

APPLICATION FOR CERTIFICATION

On Behalf of

SMC Networks Inc

5GHz 802.11n 3T3R wifi module

Model No. : SMC-RT359333DB5

FCC ID : JI5-RT359333DB5

Brand : SMC Networks, Inc.

Prepared for : SMC Networks Inc
20 Mason, Irvine, California, United States,
CA 92618

Prepared by : AUDIX Technology Corporation
EMC Department
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan, R.O.C.

Tel : (02) 2609-9301, 2609-2133
Fax: (02) 2609-9303

File Number : C1M1211260
Report Number : EM-F1010979
Date of Test : Nov. 30 ~ Dec. 20, 2012
Date of Report : Jan. 29, 2013

TABLE OF CONTENTS

Description	Page
TEST REPORT CERTIFICATION	4
1. GENERAL INFORMATION	5
1.1. Description of Device (EUT).....	5
1.2. Data Rate Relative to Output Power.....	6
1.3. Test Configuration for Each Test Item	6
1.4. Tested Supporting System Details	7
1.5. Description of Test Facility	7
1.6. Measurement Uncertainty	8
2. CONDUCTED EMISSION MEASUREMENT	9
2.1. Test Equipment.....	9
2.2. Block Diagram of Test Setup.....	9
2.3. Powerline Conducted Emission Limit [§15.207, Class B]	9
2.4. Operating Condition of EUT	10
2.5. Test Procedure	10
2.6. Powerline Conducted Emission Measurement Results.....	10
3. RADIATED EMISSION MEASUREMENT	13
3.1. Test Equipment.....	13
3.2. Test Setup	13
3.3. Radiated Emission Limits.....	15
3.4. Operating Condition of EUT	15
3.5. Test Procedure	16
3.6. Test Results.....	17
4. 26dB BANDWIDTH MEASUREMENT	34
4.1. Test Equipment.....	34
4.2. Block Diagram of Test Setup.....	34
4.3. Operating Condition of EUT	34
4.4. Test Procedure	34
4.5. Test Results.....	35
5. MAXIMUM PEAK OUTPUT POWER MEASUREMENT	40
5.1. Test Equipment.....	40
5.2. Block Diagram of Test Setup.....	40
5.3. Specification Limits [§15.407(a)-(1)].....	40
5.4. Operating Condition of EUT	40
5.5. Test Procedure	41
5.6. Test Results.....	41
6. POWER SPECTRAL DENSITY MEASUREMENT	42
6.1. Test Equipment.....	42
6.2. Block Diagram of Test Setup.....	42
6.3. Specification Limits [§15.407(a)-(1)].....	42
6.4. Operating Condition of EUT	42
6.5. Test Procedure	42
6.6. Test Results.....	43
7. PEAK POWER EXCURSION MEASUREMENT	48
7.1. Test Equipment.....	48
7.2. Block Diagram of Test Setup.....	48
7.3. Specification Limits (§15.407(a)-(6)).....	48
7.4. Operating Condition of EUT	48
7.5. Test Procedure	48
7.6. Test Results.....	49
8. DEVIATION TO TEST SPECIFICATIONS.....	54

9. PHOTOGRAPHS.....	55
9.1. Photos of Conducted Emission Measurement	55
9.2. Photos of Radiated Measurement at Semi-Anechoic Chamber	56
9.3. Photo of Section RF Conducted Measurement	57
9.4. Photo of Maximum Peak Output Power Measurement	57

TEST REPORT CERTIFICATION

Applicant : SMC Networks Inc
Manufacturer : MAINTEK COMPUTER
EUT Description : 5GHz 802.11n 3T3R wifi module
FCC ID : JI5-RT359333DB5
(A) Model No. : SMC-RT359333DB5
(B) Serial No. : N/A
(C) Brand : SMC Networks, Inc.
(D) Power Supply : DC 5V (Powered by Notebook PC)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C & E, Oct. 2012
(FCC CFR 47 Part 15C & E, §15.205, §15.207, §15.209 and 15.407)
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 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 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: Nov. 30 ~ Dec. 20, 2012

Date of Report: Jan. 29, 2013

Producer: Annie Yu
(Annie Yu/Assistant Administrator)

Signatory: Leon Liu
(Leon Liu/Deputy General Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	5GHz 802.11n 3T3R wifi module The frequency range of 5150MHz ~ 5250MHz was tested in this report. The frequency range of 5725MHz ~ 5850MHz has been tested and the test data are reported in other report of EM-F1010978.
Model Number	:	SMC-RT359333DB5
Serial Number	:	N/A
Brand	:	SMC Networks, Inc.
FCC ID	:	JI5-RT359333DB5
Applicant	:	SMC Networks Inc 20 Mason, Irvine, California, United States, CA 92618
Manufacturer	:	MAINTEK COMPUTER 233 Jinfeng Rd., Suzhou, Jiangsu, PRC
Fundamental Range	:	5180MHz ~ 5240MHz and 5745MHz ~ 5825MHz
Radio Technology	:	802.11a/n-HT20/n-HT40: OFDM Modulation 3T3R, (BPSK/QPSK/16QAM/64QAM)
Data Transfer Rate	:	802.11a: 6/9/12/18/24/48/54Mbps 802.11n: up to 450Mbps
Antenna Gain	:	1.9dBi (Peak)
Antenna Transmit Type	:	802.11a: 1T1R 802.11n: 3T3R
Antenna Type	:	Embedded Antenna
Date of Receipt of Sample	:	Nov. 23, 2012
Date of Test	:	Nov. 30 ~Dec. 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	14.96
36	BPSK	9	14.93
36	QPSK	12	14.90
36	QPSK	18	14.88
36	16-QAM	24	14.85
36	16-QAM	36	14.81
36	64-QAM	48	14.77
36	64-QAM	54	14.72

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	14.35	38	BPSK	13.5	16.30
36	QPSK	13	14.34	38	QPSK	27	16.28
36	QPSK	19.5	14.33	38	QPSK	40.5	16.24
36	16-QAM	26	14.31	38	16-QAM	54	16.20
36	16-QAM	39	14.29	38	16-QAM	81	16.19
36	64-QAM	52	14.25	38	64-QAM	108	16.17
36	64-QAM	58.6	14.24	38	64-QAM	121.5	16.11
36	64-QAM	65	14.22	38	64-QAM	135	16.09

Remark: After confirming, chain 2 has worst perform thus we perform all test items at chain 2.

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
Express Card	:	N/A
AC Adapter	:	M/N:AD6513
		DC Cord: Non-Shielded, Undetachable, 2.4m
USB Cable	:	Non-Shielded, Detachable, 0.5m
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 (C8/Semi-AC)	:	No. 8 Shielded Room & 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	$\pm 1.73\text{dB}$
Radiation Test (Distance: 3m)	30MHz~300MHz	$\pm 2.91\text{dB}$
	300MHz~1000MHz	$\pm 2.74\text{dB}$
	Above 1GHz	$\pm 5.02\text{dB}$

Remark : Uncertainty = $k u_c(y)$

Test Item	Uncertainty
26dB Bandwidth	$\pm 0.2\text{kHz}$
Maximum output power	$\pm 0.33\text{dBm}$
Power spectral density	$\pm 0.13\text{dB}$
Peak power Excursion	$\pm 0.14\text{dB}$

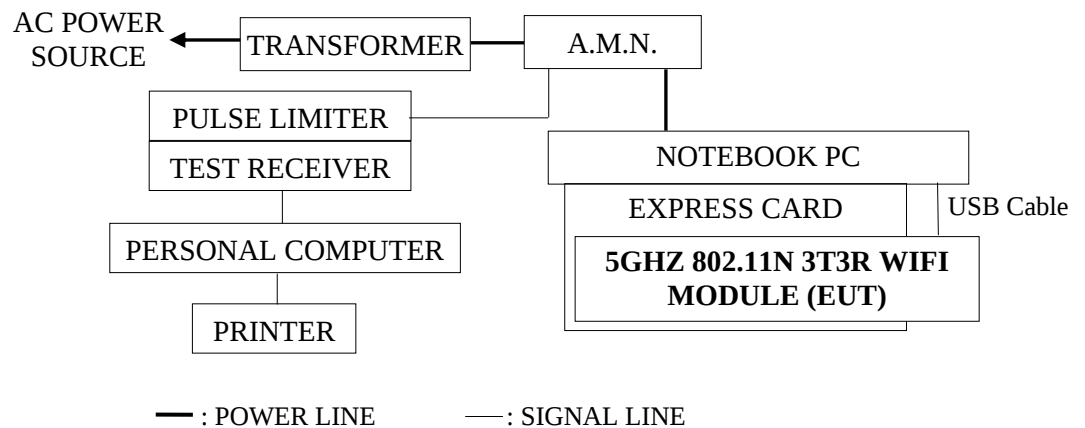
2. CONDUCTED EMISSION MEASUREMENT

2.1. Test Equipment

The following test equipment was used during the powerline conducted emission measurement: (No. 8 Shielded Room)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCS30	100265	Apr. 30, 12'	Apr. 29, 13'
2.	A.M.N.	R&S	ESH2-Z5	100366	Mar. 26, 12'	Mar. 25, 13'
	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	Jan. 05, 12'	Jan. 04, 13'

2.2. Block Diagram of Test Setup



2.3. Powerline Conducted Emission Limit [§15.207, Class B]

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ 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 “RT3593QA” to set EUT (5GHz 802.11n 3T3R wifi 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 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 : 5GHz 802.11n 3T3R wifi module M/N : SMC-RT359333DB5

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

Reference Test Data : Neutral # 2, Line # 1

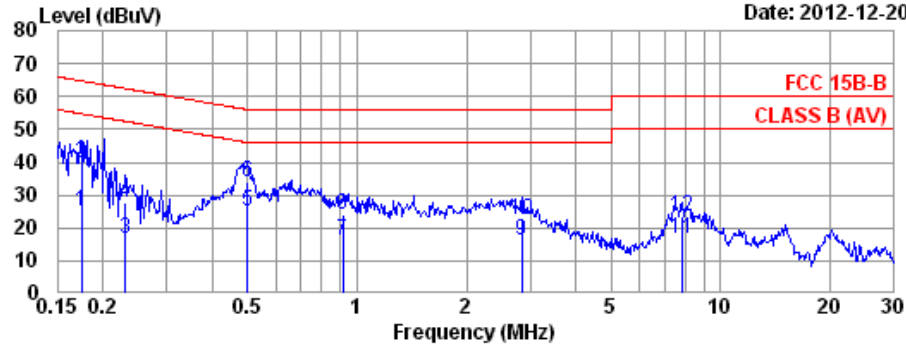


AUDIX TECHNOLOGY Corp. EMC Department
 No.53-11, Dinfu, Linkou Dist., New Taipei
 City 244, Taiwan R.O.C.
 Tel: +886-2-26092133 Fax: +886-2-26099303
 Email: emc@audixtech.com

Data: 2

File: D:\test data\REPORT\1M1211XXX\1M1211260-C-D.EM6 (2)

Date: 2012-12-20



Site no. : No.8 Shielded Room Data no. : 2
 Dis. / Ant. : ESH2-Z5 366 Ant. pol. : NEUTRAL
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 52% ESCS (265) Engineer : Jack_Wu
 EUT : SMC-RT359333DB5
 Power Rating : 120Vac/60Hz
 Test Mode : OPERATING

	Freq. (MHz)	AMN. Factor (dB)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.175	0.10	0.04	24.81	24.95	54.72	29.77	Average
2	0.175	0.10	0.04	39.82	39.96	64.72	24.76	QP
3	0.230	0.10	0.04	16.66	16.80	52.44	35.64	Average
4	0.230	0.10	0.04	27.62	27.76	62.44	34.68	QP
5	0.499	0.12	0.04	24.81	24.97	46.01	21.04	Average
6	0.499	0.12	0.04	33.80	33.96	56.01	22.05	QP
7	0.914	0.19	0.05	15.72	15.96	46.00	30.04	Average
8	0.914	0.19	0.05	23.98	24.22	56.00	31.78	QP
9	2.839	0.20	0.10	15.67	15.97	46.00	30.03	Average
10	2.839	0.20	0.10	22.04	22.34	56.00	33.66	QP
11	7.810	0.27	0.17	16.45	16.89	50.00	33.11	Average
12	7.810	0.27	0.17	23.24	23.68	60.00	36.32	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Reading.

2. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

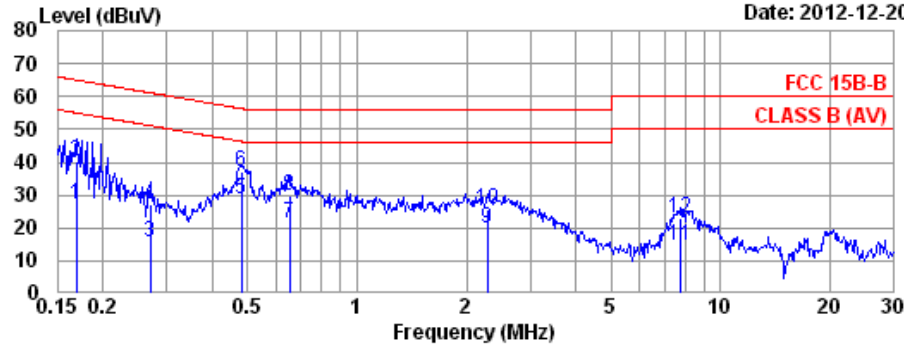


AUDIX TECHNOLOGY Corp. EMC Department
 No.53-11, Dinfu, Linkou Dist., New Taipei
 City 244, Taiwan R.O.C.
 Tel: +886-2-26092133 Fax: +886-2-26099303
 Email: emc@audixtech.com

Data: 1

File: D:\test data\REPORT\1M1211XXX\1M1211260-C-D.EM6 (2)

Date: 2012-12-20



Site no. : No.8 Shielded Room Data no. : 1
 Dis. / Ant. : ESH2-Z5 366 Ant. pol. : LINE
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 52% ESCS (265) Engineer : Jack_Wu
 EUT : SMC-RT359333DB5
 Power Rating : 120Vac/60Hz
 Test Mode : OPERATING

	Freq. (MHz)	AMN. Factor (dB)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.169	0.10	0.04	26.97	27.11	54.99	27.88	Average
2	0.169	0.10	0.04	40.36	40.50	64.99	24.49	QP
3	0.270	0.10	0.04	15.72	15.86	51.12	35.26	Average
4	0.270	0.10	0.04	27.10	27.24	61.12	33.88	QP
5	0.481	0.12	0.04	28.60	28.76	46.32	17.56	Average
6	0.481	0.12	0.04	36.76	36.92	56.32	19.40	QP
7	0.651	0.15	0.04	21.33	21.52	46.00	24.48	Average
8	0.651	0.15	0.04	29.54	29.73	56.00	26.27	QP
9	2.285	0.20	0.09	19.42	19.71	46.00	26.29	Average
10	2.285	0.20	0.09	25.46	25.75	56.00	30.25	QP
11	7.728	0.27	0.17	14.40	14.84	50.00	35.16	Average
12	7.728	0.27	0.17	22.56	23.00	60.00	37.00	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Reading.

2. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

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)

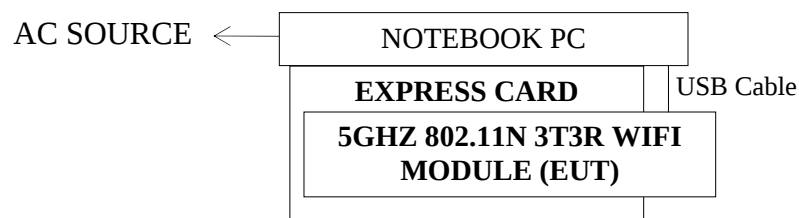
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 08, 12'	Aug. 06, 13'
2.	Test Receiver	R & S	ESCS30	100338	Jul. 04, 12'	Jul. 03, 13'
3.	Amplifier	HP	8447D	2944A06305	Feb. 13, 12'	Feb. 12, 13'
4.	Biconical Antenna	CHASE	VBA6106 A	1264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

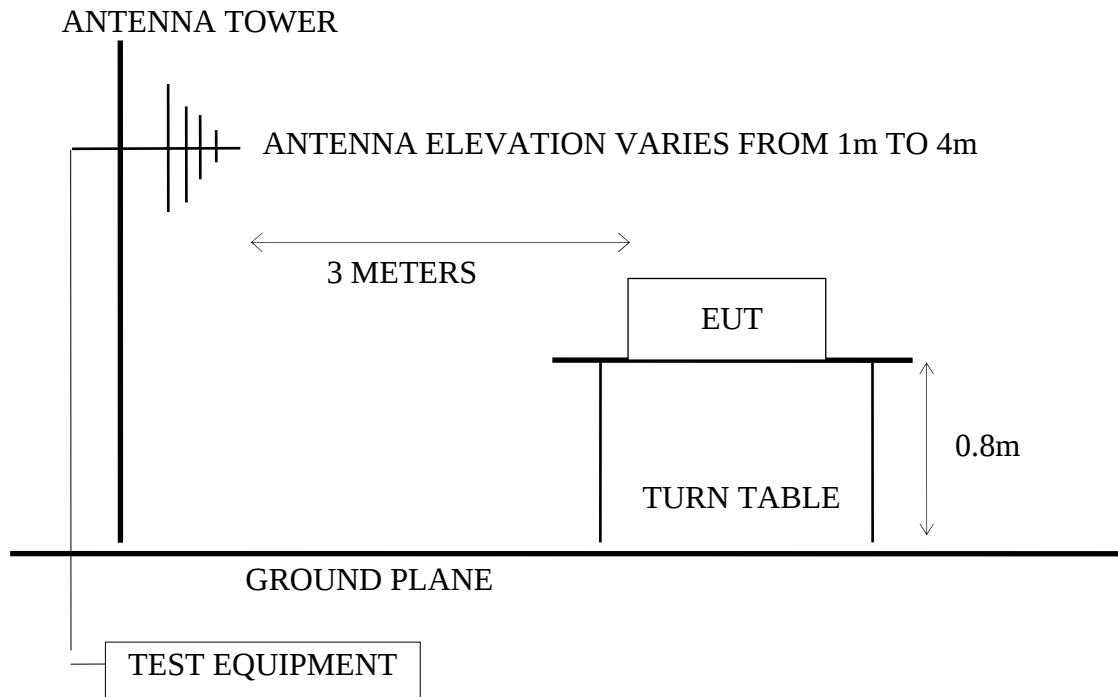
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 08, 12'	Aug. 06, 13'
2.	Amplifier	HP	8449B	3008A02678	Mar. 07, 12'	Mar. 06, 13'
3.	Horn Antenna	EMCO	3115	9609-4927	Jul. 05, 12'	Jul. 04, 13'
4.	Horn Antenna	EMCO	3116	2653	Oct. 15, 12'	Oct. 14, 13'
5.	Signal Generator	HP	83732B	US34490489	May 16, 12'	May 15, 13'

3.2. Test Setup

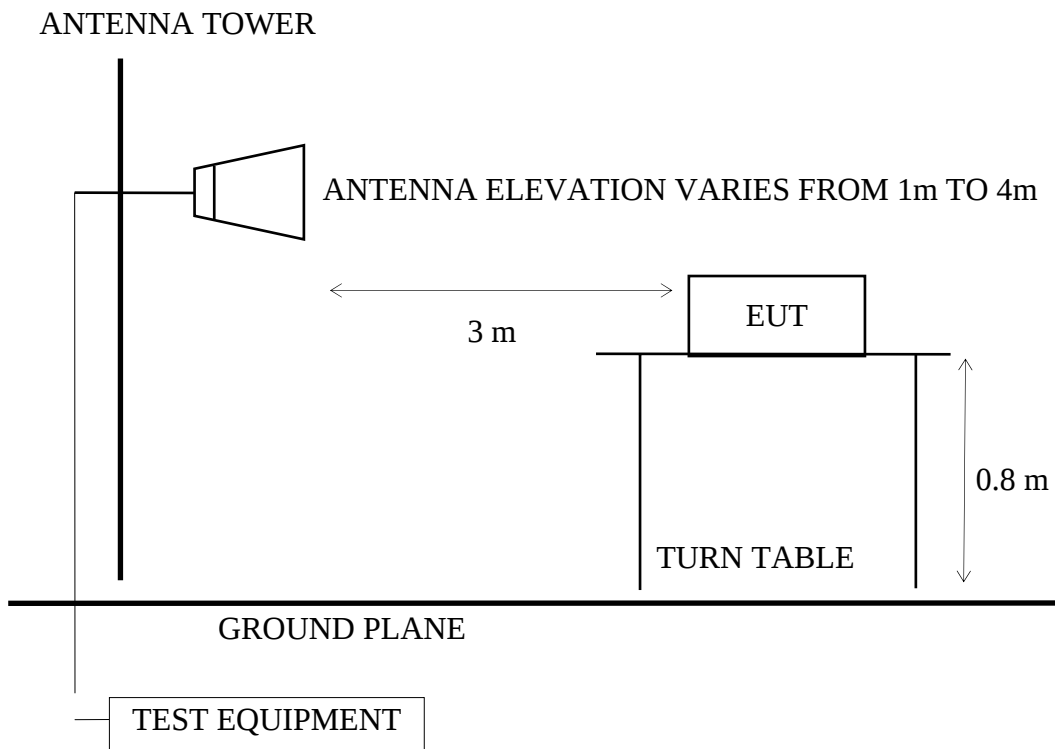
3.2.1. Block Diagram of connection between EUT and simulators



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

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 (5GHz 802.11n 3T3R wifi 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 “RT3593QA”.
 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 36
2.	NII 802.11n-HT20 (5.2GHz)	CH 36
3.	NII 802.11n-HT40 (5.2GHz)	CH 38

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 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 10th 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 for there is no emission be found.)

EUT : 5GHz 802.11n 3T3R wifi module

M/N : SMC-RT359333DB5

Test Date : Dec. 11, 2012 Temperature : 25 Humidity : 61%

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 36	5180MHz	Transmit	# 13	# 14
2.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	Transmit	# 13	# 14
3.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	Transmit	# 13	# 14

* Above all final readings were measured with Quasi-Peak detector.

For Frequency above 1GHz:

The EUT with following test modes were 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	Reference Test Data			
					Horizontal		Vertical	
					Peak	Average	Peak	Average
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	Transmit	# 16	# 9	# 15	# 3
2.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz		# 16	# 9	# 15	# 3
3.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz		# 16	# 9	# 15	# 3

Note: 1. Above all final readings were measured with Peak and Average detector.

2. The emissions (up to 40GHz) not reported for there is no emission be found.

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	# 3, # 4	# 1, # 2
2.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	Transmit	# 3, # 4	# 1, # 2
3.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	Transmit	# 3, # 4	# 1, # 2

3.6.1. Frequency Range 30-1000MHz

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

Site no. : A/C Chamber Data no. : 13
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11a (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	55.220	14.39	1.50	12.64	28.53	40.00	11.47	QP
2	200.720	22.08	3.00	10.16	35.24	43.50	8.26	QP
3	299.660	26.77	3.90	6.90	37.57	46.00	8.43	QP
4	501.420	18.95	6.52	2.35	27.83	46.00	18.17	QP

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. : A/C Chamber Data no. : 14
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11a (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	35.820	22.49	1.20	13.11	36.79	40.00	3.21	QP
2	199.750	22.09	3.00	1.83	26.91	43.50	16.59	QP
3	299.660	26.77	3.90	-0.66	30.01	46.00	15.99	QP
4	501.420	18.95	6.52	5.13	30.61	46.00	15.39	QP

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: 5180MHz

Site no. : A/C Chamber Data no. : 13
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	55.220	14.39	1.50	11.18	27.07	40.00	12.93	QP
2	200.720	22.08	3.00	5.88	30.96	43.50	12.54	QP
3	299.660	26.77	3.90	1.86	32.53	46.00	13.47	QP
4	501.420	18.95	6.52	4.32	29.80	46.00	16.20	QP

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. : A/C Chamber Data no. : 14
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	35.820	22.49	1.20	13.92	37.60	40.00	2.40	QP
2	200.720	22.08	3.00	1.49	26.57	43.50	16.93	QP
3	501.420	18.95	6.52	5.23	30.71	46.00	15.29	QP

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: 5190MHz

Site no. : A/C Chamber Data no. : 13
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n40 (Tx5190MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	58.130	13.43	1.60	17.46	32.49	40.00	7.51	QP
2	200.720	22.08	3.00	9.85	34.93	43.50	8.57	QP
3	299.660	26.77	3.90	6.62	37.29	46.00	8.71	QP

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. : A/C Chamber Data no. : 14
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n40 (Tx5190MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	35.820	22.49	1.20	13.42	37.10	40.00	2.90	QP
2	200.720	22.08	3.00	2.25	27.33	43.50	16.17	QP
3	299.660	26.77	3.90	0.53	31.20	46.00	14.80	QP

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

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

Site no. : A/C Chamber site Data no. : 16
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11a (Tx5180MHz)

	Freq.	Ant. Factor	Cable Loss	Reading	Emission Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5778.000	34.31	10.06	13.54	57.91	74.00	16.09	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. All emissions are in compliance with both 15.209 and 15.407(b)(1).

Site no. : A/C Chamber Data no. : 9
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C (1G-AV)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11a (Tx5180MHz)

	Freq.	Ant. Factor	Cable Loss	Reading	Emission Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5778.000	34.31	10.06	4.54	48.91	54.00	5.09	Average

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 emissions are in compliance with both 15.209 and 15.407(b)(1).

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

Site no. : A/C Chamber site Data no. : 15
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11a (Tx5180MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5778.000	34.31	10.06	12.68	57.05	74.00	16.95	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. All emissions are in compliance with both 15.209 and 15.407(b)(1).

Site no. : A/C Chamber Data no. : 3
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : FCC PART-15C (1G-AV)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11a (Tx5180MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5778.000	34.31	10.06	3.72	48.09	54.00	5.91	Average

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

3. All emissions are in compliance with both 15.209 and 15.407(b)(1).

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

Site no. : A/C Chamber site Data no. : 16
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n (Tx5180MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5788.000	34.32	10.06	20.45	64.83	74.00	9.17	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. All emissions are in compliance with both 15.209 and 15.407(b)(1).

Site no. : A/C Chamber Data no. : 9
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : SMC-RT359333DB5
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : D3GN6_WIFICARD_5G_V2
 Power Rating : DC 5V
 Test Mode : 802.11n (Tx5180MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5788.000	34.32	10.06	6.45	50.83	54.00	3.17	Average !

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.
 3. All emissions are in compliance with both 15.209 and 15.407(b)(1).

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

Site no. : A/C Chamber site Data no. : 15
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n (Tx5180MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5778.000	34.31	10.06	19.94	64.31	74.00	9.69	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. All emissions are in compliance with both 15.209 and 15.407(b)(1).

Site no. : A/C Chamber Data no. : 3
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : SMC-RT359333DB5
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : D3GN6_WIFICARD_5G_V2
 Power Rating : DC 5V
 Test Mode : 802.11n (Tx5180MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5778.000	34.31	10.06	5.94	50.31	54.00	3.69	Average !

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 emissions are in compliance with both 15.209 and 15.407(b)(1).

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

Site no. : A/C Chamber site Data no. : 16
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : SMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n40 (Tx5190MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5784.000	34.31	10.06	16.44	60.81	74.00	13.19	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. All emissions are in compliance with both 15.209 and 15.407(b)(1).

Site no. : A/C Chamber Data no. : 9
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : SMC-RT359333DB5
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : D3GN6_WIFICARD_5G_V2
 Power Rating : DC 5V
 Test Mode : 802.11n40 (Tx5190MHz)

		Ant.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	5784.000	34.31	10.06	6.15	50.52	54.00	3.48	Average !

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 emissions are in compliance with both 15.209 and 15.407(b)(1).

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

Site no. : A/C Chamber site Data no. : 15
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : ISMC-RT359333DB5
 Power Rating : DC 5V
 Test Mode : 802.11n40 (Tx5190MHz)

		Ant.	Cable		Emission			
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)		
1	5784.000	34.31	10.06	17.69	62.06	74.00	11.94	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. All emissions are in compliance with both 15.209 and 15.407(b)(1).

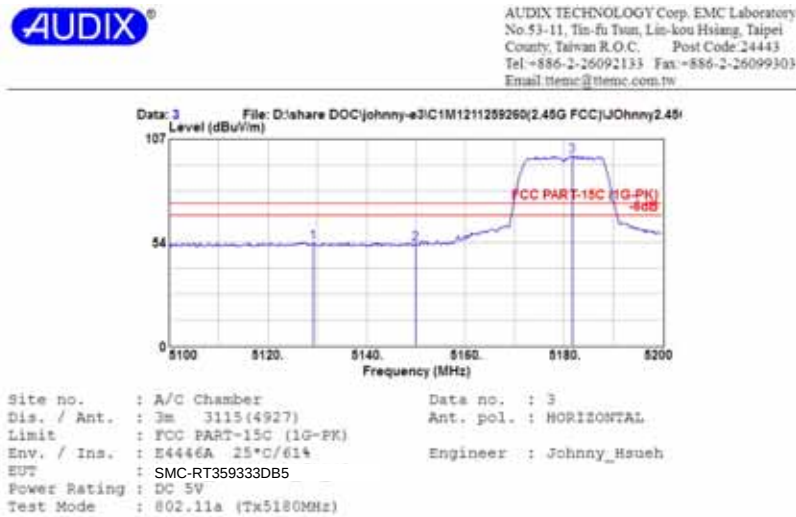
Site no. : A/C Chamber Data no. : 3
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : SMC-RT359333DB5
 Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
 EUT : D3GN6_WIFICARD_5G_V2
 Power Rating : DC 5V
 Test Mode : 802.11n40 (Tx5190MHz)

		Ant.	Cable		Emission			
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)		
1	5784.000	34.31	10.06	5.67	50.04	54.00	3.96	Average !

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

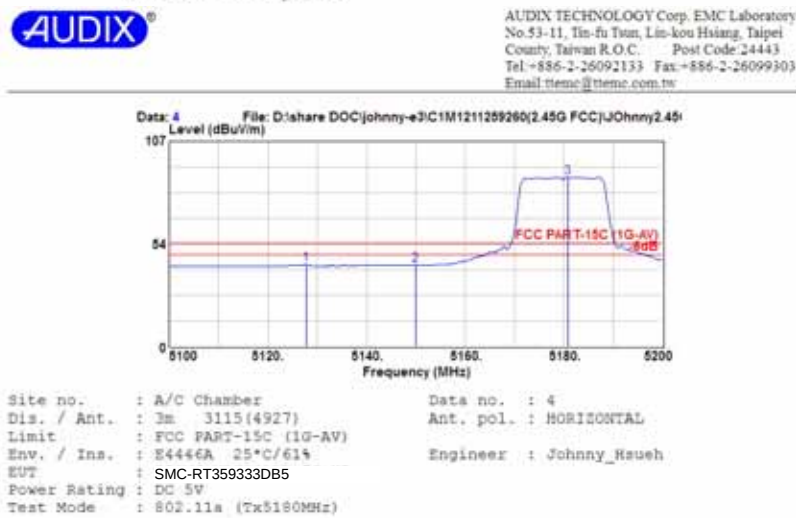
3. All emissions are in compliance with both 15.209 and 15.407(b)(1).

3.6.3. Restricted Bands Measurement Results

Date of Test : Dec. 11, 2012 Temperature : 25EUT : 5GHz 802.11n 3T3R wifi module Humidity : 61%Test Mode : NII 802.11a (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5129.200	33.61	9.42	10.67	53.70	74.00	20.30	Peak
2	5150.000	33.64	9.43	9.37	52.44	74.00	21.56	Peak
3	5181.700	33.69	9.46	55.23	98.38	74.00	-24.38	Peak

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



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5127.700	33.61	9.42	-0.29	42.74	54.00	11.26	Average
2	5150.000	33.64	9.43	-0.65	42.42	54.00	11.58	Average
3	5180.900	33.69	9.46	45.11	88.26	54.00	-34.26	Average

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

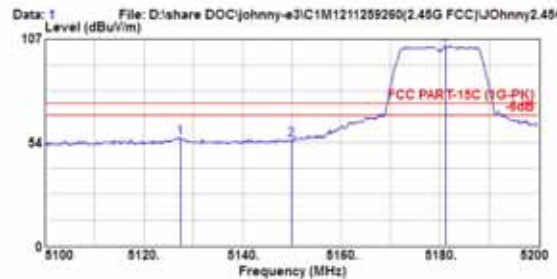
Date of Test : Dec. 11, 2012 Temperature : 25

EUT : 5GHz 802.11n 3T3R wifi module Humidity : 61%

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



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:~886-2-26092133 Fax:~886-2-26099303
Email:ttenc@ttenc.com.tw



Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m 3115 (4927) Ant. pol. : VERTICAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11a (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5127.400	33.61	9.42	12.94	55.97	74.00	18.03	Peak
2	5150.000	33.64	9.43	11.63	54.71	74.00	19.29	Peak
3	5181.200	33.69	9.46	60.83	103.98	74.00	-29.98	Peak

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



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:~886-2-26092133 Fax:~886-2-26099303
Email:ttenc@ttenc.com.tw



Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m 3115 (4927) Ant. pol. : VERTICAL
Limit : FCC ABOVE 1GHz (AV)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11a (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5127.700	33.61	9.42	2.82	45.85	63.50	17.65	Average
2	5150.000	33.64	9.43	0.93	44.00	63.50	19.50	Average
3	5180.900	33.69	9.46	50.84	93.99	63.50	-30.49	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 : Dec. 11, 2012 Temperature : 25

EUT : 5GHz 802.11n 3T3R wifi module Humidity : 61%

Test Mode : NII 802.11n-HT20 (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz



AUDIX TECHNOLOGY Corp. EMC Laboratory
No. 53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itemc@itemc.com.tw



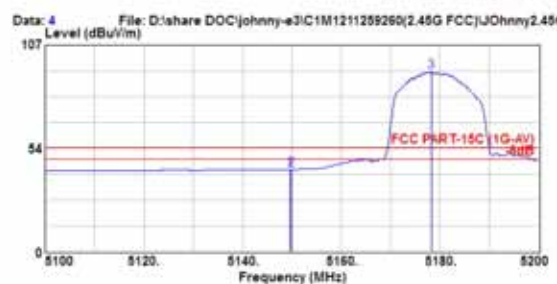
Site no. : A/C Chamber Data no. : 3
Dis. / Ant. : 3m 3115 (4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5112.200	33.59	9.41	11.24	54.23	74.00	19.77	Peak
2	5150.000	33.64	9.43	9.50	52.57	74.00	21.43	Peak
3	5177.900	33.69	9.46	58.42	101.57	74.00	-27.57	Peak

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



AUDIX TECHNOLOGY Corp. EMC Laboratory
No. 53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itemc@itemc.com.tw



Site no. : A/C Chamber Data no. : 4
Dis. / Ant. : 3m 3115 (4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-AV)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n (Tx5180MHz)

	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	-0.49	42.58	54.00	11.42	Average
2	5150.000	33.64	9.43	-0.48	42.59	54.00	11.41	Average
3	5178.400	33.69	9.46	49.81	92.96	54.00	-38.96	Average

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

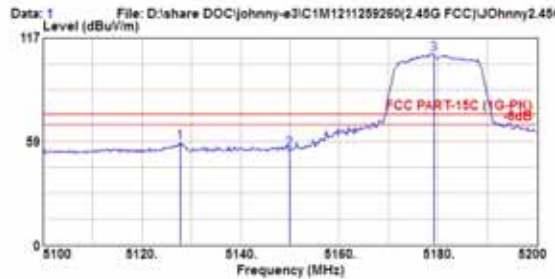
Date of Test : Dec. 11, 2012 Temperature : 25

EUT : 5GHz 802.11n 3T3R wifi module Humidity : 61%

Test Mode : NII 802.11n-HT20 (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz



AUDIX TECHNOLOGY Corp. EMC Laboratory
No. 53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itenc@itenc.com.tw



Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m 3115 (4927) Ant. pol. : VERTICAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5127.700	33.61	9.42	14.88	57.91	74.00	16.09	Peak
2	5150.000	33.64	9.43	10.76	53.84	74.00	20.16	Peak
3	5179.200	33.69	9.46	65.01	108.17	74.00	-34.17	Peak

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



AUDIX TECHNOLOGY Corp. EMC Laboratory
No. 53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itenc@itenc.com.tw



Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m 3115 (4927) Ant. pol. : VERTICAL
Limit : FCC PART-15C (1G-AV)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n (Tx5180MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5127.900	33.61	9.42	2.86	45.89	54.00	8.11	Average
2	5150.000	33.64	9.43	2.06	45.14	54.00	8.86	Average
3	5178.400	33.69	9.46	55.20	98.35	54.00	-44.35	Average

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

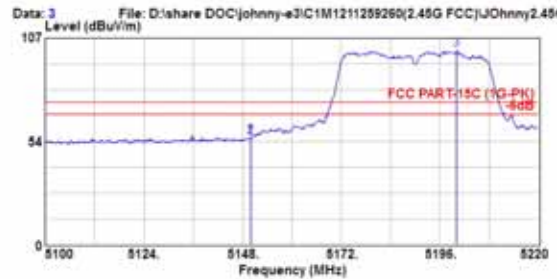
Date of Test : Dec. 11, 2012 Temperature : 25

EUT : 5GHz 802.11n 3T3R wifi module Humidity : 61%

Test Mode : NII 802.11n-HT40 (5.2GHz), Transmit, Channel: 38, Frequency: 5190MHz



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itemc@itemc.com.tw



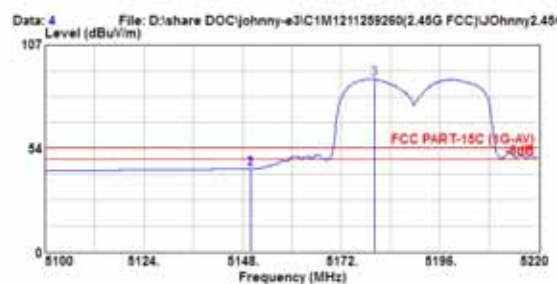
Site no. : A/C Chamber Data no. : 3
Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n40 (Tx5190MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5149.920	33.64	9.43	12.35	55.42	74.00	18.58	Peak
2	5150.000	33.64	9.43	12.72	55.79	74.00	18.21	Peak
3	5200.080	33.72	9.48	57.59	100.79	74.00	-26.79	Peak

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



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itemc@itemc.com.tw



Site no. : A/C Chamber Data no. : 4
Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-AV)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n40 (Tx5190MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5149.920	33.64	9.43	-0.28	42.79	54.00	11.21	Average
2	5150.000	33.64	9.43	-0.28	42.79	54.00	11.21	Average
3	5190.040	33.69	9.46	46.36	89.51	54.00	-35.51	Average

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

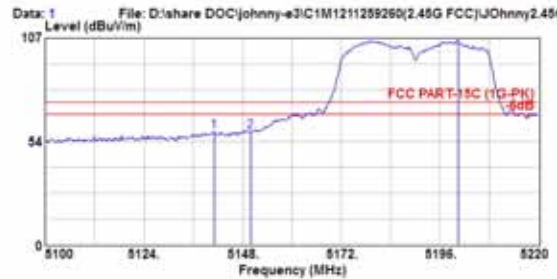
Date of Test : Dec. 11, 2012 Temperature : 25

EUT : 5GHz 802.11n 3T3R wifi module Humidity : 61%

Test Mode : NII 802.11n-HT40 (5.2GHz), Transmit, Channel: 38, Frequency: 5190MHz



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itemc@itemc.com.tw



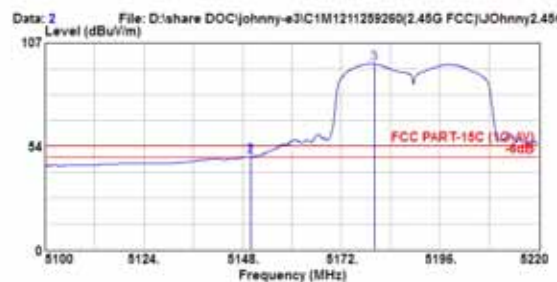
Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n40 (Tx5190MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5141.040	33.64	9.43	15.66	58.74	74.00	15.26	Peak
2	5150.000	33.64	9.43	15.75	58.82	74.00	15.18	Peak
3	5200.440	33.72	9.48	62.73	105.93	74.00	-31.93	Peak

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



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code 24443
Tel: +886-2-26092133 Fax: +886-2-26099303
Email: itemc@itemc.com.tw



Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
Limit : FCC PART-15C (1G-AV)
Env. / Ins. : E4446A 25°C/61% Engineer : Johnny_Hsueh
EUT : SMC-RT359333DB5
Power Rating : DC 5V
Test Mode : 802.11n40 (Tx5190MHz)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	5149.920	33.64	9.43	5.12	48.19	54.00	5.81	Average
2	5150.000	33.64	9.43	5.16	48.23	54.00	5.77	Average
3	5180.040	33.69	9.46	53.23	96.38	54.00	-42.38	Average

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

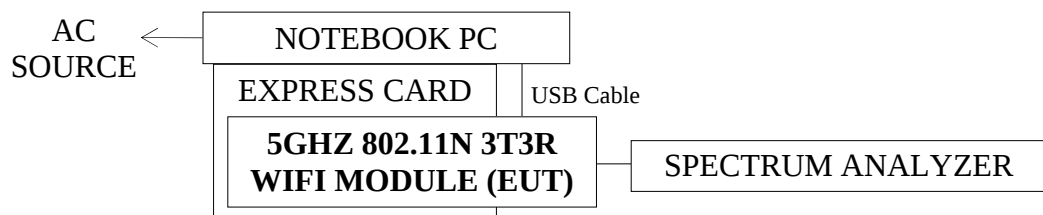
4. 26dB BANDWIDTH MEASUREMENT

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. 17, 12'	Oct. 16, 13'

4.2. Block Diagram of Test Setup



4.3. Operating Condition of EUT

The test program “RT3593QA” 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-v01r02

4.5. Test Results

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

(Test Date : Nov. 30, 2012 Temperature : 26 Humidity : 61%)

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	18.96MHz
2.		CH 40	5200MHz	18.80MHz
3.		CH 48	5240MHz	18.99MHz

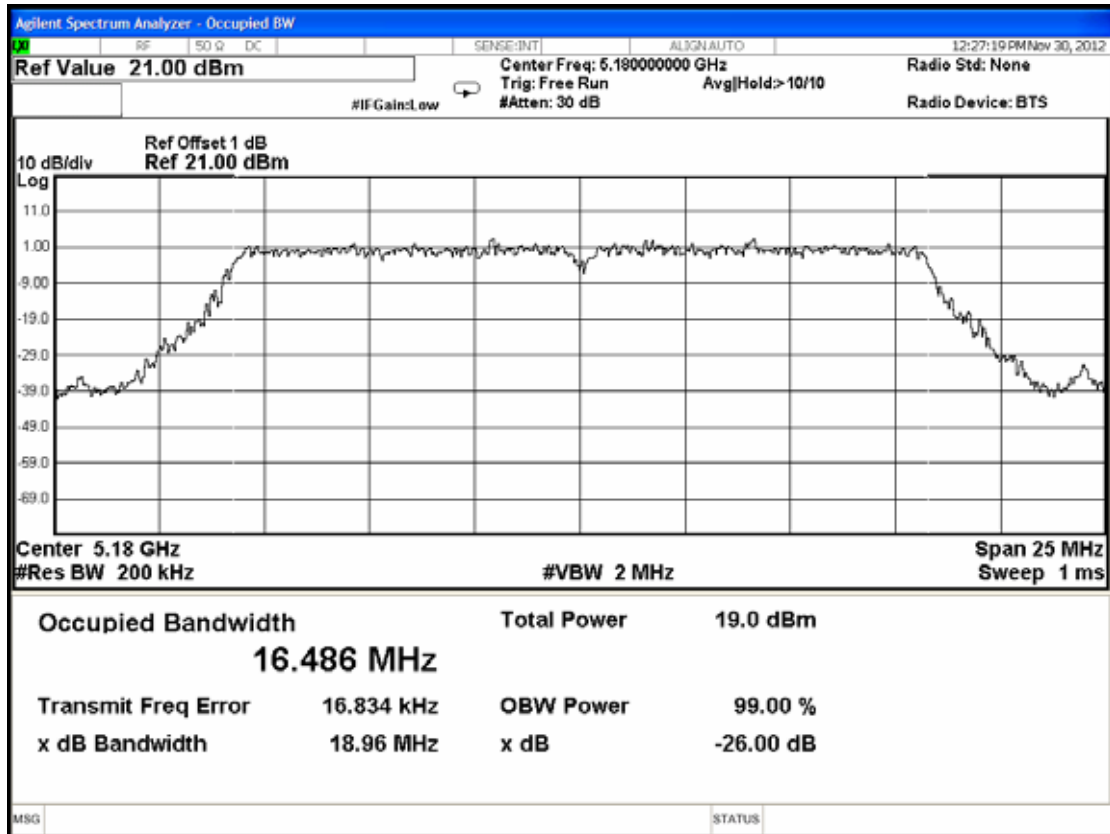
4.5.2. For NII 802.11n-HT20 (5.2GHz)

Mode	Type of Network	Channel	Frequency	26dB Bandwidth
1.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	19.66MHz
2.		CH 40	5200MHz	19.82MHz
3.		CH 48	5240MHz	19.61MHz

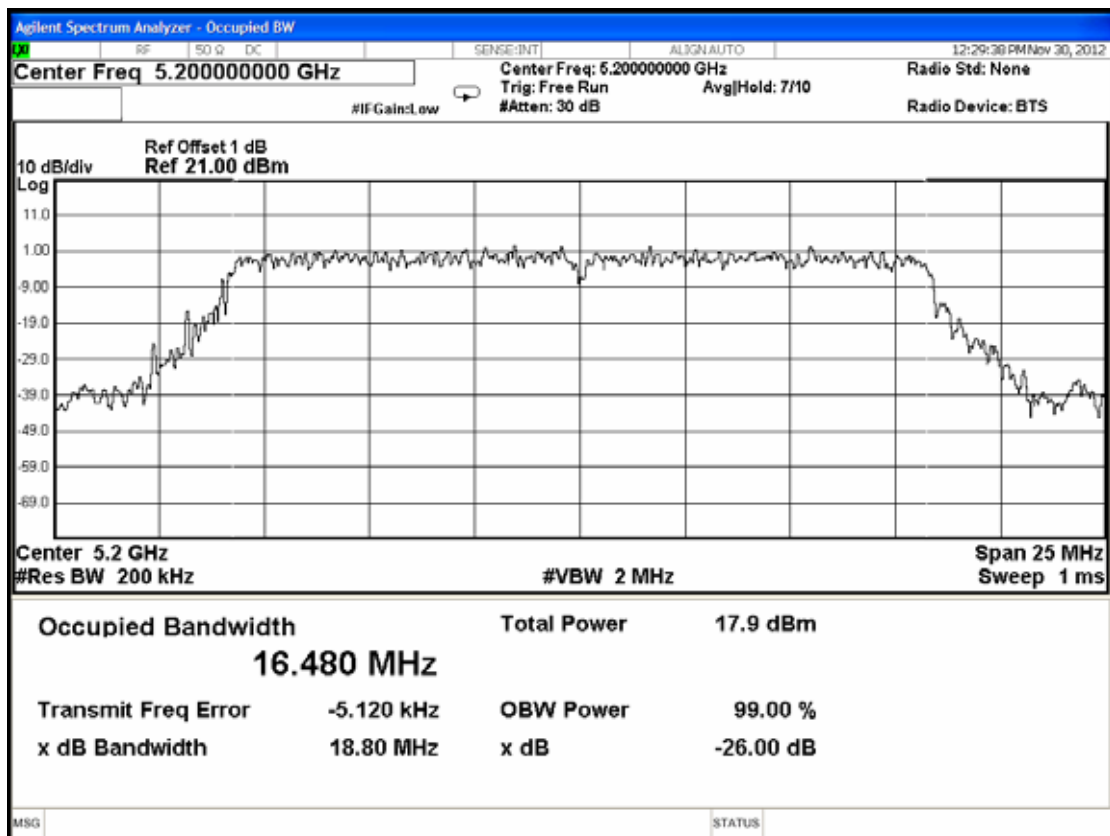
4.5.3. For NII 802.11n-HT40 (5.2GHz)

Mode	Type of Network	Channel	Frequency	26dB Bandwidth
1.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	39.82MHz
2.		CH 46	5230MHz	40.06MHz

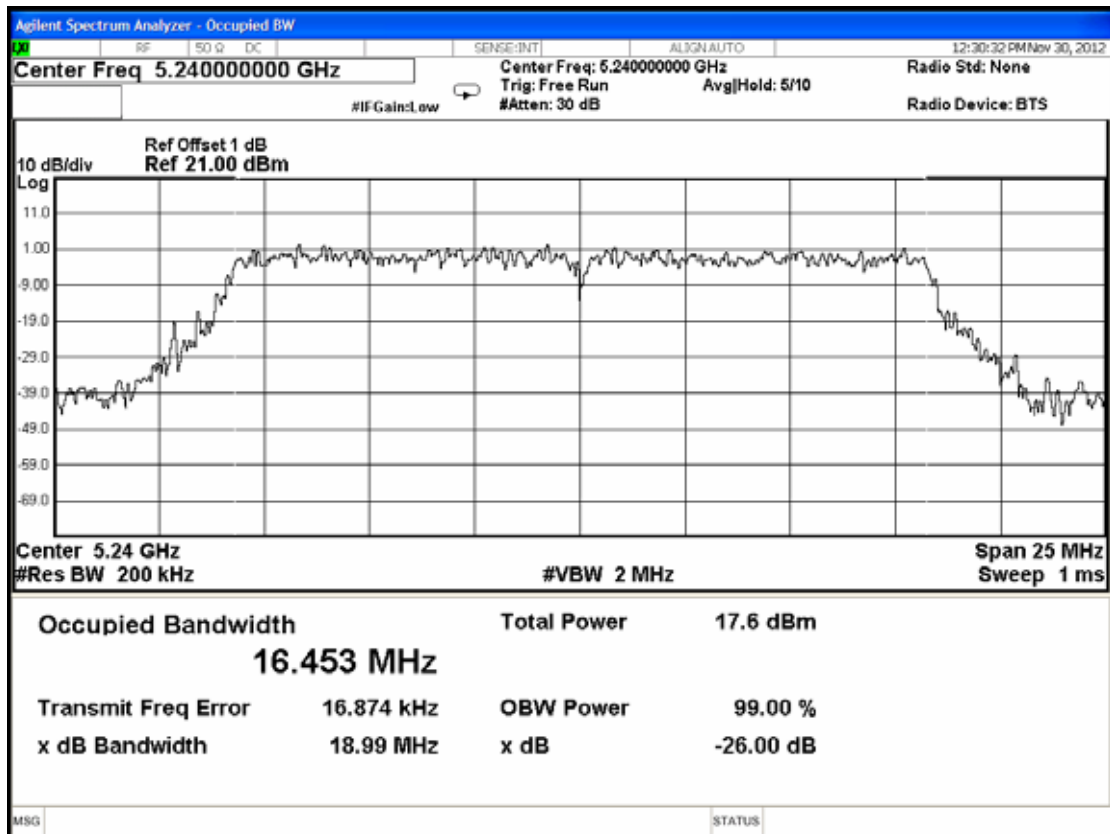
NII 802.11a (5.2GHz), Frequency: 5180MHz



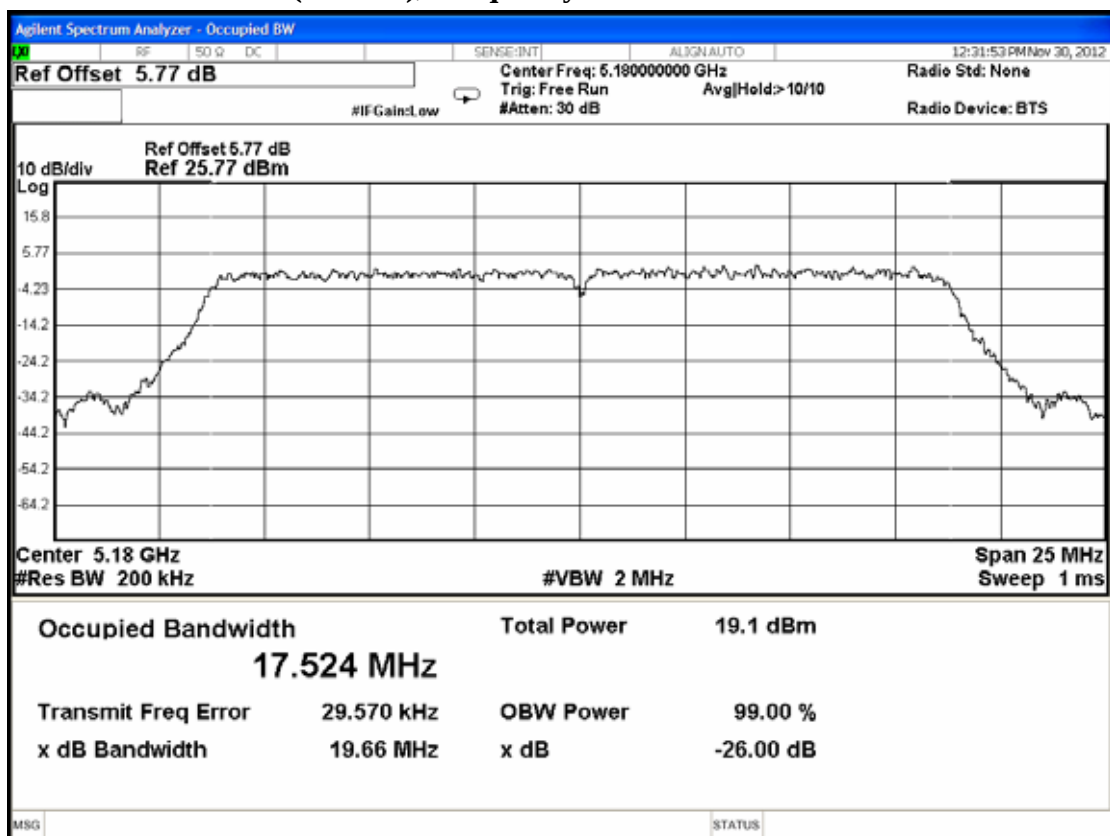
NII 802.11a (5.2GHz), Frequency: 5200MHz



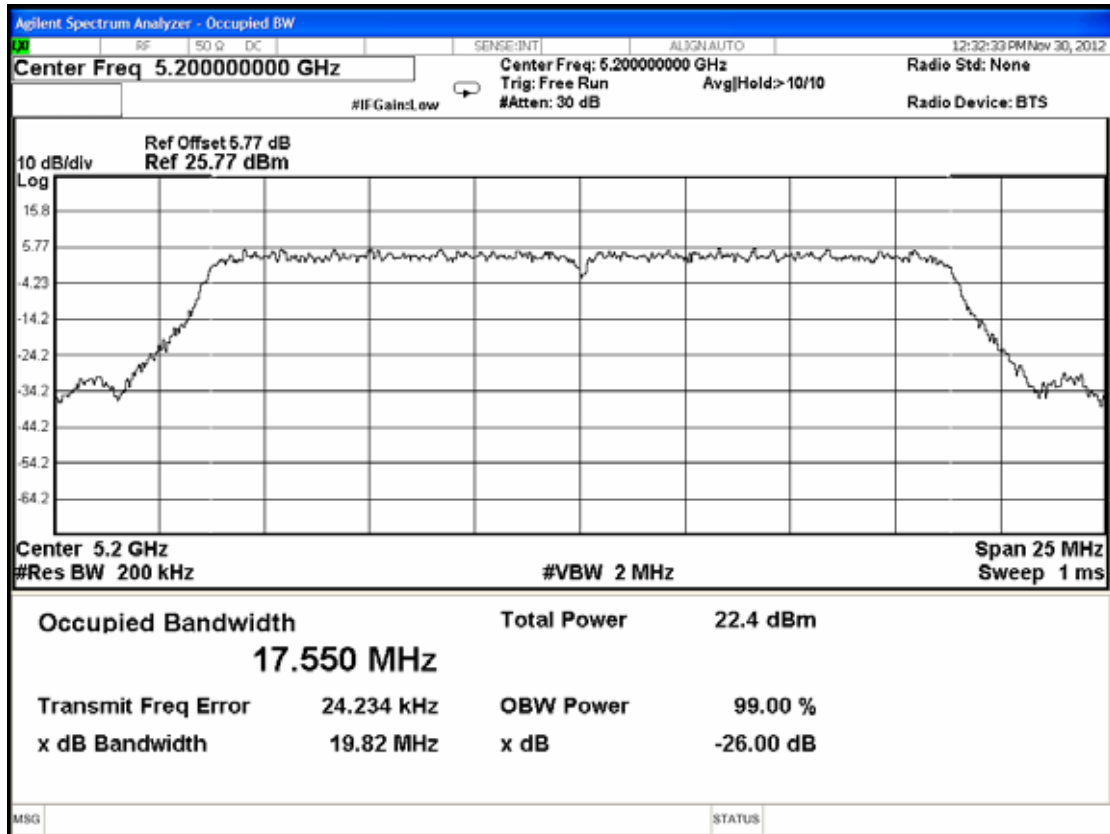
NII 802.11a (5.2GHz), Frequency: 5240MHz



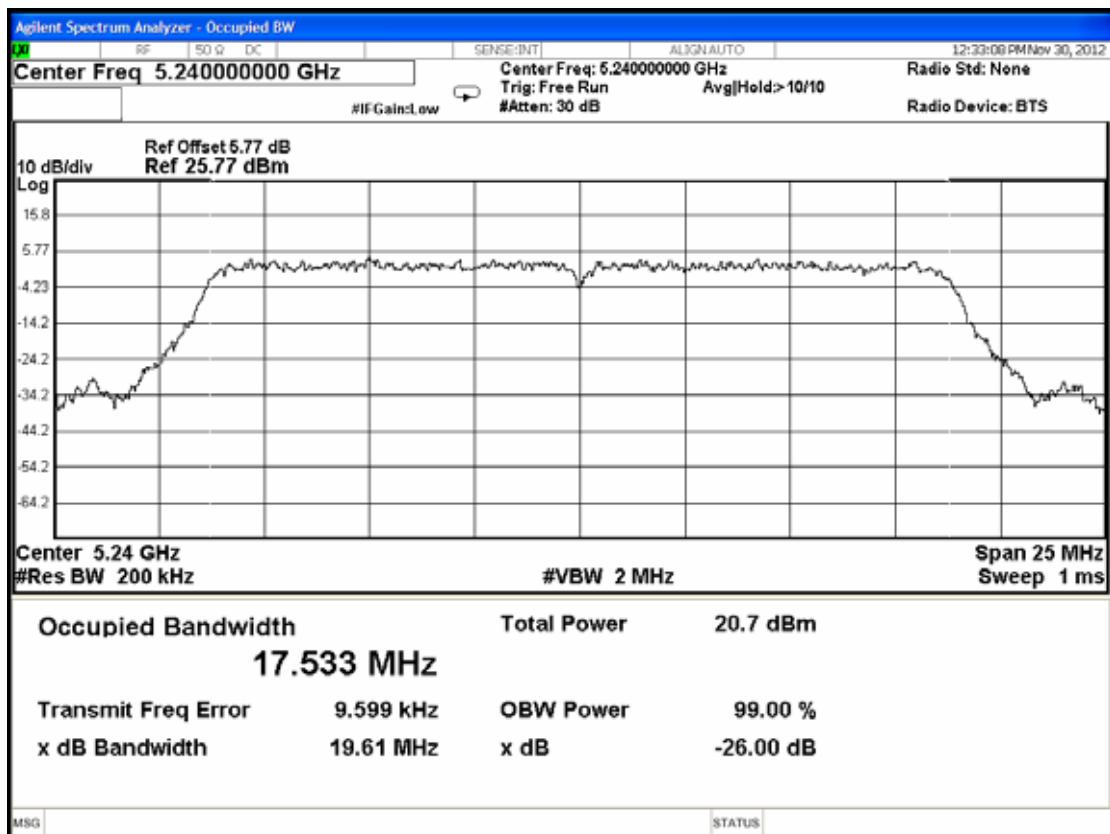
NII 802.11n-HT20 (5.2GHz), Frequency: 5180MHz



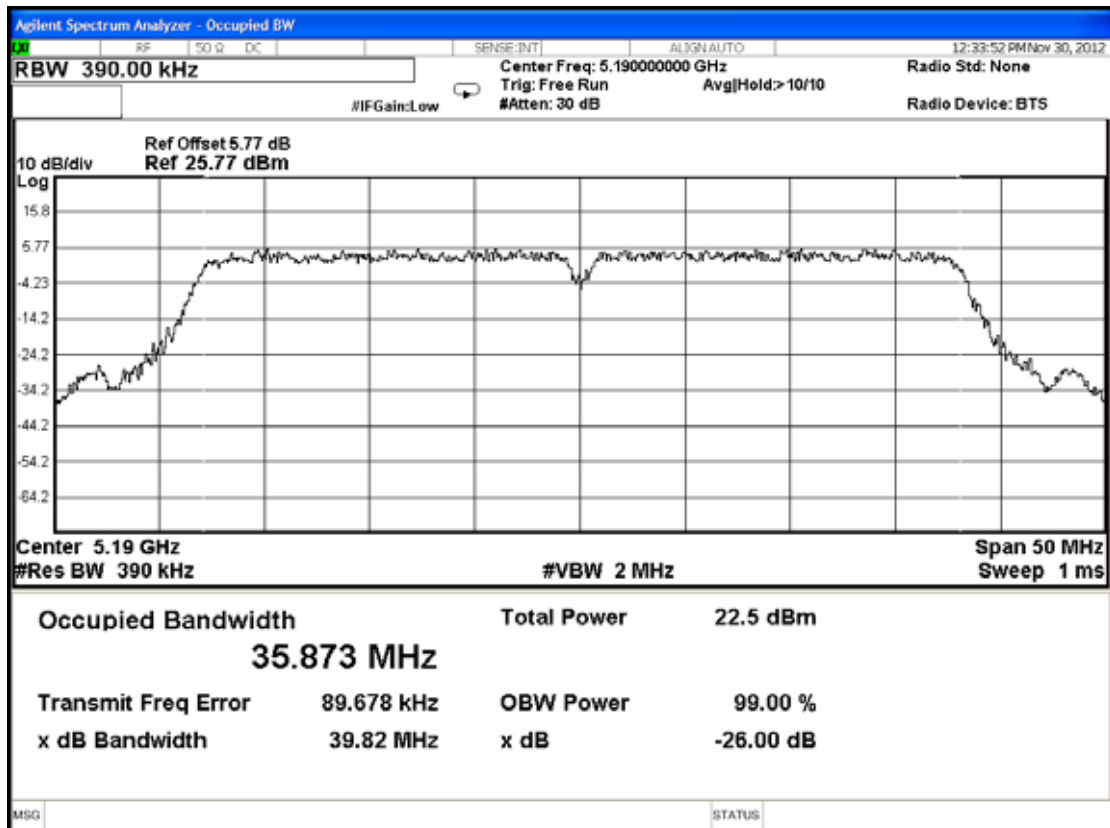
NII 802.11n-HT20 (5.2GHz), Frequency: 5200MHz



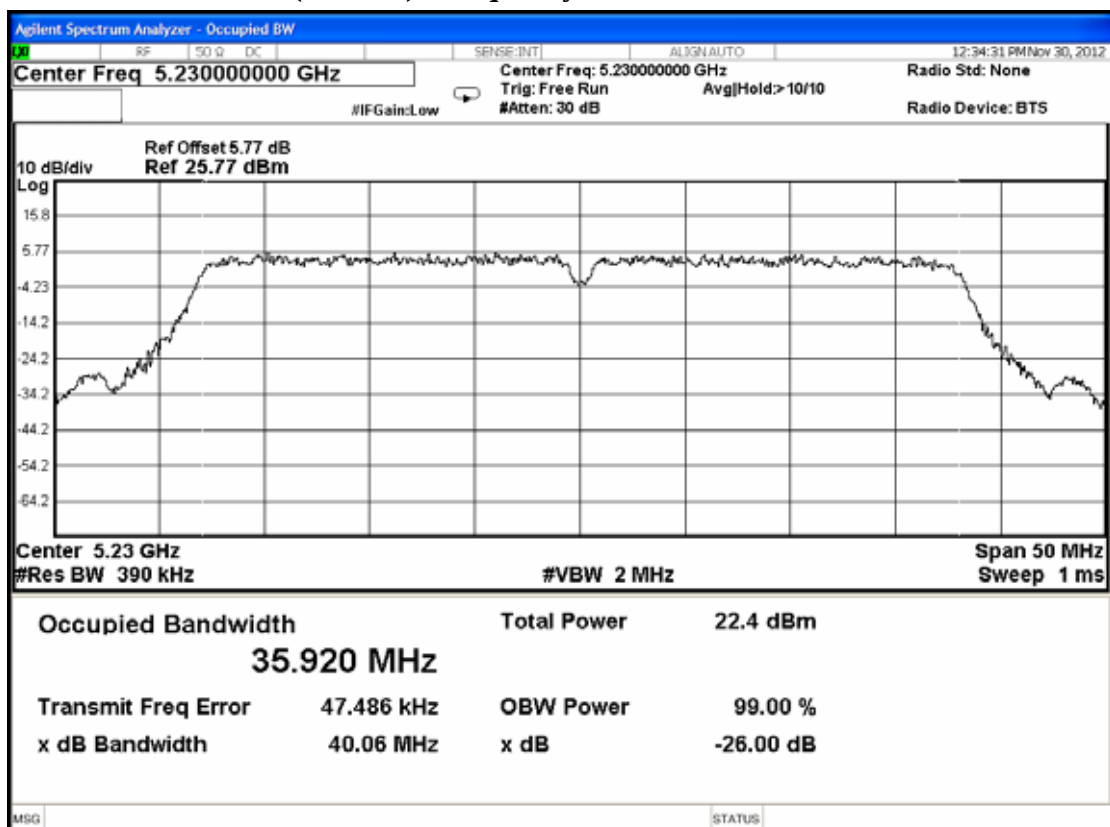
NII 802.11n-HT20 (5.2GHz), Frequency: 5240MHz



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



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



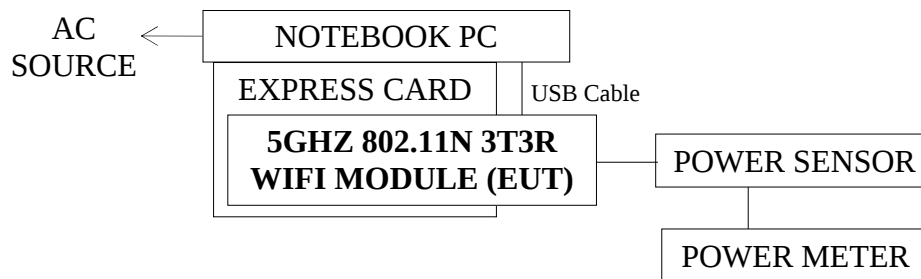
5. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

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)]

5.3.1. For NII 802.11a (5.2GHz)

Frequency	Limit 1	Limit 2 (4dBm+10log B)
5150~5250MHz	50mW (17dBm)	17.04dBm

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)	17.07dBm

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)	20.08dBm

Remark: B= 26dB Bandwidth

5.4. Operating Condition of EUT

The test program “RT3593QA” 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-v01r02

5.6. Test Results

PASSED. All the test results are listed below.

(Test Date : Dec. 10, 2012 Temperature : 25 Humidity : 60%)

5.6.1. For NII 802.11a (5.2GHz)

Mode	Type of Network	Channel	Frequency	Maximum Output Power (dBm)
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	14.96
2.		CH 40	5200MHz	14.47
3.		CH 48	5240MHz	14.63

Remark: After confirming, chain 2 has worst perform thus we perform peak output power at chain 2 for 802.11a.

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)
				Ant.0	Ant.1	Ant.2	
1.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	9.54	9.50	9.69	14.35
2.		CH 40	5200MHz	9.64	9.69	9.62	14.42
3.		CH 48	5240MHz	9.73	10.11	9.75	14.64

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)
				Ant.0	Ant.1	Ant.2	
1.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	11.57	11.53	11.48	16.30
2.		CH 46	5230MHz	11.61	11.57	11.53	16.34

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. 17, 12'	Oct. 16, 13'

6.2. Block Diagram of Test Setup

The same as section.4.2.

6.3. Specification Limits [§15.407(a)-(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-v01r02

Pursuant to KDB 662911, we performed conducted tests for both antenna chains and submit test data measured on chain 2 as worse performance.

6.6. Test Results

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

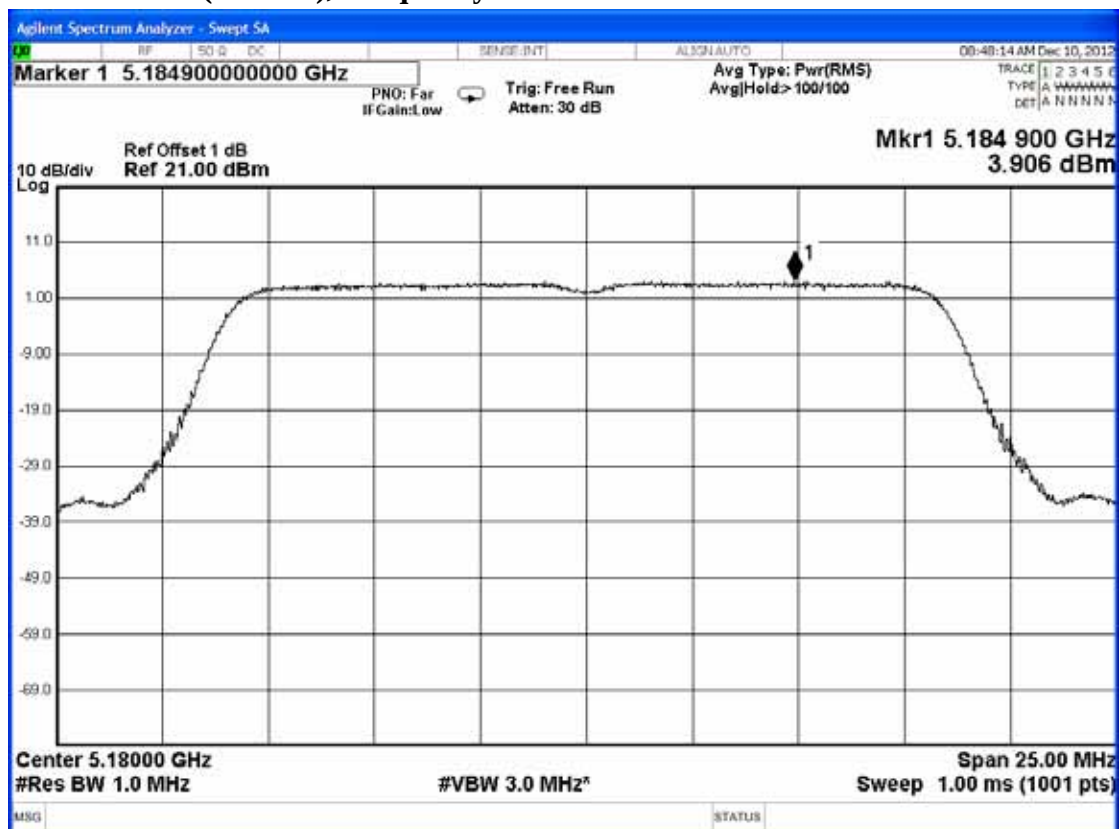
Pursuant to KDB 662911, the test results of 802.11n-H20/H40 have been included
4.77 dB is calculated from $10\log(N)$, where N is the number of outputs.

(Test Date : Dec. 10, 2012 Temperature : 25 Humidity : 60%)

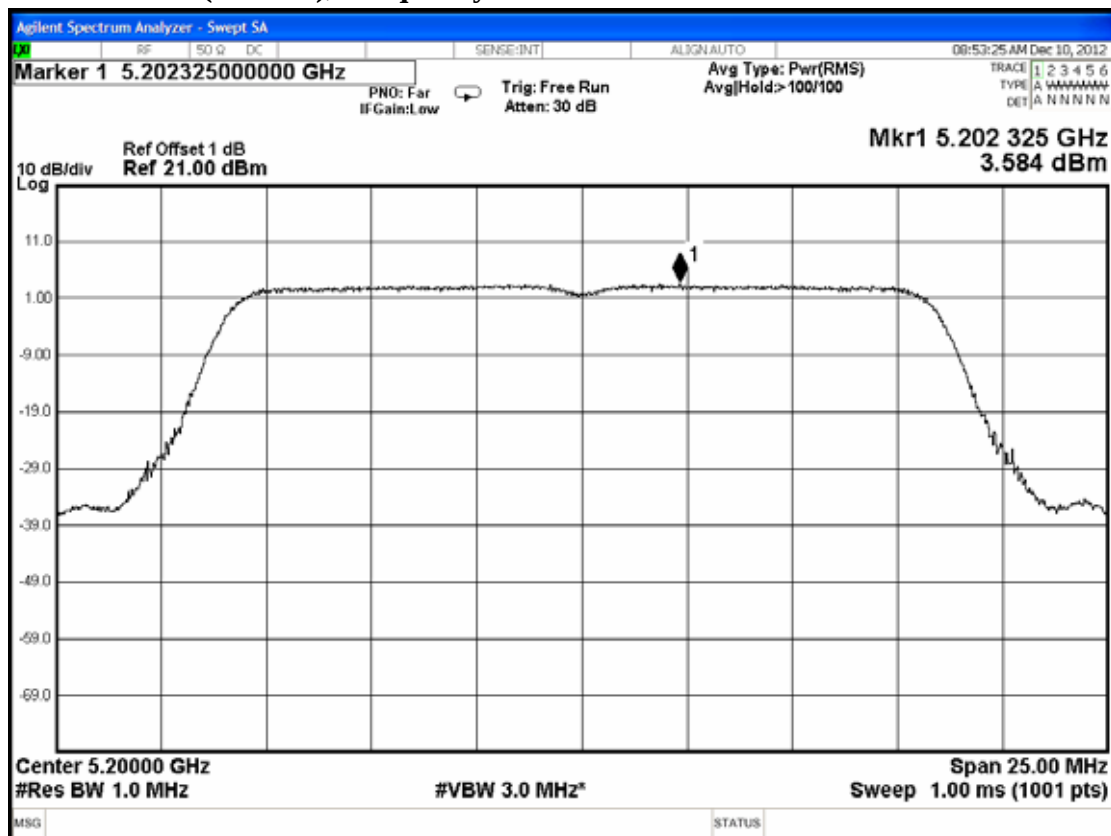
Mode	Type of Network	Channel	Frequency	Power Spectral Density (dBm)
1.	NII 802.11a (5.2GHz)	CH 36	5180MHz	3.906
2.		CH 40	5200MHz	3.584
3.		CH 48	5240MHz	3.723
4.	NII 802.11n-HT20 (5.2GHz)	CH 36	5180MHz	3.484
5.		CH 40	5200MHz	3.612
6.		CH 48	5240MHz	3.867
7.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	2.389
8.		CH 46	5230MHz	2.613

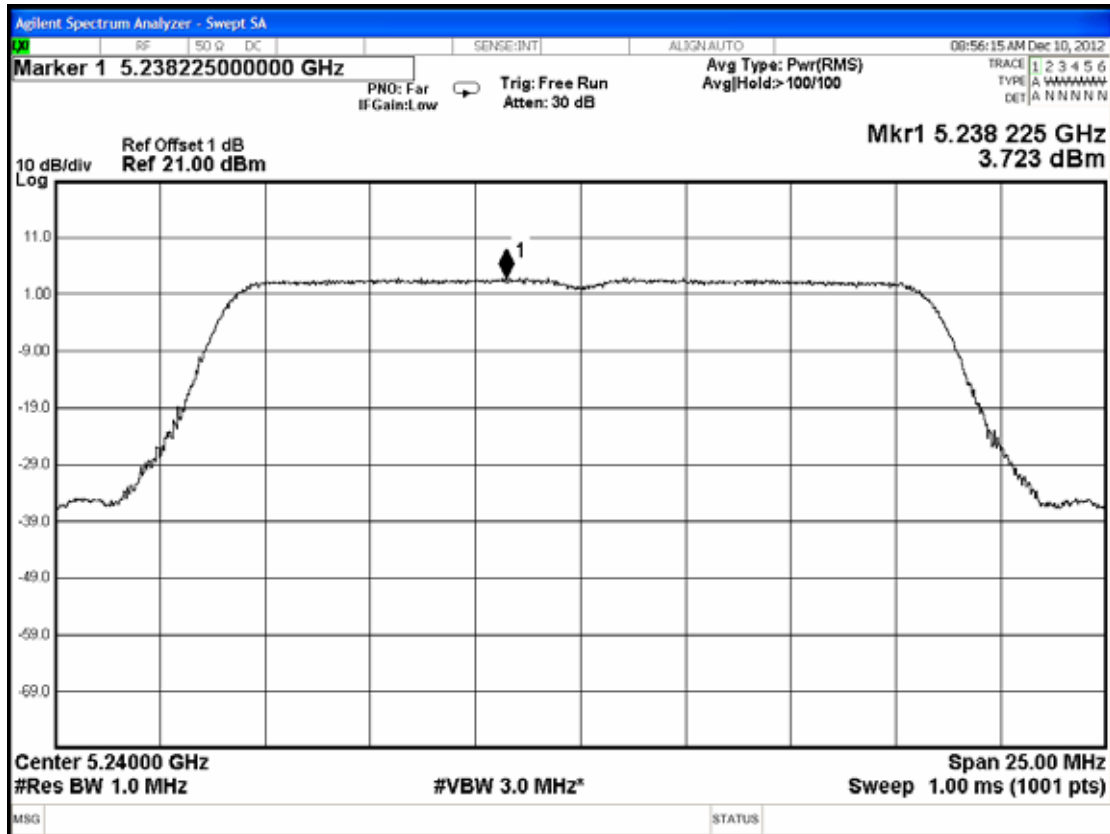
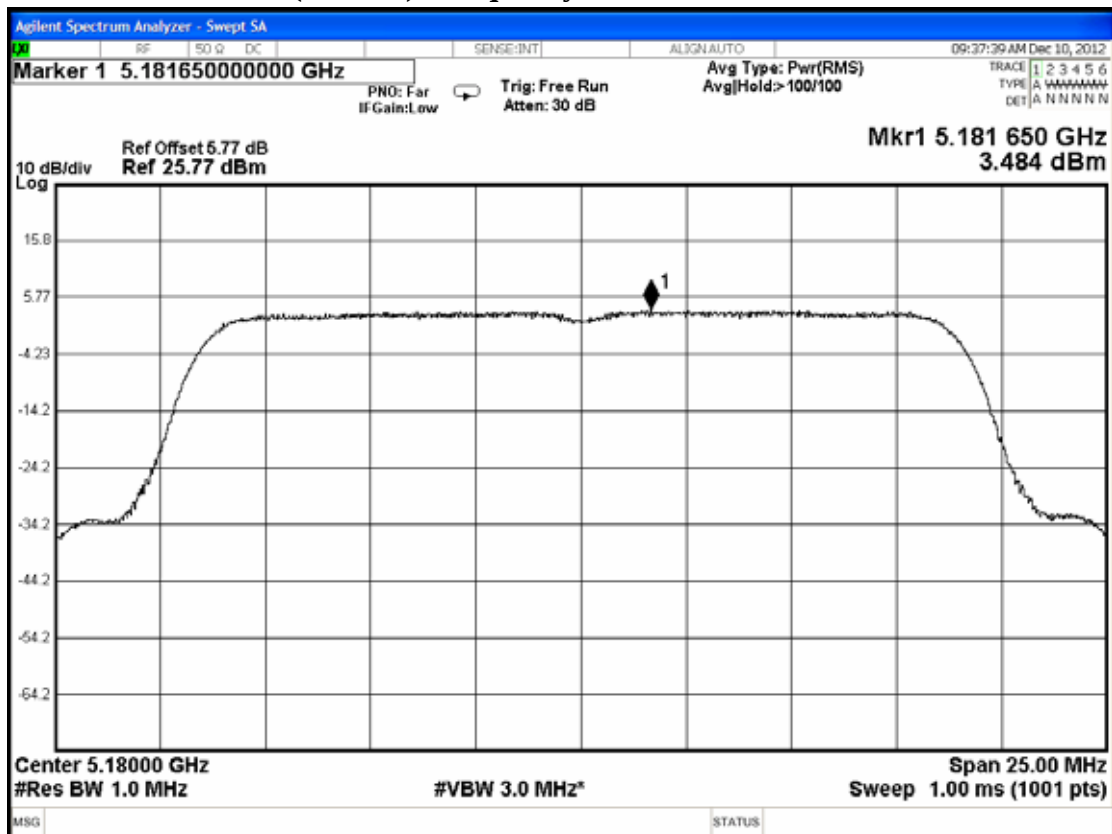
[Limit: 4dBm]

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

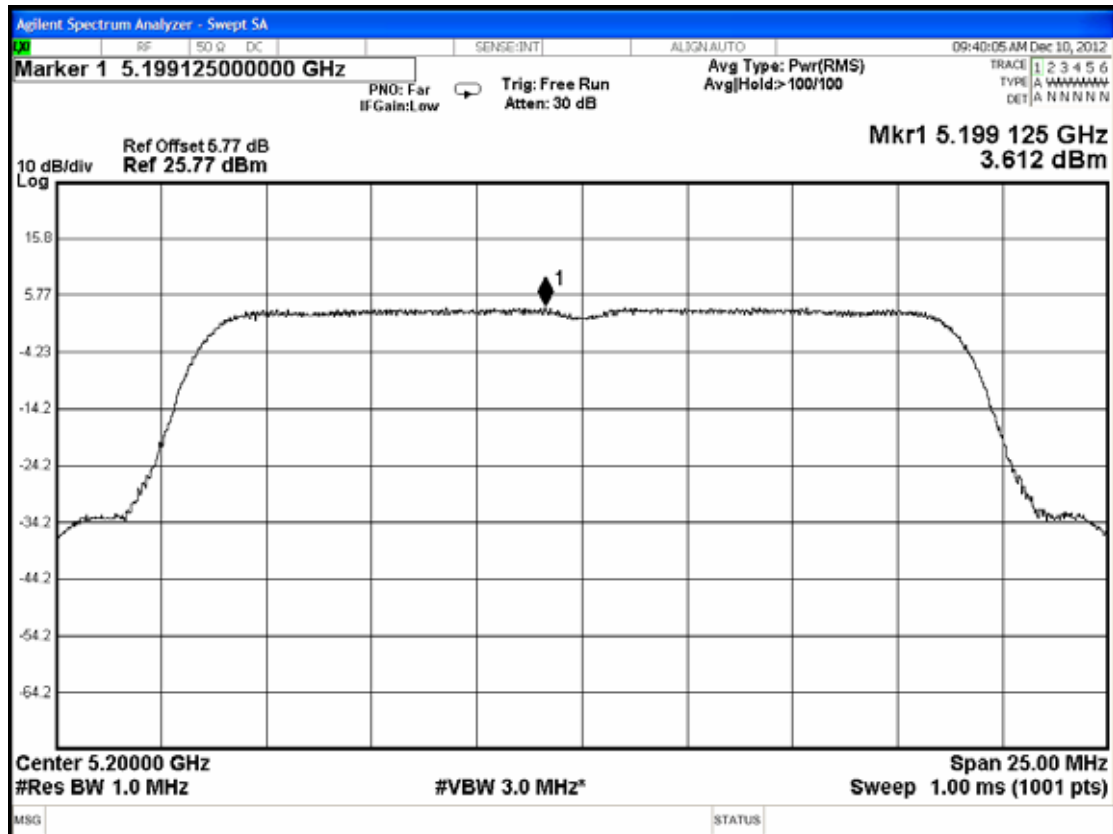


NII 802.11a (5.2GHz), Frequency: 5200MHz

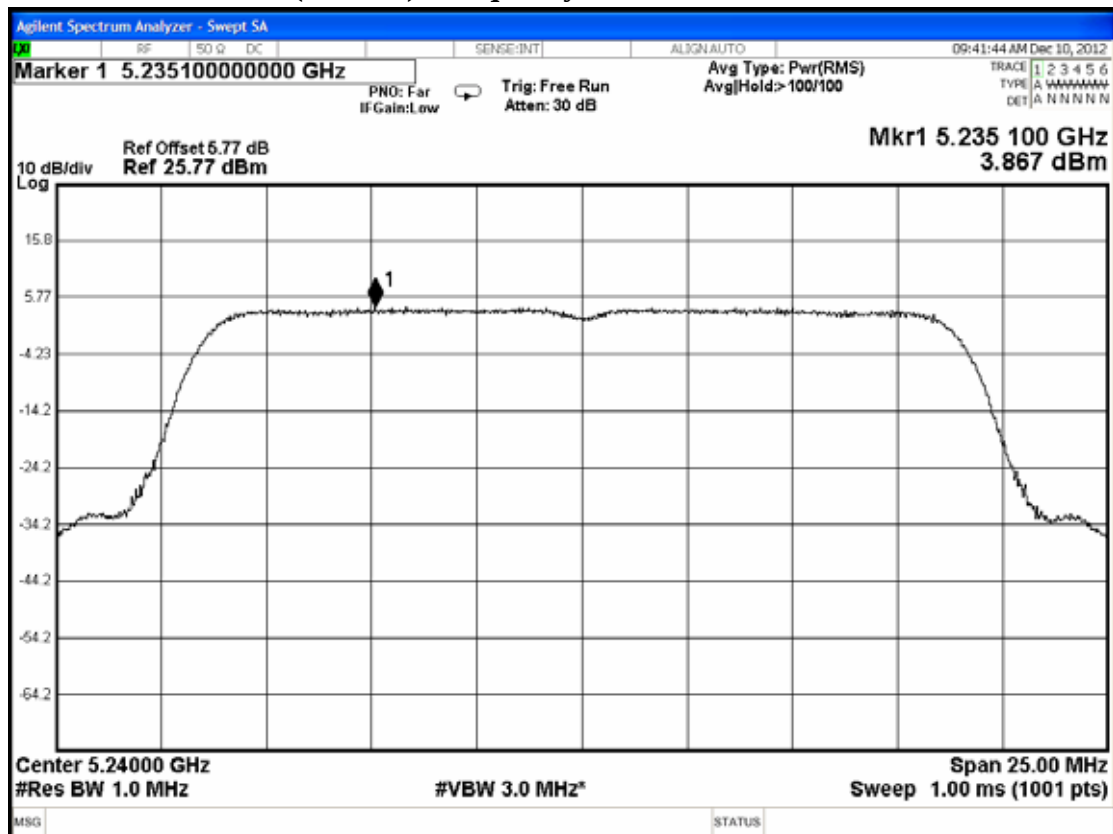


NII 802.11a (5.2GHz), Frequency: 5240MHz**NII 802.11n-HT20 (5.2GHz), Frequency: 5180MHz**

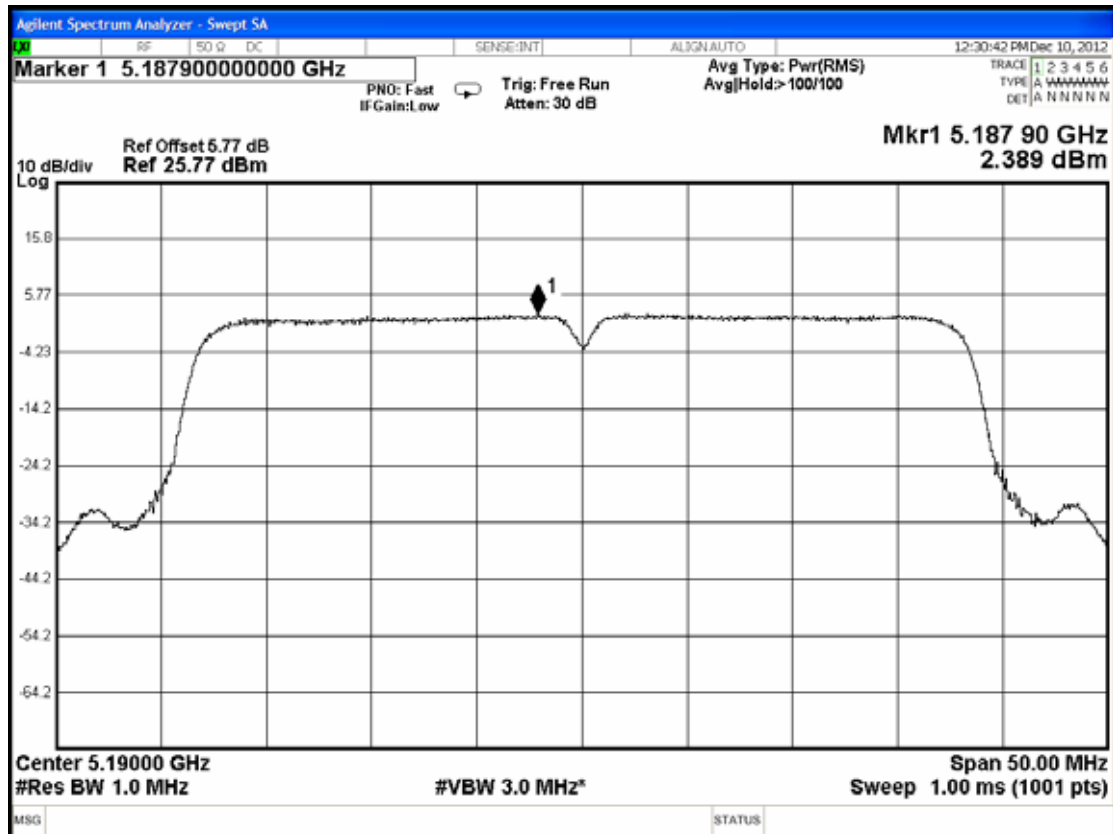
NII 802.11n-HT20 (5.2GHz), Frequency: 5200MHz



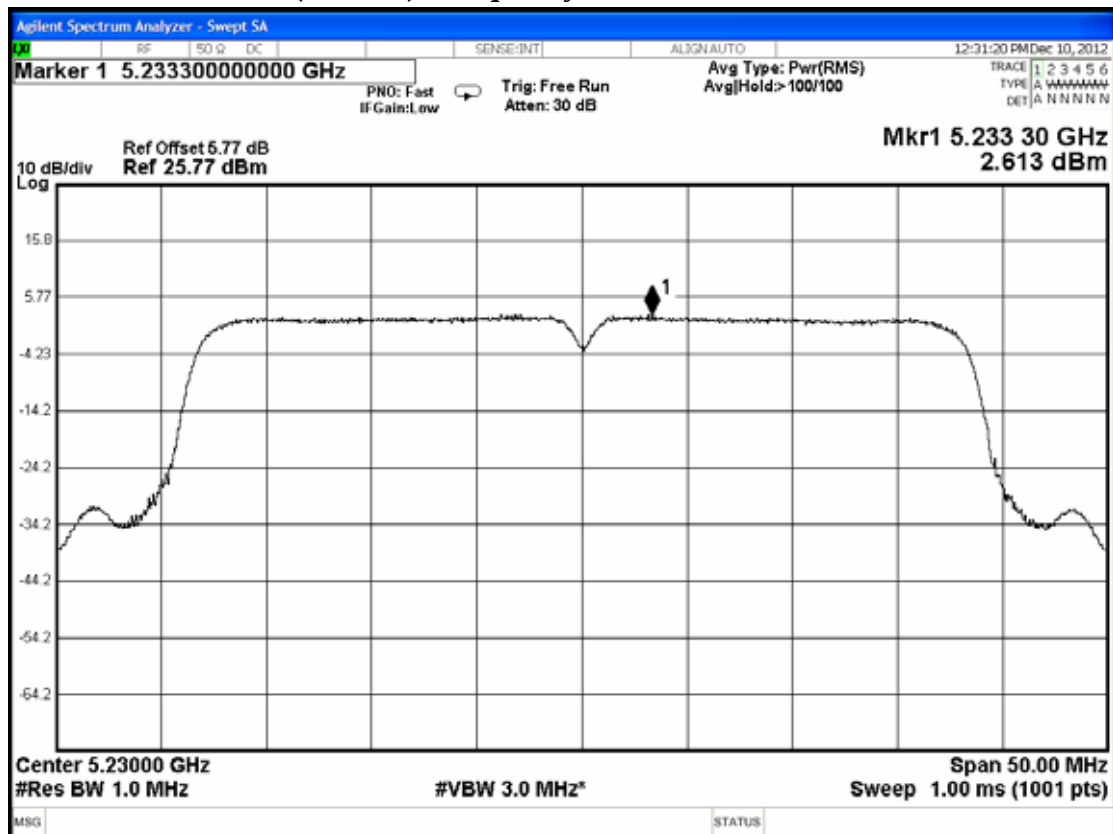
NII 802.11n-HT20 (5.2GHz), Frequency: 5240MHz



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. 17, 12'	Oct. 16, 13'

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≤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≥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-v01r02

Pursuant to KDB 662911, we performed conducted tests for both antenna chains and submit test data measured on chain 2 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 4.77 dB is calculated from $10\log(N)$, where N is the number of outputs.

(Test Date : Nov. 30, 2012 Temperature : 26 Humidity : 61%)

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	-7.667dB
2.		CH 40	5200MHz	-7.880dB
3.		CH 48	5240MHz	-7.624dB

[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	-7.907dB
2.		CH 40	5200MHz	6.732dB
3.		CH 48	5240MHz	-7.735dB

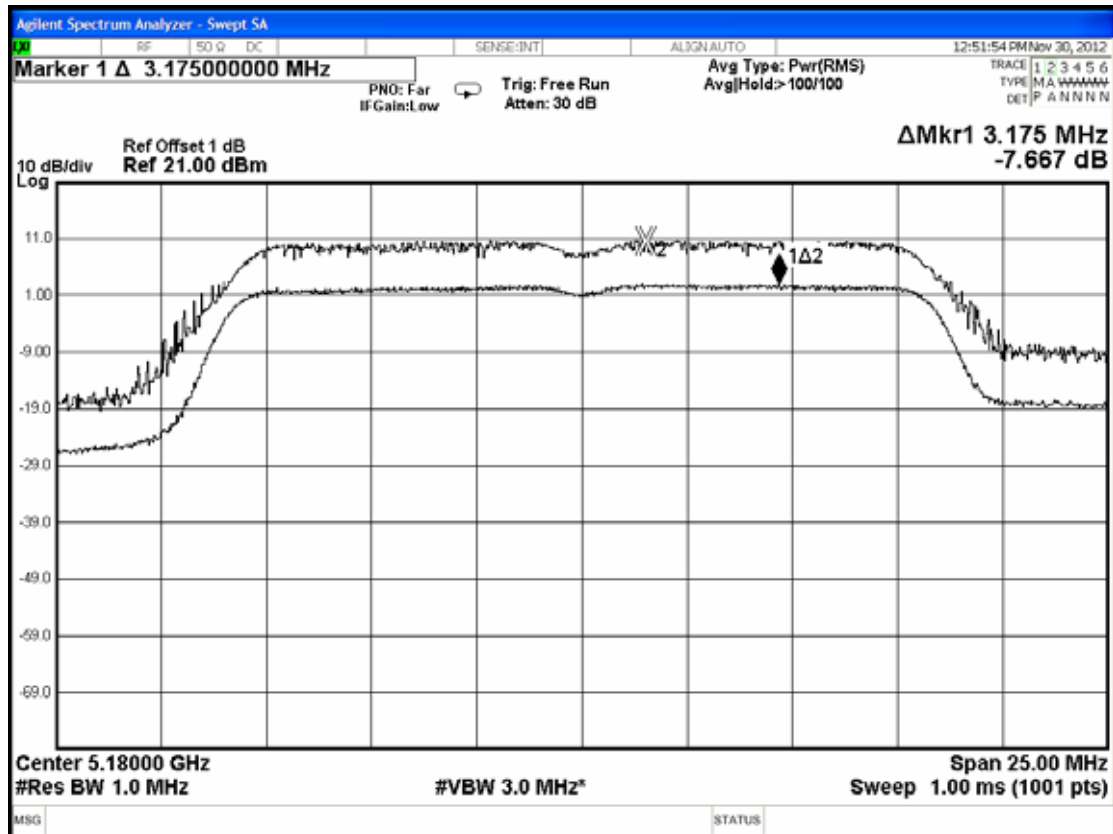
[Limit: 13dB]

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

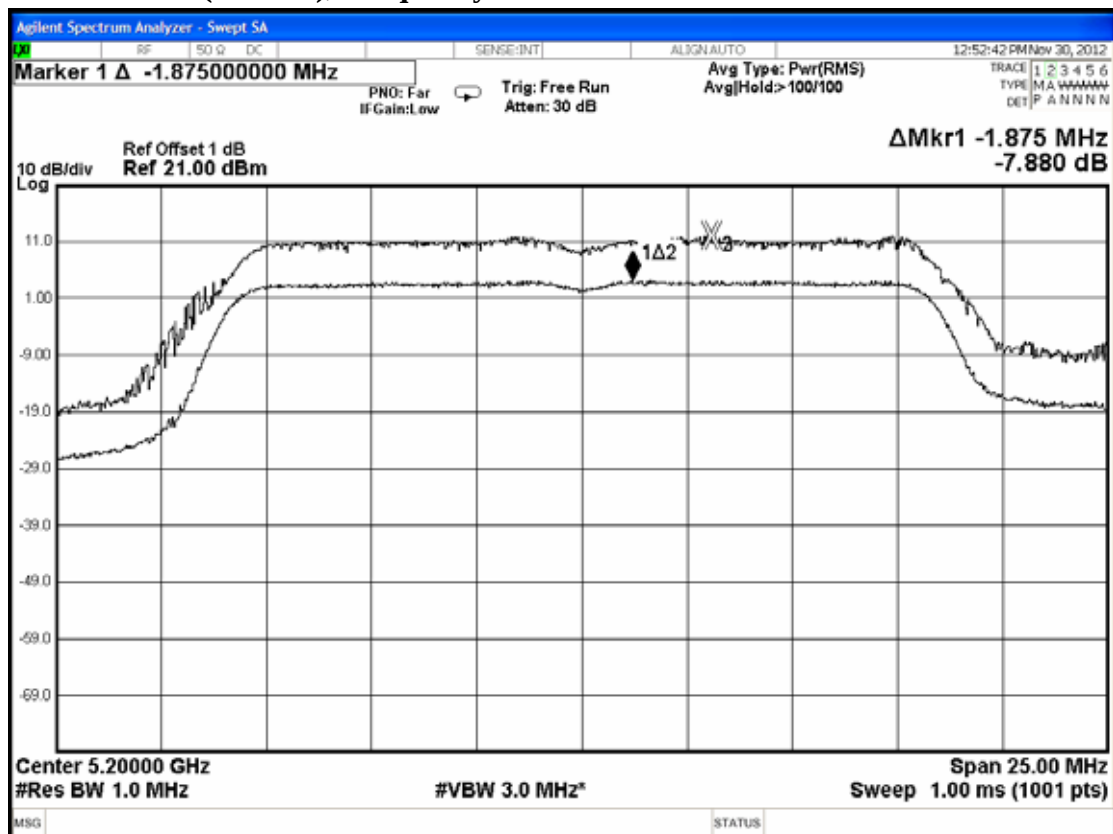
Mode	Type of Network	Channel	Frequency	Peak Power Excursion
1.	NII 802.11n-HT40 (5.2GHz)	CH 38	5190MHz	7.803dB
2.		CH 46	5230MHz	-8.266dB

[Limit: 13dB]

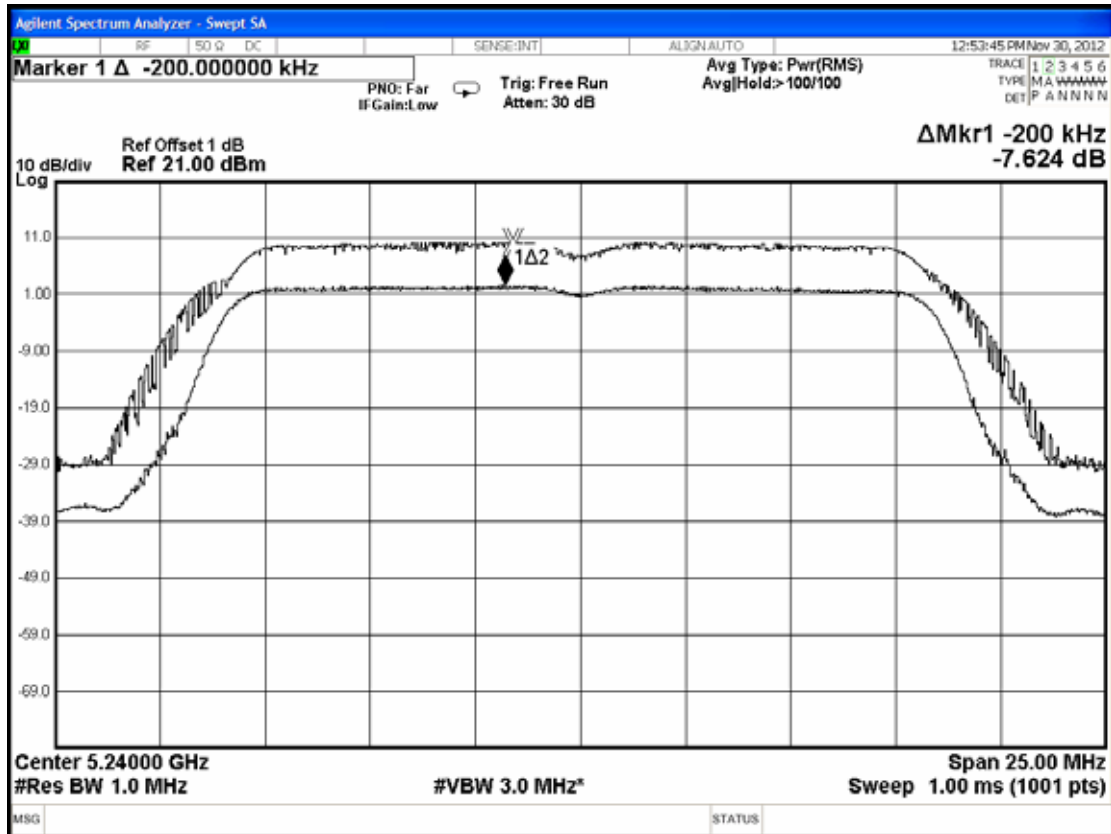
NII 802.11a (5.2GHz), Frequency: 5180MHz



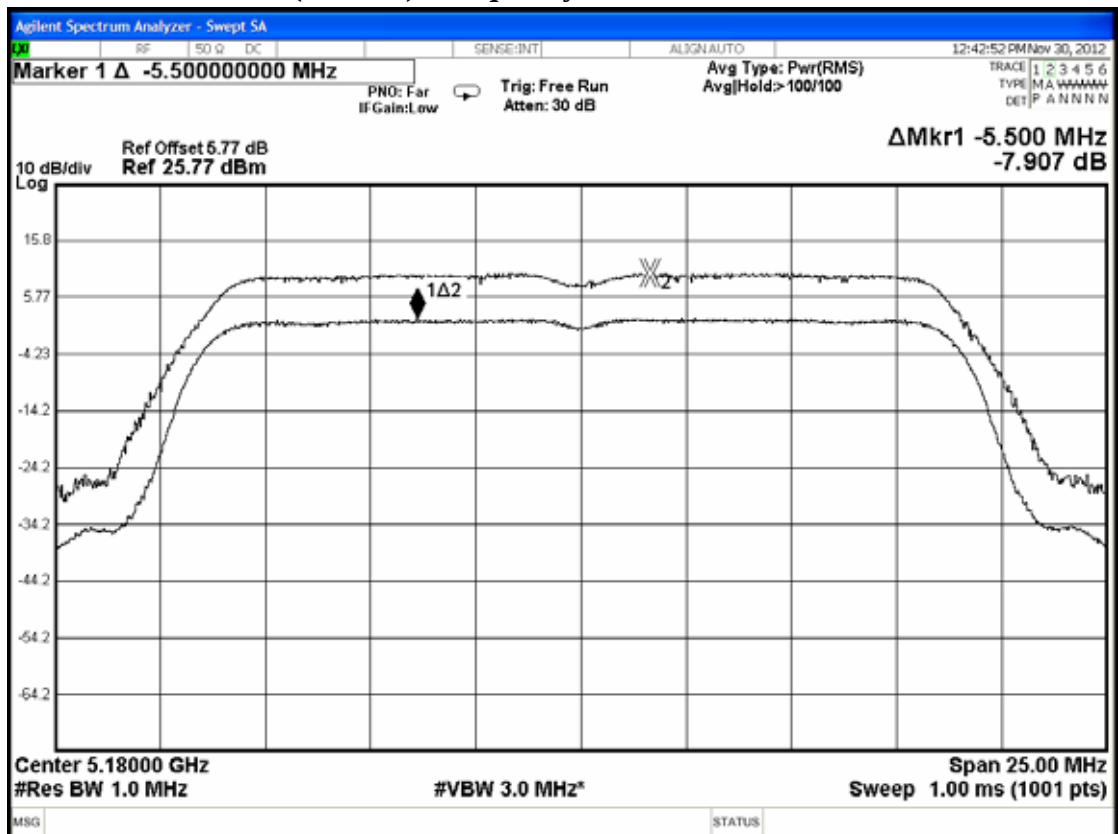
NII 802.11a (5.2GHz), Frequency: 5200MHz



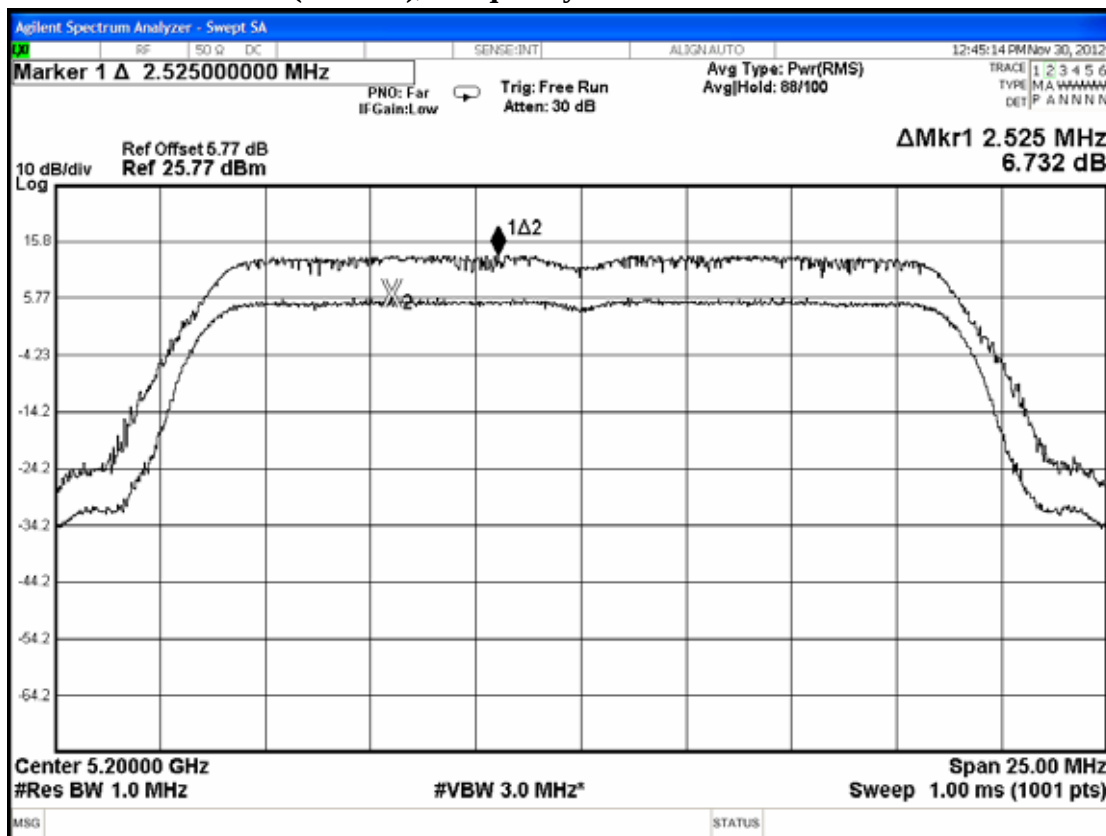
NII 802.11a (5.2GHz), Frequency: 5240MHz



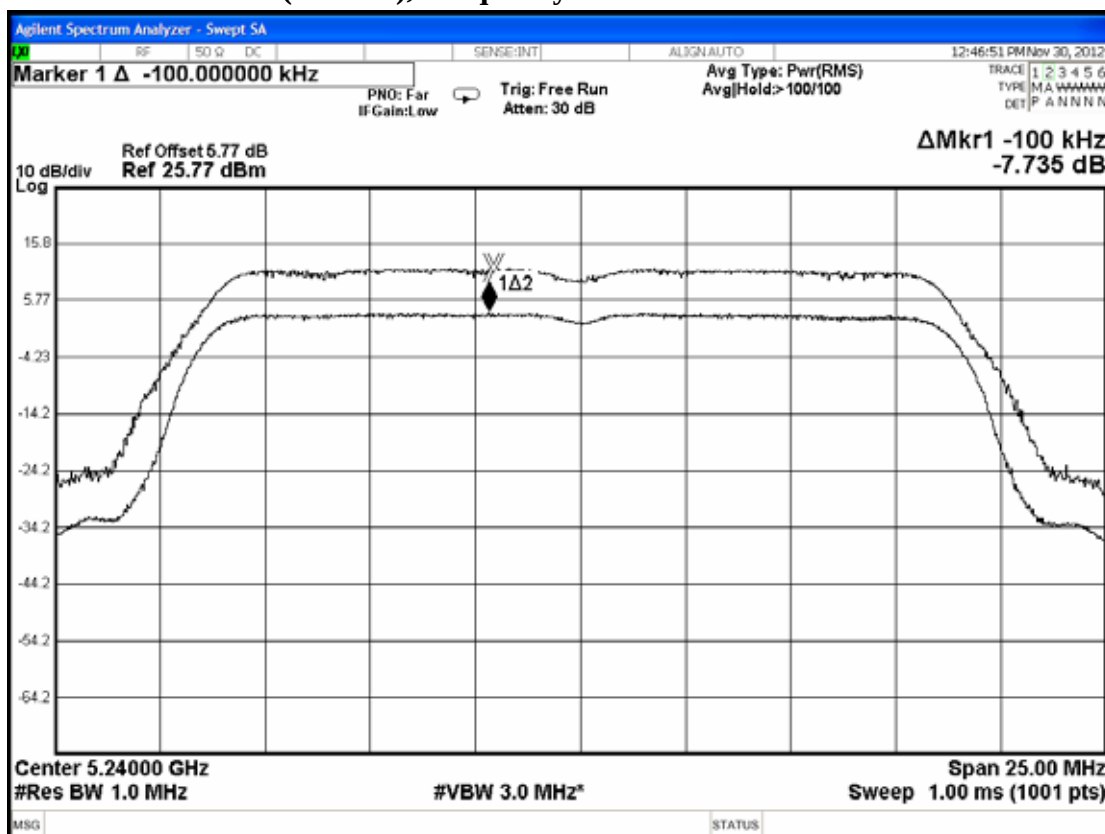
NII 802.11n-HT20 (5.2GHz), Frequency: 5180MHz



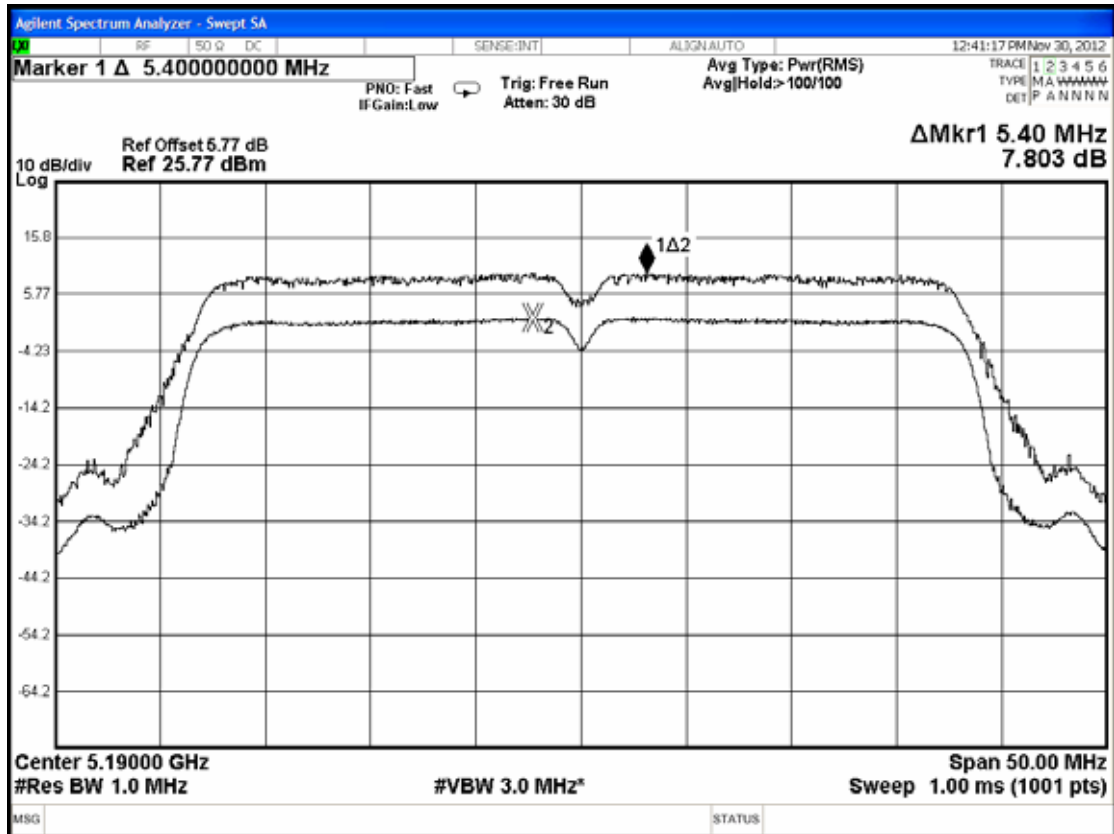
NII 802.11n-HT20 (5.2GHz), Frequency: 5200MHz



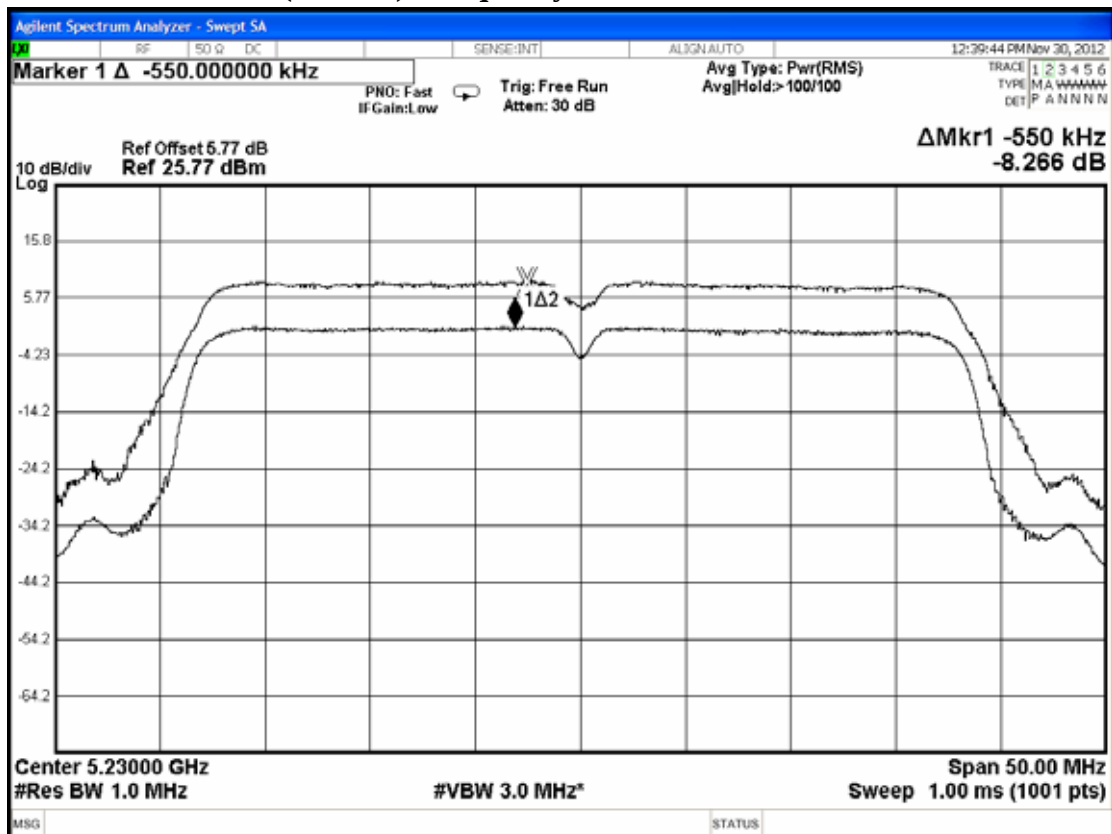
NII 802.11n-HT20 (5.2GHz), Frequency: 5240MHz



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



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



8. DEVIATION TO TEST SPECIFICATIONS

【NONE】

9. PHOTOGRAPHS

9.1. Photos of Conducted Emission Measurement



FRONT VIEW OF CONDUCTED MEASUREMENT



BACK VIEW OF CONDUCTED MEASUREMENT

9.2. Photos of Radiated Measurement at Semi-Anechoic Chamber

9.2.1. Frequency Below 1GHz



9.2.2. Frequency Above 1GHz



9.3. Photo of Section RF Conducted Measurement



9.4. Photo of Maximum Peak Output Power Measurement

