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FCC RADIO TEST REPORT

Applicant's company	NETGEAR, Inc.
Applicant Address	4500 Great America Parkway, Santa Clara, CA 95054, USA
FCC ID	PY308400093
Manufacturer's company	Ambit Microsystems (Shanghai) Ltd.
Manufacturer Address	No. 1925, Nanle Road, Songjiang Export Processing Zone, Shanghai, China

Product Name	RangeMax Wireless-N Gigabit Router
Brand Name	NETGEAR
Model Name	WNR3500v2, WNR3500U
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Dec. 09, 2008
Final Test Date	Jan. 07, 2009
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.7



Statement

Test result included in this report is for the Draft n and 802.11b/g part 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.



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History of This Test Report

Original Issue Date: Jan. 12, 2009

Report No.: FR8D0917

- No additional attachment.
- Additional attachment were issued as following record:


Attachment No.	Issue Date	Description



1. CERTIFICATE OF COMPLIANCE

Product Name : RangeMax Wireless-N Gigabit Router
Brand Name : NETGEAR
Model Name : WNR3500v2, WNR3500U
Applicant : NETGEAR, 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 Dec. 09, 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 2009.1.22

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	2.51 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.74 dB
4.3	15.247(e)	Power Spectral Density	Complies	9.97 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.05 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.21 dB
4.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.8dB	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

Draft n

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	Power Adapter
Modulation	see the below table for draft n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for Draft n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS0 (20MHz) : 17.04 MHz MCS0 (40MHz) : 36.24 MHz
Conducted Output Power	MCS0 (20MHz) : 29.26 dBm MCS0 (40MHz) : 28.77 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11b/g

Items	Description
Product Type	802.11b :WLAN (1TX, 1RX) 802.11g :WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	Power Adapter
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g
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
Channel Number	11
Channel Band Width (99%)	11b: 12.60MHz ; 11g: 15.76 MHz
Conducted Output Power	11b: 23.77 dBm ; 11g: 29.21 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)		Two (TX)	
	20 MHz	40 MHz	20 MHz	40 MHz
Band width Mode				
802.11b	V	X	X	X
802.11g	X	X	V	X
Draft n	X	X	V	V

Draft n spec

MCS Index	Nss	Modulation	R	NBPCS	NCBPS		NDBPS		Datarate(Mbps)			
					20MHz	40MHz	20MHz	40MHz	800nsGI		400nsGI	
									20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPCS	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

3.2. Accessories

Power	Brand	Model	Rating
Adapter 1	NETGEAR	MT12-Y120100-A1	Input:100-120VAC, 60Hz, 0.3A Output:12VDC, 1.0A
Adapter 2	NETGEAR	T012LF1209 16100LF	Input:100-120VAC, 50/60Hz, 0.5A Output:12VDC, 1A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
1	RAYSPAN	WNR3500v2 on-board antenna	Printed Antenna	N/A	5.1	TX / RX Ant.
2	RAYSPAN	WNR3500v2 on-board antenna	Printed Antenna	N/A	3.8	RX Ant.
3	RAYSPAN	WNR3500v2 on-board antenna	Printed Antenna	N/A	4.2	TX / RX Ant.

Note: The EUT has three antennas(2TX, 2RX).

For 802.11b mode:

Antenna 1 can be used as transmitting antenna and receiving antenna.

Due to Antenna 1 generated the worst test result, so it was recorded in this report.

For 802.11g mode:

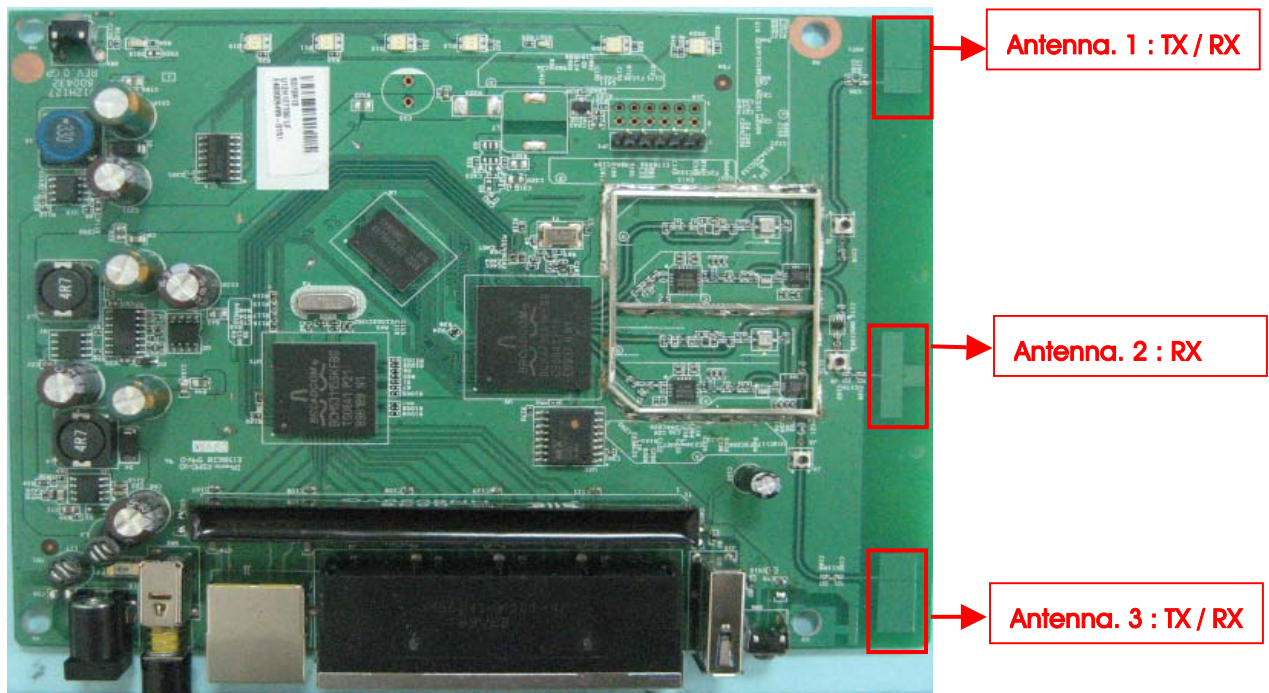
Both Antenna 1 and Antenna 3 will transmit the same signal simultaneously.

Antenna 1, Antenna 2 and Antenna 3 can be used as receiving antenna, and the EUT supports the antennas with RX diversity function for 802.11g mode and Draft n mode.

For Draft n mode:

Both Antenna 1 and Antenna 3 will transmit the same signal simultaneously.

Antenna 1, Antenna 2 and Antenna 3 can be used as receiving antenna, and the EUT supports the antennas with RX diversity function for 802.11g mode and Draft n mode.



3.4. Table for Carrier Frequencies

There are two bandwidth systems for draft n.

For both 20MHz bandwidth systems, use Channel 1~Channel 11.

For both 40MHz bandwidth systems, use Channel 3~Channel 9.

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		

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	-	-	-
Maximum Peak Conducted Output Power	MCS0/20MHz	13 Mbps	1/6/11	1/ 3 / 1+3
	MCS0/40MHz	27 Mbps	3/6/9	1/ 3 / 1+3
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1/ 3 / 1+3
Power Spectral Density 6dB Spectrum Bandwidth	MCS0/20MHz	13 Mbps	1/6/11	1+3
	MCS0/40MHz	27 Mbps	3/6/9	1+3
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1+3
Radiated Emissions 9kHz~1GHz	Normal Link	-	-	-
Radiated Emissions 1GHz~10 th Harmonic	MCS0/20MHz	13 Mbps	1/6/11	1+3
	MCS0/40MHz	27 Mbps	3/6/9	1+3
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1+3
Band Edge Emissions	MCS0/20MHz	13 Mbps	1/11	1+3
	MCS0/40MHz	27 Mbps	3/9	1+3
	11b/BPSK	1 Mbps	1/11	1
	11g/BPSK	6 Mbps	1/11	1+3

Note:

All the test modes were listed as below.

Mode 1: EUT + Adapter 1 + Cradle

Mode 2: EUT + Adapter 2+ Cradle

<For Conducted Emissions>:

Due to Mode 1 generated the worst test result, so it was recorded in this report.

<For Radiated Emissions below 1GHz>:

Due to Mode 2 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 difference between the model names was listed in the following table.

Brand Name	Model Name	Manufacturer
NETGEAR	WNR3500v2	EUT without USB connector
NETGEAR	WNR3500U	EUT with USB connector

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL
Notebook	DELL	PP25L	E2K4965AGNM
Notebook	DELL	M1330	E2KWM3945ABG
Modem	ACEEX	DM1414	IFAXDM1414
Mouse	HP	M-UAE96	DoC
Ruzer USB Flash Drive	SanDisk	SDCZ4-2048-A10	N/A
HUB	BELKIN	F5D5131-24	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.

Power Parameters of Draft n MCS0 20MHz

Test Software Version	TELNET		
Frequency	2412 MHz	2437 MHz	2462 MHz
Draft n Ant. 1 / Ant. 3	64	72	64

Power Parameters of Draft n MCS0 40MHz

Test Software Version	TELNET		
Frequency	2422 MHz	2437 MHz	2452 MHz
Draft n Ant. 1 / Ant. 3	56	67	52

Power Parameters of IEEE 802.11b/g

Test Software Version	TELNET		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b Ant. 1	80	85	78
IEEE 802.11g Ant. 1 / Ant. 3	67	72	67

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The NB sends " H " messages to the panel, and the panel displays " H " patterns on the screen.
- c. The NB sends " H " messages to the modem.
- d. Repeat the steps from b to c.

At the same time, the following programs were executed:

During testing, the remote wireless network ancillary were connected by EUT.

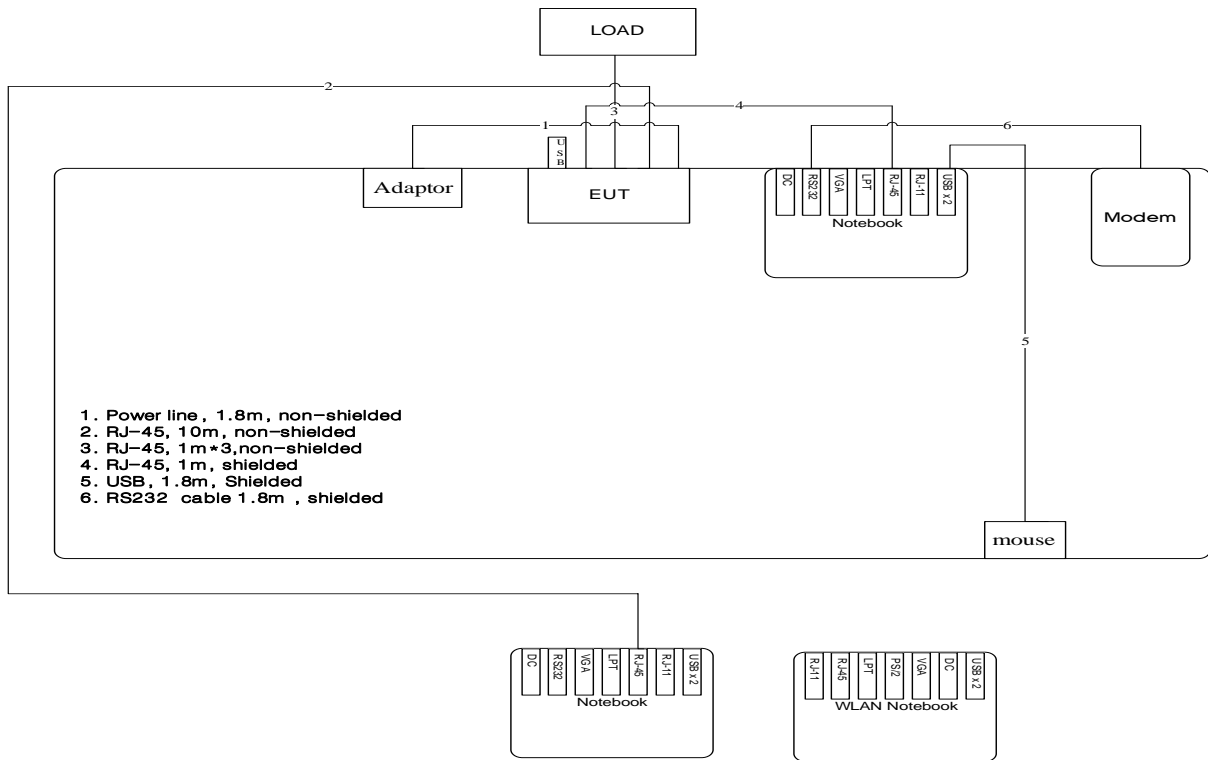
At the same time, "TELNET" was executed the test program to control the EUT continuously transmit RF signal.

3.10. Test Configurations

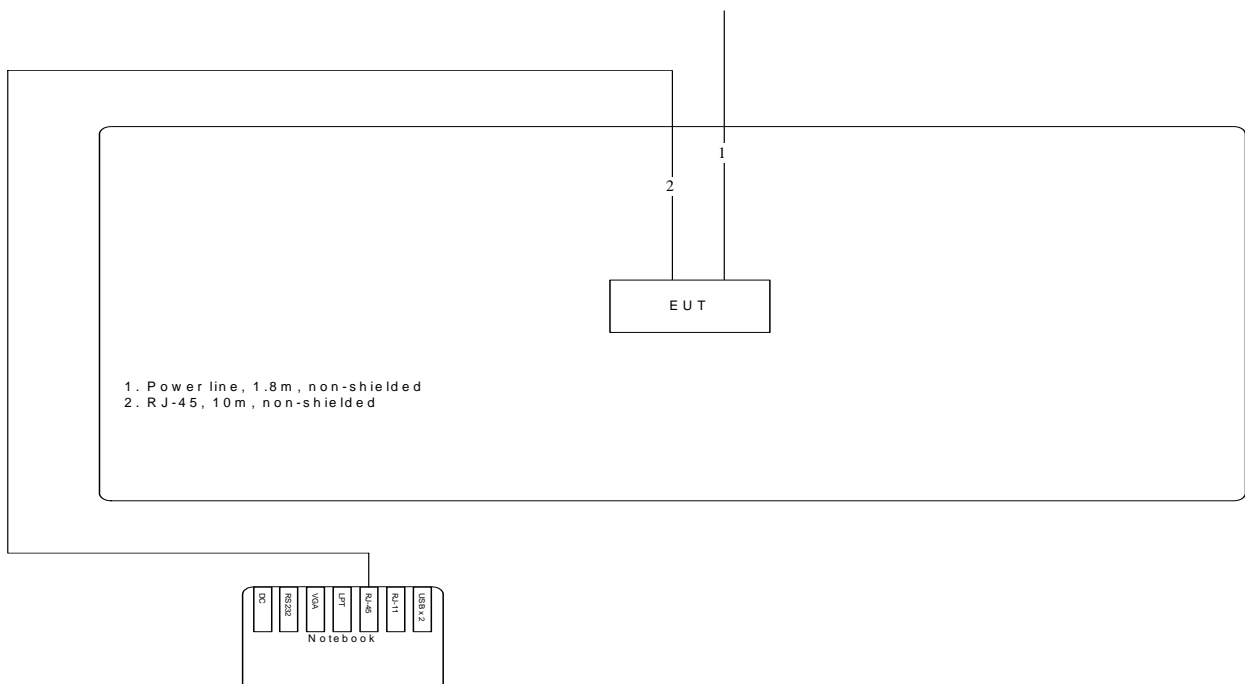
3.10.1. Radiation Emissions Test Configuration

Test Configuration: 30KHz~1GHz

Test Mode: Mode 2

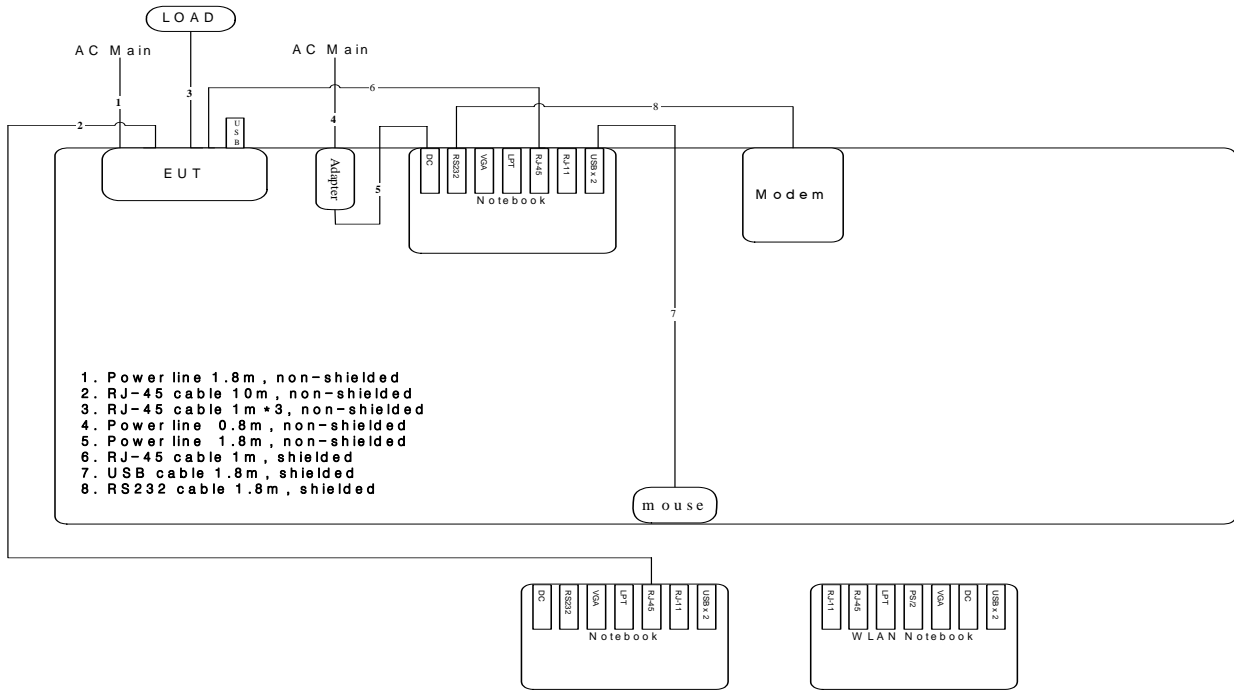


Test Configuration: above 1GHz



3.10.2. AC Power Line Conduction Emissions Test Configuration

Test Mode: Mode 1



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

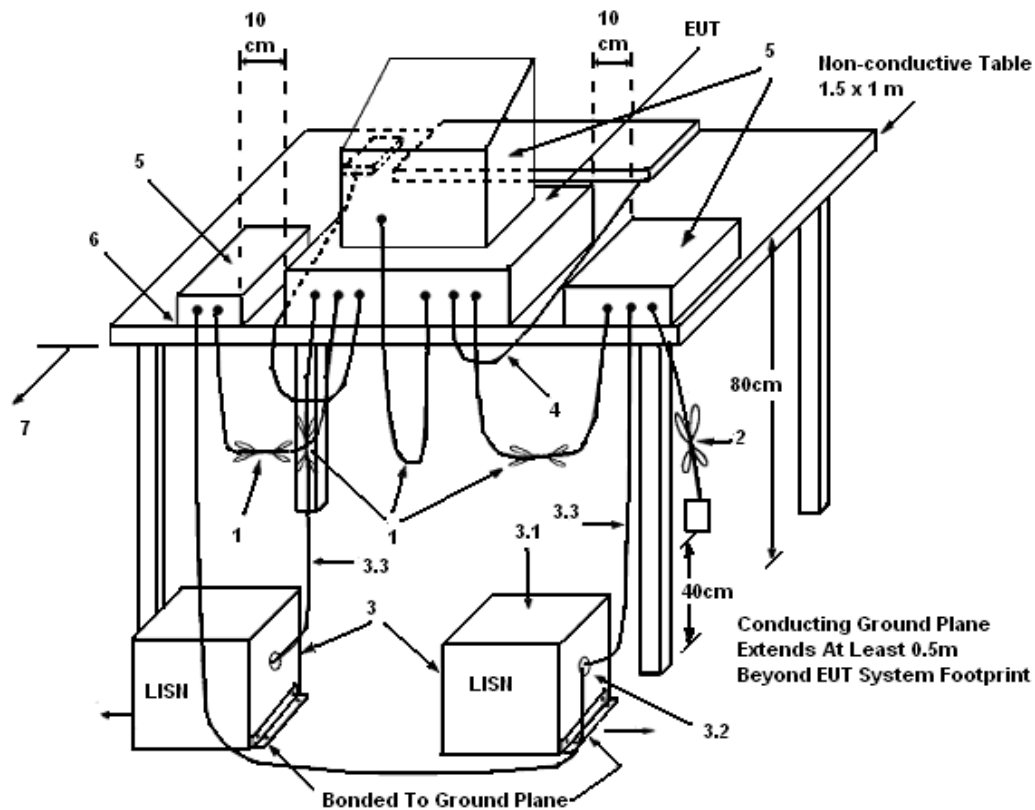
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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 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

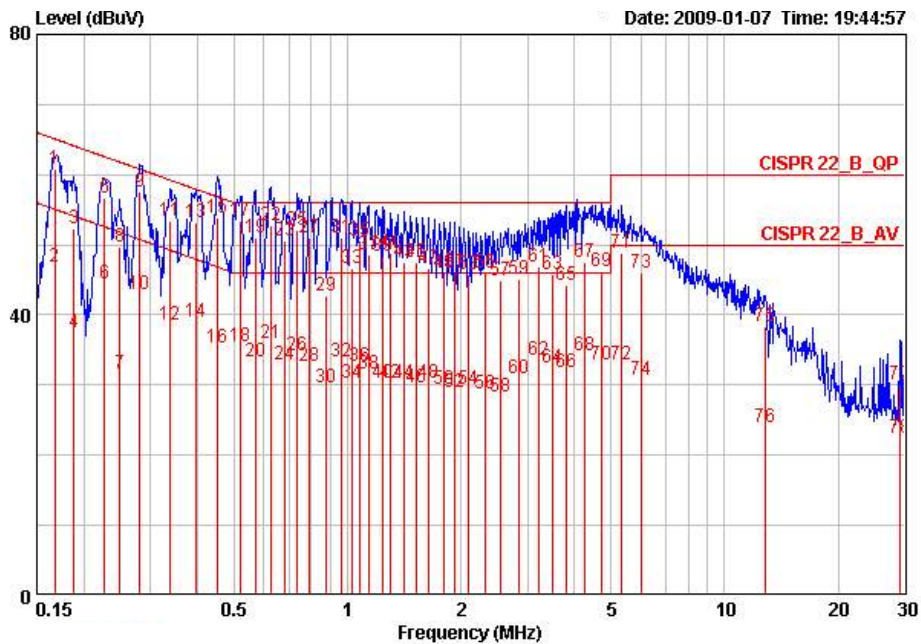
There is no deviation with the original standard.

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

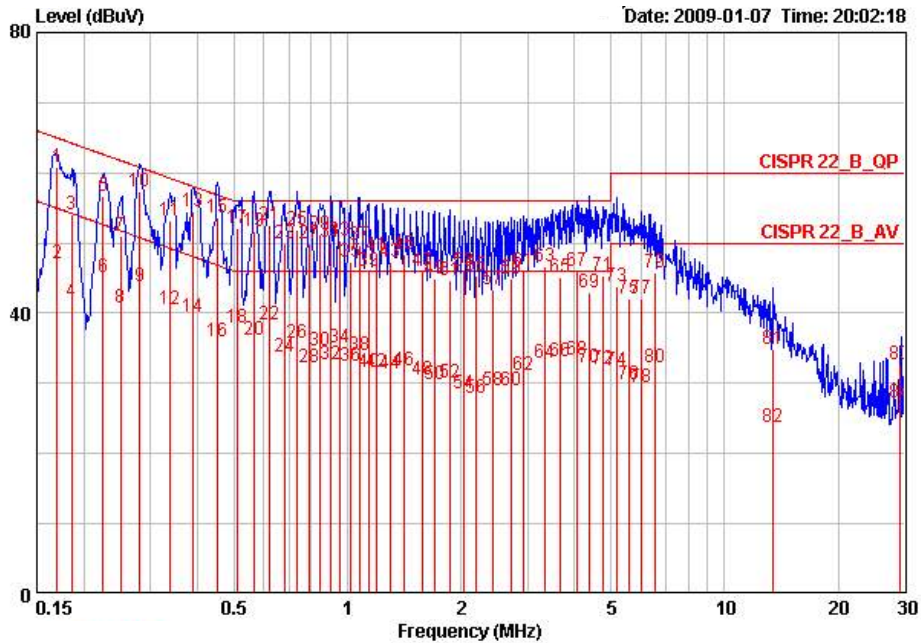
Temperature	22°C	Humidity	57%
Test Engineer	Peter Wu	Phase	Line
Configuration	Normal Link / Mode 1		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.16754	60.85	-4.24	65.08	60.58	0.07	0.20	QP
2	0.16754	46.91	-8.18	55.08	46.64	0.07	0.20	AVERAGE
3	0.18838	52.34	-11.76	64.11	52.09	0.05	0.20	QP
4	0.18838	37.56	-16.54	54.11	37.31	0.05	0.20	AVERAGE
5	0.22676	56.68	-5.89	62.57	56.43	0.05	0.20	QP
6	0.22676	44.55	-8.02	52.57	44.30	0.05	0.20	AVERAGE
7	0.24945	31.55	-20.22	51.78	31.31	0.04	0.20	AVERAGE
8	0.24945	49.75	-12.02	61.78	49.51	0.04	0.20	QP
9	0.28178	57.55	-3.21	60.76	57.31	0.04	0.20	QP
10	0.28178	42.91	-7.85	50.76	42.67	0.04	0.20	AVERAGE
11	0.33920	53.41	-5.81	59.22	53.18	0.03	0.20	QP
12	0.33920	38.67	-10.55	49.22	38.44	0.03	0.20	AVERAGE
13	0.39553	53.08	-4.87	57.95	52.85	0.03	0.20	QP
14	0.39553	38.96	-8.99	47.95	38.73	0.03	0.20	AVERAGE
15	0.45155	53.87	-2.98	56.85	53.64	0.03	0.20	QP
16	0.45155	35.32	-11.53	46.85	35.09	0.03	0.20	AVERAGE
17	0.52100	53.49	-2.51	56.00	53.26	0.03	0.20	QP
18	0.52100	35.47	-10.53	46.00	35.24	0.03	0.20	AVERAGE
19	0.57010	51.03	-4.97	56.00	50.80	0.03	0.20	QP
20	0.57010	33.26	-12.74	46.00	33.03	0.03	0.20	AVERAGE
21	0.62383	36.04	-9.96	46.00	35.81	0.03	0.20	AVERAGE
22	0.62383	52.81	-3.19	56.00	52.58	0.03	0.20	QP
23	0.67902	50.48	-5.52	56.00	50.25	0.03	0.20	QP
24	0.67902	32.85	-13.15	46.00	32.62	0.03	0.20	AVERAGE
25	0.73519	52.06	-3.94	56.00	51.83	0.03	0.20	QP
26	0.73519	34.26	-11.74	46.00	34.03	0.03	0.20	AVERAGE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
27	0.79180	50.90	-5.10	56.00	50.67	0.03	0.20	QP
28	0.79180	32.62	-13.38	46.00	32.39	0.03	0.20	AVERAGE
29	0.87566	42.81	-13.19	56.00	42.58	0.03	0.20	QP
30	0.87566	29.66	-16.34	46.00	29.43	0.03	0.20	AVERAGE
31	0.96328	51.02	-4.98	56.00	50.79	0.03	0.20	QP
32	0.96328	33.42	-12.58	46.00	33.19	0.03	0.20	AVERAGE
33	1.032	46.75	-9.25	56.00	46.53	0.03	0.19	QP
34	1.032	30.20	-15.80	46.00	29.98	0.03	0.19	AVERAGE
35	1.077	50.53	-5.47	56.00	50.32	0.03	0.18	QP
36	1.077	32.76	-13.24	46.00	32.55	0.03	0.18	AVERAGE
37	1.135	48.61	-7.39	56.00	48.41	0.03	0.17	QP
38	1.135	31.57	-14.43	46.00	31.37	0.03	0.17	AVERAGE
39	1.242	48.38	-7.62	56.00	48.20	0.04	0.15	QP
40	1.242	30.21	-15.79	46.00	30.03	0.04	0.15	AVERAGE
41	1.303	48.93	-7.07	56.00	48.76	0.04	0.14	QP
42	1.303	30.39	-15.61	46.00	30.22	0.04	0.14	AVERAGE
43	1.411	47.56	-8.44	56.00	47.40	0.04	0.12	QP
44	1.411	30.20	-15.80	46.00	30.04	0.04	0.12	AVERAGE
45	1.527	47.54	-8.46	56.00	47.39	0.04	0.11	QP
46	1.527	29.60	-16.40	46.00	29.45	0.04	0.11	AVERAGE
47	1.645	46.61	-9.39	56.00	46.43	0.04	0.13	QP
48	1.645	30.21	-15.79	46.00	30.03	0.04	0.13	AVERAGE
49	1.810	46.09	-9.91	56.00	45.88	0.05	0.16	QP
50	1.810	29.44	-16.56	46.00	29.23	0.05	0.16	AVERAGE
51	1.918	46.11	-9.89	56.00	45.88	0.05	0.19	QP
52	1.918	29.02	-16.98	46.00	28.79	0.05	0.19	AVERAGE
53	2.088	45.88	-10.12	56.00	45.63	0.05	0.20	QP
54	2.088	29.53	-16.47	46.00	29.28	0.05	0.20	AVERAGE
55	2.321	46.08	-9.92	56.00	45.82	0.06	0.20	QP
56	2.321	28.79	-17.21	46.00	28.53	0.06	0.20	AVERAGE
57	2.540	44.85	-11.15	56.00	44.58	0.07	0.20	QP
58	2.540	28.44	-17.56	46.00	28.17	0.07	0.20	AVERAGE
59	2.839	45.18	-10.82	56.00	44.90	0.08	0.20	QP
60	2.839	30.86	-15.14	46.00	30.58	0.08	0.20	AVERAGE
61	3.224	46.82	-9.18	56.00	46.49	0.08	0.25	QP
62	3.224	33.55	-12.45	46.00	33.22	0.08	0.25	AVERAGE
63	3.509	45.86	-10.14	56.00	45.47	0.09	0.30	QP
64	3.509	32.44	-13.56	46.00	32.05	0.09	0.30	AVERAGE
65	3.799	44.25	-11.75	56.00	43.85	0.10	0.30	QP
66	3.799	31.82	-14.18	46.00	31.42	0.10	0.30	AVERAGE
67	4.247	47.53	-8.47	56.00	47.11	0.12	0.30	QP
68	4.247	34.18	-11.82	46.00	33.76	0.12	0.30	AVERAGE
69	4.696	46.27	-9.73	56.00	45.83	0.14	0.30	QP
70	4.696	32.83	-13.17	46.00	32.39	0.14	0.30	AVERAGE
71	5.333	48.86	-11.14	60.00	48.38	0.18	0.30	QP
72	5.333	32.93	-17.07	50.00	32.45	0.18	0.30	AVERAGE
73	5.993	46.03	-13.97	60.00	45.52	0.21	0.30	QP
74	5.993	30.71	-19.29	50.00	30.20	0.21	0.30	AVERAGE
75	12.874	38.29	-21.71	60.00	37.42	0.47	0.40	QP
76	12.874	23.93	-26.07	50.00	23.06	0.47	0.40	AVERAGE
77	29.058	29.98	-30.02	60.00	27.99	1.39	0.60	QP
78	29.058	22.46	-27.54	50.00	20.47	1.39	0.60	AVERAGE

Temperature	22°C	Humidity	57%
Test Engineer	Peter Wu	Phase	Neutral
Configuration	Normal Link / Mode 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16944	60.72	-4.26	64.99	60.43	0.09	0.20	QP
2	0.16944	47.18	-7.80	54.99	46.89	0.09	0.20	AVERAGE
3	0.18541	54.12	-10.12	64.24	53.83	0.09	0.20	QP
4	0.18541	41.70	-12.54	54.24	41.41	0.09	0.20	AVERAGE
5	0.22516	56.63	-6.00	62.63	56.35	0.08	0.20	QP
6	0.22516	45.08	-7.55	52.63	44.80	0.08	0.20	AVERAGE
7	0.25051	51.06	-10.68	61.74	50.78	0.08	0.20	QP
8	0.25051	40.70	-11.04	51.74	40.42	0.08	0.20	AVERAGE
9	0.28178	43.79	-6.98	50.76	43.51	0.08	0.20	AVERAGE
10	0.28178	57.31	-3.46	60.76	57.03	0.08	0.20	QP
11	0.33920	53.19	-6.03	59.22	52.92	0.07	0.20	QP
12	0.33920	40.44	-8.78	49.22	40.17	0.07	0.20	AVERAGE
13	0.38929	54.57	-3.51	58.08	54.30	0.07	0.20	QP
14	0.38929	39.50	-8.58	48.08	39.23	0.07	0.20	AVERAGE
15	0.45155	53.66	-3.19	56.85	53.39	0.07	0.20	QP
16	0.45155	35.86	-10.99	46.85	35.59	0.07	0.20	AVERAGE
17	0.51026	52.20	-3.80	56.00	51.93	0.07	0.20	QP
18	0.51026	37.90	-8.10	46.00	37.63	0.07	0.20	AVERAGE
19	0.56409	51.61	-4.39	56.00	51.34	0.07	0.20	QP
20	0.56409	36.14	-9.86	46.00	35.87	0.07	0.20	AVERAGE
21	0.62054	52.57	-3.43	56.00	52.30	0.07	0.20	QP
22	0.62054	38.37	-7.63	46.00	38.10	0.07	0.20	AVERAGE
23	0.67902	50.01	-5.99	56.00	49.74	0.07	0.20	QP
24	0.67902	33.78	-12.22	46.00	33.51	0.07	0.20	AVERAGE
25	0.73519	51.82	-4.18	56.00	51.55	0.07	0.20	QP
26	0.73519	35.81	-10.19	46.00	35.54	0.07	0.20	AVERAGE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
27	0.79180	49.91	-6.09	56.00	49.64	0.07	0.20	QP
28	0.79180	32.18	-13.82	46.00	31.91	0.07	0.20	AVERAGE
29	0.84826	51.31	-4.69	56.00	51.04	0.07	0.20	QP
30	0.84826	34.73	-11.27	46.00	34.46	0.07	0.20	AVERAGE
31	0.90394	50.12	-5.88	56.00	49.85	0.07	0.20	QP
32	0.90394	32.63	-13.37	46.00	32.36	0.07	0.20	AVERAGE
33	0.95819	50.43	-5.57	56.00	50.16	0.07	0.20	QP
34	0.95819	35.04	-10.96	46.00	34.77	0.07	0.20	AVERAGE
35	1.021	47.34	-8.66	56.00	47.07	0.07	0.19	QP
36	1.021	32.57	-13.43	46.00	32.30	0.07	0.19	AVERAGE
37	1.077	49.62	-6.38	56.00	49.37	0.07	0.18	QP
38	1.077	33.92	-12.08	46.00	33.67	0.07	0.18	AVERAGE
39	1.135	46.01	-9.99	56.00	45.77	0.07	0.17	QP
40	1.135	31.52	-14.48	46.00	31.28	0.07	0.17	AVERAGE
41	1.191	48.17	-7.83	56.00	47.94	0.08	0.16	QP
42	1.191	31.64	-14.36	46.00	31.41	0.08	0.16	AVERAGE
43	1.303	47.36	-8.64	56.00	47.15	0.08	0.14	QP
44	1.303	31.47	-14.53	46.00	31.26	0.08	0.14	AVERAGE
45	1.411	48.37	-7.63	56.00	48.17	0.08	0.12	QP
46	1.411	31.79	-14.21	46.00	31.59	0.08	0.12	AVERAGE
47	1.585	45.95	-10.05	56.00	45.75	0.08	0.12	QP
48	1.585	30.60	-15.40	46.00	30.40	0.08	0.12	AVERAGE
49	1.698	44.92	-11.08	56.00	44.69	0.09	0.14	QP
50	1.698	29.88	-16.12	46.00	29.65	0.09	0.14	AVERAGE
51	1.868	44.65	-11.35	56.00	44.39	0.09	0.18	QP
52	1.868	29.99	-16.01	46.00	29.73	0.09	0.18	AVERAGE
53	2.033	45.93	-10.07	56.00	45.64	0.09	0.20	QP
54	2.033	28.65	-17.35	46.00	28.36	0.09	0.20	AVERAGE
55	2.201	45.24	-10.76	56.00	44.94	0.10	0.20	QP
56	2.201	27.97	-18.03	46.00	27.67	0.10	0.20	AVERAGE
57	2.435	43.41	-12.59	56.00	43.11	0.10	0.20	QP
58	2.435	29.01	-16.99	46.00	28.71	0.10	0.20	AVERAGE
59	2.707	44.99	-11.01	56.00	44.68	0.11	0.20	QP
60	2.707	29.02	-16.98	46.00	28.71	0.11	0.20	AVERAGE
61	2.931	45.90	-10.10	56.00	45.58	0.12	0.20	QP
62	2.931	31.14	-14.86	46.00	30.82	0.12	0.20	AVERAGE
63	3.328	46.67	-9.33	56.00	46.28	0.13	0.27	QP
64	3.328	32.94	-13.06	46.00	32.55	0.13	0.27	AVERAGE
65	3.681	45.07	-10.93	56.00	44.64	0.13	0.30	QP
66	3.681	33.07	-12.93	46.00	32.64	0.13	0.30	AVERAGE
67	4.070	45.95	-10.05	56.00	45.50	0.15	0.30	QP
68	4.070	33.34	-12.66	46.00	32.89	0.15	0.30	AVERAGE
69	4.361	42.95	-13.05	56.00	42.49	0.16	0.30	QP
70	4.361	32.25	-13.75	46.00	31.79	0.16	0.30	AVERAGE
71	4.746	45.24	-10.76	56.00	44.75	0.19	0.30	QP
72	4.746	32.10	-13.90	46.00	31.61	0.19	0.30	AVERAGE
73	5.194	43.75	-16.25	60.00	43.24	0.21	0.30	QP
74	5.194	31.77	-18.23	50.00	31.26	0.21	0.30	AVERAGE
75	5.594	42.13	-17.87	60.00	41.60	0.23	0.30	QP
76	5.594	29.97	-20.03	50.00	29.44	0.23	0.30	AVERAGE
77	5.993	42.08	-17.92	60.00	41.53	0.25	0.30	QP
78	5.993	29.44	-20.56	50.00	28.89	0.25	0.30	AVERAGE
79	6.557	45.79	-14.21	60.00	45.13	0.27	0.39	QP
80	6.557	32.33	-17.67	50.00	31.67	0.27	0.39	AVERAGE
81	13.479	34.98	-25.02	60.00	34.06	0.52	0.40	QP
82	13.479	23.80	-26.20	50.00	22.88	0.52	0.40	AVERAGE
83	29.051	32.73	-27.27	60.00	30.70	1.43	0.60	QP
84	29.051	27.19	-22.81	50.00	25.16	1.43	0.60	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Maximum Conducted 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.

4.2.2. Measuring Instruments and Setting

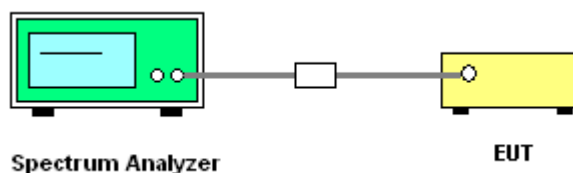
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	Auto

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 Conducted Output Power

Temperature	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	Draft n

Configuration Draft n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	23.65	30.00	Complies
6	2437 MHz	25.83	30.00	Complies
11	2462 MHz	23.80	30.00	Complies

Configuration Draft n MCS0 20MHz Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	24.79	30.00	Complies
6	2437 MHz	26.63	30.00	Complies
11	2462 MHz	25.36	30.00	Complies

Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	27.27	30.00	Complies
6	2437 MHz	29.26	30.00	Complies
11	2462 MHz	27.66	30.00	Complies

Configuration Draft n MCS0 40MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	22.01	30.00	Complies
6	2437 MHz	24.32	30.00	Complies
9	2452 MHz	21.03	30.00	Complies

Configuration Draft n MCS0 40MHz Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	24.46	30.00	Complies
6	2437 MHz	26.84	30.00	Complies
9	2452 MHz	23.47	30.00	Complies

Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	26.42	30.00	Complies
6	2437 MHz	28.77	30.00	Complies
9	2452 MHz	25.43	30.00	Complies

Temperature	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b/g

Configuration IEEE 802.11b Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	22.09	30.00	Complies
6	2437 MHz	23.77	30.00	Complies
11	2462 MHz	21.65	30.00	Complies

Configuration IEEE 802.11g Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	23.87	30.00	Complies
6	2437 MHz	25.57	30.00	Complies
11	2462 MHz	23.70	30.00	Complies

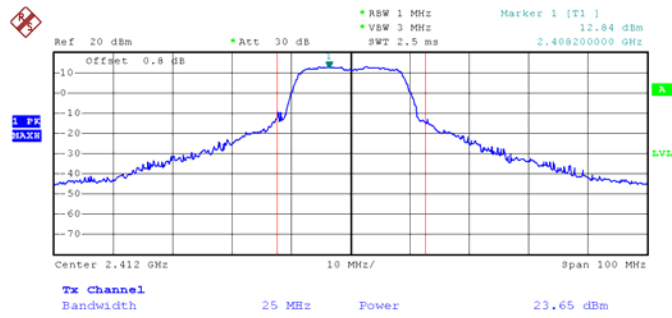
Configuration IEEE 802.11g Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	25.62	30.00	Complies
6	2437 MHz	26.75	30.00	Complies
11	2462 MHz	25.81	30.00	Complies

Configuration IEEE 802.11g Ant. 1 + Ant. 3

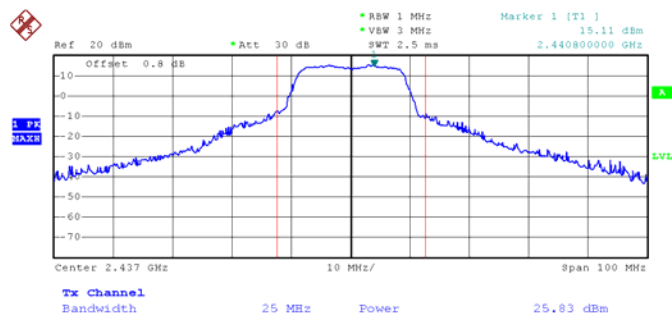
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	27.84	30.00	Complies
6	2437 MHz	29.21	30.00	Complies
11	2462 MHz	27.89	30.00	Complies

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2412 MHz



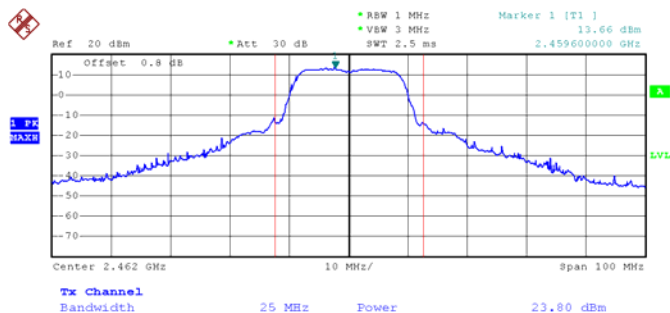
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2437 MHz



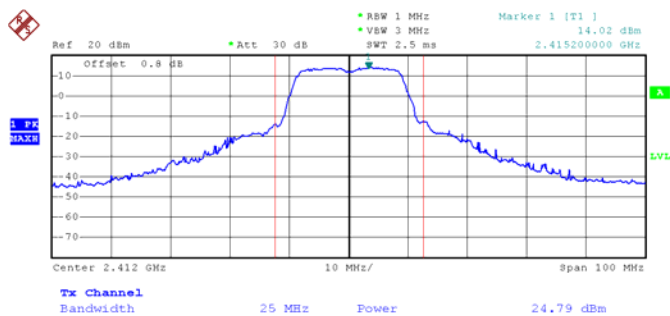
Date: 26.DEC.2008 16:44:36

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2462 MHz



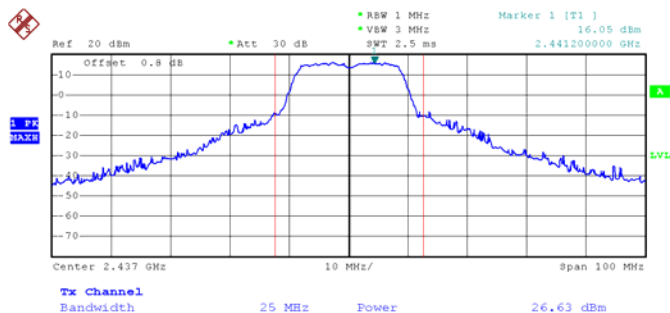
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 3 / 2412 MHz



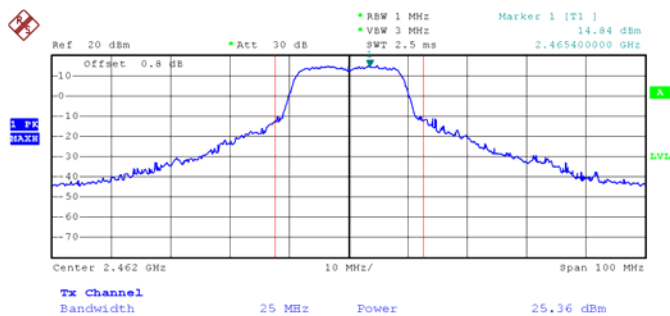
Date: 26.DEC.2008 16:34:23

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 3 / 2437 MHz



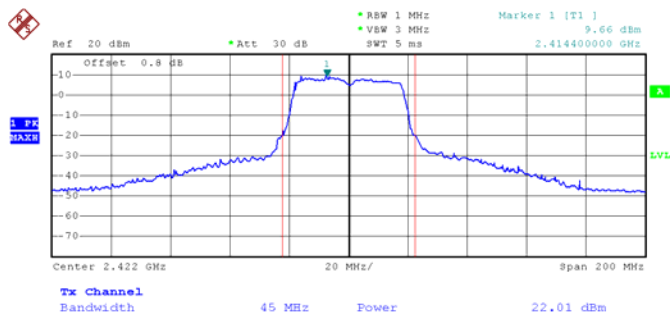
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 3 / 2462 MHz



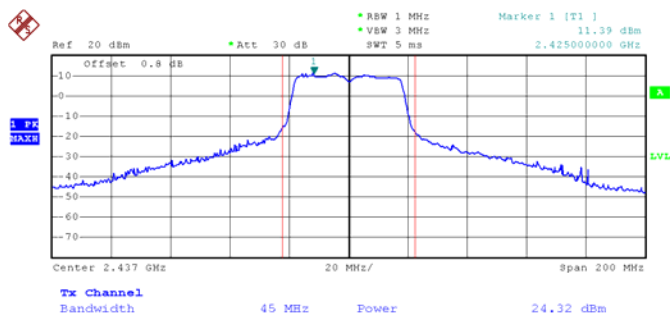
Date: 26.DEC.2008 16:49:33

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 2422 MHz



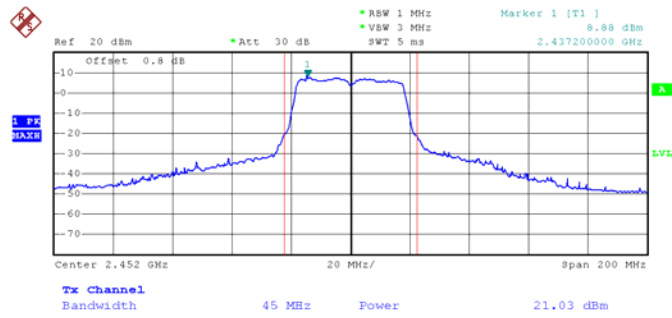
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Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 2437 MHz



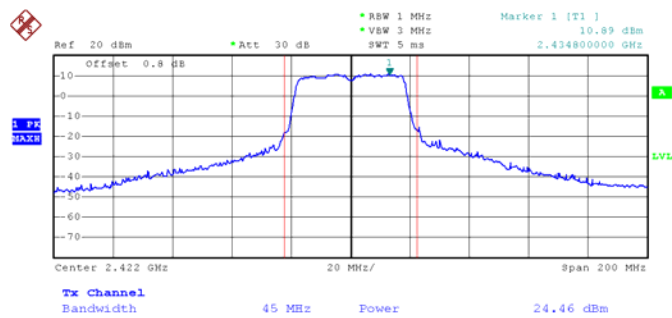
Date: 26.DEC.2008 17:16:51

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 2452 MHz



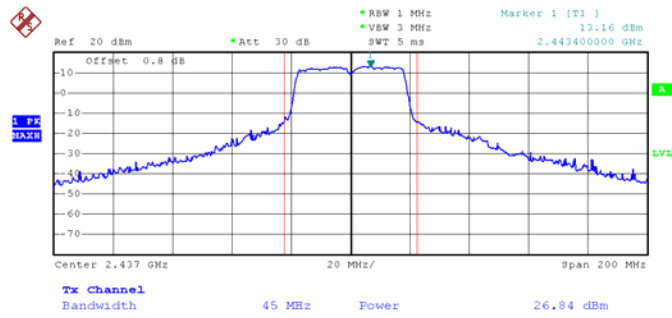
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Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 3 / 2422 MHz



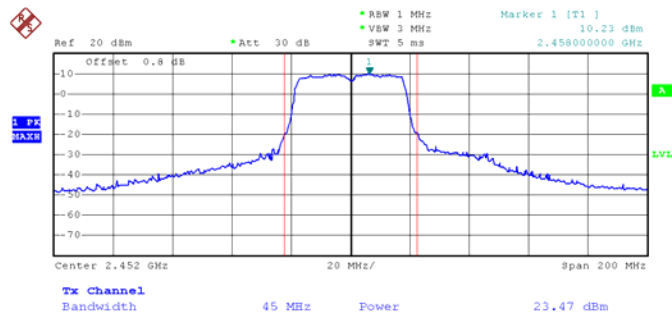
Date: 26.DEC.2008 17:29:36

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 3 / 2437 MHz



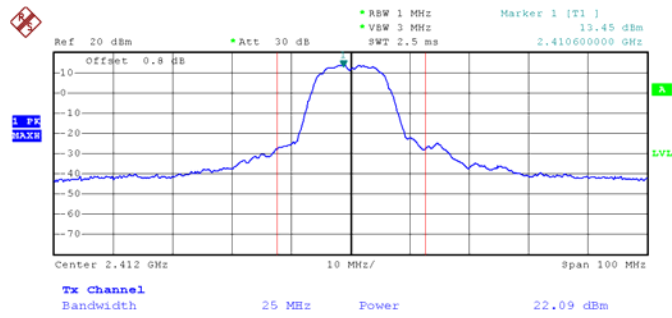
Date: 26.DEC.2008 17:31:53

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 3 / 2452 MHz



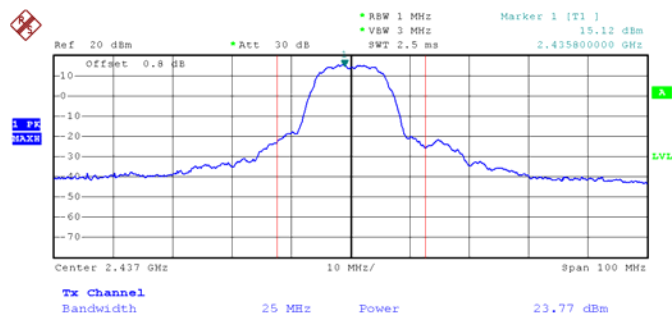
Date: 26.DEC.2008 17:20:43

Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz



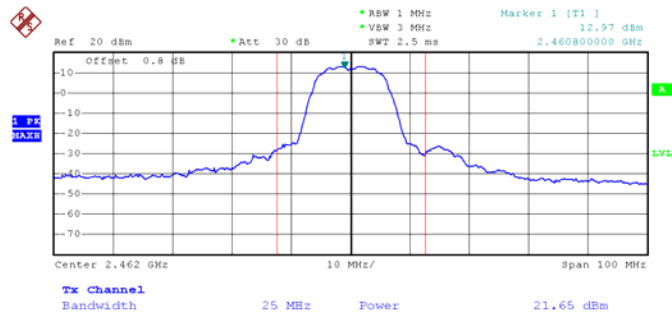
Date: 26.DEC.2008 16:13:58

Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz



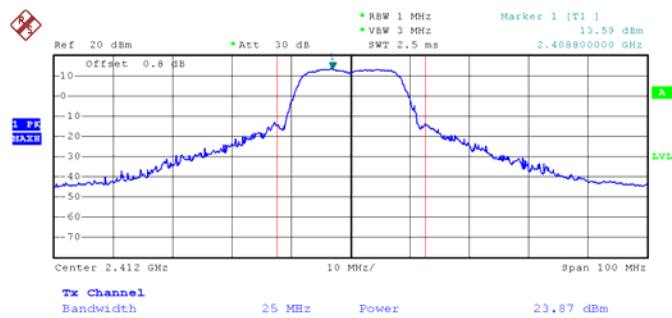
Date: 26.DEC.2008 16:15:10

Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz



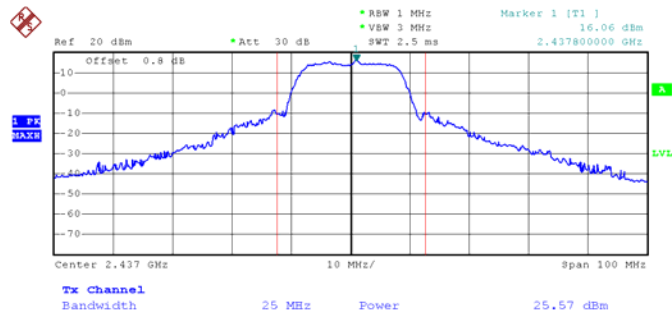
Date: 26.DEC.2008 16:17:12

Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2412 MHz



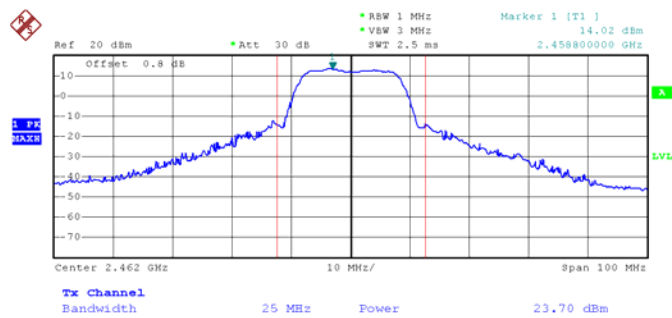
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2437 MHz



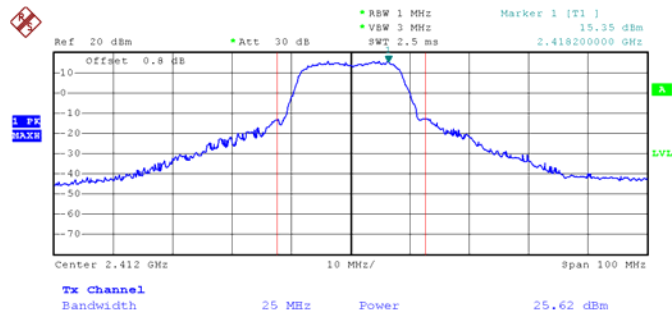
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2462 MHz



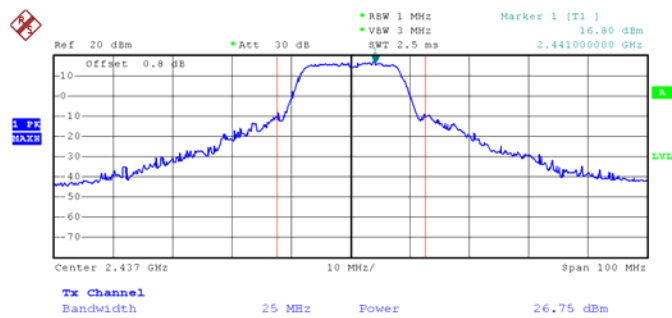
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 3 / 2412 MHz



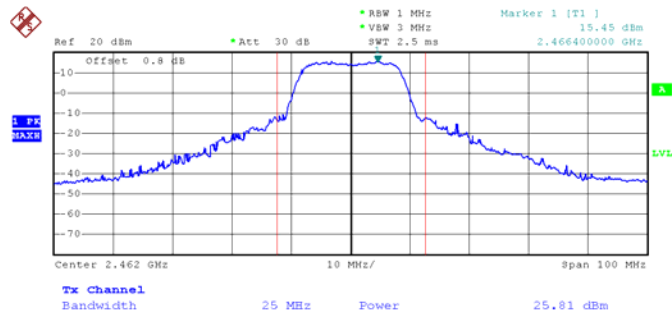
Date: 26.DEC.2008 16:23:04

Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 3 / 2437 MHz



Date: 26.DEC.2008 16:51:11

Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 3 / 2462 MHz



Date: 26.DEC.2008 16:32:08

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 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2. Measuring Instruments and Setting

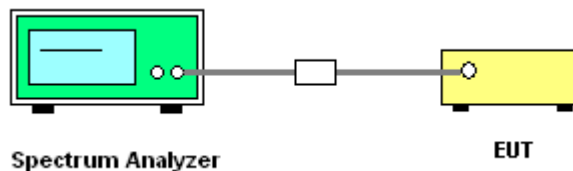
Please refer to section 5 of equipments list in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	30 kHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	10s

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
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 30kHz and the sweep time to 10s 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	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	Draft n

Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 3

Channel	Frequency	Power Density (dBm / 3kHz)	Max. Limit (dBm / 3kHz)	Result
1	2412 MHz	-5.39	8.00	Complies
6	2437 MHz	-4.07	8.00	Complies
11	2462 MHz	-5.30	8.00	Complies

Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 3

Channel	Frequency	Power Density (dBm / 3kHz)	Max. Limit (dBm / 3kHz)	Result
3	2422 MHz	-11.44	8.00	Complies
6	2437 MHz	-9.41	8.00	Complies
9	2452 MHz	-13.13	8.00	Complies

Temperature	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b/g

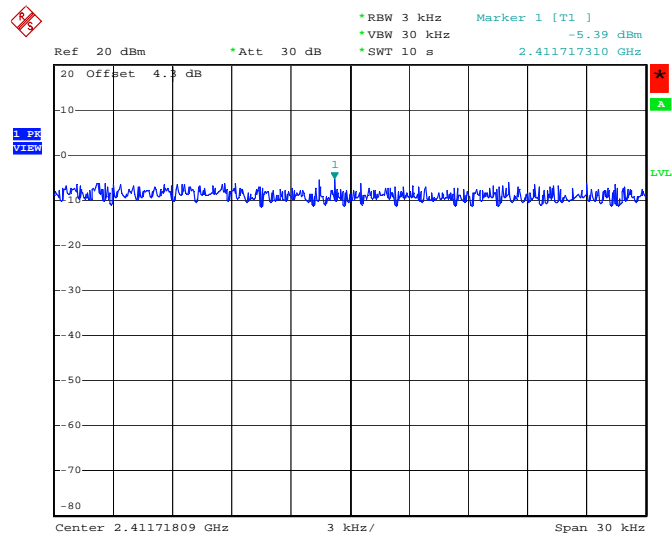
Configuration IEEE 802.11b Ant. 1

Channel	Frequency	Power Density (dBm / 3kHz)	Max. Limit (dBm / 3kHz)	Result
1	2412 MHz	-3.66	8.00	Complies
6	2437 MHz	-1.97	8.00	Complies
11	2462 MHz	-2.67	8.00	Complies

Configuration IEEE 802.11g Ant. 1 + Ant. 3

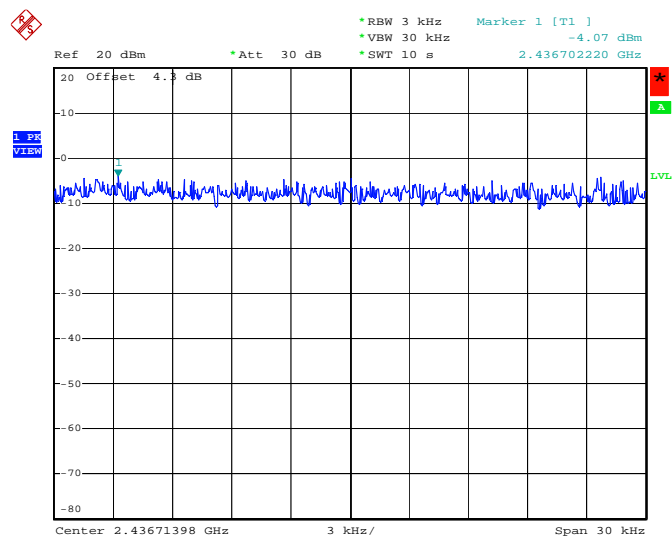
Channel	Frequency	Power Density (dBm / 3kHz)	Max. Limit (dBm / 3kHz)	Result
1	2412 MHz	-4.52	8.00	Complies
6	2437 MHz	-3.13	8.00	Complies
11	2462 MHz	-4.42	8.00	Complies

Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 3 / 2412 MHz



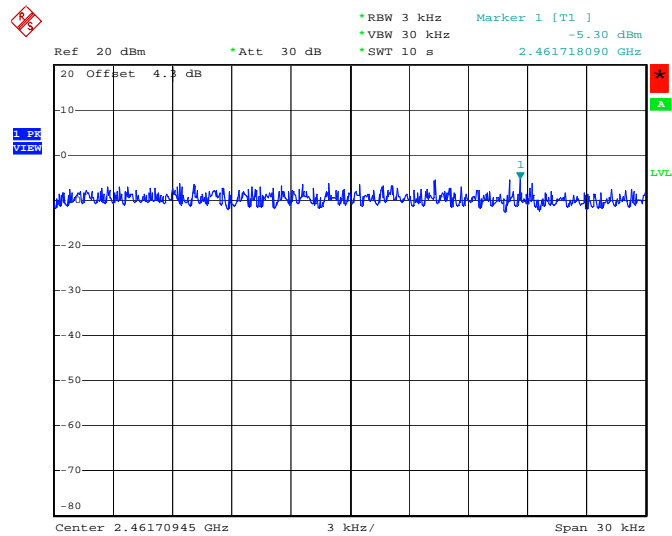
Date: 26.DEC.2008 17:55:14

Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 3 / 2437 MHz



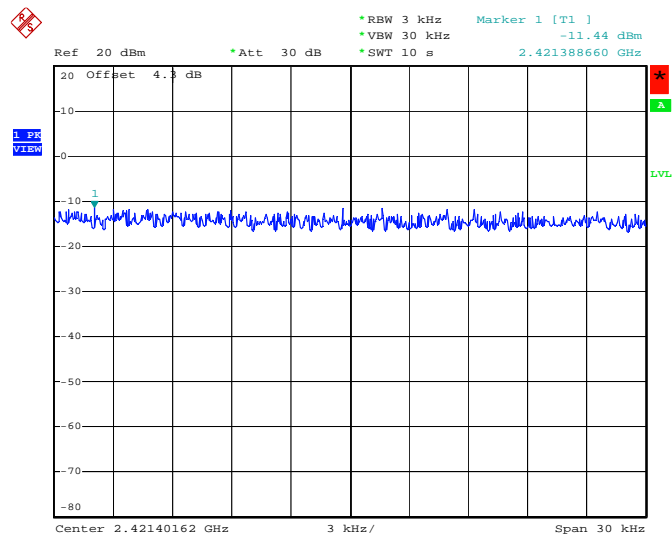
Date: 26.DEC.2008 17:56:10

Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 3 / 2462 MHz



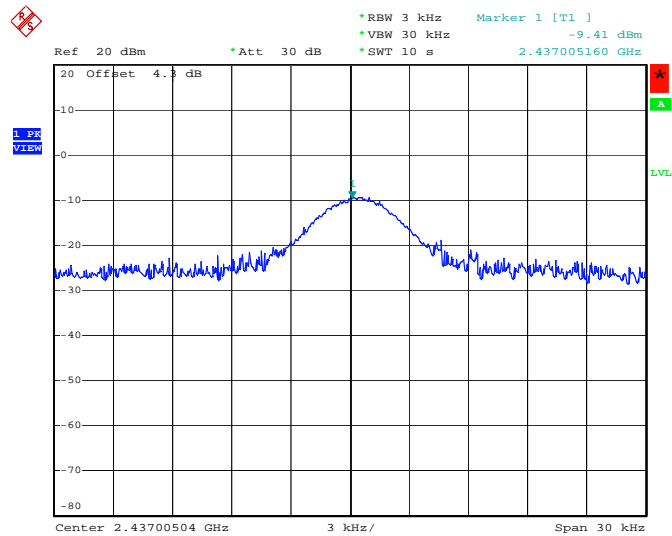
Date: 26.DEC.2008 17:54:10

Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 3 / 2422 MHz



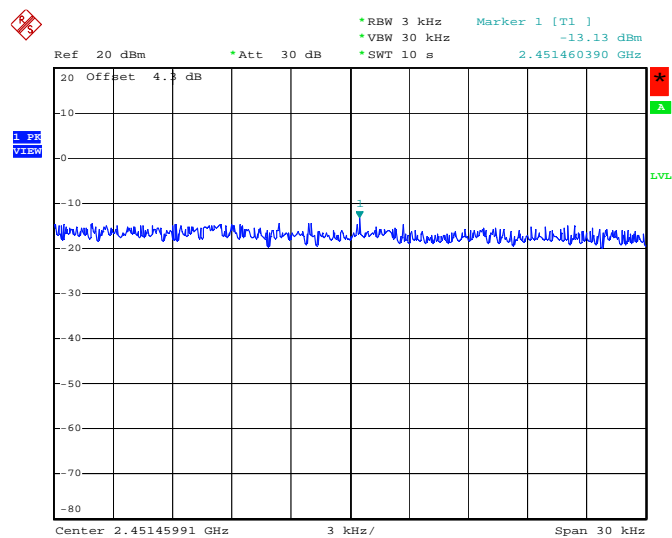
Date: 26.DEC.2008 18:02:16

Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 3 / 2437 MHz



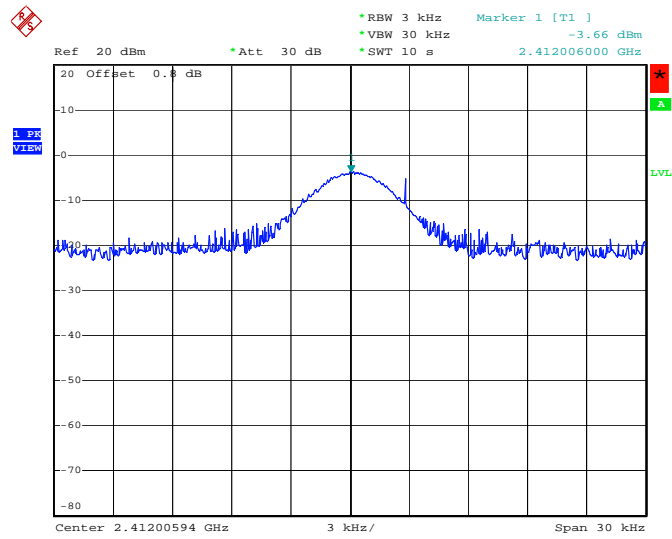
Date: 26.DEC.2008 17:58:07

Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 3 / 2452 MHz



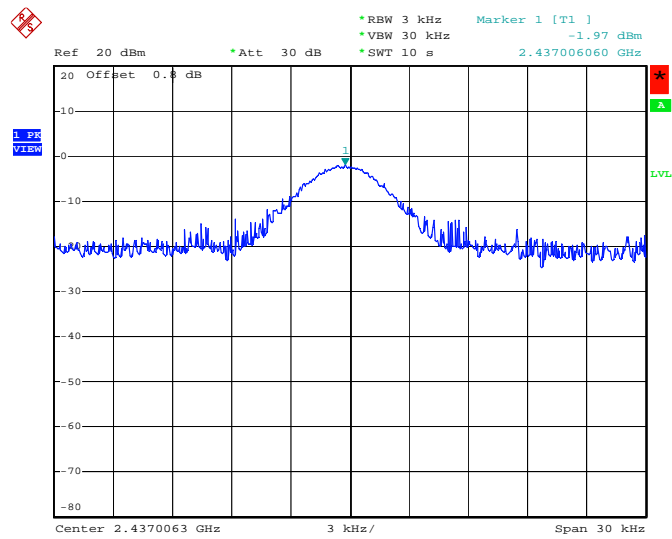
Date: 26.DEC.2008 18:01:06

Power Density Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz



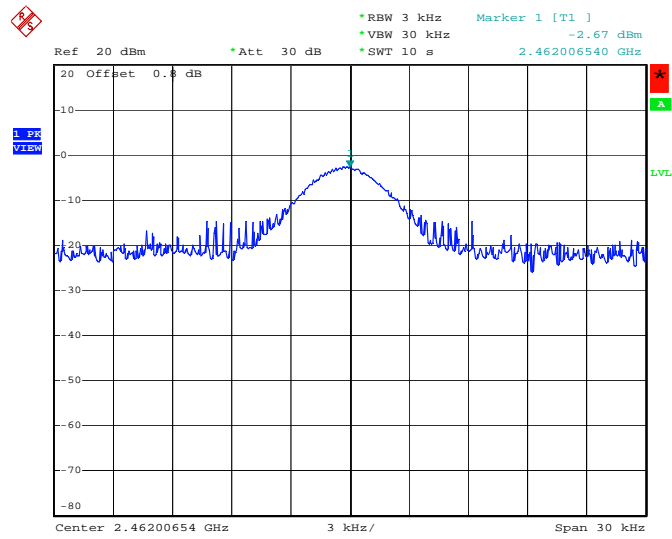
Date: 26.DEC.2008 17:43:58

Power Density Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz



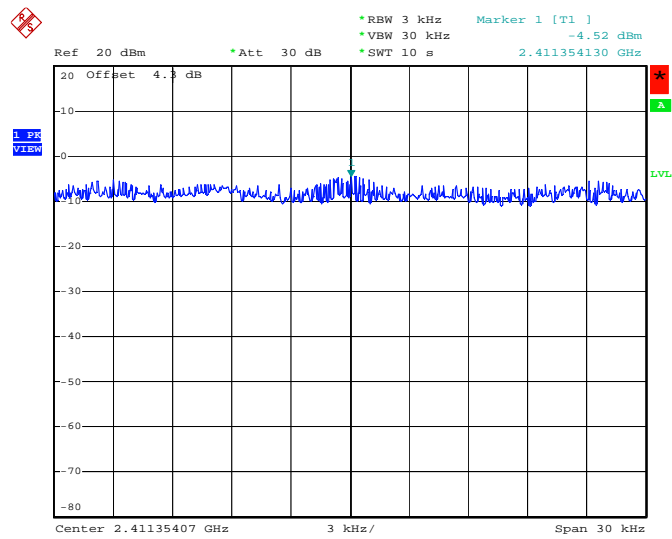
Date: 26.DEC.2008 17:45:11

Power Density Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz



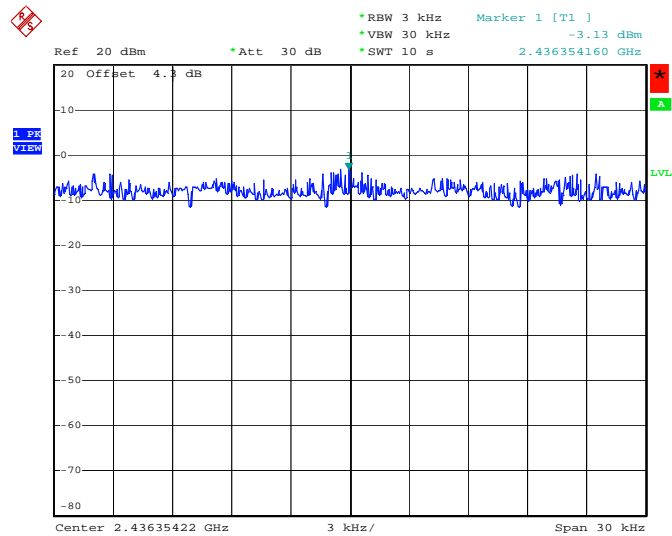
Date: 26.DEC.2008 17:46:54

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



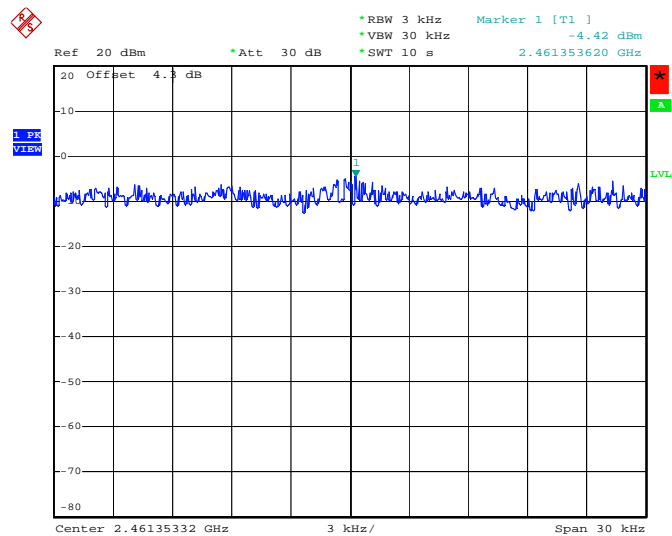
Date: 26.DEC.2008 17:50:33

Power Density Plot on Configuration IEEE 802.11g Ant. 1 + Ant. 3 / 2437 MHz



Date: 26.DEC.2008 17:52:01

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



Date: 26.DEC.2008 17:53:03

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

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

4.4.2. Measuring Instruments and Setting

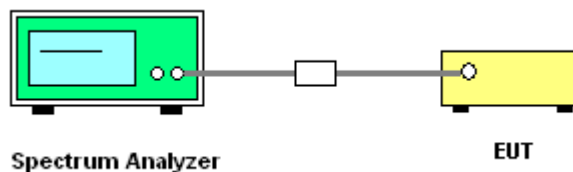
Please refer to section 5 of equipments list in this report. The following table is the setting of the Spectrum Analyzer.

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 analyzer 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	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	Draff n

Configuration Draff n MCS0 20MHz Ant. 1 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.04	17.04	500	Complies
6	2437 MHz	16.08	17.00	500	Complies
11	2462 MHz	16.08	16.96	500	Complies

Configuration Draff n MCS0 40MHz Ant. 1 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	35.76	36.24	500	Complies
6	2437 MHz	35.52	36.24	500	Complies
9	2452 MHz	35.60	36.24	500	Complies

Temperature	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b/g

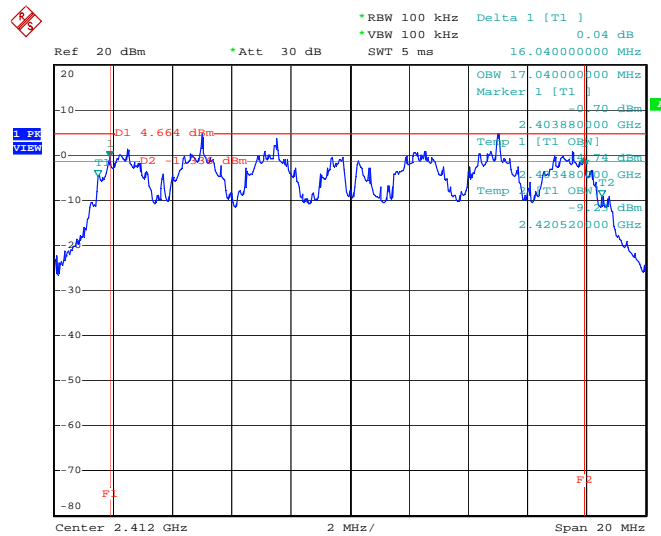
Configuration IEEE 802.11b Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	10.12	12.52	500	Complies
6	2437 MHz	10.12	12.60	500	Complies
11	2462 MHz	10.12	12.52	500	Complies

Configuration IEEE 802.11g Ant. 1 + Ant. 3

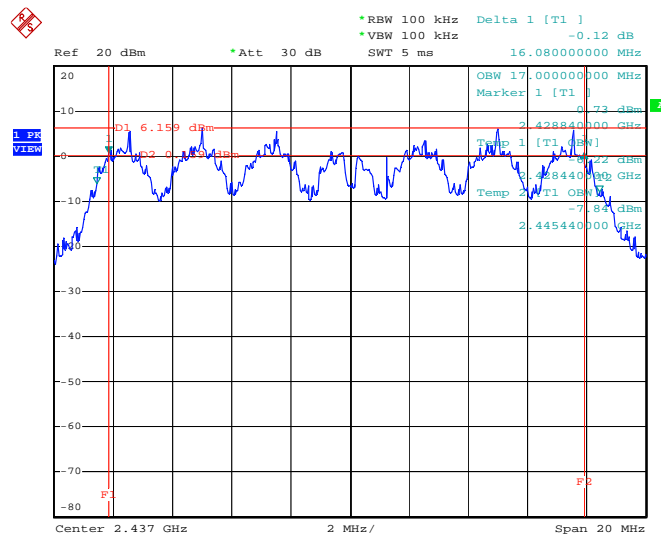
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	12.00	15.76	500	Complies
6	2437 MHz	12.64	15.76	500	Complies
11	2462 MHz	12.04	15.76	500	Complies

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 3 / 2412 MHz



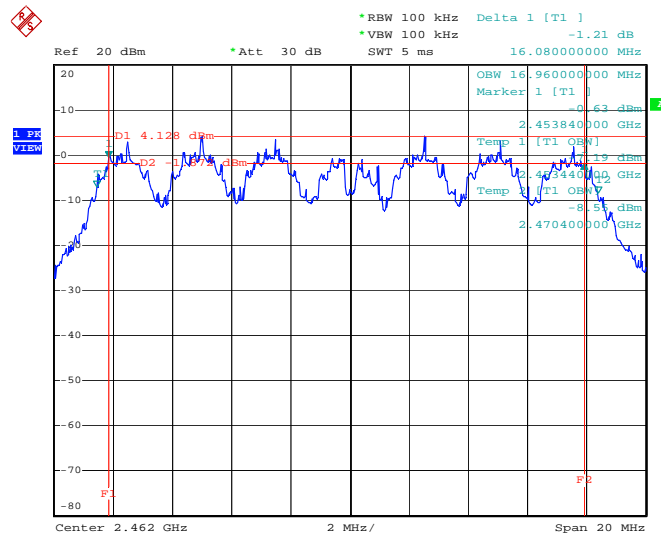
Date: 26.DEC.2008 17:54:49

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 3 / 2437 MHz



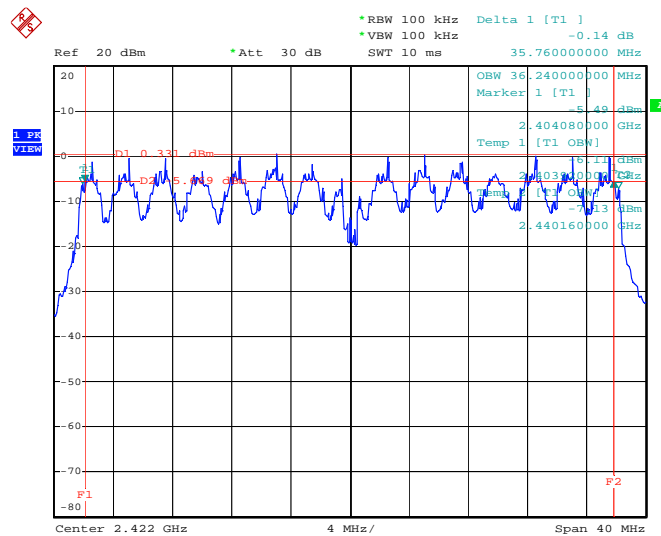
Date: 26.DEC.2008 17:55:54

6 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 3 / 2462 MHz



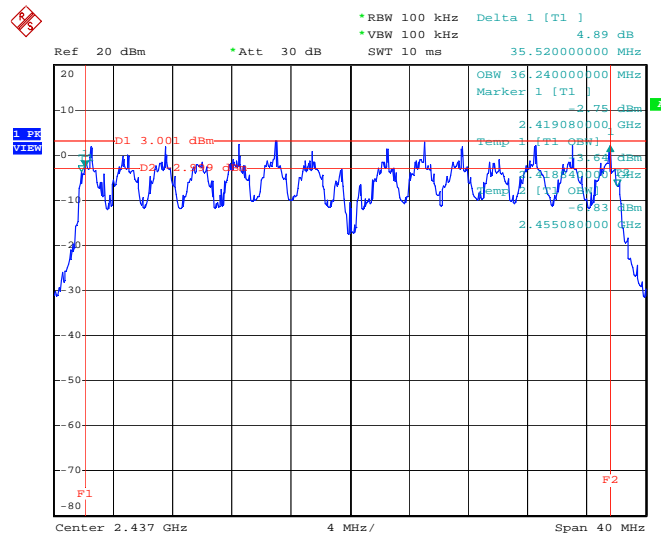
Date: 26.DEC.2008 17:53:55

6 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 3 / 2422 MHz



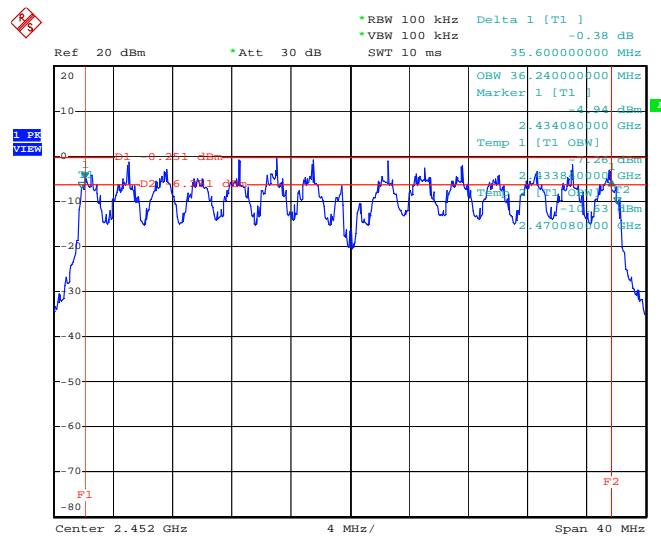
Date: 26.DEC.2008 18:01:51

6 dB Bandwidth Plot on Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 3 / 2437 MHz



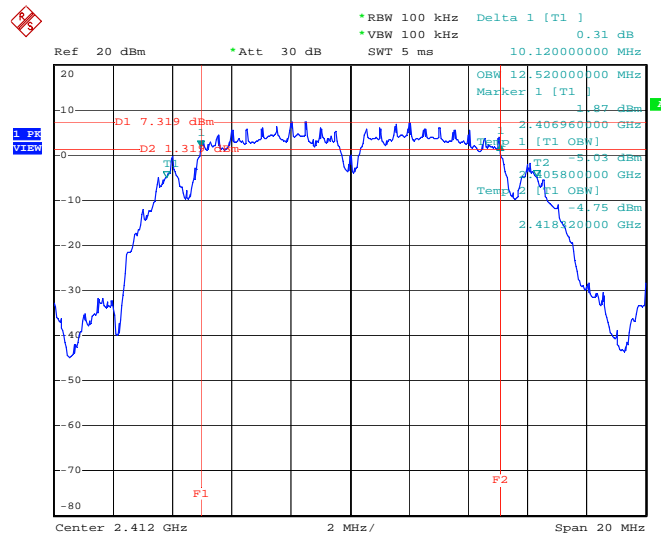
Date: 26.DEC.2008 17:57:41

6 dB Bandwidth Plot on Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 3 / 2452 MHz



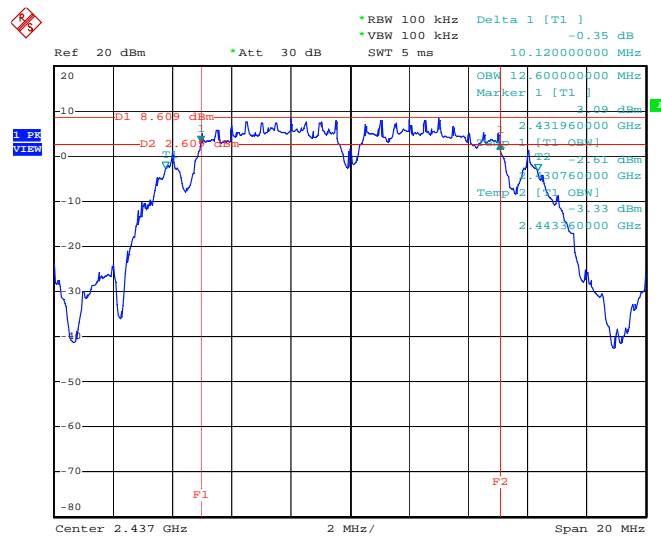
Date: 26.DEC.2008 18:00:41

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz



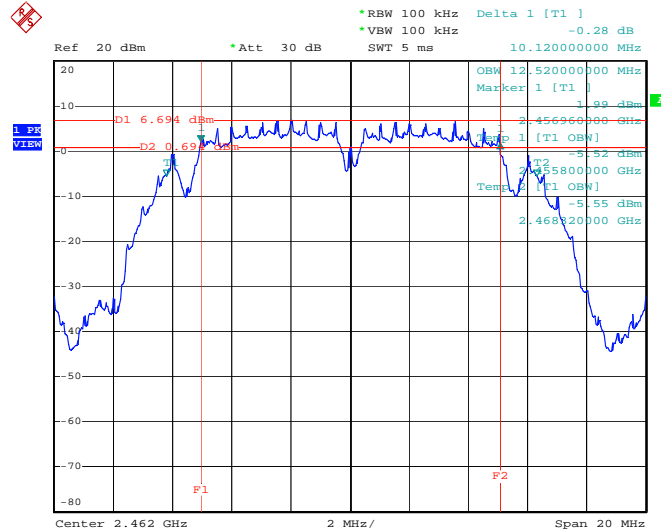
Date: 26.DEC.2008 17:43:33

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz



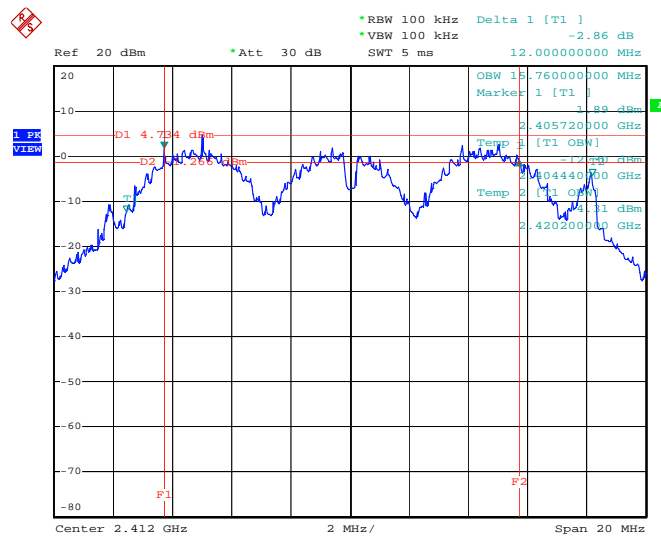
Date: 26.DEC.2008 17:44:55

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz



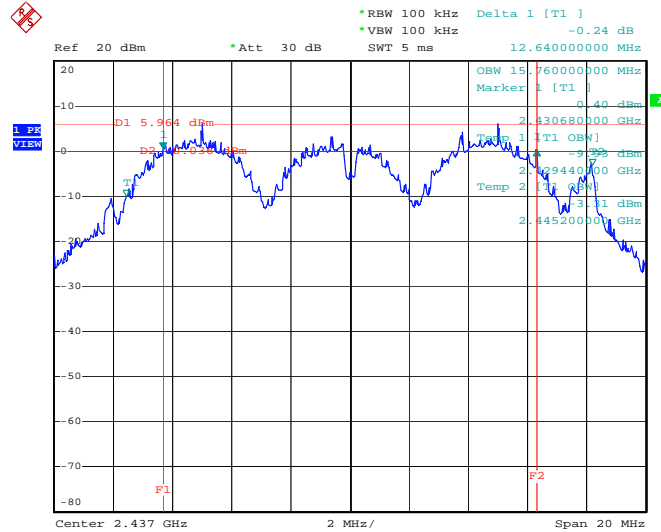
Date: 26.DEC.2008 17:46:39

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



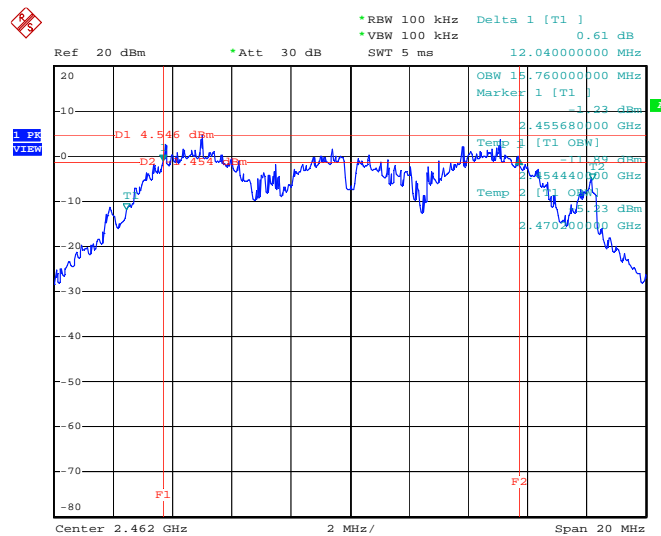
Date: 26.DEC.2008 17:50:08

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



Date: 26.DEC.2008 17:51:45

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



Date: 26.DEC.2008 17:52:48

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)	1000KHz / 1000KHz for peak

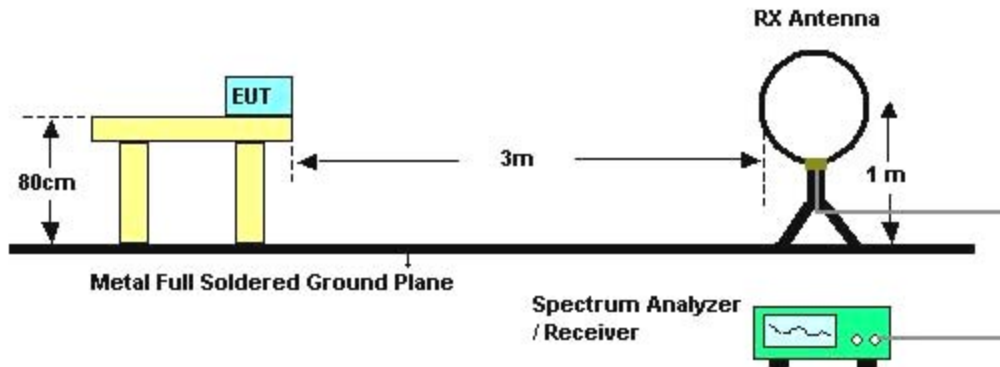
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

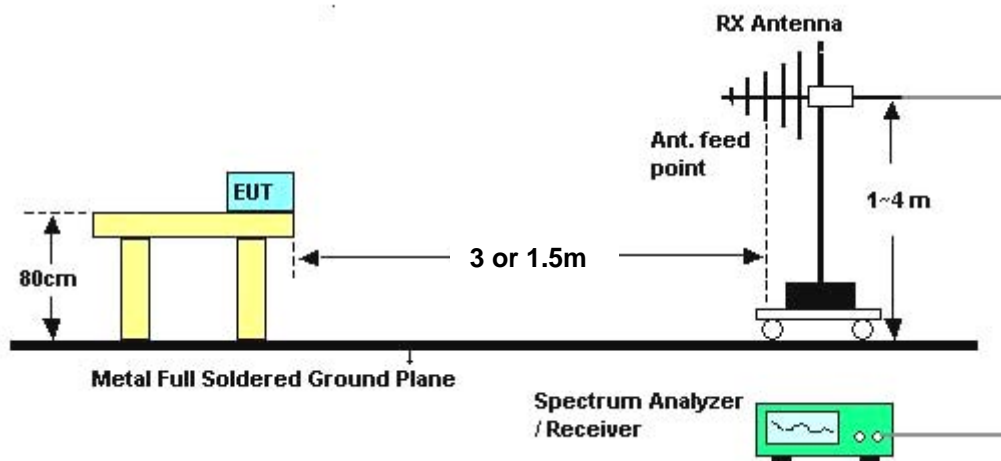
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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	24.3°C	Humidity	56%
Test Engineer	Jacky Ho	Configurations	Normal Link

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

Note:

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

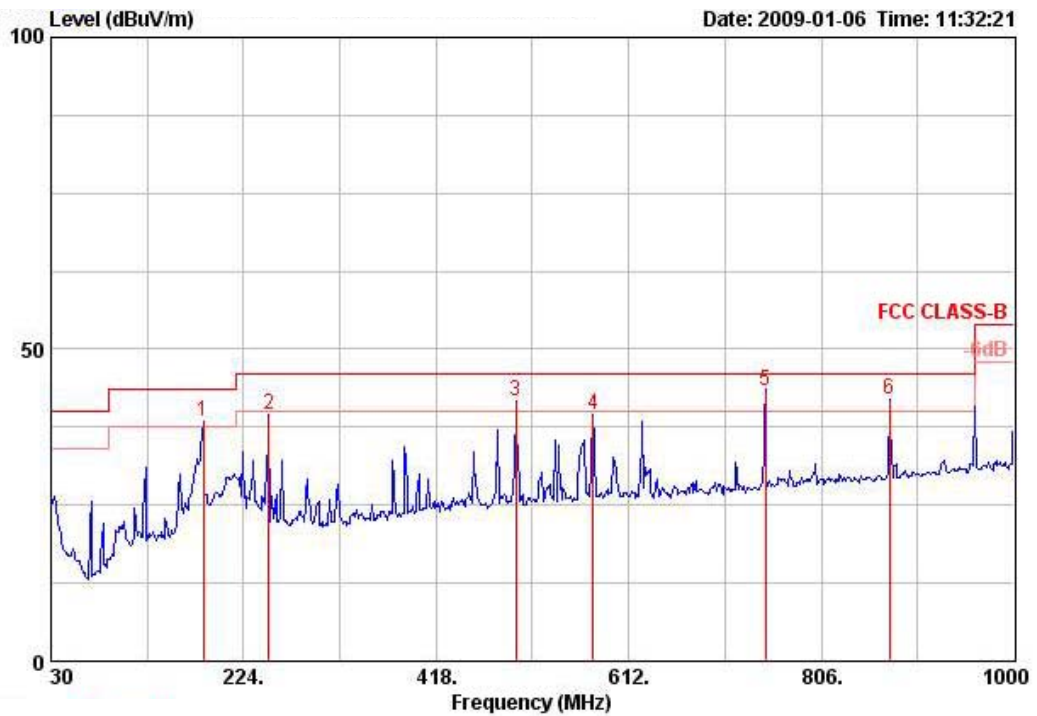
Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

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

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

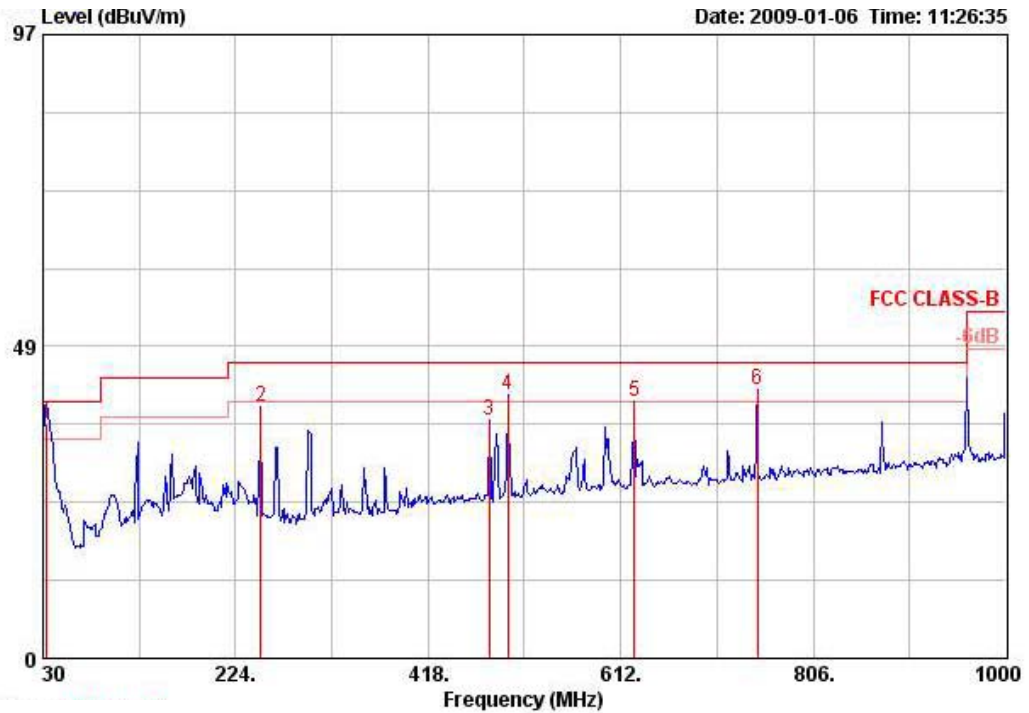
Temperature	24.3°C	Humidity	56%
Test Engineer	Jacky Ho	Configurations	Normal Link / Mode 2

Horizontal



	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 !	183.260	38.53	-4.97	43.50	52.01	12.53	1.19	27.18	Peak	100	0	HORIZONTAL
2	249.220	39.63	-6.37	46.00	52.44	12.70	1.49	27.00	Peak	100	0	HORIZONTAL
3 !	498.510	41.77	-4.23	46.00	49.85	17.60	2.40	28.09	Peak	100	0	HORIZONTAL
4	576.110	39.64	-6.36	46.00	46.54	18.49	2.70	28.10	Peak	100	0	HORIZONTAL
5 @	749.740	43.40	-2.60	46.00	48.50	19.43	3.27	27.80	QP	113	196	HORIZONTAL
6 !	874.870	41.84	-4.16	46.00	45.30	20.34	3.65	27.45	Peak	100	0	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 !	33.790	36.48	-3.52	40.00	47.80	16.08	0.40	27.80	QP	100	68	VERTICAL
2	249.220	39.24	-6.76	46.00	52.05	12.70	1.49	27.00	Peak	400	0	VERTICAL
3	479.110	37.08	-8.92	46.00	45.43	17.30	2.35	27.99	Peak	400	0	VERTICAL
4 !	498.510	40.87	-5.13	46.00	48.96	17.60	2.40	28.09	Peak	400	0	VERTICAL
5	625.580	39.78	-6.22	46.00	46.17	18.85	2.84	28.07	Peak	400	0	VERTICAL
6 !	749.740	41.72	-4.28	46.00	46.82	19.43	3.27	27.80	Peak	400	0	VERTICAL

Note:

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

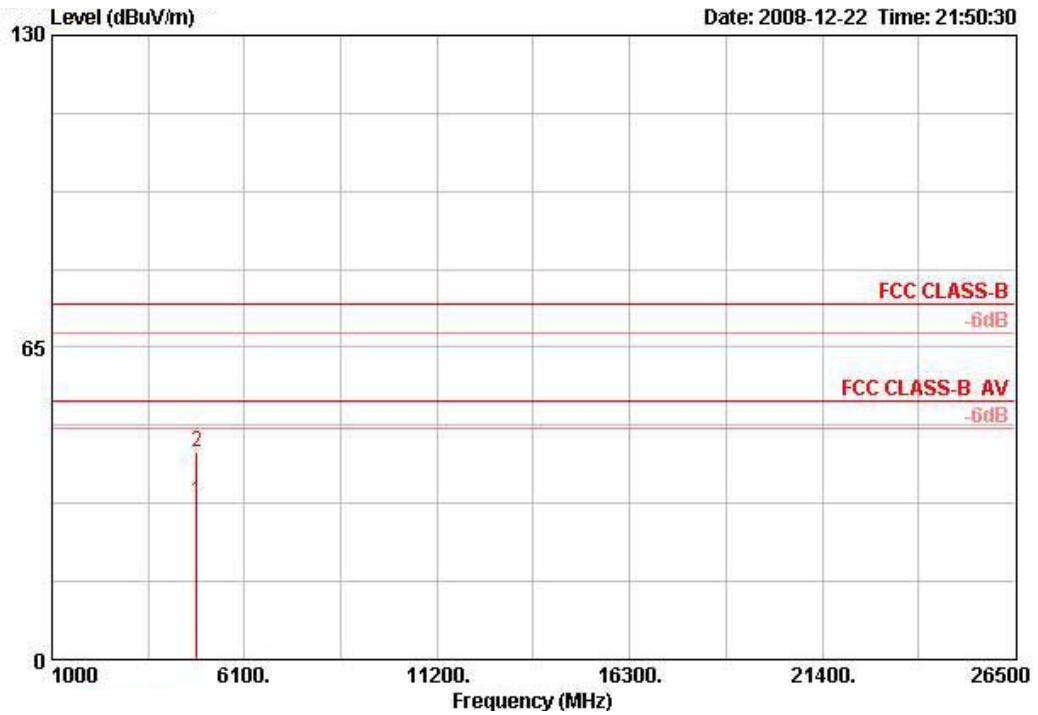
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

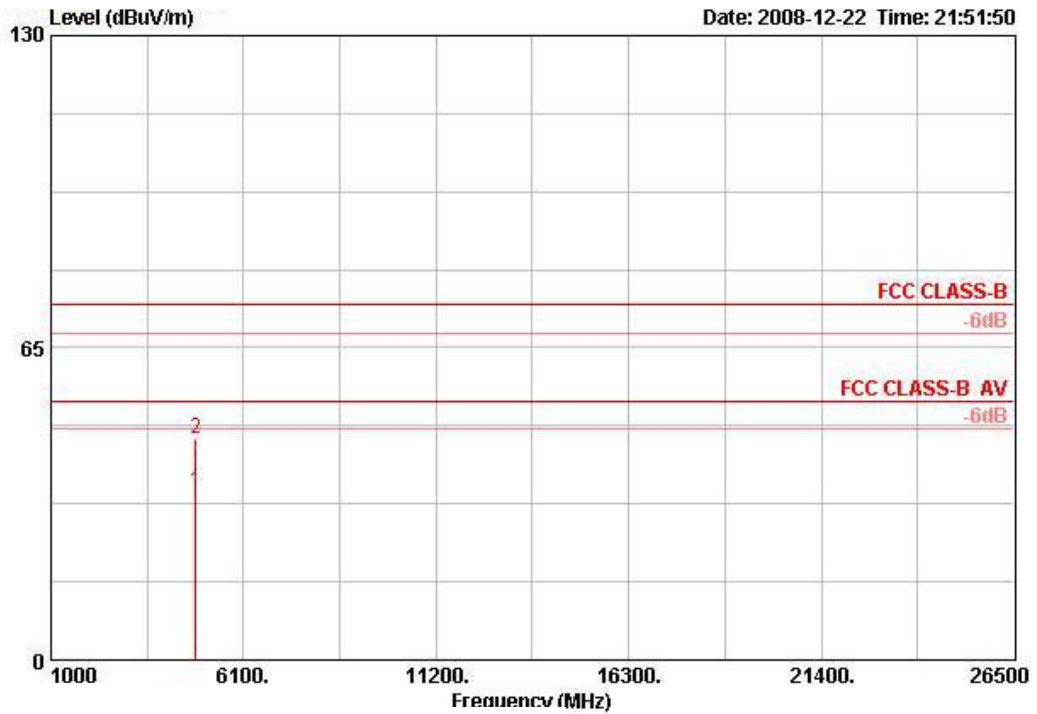
Temperature	24.3°C	Humidity	56%
Test Engineer	Jacky Ho	Configurations	Draft n MCS0 20MHz Ch 1 Ant. 1 + Ant. 3

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	4823.998	33.06	-20.94	54.00	32.52	32.46	3.34	35.26	AVERAGE	100	360	HORIZONTAL
2	4824.003	43.36	-30.64	74.00	42.82	32.46	3.34	35.26	PEAK	100	360	HORIZONTAL

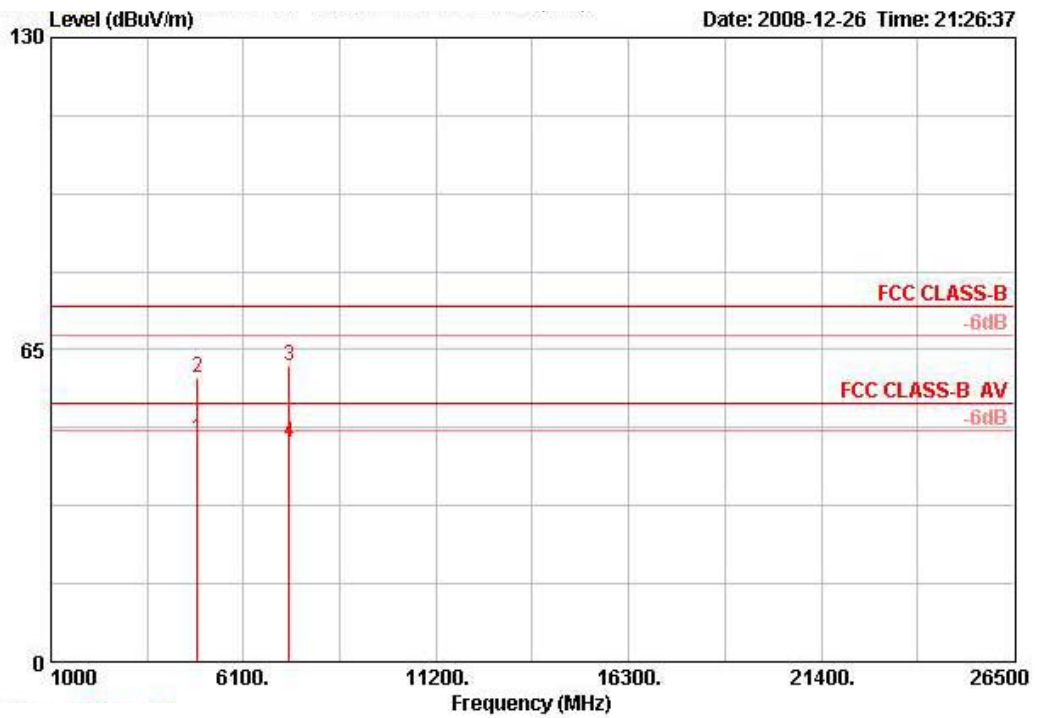
Vertical



	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 @	4823.991	35.07	-18.93	54.00	34.53	32.46	3.34	35.26	AVERAGE	100	0	VERTICAL
2	4824.000	46.11	-27.89	74.00	45.57	32.46	3.34	35.26	PEAK	100	0	VERTICAL

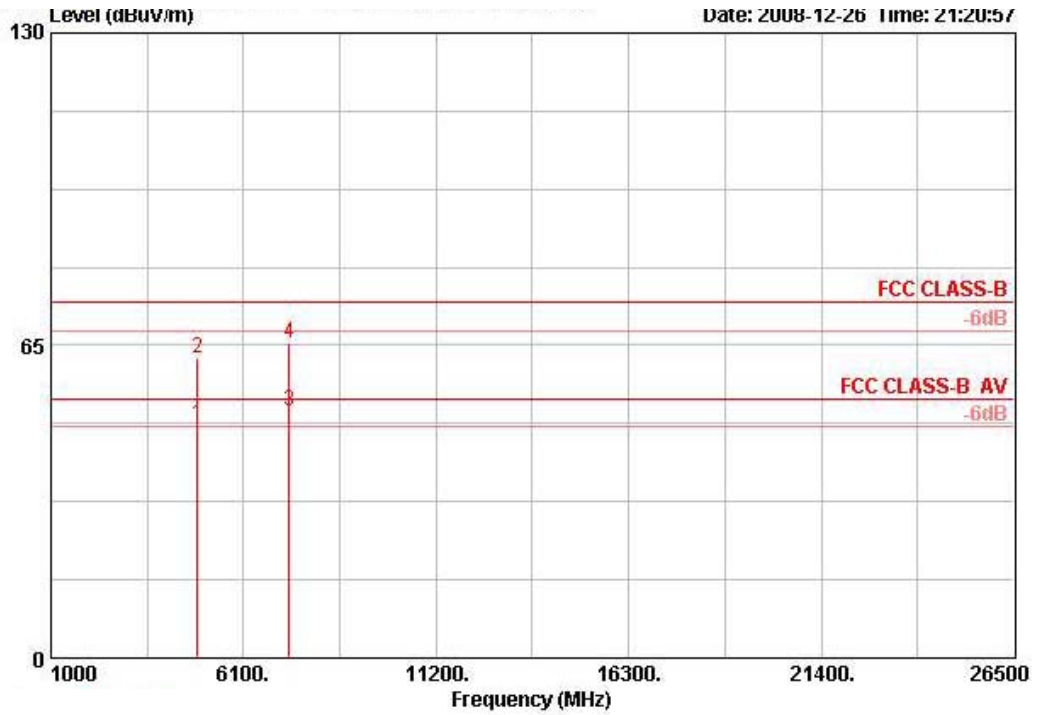
Temperature	24.3°C	Humidity	56%
Test Engineer	Jacky Ho	Configurations	Draft n MCS0 20MHz Ch 6 Ant. 1 + Ant. 3

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	4872.700	46.52	-7.48	54.00	45.75	32.56	3.36	35.15	AVERAGE	121	91	HORIZONTAL
2	4873.000	59.21	-14.79	74.00	58.43	32.56	3.36	35.15	PEAK	121	91	HORIZONTAL
3	7305.600	61.57	-12.43	74.00	55.52	36.67	4.32	34.94	PEAK	100	157	HORIZONTAL
4	7309.900	45.73	-8.27	54.00	39.67	36.67	4.32	34.94	AVERAGE	100	157	HORIZONTAL

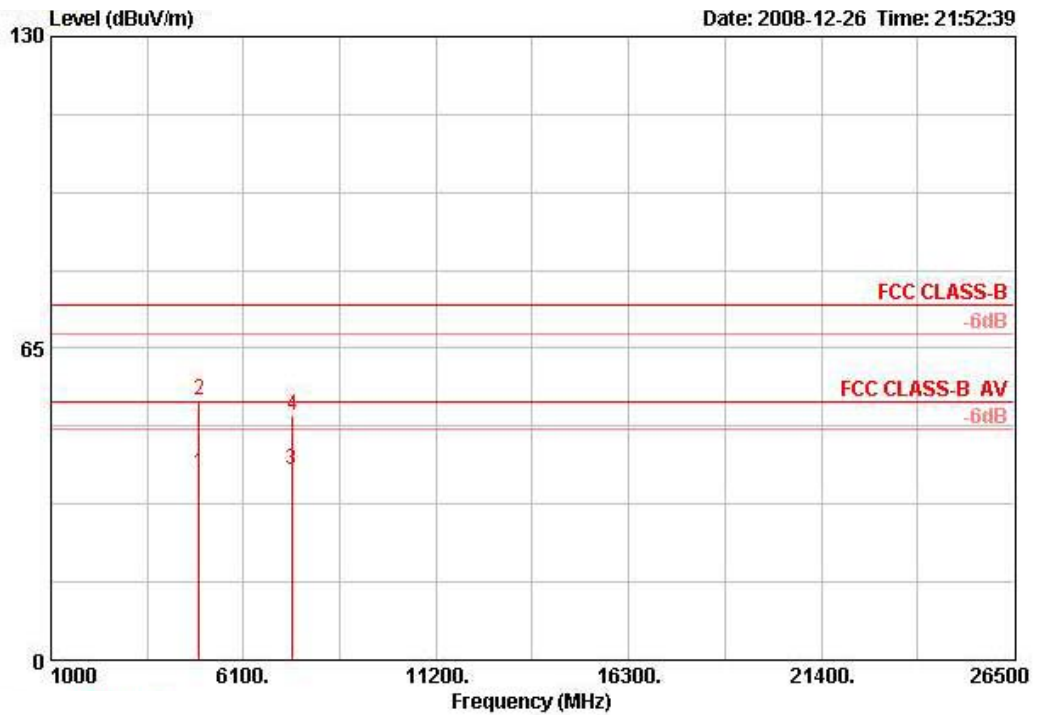
Vertical



	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 !	4873.400	48.67	-5.33	54.00	47.90	32.56	3.36	35.15	AVERAGE	111	269	VERTICAL
2	4873.600	62.34	-11.66	74.00	61.56	32.56	3.36	35.15	PEAK	111	269	VERTICAL
3 !	7310.840	51.31	-2.69	54.00	45.25	36.67	4.32	34.94	AVERAGE	180	85	VERTICAL
4	7311.080	65.51	-8.49	74.00	59.46	36.67	4.32	34.94	PEAK	180	85	VERTICAL

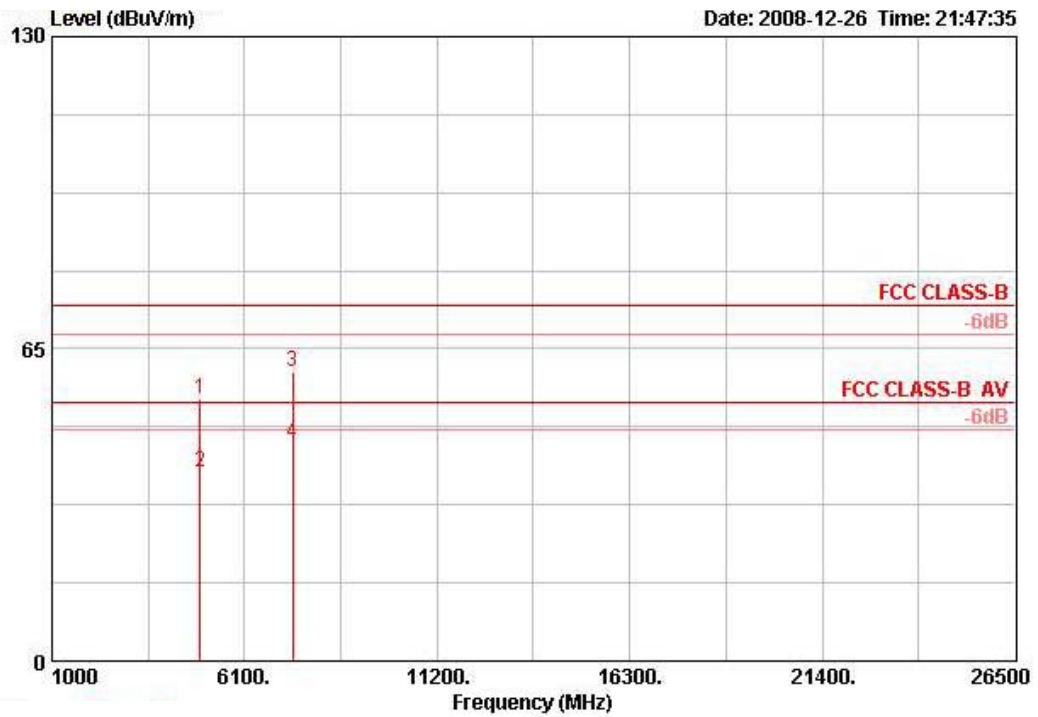
Temperature	24.3°C	Humidity	56%
Test Engineer	Jacky Ho	Configurations	Draft n MCS0 20MHz Ch11 Ant. 1 + Ant. 3

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	4924.800	38.91	-15.09	54.00	37.90	32.66	3.38	35.03	AVERAGE	121	94	HORIZONTAL
2	4926.800	54.11	-19.89	74.00	53.10	32.66	3.38	35.03	PEAK	121	94	HORIZONTAL
3	7386.100	39.69	-14.31	54.00	33.52	36.78	4.30	34.90	AVERAGE	100	151	HORIZONTAL
4	7388.680	50.96	-23.04	74.00	44.74	36.82	4.28	34.88	PEAK	100	151	HORIZONTAL

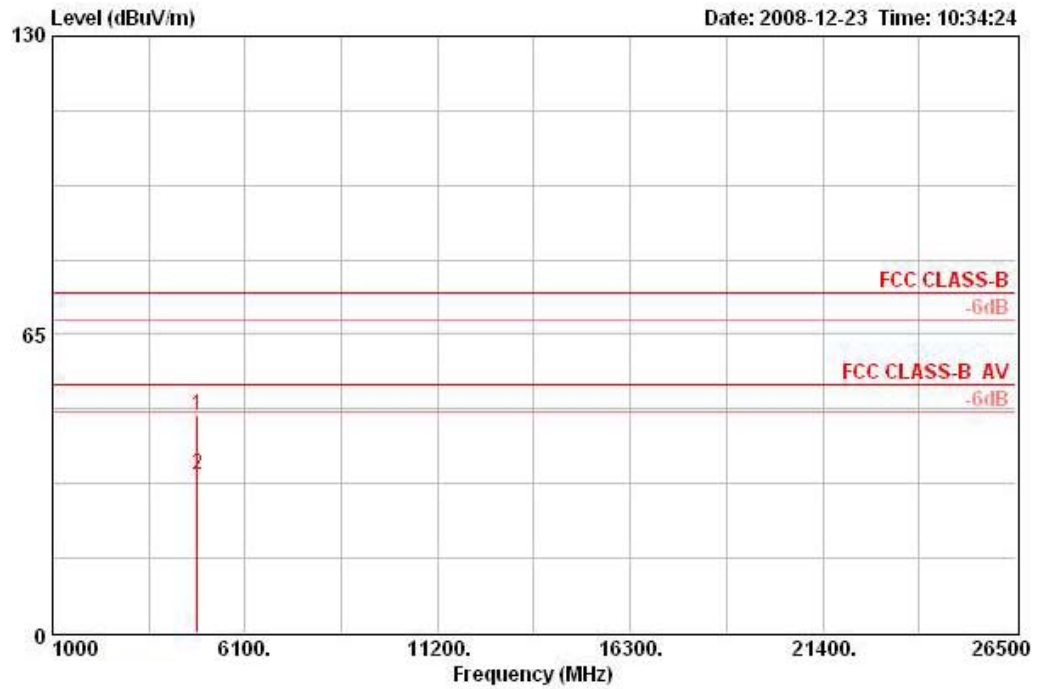
Vertical



	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	4923.400	54.53	-19.47	74.00	53.51	32.66	3.38	35.03	PEAK	110	270	VERTICAL
2	4923.680	39.47	-14.53	54.00	38.46	32.66	3.38	35.03	AVERAGE	110	270	VERTICAL
3	7375.400	60.28	-13.72	74.00	54.12	36.76	4.30	34.90	PEAK	178	88	VERTICAL
4	7380.800	45.45	-8.55	54.00	39.30	36.76	4.30	34.90	AVERAGE	178	88	VERTICAL

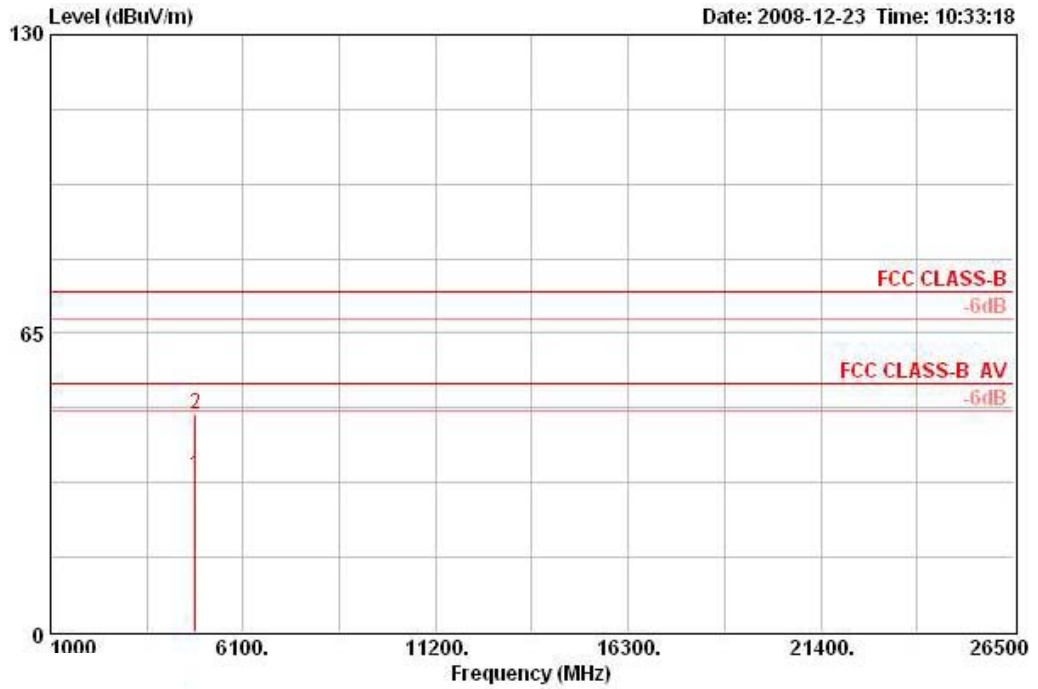
Temperature	24.3°C	Humidity	56%
Test Engineer	Jacky Ho	Configurations	Draft n MCS0 40MHz Ch 3 Ant. 1 + Ant. 3

Horizontal



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Remark	Ant	Table	
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	cm	deg	Pol/Phase
1	4843.979	47.25	-26.75	74.00	45.23	33.09	3.96	35.03	100	133	HORIZONTAL
2	4843.997	34.28	-19.72	54.00	32.25	33.09	3.96	35.03	100	133	HORIZONTAL

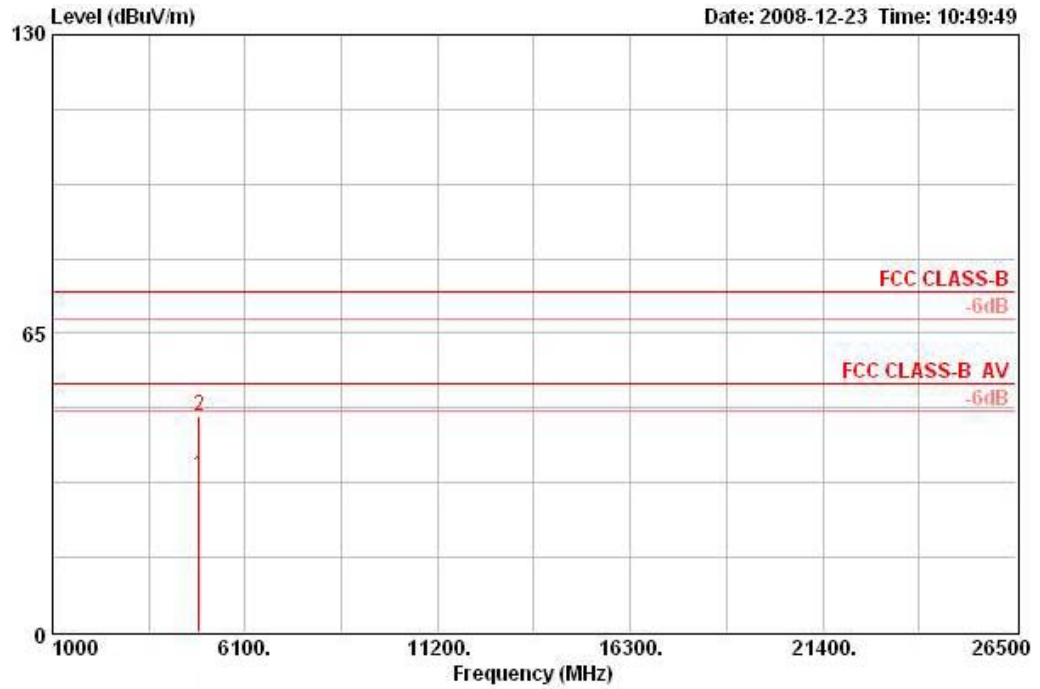
Vertical



	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	4843.994	34.12	-19.88	54.00	32.09	33.09	3.96	35.03	AVERAGE	100	210	VERTICAL
2	4844.005	47.45	-26.55	74.00	45.42	33.09	3.96	35.03	PEAK	100	210	VERTICAL

Temperature	24.3°C	Humidity	56%
Test Engineer	Jacky Ho	Configurations	Draft n MCS0 40MHz Ch 6 Ant. 1 + Ant. 3

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	4874.001	34.10	-19.90	54.00	32.00	33.16	3.97	35.03	AVERAGE	100	107	HORIZONTAL
2	4874.009	46.97	-27.03	74.00	44.87	33.16	3.97	35.03	PEAK	100	107	HORIZONTAL