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FCC RADIO TEST REPORT

Applicant's company	**NETGEAR, Inc.**
Applicant Address	350 East Plumeria Drive, San Jose, California 95134, USA
FCC ID	**PY311100157**

Product Name	Universal Dual Band WiFi Internet Adapter
Brand Name	NETGEAR
Model No.	WNCE3001
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5250 ~ 5350 MHz / 5470 ~ 5725 MHz
Received Date	Jun. 28, 2011
Final Test Date	Jul. 11, 2011
Submission Type	Class II Change
Operating Mode	Client (without radar detection function)

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a 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 C63.10-2009**, **47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01, KDB662911 D01 v02r01.**

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

TAF
Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR171807-05AB	Rev. 01	Initial issue of report	Sep. 02, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	Universal Dual Band WiFi Internet Adapter
Brand Name	:	NETGEAR
Model No.	:	WNCE3001
Applicant	:	NETGEAR, 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 Jun. 28, 2011 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.

Sam Chen

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	10.36 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	1.27 dB
4.4	15.407(a)	Power Spectral Density	Complies	1.08 dB
4.5	15.407(b)	Radiated Emissions	Complies	0.14 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.11 dB
4.7	15.407(g)	Frequency Stability	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	IEEE 802.11a: WLAN (1TX, 2RX) IEEE 802.11n: WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter and host system
Modulation	IEEE 802.11a: OFDM IEEE 802.11n: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n: see the below table
Frequency Range	5250 ~ 5350 MHz / 5470 ~ 5725 MHz
Channel Number	15 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	Band 2: IEEE 802.11a: 29.60 MHz IEEE 802.11n MCS13 (HT20): 18.72 MHz IEEE 802.11n MCS13 (HT40): 36.80 MHz Band 3: IEEE 802.11a: 17.60 MHz IEEE 802.11n MCS13 (HT20): 20.48 MHz IEEE 802.11n MCS13 (HT40): 42.88 MHz
Maximum Conducted Output Power	Band 2: IEEE 802.11a: 22.72 dBm IEEE 802.11n MCS13 (HT20): 22.65 dBm IEEE 802.11n MCS13 (HT40): 22.73 dBm Band 3: IEEE 802.11a: 18.85 dBm IEEE 802.11n MCS13 (HT20): 21.97 dBm IEEE 802.11n MCS13 (HT40): 22.65 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☒ With 5600~5650MHz	☐ Without 5600~5650MHz
Beamforming Function	☐ With beamforming	☒ Without beamforming
Operating Mode	☐ Outdoor access point	
	☒ Indoor access point	
	☐ Fixed point-to-point access points	
	☐ Mobile and portable client devices	

Antenna and Band width

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

IEEE 11n Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS13-15
802.11n (HT40)	2	MCS13-15
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40. Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n		

3.2. Accessories

Power	Brand	Model No.	P/N	Rating
Adapter	NETGEAR	AD63130	332-10391-01	Input: 100-240Vac, 50/60Hz,130mA Output: 5Vdc, 1A
Others				
Angle bracket*1				
RJ-45 cable*1: Non-shielded, 0.82m				
USB cable*1: Shielded, 1.1m				

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed Antenna	N/A	2.78
2	N/A	N/A	Printed Antenna	N/A	2.27

Note: There are two sets of antenna provided to this EUT and all of them can be used as transmitting and receiving antenna

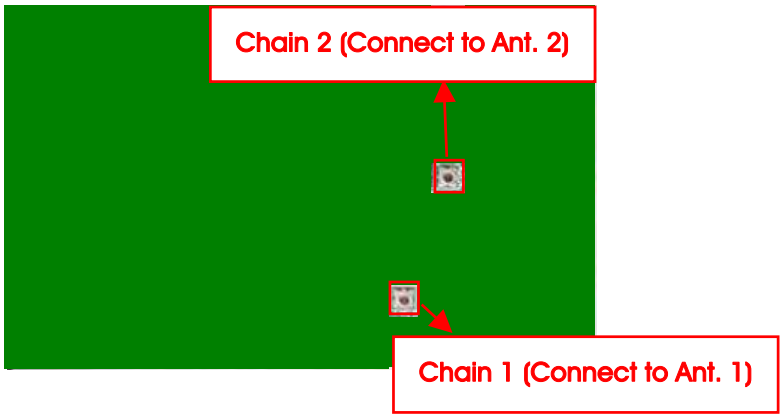
For IEEE 802.11a mode (1TX/2RX):

Only Chain 1 can be used as transmitting antenna.

Chain 1 and Chain 2 can both receive simultaneously.

For IEEE 802.11n mode (2TX/2RX)

Chain 1 and Chain 2 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

The EUT has two bandwidth system.

For 20MHz bandwidth systems, use Channel 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140.

For 40MHz bandwidth systems, use Channel 54, 62, 102, 110, 118, 126, 134.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5250~5350 MHz Band 2	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
5470~5725 MHz Band 3	100	5500 MHz	120	5600 MHz
	102	5510 MHz	124	5620 MHz
	104	5520 MHz	126	5630 MHz
	108	5540 MHz	128	5640 MHz
	110	5550 MHz	132	5660 MHz
	112	5560 MHz	134	5670 MHz
	116	5580 MHz	136	5680 MHz
	118	5590 MHz	140	5700 MHz

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Chain
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 2, 3	6Mbps	52/60/64/100/116/140	1
	11n HT20	Band 2, 3	MCS13	52/60/64/100/116/140	1+2
	11n HT40	Band 2, 3	MCS13	54/62/102/110/134	1+2
Power Spectral Density	11a/BPSK	Band 2, 3	6Mbps	52/60/64/100/116/140	1
	11n HT20	Band 2, 3	MCS13	52/60/64/100/116/140	1+2
	11n HT40	Band 2, 3	MCS13	54/62/102/110/134	1+2
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 2, 3	6Mbps	52/60/64/100/116/140	1
	11n HT20	Band 2, 3	MCS13	52/60/64/100/116/140	1+2
	11n HT40	Band 2, 3	MCS13	54/62/102/110/134	1+2
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 2, 3	6Mbps	52/60/64/100/116/140	1
	11n HT20	Band 2, 3	MCS13	52/60/64/100/116/140	1+2
	11n HT40	Band 2, 3	MCS13	54/62/102/110/134	1+2
Band Edge Emission	11a/BPSK	Band 2, 3	6Mbps	60/64/100/140	1
	11n HT20	Band 2, 3	MCS13	60/64/100/140	1+2
	11n HT40	Band 2, 3	MCS13	54/62/102/110/134	1+2
Frequency Stability	Un-modulation		-	60	N/A

Note: The EUT can only be used at Y axis position.

The following test modes were performed for all tests:

For AC Power Conducted Emission test:

Mode 1. EUT + USB cable with 2.4GHz WLAN function

Mode 2. EUT + Adapter with 5GHz WLAN function

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

For Radiation Emission below 1GHz test:

Mode 1. EUT + USB cable with 2.4GHz WLAN function

Mode 2. EUT + Adapter with 5GHz WLAN function

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

3.6. Table for Testing Locations

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

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR171807

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Changing applicant address. 2. Adding weather band (5600~5650 MHz) for this device. 3. Updating 5GHz band 2, band 3 (5250~5350 MHz, 5470~5725 MHz) test rule to "New Rules" from "Old Rules".	After evaluating, it is not necessary to re-test.

Note: Test result of all test are based on original test report.

3.8. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL
Mouse	First Price	FP-M02	DoC
Wireless AP	Planex	GW-AP54SGX	N/A

For Test Site No: 03CH01-CB (Below 1GHz)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	1200	E2K4965AGNM
Mouse	First Price	FP-M02	DoC
Modem	ACEEX	DM1414	IFAXDM1414
Wireless AP	Planex	GW-AP54SGX	N/A

For Test Site No: 03CH01-CB (Above 1GHz)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	1200	E2K4965AGNM

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	PP25L	E2K4965AGNM

3.9. Table for Parameters of Test Software Setting

During testing, Channel and 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.

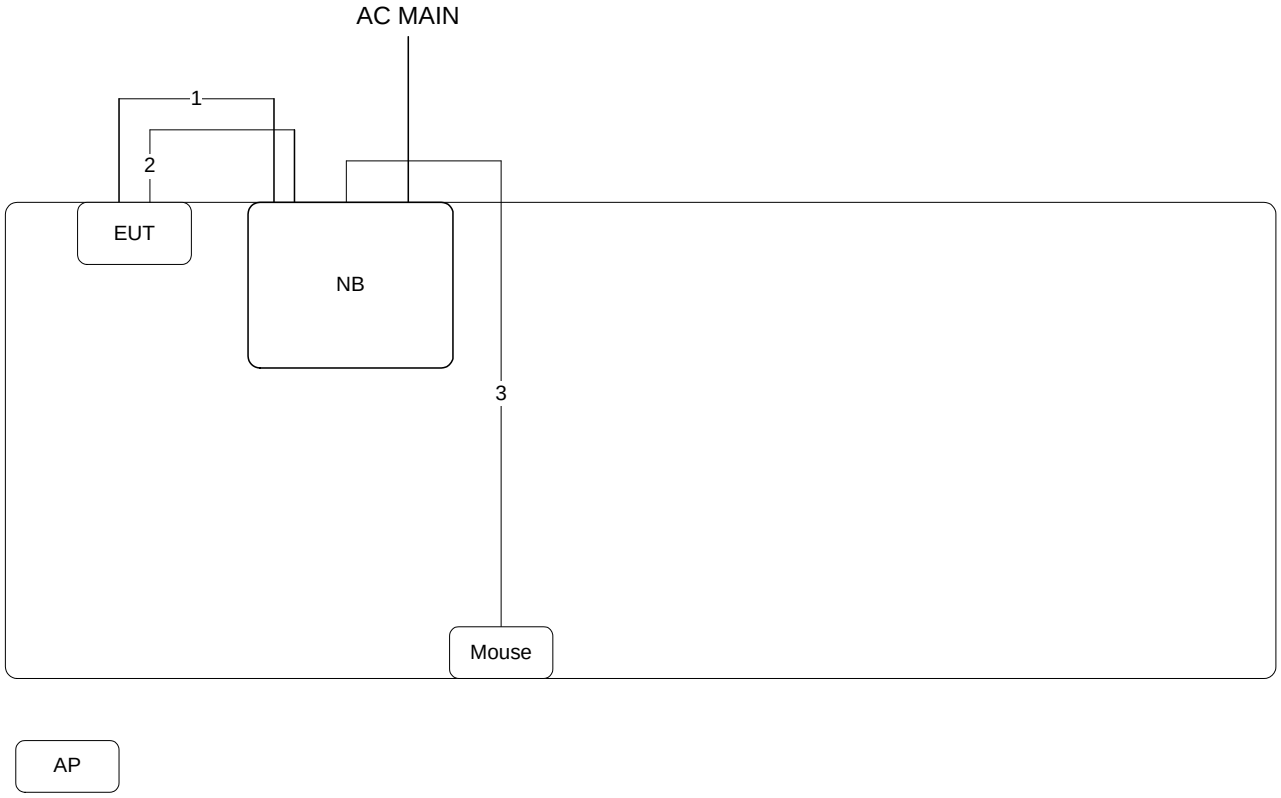
Test Software Version	MP_TEST 1.3.8.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
802.11a	63	56	49	44	46	53
802.11n MCS13 HT20	58/56	56/61	55/60	47/48	53/52	61/56
Mode	NCB: 40MHz					
802.11n MCS13 HT40	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz	
	58/63	49/54	47/48	53/53	62/57	

3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.11. Test Configurations

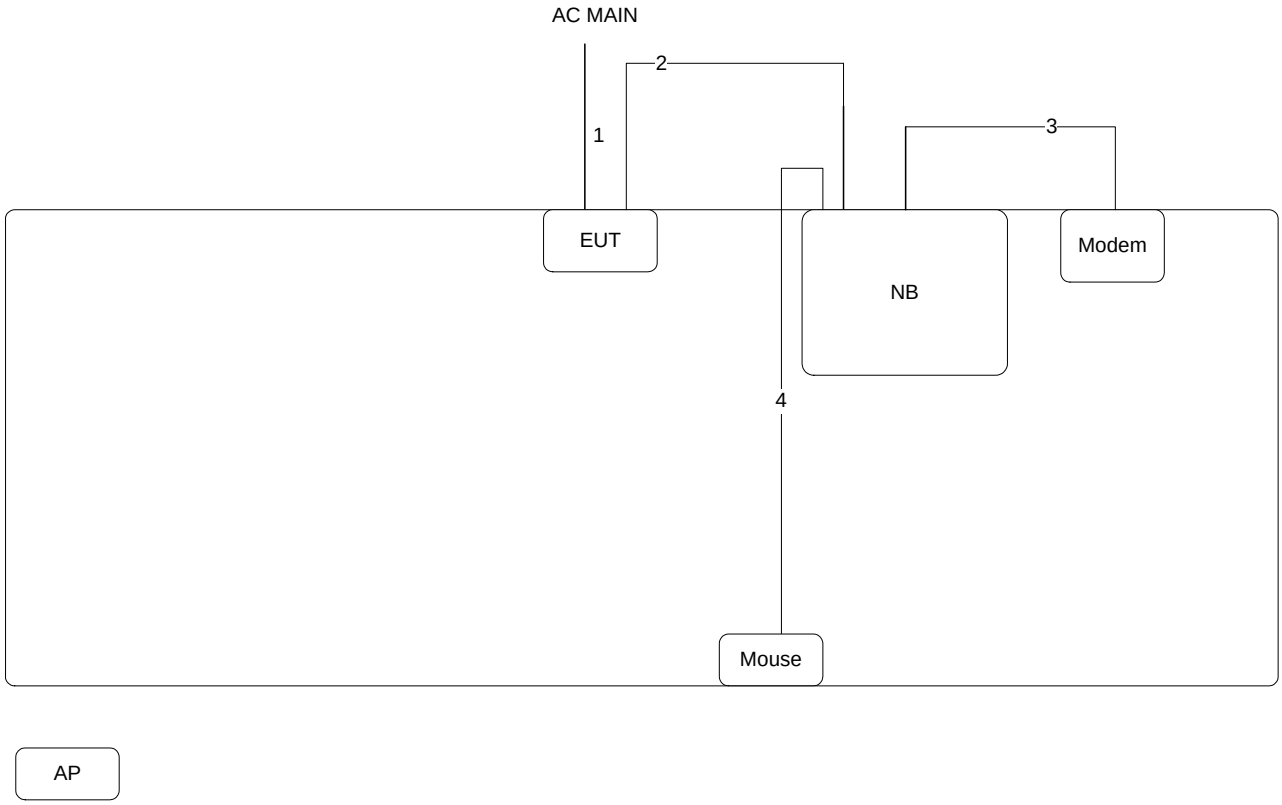
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	USB cable	Yes	1.1m
2	RJ-45 cable	No	0.82m
3	USB cable	Yes	1.8m

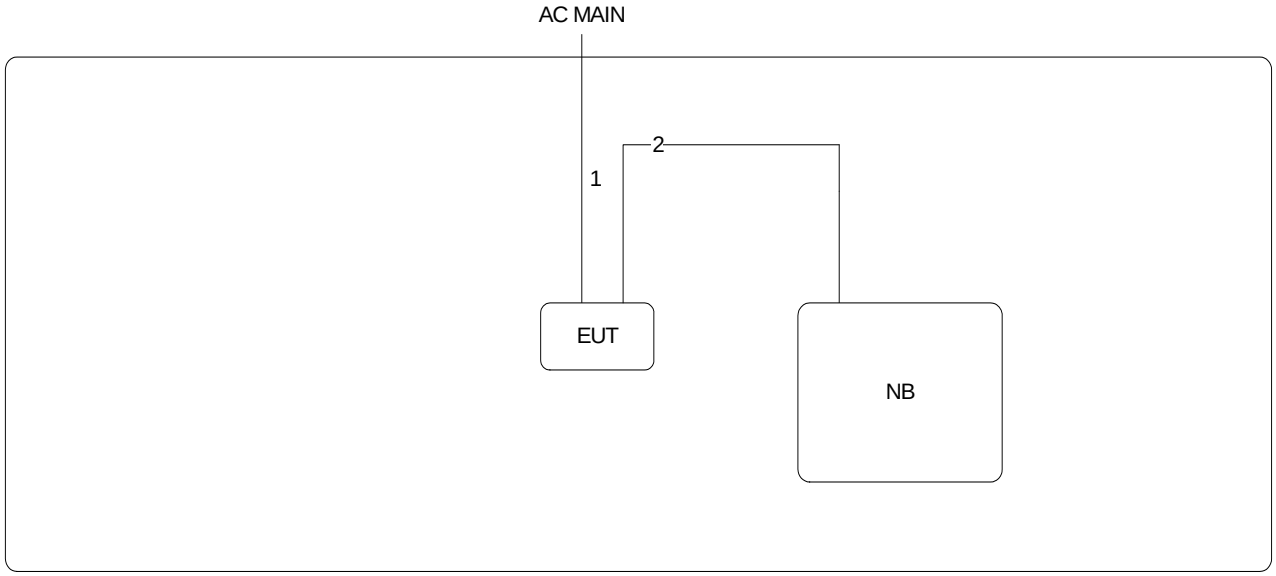
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	USB cable	Yes	1.1m
2	RJ-45 cable	No	0.82m
3	Console cable	Yes	1.33m
4	USB cable	Yes	1.8m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	USB cable	Yes	1.1m
2	RJ-45 cable	No	0.82m

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

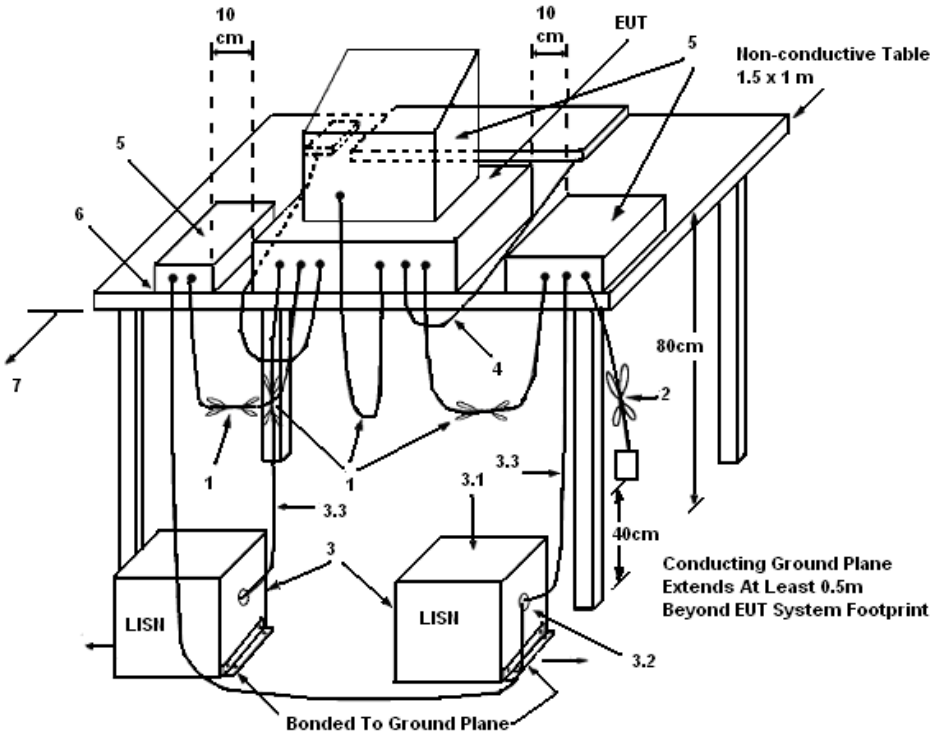
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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 C63.10. 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

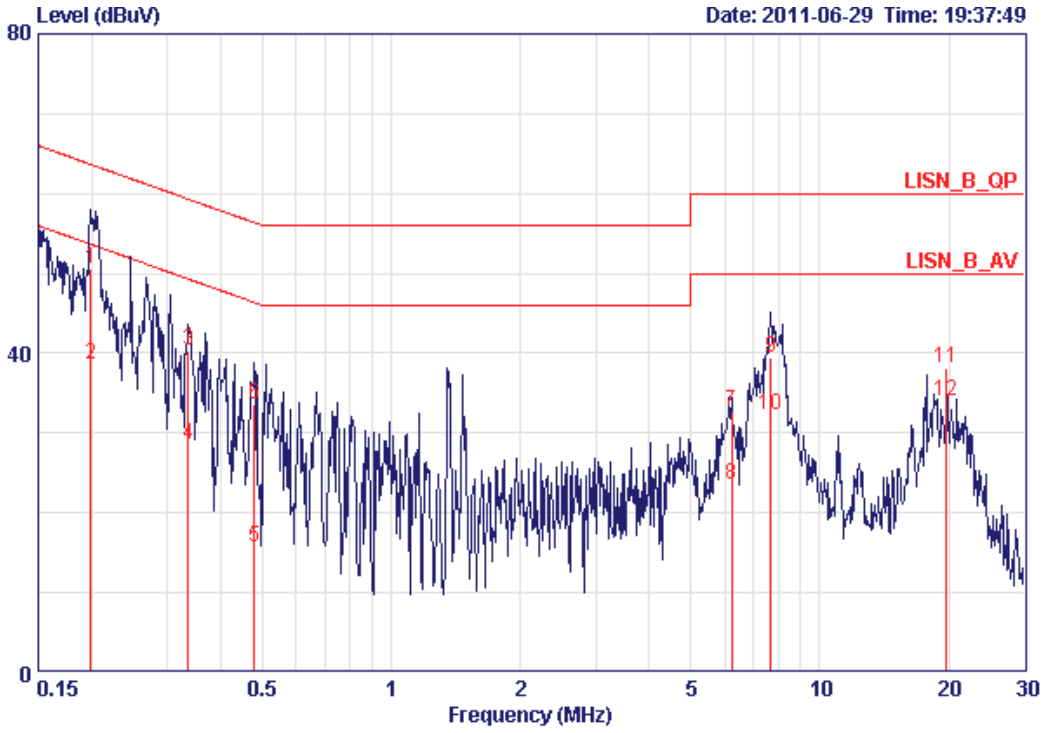
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

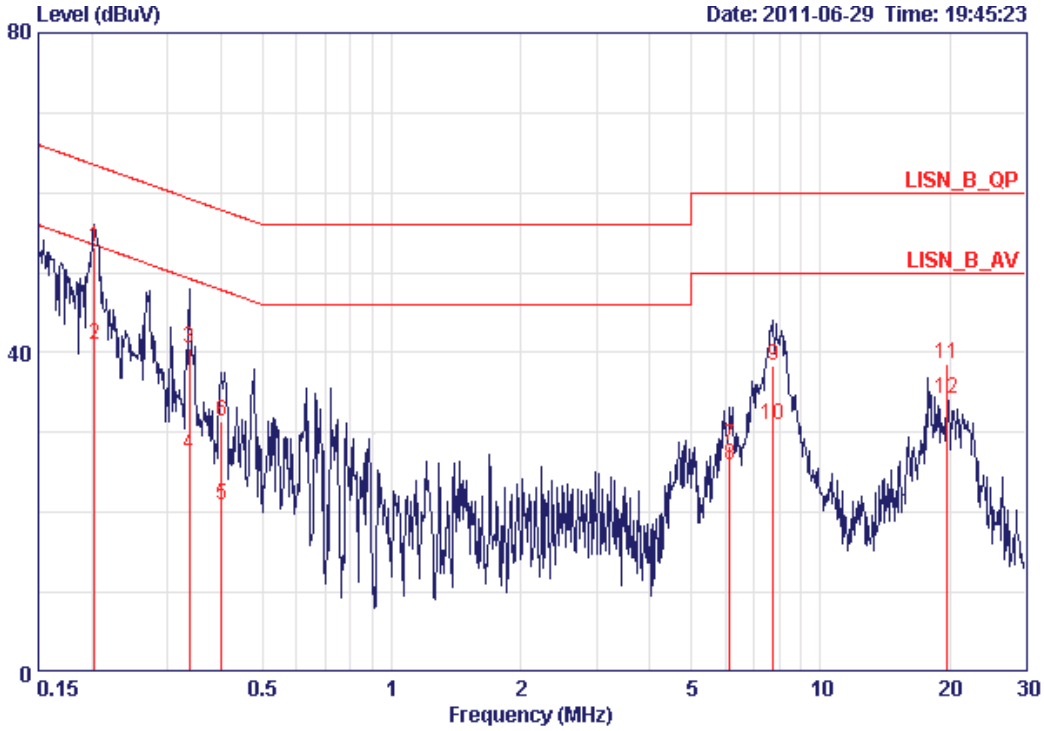
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	58%
Test Engineer	Sin Chang	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.19863	50.66	-13.01	63.67	50.41	0.05	0.20	QP
2	0.19863	38.48	-15.19	53.67	38.23	0.05	0.20	AVERAGE
3	0.33562	40.26	-19.06	59.31	40.02	0.04	0.20	QP
4	0.33562	28.66	-20.66	49.31	28.42	0.04	0.20	AVERAGE
5	0.47865	15.80	-30.56	46.36	15.64	0.03	0.13	AVERAGE
6	0.47865	33.50	-22.86	56.36	33.34	0.03	0.13	QP
7	6.219	32.70	-27.30	60.00	32.14	0.22	0.34	QP
8	6.219	23.64	-26.36	50.00	23.08	0.22	0.34	AVERAGE
9	7.687	39.41	-20.59	60.00	38.73	0.28	0.40	QP
10	7.687	32.36	-17.64	50.00	31.68	0.28	0.40	AVERAGE
11	19.740	38.21	-21.79	60.00	36.90	0.81	0.50	QP
12	19.740	33.99	-16.01	50.00	32.68	0.81	0.50	AVERAGE

Temperature	23°C	Humidity	58%
Test Engineer	Sin Chang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.20289	53.13	-10.36	63.49	52.85	0.08	0.20	QP
2	0.20289	40.91	-12.58	53.49	40.63	0.08	0.20	AVERAGE
3	0.33740	40.49	-18.77	59.27	40.22	0.07	0.20	QP
4	0.33740	27.22	-22.04	49.27	26.95	0.07	0.20	AVERAGE
5	0.40187	21.03	-26.78	47.81	20.76	0.07	0.20	AVERAGE
6	0.40187	31.38	-26.43	57.81	31.11	0.07	0.20	QP
7	6.153	28.33	-31.67	60.00	27.74	0.26	0.34	QP
8	6.153	25.95	-24.05	50.00	25.36	0.26	0.34	AVERAGE
9	7.769	38.26	-21.74	60.00	37.54	0.32	0.40	QP
10	7.769	30.98	-19.02	50.00	30.26	0.32	0.40	AVERAGE
11	19.740	38.55	-21.45	60.00	37.26	0.79	0.50	QP
12	19.740	34.31	-15.69	50.00	33.02	0.79	0.50	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

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.

26dB Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth	
Spectrum Parameters	**Setting**
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold

4.2.3. Test Procedures

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.2.4. Test Setup Layout

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

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

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

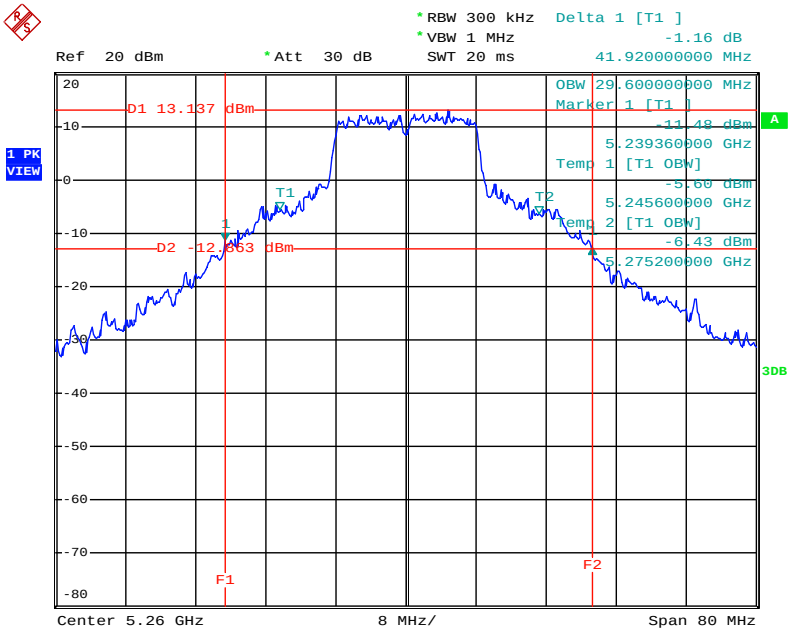
The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

Temperature	25°C	Humidity	56%
Test Engineer	Sean Ku		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5260 MHz	41.92	29.60
	5300 MHz	37.44	21.44
	5320 MHz	27.84	17.44
	5500 MHz	24.48	17.28
	5580 MHz	25.60	17.28
	5700 MHz	32.32	17.60
802.11n MCS13 HT20	5260 MHz	32.96	18.72
	5300 MHz	35.52	18.72
	5320 MHz	33.60	18.72
	5500 MHz	25.44	18.24
	5580 MHz	36.00	19.84
	5700 MHz	38.40	20.48
802.11n MCS13 HT40	5270 MHz	69.44	36.80
	5310 MHz	40.32	36.48
	5510 MHz	44.80	36.48
	5550 MHz	73.92	37.12
	5670 MHz	79.68	42.88

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5260 MHz



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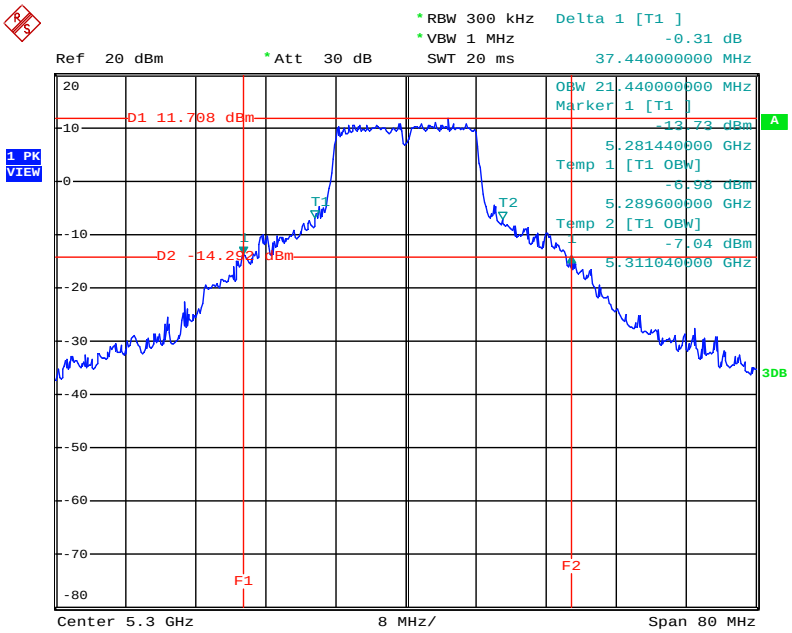
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5300 MHz



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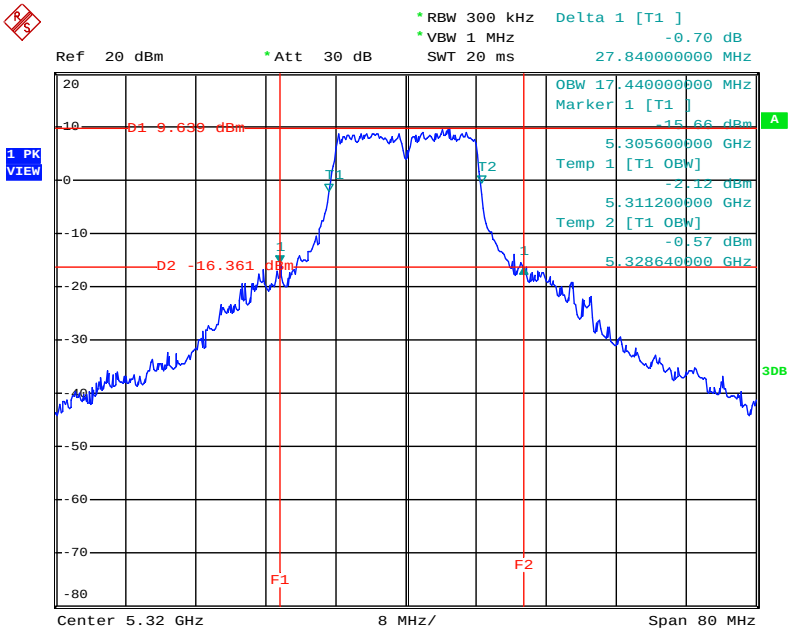
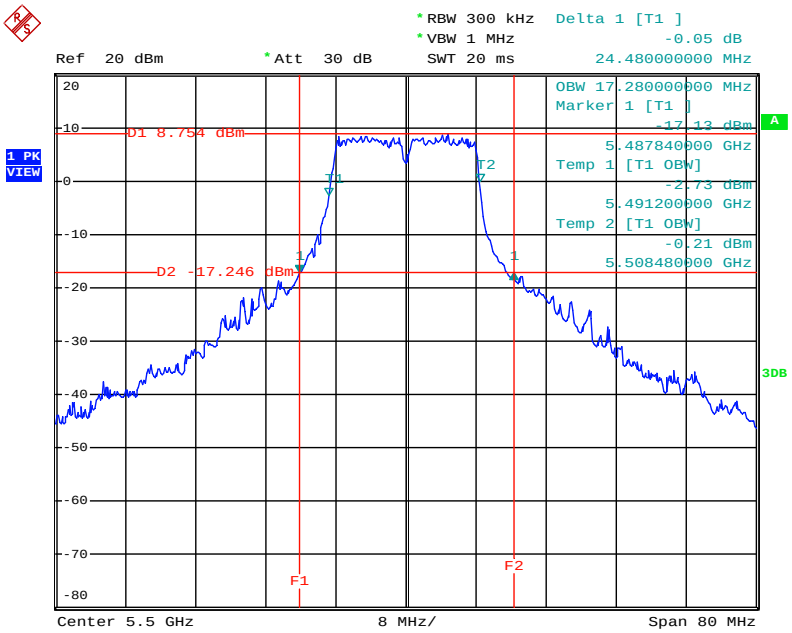
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5320 MHz



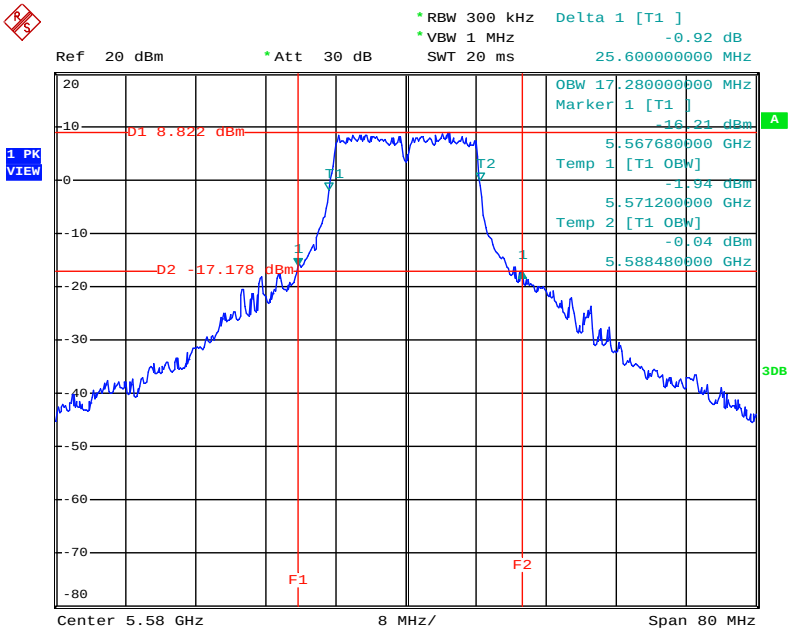
Date: 11.JUL.2011 19:36:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5500 MHz



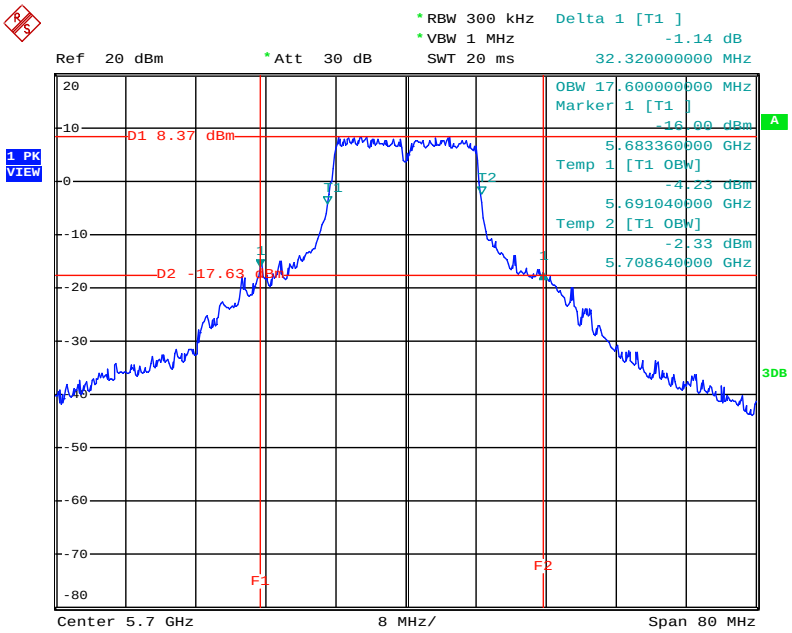
Date: 11.JUL.2011 19:38:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5580 MHz



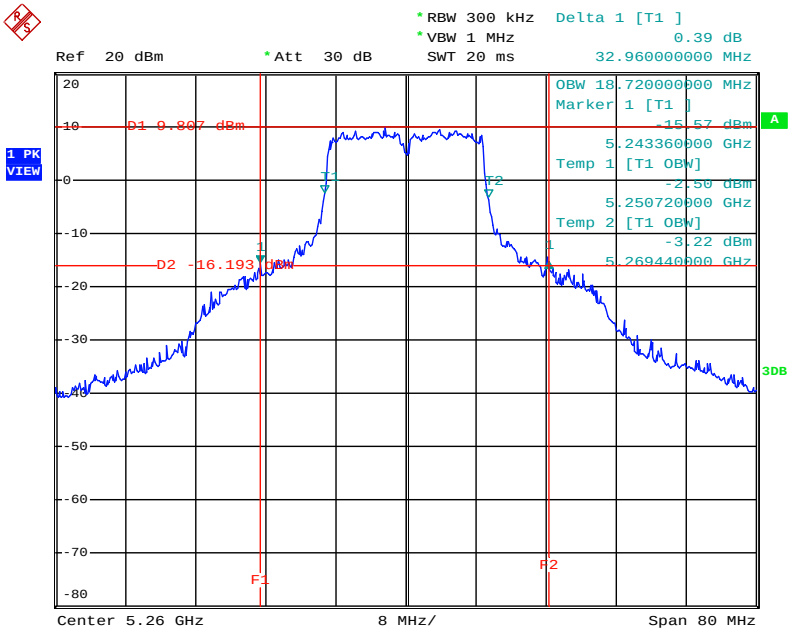
Date: 11.JUL.2011 19:39:55

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5700 MHz



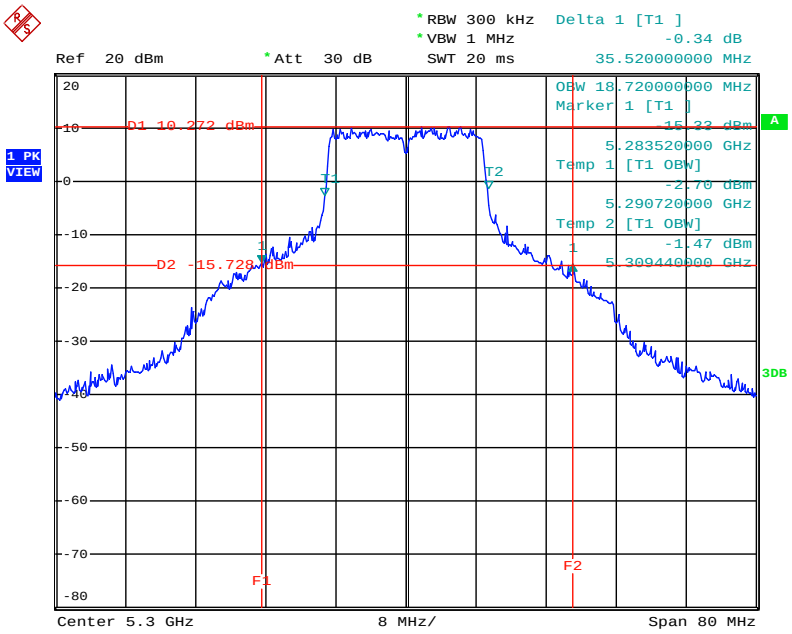
Date: 11.JUL.2011 19:41:19

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 + Chain 2 / 5260 MHz



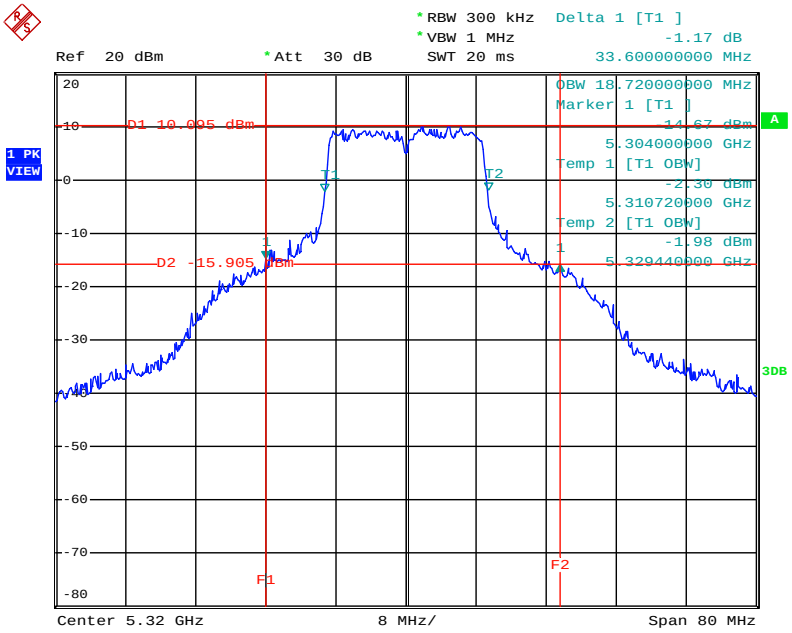
Date: 11.JUL.2011 19:59:52

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 + Chain 2 / 5300 MHz



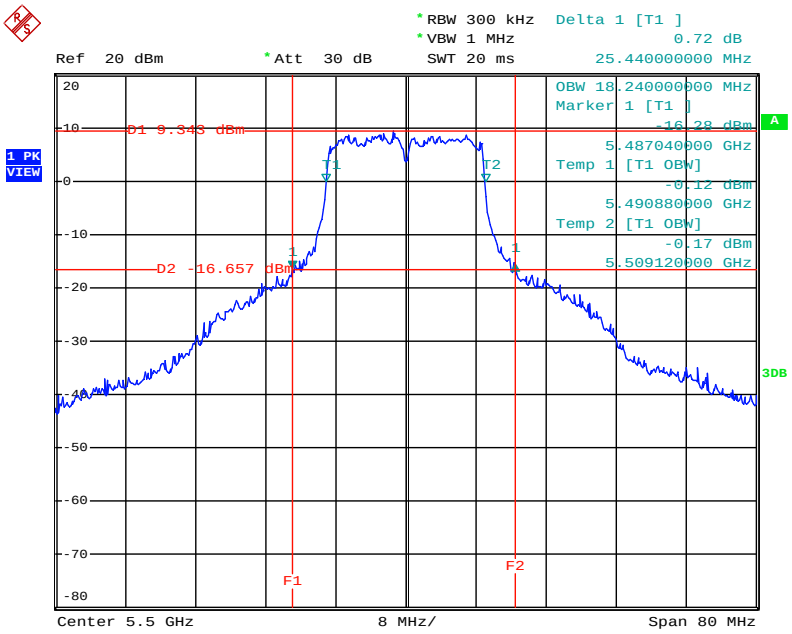
Date: 11.JUL.2011 20:01:23

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 + Chain 2 / 5320 MHz



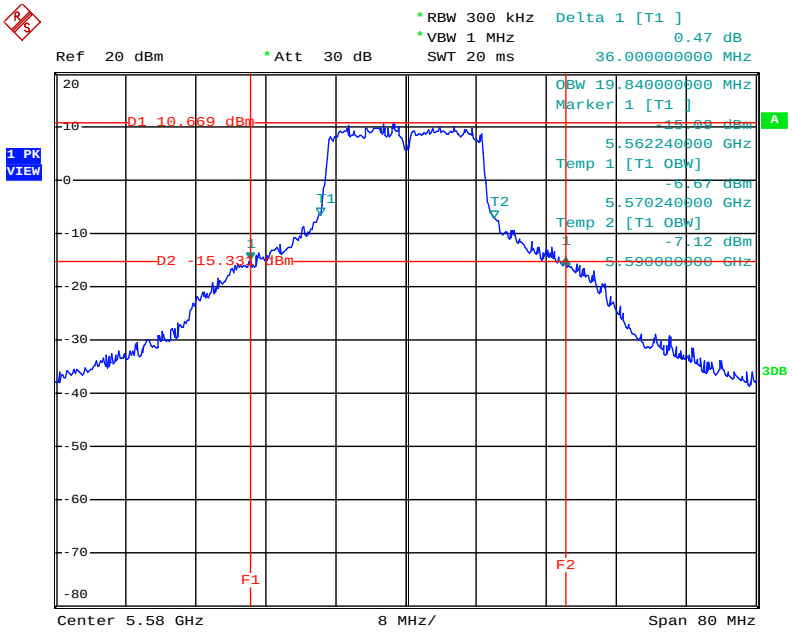
Date: 11.JUL.2011 20:02:27

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 + Chain 2 / 5500 MHz



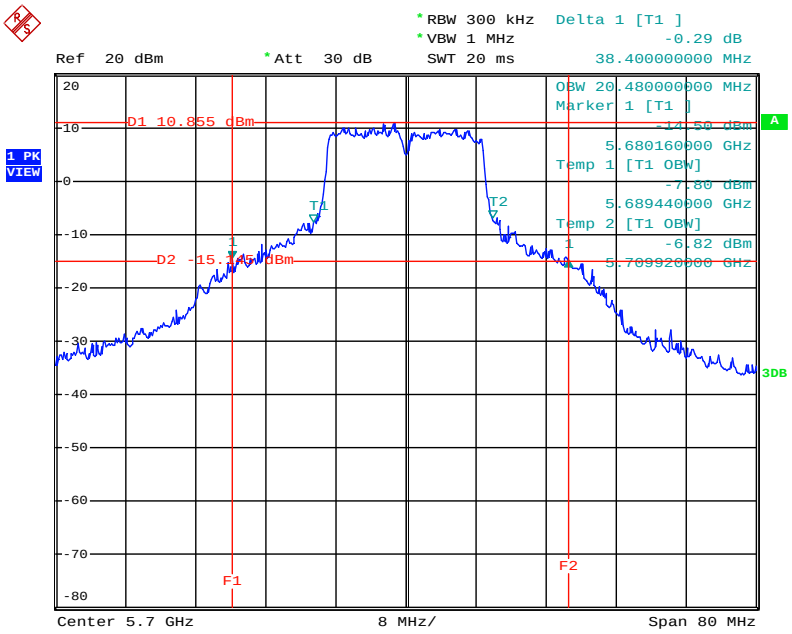
Date: 11.JUL.2011 20:06:13

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 + Chain 2 / 5580 MHz



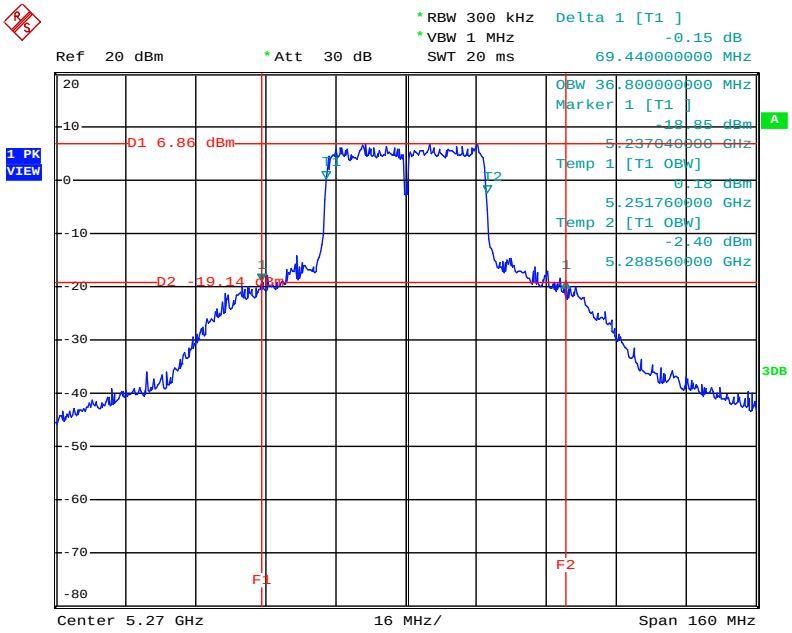
Date: 11.JUL.2011 20:07:27

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 + Chain 2 / 5700 MHz



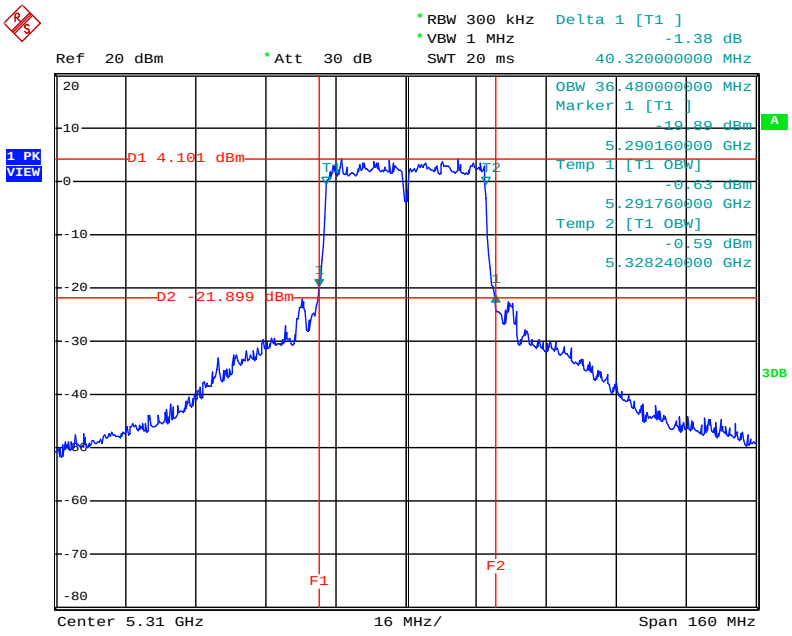
Date: 11.JUL.2011 20:08:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 1 + Chain 2 / 5270 MHz



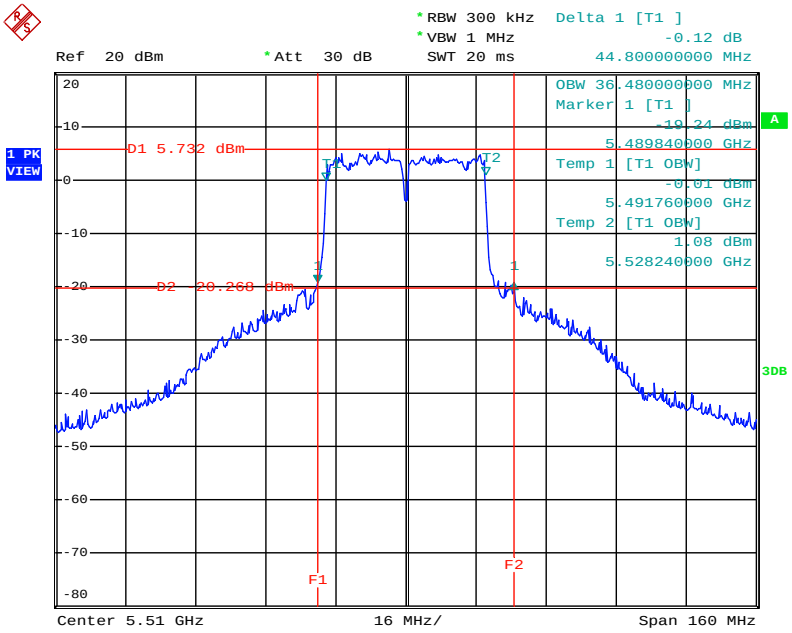
Date: 11.JUL.2011 20:20:02

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 1 + Chain 2 / 5310 MHz



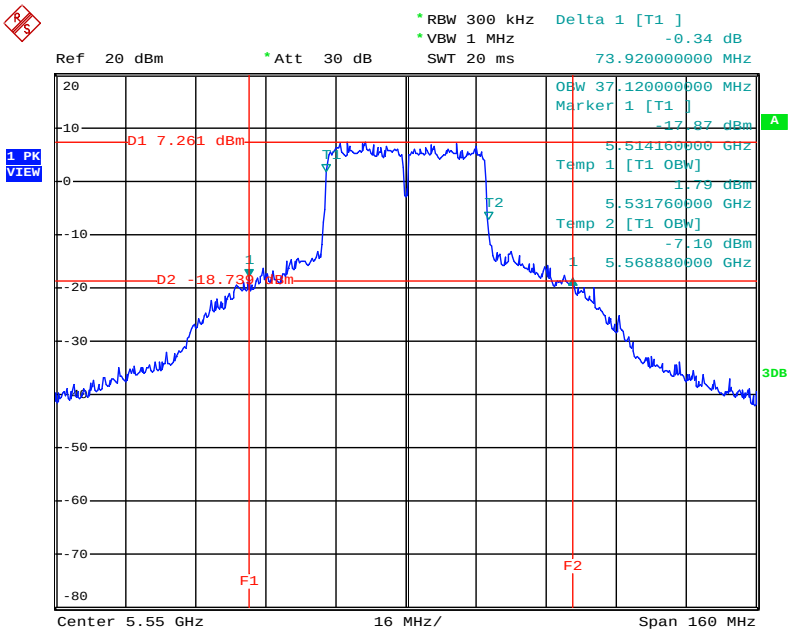
Date: 11.JUL.2011 20:23:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 1 + Chain 2 / 5510 MHz



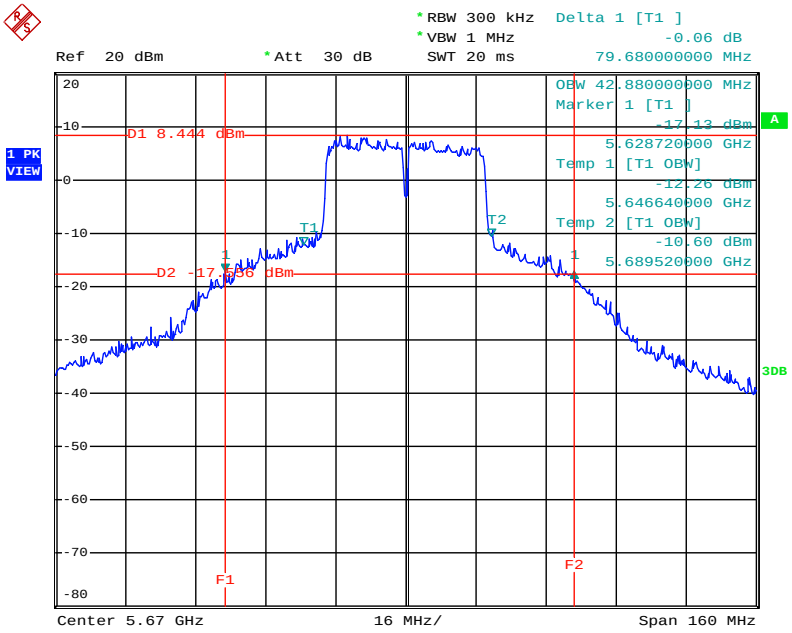
Date: 11.JUL.2011 20:10:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 1 + Chain 2 / 5550 MHz



Date: 11.JUL.2011 20:13:31

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 1 + Chain 2 / 5670 MHz



Date: 11.JUL.2011 20:15:26

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

Frequency Band		Limit
☒	5.25-5.35 GHz	The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
☒	5.470-5.725 GHz	

4.3.2. Measuring Instruments and Setting

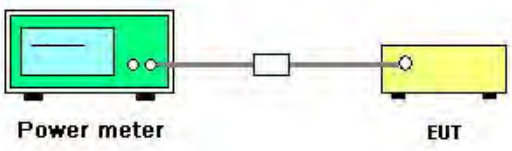
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. 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

Temperature	25°C	Humidity	56%
Test Engineer	Sean Ku	Test Date	Jul. 11, 2011

Mode	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
		Chain 1		
802.11a	5260 MHz	22.72	24.00	Complies
	5300 MHz	21.22	24.00	Complies
	5320 MHz	19.13	24.00	Complies
	5500 MHz	17.92	24.00	Complies
	5580 MHz	18.50	24.00	Complies
	5700 MHz	18.85	24.00	Complies

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
802.11n MCS13 HT20	5260 MHz	19.75	19.52	22.65	24.00	Complies
	5300 MHz	19.12	19.09	22.12	24.00	Complies
	5320 MHz	18.80	18.84	21.83	24.00	Complies
	5500 MHz	16.65	16.33	19.50	24.00	Complies
	5580 MHz	18.54	18.18	21.37	24.00	Complies
	5700 MHz	18.95	18.96	21.97	24.00	Complies
802.11n MCS13 HT40	5270 MHz	19.81	19.63	22.73	24.00	Complies
	5310 MHz	16.60	16.69	19.66	24.00	Complies
	5510 MHz	16.89	16.39	19.66	24.00	Complies
	5550 MHz	18.86	18.28	21.59	24.00	Complies
	5670 MHz	19.82	19.46	22.65	24.00	Complies

4.4. Power Spectral Density Measurement

4.4.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Band		Limit
☒	5.25-5.35 GHz	11 dBm/MHz
☒	5.470-5.725 GHz	11 dBm/MHz

4.4.2. Measuring Instruments and Setting

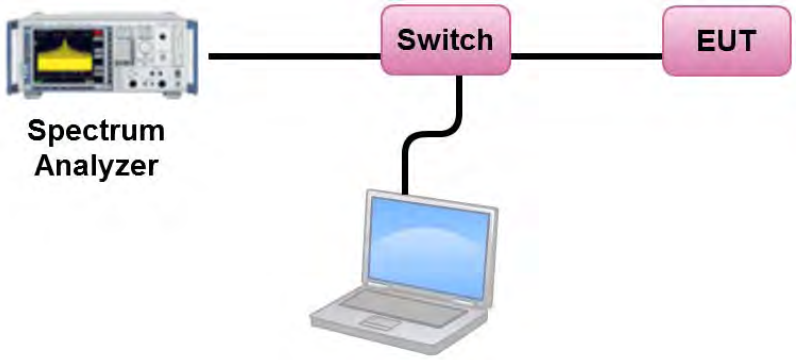
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	56%
Test Engineer	Sean Ku	Test Date	Jul. 11, 2011

Configuration IEEE 802.11a / Chain 1

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
52	5260 MHz	9.42	11.00	Complies
60	5300 MHz	8.41	11.00	Complies
64	5320 MHz	6.50	11.00	Complies
100	5500 MHz	5.33	11.00	Complies
116	5580 MHz	5.99	11.00	Complies
140	5700 MHz	6.04	11.00	Complies

Configuration IEEE 802.11n MCS13 HT20

Channel	Frequency	Power Density (dBm/3kHz)		Total Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
		Chain 1	Chain 2			
52	5260 MHz	6.88	3.36	8.48	11.00	Complies
60	5300 MHz	6.93	6.45	9.71	11.00	Complies
64	5320 MHz	6.46	7.32	9.92	11.00	Complies
100	5500 MHz	5.17	4.10	7.68	11.00	Complies
116	5580 MHz	6.37	5.91	9.16	11.00	Complies
140	5700 MHz	6.30	6.22	9.27	11.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.54dBi <6dBi, so the limit doesn't reduce.

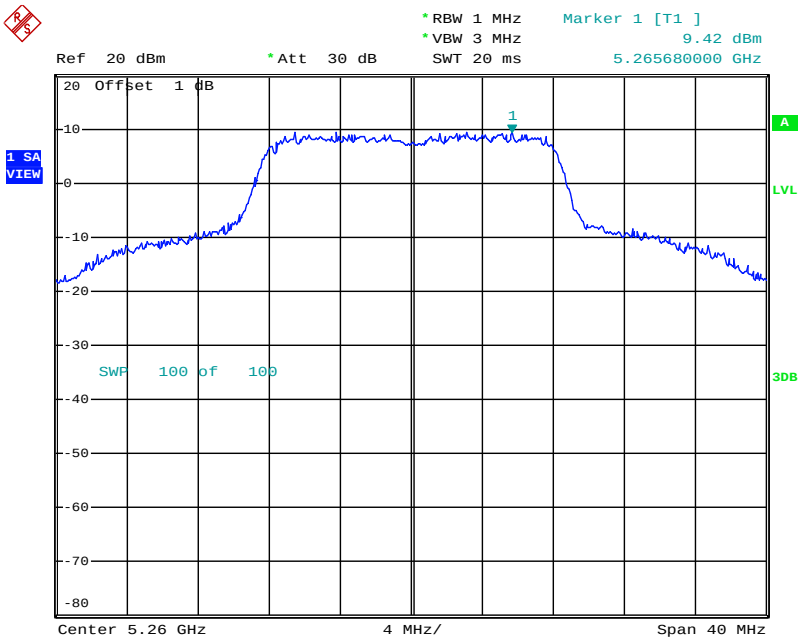
Configuration IEEE 802.11n MCS13 HT40

Channel	Frequency	Power Density (dBm/3kHz)		Total Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
		Chain 1	Chain 2			
54	5270 MHz	4.39	4.09	7.25	11.00	Complies
62	5310 MHz	0.16	1.17	3.70	11.00	Complies
102	5510 MHz	2.41	1.49	4.98	11.00	Complies
110	5550 MHz	-0.41	3.08	4.69	11.00	Complies
134	5670 MHz	4.94	3.57	7.32	11.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.54dBi <6dBi, so the limit doesn't reduce.

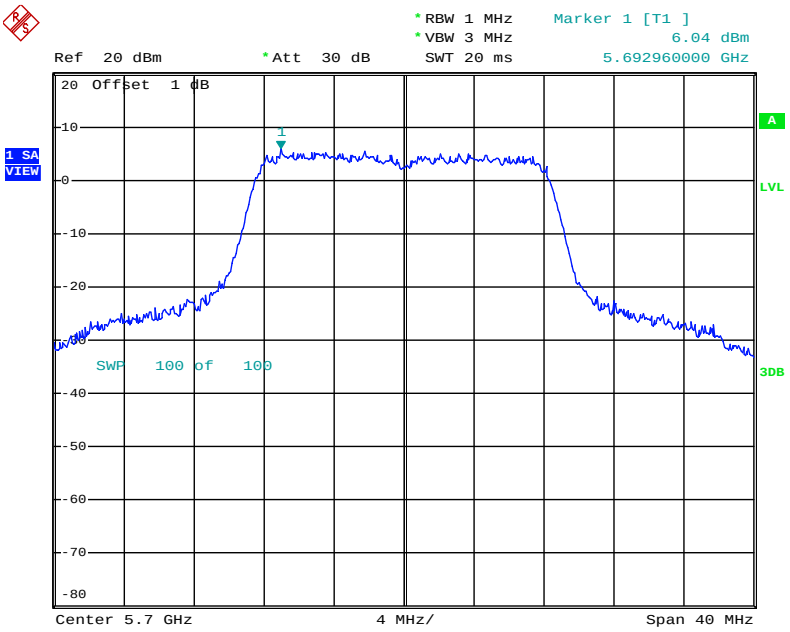
Note: All the test values were listed in the report.
For plots, only the channel with worse result was shown.

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5260 MHz



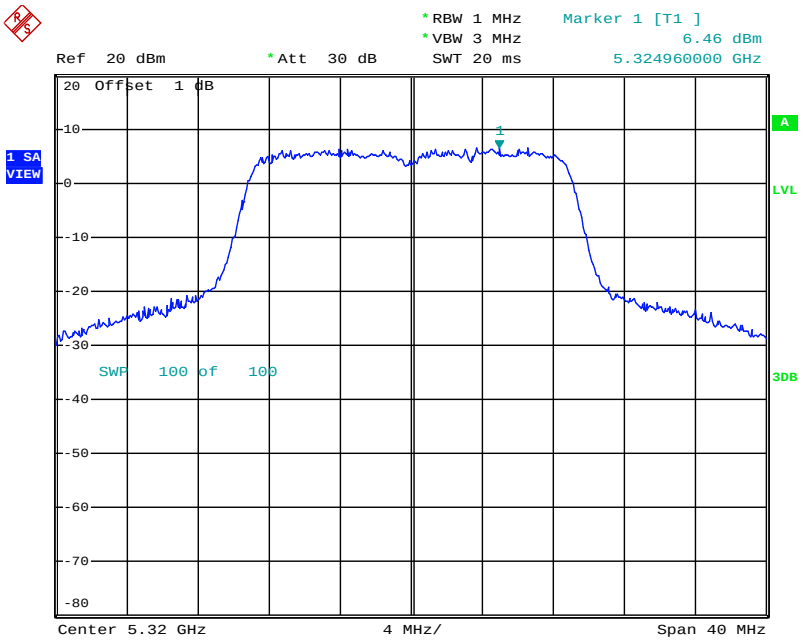
Date: 11.JUL.2011 21:51:31

Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5700 MHz



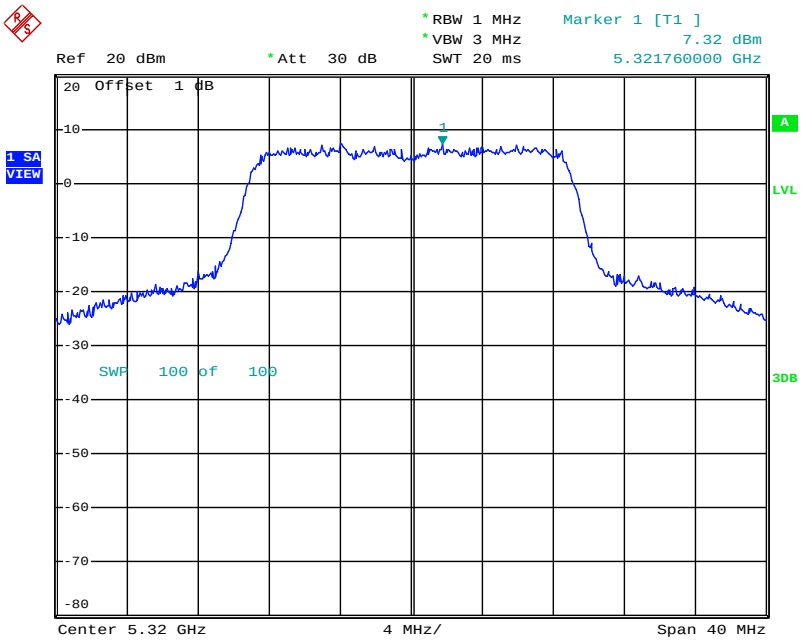
Date: 11.JUL.2011 21:58:50

Power Density Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 / 5320 MHz



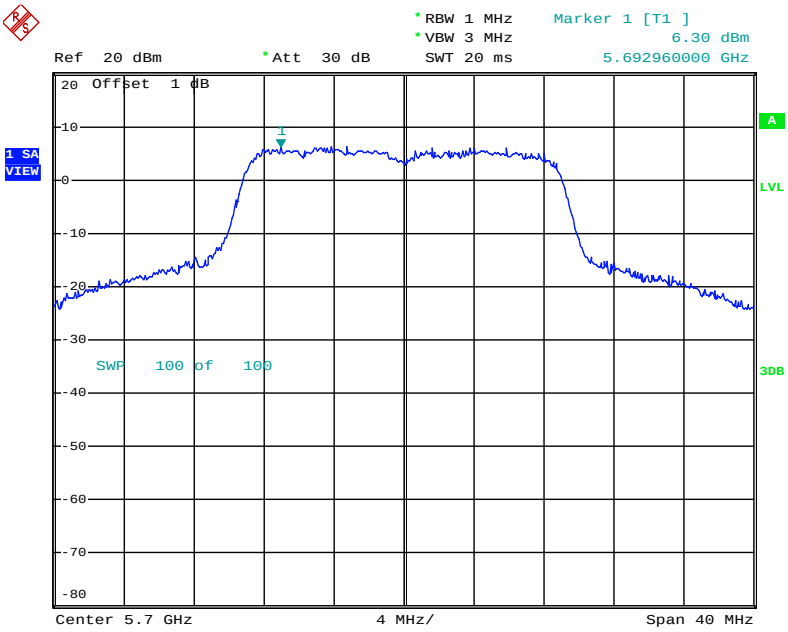
Date: 11.JUL.2011 21:38:30

Power Density Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 2 / 5320 MHz



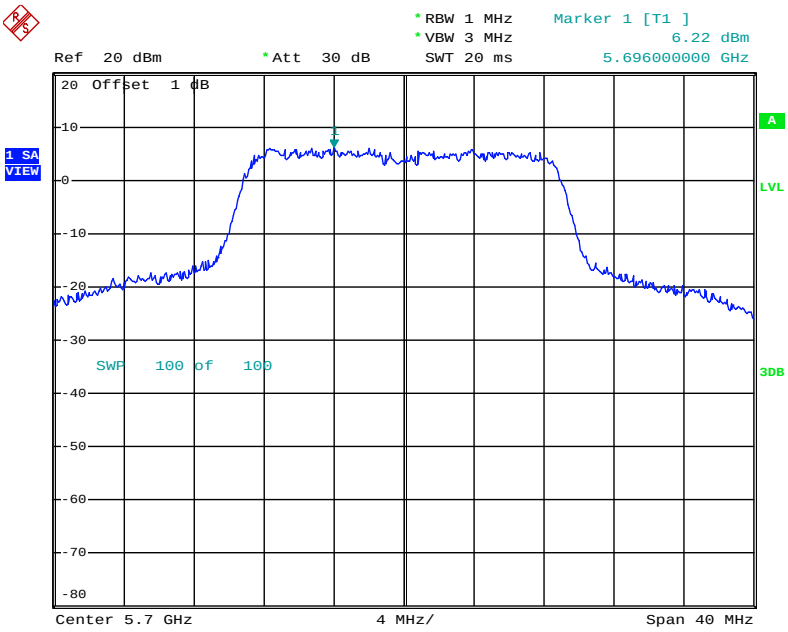
Date: 11.JUL.2011 21:37:34

Power Density Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 1 / 5700 MHz



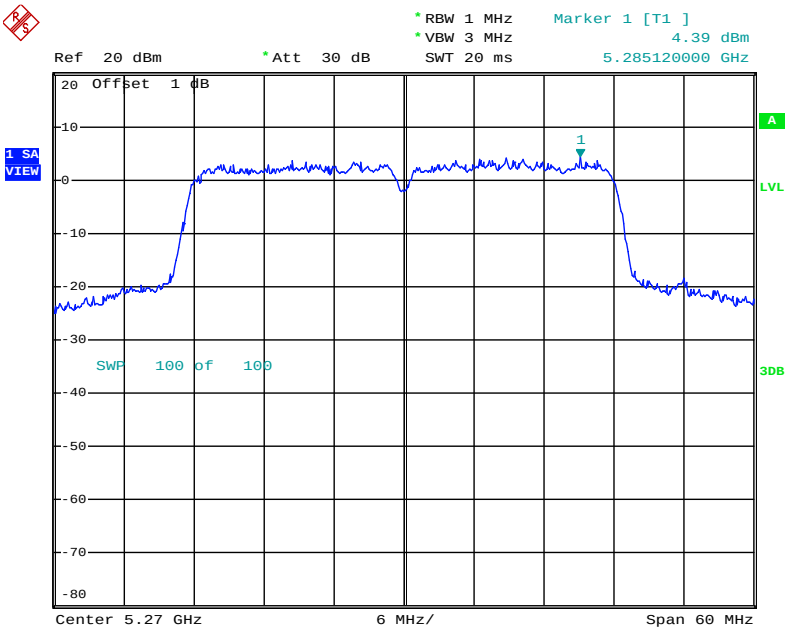
Date: 11.JUL.2011 21:44:34

Power Density Plot on Configuration IEEE 802.11n MCS13 HT20 / Chain 2 / 5700 MHz



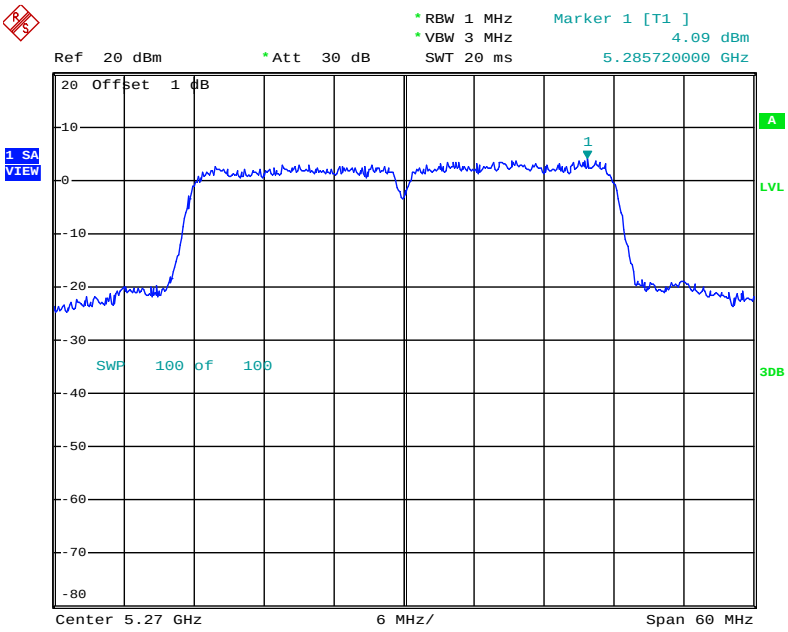
Date: 11.JUL.2011 21:45:27

Power Density Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 1 / 5270 MHz



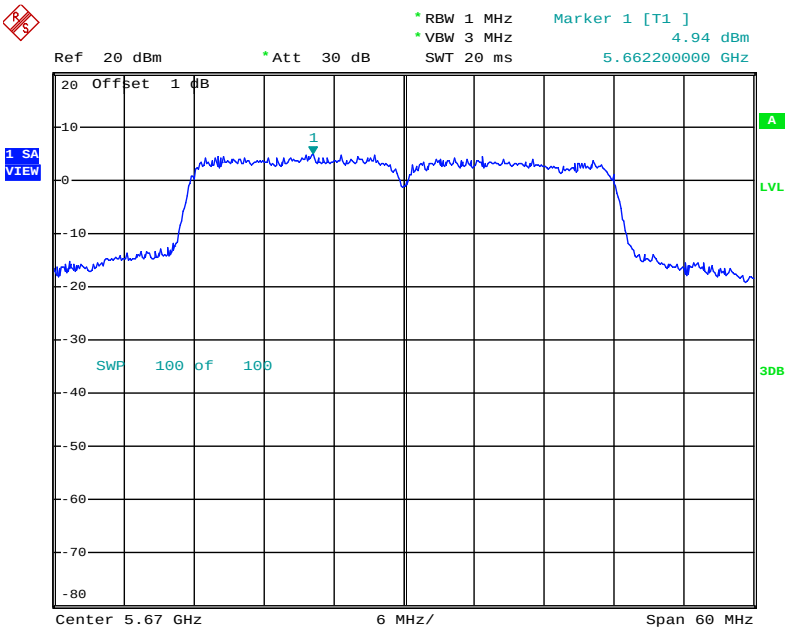
Date: 11.JUL.2011 20:35:30

Power Density Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 2 / 5270 MHz



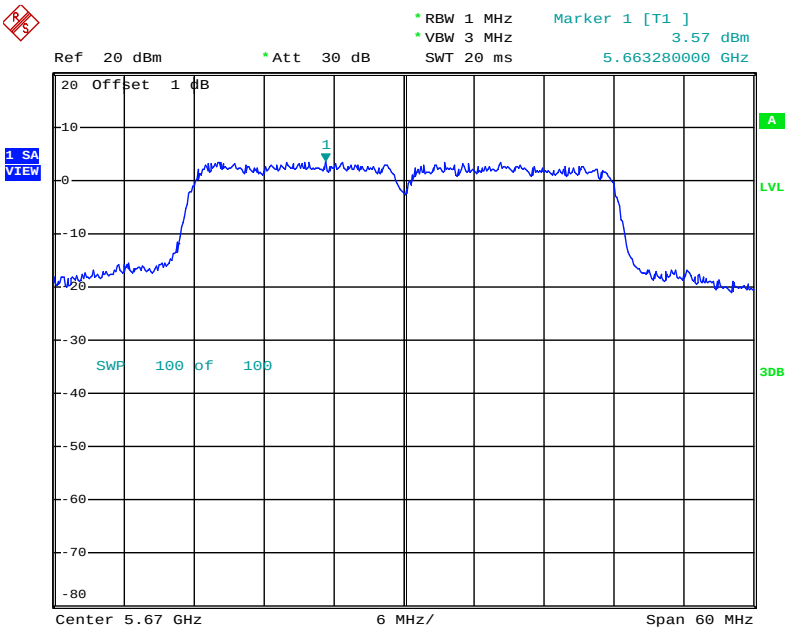
Date: 11.JUL.2011 20:34:51

Power Density Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 1 / 5670 MHz



Date: 11.JUL.2011 20:41:58

Power Density Plot on Configuration IEEE 802.11n MCS13 HT40 / Chain 2 / 5670 MHz



Date: 11.JUL.2011 20:43:01

4.5. Radiated Emissions Measurement

4.5.1. Limit

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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

4.5.2. Measuring Instruments and Setting

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

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

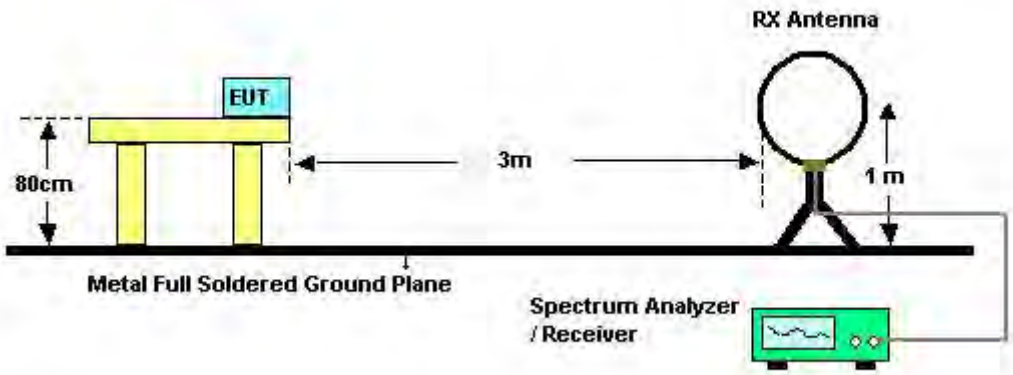
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

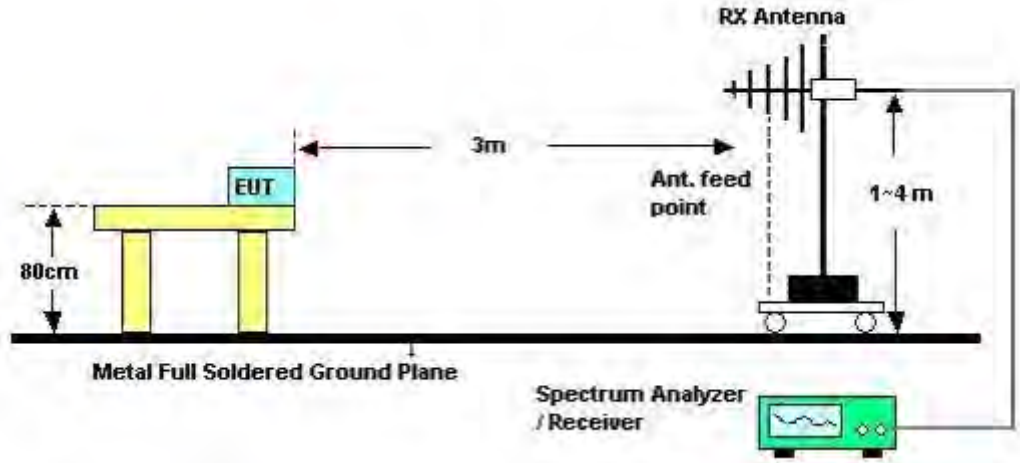
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting 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. 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.
8. 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.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.5.4. Test Setup Layout

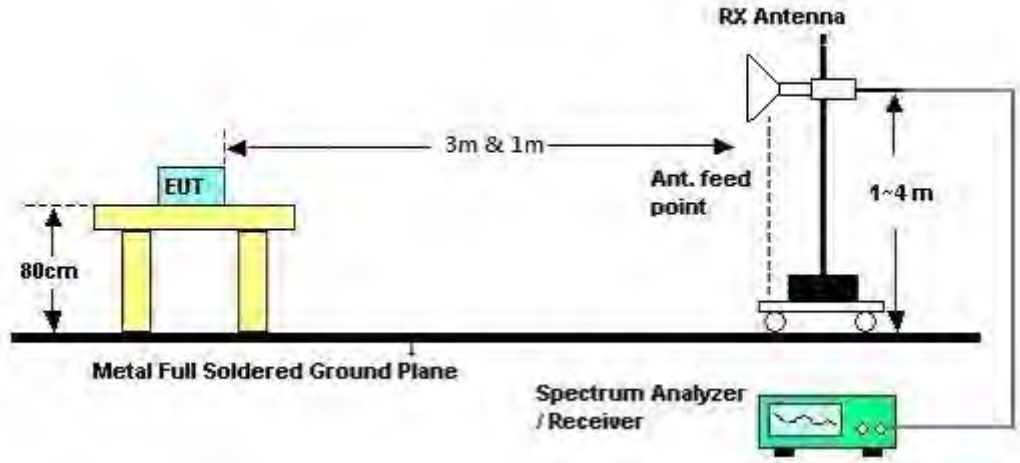
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	20°C	Humidity	65%
Test Engineer	Serway	Configurations	Normal Link
Test Date	Jul. 07, 2011	Test Mode	Mode 1

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.

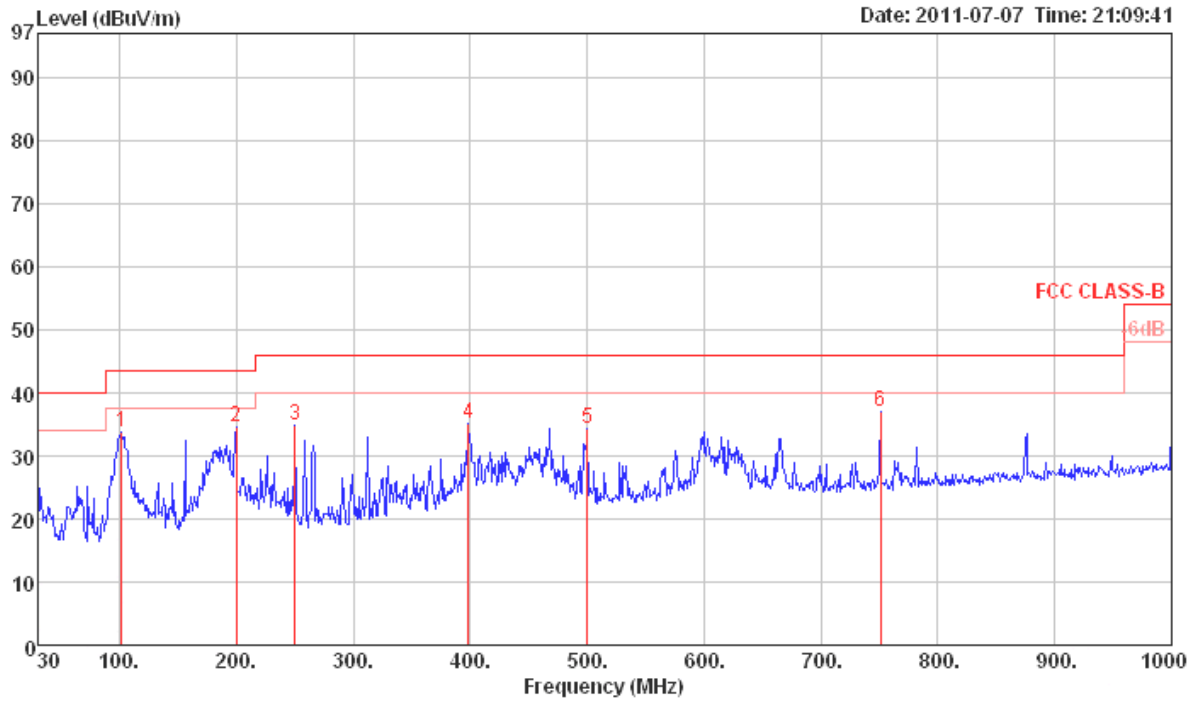
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

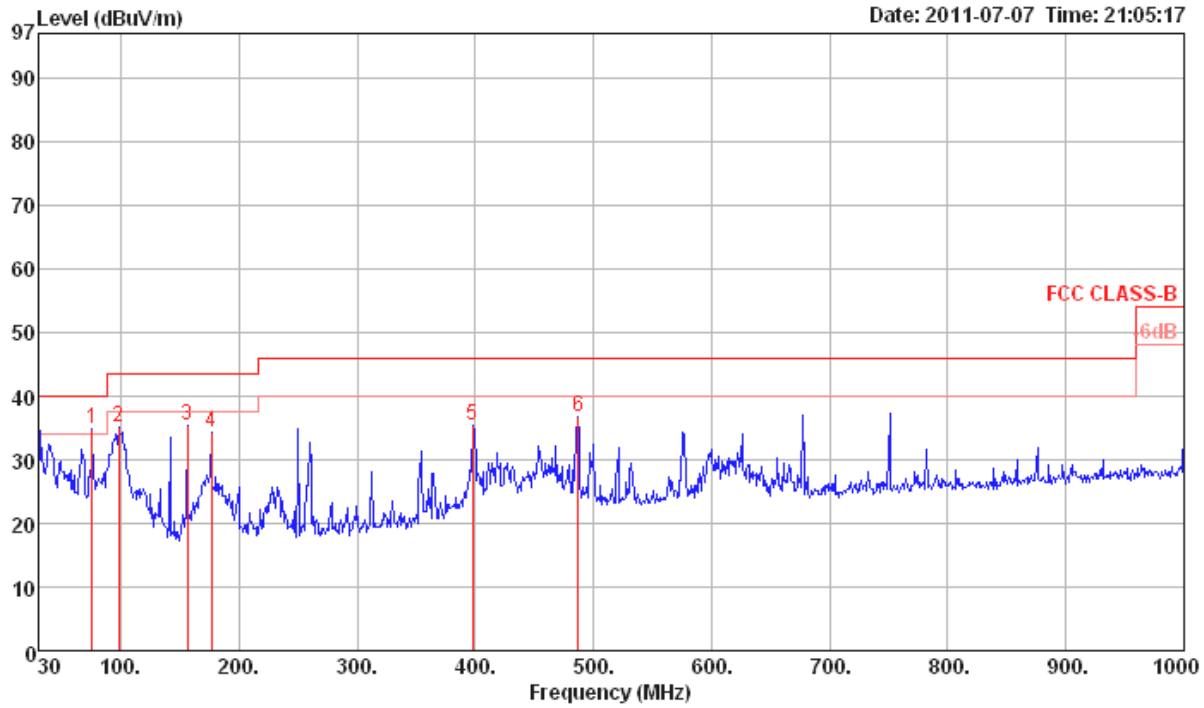
Temperature	20°C	Humidity	65%
Test Engineer	Serway	Configurations	Normal Link
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		
1	101.78	33.65	43.50	-9.85	48.90	1.20	11.14	27.59	Peak	HORIZONTAL
2	199.75	34.58	43.50	-8.92	50.93	1.70	9.05	27.10	Peak	HORIZONTAL
3	250.19	34.79	46.00	-11.21	47.12	1.90	12.77	27.00	Peak	HORIZONTAL
4	398.60	35.08	46.00	-10.92	44.34	2.30	16.03	27.59	Peak	HORIZONTAL
5	500.45	34.43	46.00	-11.57	42.20	2.70	17.63	28.10	Peak	HORIZONTAL
6	750.71	37.08	46.00	-8.92	41.95	3.50	19.43	27.80	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		
1	75.59	34.87	40.00	-5.13	54.71	0.93	6.93	27.70	Peak	VERTICAL
2	97.90	35.14	43.50	-8.36	51.00	1.16	10.59	27.61	Peak	VERTICAL
3	156.10	35.35	43.50	-8.15	49.23	1.48	11.96	27.32	Peak	VERTICAL
4	176.47	34.39	43.50	-9.11	46.90	1.58	13.13	27.22	Peak	VERTICAL
5	397.63	35.35	46.00	-10.65	44.62	2.30	16.01	27.58	Peak	VERTICAL
6	486.87	36.71	46.00	-9.29	44.65	2.67	17.42	28.03	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.

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

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 52 / Chain 1
Test Date	Jul. 07, 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	15778.72	55.23	60.00	-4.77	47.10	6.14	37.41	35.42	296	100	Average	HORIZONTAL
2	15779.19	67.03	80.00	-12.97	58.90	6.14	37.41	35.42	296	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	15778.80	47.88	60.00	-12.12	39.75	6.14	37.41	35.42	338	100	Average	VERTICAL
2	15779.20	60.05	80.00	-19.95	51.92	6.14	37.41	35.42	338	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 60 / Chain 1
Test Date	Jul. 07, 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	10602.56	59.43	60.00	-0.57	51.46	5.01	38.38	35.42	27	101	Average	HORIZONTAL
2	10602.56	70.03	80.00	-9.97	62.06	5.01	38.38	35.42	27	101	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	10602.56	58.15	60.00	-1.85	50.18	5.01	38.38	35.42	71	104	Average	VERTICAL
2	10602.56	68.23	80.00	-11.77	60.26	5.01	38.38	35.42	71	104	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 64 / Chain 1
Test Date	Jul. 07, 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	10638.30	70.47	80.00	-9.53	62.48	5.01	38.37	35.39	293	105	Peak	HORIZONTAL
2	10638.50	59.46	60.00	-0.54	51.47	5.01	38.37	35.39	293	105	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	10640.16	55.70	60.00	-4.30	47.71	5.01	38.37	35.39	4	100	Average	VERTICAL
2	10640.64	68.44	80.00	-11.56	60.45	5.01	38.37	35.39	4	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 100 / Chain 1
Test Date	Jul. 07, 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	10998.72	59.29	60.00	-0.71	51.06	5.01	38.32	35.10	164	101	Average	HORIZONTAL
2	10998.97	70.31	80.00	-9.69	62.08	5.01	38.32	35.10	164	101	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	10998.80	55.50	60.00	-4.50	47.29	5.01	38.30	35.10	73	100	Average	VERTICAL
2	10999.29	66.70	80.00	-13.30	58.49	5.01	38.30	35.10	73	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 116 / Chain 1
Test Date	Jul. 07, 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	11157.67	72.20	80.00	-7.80	63.87	5.04	38.45	35.16	291	103	Peak	HORIZONTAL
2	11158.54	59.86	60.00	-0.14	51.52	5.04	38.47	35.17	291	103	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	11157.61	65.93	80.00	-14.07	57.60	5.04	38.45	35.16	149	100	Peak	VERTICAL
2	11158.08	54.07	60.00	-5.93	45.74	5.04	38.45	35.16	149	100	Average	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 140 / Chain 1
Test Date	Jul. 07, 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	11398.31	70.82	80.00	-9.18	62.27	5.10	38.70	35.25	238	102	Peak	HORIZONTAL
2	11398.50	59.42	60.00	-0.58	50.87	5.10	38.70	35.25	238	102	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	11398.26	64.25	80.00	-15.75	55.70	5.10	38.70	35.25	148	100	Peak	VERTICAL
2	11398.72	53.39	60.00	-6.61	44.84	5.10	38.70	35.25	148	100	Average	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 52 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	15780.52	65.30	80.00	-14.70	57.17	6.14	37.41	35.42	301	100	Peak	HORIZONTAL
2	15780.72	53.76	60.00	-6.24	45.63	6.14	37.41	35.42	301	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	15778.80	50.01	60.00	-9.99	41.88	6.14	37.41	35.42	24	100	Average	VERTICAL
2	15779.24	61.79	80.00	-18.21	53.66	6.14	37.41	35.42	24	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 60 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	10600.72	59.04	60.00	-0.96	51.07	5.01	38.38	35.42	295	105	Average	HORIZONTAL
2	10600.72	70.36	80.00	-9.64	62.39	5.01	38.38	35.42	295	105	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	10600.40	53.83	60.00	-6.17	45.86	5.01	38.38	35.42	67	100	Average	VERTICAL
2	10600.40	66.50	80.00	-13.50	58.53	5.01	38.38	35.42	67	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 64 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	10639.44	58.11	60.00	-1.89	50.12	5.01	38.37	35.39	187	122	Average	HORIZONTAL
2	10639.92	68.91	80.00	-11.09	60.92	5.01	38.37	35.39	187	122	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	10639.52	55.94	60.00	-4.06	47.95	5.01	38.37	35.39	357	100	Average	VERTICAL
2	10639.97	66.39	80.00	-13.61	58.40	5.01	38.37	35.39	357	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 100 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	10999.67	71.57	80.00	-8.43	63.34	5.01	38.32	35.10	293	104	Peak	HORIZONTAL
2	10999.74	59.69	60.00	-0.31	51.46	5.01	38.32	35.10	293	104	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	10999.28	55.17	60.00	-4.83	46.96	5.01	38.30	35.10	14	100	Average	VERTICAL
2	10999.29	66.61	80.00	-13.39	58.40	5.01	38.30	35.10	14	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 116 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	11158.68	71.55	80.00	-8.45	63.21	5.04	38.47	35.17	292	102	Peak	HORIZONTAL
2	11159.28	59.73	60.00	-0.27	51.39	5.04	38.47	35.17	292	102	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	11159.20	57.25	60.00	-2.75	48.91	5.04	38.47	35.17	190	121	Average	VERTICAL
2	11159.30	69.34	80.00	-10.66	61.00	5.04	38.47	35.17	190	121	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 140 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	11399.44	59.42	60.00	-0.58	50.87	5.10	38.70	35.25	238	102	Average	HORIZONTAL
2	11399.63	70.09	80.00	-9.91	61.54	5.10	38.70	35.25	238	102	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	11399.07	66.33	80.00	-13.67	57.78	5.10	38.70	35.25	139	100	Peak	VERTICAL
2	11399.20	55.05	60.00	-4.95	46.50	5.10	38.70	35.25	139	100	Average	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT40 CH 54 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	15798.69	48.00	60.00	-12.00	39.90	6.14	37.39	35.43	300	100	Average	HORIZONTAL
2	15799.01	60.45	80.00	-19.55	52.35	6.14	37.39	35.43	300	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	15795.58	43.54	60.00	-16.46	35.44	6.14	37.39	35.43	25	100	Average	VERTICAL
2	15795.72	55.68	80.00	-24.32	47.58	6.14	37.39	35.43	25	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11nMCS13 HT40 CH 62 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	10619.28	51.56	60.00	-8.44	43.59	5.01	38.38	35.42	165	106	Average	HORIZONTAL
2	10619.61	63.47	80.00	-16.53	55.50	5.01	38.38	35.42	165	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	10619.42	59.96	80.00	-20.04	51.99	5.01	38.38	35.42	356	100	Peak	VERTICAL
2	10619.52	48.18	60.00	-11.82	40.21	5.01	38.38	35.42	356	100	Average	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT40 CH 102 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	11019.36	55.97	60.00	-4.03	47.73	5.02	38.33	35.11	293	104	Average	HORIZONTAL
2	11019.75	68.75	80.00	-11.25	60.51	5.02	38.33	35.11	293	104	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	11019.36	52.13	60.00	-7.87	43.90	5.02	38.32	35.11	15	100	Average	VERTICAL
2	11019.82	63.01	80.00	-16.99	54.78	5.02	38.32	35.11	15	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT40 CH 110 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	11099.48	59.02	60.00	-0.98	50.73	5.03	38.40	35.14	290	104	Average	HORIZONTAL
2	11099.74	71.52	80.00	-8.48	63.23	5.03	38.40	35.14	290	104	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	11099.52	54.72	60.00	-5.28	46.43	5.03	38.40	35.14	142	100	Average	VERTICAL
2	11099.76	66.76	80.00	-13.24	58.47	5.03	38.40	35.14	142	100	Peak	VERTICAL

Temperature	25.6°C	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT40 CH 134 / Chain 1 + Chain 2
Test Date	Jul. 07, 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	11339.26	59.78	60.00	-0.22	51.31	5.08	38.63	35.24	291	103	Average	HORIZONTAL
2	11339.64	71.03	80.00	-8.97	62.56	5.08	38.63	35.24	291	103	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	11339.20	54.04	60.00	-5.96	45.57	5.08	38.63	35.24	138	100	Average	VERTICAL
2	11339.49	67.04	80.00	-12.96	58.57	5.08	38.63	35.24	138	100	Peak	VERTICAL

Note:

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

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

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

4.6. Band Edge Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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 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)	100 KHz /100 KHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.4.

4.6.4. Test Setup Layout

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	25.6℃	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 60, 64 / Chain 1
Test Date	Jul. 08, 2011		

Channel 60

	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	5302.56	119.74			82.32	3.48	33.94	0.00	203	100	Peak	HORIZONTAL
2	5303.53	110.60			73.18	3.48	33.94	0.00	203	100	Average	HORIZONTAL
3	5350.00	56.00	60.00	-4.00	18.48	3.49	34.03	0.00	203	100	Average	HORIZONTAL
4	5350.00	67.81	80.00	-12.19	30.29	3.49	34.03	0.00	203	100	Peak	HORIZONTAL

Item 1, 2 are the fundamental frequency at 5300 MHz.

Channel 64

	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	5313.75	117.32			79.87	3.48	33.97	0.00	203	100	Peak	HORIZONTAL
2	5315.03	107.82			70.37	3.48	33.97	0.00	203	100	Average	HORIZONTAL
3	5350.00	59.89	60.00	-0.11	22.37	3.49	34.03	0.00	203	100	Average	HORIZONTAL
4	5350.00	75.07	80.00	-4.93	37.55	3.49	34.03	0.00	203	100	Peak	HORIZONTAL

Item 1, 2 are the fundamental frequency at 5320 MHz.

Temperature	25.6℃	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11a CH 100, 140 / Chain 1
Test Date	Jul. 08, 2011		

Channel 100

	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	5460.00	53.63	60.00	-6.37	15.92	3.52	34.19	0.00	356	100	Average	HORIZONTAL
2	5460.00	63.77	80.00	-16.23	26.06	3.52	34.19	0.00	356	100	Peak	HORIZONTAL
3	5504.65	115.39			77.60	3.54	34.25	0.00	356	100	Peak	HORIZONTAL
4	5506.73	106.67			68.88	3.54	34.25	0.00	356	100	Average	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5500 MHz.

Channel 140

	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	5693.59	117.56			79.63	3.59	34.34	0.00	200	100	Peak	HORIZONTAL
2	5694.87	108.32			70.39	3.59	34.34	0.00	200	100	Average	HORIZONTAL
3	5725.00	60.28	74.00	-13.72	22.34	3.60	34.34	0.00	200	100	Average	HORIZONTAL
4	5725.00	74.57	94.00	-19.43	36.63	3.60	34.34	0.00	200	100	Peak	HORIZONTAL

Item 1, 2 are the fundamental frequency at 5700 MHz.

Temperature	25.6℃	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 60, 64 / Chain 1 + Chain 2
Test Date	Jul. 08, 2011		

Channel 60

	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	5296.15	109.35			71.97	3.47	33.91	0.00	16	100	Average	VERTICAL
2	5302.89	119.76			82.34	3.48	33.94	0.00	16	100	Peak	VERTICAL
3	5350.00	54.20	60.00	-5.80	16.68	3.49	34.03	0.00	16	100	Average	VERTICAL
4	5350.00	64.43	80.00	-15.57	26.91	3.49	34.03	0.00	16	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5300 MHz.

Channel 64

	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	5316.96	118.93			81.48	3.48	33.97	0.00	172	100	Peak	HORIZONTAL
2	5317.60	108.74			71.29	3.48	33.97	0.00	172	100	Average	HORIZONTAL
3	5350.00	59.35	60.00	-0.65	21.83	3.49	34.03	0.00	172	100	Average	HORIZONTAL
4	5350.00	72.95	80.00	-7.05	35.43	3.49	34.03	0.00	172	100	Peak	HORIZONTAL

Item 1, 2 are the fundamental frequency at 5320 MHz.

Temperature	25.6℃	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT20 CH 100, 140 / Chain 1 + Chain 2
Test Date	Jul. 08, 2011		

Channel 100

	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	5460.00	53.97	60.00	-6.03	16.24	3.52	34.21	0.00	189	101	Average	VERTICAL
2	5460.00	64.64	80.00	-15.36	26.91	3.52	34.21	0.00	189	101	Peak	VERTICAL
3	5505.61	104.62			66.80	3.54	34.28	0.00	189	101	Average	VERTICAL
4	5507.21	114.55			76.73	3.54	34.28	0.00	189	101	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5500 MHz.

Channel 140

	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	5695.99	107.45			69.52	3.59	34.34	0.00	172	105	Average	VERTICAL
2	5696.80	117.46			79.53	3.59	34.34	0.00	172	105	Peak	VERTICAL
3	5725.00	67.96	74.00	-6.04	30.02	3.60	34.34	0.00	172	105	Average	VERTICAL
4	5725.00	80.67	94.00	-13.33	42.73	3.60	34.34	0.00	172	105	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5700 MHz.

Temperature	25.6℃	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT40 CH 54, 62 / Chain 1 + Chain 2
Test Date	Jul. 08, 2011		

Channel 54

	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	5267.44	116.42			79.08	3.46	33.88	0.00	169	100	Peak	HORIZONTAL
2	5273.21	105.96			68.61	3.47	33.88	0.00	169	100	Average	HORIZONTAL
3	5350.00	55.33	60.00	-4.67	17.81	3.49	34.03	0.00	169	100	Average	HORIZONTAL
4	5350.00	65.77	80.00	-14.23	28.25	3.49	34.03	0.00	169	100	Peak	HORIZONTAL

Item 1, 2 are the fundamental frequency at 5270 MHz.

Channel 62

	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	5325.71	101.91			64.45	3.49	33.97	0.00	20	100	Average	VERTICAL
2	5326.03	112.33			74.87	3.49	33.97	0.00	20	100	Peak	VERTICAL
3	5350.00	59.49	60.00	-0.51	21.97	3.49	34.03	0.00	20	100	Average	VERTICAL
4	5350.00	71.09	80.00	-8.91	33.57	3.49	34.03	0.00	20	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5310 MHz.

Temperature	25.6℃	Humidity	60%
Test Engineer	Serway	Configurations	IEEE 802.11n MCS13 HT40 CH 102, 110, 134 / Chain 1 + Chain 2
Test Date	Jul. 08, 2011		

Channel 102

	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	5460.00	59.64	60.00	-0.36	21.91	3.52	34.21	0.00	167	100	Average	VERTICAL
2	5460.00	71.01	80.00	-8.99	33.28	3.52	34.21	0.00	167	100	Peak	VERTICAL
3	5505.51	113.55			75.73	3.54	34.28	0.00	167	100	Peak	VERTICAL
4	5506.47	103.87			66.05	3.54	34.28	0.00	167	100	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5510 MHz.

Channel 110

	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	5460.00	55.04	60.00	-4.96	17.33	3.52	34.19	0.00	156	100	Average	HORIZONTAL
2	5460.00	66.36	80.00	-13.64	28.65	3.52	34.19	0.00	156	100	Peak	HORIZONTAL
3	5565.71	114.75			76.89	3.55	34.31	0.00	156	100	Peak	HORIZONTAL
4	5566.35	104.99			67.13	3.55	34.31	0.00	156	100	Average	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5550 MHz.

Channel 134

	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	5659.74	117.20			79.28	3.59	34.33	0.00	173	105	Peak	VERTICAL
2	5678.33	106.75			68.83	3.59	34.33	0.00	173	105	Average	VERTICAL
3	5725.00	65.56	74.00	-8.44	27.62	3.60	34.34	0.00	173	105	Average	VERTICAL
4	5725.00	77.01	94.00	-16.99	39.07	3.60	34.34	0.00	173	105	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5670 MHz.

Note:

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

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

4.7. Frequency Stability Measurement

4.7.1. Limit

In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

4.7.2. Measuring Instruments and Setting

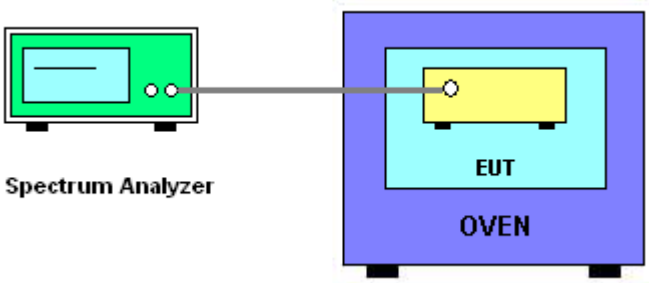
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.7.3. 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. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is -30°C~50°C.

4.7.4. Test Setup Layout



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 un-modulation transmitting mode.

4.7.7. Test Result of Frequency Stability

Temperature	25°C	Humidity	56%
Test Engineer	Sean Ku	Test Date	Jul. 11, 2011

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5299.9982
126.50	5299.9883
110.00	5299.9985
93.50	5300.0050
Max. Deviation (MHz)	0.0099
Max. Deviation (ppm)	1.87

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(°C)	5300
-30	5300.0002
-20	5300.0002
-10	5300.0001
0	5300.0000
10	5299.9986
20	5299.9988
30	5299.9987
40	5299.9988
50	5299.9989
Max. Deviation (MHz)	0.0014
Max. Deviation (ppm)	0.2642

4.8. Antenna Requirements

4.8.1. 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.

4.8.2. 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	Oct. 28,2011	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9k ~ 30MHz	Nov. 16, 2010	Conduction (CO01-CB)
Capacitive Voltage Probe	SCHAFFNER	CVP2200A	18697	150k ~ 30MHz	Sep. 28, 2010	Conduction (CO01-CB)
RF Current Probe	SOLAR.	ESH2-Z1	041039	9k ~ 30MHz	Sep. 28, 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.04, 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. 22, 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. 23, 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. 22, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Mar. 22, 2011	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	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	N/A	30 MHz - 1 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV30	101026	9kHz~30GHz	Jul. 23, 2010	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	May 20, 2011	Conducted (TH01-CB)
Thermo-Hygro Meter	N/A	HC 520	#1	15~70 degree	Nov. 02, 2010	Conducted (TH01-CB)
RF Power Divider	HP	11636A	00306	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	44100	1839	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	42100	17930	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 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)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
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 years.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%