

APPLICATION FOR CERTIFICATION

On Behalf of

LG Electronics Inc.

Wi-Fi module

Model No. : WN8122E1

FCC ID : BEJWN8122E1

IC: 2703H-WN8122E1

Brand : LG

Prepared for : LG Electronics Inc.  
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Pyeongtaek-City, Gyeonggi-Do, 451-713,  
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File Number : C1M1208112  
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Date of Report : Aug. 22, 2012

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## TEST REPORT CERTIFICATION

Applicant : LG Electronics Inc.  
Manufacturer : Compal Networking (Kunshan) Co., Ltd.  
EUT Description : Wi-Fi module  
**FCC ID** : **BEJWN8122E1**  
**IC** : **2703H-WN8122E1**  
(A) Model No. : WN8122E1  
(B) Serial No. : N/A  
(C) Brand : LG  
(D) Power Supply : DC 3.3V (Powered by Notebook PC)

### Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C & E, Oct. 2010  
(FCC CFR 47 Part 15C & E, §15.205, §15.207, §15.209 and 15.407)  
Industry Canada Rules and Regulations RSS-Gen (Issue 2), December 2010 and  
RSS-210 (Issue 8), December 2010  
(Canada RSS-210 §Annex 9)  
AND ANSI C63.4:2003

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C & E and Canada RSS-210 (Issue 8) Annex 9 limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the requirements of FCC Part 15 and Industry Canada RSS-Gen, RSS-210 standards.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test: Aug. 16 ~ 20, 2012

Date of Report: Aug. 22, 2012

Producer:   
(Julie Hsu/Administrator)

Signatory:   
(Leon Liu/Deputy General Manager)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

Description	:	Wi-Fi module The frequency range of 5150MHz ~ 5250MHz was tested in this report. The frequency range of 2400MHz ~ 2483.5MHz, 5725MHz ~ 5850MHz has been tested and the test data are reported in other report of EM-F1010669.
Model Number	:	WN8122E1
Serial Number	:	N/A
Brand	:	LG
FCC ID	:	BEJWN8122E1
IC	:	2703H-WN8122E11
Applicant	:	LG Electronics Inc. 19-1, Cheongho-Ri, Jinwuy-Myeon, Pyeongtaek-City, Gyeonggi-Do, 451-713, Korea
Manufacturer	:	Compal Networking (Kunshan) Co., Ltd. No.520, Nanbang Rd., Economic & Technical Development Zone, Kunshan, Jiangsu Province, China.
Fundamental Range	:	2412MHz ~ 2462MHz and 5180MHz ~ 5240MHz and 5745MHz ~ 5825MHz
Radio Technology	:	802.11b: DSSS Modulation (DBPSK/DQPSK/CCK) 802.11a/g/n-HT20/n-HT40: OFDM Modulation 2T2R, (BPSK/QPSK/16QAM/64QAM)
Data Transfer Rate	:	802.11b: 1/2/5.5/11Mbps 802.11a/g: 6/9/12/18/24/48/54Mbps 802.11n: up to 300Mbps
Antenna Gain	:	0.62dBi (Peak)

Date of Receipt of Sample : Aug. 04, 2012

Date of Test : Aug. 16 ~ 20, 2012

## 1.2. Data Rate Relative to Output Power

NII 802.11a (5.2GHz)			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)
36	BPSK	6	13.27
36	BPSK	9	13.19
36	QPSK	12	13.21
36	QPSK	18	13.24
36	16-QAM	24	13.15
36	16-QAM	36	13.19
36	64-QAM	48	13.20
36	64-QAM	54	13.25

NII 802.11n-HT20 (5.2GHz)				NII 802.11n-HT40 (5.2GHz)			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)	Channel	Modulation	Date Rate (Mbps)	Power (dBm)
36	BPSK	6.5	13.20	38	BPSK	6.5	13.06
36	QPSK	13	13.11	38	QPSK	13	13.01
36	QPSK	19.5	13.15	38	QPSK	19.5	12.96
36	16-QAM	26	13.09	38	16-QAM	26	12.94
36	16-QAM	39	13.14	38	16-QAM	39	12.98
36	64-QAM	52	13.15	38	64-QAM	52	12.96
36	64-QAM	58.6	13.17	38	64-QAM	58.6	12.95
36	64-QAM	65	13.18	38	64-QAM	65	13.02

### 1.3. Test Configuration for Each Test Item

Test Item	802.11a	802.11n-HT20	802.11n-HT40
	Data Rate for Test(Mbps)		
26dB Bandwidth	6	6.5	13.5
Emission Limitations	6	6.5	13.5
Maximum peak output power	6	6.5	13.5
Power spectral density	6	6.5	13.5
Peak power Excursion	6	6.5	13.5
Frequency Stability	6	6.5	13.5

### 1.4. Tested Supporting System Details

#### 1.4.1. NOTEBOOK PC

Model Number : PP19S  
 Serial Number : 8285  
 FCC ID : MCLBCM92046  
 BSMI ID : R33002  
 Brand : DELL  
 AC Adapter : M/N:AD6513  
 DC Cord: Non-Shielded, Undetachable, 2.4m  
 USB Cable : Non-Shielded, Detachable, 0.25m  
 Power Cord : Non-Shielded, Detachable, 1.8m

### 1.5. Description of Test Facility

Name of Firm : **AUDIX Technology Corporation**  
 EMC Department  
 No. 53-11, Dingfu, Linkou Dist.,  
 New Taipei City 244, Taiwan, R.O.C.

Test Site : **No. 1 Shielded Room &**  
 (C1/Semi-AC) No. 53-11, Dingfu, Linkou Dist.,  
 New Taipei City 244, Taiwan, R.O.C.

**Semi-Anechoic Chamber**  
 No. 53-11, Dingfu, Linkou Dist.,  
 New Taipei City 244, Taiwan, R.O.C.

May 14, 2009 Renewal on  
 Federal Communication Commission  
 Registration Number: 90993

NVLAP Lab. Code : 200077-0  
 TAF Accreditation No : 1724

## 1.6. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150kHz~30MHz	± 1.73dB
Radiation Test (Distance: 3m)	30MHz~300MHz	± 2.91dB
	300MHz~1000MHz	± 2.74dB
	Above 1GHz	± 5.02dB

Remark : Uncertainty =  $ku_c(y)$

Test Item	Uncertainty
26dB Bandwidth	± 0.2kHz
Maximum peak output power	± 0.33dBm
Power spectral density	± 0.13dB
Peak power Excursion	± 0.14dB



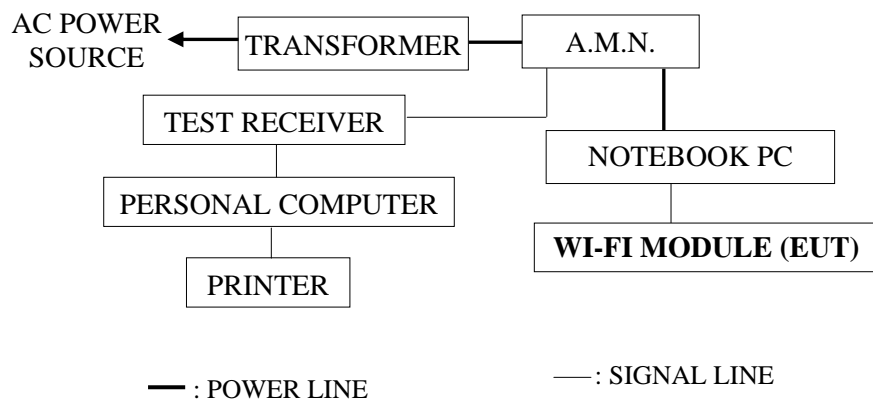
## 2. CONDUCTED EMISSION MEASUREMENT

### 2.1. Test Equipment

The following test equipment was used during the powerline conducted emission measurement: (No. 1 Shielded Room)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCS30	100265	Aug. 25, 11'	Aug. 24, 12'
2.	A.M.N.	R&S	ENV4200	100169	May 04, 12'	May 03, 13'

### 2.2. Block Diagram of Test Setup



### 2.3. Powerline Conducted Emission Limit [§15.207, Class B, RSS-Gen §7.2.2/Table 2]

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB $\mu$ V	56 ~ 46 dB $\mu$ V
500kHz ~ 5MHz	56 dB $\mu$ V	46 dB $\mu$ V
5MHz ~ 30MHz	60 dB $\mu$ V	50 dB $\mu$ V

- Remark: 1. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.  
 2. The lower limit applies at the band edges.

## 2.4. Operating Condition of EUT

- 2.4.1. Setup the EUT and simulator as shown on 2.2.
- 2.4.2. Turn on the power of all equipment.
- 2.4.3. The Notebook PC was running test software “Broadcom WL Command” to set EUT (Wi-Fi module) on transmitting and receiving during all testing.

## 2.5. Test Procedure

The EUT (link Notebook PC) was placed on the table which was above the ground by 80cm and Notebook PC’s adapter’s power cord connected to the AC mains through an Artificial Mains Network (A.M.N.). This provided a 50 ohm coupling impedance for the measuring equipment. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions simulators of the interface cables should be manipulated according to ANSI C63.4-2003, RSS-Gen and RSS-210 regulation during conducted measurement.

The bandwidth of the R&S Test Receiver ESCS30 was set at 9kHz.

The frequency range from 150kHz to 30MHz was checked.

All the final readings from Test Receiver were measured with the Quasi-Peak detector and Average detector. Remark: If the Average limit is met when using a Quasi-Peak detector, the Average detector is unnecessary)

## 2.6. Powerline Conducted Emission Measurement Results

### **PASSED.**

(All the emissions not reported below are too low against the prescribed limits.)

EUT was performed during this section testing and all the test results are attached in next pages.

EUT : Wi-Fi module                      M/N : WN8122E1

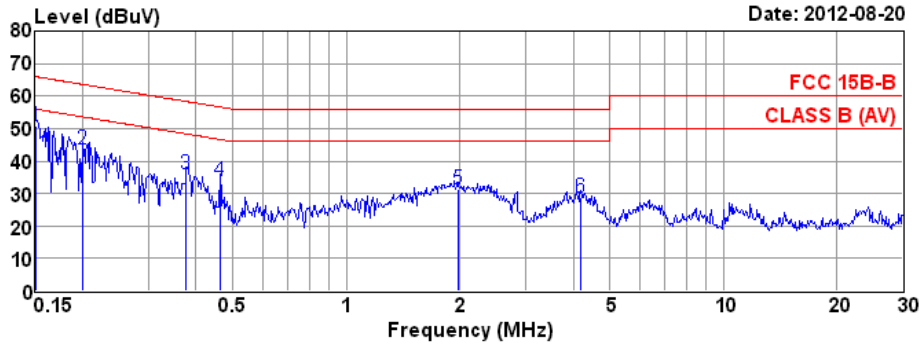
Test Date : Aug. 20, 2012              Temperature : 25              Humidity : 52%

Reference Test Data : Neutral # 3; Line # 4



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Data: 3 File: D:\test data\REPORT\IC1M1208XXX\IC1M1208112-C.EM6 (6)



Site no. : No.1 Shielded Room Data no. : 3  
 Dis. / Ant. : ENV4200 Ant. pol. : NEUTRAL  
 Limit : FCC 15B-B  
 Env. / Ins. : 25°C / 52% ESCS 30 (265) Engineer : Fate  
 EUT : WN8122E1  
 Power Rating : 120Vac/60Hz  
 Test Mode : OPERATING

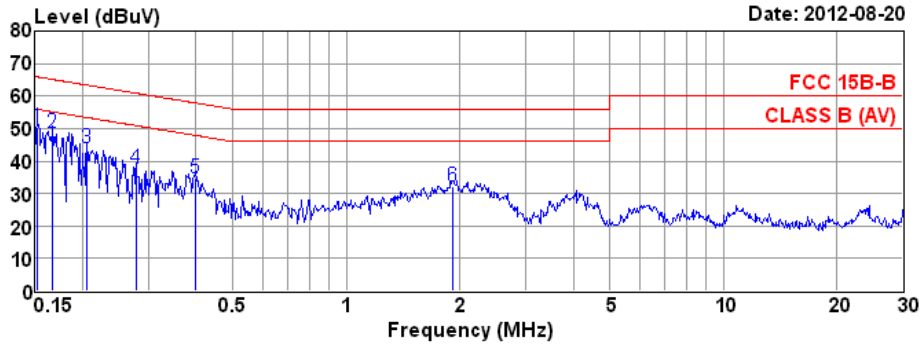
	AMN.	Cable	Emission		Limits	Margin	Remark	
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dBμV)	Level (dBμV/m)	(dBμV/m)	(dB)		
1	0.15	10.23	9.92	30.72	50.87	66.00	15.13	QP
2	0.20	10.23	9.93	23.63	43.79	63.62	19.83	QP
3	0.38	10.18	9.97	15.87	36.02	58.34	22.32	QP
4	0.46	10.17	9.98	13.92	34.07	56.63	22.56	QP
5	1.98	10.14	10.00	11.15	31.29	56.00	24.71	QP
6	4.20	10.14	10.02	8.74	28.90	56.00	27.10	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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 Email:emc@audixtech.com

Data: 4 File: D:\test data\REPORT\IC1M1208XXX\IC1M1208112-C.EM6 (6)



Site no. : No.1 Shielded Room Data no. : 4  
 Dis. / Ant. : ENV4200 Ant. pol. : LINE  
 Limit : FCC 15B-B  
 Env. / Ins. : 25°C / 52% ESCS 30 (265) Engineer : Fate  
 EUT : WN8122E1  
 Power Rating : 120Vac/60Hz  
 Test Mode : OPERATING

	AMN.	Cable	Emission		Limits	Margin	Remark	
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dBμV)	Level (dBμV/m)	(dBμV/m)	(dB)		
1	0.15	10.22	9.92	30.22	50.36	65.91	15.55	QP
2	0.17	10.23	9.93	28.57	48.73	65.12	16.39	QP
3	0.21	10.24	9.94	23.75	43.93	63.40	19.47	QP
4	0.28	10.22	9.95	17.39	37.56	60.90	23.34	QP
5	0.40	10.20	9.97	14.65	34.82	57.86	23.04	QP
6	1.92	10.18	10.00	11.88	32.06	56.00	23.94	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

### 3. RADIATED EMISSION MEASUREMENT

#### 3.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

##### 3.1.1. For Frequency Range 30MHz~1000MHz (at Semi-Anechoic Chamber)

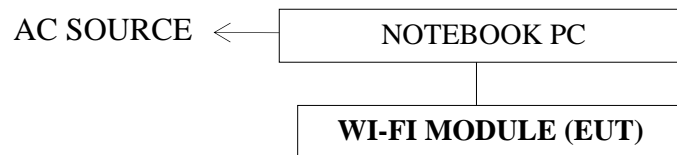
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 08, 12'	Aug. 06, 13'
2.	Test Receiver	R & S	ESCS30	100338	Jul. 04, 12'	Jul. 03, 13'
3.	Amplifier	HP	8447D	2944A06305	Feb. 13, 12'	Feb. 12, 13'
4.	Biconical Antenna	CHASE	VBA6106 A	1264	Mar. 03, 12'	Mar. 02, 13'
5.	Log Periodic Antenna	Schwarzbeck	UHALP91 08-A	0810	Mar. 03, 12'	Mar. 02, 13'

##### 3.1.2. For Frequency Above 1GHz (at Semi-Anechoic Chamber)

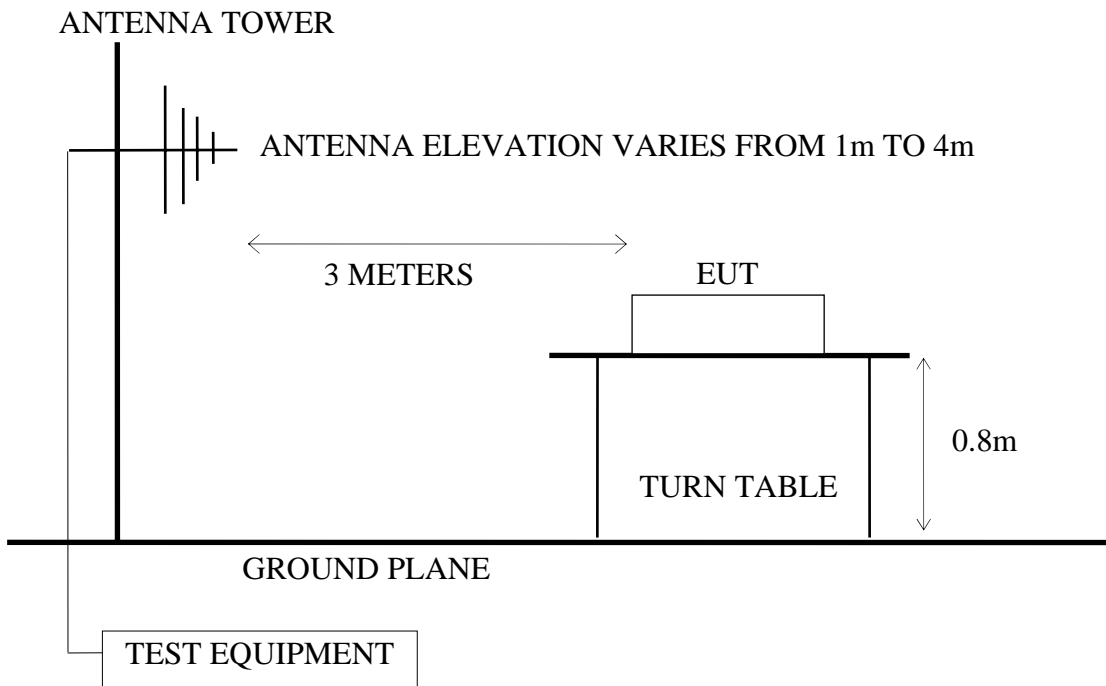
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 08, 12'	Aug. 06, 13'
2.	Amplifier	HP	8449B	3008A00529	Dec. 09, 11'	Dec. 08, 12'
3.	Horn Antenna	EMCO	3115	9112-3775	May 09, 12'	May 08, 13'
4.	Horn Antenna	EMCO	3116	2653	Oct. 07, 11'	Oct. 06, 12'
5.	Signal Generator	HP	83732B	US34490489	May 16, 12'	May 15, 13'

#### 3.2. Test Setup

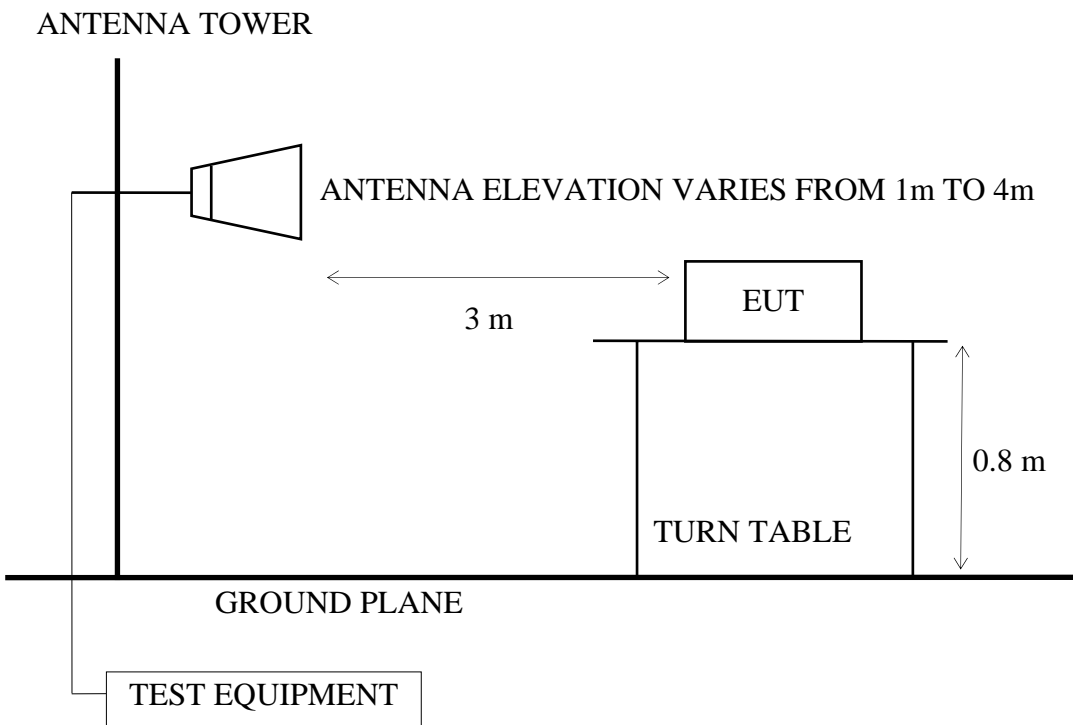
##### 3.2.1. Block Diagram of connection between EUT and simulators



3.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz



3.2.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz



### 3.3. Radiated Emission Limits

#### 3.3.1. Limits for §15.209, RSS-210 §2.7/Table 2

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

Remark : (1) Emission level ( $\text{dB}\mu\text{V/m}$ ) = 20 log Emission level ( $\mu\text{V/m}$ )

- (2) The tighter limit applies at the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
- (5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

#### 3.3.2. Limits for §15.407(b)(1)

Pursuant to 15.407(b)(1), all emissions outside of 5150-5350MHz shall not exceed an EIRP of -27dBm/MHz, where -27dBm/MHz equal to 68.2dBuV/m at 3m.

### 3.4. Operating Condition of EUT

- 3.4.1. Set up the EUT (Wi-Fi module) via Notebook PC and simulator as shown on 3.2.
- 3.4.2. To turn on the power of all equipments.
- 3.4.3. The EUT was set the Notebook PC using test program “Broadcom WL Command”.
- 3.4.4. The EUT supports 802.11a/n-HT20/n-HT40 modes, we performed pre-scan high, middle, low channels for each mode for spurious emission and listed the worst channel of each mode in test report.

The worst channel of each mode as following:

Mode	Type of Network	Channel
1.	NII 802.11a (5.2GHz)	CH 48
2.	NII 802.11n-HT20 (5.2GHz)	CH 48
3.	NII 802.11n-HT40 (5.2GHz)	CH 46

### 3.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log-periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-2003, RSS-Gen and RSS-210 regulation.

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 40GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked. 30MHz to 1000MHz was measured with Quasi-Peak detector. Pursuant to ANSI 4.2.2, peak detector is an alternate option for frequency from 30MHz to 1000MHz.

Above 1GHz was measured with peak and average detector. For frequency from 2.68GHz to 40GHz, we checked it in 1 meter distance and with a shorter cable 2 meter instead of original's. There is no signal exist.



### 3.6. Test Results

**PASSED.**

(All emissions not reported below are too low against the prescribed limits.)

EUT : Wi-Fi module                      M/N : WN8122E1

Test Date : Aug. 20, 2012    Temperature : 25            Humidity : 59%

**For Frequency Range 30MHz~1000MHz:**

The EUT with following test modes were performed during this section testing and all the test results are listed in section 3.6.1.

Mode	Type of Network	Channel	Frequency	Test Mode	Reference Test Data	
					Horizontal	Vertical
1.	NII 802.11a (5.2GHz)	CH 48	5240MHz	Transmit	# 1	# 2
2.	NII 802.11n-HT20 (5.2GHz)	CH 48	5240MHz	Transmit	# 1	# 2
3.	NII 802.11n-HT40 (5.2GHz)	CH 46	5230MHz	Transmit	# 1	# 2

\* Above all final readings were measured with Peak detector.

**For Frequency above 1GHz:**

The EUT with following test modes was performed during this section testing and all the test results are listed in section 3.6.2.

Mode	Type of Network	Channel	Frequency	Test Mode
1.	NII 802.11a (5.2GHz)	CH 48	5240MHz	Transmit
2.	NII 802.11n-HT20 (5.2GHz)	CH 48	5240MHz	
3.	NII 802.11n-HT40 (5.2GHz)	CH 46	5230MHz	

- Note: 1. Above all final readings were measured with Peak and Average detector.  
 2. For measurements above 1GHz to 2.68GHz, the peak measured value complies with the average limit, it is unnecessary to perform an average measurement. (According to ANSI C63.4-2003 section 8.3.1.2)  
 3. The emissions (up to 40GHz) not reported are too low to be measured.

**For Restricted Bands:**

The EUT was tested in restricted bands and all the test results are listed in section 3.6.3. (The restricted bands defined in part 15.205(a))

Mode	Type of Network	Channel	Frequency	Test Mode	Reference Test Data	
					Horizontal	Vertical
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	Transmit	# 1, # 2	# 3, # 4
2.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	Transmit	# 1, # 2	# 3, # 4
3.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	Transmit	# 1, # 2	# 3, # 4

3.6.1. Frequency Range 30-1000MHz

**NII 802.11a (5.2GHz), Transmit, Frequency: 5240MHz**

Site no. : site Data no. : 1  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5240 (802.11a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	144.460	20.31	2.60	17.52	40.43	43.50	3.07	Peak
2	208.480	21.85	3.12	15.48	40.44	43.50	3.06	Peak
3	329.730	15.36	4.14	18.63	38.13	46.00	7.87	Peak
4	481.050	18.74	6.10	7.94	32.78	46.00	13.22	Peak
5	721.610	22.21	6.50	13.05	41.76	46.00	4.24	Peak
6	964.110	26.80	7.60	4.25	38.65	54.00	15.35	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : site Data no. : 2  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5240 (802.11a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	126.030	19.49	2.38	7.07	28.93	43.50	14.57	Peak
2	327.790	15.28	4.10	10.11	29.49	46.00	16.51	Peak
3	483.960	18.84	6.14	6.26	31.24	46.00	14.76	Peak
4	719.670	22.30	6.60	4.70	33.60	46.00	12.40	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

**NII 802.11n-HT20 (5.2GHz), Transmit, Frequency: 5240MHz**

Site no. : site Data no. : 1  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5240 (802.11n HT-20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	144.460	20.31	2.60	15.78	38.69	43.50	4.81	Peak
2	209.450	21.81	3.16	14.98	39.95	43.50	3.55	Peak
3	327.790	15.28	4.10	18.78	38.16	46.00	7.84	Peak
4	481.050	18.74	6.10	8.39	33.23	46.00	12.77	Peak
5	717.730	22.57	6.55	13.14	42.26	46.00	3.74	Peak
6	963.140	26.63	7.60	5.21	39.44	54.00	14.56	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : site Data no. : 2  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5240 (802.11n HT-20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	126.030	19.49	2.38	8.09	29.95	43.50	13.55	Peak
2	327.790	15.28	4.10	10.27	29.65	46.00	16.35	Peak
3	483.960	18.84	6.14	6.37	31.35	46.00	14.65	Peak
4	717.730	22.57	6.55	4.32	33.44	46.00	12.56	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

**NII 802.11n-HT40 (5.2GHz), Transmit, Frequency: 5230MHz**

Site no. : site Data no. : 1  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5230 (802.11n HT-40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	144.460	20.31	2.60	16.29	39.20	43.50	4.30	Peak
2	208.480	21.85	3.12	14.97	39.93	43.50	3.57	Peak
3	329.730	15.36	4.14	18.67	38.17	46.00	7.83	Peak
4	481.050	18.74	6.10	7.88	32.72	46.00	13.28	Peak
5	719.670	22.30	6.60	12.97	41.87	46.00	4.13	Peak
6	963.140	26.63	7.60	4.38	38.61	54.00	15.39	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : site Data no. : 2  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5230 (802.11n HT-40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	120.210	19.08	2.30	8.29	29.67	43.50	13.83	Peak
2	329.730	15.36	4.14	9.02	28.52	46.00	17.48	Peak
3	434.490	17.36	5.24	8.54	31.14	46.00	14.86	Peak
4	481.050	18.74	6.10	6.14	30.98	46.00	15.02	Peak
5	717.730	22.57	6.55	4.57	33.69	46.00	12.31	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

3.6.2. Above 1GHz Frequency Range Measurement Results

Date of Test : Aug. 20, 2012 Temperature : 25  
 EUT : Wi-Fi module Humidity : 59%  
 Test Mode : NII 802.11a (5.2GHz), Transmit, Frequency: 5240MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)
1594.720	26.08	6.12	21.05	53.26

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.  
 3. All final readings of measurement were with Peak values.  
 4. All emissions level are compliance with -27dBm/MHz (68.2dBuV/m)

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Horizontal (dBμV/m)
1594.720	26.08	6.12	14.93	47.14
1994.560	27.60	5.91	12.04	45.55

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.  
 3. All final readings of measurement were with Peak values.  
 4. All emissions level are compliance with -27dBm/MHz (68.2dBuV/m)

Date of Test : Aug. 20, 2012 Temperature : 25

EUT : Wi-Fi module Humidity : 59%

Test Mode : NII 802.11n-HT20 (5.2GHz), Transmit, Frequency: 5240MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)
1594.720	26.08	6.12	16.57	48.77

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.  
 3. All final readings of measurement were with Peak values.  
 4. All emissions level are compliance with -27dBm/MHz (68.2dBuV/m)

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Horizontal (dBμV/m)
1599.760	26.08	6.14	14.58	46.79
1994.560	27.60	5.91	11.94	45.45

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.  
 3. All final readings of measurement were with Peak values.  
 4. All emissions level are compliance with -27dBm/MHz (68.2dBuV/m)

Date of Test : Aug. 20, 2012 Temperature : 25  
 EUT : Wi-Fi module Humidity : 59%  
 Test Mode : NII 802.11n-HT40 (5.2GHz), Transmit, Frequency: 5230MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)
1594.720	26.08	6.12	20.03	52.24
1997.920	27.60	5.89	11.83	45.32

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.  
 3. All final readings of measurement were with Peak values.  
 4. All emissions level are compliance with -27dBm/MHz (68.2dBuV/m)

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Horizontal (dBμV/m)
1594.720	26.08	6.12	14.75	46.96
1994.560	27.60	5.91	10.33	43.84

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.  
 3. All final readings of measurement were with Peak values.  
 4. All emissions level are compliance with -27dBm/MHz (68.2dBuV/m)



### 3.6.3. Restricted Bands Measurement Results

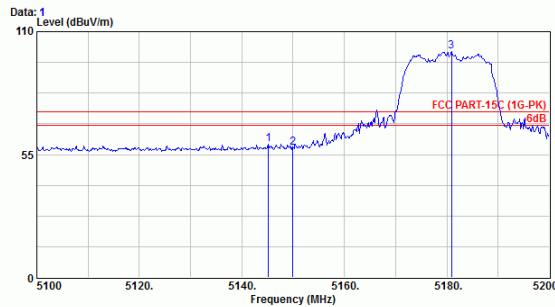
Date of Test : Aug. 20, 2012 Temperature : 25

EUT : Wi-Fi module Humidity : 59%

Test Mode : NII 802.11a (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz



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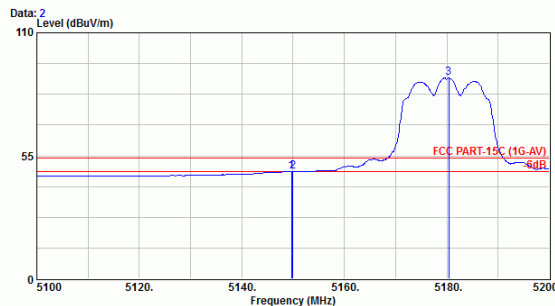
Site no. : site Data no. : 1  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5145.200	33.64	9.43	16.58	59.66	74.00	14.34	Peak
2	5150.000	33.64	9.43	15.12	58.19	74.00	15.81	Peak
3	5180.900	33.69	9.46	57.89	101.04	74.00	-27.04	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : site Data no. : 2  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11a)

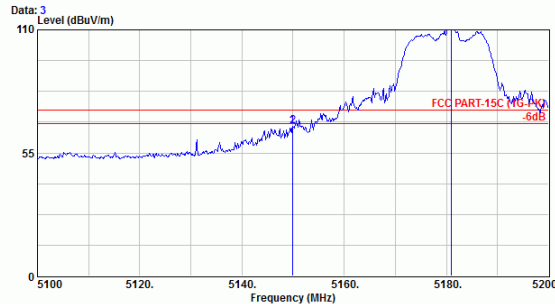
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.700	33.64	9.43	4.85	47.93	54.00	6.07	Average
2	5150.000	33.64	9.43	4.83	47.91	54.00	6.09	Average
3	5180.400	33.69	9.46	46.60	89.75	54.00	-35.75	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Aug. 20, 2012 Temperature : 25  
 EUT : Wi-Fi module Humidity : 59%  
 Test Mode : NII 802.11a (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz



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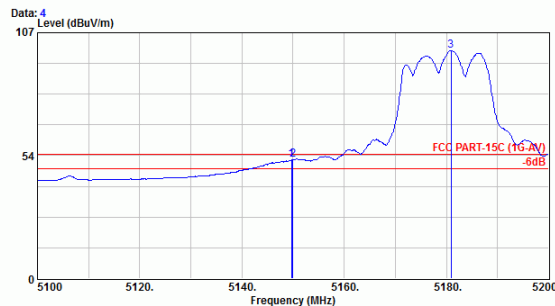
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 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.900	33.64	9.43	23.98	67.06	74.00	6.94	Peak
2	5150.000	33.64	9.43	23.71	66.78	74.00	7.22	Peak
3	5180.900	33.69	9.46	67.13	110.28	74.00	-36.28	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : site Data no. : 4  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11a)

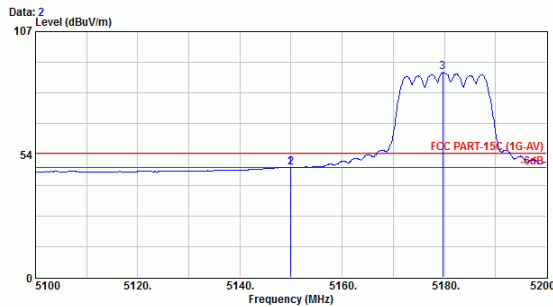
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.700	33.64	9.43	8.52	51.60	54.00	2.40	Average
2	5150.000	33.64	9.43	8.52	51.59	54.00	2.41	Average
3	5180.900	33.69	9.46	56.06	99.21	54.00	-45.21	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Aug. 20, 2012 Temperature : 25  
 EUT : Wi-Fi module Humidity : 59%  
 Test Mode : NII 802.11n-HT20 (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz



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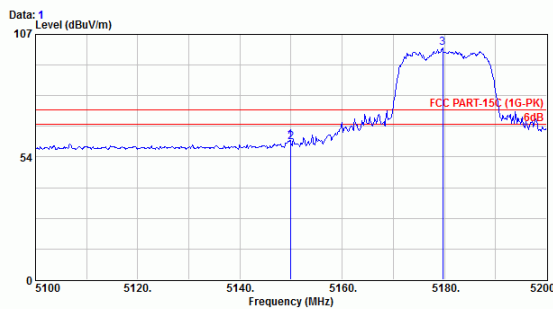
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 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11n HT-20)

	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.900	33.64	9.43	4.81	47.89	54.00	6.11 Average
2	5150.000	33.64	9.43	4.81	47.89	54.00	6.11 Average
3	5179.700	33.69	9.46	46.02	89.17	54.00	-35.17 Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : site Data no. : 1  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11n HT-20)

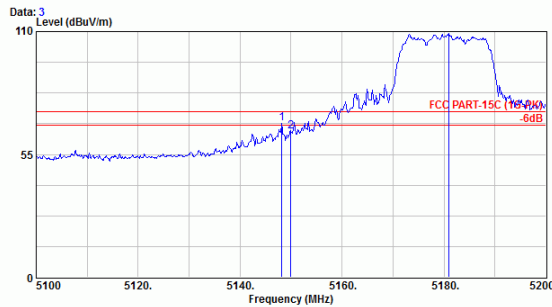
	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.900	33.64	9.43	17.63	60.71	74.00	13.29 Peak
2	5150.000	33.64	9.43	16.83	59.90	74.00	14.10 Peak
3	5179.700	33.69	9.46	57.82	100.97	74.00	-26.97 Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Aug. 20, 2012 Temperature : 25  
 EUT : Wi-Fi module Humidity : 59%  
 Test Mode : NII 802.11n-HT20 (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz



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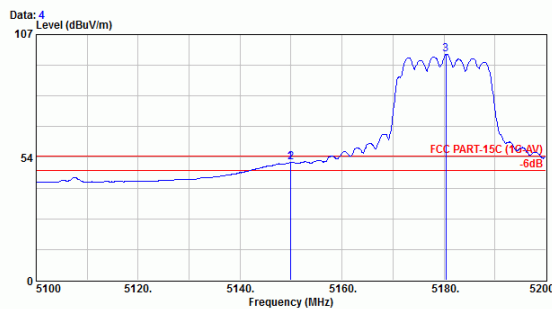
Site no. : site Data no. : 3  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (16-PR)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11n HT-20)

	Ant. Factor	Cable Loss	Reading	Emission Level	Limits	Margin	Remark
1	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	5148.200	33.64	9.43	25.76	68.83	74.00	5.17 Peak
2	5150.000	33.64	9.43	22.23	65.30	74.00	8.70 Peak
3	5180.900	33.69	9.46	65.96	109.11	74.00	-35.11 Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : site Data no. : 4  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (16-AV)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5180 (802.11n HT-20)

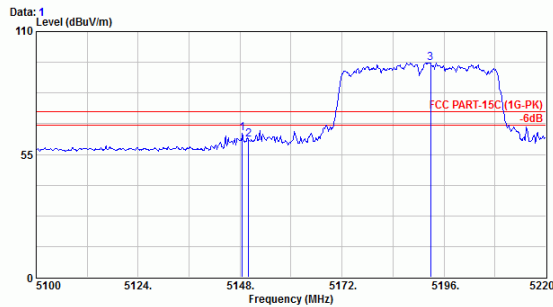
	Ant. Factor	Cable Loss	Reading	Emission Level	Limits	Margin	Remark
1	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	5149.900	33.64	9.43	8.11	51.19	54.00	2.81 Average
2	5150.000	33.64	9.43	8.14	51.21	54.00	2.79 Average
3	5180.400	33.69	9.46	55.28	98.43	54.00	-44.43 Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Aug. 20, 2012 Temperature : 25  
 EUT : Wi-Fi module Humidity : 59%  
 Test Mode : NII 802.11n-HT40 (5.2GHz), Transmit, Channel: 38, Frequency: 5190MHz



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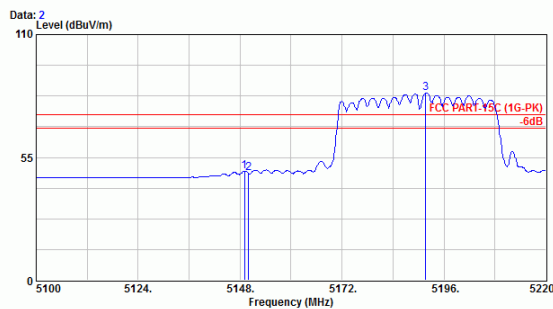
Site no. : site Data no. : 1  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5190 (802.11n HT-40)

	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5148.480	33.64	9.43	21.53	64.60	74.00	9.40
2	5150.040	33.64	9.43	18.74	61.82	74.00	12.18
3	5192.880	33.72	9.48	52.77	95.97	74.00	-21.97

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : site Data no. : 2  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5190 (802.11n HT-40)

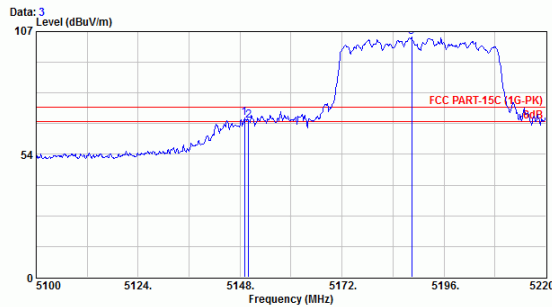
	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.080	33.64	9.43	5.83	48.90	74.00	25.10 Average
2	5150.040	33.64	9.43	4.81	47.89	74.00	26.11 Average
3	5191.680	33.72	9.48	40.72	83.91	74.00	-9.91 Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Aug. 20, 2012 Temperature : 25  
 EUT : Wi-Fi module Humidity : 59%  
 Test Mode : NII 802.11n-HT40 (5.2GHz), Transmit, Channel: 38, Frequency: 5190MHz



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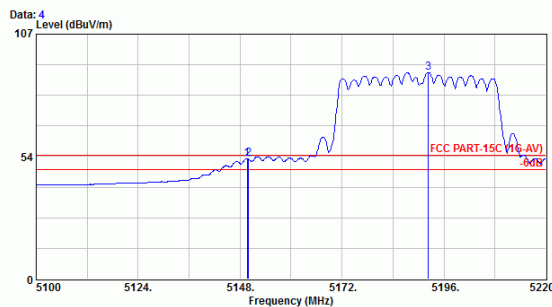
Site no. : site Data no. : 3  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5190 (802.11n HT-40)

	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.080	33.64	9.43	26.29	69.36	74.00	4.64 Peak
2	5150.040	33.64	9.43	25.11	68.19	74.00	5.81 Peak
3	5188.440	33.69	9.48	61.50	104.67	74.00	-30.67 Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : site Data no. : 4  
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E4446A 25°C/59% Vic Fong  
 EUT : WN8122E1  
 Power Rating : DC3.3V  
 Test Mode : TX5190 (802.11n HT-40)

	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5149.680	33.64	9.43	9.48	52.56	54.00	1.44 Average
2	5150.040	33.64	9.43	9.37	52.45	54.00	1.55 Average
3	5192.280	33.72	9.48	47.12	90.31	54.00	-36.31 Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

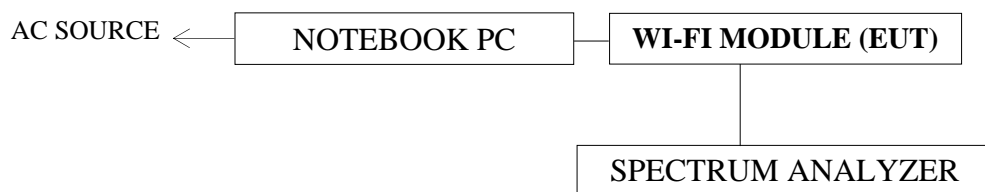
## 4. 26dB BANDWIDTH MEASUREMENT

### 4.1. Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

### 4.2. Block Diagram of Test Setup



### 4.3. Operating Condition of EUT

The test program “Broadcom WL Command” was used to enable the EUT to transmit data at different channel frequency individually.

### 4.4. Test Procedure

1. Set RBW=approximately 1% of the emission bandwidth.
2. Set the VBW>RBW
3. Detector=Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26dB down from the peak of the emission. Compare this with RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The measurement guideline was according to KDB789033 D01

The measurement guideline was according to RSS-Gen.

#### 4.5. Test Results

**PASSED.** All the test results are attached in next pages.

Test Date : Aug. 16, 2012    Temperature : 25        Humidity : 51%

##### 4.5.1. For NII 802.11a (5.2GHz)

Mode	Type of Network	Channel	Frequency	26dB Bandwidth
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	<b>19.30MHz</b>
2.		CH 40	5200MHz	<b>19.30MHz</b>
3.		CH 48	5240MHz	<b>19.30MHz</b>

##### 4.5.2. For NII 802.11n-HT20 (5.2GHz)

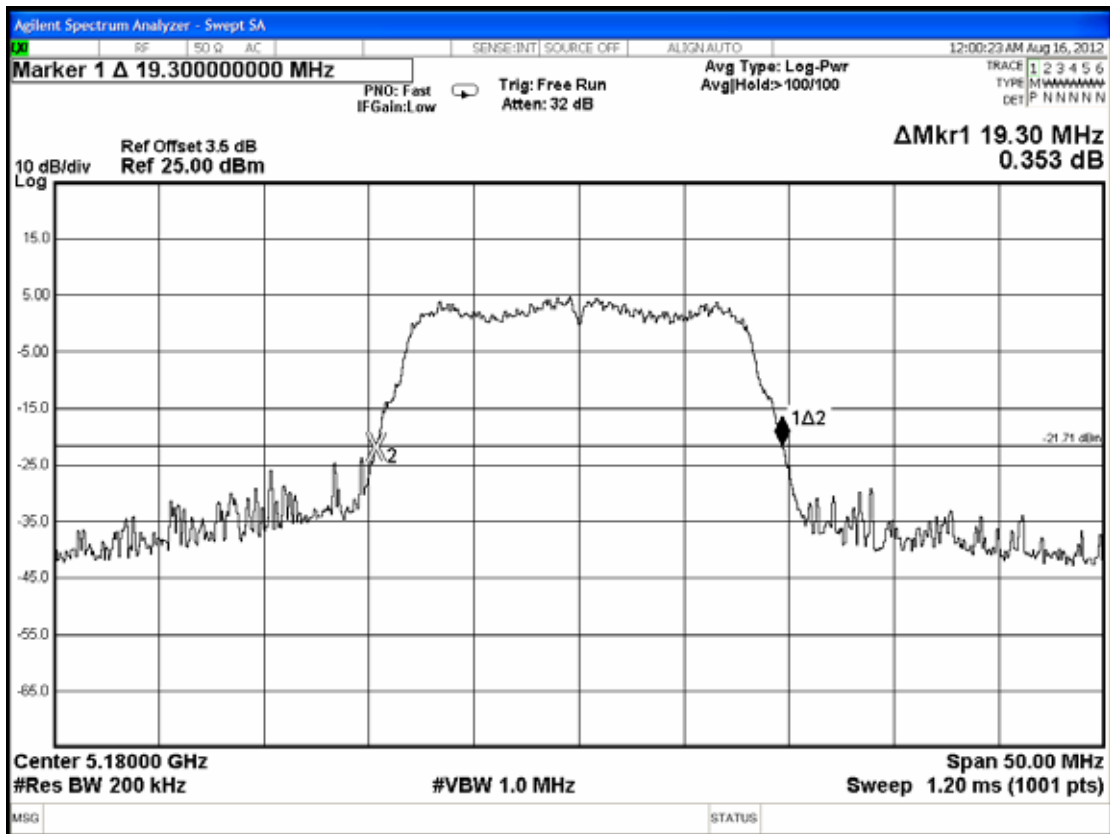
Mode	Type of Network	Channel	Frequency	26dB Bandwidth
1.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	<b>19.60MHz</b>
2.		CH 40	5200MHz	<b>19.60MHz</b>
3.		CH 48	5240MHz	<b>19.70MHz</b>

##### 4.5.3. For NII 802.11n-HT40 (5.2GHz)

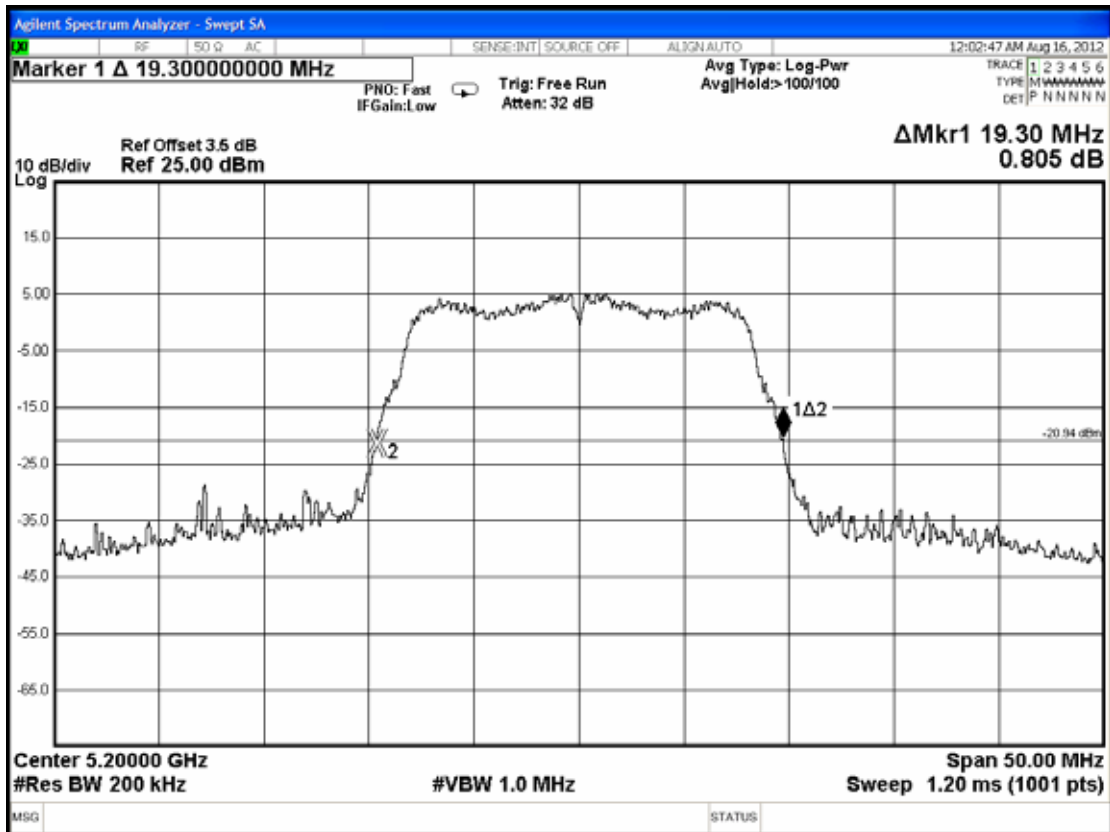
Mode	Type of Network	Channel	Frequency	26dB Bandwidth
1.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	<b>39.68MHz</b>
2.		CH 46	5230MHz	<b>39.76MHz</b>



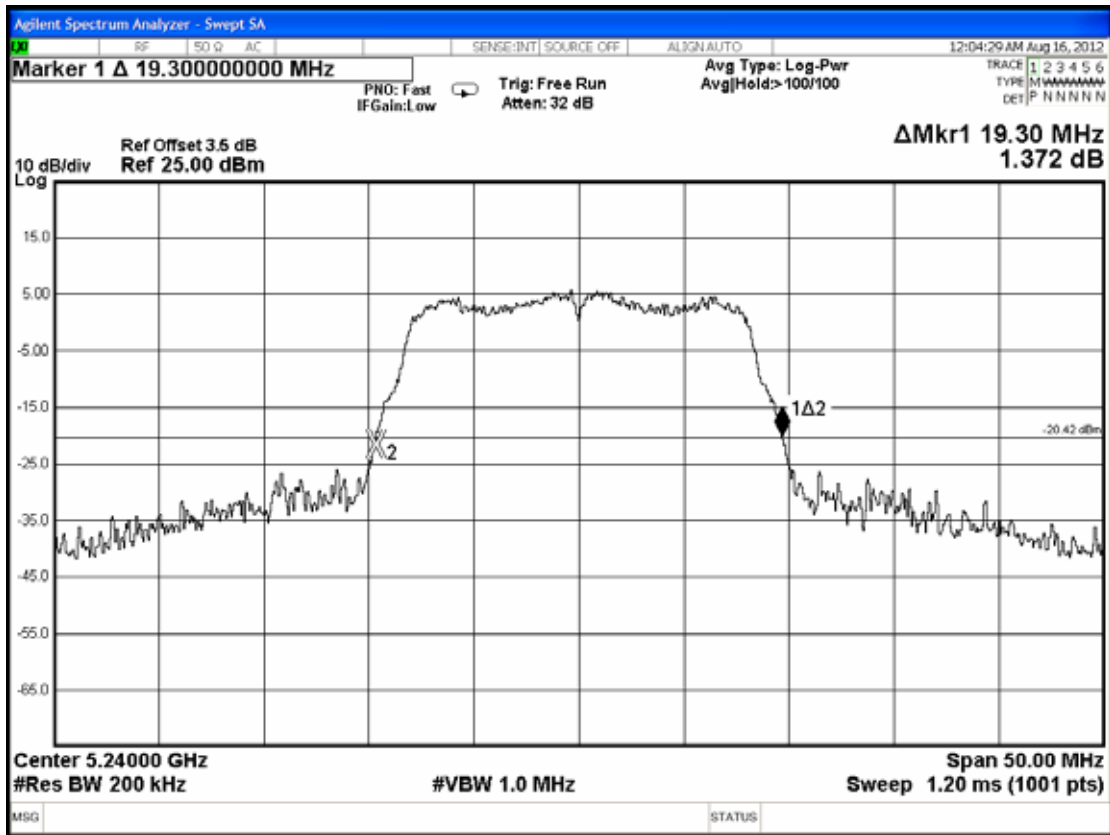
### NII 802.11a (5.2GHz), Frequency: 5180MHz



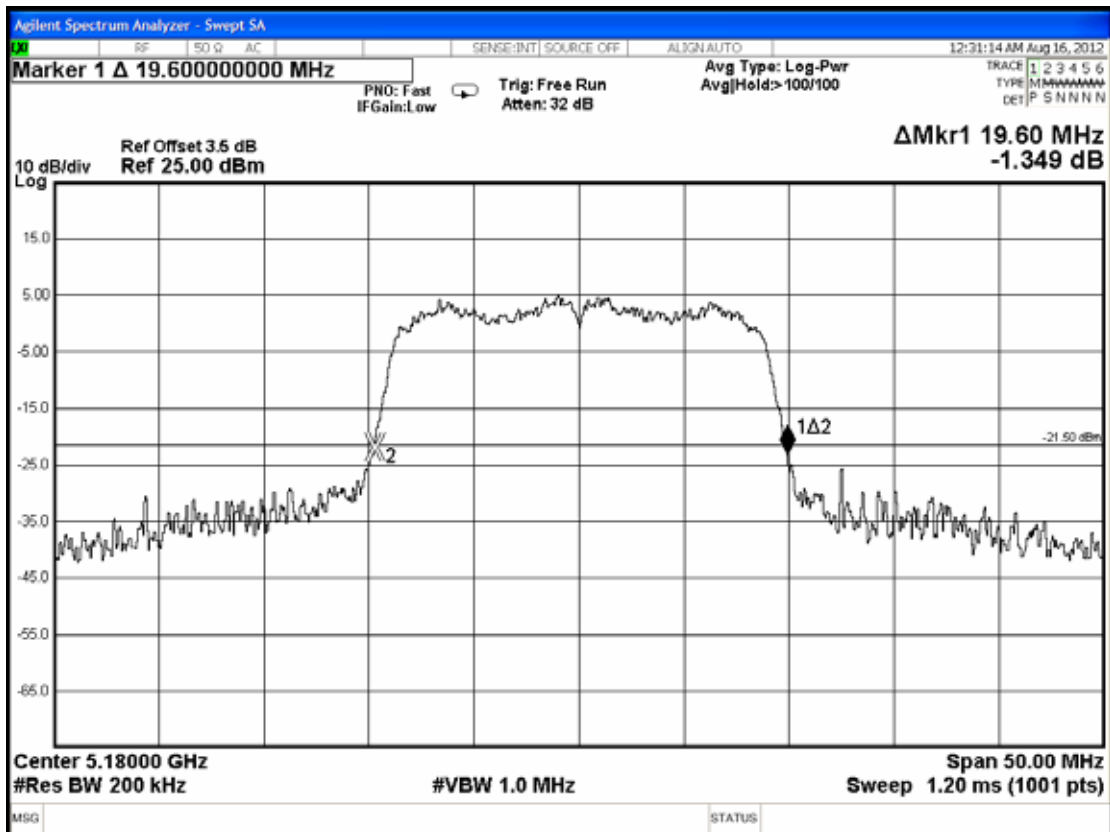
### NII 802.11a (5.2GHz), Frequency: 5200MHz



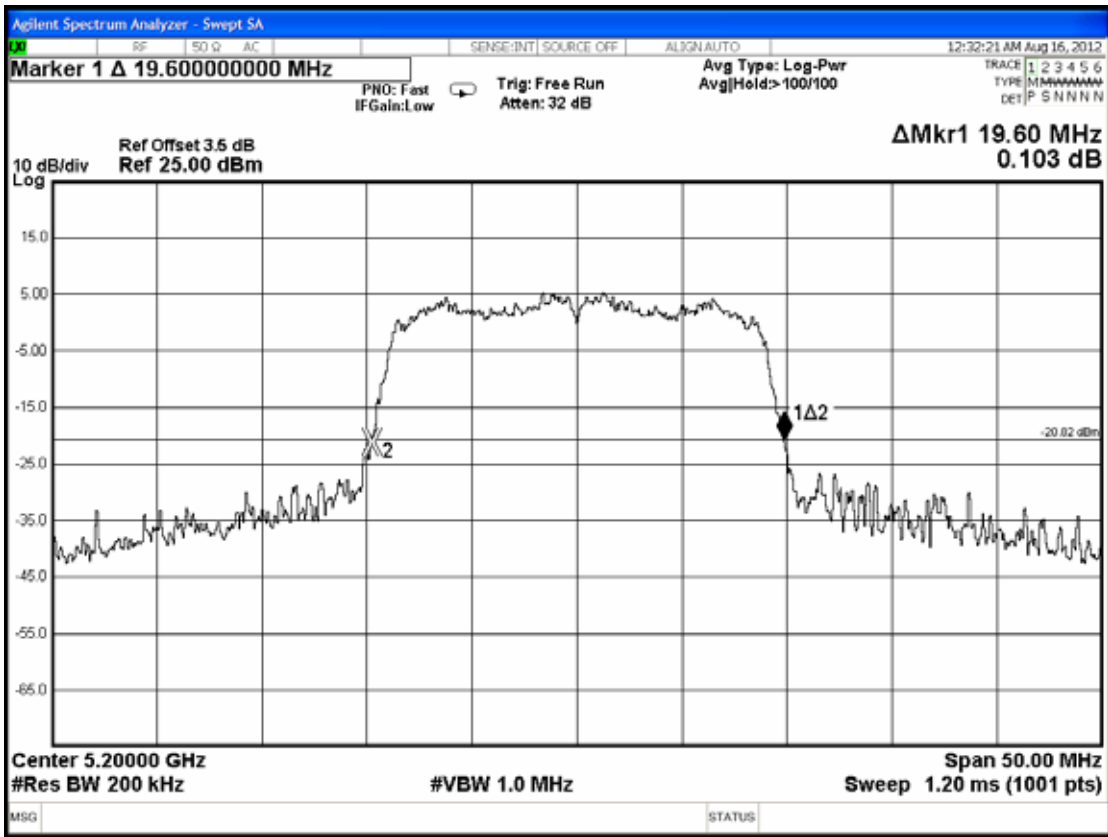
NII 802.11a (5.2GHz), Frequency: 5240MHz



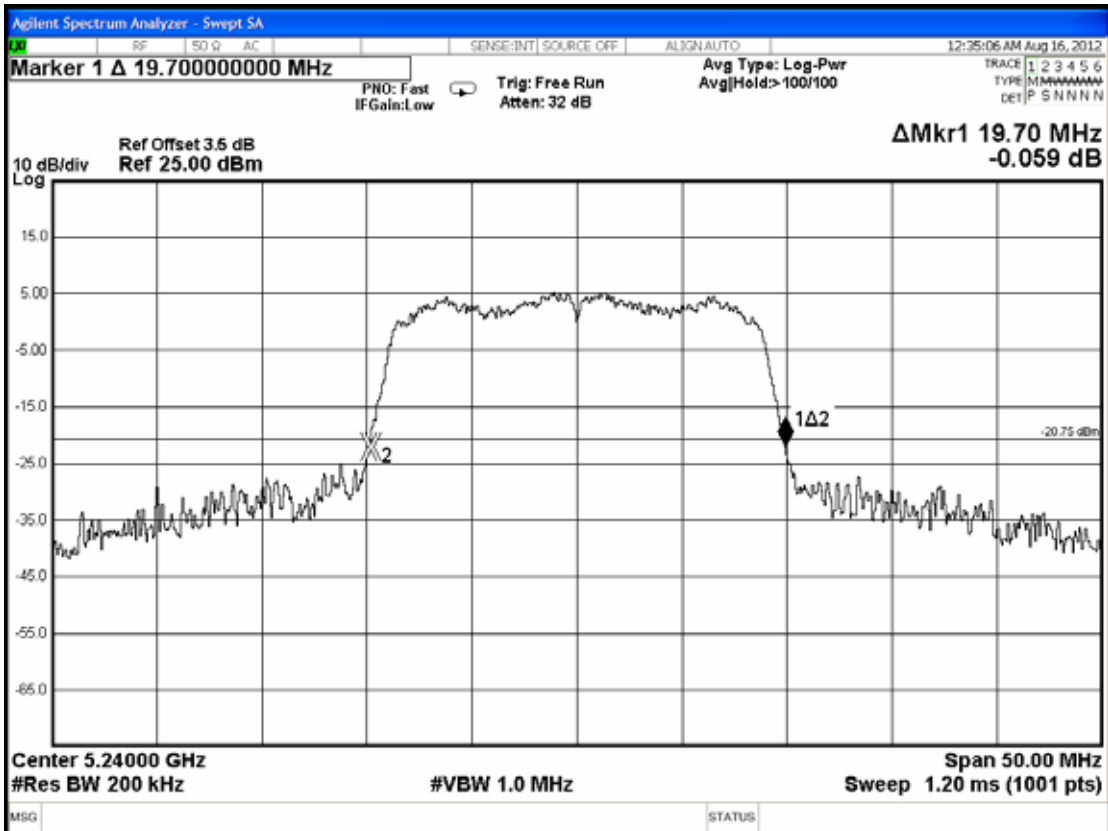
NII 802.11n-HT20 (5.2GHz), Frequency: 5180MHz



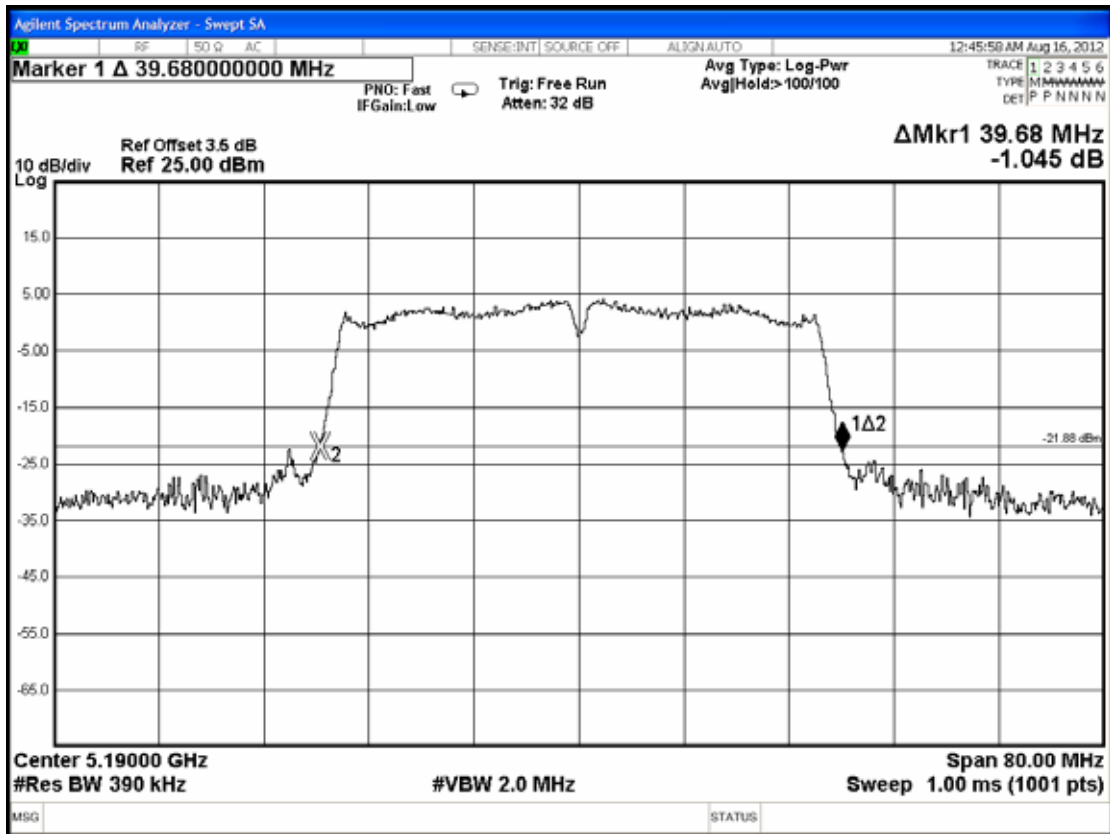
**NII 802.11n-HT20 (5.2GHz), Frequency: 5200MHz**



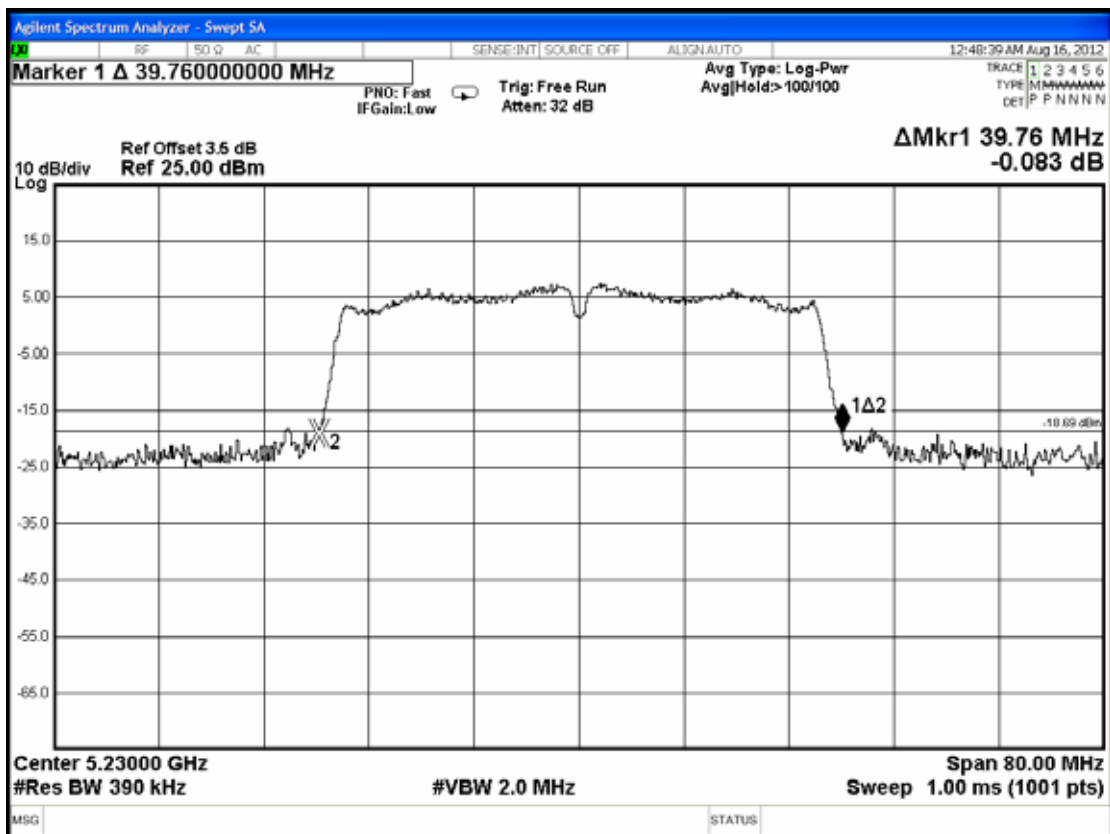
**NII 802.11n-HT20 (5.2GHz), Frequency: 5240MHz**



### NII 802.11n-HT40 (5.2GHz), Frequency: 5190MHz



### NII 802.11n-HT40 (5.2GHz), Frequency: 5230MHz



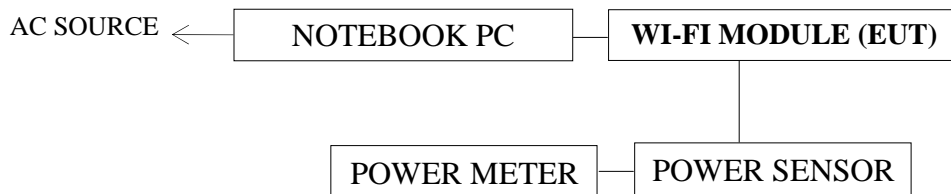
## 5. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 5.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Power Meter	Anritsu	ML2487A	6K00005406	Feb. 13, 12'	Feb. 12, 13'
2.	Power Sensor	Anritsu	MA2491A	030873	Feb. 13, 12'	Feb. 12, 13'

### 5.2. Block Diagram of Test Setup



### 5.3. Specification Limits [§15.407(a)-(1), RSS-210 A9.2 (1)]

#### 5.3.1. For NII 802.11a (5.2GHz)

Frequency	Limit 1	Limit 2 (4dBm+10log B)
5150~5250MHz	50mW (17dBm)	17.42dBm

Remark: B= 26dB Bandwidth

#### 5.3.2. For NII 802.11n-HT20 (5.2GHz)

Frequency	Limit 1	Limit 2 (4dBm+10log B)
5150~5250MHz	50mW (17dBm)	17.96dBm

Remark: B= 26dB Bandwidth

#### 5.3.3. For NII 802.11n-HT40 (5.2GHz)

Frequency	Limit 1	Limit 2 (4dBm+10log B)
5150~5250MHz	50mW (17dBm)	20.57dBm

Remark: B= 26dB Bandwidth

### 5.4. Operating Condition of EUT

The test program “Broadcom WL Command” was used to enable the EUT to transmit data at different channel frequency individually.

## 5.5. Test Procedure

The EUT connected to power meter and sensor and record the average value

The measurement guideline was according to KDB789033 D01

The measurement guideline was according to RSS-Gen.

## 5.6. Test Results

**PASSED.** All the test results are listed below.

Test Date : Aug. 16, 2012    Temperature : 25        Humidity : 51%

### 5.6.1. For NII 802.11a (5.2GHz)

Mode	Type of Network	Channel	Frequency	Maximum Output Power (dBm)		Total Maximum Output Power (dBm)	Power Setting
				Ant.0	Ant.1		
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	10.11	10.4	13.27	38
2.		CH 40	5200MHz	10.01	10.39	13.21	40
3.		CH 48	5240MHz	10.33	10.64	13.50	40

### 5.6.2. For NII 802.11n-HT20 (5.2GHz)

Mode	Type of Network	Channel	Frequency	Maximum Output Power (dBm)		Total Maximum Output Power (dBm)	Power Setting
				Ant.0	Ant.1		
1.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	10.09	10.29	13.20	38
2.		CH 40	5200MHz	9.92	10.42	13.19	40
3.		CH 48	5240MHz	10.34	10.43	13.40	40

### 5.6.3. For NII 802.11n-HT40 (5.2GHz)

Mode	Type of Network	Channel	Frequency	Maximum Output Power (dBm)		Total Maximum Output Power (dBm)	Power Setting
				Ant.0	Ant.1		
1.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	9.83	10.25	13.06	34
2.		CH 46	5230MHz	12.99	12.81	15.91	50

## 6. POWER SPECTRAL DENSITY MEASUREMENT

### 6.1. Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

### 6.2. Block Diagram of Test Setup

The same as section.4.2.

### 6.3. Specification Limits [§15.407(a)-(1), RSS-210 A9.2 (1)]

For the band 5.15-5.25GHz, the peak power spectral density shall not exceed 4dBm in any 1MHz band.

### 6.4. Operating Condition of EUT

The test program “hyper terminal” was used to enable the EUT to transmit data at different channel frequency individually.

### 6.5. Test Procedure

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW=1MHz
3. Set VBW≥3MHz
4. Detector=RMS (i.e., power averaging), if available, Otherwise, use sample detector mode.
5. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
6. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.

The measurement guideline was according to KDB789033 D01

The measurement guideline was according to RSS-Gen.

Pursuant to KDB 662911, we performed conducted tests for both antenna chains and submit test data measured on chain 0 as worse performance.

## 6.6. Test Results

**PASSED.** All the test results are attached in next pages.

Pursuant to KDB 662911, the test result has been included 3 dB is calculated from  $10\log(N)$ , where N is the number of outputs.

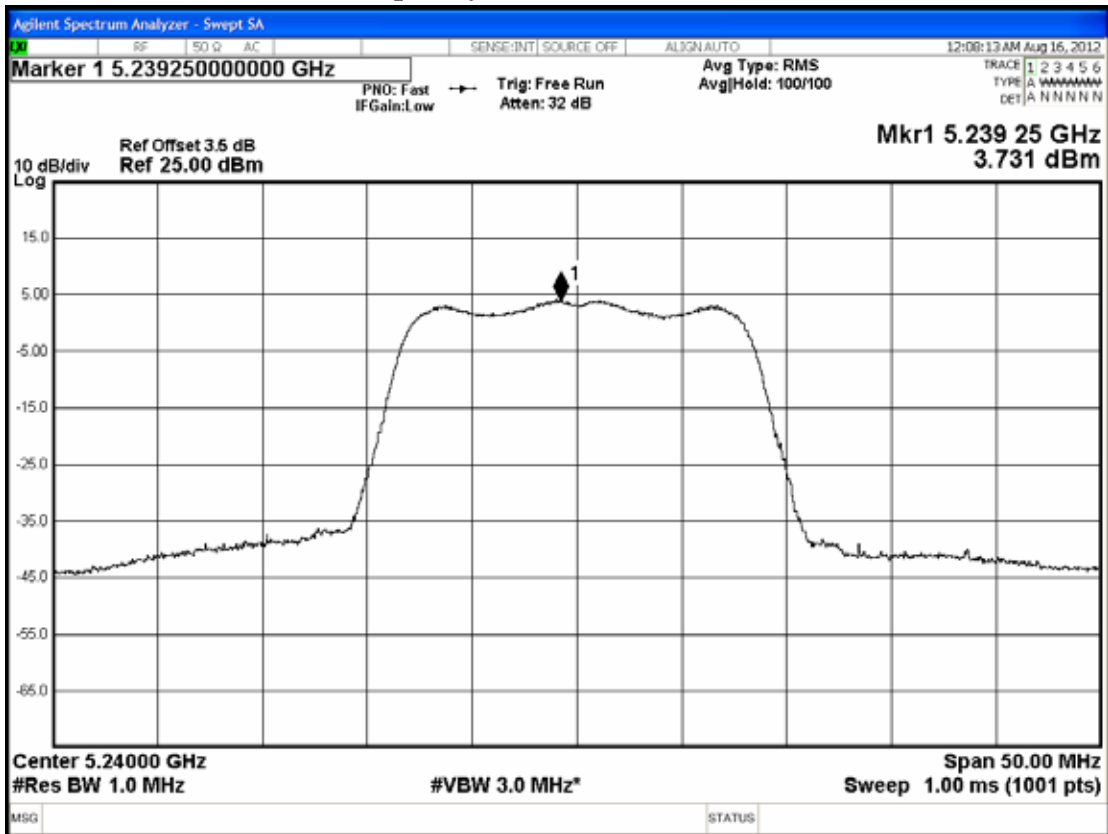
Test Date : Aug. 16, 2012    Temperature : 25    Humidity : 51%

Mode	Type of Network	Channel	Frequency	Power Spectral Density (dBm)
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	<b>3.731</b>
2.		CH 40	5200MHz	<b>3.501</b>
3.		CH 48	5240MHz	<b>3.561</b>
4.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	<b>3.370</b>
5.		CH 40	5200MHz	<b>3.680</b>
6.		CH 48	5240MHz	<b>3.841</b>
7.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	<b>0.175</b>
8.		CH 46	5230MHz	<b>3.077</b>

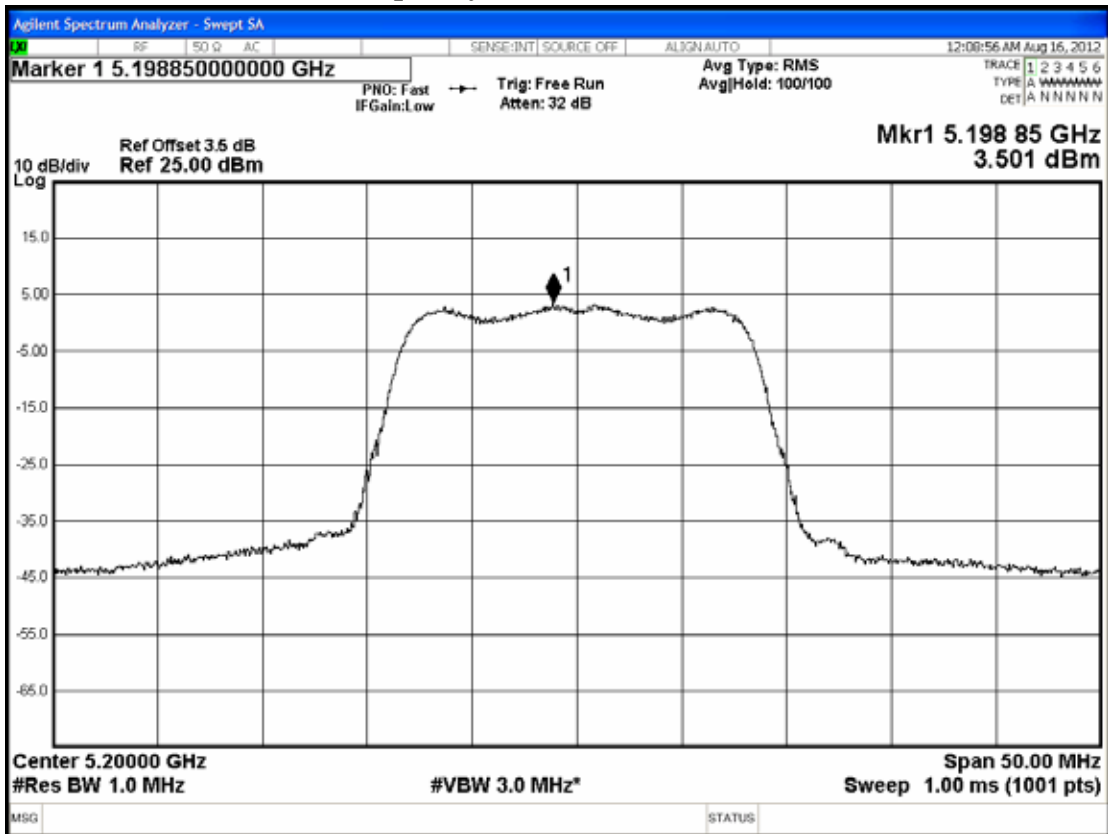
[Limit: 4dBm]



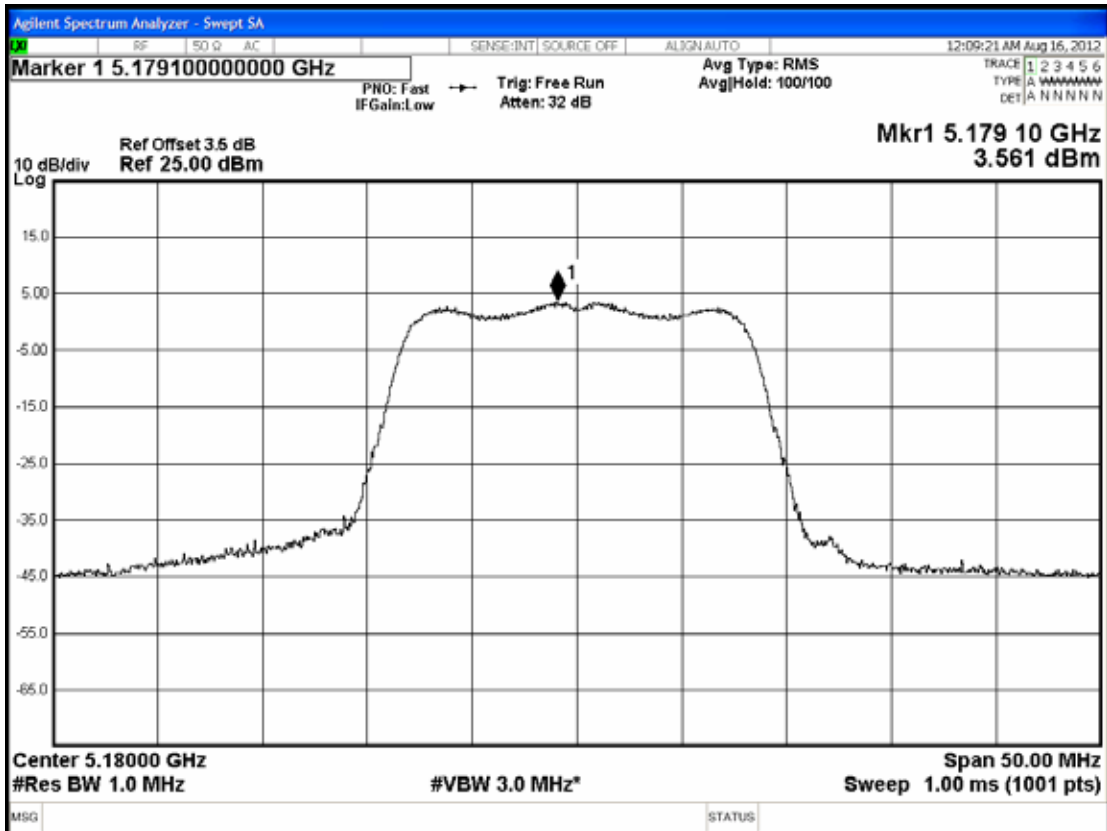
### NII 802.11a (5.2GHz), Frequency: 5180MHz



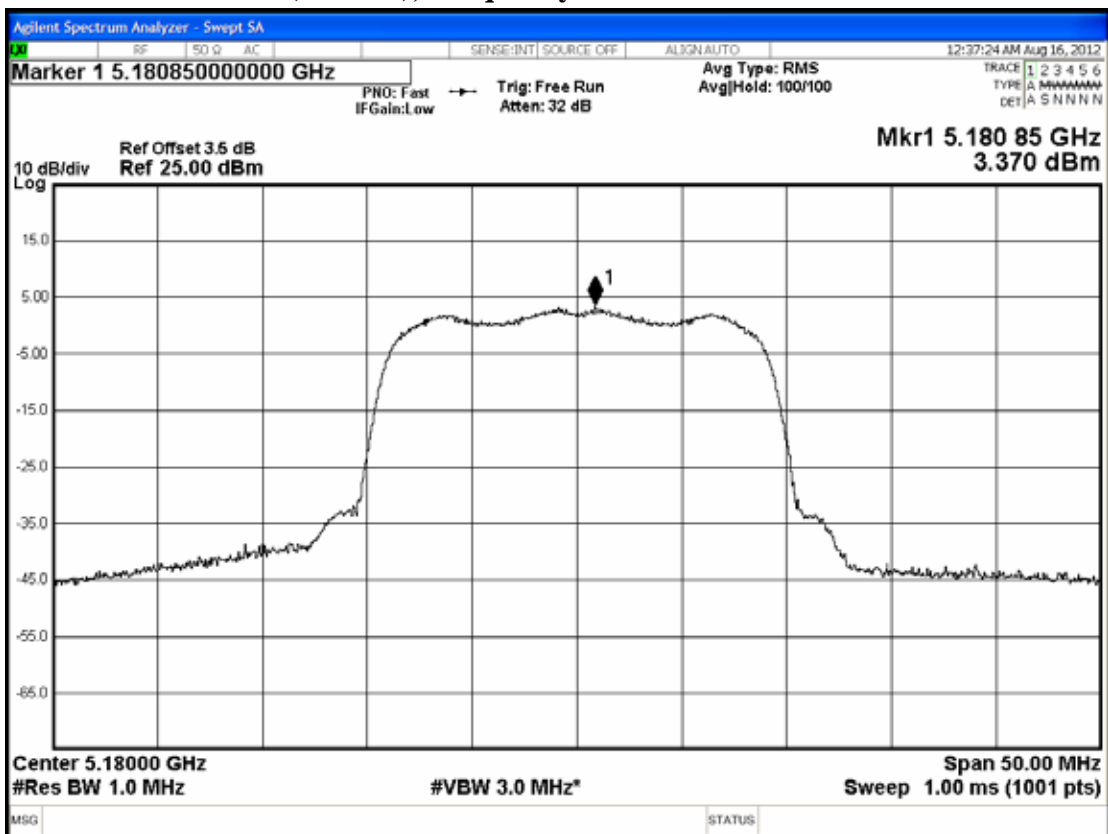
### NII 802.11a (5.2GHz), Frequency: 5200MHz



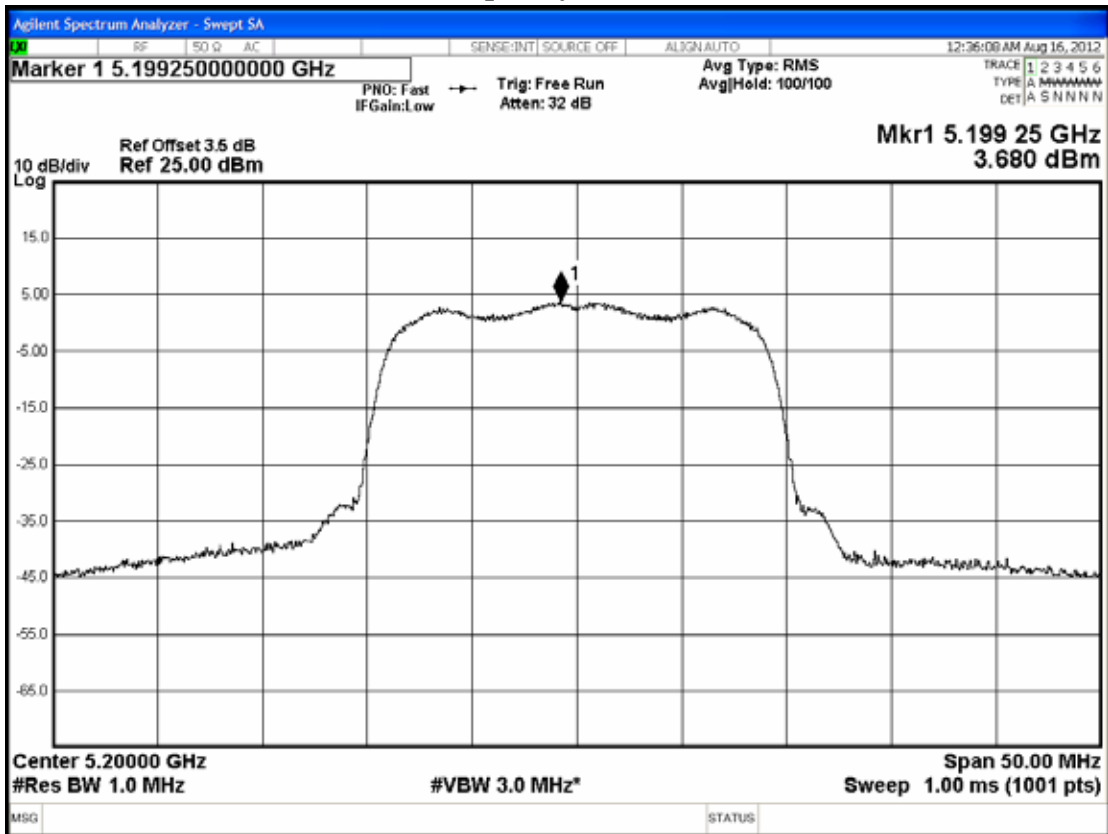
### NII 802.11a (5.2GHz), Frequency: 5240MHz



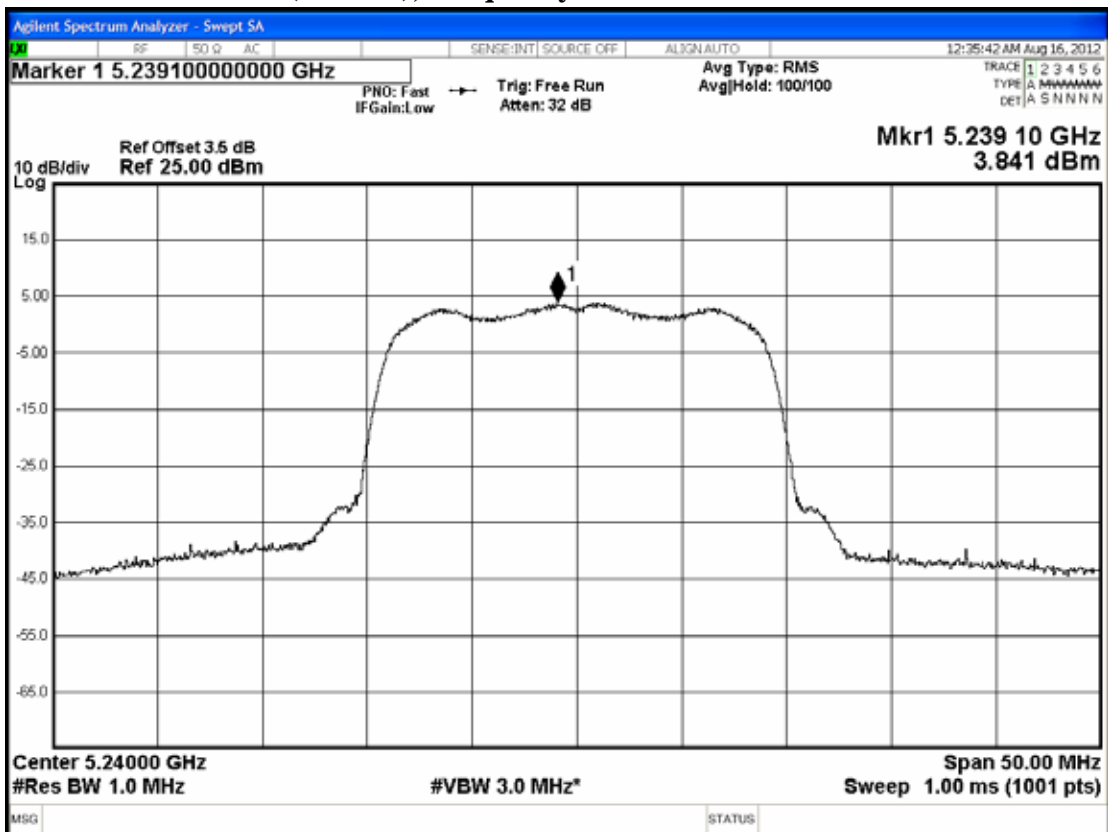
### NII 802.11n-HT20 (5.2GHz), Frequency: 5180MHz



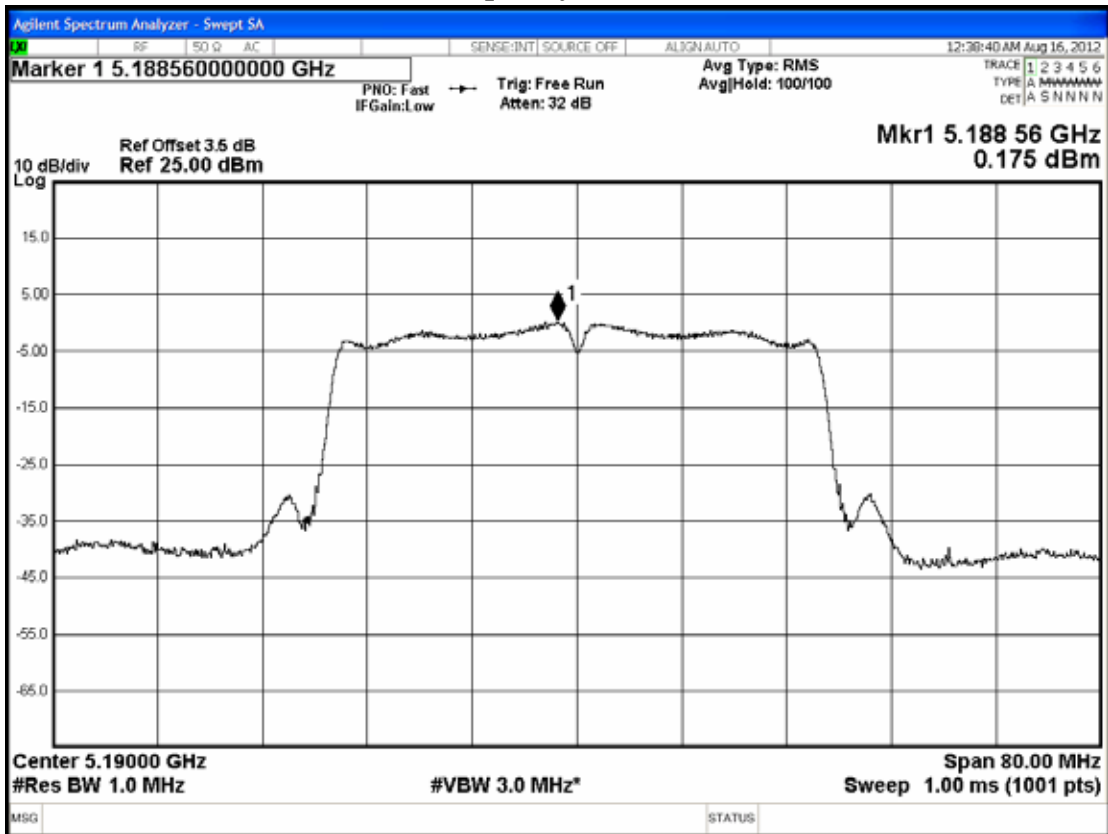
### NII 802.11n-HT20 (5.2GHz), Frequency: 5200MHz



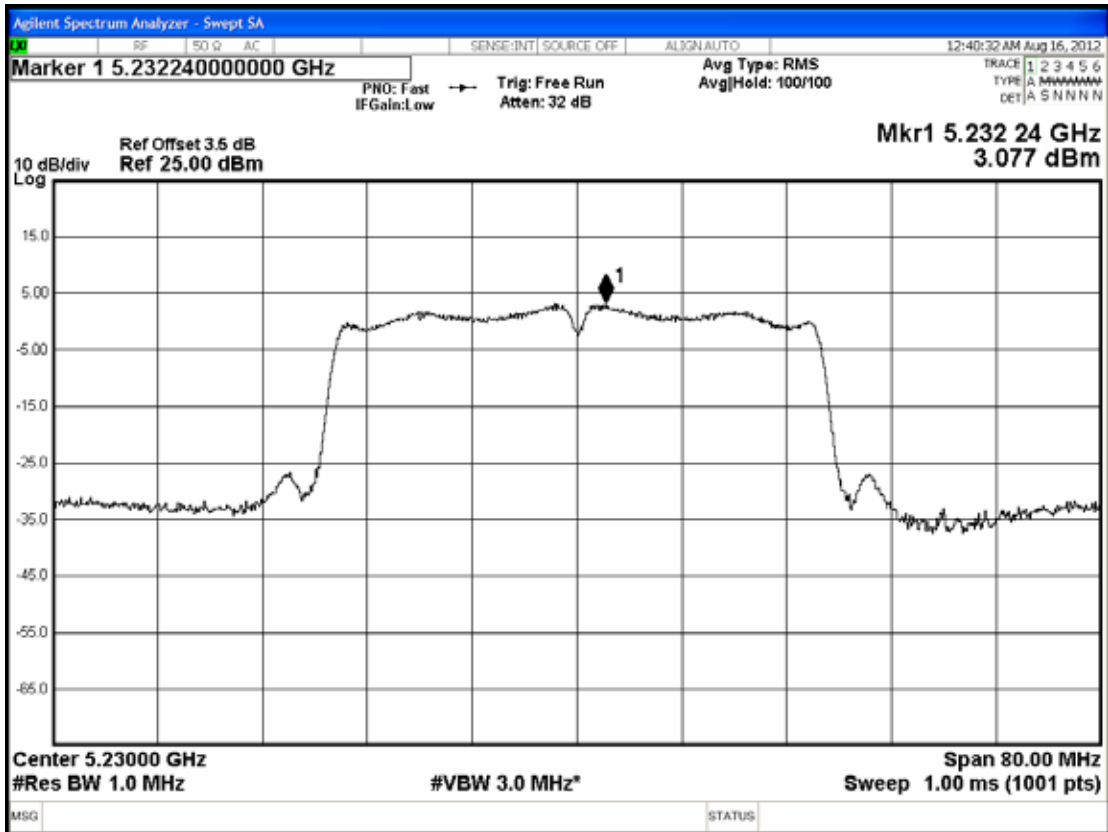
### NII 802.11n-HT20 (5.2GHz), Frequency: 5240MHz



### NII 802.11n-HT40 (5.2GHz), Frequency: 5190MHz



### NII 802.11n-HT40 (5.2GHz), Frequency: 5230MHz



## 7. PEAK POWER EXCURSION MEASUREMENT

### 7.1. Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

### 7.2. Block Diagram of Test Setup

The same as section.4.2.

### 7.3. Specification Limits (§15.407(a)-(6))

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 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less.

### 7.4. Operating Condition of EUT

The test program “hyper terminal” was used to enable the EUT to transmit data at different channel frequency individually.

### 7.5. Test Procedure

For 1st trace:

Find the maximum of the peak-max-hold spectrum.

1. Set RBW=1MHz
2. Set VBW $\leq$ 3MHz
3. Detector=peak.
4. Trace mode=max-hold.
5. Allow the sweeps to continue until the trace stabilizes.
6. Use the peak search function to find the peak of the spectrum.

For 2st trace:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW=1MHz
3. Set VBW $\geq$ 3MHz
4. Detector=RMS (i.e., power averaging), if available, Otherwise, use sample detector mode.
5. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
6. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.

The measurement guideline was according to KDB789033 D01

The measurement guideline was according to RSS-Gen.

Pursuant to KDB 662911, we performed conducted tests for both antenna chains and submit test data measured on chain 0 as worse performance.

## 7.6. Test Results

**PASSED.** All the test results are attached in next pages.

Pursuant to KDB 662911, the test result has been included 3 dB is calculated from  $10\log(N)$ , where N is the number of outputs.

Test Date : Aug. 16, 2012    Temperature : 25        Humidity : 51%

### 7.6.1. For NII 802.11a (5.2GHz)

Mode	Type of Network	Channel	Frequency	Peak Power Excursion
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	<b>8.805dB</b>
2.		CH 40	5200MHz	<b>9.026dB</b>
3.		CH 48	5240MHz	<b>9.100dB</b>

[Limit: 13dB]

### 7.6.2. For NII 802.11n-HT20 (5.2GHz)

Mode	Type of Network	Channel	Frequency	Peak Power Excursion
1.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	<b>8.814dB</b>
2.		CH 40	5200MHz	<b>8.657dB</b>
3.		CH 48	5240MHz	<b>8.329dB</b>

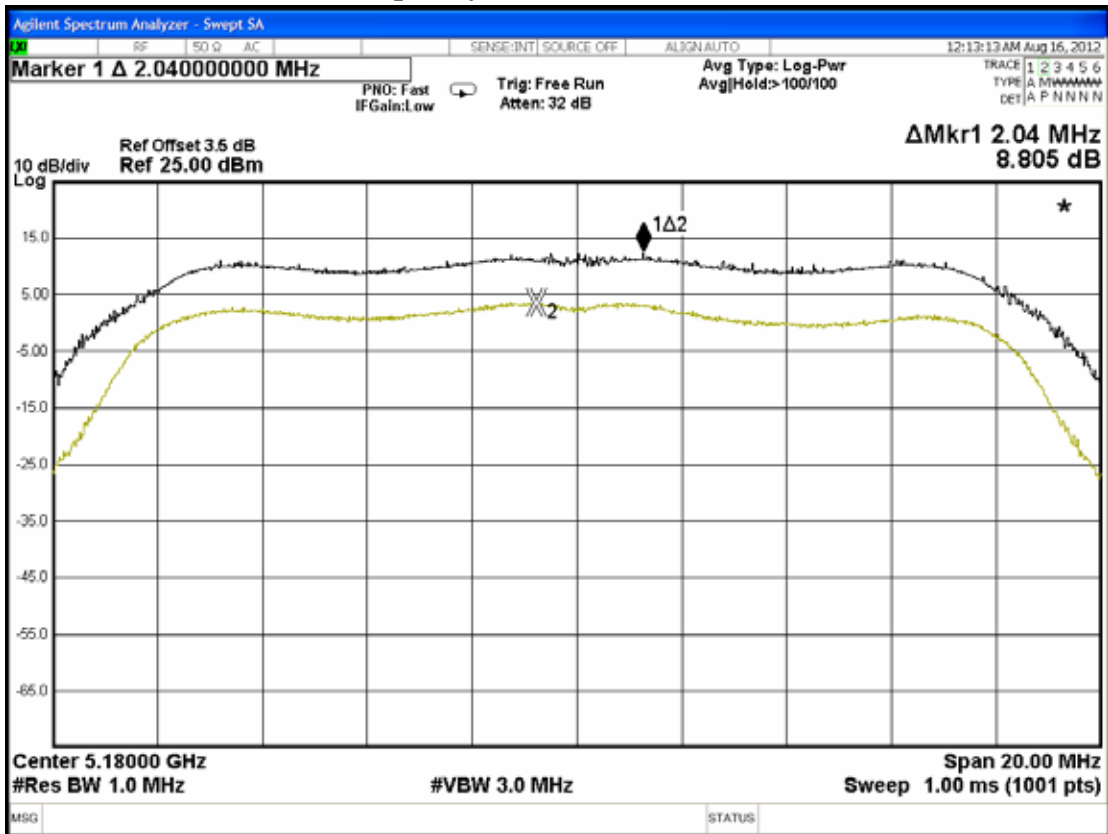
[Limit: 13dB]

### 7.6.3. For NII 802.11n-HT40 (5.2GHz)

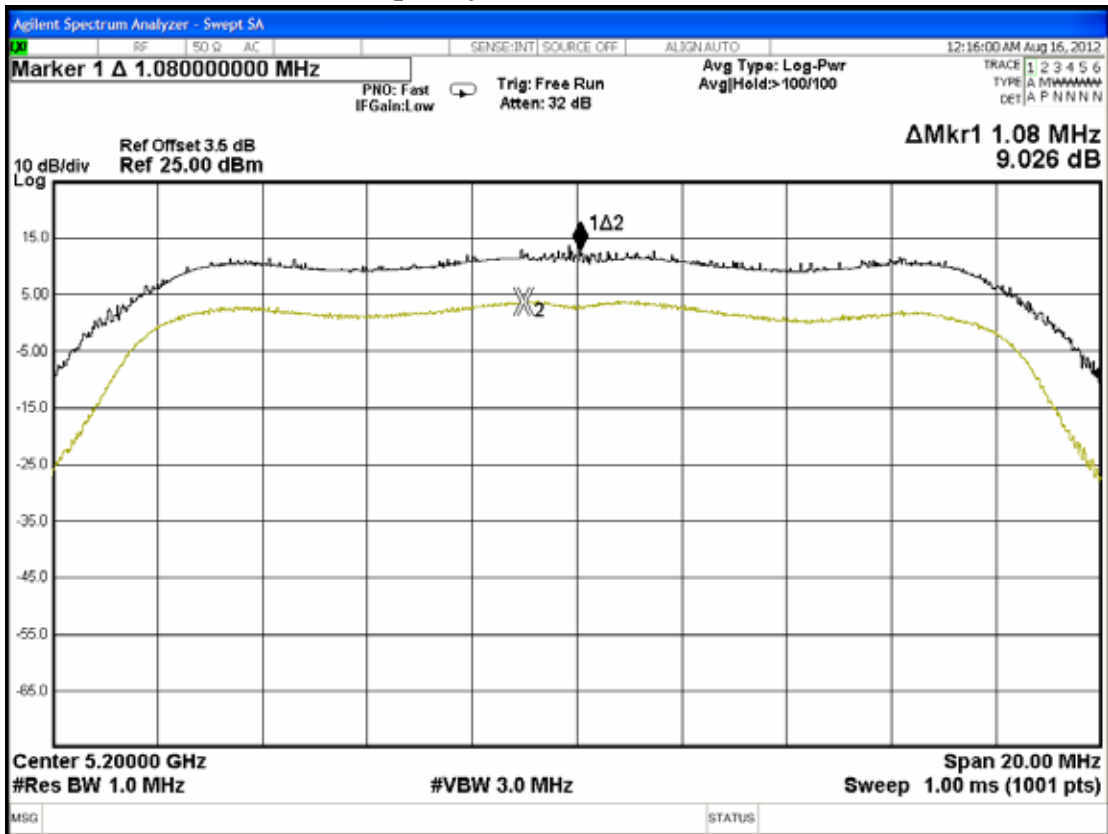
Mode	Type of Network	Channel	Frequency	Peak Power Excursion
1.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	<b>8.281dB</b>
2.		CH 46	5230MHz	<b>8.645dB</b>

[Limit: 13dB]

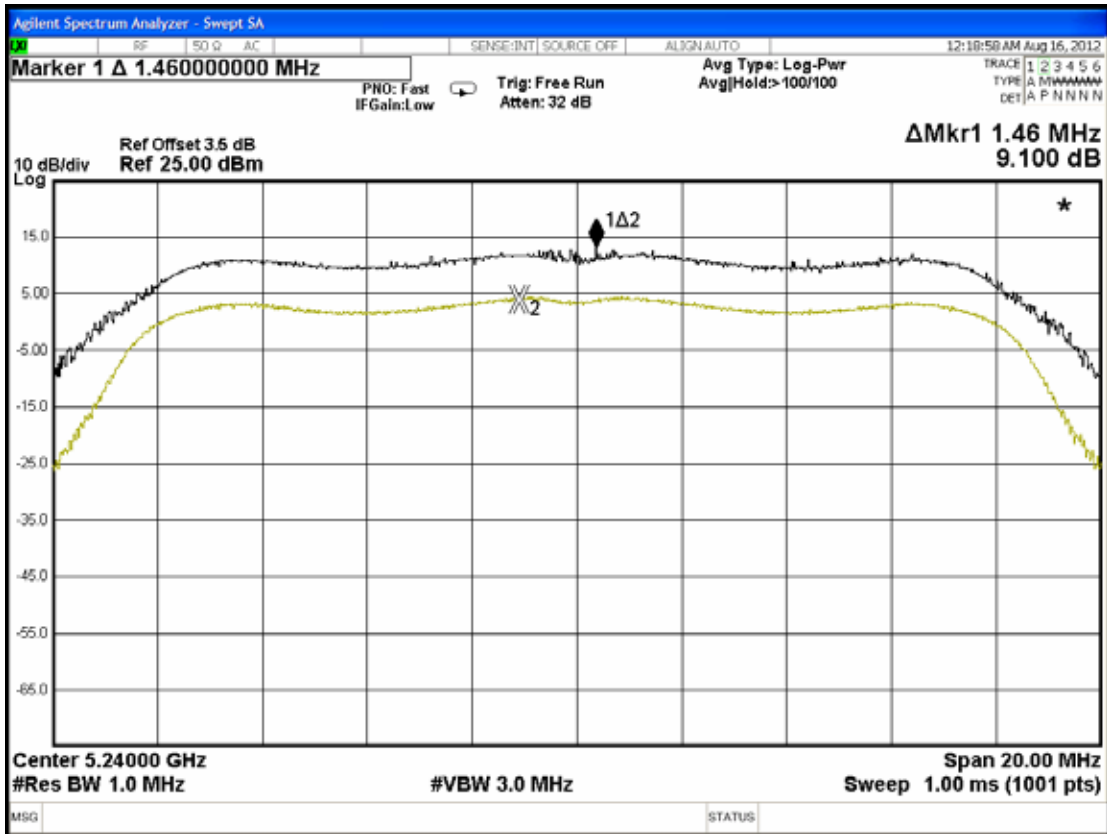
### NII 802.11a (5.2GHz), Frequency: 5180MHz



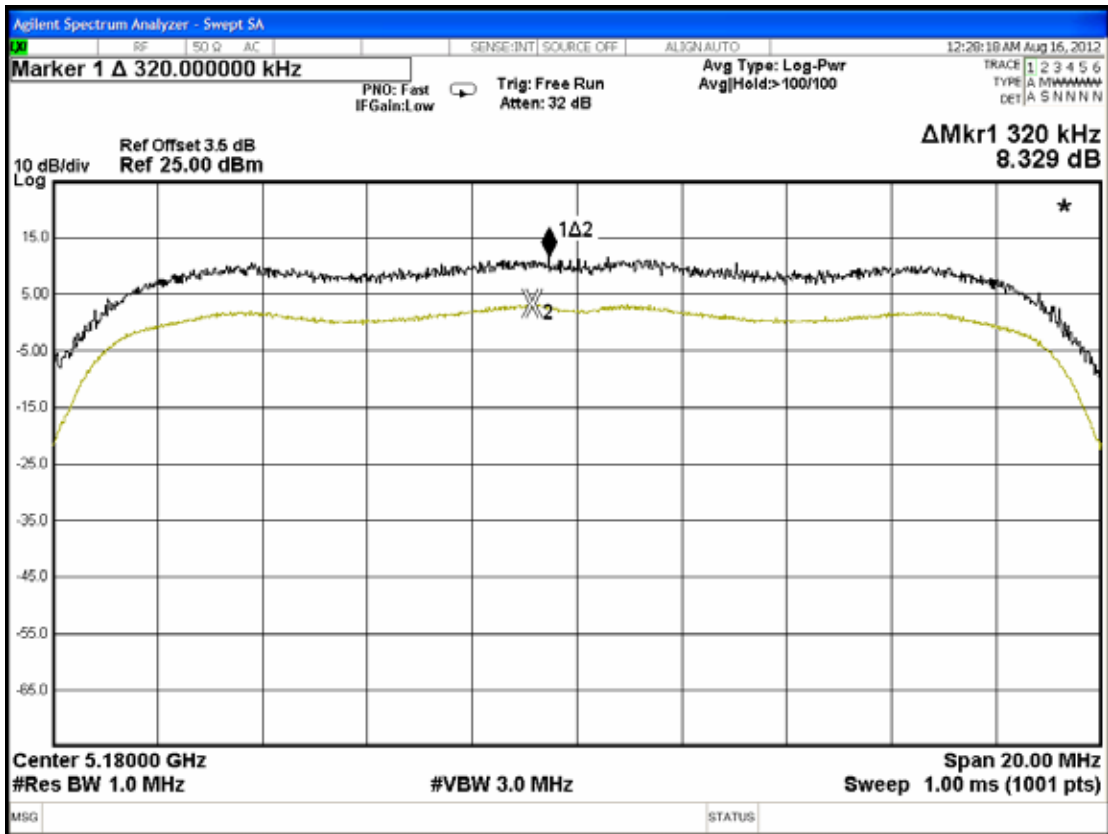
### NII 802.11a (5.2GHz), Frequency: 5200MHz



### NII 802.11a (5.2GHz), Frequency: 5240MHz

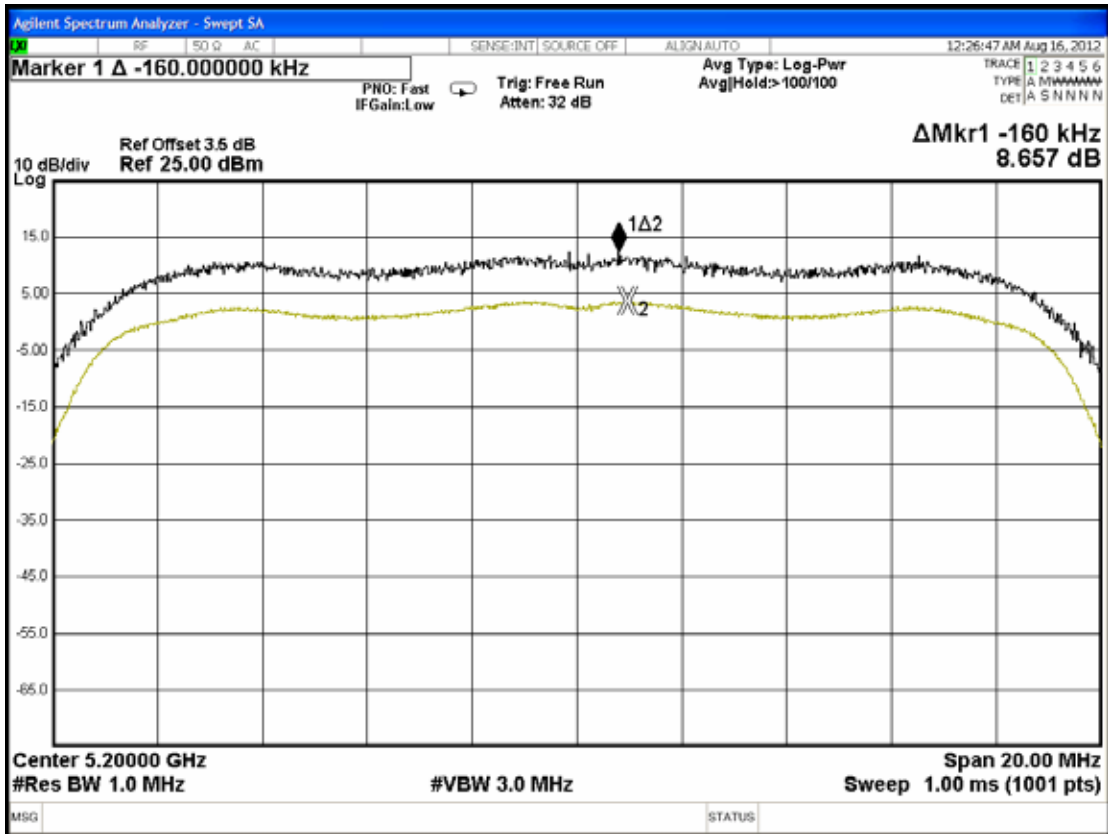


### NII 802.11n-HT20 (5.2GHz), Frequency: 5180MHz

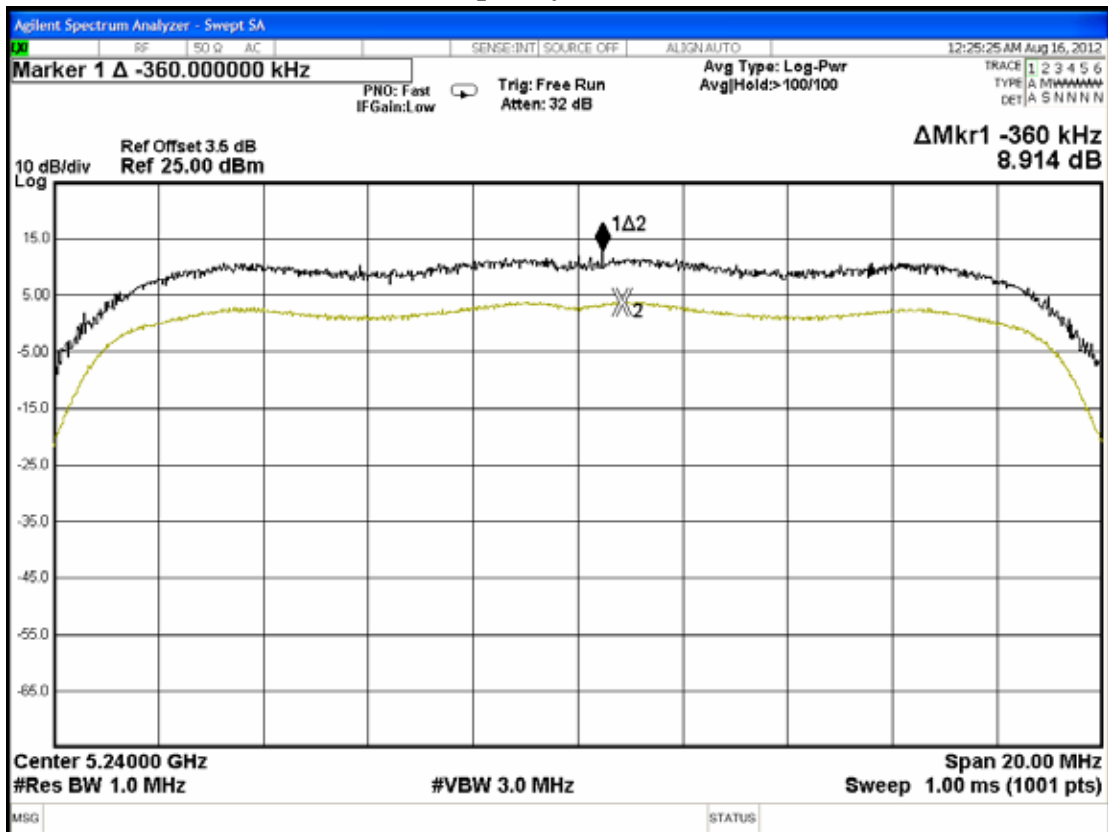




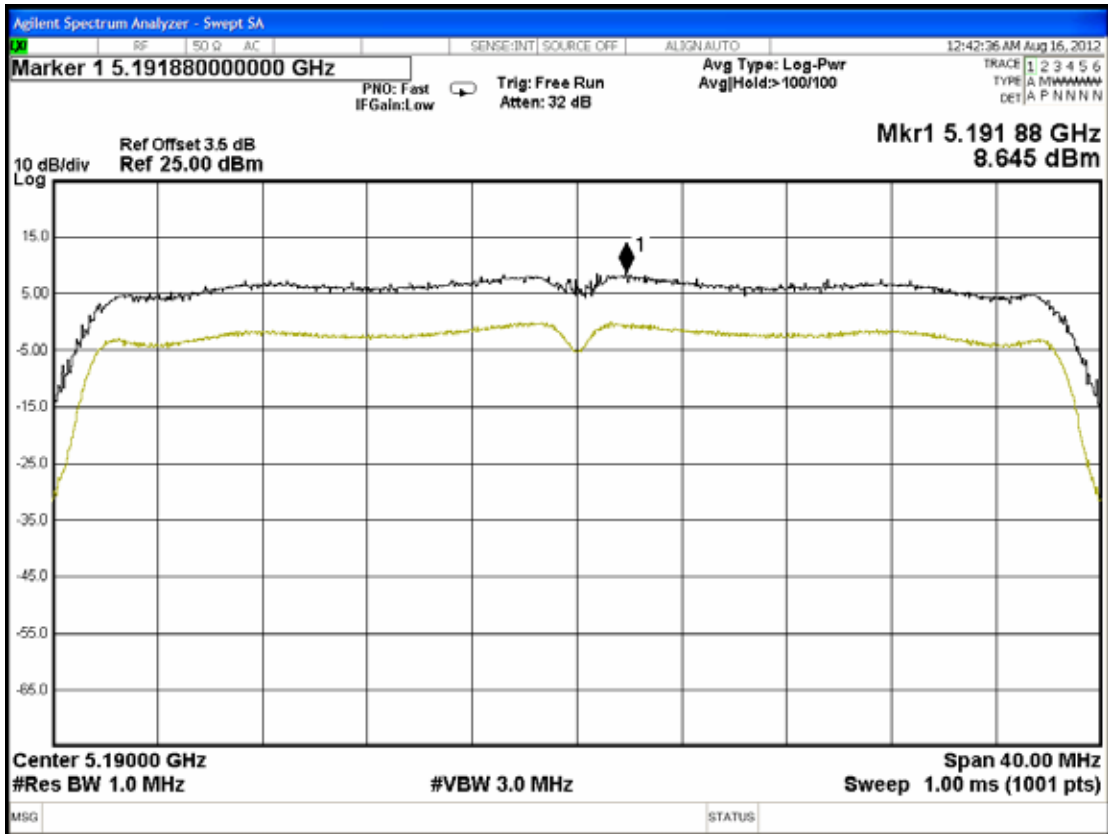
### NII 802.11n-HT20 (5.2GHz), Frequency: 5200MHz



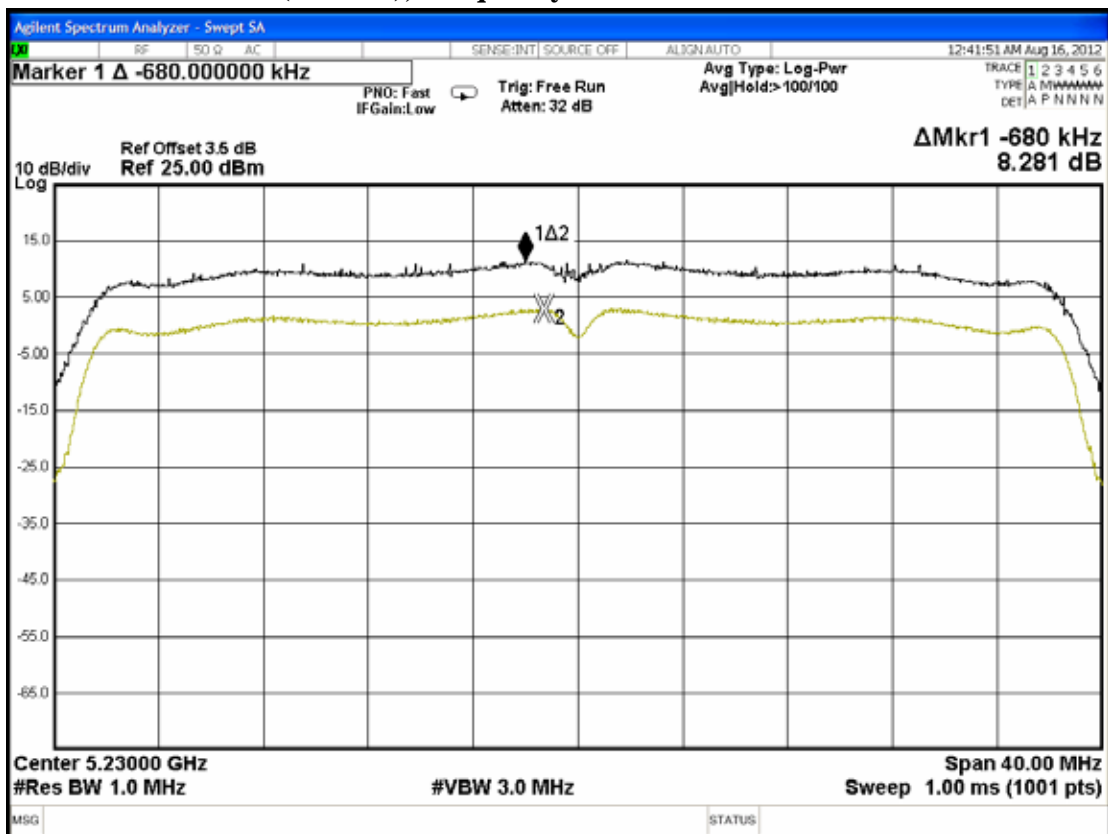
### NII 802.11n-HT20 (5.2GHz), Frequency: 5240MHz



### NII 802.11n-HT40 (5.2GHz), Frequency: 5190MHz



### NII 802.11n-HT40 (5.2GHz), Frequency: 5230MHz



## 8. OCCUPIED BANDWIDTH 99% POWER MEASUREMENT

### 8.1. Test Equipment

The following test equipment was used during the occupied bandwidth 99% power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

### 8.2. Block Diagram of Test Setup

The same as section.4.2.

### 8.3. Specification [RSS-Gen §4.6.1]

The emission bandwidth may be taken as the bandwidth within which is 99% of the transmitter output power. The 20 dB bandwidth may also be used instead, when the spectral density has decreased by 20 dB from the in band spectral density. For the determination of the 20 dB bandwidth, the measurement bandwidth should be in the order of 1.0% of the emission bandwidth and VBW=3 times RBW.

### 8.4. Operating Condition of EUT

The test program “hyper terminal” was used to enable the EUT to transmit data at different channel frequency individually.

### 8.5. Test Procedure

The RF output of EUT was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 20kHz RBW and 62kHz VBW, set span = 15MHz and sweep time = auto.

The measurement guideline was according to RSS-Gen.

## 8.6. Test Results

**PASSED.** All the test results are attached in next pages.

Test Date : Aug. 16, 2012    Temperature : 25        Humidity : 51%

### 8.6.1. For NII 802.11a (5.2GHz)

Mode	Type of Network	Channel	Frequency	Occupied Bandwidth
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	<b>16.322MHz</b>
2.		CH 40	5200MHz	<b>16.372MHz</b>
3.		CH 48	5240MHz	<b>16.351MHz</b>

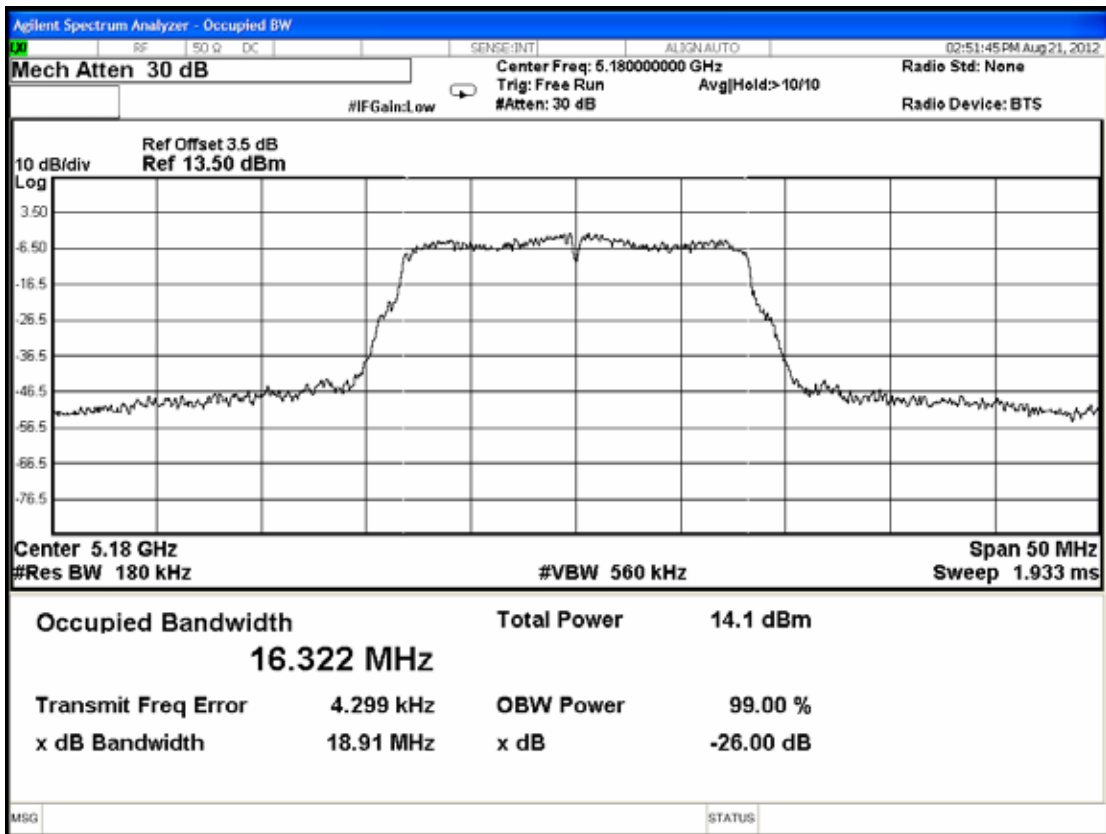
### 8.6.2. For NII 802.11n-HT20 (5.2GHz)

Mode	Type of Network	Channel	Frequency	Occupied Bandwidth
1.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	<b>17.534MHz</b>
2.		CH 40	5200MHz	<b>17.564MHz</b>
3.		CH 48	5240MHz	<b>17.538MHz</b>

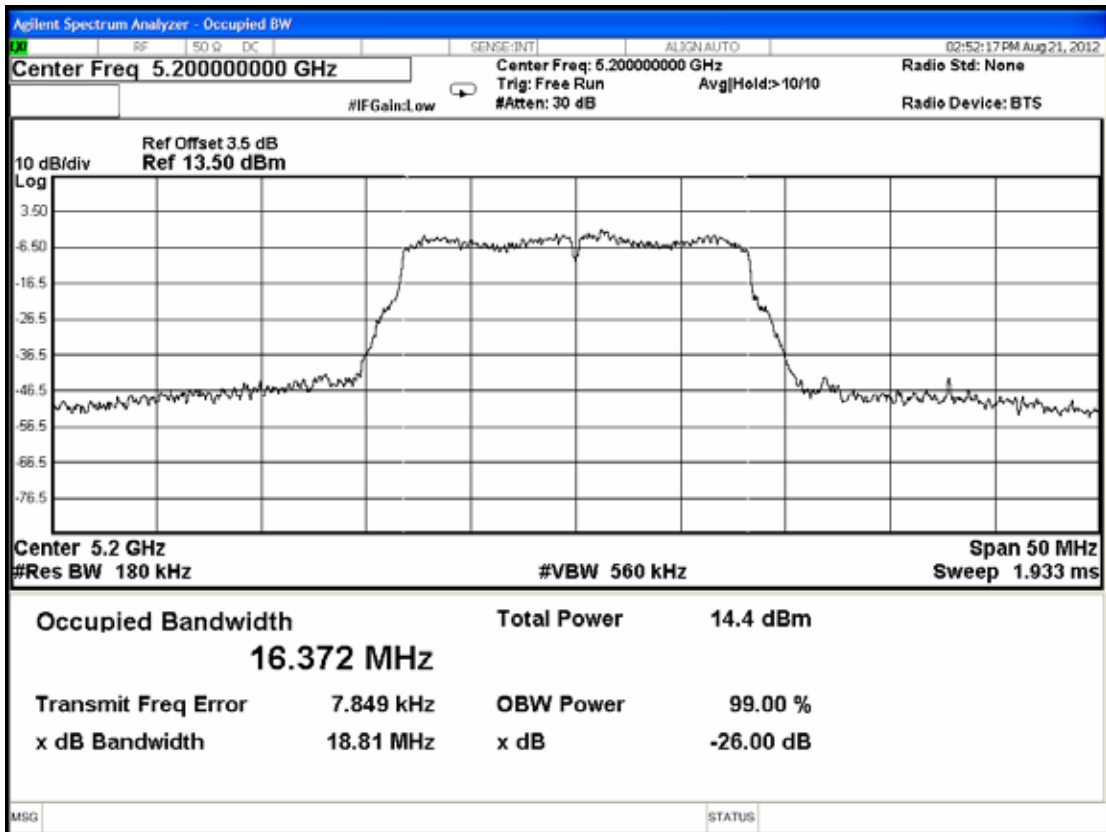
### 8.6.3. For NII 802.11n-HT40 (5.2GHz)

Mode	Type of Network	Channel	Frequency	Occupied Bandwidth
1.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	<b>36.220MHz</b>
2.		CH 46	5230MHz	<b>36.233MHz</b>

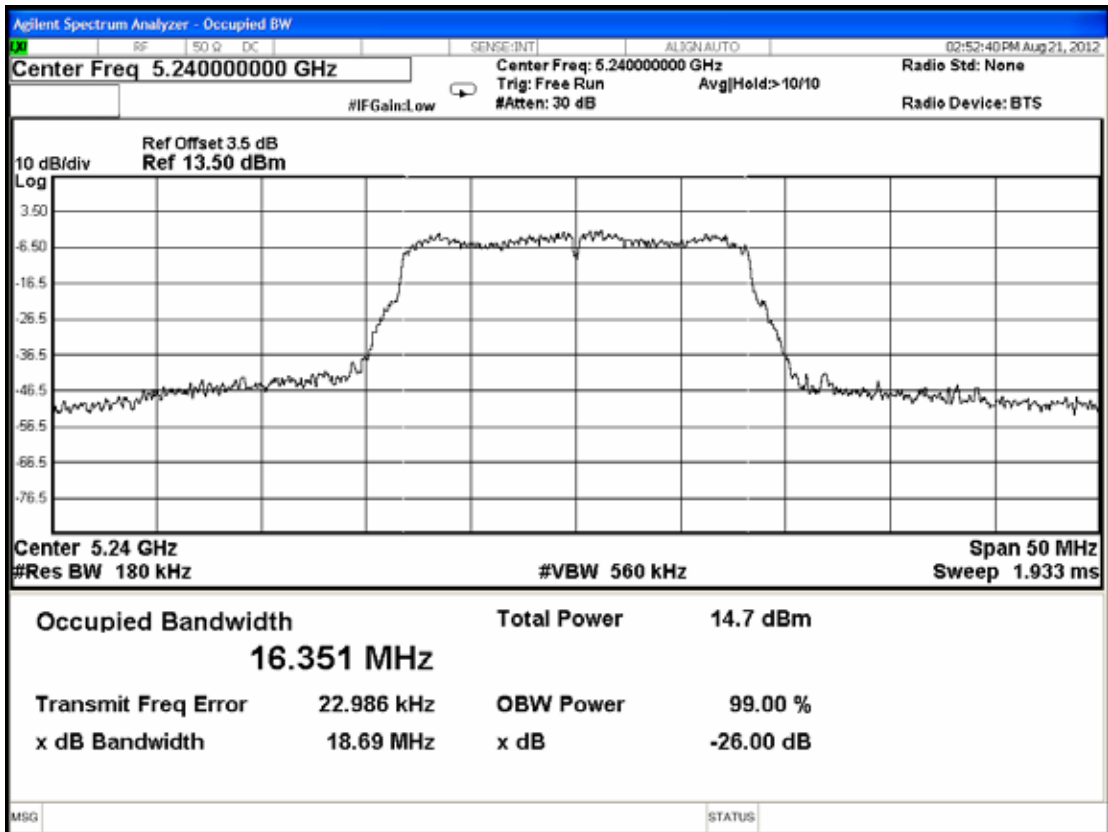
**NII 802.11a (5.2GHz), Frequency: 5180MHz**



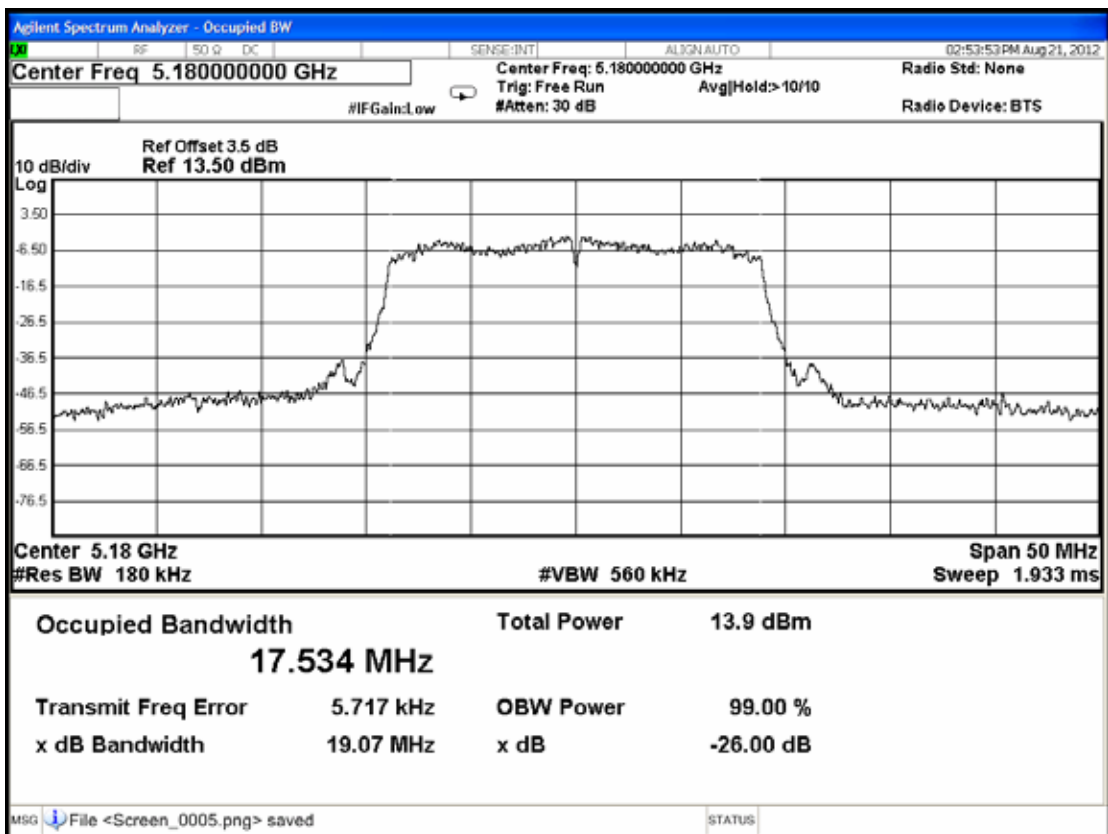
**NII 802.11a (5.2GHz), Frequency: 5200MHz**



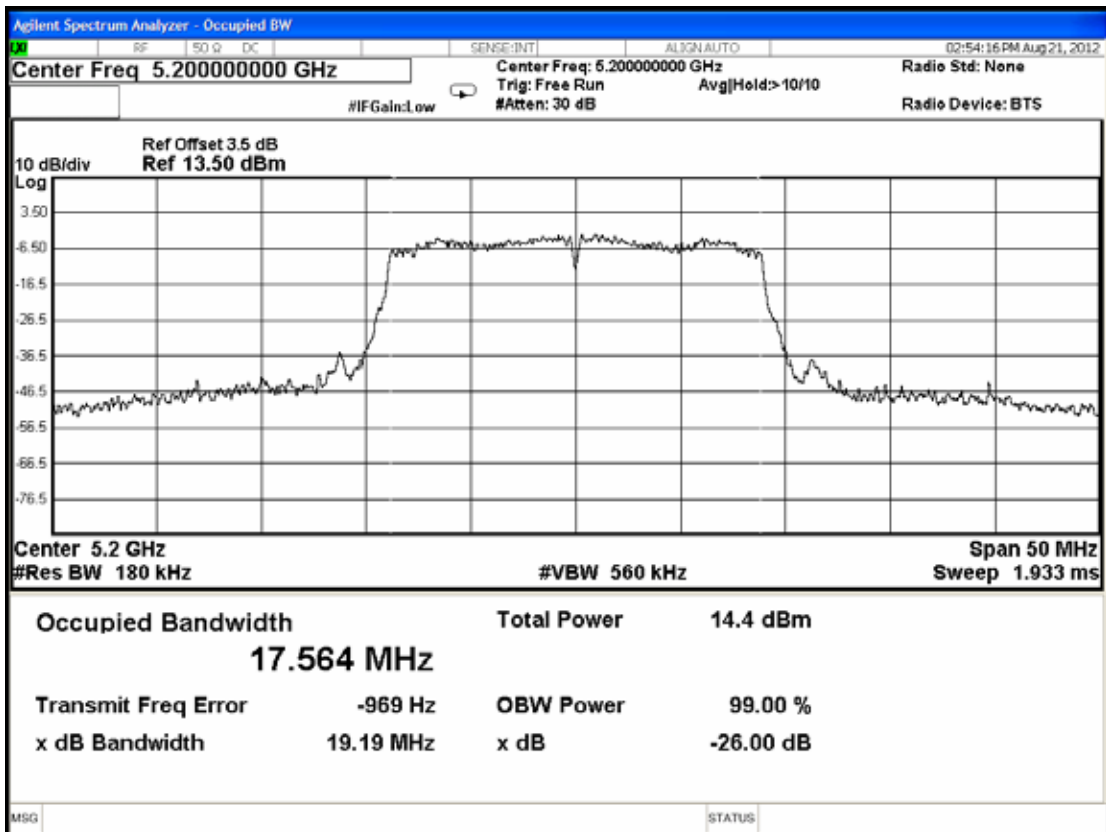
**NII 802.11a (5.2GHz), Frequency: 5240MHz**



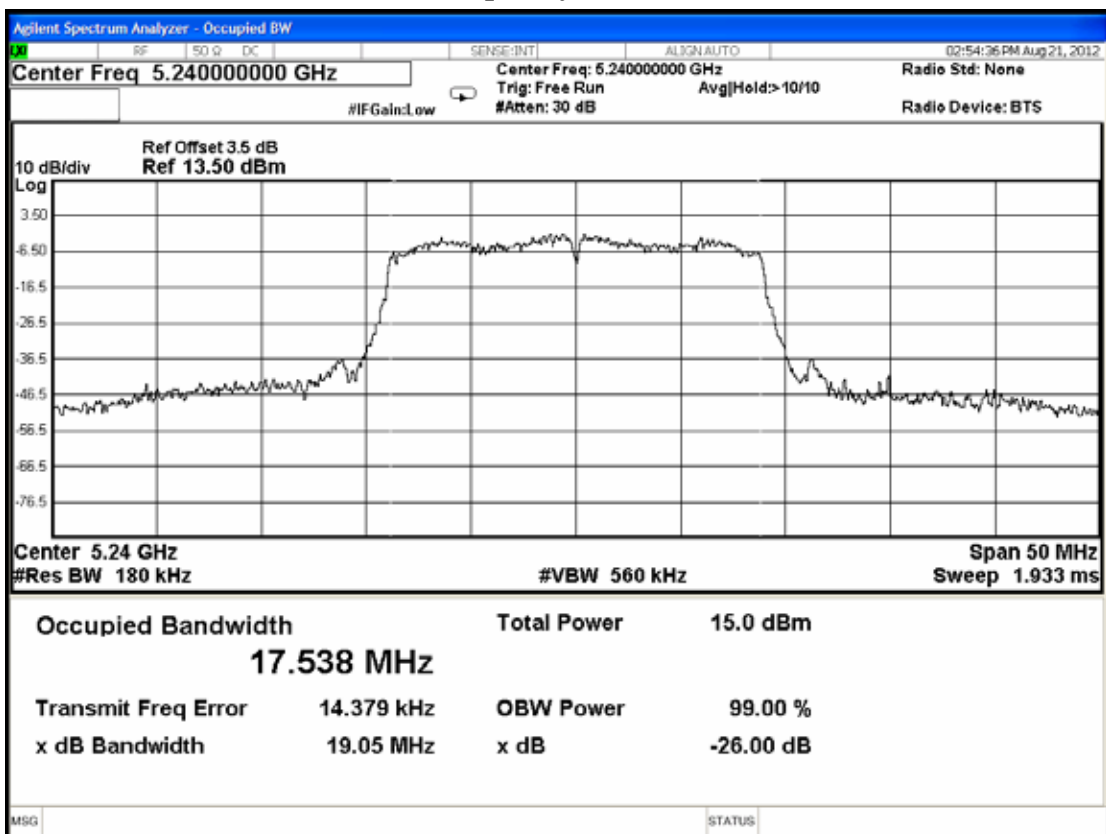
**NII 802.11n-HT20 (5.2GHz), Frequency: 5180MHz**



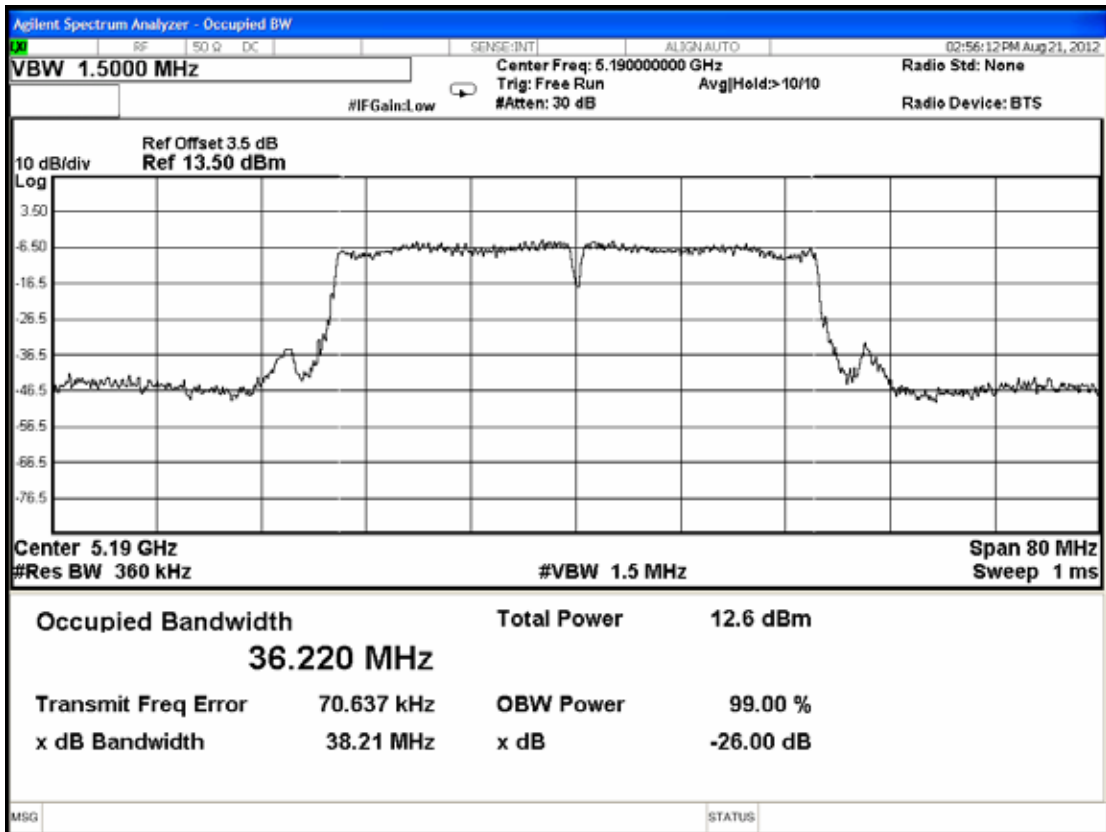
**NII 802.11n-HT20 (5.2GHz), Frequency: 5200MHz**



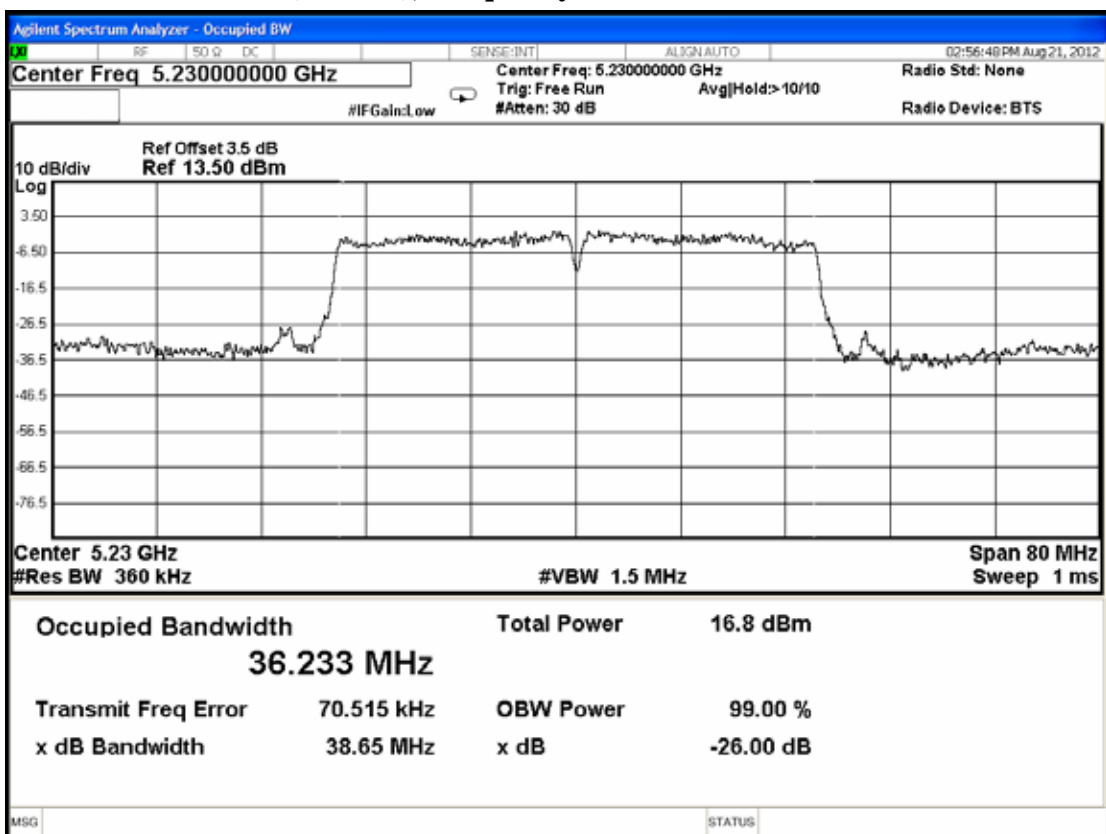
**NII 802.11n-HT20 (5.2GHz), Frequency: 5240MHz**



**NII 802.11n-HT40 (5.2GHz), Frequency: 5190MHz**



**NII 802.11n-HT40 (5.2GHz), Frequency: 5230MHz**





## **9. DEVIATION TO TEST SPECIFICATIONS**

**【NONE】**