SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	**Trapeze Networks Inc.**
Applicant Address	5753 W. Las Positas Blvd. Pleasanton, CA 94588, US
FCC ID	**QZE250**
Manufacturer's company	**Alpha Networks Inc.**
Manufacturer Address	No. 8, Li-Hsin VII Road,Science-Based Industrial Park, Hsin-Chu, Taiwan, R.O.C.

Product Name	Dual mode 2.4GHz / 5GHz Access Point
Brand Name	Trapeze Networks, Enterasys
Model Name	400, RBT-161x-xx
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150~5250 MHz
Received Date	Oct. 27, 2006
Final Test Date	Nov. 30, 2006
Submission Type	Original Equipment

Statement

Test result included is only for the 802.11a (5150~5250 MHz) 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

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History of This Test Report

Original Issue Date: Dec. 01, 2006

Report No.: FR6O2612AA

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Dual mode 2.4GHz / 5GHz Access Point
Brand Name	:	Trapeze Networks, Enterasys
Model Name	:	400, RBT-161x-xx
Applicant	:	Trapeze Networks Inc.
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 Oct. 27, 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	Sam Lee / Engineer	Roger Sheng / Manager

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	1.98 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	3.16 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.04 dB
4.5	15.407(a)	Peak Excursion	Complies	0.15 dB
4.6	15.407(b)	Radiated Emissions	Complies	1.23 dB
4.7	15.407(b)	Band Edge Emissions	Complies	1.61 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	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.5dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
Peak Excursion	±0.5dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	$\pm 8.5 \times 10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

EUT is a Wireless Access Point with IEEE 802.11a/b/g radio functions. Only the radio detail of WLAN is shown in the table below. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

This equipment will be marketed and installed by specific contract retailer.

The installation of this equipment is only be performed by well-trained and qualified personnel.

Items	Description
Power Type	48V DC from POE
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)
Frequency Range	5150~5250 MHz
Channel Number	11a: 4
Channel Band Width (99%)	11a: 17.44 MHz
Conducted Output Power	13.84 dBm

3.2. Accessories

N/A

3.3. Table for Filed Antenna

For 5GHz Band

Ant.	Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)	REMARK
1	Wha Yu Industrial Co	C037-520720-A*	F Type	NA	3.00	(Internal)
2	ASTRON	ANT-5180 (ASTN6H)	180° Panel Ant.	Reversed-SMA	10.80	(External)
3	ASTRON	ANT-5120 (ASTN6T)	120° Panel Ant.	Reversed-SMA	12.50	(External)
4	ASTRON	ANT-5060 (ASTN6S)*	60° Panel Ant.	Reversed-SMA	14.50	(External)

"*": The antenna internal F Type (3.00dBi) and external 60° Panel Antenna (14.50dBi) with highest antenna gain were configured with EUT during test.

Dual band

For 5GHz Band

Ant.	Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)	REMARK
1	HUBER+SUHNER	SWA 2459/360/7/20/V*	OMNI Antenna	N Type	8.00	(External)
2	MAXRAD	MMO24580608*	Omni directional Antenna	N Type	8.00	(External)

Both antennas were configured with EUT during test.

*: For professional installation

3.4. Table for Carrier Frequencies

Frequency Allocation for 802.11a

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz (USA/Canada)	36	5180 MHz	44	5220 MHz
	40	5200 MHz	48	5240 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
AC Power Conducted Emission	Normal Link	54Mbps	48
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Max. Conducted Output Power Power Spectral Density Peak Excursion	Band 1/BPSK	6Mbps	36/40/48
Radiated Emission Below 1GHz	BPSK	6Mbps	48
Radiated Emission Above 1GHz Band Edge Emission	Band 1/BPSK	6Mbps	36/40/48
Band Edge Emission	Band 1/BPSK	6Mbps	36/48
Frequency Stability	Un-modulation	-	40

Note: There are four test modes shown in the table below:

Mode 1: Internal F Type Antenna, **C037-520721-A**., for IEEE 802.11a

Mode 2: External Antenna, **ANT-5060 (ASTN6S)**, for IEEE 802.11a

Mode 3: External Antenna, **SWA 2459/360/7/20/V**, for IEEE 802.11a

Mode 4: External Antenna, **MMO24580608**, for IEEE 802.11a

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
POE	Trapeze	MXR-2	DoC
Adapter	LB	SA06L48-V	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:

Mode 1: Internal F Type Antenna, **C037-520721-A.**, for IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	18.5	18.5	18.5

Mode 2: External Antenna, **ANT-5060 (ASTN6S)**, for IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	13	13	13

Mode 3: External Antenna, **SWA 2459/360/7/20/V**, for IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	17	17	17

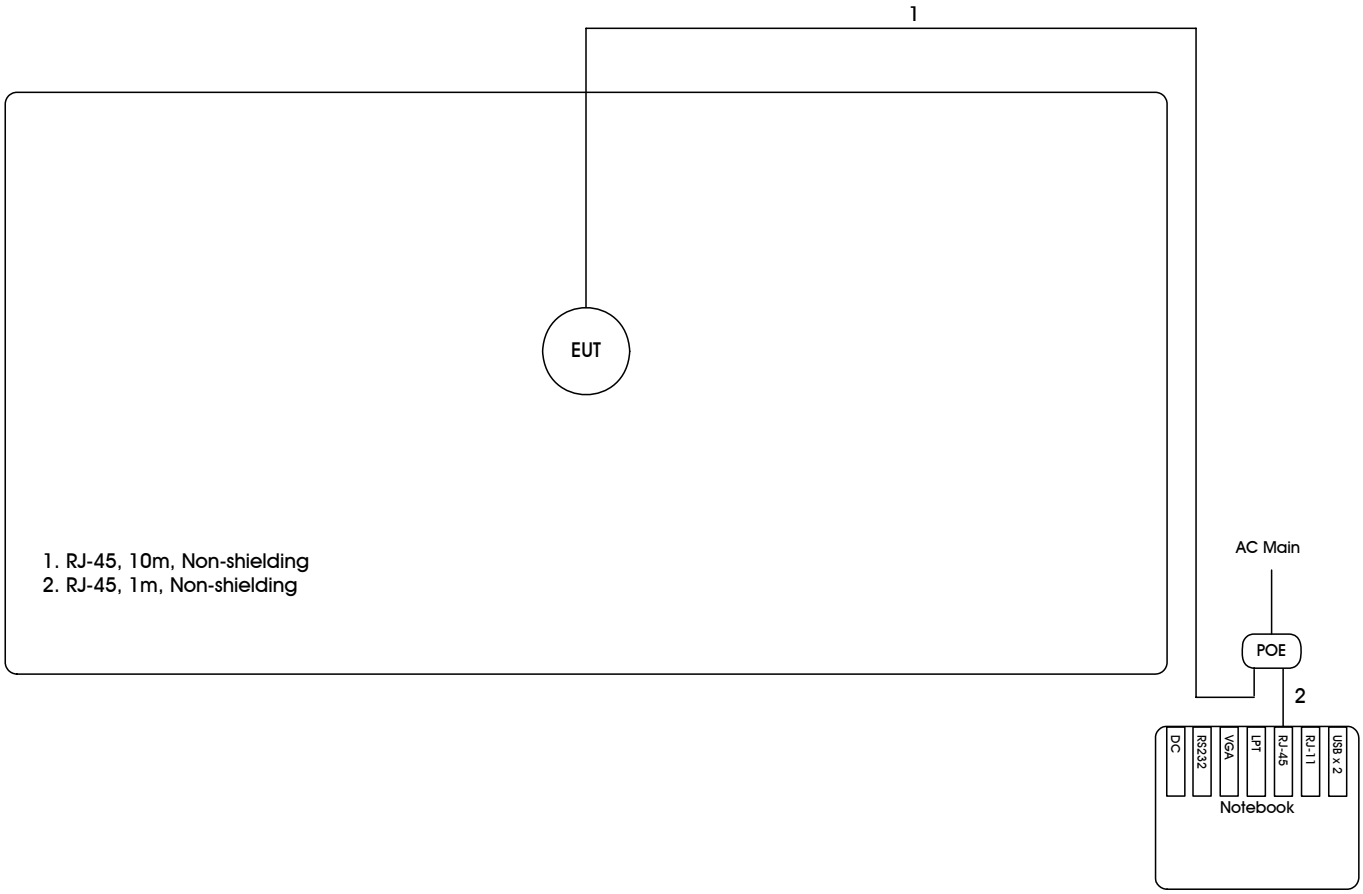
Mode 4: External Antenna, **MMO24580608**, for IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	17	17	17

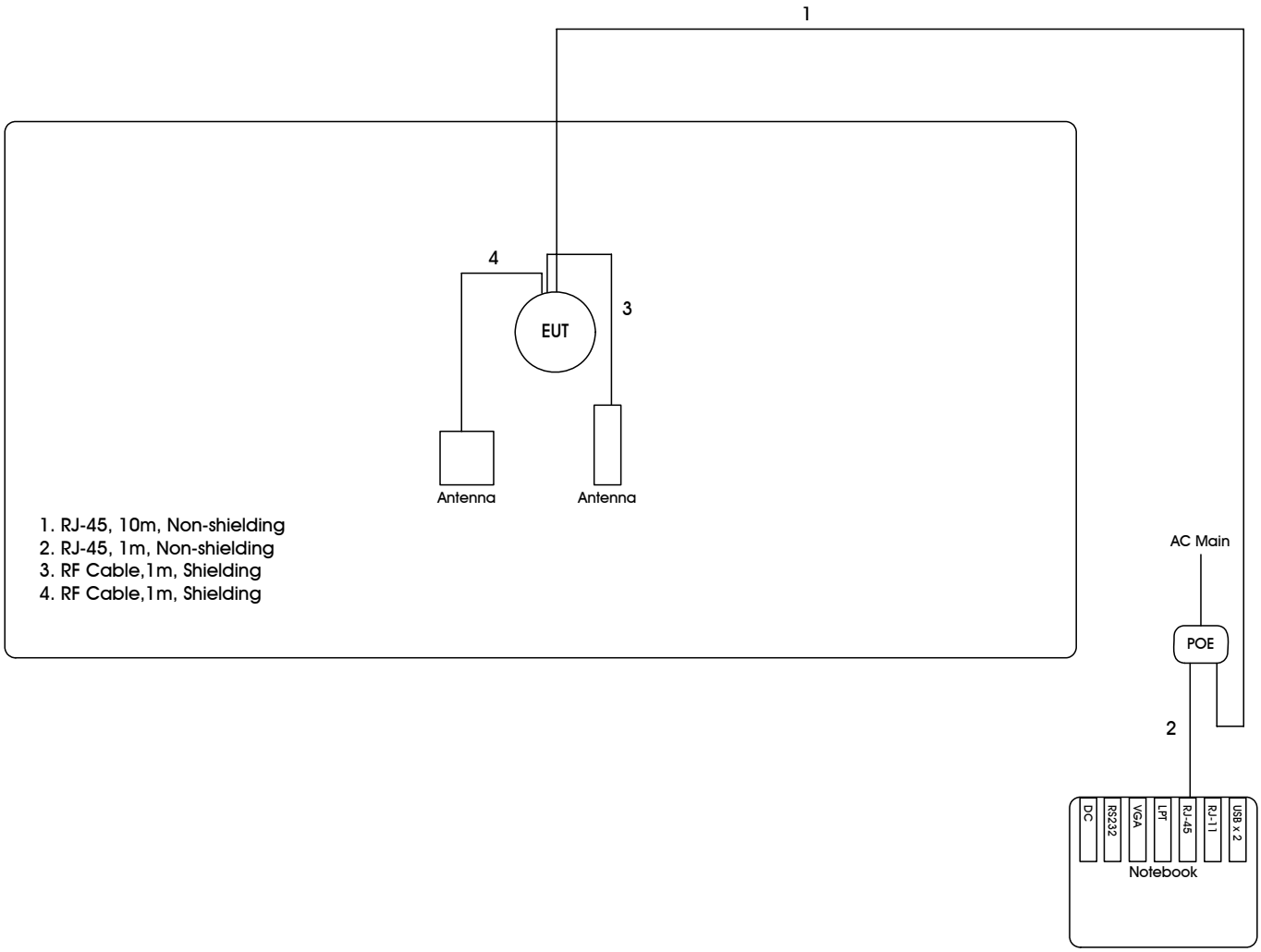
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

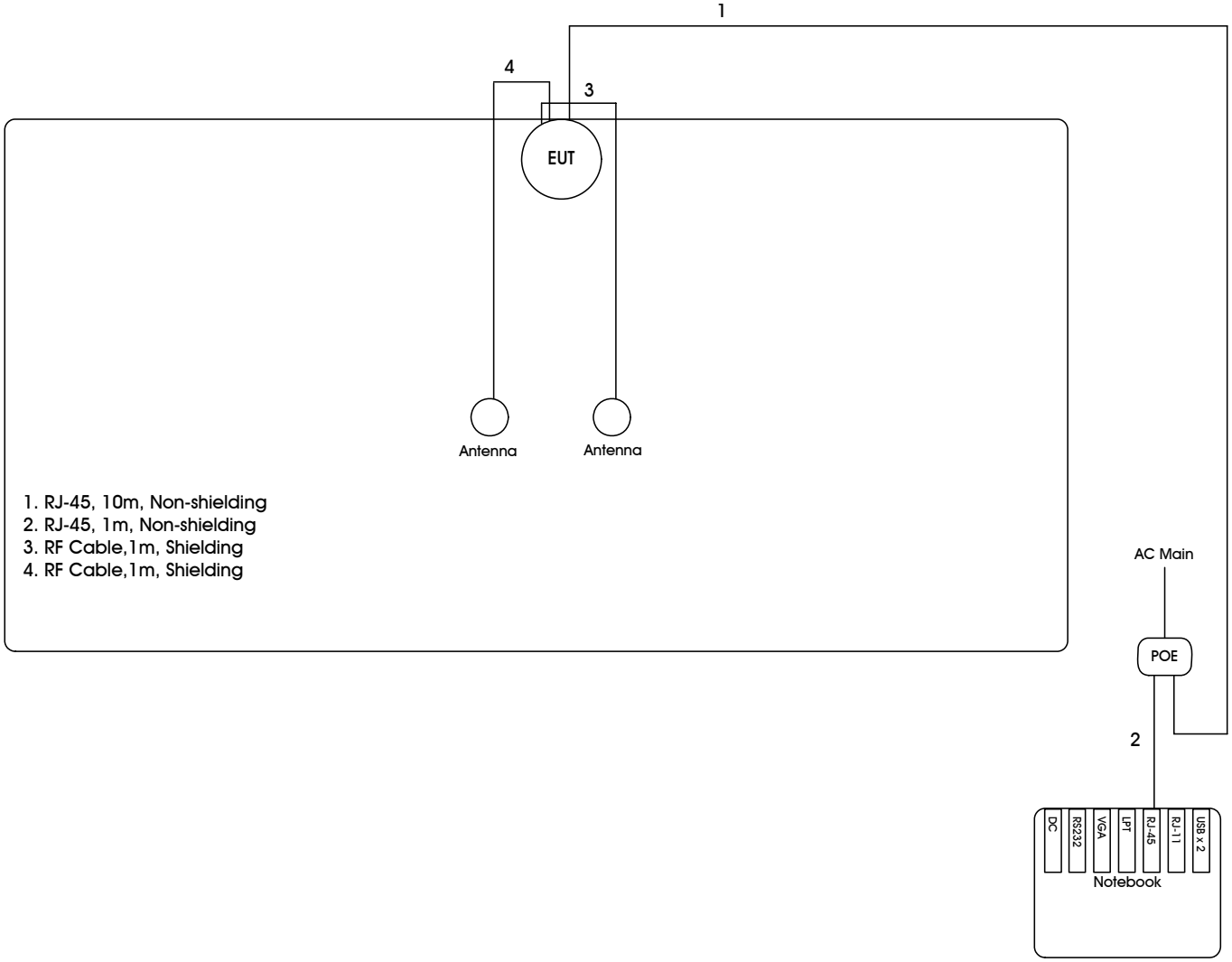
Mode 1: Internal Antenna (F Type Ant. 1) for IEEE 802.11a



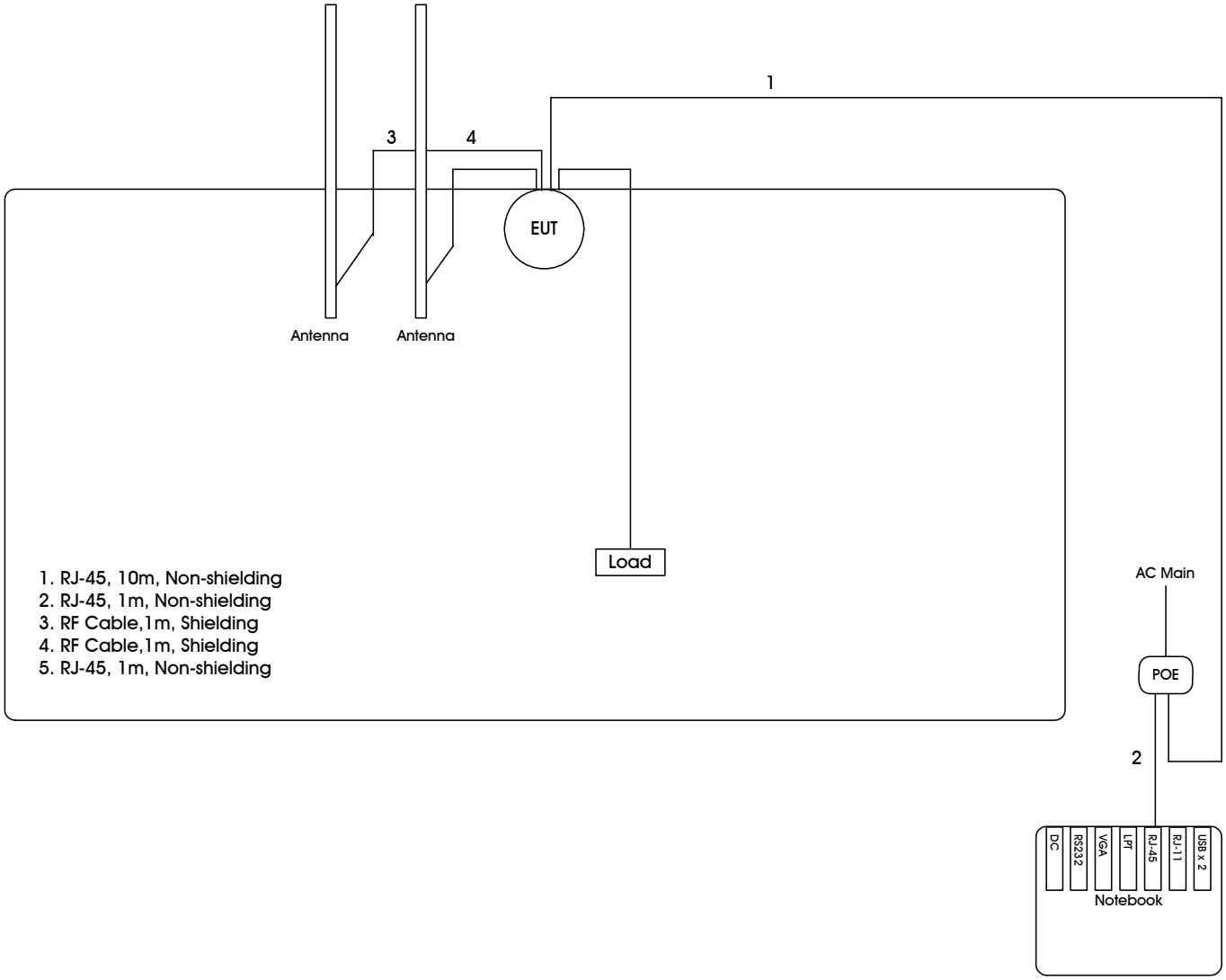
Mode 2: External Antenna (60° Panel Ant. 4) for IEEE 802.11a



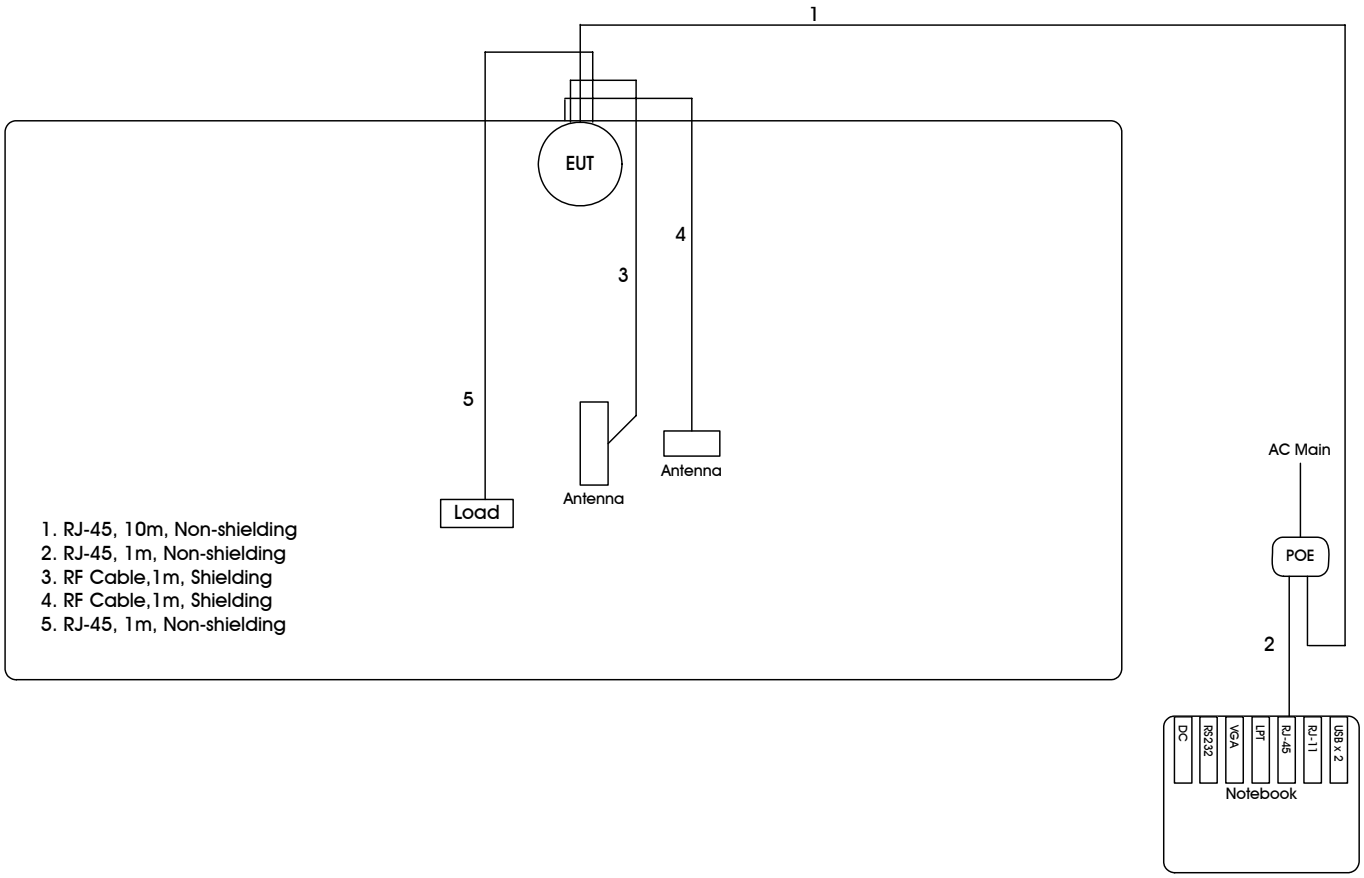
Mode 3: Omni ANT for 5GHz Band



Mode 4: Omnidirectionall ANT for 5GHz Band



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 this product that is designed to connect 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

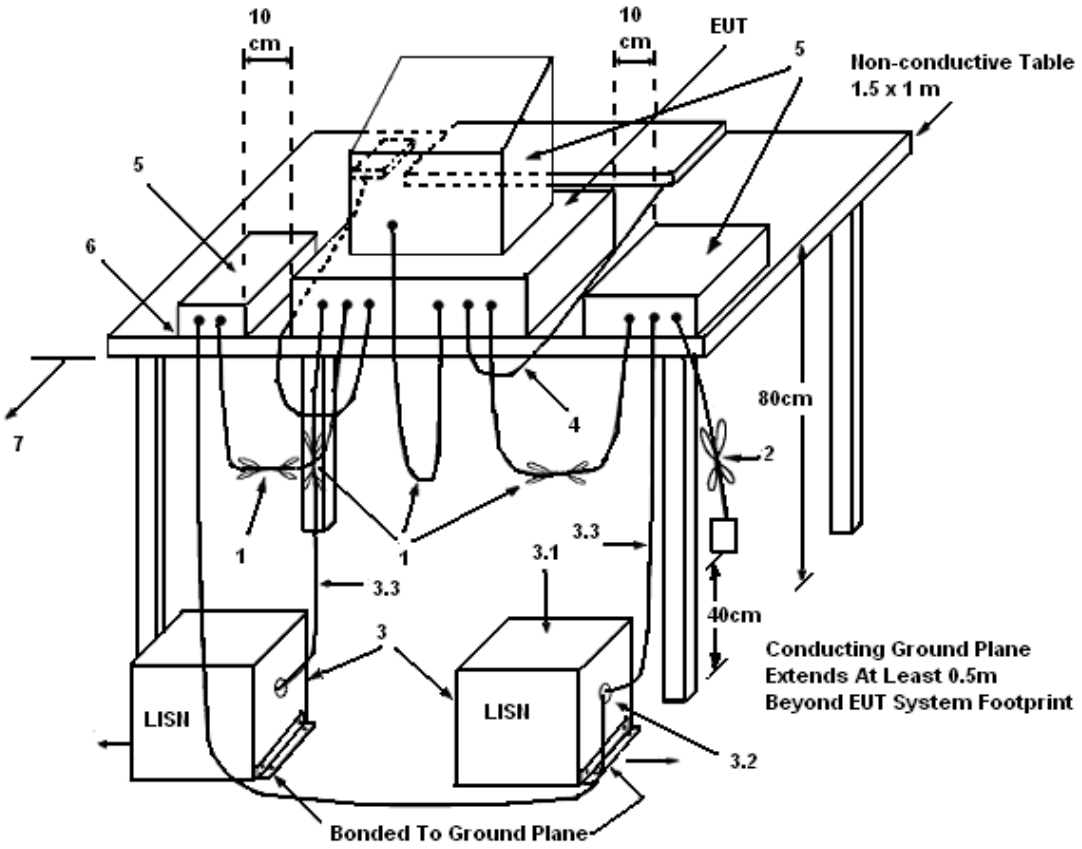
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

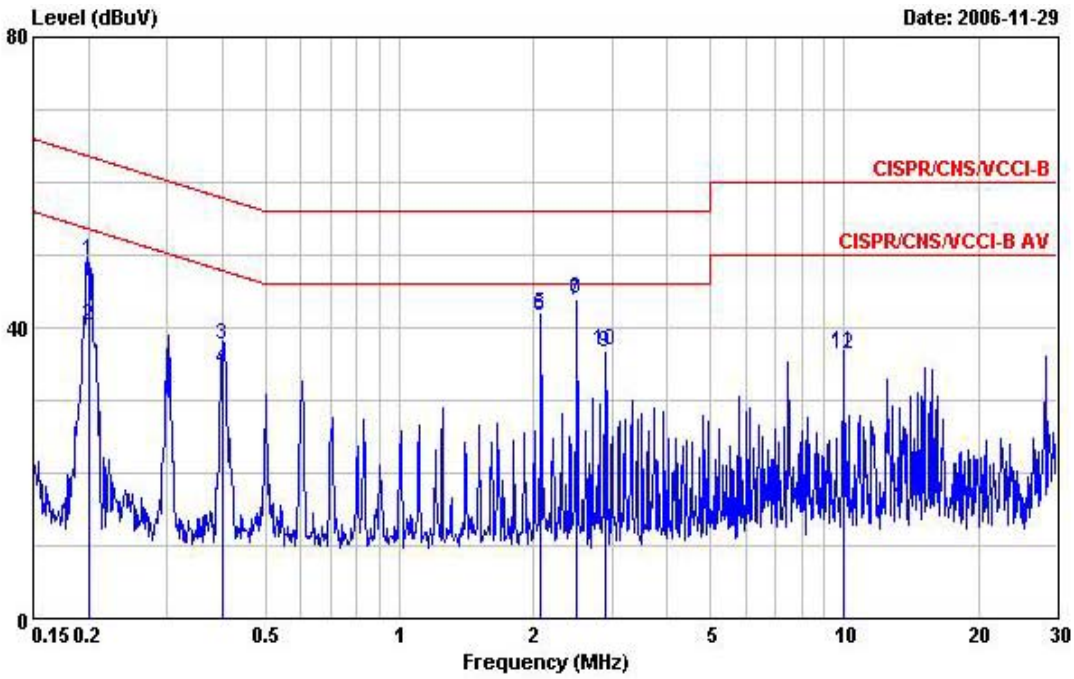
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

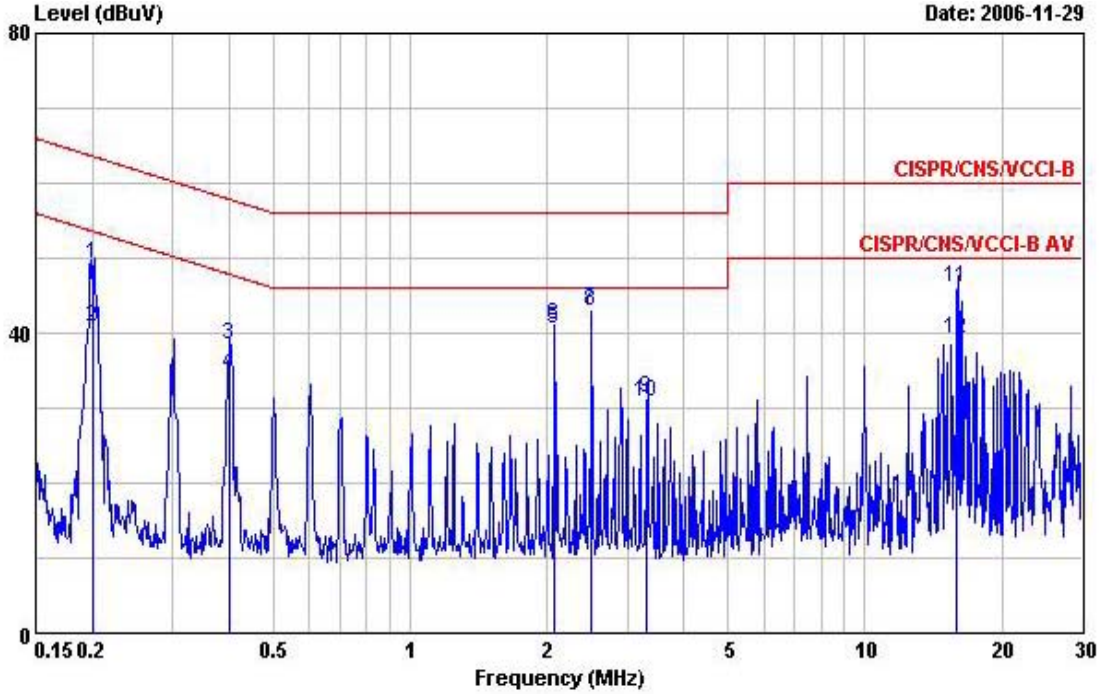
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	26℃	Humidity	55%
Test Engineer	Duncan	Phase	Line
Configuration	Normal Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2009010	49.24	-14.33	63.57	48.94	0.10	0.20	QP
2	0.2009010	40.25	-13.32	53.57	39.95	0.10	0.20	Average
3	0.4018680	37.74	-20.07	57.81	37.53	0.10	0.11	QP
4	0.4018680	34.18	-13.63	47.81	33.97	0.10	0.11	Average
5	2.075	41.85	-4.15	46.00	41.54	0.10	0.21	Average
6	2.075	41.49	-14.51	56.00	41.18	0.10	0.21	QP
7	2.490	43.58	-12.42	56.00	43.23	0.10	0.25	QP
8 @	2.490	44.02	-1.98	46.00	43.67	0.10	0.25	Average
9	2.905	36.66	-9.34	46.00	36.27	0.10	0.29	Average
10	2.905	36.93	-19.07	56.00	36.54	0.10	0.29	QP
11	9.961	36.62	-13.38	50.00	36.02	0.20	0.40	Average
12	9.961	36.31	-23.69	60.00	35.71	0.20	0.40	QP

Temperature	26℃	Humidity	55%
Test Engineer	Duncan	Phase	Neutral
Configuration	Normal Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2004330	49.30	-14.29	63.59	49.00	0.10	0.20	QP
2	0.2004330	40.75	-12.84	53.59	40.45	0.10	0.20	Average
3	0.4018680	38.34	-19.47	57.81	38.13	0.10	0.11	QP
4	0.4018680	34.58	-13.23	47.81	34.37	0.10	0.11	Average
5	2.074	40.54	-15.46	56.00	40.23	0.10	0.21	QP
6	2.074	40.95	-5.05	46.00	40.64	0.10	0.21	Average
7 @	2.490	43.23	-2.77	46.00	42.85	0.13	0.25	Average
8	2.490	42.86	-13.14	56.00	42.48	0.13	0.25	QP
9	3.320	31.22	-24.78	56.00	30.75	0.17	0.30	QP
10	3.320	30.88	-15.12	46.00	30.41	0.17	0.30	Average
11	15.850	45.95	-14.05	60.00	45.15	0.30	0.50	QP
12	15.850	39.25	-10.75	50.00	38.45	0.30	0.50	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 99% Occupied Bandwidth Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

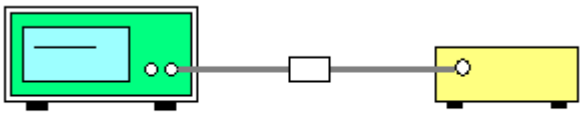
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 analyzer 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	26.8℃	Humidity	54%
Test Engineer	Sam Lee	Configurations	802.11a

Mode 1

Configuration IEEE 802.11a

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.12	17.44
40	5200 MHz	25.28	17.44
48	5240 MHz	25.92	17.44

Mode 2

Configuration IEEE 802.11a

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.84	17.28
40	5200 MHz	24.64	17.44
48	5240 MHz	25.12	17.28

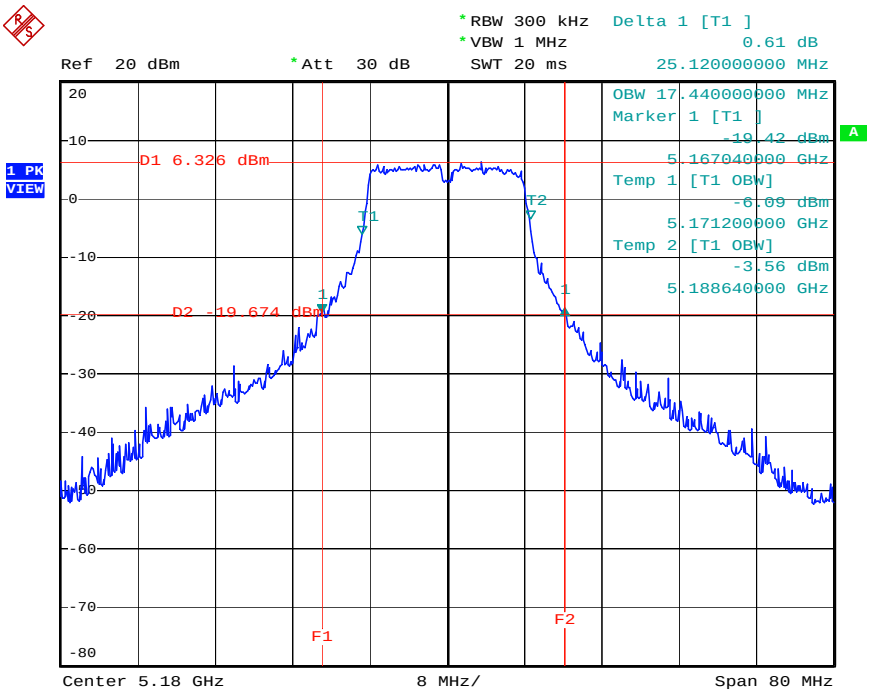
Mode 3 & Mode 4

Configuration IEEE 802.11a

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.48	17.44
40	5200 MHz	25.60	17.28
48	5240 MHz	24.96	17.44

Mode 1

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



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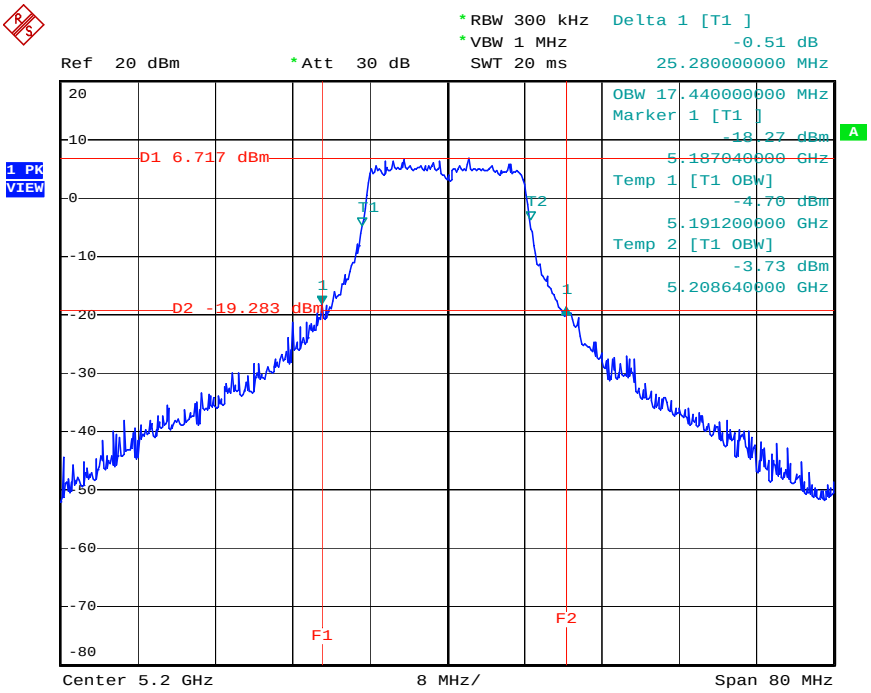
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5200 MHz



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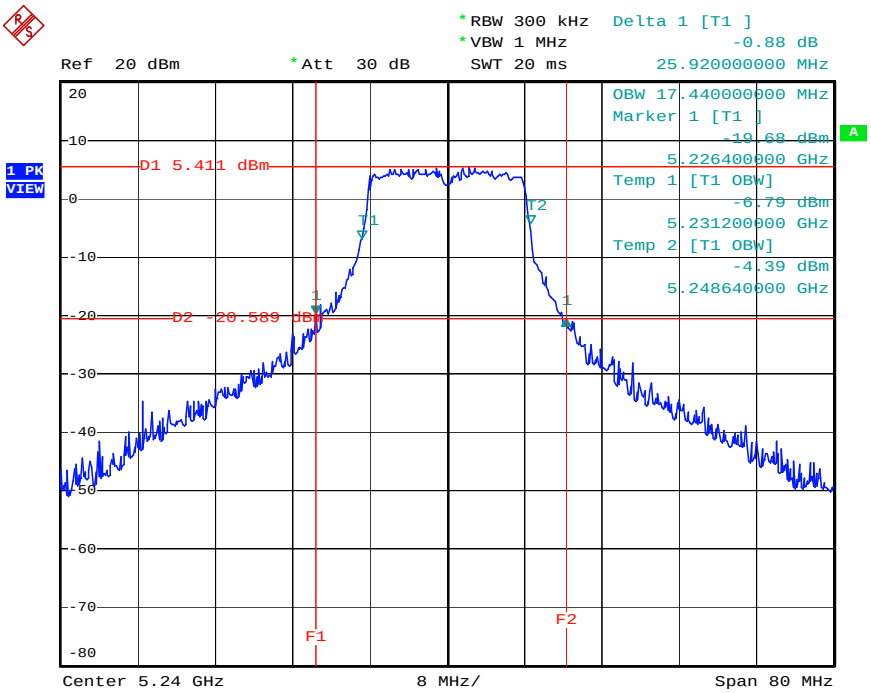
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5240 MHz



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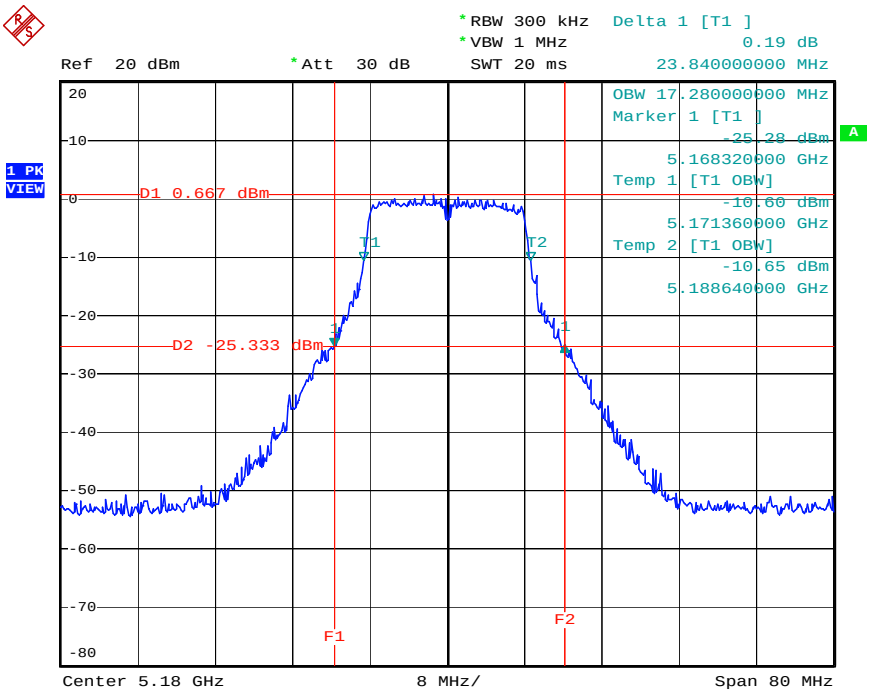
Mode 2

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



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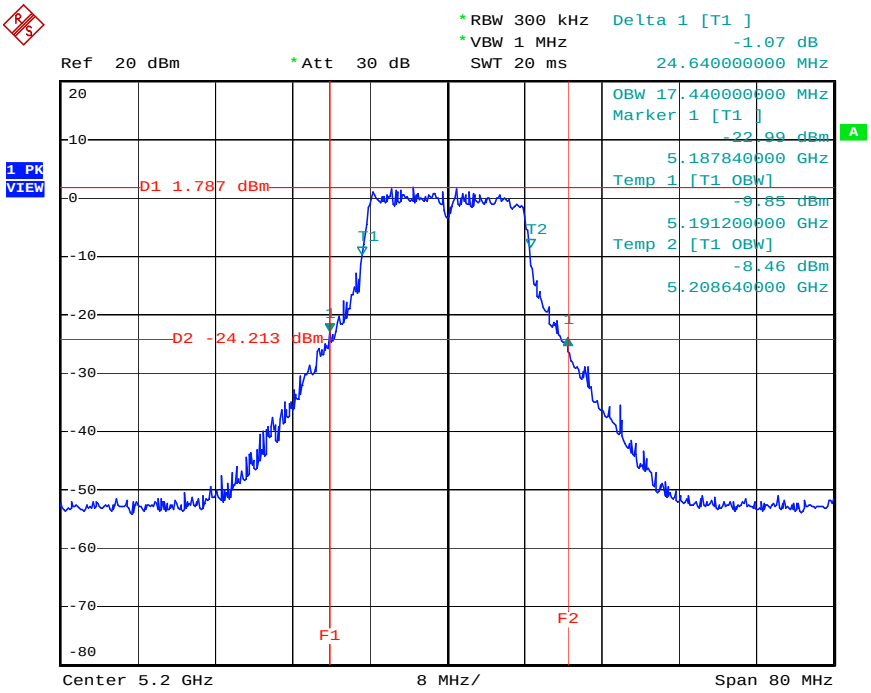
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5200 MHz



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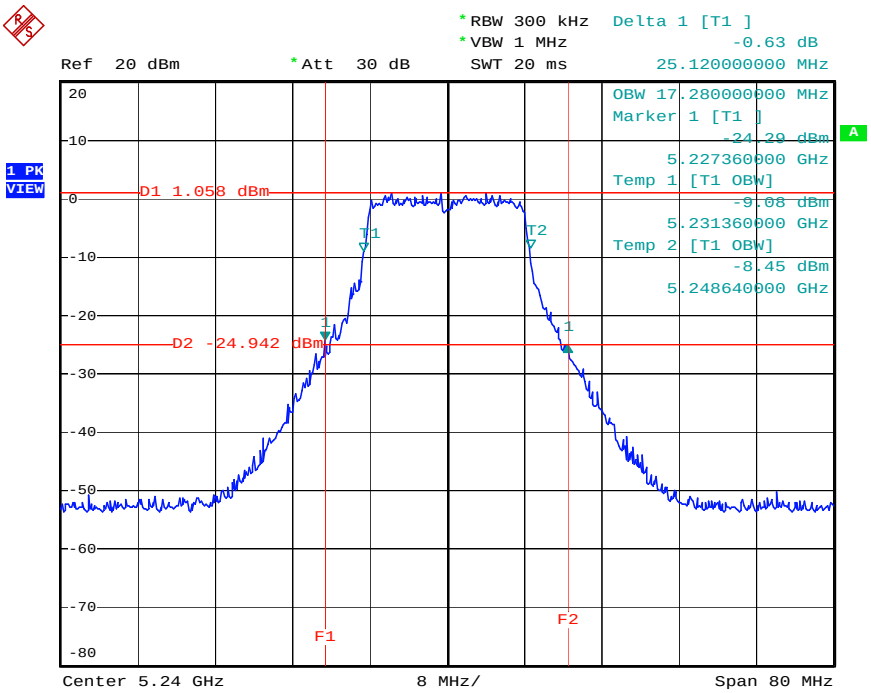
26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5240 MHz



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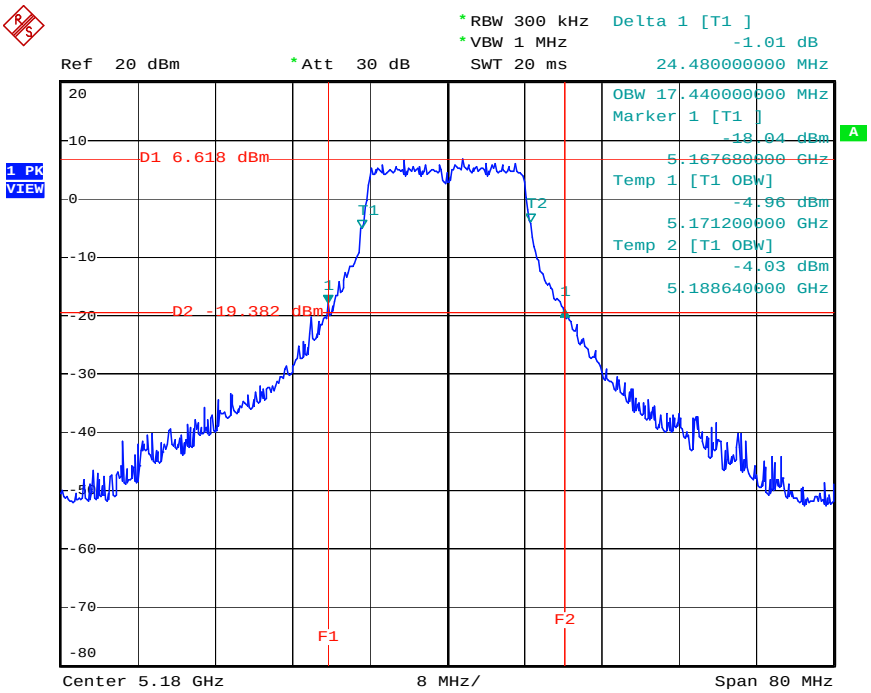
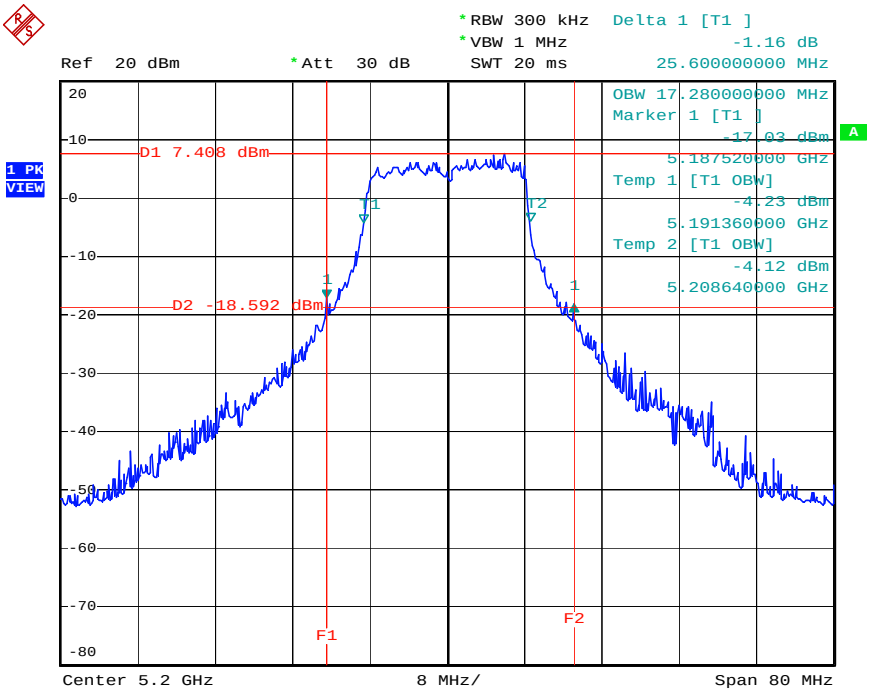
Mode 3 & Mode 4

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



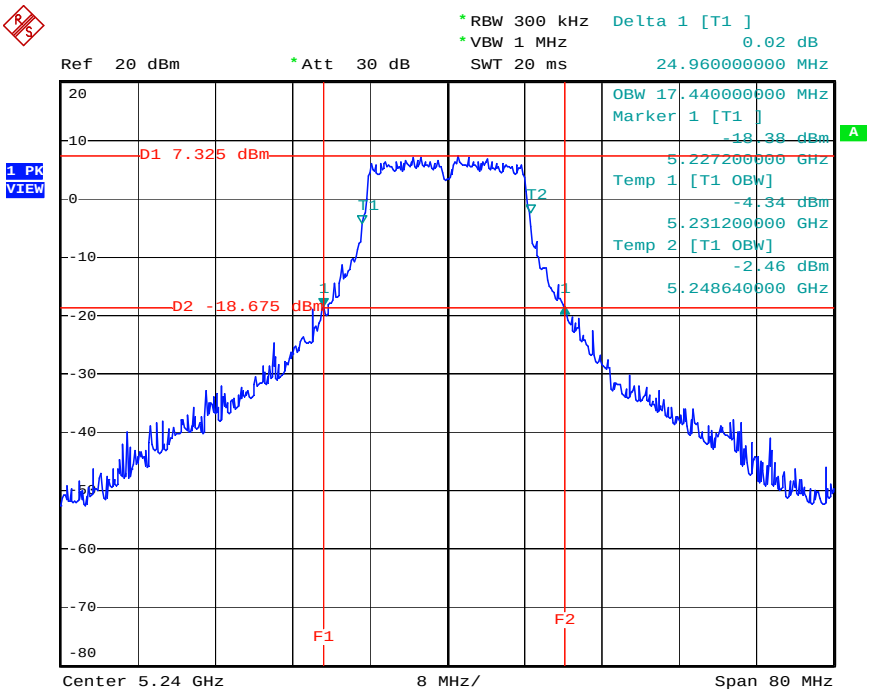
Date: 27.NOV.2006 10:48:40

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 12:57:11

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5240 MHz



Date: 27.NOV.2006 12:58:46

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 and power density 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 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 and power density 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 and power density 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 and 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

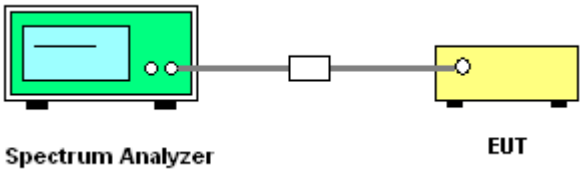
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	26.8℃	Humidity	54%
Test Engineer	Sam Lee	Configurations	802.11a

Mode 1

Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.84	17.00	Complies
40	5200 MHz	13.81	17.00	Complies
48	5240 MHz	12.98	17.00	Complies

Mode 2

Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	5.44	8.50	Complies
40	5200 MHz	5.59	8.50	Complies
48	5240 MHz	5.44	8.50	Complies

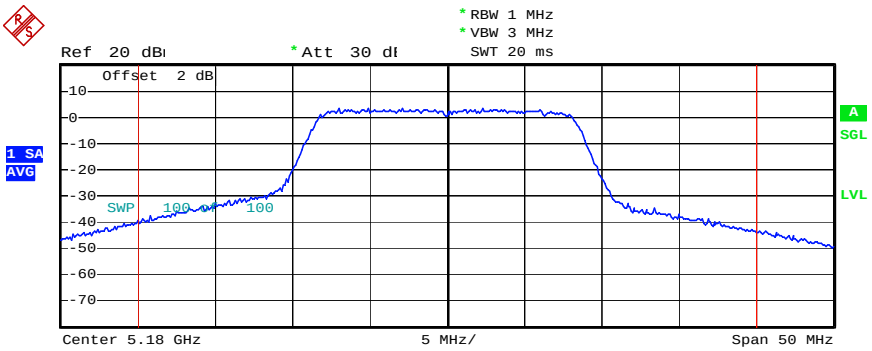
Mode 3 & Mode 4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.60	15.00	Complies
40	5200 MHz	11.37	15.00	Complies
48	5240 MHz	11.90	15.00	Complies

For IEEE 802.11a there are for test modes shown in the table below: Mode 1: Internal Antenna (F Type Antenna- 1 @3dBi) and Mode 2: External Antenna (Panel Antenna- 4 @14.50dBi), Mode 3 & Mode 4: External Antenna (OMNI Antenna and Omnidirectionall Antenna – 1 & 2 @8.00dBi). So max. Power limit: Mode 1 is 17dBm and Mode 2 is 8.5dBm, Mode 3 & Mode 4 is 15dBm.

Mode 1

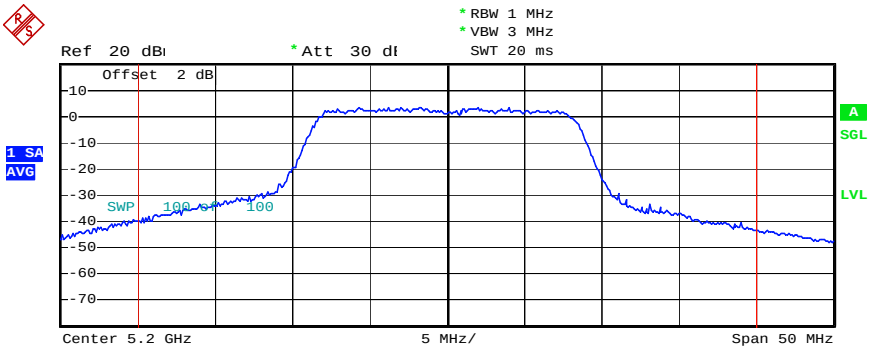
Channel Output Power Plot on Configuration IEEE 802.11a / 5180 MHz



Tx Channel
Bandwidth 40 MHz Power 13.84 dBm

Date: 27.NOV.2006 13:59:27

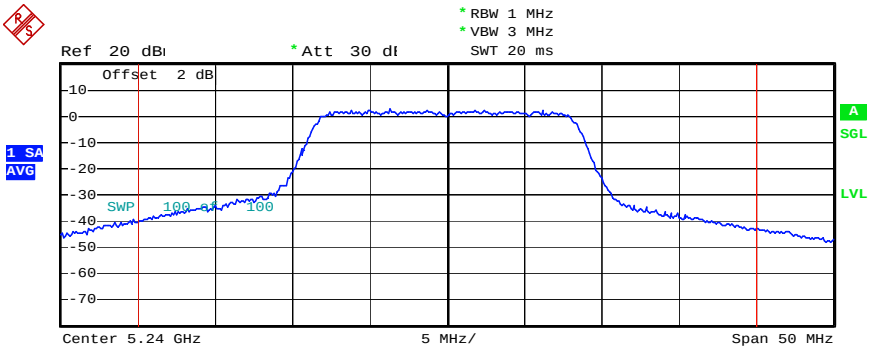
Channel Output Power Plot on Configuration IEEE 802.11a / 5200 MHz



Tx Channel
Bandwidth 40 MHz Power 13.81 dBm

Date: 27.NOV.2006 14:00:17

Channel Output Power Plot on Configuration IEEE 802.11a / 5240 MHz

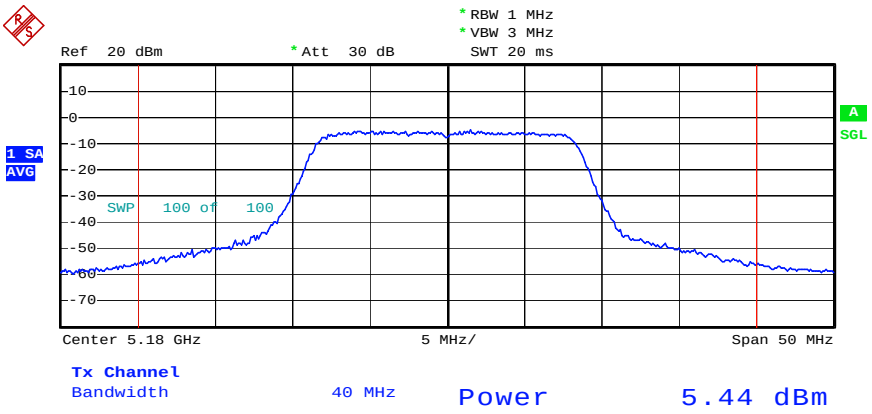


Tx Channel
Bandwidth 40 MHz Power 12.98 dBm

Date: 27.NOV.2006 14:01:11

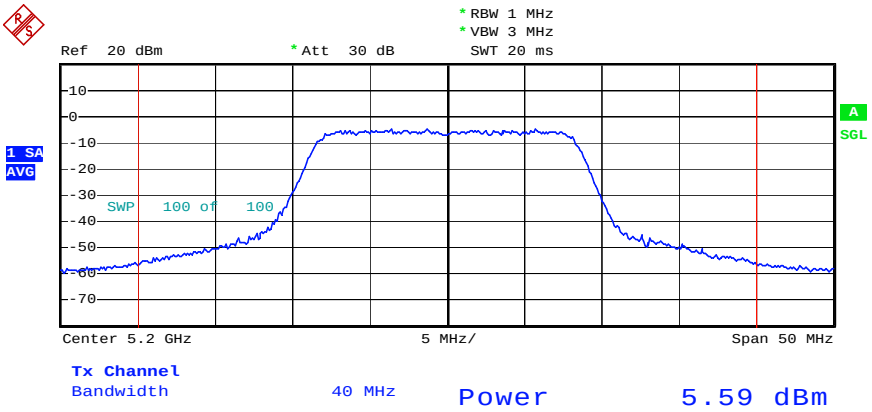
Mode 2

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



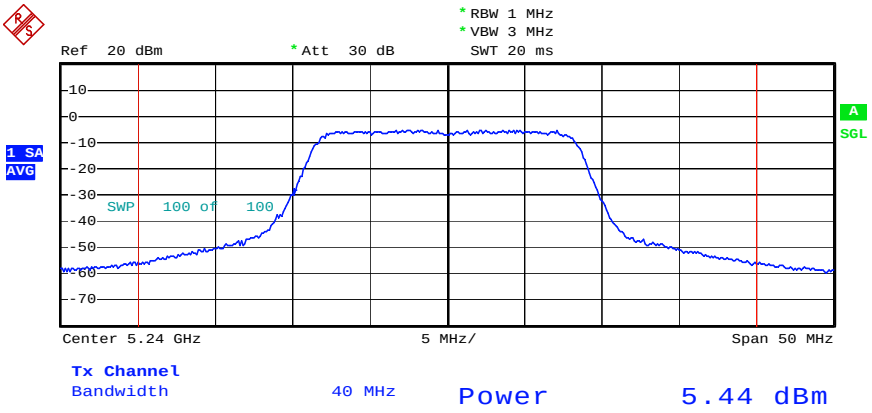
Date: 27.NOV.2006 09:49:19

Channel Output Power Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 13:09:15

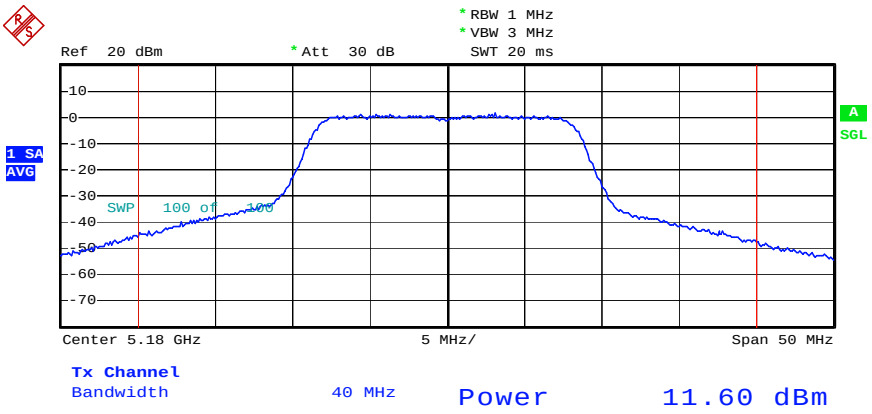
Channel Output Power Plot on Configuration IEEE 802.11a / 5240 MHz



Date: 27.NOV.2006 13:03:51

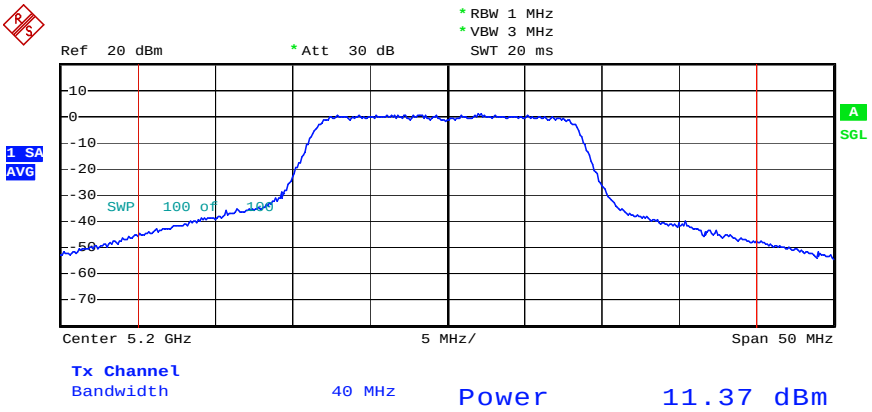
Mode 3 & Mode 4

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



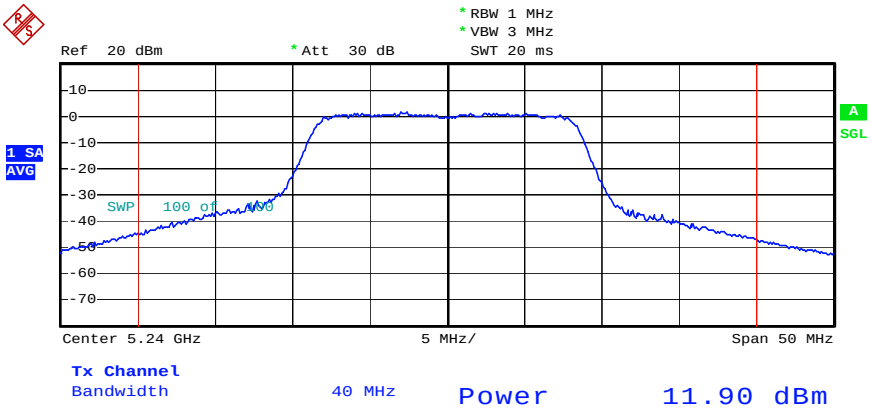
Date: 27.NOV.2006 10:48:58

Channel Output Power Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 12:57:41

Channel Output Power Plot on Configuration IEEE 802.11a / 5240 MHz



Date: 27.NOV.2006 12:59:04

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 and decrease power density limit rule refer to section 4.3.1.

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

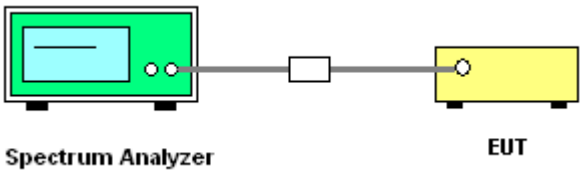
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 analyzer.
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	26.8℃	Humidity	54%
Test Engineer	Sam Lee	Configurations	802.11a

Mode 1

Configuration IEEE 802.11a

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	3.74	4.00	Complies
5200 MHz	3.96	4.00	Complies
5240 MHz	3.03	4.00	Complies

Mode 2

Configuration IEEE 802.11a

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-4.80	-4.50	Complies
5200 MHz	-4.72	-4.50	Complies
5240 MHz	-4.58	-4.50	Complies

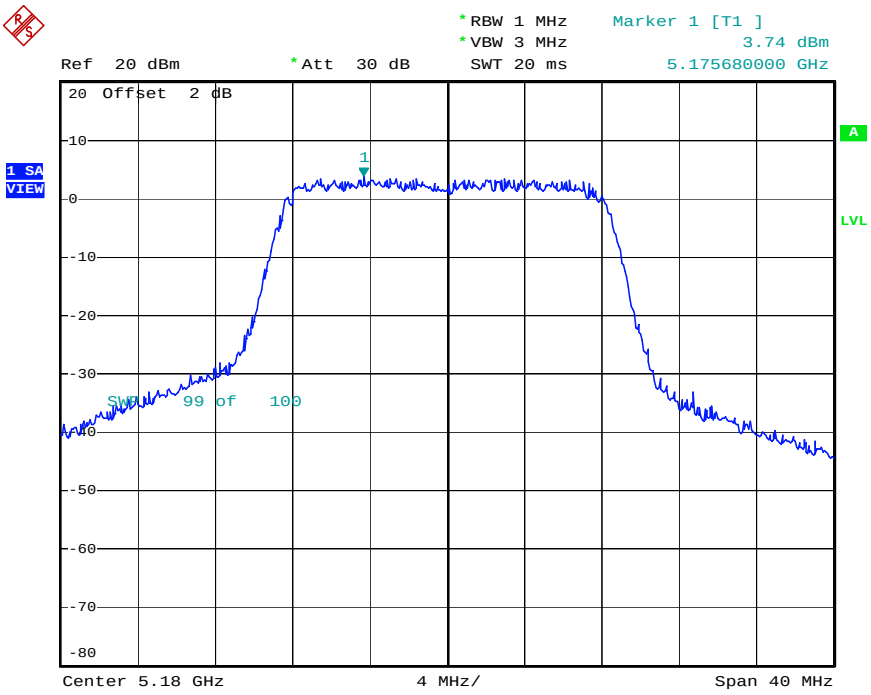
Mode 3& Mode 4

Configuration IEEE 802.11a

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	1.23	2.00	Complies
5200 MHz	0.88	2.00	Complies
5240 MHz	1.95	2.00	Complies

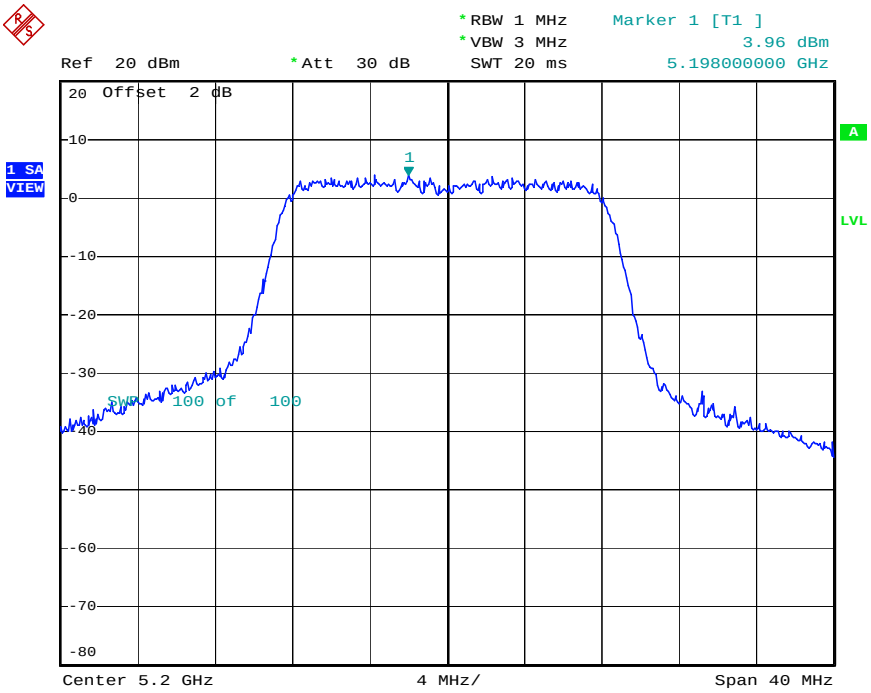
Mode 1

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



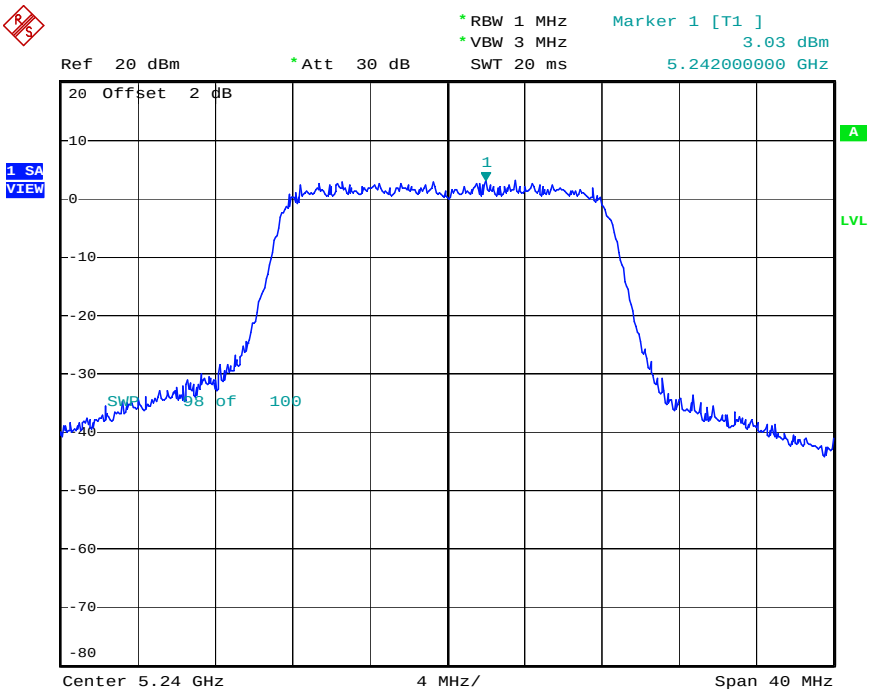
Date: 27.NOV.2006 13:59:15

Power Density Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 14:00:06

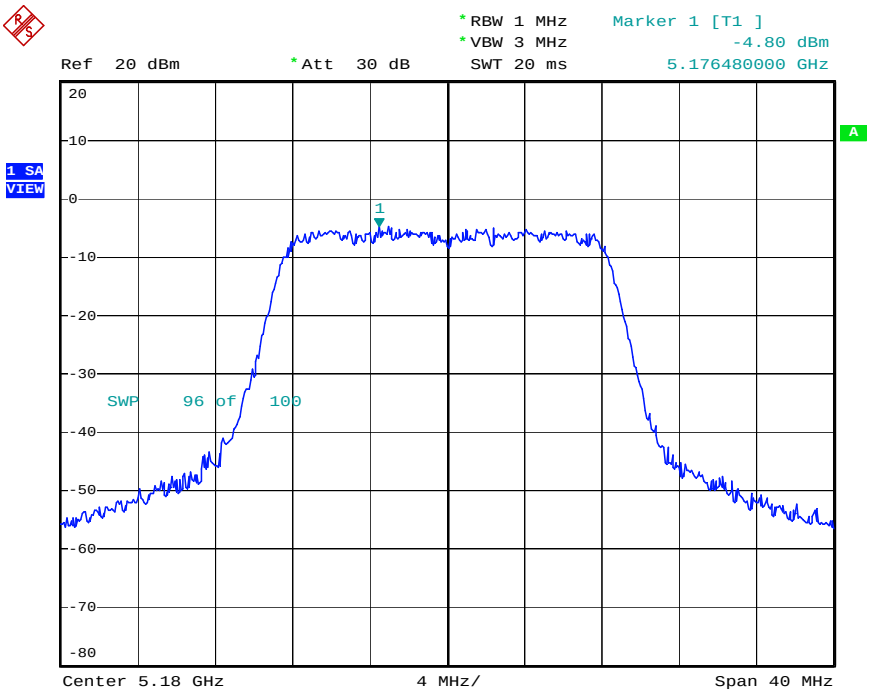
Power Density Plot on Configuration IEEE 802.11a / 5240 MHz



Date: 27.NOV.2006 14:00:59

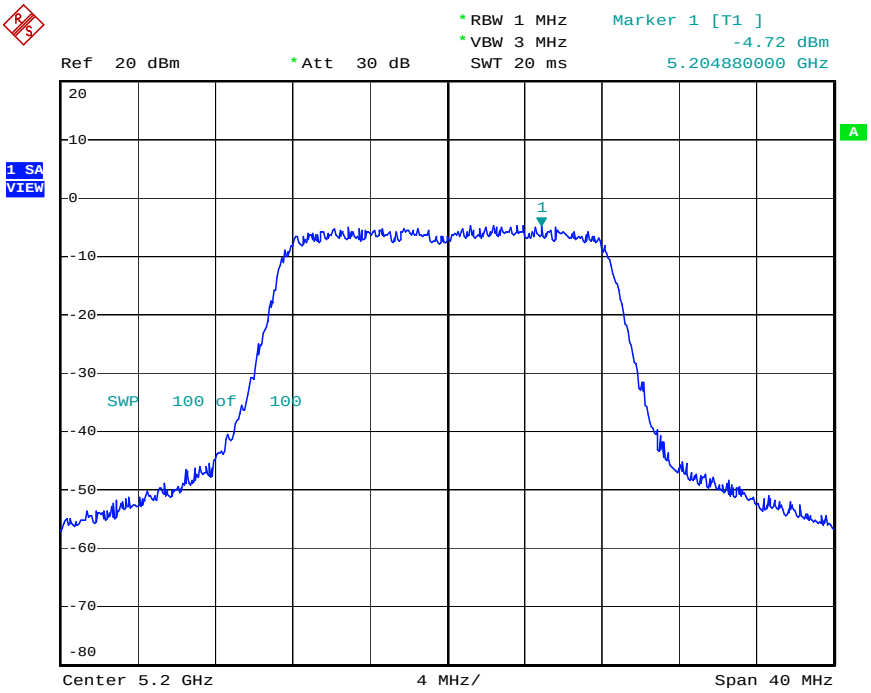
Mode 2

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



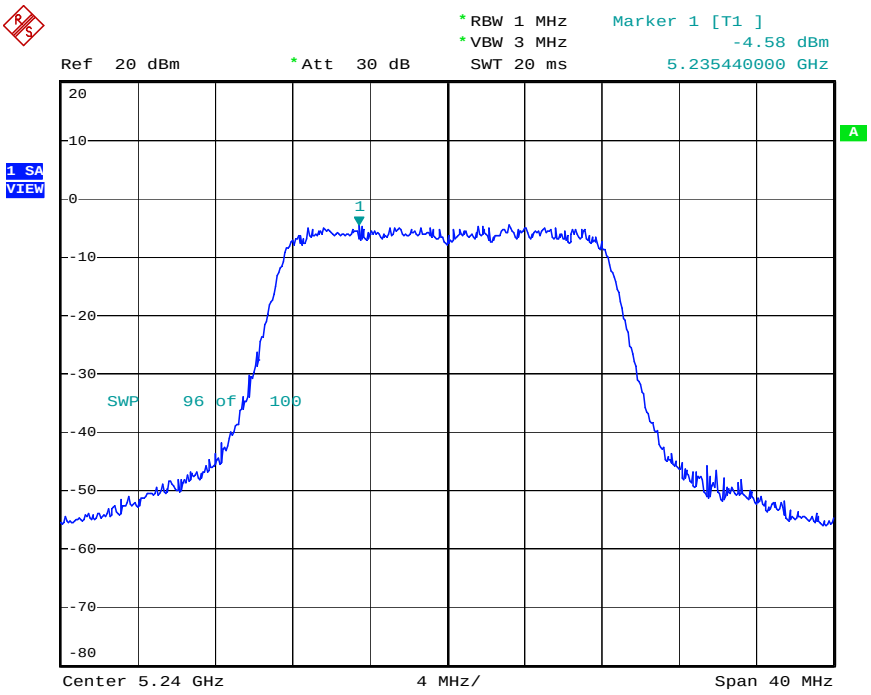
Date: 27.NOV.2006 08:54:42

Power Density Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 13:09:04

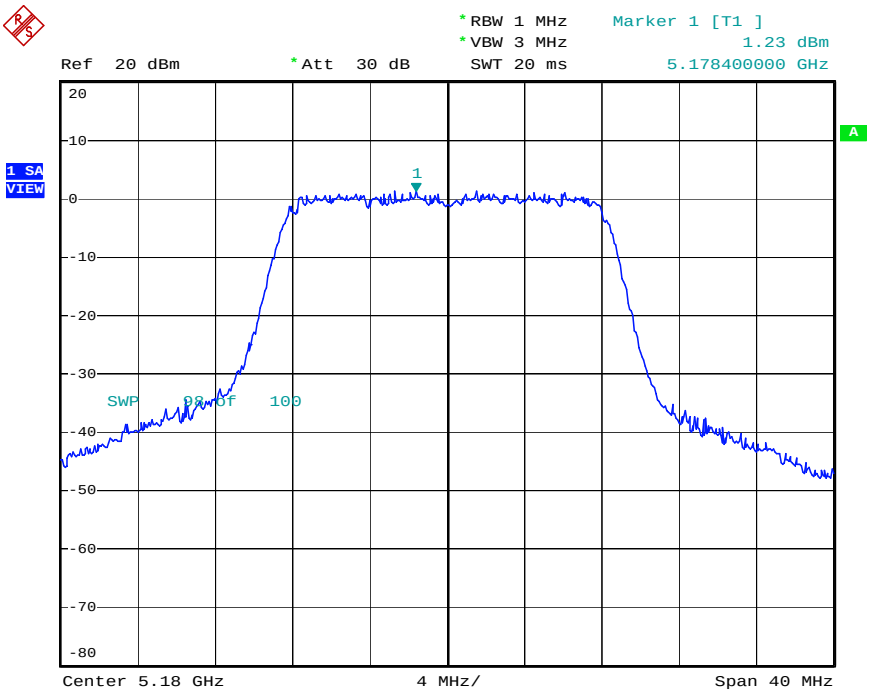
Power Density Plot on Configuration IEEE 802.11a / 5240 MHz



Date: 27.NOV.2006 13:03:39

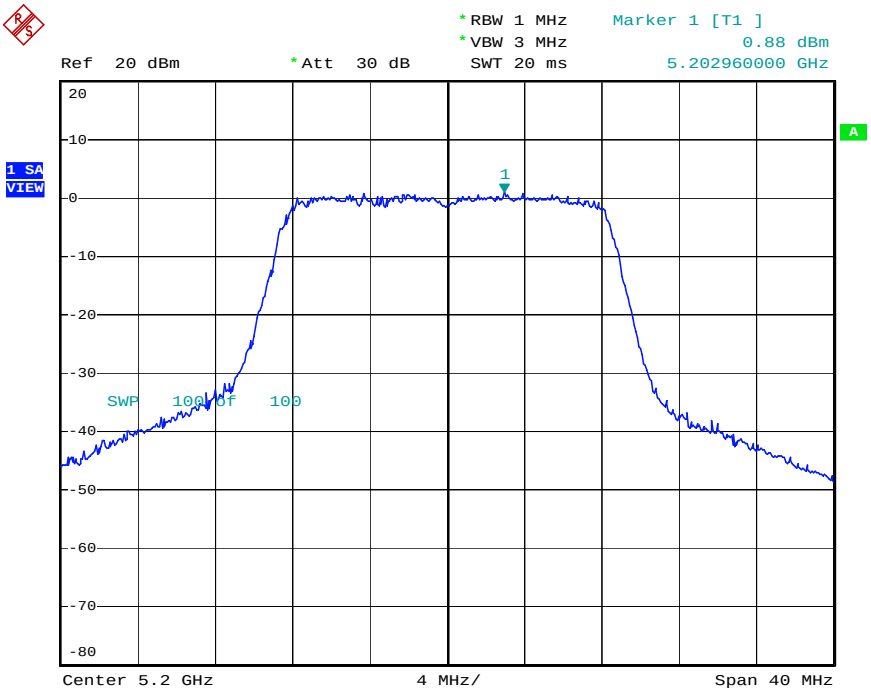
Mode 3 & Mode 4

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



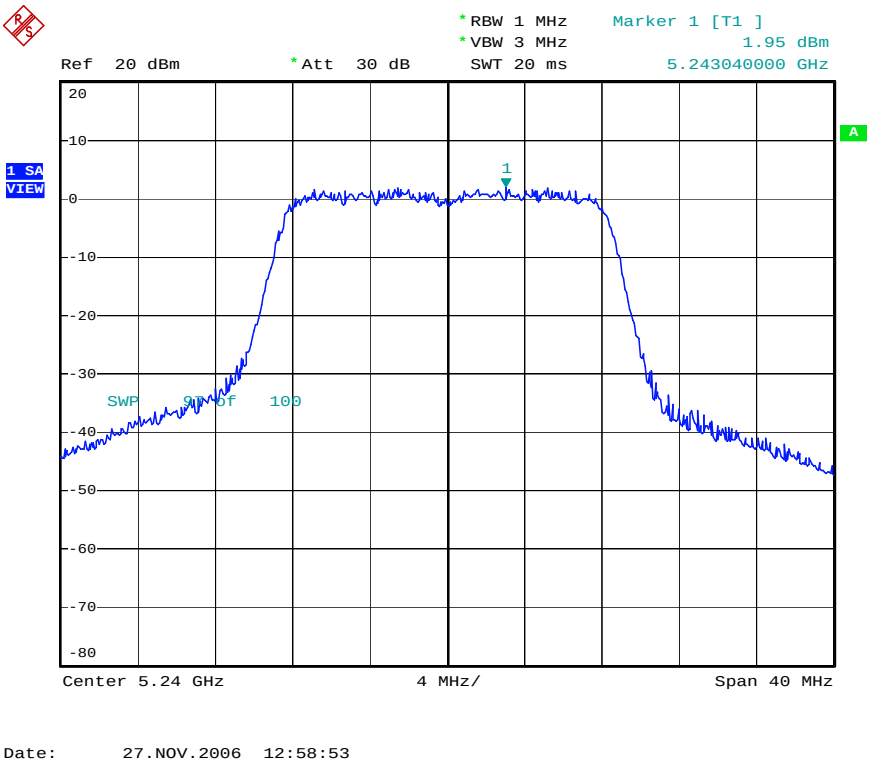
Date: 27.NOV.2006 10:48:47

Power Density Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 12:57:30

Power Density Plot on Configuration IEEE 802.11a / 5240 MHz



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

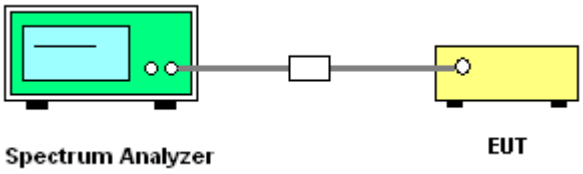
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 analyzer.
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 max-hold 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	26.8℃	Humidity	54%
Test Engineer	Sam Lee	Configurations	802.11a

Mode 1

Configuration IEEE 802.11a

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	5.48	13	Complies
5200 MHz	5.07	13	Complies
5240 MHz	5.99	13	Complies

Mode 2

Configuration IEEE 802.11a

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	4.44	13	Complies
5200 MHz	5.63	13	Complies
5240 MHz	5.89	13	Complies

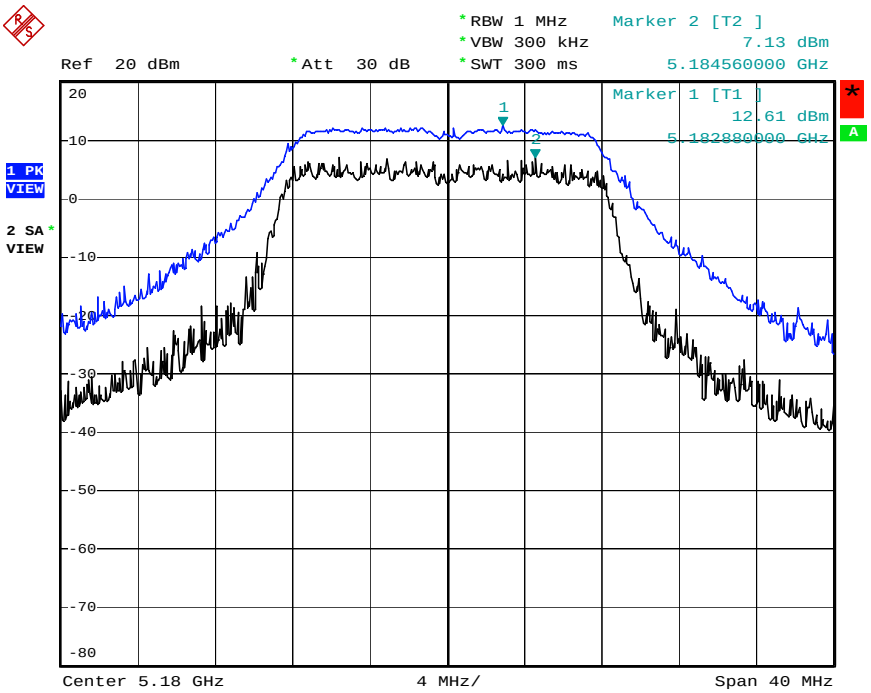
Mode 3 & Mode 4

Configuration IEEE 802.11a

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	6.15	13	Complies
5200 MHz	5.08	13	Complies
5240 MHz	4.62	13	Complies

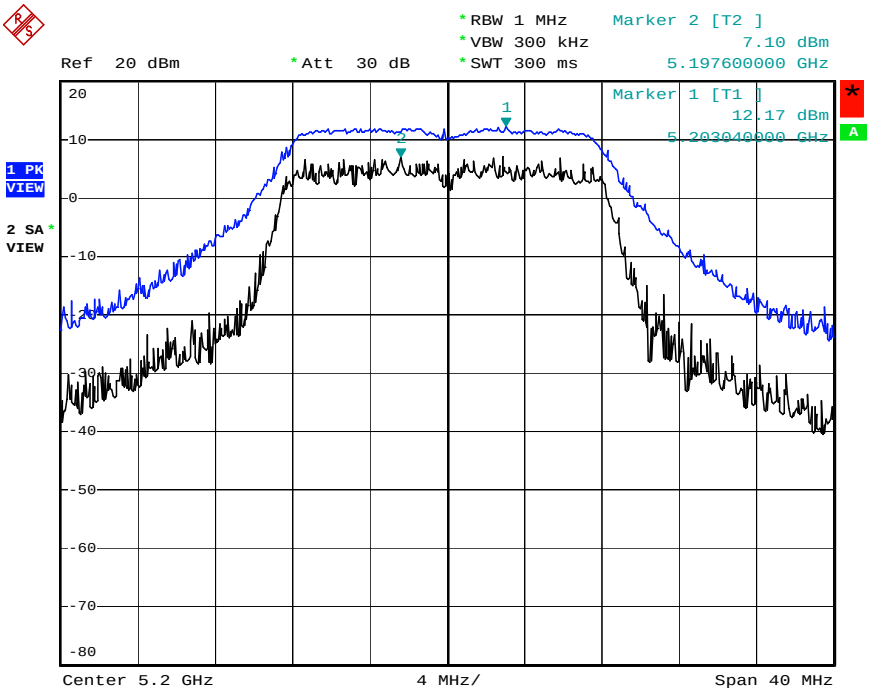
Mode 1

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



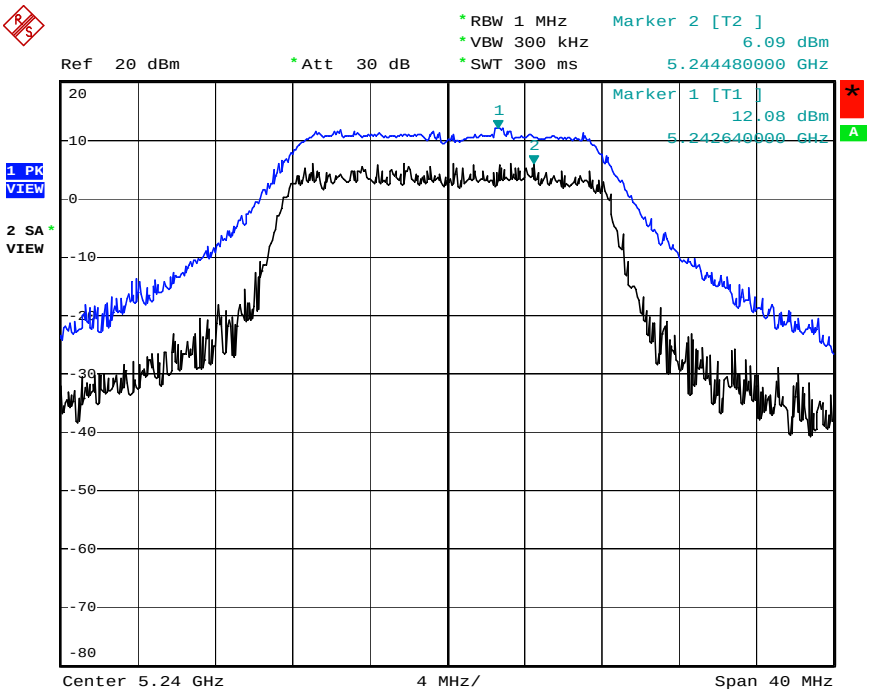
Date: 27.NOV.2006 13:59:39

Peak Excursion Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 14:00:29

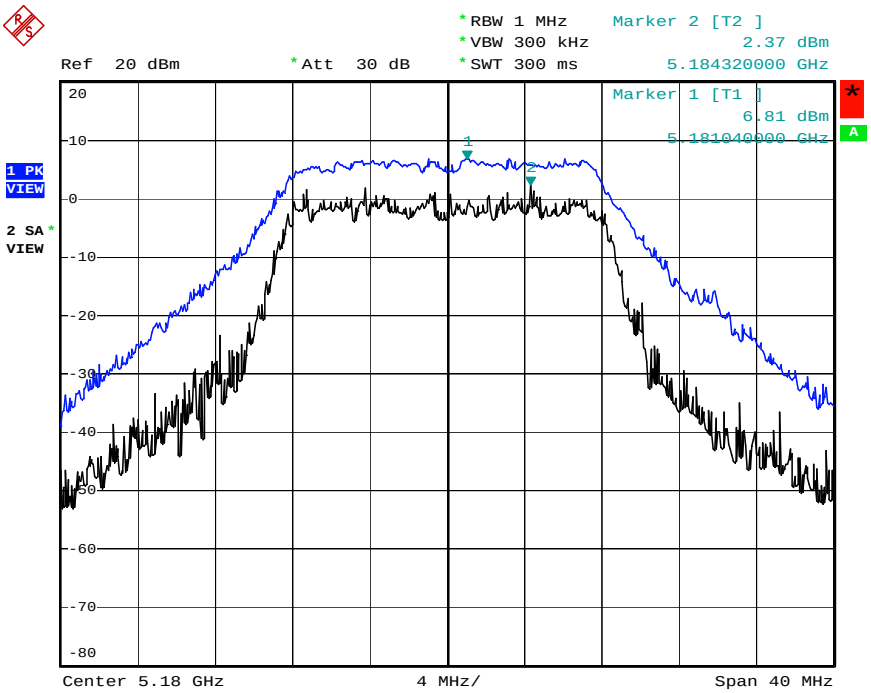
Peak Excursion Plot on Configuration IEEE 802.11a / 5240 MHz



Date: 27.NOV.2006 14:01:23

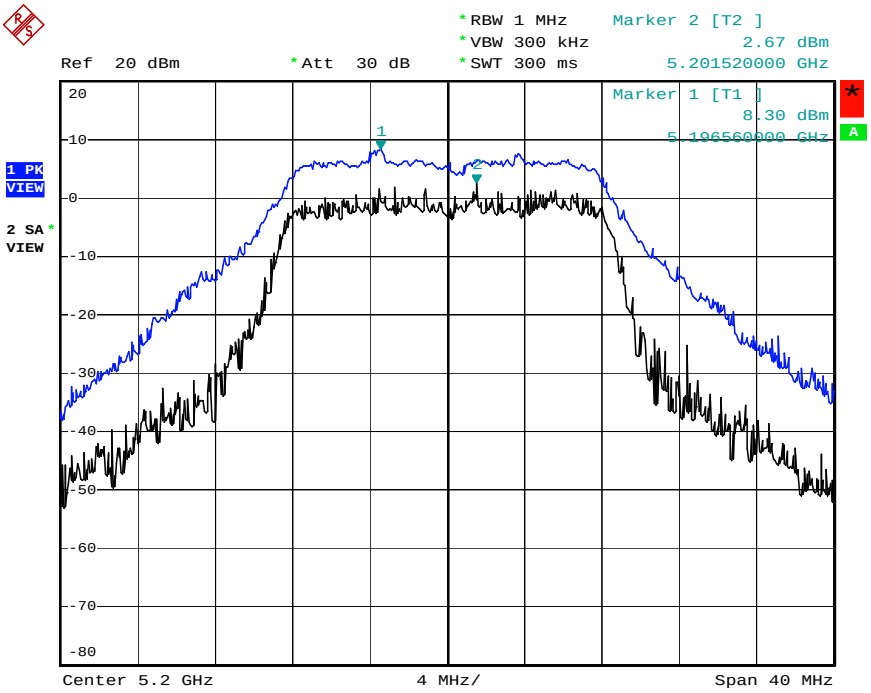
Mode 2

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



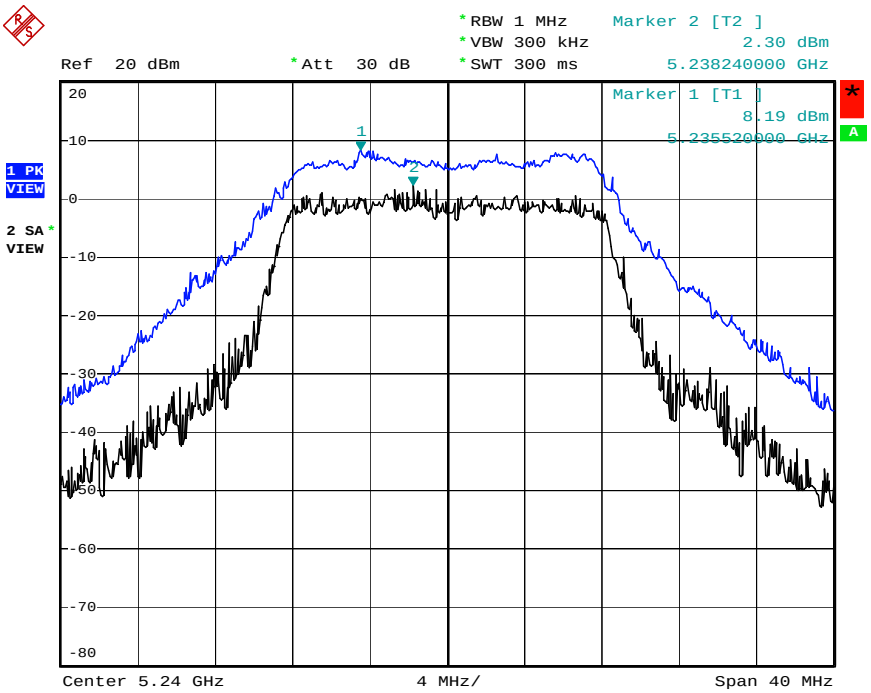
Date: 27.NOV.2006 09:49:32

Peak Excursion Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 13:09:28

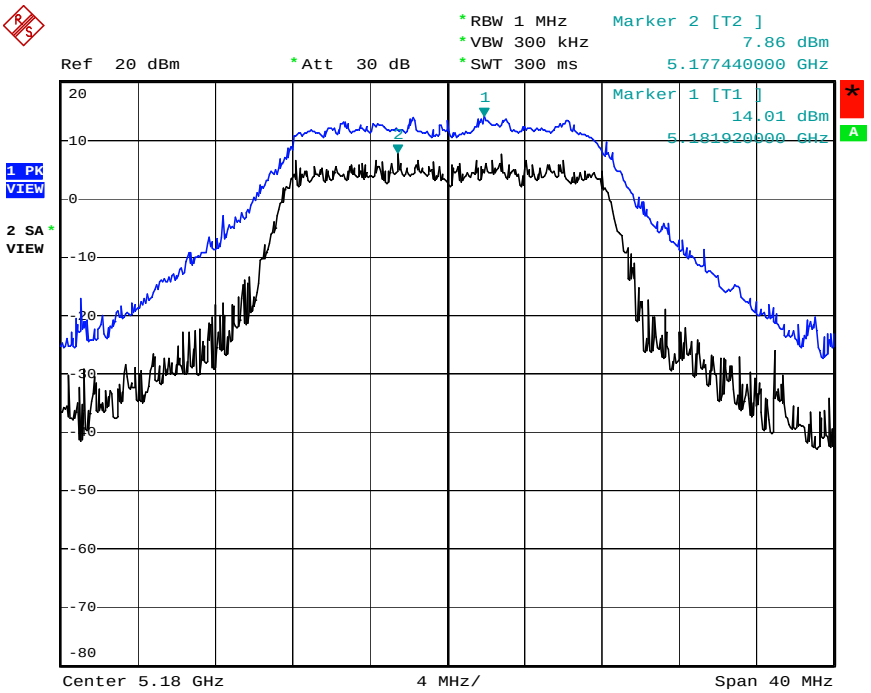
Peak Excursion Plot on Configuration IEEE 802.11a / 5240 MHz



Date: 27.NOV.2006 13:04:03

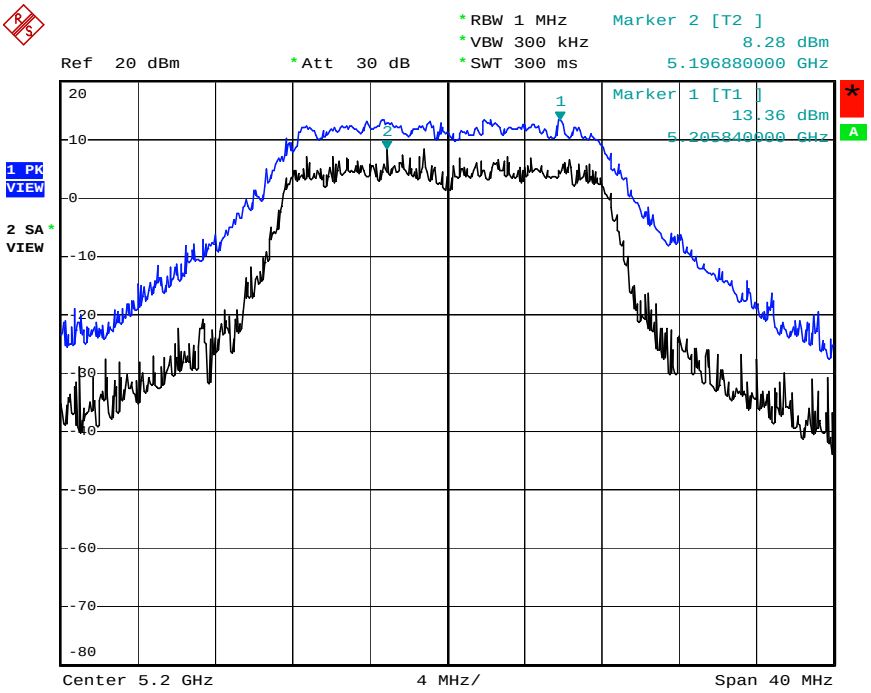
Mode 3 & Mode 4

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



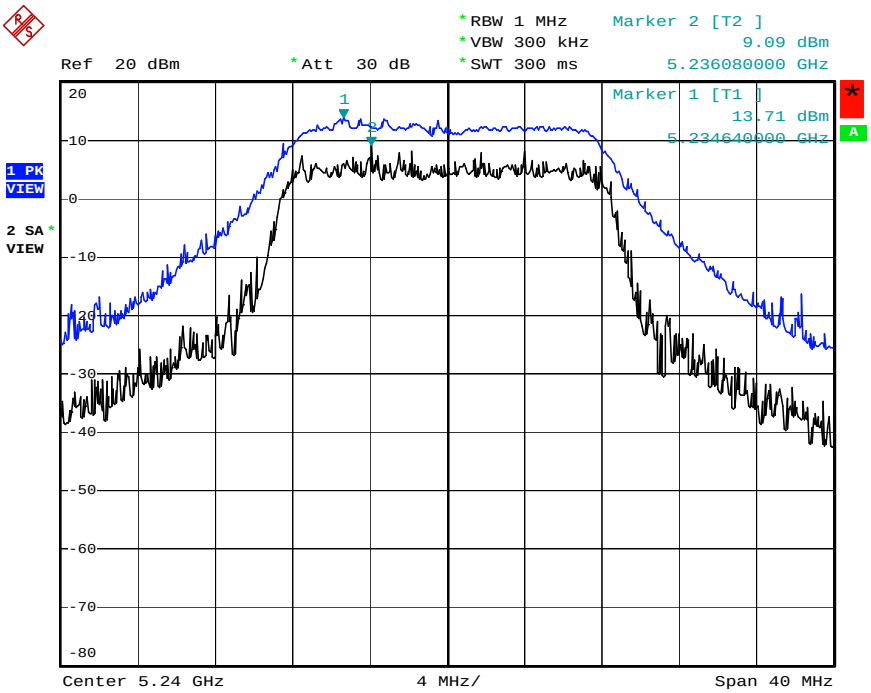
Date: 27.NOV.2006 10:49:10

Peak Excursion Plot on Configuration IEEE 802.11a / 5200 MHz



Date: 27.NOV.2006 12:57:54

Peak Excursion Plot on Configuration IEEE 802.11a / 5240 MHz



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	40 GHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1000KHz / 1000KHz for peak

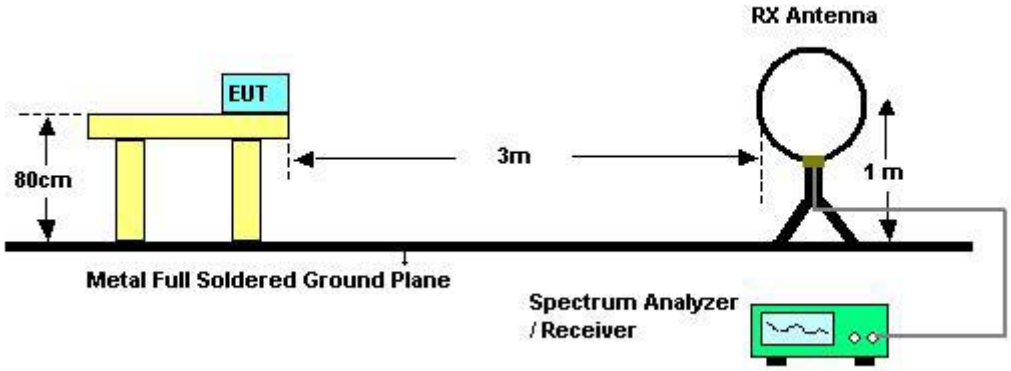
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

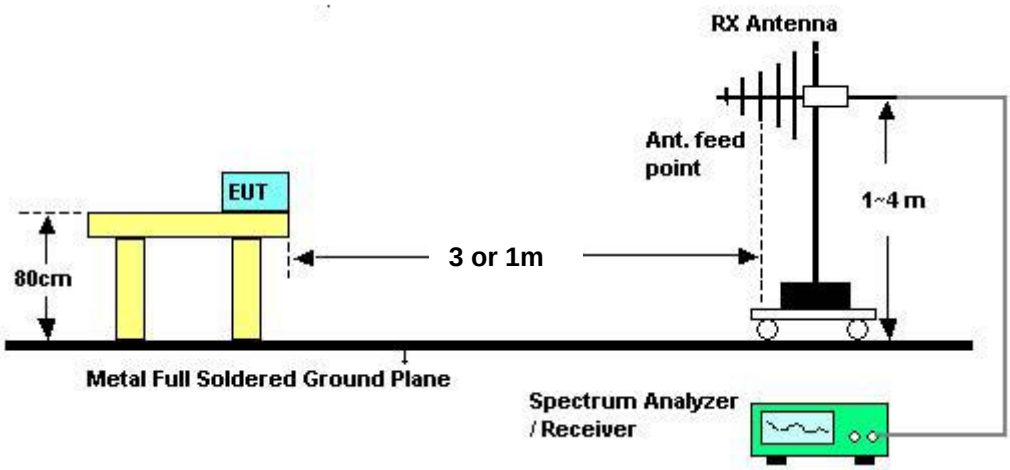
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 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	26℃	Humidity	55%
Test Engineer	Vic Hsiao		

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

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB 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.