



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	Siemens Communications, Inc.
Applicant Address	1700 Technology Drive, Mailstop 130, San Jose, California 95110
FCC ID	AY3-AP36V1B
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	HiPath Wireless Access Point, Altitude 450, Altitude 451
Brand Name	SIEMENS, Extreme
Model Name	HiPath Wireless AP3610, HiPath Wireless AP3620, 15800 Altitude 450, 15801 Altitude 451
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Jan. 16, 2008
Final Test Date	Mar. 24, 2008
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.7



Statement

Test result included is only for the 802.11b/g part and 802.11a (5725 ~ 5850MHz) 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 C**.

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





Table of Contents


1. CERTIFICATE OF COMPLIANCE	1
2. SUMMARY OF THE TEST RESULT	2
3. GENERAL INFORMATION	3
3.1. Product Details.....	3
3.2. Accessories.....	3
3.3. Table for Filed Antenna.....	4
3.4. Table for Carrier Frequencies	5
3.5. Table for Test Modes	6
3.6. Table for Testing Locations.....	7
3.7. Table for Multiple Listing & Existing Change	7
3.8. Table for Supporting Units	7
3.9. Table for Parameters of Test Software Setting	8
3.10. Test Configurations	9
4. TEST RESULT	14
4.1. AC Power Line Conducted Emissions Measurement.....	14
4.2. Maximum Peak Output Power Measurement	20
4.3. Power Spectral Density Measurement	54
4.4. 6dB Spectrum Bandwidth Measurement	66
4.5. Radiated Emissions Measurement	78
4.6. Band Edge Emissions Measurement	122
4.7. Antenna Requirements	135
5. LIST OF MEASURING EQUIPMENTS	136
6. TEST LOCATION.....	138
7. TAF CERTIFICATE OF ACCREDITATION	139
APPENDIX A. PHOTOGRAPHS OF EUT.....	A1 ~ A55
APPENDIX B. TEST PHOTOS.....	B1 ~ B8
APPENDIX C. MAXIMUM PERMISSIBLE EXPOSURE.....	C1 ~ C3
APPENDIX D. CO-LOCATION	D1 ~ D5



1. CERTIFICATE OF COMPLIANCE

Product Name : HiPath Wireless Access Point,
Altitude 450, Altitude 451
Brand Name : SIEMENS, Extreme
Model Name : HiPath Wireless AP3610, HiPath Wireless AP3620,
15800 Altitude 450, 15801 Altitude 451
Applicant : Siemens Communications, Inc.
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jan. 16, 2008 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.


Wayne Hsu

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	2.00 dB
4.2	15.247(b)(3)	Maximum Peak Conducted Output Power	Complies	0.72 dB
4.3	15.247(e)	Power Spectral Density	Complies	2.70 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.26 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.10 dB
4.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Peak Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 ⁻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°C	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

Items	Description
Power Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	POE & Power Adapter
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	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Channel Band Width (99%)	11b: 16.02 MHz ; 11g: 16.66 MHz ; 11a: 18.04 MHz
Conducted Output Power	11b: 27.41 dBm ; 11g: 29.22 dBm ; 11a: 29.28 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)		Three (TX)	
	20 MHz	40 MHz	20 MHz	40 MHz
802.11a	X	X	V	X
802.11b	X	X	V	X
802.11g	X	X	V	X
Draft n	X	X	V	V

3.2. Accessories

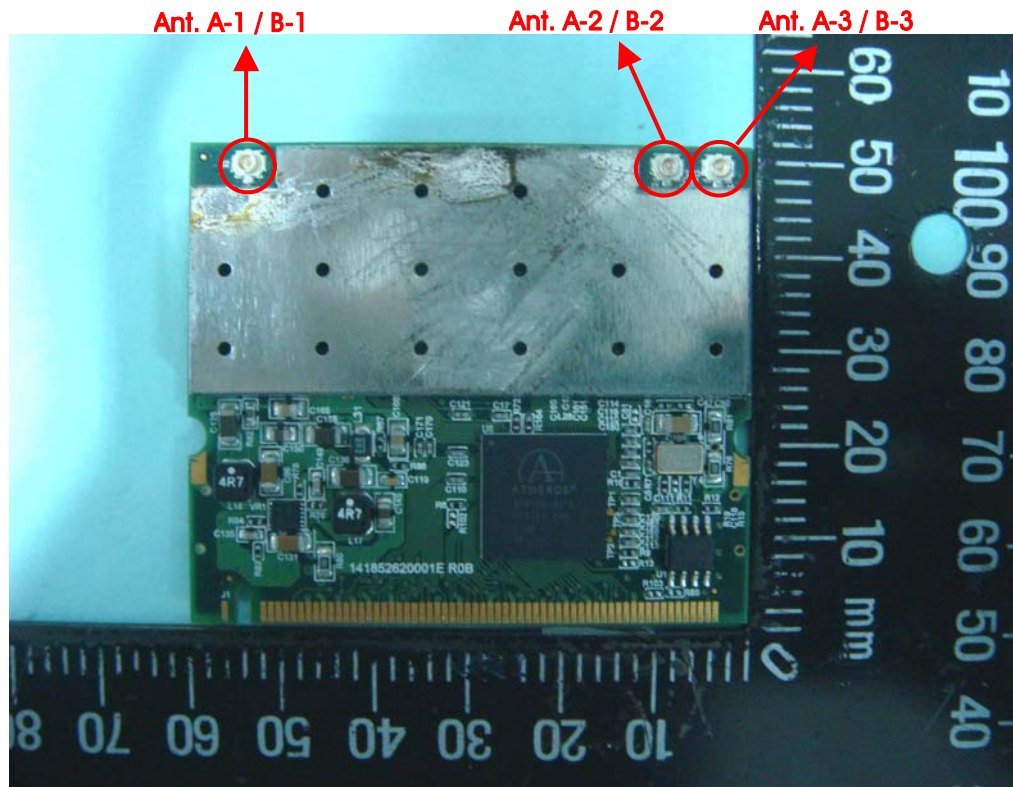
N/A

3.3. Table for Filed Antenna

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A-1	JOYMAX	FWX-614RSXXX-514	Dipole Antenna	Reversed-SMA	5	TX/RX
A-2	JOYMAX	FWX-614RSXXX-514	Dipole Antenna	Reversed-SMA	5	TX/RX
A-3	JOYMAX	FWX-614RSXXX-514	Dipole Antenna	Reversed-SMA	5	TX/RX
B-1	WYA YU	NP-7041	Embedded Antenna	NA	6	TX/RX
B-2	WYA YU	NP-7041	Embedded Antenna	NA	6	TX/RX
B-3	WYA YU	NP-7041	Embedded Antenna	NA	6	TX/RX

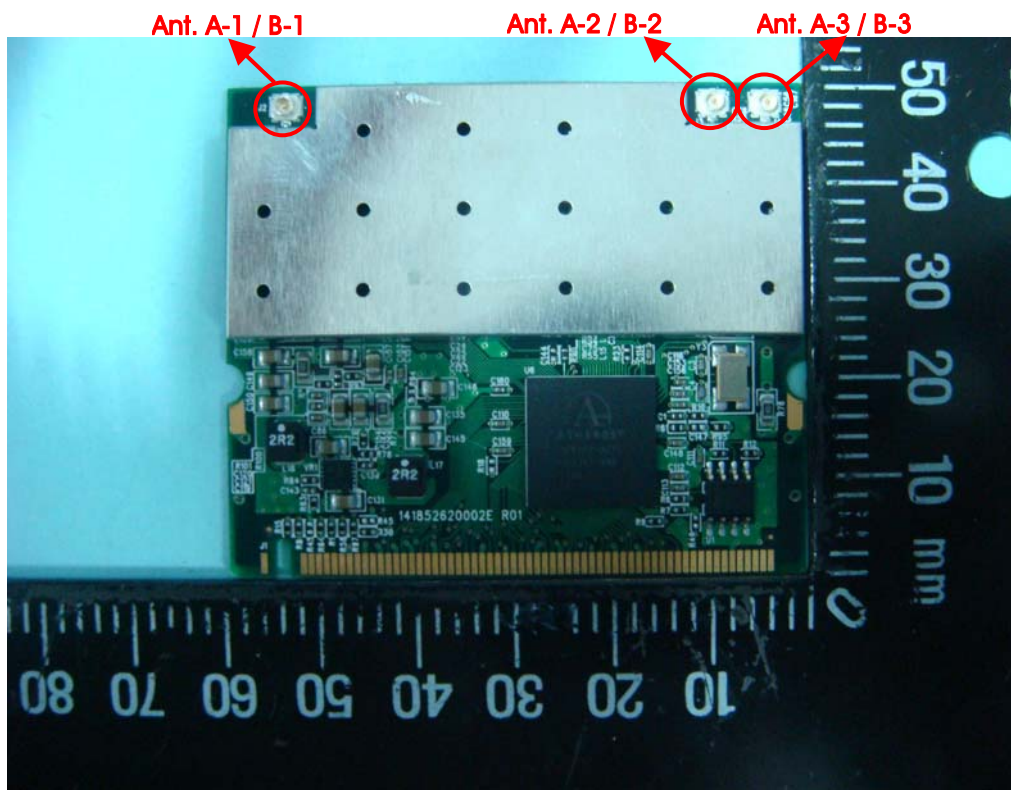
Note: Ant. A-1, Ant. A-2, Ant. A-3, Ant. B-1, Ant. B-2, Ant. B-3 could transmit/receive simultaneously.



For 2.4GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A-1	JOYMAX	FWX-614RSXXX-514	Dipole Antenna	Reversed-SMA	4	TX/RX
A-2	JOYMAX	FWX-614RSXXX-514	Dipole Antenna	Reversed-SMA	4	TX/RX
A-3	JOYMAX	FWX-614RSXXX-514	Dipole Antenna	Reversed-SMA	4	TX/RX
B-1	WYA YU	NP-7041	Embedded Antenna	NA	3	TX/RX
B-2	WYA YU	NP-7041	Embedded Antenna	NA	3	TX/RX
B-3	WYA YU	NP-7041	Embedded Antenna	NA	3	TX/RX

Note: Ant. A-1, Ant. A-2, Ant. A-3, Ant. B-1, Ant. B-2, Ant. B-3 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

Frequency Allocation for 802.11b/g

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz		

Frequency Allocation for 802.11a

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz (USA/Canada/Taiwan)	149	5745 MHz		
	153	5765 MHz		
	157	5785 MHz		
	161	5805 MHz		
	165	5825 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 Line Conducted Emissions	Normal Link	Auto	-	-
Max. Peak Conducted Output Power Power Spectral Density 6dB Spectrum Bandwidth	11b/CCK	11 Mbps	1/6/11	A-1+A-2+A-3 / B-1+B-2+B-3
	11g/BPSK	6 Mbps	1/6/11	A-1+A-2+A-3 / B-1+B-2+B-3
	11a/BPSK	6 Mbps	149/157/165	A-1+A-2+A-3 / B-1+B-2+B-3
Radiated Emissions Below 1GHz	11g/BPSK	Auto	-	-
Radiated Emissions Above 1GHz	11b/CCK	11 Mbps	1/6/11	A/B
	11g/BPSK	6 Mbps	1/6/11	A/B
	11a/BPSK	6 Mbps	149/157/165	A/B
Band Edge Emissions	11b/CCK	11 Mbps	1/11	A/B
	11g/BPSK	6 Mbps	1/11	A/B
	11a/BPSK	6 Mbps	149/165	A/B

Test Mode:

<For Ant. A Dipole Antenna>

Adapter Mode: EUT with Ant. A + Adapter

POE Mode: EUT with Ant. A + POE

For Conducted Emissions test:

Due to Adapter Mode generated the worst test result, so it was recorded in this report.

For Radiated Emissions test:

Adapter Mode and POE Mode for Radiated emission test were performed at Horizontal and Vertical and the worst-case was found at Horizontal. So it was recorded in this report.

Due to POE Mode (Horizontal) generated the worst test result, so it was recorded in this report.

<For Ant. B Embedded Antenna>

Adapter Mode: EUT with Ant. B + Adapter

POE Mode: EUT with Ant. B + POE

For Conducted Emissions test:

Due to Adapter Mode generated the worst test result, so it was recorded in this report.

For Radiated Emissions test:

Adapter Mode and POE Mode for Radiated emission test were performed at Horizontal and Vertical and the worst-case was found at Vertical. So it was recorded in this report.

Due to POE Mode (Horizontal) generated the worst test result, so it was recorded in this report.

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 Multiple Listing & Existing Change

The brand/model names in the following table are all refer to the identical product.

Product Name	Brand Name	Model Name	Description
HiPath Wireless Access Point	SIEMENS	AP3610	EUT with internal antennas
		AP3620	EUT with external antennas
Altitude 450	Extreme	15800 Altitude 450	EUT with internal antennas
Altitude 451	Extreme	15801 Altitude 451	EUT with external antennas

Note: All the models are identical, the difference model for difference brand served as marketing strategy.

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL
Notebook	DELL	D400	E2K24GBRL
Adapter	PHIHONG	PSA18U-480C (A)-R	DoC
POE adapter	PHIHONG	POE20U-560 (G)-R	DoC

3.9. 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.

For 2.4GHz Band

Power Parameters of IEEE 802.11b/g Ant. A

Test Software Version	ART		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	20.5	22	20.5
IEEE 802.11g	16.5	20	17

Power Parameters of IEEE 802.11b/g Ant. B

Test Software Version	ART		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	19	22	18
IEEE 802.11g	14	22	16

For 5GHz Band

Power Parameters of IEEE 802.11a Ant. A

Test Software Version	ART		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	19	19.5	21.5

Power Parameters of IEEE 802.11a Ant. B

Test Software Version	ART		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	21.5	21.5	21.5

During the test, the following programs under WIN XP were executed:

Executed "ping.exe" to link with the remote workstation to receive and transmit signal by LAN and WLAN.

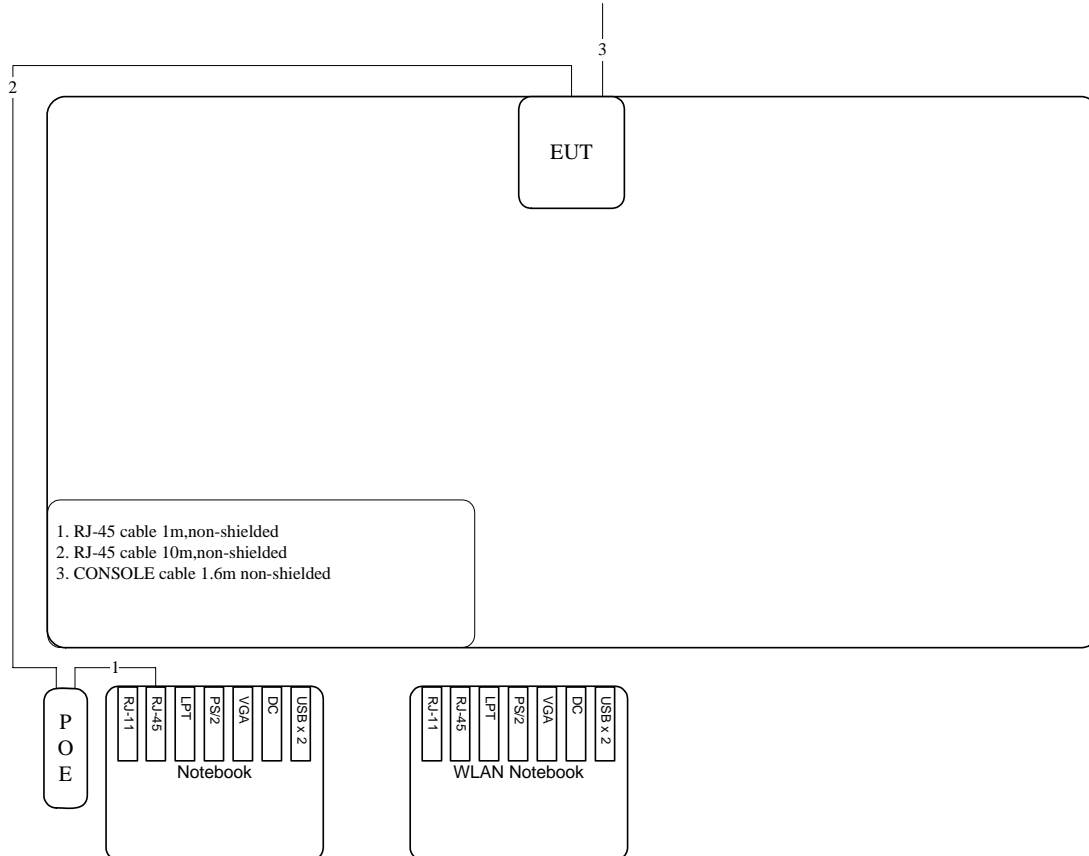
Executed "LAN Test" to traffic packet data generated software and keep 10% traffic load to link with the remote workstation by LAN and WAN.

3.10. Test Configurations

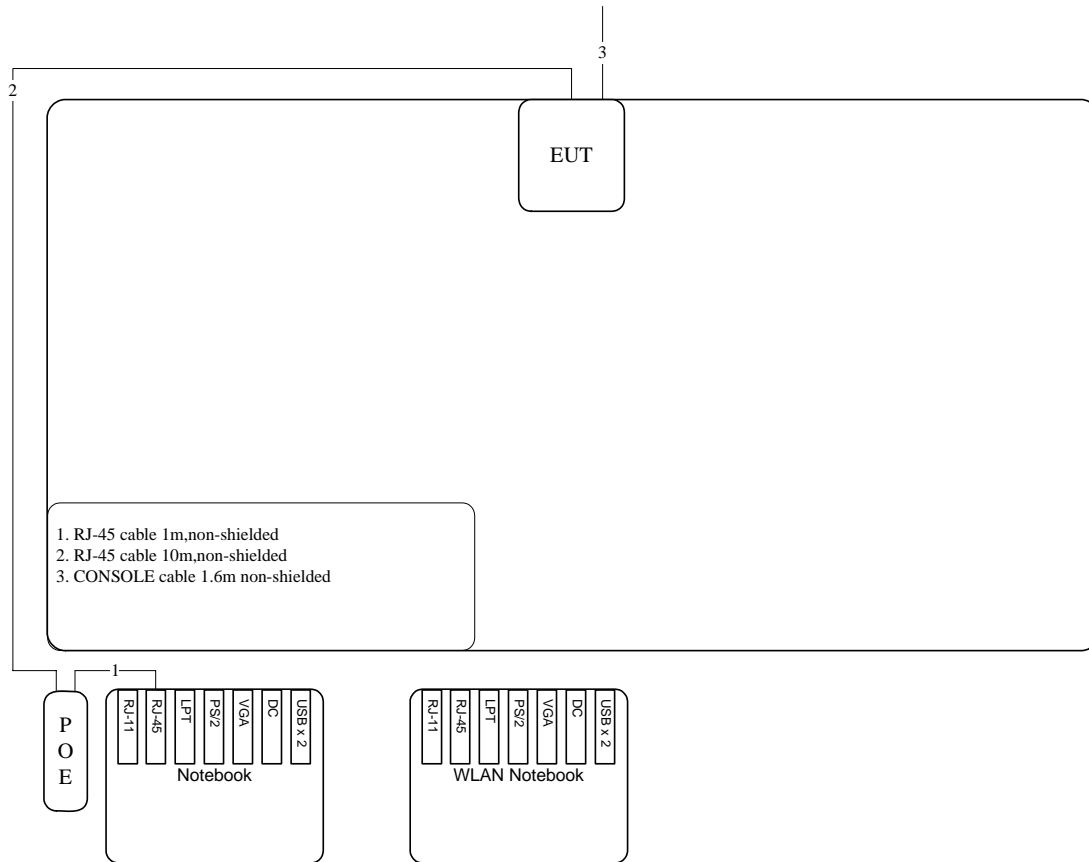
3.10.1. Radiation Emissions Test Configuration

Test Configuration: 9KHz~1GHz

Test Mode: Ant. A POE Mode (Horizontal)

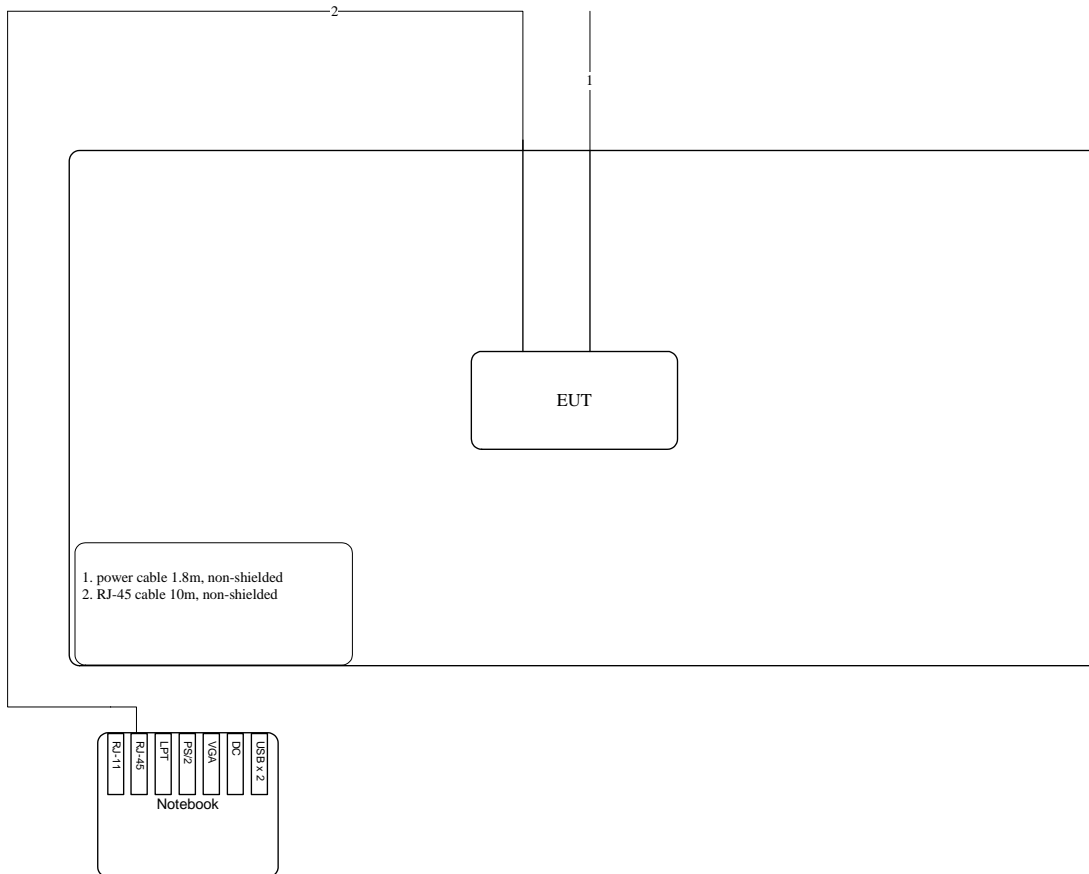


Test Mode: Ant. B POE Mode (Horizontal)

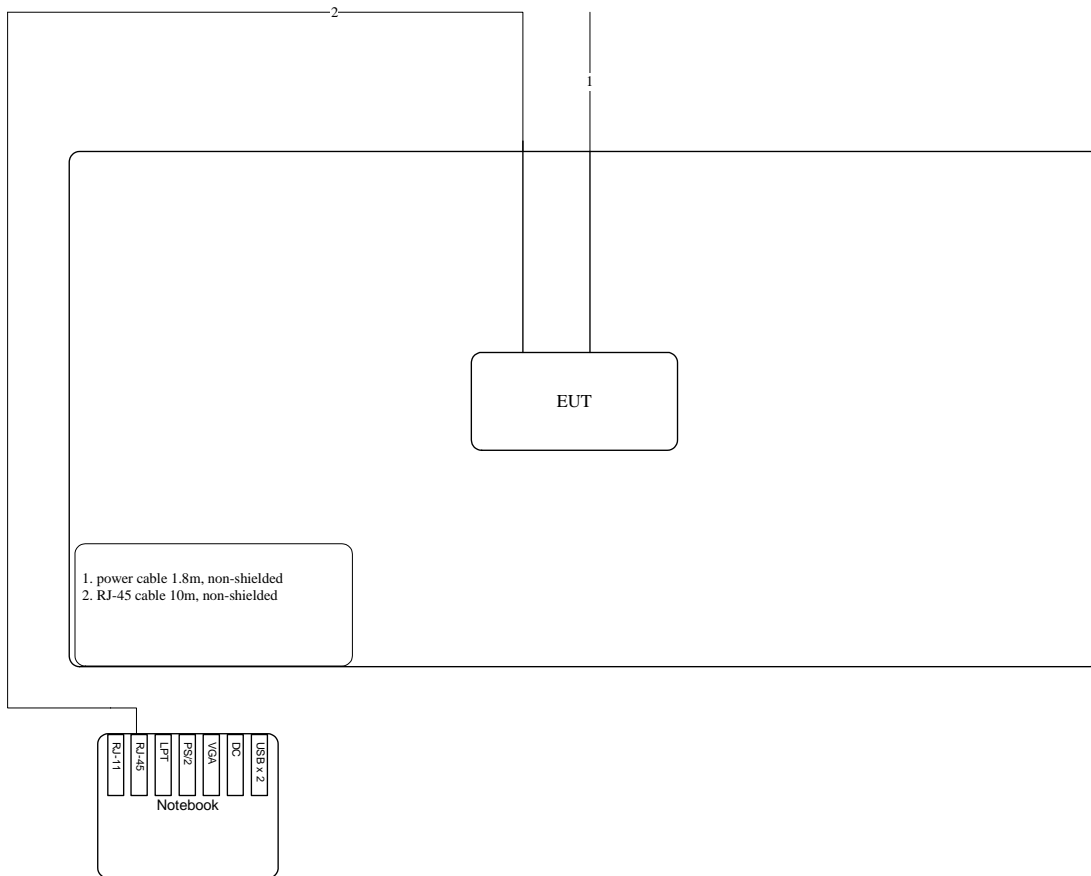


Test Configuration: above 1GHz

Ant. A

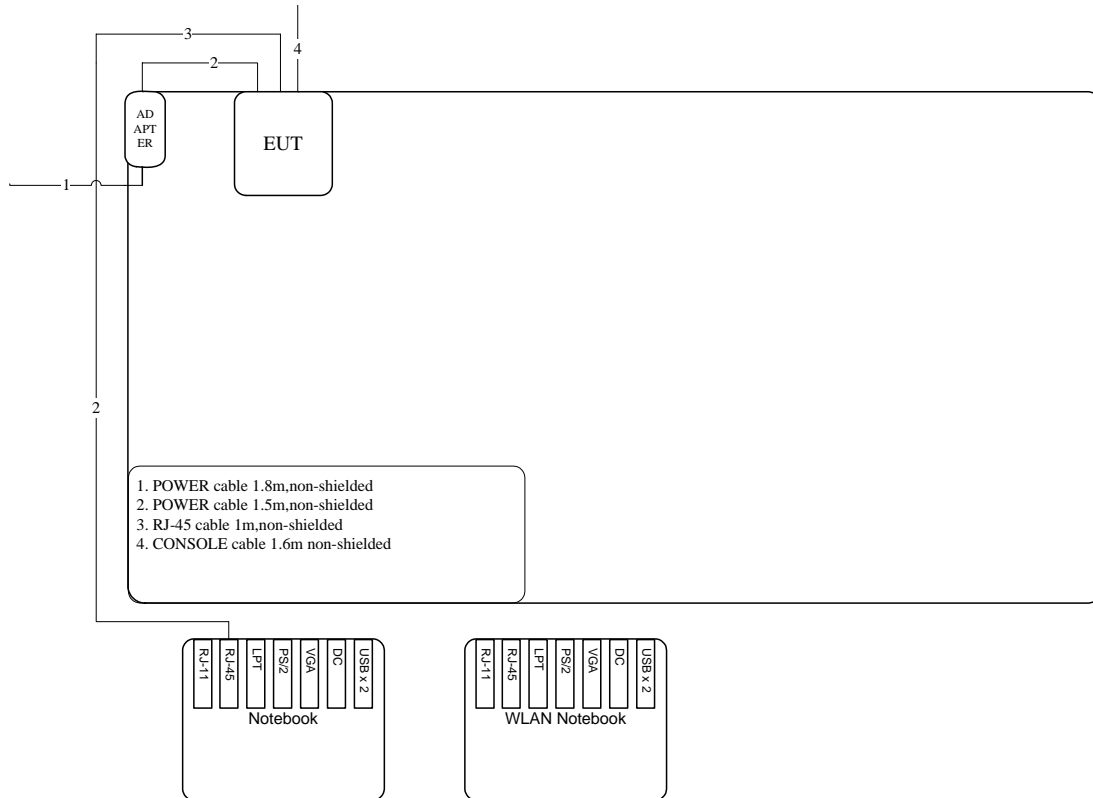


Ant. B

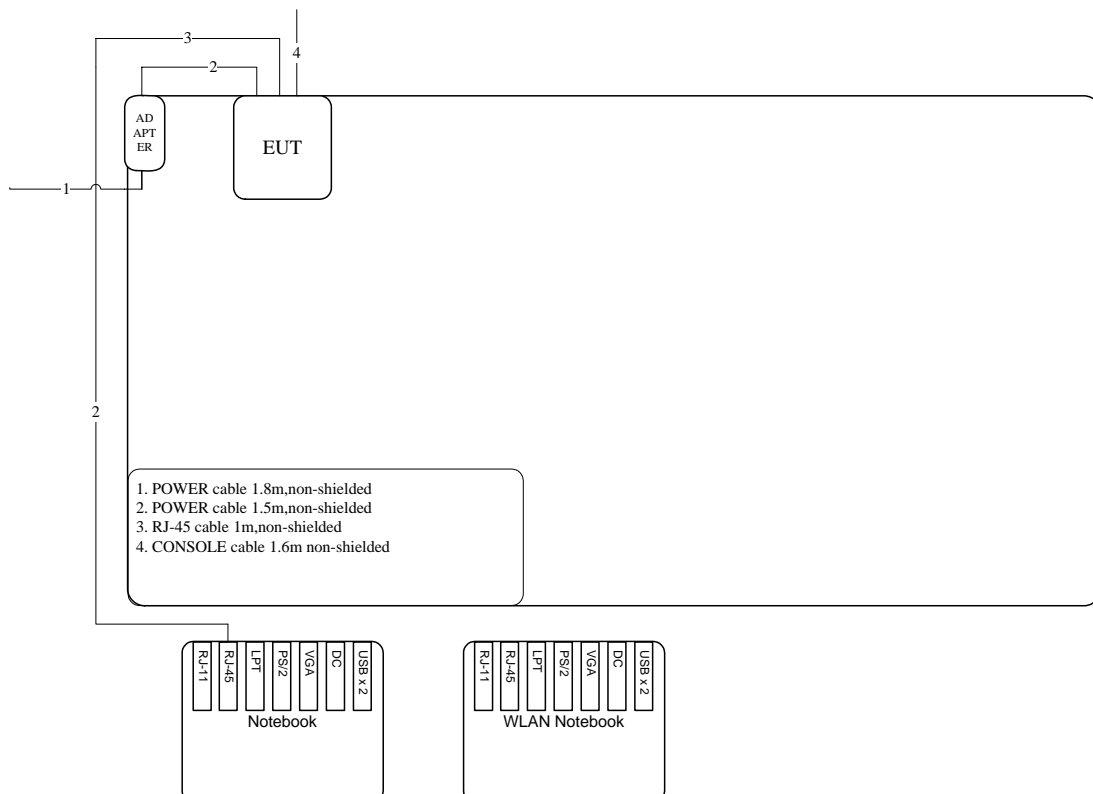


3.10.2. AC Power Line Conduction Emissions Test Configuration

Test Mode: Ant. A Adapter Mode



Test Mode: Ant. B Adapter Mode



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product 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

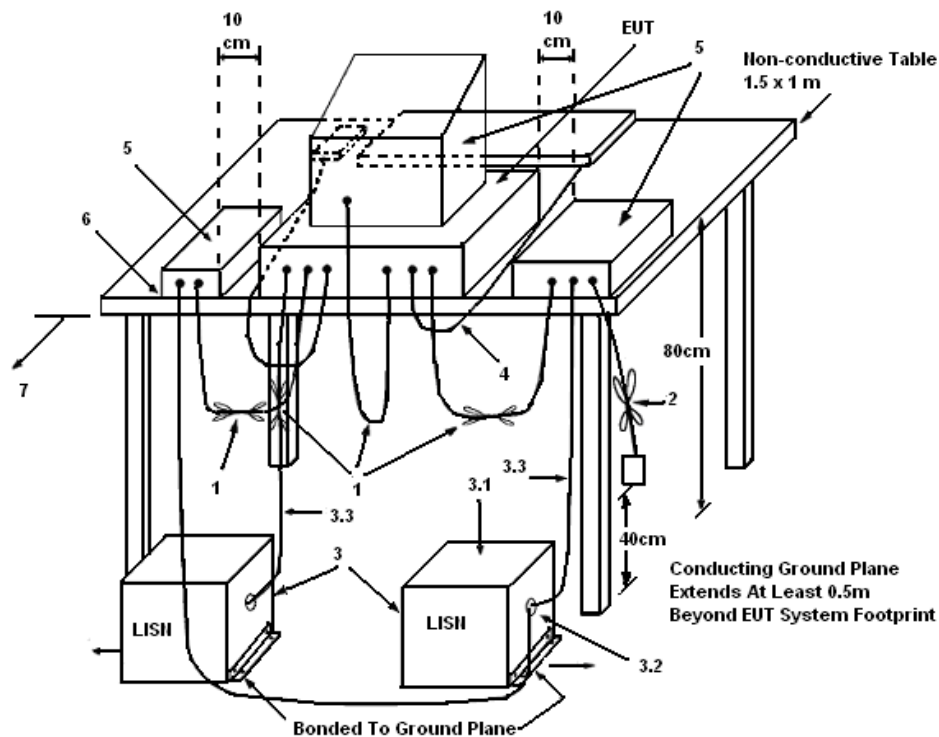
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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



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 50Ω . 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

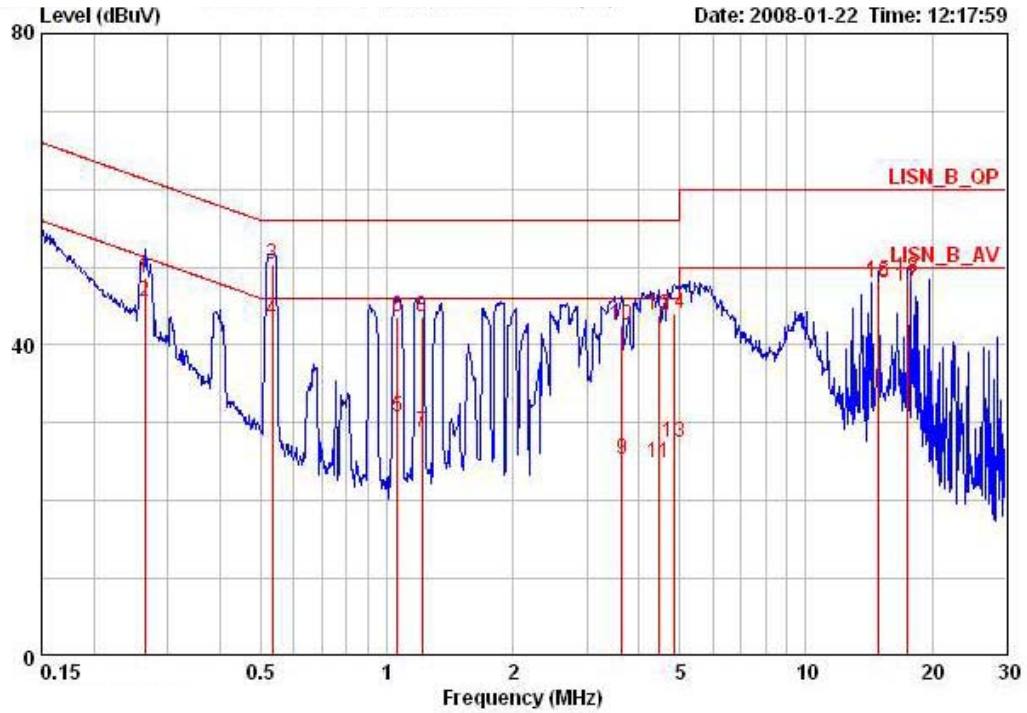
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

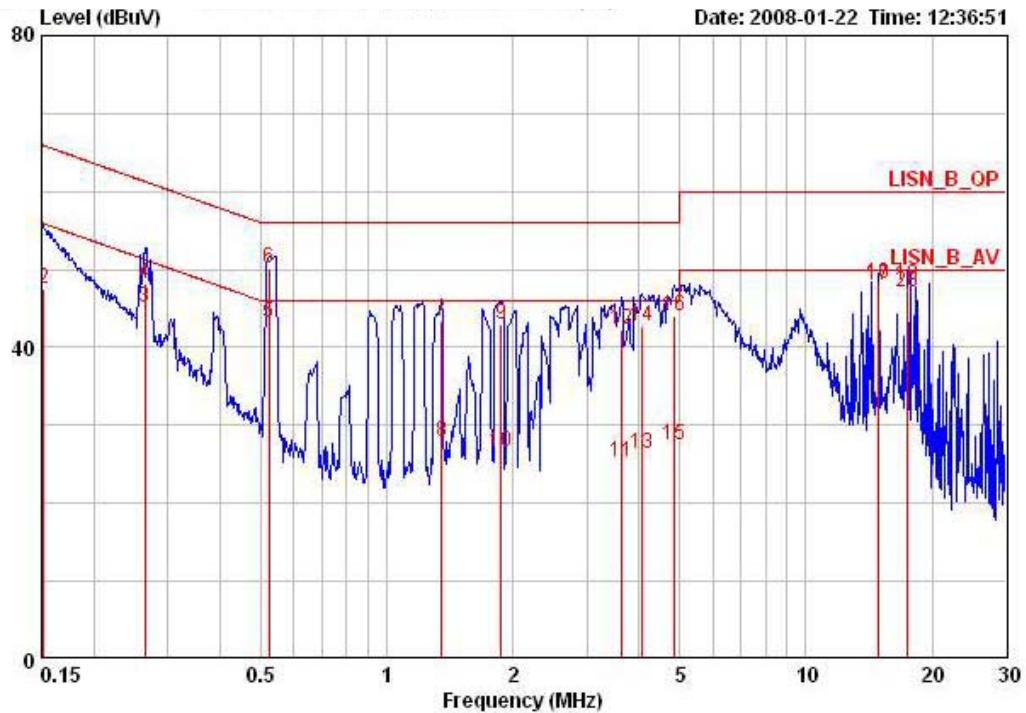
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	21°C	Humidity	60%
Test Engineer	Andy Tsai	Phase	Line
Configuration	Ant. A Adapter Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.26442	48.55	-12.74	61.29	48.25	0.10	0.20	QP	LINE
2	0.26442	45.49	-5.80	51.29	45.19	0.10	0.20	AVERAGE	LINE
3	0.53215	50.27	-5.74	56.00	49.99	0.08	0.20	QP	LINE
4	0.53215	43.18	-2.83	46.00	42.90	0.08	0.20	AVERAGE	LINE
5	1.060	30.76	-15.24	46.00	30.57	0.00	0.19	AVERAGE	LINE
6	1.060	43.55	-12.45	56.00	43.36	0.00	0.19	QP	LINE
7	1.216	28.78	-17.22	46.00	28.63	0.00	0.15	AVERAGE	LINE
8	1.216	43.54	-12.46	56.00	43.39	0.00	0.15	QP	LINE
9	3.642	25.23	-20.77	46.00	24.93	0.00	0.30	AVERAGE	LINE
10	3.642	42.53	-13.47	56.00	42.23	0.00	0.30	QP	LINE
11	4.472	24.93	-21.07	46.00	24.62	0.01	0.30	AVERAGE	LINE
12	4.472	43.86	-12.14	56.00	43.55	0.01	0.30	QP	LINE
13	4.848	27.39	-18.61	46.00	27.08	0.01	0.30	AVERAGE	LINE
14	4.848	44.11	-11.89	56.00	43.80	0.01	0.30	QP	LINE
15	14.903	48.08	-11.92	60.00	47.58	0.10	0.40	QP	LINE
16	14.903	47.94	-2.06	50.00	47.44	0.10	0.40	AVERAGE	LINE
17	17.418	47.49	-2.51	50.00	46.89	0.10	0.50	AVERAGE	LINE
18	17.418	48.66	-11.34	60.00	48.06	0.10	0.50	QP	LINE

Temperature	21°C	Humidity	60%
Test Engineer	Andy Tsai	Phase	Neutral
Configuration	Ant. A Adapter Mode		

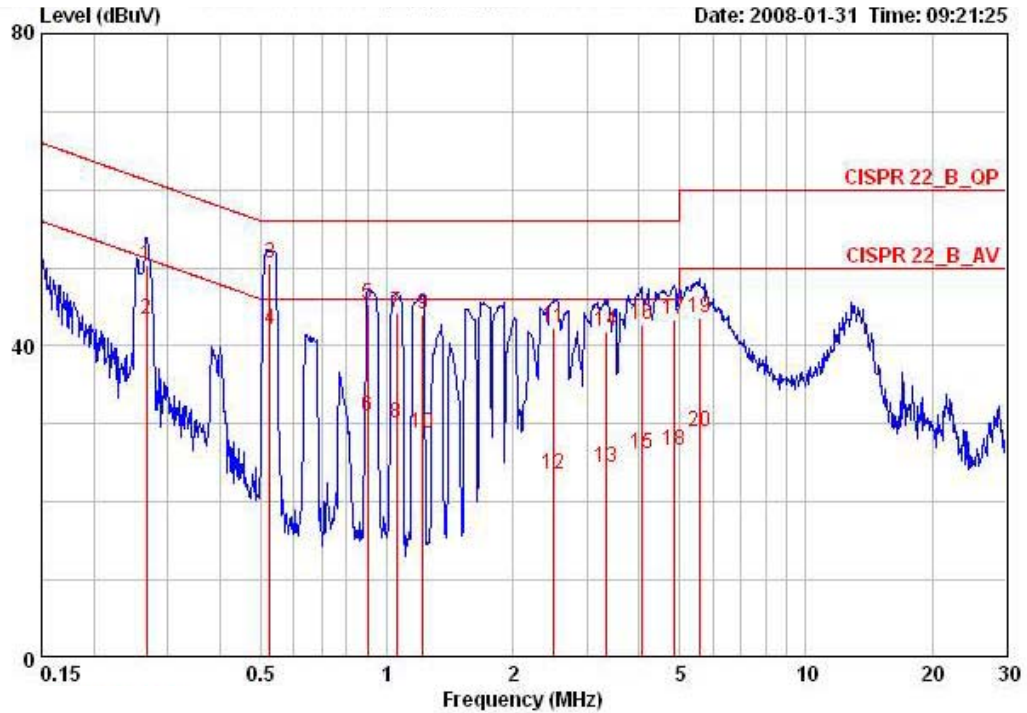


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15160	22.48	-33.43	55.91	21.98	0.30	0.20	AVERAGE	NEUTRAL
2	0.15160	47.61	-18.30	65.91	47.11	0.30	0.20	QP	NEUTRAL
3	0.26442	45.16	-6.13	51.29	44.79	0.17	0.20	AVERAGE	NEUTRAL
4	0.26442	48.26	-13.03	61.29	47.89	0.17	0.20	QP	NEUTRAL
5	0.52376	43.09	-2.91	46.00	42.79	0.10	0.20	AVERAGE	NEUTRAL
6	0.52376	50.19	-5.81	56.00	49.89	0.10	0.20	QP	NEUTRAL
7	1.352	43.35	-12.65	56.00	43.12	0.10	0.13	QP	NEUTRAL
8	1.352	27.95	-18.05	46.00	27.72	0.10	0.13	AVERAGE	NEUTRAL
9	1.878	42.90	-13.10	56.00	42.62	0.10	0.18	QP	NEUTRAL
10	1.878	26.57	-19.43	46.00	26.29	0.10	0.18	AVERAGE	NEUTRAL
11	3.642	25.27	-20.73	46.00	24.87	0.10	0.30	AVERAGE	NEUTRAL
12	3.642	42.38	-13.62	56.00	41.98	0.10	0.30	QP	NEUTRAL
13	4.049	26.46	-19.54	46.00	26.06	0.10	0.30	AVERAGE	NEUTRAL
14	4.049	42.80	-13.20	56.00	42.40	0.10	0.30	QP	NEUTRAL
15	4.848	27.48	-18.52	46.00	27.08	0.10	0.30	AVERAGE	NEUTRAL
16	4.848	44.08	-11.92	56.00	43.68	0.10	0.30	QP	NEUTRAL
17	14.907	48.00	-2.00	50.00	47.50	0.10	0.40	AVERAGE	NEUTRAL
18	14.907	48.14	-11.86	60.00	47.64	0.10	0.40	QP	NEUTRAL
19	17.423	47.95	-12.05	60.00	47.35	0.10	0.50	QP	NEUTRAL
20	17.423	47.03	-2.97	50.00	46.43	0.10	0.50	AVERAGE	NEUTRAL

Note:

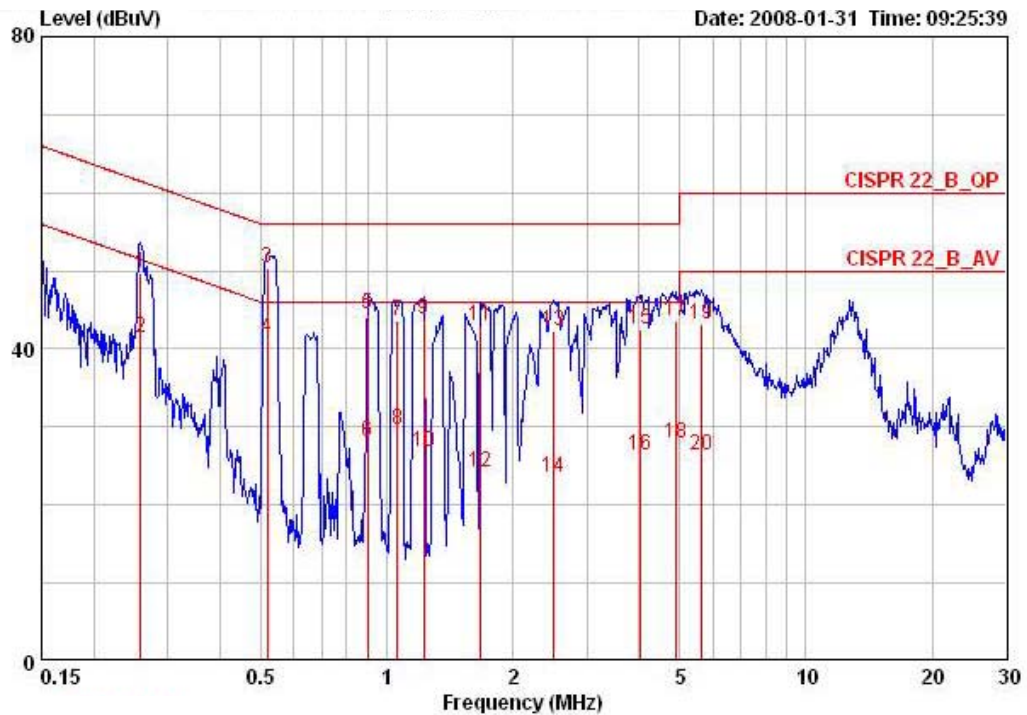
Level = Read Level + LISN Factor + Cable Loss.

Temperature	21°C	Humidity	60%
Test Engineer	Andy Tsai	Phase	Line
Configuration	Ant. B Adapter Mode		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.26724	50.46	-10.74	61.20	50.16	0.10	0.20	QP	LINE
2	0.26724	43.38	-7.82	51.20	43.08	0.10	0.20	AVERAGE	LINE
3	0.52655	50.61	-5.40	56.00	50.33	0.08	0.20	QP	LINE
4	0.52655	42.03	-3.97	46.00	41.75	0.08	0.20	AVERAGE	LINE
5	0.89917	45.34	-10.67	56.00	45.12	0.02	0.20	QP	LINE
6	0.89917	30.89	-15.12	46.00	30.67	0.02	0.20	AVERAGE	LINE
7	1.054	44.24	-11.76	56.00	44.05	0.00	0.19	QP	LINE
8	1.054	30.09	-15.91	46.00	29.90	0.00	0.19	AVERAGE	LINE
9	1.217	44.01	-11.99	56.00	43.86	0.00	0.15	QP	LINE
10	1.217	28.73	-17.27	46.00	28.58	0.00	0.15	AVERAGE	LINE
11	2.500	42.34	-13.66	56.00	42.14	0.00	0.20	QP	LINE
12	2.500	23.44	-22.56	46.00	23.24	0.00	0.20	AVERAGE	LINE
13	3.346	24.49	-21.51	46.00	24.22	0.00	0.27	AVERAGE	LINE
14	3.346	41.87	-14.13	56.00	41.60	0.00	0.27	QP	LINE
15	4.070	26.22	-19.78	46.00	25.92	0.00	0.30	AVERAGE	LINE
16	4.070	42.82	-13.18	56.00	42.52	0.00	0.30	QP	LINE
17	4.848	43.37	-12.63	56.00	43.06	0.01	0.30	QP	LINE
18	4.848	26.61	-19.39	46.00	26.30	0.01	0.30	AVERAGE	LINE
19	5.564	43.66	-16.34	60.00	43.33	0.03	0.30	QP	LINE
20	5.564	29.00	-21.00	50.00	28.67	0.03	0.30	AVERAGE	LINE

Temperature	21°C	Humidity	60%
Test Engineer	Andy Tsai	Phase	Neutral
Configuration	Ant. B Adapter Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.25888	49.79	-11.68	61.47	49.42	0.17	0.20	QP	NEUTRAL
2	0.25888	41.50	-9.97	51.47	41.13	0.17	0.20	AVERAGE	NEUTRAL
3	0.51824	50.36	-5.64	56.00	50.06	0.10	0.20	QP	NEUTRAL
4	0.51824	41.32	-4.68	46.00	41.02	0.10	0.20	AVERAGE	NEUTRAL
5	0.89917	44.42	-11.58	56.00	44.12	0.10	0.20	QP	NEUTRAL
6	0.89917	28.08	-17.92	46.00	27.78	0.10	0.20	AVERAGE	NEUTRAL
7	1.060	43.65	-12.35	56.00	43.36	0.10	0.19	QP	NEUTRAL
8	1.060	29.59	-16.41	46.00	29.30	0.10	0.19	AVERAGE	NEUTRAL
9	1.223	43.76	-12.24	56.00	43.51	0.10	0.15	QP	NEUTRAL
10	1.223	26.77	-19.23	46.00	26.52	0.10	0.15	AVERAGE	NEUTRAL
11	1.671	42.94	-13.06	56.00	42.70	0.10	0.14	QP	NEUTRAL
12	1.671	24.26	-21.74	46.00	24.02	0.10	0.14	AVERAGE	NEUTRAL
13	2.487	42.30	-13.70	56.00	42.00	0.10	0.20	QP	NEUTRAL
14	2.487	23.46	-22.54	46.00	23.16	0.10	0.20	AVERAGE	NEUTRAL
15	4.027	42.47	-13.53	56.00	42.07	0.10	0.30	QP	NEUTRAL
16	4.027	26.35	-19.65	46.00	25.95	0.10	0.30	AVERAGE	NEUTRAL
17	4.900	43.62	-12.38	56.00	43.22	0.10	0.30	QP	NEUTRAL
18	4.900	27.91	-18.09	46.00	27.51	0.10	0.30	AVERAGE	NEUTRAL
19	5.623	43.08	-16.92	60.00	42.68	0.10	0.30	QP	NEUTRAL
20	5.623	26.33	-23.67	50.00	25.93	0.10	0.30	AVERAGE	NEUTRAL

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Maximum Peak Output Power Measurement

4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi. Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

4.2.2. Measuring Instruments and Setting

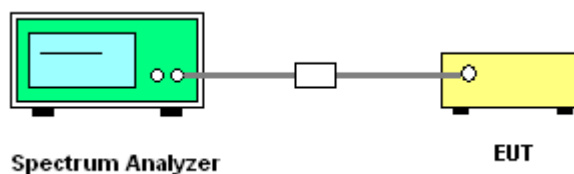
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum 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	20ms

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

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 Maximum Peak Output Power

Temperature	23°C	Humidity	61%
Test Engineer	Jacky Ho	Configurations	802.11a/b/g

Configuration IEEE 802.11b Ant. A-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	21.35	30.00	Complies
6	2437 MHz	22.42	30.00	Complies
11	2462 MHz	21.89	30.00	Complies

Configuration IEEE 802.11b Ant. A-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.60	30.00	Complies
6	2437 MHz	21.97	30.00	Complies
11	2462 MHz	20.38	30.00	Complies

Configuration IEEE 802.11b Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.59	30.00	Complies
6	2437 MHz	21.04	30.00	Complies
11	2462 MHz	20.20	30.00	Complies

Configuration IEEE 802.11b Ant. A-1 + Ant. A-2 + Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	25.63	30.00	Complies
6	2437 MHz	26.62	30.00	Complies
11	2462 MHz	25.66	30.00	Complies

Configuration IEEE 802.11b Ant. B-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	19.54	30.00	Complies
6	2437 MHz	22.59	30.00	Complies
11	2462 MHz	18.96	30.00	Complies

Configuration IEEE 802.11b Ant. B-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	19.34	30.00	Complies
6	2437 MHz	22.02	30.00	Complies
11	2462 MHz	17.92	30.00	Complies

Configuration IEEE 802.11b Ant. B-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	19.07	30.00	Complies
6	2437 MHz	23.22	30.00	Complies
11	2462 MHz	18.08	30.00	Complies

Configuration IEEE 802.11b Ant. B-1 + Ant. B-2 + Ant. B-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	24.09	30.00	Complies
6	2437 MHz	27.41	30.00	Complies
11	2462 MHz	23.12	30.00	Complies

Configuration IEEE 802.11g Ant. A-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.99	30.00	Complies
6	2437 MHz	22.64	30.00	Complies
11	2462 MHz	20.03	30.00	Complies

Configuration IEEE 802.11g Ant. A-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.57	30.00	Complies
6	2437 MHz	22.26	30.00	Complies
11	2462 MHz	19.15	30.00	Complies

Configuration IEEE 802.11g Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.08	30.00	Complies
6	2437 MHz	21.59	30.00	Complies
11	2462 MHz	19.08	30.00	Complies

Configuration IEEE 802.11g Ant. A-1 + Ant. A-2 + Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	23.33	30.00	Complies
6	2437 MHz	26.96	30.00	Complies
11	2462 MHz	24.21	30.00	Complies

Configuration IEEE 802.11g Ant. B-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	17.12	30.00	Complies
6	2437 MHz	25.13	30.00	Complies
11	2462 MHz	18.96	30.00	Complies

Configuration IEEE 802.11g Ant. B-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.63	30.00	Complies
6	2437 MHz	24.93	30.00	Complies
11	2462 MHz	18.12	30.00	Complies

Configuration IEEE 802.11g Ant. B-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.17	30.00	Complies
6	2437 MHz	22.96	30.00	Complies
11	2462 MHz	17.66	30.00	Complies

Configuration IEEE 802.11g Ant. B-1 + Ant. B-2 + Ant. B-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	21.43	30.00	Complies
6	2437 MHz	29.22	30.00	Complies
11	2462 MHz	23.05	30.00	Complies

Configuration IEEE 802.11a Ant. A-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	19.32	30.00	Complies
157	5785 MHz	19.55	30.00	Complies
165	5825 MHz	21.04	30.00	Complies

Configuration IEEE 802.11a Ant. A-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	24.43	30.00	Complies
157	5785 MHz	24.47	30.00	Complies
165	5825 MHz	24.46	30.00	Complies

Configuration IEEE 802.11a Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	19.69	30.00	Complies
157	5785 MHz	24.86	30.00	Complies
165	5825 MHz	24.68	30.00	Complies

Configuration IEEE 802.11a Ant. A-1 + Ant. A-2 + Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	26.59	30.00	Complies
157	5785 MHz	28.30	30.00	Complies
165	5825 MHz	28.45	30.00	Complies

Configuration IEEE 802.11a Ant. B-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	24.07	30.00	Complies
157	5785 MHz	24.34	30.00	Complies
165	5825 MHz	24.37	30.00	Complies

Configuration IEEE 802.11a Ant. B-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	24.38	30.00	Complies
157	5785 MHz	24.59	30.00	Complies
165	5825 MHz	24.27	30.00	Complies

Configuration IEEE 802.11a Ant. B-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	24.61	30.00	Complies
157	5785 MHz	24.59	30.00	Complies
165	5825 MHz	24.20	30.00	Complies

Configuration IEEE 802.11a Ant. B-1 + Ant. B-2 + Ant. B-3

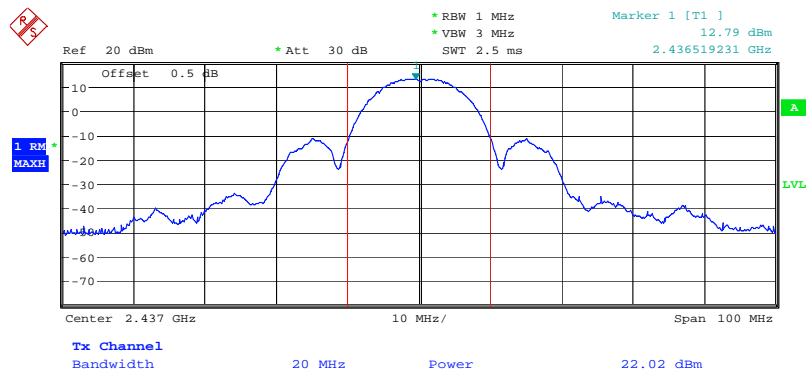
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	29.13	30.00	Complies
157	5785 MHz	29.28	30.00	Complies
165	5825 MHz	29.05	30.00	Complies

Channel Output Power Plot on Configuration IEEE 802.11b Ant. B-2 / 2412 MHz



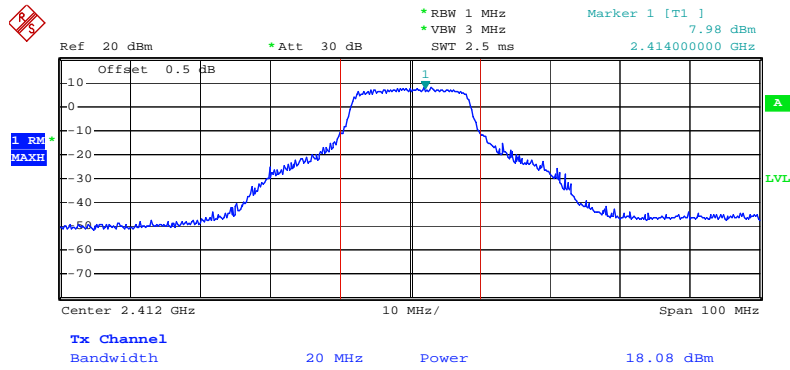
Date: 12.FEB.2008 19:32:34

Channel Output Power Plot on Configuration IEEE 802.11b Ant. B-2 / 2437 MHz



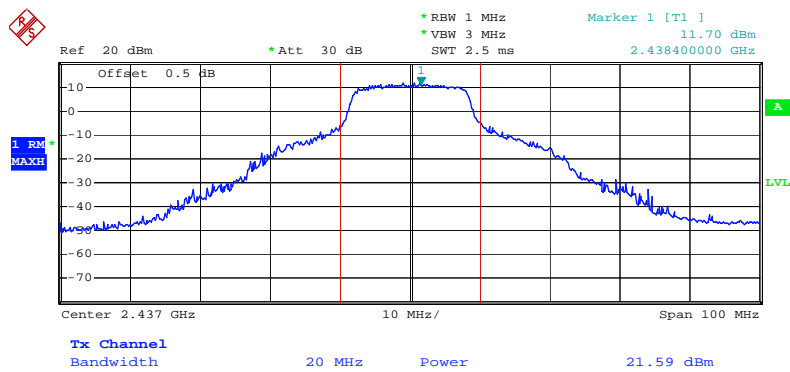
Date: 12.FEB.2008 19:35:01

Channel Output Power Plot on Configuration IEEE 802.11g Ant. A-3 / 2412 MHz



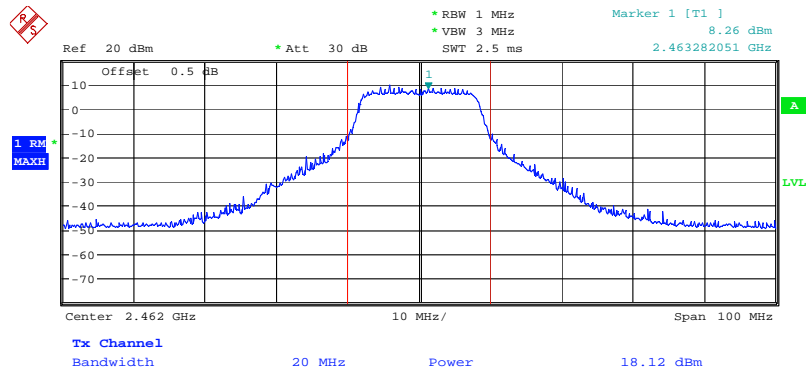
Date: 19.FEB.2008 08:54:23

Channel Output Power Plot on Configuration IEEE 802.11g Ant. A-3 / 2437 MHz



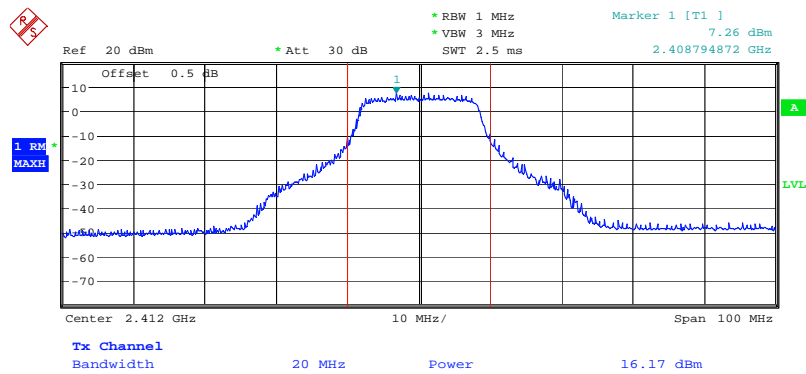
Date: 19.FEB.2008 11:03:06

Channel Output Power Plot on Configuration IEEE 802.11g Ant. B-2 / 2462 MHz



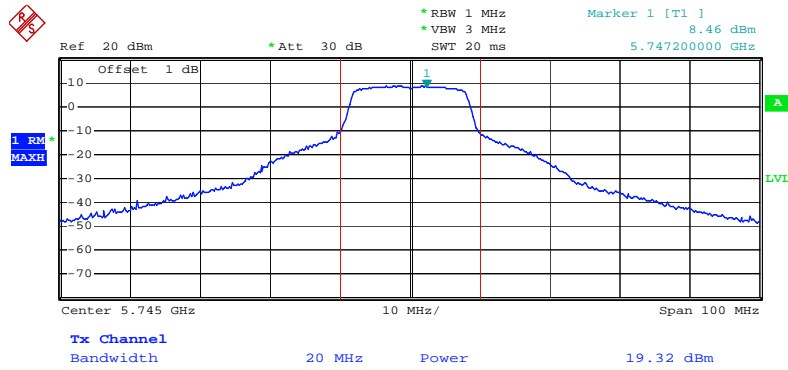
Date: 12.FEB.2008 19:41:03

Channel Output Power Plot on Configuration IEEE 802.11g Ant. B-3 / 2412 MHz



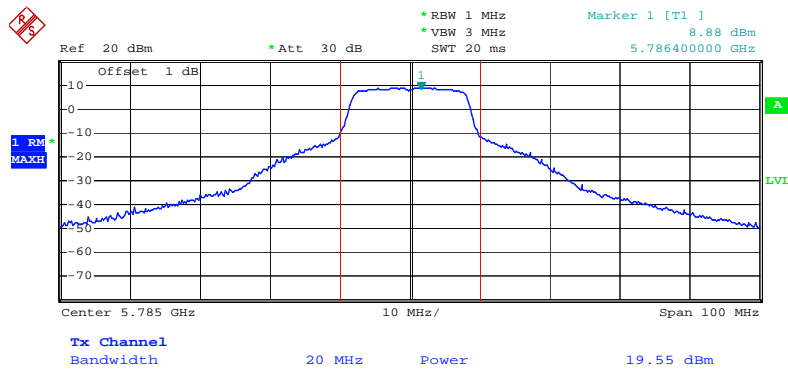
Date: 12.FEB.2008 19:50:00

Channel Output Power Plot on Configuration IEEE 802.11a Ant. A-1 / 5745 MHz



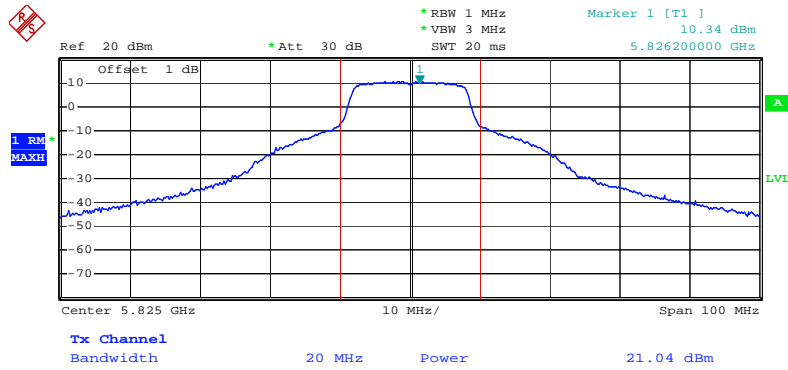
Date: 19.FEB.2008 12:44:16

Channel Output Power Plot on Configuration IEEE 802.11a Ant. A-1 / 5785 MHz



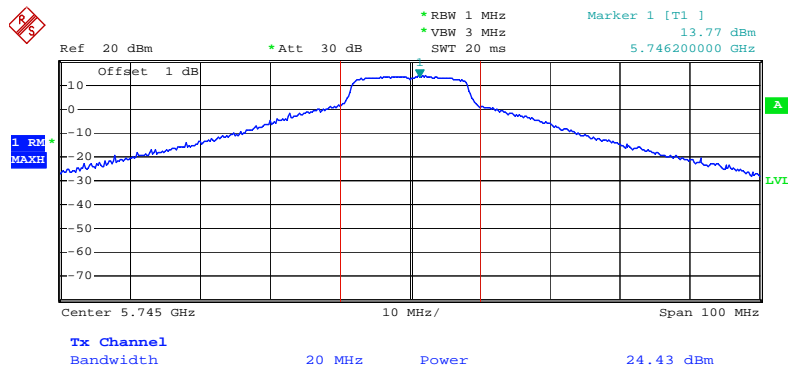
Date: 19.FEB.2008 12:44:37

Channel Output Power Plot on Configuration IEEE 802.11a Ant. A-1 / 5825 MHz



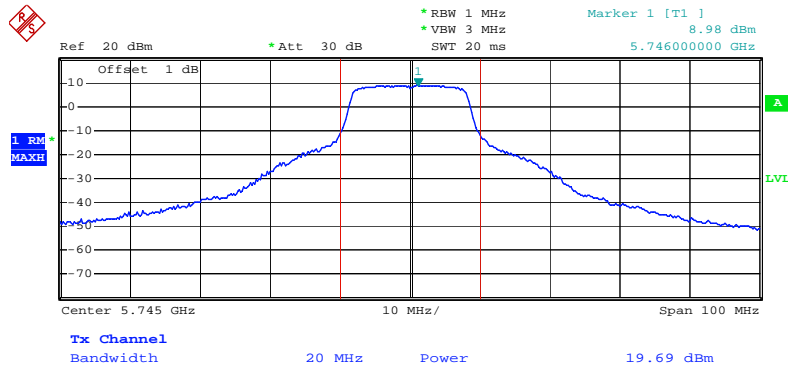
Date: 19.FEB.2008 12:46:48

Channel Output Power Plot on Configuration IEEE 802.11a Ant. A-2 / 5745 MHz



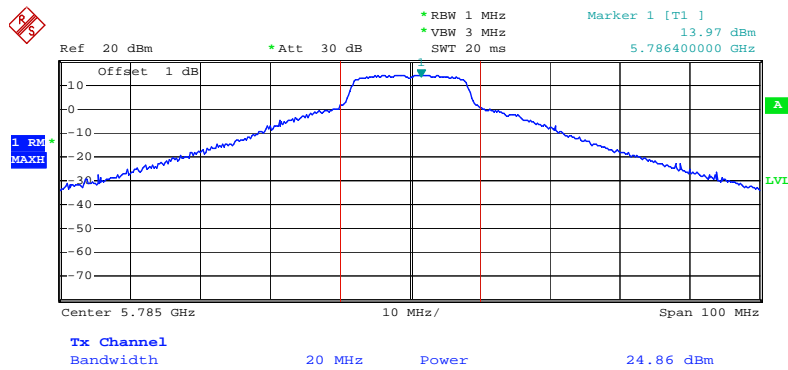
Date: 19.FEB.2008 12:44:00

Channel Output Power Plot on Configuration IEEE 802.11a Ant. A-3 / 5745 MHz



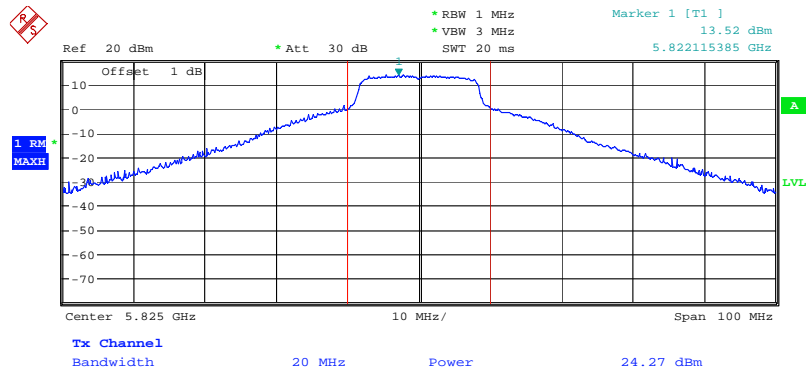
Date: 19.FEB.2008 12:43:48

Channel Output Power Plot on Configuration IEEE 802.11a Ant. A-3 / 5785 MHz



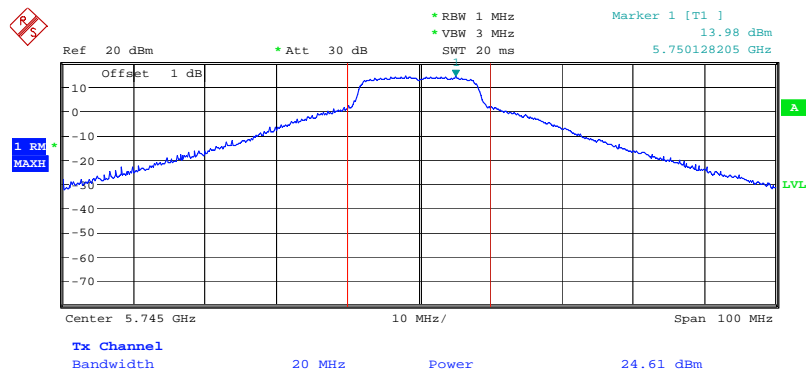
Date: 19.FEB.2008 12:45:05

Channel Output Power Plot on Configuration IEEE 802.11 a Ant. B-2 / 5825 MHz



Date: 12.FEB.2008 15:30:19

Channel Output Power Plot on Configuration IEEE 802.11 a Ant. B-3 / 5745 MHz



Date: 12.FEB.2008 15:16:56

4.3. Power Spectral Density Measurement

4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2. Measuring Instruments and Setting

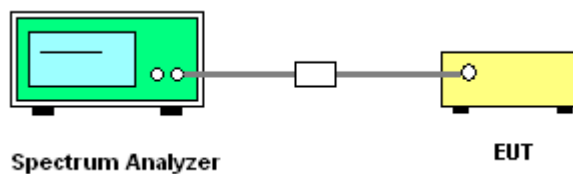
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5MHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	500s

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.
5. Measuring multiple antennas, the connector is required to link with spectrum analyser through a combiner.

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 Power Spectral Density

Temperature	23°C	Humidity	61%
Test Engineer	Jacky Ho	Configurations	802.11a/b/g

Configuration IEEE 802.11b Ant. A-1+A-2+A-3

Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm)	Result
1	2412 MHz	3.24	8.00	Complies
6	2437 MHz	2.61	8.00	Complies
11	2462 MHz	3.16	8.00	Complies

Configuration IEEE 802.11b Ant. B-1+B-2+B-3

Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm)	Result
1	2412 MHz	3.62	8.00	Complies
6	2437 MHz	5.30	8.00	Complies
11	2462 MHz	2.83	8.00	Complies

Configuration IEEE 802.11g Ant. Ant. A-1+A-2+A-3

Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm)	Result
1	2412 MHz	1.73	8.00	Complies
6	2437 MHz	3.42	8.00	Complies
11	2462 MHz	-0.23	8.00	Complies

Configuration IEEE 802.11g Ant. B-1+B-2+B-3

Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm)	Result
1	2412 MHz	-2.28	8.00	Complies
6	2437 MHz	4.47	8.00	Complies
11	2462 MHz	-1.09	8.00	Complies

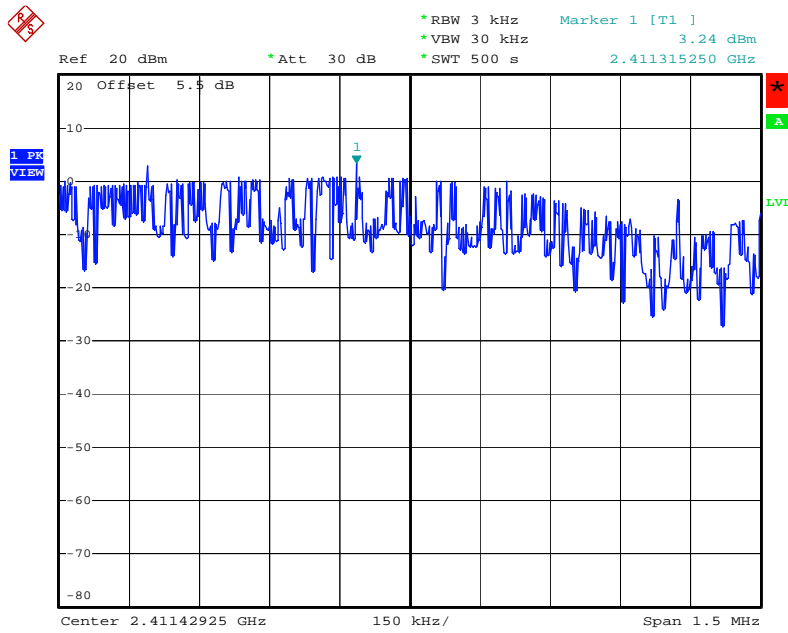
Configuration IEEE 802.11a Ant. A-1+A-2+A-3

Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm)	Result
149	5745 MHz	-6.19	8.00	Complies
157	5785 MHz	-2.92	8.00	Complies
165	5825 MHz	-3.72	8.00	Complies

Configuration IEEE 802.11a Ant. B-1+B-2+B-3

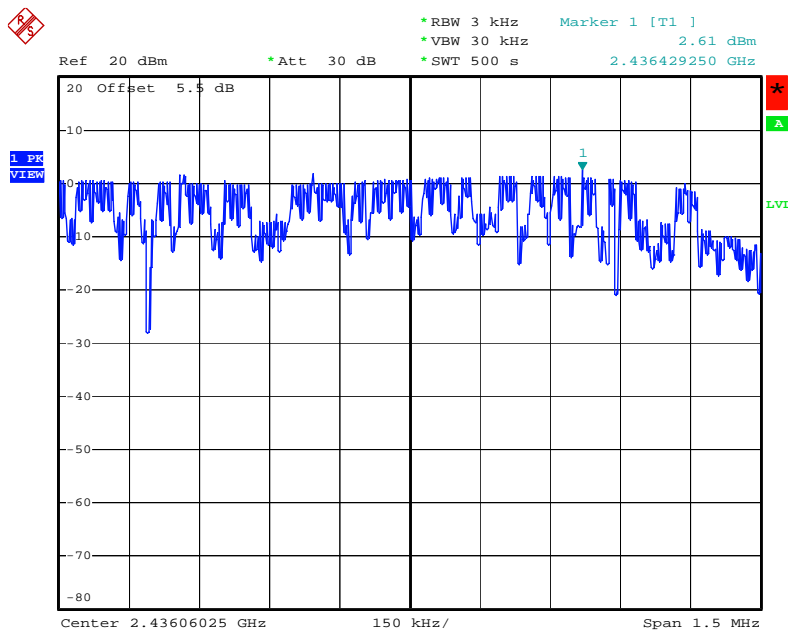
Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm)	Result
149	5745 MHz	1.48	8.00	Complies
157	5785 MHz	0.54	8.00	Complies
165	5825 MHz	-0.70	8.00	Complies

Power Density Plot on Configuration IEEE 802.11b Ant. A-1+A-2+A-3 / 2412 MHz



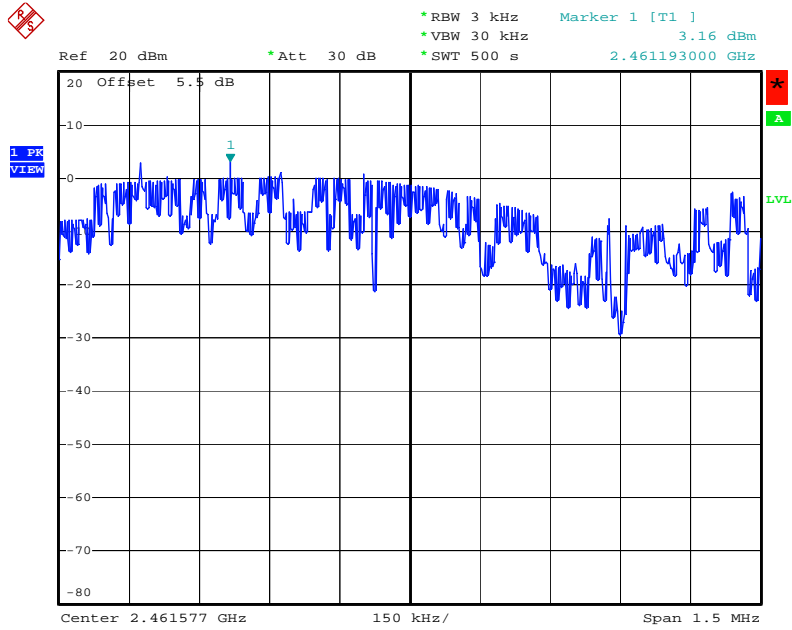
Date: 19.FEB.2008 15:49:36

Power Density Plot on Configuration IEEE 802.11b Ant. A-1+A-2+A-3 / 2437 MHz



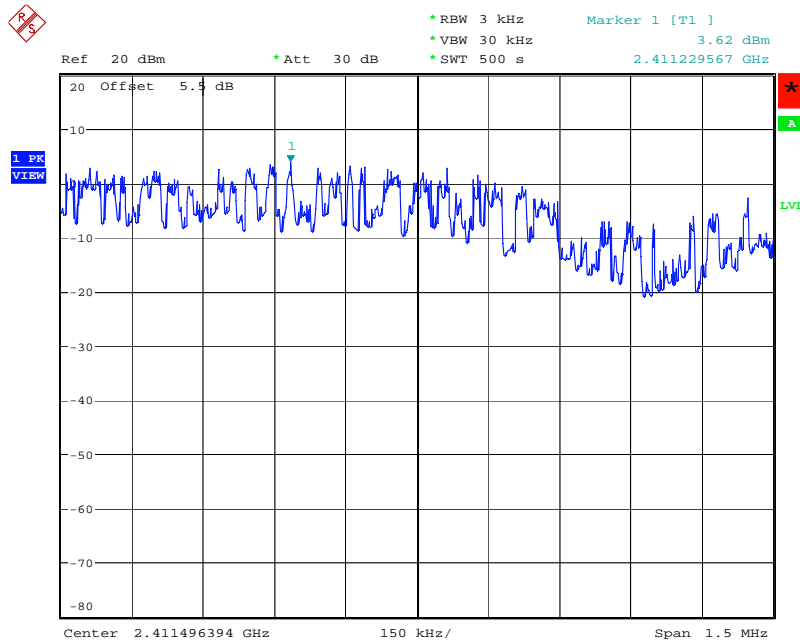
Date: 19.FEB.2008 15:50:26

Power Density Plot on Configuration IEEE 802.11b Ant. A-1+A-2+A-3 / 2462 MHz



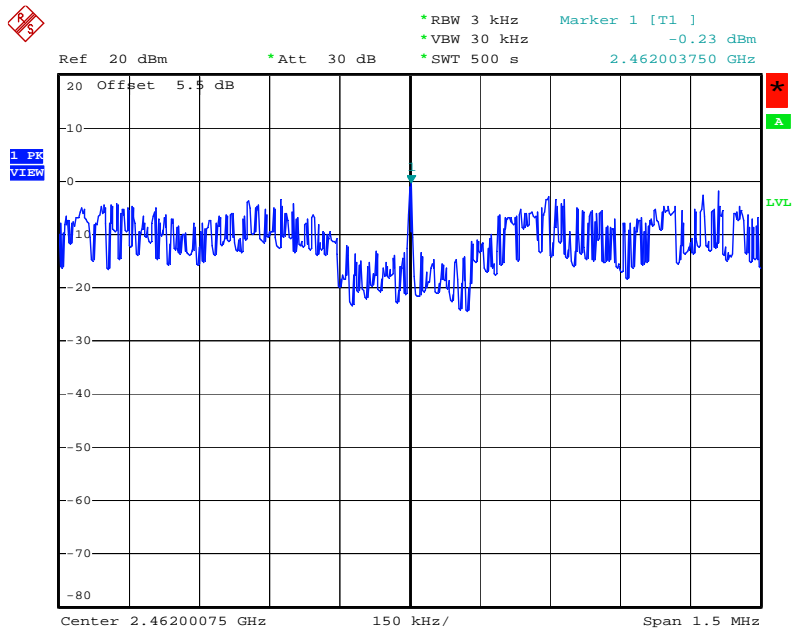
Date: 19.FEB.2008 15:47:24

Power Density Plot on Configuration IEEE 802.11b Ant. B-1+B-2+B-3 / 2412 MHz



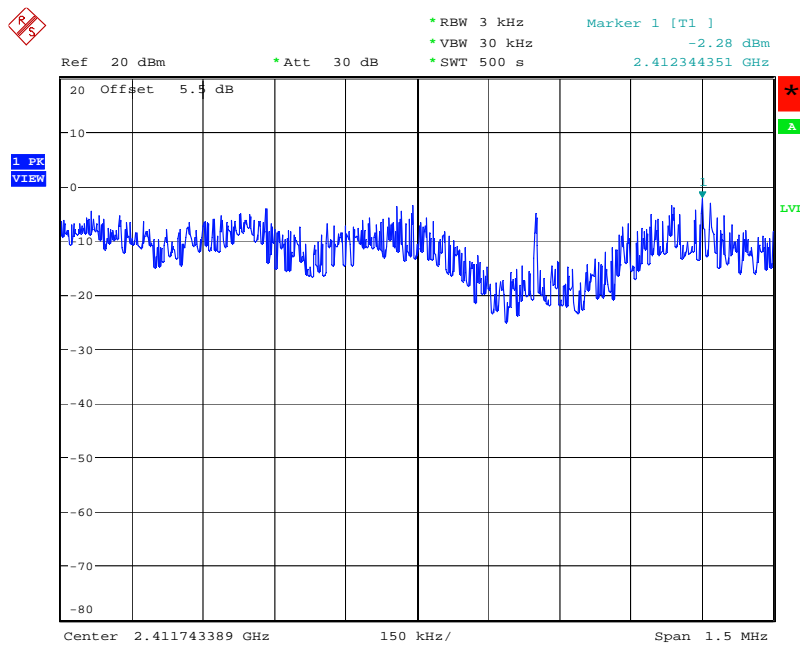
Date: 12.FEB.2008 20:43:55

Power Density Plot on Configuration IEEE 802.11g Ant. A-1+A-2+A-3 / 2462 MHz



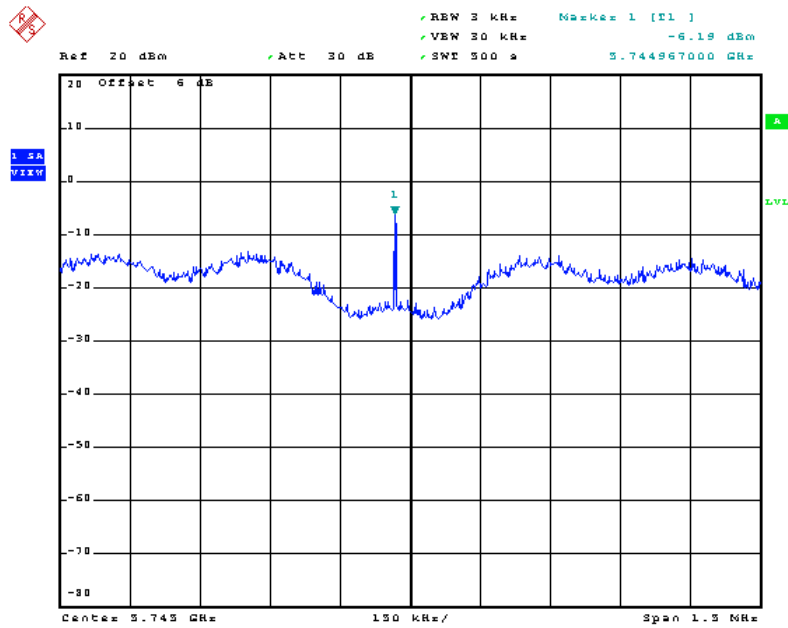
Date: 19.FEB.2008 15:24:33

Power Density Plot on Configuration IEEE 802.11g Ant. B-1+B-2+B-3 / 2412 MHz



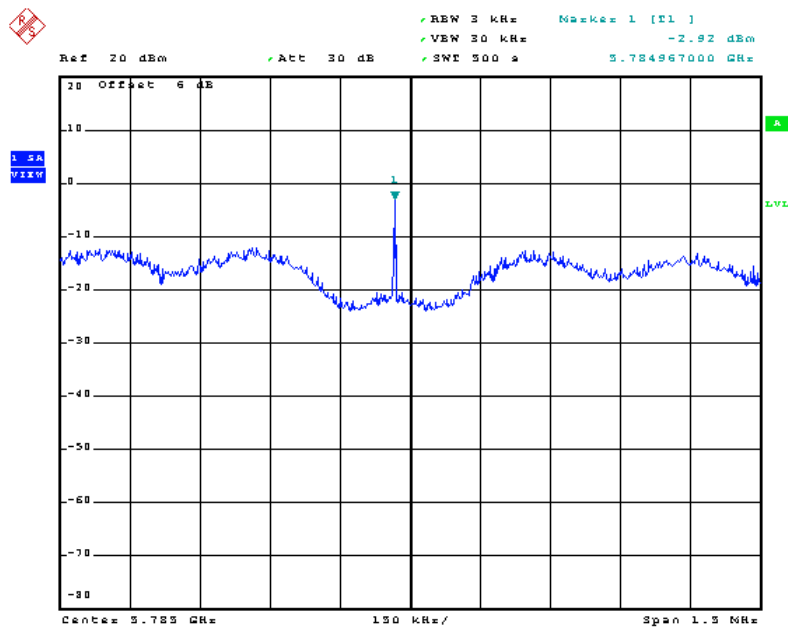
Date: 12.FEB.2008 20:48:47

Power Density Plot on Configuration IEEE 802.11a Ant. A-1+A-2+A-3 / 5745 MHz



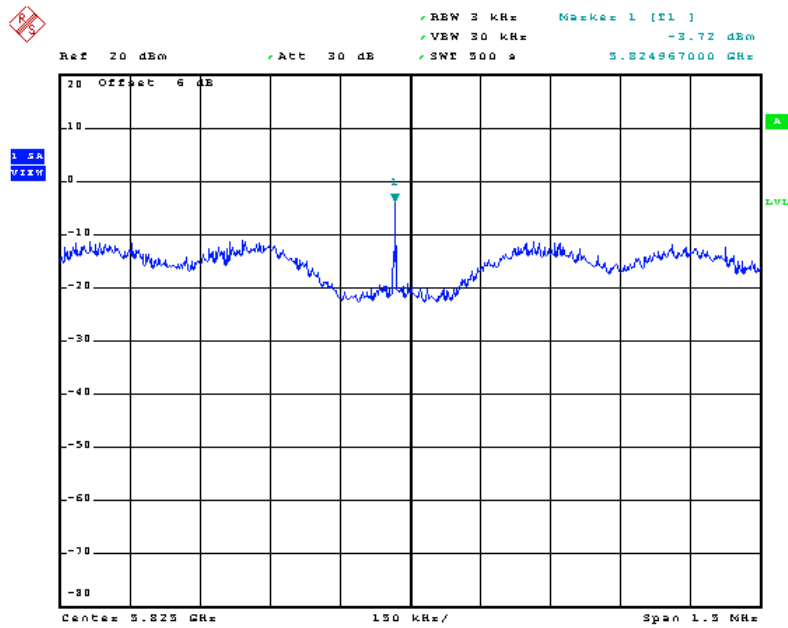
Date: 19.FEB.2008 14:16:48

Power Density Plot on Configuration IEEE 802.11a Ant. A-1+A-2+A-3 / 5785 MHz



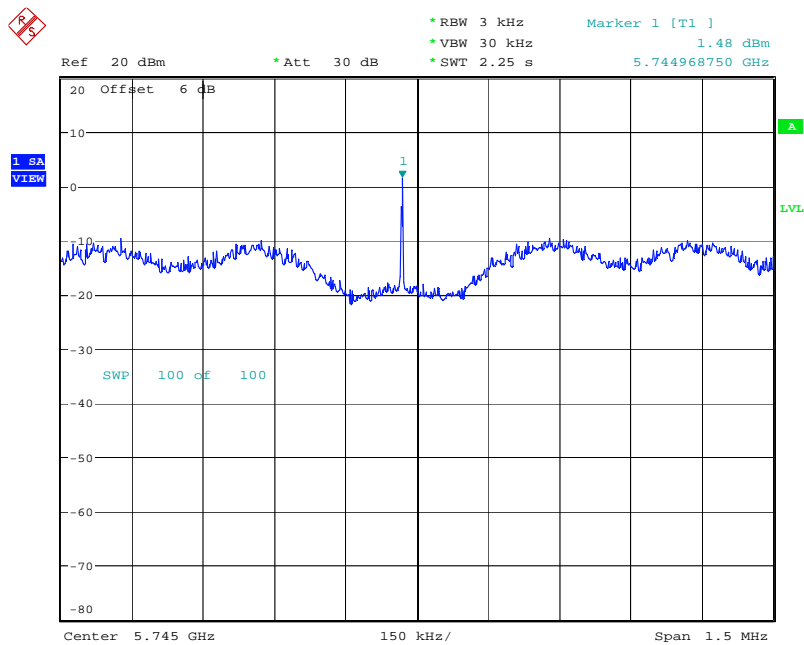
Date: 19.FEB.2008 14:21:22

Power Density Plot on Configuration IEEE 802.11a Ant. A-1+A-2+A-3 / 5825 MHz



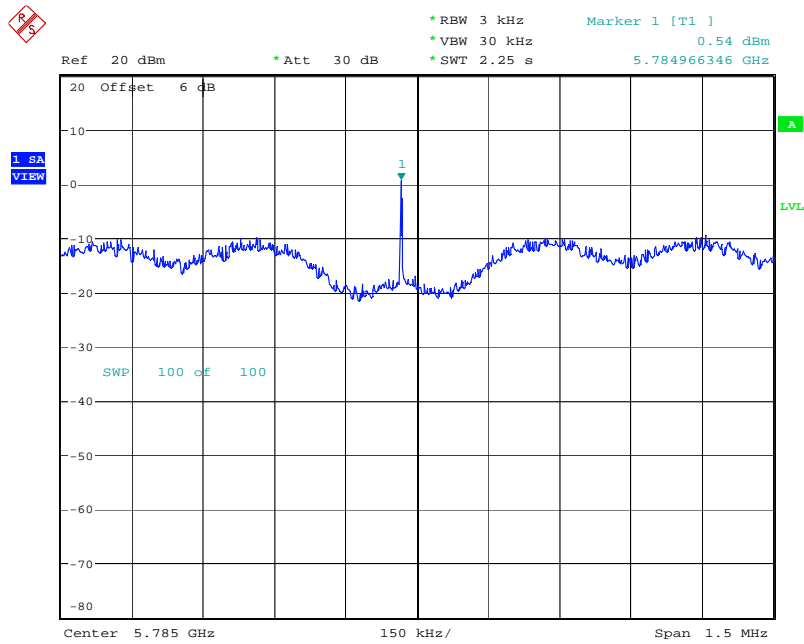
Date: 19.FEB.2008 14:30:05

Power Density Plot on Configuration IEEE 802.11a Ant. B-1+B-2+B-3 / 5745 MHz



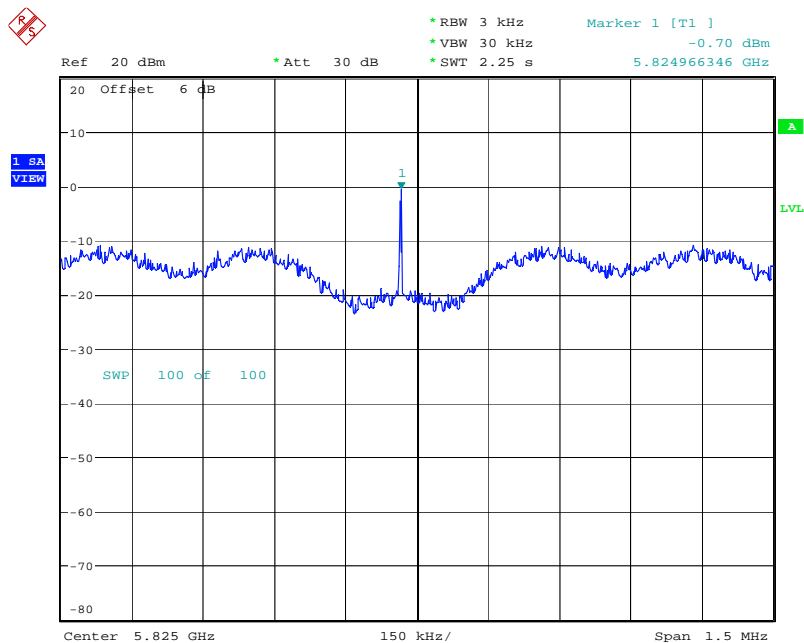
Date: 12.FEB.2008 16:45:39

Power Density Plot on Configuration IEEE 802.11a Ant. B-1+B-2+B-3 / 5785 MHz



Date: 12.FEB.2008 16:41:12

Power Density Plot on Configuration IEEE 802.11a Ant. B-1+B-2+B-3 / 5825 MHz



Date: 12.FEB.2008 16:35:23

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.4.2. Measuring Instruments and Setting

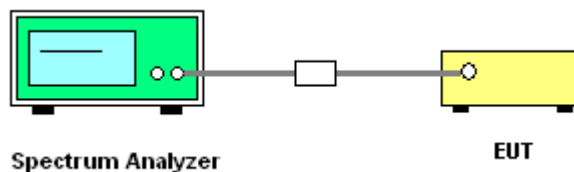
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	100 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 in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.
4. Measuring multiple antennas, the connector is required to link with spectrum analyser through a combiner.

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 6dB Spectrum Bandwidth

Temperature	23°C	Humidity	61%
Test Engineer	Jacky Ho	Configurations	802.11a/b/g

Configuration IEEE 802.11b Ant. A-1+A-2+A-3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	10.08	15.60	500	Complies
6	2437 MHz	10.12	15.48	500	Complies
11	2462 MHz	10.12	15.16	500	Complies

Configuration IEEE 802.11b Ant. B-1+B-2+B-3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	11.02	15.25	500	Complies
6	2437 MHz	12.08	16.02	500	Complies
11	2462 MHz	10.03	15.06	500	Complies

Configuration IEEE 802.11g Ant. A-1+A-2+A-3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.32	16.40	500	Complies
6	2437 MHz	14.44	16.40	500	Complies
11	2462 MHz	16.32	16.40	500	Complies

Configuration IEEE 802.11g Ant. B-1+B-2+B-3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.89	16.37	500	Complies
6	2437 MHz	16.34	16.66	500	Complies
11	2462 MHz	16.31	16.41	500	Complies

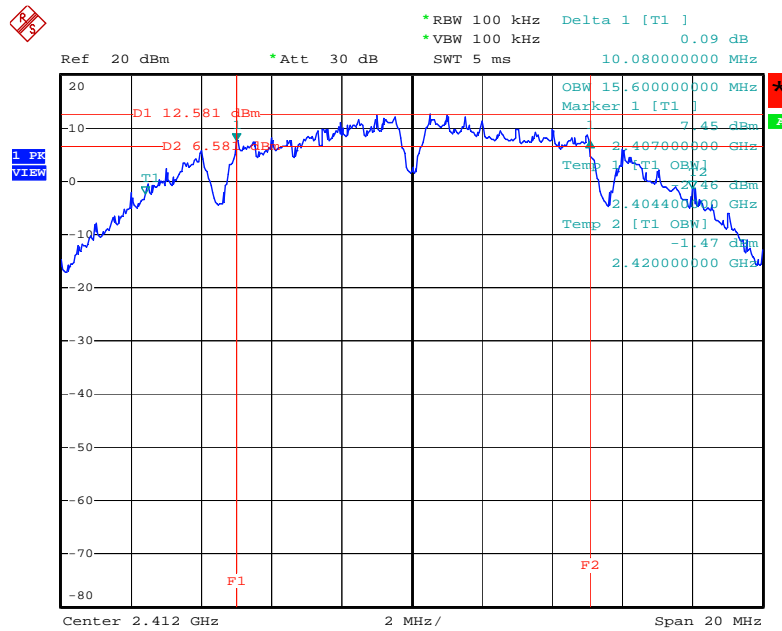
Configuration IEEE 802.11a Ant. A-1 +A-2+A-3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.40	16.52	500	Complies
157	5785 MHz	15.32	16.68	500	Complies
165	5825 MHz	15.68	17.24	500	Complies

Configuration IEEE 802.11a Ant. B-1 +B-2+B-3

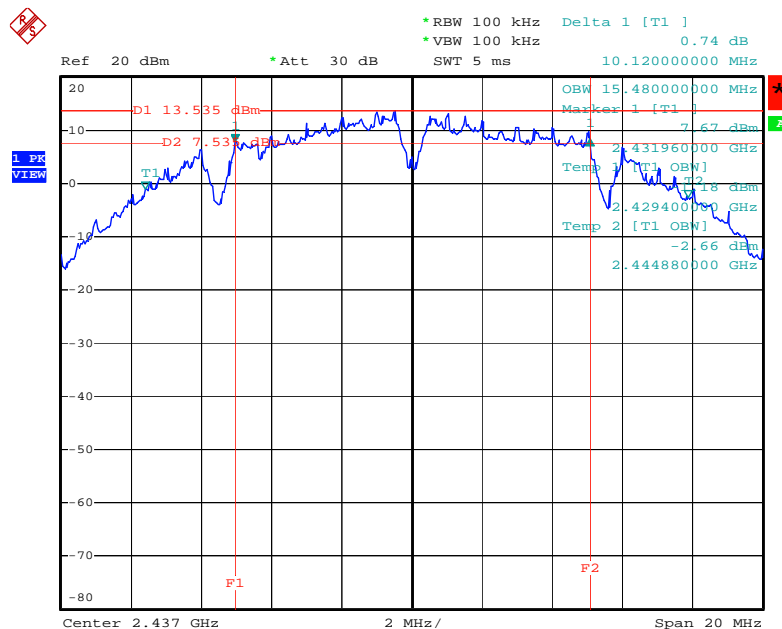
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.00	18.04	500	Complies
157	5785 MHz	15.67	17.82	500	Complies
165	5825 MHz	13.84	17.53	500	Complies

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. A-1+A-2+A-3 / 2412 MHz



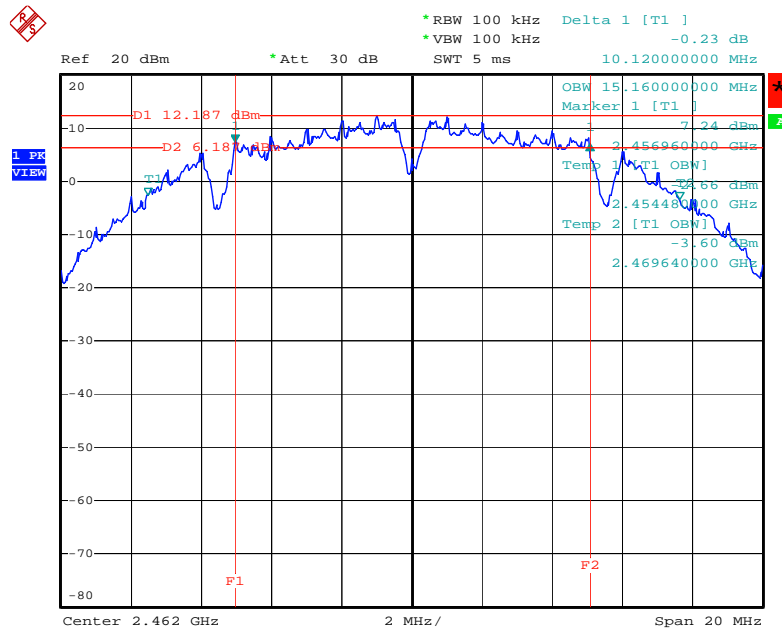
Date: 19.FEB.2008 15:49:11

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. A-1+A-2+A-3 / 2437 MHz



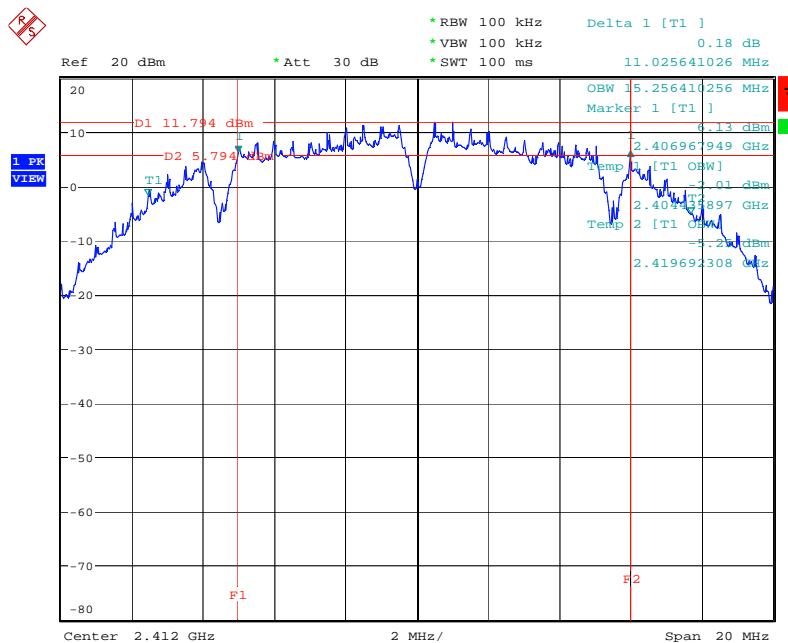
Date: 19.FEB.2008 15:50:10

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. A-1+A-2+A-3 / 2462 MHz



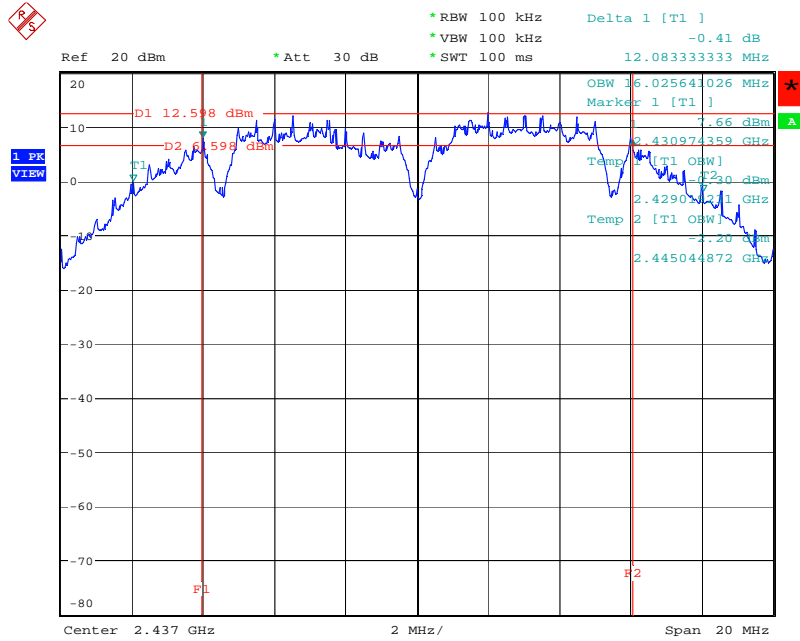
Date: 19.FEB.2008 15:47:08

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. B-1+B-2+B-3 / 2412 MHz



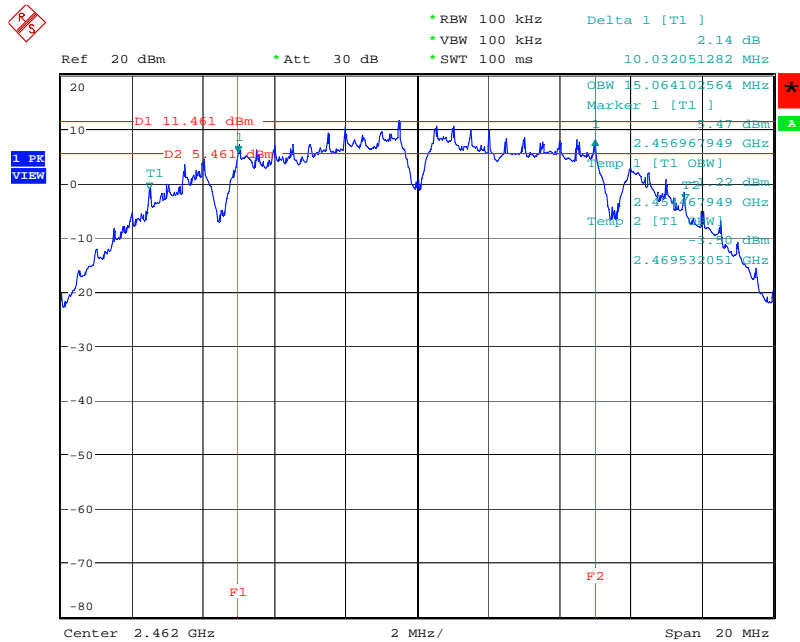
Date: 12.FEB.2008 20:43:29

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. B-1+B-2+B-3 / 2437 MHz



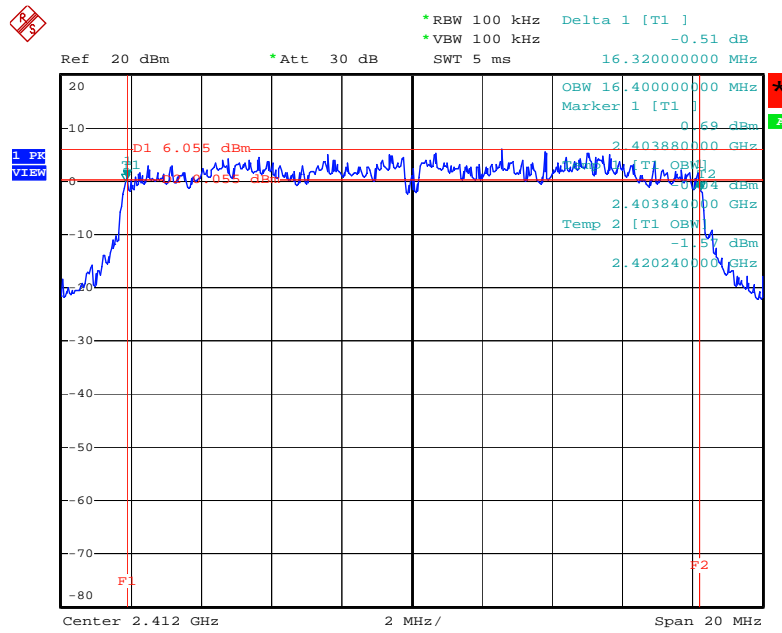
Date: 12.FEB.2008 20:44:43

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. B-1+B-2+B-3 / 2462 MHz



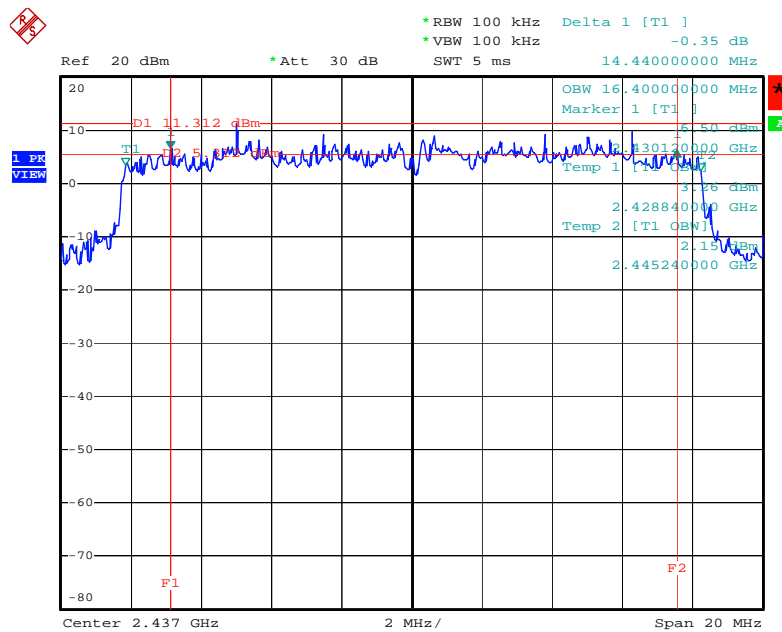
Date: 12.FEB.2008 20:45:28

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. A-1+A-2+A-3 / 2412 MHz



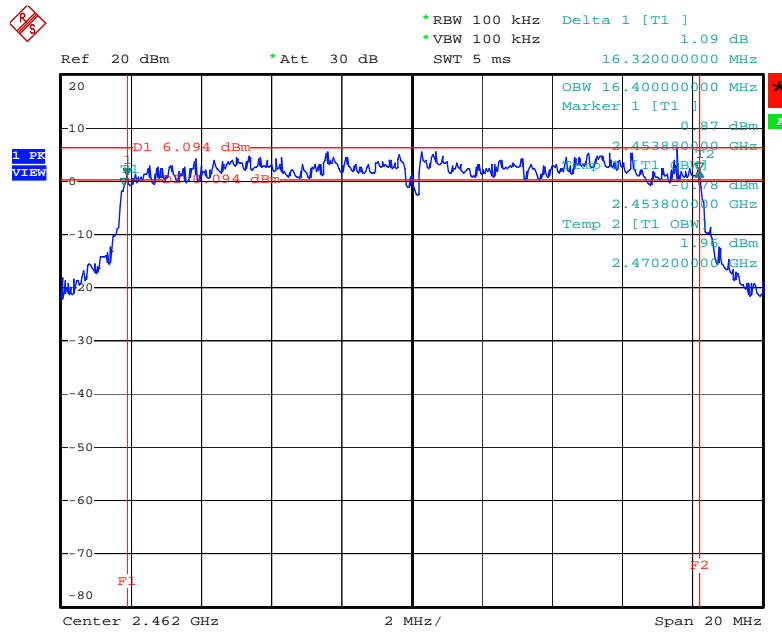
Date: 19.FEB.2008 15:25:52

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. A-1+A-2+A-3 / 2437 MHz



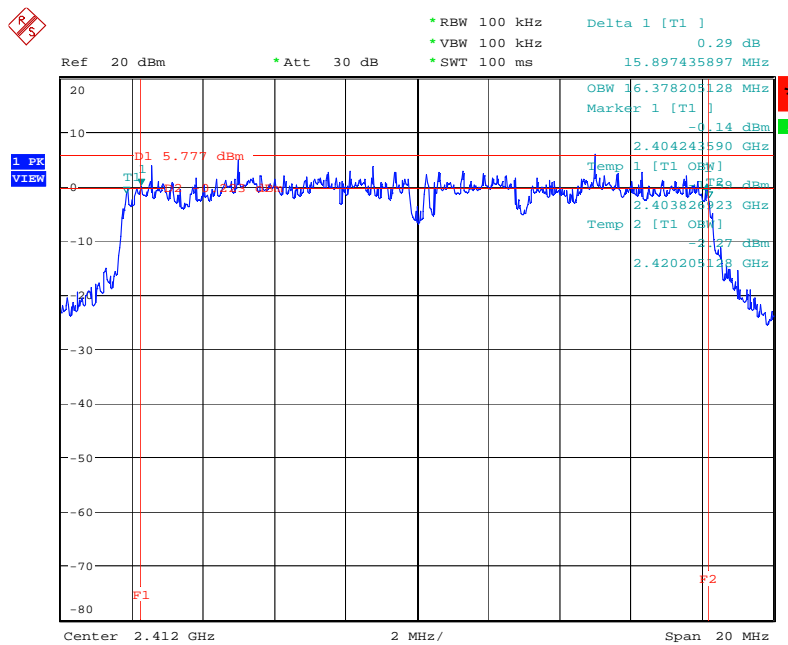
Date: 19.FEB.2008 15:25:05

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. A-1+A-2+A-3 / 2462 MHz



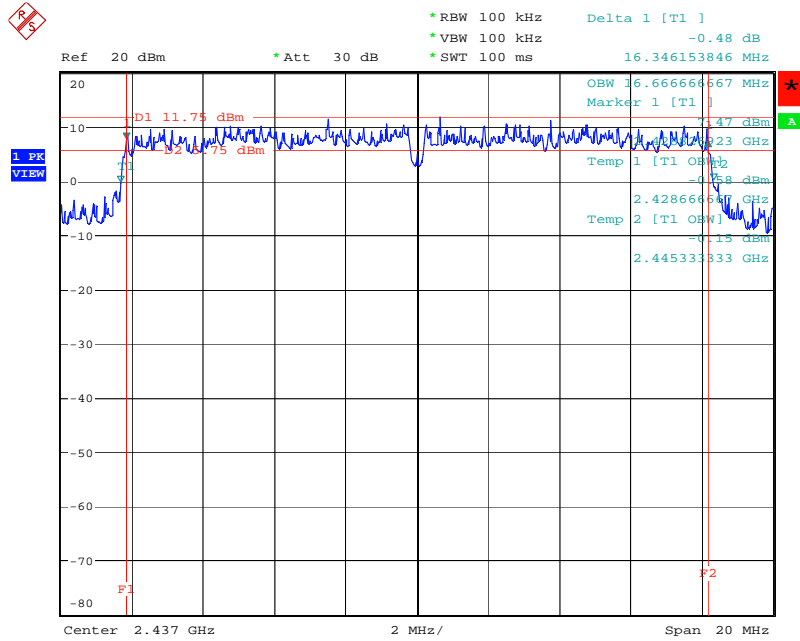
Date: 19.FEB.2008 15:24:18

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. B-1+B-2+B-3 / 2412 MHz



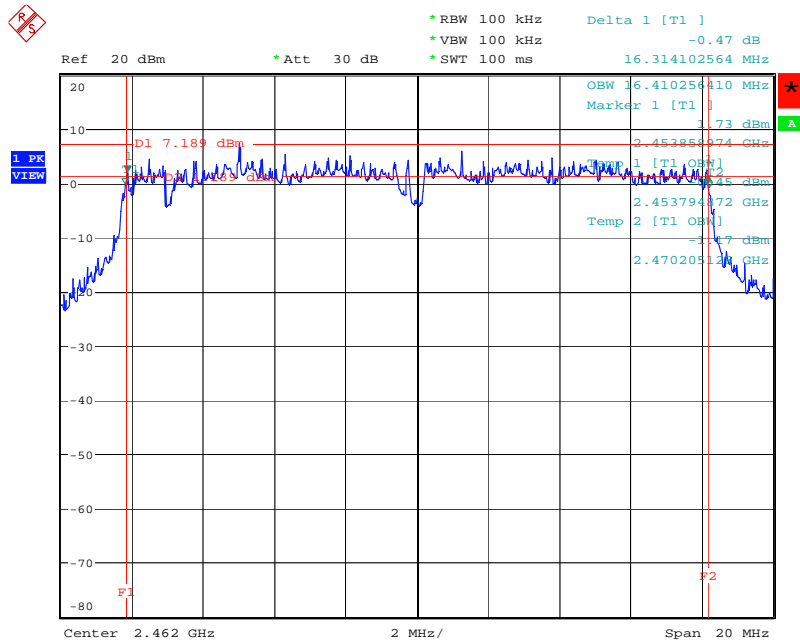
Date: 12.FEB.2008 20:48:22

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. B-1+B-2+B-3 / 2437 MHz



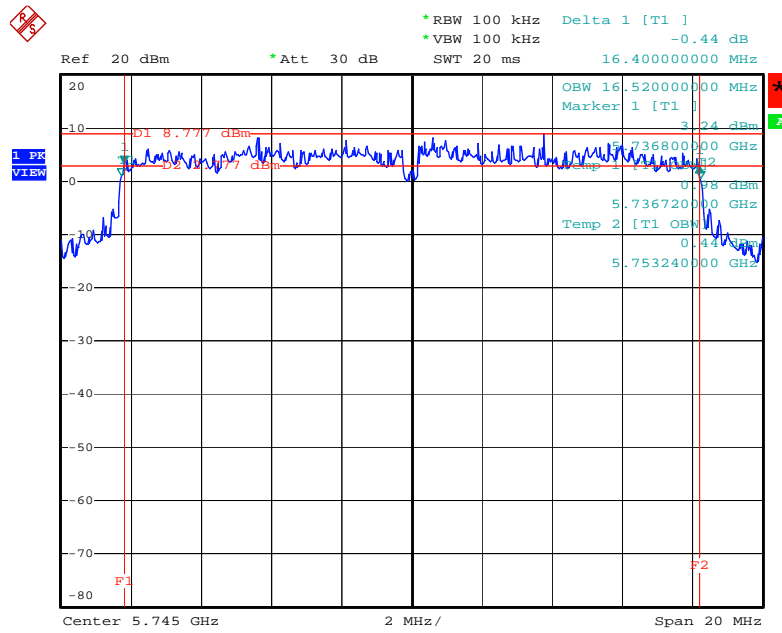
Date: 12.FEB.2008 20:47:28

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. B-1+B-2+B-3 / 2462 MHz



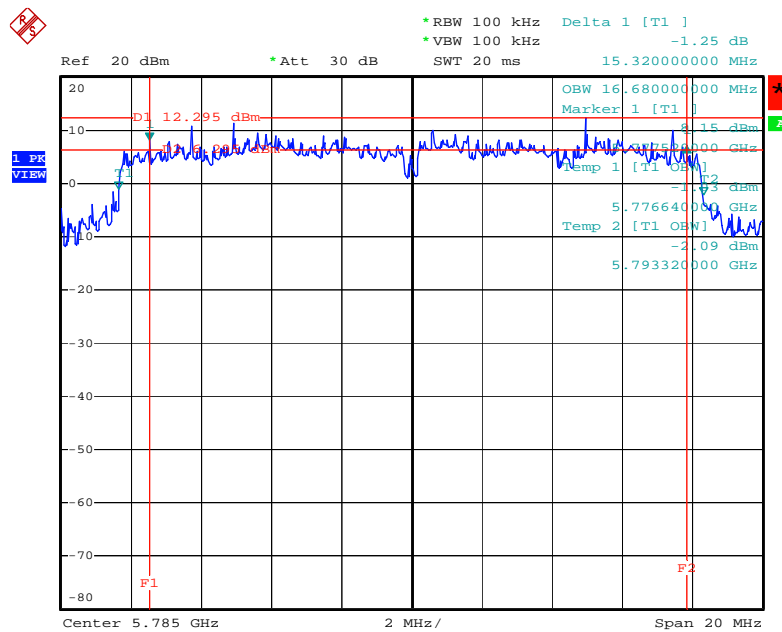
Date: 12.FEB.2008 20:46:27

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B-1+B-2+B-3 / 5745 MHz



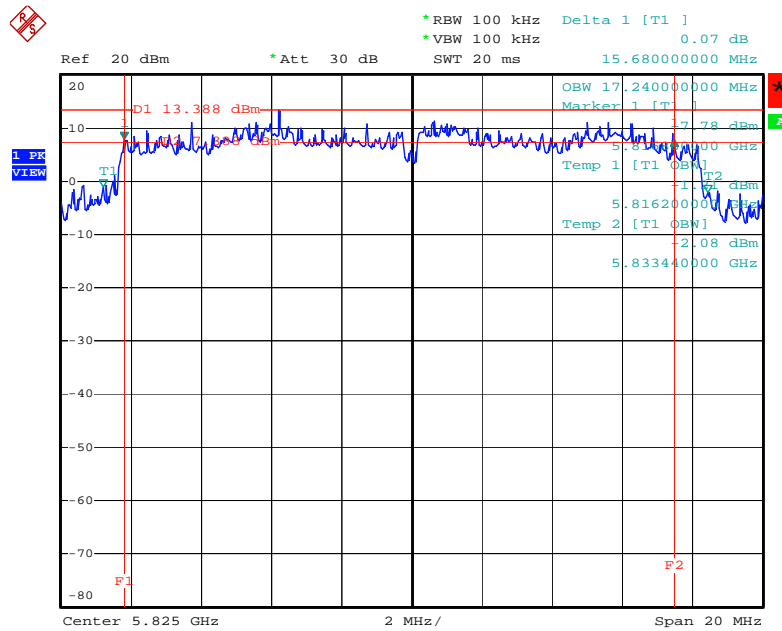
Date: 19.FEB.2008 14:12:58

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A-1+A-2+A-3 / 5785 MHz



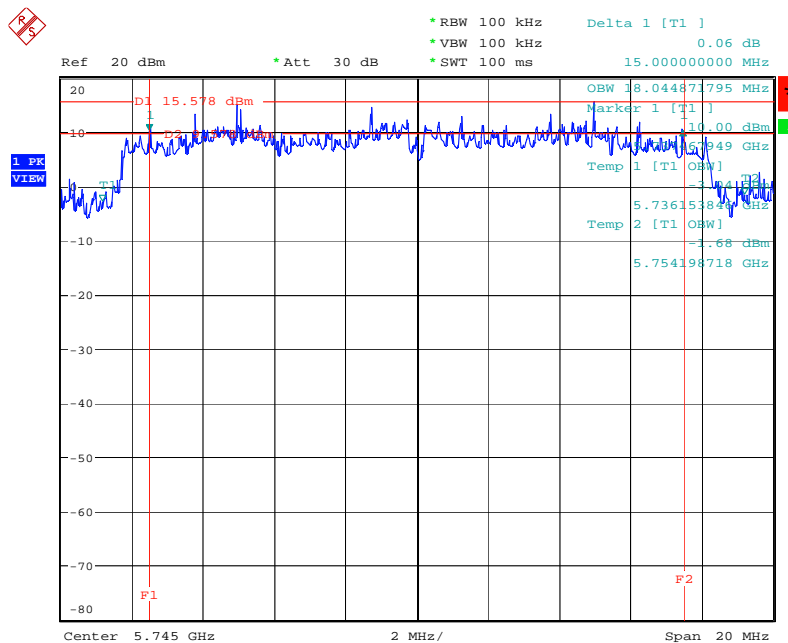
Date: 19.FEB.2008 14:17:32

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A-1+A-2+A-3 / 5825 MHz



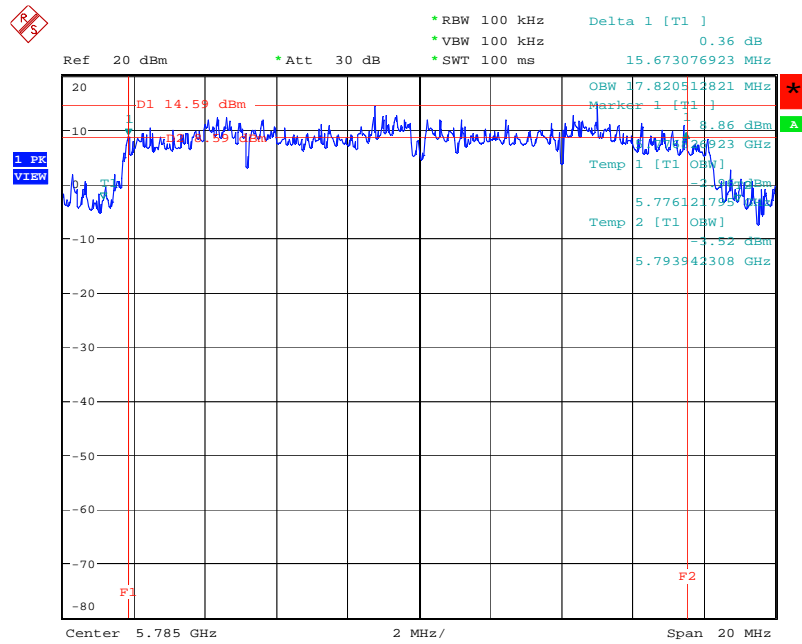
Date: 19.FEB.2008 14:26:15

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B-1+B-2+B-3 / 5745 MHz



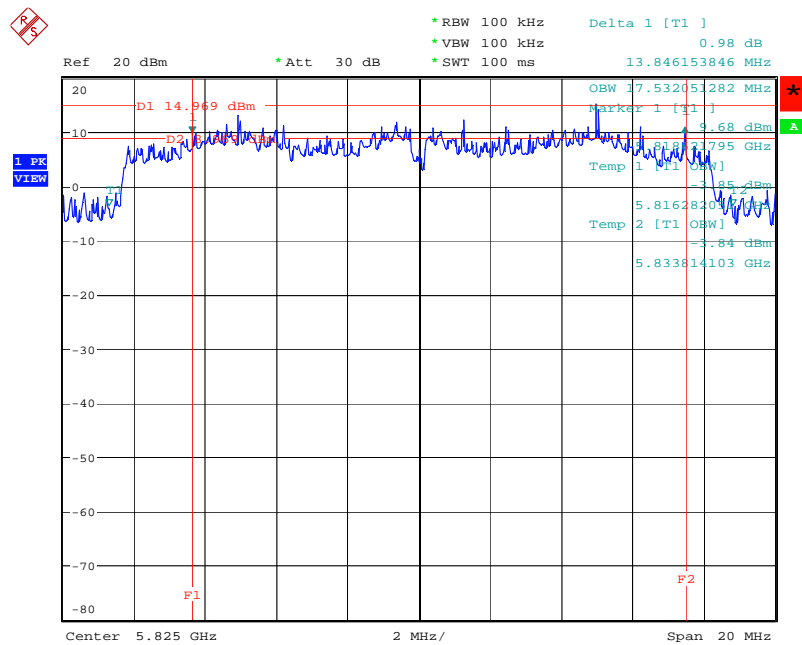
Date: 12.FEB.2008 16:41:49

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B-1+B-2+B-3 / 5785 MHz



Date: 12.FEB.2008 16:37:21

6 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B-1+B-2+B-3 / 5825 MHz



Date: 12.FEB.2008 16:31:34

4.5. Radiated Emissions Measurement

4.5.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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 (microvolts/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

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer 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 (Emission in non-restricted band)	100KHz / 100KHz for peak

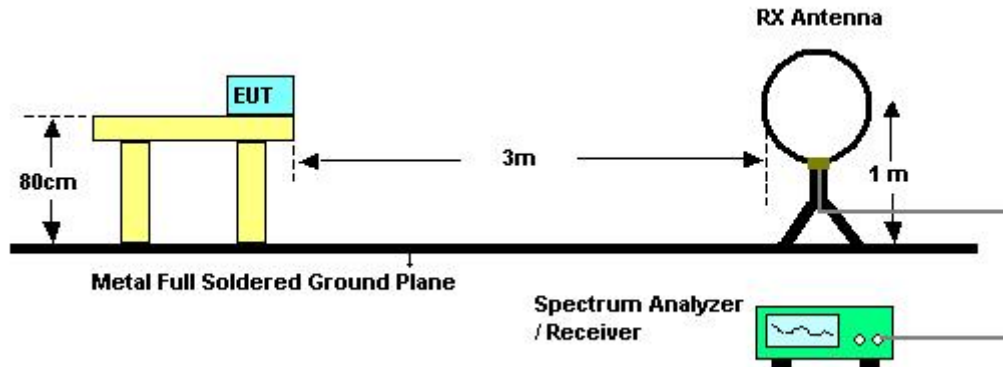
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

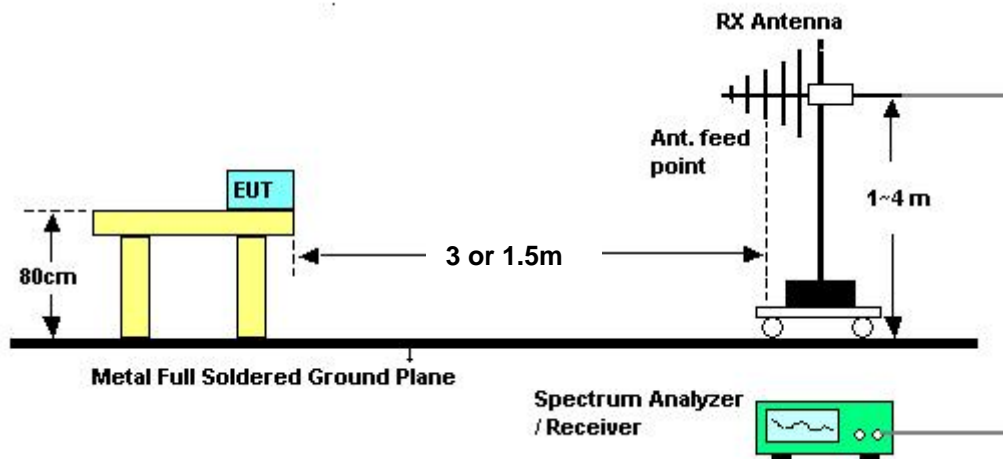
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

4.5.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

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

Temperature	18°C	Humidity	63%
Test Engineer	Aric Li		

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 20 dB below the permissible value has no need to be reported.

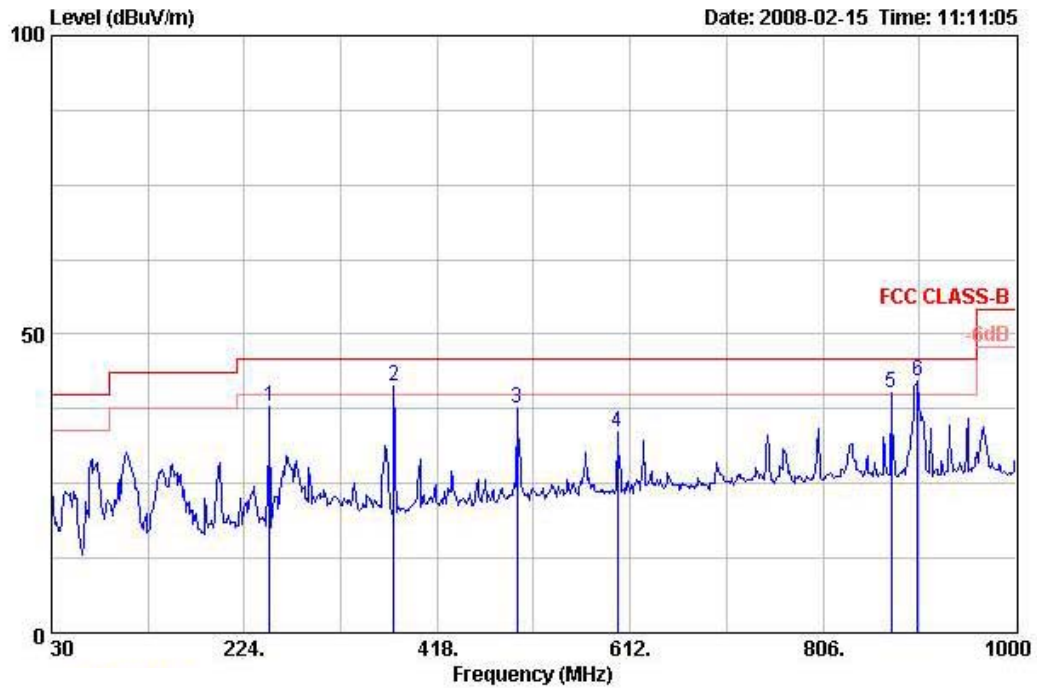
Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

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

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

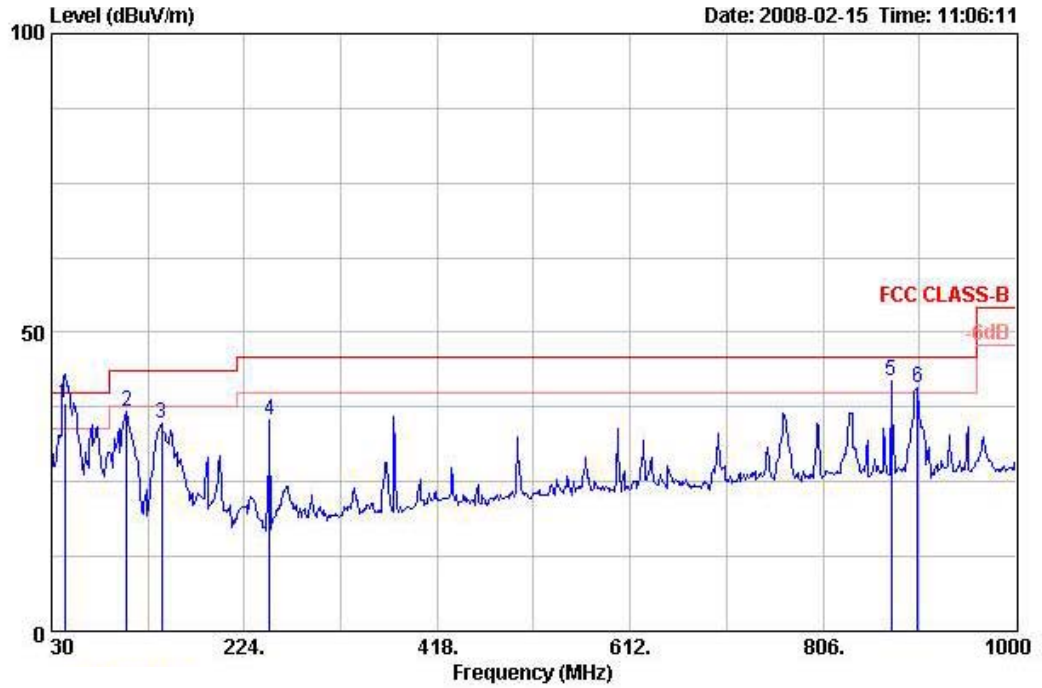
Temperature	18°C	Humidity	63%
Test Engineer	Aric Li	Configurations	Ant. A POE Mode (Horizontal)

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Table Pos	Ant Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		deg	cm	
1	249.220	37.89	-8.11	46.00	51.43	11.56	27.00	1.90	Peak	0	100	HORIZONTAL
2 !	374.350	41.37	-4.63	46.00	51.75	14.79	27.42	2.25	Peak	254	100	HORIZONTAL
3	498.510	37.57	-8.43	46.00	45.72	17.24	28.09	2.70	Peak	0	100	HORIZONTAL
4	599.390	33.53	-12.47	46.00	40.40	18.33	28.10	2.90	Peak	0	100	HORIZONTAL
5 !	874.870	40.22	-5.78	46.00	43.75	20.42	27.45	3.50	Peak	0	100	HORIZONTAL
6 B	901.060	42.24	-3.76	46.00	45.61	20.43	27.39	3.60	Peak	0	100	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Table Pos	Ant Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		deg	cm	
1	43.580	38.20	-1.80	40.00	55.55	9.75	27.80	0.70	QP	46	100	VERTICAL
2	105.660	36.67	-6.83	43.50	52.10	10.94	27.57	1.20	Peak	0	400	VERTICAL
3	140.580	34.85	-8.65	43.50	50.43	10.41	27.39	1.40	Peak	0	400	VERTICAL
4	249.220	35.23	-10.77	46.00	48.77	11.56	27.00	1.90	Peak	0	400	VERTICAL
5	874.870	41.80	-4.20	46.00	45.34	20.42	27.45	3.50	Peak	0	400	VERTICAL
6	901.060	40.76	-5.24	46.00	44.13	20.43	27.39	3.60	Peak	0	400	VERTICAL

Note:

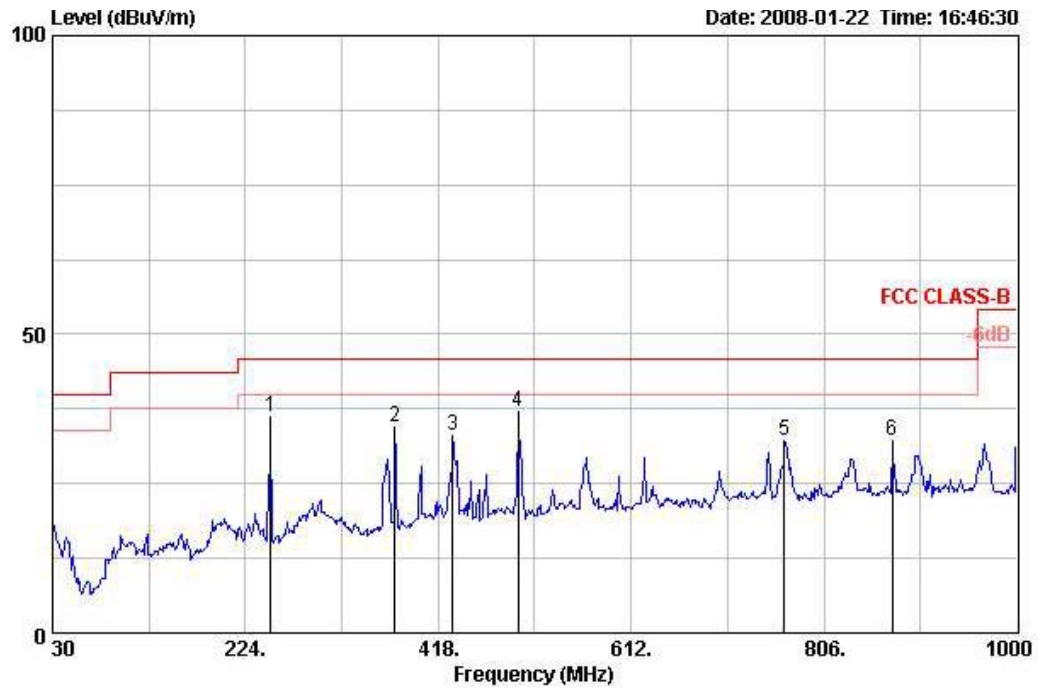
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

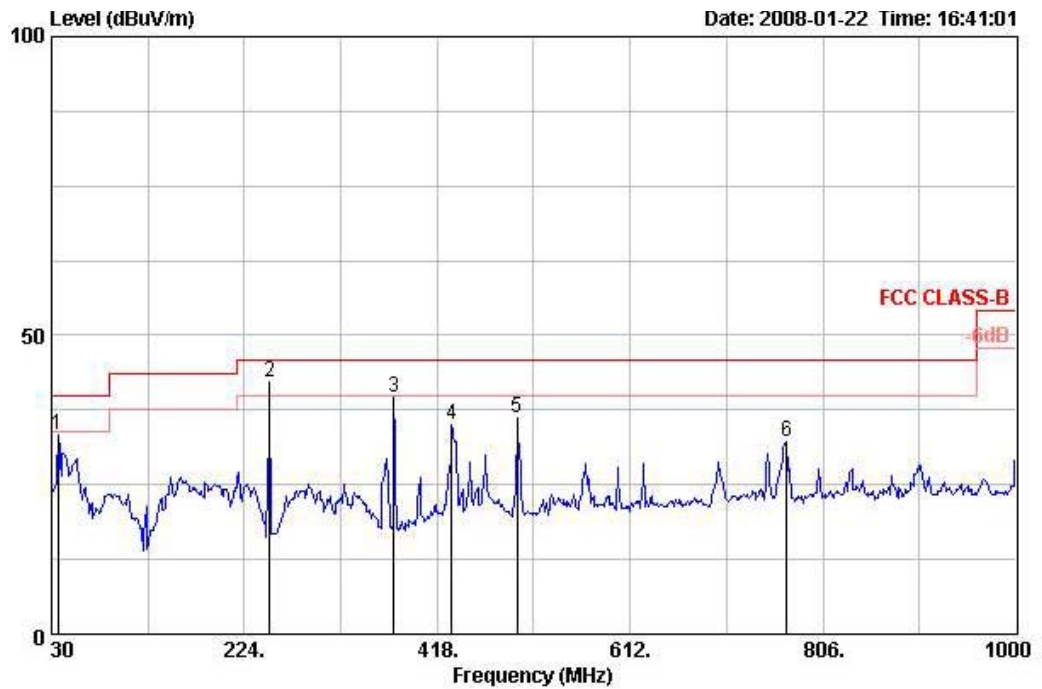
Temperature	18°C	Humidity	63%
Test Engineer	Aric Li	Configurations	Ant. B POE Mode (Horizontal)

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Table Pos	Ant Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		deg	cm	
1	249.220	36.28	-9.72	46.00	49.82	11.56	27.00	1.90	Peak	0	100	HORIZONTAL
2	374.350	34.49	-11.51	46.00	44.87	14.79	27.42	2.25	Peak	0	100	HORIZONTAL
3	432.550	32.96	-13.04	46.00	41.86	16.37	27.76	2.50	Peak	0	100	HORIZONTAL
4	498.510	36.98	-9.02	46.00	45.13	17.24	28.09	2.70	Peak	0	100	HORIZONTAL
5	766.230	32.07	-13.93	46.00	36.50	19.87	27.74	3.43	Peak	0	100	HORIZONTAL
6	874.870	32.11	-13.89	46.00	35.64	20.42	27.45	3.50	Peak	0	100	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Table Pos	Ant Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		deg	cm	
1	36.790	33.35	-6.65	40.00	46.97	13.60	27.80	0.58	Peak	0	400	VERTICAL
2	249.220	42.29	-3.71	46.00	55.83	11.56	27.00	1.90	Peak	135	125	VERTICAL
3	374.350	39.67	-6.33	46.00	50.05	14.79	27.42	2.25	Peak	0	400	VERTICAL
4	432.550	35.10	-10.90	46.00	43.99	16.37	27.76	2.50	Peak	0	400	VERTICAL
5	498.510	36.21	-9.79	46.00	44.36	17.24	28.09	2.70	Peak	0	400	VERTICAL
6	769.140	32.06	-13.94	46.00	36.43	19.93	27.72	3.42	Peak	0	400	VERTICAL

Note:

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

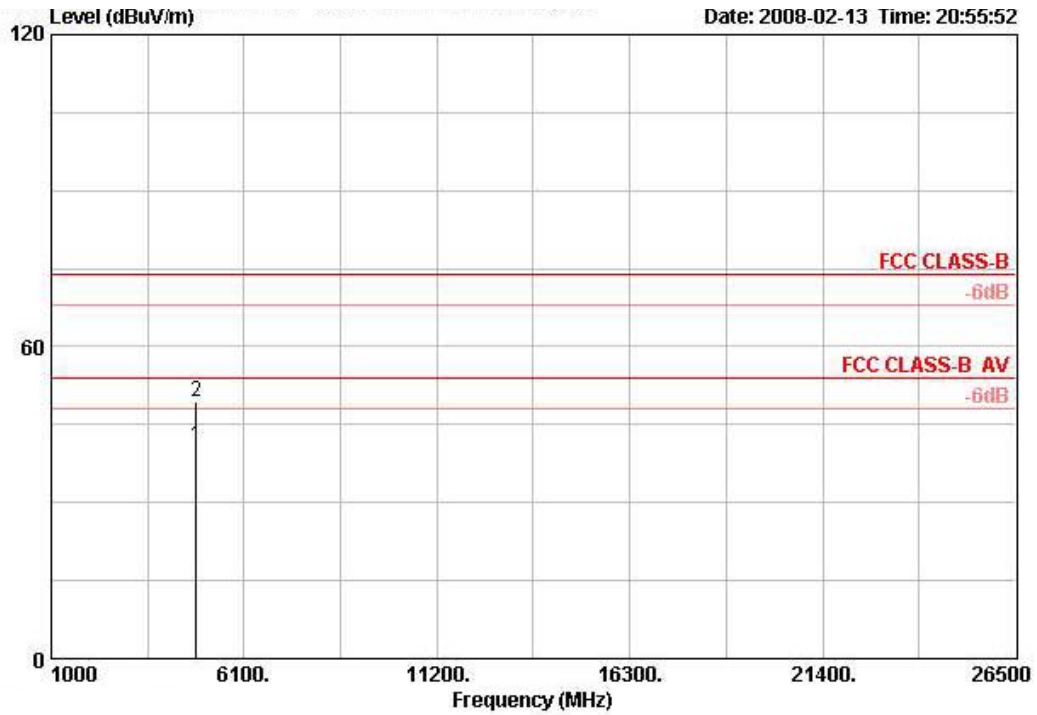
Emission level (dBUV/m) = 20 log Emission level (uV/m).

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

4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

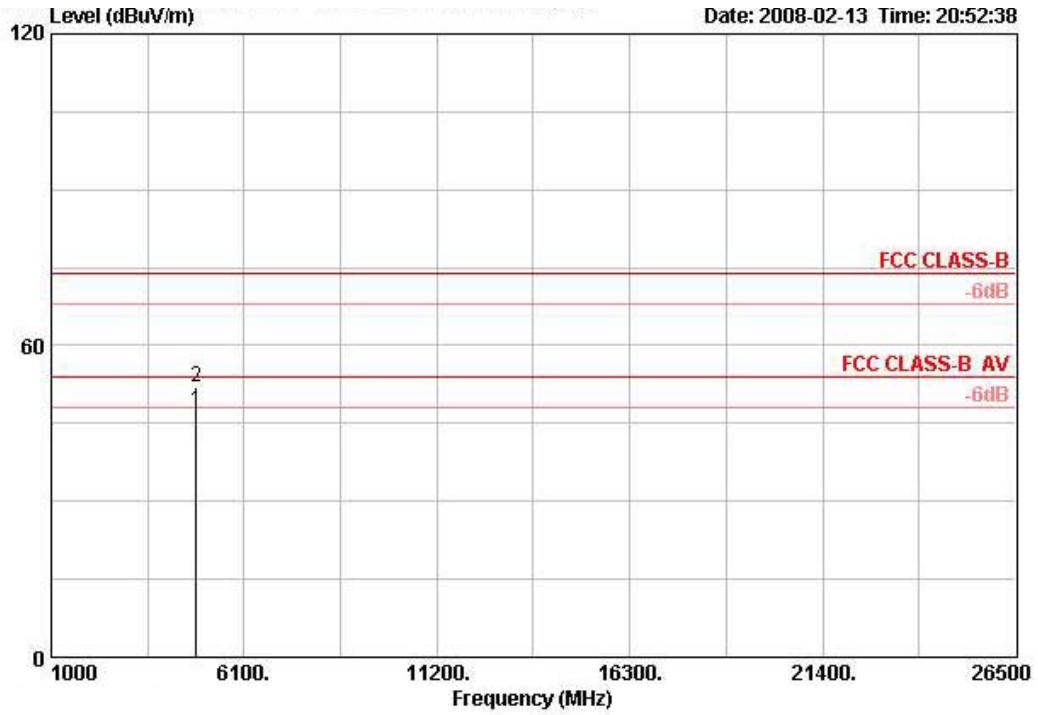
Temperature	18°C	Humidity	63%
Test Engineer	Aric Li	Configurations	802.11b CH 1 / Ant. A POE Mode (Horizontal)

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4823.950	40.83	-13.17	54.00	34.78	33.39	7.91	35.25	AVERAGE	100	309	HORIZONTAL
2	4824.310	49.46	-24.54	74.00	43.41	33.39	7.91	35.25	PEAK	100	309	HORIZONTAL

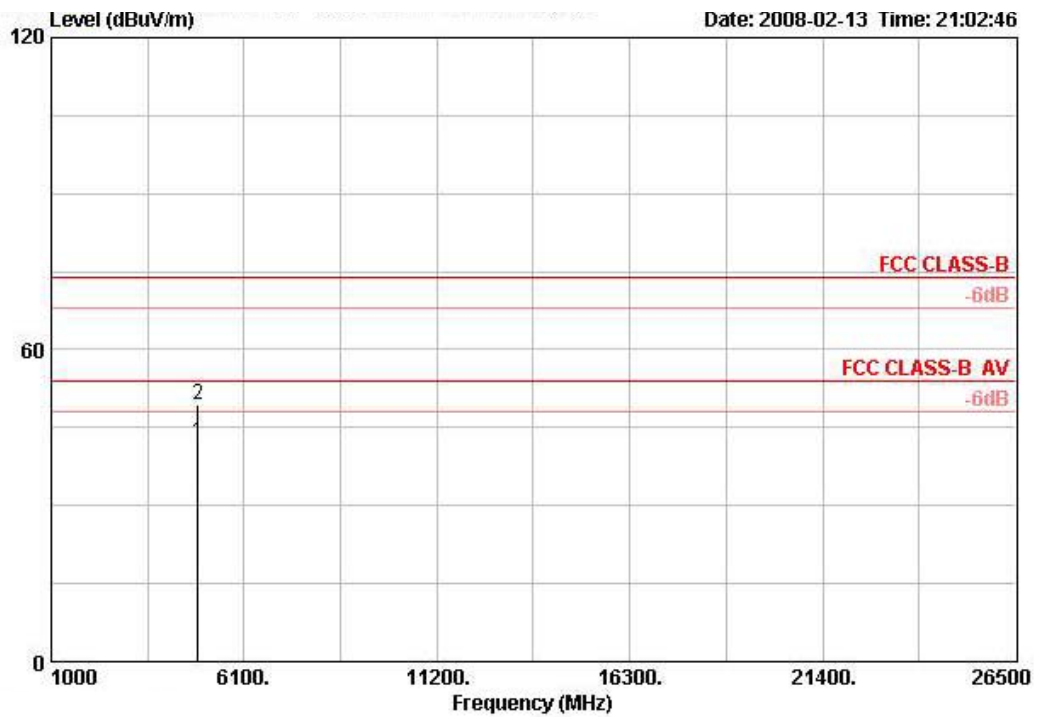
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4823.970	47.52	-6.48	54.00	41.47	33.39	7.91	35.25	AVERAGE	100	214	VERTICAL
2	4824.020	52.10	-21.90	74.00	46.05	33.39	7.91	35.25	PEAK	100	214	VERTICAL

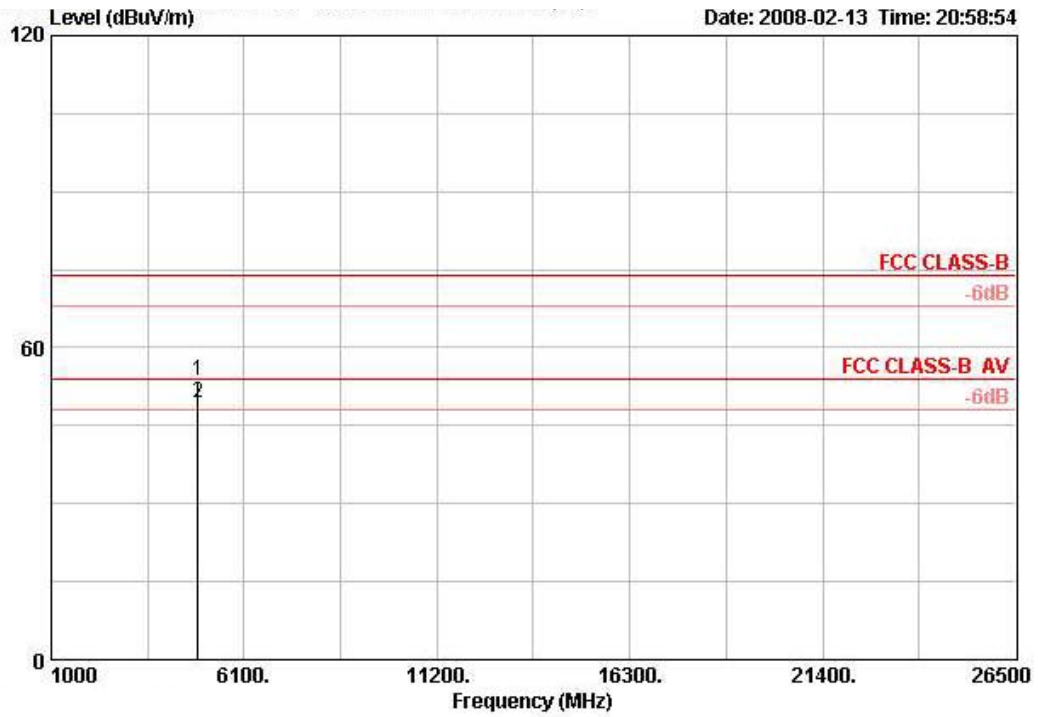
Temperature	18°C	Humidity	63%
Test Engineer	Aric Li	Configurations	802.11b CH 6 / Ant. A POE Mode (Horizontal)

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4874.050	42.26	-11.74	54.00	36.06	33.48	7.96	35.25	AVERAGE	100	38	HORIZONTAL
2	4874.070	49.37	-24.63	74.00	43.17	33.48	7.96	35.25	PEAK	100	38	HORIZONTAL

Vertical

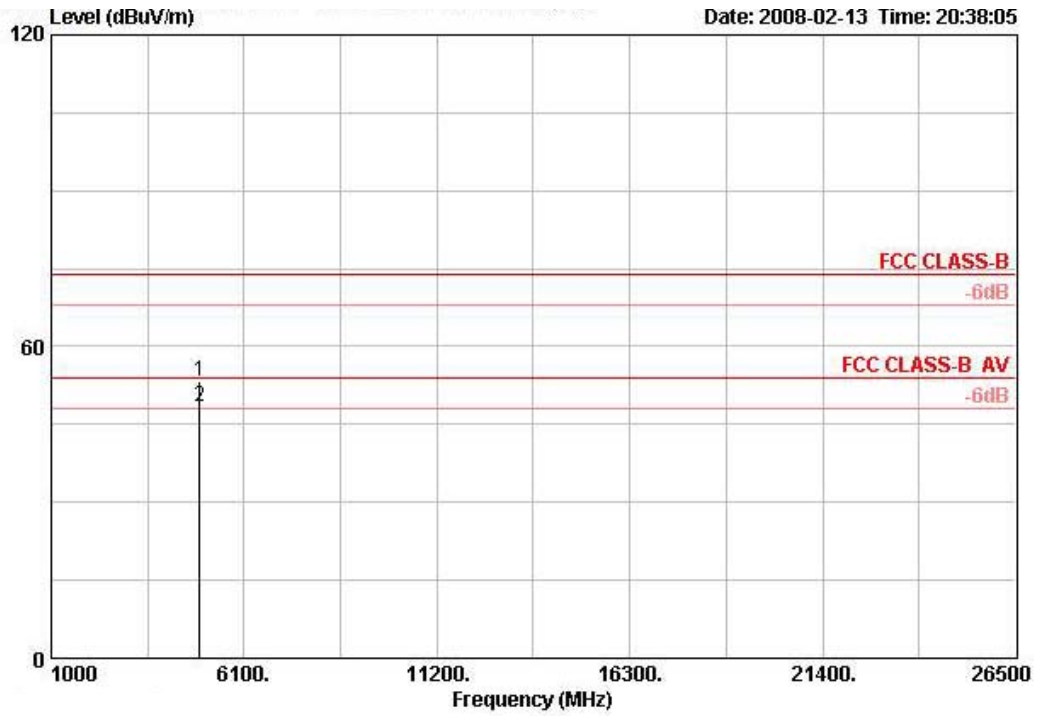


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4874.020	53.49	-20.51	74.00	47.29	33.48	7.96	35.25	PEAK	100	41	VERTICAL
2 @	4874.030	49.48	-4.52	54.00	43.28	33.48	7.96	35.25	AVERAGE	100	41	VERTICAL



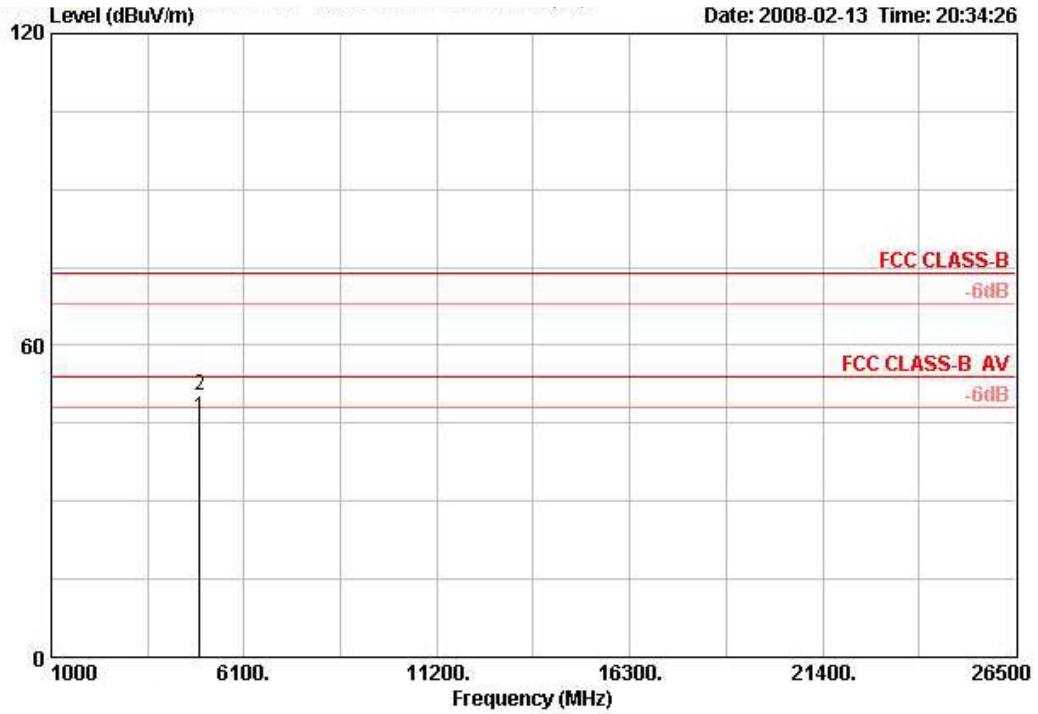
Temperature	18°C	Humidity	63%
Test Engineer	Aric Li	Configurations	802.11b CH 11 / Ant. A POE Mode (Horizontal)

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Antenna Level	Antenna Factor	Cable Loss	Preamp	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4923.990	53.25	-20.75	74.00	46.90	33.58	8.01	35.24	PEAK	100	41	HORIZONTAL
2 @	4924.030	48.46	-5.54	54.00	42.12	33.58	8.01	35.24	AVERAGE	100	41	HORIZONTAL

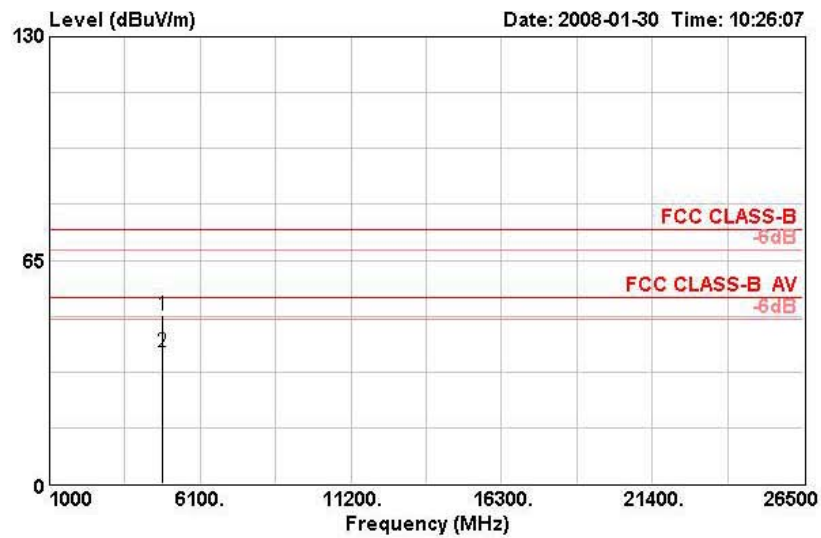
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4924.010	46.03	-7.97	54.00	39.69	33.58	8.01	35.24	AVERAGE	122	190	VERTICAL
2	4924.020	50.38	-23.62	74.00	44.03	33.58	8.01	35.24	PEAK	122	190	VERTICAL

Temperature	18°C	Humidity	63%
Test Engineer	Aric Li	Configurations	802.11b CH 1 / Ant. B POE Mode (Horizontal)

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4823.810	48.88	-25.12	74.00	44.59	33.06	6.40	35.16	PEAK	100	66	HORIZONTAL
2 @	4823.930	38.53	-15.47	54.00	34.25	33.06	6.40	35.16	AVERAGE	100	66	HORIZONTAL