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	**Aruba Networks, Inc.**
Applicant Address	1344 Crossman Avenue Sunnyvale CA 94089, USA
FCC ID	**Q9DAP134135**
Manufacturer's company	**Wistron NeWeb Corporation**
Manufacturer Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308,Taiwan,R.O.C.

Product Name	ARUBA 134 WIRELESS ACCESS POINT, EXT ANTENNA / ARUBA 135 WIRELESS ACCESS POINT
Brand Name	Aruba
Model Name	AP-134 / AP-135
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250MHz
Received Date	Dec. 10, 2010
Final Test Date	Mar. 29, 2011
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.7

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a (5150 ~ 5250MHz) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart E**.

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

Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR0D2823AA	Rev. 01	Initial issue of report	Mar. 14, 2011

Certificate No.: CB10003055

1. CERTIFICATE OF COMPLIANCE

Product Name	:	**ARUBA 134 WIRELESS ACCESS POINT, EXT ANTENNA / ARUBA 135 WIRELESS ACCESS POINT**
Brand Name	:	**Aruba**
Model Name	:	**AP-134 / AP-135**
Applicant	:	**Aruba Networks, Inc.**
Test Rule Part(s)	:	**47 CFR FCC Part 15 Subpart E § 15.407**

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Dec. 10, 2010 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.

Leo Huang

_____

Leo Huang

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	3.49 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.12 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.28 dB
4.5	15.407(a)	Peak Excursion	Complies	7.05 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.13 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.13 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.5dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
Peak Excursion	±0.5dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	$\pm 8.5\times10^{-8}$	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	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From POE and 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	5150 ~ 5250MHz
Channel Number	4 for 20MHz bandwidth ; 2 for 40MHz bandwidth
Channel Band Width (99%)	**<For External Antenna / Ant. 5>** MCS8 (20MHz): 18.56 MHz ; MCS8 (40MHz): 36.80 MHz **<For External Antenna / Ant. 6>** MCS8 (20MHz): 18.56 MHz ; MCS8 (40MHz): 36.80 MHz **<For Internal Antenna / Ant. 8>** MCS8 (20MHz): 18.40 MHz ; MCS8 (40MHz): 37.12 MHz
Conducted Output Power	**<For External Antenna / Ant. 5>** Band 1: MCS8 (20MHz): 16.72 dBm ; MCS8 (40MHz): 16.74 dBm **<For External Antenna / Ant. 6>** Band 1: MCS8 (20MHz): 16.72 dBm ; MCS8 (40MHz): 16.74 dBm **<For Internal Antenna / Ant. 8>** Band 1: MCS8 (20MHz): 16.72 dBm ; MCS8 (40MHz): 16.88 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

IEEE 802.11a

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From POE and Power Adapter
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5150 ~ 5250MHz
Channel Number	4
Channel Band Width (99%)	**<For External Antenna / Ant. 5>** 11a: 17.28 MHz **<For External Antenna / Ant. 6>** 11a: 17.28 MHz **<For Internal Antenna / Ant. 8>** 11a: 17.44 MHz
Conducted Output Power	**<For External Antenna / Ant. 5>** 11a: 16.56 dBm **<For External Antenna / Ant. 6>** 11a: 16.56 dBm **<For Internal Antenna / Ant. 8>** 11a: 16.61 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

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

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Antenna Gain		Cable Loss		Test Antenna gain	
					2.4GHz Band	5GHz Band	2.4GHz Band	5GHz Band	2.4GHz Band	5GHz Band
1	ARUBA	AP-ANT-1B	Omni Antenna	RP-SMA	3.8	5.8	1.8	3.3	2	2.5
2	ARUBA	AP-ANT-13B	Omni Antenna	RP-SMA	4.4	3.3	1.8	3.3	2.6	0
3	ARUBA	AP-ANT-16	Omni Antenna	RP-SMA	3.9	4.7	1.8	3.3	2.1	1.4
4	ARUBA	AP-ANT-17	Directional Antenna	RP-SMA	6	5	1.8	3.3	4.2	1.7
5	ARUBA	AP-ANT-18	Directional Antenna	RP-SMA	7	7.5	1.8	3.3	5.2	4.2
6	ARUBA	AP-ANT-19	Omni Antenna	RP-SMA	3	6	1.8	3.3	1.2	2.7
7	ARUBA	AP-ANT-93	Directional Antenna	RP-SMA	-	13	-	3.3	-	9.7
8	WNC	-	Embedded Antenna	I-PEX	4.5	6	1.8	3.3	3.5	4.5

Note 1: There are two types of EUT, one will collocate with external antennas (Ant. 1~Ant. 7) and another

will collocate with internal antenna (Ant. 8).

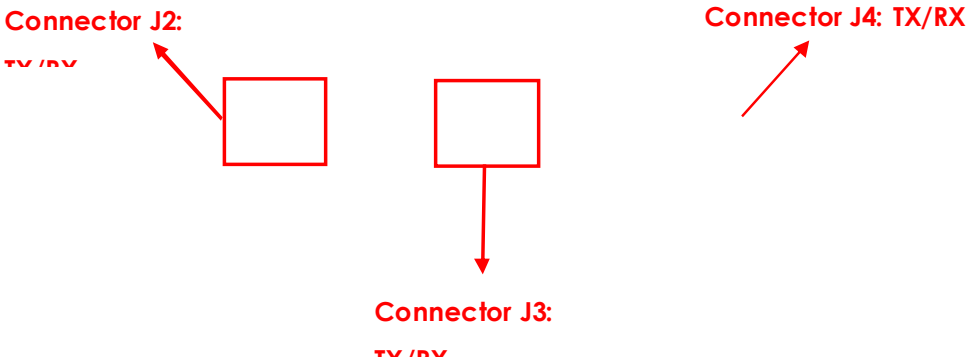
Note 2: Ant. 7 only for IEEE 802.11a/n Band 4 uses.

Note 3: **For IEEE 802.11a/n Band 1:**

Ant. 5, Ant. 6 and Ant. 8 were selected to be tested and recorded in the report.

Note 4: The EUT has three antenna connectors (Connector J2, J3 and J4) that can be used for transmitting

and receiving simultaneously as 3TX and 3RX.




MAC : D8C7C8000081

3.4. Table for Carrier Frequencies

For IEEE 802.11a, use Channel 36, 40, 44.

There are two bandwidth systems for IEEE 802.11n.

For both 20MHz bandwidth systems, use Channel 36, 40, 44.

For both 40MHz bandwidth systems, use Channel 38, 46.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode		Data Rate	Channel	Connector
AC Power Conducted Emission	Normal Link		Auto	-	-
Max. Conducted Output Power	MCS8/20MHz	Band 1	13Mbps	36/40/48	J2/J3/J4/J2+J3+J4
	MCS8/40MHz	Band 1	27Mbps	38/46	J2/J3/J4/J2+J3+J4
	11a/BPSK	Band 1	6Mbps	36/40/48	J2/J3/J4/J2+J3+J4
26dB Spectrum Bandwidth 99% Occupied Bandwidth Power Spectral Density Peak Excursion	MCS8/20MHz	Band 1	13Mbps	36/40/48	J2+J3+J4
	MCS8/40MHz	Band 1	27Mbps	38/46	J2+J3+J4
	11a/BPSK	Band 1	6Mbps	36/40/48	J2+J3+J4
Radiated Emission Below 1GHz	Normal Link		Auto	-	-
Radiated Emission Above 1GHz	MCS8/20MHz	Band 1	13Mbps	36/40/48	J2+J3+J4
	MCS8/40MHz	Band 1	27Mbps	38/46	J2+J3+J4
	11a/BPSK	Band 1	6Mbps	36/40/48	J2+J3+J4

Band Edge Emission	MCS8/20MHz	Band 1	13Mbps	36/40/48	J2+J3+J4
	MCS8/40MHz	Band 1	27Mbps	38/46	J2+J3+J4
	11a/BPSK	Band 1	6Mbps	36/40/48	J2+J3+J4
Frequency Stability	Un-modulation		-	40	N/A

All the test modes were listed as below:

Mode 1. EUT 1 with external antenna + Adapter

Mode 2. EUT 1 with external antenna + POE

Mode 3. EUT 2 with internal antenna + Adapter

Mode 4. EUT 2 with internal antenna + POE

<For Conducted Emissions Test>:

Due to Mode 1 and Mode 4 generated the worst test result, so both of them were recorded in this report.

<For Radiated Emissions Test Below 1GHz>:

Adapter Mode and POE Mode were performed at Horizontal and Vertical and the worst-case was found at Horizontal, thus measurement will follow this same test mode.

Due to Mode 2 and Mode 4 generated the worst test result, so both of them were recorded in this report.

<For Radiated Emissions Test Above 1GHz>:

Adapter Mode and POE Mode were performed at Horizontal and Vertical and the worst-case was found at Vertical, thus measurement will follow this same test mode.

Due to Mode 1 and Mode 3 generated the worst test result, so both of them were recorded in this report.

<For MPE and Co-location Test>:

For Co-location Test, Ant. 5 and Ant. 8 were selected to be tested and recorded in the report.

The EUT could be applied with wireless LAN function 2.4GHz Band and wireless LAN function 5GHz Band; therefore Maximum Permissible Exposure (please refer to Appendix B) and Co-location (please refer to Appendix C) tests are added for simultaneously transmit between wireless LAN function 2.4GHz Band and wireless LAN function 5GHz Band.

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	187376	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	187376	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

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

EUT	Product Name	Model No.	Description
1	ARUBA 134 WIRELESS ACCESS POINT, EXT ANTENNA	AP-134	EUT with external antenna

EUT	Product Name	Model No.	Description
2	ARUBA 135 WIRELESS ACCESS POINT	AP-135	EUT with internal antenna

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D420	E2KWM3945ABG
Notebook	DELL	D420	E2KWM3945ABG
Notebook	DELL	1340	E2K4965AGNM
POE	HiPoE	N/A	9001G
Adaptor	LEI	IU18-2120150-WP	DOC
Notebook	DELL	D400	E2K24GBRL

3.9. Table for Parameters of Test Software Setting

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

<For External Antenna / Ant. 5>

Power Parameters of IEEE 802.11n

Test Software Version	ART2-GUI 1.7		
Frequency	5180 MHz	5200 MHz	5240 MHz
MCS8 20MHz	13	12	12
Frequency	5190 MHz	5230 MHz	-
MCS8 40MHz	12.5	12	-

Power Parameters of IEEE 802.11a

Refer to Appendix D for the actual test results in legacy mode based on KDB662911

<For External Antenna / Ant. 6>

Power Parameters of IEEE 802.11n

Test Software Version	ART2-GUI 1.7		
Frequency	5180 MHz	5200 MHz	5240 MHz
MCS8 20MHz	13	12	12
Frequency	5190 MHz	5230 MHz	-
MCS8 40MHz	12.5	12	-

Power Parameters of IEEE 802.11a

Refer to Appendix D for the actual test results in legacy mode based on KDB662911

<For Internal Antenna / Ant. 8>

Power Parameters of IEEE 802.11n

Test Software Version	ART2-GUI 2.13		
Frequency	5180 MHz	5200 MHz	5240 MHz
MCS8 20MHz	11.50	11.00	11.50
Frequency	5190 MHz	5230 MHz	-
MCS8 40MHz	8.5	11.5	-

Power Parameters of IEEE 802.11a

Refer to Appendix D for the actual test results in legacy mode based on KDB662911

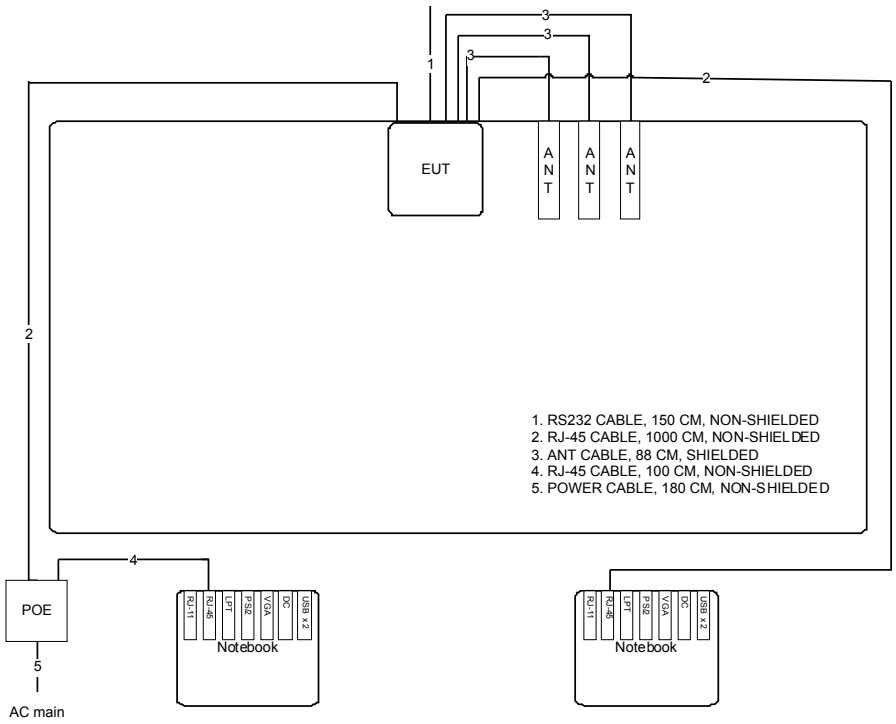
During the test, "ART2-GUI 1.7" and "ART2-GUI 2.13" under WIN XP was executed to control the EUT continuously transmit RF signal.

3.10. Test Configurations

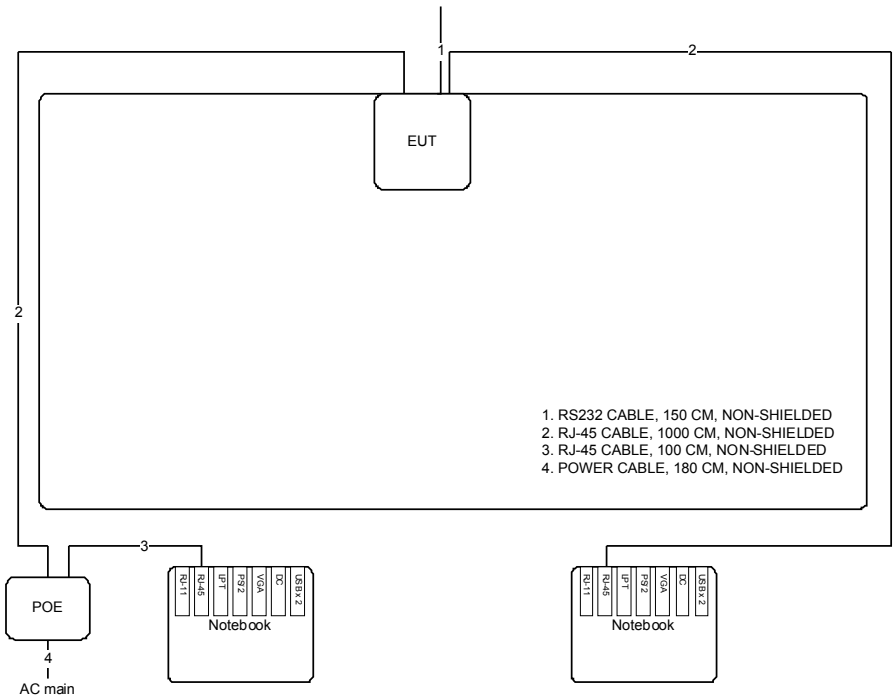
3.10.1. Radiation Emissions Test Configuration

Test Configuration: 9KHz~1GHz

Test Mode: Mode 2

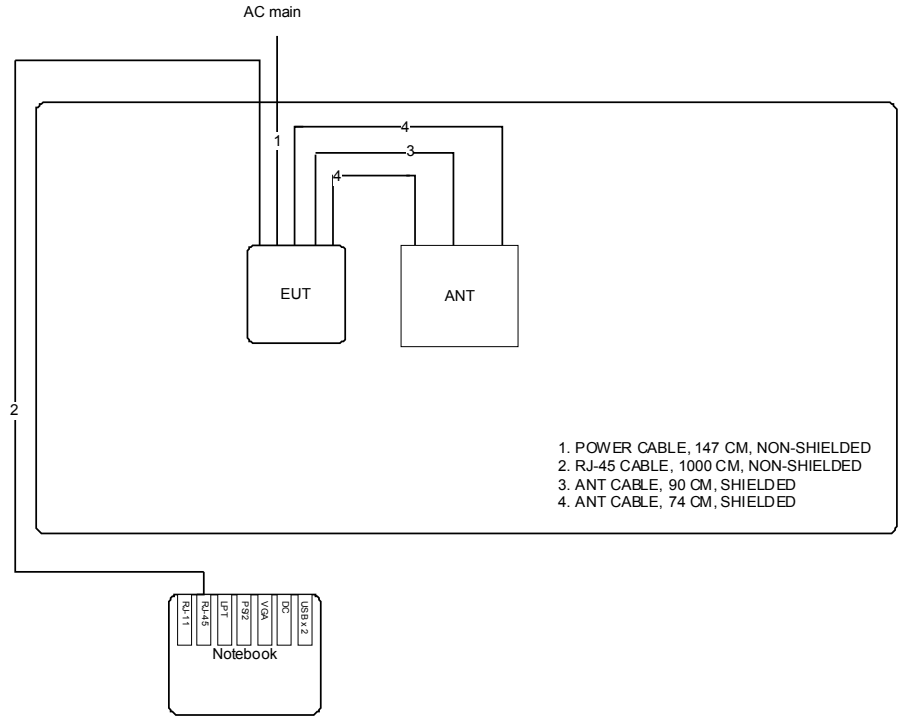


Test Mode: Mode 4

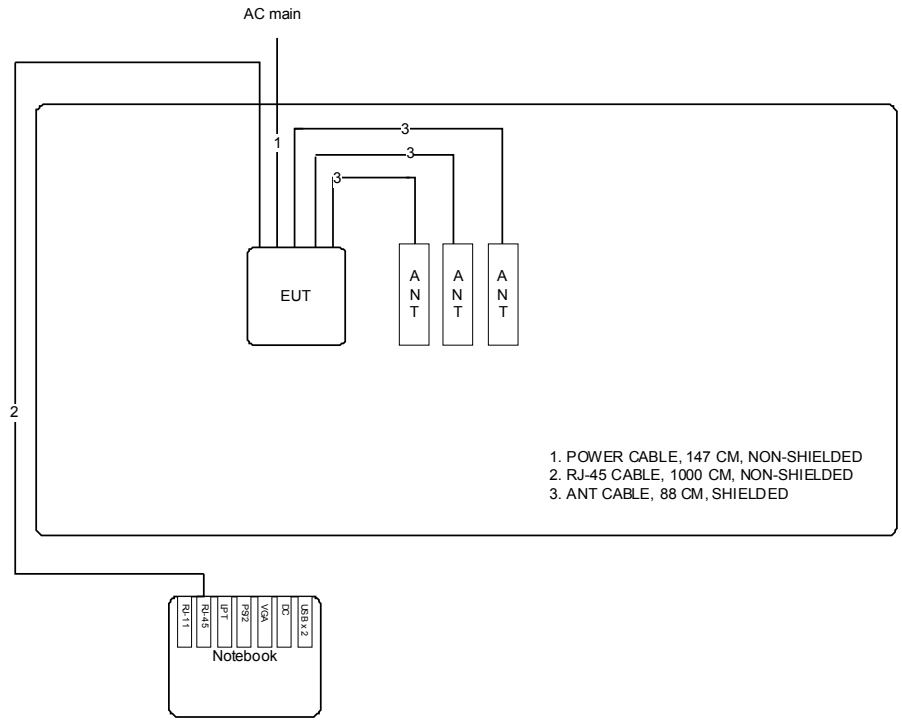


Test Configuration: above 1GHz

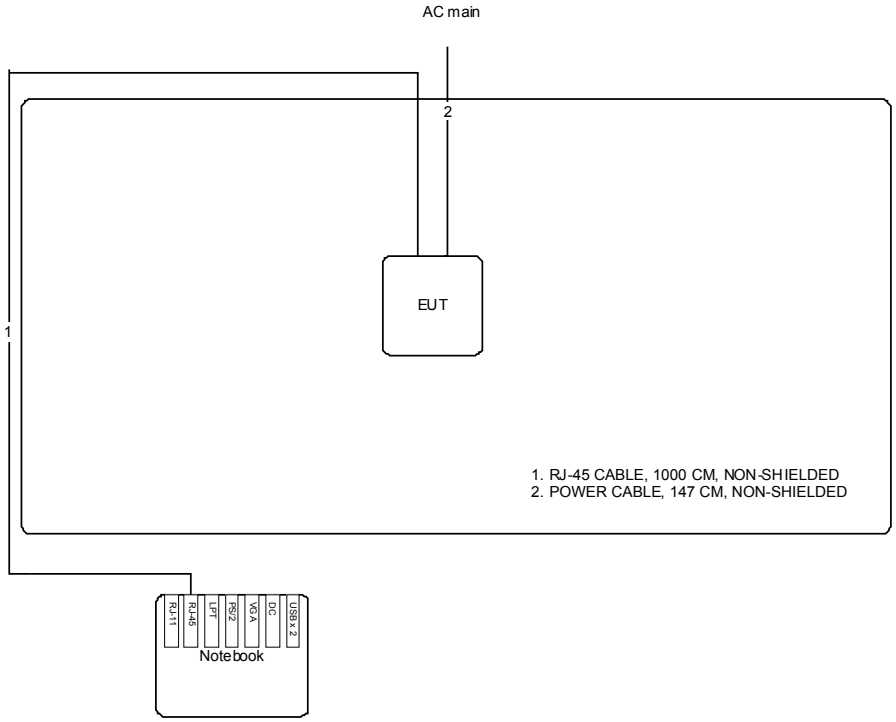
<For External Antenna / Ant. 5>



<For External Antenna / Ant. 6>

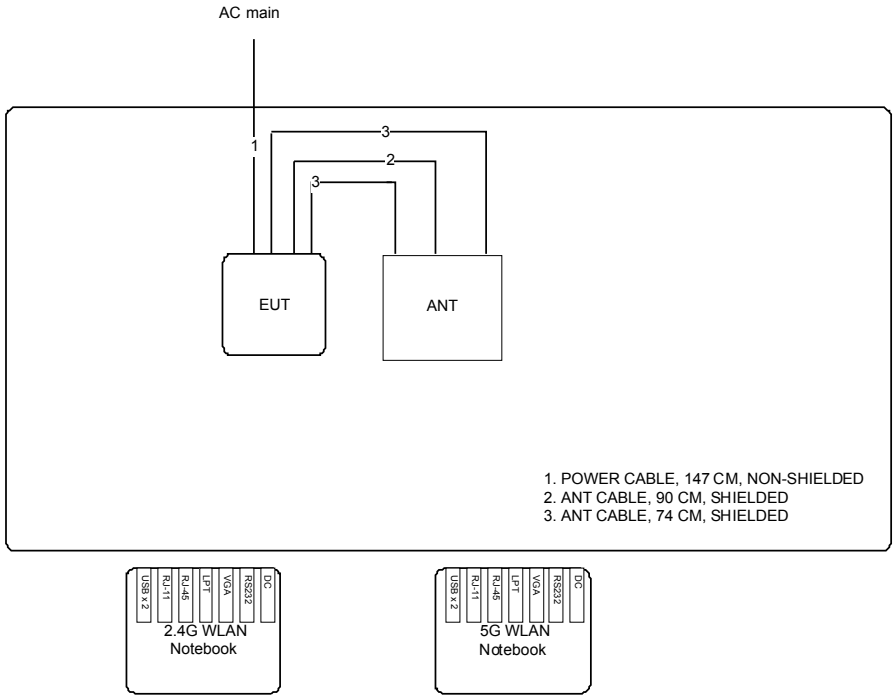


<For Internal Antenna / Ant. 8>

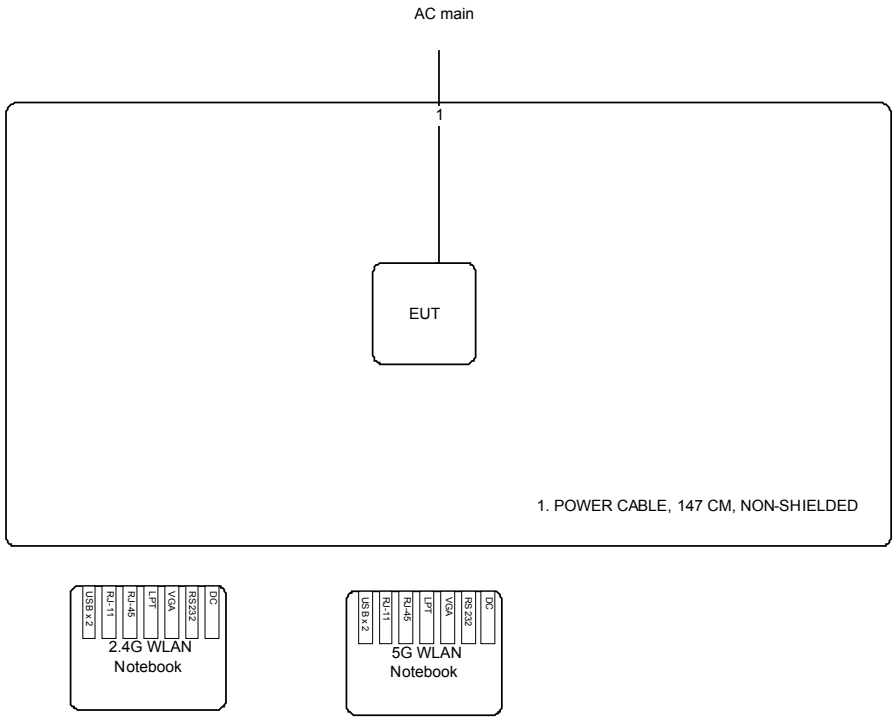


Test Configuration: Co-Location

<For External Antenna / Ant. 5>

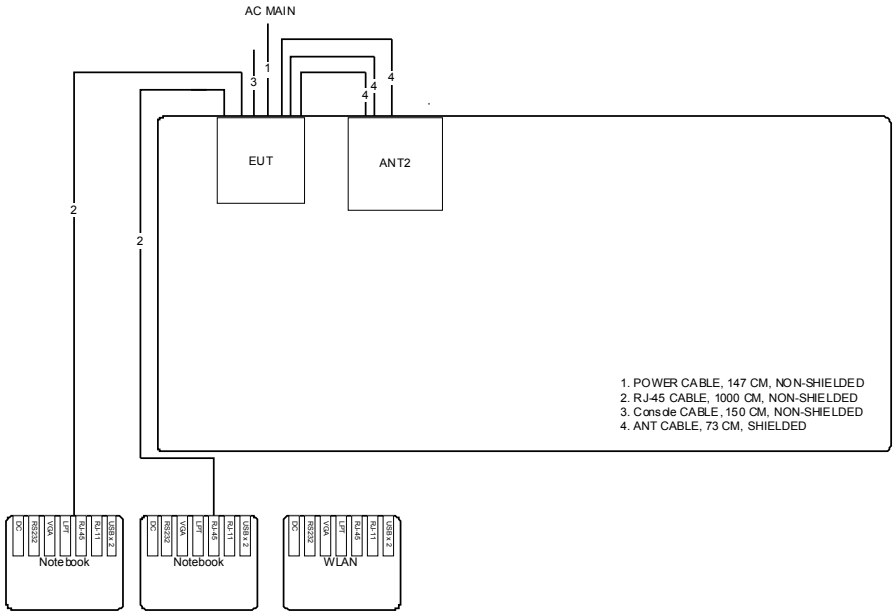


<For Internal Antenna / Ant. 8>

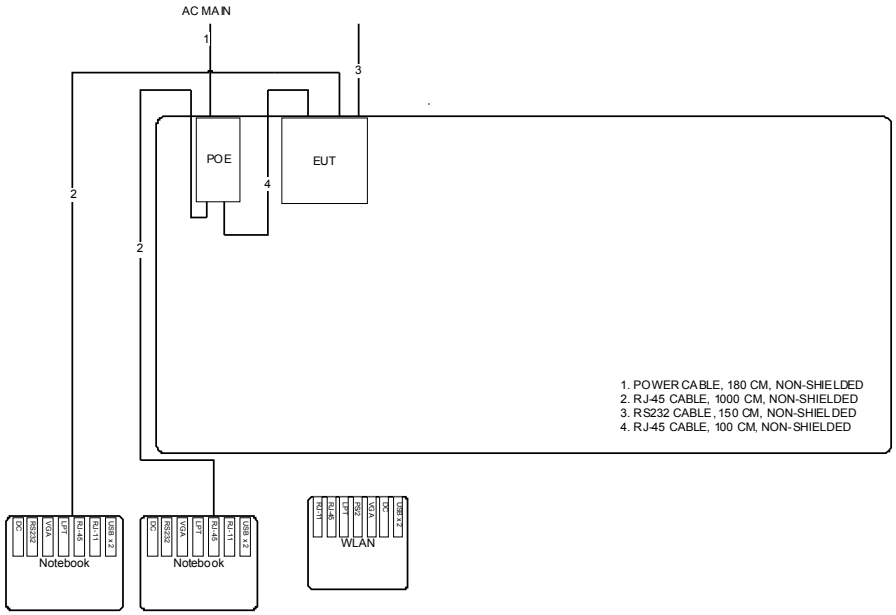


3.10.2. AC Power Line Conduction Emissions Test Configuration

Test Mode: Mode 1



Test Mode: Mode 4



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

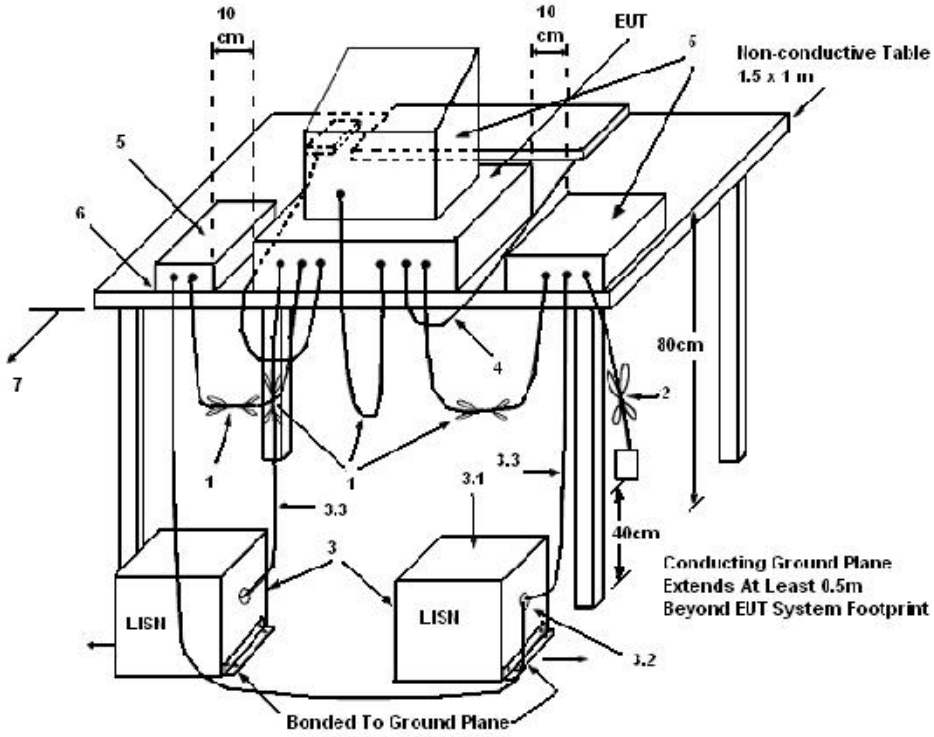
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

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

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

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

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

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

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

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

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

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

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

4.1.5. Test Deviation

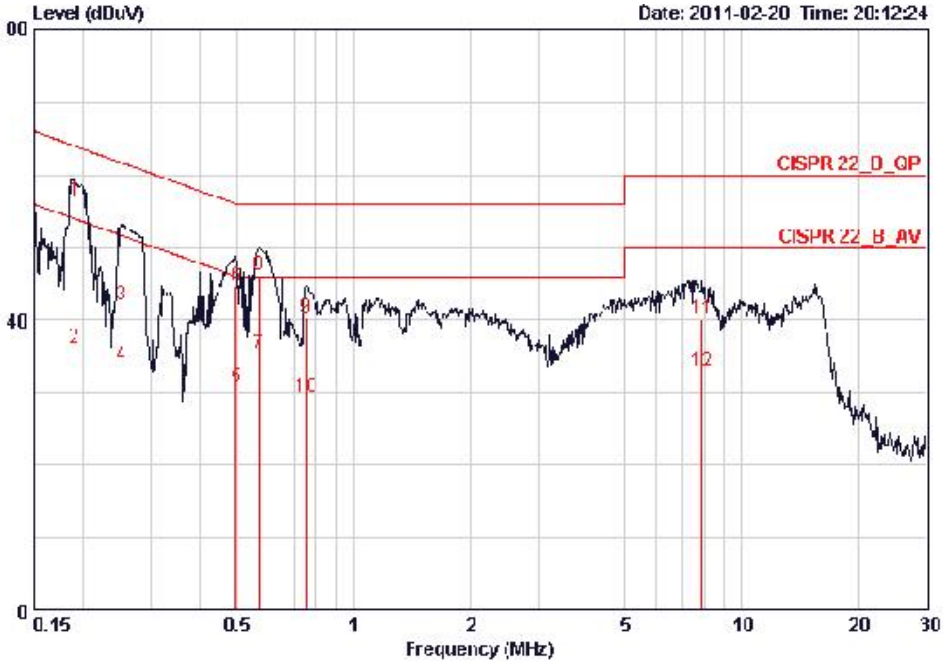
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

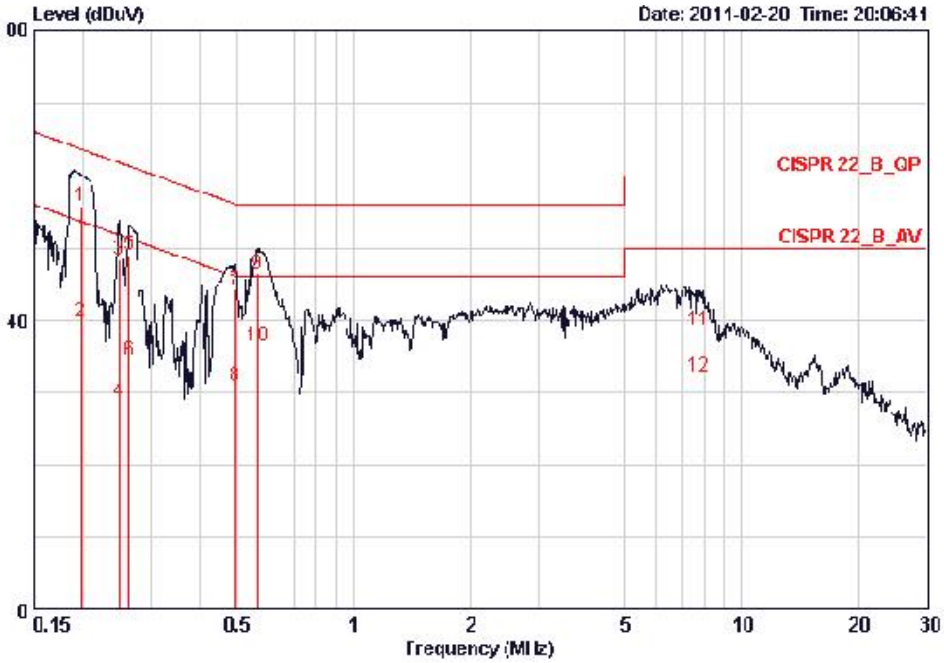
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	21℃	Humidity	58%
Test Engineer	Ryo Fan	Phase	Line
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	0.19039	56.49	-7.53	64.02	56.24	0.05	0.20	QP
2	0.19039	36.18	-17.84	54.02	35.93	0.05	0.20	AVERAGE
3	0.25211	42.01	-19.67	61.69	41.77	0.04	0.20	QP
4	0.25211	33.81	-17.87	51.69	33.57	0.04	0.20	AVERAGE
5	0.49673	30.21	-15.25	46.05	30.60	0.03	0.18	AVERAGE
6	0.49673	44.67	-11.39	56.05	44.46	0.03	0.18	QP
7	0.57010	35.33	-10.67	46.00	35.10	0.03	0.20	AVERAGE
8	0.57010	46.24	-9.76	56.00	46.01	0.03	0.20	QP
9	0.75493	40.35	-15.65	56.00	40.12	0.03	0.20	QP
10	0.75493	29.40	-16.60	46.00	29.17	0.03	0.20	AVERAGE
11	7.893	40.05	-19.95	60.00	39.37	0.28	0.40	QP
12	7.093	32.93	-17.07	50.00	32.25	0.28	0.40	AVERAGE

Temperature	21℃	Humidity	58%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	Normal Link / Mode 1		

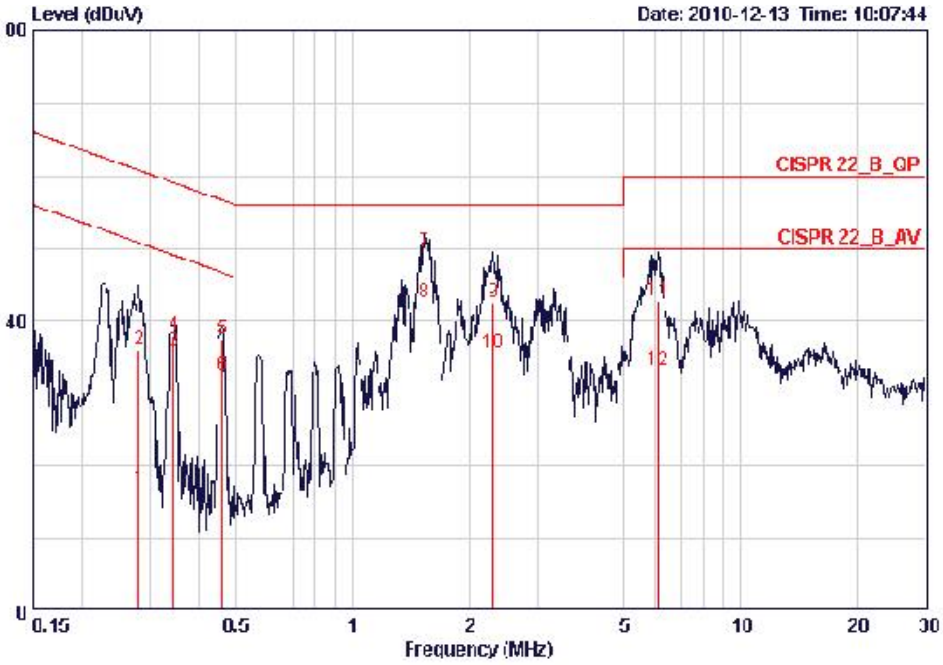


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.19789	55.81	-7.89	63.70	55.53	0.08	0.20	QP
2	0.19789	39.98	-13.72	53.70	39.70	0.08	0.20	AVERAGE
3	0.24814	48.36	-13.46	61.82	48.08	0.08	0.20	QP
4	0.24814	28.80	-23.02	51.82	28.52	0.08	0.20	AVERAGE
5	0.26303	49.88	-12.26	61.34	48.80	0.08	0.20	QP
6	0.26303	34.40	-16.94	51.34	34.12	0.08	0.20	AVERAGE
7	0.49411	44.33	-11.77	56.10	44.00	0.07	0.10	QP
8	0.49411	31.00	-15.10	46.10	30.75	0.07	0.18	AVERAGE
9	0.56409	46.52	-9.48	56.00	46.25	0.07	0.20	QP
10	0.56409	36.48	-9.52	46.00	36.21	0.07	0.20	AVERAGE
11	7.769	38.51	-21.49	60.00	37.79	0.32	0.40	QP
12	7.769	32.22	-17.78	50.00	31.50	0.32	0.40	AVERAGE

Note:

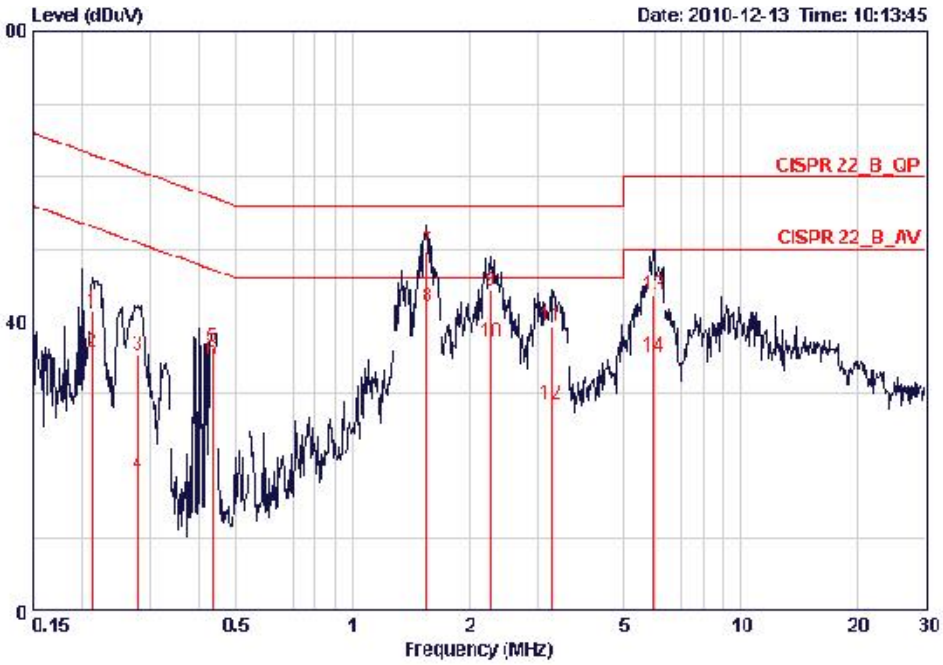
Level = Read Level + LISN Factor + Cable Loss.

Temperature	21℃	Humidity	58%
Test Engineer	Ryo Fan	Phase	Line
Configuration	Normal Link / Mode 4		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.28178	17.03	-33.73	50.76	16.79	0.04	0.20	AVERAGE
2	0.28178	35.99	-24.77	60.76	35.75	0.04	0.20	QP
3	0.34463	35.74	-13.35	49.09	35.51	0.03	0.20	AVERAGE
4	0.34463	37.87	-21.22	59.09	37.64	0.03	0.20	QP
5	0.46122	37.59	-19.08	56.67	37.36	0.03	0.20	QP
6	0.46122	32.18	-14.19	46.37	32.25	0.03	0.20	AVERAGE
7 @	1.535	43.55	-6.45	50.00	43.40	0.04	0.11	QP
8 @	1.535	42.51	-3.49	46.00	42.36	0.04	0.11	AVERAGE
9	2.297	42.17	-13.83	56.00	42.21	0.06	0.20	QP
10	2.297	35.50	-10.50	46.00	35.24	0.06	0.20	AVERAGE
11	6.153	42.76	-17.24	60.00	42.21	0.22	0.34	QP
12	6.153	33.23	-16.77	50.00	32.68	0.22	0.34	AVERAGE

Temperature	21℃	Humidity	58%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	Normal Link / Mode 4		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.21392	41.52	-21.53	63.05	41.24	0.08	0.20	QP
2	0.21392	35.72	-17.33	53.05	35.44	0.08	0.20	AVERAGE
3	0.28029	35.35	-25.46	60.81	35.07	0.08	0.20	QP
4	0.28029	19.03	-31.78	50.81	18.75	0.08	0.20	AVERAGE
5	0.43511	36.47	-20.68	57.15	36.20	0.07	0.20	QP
6	0.43511	34.62	-12.53	47.15	34.35	0.07	0.20	AVERAGE
7 @	1.552	49.76	-6.24	56.00	49.57	0.08	0.11	QP
8 @	1.552	42.04	-3.96	46.00	41.85	0.08	0.11	AVERAGE
9	2.273	44.24	-11.76	56.00	43.94	0.10	0.20	QP
10	2.273	37.14	-8.86	46.00	36.84	0.10	0.20	AVERAGE
11	3.241	39.34	-16.66	56.00	38.96	0.12	0.25	QP
12	3.241	28.54	-17.46	46.00	28.16	0.12	0.25	AVERAGE
13	5.961	43.65	-16.35	60.00	43.10	0.25	0.30	QP
14	5.961	35.01	-14.99	50.00	34.46	0.25	0.30	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 99% Occupied Bandwidth Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

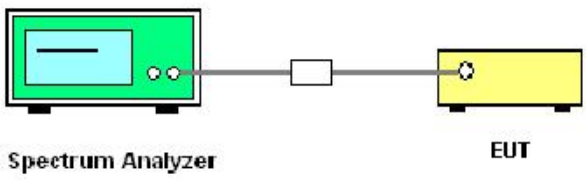
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RB	300 kHz
VB	1000 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.
4. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 99% Occupied Bandwidth

<For External Antenna / Ant. 5>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 5

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.88	17.60
40	5200 MHz	23.20	18.24
48	5240 MHz	24.16	18.56

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	46.08	36.48
46	5230 MHz	46.72	36.80

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 5

Configuration IEEE 802.11a Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.40	17.28
40	5200 MHz	23.20	17.12
48	5240 MHz	22.56	17.12

<For External Antenna / Ant. 6>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 6

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.88	17.60
40	5200 MHz	23.20	18.24
48	5240 MHz	24.16	18.56

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	46.08	36.48
46	5230 MHz	46.72	36.80

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 6

Configuration IEEE 802.11a Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.40	17.28
40	5200 MHz	23.20	17.12
48	5240 MHz	22.56	17.12

<For Internal Antenna / Ant. 8>

Temperature	22℃	Humidity	65%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Ant. 8

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.56	17.92
40	5200 MHz	24.00	18.40
48	5240 MHz	22.40	17.92

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	43.52	36.48
46	5230 MHz	46.08	37.12

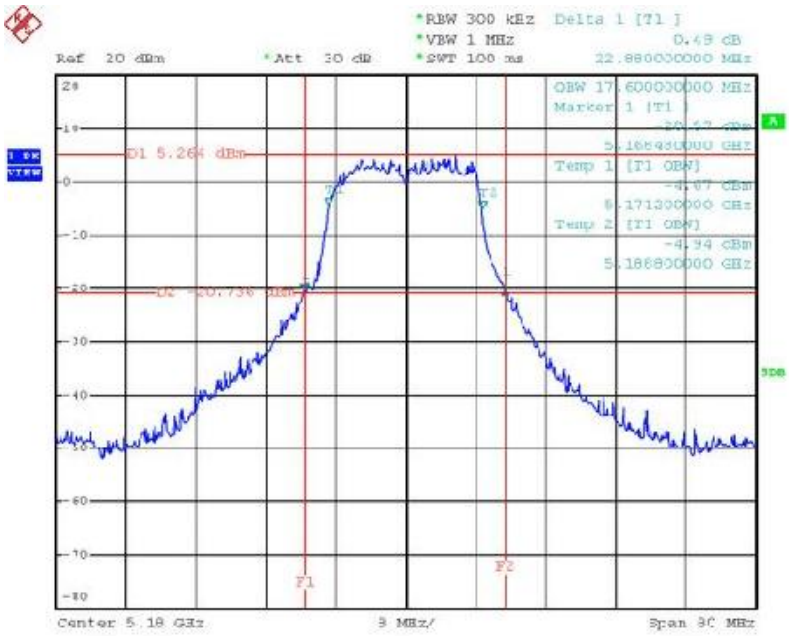
Temperature	22℃	Humidity	65%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Ant. 8

Configuration IEEE 802.11a Connector J2 + J3 + J4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.52	16.96
40	5200 MHz	23.36	17.44
48	5240 MHz	22.08	17.44

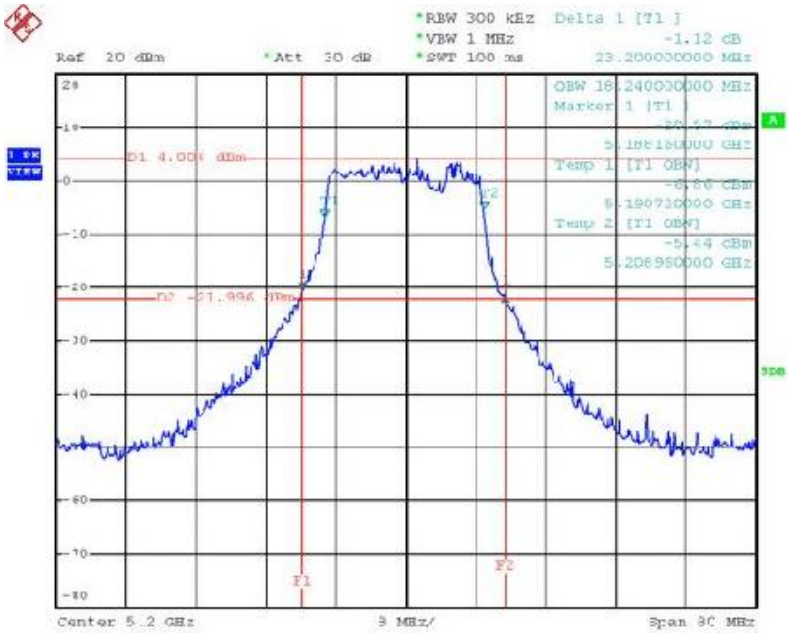
<For External Antenna / Ant. 5>

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5180 MHz



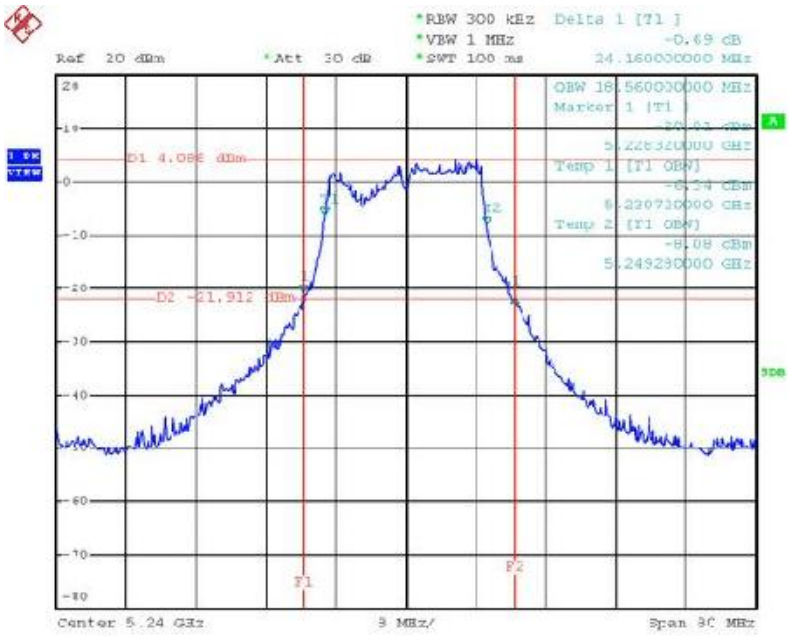
Date: 9.MAR.2011 11:25:06

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5200 MHz



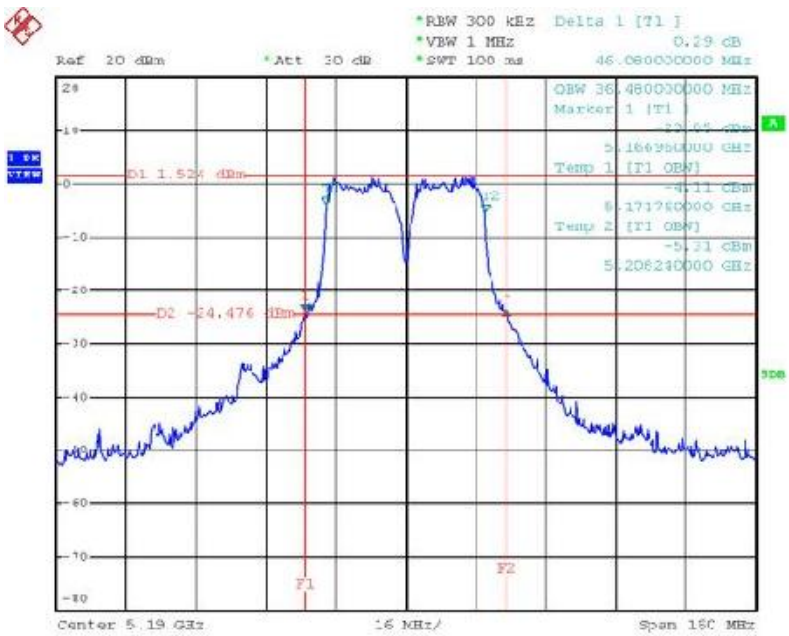
Date: 9.MAR.2011 11:23:40

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5240 MHz



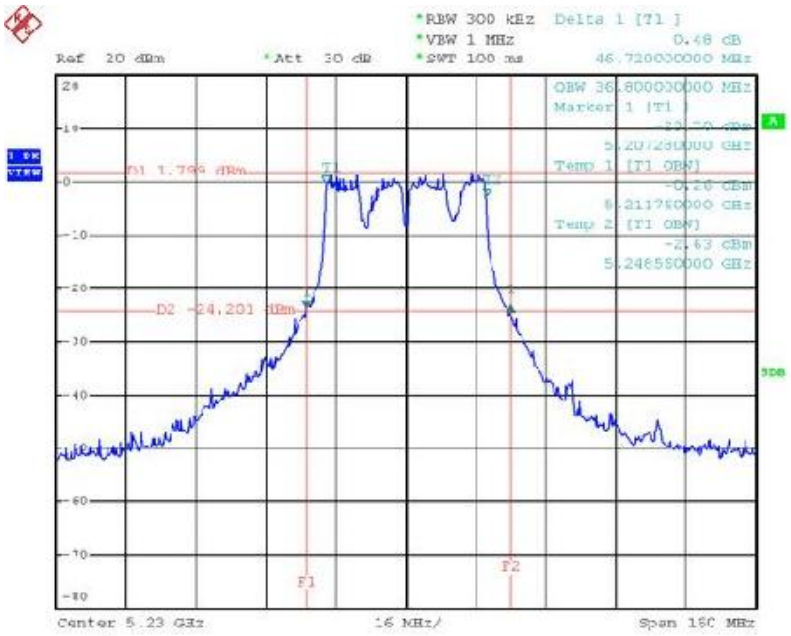
Date: 9.MAR.2011 11:21:40

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5190 MHz



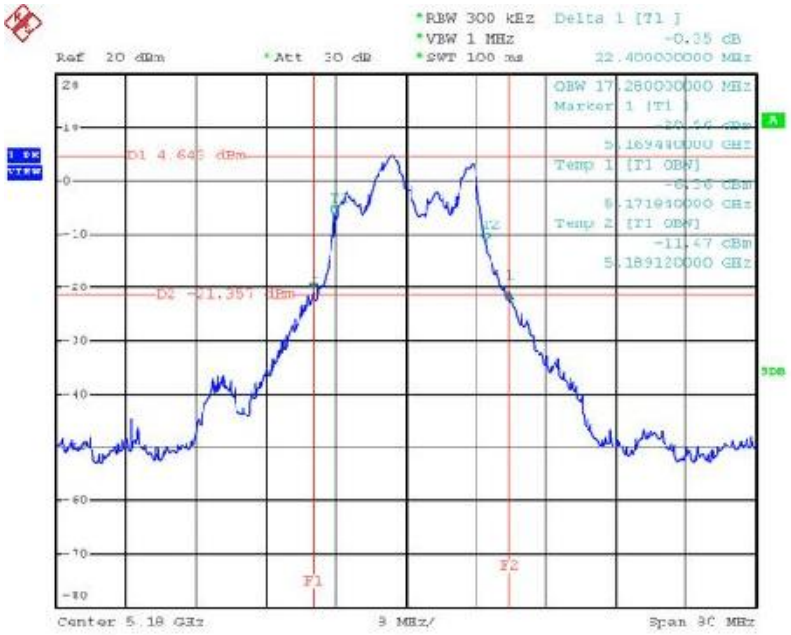
Date: 9.MAR.2011 11:05:24

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5230 MHz



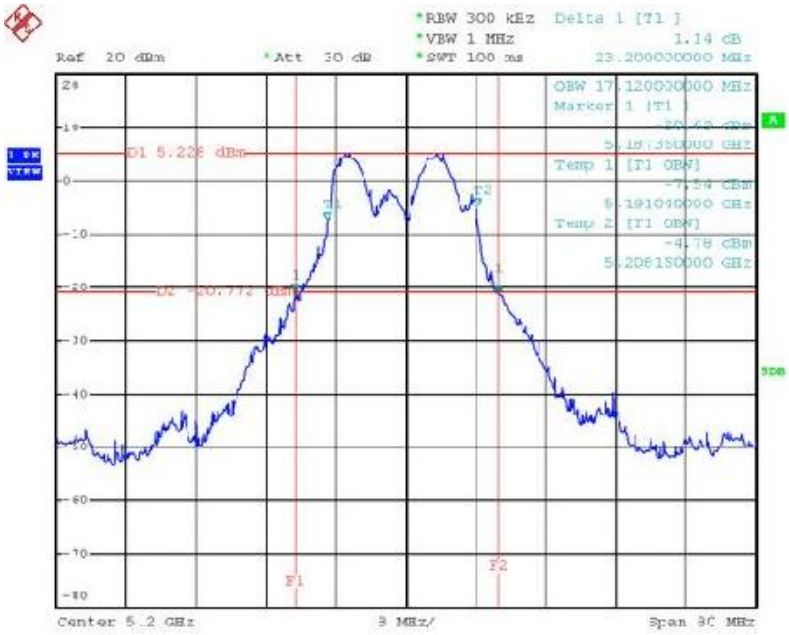
Date: 9.MAR.2011 11:06:32

26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5180 MHz



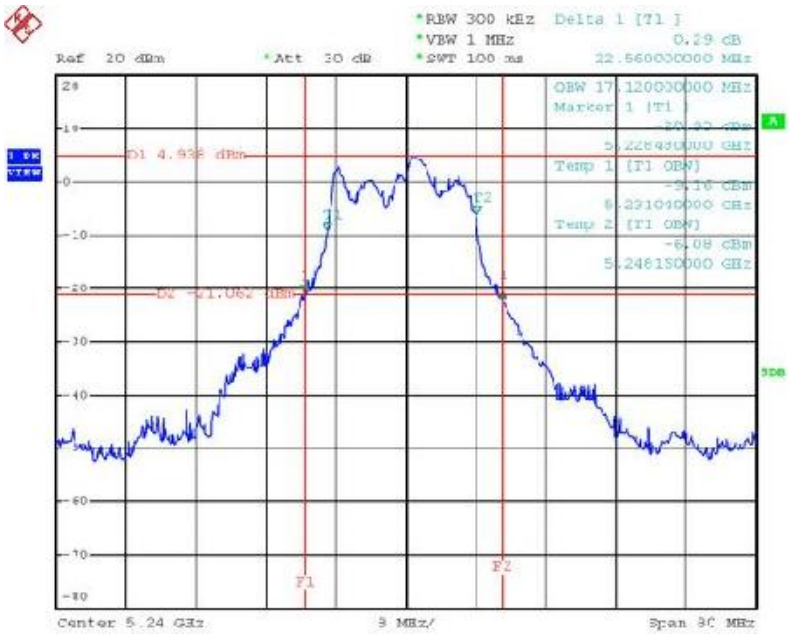
Date: 9.MAR.2011 11:26:50

26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5200 MHz



Date: 9.MAR.2011 11:28:00

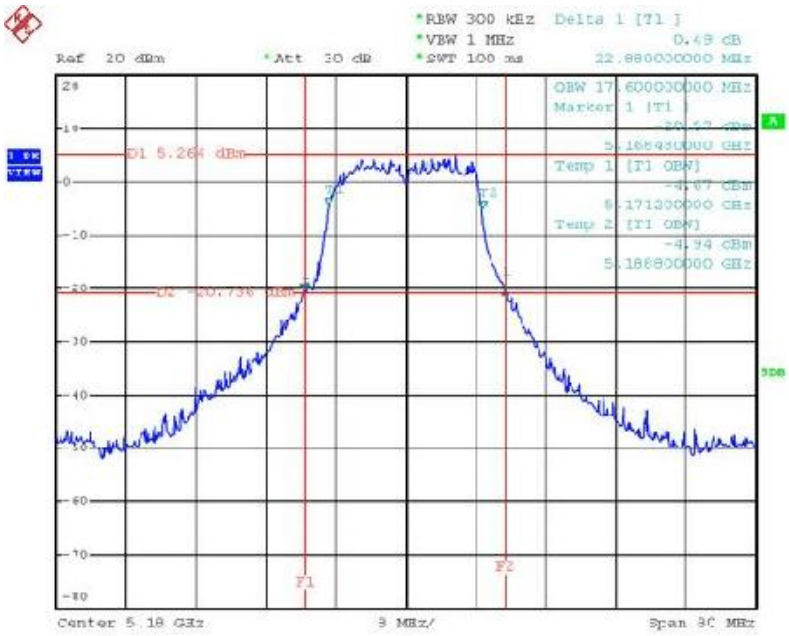
26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5240 MHz



Date: 9.MAR.2011 11:29:04

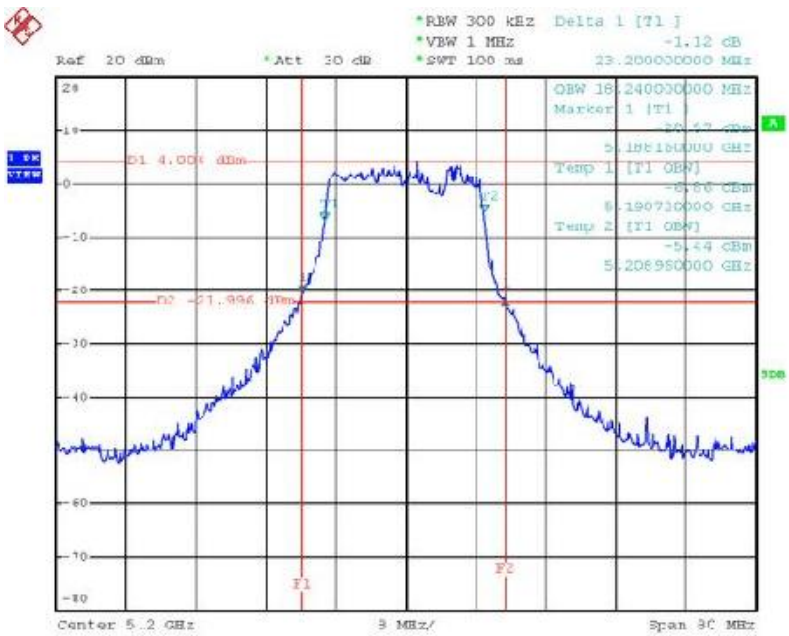
<For External Antenna / Ant. 6>

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5180 MHz



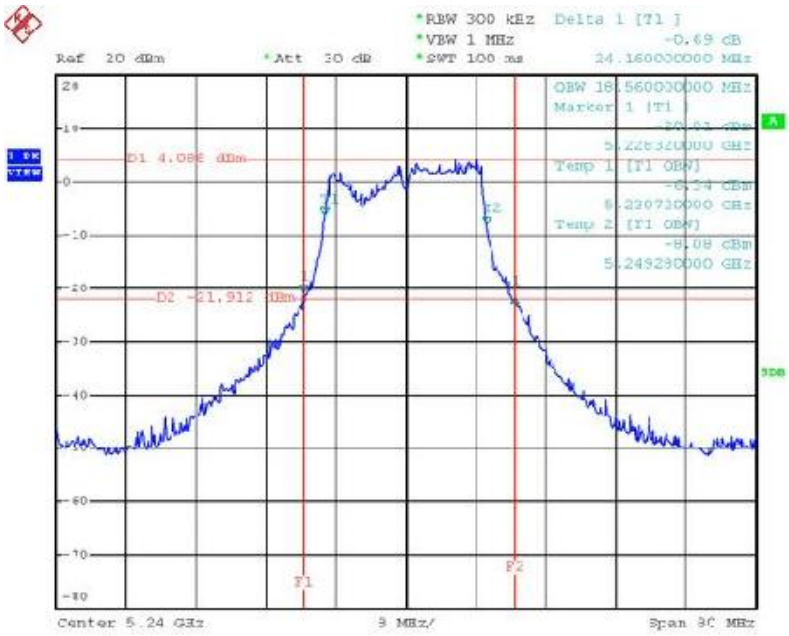
Date: 9.MAR.2011 11:25:06

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5200 MHz



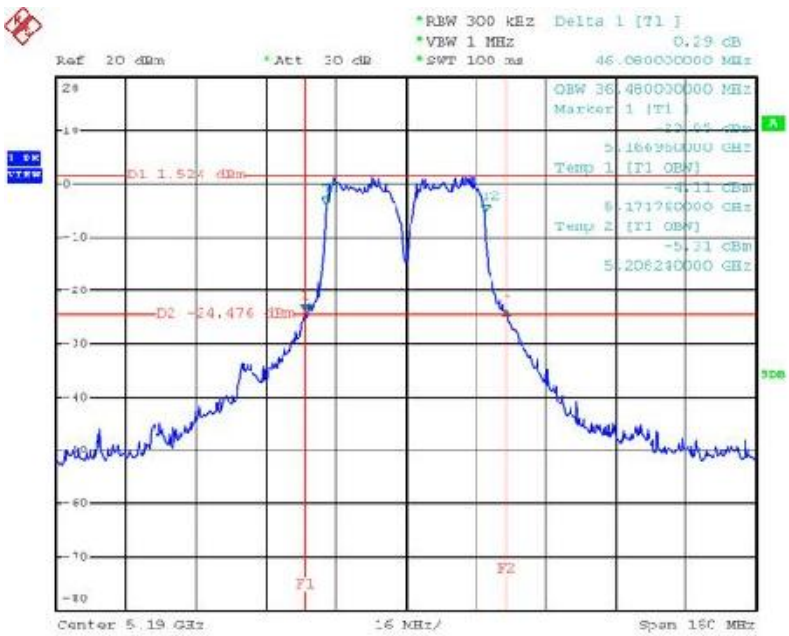
Date: 9.MAR.2011 11:23:40

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5240 MHz



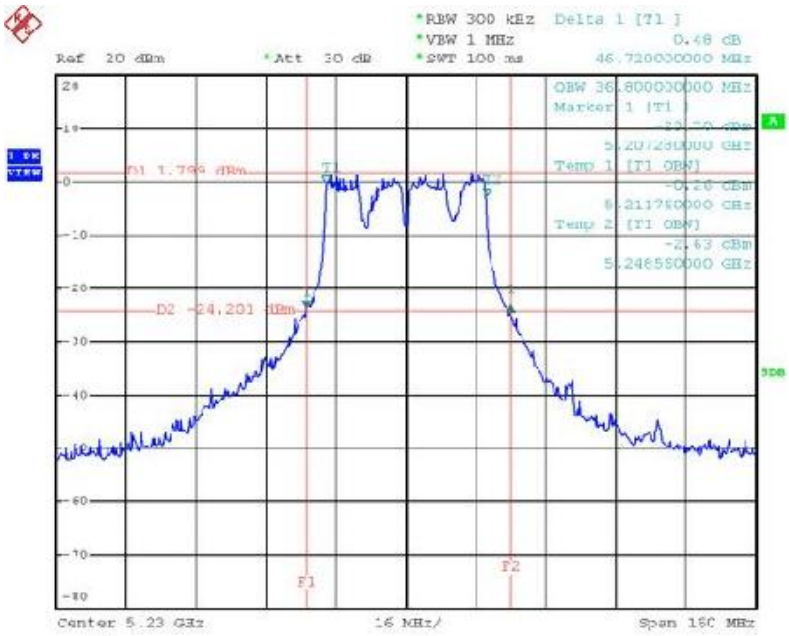
Date: 9.MAR.2011 11:21:40

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5190 MHz



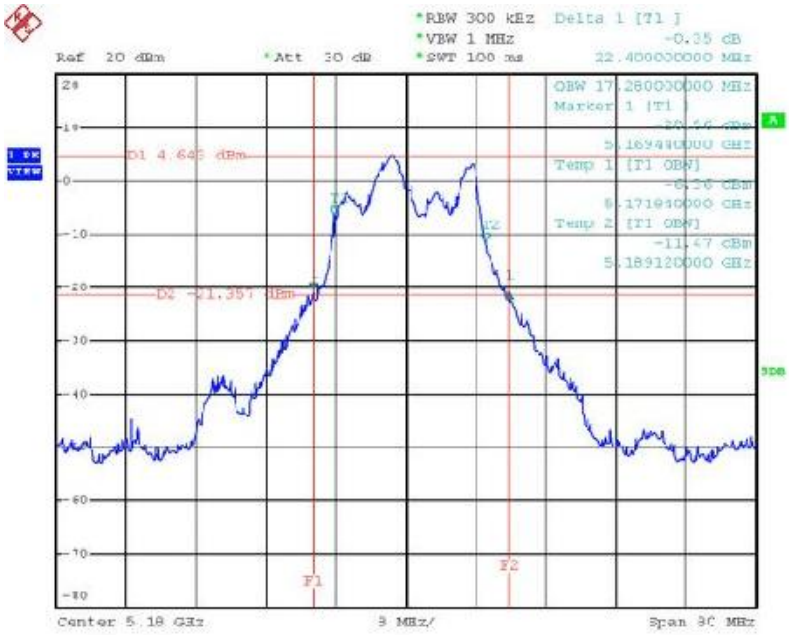
Date: 9.MAR.2011 11:05:24

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5230 MHz



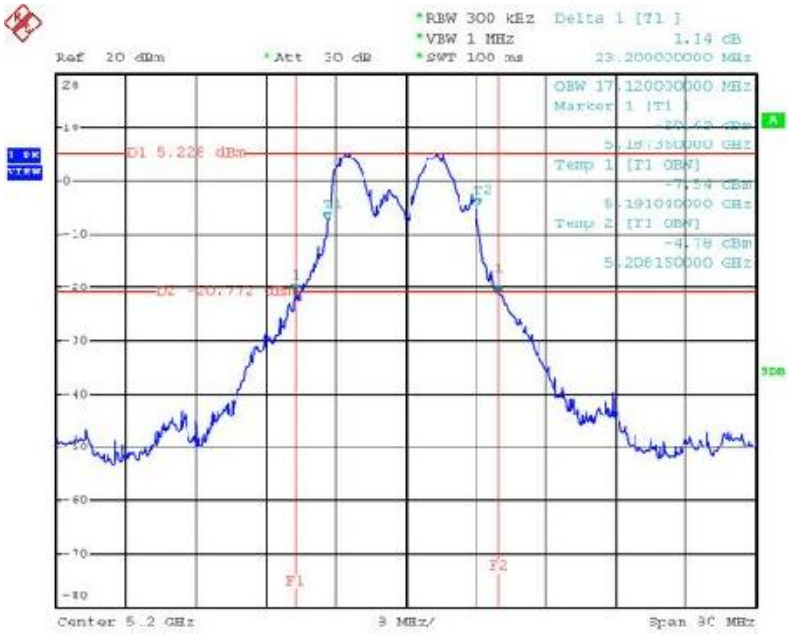
Date: 9.MAR.2011 11:06:32

26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5180 MHz



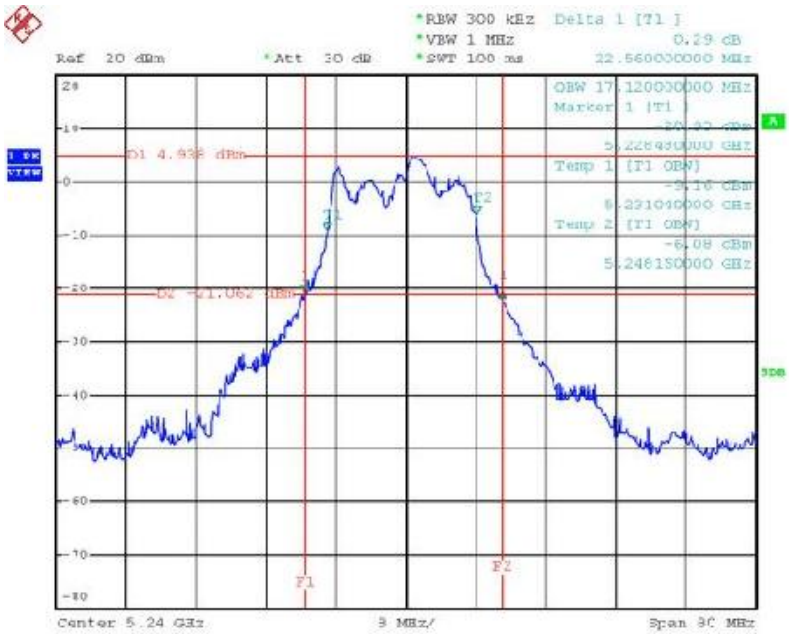
Date: 9.MAR.2011 11:26:50

26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5200 MHz



Date: 9.MAR.2011 11:28:00

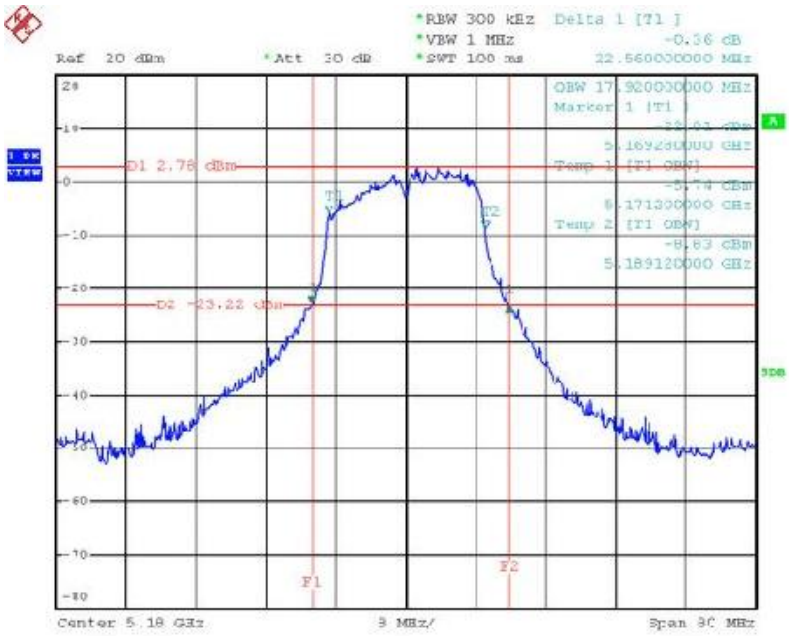
26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5240 MHz



Date: 9.MAR.2011 11:29:04

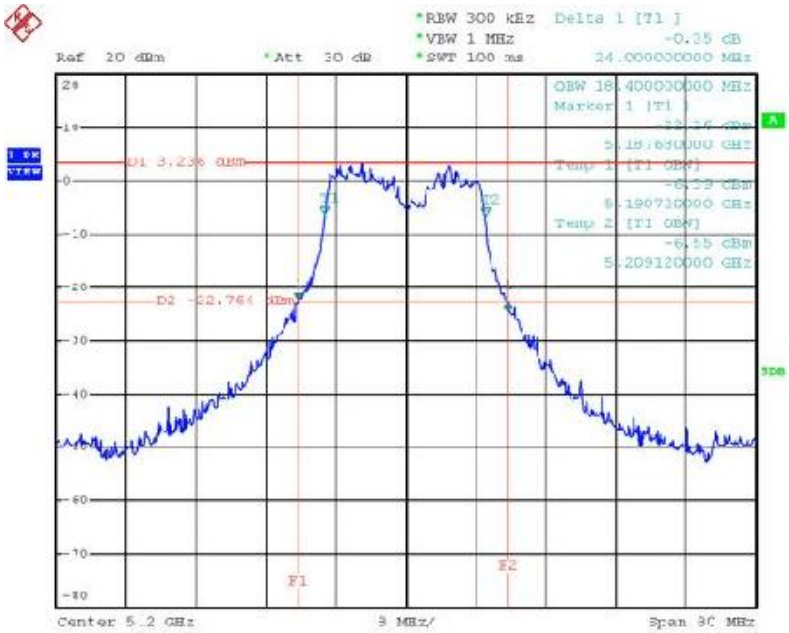
<For Internal Antenna / Ant. 8>

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5180 MHz



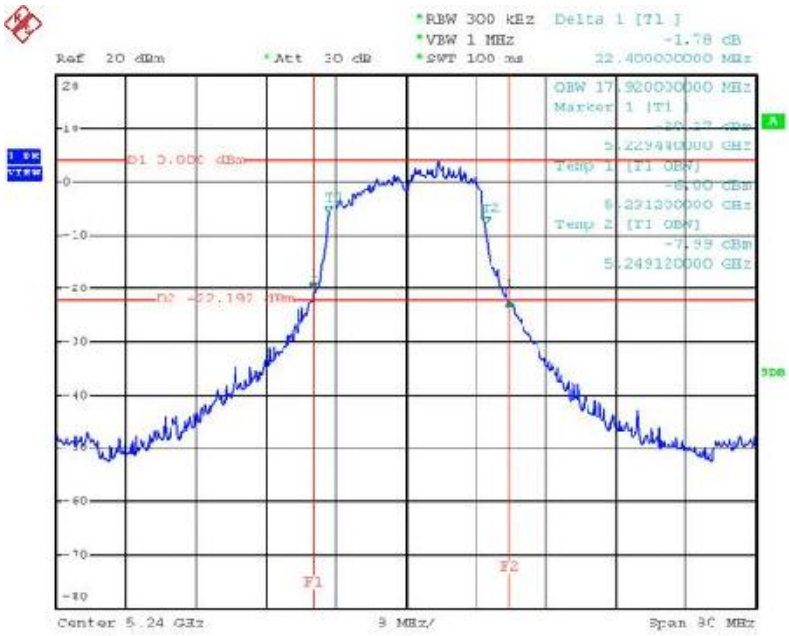
Date: 29.MAR.2011 05:07:40

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5200 MHz



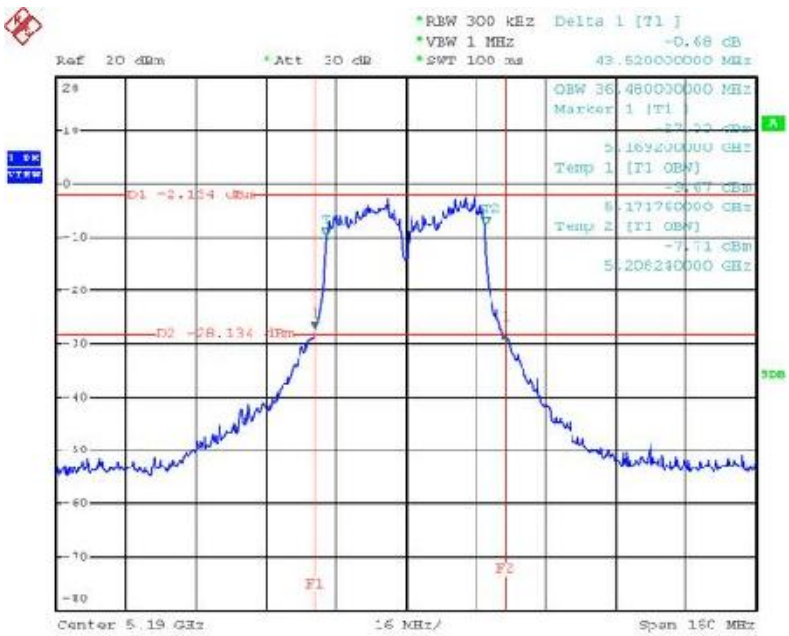
Date: 29.MAR.2011 05:08:32

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4 / 5240 MHz



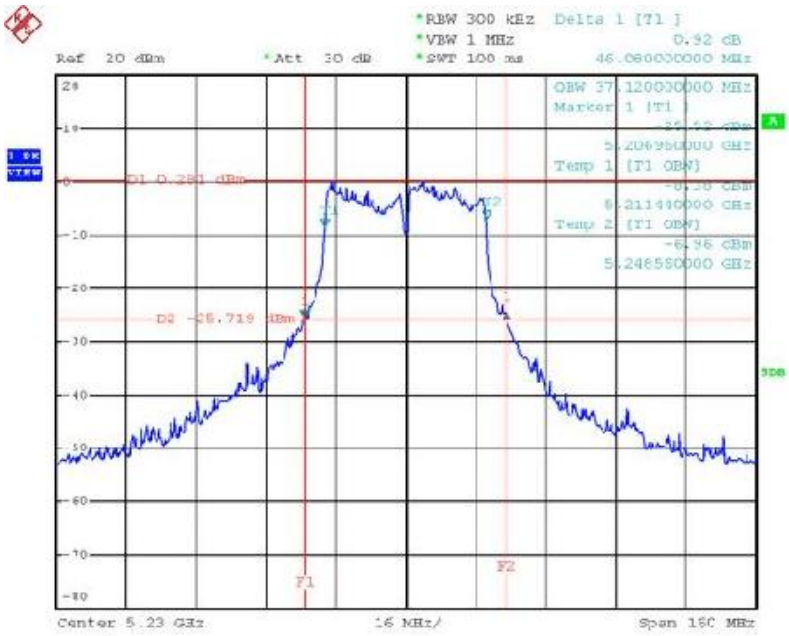
Date: 29.MAR.2011 05:09:34

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5190 MHz



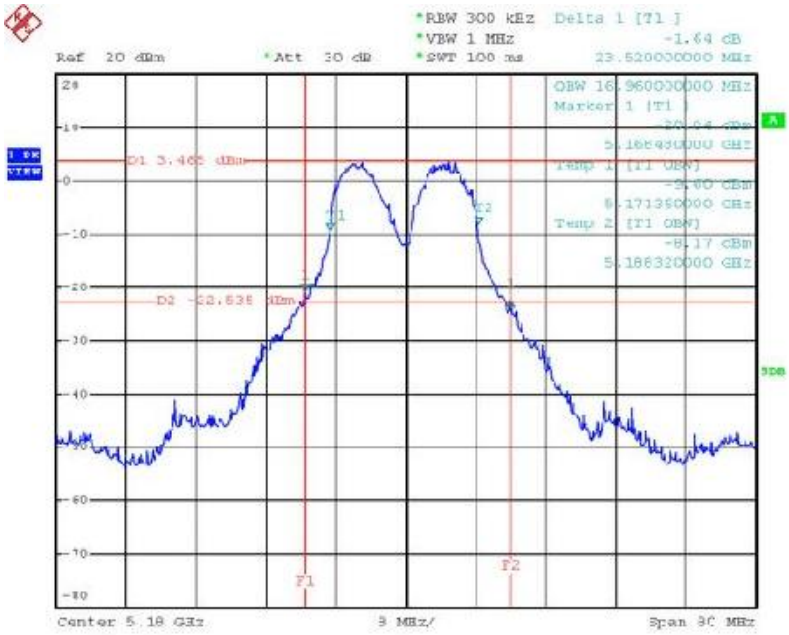
Date: 29.MAR.2011 05:05:58

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5230 MHz



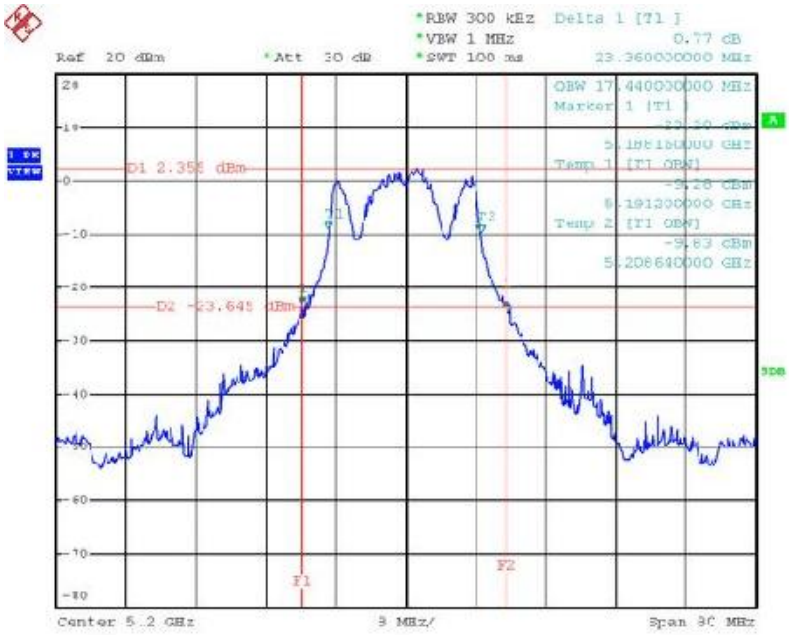
Date: 29.MAR.2011 05:04:39

26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5180 MHz



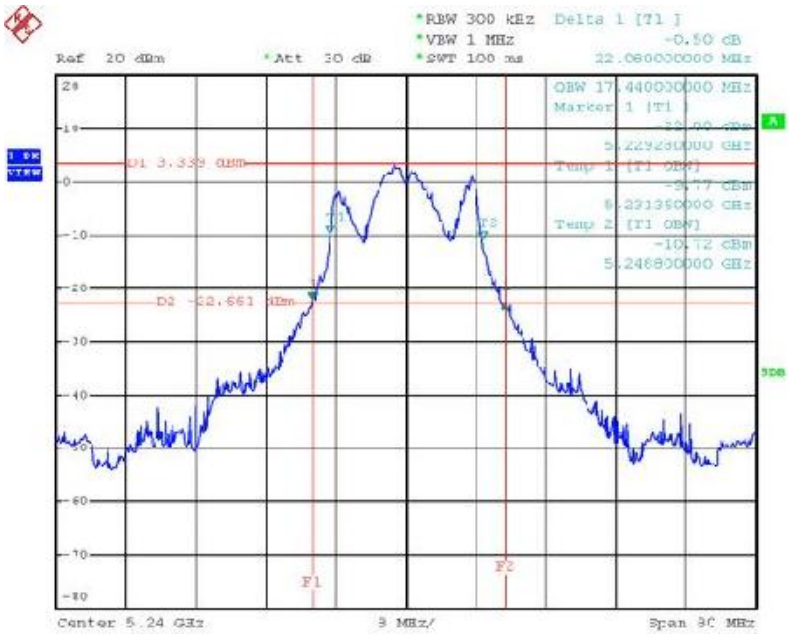
Date: 29.MAR.2011 05:12:34

26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5200 MHz



Date: 29.MAR.2011 05:11:40

26 dB Bandwidth Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5240 MHz



Date: 29.MAR.2011 05:10:44

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.3.2. Measuring Instruments and Setting

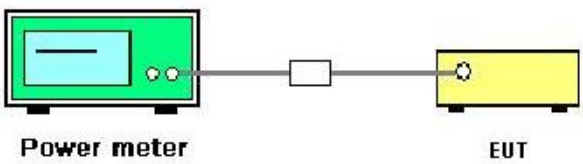
Please refer to section 5 of equipments list in this report. The following table is the setting of the peak power meter

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

4.3.3. 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
Note: When measuring maximum conducted output power 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 Maximum Conducted Output Power

<For External Antenna / Ant. 5>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 5
Test Date	Mar. 08, 2011		

Configuration IEEE 802.11n MCS8 20MHz Connector J2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.94	17.00	**Complies**
40	5200 MHz	12.17	17.00	**Complies**
48	5240 MHz	12.00	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.74	17.00	**Complies**
40	5200 MHz	12.29	17.00	**Complies**
48	5240 MHz	12.32	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.00	17.00	**Complies**
40	5200 MHz	10.94	17.00	**Complies**
48	5240 MHz	10.49	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.72	17.00	**Complies**
40	5200 MHz	16.61	17.00	**Complies**
48	5240 MHz	16.44	17.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.74	17.00	**Complies**
46	5230 MHz	12.30	17.00	**Complies**

Configuration IEEE 802.11nMCS8 40MHz Connector J3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.54	17.00	**Complies**
46	5230 MHz	12.40	17.00	**Complies**

Configuration IEEE 802.11nMCS8 40MHz Connector J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	10.75	17.00	**Complies**
46	5230 MHz	11.07	17.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	16.51	17.00	**Complies**
46	5230 MHz	16.74	17.00	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 5
Test Date	Mar. 08, 2011		

Refer to Appendix D for the actual test results in legacy mode based on KDB662911

<For External Antenna / Ant. 6>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 6
Test Date	Mar. 09, 2011		

Configuration IEEE 802.11n MCS8 20MHz Connector J2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.94	17.00	**Complies**
40	5200 MHz	12.17	17.00	**Complies**
48	5240 MHz	12.00	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.74	17.00	**Complies**
40	5200 MHz	12.29	17.00	**Complies**
48	5240 MHz	12.32	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.00	17.00	**Complies**
40	5200 MHz	10.94	17.00	**Complies**
48	5240 MHz	10.49	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.72	17.00	**Complies**
40	5200 MHz	16.61	17.00	**Complies**
48	5240 MHz	16.44	17.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.74	17.00	**Complies**
46	5230 MHz	12.30	17.00	**Complies**

Configuration IEEE 802.11nMCS8 40MHz Connector J3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.54	17.00	**Complies**
46	5230 MHz	12.40	17.00	**Complies**

Configuration IEEE 802.11nMCS8 40MHz Connector J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	10.75	17.00	**Complies**
46	5230 MHz	11.07	17.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	16.51	17.00	**Complies**
46	5230 MHz	16.74	17.00	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 6
Test Date	Mar. 09, 2011		

Refer to Appendix D for the actual test results in legacy mode based on KDB662911

<For Internal Antenna / Ant. 8>

Temperature	22℃	Humidity	65%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Ant. 8
Test Date	Mar. 29, 2011		

Configuration IEEE 802.11n MCS8 20MHz Connector J2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.48	17.00	**Complies**
40	5200 MHz	11.16	17.00	**Complies**
48	5240 MHz	11.14	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.97	17.00	**Complies**
40	5200 MHz	11.54	17.00	**Complies**
48	5240 MHz	11.52	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.36	17.00	**Complies**
40	5200 MHz	12.26	17.00	**Complies**
48	5240 MHz	12.12	17.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.72	17.00	**Complies**
40	5200 MHz	16.45	17.00	**Complies**
48	5240 MHz	16.38	17.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	10.33	17.00	**Complies**
46	5230 MHz	11.42	17.00	**Complies**

Configuration IEEE 802.11nMCS8 40MHz Connector J3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	9.30	17.00	**Complies**
46	5230 MHz	11.96	17.00	**Complies**

Configuration IEEE 802.11nMCS8 40MHz Connector J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	8.87	17.00	**Complies**
46	5230 MHz	12.84	17.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	14.32	17.00	**Complies**
46	5230 MHz	16.88	17.00	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 8
Test Date	Mar. 29, 2011		

Refer to Appendix D for the actual test results in legacy mode based on KDB662911

4.4. Power Spectral Density Measurement

4.4.1. Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	4

4.4.2. Measuring Instruments and Setting

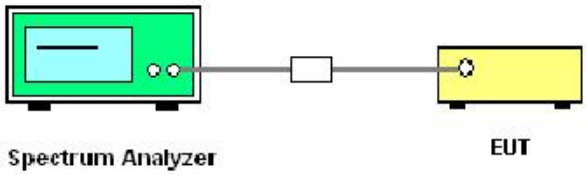
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	SAMPLE
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 3000kHz. Set Detector to Peak, Trace to Max Hold. Mark the frequency with maximum peak power as the center of the display of the spectrum.
3. 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 Power Spectral Density

<For External Antenna / Ant. 5>

Temperature	22℃	Humidity	65%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Ant. 5

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	2.60	4.00	**Complies**
40	5200 MHz	0.12	4.00	**Complies**
48	5240 MHz	2.21	4.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	-2.75	4.00	**Complies**
46	5230 MHz	-2.29	4.00	**Complies**

Temperature	22℃	Humidity	65%
Test Engineer	Allen Liu	Configurations	IEEE 802.11a / Ant. 5

Configuration IEEE 802.11a Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	3.72	4.00	**Complies**
40	5200 MHz	3.12	4.00	**Complies**
48	5240 MHz	3.72	4.00	**Complies**

Note: All the test values were listed in the report.

For plots, only the worse case of OFDM modulation was listed in the report.

<For External Antenna / Ant. 6>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 6

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	2.60	4.00	**Complies**
40	5200 MHz	0.12	4.00	**Complies**
48	5240 MHz	2.21	4.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	-2.75	4.00	**Complies**
46	5230 MHz	-2.29	4.00	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 6

Configuration IEEE 802.11a Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	3.72	4.00	**Complies**
40	5200 MHz	3.12	4.00	**Complies**
48	5240 MHz	3.72	4.00	**Complies**

Note: All the test values were listed in the report.

For plots, only the worse case of OFDM modulation was listed in the report.

<For Internal Antenna / Ant. 8>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 8

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	-0.27	4.00	**Complies**
40	5200 MHz	0.28	4.00	**Complies**
48	5240 MHz	0.64	4.00	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	-6.23	4.00	**Complies**
46	5230 MHz	-4.24	4.00	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 8

Configuration IEEE 802.11a Connector J2 + J3 + J4

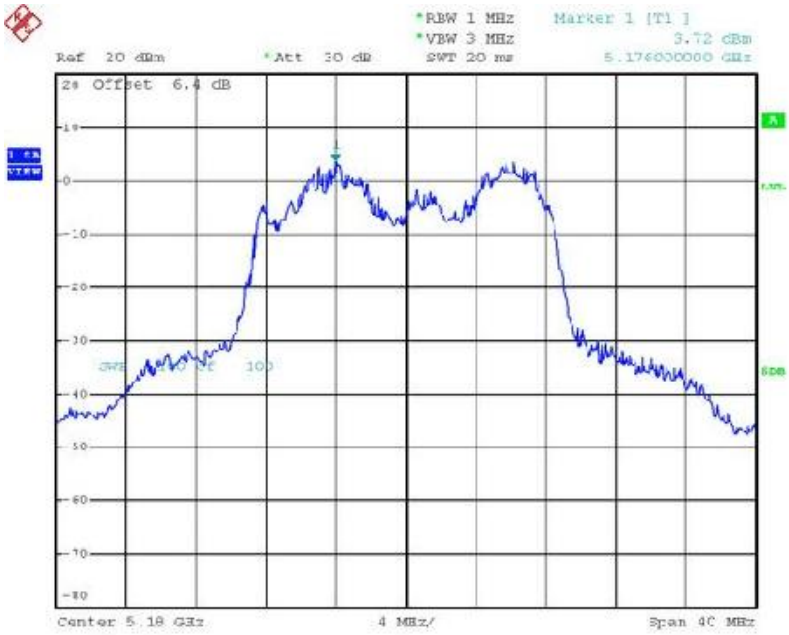
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	1.71	4.00	**Complies**
40	5200 MHz	1.47	4.00	**Complies**
48	5240 MHz	3.13	4.00	**Complies**

Note: All the test values were listed in the report.

For plots, only the worse case of OFDM modulation was listed in the report.

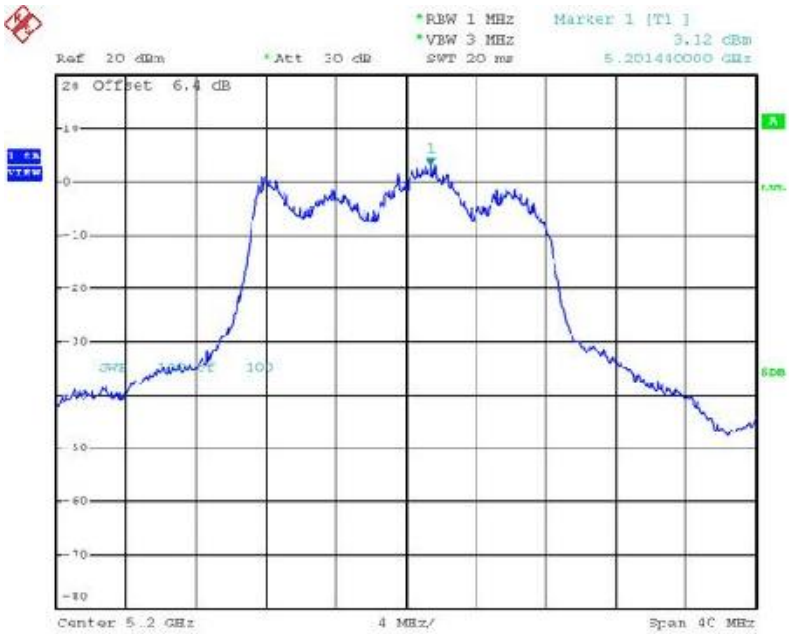
<For External Antenna / Ant. 5>

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5180 MHz



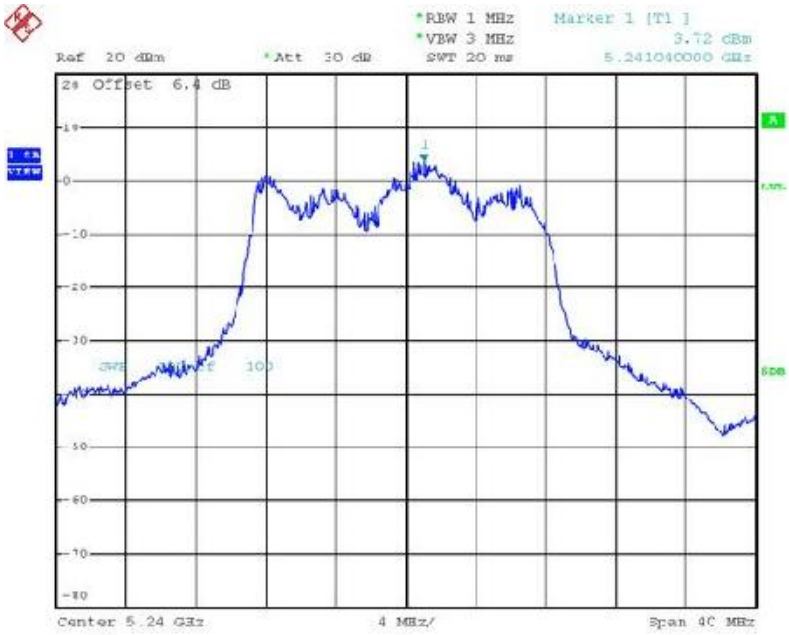
Date: 9.MAR.2011 09:19:56

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5200 MHz



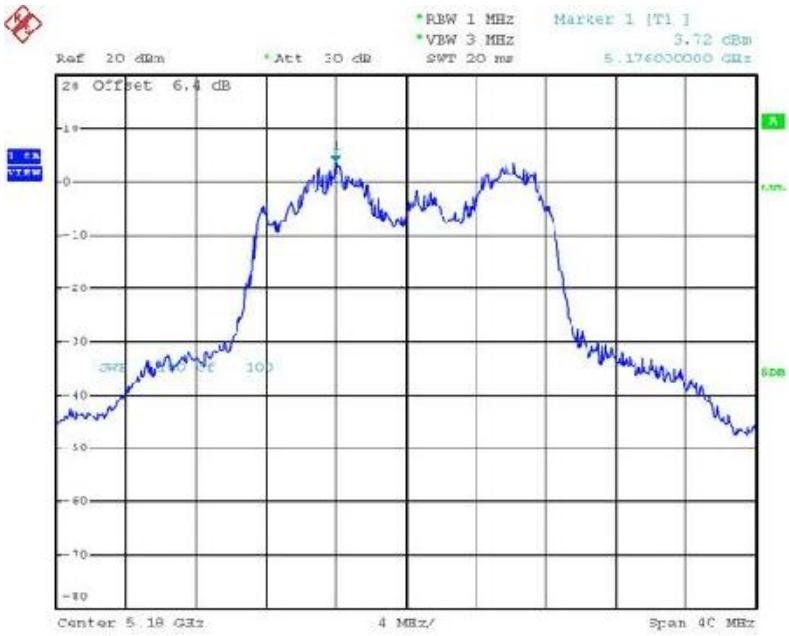
Date: 9.MAR.2011 09:21:17

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5240 MHz



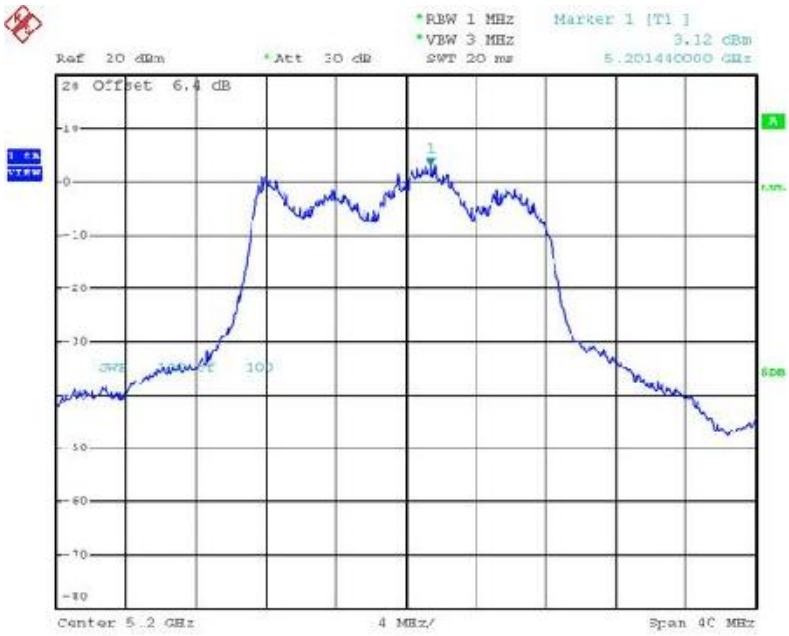
<For External Antenna / Ant. 6>

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5180 MHz



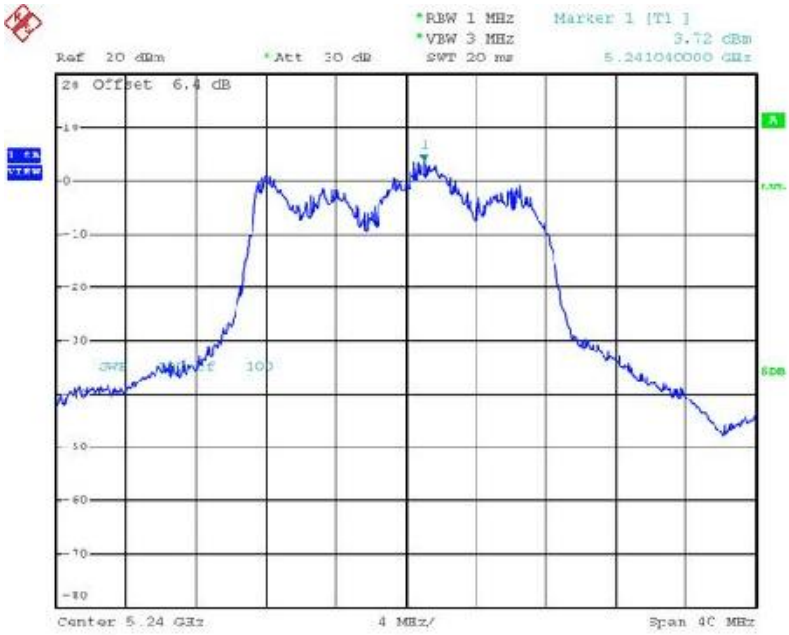
Date: 9.MAR.2011 09:19:56

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5200 MHz



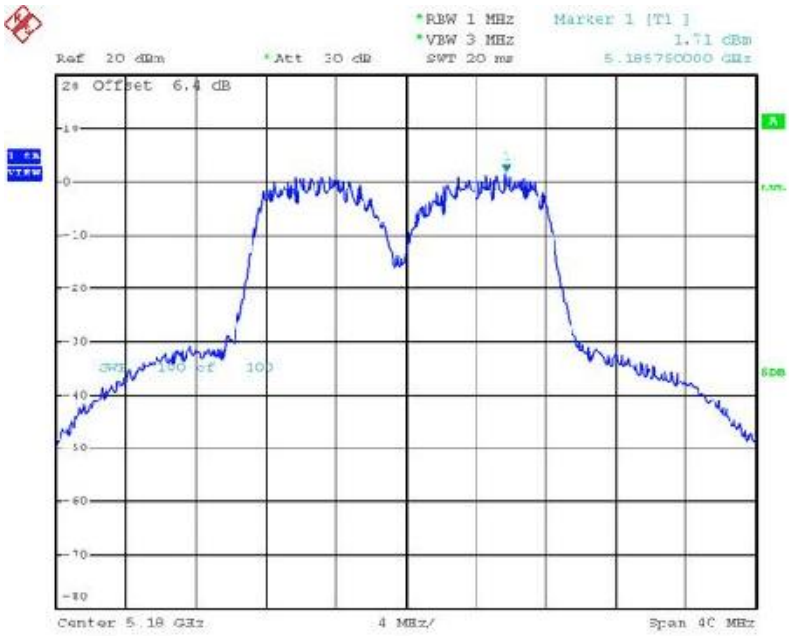
Date: 9.MAR.2011 09:21:17

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5240 MHz



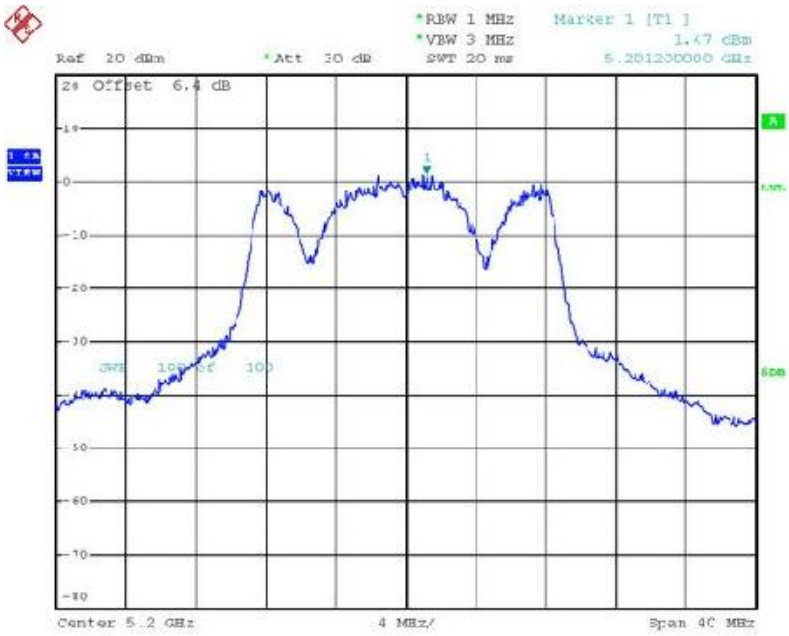
<For Internal Antenna / Ant. 8>

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5180 MHz



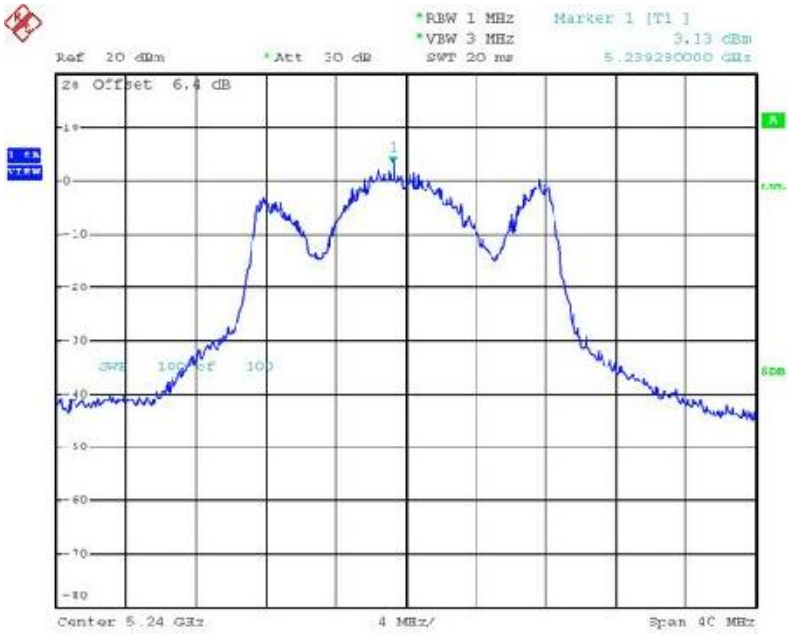
Date: 29.MAR.2011 04:55:36

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5200 MHz



Date: 29.MAR.2011 04:56:33

Power Density Plot on Configuration IEEE 802.11a Connector J2 + J3 + J4 / 5240 MHz



Date: 29.MAR.2011 04:57:16

4.5. Peak Excursion Measurement

4.5.1. Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.

4.5.2. Measuring Instruments and Setting

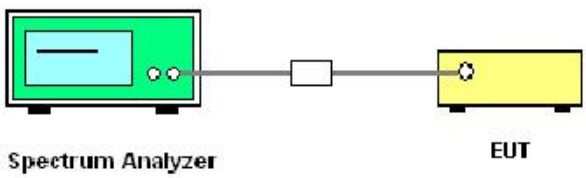
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz (Peak Trace) / 1000 kHz (Average Trace)
VB	3000 kHz (Peak Trace) / 300 kHz (Average Trace)
Detector	Peak (Peak Trace) / Sample (Average Trace)
Trace	Max Hold
Sweep Time	60s

4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emissions bandwidth. The largest difference between the following two traces (Peak Trace and Average Trace) must be ≤ 13 dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and max-hold settings.
4. Average Trace: Method #3—video averaging with max hold--and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to "free run". Set RBW = 1 MHz. Set VBW ≥ 1/T (IEEE 802.11nVBW = 300kHz ≥ 1/4μs). Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode. Set max hold. Allow max hold to run for 60 seconds.
5. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Peak Excursion

<For External Antenna / Ant. 5>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 5

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.45	13	**Complies**
40	5200 MHz	4.27	13	**Complies**
48	5240 MHz	5.94	13	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	5.74	13	**Complies**
46	5230 MHz	5.95	13	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 5

Configuration IEEE 802.11a Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.31	13	**Complies**
40	5200 MHz	5.17	13	**Complies**
48	5240 MHz	4.92	13	**Complies**

Note: All the test values were listed in the report.

For plots, only the worse case of OFDM modulation was listed in the report.

<For External Antenna / Ant. 6>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 6

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.45	13	**Complies**
40	5200 MHz	4.27	13	**Complies**
48	5240 MHz	5.94	13	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	5.74	13	**Complies**
46	5230 MHz	5.95	13	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 6

Configuration IEEE 802.11a Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.31	13	**Complies**
40	5200 MHz	5.17	13	**Complies**
48	5240 MHz	4.92	13	**Complies**

Note: All the test values were listed in the report.

For plots, only the worse case of OFDM modulation was listed in the report.

<For Internal Antenna / Ant. 8>

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11n / Ant. 8

Configuration IEEE 802.11n MCS8 20MHz Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.91	13	**Complies**
40	5200 MHz	5.71	13	**Complies**
48	5240 MHz	5.23	13	**Complies**

Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	6.57	13	**Complies**
46	5230 MHz	6.03	13	**Complies**

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 8

Configuration IEEE 802.11a Connector J2 + J3 + J4

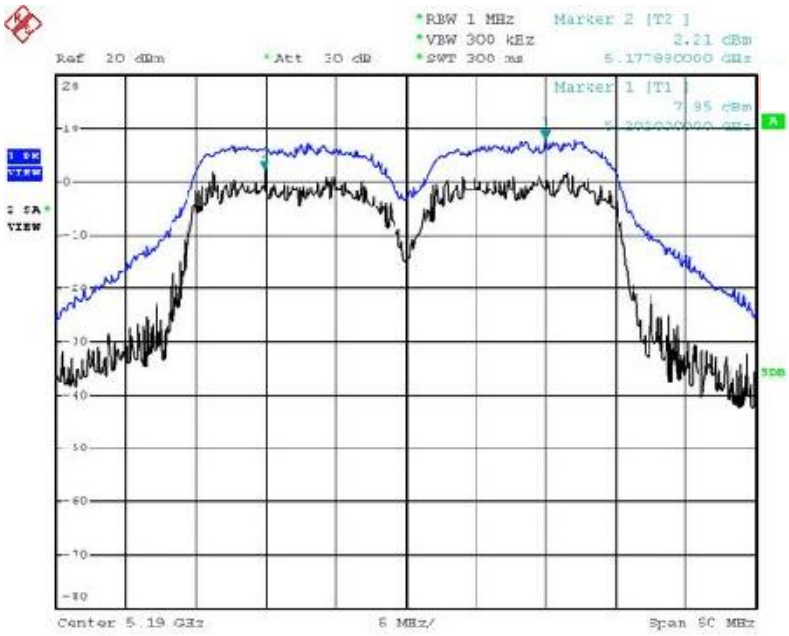
Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.95	13	**Complies**
40	5200 MHz	5.62	13	**Complies**
48	5240 MHz	4.99	13	**Complies**

Note: All the test values were listed in the report.

For plots, only the worse case of OFDM modulation was listed in the report.

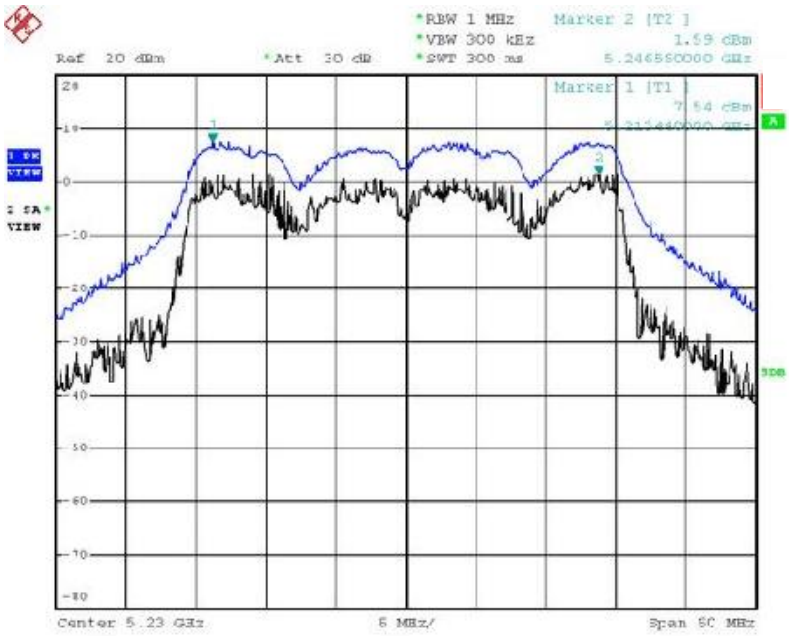
<For External Antenna / Ant. 5>

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5190 MHz



Date: 9.MAR.2011 11:05:48

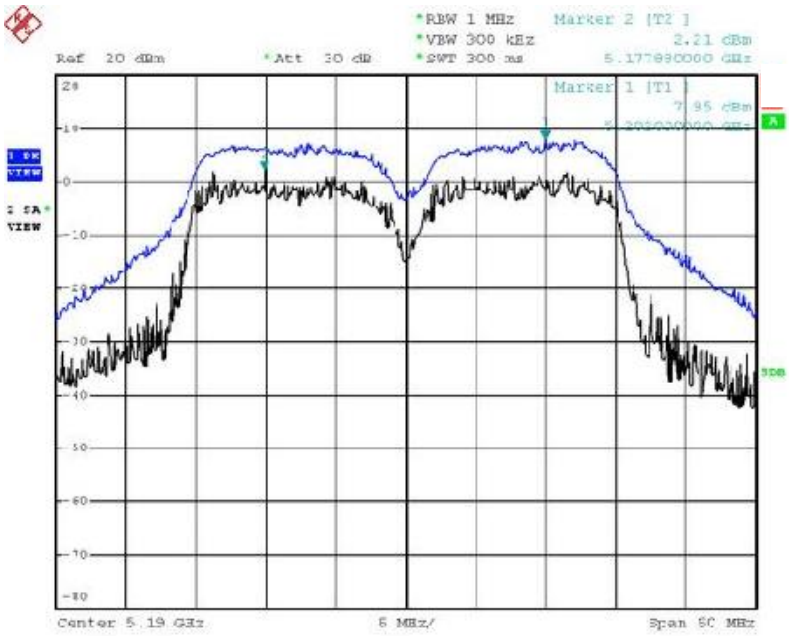
Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5230 MHz



Date: 9.MAR.2011 11:06:56

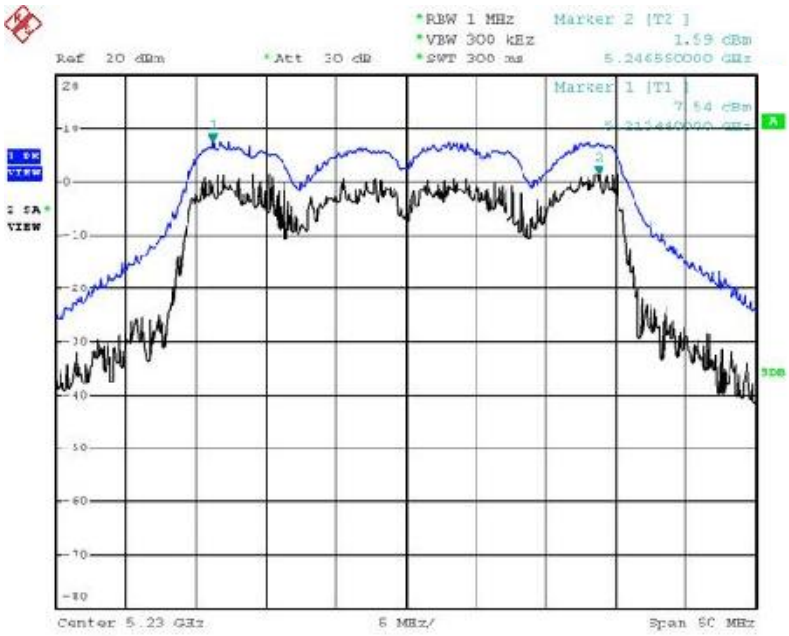
<For External Antenna / Ant. 6>

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5190 MHz



Date: 9.MAR.2011 11:05:48

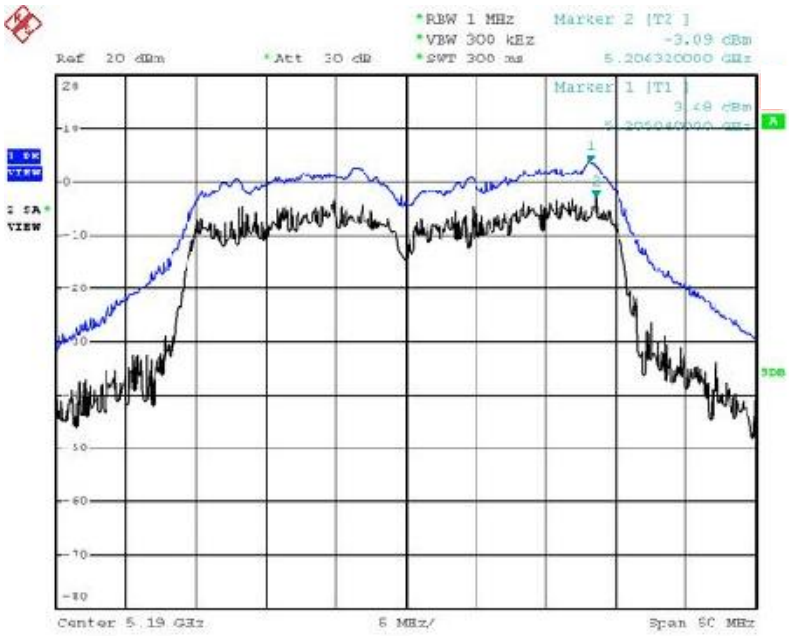
Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5230 MHz



Date: 9.MAR.2011 11:06:56

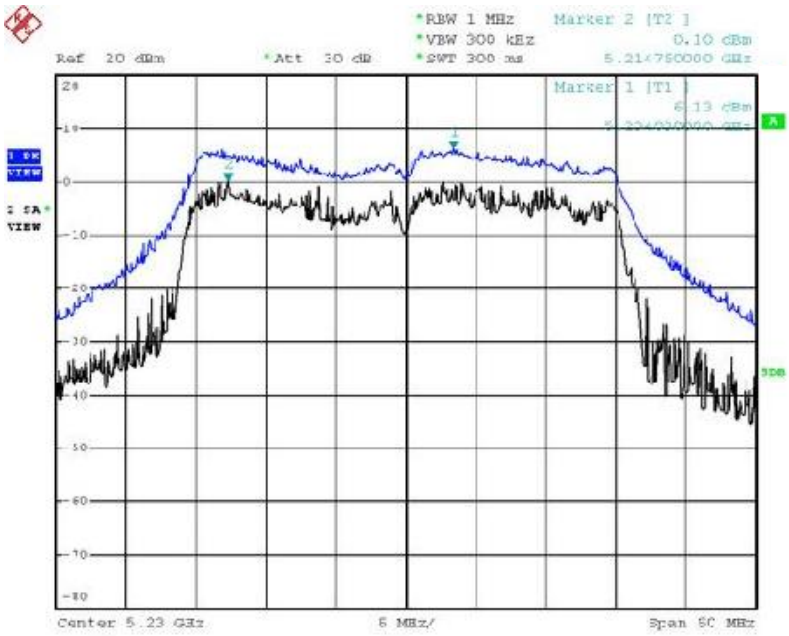
<For Internal Antenna / Ant. 8>

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5190 MHz



Date: 29.MAR.2011 05:06:22

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Connector J2 + J3 + J4 / 5230 MHz



Date: 29.MAR.2011 05:05:02

4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.25 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

4.6.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1000KHz / 1000KHz for peak

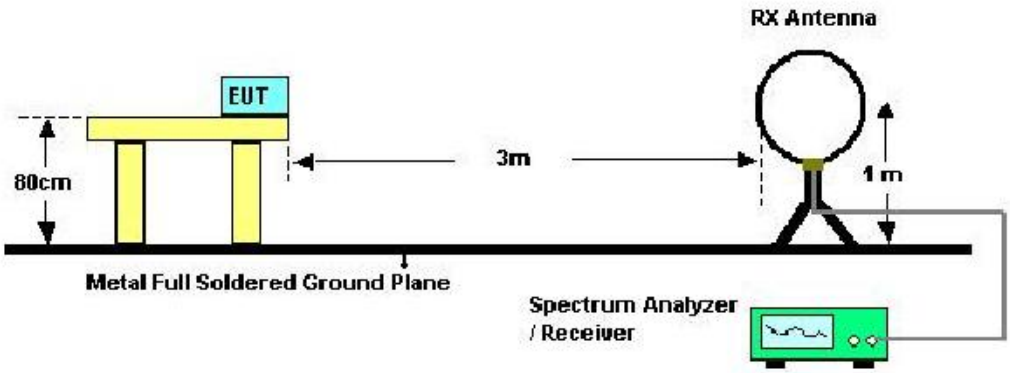
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

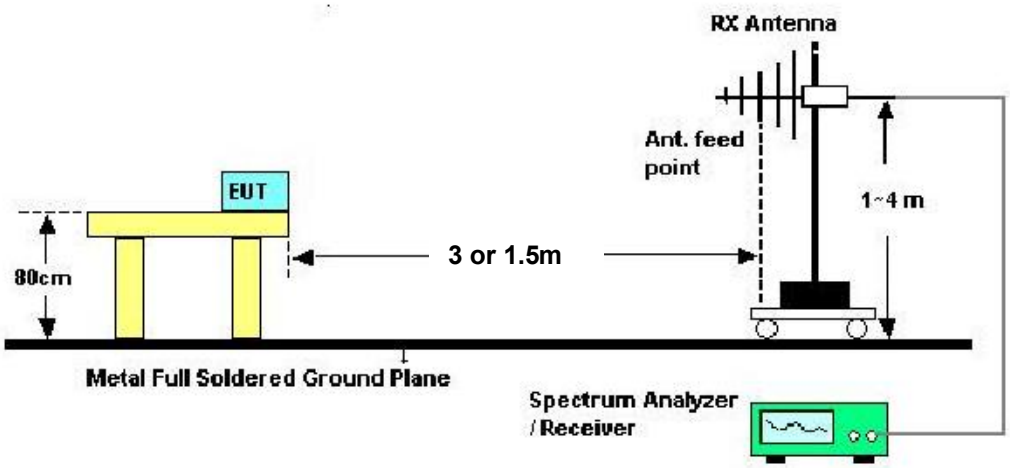
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.6.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

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

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	Normal Link
Test Date	Mar. 09, 2011		

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

Note:

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

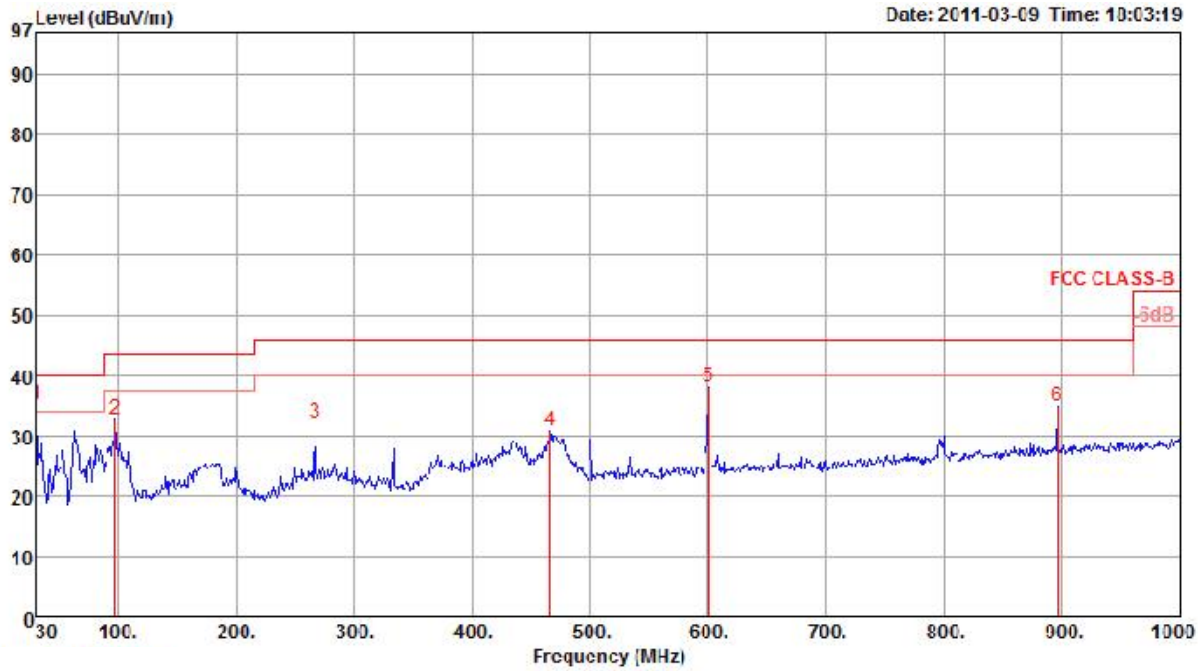
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

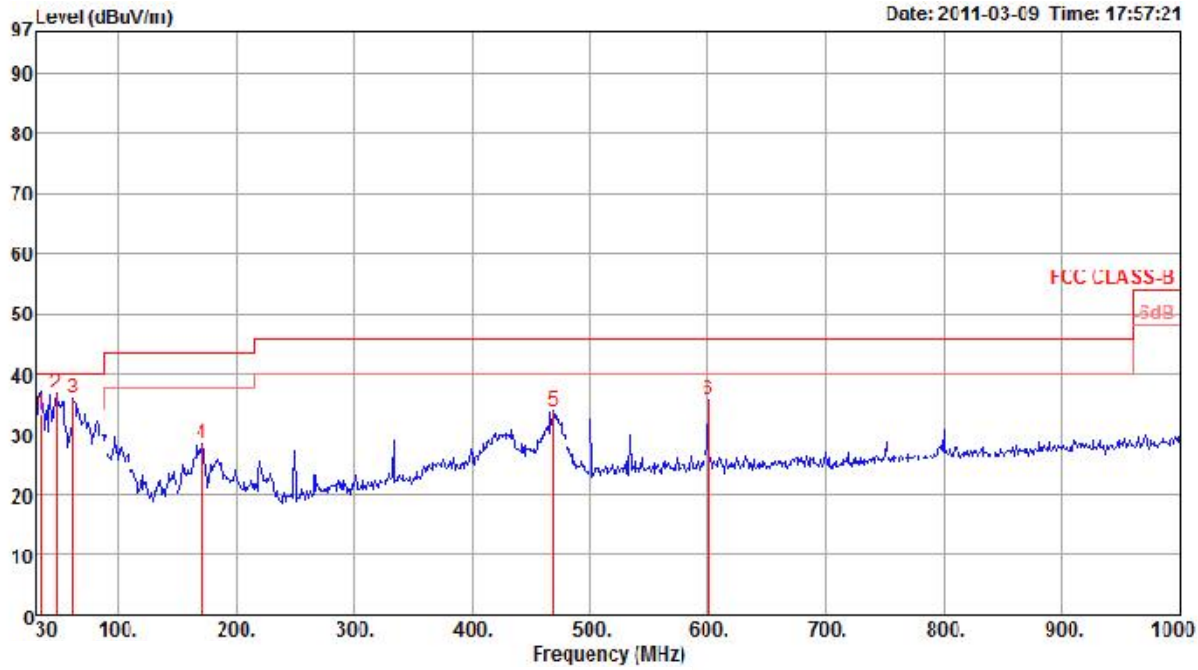
Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	Normal Link / Mode 2

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pcs	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	30.00	35.03	40.00	-4.97	43.92	0.50	27.80	18.41	0	100	Peak	HORIZONTAL
2	97.90	32.74	43.50	-10.76	48.76	1.16	27.61	10.43	0	100	Peak	HORIZONTAL
3	266.68	32.16	46.00	-13.84	44.23	1.97	26.97	12.93	0	100	Peak	HORIZONTAL
4	466.50	30.31	46.00	-15.19	38.99	2.63	27.93	17.12	0	100	Peak	HORIZONTAL
5	600.36	33.12	46.00	-7.88	44.50	2.90	28.10	18.82	0	100	Peak	HORIZONTAL
6	896.21	34.54	46.00	-11.46	37.53	3.58	27.41	21.14	0	100	Peak	HORIZONTAL

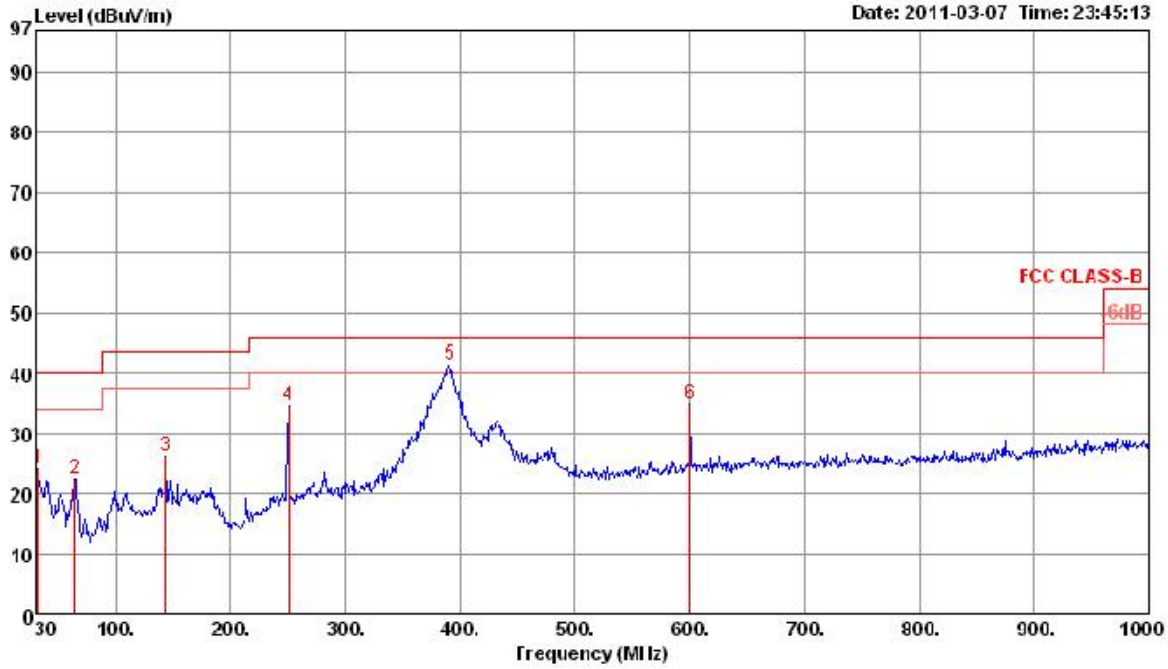
Vertical



	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 q	34.85	33.30	40.00	-6.70	45.27	0.50	27.80	15.33	256	135	QP	VERTICAL
2 p	47.46	35.37	40.00	-3.13	55.47	0.70	27.80	6.50	0	400	Peak	VERTICAL
3 !	62.01	36.03	40.00	-3.97	56.67	0.84	27.75	6.27	0	400	Peak	VERTICAL
4	171.62	23.37	43.50	-15.13	44.73	1.56	27.24	9.32	0	400	Peak	VERTICAL
5	469.41	33.36	46.00	-12.14	42.01	2.64	27.95	17.16	0	400	Peak	VERTICAL
6	600.36	35.78	46.00	-10.22	42.16	2.90	28.10	18.82	0	400	Peak	VERTICAL

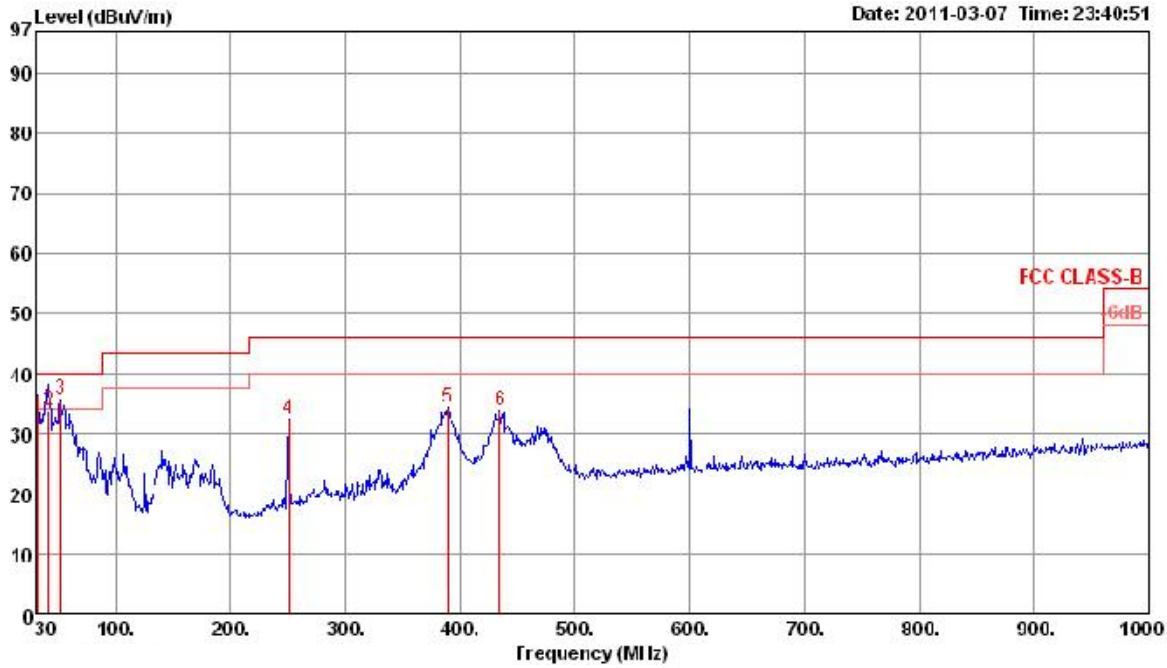
Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	Normal Link / Mode 4

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	31.94	24.32	40.00	-15.98	33.63	0.50	27.80	17.69	0	100	Peak	HORIZONTAL
2	63.95	22.54	40.00	-17.46	42.68	0.88	27.74	6.72	0	100	Peak	HORIZONTAL
3	143.49	26.10	43.50	-17.40	39.89	1.42	27.38	12.17	0	100	Peak	HORIZONTAL
4	250.19	34.53	46.00	-11.47	46.86	1.90	27.00	12.77	0	100	Peak	HORIZONTAL
5 p	391.81	41.35	46.00	-4.65	50.77	2.28	27.55	15.85	0	100	Peak	HORIZONTAL
6	600.36	34.72	46.00	-11.28	41.15	2.90	28.10	18.77	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 p	30.97	36.59	40.00	-3.41	45.67	0.50	27.80	18.22	0	400	Peak	VERTICAL
2 q	41.63	33.39	40.00	-6.11	49.00	0.70	27.80	11.99	178	100	QP	VERTICAL
3 !	51.34	35.66	40.00	-4.34	54.38	0.72	27.79	8.35	0	400	Peak	VERTICAL
4	250.19	32.53	46.00	-13.47	44.86	1.90	27.00	12.77	0	400	Peak	VERTICAL
5	388.90	34.33	46.00	-11.67	43.80	2.28	27.52	15.77	0	400	Peak	VERTICAL
6	434.49	33.70	46.00	-12.30	42.36	2.51	27.77	16.60	0	400	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.

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

<For External Antenna / Ant. 5>

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 36 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

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	15540.34	44.43	60.00	-15.57	35.96	6.13	37.65	35.31	53	106	Average	HORIZONTAL
2	15541.19	59.39	80.00	-20.61	50.92	6.13	37.65	35.31	53	106	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	15540.69	42.37	60.00	-17.63	33.86	6.13	37.69	35.31	32	100	Average	VERTICAL
2	15541.09	55.38	80.00	-24.62	46.87	6.13	37.69	35.31	32	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 40 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

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	15603.35	62.16	80.00	-17.84	53.77	6.13	37.60	35.34	54	106	Peak	HORIZONTAL
2	15603.40	47.56	60.00	-12.44	39.17	6.13	37.60	35.34	54	106	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	15599.97	43.17	60.00	-16.83	34.78	6.13	37.60	35.34	358	100	Average	VERTICAL
2	15600.43	51.53	80.00	-28.47	43.14	6.13	37.60	35.34	358	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 48 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

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	15715.74	61.95	80.00	-18.05	53.71	6.14	37.48	35.38	54	101	Peak	HORIZONTAL
2	15715.81	46.44	60.00	-13.56	38.20	6.14	37.48	35.38	54	101	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	15717.29	59.09	80.00	-20.91	50.86	6.14	37.48	35.39	22	100	Peak	VERTICAL
2	15717.39	43.73	60.00	-16.27	35.50	6.14	37.48	35.39	22	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 38 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

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	15545.40	41.34	60.00	-18.66	32.87	6.13	37.65	35.31	125	100	Average	HORIZONTAL
2	15580.60	54.13	80.00	-25.87	45.72	6.13	37.61	35.33	125	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	15555.90	40.36	60.00	-19.64	31.89	6.13	37.65	35.31	236	100	Average	VERTICAL
2	15560.10	52.40	80.00	-27.60	43.93	6.13	37.65	35.31	236	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 46 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

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	15682.53	42.97	60.00	-17.03	34.69	6.14	37.51	35.37	303	100	Average	HORIZONTAL
2	15682.74	58.16	80.00	-21.84	49.88	6.14	37.51	35.37	303	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	15690.06	39.33	60.00	-20.67	31.05	6.14	37.51	35.37	253	100	Average	VERTICAL
2	15690.37	52.46	80.00	-27.54	44.18	6.14	37.51	35.37	253	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.

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 03, 2011		

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	15541.59	63.98	80.00	-16.02	55.51	6.13	37.65	35.31	289	100	Peak	HORIZONTAL
2	15541.76	47.70	60.00	-12.30	39.23	6.13	37.65	35.31	289	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	15541.65	45.96	60.00	-14.04	37.45	6.13	37.69	35.31	332	100	Average	VERTICAL
2	15541.79	62.04	80.00	-17.96	53.53	6.13	37.69	35.31	332	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 40 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 03, 2011		

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	15601.91	51.42	60.00	-8.58	43.03	6.13	37.60	35.34	283	100	Average	HORIZONTAL
2	15602.07	65.48	80.00	-14.52	57.09	6.13	37.60	35.34	283	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	15601.84	48.92	60.00	-11.08	40.53	6.13	37.60	35.34	332	100	Average	VERTICAL
2	15601.87	64.39	80.00	-15.61	56.00	6.13	37.60	35.34	332	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 48 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 03, 2011		

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	15719.82	48.32	60.00	-11.68	40.09	6.14	37.48	35.39	281	100	Average	HORIZONTAL
2	15720.12	64.05	80.00	-15.95	55.82	6.14	37.48	35.39	281	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	15724.52	47.05	60.00	-12.95	38.82	6.14	37.48	35.39	329	100	Average	VERTICAL
2	15724.54	62.88	80.00	-17.12	54.65	6.14	37.48	35.39	329	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.

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

<For External Antenna / Ant. 6>

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 36 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 24, 2011		

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	10361.00	48.49	74.00	-25.51	40.77	4.97	38.37	35.62	66	100	Average	HORIZONTAL
2	10365.50	59.70	94.00	-34.30	51.98	4.97	38.37	35.62	66	100	Peak	HORIZONTAL
3	15537.30	43.95	60.00	-16.05	35.44	6.13	37.67	35.29	66	100	Average	HORIZONTAL
4	15539.50	56.73	80.00	-23.27	48.26	6.13	37.65	35.31	66	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	10359.40	45.44	74.00	-28.56	37.72	4.97	38.37	35.62	65	100	Average	VERTICAL
2	10360.00	57.88	94.00	-36.12	50.16	4.97	38.37	35.62	65	100	Peak	VERTICAL
3	15520.30	52.25	80.00	-27.75	43.64	6.13	37.77	35.29	97	100	Peak	VERTICAL
4	15541.40	39.81	60.00	-20.19	31.30	6.13	37.69	35.31	97	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 40 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 24, 2011		

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	15601.51	54.78	80.00	-25.22	46.39	6.13	37.60	35.34	56	100	Peak	HORIZONTAL
2	15602.47	41.60	60.00	-18.40	33.21	6.13	37.60	35.34	56	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	15599.56	51.59	80.00	-28.41	43.20	6.13	37.60	35.34	83	100	Peak	VERTICAL
2	15602.25	39.06	60.00	-20.94	30.67	6.13	37.60	35.34	83	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 48 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 24, 2011		

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	15721.07	43.08	60.00	-16.92	34.85	6.14	37.48	35.39	61	100	Average	HORIZONTAL
2	15722.14	57.08	80.00	-22.92	48.85	6.14	37.48	35.39	61	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	15717.91	51.22	80.00	-28.78	42.99	6.14	37.48	35.39	122	100	Peak	VERTICAL
2	15718.59	39.61	60.00	-20.39	31.38	6.14	37.48	35.39	122	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 38 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 24, 2011		

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	15567.08	39.32	60.00	-20.68	30.89	6.13	37.63	35.33	186	100	Average	HORIZONTAL
2	15574.38	51.29	80.00	-28.71	42.88	6.13	37.61	35.33	186	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	15566.66	39.14	60.00	-20.86	30.69	6.13	37.65	35.33	88	100	Average	VERTICAL
2	15567.12	51.53	80.00	-28.47	43.08	6.13	37.65	35.33	88	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 46 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 24, 2011		

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	15686.40	53.41	80.00	-26.59	45.13	6.14	37.51	35.37	63	100	Peak	HORIZONTAL
2	15689.04	40.44	60.00	-19.56	32.16	6.14	37.51	35.37	63	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	15685.80	38.77	60.00	-21.23	30.49	6.14	37.51	35.37	151	100	Average	VERTICAL
2	15688.02	51.31	80.00	-28.69	43.03	6.14	37.51	35.37	151	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.

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 22, 2011		

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	11491.94	64.14	80.00	-15.86	55.53	5.11	38.78	35.28	281	108	Peak	HORIZONTAL
2	11492.43	49.92	60.00	-10.08	41.31	5.11	38.78	35.28	281	108	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	11489.66	57.55	80.00	-22.45	48.94	5.11	38.78	35.28	160	101	Peak	VERTICAL
2	11489.90	43.27	60.00	-16.73	34.66	5.11	38.78	35.28	160	101	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 40 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 23, 2011		

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	15602.67	54.94	60.00	-5.06	46.55	6.13	37.60	35.34	55	117	Average	HORIZONTAL
2	15603.09	71.14	80.00	-8.86	62.75	6.13	37.60	35.34	55	117	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	15602.47	54.91	60.00	-5.09	46.52	6.13	37.60	35.34	10	114	Average	VERTICAL
2	15602.65	71.20	80.00	-8.80	62.81	6.13	37.60	35.34	10	114	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 48 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 23, 2011		

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	15722.52	51.94	60.00	-8.06	43.71	6.14	37.48	35.39	54	114	Average	HORIZONTAL
2	15722.92	65.46	80.00	-14.54	57.23	6.14	37.48	35.39	54	114	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	15717.39	65.20	80.00	-14.80	56.97	6.14	37.48	35.39	13	115	Peak	VERTICAL
2	15717.60	50.64	60.00	-9.36	42.41	6.14	37.48	35.39	13	115	Average	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.

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

<For Internal Antenna / Ant. 8>

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 36 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10359.86	46.80	74.00	-27.20	39.08	4.97	38.37	35.62	286	100	Average	HORIZONTAL
2	10360.96	60.20	94.00	-33.80	52.48	4.97	38.37	35.62	287	100	Peak	HORIZONTAL
3	15538.82	52.85	80.00	-27.15	44.38	6.13	37.65	35.31	329	100	Peak	HORIZONTAL
4	15539.42	39.00	60.00	-21.00	30.53	6.13	37.65	35.31	329	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	10359.56	40.65	74.00	-33.35	32.93	4.97	38.37	35.62	322	100	Average	VERTICAL
2	10359.94	56.94	94.00	-37.06	49.22	4.97	38.37	35.62	322	100	Peak	VERTICAL
3	15538.64	52.15	80.00	-27.85	43.64	6.13	37.69	35.31	18	100	Peak	VERTICAL
4	15539.35	40.76	60.00	-19.24	32.25	6.13	37.69	35.31	18	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 40 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10399.10	45.95	74.00	-28.05	38.17	4.98	38.38	35.58	279	100	Average	HORIZONTAL
2	10399.93	60.40	94.00	-33.60	52.62	4.98	38.38	35.58	279	100	Peak	HORIZONTAL
3	15600.83	42.05	60.00	-17.95	33.66	6.13	37.60	35.34	331	100	Average	HORIZONTAL
4	15602.42	55.52	80.00	-24.48	47.13	6.13	37.60	35.34	331	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	10398.74	41.82	74.00	-32.18	34.04	4.98	38.38	35.58	329	100	Average	VERTICAL
2	10399.90	58.23	94.00	-35.77	50.45	4.98	38.38	35.58	329	100	Peak	VERTICAL
3	15598.73	57.69	80.00	-22.31	49.30	6.13	37.60	35.34	7	100	Peak	VERTICAL
4	15601.73	42.78	60.00	-17.22	34.39	6.13	37.60	35.34	7	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 48 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10480.28	51.77	74.00	-22.23	43.90	5.00	38.39	35.52	280	100	Average	HORIZONTAL
2	10482.46	66.82	94.00	-27.18	58.95	5.00	38.39	35.52	280	100	Peak	HORIZONTAL
3	15717.62	45.73	60.00	-14.27	37.50	6.14	37.48	35.39	329	100	Average	HORIZONTAL
4	15717.95	59.68	80.00	-20.32	51.45	6.14	37.48	35.39	329	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	10479.83	63.08	94.00	-30.92	55.20	5.00	38.40	35.52	328	100	Peak	VERTICAL
2	10479.85	47.02	74.00	-26.98	39.14	5.00	38.40	35.52	328	100	Average	VERTICAL
3	15718.63	48.28	60.00	-11.72	40.05	6.14	37.48	35.39	9	100	Average	VERTICAL
4	15721.89	62.64	80.00	-17.36	54.41	6.14	37.48	35.39	9	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 38 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10357.32	49.17	94.00	-44.83	41.45	4.97	38.37	35.62	213	100	Peak	HORIZONTAL
2	10360.32	38.46	74.00	-35.54	30.74	4.97	38.37	35.62	213	100	Average	HORIZONTAL
3	15538.68	38.49	60.00	-21.51	30.02	6.13	37.65	35.31	337	100	Average	HORIZONTAL
4	15544.05	51.54	80.00	-28.46	43.07	6.13	37.65	35.31	337	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	10358.93	36.85	74.00	-37.15	29.13	4.97	38.37	35.62	106	100	Average	VERTICAL
2	10359.17	49.02	94.00	-44.98	41.30	4.97	38.37	35.62	106	100	Peak	VERTICAL
3	15537.57	50.59	80.00	-29.41	42.02	6.13	37.73	35.29	215	100	Peak	VERTICAL
4	15538.61	38.61	60.00	-21.39	30.10	6.13	37.69	35.31	215	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 46 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10459.99	64.73	94.00	-29.27	56.88	5.00	38.39	35.54	58	100	Peak	HORIZONTAL
2	10460.33	46.98	74.00	-27.02	39.13	5.00	38.39	35.54	58	100	Average	HORIZONTAL
3	15682.47	41.03	60.00	-18.97	32.75	6.14	37.51	35.37	329	100	Average	HORIZONTAL
4	15698.92	56.26	80.00	-23.74	48.01	6.14	37.49	35.38	329	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	10461.13	58.36	94.00	-35.64	50.51	5.00	38.39	35.54	84	100	Peak	VERTICAL
2	10469.99	42.21	74.00	-31.79	34.36	5.00	38.39	35.54	84	100	Average	VERTICAL
3	15683.46	42.57	60.00	-17.43	34.29	6.14	37.51	35.37	9	100	Average	VERTICAL
4	15684.21	57.50	80.00	-22.50	49.22	6.14	37.51	35.37	9	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.

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10360.48	47.63	74.00	-26.37	39.91	4.97	38.37	35.62	62	100	Average	HORIZONTAL
2	10361.14	63.63	94.00	-30.37	55.91	4.97	38.37	35.62	62	100	Peak	HORIZONTAL
3	15541.37	52.44	80.00	-27.56	43.97	6.13	37.65	35.31	334	100	Peak	HORIZONTAL
4	15541.79	38.40	60.00	-21.60	29.93	6.13	37.65	35.31	334	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	10360.85	44.24	74.00	-29.76	36.52	4.97	38.37	35.62	318	100	Average	VERTICAL
2	10361.25	54.47	94.00	-39.53	46.75	4.97	38.37	35.62	318	100	Peak	VERTICAL
3	15542.21	40.08	60.00	-19.92	31.57	6.13	37.69	35.31	7	100	Average	VERTICAL
4	15542.53	54.40	80.00	-25.60	45.89	6.13	37.69	35.31	7	100	Peak	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 40 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10400.56	48.83	74.00	-25.17	41.05	4.98	38.38	35.58	64	100	Average	HORIZONTAL
2	10400.88	62.45	94.00	-31.55	54.67	4.98	38.38	35.58	64	100	Peak	HORIZONTAL
3	15599.51	39.89	60.00	-20.11	31.50	6.13	37.60	35.34	202	100	Average	HORIZONTAL
4	15601.94	50.84	80.00	-29.16	42.45	6.13	37.60	35.34	202	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	10400.97	41.62	74.00	-32.38	33.84	4.98	38.38	35.58	72	100	Average	VERTICAL
2	10402.01	56.49	94.00	-37.51	48.71	4.98	38.38	35.58	72	100	Peak	VERTICAL
3	15602.84	52.70	80.00	-27.30	44.31	6.13	37.60	35.34	353	100	Peak	VERTICAL
4	15603.34	40.31	60.00	-19.69	31.92	6.13	37.60	35.34	353	100	Average	VERTICAL

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 48 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

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	10480.93	71.27	94.00	-22.73	63.40	5.00	38.39	35.52	59	100	Peak	HORIZONTAL
2	10481.22	55.89	74.00	-18.11	48.02	5.00	38.39	35.52	59	100	Average	HORIZONTAL
3	15721.48	61.99	80.00	-18.01	53.76	6.14	37.48	35.39	329	100	Peak	HORIZONTAL
4	15721.61	47.36	60.00	-12.64	39.13	6.14	37.48	35.39	329	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	10480.72	65.13	94.00	-28.87	57.25	5.00	38.40	35.52	333	100	Peak	VERTICAL
2	10480.84	53.21	74.00	-20.79	45.33	5.00	38.40	35.52	333	100	Average	VERTICAL
3	15721.50	64.62	80.00	-15.38	56.39	6.14	37.48	35.39	9	100	Peak	VERTICAL
4	15722.00	50.19	60.00	-9.81	41.96	6.14	37.48	35.39	9	100	Average	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.

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

4.7. Band Edge Emissions Measurement

4.7.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.25 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

4.7.2. Measuring Instruments and Setting

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

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

4.7.3. Test Procedures

1. The test procedure is the same as section 4.6.3, only the frequency range investigated is limited to 100MHz around bandedges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

4.7.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

<For External Antenna / Ant. 5>

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 36 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

Channel 36

	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	5150.00	59.45	60.00	-0.55	22.35	3.43	33.67	0.00	335	128	Average	VERTICAL
2	5150.00	75.93	80.00	-4.07	38.83	3.43	33.67	0.00	335	128	Peak	VERTICAL
3	5185.20	99.72	74.00			3.44	33.73	0.00	335	128	Average	VERTICAL
4	5185.60	114.07	94.00			3.44	33.73	0.00	335	128	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 40 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

Channel 40

	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	5000.00	59.08	60.00	-0.92	22.29	3.39	33.40	0.00	334	100	Average	VERTICAL
2	5000.00	64.83	80.00	-15.17	28.04	3.39	33.40	0.00	334	100	Peak	VERTICAL
3	5194.00	104.96	74.00			3.44	33.73	0.00	334	100	Average	VERTICAL
4	5194.00	115.56	94.00			3.44	33.73	0.00	334	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 48 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

Channel 48

	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	5000.00	59.17	60.00	-0.83	22.38	3.39	33.40	0.00	334	107	Average	VERTICAL
2	5000.00	64.93	80.00	-15.07	28.14	3.39	33.40	0.00	334	107	Peak	VERTICAL
3	5242.00	105.69	74.00			3.46	33.82	0.00	334	107	Average	VERTICAL
4	5248.00	115.45	94.00			3.46	33.85	0.00	334	107	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 38 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

Channel 38

	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	5149.60	73.81	80.00	-6.19	36.71	3.43	33.67	0.00	336	112	Peak	VERTICAL
2	5150.00	59.10	60.00	-0.90	22.00	3.43	33.67	0.00	336	112	Average	VERTICAL
3	5174.00	96.04	74.00			3.44	33.70	0.00	336	112	Average	VERTICAL
4	5176.80	107.76	94.00			3.44	33.70	0.00	336	112	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5190 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 46 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 04, 2011		

Channel 46

	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	5000.00	59.09	60.00	-0.91	22.30	3.39	33.40	0.00	334	100	Average	VERTICAL
2	5000.00	64.17	80.00	-15.83	27.38	3.39	33.40	0.00	334	100	Peak	VERTICAL
3	5214.00	102.16	74.00			3.45	33.79	0.00	334	100	Average	VERTICAL
4	5228.00	112.82	94.00			3.46	33.79	0.00	334	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5230 MHz.

Note:

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

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

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 03, 2011		

Channel 36

	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	5149.40	76.71	80.00	-3.29	39.61	3.43	33.67	0.00	339	100	Peak	VERTICAL
2	5150.00	59.19	60.00	-0.81	22.09	3.43	33.67	0.00	339	100	Average	VERTICAL
3	5180.60	103.46	74.00			3.44	33.73	0.00	339	100	Average	VERTICAL
4	5180.60	114.76	94.00			3.44	33.73	0.00	339	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 40 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 03, 2011		

Channel 40

	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	4999.00	59.25	60.00	-0.75	22.46	3.39	33.40	0.00	338	106	Average	VERTICAL
2	5150.00	69.59	80.00	-10.41	32.49	3.43	33.67	0.00	338	106	Peak	VERTICAL
3	5199.00	117.15	94.00			3.45	33.76	0.00	338	106	Peak	VERTICAL
4	5201.00	108.28	74.00			3.45	33.76	0.00	338	106	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 48 / Ant. 5 / Connector J2 + J3 + J4
Test Date	Mar. 03, 2011		

Channel 48

	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	5000.00	59.09	60.00	-0.91	22.30	3.39	33.40	0.00	338	113	Average	VERTICAL
2	5000.00	65.93	80.00	-14.07	29.14	3.39	33.40	0.00	338	113	Peak	VERTICAL
3	5235.00	102.45	74.00			3.46	33.82	0.00	338	113	Average	VERTICAL
4	5235.00	113.49	94.00			3.46	33.82	0.00	338	113	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Note:

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

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

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

<For External Antenna / Ant. 6>

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 36 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 23, 2011		

Channel 36

	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	5150.00	59.54	60.00	-0.46	22.44	3.43	33.67	0.00	134	101	Average	VERTICAL
2	5150.00	75.00	80.00	-5.00	37.90	3.43	33.67	0.00	134	101	Peak	VERTICAL
3	5174.60	105.95	74.00			3.44	33.70	0.00	134	101	Average	VERTICAL
4	5185.80	121.06	94.00			3.44	33.73	0.00	134	101	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 40 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 23, 2011		

Channel 40

	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	4999.00	67.21	80.00	-12.79	30.42	3.39	33.40	0.00	312	100	Peak	VERTICAL
2	5000.00	59.83	60.00	-0.17	23.04	3.39	33.40	0.00	312	100	Average	VERTICAL
3	5196.00	108.80	74.00			3.45	33.76	0.00	312	100	Average	VERTICAL
4	5198.00	119.14	94.00			3.45	33.76	0.00	312	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 48 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 23, 2011		

Channel 48

	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	5000.00	59.85	60.00	-0.15	23.06	3.39	33.40	0.00	310	103	Average	VERTICAL
2	5000.00	67.27	80.00	-12.73	30.48	3.39	33.40	0.00	310	103	Peak	VERTICAL
3	5234.00	105.44	74.00			3.46	33.82	0.00	310	103	Average	VERTICAL
4	5245.00	119.21	94.00			3.46	33.82	0.00	310	103	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 38 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 24, 2011		

Channel 38

	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	5149.60	76.28	80.00	-3.72	39.18	3.43	33.67	0.00	67	100	Peak	VERTICAL
2	5150.00	59.68	60.00	-0.32	22.58	3.43	33.67	0.00	67	100	Average	VERTICAL
3	5193.60	113.19	94.00			3.44	33.73	0.00	67	100	Peak	VERTICAL
4	5207.20	97.01	60.00			3.45	33.76	0.00	67	100	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5190 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 46 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 24, 2011		

Channel 46

	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	4999.00	67.74	80.00	-12.26	30.95	3.39	33.40	0.00	313	100	Peak	VERTICAL
2	4999.96	59.14	60.00	-0.86	22.35	3.39	33.40	0.00	313	100	Average	VERTICAL
3	5215.00	104.55	74.00			3.45	33.79	0.00	313	100	Average	VERTICAL
4	5234.00	117.53	94.00			3.46	33.82	0.00	313	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5230 MHz.

Note:

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

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

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 22, 2011		

Channel 36

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Aux Factor	T/Pos	A/Pos	Remark	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	dB	deg	cm		
1	!	5149.80	76.40	80.00	-3.60	40.24	3.09	0.00	33.07	0.00	182	132	Peak	VERTICAL
2	!	5150.00	59.55	60.00	-0.45	23.39	3.09	0.00	33.07	0.00	182	132	Average	VERTICAL
3	p	5181.25	121.36	94.00			3.10	0.00	33.13	0.00	182	132	Peak	VERTICAL
4	a	5181.35	111.77	74.00			3.10	0.00	33.13	0.00	182	132	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 40 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 23, 2011		

Channel 40

	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	5148.80	77.69	80.00	-2.31	40.59	3.43	33.67	0.00	53	100	Peak	VERTICAL
2	5149.20	59.52	60.00	-0.48	22.42	3.43	33.67	0.00	53	100	Average	VERTICAL
3	5198.40	110.68	74.00			3.45	33.76	0.00	53	100	Average	VERTICAL
4	5198.40	122.75	94.00			3.45	33.76	0.00	53	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 48 / Ant. 6 / Connector J2 + J3 + J4
Test Date	Feb. 23, 2011		

Channel 48

	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	4994.00	67.89	80.00	-12.11	31.10	3.39	33.40	0.00	210	100	Peak	VERTICAL
2	5000.00	59.41	60.00	-0.59	22.62	3.39	33.40	0.00	210	100	Average	VERTICAL
3	5244.00	113.87	74.00			3.46	33.82	0.00	210	100	Average	VERTICAL
4	5244.00	123.26	94.00			3.46	33.82	0.00	210	100	Peak	VERTICAL
5	5376.00	67.75	80.00	-12.25	30.19	3.50	34.06	0.00	210	100	Peak	VERTICAL
6	5400.00	58.77	60.00	-1.23	21.14	3.51	34.12	0.00	210	100	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Note:

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

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

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

<For Internal Antenna / Ant. 8>

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 36 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 01, 2011		

Channel 36

	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	5144.10	59.57	60.00	-0.43	22.47	3.43	33.67	0.00	64	100	Average	HORIZONTAL
2	5146.53	76.46	80.00	-3.54	39.36	3.43	33.67	0.00	64	100	Peak	HORIZONTAL
3	5186.08	122.54	94.00			3.44	33.73	0.00	64	100	Peak	HORIZONTAL
4	5187.09	107.29	74.00			3.44	33.73	0.00	64	100	Average	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Temperature	23℃	**Humidity**	61%
Test Engineer	Sean Ku	**Configurations**	IEEE 802.11n MCS8 20MHz Ch 40 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

Channel 40

	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	5149.42	72.98	80.00	-7.02	35.88	3.43	33.67	0.00	63	100	Peak	HORIZONTAL
2	5150.00	59.87	60.00	-0.13	22.77	3.43	33.67	0.00	63	100	Average	HORIZONTAL
3	5204.05	109.34	74.00			3.45	33.76	0.00	63	100	Average	HORIZONTAL
4	5205.50	122.80	94.00			3.45	33.76	0.00	63	100	Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 20MHz Ch 48 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

Channel 48

	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	4999.84	59.38	60.00	-0.62	22.60	3.39	33.39	0.00	301	100	Average	HORIZONTAL
2	5000.07	69.34	80.00	-10.66	32.56	3.39	33.39	0.00	301	100	Peak	HORIZONTAL
3	5079.81	69.63	80.00	-10.37	32.67	3.41	33.55	0.00	301	100	Peak	HORIZONTAL
4	5079.86	59.02	60.00	-0.98	22.06	3.41	33.55	0.00	301	100	Average	HORIZONTAL
5	5237.10	126.29	94.00			3.46	33.82	0.00	301	100	Peak	HORIZONTAL
6	5247.20	116.66	74.00			3.46	33.85	0.00	301	100	Average	HORIZONTAL

Item 5, 6 are the fundamental frequency at 5240 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 38 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

Channel 38

	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	5147.40	73.90	80.00	-6.10	36.80	3.43	33.67	0.00	298	100	Peak	HORIZONTAL
2	5150.00	59.81	60.00	-0.19	22.71	3.43	33.67	0.00	298	100	Average	HORIZONTAL
3	5205.63	101.46	74.00			3.45	33.76	0.00	298	100	Average	HORIZONTAL
4	5206.21	115.48	94.00			3.45	33.76	0.00	298	100	Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5190 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS8 40MHz Ch 46 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

Channel 46

	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	5147.68	77.92	80.00	-2.08	40.82	3.43	33.67	0.00	298	100	Peak	HORIZONTAL
2	5150.00	59.08	60.00	-0.92	21.98	3.43	33.67	0.00	298	100	Average	HORIZONTAL
3	5226.82	123.35	94.00			3.46	33.79	0.00	298	100	Peak	HORIZONTAL
4	5245.63	108.12	74.00			3.46	33.85	0.00	298	100	Average	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5230 MHz.

Note:

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

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

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

Channel 36

	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	5143.29	59.67	60.00	-0.33	22.60	3.43	33.64	0.00	62	100	Average	HORIZONTAL
2	5147.40	73.87	80.00	-6.13	36.77	3.43	33.67	0.00	62	100	Peak	HORIZONTAL
3	5186.66	109.54	74.00			3.44	33.73	0.00	62	100	Average	HORIZONTAL
4	5186.80	121.40	94.00			3.44	33.73	0.00	62	100	Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 40 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

Channel 40

	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	5149.87	72.85	80.00	-7.15	35.75	3.43	33.67	0.00	66	100	Peak	HORIZONTAL
2	5150.00	59.64	60.00	-0.36	22.54	3.43	33.67	0.00	66	100	Average	HORIZONTAL
3	5200.58	109.26	74.00			3.45	33.76	0.00	66	100	Average	HORIZONTAL
4	5200.58	120.66	94.00			3.45	33.76	0.00	66	100	Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Temperature	23℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 48 / Ant. 8 / Connector J2 + J3 + J4
Test Date	Mar. 25, 2011		

Channel 48

	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	4999.82	59.44	60.00	-0.56	22.66	3.39	33.39	0.00	299	100	Average	HORIZONTAL
2	5000.01	68.94	80.00	-11.06	32.16	3.39	33.39	0.00	299	100	Peak	HORIZONTAL
3	5077.90	67.61	80.00	-12.39	30.65	3.41	33.55	0.00	299	100	Peak	HORIZONTAL
4	5079.40	59.28	60.00	-0.72	22.32	3.41	33.55	0.00	299	100	Average	HORIZONTAL
5	5234.20	117.07	74.00			3.46	33.82	0.00	299	100	Average	HORIZONTAL
6	5244.30	127.96	94.00			3.46	33.82	0.00	299	100	Peak	HORIZONTAL

Item 5, 6 are the fundamental frequency at 5240 MHz.

Note:

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

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

The limits above 5GHz 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 distance [3m] / test distance [1.5m]) (dB);

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

4.8. Frequency Stability Measurement

4.8.1. Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user's manual or ±20ppm (IEEE 802.11nspecification).

4.8.2. Measuring Instruments and Setting

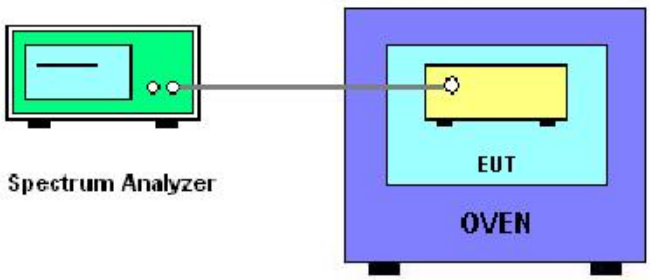
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RB	10 kHz
VB	10 kHz
Sweep Time	Auto

4.8.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is -30°C~50°C.
8. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

4.8.7. Test Result of Frequency Stability

<For External Antenna / Ant. 5>

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5200
126.50	5200.0190
110.00	5200.0288
93.50	5200.0268
Max. Deviation (MHz)	0.028826
Max. Deviation (ppm)	5.54

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(°C)	5200
-30	5199.9855
-20	5199.9661
-10	5199.9543
0	5199.9510
10	5199.9547
20	5199.9556
30	5199.9545
40	5199.9517
50	5199.9556
Max. Deviation (MHz)	0.049000
Max. Deviation (ppm)	9.42

<For External Antenna / Ant. 6>

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5200
126.50	5200.0190
110.00	5200.0288
93.50	5200.0268
Max. Deviation (MHz)	0.028826
Max. Deviation (ppm)	5.54

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(℃)	5200
-30	5199.9855
-20	5199.9661
-10	5199.9543
0	5199.9510
10	5199.9547
20	5199.9556
30	5199.9545
40	5199.9517
50	5199.9556
Max. Deviation (MHz)	0.049000
Max. Deviation (ppm)	9.42

<For Internal Antenna / Ant. 8>

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5200
126.50	5200.0199
110.00	5200.0283
93.50	5200.0274
Max. Deviation (MHz)	0.028300
Max. Deviation (ppm)	5.44

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(°C)	5200
-30	5199.9874
-20	5199.9762
-10	5199.9654
0	5199.9523
10	5199.9508
20	5199.9588
30	5199.9561
40	5199.9537
50	5199.9522
Max. Deviation (MHz)	0.049200
Max. Deviation (ppm)	9.46

4.9. Antenna Requirements

4.9.1. Limit

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

4.9.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100377	9kHz ~ 2.75GHz	Sep. 01, 2010	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Apr. 24, 2010	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9K ~ 30MHz	Oct. 30, 2010	Conduction (CO01-CB)
PULSE LIMITER	R&S	ESH3-Z2	100430	9K~30MHz	Jan. 04, 2010	Conduction (CO01-CB)
PULSE LIMITER	R&S	ESH3-Z2	100430	9K~30MHz	Jan. 04, 2011	Conduction (CO01-CB)
COND Cable	-	Cable	-	0.15MHz~30MHz	Dec. 01, 2010	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Oct. 17, 2010	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 13, 2010	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Oct. 08, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 06, 2010	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP	100304	9kHz ~ 40GHz	Nov. 06, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 06, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 06, 2011	Radiation (03CH01-CB)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Sep. 09, 2010*	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N/A	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N/A	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	-	30 MHz - 1 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	-	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	-	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP30	100023	9KHz~30GHz	Mar. 05, 2011	Conducted (TH01-CB)
Temp. and Humidity Chamber	TEN BILLION	TTH-D3SP	TBN-931011	-30~100℃	May 21, 2010	Conducted (TH01-CB)
Signal Generator	R&S	SMR40	100302	10MHz-40GHz	Mar. 09, 2010	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Signal Generator	R&S	SMR40	100302	10MHz-40GHz	Mar. 09, 2011	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)
Signal generator	R&S	SMU200A	102782	10MHz-40GHz	Mar. 09, 2010	Conducted (TH01-CB)
Signal generator	R&S	SMU200A	102782	10MHz-40GHz	Mar. 09, 2011	Conducted (TH01-CB)
Horn Antenna	COM-POWER	AH-118	071187	1GHz – 18GHz	Apr. 16, 2010	Conducted (TH01-CB)
Horn Antenna	COM-POWER	AH-118	071042	1GHz – 18GHz	Oct. 14, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-12	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-13	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 13, 2010	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 08, 2010	Conducted (TH01-CB)

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

* Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.

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

TAF

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

Appendix D. New Power Measurement for MIMO Device

In order to comply with latest FCC regulations(KDB662911) the RF power in legacy modes (802.11 a/b/g) must be added the additional antenna gain by 4.77 dB (10log(N), N=3) .It is re-calculated the RF output power in legacy mode in below table.

For the In-band PSD and out –Band Measurement, it is measured by original power value so that it is over –estimated so it is not measured again.

Test Result of Maximum Conducted Output Power for legacy mode

Temperature	22℃	**Humidity**	65%
Test Engineer	Allen Liu	**Configurations**	IEEE 802.11a / Ant. 5
Test Date	Mar. 08, 2011& April 29,2011		

Power Parameters of IEEE 802.11a

Test Software Version	**ART2-GUI 1.7**		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	10.5	10.5	11.0

Configuration IEEE 802.11a

Channel	**Frequency**	**Power output (dBm)**			**Total power (dBm)**	**Max. Limit (dBm)**	**Result**
		Connector J2	**Connector J3**	**Connector J4**			
Error! Reference source not found.	**Error! Reference source not found.**	8.82	9.27	9.33	13.92	14.03	**Complies**
40	5200 MHz	8.99	8.77	8.81	13.63	14.03	**Complies**
48	5240 MHz	9.33	8.85	9.02	13.84	14.03	**Complies**

Directional gain=4.2dBi +10log (3)= 8.97dBi >6dBi ,so the conducted output power limit should be reduced to 17-(8.97-6) =14.03dBm

Temperature	22℃	Humidity	65%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Ant. 6
Test Date	Mar. 08, 2011& April 29,2011		

Power Parameters of IEEE 802.11a

Test Software Version	ART2-GUI 1.7		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	12.0	12.0	12.0

Configuration IEEE 802.11a

Channel	Frequency	Power output (dBm)			Total power (dBm)	Max. Limit (dBm)	Result
		Connector J2	Connector J3	Connector J4			
Error! Reference source not found.	Error! Reference source not found.	10.4	10.54	10.75	15.34	15.53	**Complies**
40	5200 MHz	10.76	10.63	10.62	15.44	15.53	**Complies**
48	5240 MHz	10.54	10.35	10.4	15.20	15.53	**Complies**

Directional gain=2.7dBi +10log (3)= 7.47dBi >6dBi ,so the conducted output power limit should be reduced to 17-(7.47-6) =15.53dBm

Temperature	22℃	Humidity	65%
Test Engineer	Allen Liu	Configurations	IEEE 802.11n / Ant. 8
Test Date	Mar. 08, 2011& April 29,2011		

Power Parameters of IEEE 802.11a

Test Software Version	ART2-GUI 1.7		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	9.5	9.5	.0

Configuration IEEE 802.11a

Channel	Frequency	Power output (dBm)			Total power (dBm)	Max. Limit (dBm)	Result
		Connector J2	Connector J3	Connector J4			

Error! Reference source not found.	**Error! Reference source not found.**	8.91	9.09	8.85	13.72	13.73	**Complies**
40	5200 MHz	8.5	8.88	9.29	13.67	13.73	**Complies**
48	5240 MHz	8.65	8.63	9.07	13.56	13.73	**Complies**

Directional gain=4.5dBi +10log (3)= 9.27dBi >6dBi ,so the conducted output power limit should be reduced to 17-(9.27-6) =13.73dBm