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FCC RADIO TEST REPORT

Applicant's company	**Accton Technology Corporation**
Applicant Address	No. 1 Creation Rd., III, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C.
FCC ID	**HED2555WAG2**
Manufacturer's company	**Accton Technology Corporation**
Manufacturer Address	No. 1 Creation Rd., III, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C.

Product Name	Dual Band Access Point
Model (Brand) Name	SMC2555W-AG2 (SMC), AirDefense Model 520 (AirDefense)
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150~5350 MHz
Receive Date	Jan. 04, 2006
Test Date	July 19, 2006
Submission Type	Class II Change

Statement

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

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History of This Test Report

Original Issue Date: July 19, 2006

Report No.: FR610403-02AA

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Dual Band Access Point
Model (Brand) Name	:	SMC2555W-AG2 (SMC), AirDefense Model 520 (AirDefense)
Applicant	:	Accton Technology Corporation
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jan. 04, 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:	Tested By:	Reviewed By:
Tina Jao / Specialist	Steven Lu / Engineer	Wayne Hsu

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	15.207	AC Power Line Conducted Emissions	Complies	12.84 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	1.31 dB
4.4	15.407(a)	Power Spectral Density	Complies	7.05 dB
4.5	15.407(a)	Peak Excursion	Complies	7.73 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.03 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.84 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	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

EUT is a dual band access point with IEEE 802.11a/b/g radio functions.

The difference is that the manufacture process of the EUT is changed to Lead-free manufacture process.

Only the radio detail of IEEE 802.11a is shown in the table below. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Power Type	5.1VDC from adapter
Interface Type	RJ-45 / Serial Port
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54/108)
Frequency Range	5150~5350 MHz
Channel Number	11
Channel Band Width (99%)	11a: 17.76 MHz ; 11a Turbo: 33.80 MHz
Conducted Output Power	Band 1: 15.69 dBm ; Band 2: 18.52 dBm

3.2. Accessories

Power	Brand	Model	Rating
Adapter	DELTA	ADP-15KB	Input: 100~240 VAC Output: 5.1VDC

3.3. Table for Filed Antenna

Ant.	Antenna Type	Connector	Gain (dBi)
1	Dipole Antenna	Reversed-SMA	5.00

3.4. Table for Carrier Frequencies

Frequency Allocation for 802.11a

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz (USA/Canada) 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 (USA/Canada/Taiwan) Band 2	52	5260 MHz	Turbo 58	5290 MHz
	56	5280 MHz		
	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	54Mbps	64	1
26dB Spectrum Bandwidth Max. Conducted Output Power Power Spectral Density Peak Excursion	Band 1～2/BPSK	6Mbps	36/52/64	NA
	Band 1～2 Turbo/BPSK	12Mbps	42/50/58	NA
Radiated Emission Below 1GHz	BPSK	6Mbps	64	1
Radiated Emission Above 1GHz	Band 1～2/BPSK	6Mbps	36/52/64	1
	Band 1～2 Turbo/BPSK	12Mbps	42/50/58	1
Frequency Stability	Un-modulation	-	64	NA
Band Edge Emission	Band 1～2/BPSK	6Mbps	36/64	1
	Band 1～2 Turbo/BPSK	12Mbps	42/58	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 (Remote Workstation)	DELL	PP01L	DoC

3.8. Table for Parameters of Test Software Setting

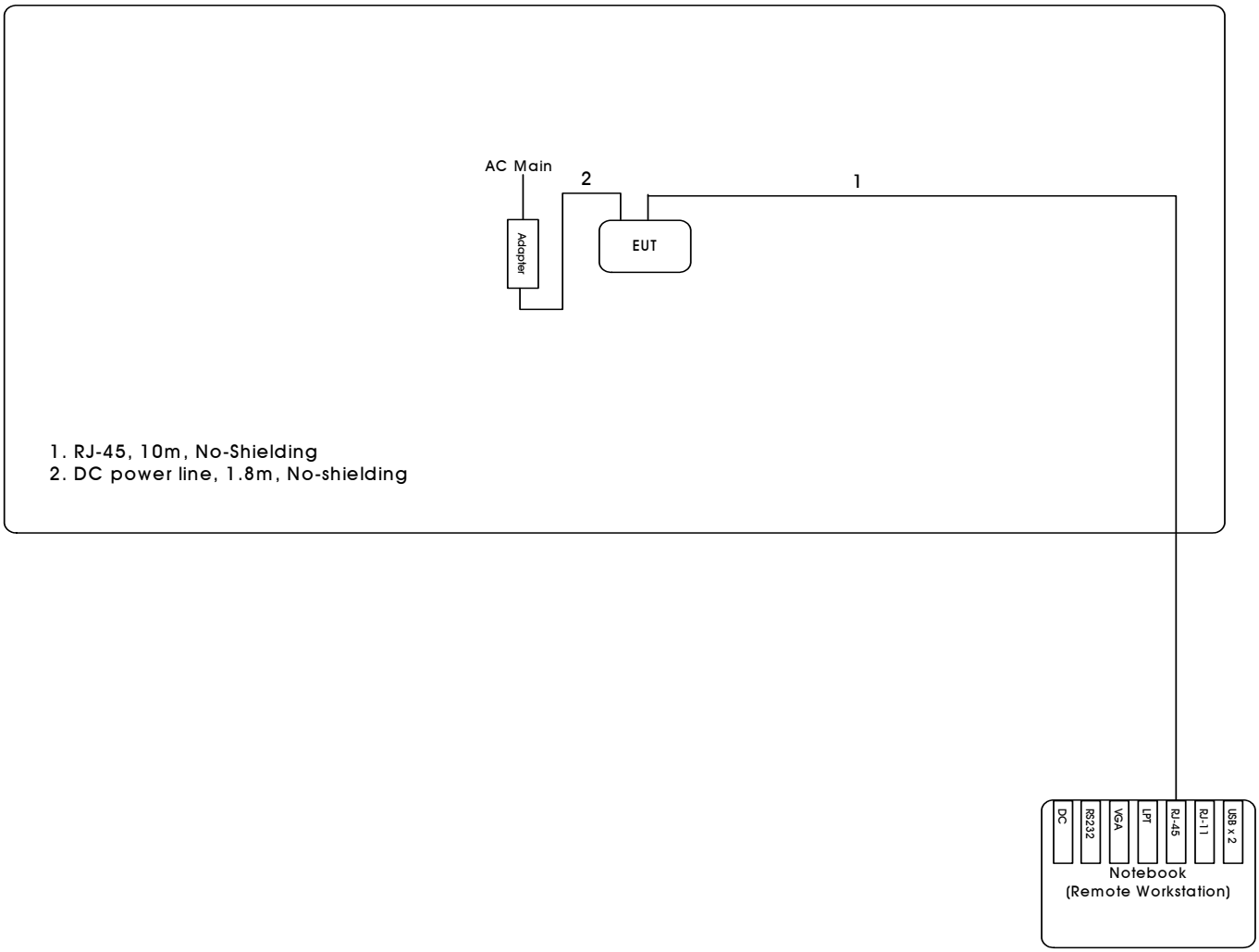
During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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

Power Parameters of IEEE 802.11a

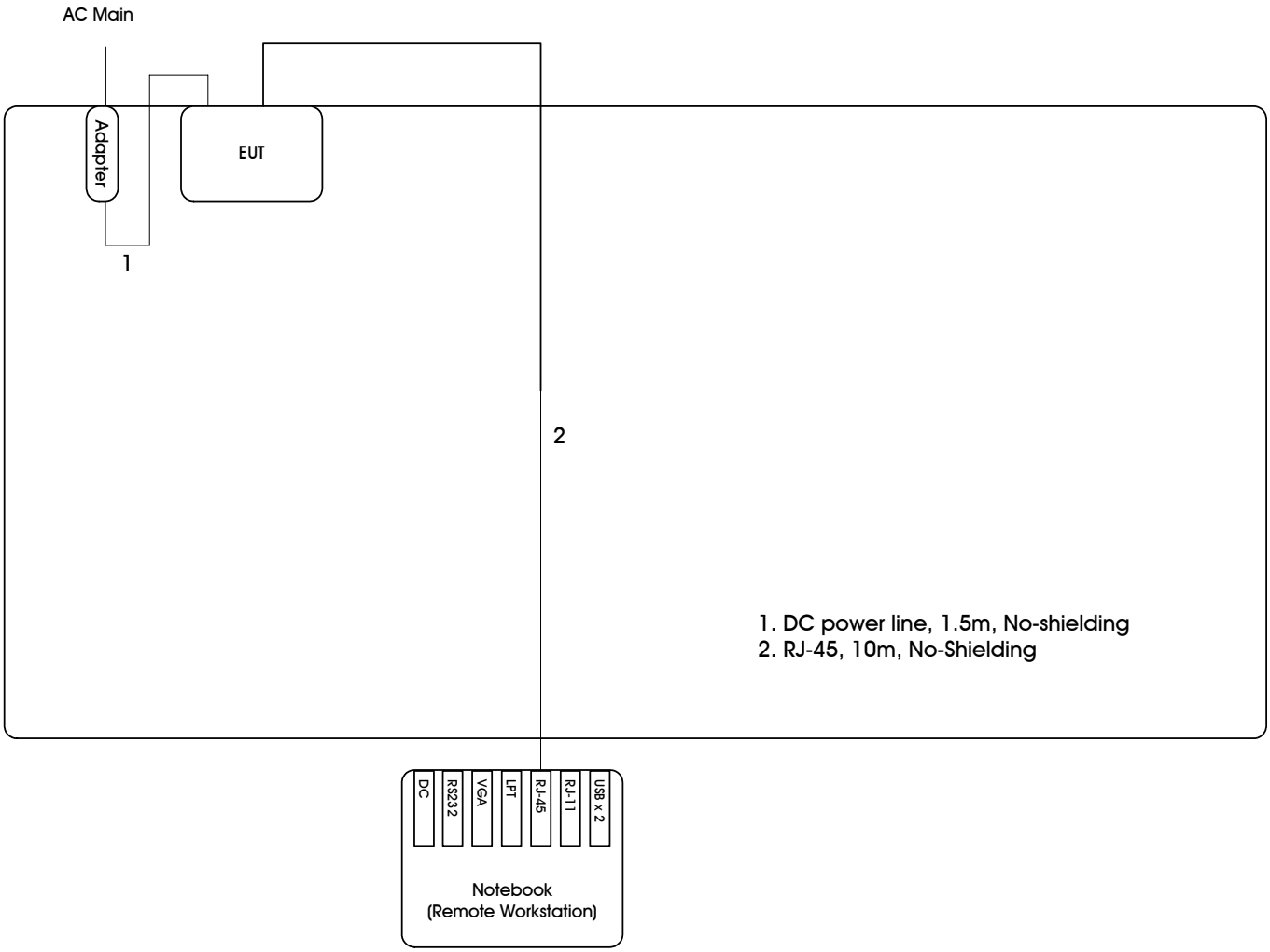
Test Software Version	ART_V48_Build13		
Frequency	5180 MHz	5260 MHz	5320 MHz
IEEE 802.11a	13.5	15	15
Frequency	5210 MHz	5250 MHz	5290 MHz
IEEE 802.11a Turbo	13.5	13.5	17

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

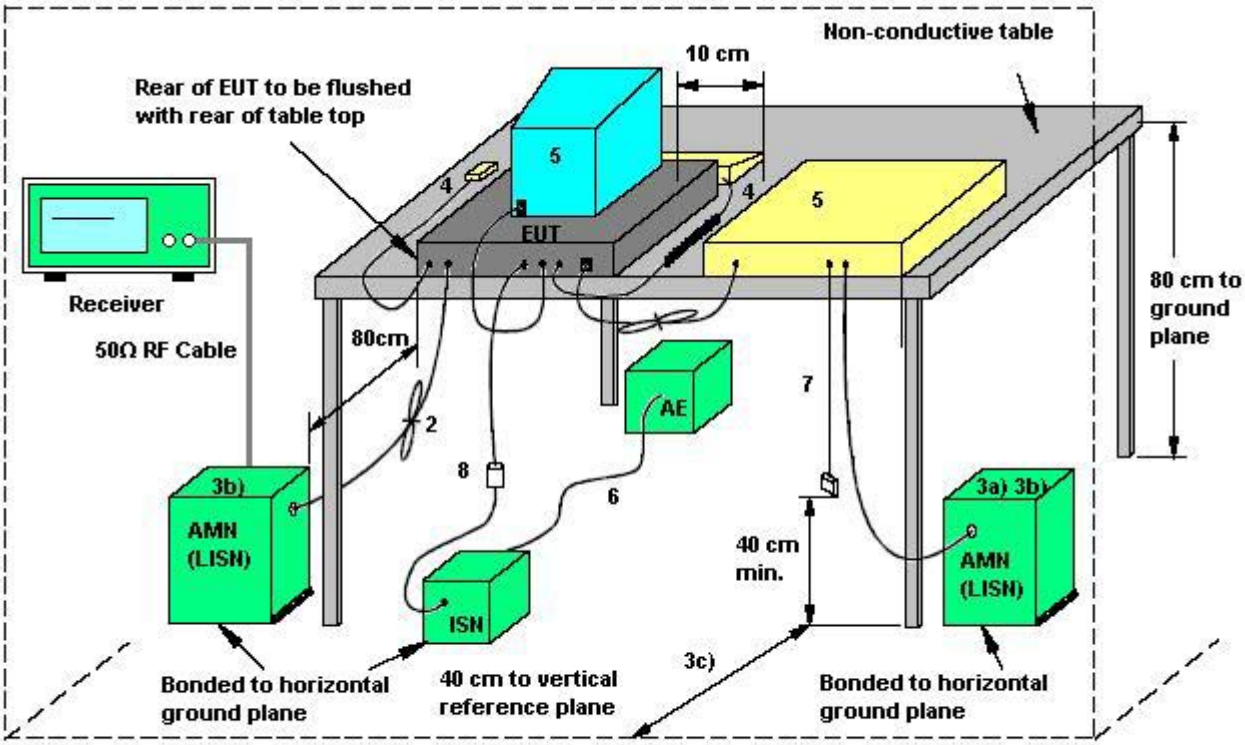
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

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

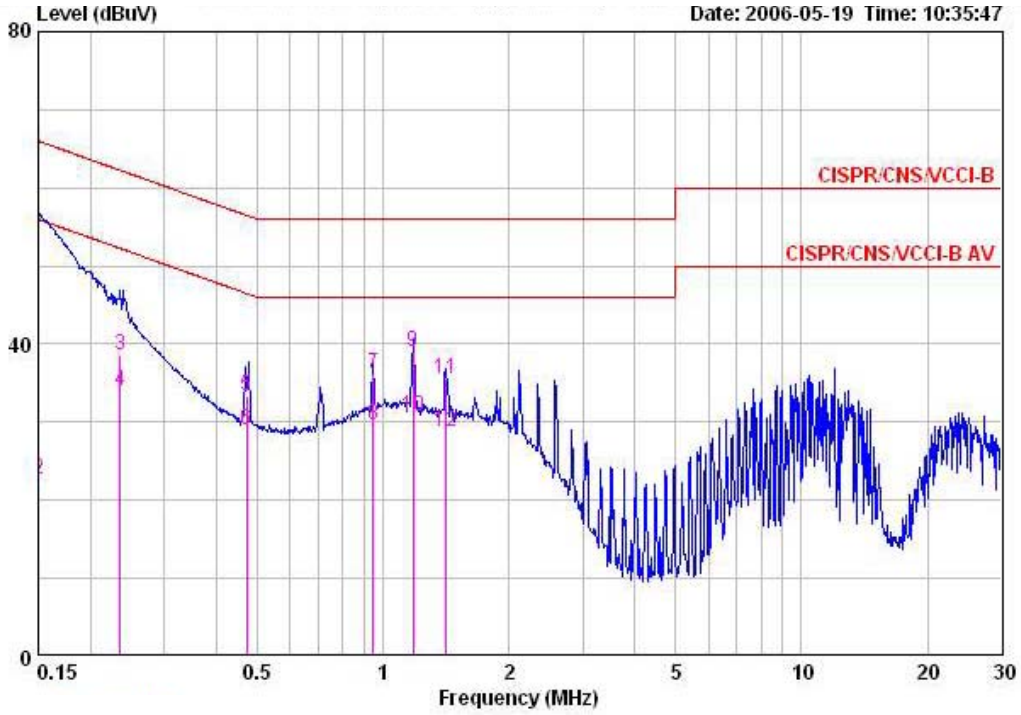
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

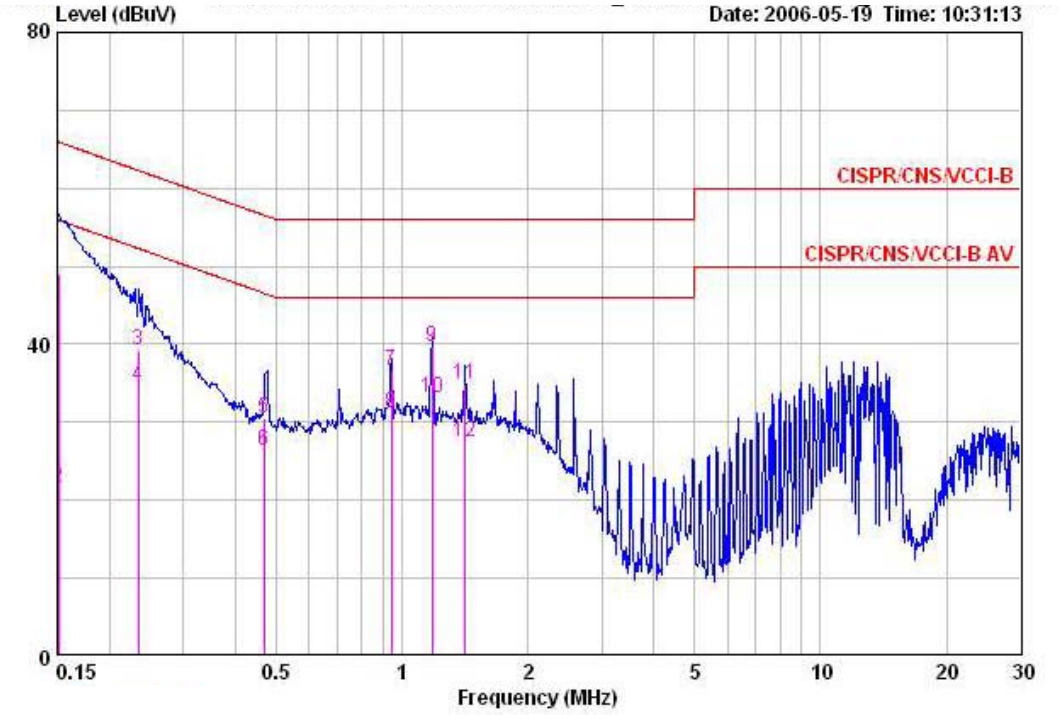
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	64%
Test Engineer	Rush Kao	Phase	Line
Configuration	Normal Use		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15040	49.57	-16.41	65.98	47.36	2.01	0.20	QP
2	0.15040	22.78	-33.20	55.98	20.57	2.01	0.20	AVERAGE
3	0.23506	38.68	-23.59	62.27	37.48	1.00	0.20	QP
4	0.23506	34.04	-18.23	52.27	32.84	1.00	0.20	AVERAGE
5	0.47212	33.33	-23.15	56.48	32.63	0.50	0.20	QP
6	0.47212	29.10	-17.38	46.48	28.40	0.50	0.20	AVERAGE
7	0.94609	36.19	-19.81	56.00	35.69	0.30	0.20	QP
8	0.94609	29.57	-16.43	46.00	29.07	0.30	0.20	AVERAGE
9	1.183	39.00	-17.00	56.00	38.54	0.30	0.16	QP
10 @	1.183	30.63	-15.37	46.00	30.17	0.30	0.16	AVERAGE
11	1.418	35.44	-20.56	56.00	35.03	0.30	0.11	QP
12	1.418	28.81	-17.19	46.00	28.40	0.30	0.11	AVERAGE

Temperature	24°C	Humidity	64%
Test Engineer	Rush Kao	Phase	Neutral
Configuration	Normal Use		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15080	49.00	-16.96	65.96	46.90	1.90	0.20	QP
2	0.15080	21.67	-34.29	55.96	19.57	1.90	0.20	AVERAGE
3	0.23482	39.30	-22.98	62.28	38.20	0.90	0.20	QP
4	0.23482	34.63	-17.65	52.28	33.53	0.90	0.20	AVERAGE
5	0.46812	30.43	-26.12	56.55	29.83	0.40	0.20	QP
6	0.46812	26.43	-20.12	46.55	25.83	0.40	0.20	AVERAGE
7	0.94308	36.52	-19.48	56.00	36.02	0.30	0.20	QP
8 @	0.94308	31.26	-14.74	46.00	30.76	0.30	0.20	AVERAGE
9	1.178	39.70	-16.30	56.00	39.24	0.30	0.16	QP
10 @	1.178	33.16	-12.84	46.00	32.70	0.30	0.16	AVERAGE
11	1.418	34.83	-21.17	56.00	34.42	0.30	0.11	QP
12	1.418	27.44	-18.56	46.00	27.03	0.30	0.11	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

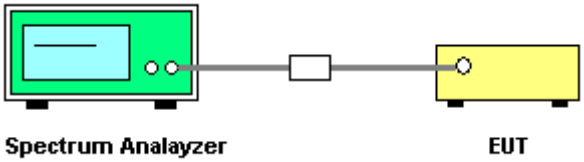
Please refer to section 5 of equipments list in this report. The following table is the setting of the Spectrum Analyzer.

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°C	Humidity	61%
Test Engineer	Steven Lu	Configurations	802.11a

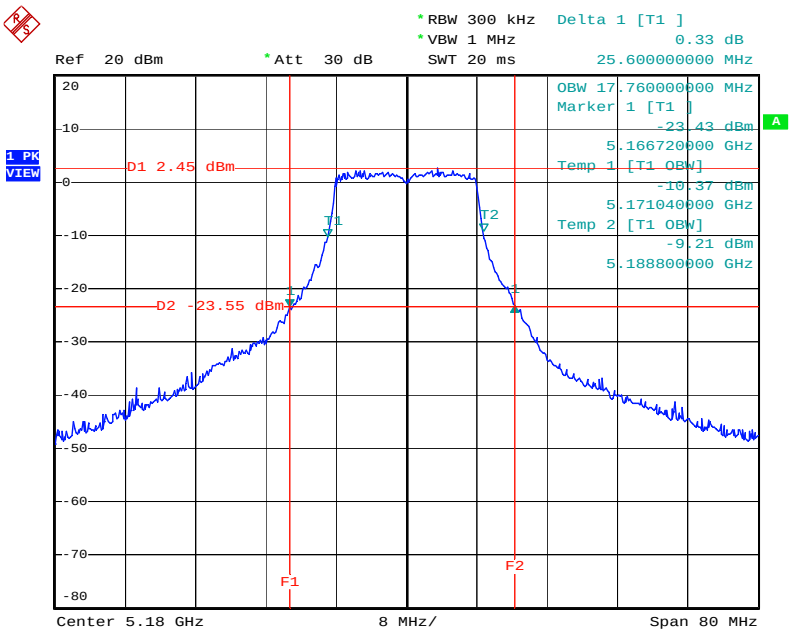
Configuration IEEE 802.11a

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.60	17.76
52	5260 MHz	24.96	17.76
64	5320 MHz	26.40	17.76

Configuration IEEE 802.11a Turbo

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
42	5210 MHz	48.20	33.80
50	5250 MHz	49.80	33.80
58	5290 MHz	47.80	33.80

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



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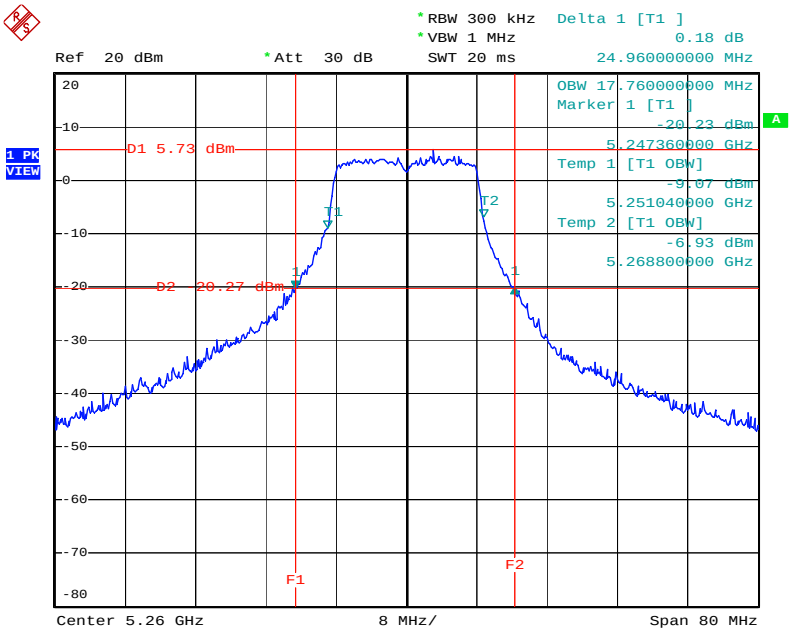
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5260 MHz



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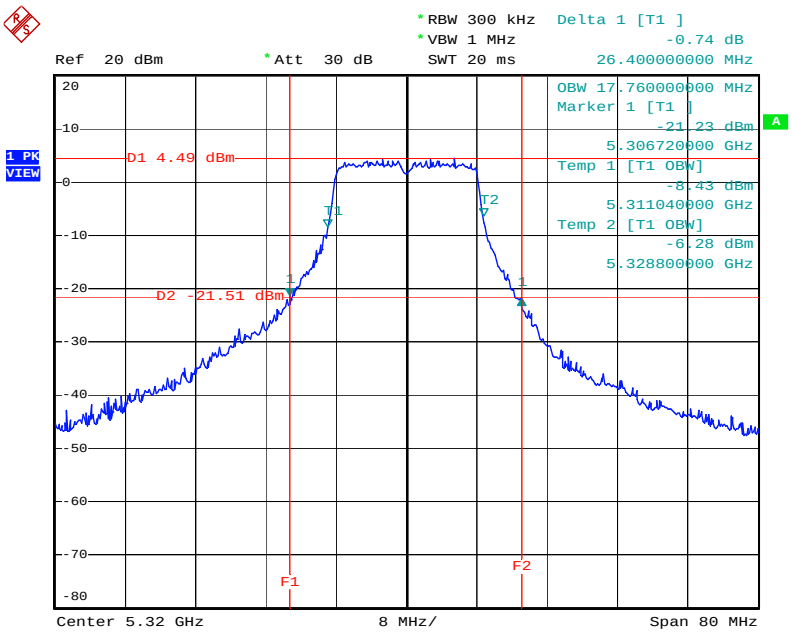
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5320 MHz



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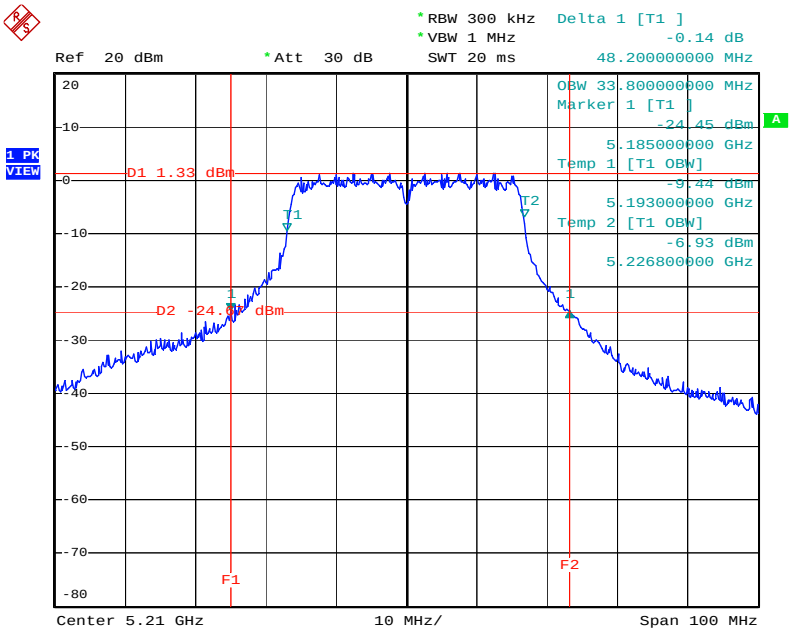
26 dB Bandwidth Plot on Configuration IEEE 802.11a Turbo / 5210 MHz



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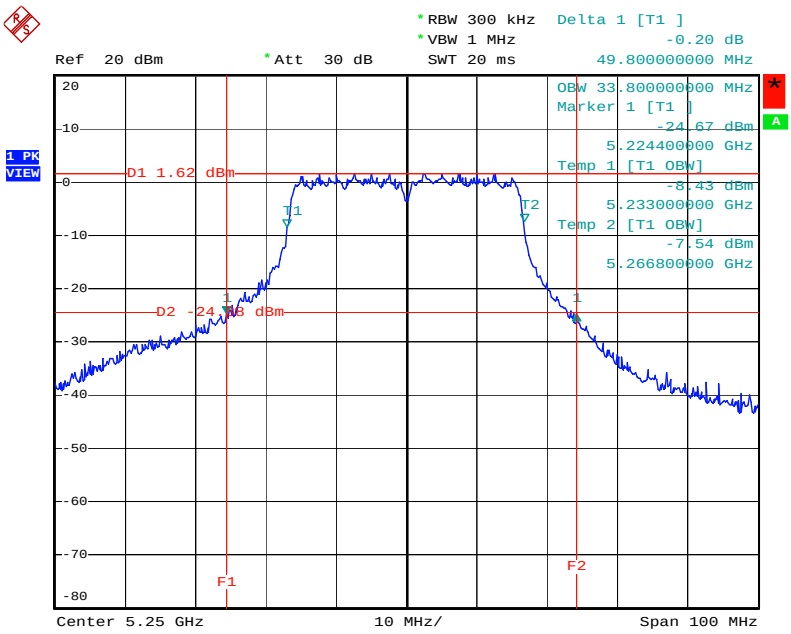
26 dB Bandwidth Plot on Configuration IEEE 802.11a Turbo / 5250 MHz



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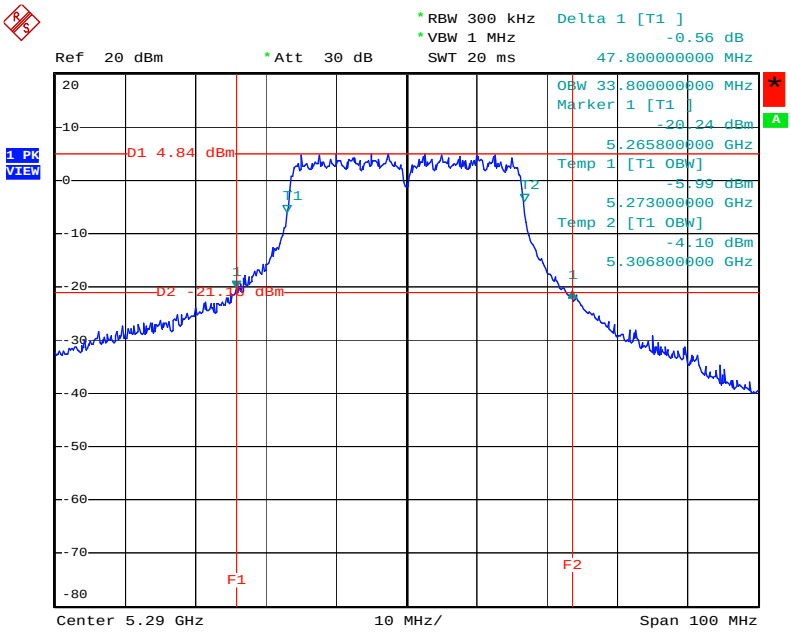
26 dB Bandwidth Plot on Configuration IEEE 802.11a Turbo / 5290 MHz



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4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

For the band 5.15~5.25 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 5.25-5.35 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

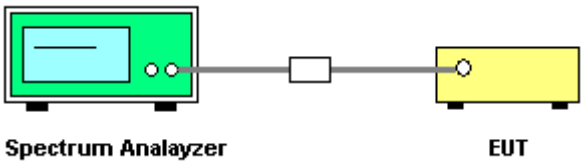
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum.

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°C	Humidity	61%
Test Engineer	Steven Lu	Configurations	802.11a

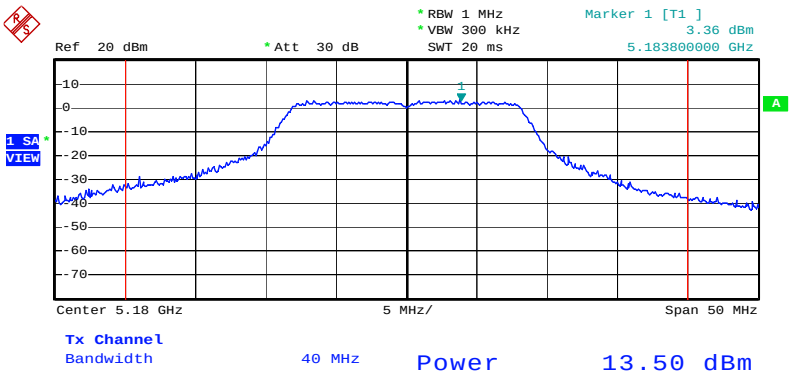
Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.50	17.00	Complies
52	5260 MHz	16.34	24.00	Complies
64	5320 MHz	16.25	24.00	Complies

Configuration IEEE 802.11a Turbo

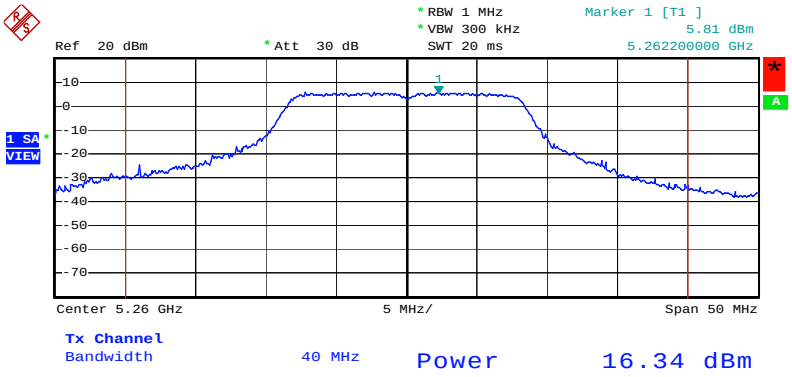
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
42	5210 MHz	15.58	17.00	Complies
50	5250 MHz	15.69	17.00	Complies
58	5290 MHz	18.52	24.00	Complies

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



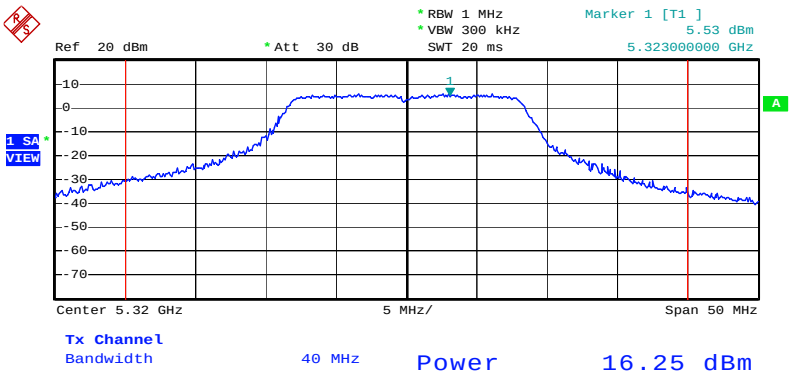
Date: 11.JAN.2006 22:55:06

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



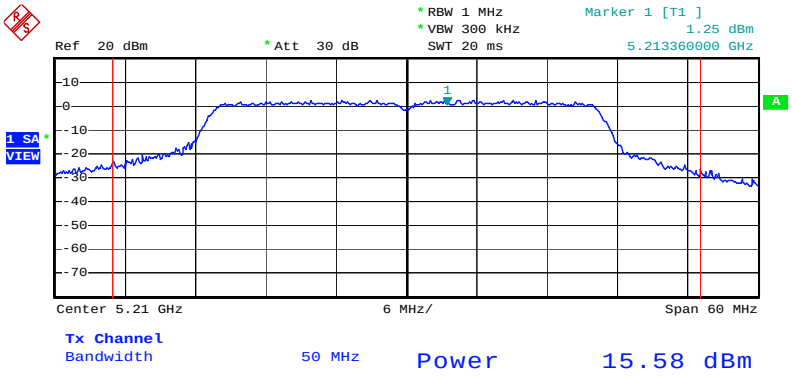
Date: 12.JAN.2006 09:14:47

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



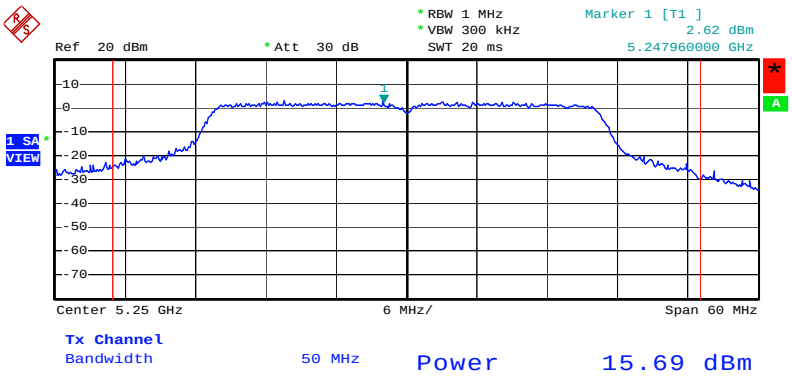
Date: 12.JAN.2006 09:13:40

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



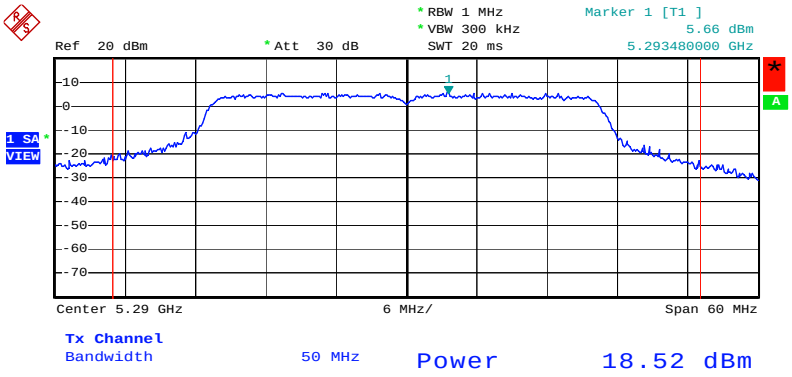
Date: 20.JAN.2006 00:36:16

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



Date: 20.JAN.2006 00:36:59

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



Date: 20.JAN.2006 00:37:35

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	4
5.25-5.35 GHz	11
5.725-5.825	17

4.4.2. Measuring Instruments and Setting

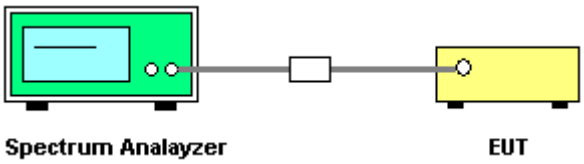
Please refer to section 5 of equipments list in this report. The following table is the setting of Spectrum Analyzer.

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°C	Humidity	61%
Test Engineer	Steven Lu	Configurations	802.11a

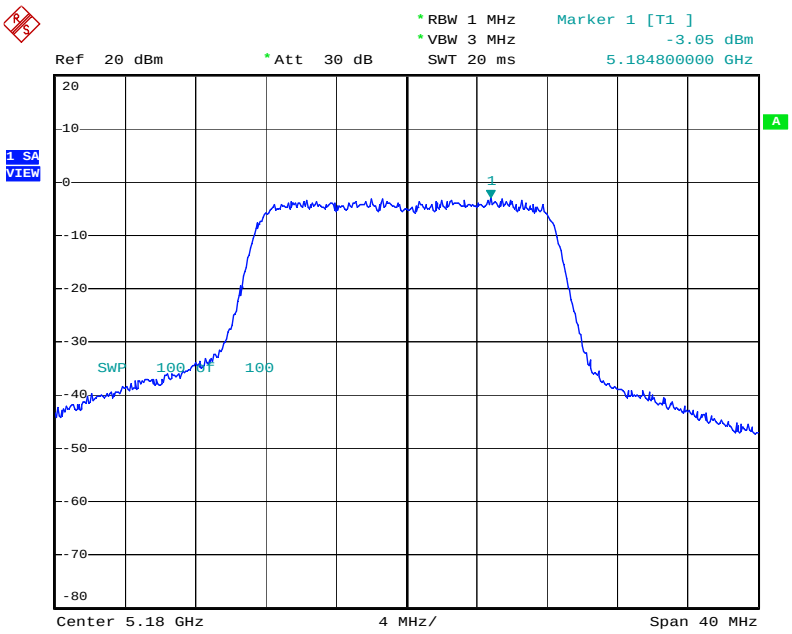
Configuration IEEE 802.11a

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-3.05	4.00	Complies
5260 MHz	-0.64	11.00	Complies
5320 MHz	-0.57	11.00	Complies

Configuration IEEE 802.11a Turbo

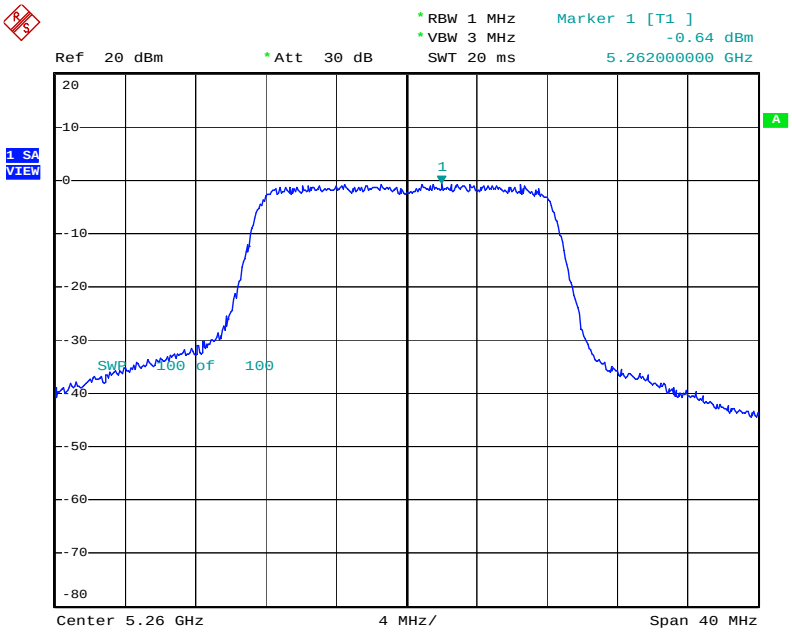
Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5210 MHz	-4.00	4.00	Complies
5250 MHz	-3.75	4.00	Complies
5290 MHz	-0.89	11.00	Complies

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



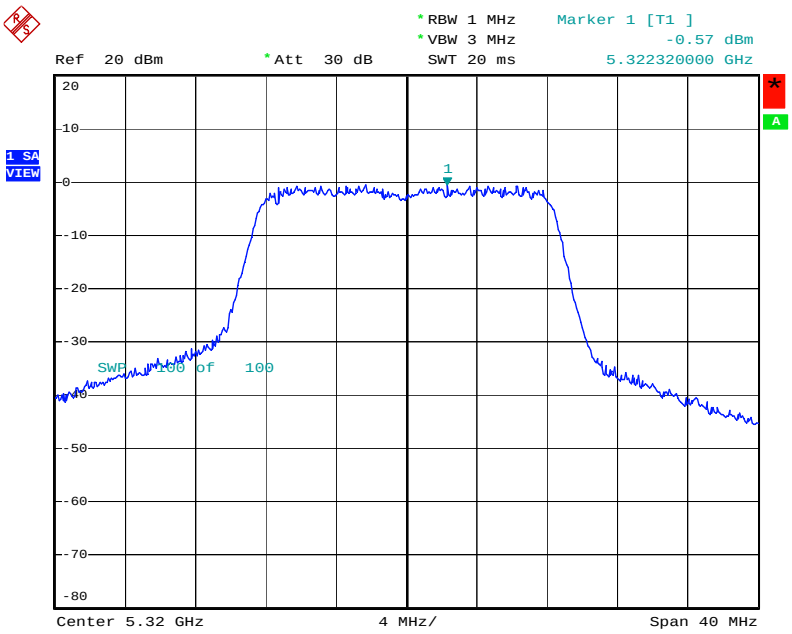
Date: 11.JAN.2006 22:52:56

Power Density Plot on Configuration IEEE 802.11a / 5260 MHz



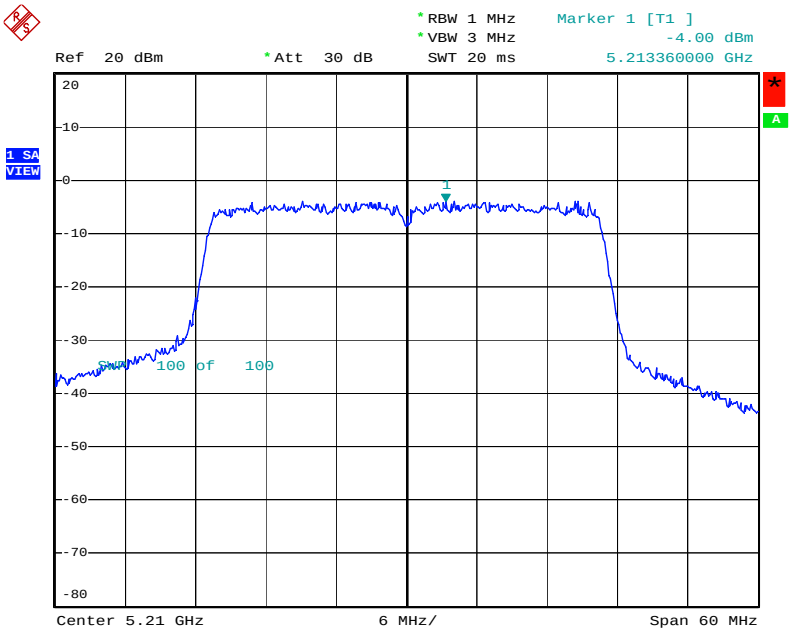
Date: 12.JAN.2006 09:11:11

Power Density Plot on Configuration IEEE 802.11a / 5320 MHz



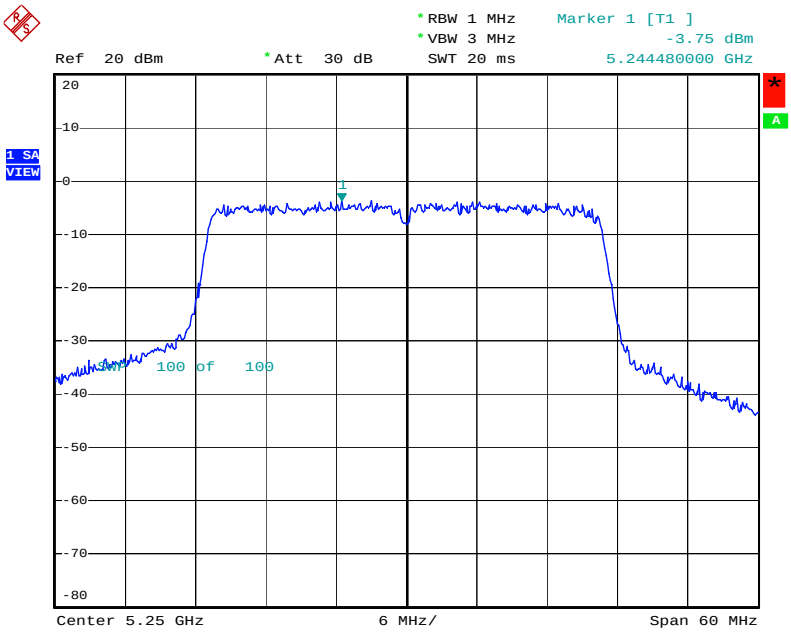
Date: 12.JAN.2006 09:11:49

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



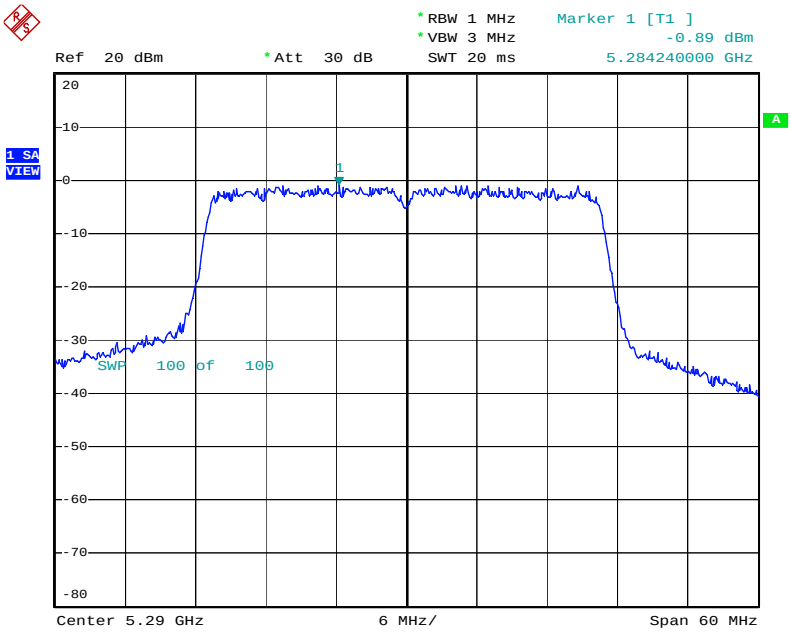
Date: 20.JAN.2006 00:35:00

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



Date: 20.JAN.2006 00:34:33

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



Date: 20.JAN.2006 00:34:08

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

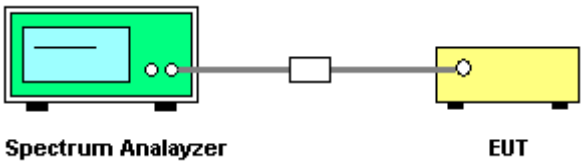
Please refer to section 5 of equipments list in this report. The following table is the setting of Spectrum Analyzer.

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 μs). 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°C	Humidity	61%
Test Engineer	Steven Lu	Configurations	802.11a

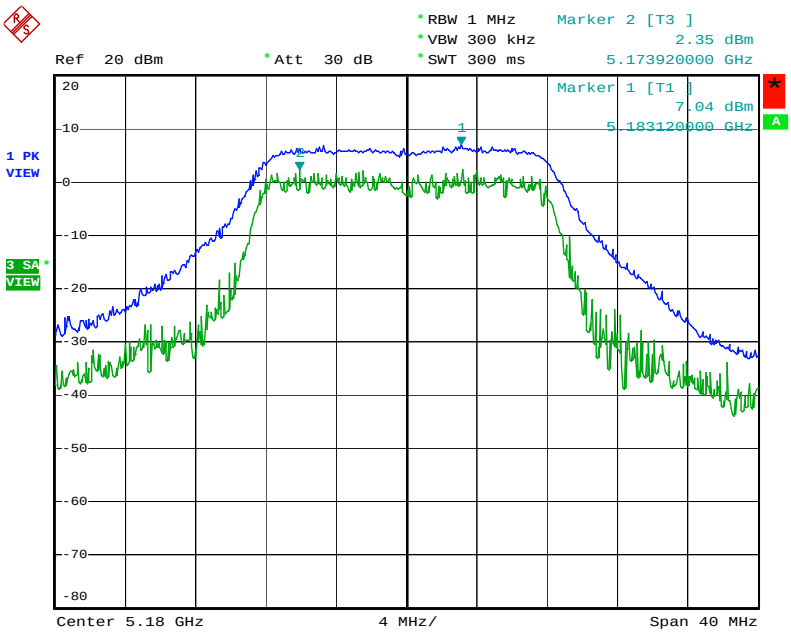
Configuration IEEE 802.11a

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	4.69	13	Complies
5260 MHz	4.75	13	Complies
5320 MHz	5.27	13	Complies

Configuration IEEE 802.11a Turbo

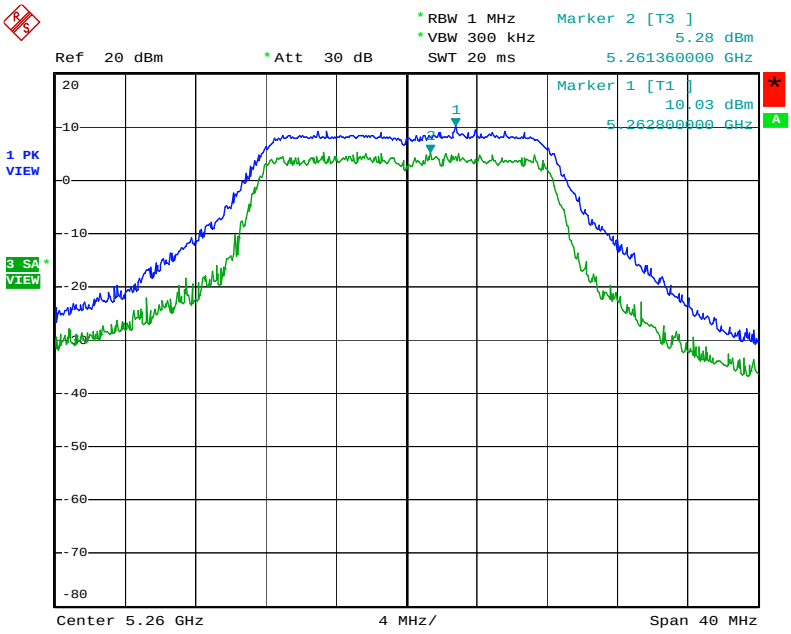
Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5210 MHz	4.09	13	Complies
5250 MHz	4.73	13	Complies
5290 MHz	4.26	13	Complies

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



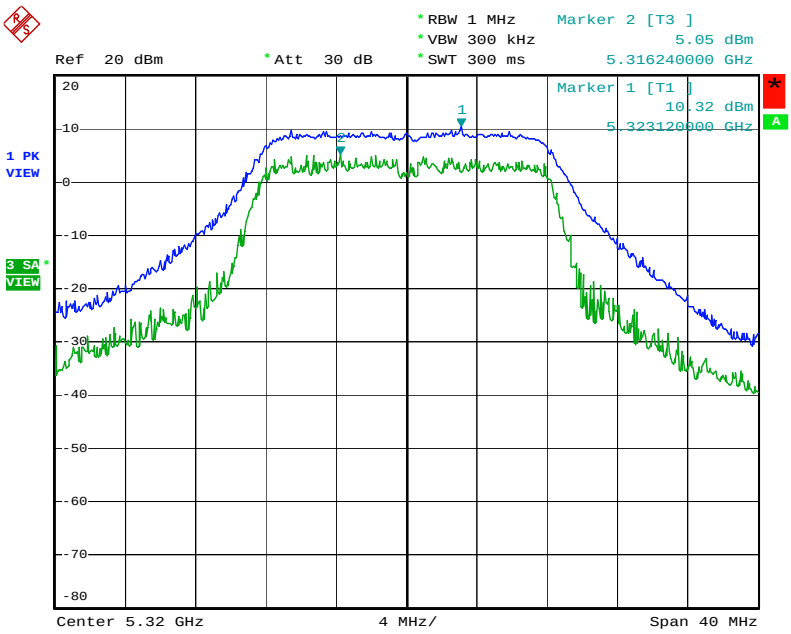
Date: 11.JAN.2006 22:51:44

Peak Excursion Plot on Configuration IEEE 802.11a / 5260 MHz



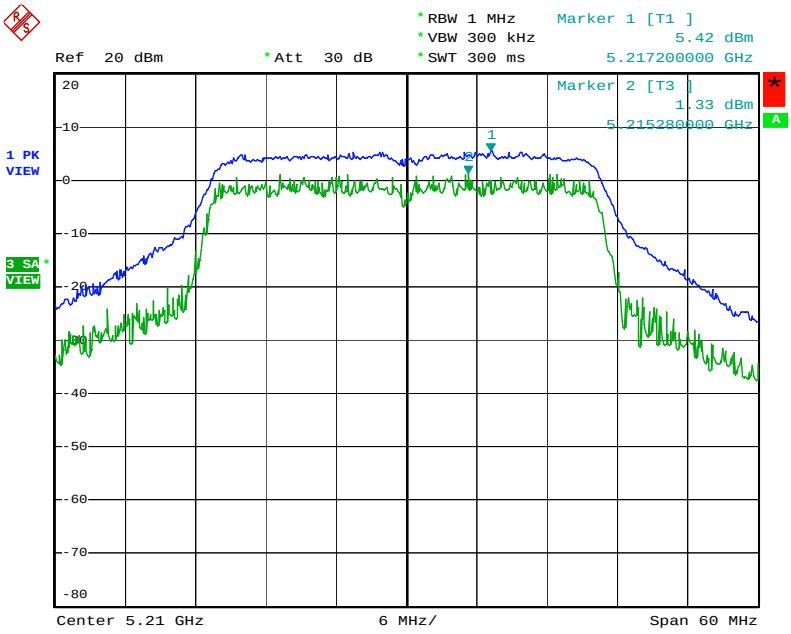
Date: 12.JAN.2006 09:09:54

Peak Excursion Plot on Configuration IEEE 802.11a / 5320 MHz



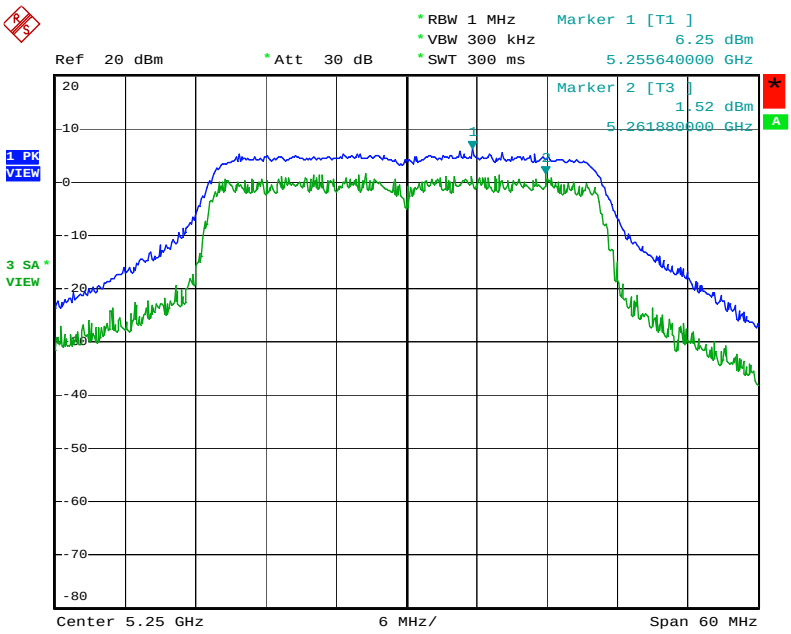
Date: 12.JAN.2006 09:06:32

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



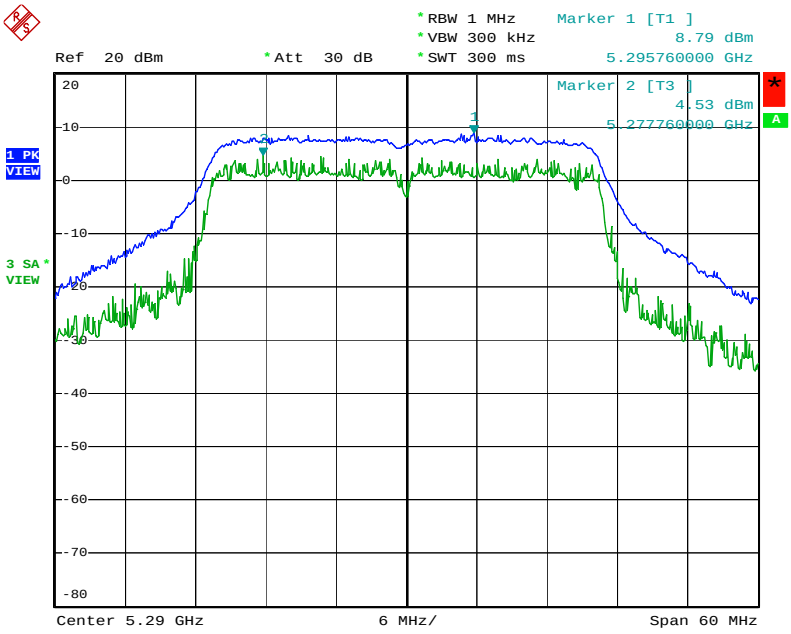
Date: 20.JAN.2006 00:31:29

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



Date: 20.JAN.2006 00:32:28

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



Date: 20.JAN.2006 00:33:17

4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 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 15.205(a), then the 15.209(a) 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 of equipments list 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

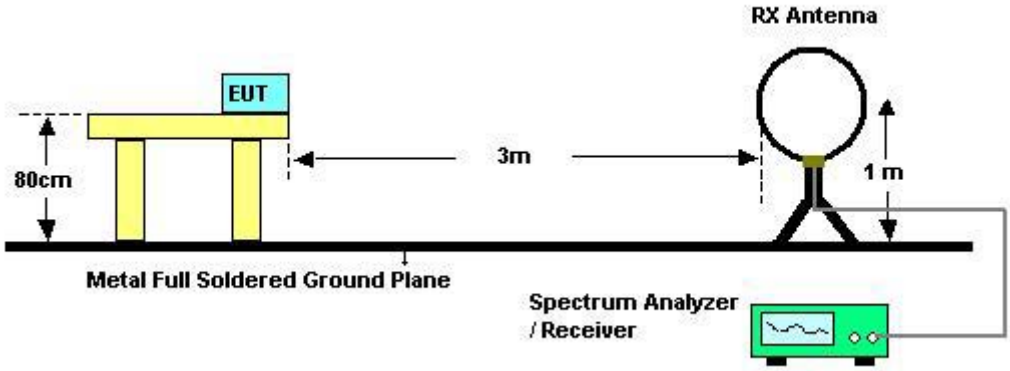
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

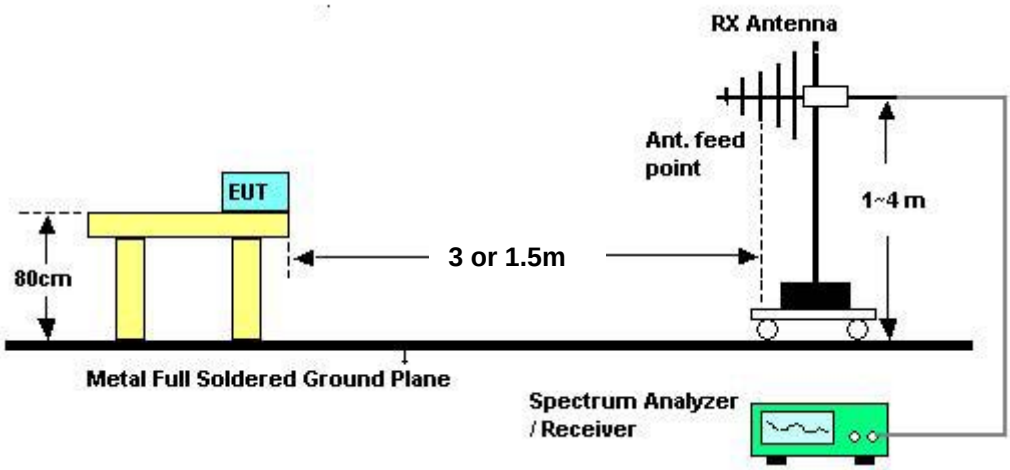
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 1m.

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	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Channel 64

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.

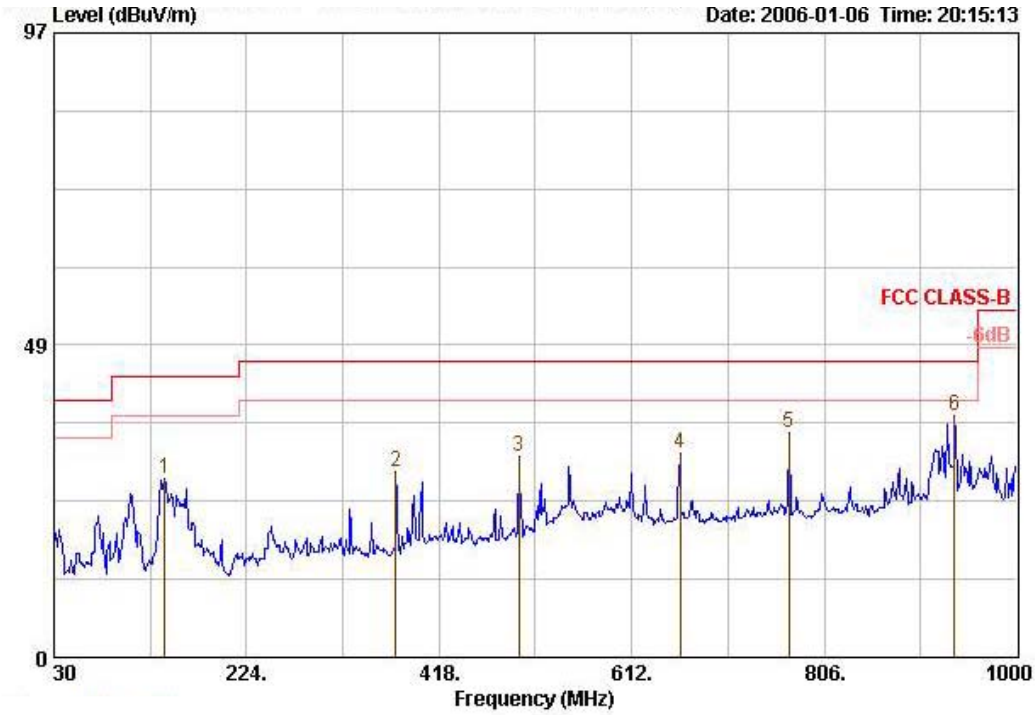
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

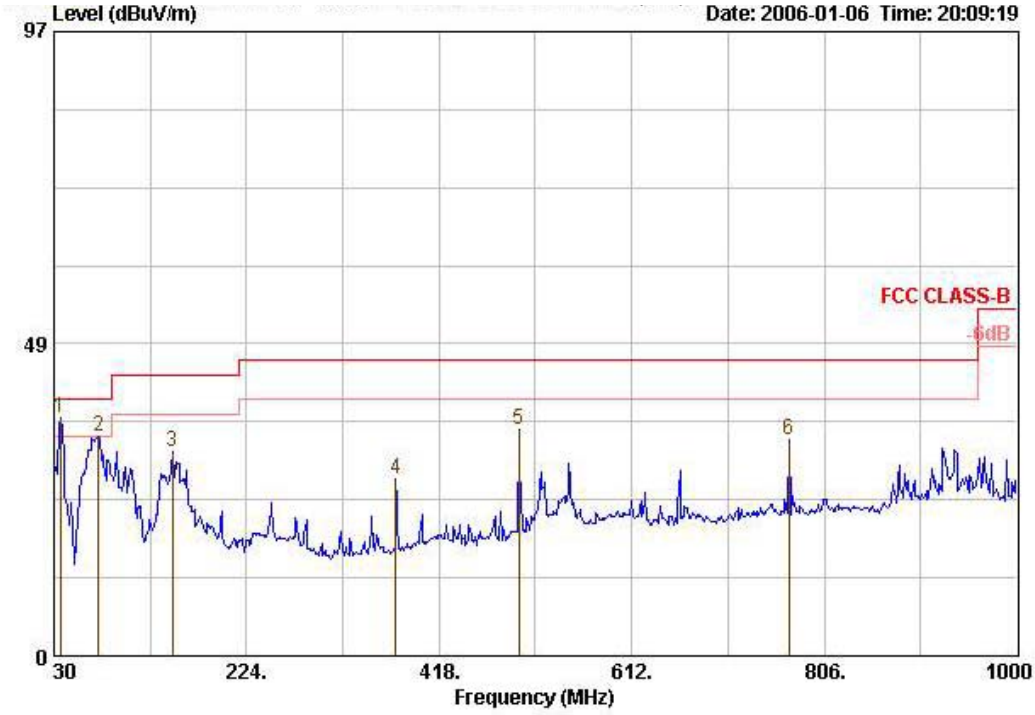
Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Channel 64

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	141.550	27.72	-15.78	43.50	10.85	0.94	30.04	45.97	Peak	---	---
2	374.350	28.84	-17.16	46.00	14.95	1.53	30.52	42.88	Peak	---	---
3	498.510	31.31	-14.69	46.00	17.36	1.77	30.53	42.71	Peak	---	---
4	660.500	31.67	-14.33	46.00	18.90	2.05	30.34	41.07	Peak	---	---
5	770.110	34.89	-11.11	46.00	19.92	2.19	30.09	42.86	Peak	---	---
6	936.950	37.57	-8.43	46.00	20.57	2.48	29.00	43.52	Peak	---	---

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 !	36.790	36.97	-3.03	40.00	14.10	0.51	29.79	52.15	Peak	---	---
2	74.620	33.99	-6.01	40.00	6.05	0.70	29.98	57.23	Peak	---	---
3	149.310	31.61	-11.89	43.50	10.19	0.97	30.09	50.55	Peak	---	---
4	374.350	27.46	-18.54	46.00	14.95	1.53	30.52	41.51	Peak	---	---
5	498.510	35.17	-10.83	46.00	17.36	1.77	30.53	46.57	Peak	---	---
6	770.110	33.63	-12.37	46.00	19.92	2.19	30.09	41.61	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).

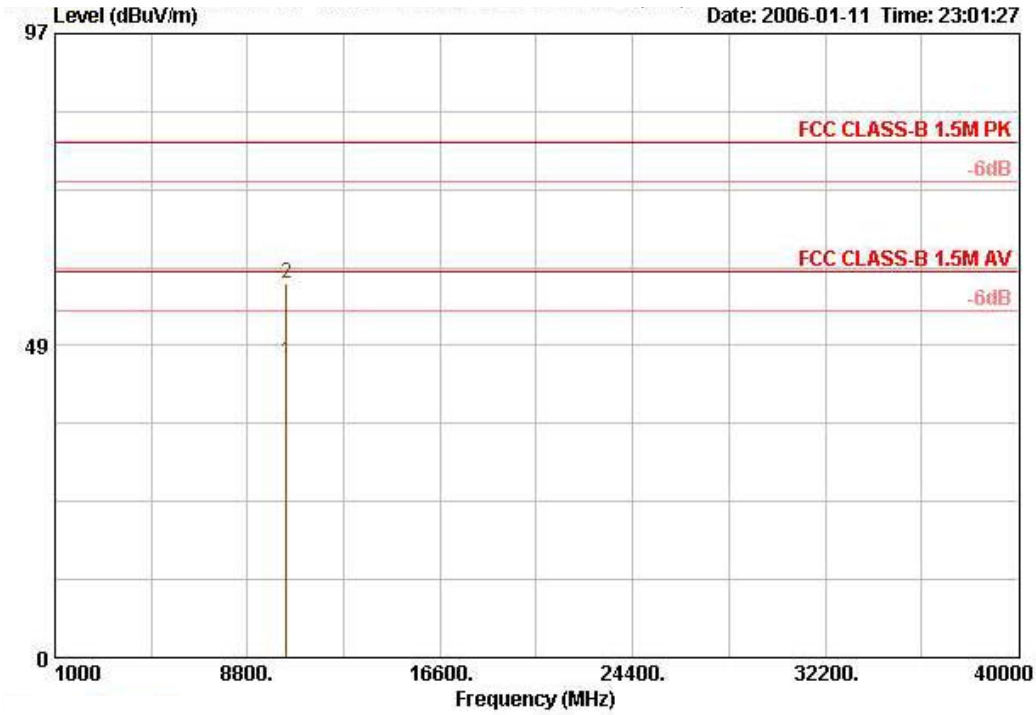
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Pol. : V is Vertical Polarization ; H is Horizontal Polarization.

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

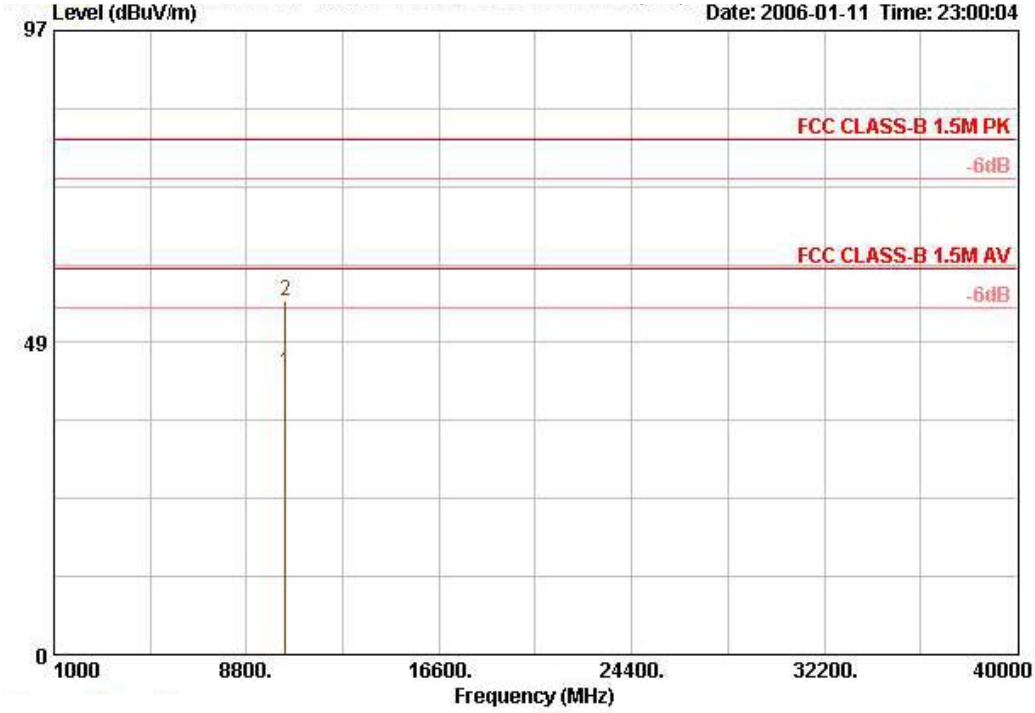
Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Channel 36

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 @	10360.000	46.00	-14.00	60.00	39.34	5.80	35.55	36.41	Average	107	22
2	10360.000	58.10	-21.90	80.00	39.34	5.80	35.55	48.51	Peak	107	22

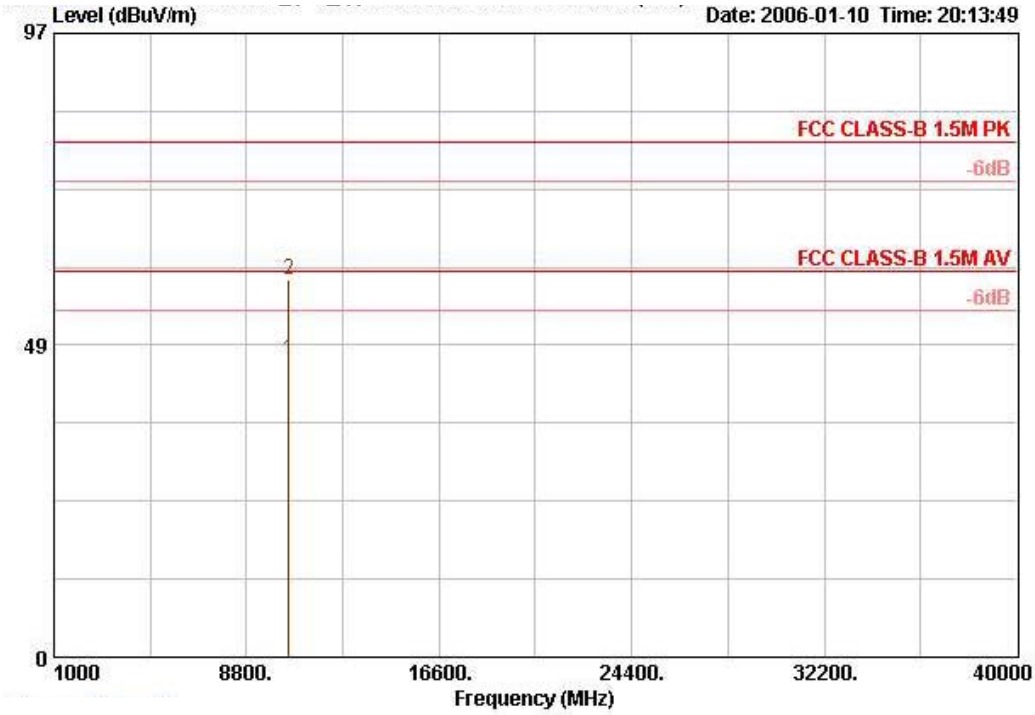
Vertical



	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 @	10360.000	44.00	-16.00	60.00	39.34	5.80	35.55	34.41	Average	100	30
2	10360.000	55.00	-25.00	80.00	39.34	5.80	35.55	45.41	Peak	100	30

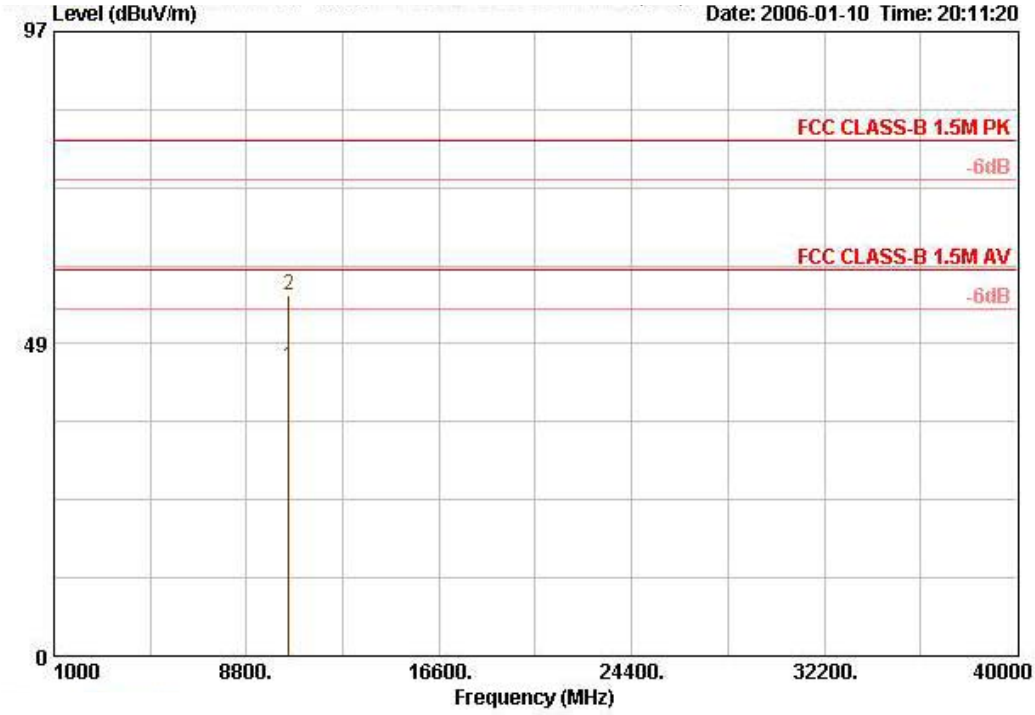
Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Channel 52

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 @	10520.120	46.31	-13.69	60.00	39.49	5.93	35.40	36.29	AVERAGE	127	42
2	10520.120	58.58	-21.42	80.00	39.49	5.93	35.40	48.56	PEAK	127	42

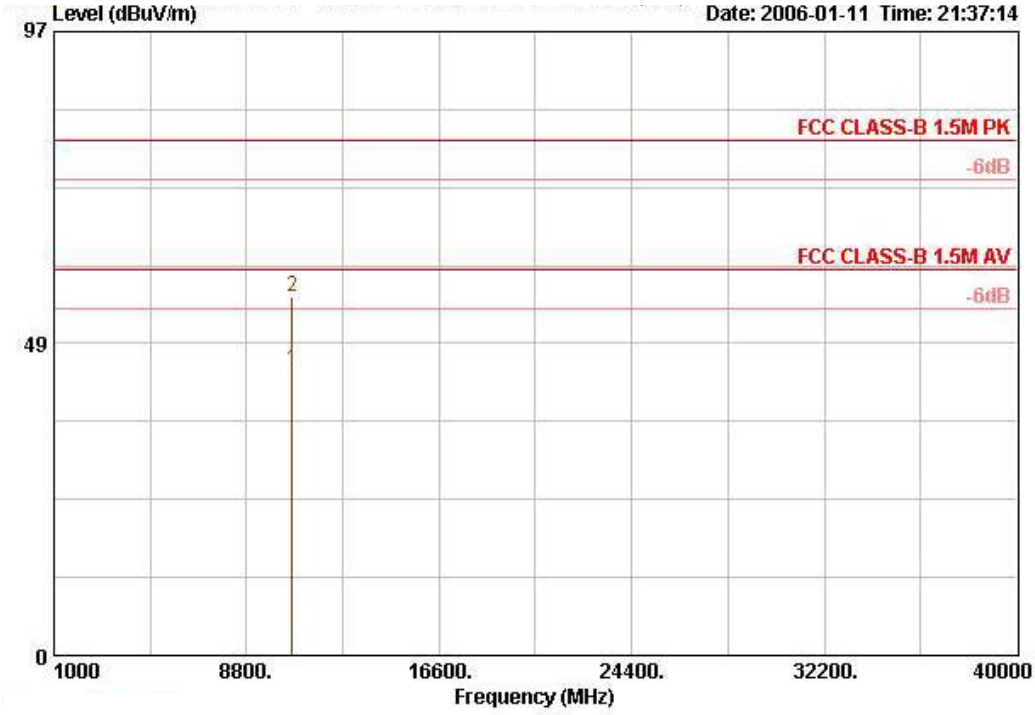
Vertical



	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 @	10520.040	44.88	-15.12	60.00	39.49	5.93	35.40	34.86	AVERAGE	122	322
2	10520.040	55.94	-24.06	80.00	39.49	5.93	35.40	45.92	PEAK	122	322

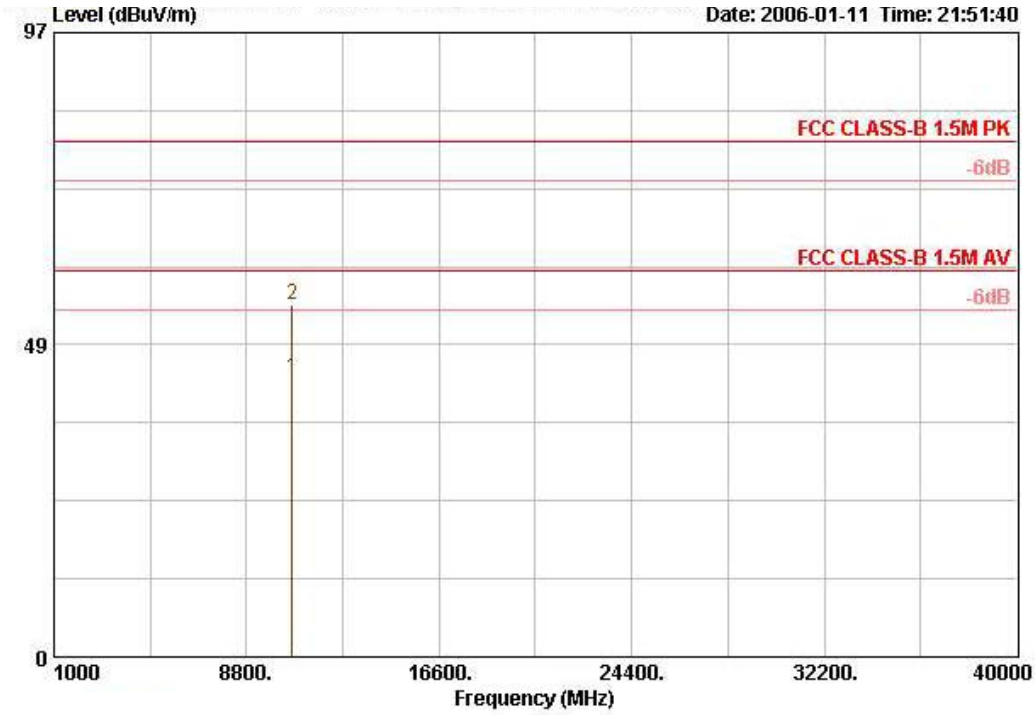
Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Channel 64

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 @	10640.440	44.48	-15.52	60.00	39.42	6.03	35.32	34.35	AVERAGE	123	45
2	10640.440	55.79	-24.21	80.00	39.42	6.03	35.32	45.66	PEAK	123	45

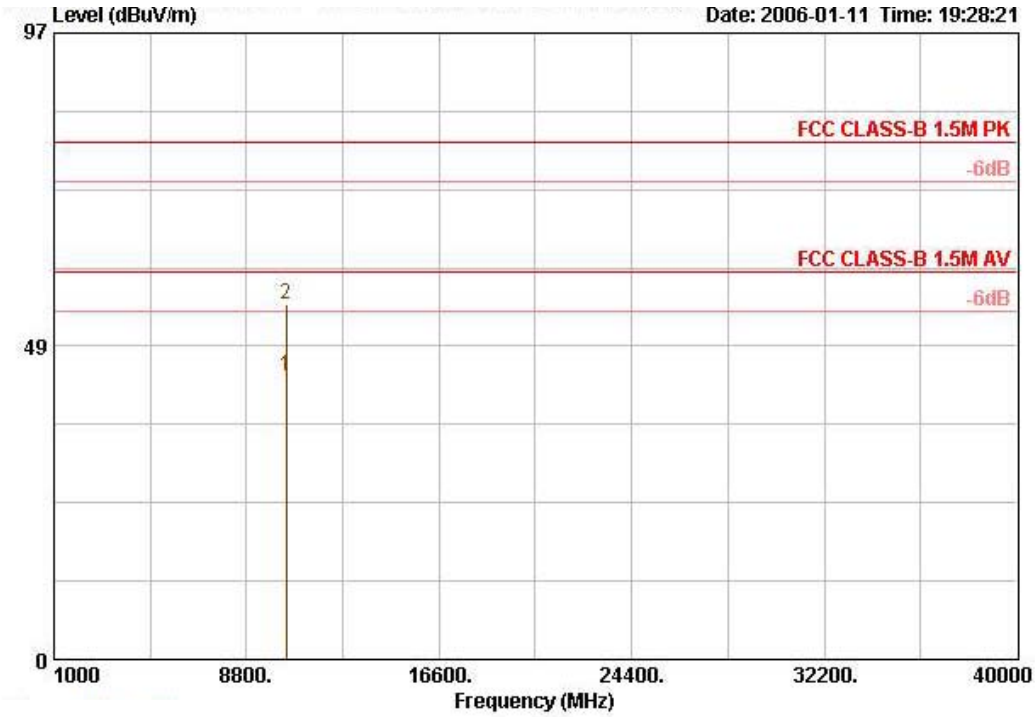
Vertical



	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 @	10640.720	43.38	-16.62	60.00	39.42	6.03	35.32	33.25	AVERAGE	114	133
2	10640.720	54.71	-25.29	80.00	39.42	6.03	35.32	44.58	PEAK	114	133

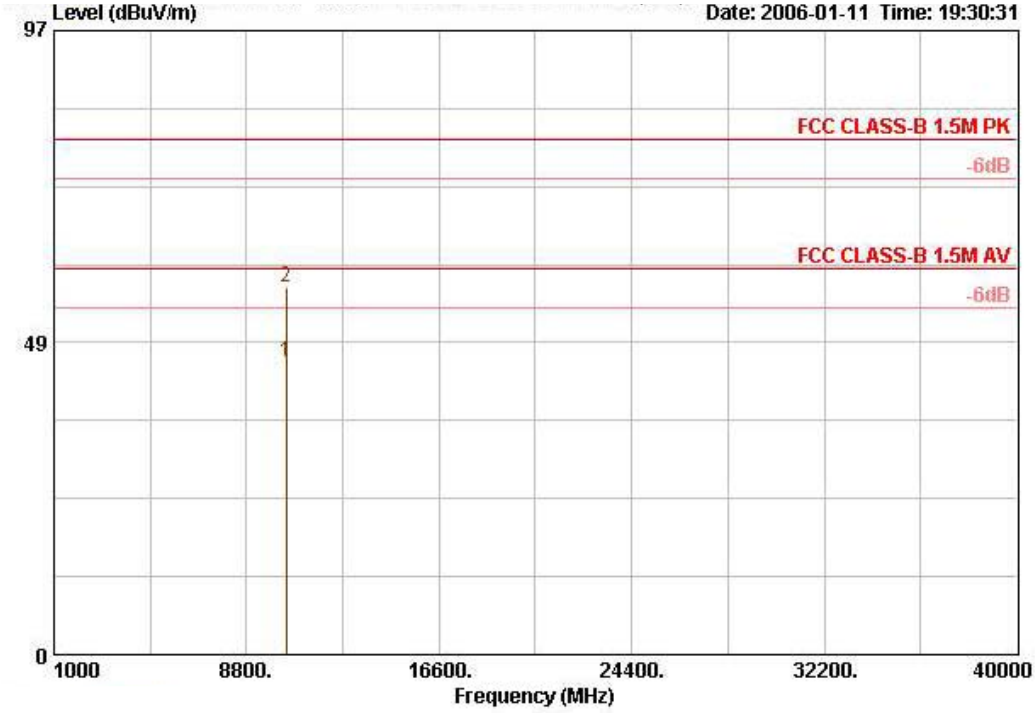
Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Turbo Channel 42

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 @	10422.040	43.99	-16.01	60.00	39.40	5.86	35.50	34.23	AVERAGE	122	72
2	10422.040	55.03	-24.97	80.00	39.40	5.86	35.50	45.27	PEAK	122	72

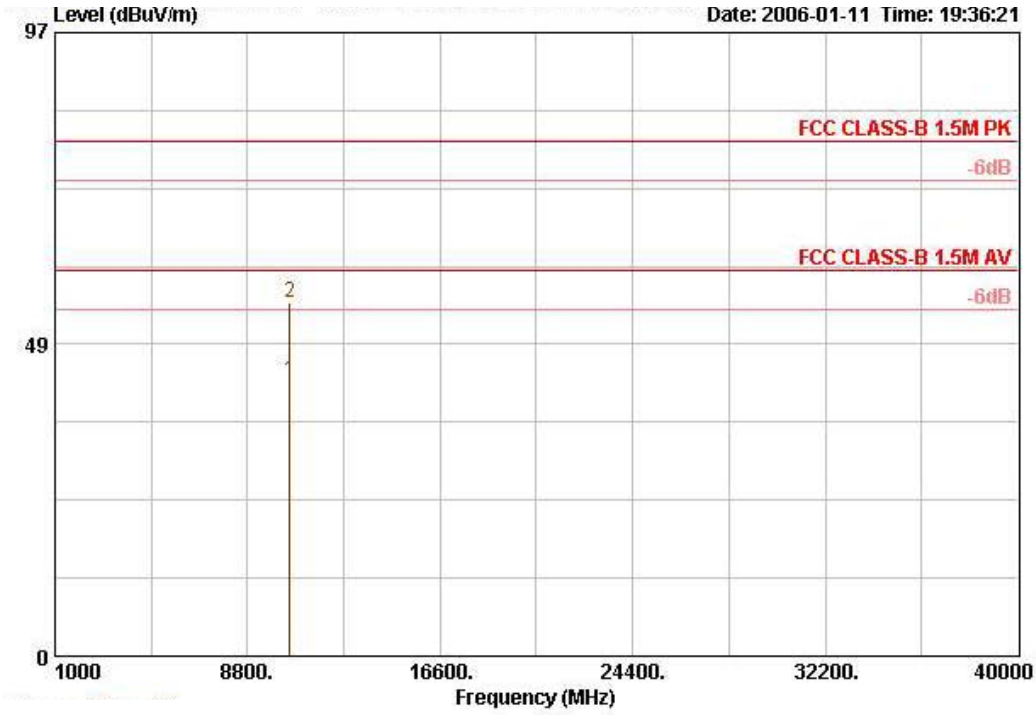
Vertical



	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 @	10421.320	45.46	-14.54	60.00	39.40	5.86	35.50	35.70	AVERAGE	107	343
2	10421.320	57.02	-22.98	80.00	39.40	5.86	35.50	47.26	PEAK	107	343

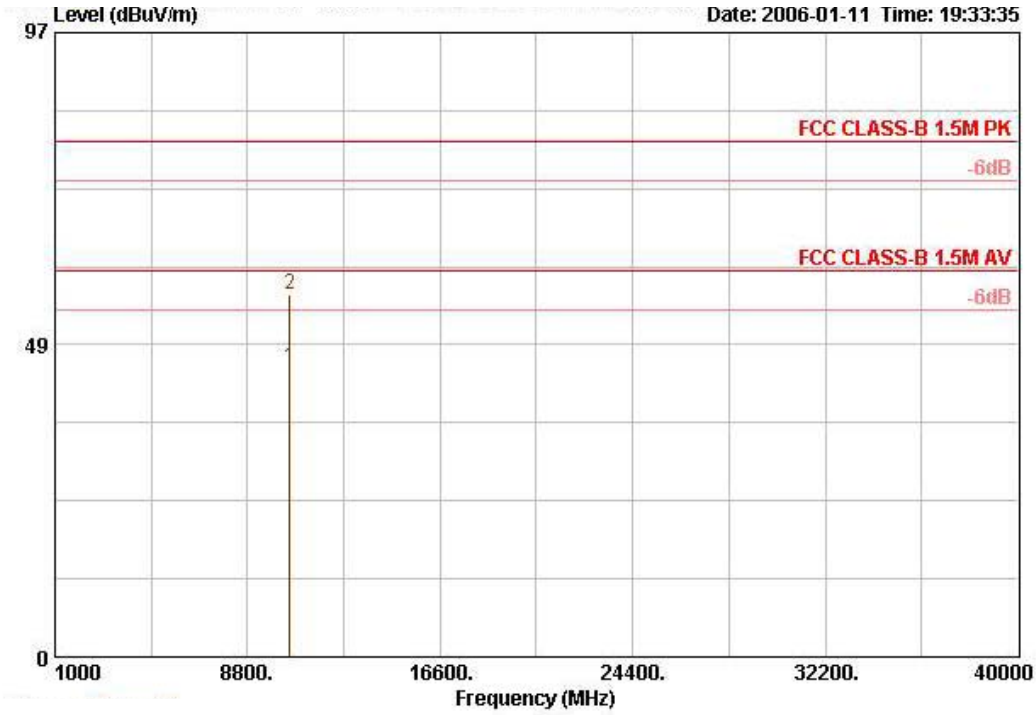
Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Turbo Channel 50

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 @	10499.520	42.91	-17.09	60.00	39.50	5.93	35.40	32.88	AVERAGE	120	6
2	10499.520	54.99	-25.01	80.00	39.50	5.93	35.40	44.96	PEAK	120	6

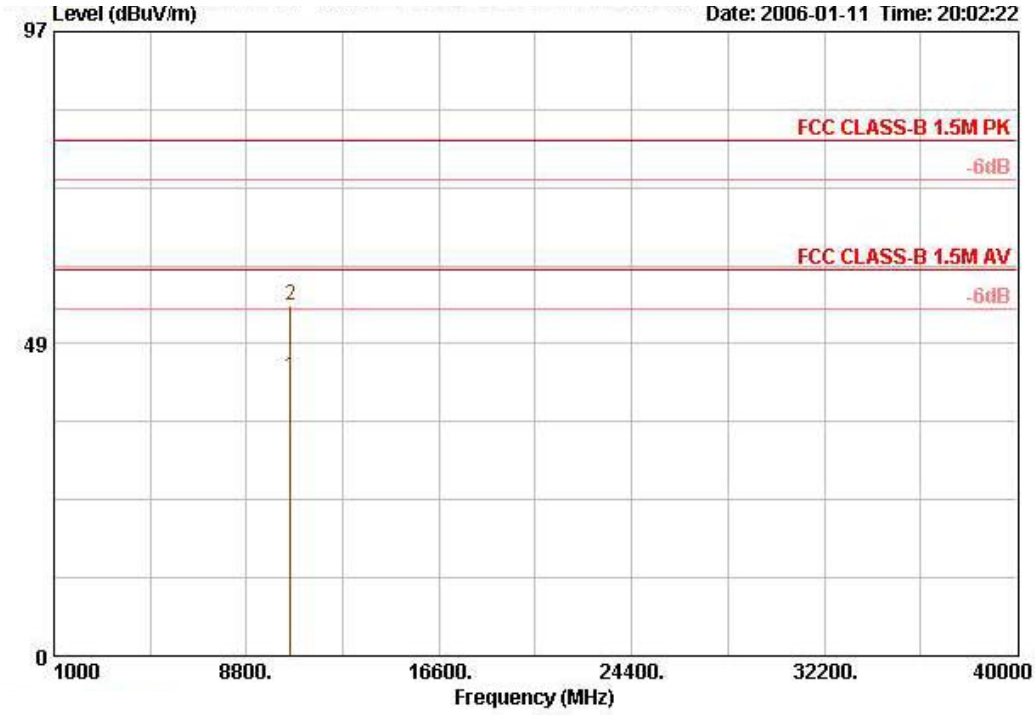
Vertical



	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 @	10497.080	45.03	-14.97	60.00	39.50	5.93	35.43	35.02	AVERAGE	109	343
2	10497.080	56.30	-23.70	80.00	39.50	5.93	35.43	46.30	PEAK	109	343

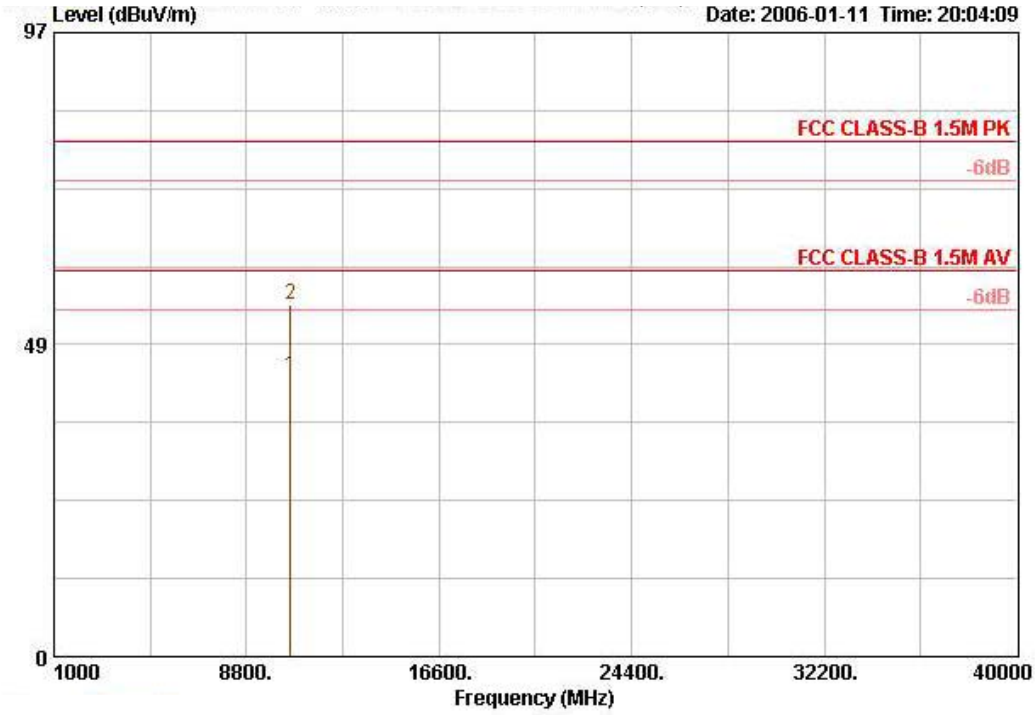
Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Turbo Channel 58

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 @	10578.200	43.29	-16.71	60.00	39.46	6.00	35.35	33.19	AVERAGE	122	5
2	10578.200	54.53	-25.47	80.00	39.46	6.00	35.35	44.42	PEAK	122	5

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 @	10577.320	43.71	-16.29	60.00	39.46	6.00	35.35	33.61	AVERAGE	106	352
2	10577.320	54.80	-25.20	80.00	39.46	6.00	35.35	44.69	PEAK	106	352

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.

Pol. : V is Vertical Polarization ; H is Horizontal Polarization.

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

4.7. Band Edge Emissions Measurement

4.7.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 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 15.205(a), then the 15.209(a) 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 of equipments list 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 Emissions

For Emission in Restricted Band

Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	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	73.01	-6.99	80.00	33.84	4.88	0.00	34.30	PEAK	100	0
2 @	5150.000	59.16	-0.84	60.00	33.84	4.88	0.00	20.44	AVERAGE	100	0

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
3 @	5350.000	71.06	-8.94	80.00	34.16	5.11	0.00	31.79	PEAK	104	67
4 @	5350.000	58.81	-1.19	60.00	34.16	5.11	0.00	19.54	AVERAGE	104	67

Temperature	22°C	Humidity	64%
Test Engineer	Rush Kao	Configurations	802.11a Turbo Channel 42, 58

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	71.74	-8.26	80.00	33.84	4.88	0.00	33.02	PEAK	101	65
2 @	5150.000	58.84	-1.16	60.00	33.84	4.88	0.00	20.12	AVERAGE	101	65

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
3 @	5350.000	70.24	-9.76	80.00	34.16	5.11	0.00	30.97	PEAK	102	380
4 @	5350.000	58.40	-1.60	60.00	34.16	5.11	0.00	19.13	AVERAGE	102	380

Note:

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

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

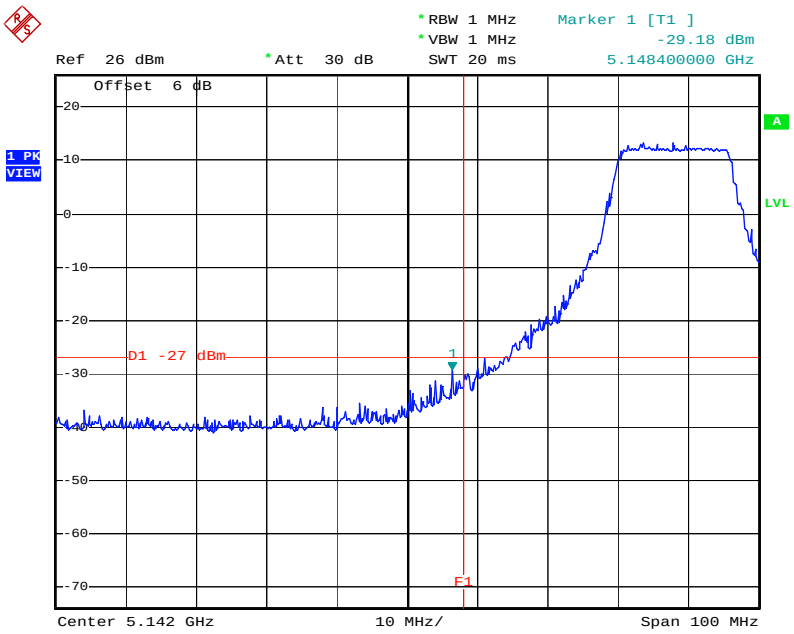
Receiving maximum band edge emissions are Vertical Polarization /Horizontal Polarization.

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1m]) (dB);

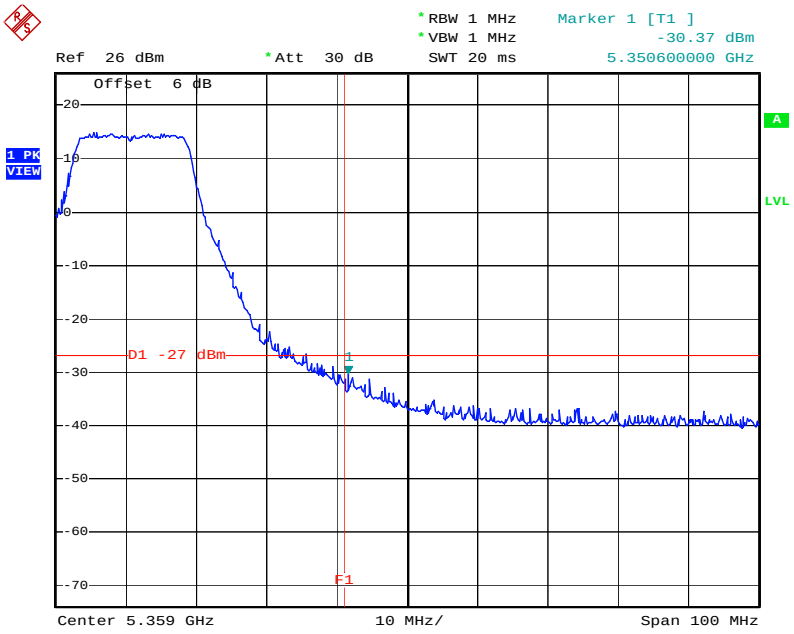
Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

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



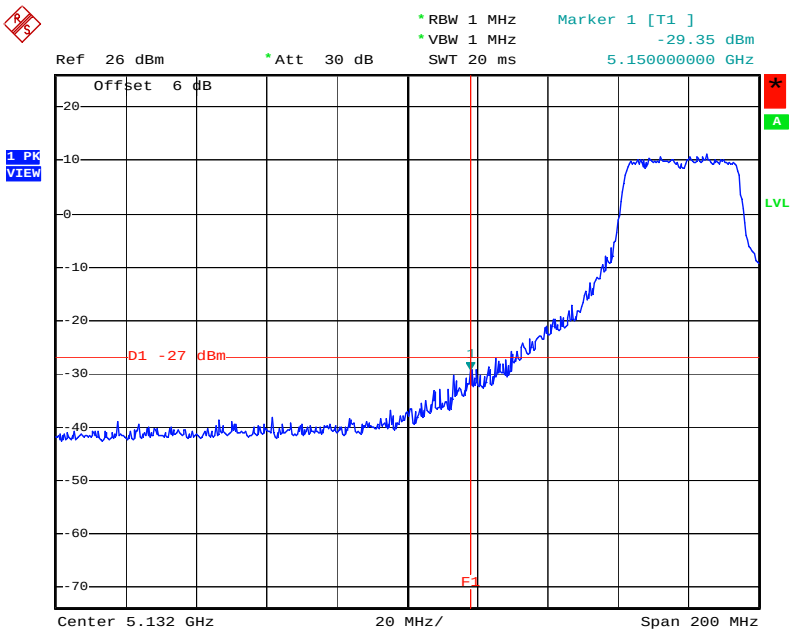
Date: 23.JAN.2006 17:58:44

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



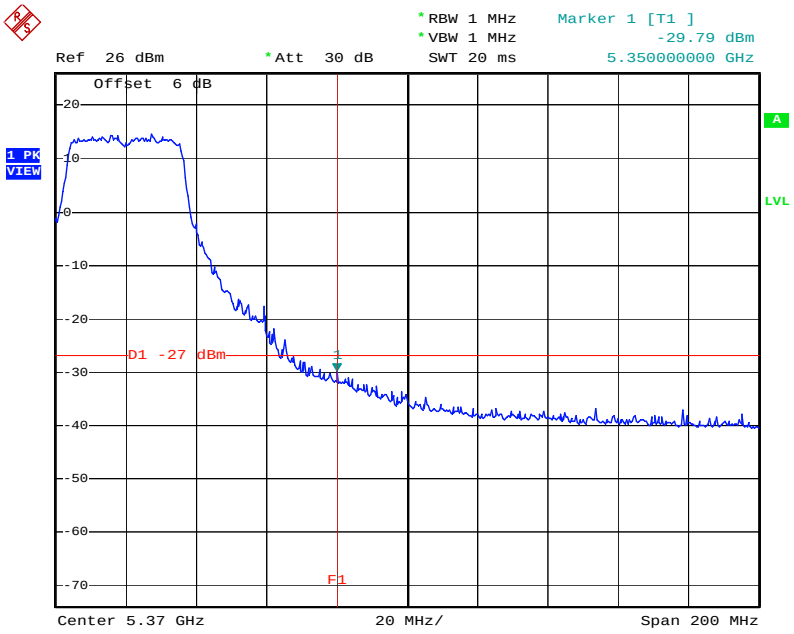
Date: 23.JAN.2006 18:01:18

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



Date: 20.JAN.2006 00:30:06

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



Date: 20.JAN.2006 00:28:32

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

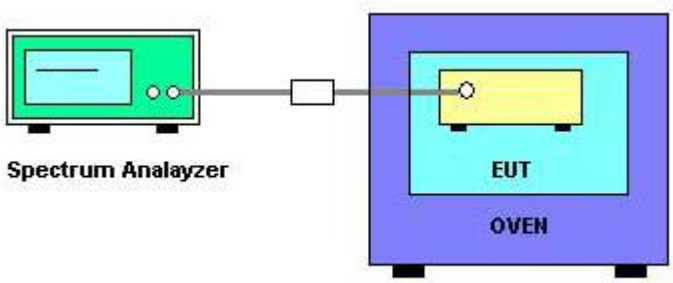
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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
126.50	5260.0112
110.00	5260.0142
93.50	5260.0136
Max. Deviation (MHz)	0.0142
Max. Deviation (ppm)	2.6996

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(°C)	5260
-30	5260.0475
-20	5260.0533
-10	5260.0572
0	5260.0456
10	5260.0325
20	5260.0192
30	5260.0161
40	5260.0074
50	5260.0110
Max. Deviation (MHz)	0.0572
Max. Deviation (ppm)	10.8745

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. Further, this requirement does not apply to intentional radiators that must be professionally installed.

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. 22, 2006	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Dec. 19, 2005	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9708-1839	9kHz – 30MHz	Mar. 18, 2006	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2006	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	30 MHz - 1 GHz 3m	Jun. 15, 2006	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	3565	9 kHz - 2 GHz	Jan. 18, 2006	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	May 29, 2006	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100004/040	9 kHZ - 40 GHz	Sep. 30, 2005	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30 MHz - 200 MHz	Jul. 22, 2005	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200 MHz - 1 GHz	Jul. 22, 2005	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6903	1GHz ~ 18GHz	Mar. 15, 2006	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	NCR	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Dec.02, 2005	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec.02, 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 ~ 30GHz	Nov. 26, 2005	Conducted (TH01-HY)
Power meter	R&S	NRVS	100444	DC ~ 40GHz	Jun, 10, 2006	Conducted (TH01-HY)
Power sensor	R&S	NRV-Z55	100049	DC ~ 40GHz	Jul. 05, 2006	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jun, 10, 2006	Conducted (TH01-HY)
DC power source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Dec. 28, 2005	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2005	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 30, 2005	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 30, 2005	Conducted (TH01-HY)
Oscilloscope	Tektronix	TDS1012	CO38515	100MHz / 1GS/s	Jun. 20, 2006	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Dec. 30, 2005	Conducted (TH01-HY)
Data Generator	Tektronix	DG2030	063-2920-50	0.1Hz~400MHz	Jun. 16, 2006	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year. NCR: Non-Calibration required.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 24, 2006*	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2006*	Radiation (03CH03-HY)
AC power source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Apr. 21, 2005*	Conducted (TH01-HY)

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

6. TEST LOCATION

SHIJR	ADD	:	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	:	886-2-2696-2468
	FAX	:	886-2-2696-2255
HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	:	886-3-327-3456
	FAX	:	886-3-318-0055
LINKOU	ADD	:	No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	:	886-2-2601-1640
	FAX	:	886-2-2601-1695
DUNGHU	ADD	:	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	:	886-2-2631-4739
	FAX	:	886-2-2631-9740
JUNGHE	ADD	:	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	:	886-2-8227-2020
	FAX	:	886-2-8227-2626
NEIHU	ADD	:	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	:	886-2-2794-8886
	FAX	:	886-2-2794-9777
JHUBEI	ADD	:	No.8, Lane 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	:	886-3-656-9065
	FAX	:	886-3-656-9085

7. NVLAP CERTIFICATE OF ACCREDITATION

United States Department of Commerce
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Tao Yuan Hsien 333
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ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

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

For the National Institute of Standards and Technology

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