.MAR.2006 05:59:52

Peak Excursion Plot on Configuration IEEE 802.11a Turbo / 5210 MHz



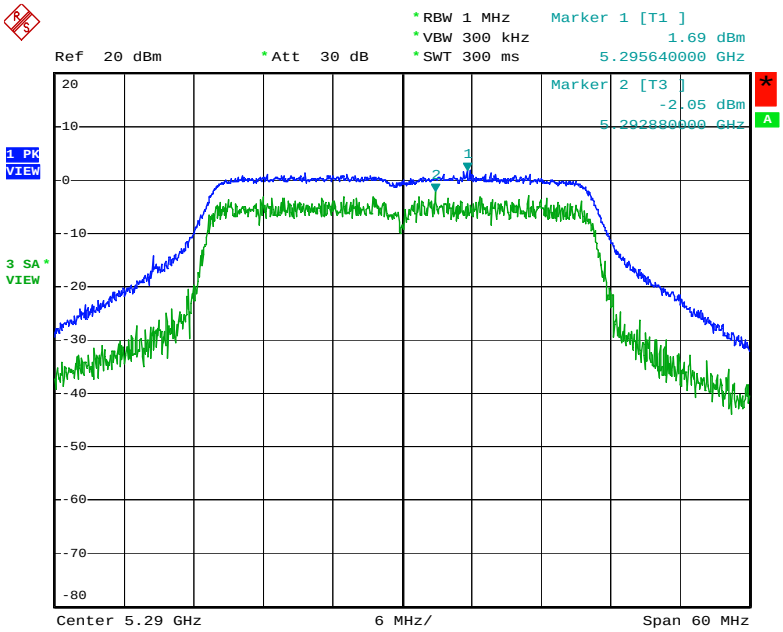
Date: 20.MAR.2006 21:01:29

Peak Excursion Plot on Configuration IEEE 802.11a Turbo / 5250 MHz



Date: 20.MAR.2006 21:02:27

Peak Excursion Plot on Configuration IEEE 802.11a Turbo / 5290 MHz



Date: 20.MAR.2006 21:03:28

4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 2.7, then the 2.8 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.6.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	100KHz / 100KHz for peak

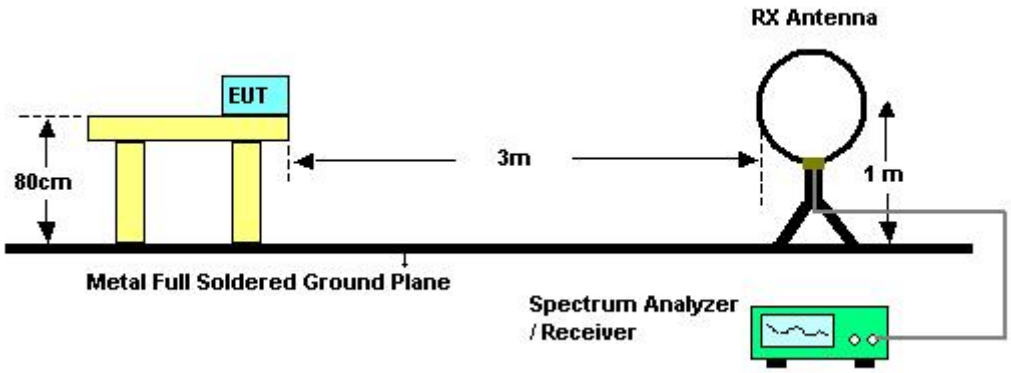
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

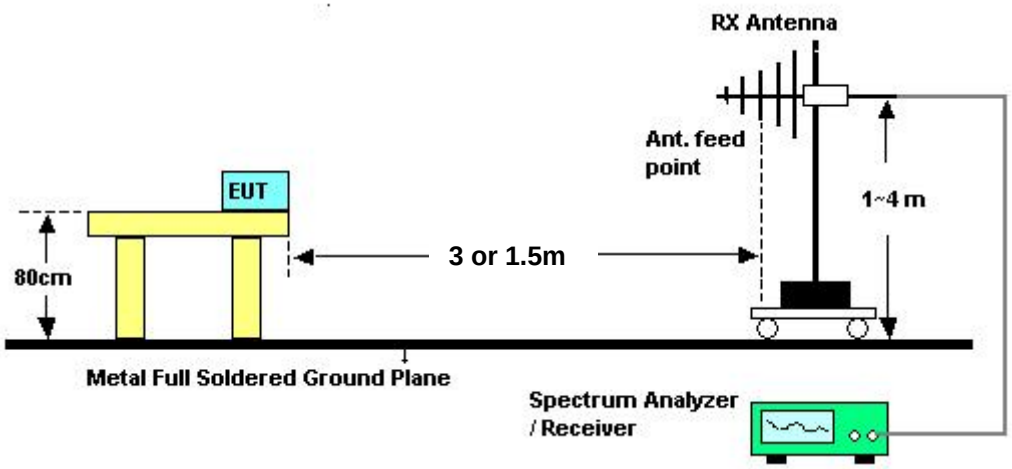
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.6.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6.02 dB].

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	20℃	Humidity	63%
Test Engineer	Leo Hung	Configurations	802.11a Channel 64 / Ant. 1

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

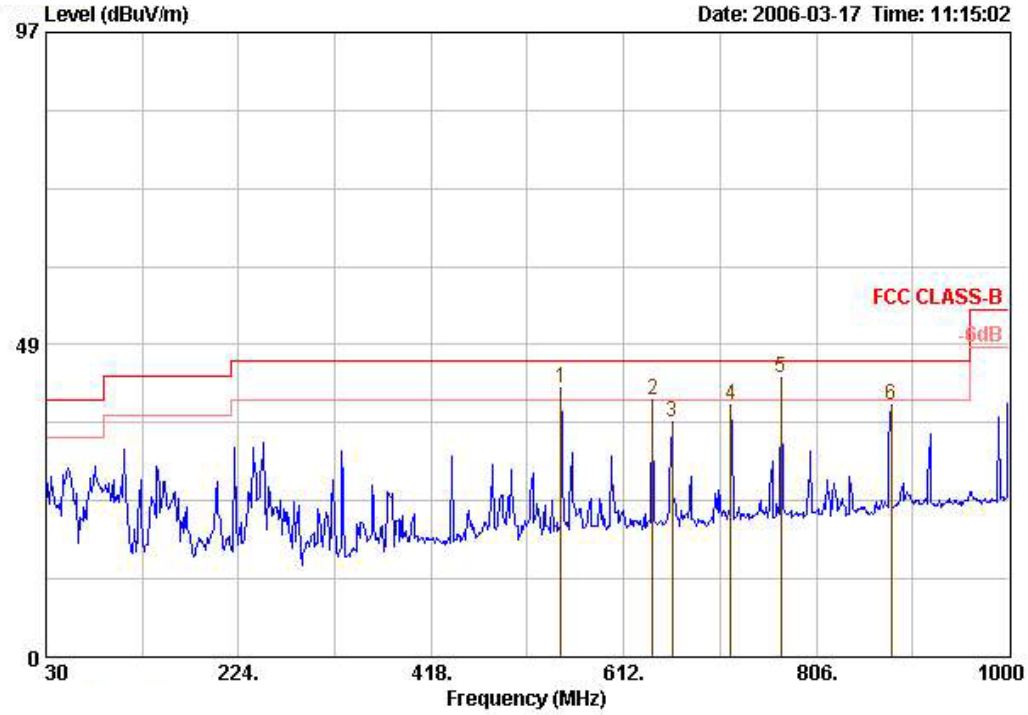
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

4.6.8. Results of Radiated Emissions (30MHz~1GHz)

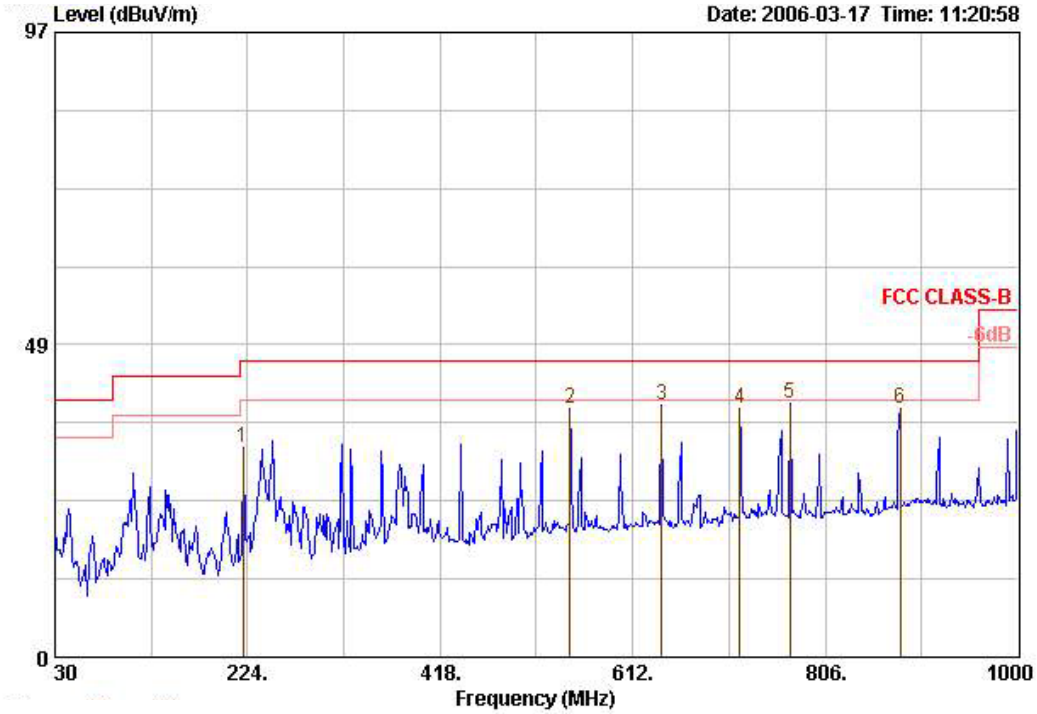
Temperature	20℃	Humidity	63%
Test Engineer	Leo Hung	Configurations	802.11a Channel 64 / Ant. 1

Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	548.950	41.82	-4.18	46.00	18.28	1.87	30.63	52.30	Peak	---	---
2 @	641.100	39.92	-6.08	46.00	18.90	2.00	30.42	49.43	Peak	---	---
3 @	660.500	36.60	-9.40	46.00	18.90	2.05	30.34	46.00	Peak	---	---
4 @	719.670	39.11	-6.89	46.00	19.40	2.14	30.28	47.84	Peak	---	---
5 @	770.110	43.22	-2.78	46.00	19.92	2.19	30.09	51.20	QP	---	---
6 @	881.660	39.15	-6.85	46.00	20.32	2.39	29.18	45.62	Peak	---	---

Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	219.150	32.47	-13.53	46.00	8.47	1.17	30.02	52.85	Peak	---	---
2 @	548.950	38.71	-7.29	46.00	18.28	1.87	30.63	49.19	Peak	---	---
3 @	641.100	39.05	-6.95	46.00	18.90	2.00	30.42	48.57	Peak	---	---
4 @	719.670	38.48	-7.52	46.00	19.40	2.14	30.28	47.21	Peak	---	---
5 @	770.110	39.43	-6.57	46.00	19.92	2.19	30.09	47.41	Peak	---	---
6 @	881.660	38.68	-7.32	46.00	20.32	2.39	29.18	45.15	Peak	---	---

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

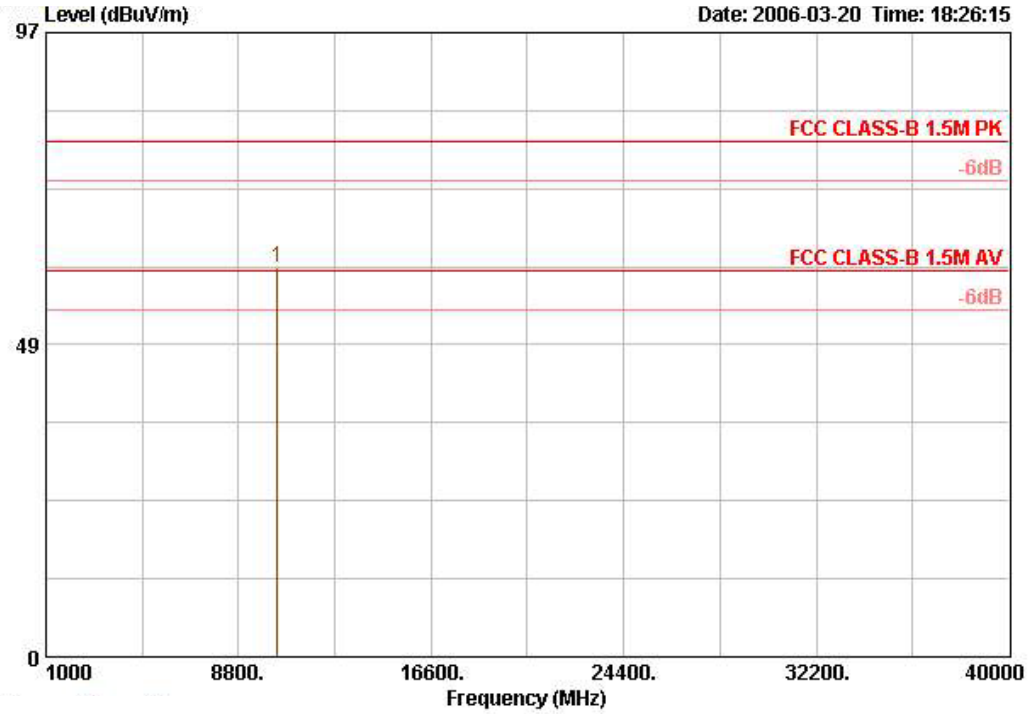
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.6.9. Results for Radiated Emissions (1GHz~40GHz)

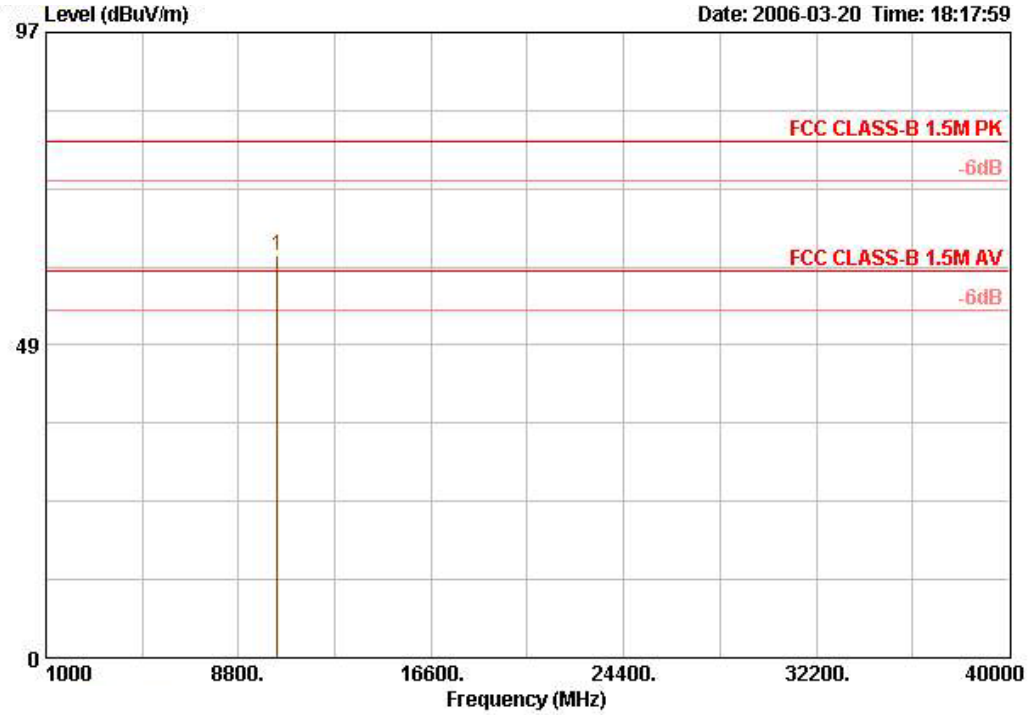
Temperature	20℃	Humidity	63%
Test Engineer	Leo Hung	Configurations	802.11a Channel 36 / Ant. 1

Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10358.120	60.62	-19.38	80.00	39.32	5.80	35.55	51.05	PEAK	111	112

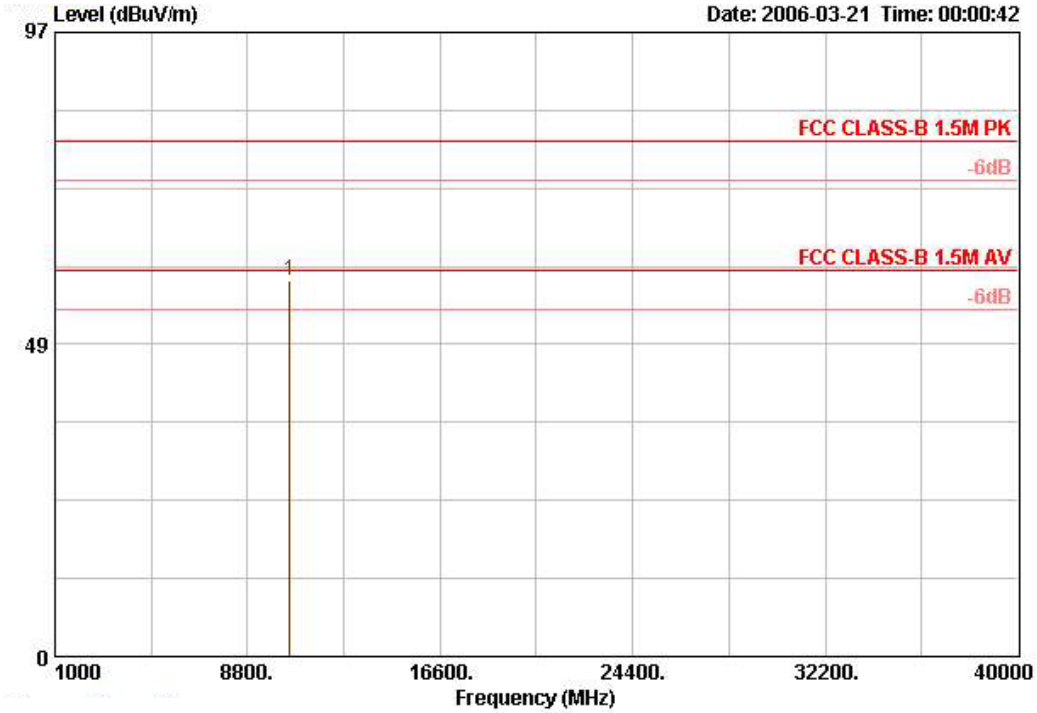
Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	10361.560	62.26	-17.74	80.00	39.34	5.80	35.55	52.67	PEAK	122	29

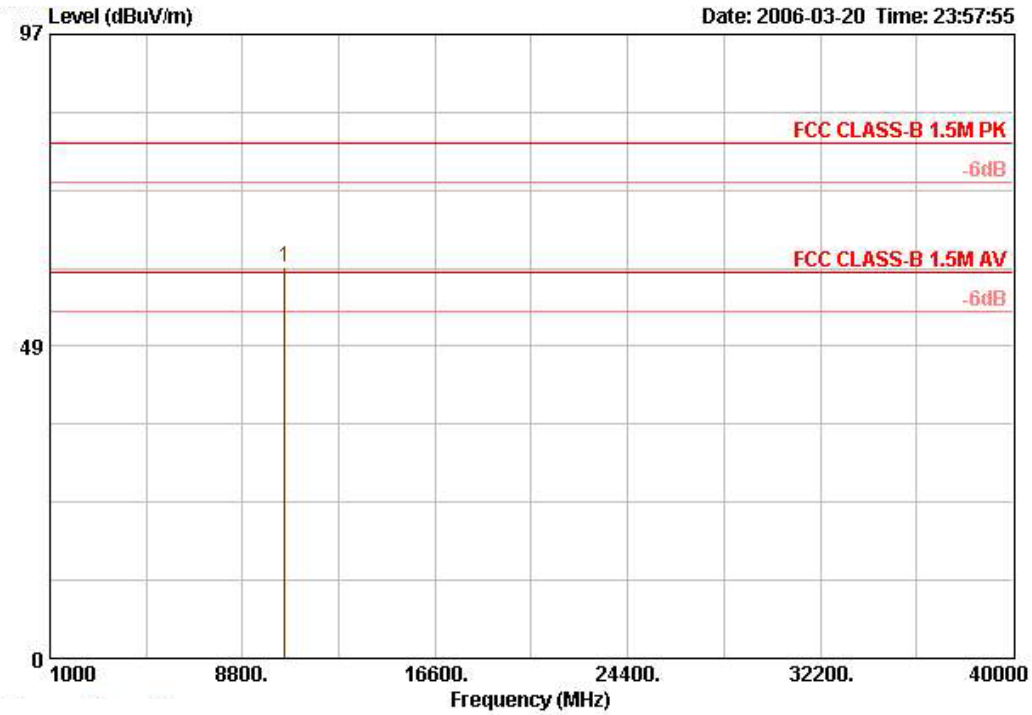
Temperature	20℃	Humidity	63%
Test Engineer	Leo Hung	Configurations	802.11a Channel 52 / Ant. 1

Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10519.480	58.31	-21.69	80.00	39.49	5.93	35.40	48.29	PEAK	110	87

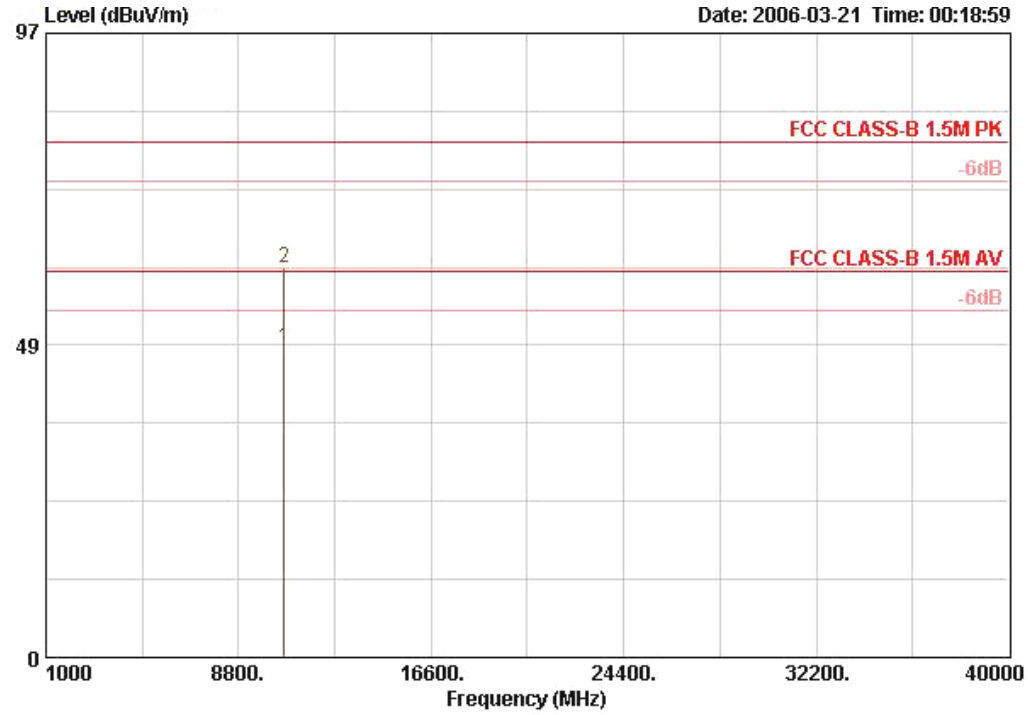
Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10519.200	60.85	-19.15	80.00	39.49	5.93	35.40	50.83	PEAK	100	31

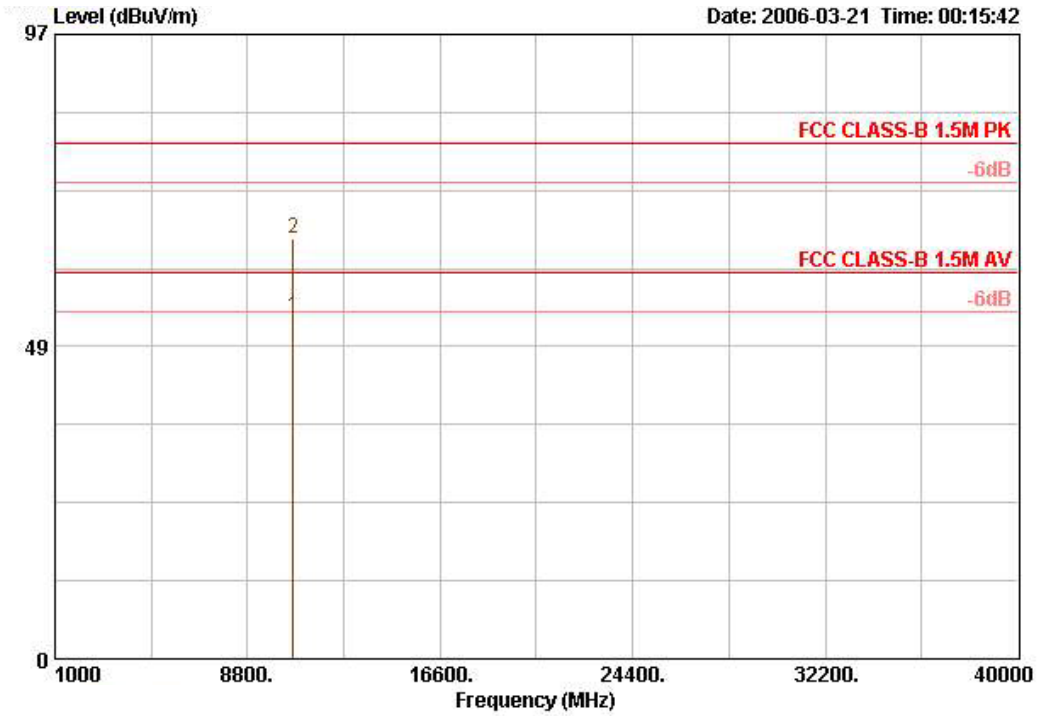
Temperature	20℃	Humidity	70%
Test Engineer	Leo Hung	Configurations	802.11a Channel 64 / Ant. 1

Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	10640.840	48.19	-11.81	60.00	39.42	6.03	35.32	38.06	AVERAGE	126	83
2	10640.840	60.55	-19.45	80.00	39.42	6.03	35.32	50.42	PEAK	126	83

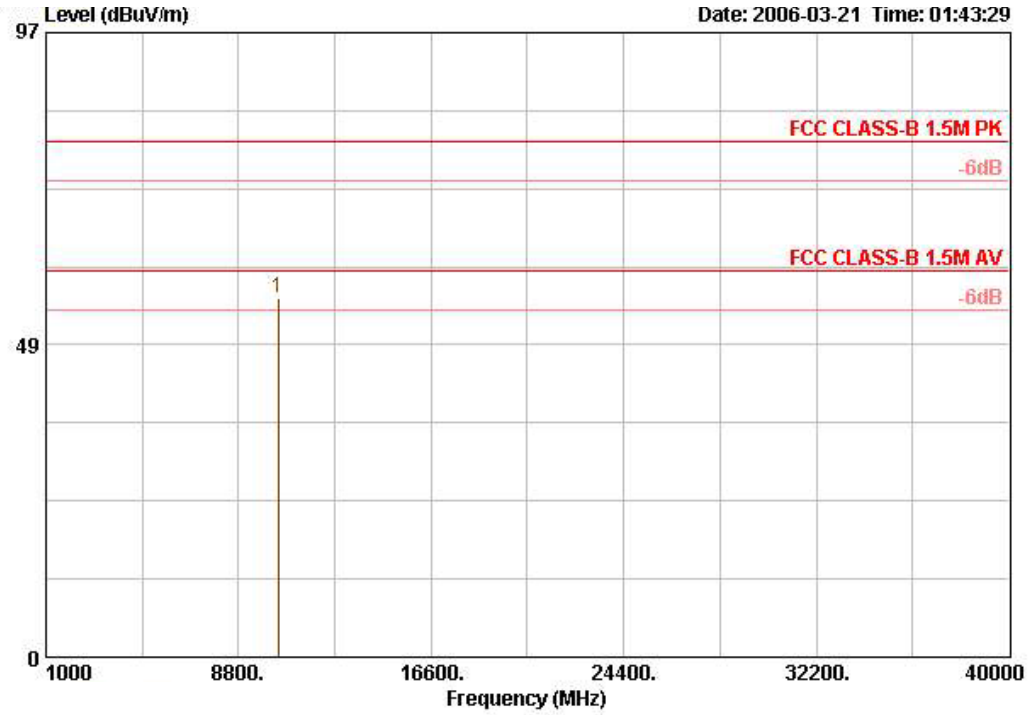
Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	10639.640	53.00	-7.00	60.00	39.42	6.03	35.32	42.87	AVERAGE	0	166
2 @	10639.640	65.39	-14.61	80.00	39.42	6.03	35.32	55.26	PEAK	124	166

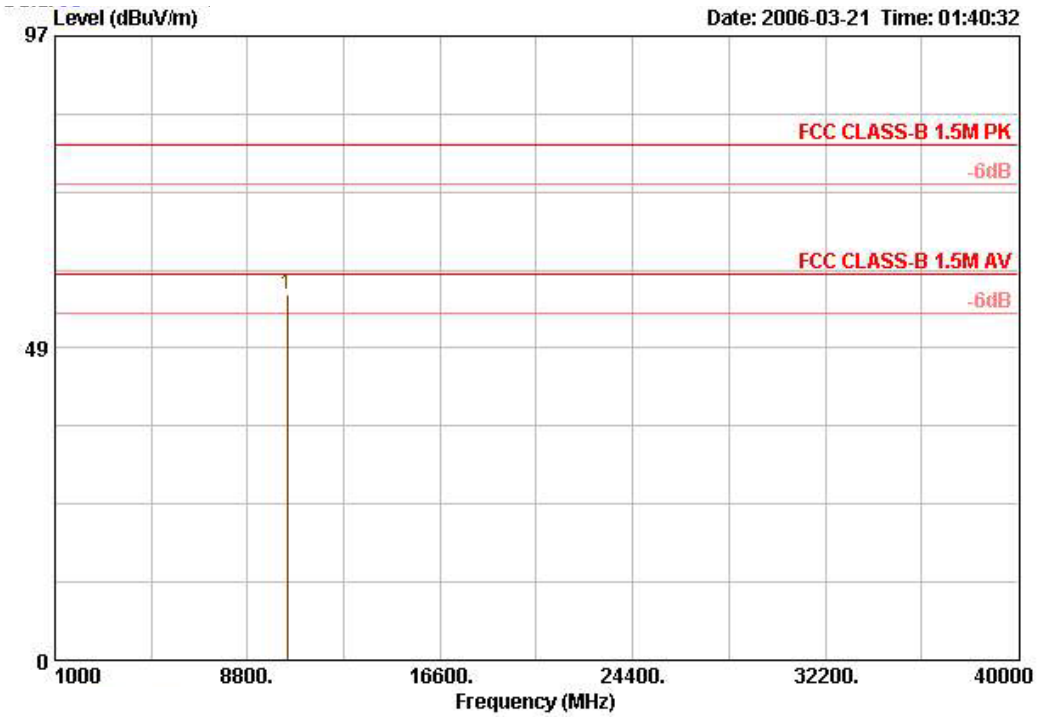
Temperature	20℃	Humidity	63%
Test Engineer	Leo Hung	Configurations	802.11a Turbo Channel 42 / Ant. 1

Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10420.240	55.86	-24.14	80.00	39.40	5.86	35.50	46.09	PEAK	107	88

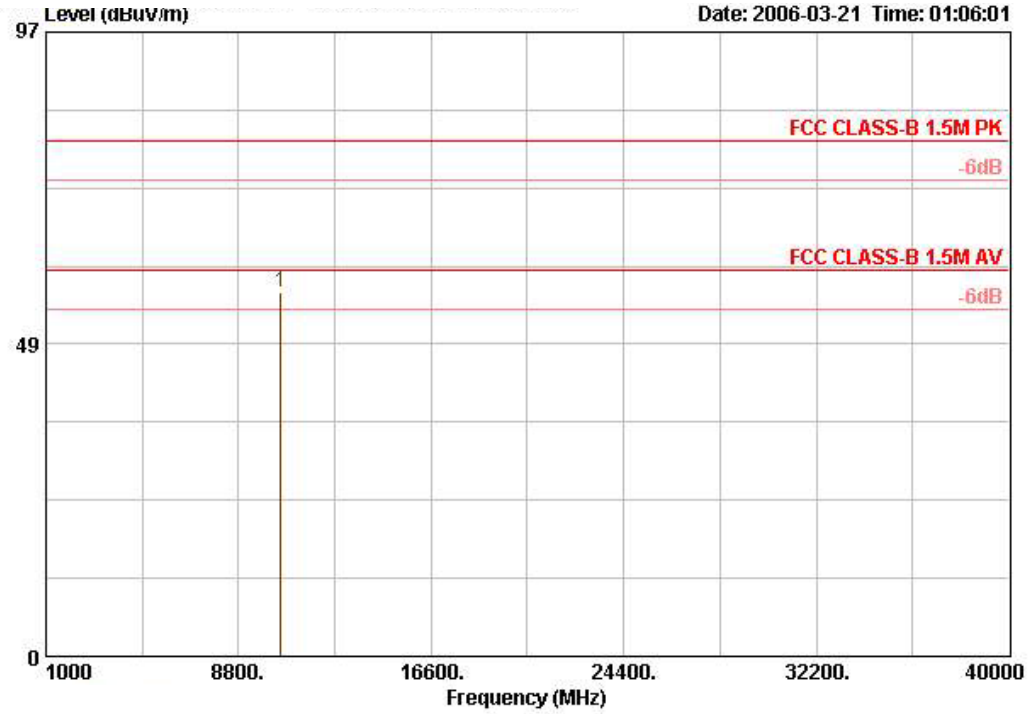
Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10422.280	56.75	-23.25	80.00	39.40	5.86	35.48	46.96	PEAK	122	32

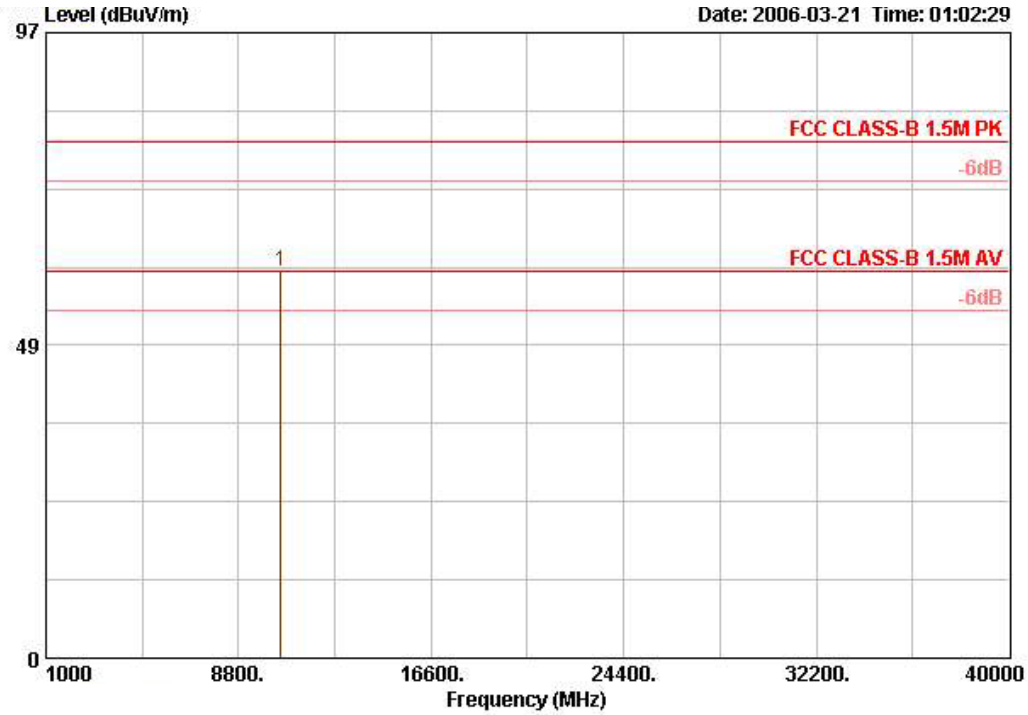
Temperature	20℃	Humidity	63%
Test Engineer	Leo Hung	Configurations	802.11a Turbo Channel 50 / Ant. 1

Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10502.400	56.68	-23.32	80.00	39.50	5.93	35.40	46.65	PEAK	106	90

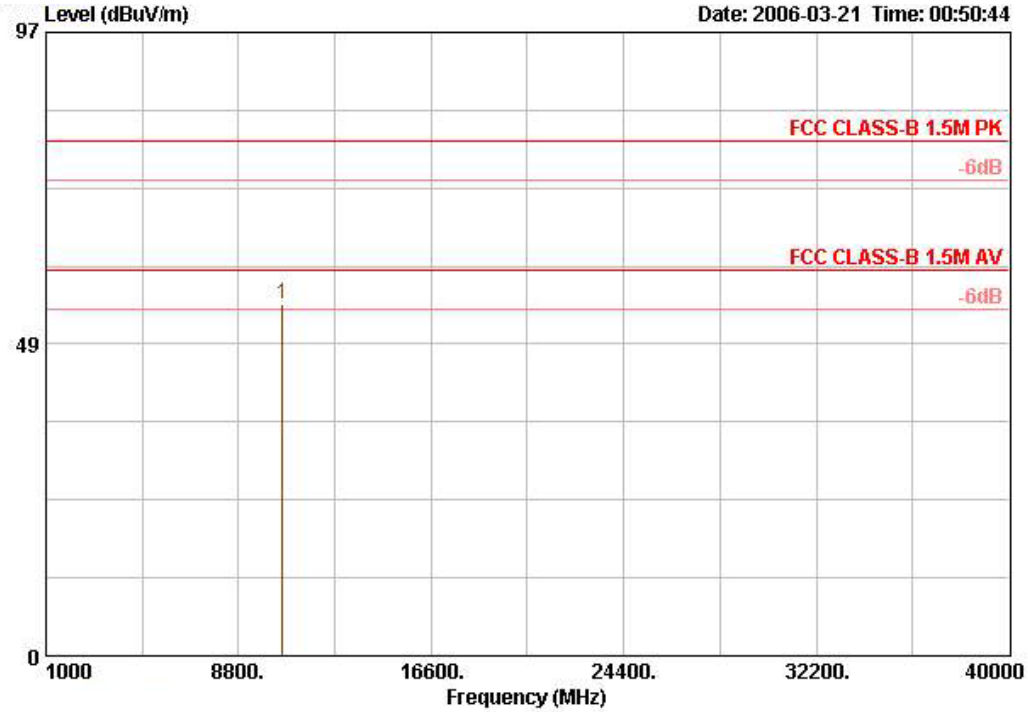
Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10496.800	59.91	-20.09	80.00	39.50	5.93	35.43	49.90	PEAK	125	164

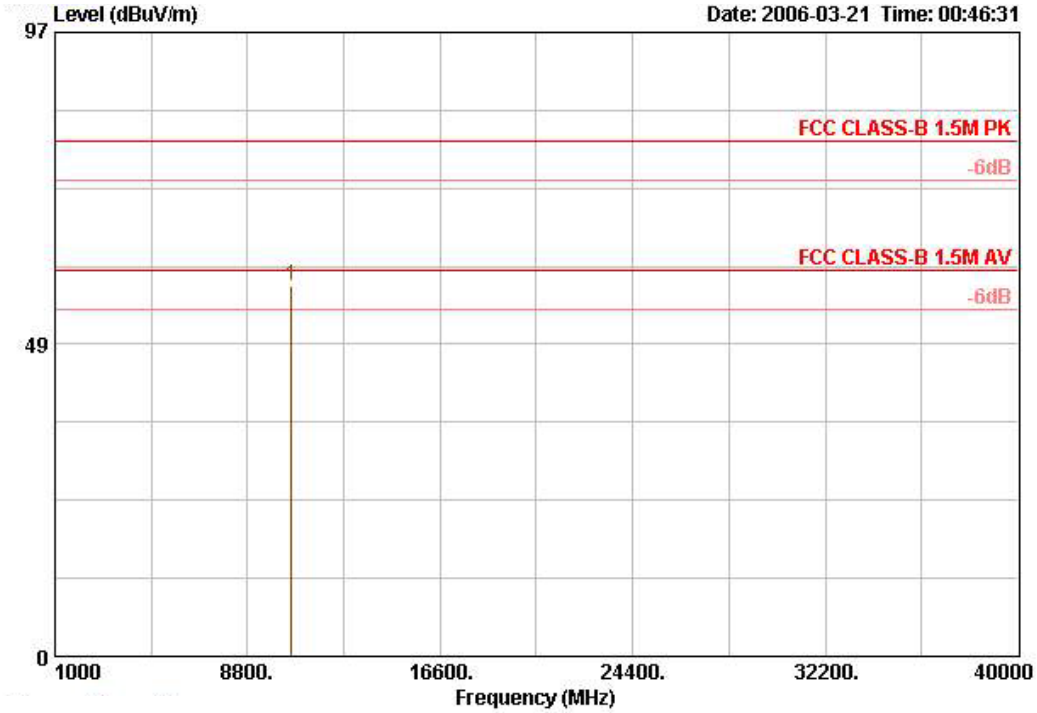
Temperature	20℃	Humidity	63%
Test Engineer	Leo Hung	Configurations	802.11a Turbo Channel 58 / Ant. 1

Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10581.040	54.64	-25.36	80.00	39.45	6.00	35.35	44.54	PEAK	100	142

Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1	10580.480	57.67	-22.33	80.00	39.45	6.00	35.35	47.58	PEAK	100	180

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6.02 dB].

4.7. Band Edge Emissions Measurement

4.7.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 2.7, then the 2.8 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.7.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	1 MHz /1 MHz for Peak

4.7.3. Test Procedures

1. The test procedure is the same as section 4.6.3, only the freqeuncy range investigated is limited to 100MHz around bandedges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

4.7.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

4.7.5. Test Deviation

There is no deviation with the original standard.

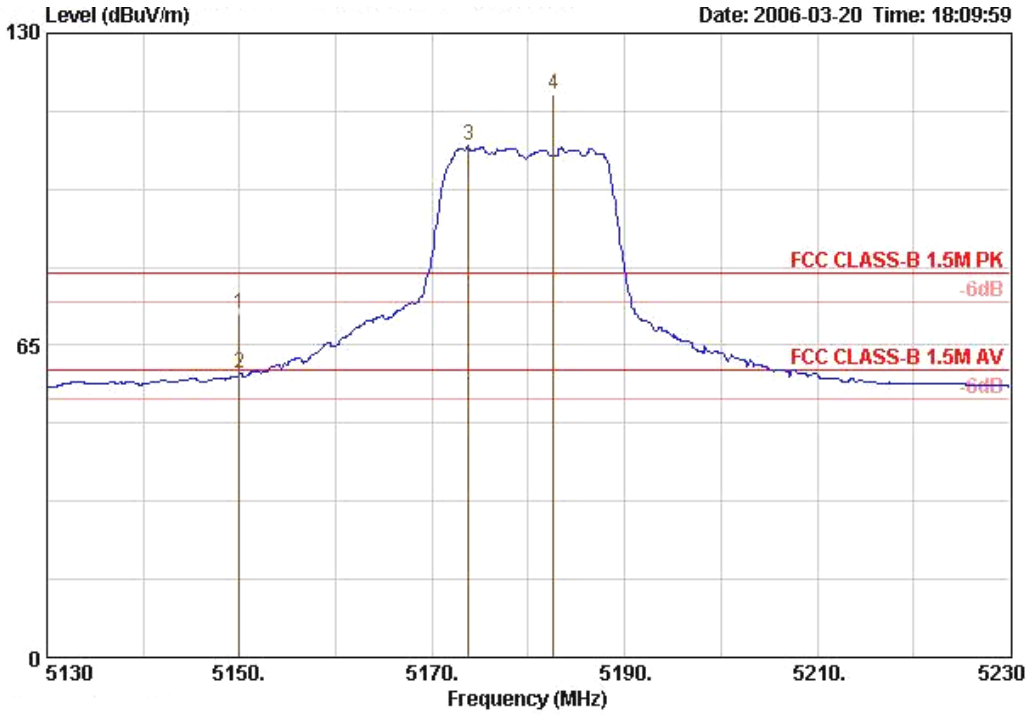
4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	20℃	Humidity	65%
Test Engineer	Rush Kur	Configurations	802.11a Channel 36, 64

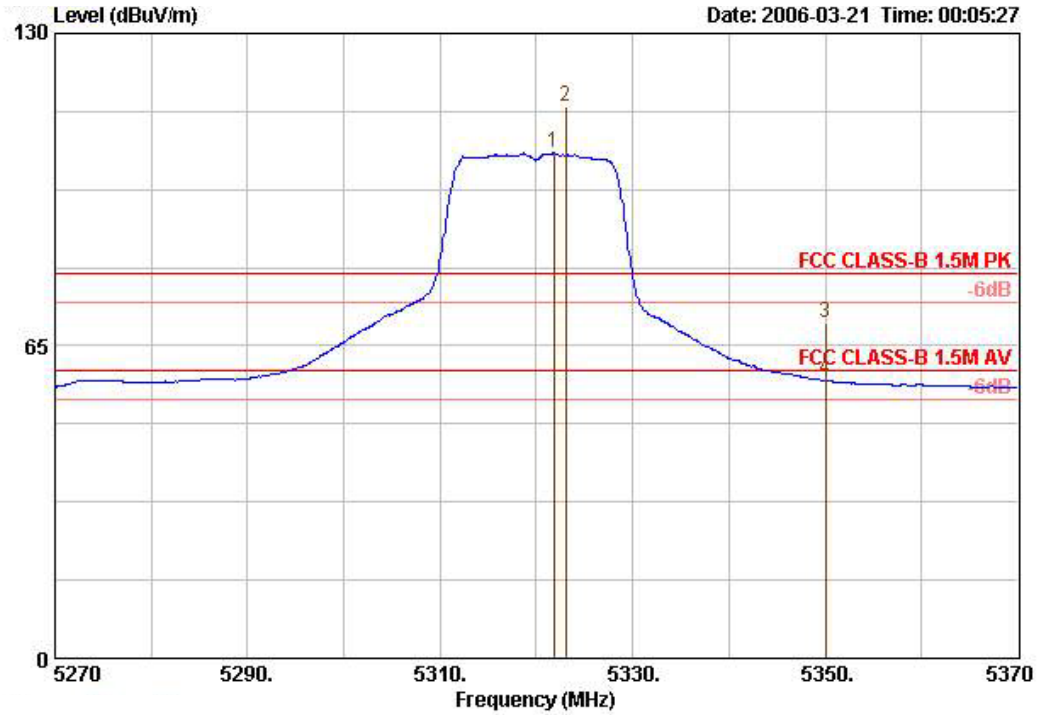
Channel 36



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	5150.000	71.66	-8.34	80.00	33.84	4.88	0.00	32.94	PEAK	113	8
2 @	5150.000	59.00	-1.00	60.00	33.84	4.88	0.00	20.29	AVERAGE	113	8
3 @	5173.800	106.52			33.89	4.92	0.00	67.71	Average	---	---
4 @	5182.600	117.08			33.89	4.92	0.00	78.27	PEAK	113	8

Channel 36 is fundamental frequency at 5180 MHz.

Channel 64

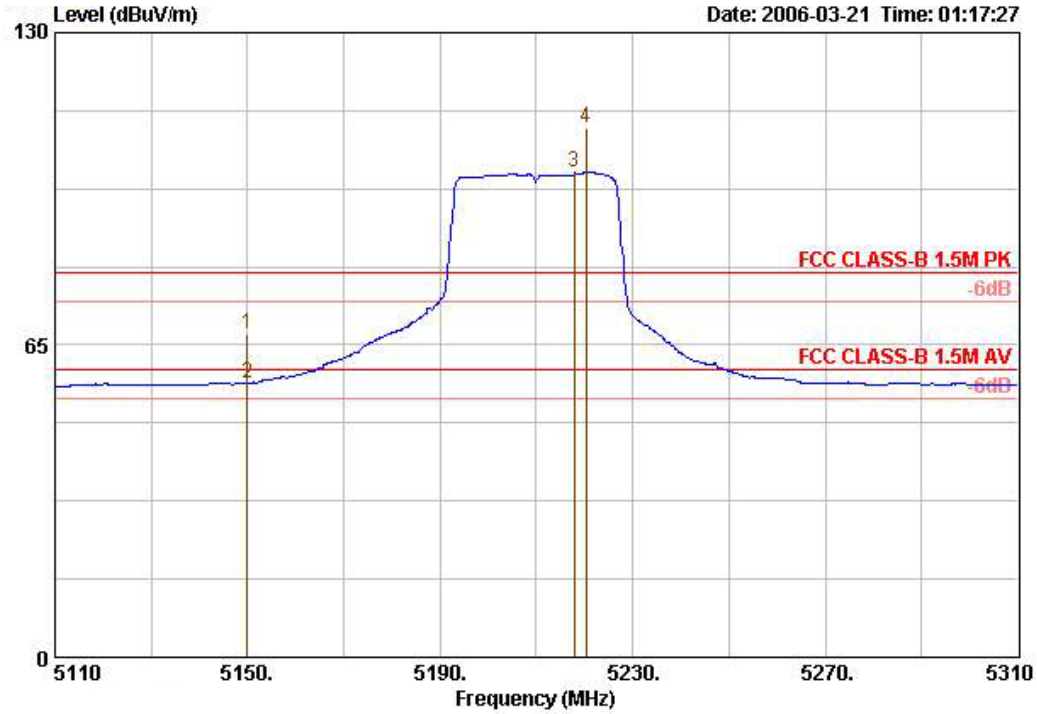


	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	5321.800	105.08			34.11	5.07	0.00	65.90	Average	---	---
2 @	5323.000	114.92			34.11	5.07	0.00	75.74	PEAK	110	0
3 @	5350.000	69.74	-10.26	80.00	34.16	5.11	0.00	30.47	PEAK	110	0
4 @	5350.000	57.96	-2.04	60.00	34.16	5.11	0.00	18.68	AVERAGE	110	0

Channel 64 is fundamental frequency at 5320 MHz.

Temperature	20℃	Humidity	65%
Test Engineer	Rush Kur	Configurations	802.11a Turbo Channel 42, 58

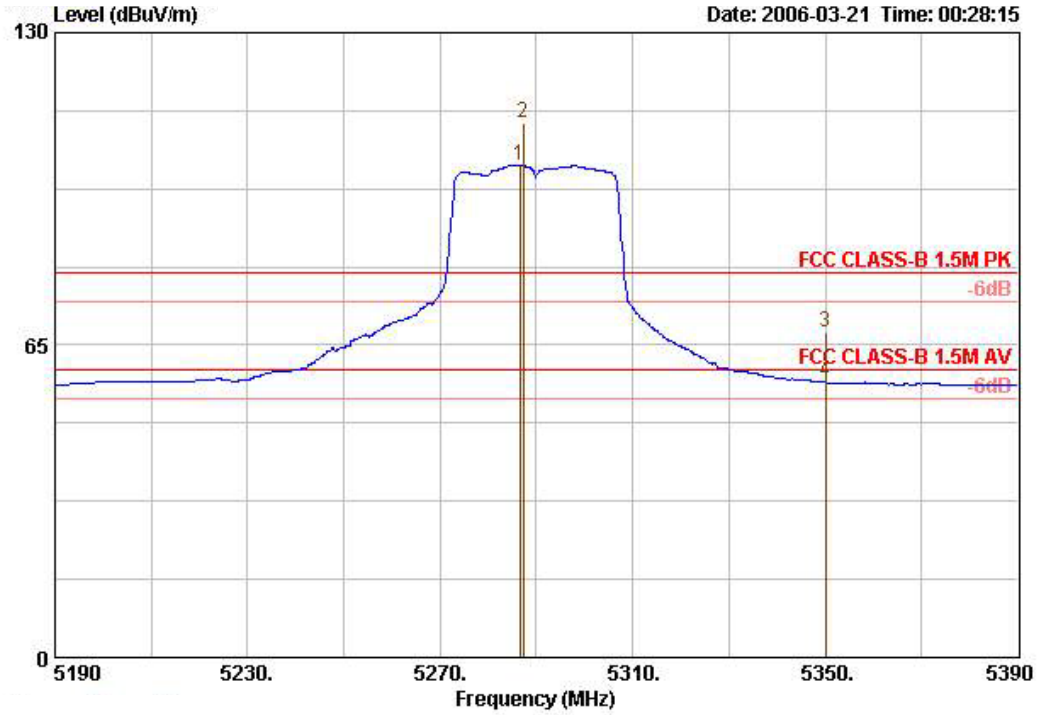
Turbo Channel 42



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	5150.000	67.32	-12.68	80.00	33.84	4.88	0.00	28.60	PEAK	113	-4
2 @	5150.000	57.05	-2.95	60.00	33.84	4.88	0.00	18.33	AVERAGE	113	-4
3 @	5217.800	101.09			33.95	4.96	0.00	62.18	Average	---	---
4 @	5220.400	110.29			33.95	4.96	0.00	71.39	PEAK	113	-4

Turbo Channel 42 is fundamental frequency at 5210 MHz.

Turbo Channel 58



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		cm	deg
1 @	5286.600	102.37			34.05	5.03	0.00	63.28	Average	---	---
2 @	5287.200	111.05			34.05	5.03	0.00	71.96	PEAK	117	361
3 @	5350.000	67.74	-12.26	80.00	34.16	5.11	0.00	28.47	PEAK	117	361
4 @	5350.000	57.26	-2.74	60.00	34.16	5.11	0.00	17.99	AVERAGE	117	361

Turbo Channel 58 is fundamental frequency at 5290 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

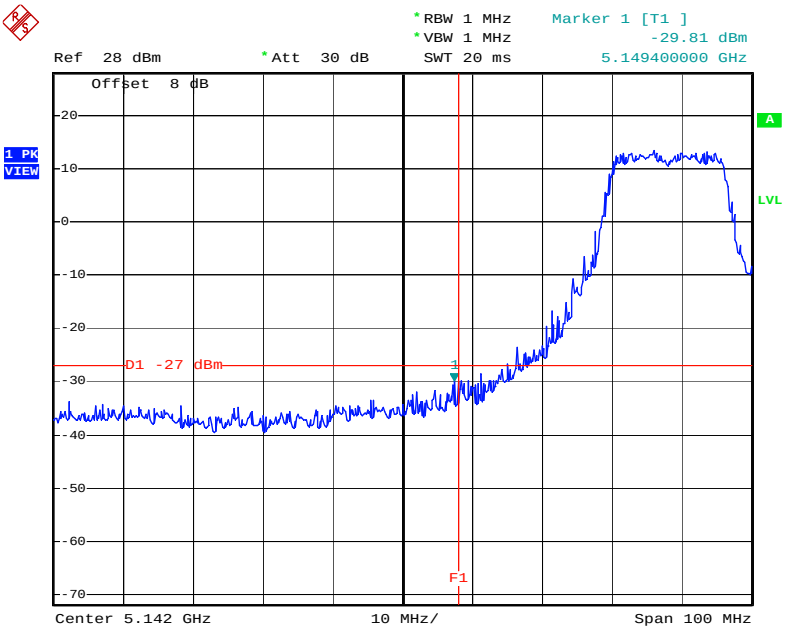
Receiving maximum band edge emissions are Vertical Polarization

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1.5m]) (dB);

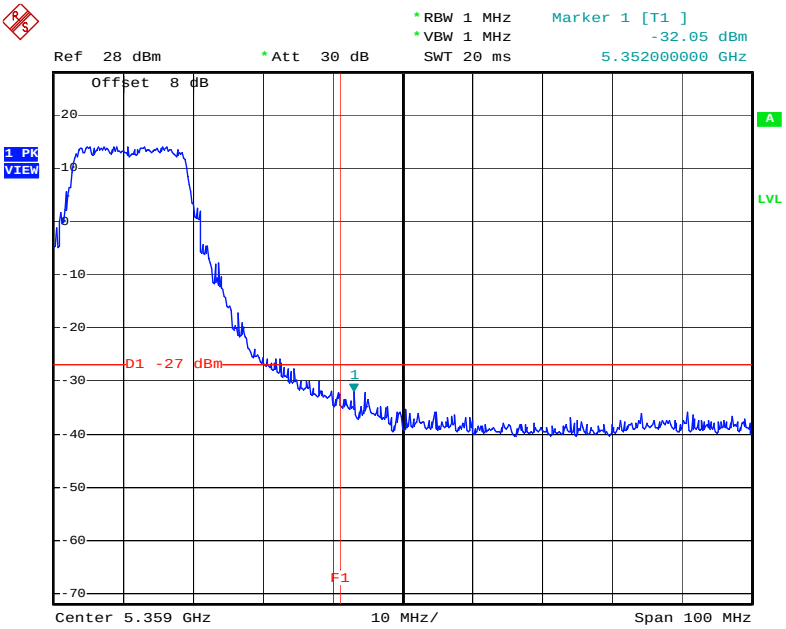
Limit line = specific limits (dBuV) + distance extrapolation factor [6.02 dB].

EIRP Emission in Band on Configuration IEEE 802.11a / 5180 MHz



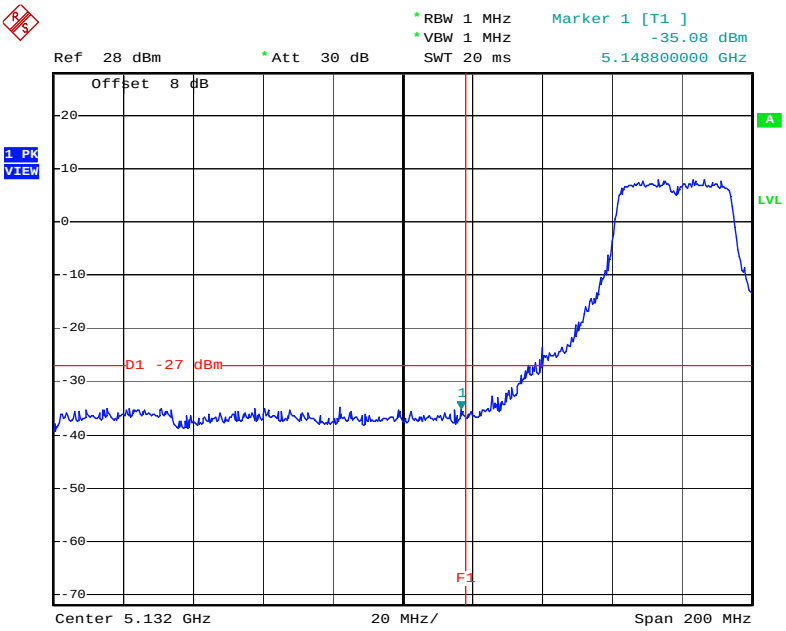
Date: 21.MAR.2006 05:57:45

EIRP Emission in Band on Configuration IEEE 802.11a / 5320 MHz



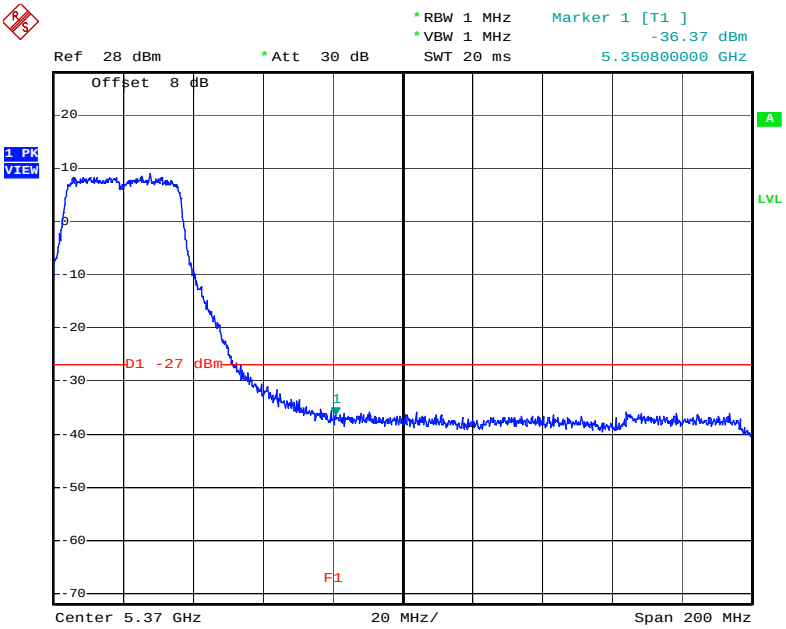
Date: 21.MAR.2006 05:58:21

EIRP Emission in Band on Configuration IEEE 802.11a Turbo / 5210MHz



Date: 20.MAR.2006 21:07:22

EIRP Emission in Band on Configuration IEEE 802.11a Turbo / 5290 MHz



Date: 20.MAR.2006 21:05:08

4.8. Frequency Stability Measurement

4.8.1. Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user's manual or ±20ppm (IEEE 802.11a specification).

4.8.2. Measuring Instruments and Setting

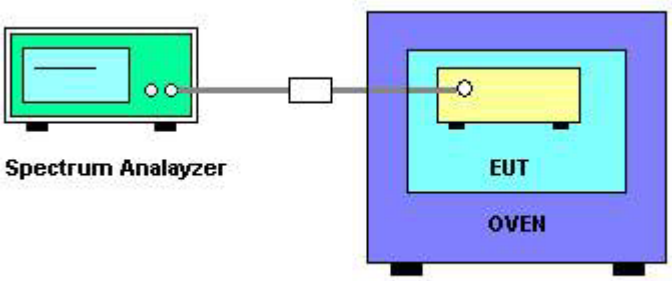
Please refer to section 5 in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RB	10 kHz
VB	10 kHz
Sweep Time	Auto

4.8.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11a specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is -30°C~50°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

4.8.7. Test Result of Frequency Stability

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	**5260**
126.5	5259.9860
110	5259.9866
93.5	5259.9968
Max. Deviation (MHz)	**0.0140**
Max. Deviation (ppm)	**2.6616**

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(℃)	5260
-30	5260.0033
-20	5260.0076
-10	5260.0014
0	5259.9918
10	5259.9759
20	5259.9658
30	5259.9605
40	5259.9952
50	5259.9591
Max. Deviation (MHz)	**0.0409**
Max. Deviation (ppm)	**7.7757**

4.9. Antenna Requirements

4.9.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

4.9.2. Antenna Connector Construction

Please refer to section 3.3 in this test report, all antenna connectors comply with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Feb. 15, 2006	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	May. 05, 2005	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Jun. 20, 2005	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ ~ 40GHz	Aug. 30, 2005	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	18667	9KHz ~ 2GHz	Jan. 09, 2006	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44-00102650	849984	100MHz ~ 26.5GHz	Mar. 24, 2006	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	923364	26.5GHz ~ 40GHz	Mar. 24, 2006	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz ~ 200MHz	Jul. 27, 2005	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz ~ 1GHz	Jul. 27, 2005	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 22, 2005	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 21, 2006	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Nov. 31, 2005	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP30	100023	9kHz ~ 30GHx	Aug. 01, 2005	Conducted (TH01-HY)
Power meter	R&S	NRVS	100444	DC ~ 40GHz	Jun. 14, 2005	Conducted (TH01-HY)
Power sensor	R&S	NRV-Z55	100049	DC ~ 40GHz	Jun. 14, 2005	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jun. 14, 2005	Conducted (TH01-HY)
AC power source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jun. 14, 2005	Conducted (TH01-HY)
DC power source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Nov. 27, 2005	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Sep. 31, 2005	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Jan. 01, 2006	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Jan. 01, 2006	Conducted (TH01-HY)
Oscilloscope	Tektronix	TDS1012	CO38515	100MHz / 1GS/s	Apr. 15, 2005	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Dec. 30, 2005	Conducted (TH01-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9kHz ~ 30MHz	May 03, 2005	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jun. 08, 2005	Radiation (03CH03-HY)
Data Generator	Tektronix	DG2030	063-2920-50	0.1Hz~400MHz	Jun. 02, 2005	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Note: *Calibration Interval of instruments listed above is two year.

6. SPORTON COMPANY PROFILE

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test familial apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

6.1. Test Location

SHIJR	ADD	: 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	: 02-2696-2468
	FAX	: 02-2696-2255
HWA YA	ADD	: No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	: 03-327-3456
	FAX	: 03-318-0055
LINKOU	ADD	: No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	: 02-2601-1640
	FAX	: 02-2601-1695
DUNGHU	ADD	: No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	: 02-2631-4739
	FAX	: 02-2631-9740
JUNGHE	ADD	: 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	: 02-8227-2020
	FAX	: 02-8227-2626
NEIHU	ADD	: 4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	: 02-2794-8886
	FAX	: 02-2794-9777
JHUBEI	ADD	: No.8, Lane 728, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.
	TEL	: 03-656-9065
	FAX	: 03-656-9085

7. NVLAP CERTIFICATE OF ACCREDITATION

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:1999

NVLAP LAB CODE: 200079-0

Sporton International, Inc. Hwa Ya EMC Laboratory
Tao Yuan Hsien 333
TAIWAN

is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in NIST Handbook 150:2001 and all requirements of ISO/IEC 17025:1999.
Accreditation is granted for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2006-01-01 through 2006-12-31
Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Institute of Standards and Technology

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