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	**OvisLink Corp.**
Applicant Address	5F, No.6, Lane 130, Min-Chuan Rd., Hsin-Tien Dist., New Taipei City, 231, Taiwan
FCC ID	**ODMNPOWER**
Manufacturer's company	**OvisLink Corp.**
Manufacturer Address	5F, No.6, Lane 130, Min-Chuan Rd., Hsin-Tien Dist., New Taipei City, 231, Taiwan

Product Name	Hi-Power Wireless-N PoE AP Router
Brand Name	Air Live
Model Name	N.Power
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Nov. 18, 2009
Final Test Date	Dec. 29, 2012
Submission Type	Original Equipment

Statement

Test result included is only for the IEEE 802.11n, IEEE 802.11b/g part.

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 C63.10-2003**, **47 CFR FCC Part 15 Subpart C**, **KDB 558074 D01 v02**.

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

Testing Laboratory
1190

Table of Contents

History of This Test Report

Test Report No.	Issue Date	Version	Description
FR9D2216-04	Jan. 07, 2013	Rev. 01	Initial issue of report.

Certificate No.:CB10201005

1. CERTIFICATE OF COMPLIANCE

Product Name	:	**Hi-Power Wireless-N PoE AP Router**
Brand Name	:	**Air Live**
Model Name	:	**N.Power**
Applicant	:	**OvisLink Corp.**
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 Nov. 18, 2009 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.

Jordan Hsiao

Jordan Hsiao
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	1.15 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	18.85 dB
4.3	15.247(e)	Power Spectral Density	Complies	23.59 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.47 dB
4.6	15.247(d)	Band Edge Emissions	Complies	5.11 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	$\pm 8.5\times10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	802.11n : WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS0 (20MHz): 17.60 MHz ; MCS0 (40MHz): 35.84 MHz
Conducted Output Power	MCS0 (20MHz): 10.85 dBm ; MCS0 (40MHz): 10.83 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

IEEE 802.11b/g

Items	Description
Product Type	802.11b/g :WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From 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: 14.32 MHz ; 11g: 16.48 MHz
Conducted Output Power	11b: 11.15 dBm ; 11g: 10.88 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

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

IEEE 802.11n spec

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Datarate(Mbps)			
									800nsGI		400nsGI	
					20MHz	40MHz	20MHz	40MHz	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

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	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

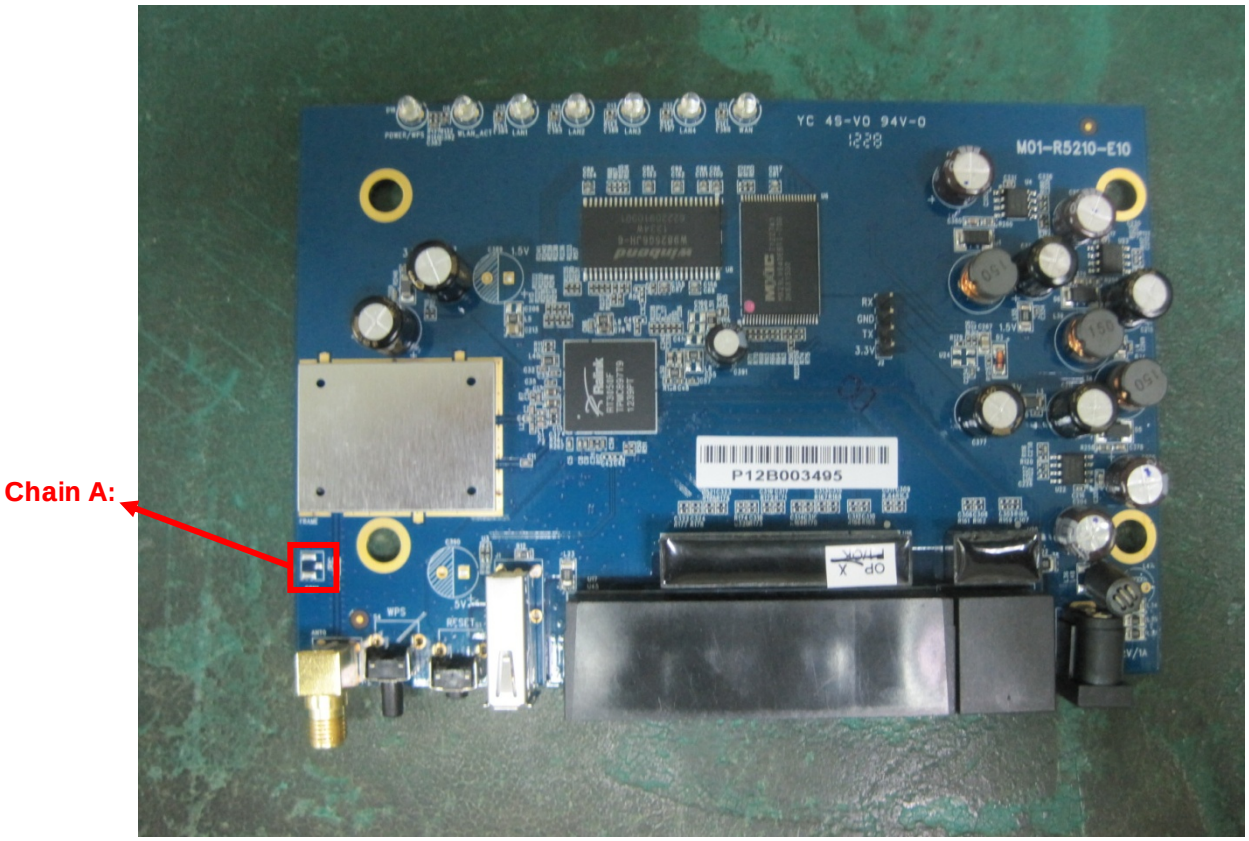
Power	Brand	Model	Rating
Adapter	DVE	DSA-12G-12 FUS 120120	Input: 100-240VAC, 50/60Hz, 0.3A Output: 12VDC, 1.0A

3.3. Table for Filed Antenna

Chain	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
A	WHA YU	C068-510416-A	Dipole Antenna	Reversed-SMA	5.00

Note: The EUT has one antenna.

Chain A can be used as transmitting/receiving antenna.



3.4. Table for Carrier Frequencies

There are two bandwidth systems for IEEE 802.11n.

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	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	A
Maximum Conducted Output Power	MCS0/20MHz	6.5 Mbps	1/6/11	A
	MCS0/40MHz	13.5 Mbps	3/6/9	A
	11b/BPSK	1 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
Power Spectral Density 6dB Spectrum Bandwidth	MCS0/20MHz	6.5 Mbps	1/6/11	A
	MCS0/40MHz	13.5 Mbps	3/6/9	A
	11b/BPSK	1 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
Radiated Emissions 9kHz~1GHz	CTX	-	-	A
Radiated Emissions 1GHz~10th Harmonic	MCS0/20MHz	6.5 Mbps	1/6/11	A
	MCS0/40MHz	13.5 Mbps	3/6/9	A
	11b/BPSK	1 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
Band Edge Emissions	MCS0/20MHz	6.5 Mbps	1/6/11	A
	MCS0/40MHz	13.5 Mbps	3/6/9	A
	11b/BPSK	1 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A

Note :

All the test modes were illustrated as below:

Test Mode 1: EUT 1 switch on **LAN+WLAN+WAN** + Adapter

Test Mode 2: EUT 1 switch on **LAN+WLAN+WWAN** + Adapter

<For Conducted Emissions Test>:

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

<For Radiated Emissions Test Below 1GHz>:

Due to Mode 2 generated the worst test result, so it was recorded in this report.

<For MPE and Co-location Test>:

The EUT could be applied with three express 3G Dongle; therefore Maximum Permissible Exposure (please refer to Appendix C) and Co-location (please refer to Appendix D) tests are added for simultaneously transmit between wireless LAN and 3G card function.

Interface	Brand	Model	FCC ID
3G USB Dongle 1	CHT	E1612	QISE1612
3G USB Dongle 2	CHT	E169	QISE169
3G USB Dongle 3	CHT	E220X	QISE220X

Test Mode 1: EUT 1 switch on **LAN+WLAN+WWAN** + Adapter with 3G USB Dongle 1

Test Mode 2: EUT 1 switch on **LAN+WLAN+WWAN** + Adapter with 3G USB Dongle 2

Test Mode 3: EUT 1 switch on **LAN+WLAN+WWAN** + Adapter with 3G USB Dongle 3

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D520	E2KWM3945ABG
Notebook	DELL	PP25L	E2K4965AGNM
Notebook	DELL	PP25L	E2K4965AGNM
CMU200	ROHDE&SCHWARZ	108087	N/A
3G USB Dongle	CHT	E1612	QISE1612
3G USB Dongle	CHT	E169	QISE169
3G USB Dongle	CHT	E220X	QISE220X
HUB	Laneed	LD-LSW16C/AT	N/A

3.8. Table for Parameters of Test Software Setting

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

Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	RT3052 QA UI : Release Version 1.0.0.2		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n MCS0 20MHz Chain A	6	7	7

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	RT3052 QA UI : Release Version 1.0.0.2		
Frequency	2422 MHz	2437 MHz	2452 MHz
IEEE 802.11n MCS0 40MHz Chain A	6	5	5

Power Parameters of IEEE 802.11b/g

Test Software Version	RT3052 QA UI : Release Version 1.0.0.2		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b Chain A	3	4	4
IEEE 802.11g Chain A	6	7	9

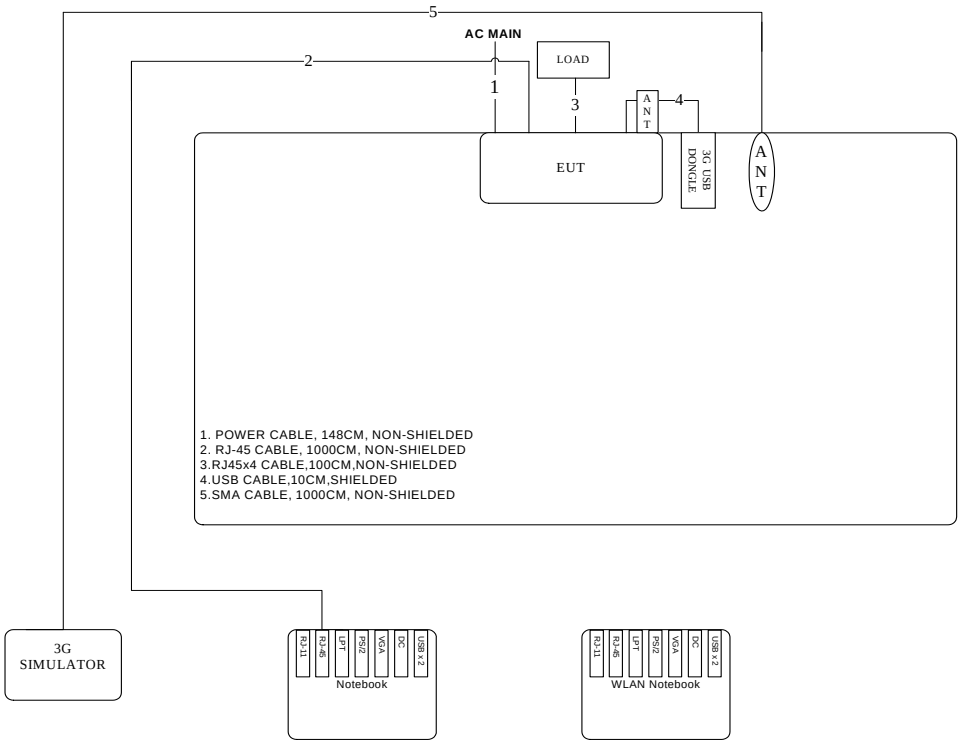
During the test, the following programs under WIN XP was executed:

"**RT3052 QA UI : Release Version 1.0.0.2**" was executed the test program to control the EUT continuously transmit RF signal.

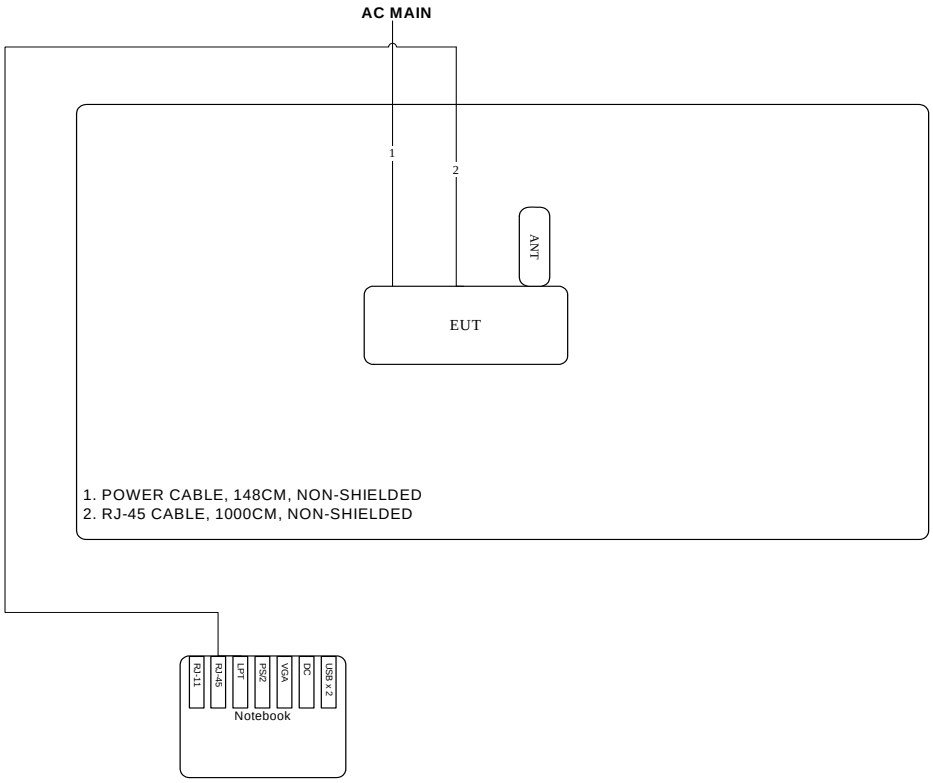
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

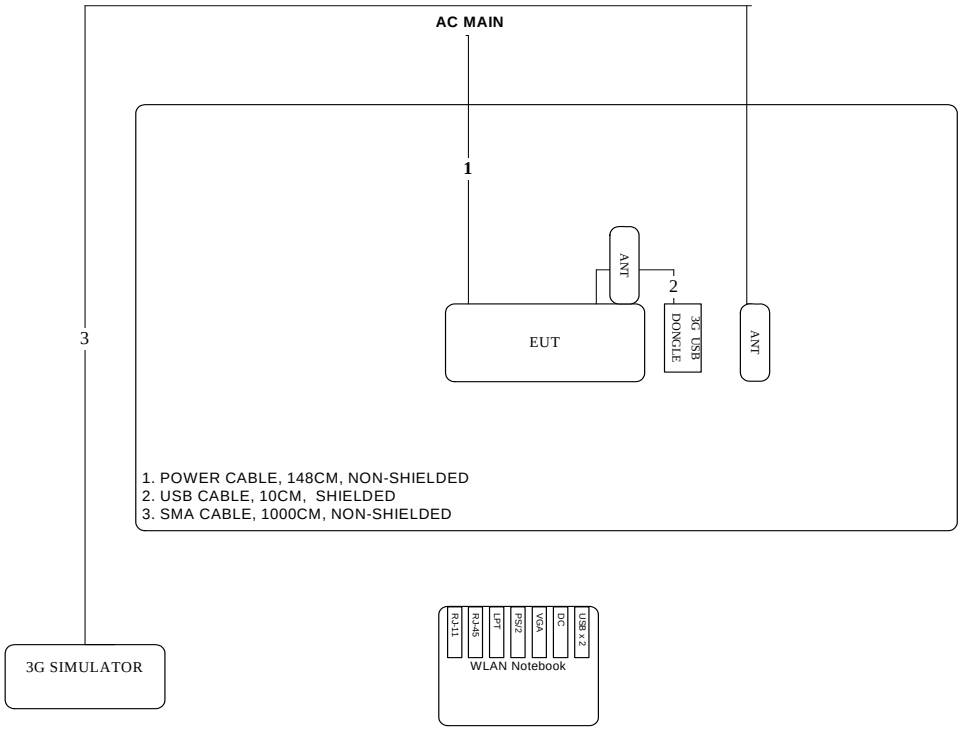
Test Configuration: 30MHz~1GHz



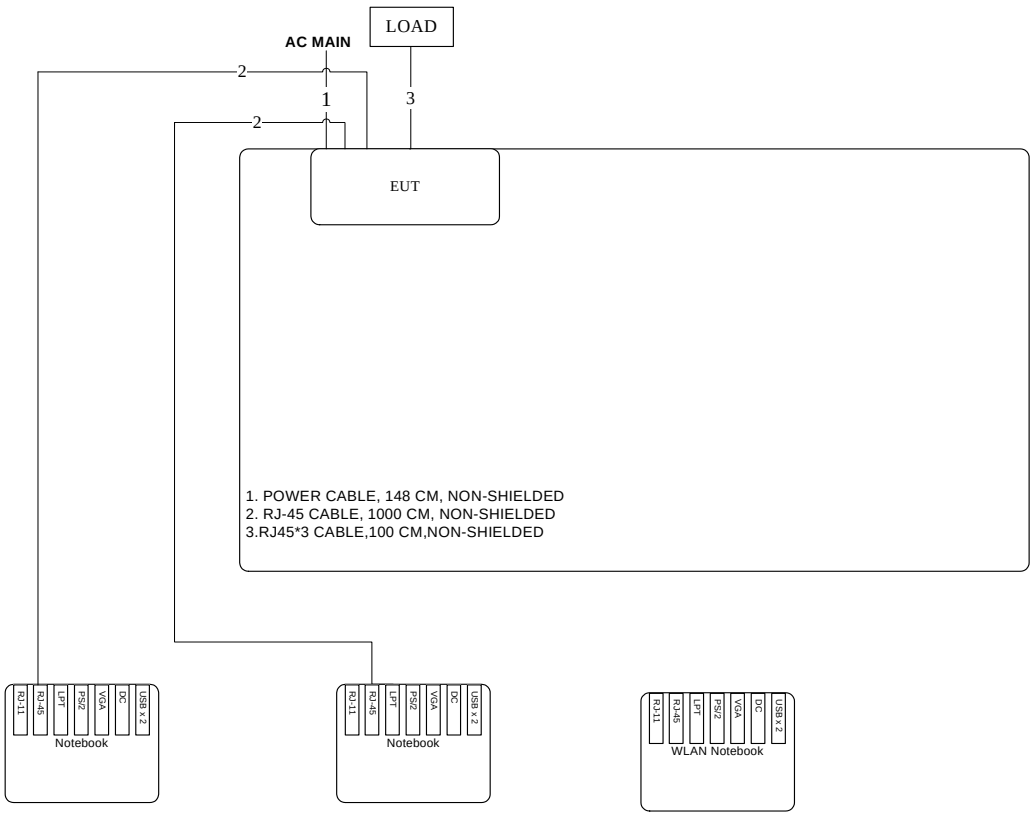
Test Configuration: Above 1GHz



Test Configuration: Co-location



3.9.2. AC Power Line Conduction Emissions Test Configuration



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product 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

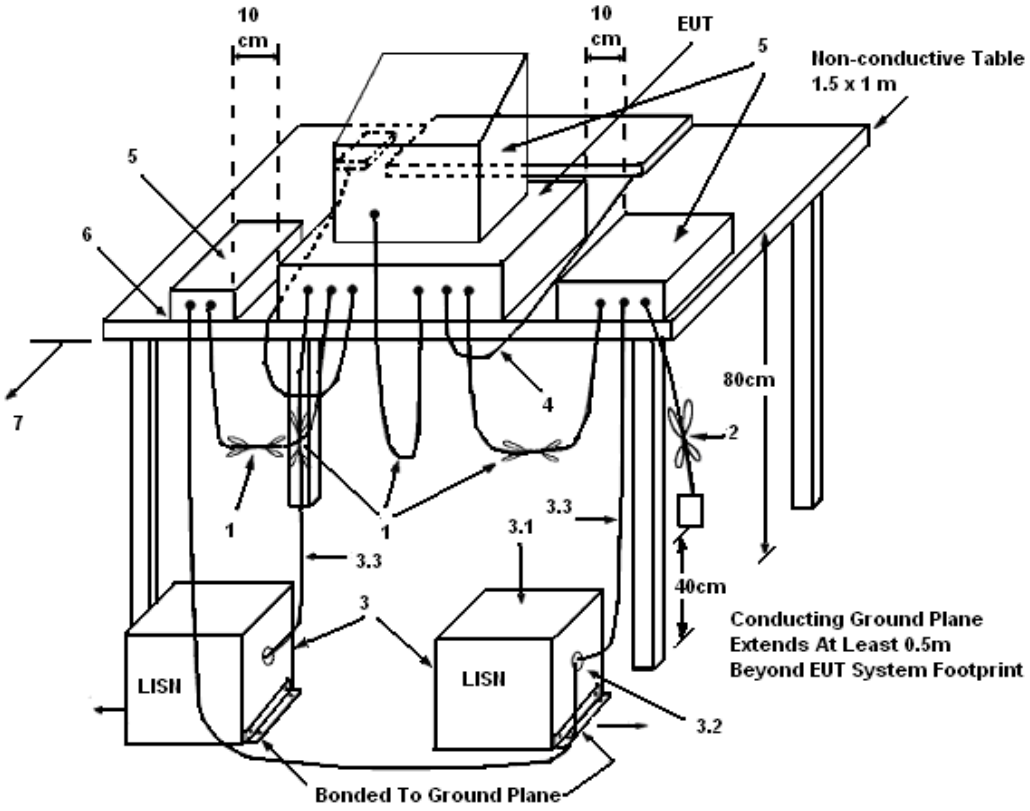
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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.

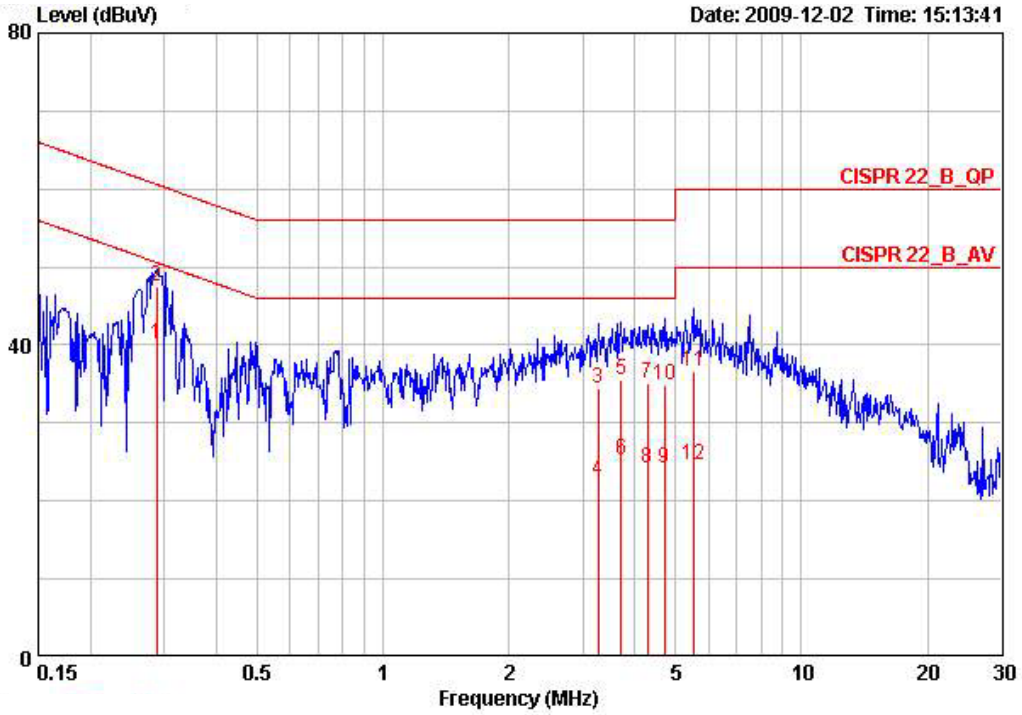
4.1.6. EUT Operation during Test

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

4.1.7. Results of AC Power Line Conducted Emissions Measurement

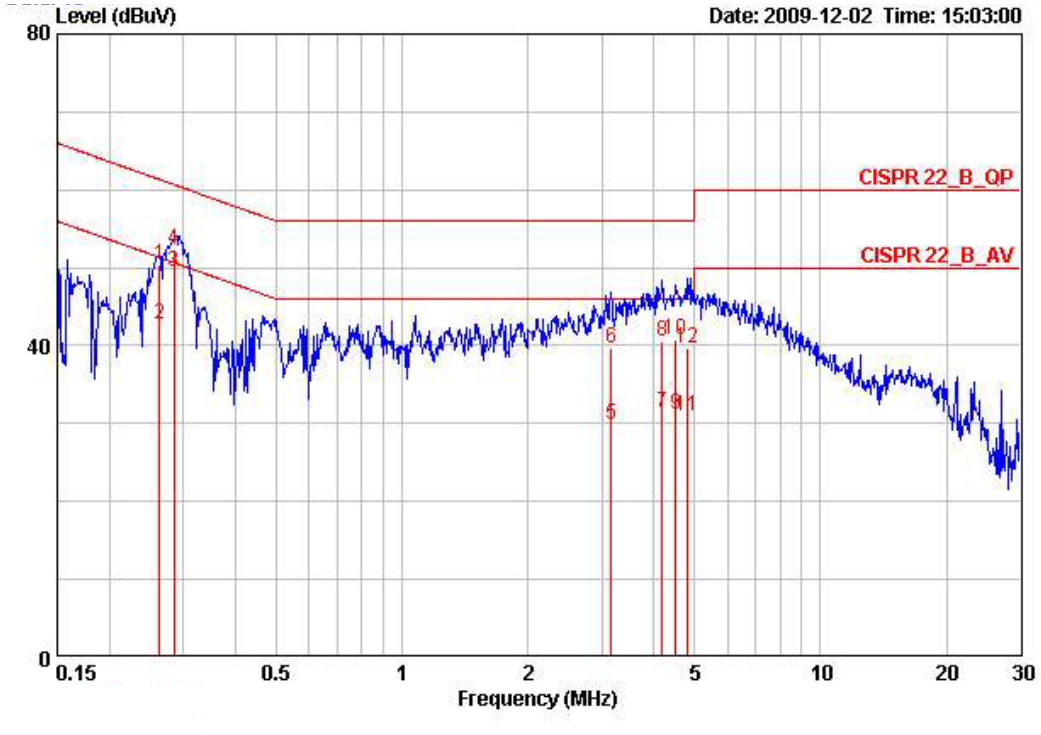
<For EUT 1>:

Temperature	23℃	**Humidity**	54%
Test Engineer	Rex Chiu	**Phase**	Line
Configuration	Normal Link / EUT 1 with Mode 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.28782	40.20	-10.39	50.59	39.96	0.04	0.20	AVERAGE
2	0.28782	47.47	-13.12	60.59	47.23	0.04	0.20	QP
3	3.276	34.47	-21.53	56.00	34.13	0.09	0.26	QP
4	3.276	22.68	-23.32	46.00	22.34	0.09	0.26	AVERAGE
5	3.700	35.47	-20.53	56.00	35.08	0.09	0.30	QP
6	3.700	25.28	-20.72	46.00	24.89	0.09	0.30	AVERAGE
7	4.292	35.04	-20.96	56.00	34.62	0.12	0.30	QP
8	4.292	24.13	-21.87	46.00	23.71	0.12	0.30	AVERAGE
9	4.696	24.26	-21.74	46.00	23.82	0.14	0.30	AVERAGE
10	4.696	34.92	-21.08	56.00	34.48	0.14	0.30	QP
11	5.505	36.63	-23.37	60.00	36.14	0.19	0.30	QP
12	5.505	24.69	-25.31	50.00	24.20	0.19	0.30	AVERAGE

Temperature	23℃	Humidity	54%
Test Engineer	Rex Chiu	Phase	Neutral
Configuration	Normal Link / EUT 1 with Mode 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.26303	50.30	-11.04	61.34	50.02	0.08	0.20	QP
2	0.26303	42.70	-8.64	51.34	42.42	0.08	0.20	AVERAGE
3	0.28475	49.52	-1.15	50.68	49.25	0.07	0.20	AVERAGE
4	0.28475	52.23	-8.44	60.68	51.96	0.07	0.20	QP
5	3.156	29.93	-16.07	46.00	29.57	0.12	0.23	AVERAGE
6	3.156	39.61	-16.39	56.00	39.25	0.12	0.23	QP
7	4.180	31.48	-14.52	46.00	31.03	0.15	0.30	AVERAGE
8	4.180	40.58	-15.42	56.00	40.13	0.15	0.30	QP
9	4.501	31.18	-14.82	46.00	30.71	0.17	0.30	AVERAGE
10	4.501	40.72	-15.28	56.00	40.25	0.17	0.30	QP
11	4.797	30.88	-15.12	46.00	30.39	0.19	0.30	AVERAGE
12	4.797	39.59	-16.41	56.00	39.10	0.19	0.30	QP

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 Maximum 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

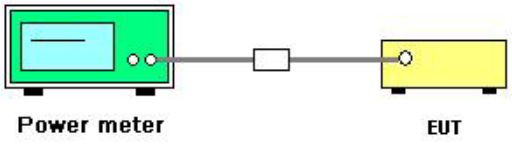
Please refer to section 5 of equipments list in this report. The following table is the setting of the peak power meter.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	Peak

4.2.3. Test Procedures

Spectrum Parameter	Setting
RF Output Power Method	☒ ANSI C63.10 clause 6.10.2.1 (a) power meter method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.2.1 (b) channel integration method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.1 Method 1 - spectral trace averaging
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.2 Method 2 - zero-span mode with trace averaging

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	23℃	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n
Test Date	Dec. 29, 2012		

Configuration IEEE 802.11n MCS0 20MHz Chain A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	10.85	30.00	**Complies**
6	2437 MHz	10.78	30.00	**Complies**
11	2462 MHz	10.02	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Chain A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	10.83	30.00	**Complies**
6	2437 MHz	9.98	30.00	**Complies**
9	2452 MHz	9.57	30.00	**Complies**

Temperature	23℃	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g
Test Date	Dec. 29, 2012		

Configuration IEEE 802.11b Chain A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	11.09	30.00	**Complies**
6	2437 MHz	11.15	30.00	**Complies**
11	2462 MHz	10.41	30.00	**Complies**

Configuration IEEE 802.11g Chain A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	10.88	30.00	**Complies**
6	2437 MHz	10.79	30.00	**Complies**
11	2462 MHz	10.87	30.00	**Complies**

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

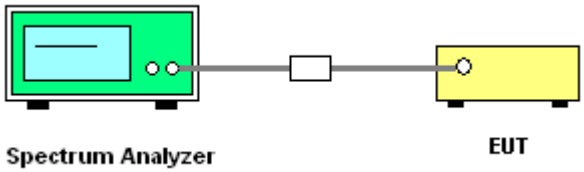
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RB	100 kHz
VB	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

4.3.3. Test Procedures

1. Test procedures refer KDB558074 v01 r02 section 9.1 option 1
2. Spectrum analyzer must be capable of utilizing a number of measurement points in each sweep that is greater than or equal to twice the span/RBW in order to ensure bin-to-bin spacing of ≤ RBW/2 so that narrowband signals are not lost between frequency bins.
3. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
4. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
5. Use the peak marker function to determine the maximum level in any 100 kHz band segment within the fundamental EBW.
6. Scale the observed power level to an equivalent level in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where: BWCF = 10log (3 kHz/100 kHz = -15.2 dB).
7. The resulting PSD level must be ≤ 8 dBm.
8. When measuring power spectral density with multiple antenna systems, add every result of the values by mathematic formula.

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℃	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n
Test Date	Dec. 29, 2012		

Configuration IEEE 802.11n MCS0 20MHz Chain A

Channel	Frequency	Power Density (dBm/100kHz)	BWCF factor (100KHz to 3KHz)	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-3.51	-15.23	-18.74	8.00	**Complies**
6	2437 MHz	-3.46	-15.23	-18.69	8.00	**Complies**
11	2462 MHz	-4.09	-15.23	-19.32	8.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Chain A

Channel	Frequency	Power Density (dBm/100kHz)	BWCF factor (100KHz to 3KHz)	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-6.70	-15.23	-21.93	8.00	**Complies**
6	2437 MHz	-7.13	-15.23	-22.36	8.00	**Complies**
9	2452 MHz	-7.94	-15.23	-23.17	8.00	**Complies**

Temperature	23℃	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g
Test Date	Dec. 29, 2012		

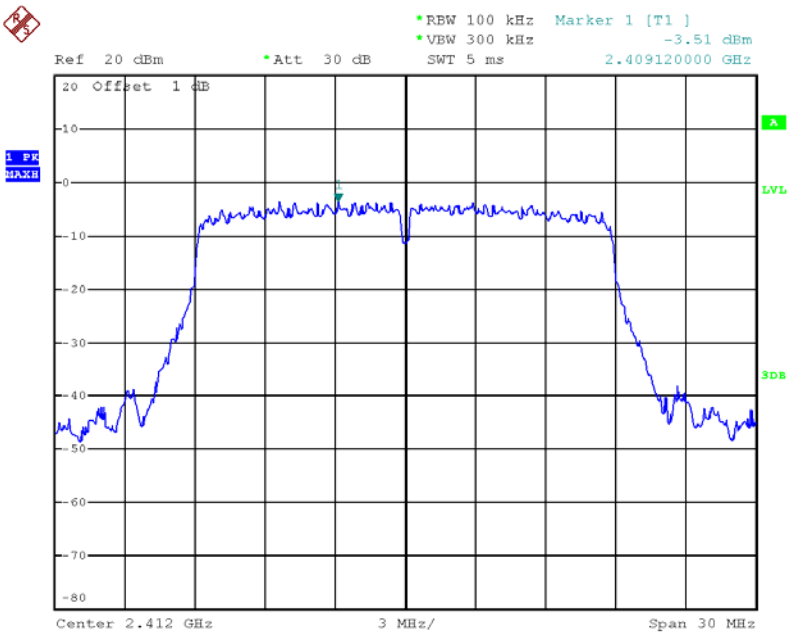
Configuration IEEE 802.11b Chain A

Channel	Frequency	Power Density (dBm/100kHz)	BWCF factor (100KHz to 3KHz)	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-0.41	-15.23	-15.64	8.00	**Complies**
6	2437 MHz	-0.36	-15.23	-15.59	8.00	**Complies**
11	2462 MHz	-1.11	-15.23	-16.34	8.00	**Complies**

Configuration IEEE 802.11g Chain A

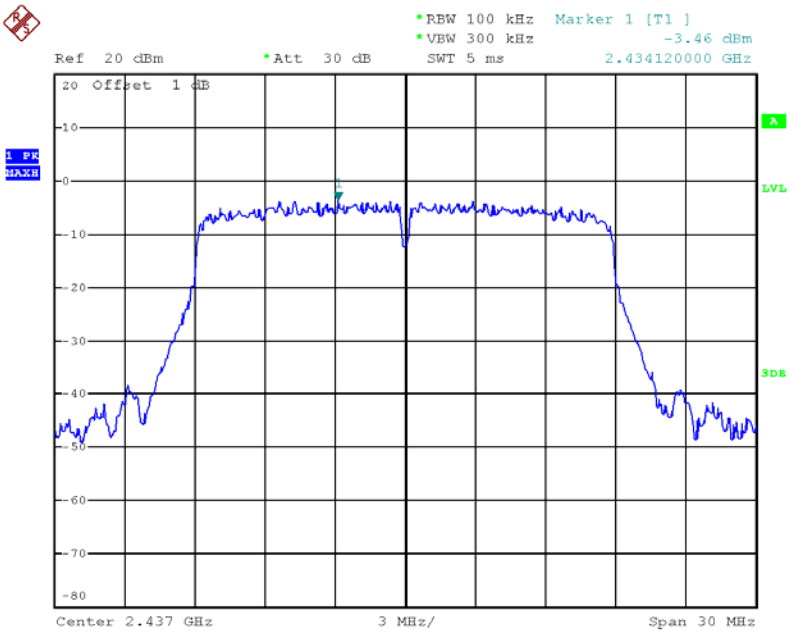
Channel	Frequency	Power Density (dBm/100kHz)	BWCF factor (100KHz to 3KHz)	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-3.46	-15.23	-18.69	8.00	**Complies**
6	2437 MHz	-3.43	-15.23	-18.66	8.00	**Complies**
11	2462 MHz	-3.37	-15.23	-18.60	8.00	**Complies**

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz Chain A / 2412 MHz



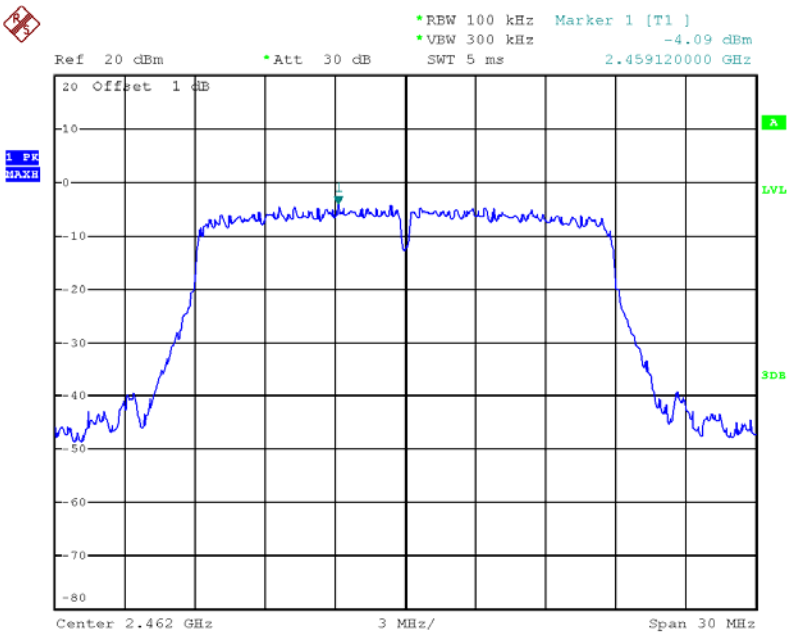
Date: 28.DEC.2012 22:07:57

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz Chain A / 2437 MHz



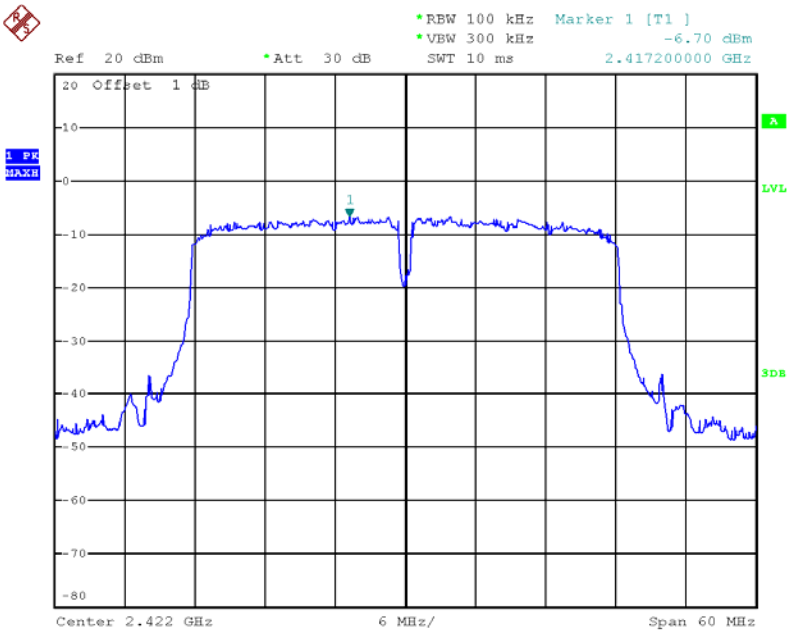
Date: 28.DEC.2012 22:07:23

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz Chain A / 2462 MHz



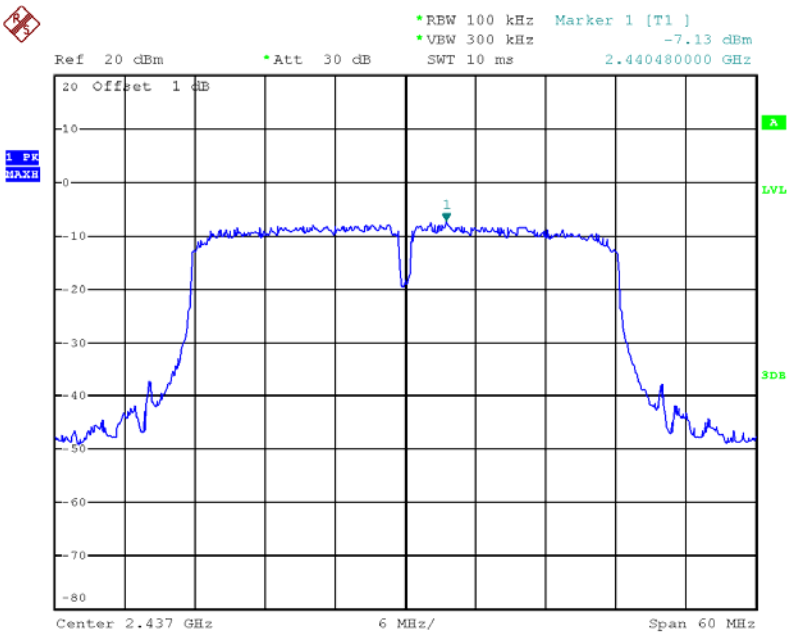
Date: 28.DEC.2012 22:06:47

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz Chain A / 2422 MHz



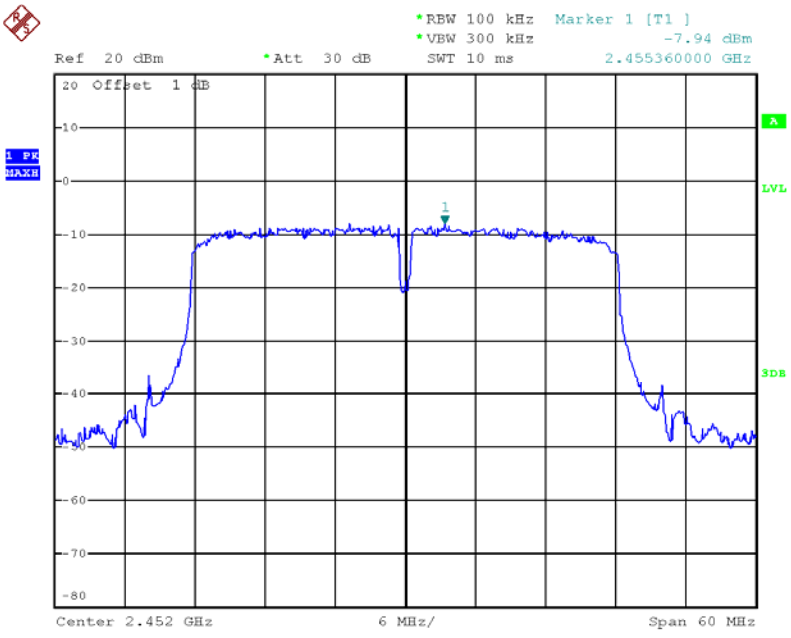
Date: 28.DEC.2012 22:11:03

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz Chain A / 2437 MHz



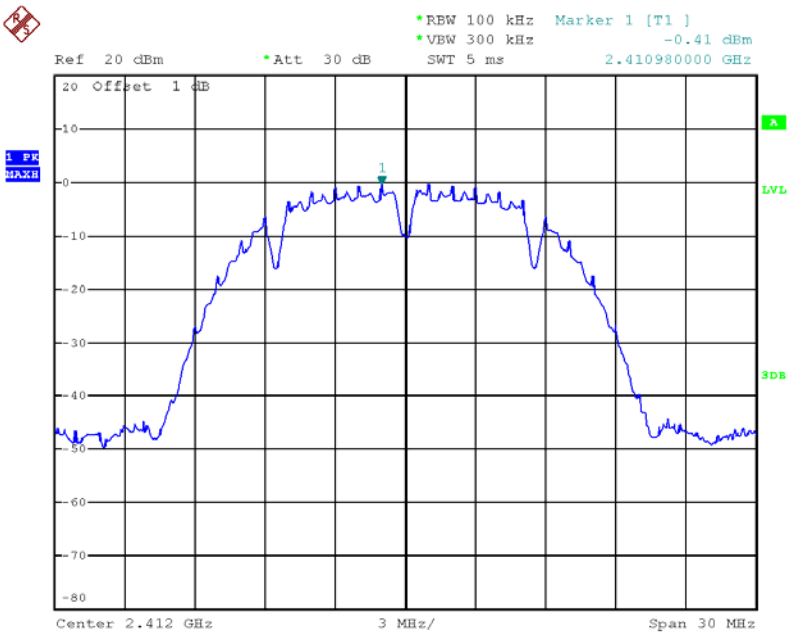
Date: 28.DEC.2012 22:11:32

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz Chain A / 2452 MHz



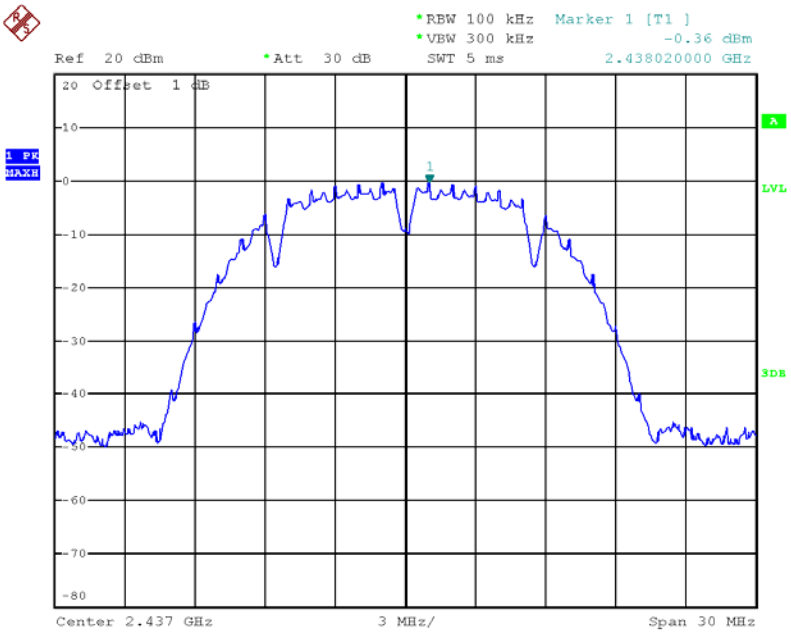
Date: 28.DEC.2012 22:11:57

Power Density Plot on Configuration IEEE 802.11b Chain A / 2412 MHz



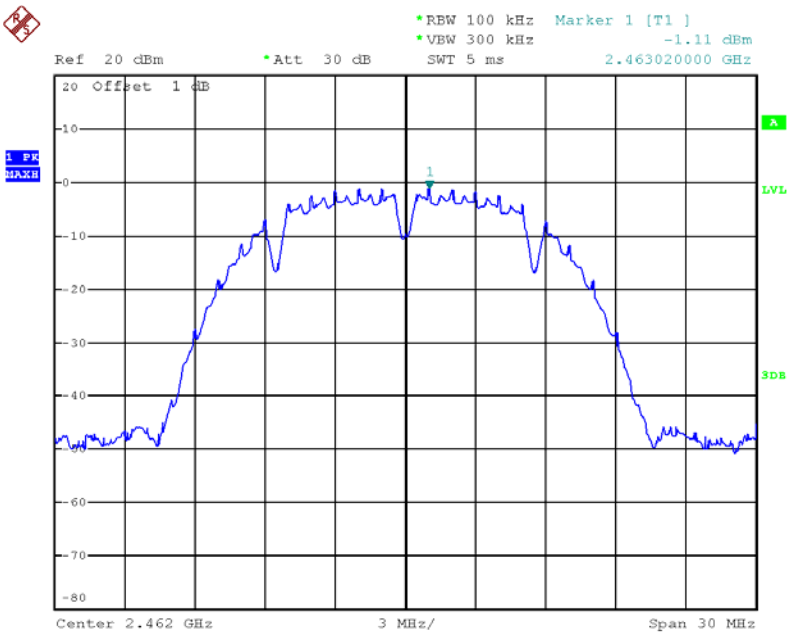
Date: 28.DEC.2012 21:56:33

Power Density Plot on Configuration IEEE 802.11b Chain A / 2437 MHz



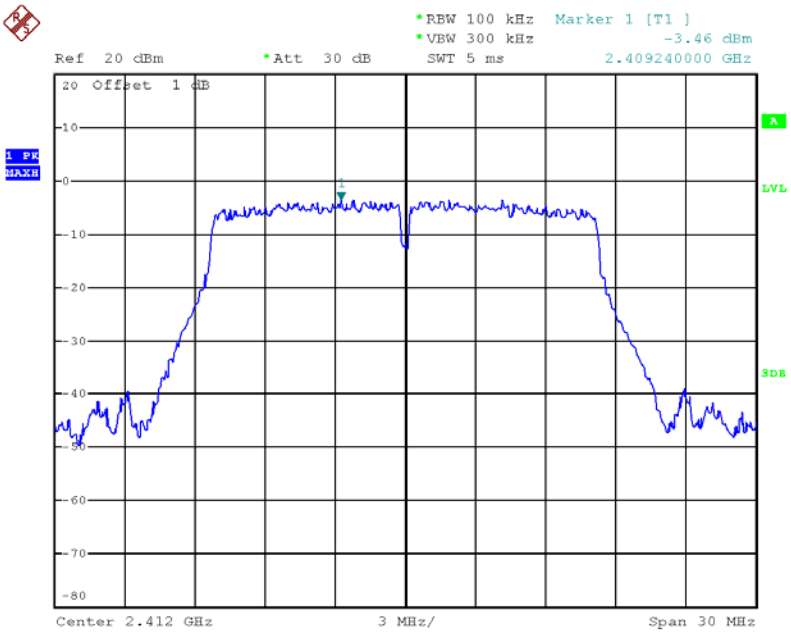
Date: 28.DEC.2012 21:57:38

Power Density Plot on Configuration IEEE 802.11b Chain A / 2462 MHz



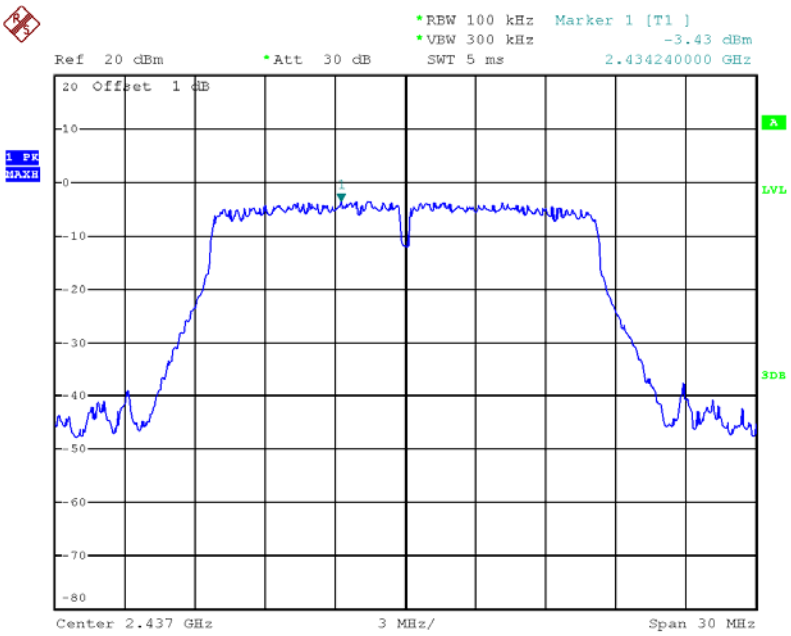
Date: 28.DEC.2012 21:58:10

Power Density Plot on Configuration IEEE 802.11g Chain A / 2412 MHz



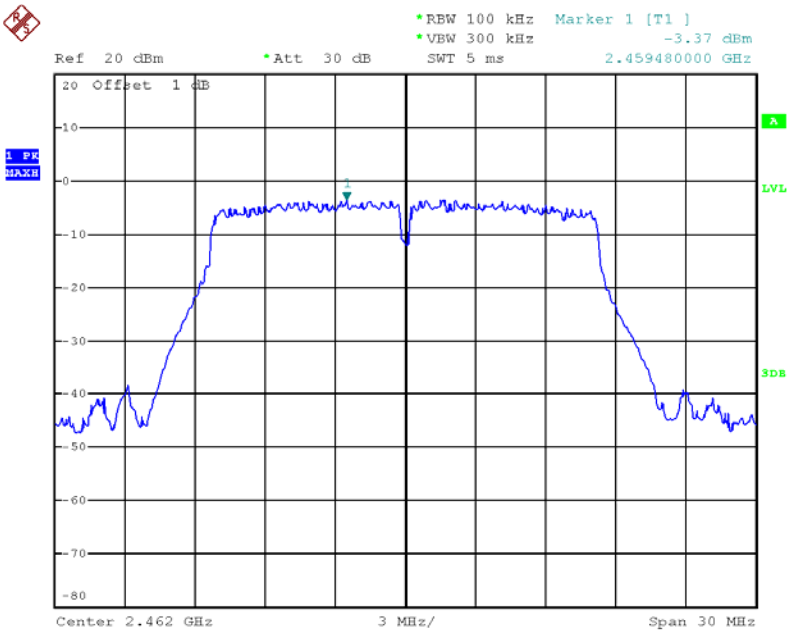
Date: 28.DEC.2012 22:04:40

Power Density Plot on Configuration IEEE 802.11g Chain A / 2437 MHz



Date: 28.DEC.2012 22:03:23

Power Density Plot on Configuration IEEE 802.11g Chain A / 2462 MHz



Date: 28.DEC.2012 22:04:09

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

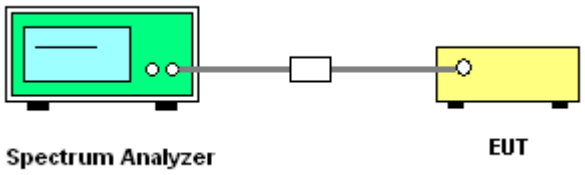
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	1-5 % or DTS BW, not exceed 100KHz
VB	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 5.1.1 EBW Measurement Procedure
3. Measured the spectrum width with power higher than 6dB below carrier.

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℃	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n
Test Date	Dec. 29, 2012		

Configuration IEEE 802.11n MCS0 20MHz Chain A

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.60	17.60	500	**Complies**
6	2437 MHz	17.60	17.60	500	**Complies**
11	2462 MHz	17.60	17.60	500	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Chain A

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.32	35.84	500	**Complies**
6	2437 MHz	36.16	35.84	500	**Complies**
9	2452 MHz	36.00	35.84	500	**Complies**

Temperature	23℃	Humidity	63%
Test Engineer	Benson Peng	Configurations	802.11b/g
Test Date	Dec. 29, 2012		

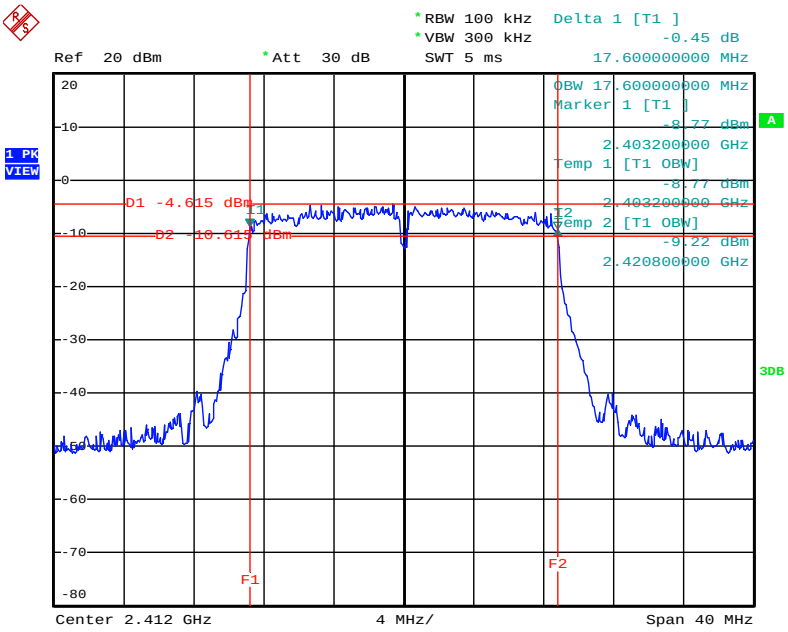
Configuration IEEE 802.11b Chain A

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	11.12	14.24	500	**Complies**
6	2437 MHz	11.12	14.24	500	**Complies**
11	2462 MHz	11.12	14.32	500	**Complies**

Configuration IEEE 802.11g Chain A

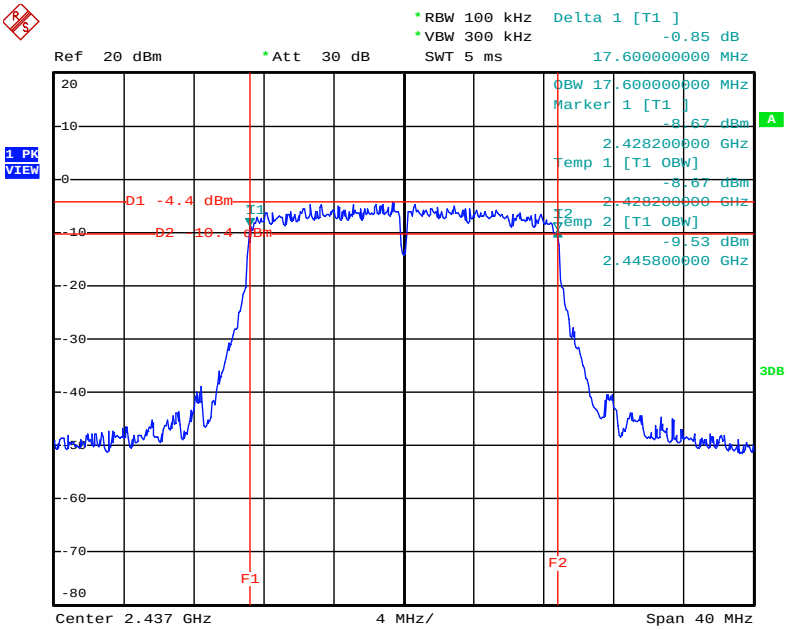
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.48	16.48	500	**Complies**
6	2437 MHz	16.40	16.48	500	**Complies**
11	2462 MHz	16.48	16.48	500	**Complies**

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz Chain A / 2412 MHz



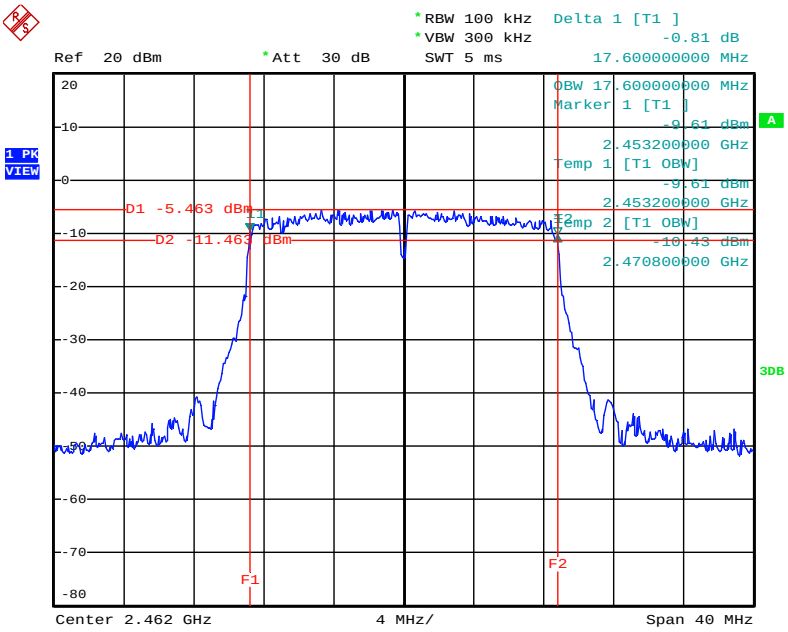
Date: 28.DEC.2012 22:39:30

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz Chain A / 2437 MHz



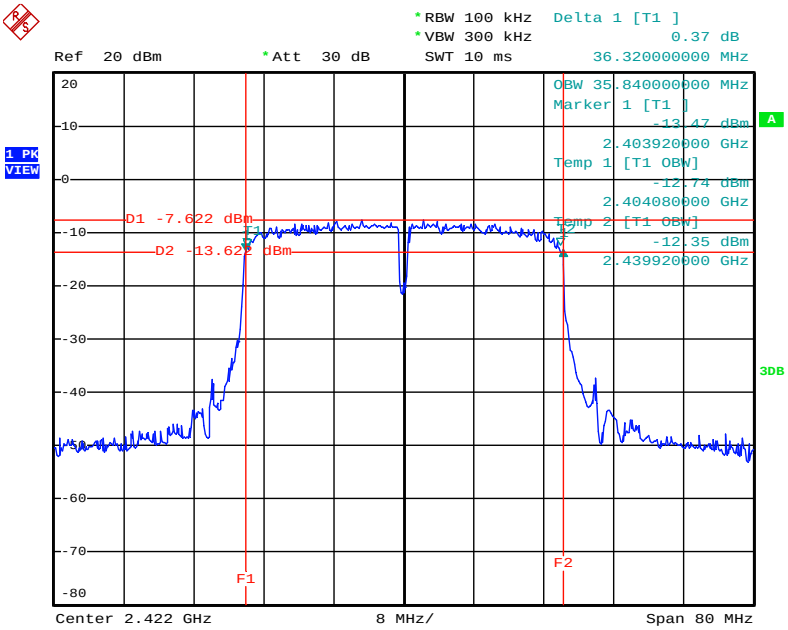
Date: 28.DEC.2012 22:39:00

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz Chain A / 2462 MHz



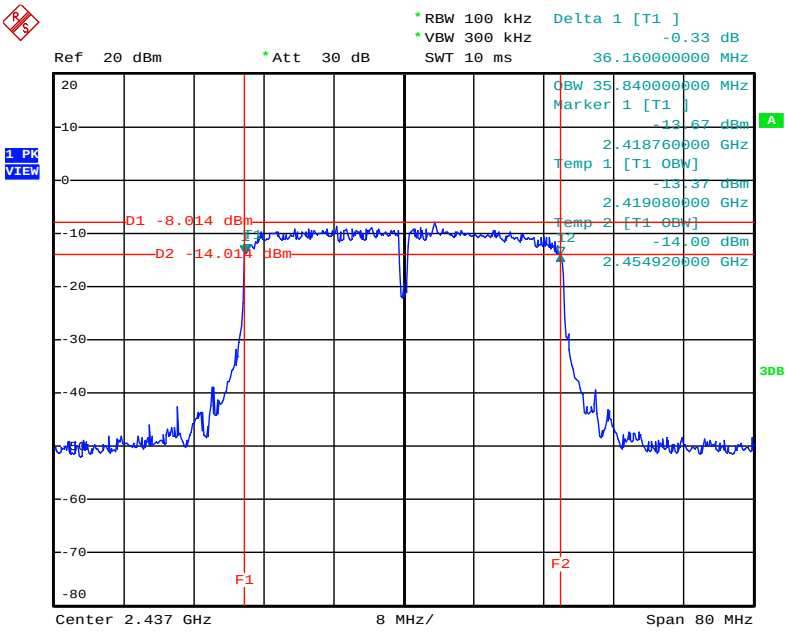
Date: 28.DEC.2012 22:38:29

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz Chain A / 2422 MHz



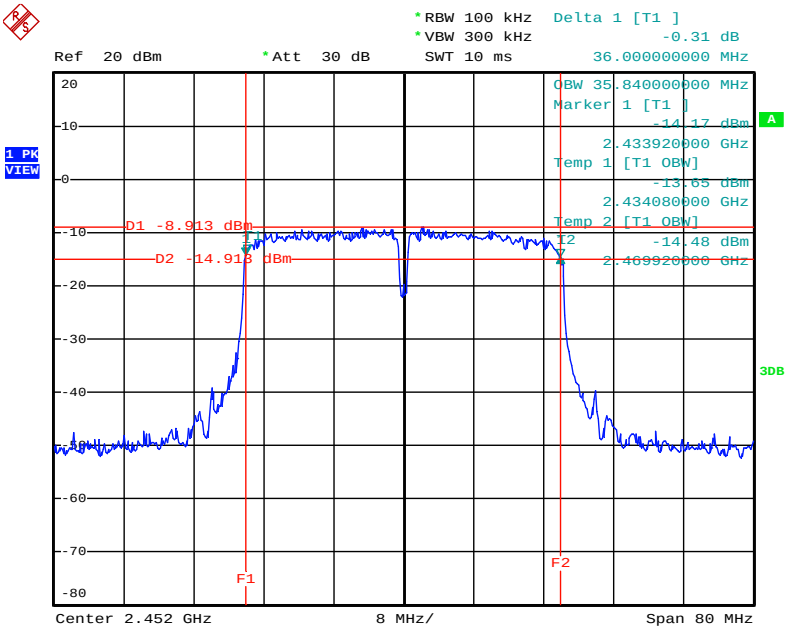
Date: 28.DEC.2012 22:41:11

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz Chain A / 2437 MHz



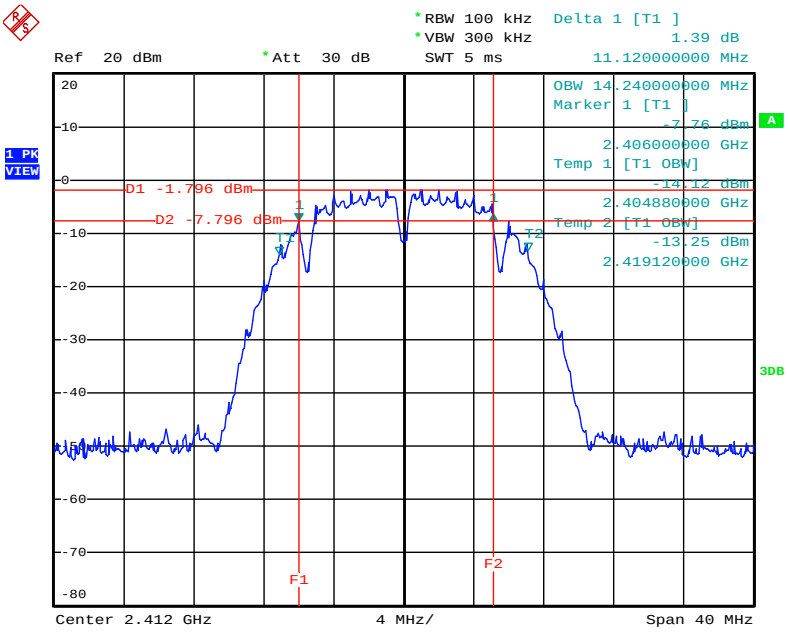
Date: 28.DEC.2012 22:41:47

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz Chain A / 2452 MHz



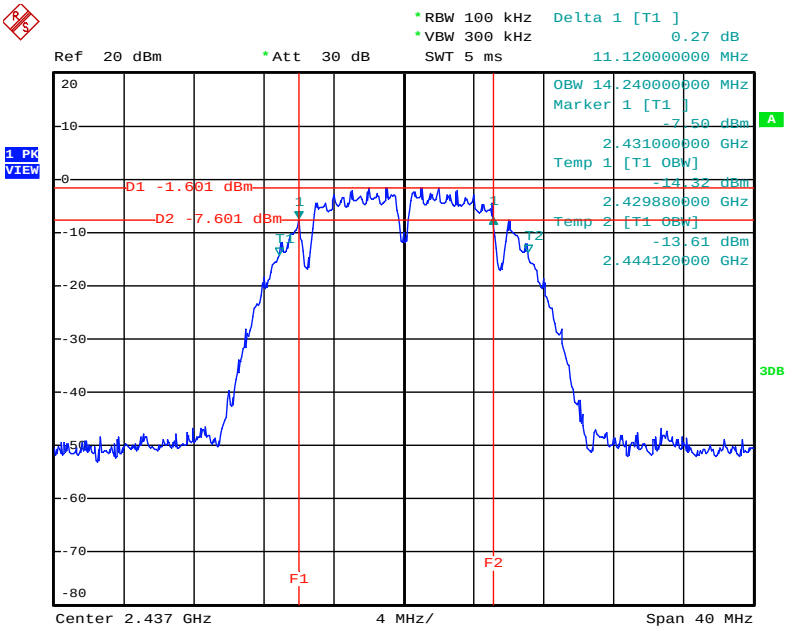
Date: 28.DEC.2012 22:42:21

6 dB Bandwidth Plot on Configuration IEEE 802.11b Chain A / 2412 MHz



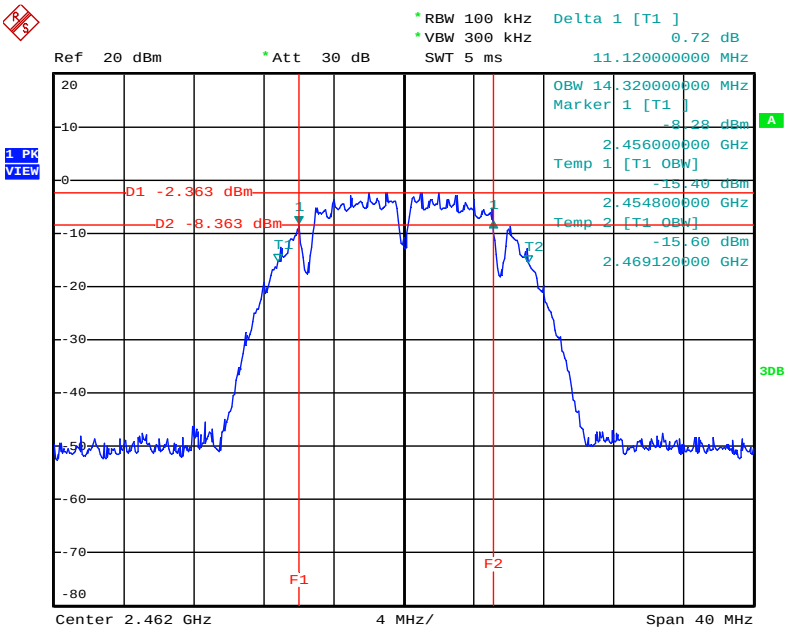
Date: 28.DEC.2012 22:35:48

6 dB Bandwidth Plot on Configuration IEEE 802.11b Chain A / 2437 MHz



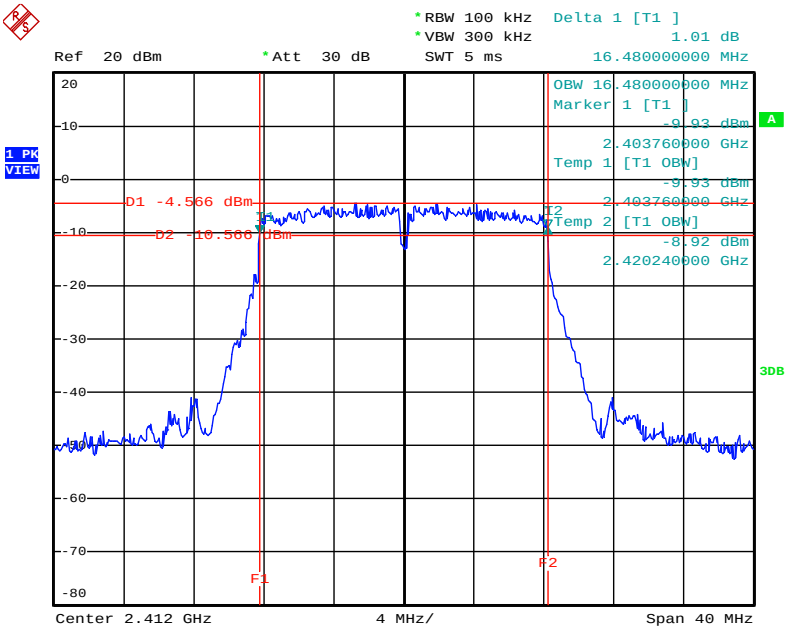
Date: 28.DEC.2012 22:34:45

6 dB Bandwidth Plot on Configuration IEEE 802.11b Chain A / 2462 MHz



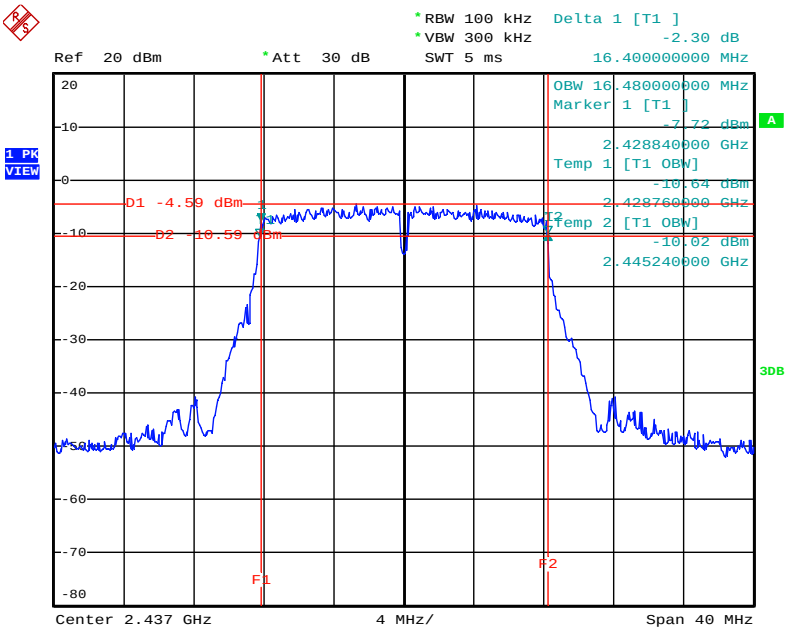
Date: 28.DEC.2012 22:35:18

6 dB Bandwidth Plot on Configuration IEEE 802.11g Chain A / 2412 MHz



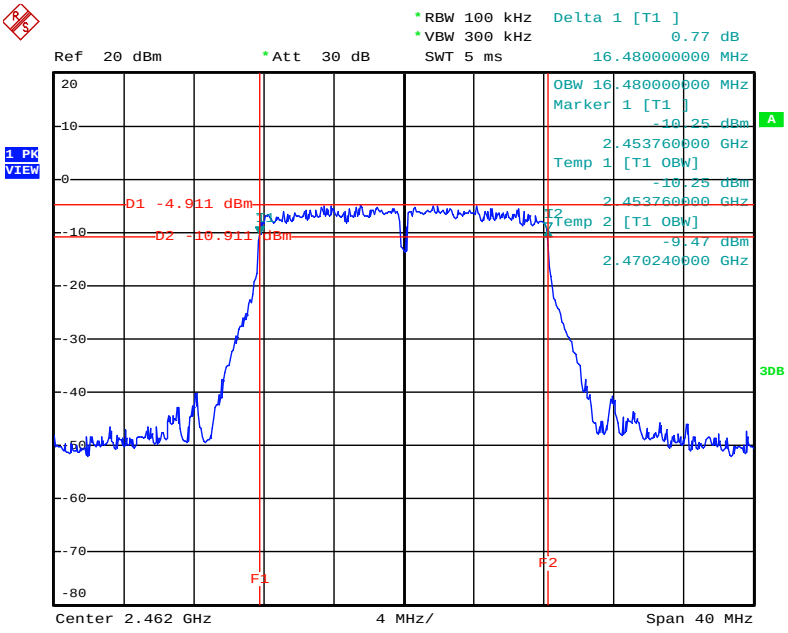
Date: 28.DEC.2012 22:36:30

6 dB Bandwidth Plot on Configuration IEEE 802.11g Chain A / 2437 MHz



Date: 28.DEC.2012 22:37:00

6 dB Bandwidth Plot on Configuration IEEE 802.11g Chain A / 2462 MHz



Date: 28.DEC.2012 22:37:35

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

4.5.2. 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 / 3MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100KHz/100KHz for Peak

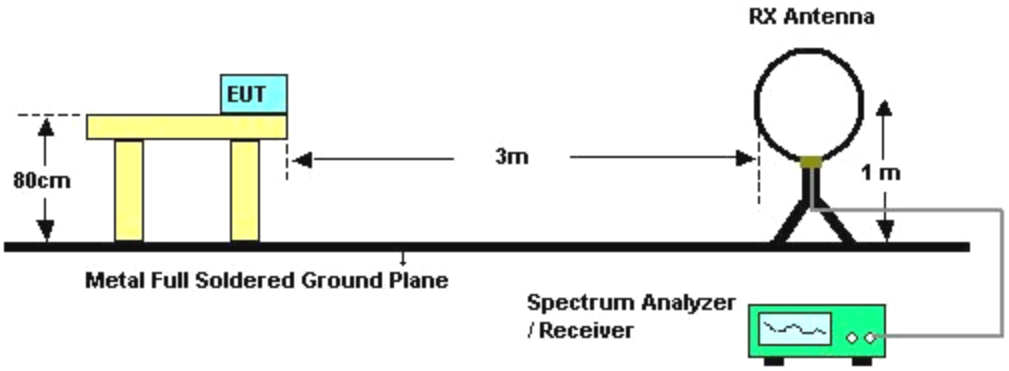
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

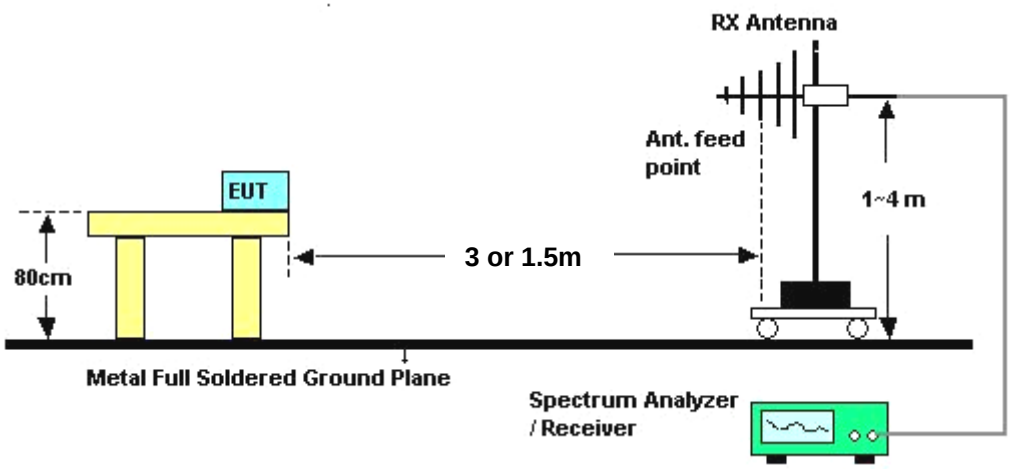
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 form 3m to 1.5m.

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

Limit line = specific limits (dBuV) + distance extrapolation factor [6 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℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	CTX
Evaluating Date	Nov. 20, 2009		

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

Note:

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

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

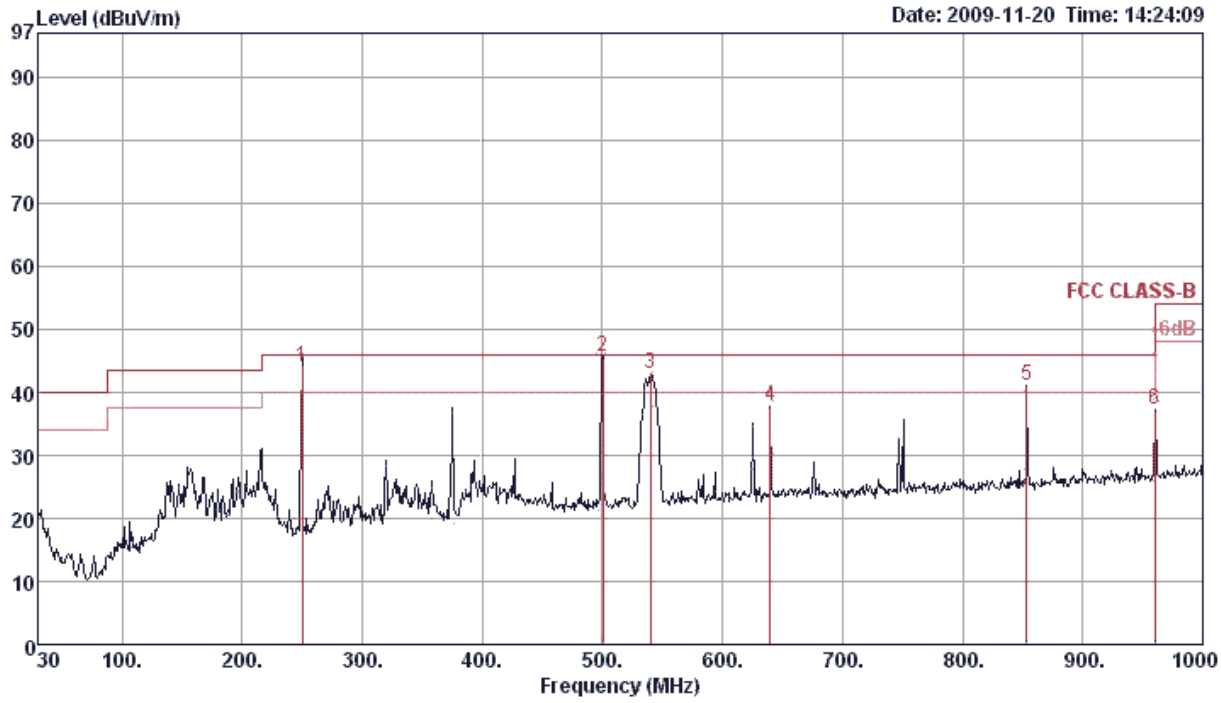
Limit line = specific limits (dBuV) + distance extrapolation factor.

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

<For EUT 1>:

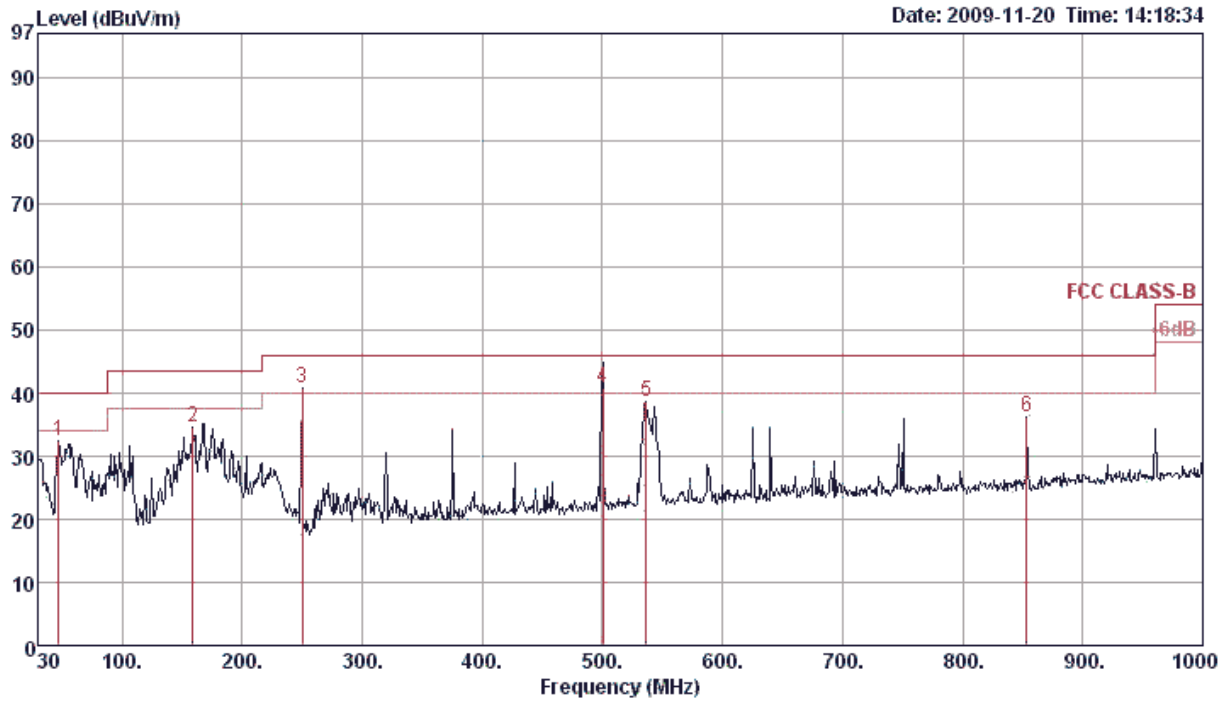
Temperature	24.3℃	**Humidity**	56%
Test Engineer	Allen Liu	**Configurations**	CTX / EUT 1 with Mode 2

Horizontal



		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1	!	250.19	43.97	46.00	-2.03	56.30	1.90	27.00	12.77	233	177	QP	HORIZONTAL
2	q	500.45	45.53	46.00	-0.47	53.30	2.70	28.10	17.63	218	100	QP	HORIZONTAL
3	p	540.22	42.88	46.00	-3.12	50.12	2.78	28.10	18.08	0	100	Peak	HORIZONTAL
4		640.13	37.72	46.00	-8.28	43.74	3.14	28.06	18.90	0	100	Peak	HORIZONTAL
5	!	853.53	40.94	46.00	-5.06	44.83	3.42	27.49	20.18	0	100	Peak	HORIZONTAL
6		960.23	37.32	54.00	-16.68	39.87	3.62	27.16	20.99	0	100	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1	47.46	32.31	40.00	-7.69	49.99	0.70	27.80	9.42	0	400	Peak	VERTICAL
2	159.01	34.59	43.50	-8.91	48.39	1.50	27.31	12.01	0	400	Peak	VERTICAL
3 p	250.19	40.88	46.00	-5.12	53.21	1.90	27.00	12.77	0	400	Peak	VERTICAL
4 q	500.45	40.83	46.00	-5.17	48.60	2.70	28.10	17.63	153	156	QP	VERTICAL
5	536.34	38.62	46.00	-7.38	45.91	2.77	28.10	18.04	0	400	Peak	VERTICAL
6	853.53	36.10	46.00	-9.90	39.99	3.42	27.49	20.18	0	400	Peak	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.

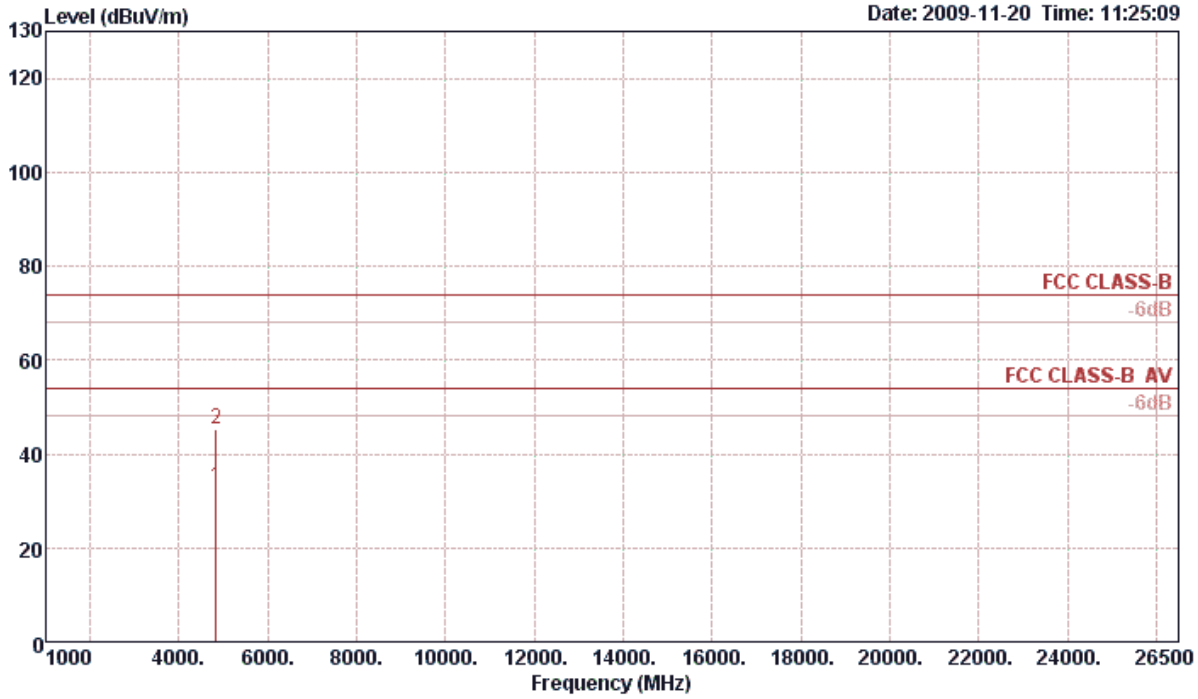
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

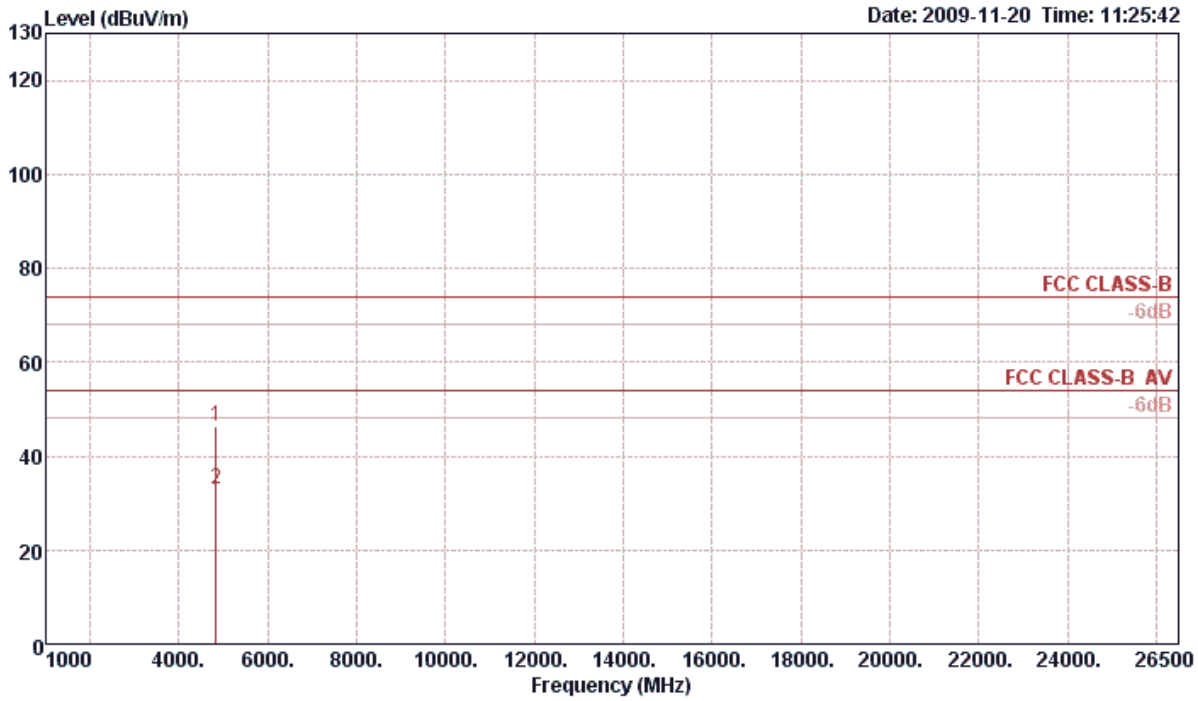
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 20MHz Ch 1 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4823.52	32.82	54.00	-21.18	30.83	3.96	33.06	35.03	119	100	Average	HORIZONTAL
2 p	4824.54	45.20	74.00	-28.80	43.21	3.96	33.06	35.03	119	100	Peak	HORIZONTAL

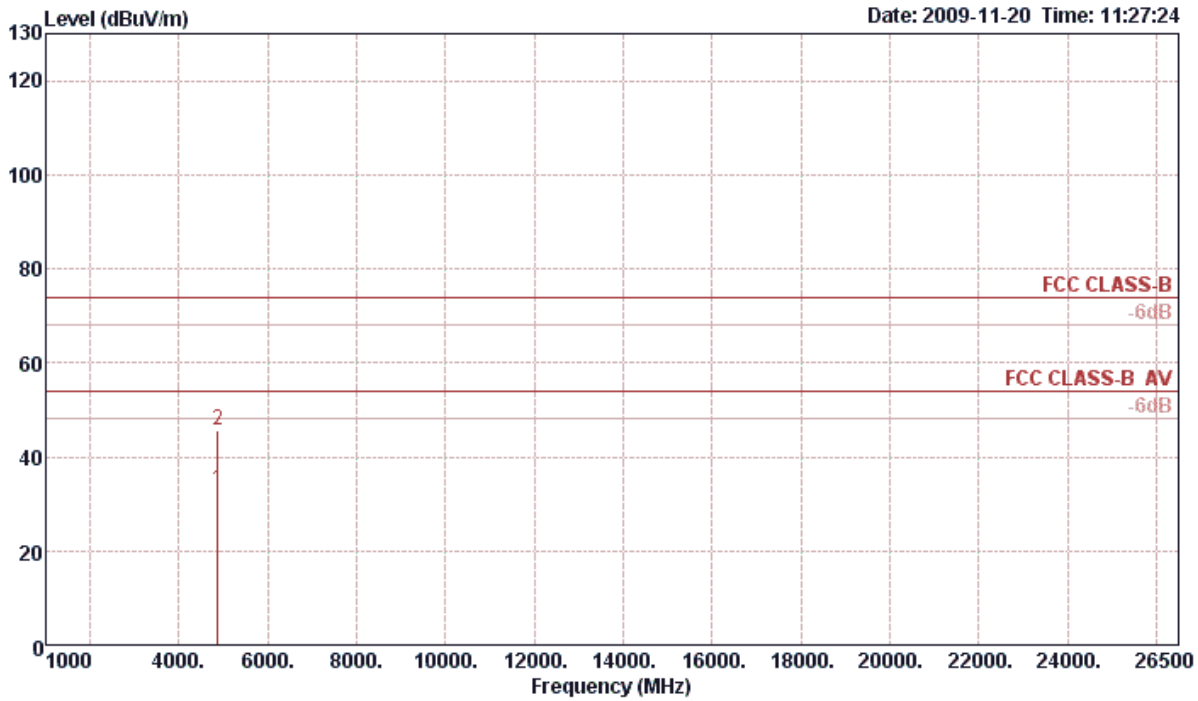
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	4823.12	46.22	74.00	-27.78	44.23	3.96	33.06	35.03	38	100	Peak	VERTICAL
2 a	4824.98	32.80	54.00	-21.20	30.81	3.96	33.06	35.03	38	100	Average	VERTICAL

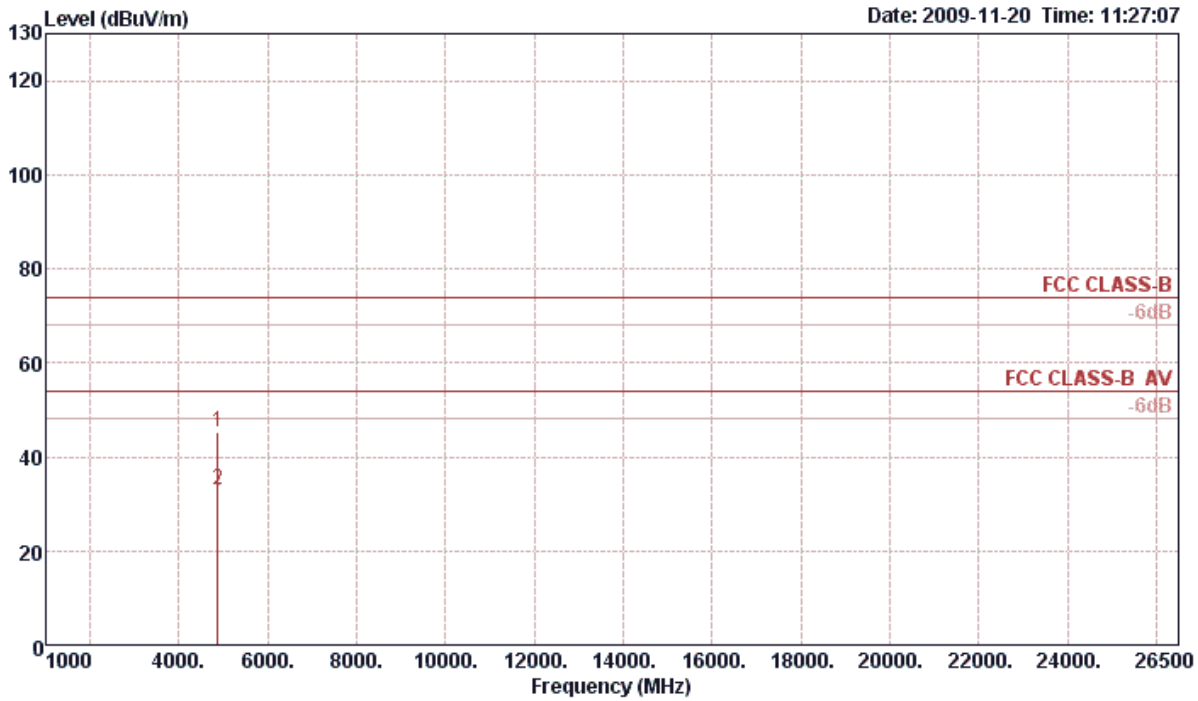
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 20MHz Ch 6 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4873.42	32.88	54.00	-21.12	30.78	3.97	33.16	35.03	227	100	Average	HORIZONTAL
2 p	4873.53	45.48	74.00	-28.52	43.38	3.97	33.16	35.03	227	100	Peak	HORIZONTAL

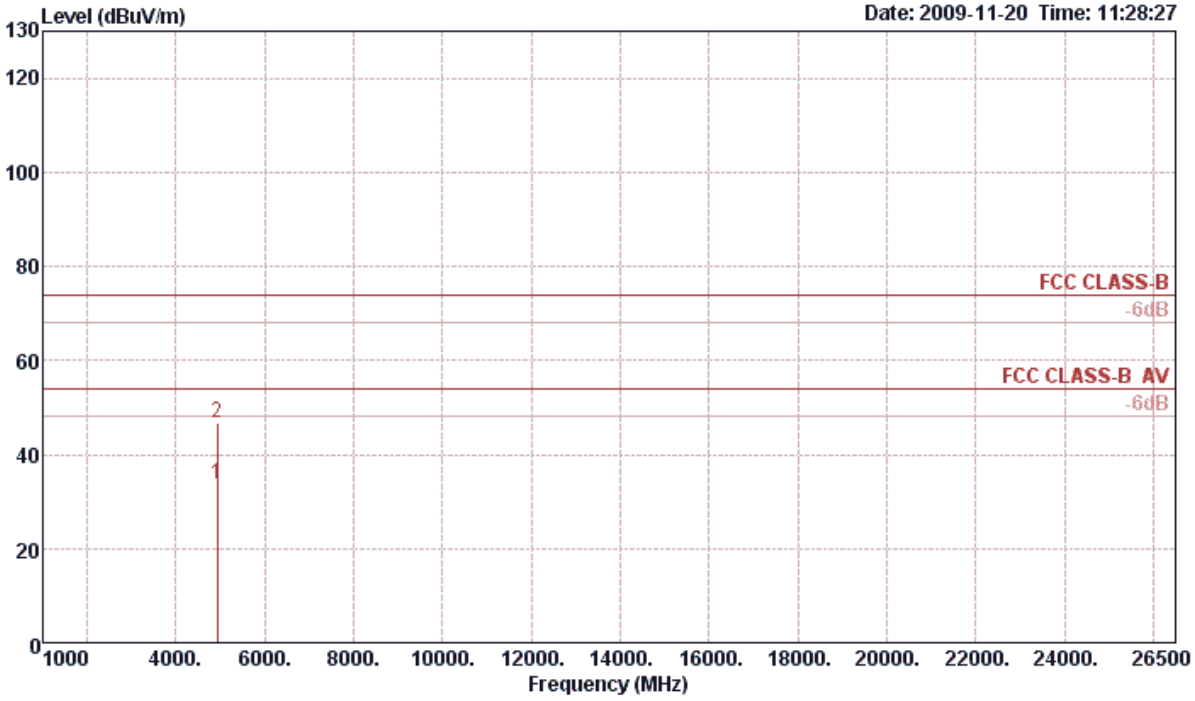
Vertical



	Freq	Level	Over Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	4873.64	45.25	74.00	-28.75	43.15	3.97	33.16	35.03	103	100	Peak	VERTICAL
2 a	4874.35	33.06	54.00	-20.94	30.96	3.97	33.16	35.03	103	100	Average	VERTICAL

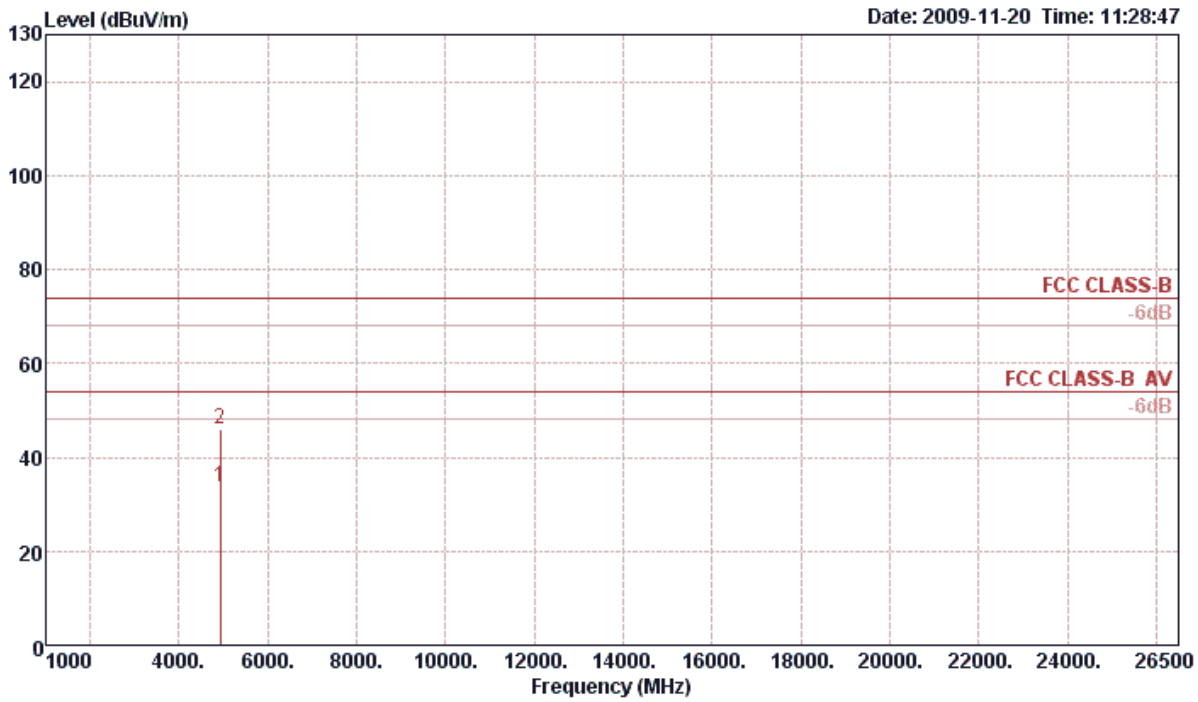
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 20MHz Ch11 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4924.42	33.62	54.00	-20.38	31.40	3.97	33.26	35.01	40	100	Average	HORIZONTAL
2 p	4924.55	46.78	74.00	-27.22	44.56	3.97	33.26	35.01	40	100	Peak	HORIZONTAL

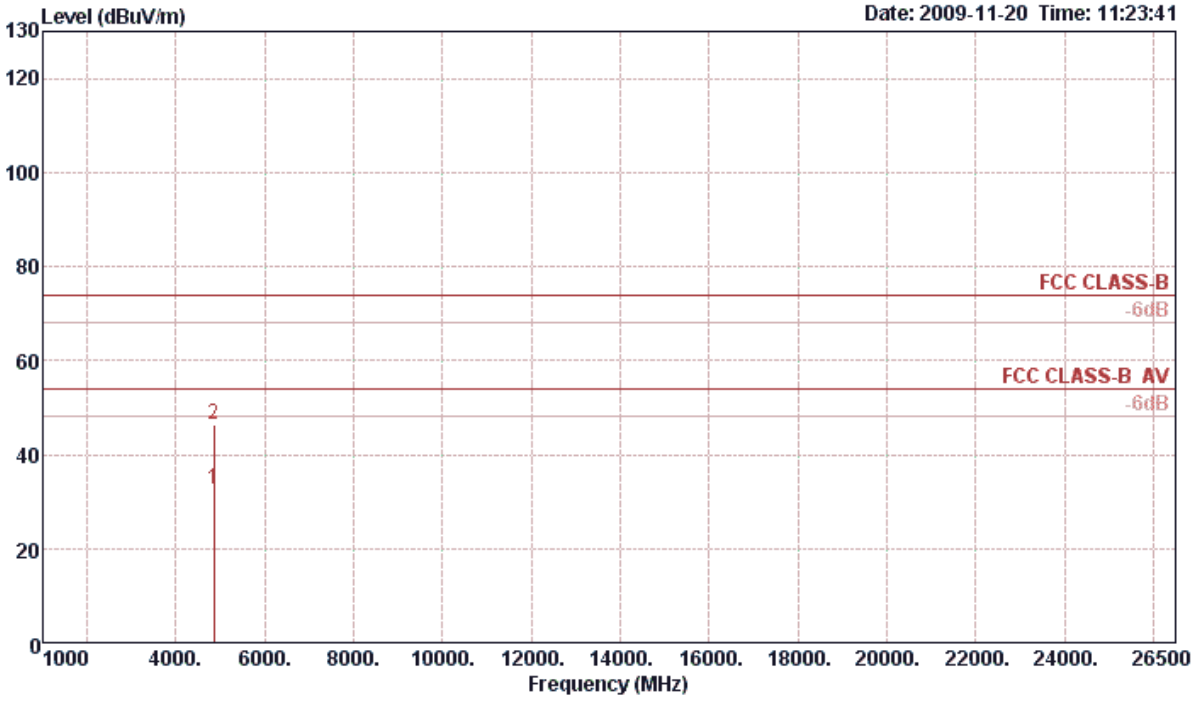
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4923.59	33.52	54.00	-20.48	31.30	3.97	33.26	35.01	153	100	Average	VERTICAL
2 p	4923.97	46.14	74.00	-27.86	43.92	3.97	33.26	35.01	153	100	Peak	VERTICAL

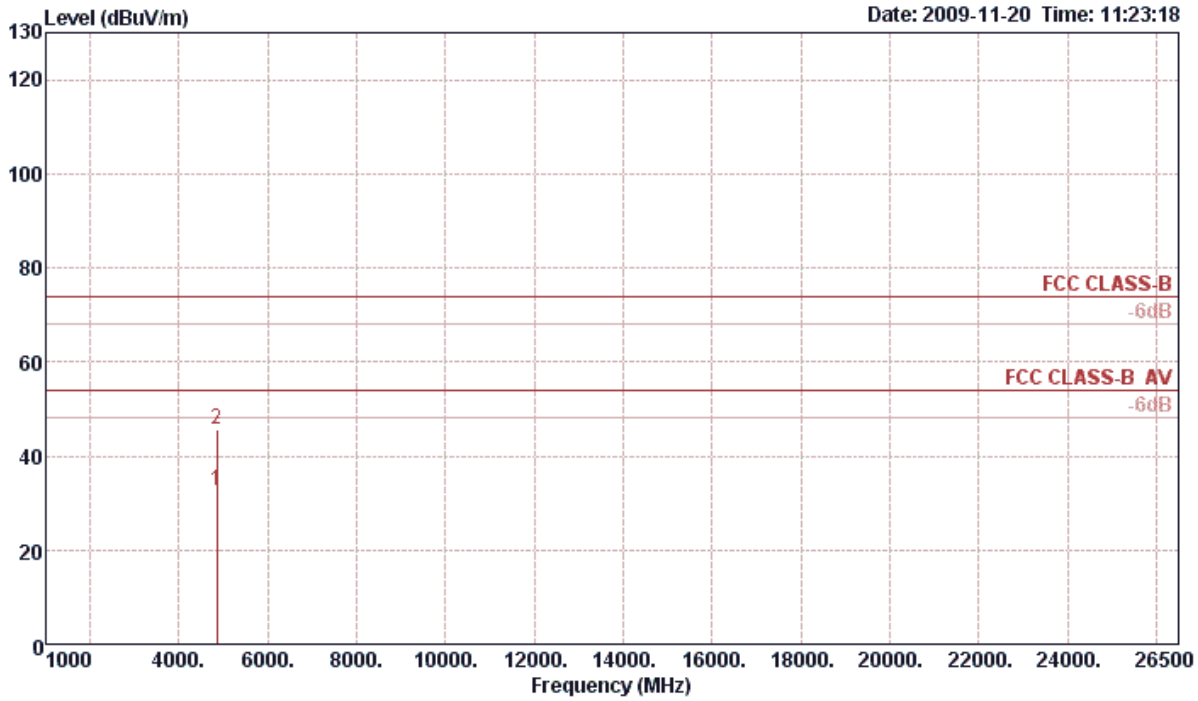
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4844.67	32.70	54.00	-21.30	30.68	3.96	33.09	35.03	272	100	Average	HORIZONTAL
2 p	4844.97	46.44	74.00	-27.56	44.42	3.96	33.09	35.03	272	100	Peak	HORIZONTAL

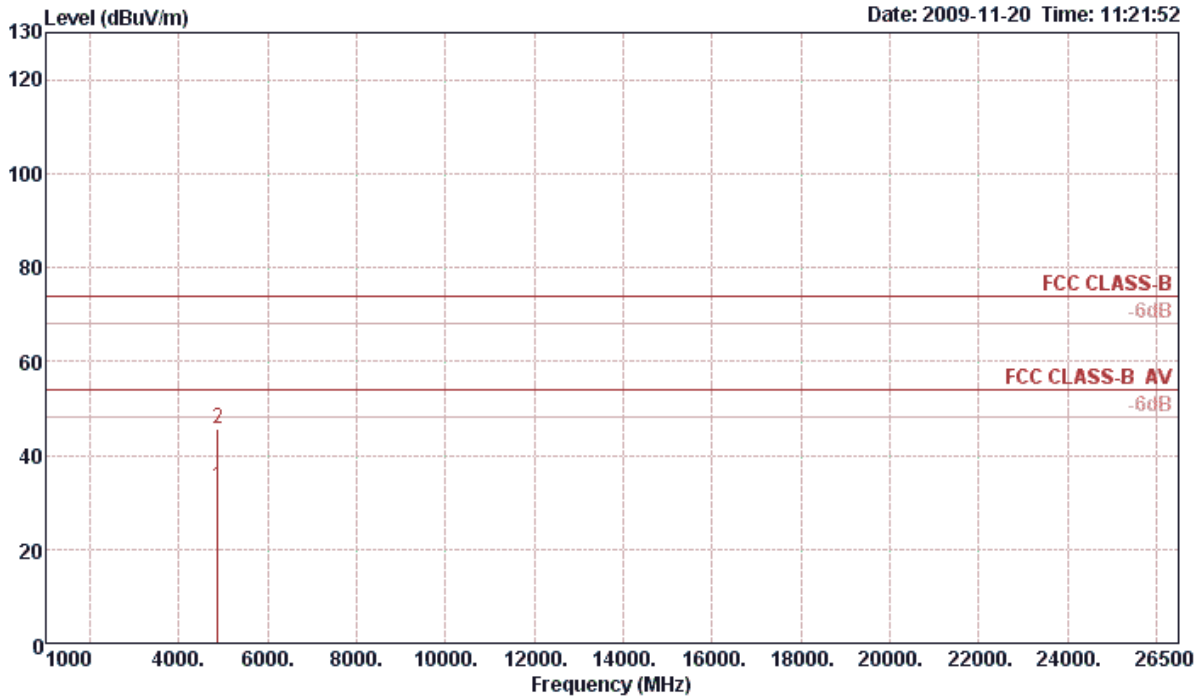
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4843.94	32.76	54.00	-21.24	30.74	3.96	33.09	35.03	145	100	Average	VERTICAL
2 p	4844.10	45.68	74.00	-28.32	43.66	3.96	33.09	35.03	145	100	Peak	VERTICAL

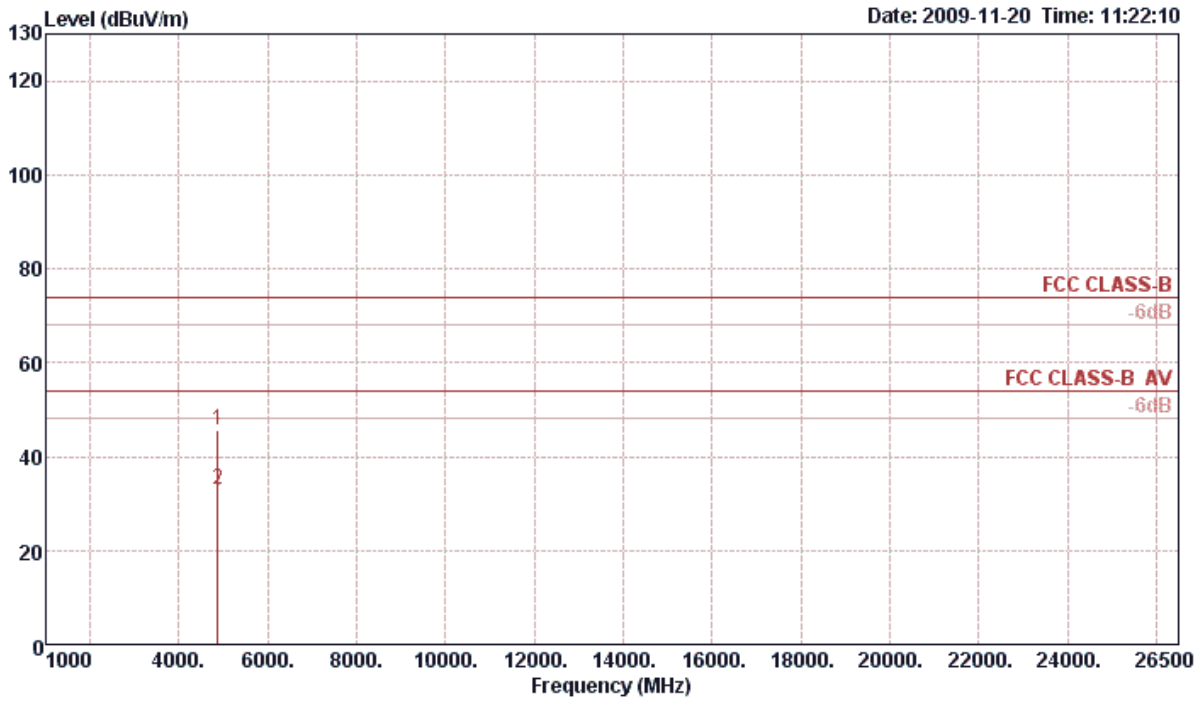
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4874.68	33.19	54.00	-20.81	31.09	3.97	33.16	35.03	172	100	Average	HORIZONTAL
2 p	4874.86	45.80	74.00	-28.20	43.70	3.97	33.16	35.03	172	100	Peak	HORIZONTAL

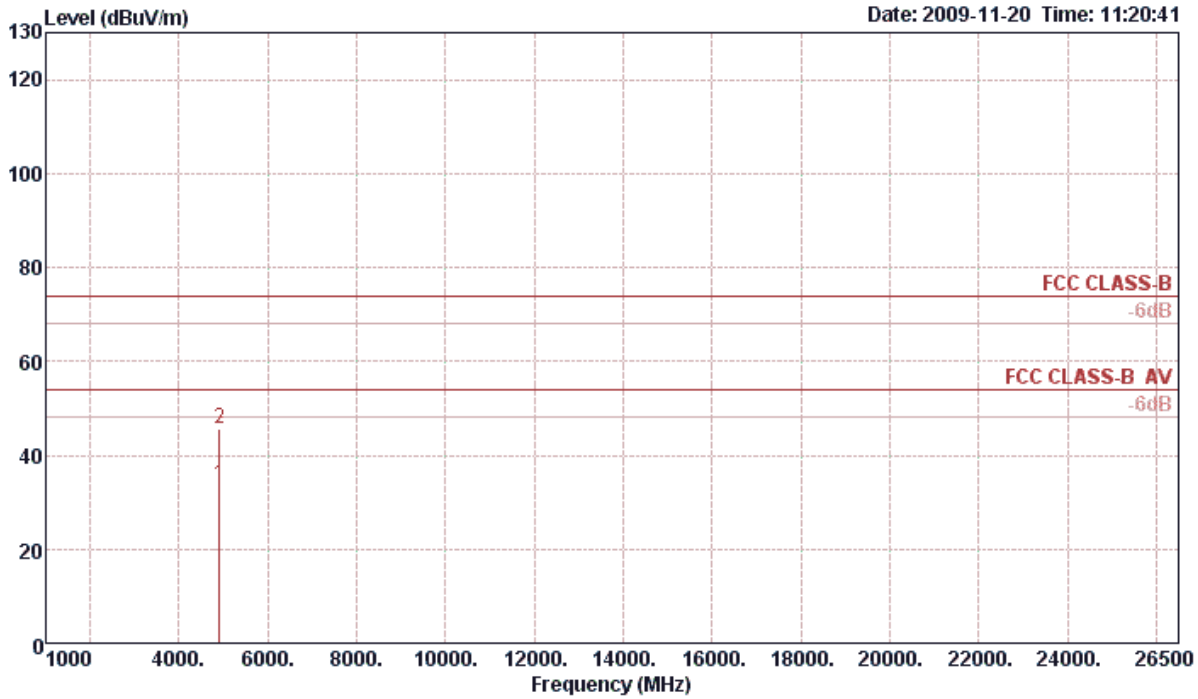
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	4873.71	45.67	74.00	-28.33	43.57	3.97	33.16	35.03	33	100	Peak	VERTICAL
2 a	4874.36	33.03	54.00	-20.97	30.93	3.97	33.16	35.03	33	100	Average	VERTICAL

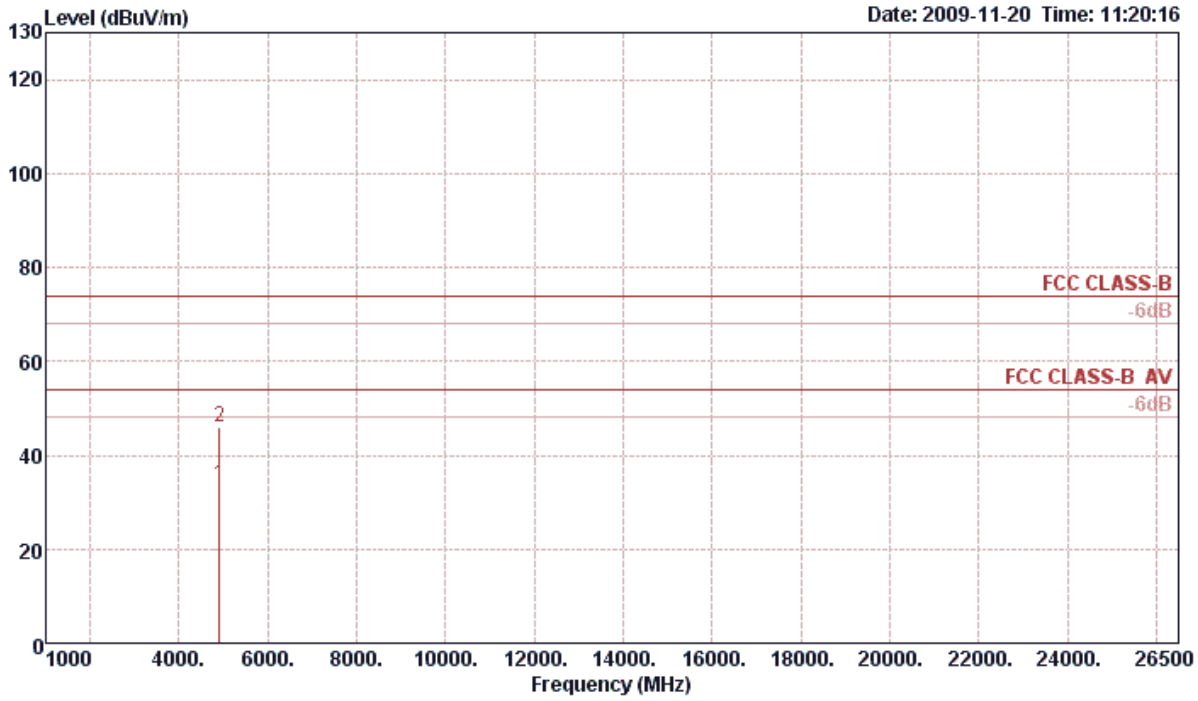
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4904.17	33.52	54.00	-20.48	31.38	3.97	33.19	35.02	287	100	Average	HORIZONTAL
2 p	4904.26	45.78	74.00	-28.22	43.64	3.97	33.19	35.02	287	100	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4903.92	33.52	54.00	-20.48	31.38	3.97	33.19	35.02	98	100	Average	VERTICAL
2 p	4904.99	46.03	74.00	-27.97	43.85	3.97	33.23	35.02	98	100	Peak	VERTICAL

Note:

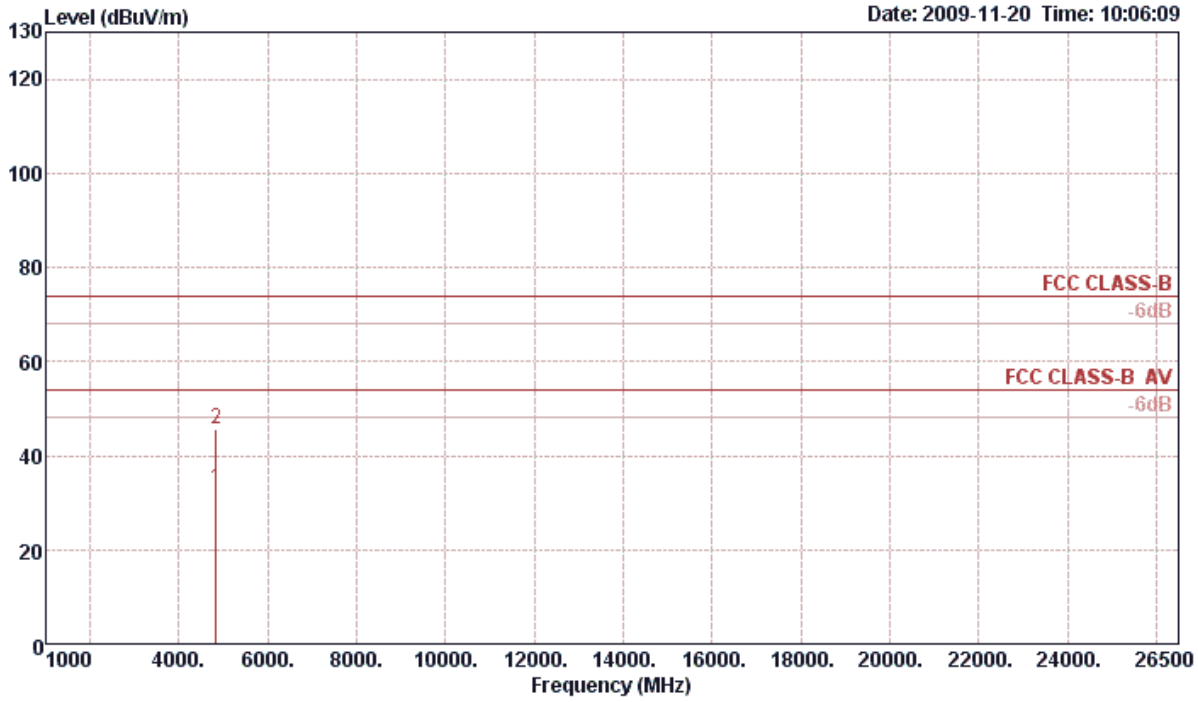
The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

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

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

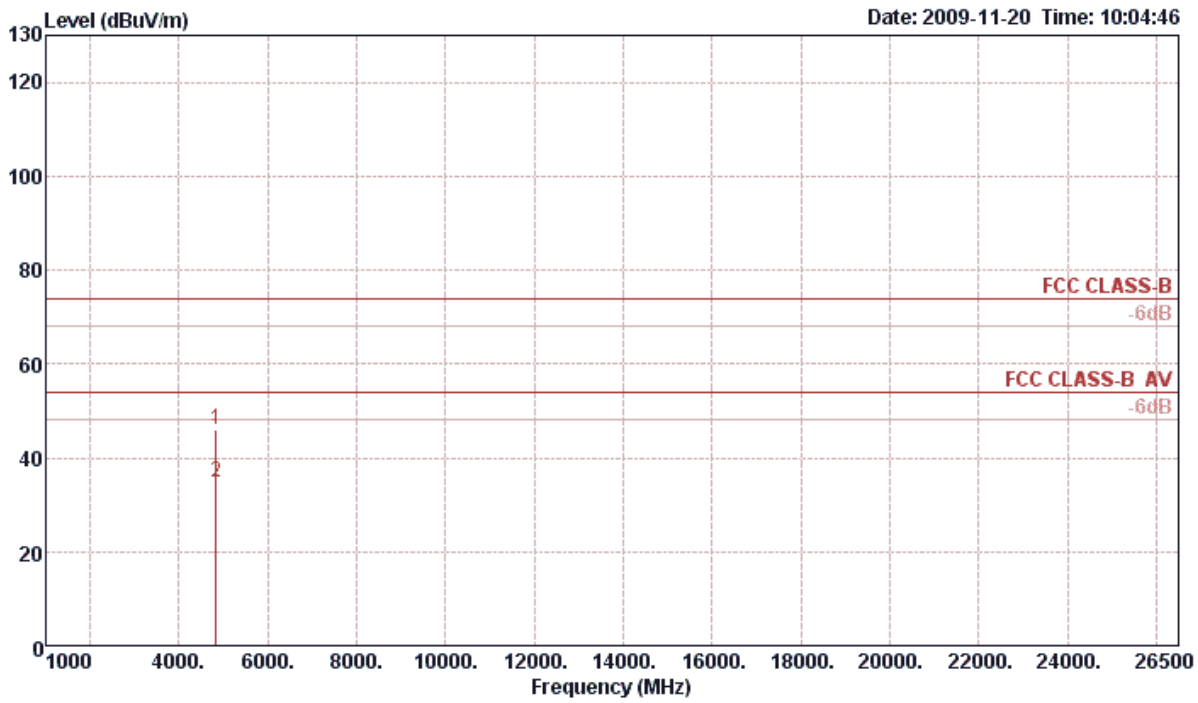
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 1 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4823.80	32.89	54.00	-21.11	30.90	3.96	33.06	35.03	311	100	Average	HORIZONTAL
2 p	4823.99	45.56	74.00	-28.44	43.57	3.96	33.06	35.03	311	100	Peak	HORIZONTAL

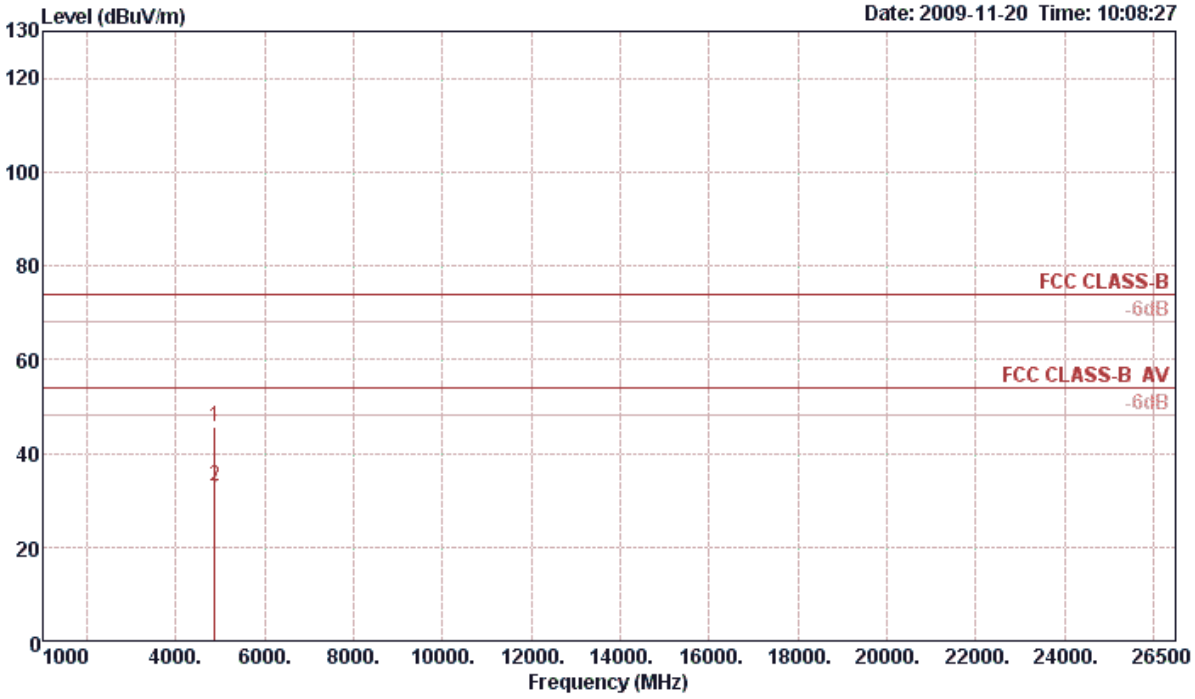
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	4823.53	45.88	74.00	-28.12	43.89	3.96	33.06	35.03	173	101	Peak	VERTICAL
2 a	4824.03	34.80	54.00	-19.20	32.81	3.96	33.06	35.03	173	101	Average	VERTICAL

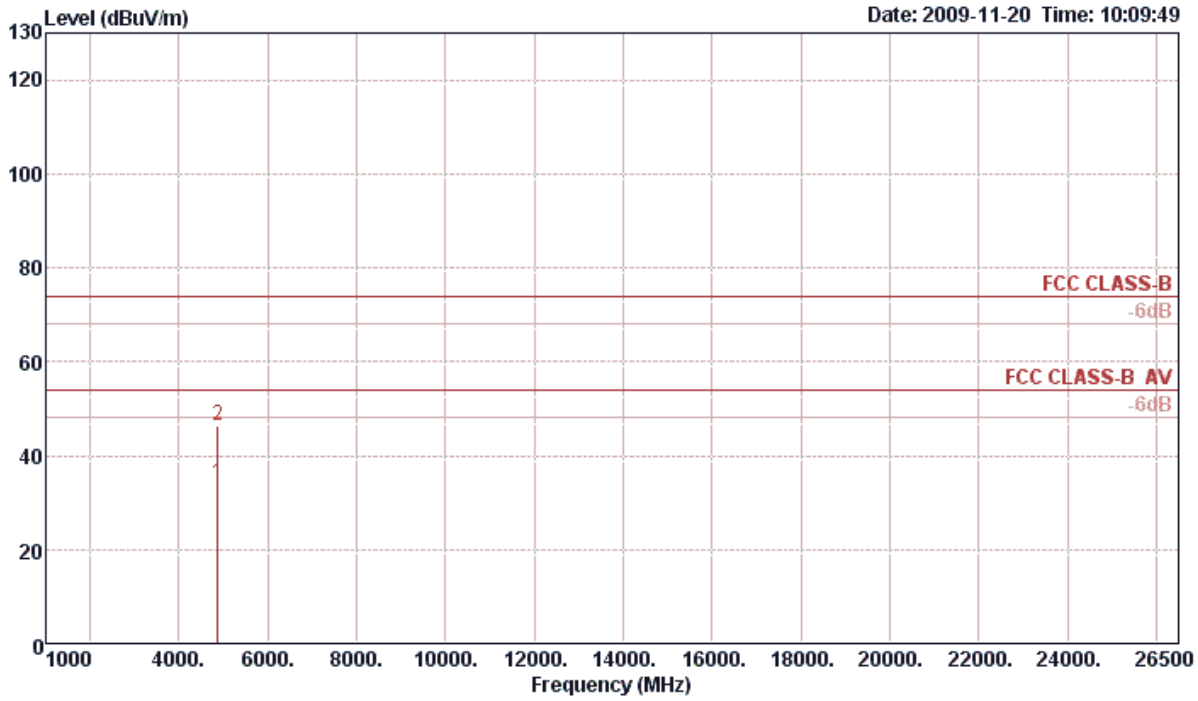
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 6 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	4874.23	45.62	74.00	-28.38	43.52	3.97	33.16	35.03	53	100	Peak	HORIZONTAL
2 a	4875.64	32.93	54.00	-21.07	30.83	3.97	33.16	35.03	53	100	Average	HORIZONTAL

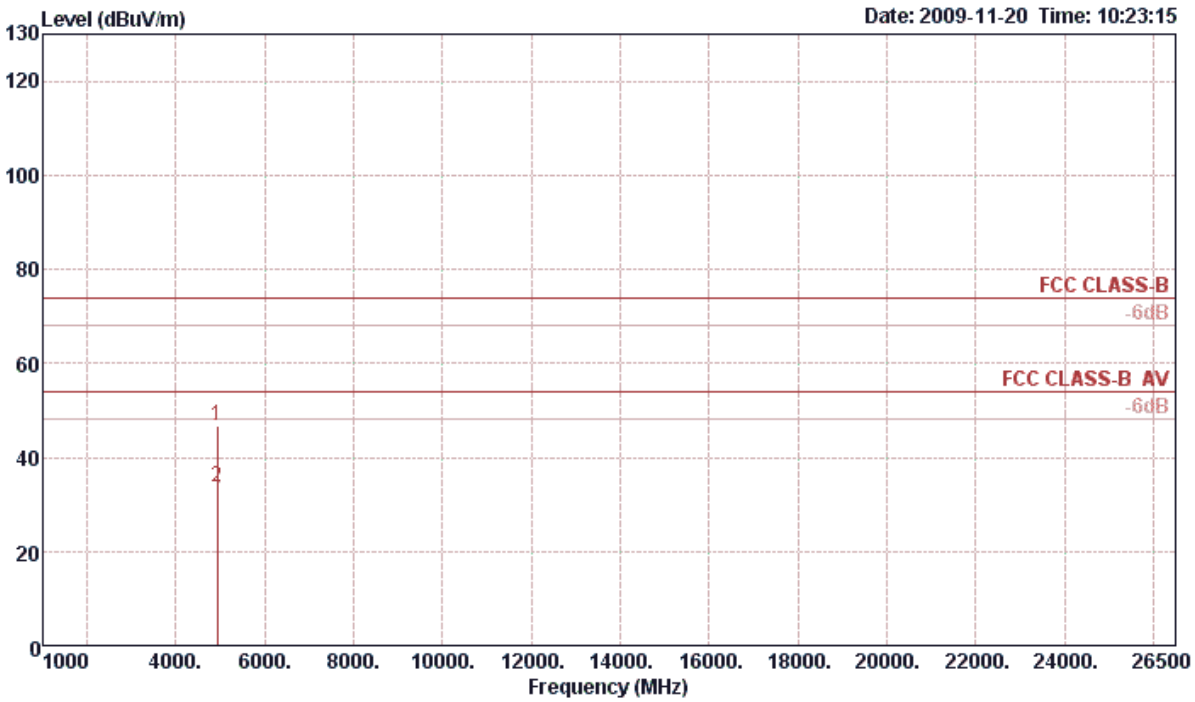
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4873.98	34.18	54.00	-19.82	32.08	3.97	33.16	35.03	177	103	Average	VERTICAL
2 p	4874.28	46.25	74.00	-27.75	44.15	3.97	33.16	35.03	177	103	Peak	VERTICAL

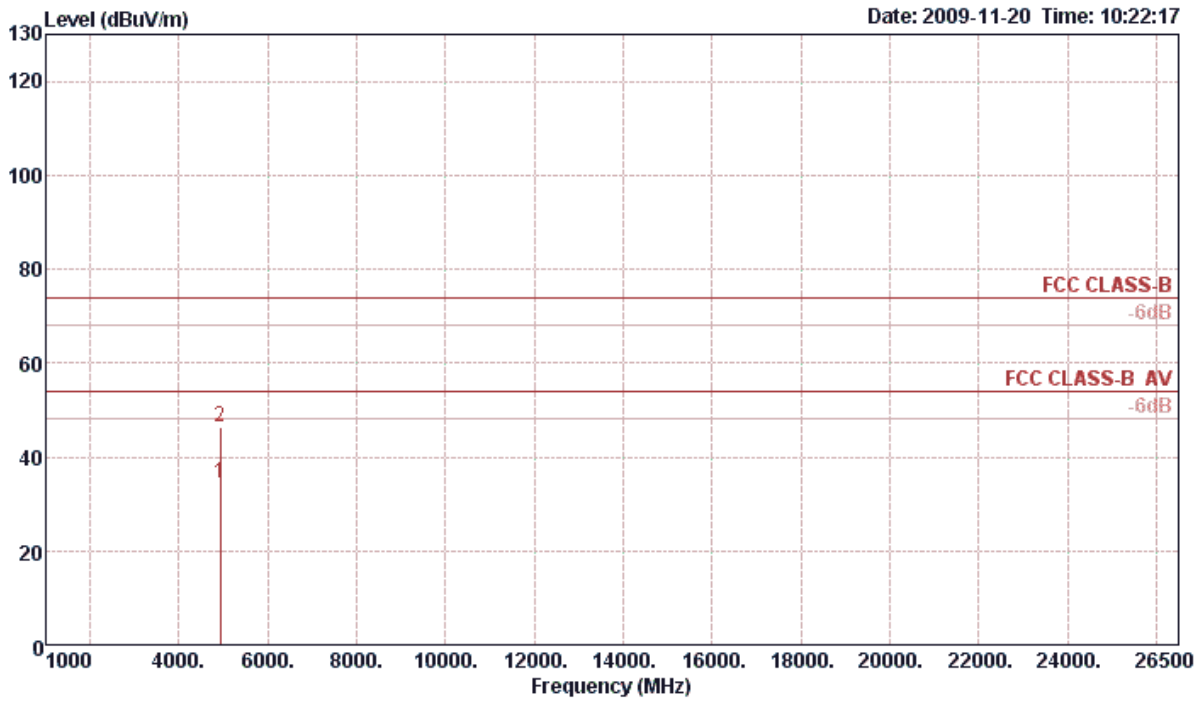
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 11 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	4921.63	46.78	74.00	-27.22	44.59	3.97	33.23	35.01	41	100	Peak	HORIZONTAL
2 a	4923.53	33.54	54.00	-20.46	31.32	3.97	33.26	35.01	41	100	Average	HORIZONTAL

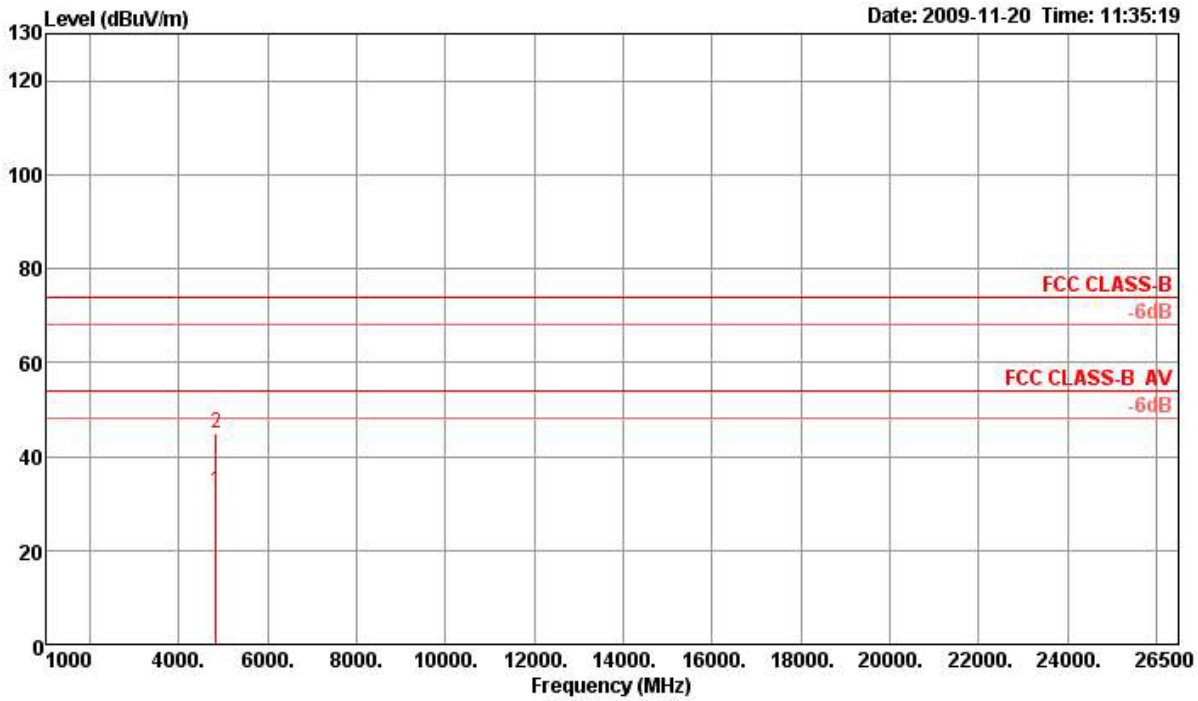
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4923.92	34.26	54.00	-19.74	32.04	3.97	33.26	35.01	278	100	Average	VERTICAL
2 p	4926.26	46.24	74.00	-27.76	44.02	3.97	33.26	35.01	278	100	Peak	VERTICAL

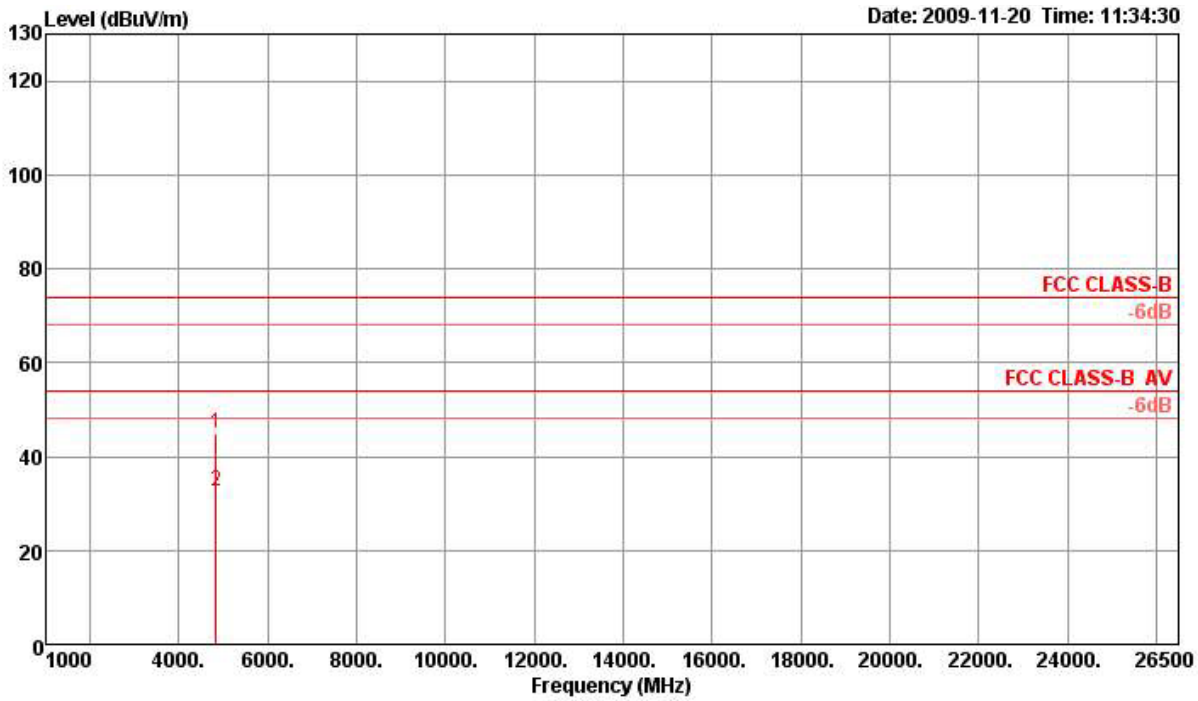
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 1 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4823.97	32.74	54.00	-21.26	30.75	3.96	33.06	35.03	44	100	Average	HORIZONTAL
2 p	4824.00	45.00	74.00	-29.00	43.01	3.96	33.06	35.03	44	100	Peak	HORIZONTAL

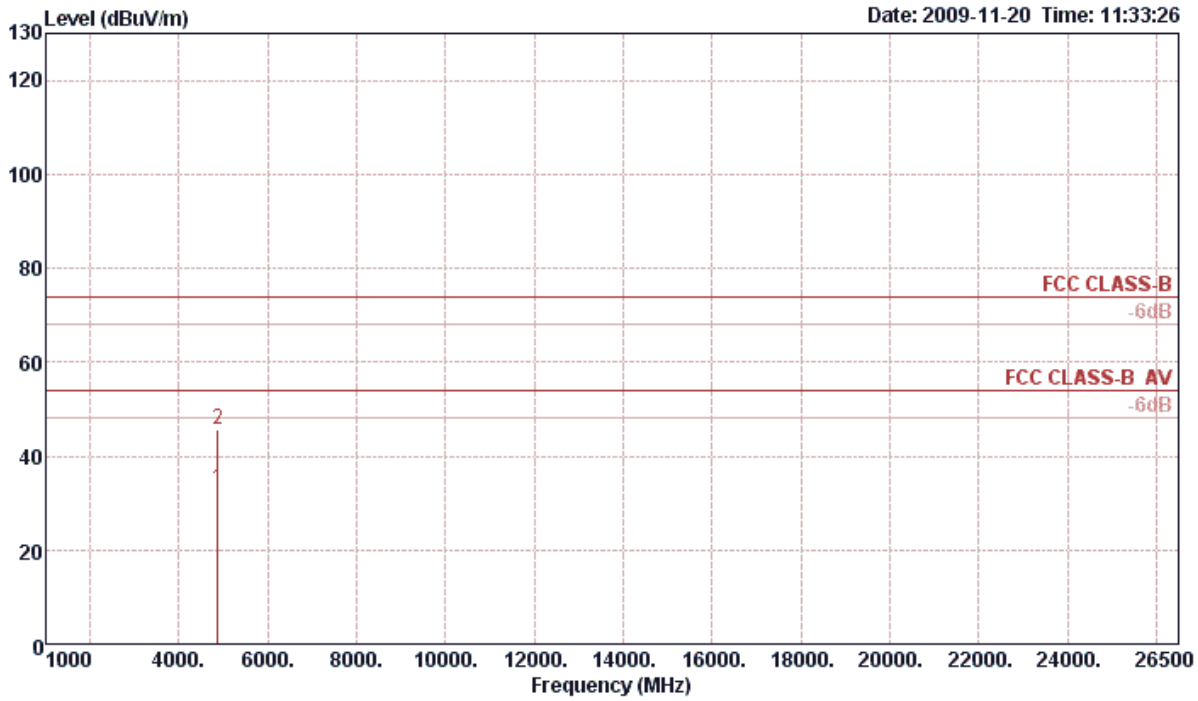
Vertical



	Freq	Level	Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	4823.15	45.03	74.00	-28.97	43.04	3.96	33.06	35.03	203	100	Peak	VERTICAL
2 a	4824.22	32.68	54.00	-21.32	30.69	3.96	33.06	35.03	203	100	Average	VERTICAL

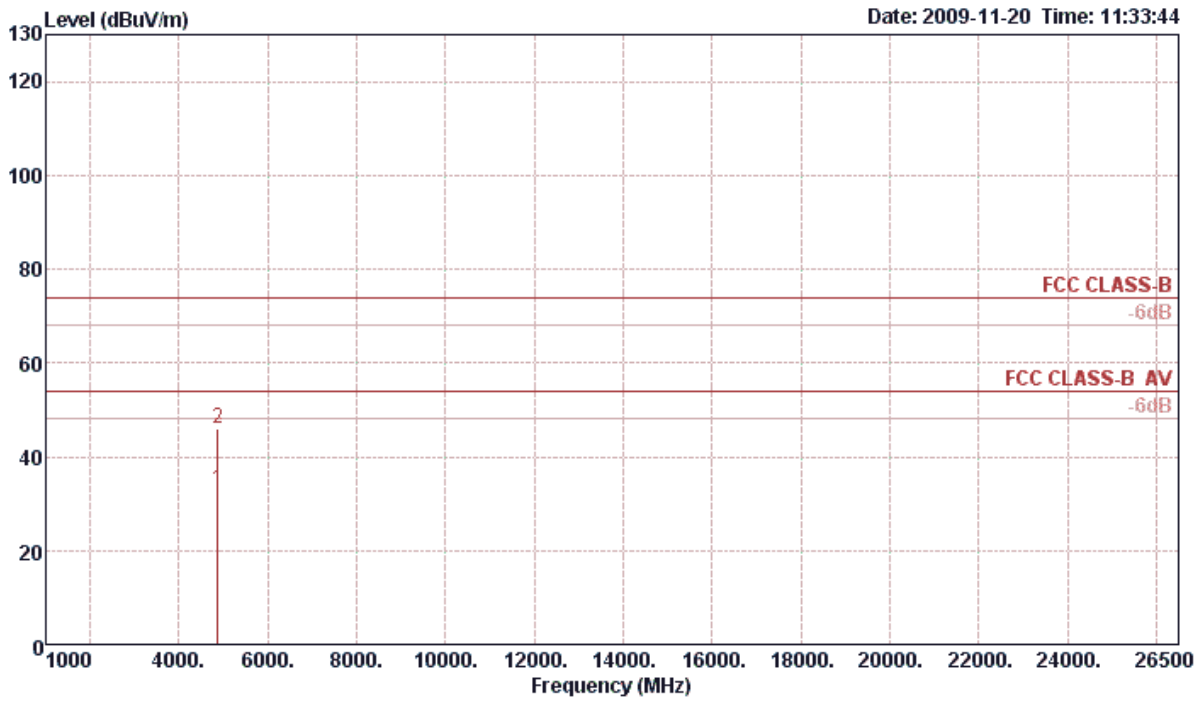
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 6 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4874.05	32.91	54.00	-21.09	30.81	3.97	33.16	35.03	179	100	Average	HORIZONTAL
2 p	4874.95	45.74	74.00	-28.26	43.64	3.97	33.16	35.03	179	100	Peak	HORIZONTAL

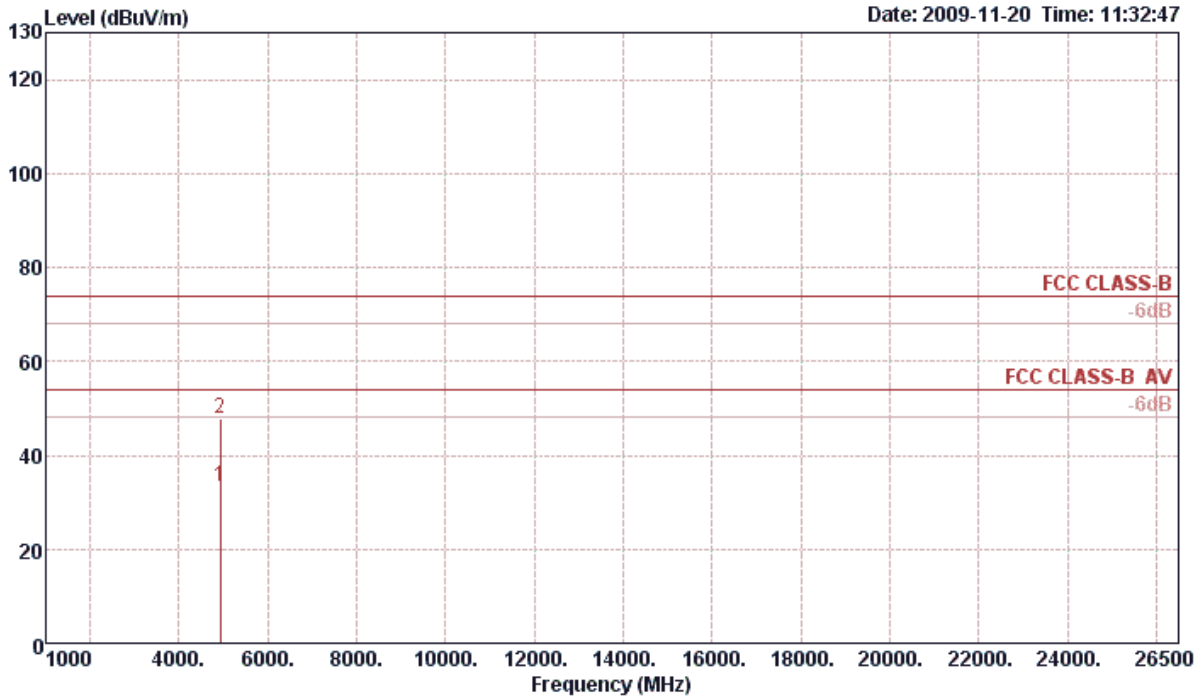
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4874.05	32.98	54.00	-21.02	30.88	3.97	33.16	35.03	49	100	Average	VERTICAL
2 p	4874.70	46.01	74.00	-27.99	43.91	3.97	33.16	35.03	49	100	Peak	VERTICAL

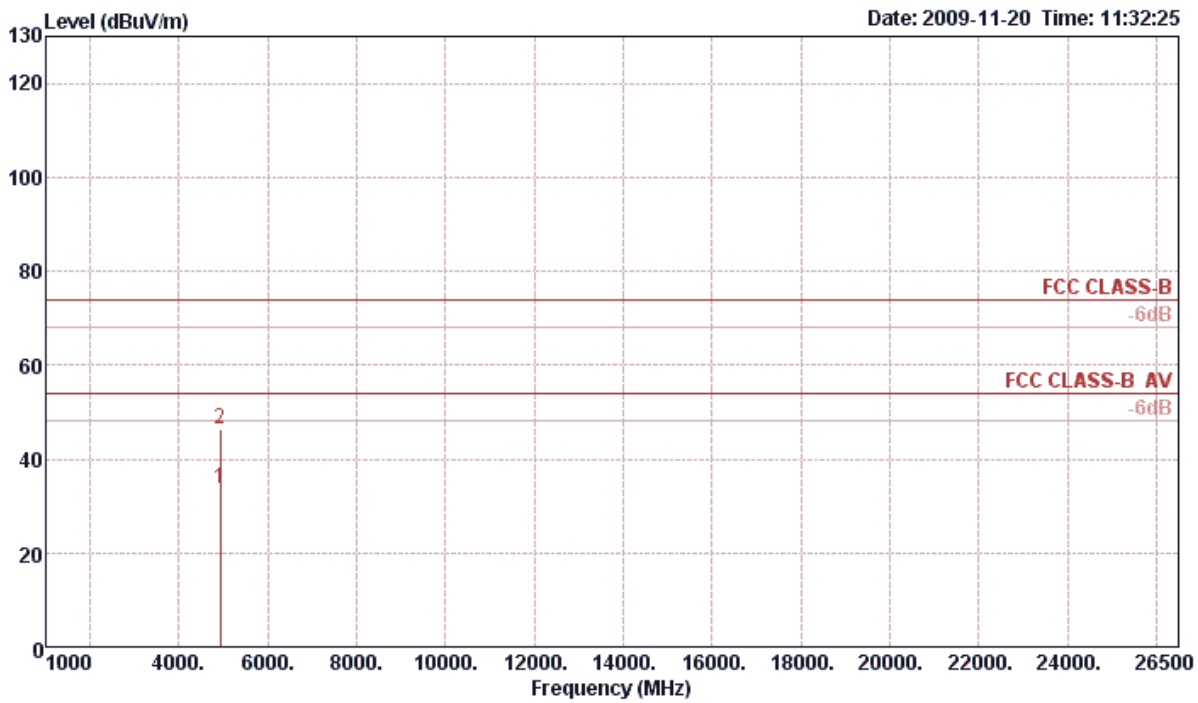
Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 11 / Chain A

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4924.07	33.40	54.00	-20.60	31.18	3.97	33.26	35.01	319	100	Average	HORIZONTAL
2 p	4924.68	47.94	74.00	-26.06	45.72	3.97	33.26	35.01	319	100	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	4923.49	33.57	54.00	-20.43	31.35	3.97	33.26	35.01	139	100	Average	VERTICAL
2 p	4923.97	46.47	74.00	-27.53	44.25	3.97	33.26	35.01	139	100	Peak	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.

4.6. Band Edge Emissions Measurement

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

4.6.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100 KHz /100 KHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3, only the freqeuncy range investigated is limited to 100MHz around bandedges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 20MHz Ch 1, 6, 11 / Chain A
Test Date	Nov. 20, 2009		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.60	58.60	74.00	-15.40	27.67	2.76	28.17	0.00	10	100	Peak	VERTICAL
2	2390.00	47.11	54.00	-6.89	16.18	2.76	28.17	0.00	10	100	Average	VERTICAL
3 a	2406.80	91.79	54.00			2.77	28.21	0.00	10	100	Average	VERTICAL
4 p	2409.00	101.40	74.00			2.77	28.21	0.00	10	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2387.40	56.58	74.00	-17.42	25.65	2.76	28.17	0.00	152	100	Peak	VERTICAL
2	2389.40	45.30	54.00	-8.70	14.37	2.76	28.17	0.00	152	100	Average	VERTICAL
3 a	2433.80	97.27	54.00			2.78	28.25	0.00	152	100	Average	VERTICAL
4 p	2433.80	106.87	74.00			2.78	28.25	0.00	152	100	Peak	VERTICAL
5	2485.70	45.04	54.00	-8.96	13.82	2.81	28.41	0.00	152	100	Average	VERTICAL
6	2486.30	56.56	74.00	-17.44	25.34	2.81	28.41	0.00	152	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	2464.40	104.81	74.00			2.80	28.33	0.00	146	100	Peak	VERTICAL
2 a	2465.20	95.45	54.00			2.80	28.33	0.00	146	100	Average	VERTICAL
3	2483.50	46.57	54.00	-7.43	15.39	2.81	28.37	0.00	146	100	Average	VERTICAL
4	2484.30	58.48	74.00	-15.52	27.30	2.81	28.37	0.00	146	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n MCS0 40MHz Ch 3, 6, 9 / Chain A
Test Date	Nov. 20, 2009		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 !	2360.00	48.89	54.00	-5.11	18.05	2.74	28.10	0.00	360	100	Average	VERTICAL
2	2387.20	60.23	74.00	-13.77	29.30	2.76	28.17	0.00	360	100	Peak	VERTICAL
3 p	2432.40	102.55	74.00			2.78	28.25	0.00	360	100	Peak	VERTICAL
4 a	2435.20	92.92	54.00			2.78	28.29	0.00	360	100	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 2422 MHz.

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2359.60	46.86	54.00	-7.14	16.02	2.74	28.10	0.00	219	100	Average	VERTICAL
2	2374.40	57.32	74.00	-16.68	26.45	2.74	28.13	0.00	219	100	Peak	VERTICAL
3 a	2432.60	92.74	54.00			2.78	28.25	0.00	219	100	Average	VERTICAL
4 p	2434.60	103.63	74.00			2.78	28.29	0.00	219	100	Peak	VERTICAL
5	2492.70	57.79	74.00	-16.21	26.57	2.81	28.41	0.00	219	100	Peak	VERTICAL
6	2520.30	46.78	54.00	-7.22	15.45	2.82	28.51	0.00	219	100	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 a	2436.00	92.16	54.00			2.78	28.29	0.00	148	100	Average	VERTICAL
2 p	2436.80	101.26	74.00			2.78	28.29	0.00	148	100	Peak	VERTICAL
3	2483.50	47.89	54.00	-6.11	16.71	2.81	28.37	0.00	148	100	Average	VERTICAL
4	2483.50	59.50	74.00	-14.50	28.32	2.81	28.37	0.00	148	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 2452 MHz.

Note:

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

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

Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 1, 6, 11 / Chain A
Test Date	Nov. 20, 2009		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.80	57.95	74.00	-16.05	27.02	2.76	28.17	0.00	348	101	Peak	VERTICAL
2	2390.00	46.83	54.00	-7.17	15.90	2.76	28.17	0.00	348	101	Average	VERTICAL
3 a	2414.80	98.30	54.00			2.77	28.21	0.00	348	101	Average	VERTICAL
4 p	2415.60	101.63	74.00			2.77	28.21	0.00	348	101	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2390.00	44.46	54.00	-9.54	13.53	2.76	28.17	0.00	151	100	Average	VERTICAL
2	2390.00	56.14	74.00	-17.86	25.21	2.76	28.17	0.00	151	100	Peak	VERTICAL
3 a	2434.20	102.39	54.00			2.78	28.29	0.00	151	100	Average	VERTICAL
4 p	2435.60	106.00	74.00			2.78	28.29	0.00	151	100	Peak	VERTICAL
5	2483.50	45.01	54.00	-8.99	13.83	2.81	28.37	0.00	151	100	Average	VERTICAL
6	2485.30	56.11	74.00	-17.89	24.89	2.81	28.41	0.00	151	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	2463.00	103.78	74.00			2.80	28.33	0.00	148	98	Peak	VERTICAL
2 a	2464.80	99.99	54.00			2.80	28.33	0.00	148	98	Average	VERTICAL
3	2483.50	47.01	54.00	-6.99	15.83	2.81	28.37	0.00	148	98	Average	VERTICAL
4	2485.70	58.70	74.00	-15.30	27.48	2.81	28.41	0.00	148	98	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	24.3℃	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 1, 6, 11 / Chain A
Test Date	Nov. 20, 2009		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.20	58.13	74.00	-15.87	27.20	2.76	28.17	0.00	347	100	Peak	VERTICAL
2	2390.00	47.07	54.00	-6.93	16.14	2.76	28.17	0.00	347	100	Average	VERTICAL
3 a	2404.80	93.37	54.00			2.77	28.21	0.00	347	100	Average	VERTICAL
4 p	2416.00	102.33	74.00			2.77	28.21	0.00	347	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.80	56.79	74.00	-17.21	25.86	2.76	28.17	0.00	217	100	Peak	VERTICAL
2	2390.00	44.57	54.00	-9.43	13.64	2.76	28.17	0.00	217	100	Average	VERTICAL
3 a	2438.80	96.64	54.00			2.78	28.29	0.00	217	100	Average	VERTICAL
4 p	2440.20	106.14	74.00			2.78	28.29	0.00	217	100	Peak	VERTICAL
5	2483.50	45.42	54.00	-8.58	14.24	2.81	28.37	0.00	217	100	Average	VERTICAL
6	2486.50	57.12	74.00	-16.88	25.90	2.81	28.41	0.00	217	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1 p	2463.60	104.42	74.00			2.80	28.33	0.00	147	98	Peak	VERTICAL
2 a	2464.80	95.12	54.00			2.80	28.33	0.00	147	98	Average	VERTICAL
3	2483.50	47.02	54.00	-6.98	15.84	2.81	28.37	0.00	147	98	Average	VERTICAL
4	2484.50	58.21	74.00	-15.79	27.03	2.81	28.37	0.00	147	98	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

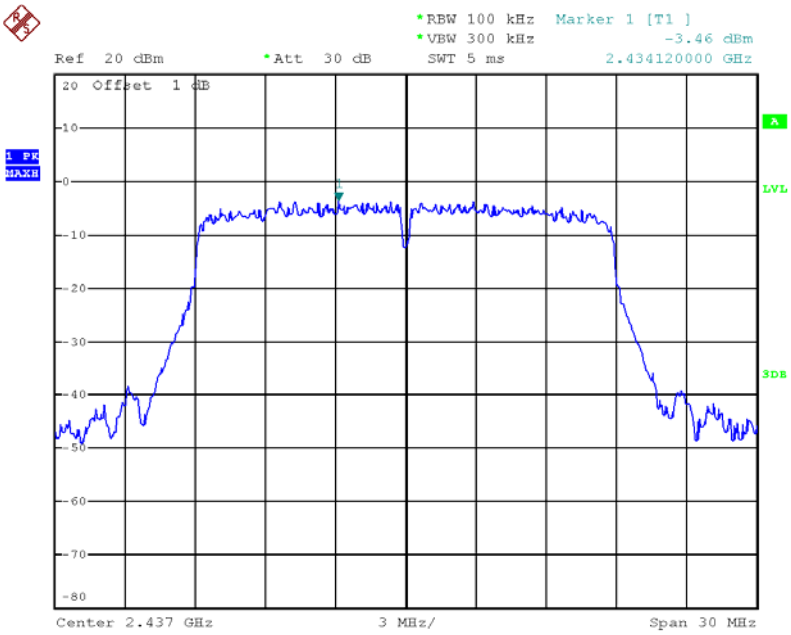
Note:

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

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

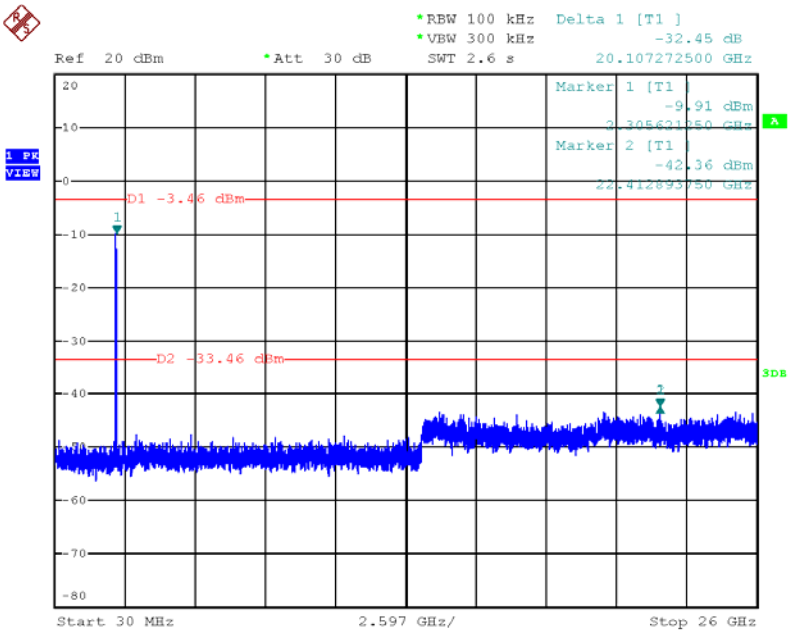
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11n MCS0 20MHz / Reference Level



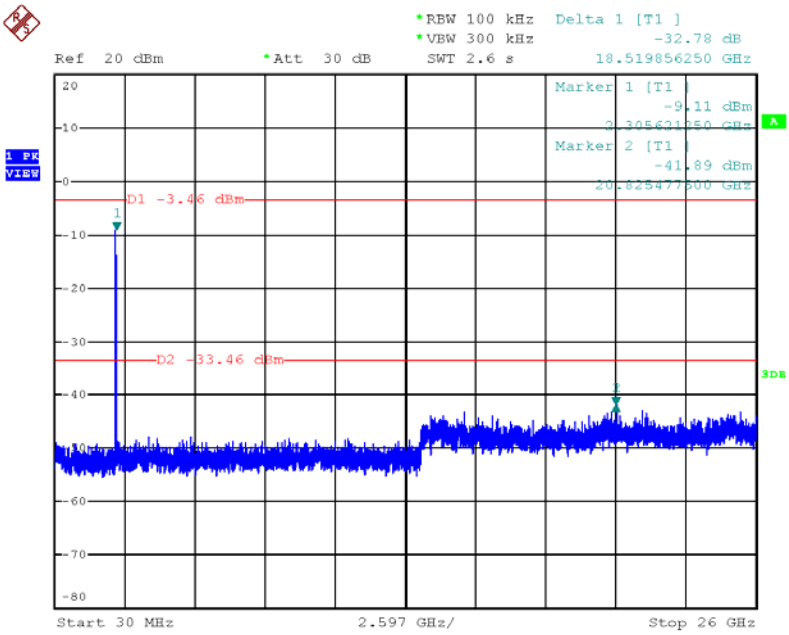
Date: 28.DEC.2012 22:07:23

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 1 (down 30dBc)



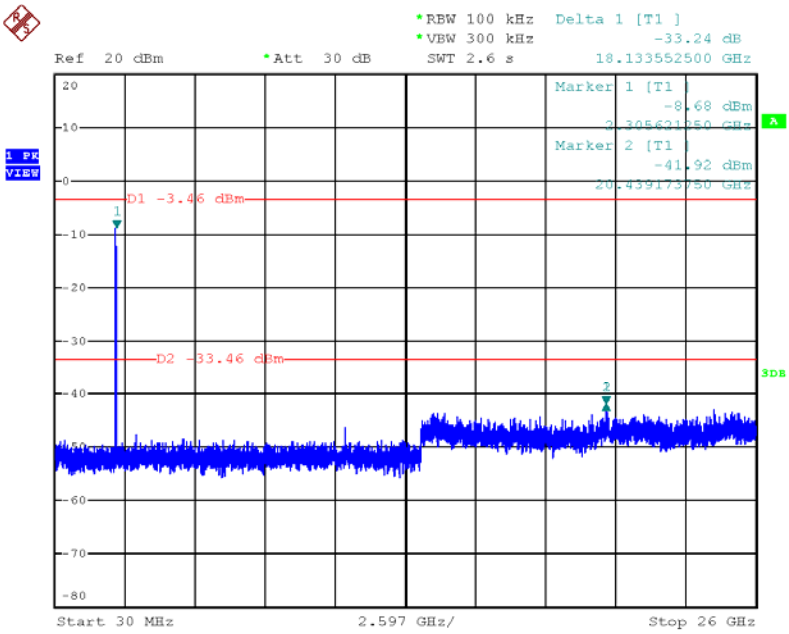
Date: 28.DEC.2012 22:23:47

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 6 (down 30dBc)



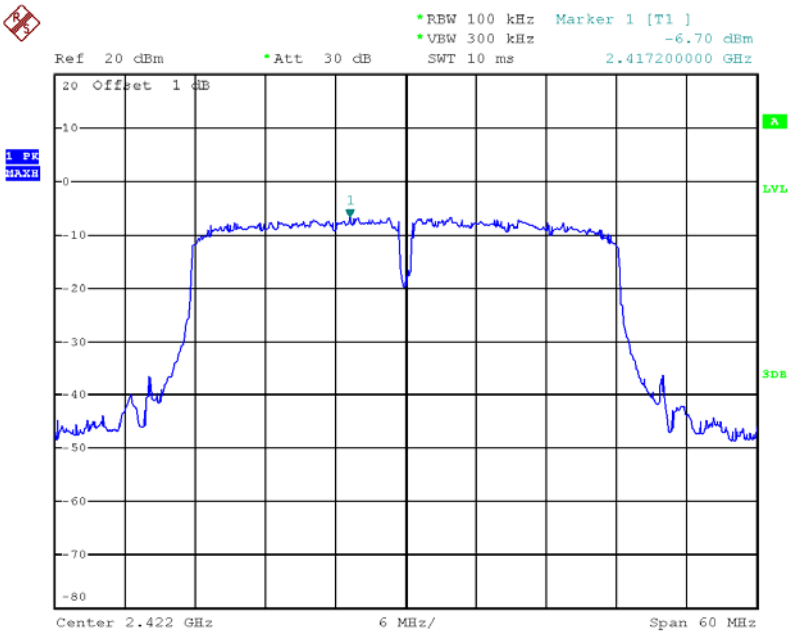
Date: 28.DEC.2012 22:24:22

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 11 (down 30dBc)



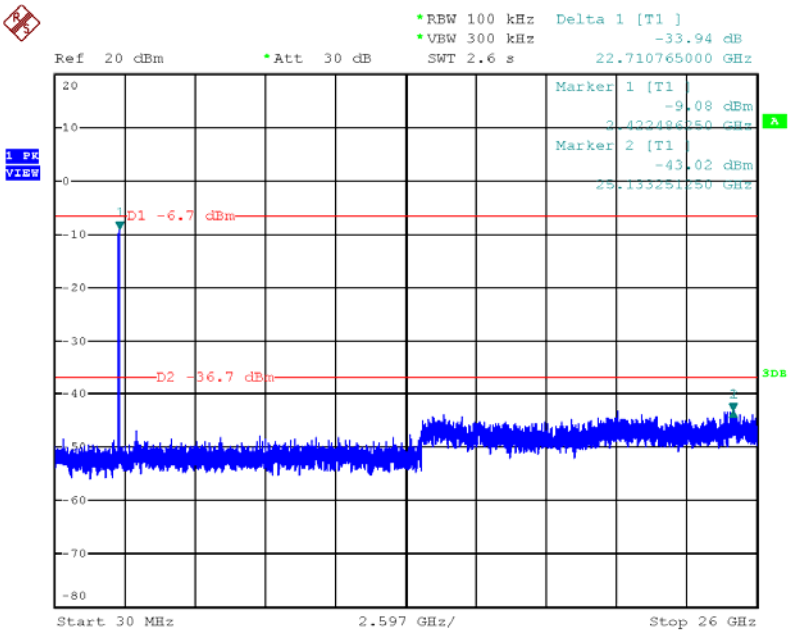
Date: 28.DEC.2012 22:25:03

Plot on Configuration IEEE 802.11n MCS0 40MHz / Reference Level



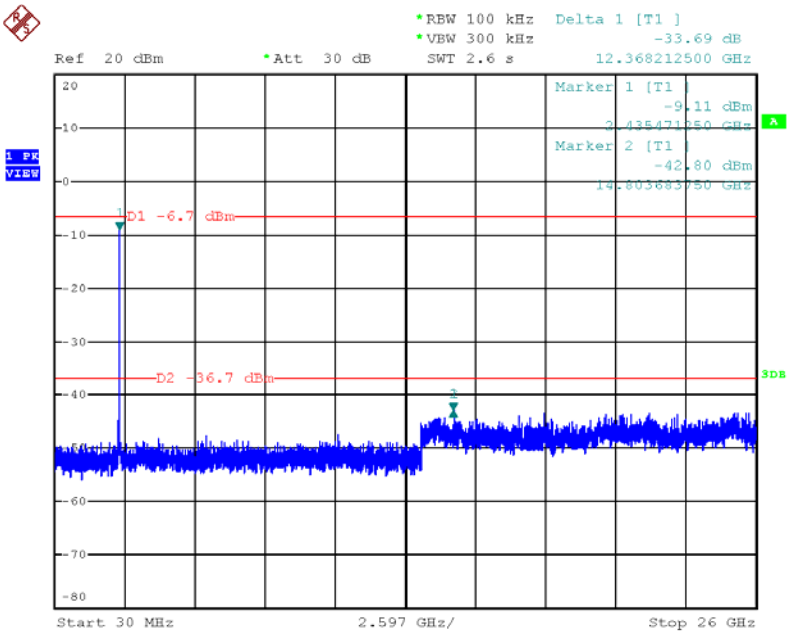
Date: 28.DEC.2012 22:11:03

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 3 (down 30dBc)



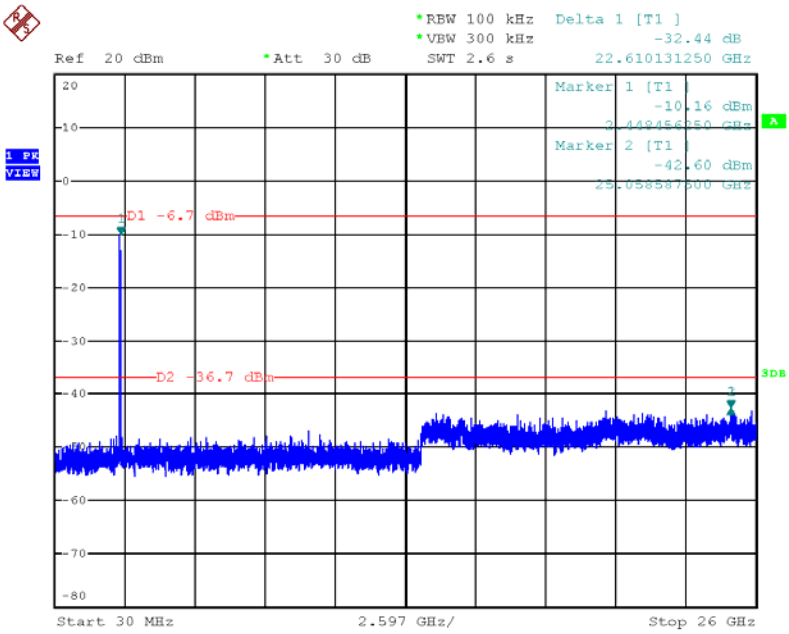
Date: 28.DEC.2012 22:14:50

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 6 (down 30dBc)



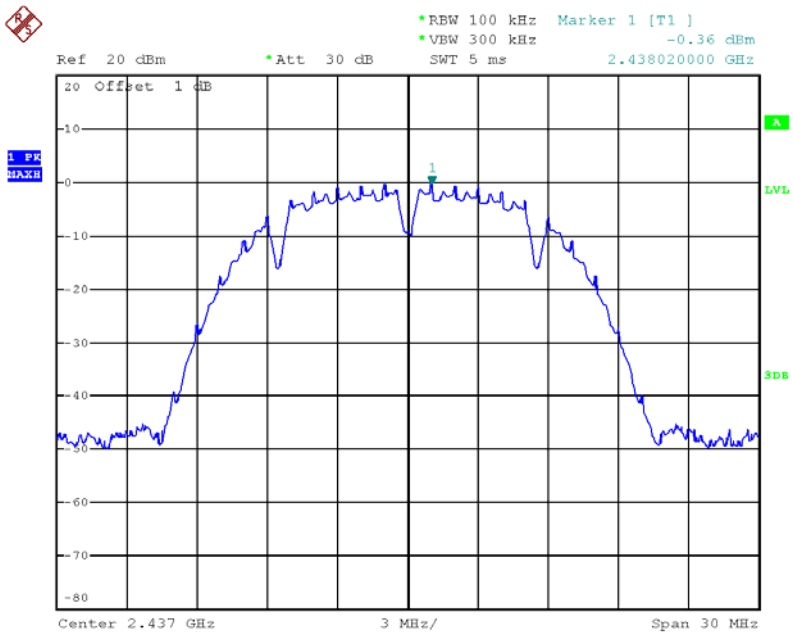
Date: 28.DEC.2012 22:15:24

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 (down 30dBc)



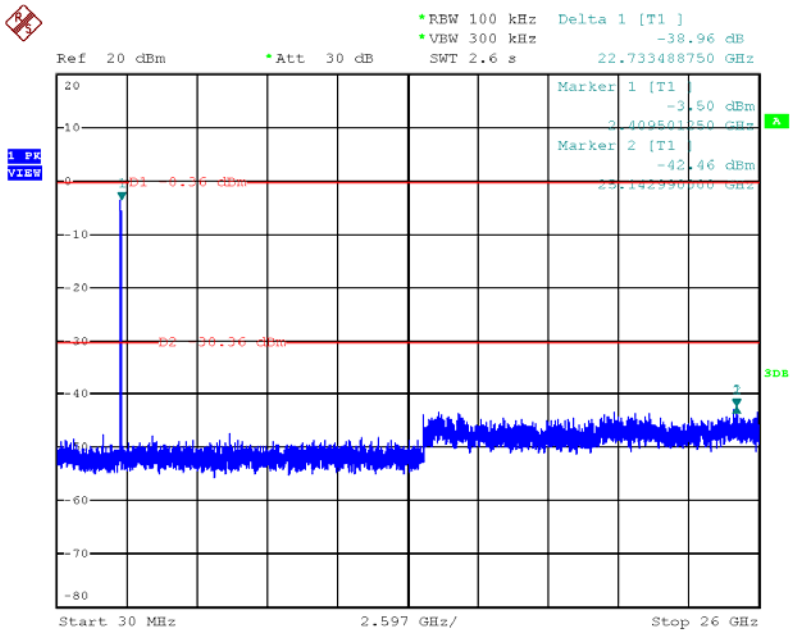
Date: 28.DEC.2012 22:15:55

Plot on Configuration IEEE 802.11b / Reference Level



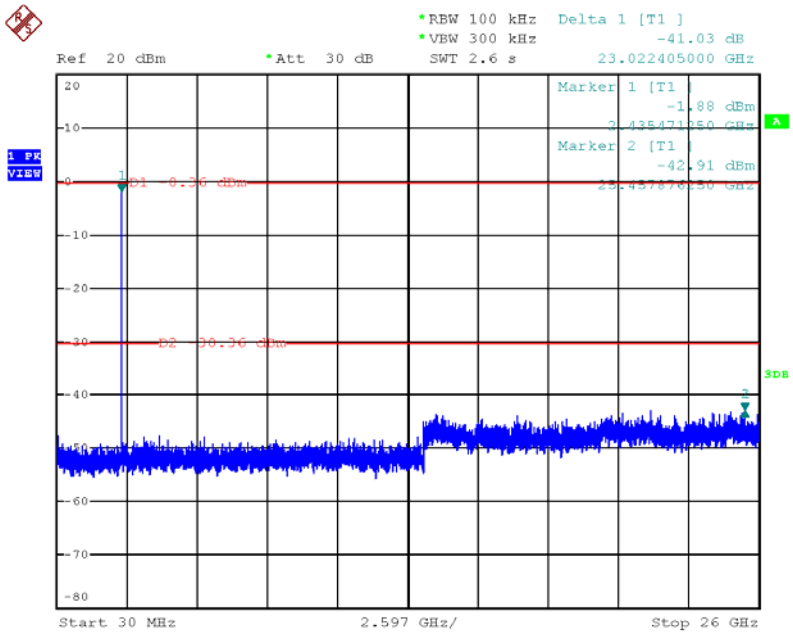
Date: 28.DEC.2012 21:57:38

Plot on Configuration IEEE 802.11b / CH 1 (down 30dBc)



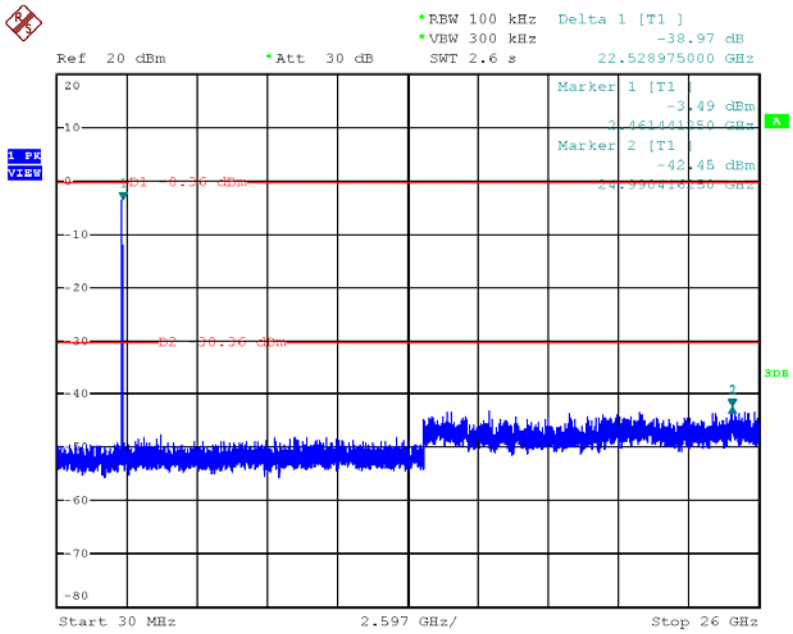
Date: 28.DEC.2012 22:17:46

Plot on Configuration IEEE 802.11b / CH 6 (down 30dBc)



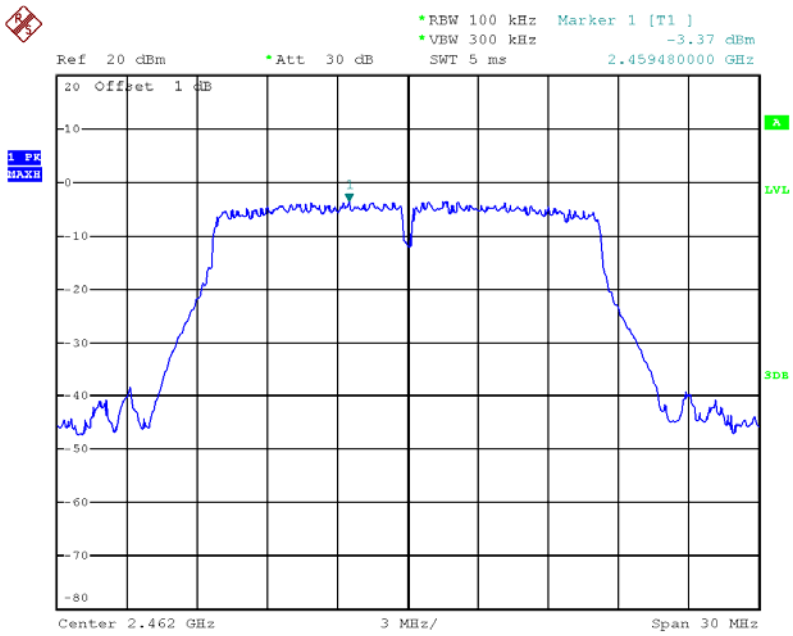
Date: 28.DEC.2012 22:18:18

Plot on Configuration IEEE 802.11b / CH 11 (down 30dBc)



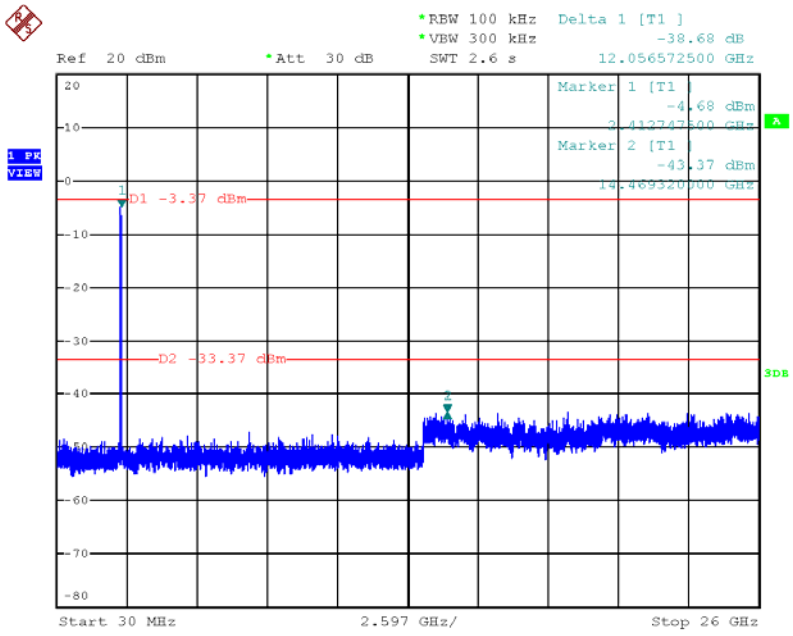
Date: 28.DEC.2012 22:18:51

Plot on Configuration IEEE 802.11g / Reference Level



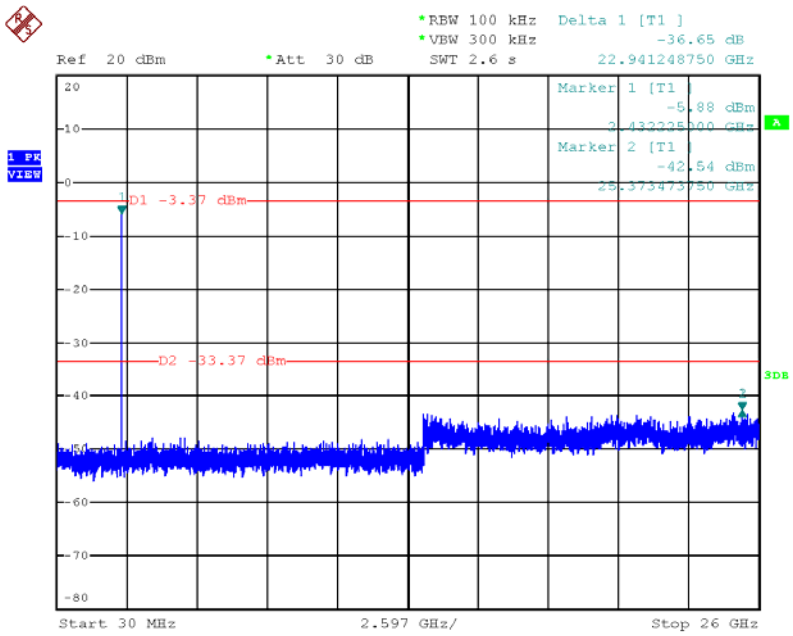
Date: 28.DEC.2012 22:04:09

Plot on Configuration IEEE 802.11g / CH 1 (down 30dBc)



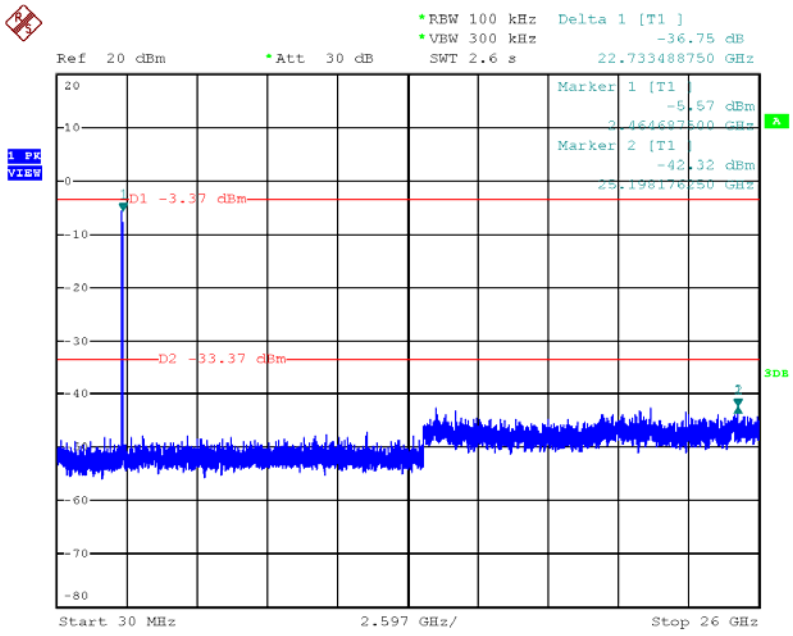
Date: 28.DEC.2012 22:20:24

Plot on Configuration IEEE 802.11g / CH 6 (down 30dBc)



Date: 28.DEC.2012 22:20:53

Plot on Configuration IEEE 802.11g / CH 11 (down 30dBc)



Date: 28.DEC.2012 22:21:23

4.7. Antenna Requirements

4.7.1. Limit

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

4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Apr. 15, 2009	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 23, 2009	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2009	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2009	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz –30MHz	Jun. 11, 2009	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 07, 2009	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 23, 2009	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jul. 21, 2009	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5 GHz - 40 GHz	Apr. 06, 2009*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP30	100305	9 kHz - 40 GHz	Feb. 03, 2009	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 28, 2008*	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Sep. 26, 2009	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 28, 2009	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jan.16, 2009	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Jan. 05, 2009	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Jan. 04, 2010	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Jan. 05, 2009	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Jan. 04, 2010	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 05, 2012	Conducted (TH01-CB)
Thermo-Hygro Meter	N/A	HC 520	#1	15~70 degree	Nov. 26, 2012	Conducted (TH01-CB)
RF Power Divider	HP	11636A	00306	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	44100	1839	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	42100	17930	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 26, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 26, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 26, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 26, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 26, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-12	-	1 GHz – 26.5 GHz	Nov. 26, 2012	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-13	-	1 GHz – 26.5 GHz	Nov. 26, 2012	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 26, 2012	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 26, 2012	Conducted (TH01-CB)

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

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

6. TEST LOCATION

SHIJR	ADD	:	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	:	886-2-2696-2468
	FAX	:	886-2-2696-2255
HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	:	886-3-327-3456
	FAX	:	886-3-318-0055
LINKOU	ADD	:	No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	:	886-2-2601-1640
	FAX	:	886-2-2601-1695
DUNGHU	ADD	:	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	:	886-2-2631-4739
	FAX	:	886-2-2631-9740
JUNGHE	ADD	:	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	:	886-2-8227-2020
	FAX	:	886-2-8227-2626
NEIHU	ADD	:	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	:	886-2-2794-8886
	FAX	:	886-2-2794-9777
JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	:	886-3-656-9065
	FAX	:	886-3-656-9085

7. TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-091230

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2005
Accreditation Number	:	1190
Originally Accredited	:	December 15, 2003
Effective Period	:	January 10, 2010 to January 09, 2013
Accredited Scope	:	Testing Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : December 30, 2009

P1, total 22 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix