

APPLICATION FOR CERTIFICATION

On Behalf of

LG Electronics Inc.

Wi-Fi/Bluetooth Dongle

Model No. : AN-WF500

FCC ID : BEJWF500

IC: 2703H-WF500

Brand : LG

Prepared for : LG Electronics Inc.
19-1, Cheongho-Ri, Jinwuy-Myeon,
Pyeongtaek-City, Gyeonggi-Do, 451-713,
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TEST REPORT CERTIFICATION

Applicant : LG Electronics Inc.
Manufacturer : LG Electronics Inc.
Factory : Compal Networking (Kunshan) Co., Ltd.
EUT Description : Wi-Fi/Bluetooth Dongle
FCC ID : **BEJWF500**
IC : **2703H-WF500**
(A) Model No. : AN-WF500
(B) Serial No. : N/A
(C) Brand : LG
(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)
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: Sep. 13 ~ Oct. 09, 2013

Date of Report: Oct. 15, 2013

Producer: Tina Huang
(Tina Huang/Administrator)

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

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product	Wi-Fi/Bluetooth Dongle
Model Number	AN-WF500
Serial Number	N/A
Brand Name	LG
Applicant	LG Electronics Inc. 19-1, Cheongho-Ri, Jinwuy-Myeon, Pyeongtaek-City, Gyeonggi-Do, 451-713, Korea
Manufacturer	LG Electronics Inc. 19-1, Cheongho-Ri, Jinwuy-Myeon, Pyeongtaek-City, Gyeonggi-Do, 451-713, Korea
Factory	Compal Networking (Kunshan) Co., Ltd. No.520, Nanbang Rd., Economic & Technical Development Zone, Kunshan, Jiangsu Province, China.
FCC ID	BEJWF500
IC	2703H-WF500
USB Cable	Shielded, Detachable, 0.5m
Fundamental Range	802.11b/g: 2412MHz ~ 2462MHz 802.11a: 5180MHz ~ 5240MHz (UNII Band I) and 5745MHz ~ 5825MHz (UNII Band IV) 802.11n-HT20: 2412MHz ~ 2462MHz and 5180MHz ~ 5240MHz (UNII Band I) and 5745MHz ~ 5825MHz (UNII Band IV) 802.11n-HT40: 2422MHz ~ 2452MHz and 5190MHz ~ 5230MHz (UNII Band I) and 5755MHz ~ 5795MHz (UNII Band IV) BT and BLE: 2402MHz ~ 2480MHz
Frequency Channel	802.11b/g: 11 channels 802.11a: UNII Band I: 4channels UNII Band IV: 4 channels 802.11n-HT20: 2.4GHz: 11 channels UNI Band I: 4channels UNII Band IV: 4 channels 802.11n-HT40: 2.4GHz: 7 channels UNII Band I: 2channels UNII Band IV: 3 channels BT: 79 channels (GFSK, π /4DQPSK, 8-DPSK) 40 channels (BLE)

Radio Technology	802.11b: DSSS Modulation (DBPSK/DQPSK/CCK) 802.11g: OFDM Modulation (BPSK/QPSK/16QAM/64QAM) 802.11a: OFDM Modulation (BPSK/QPSK/16QAM/64QAM) 802.11n: OFDM Modulation (MIMO) (BPSK/QPSK/16QAM/64QAM) BT: FHSS (GFSK, $\pi/4$ DQPSK, 8-DPSK) GFSK (BLE)
Data Transfer Rate	802.11b: 1/2/5.5/11Mbps 802.11a/g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps BT: 1/2/3Mbps BLE: Mbps
Date of Receipt of Sample	Sep. 09, 2013
Date of Test	Sep. 13 ~ Oct. 09, 2013
Note: This EUT has 802.11a/b/g/n-HT20/HT40 and BT and BLE function. See below for related test reports based on radio functionality. 1. The BT function has been test in other report of EM-F1020699. 2. The 802.11a/b/g/n-HT20/HT40 (2.4GHz and UNII Band IV) and BLE function has been test in other report of EM-F1020700. 3. The 802.11a/b/g/n-HT20/HT40 (UNII Band I) function has been test in other report of EM-F1020701.	

1.2. Antenna Information

Antenna Part Number	Manufacture	Antenna Type	Peak Gain W/ Cable loss (dBi)	
			Frequency (MHz)	Max Gain (dBi)
Wi-Fi Antenna				
120800011700J (ANT#0)	arcadyan	PIFA Antenna	2.400 GHz	-0.60 dBi (peak)
			2.450 GHz	-1.85 dBi (peak)
			2.500 GHz	-2.20 dBi (peak)
			5.150 GHz	0.42 dBi (peak)
			5.250 GHz	-0.43 dBi (peak)
			5.350 GHz	-0.97 dBi (peak)
			5.470 GHz	0.23 dBi (peak)
			5.600 GHz	0.27 dBi (peak)
			5.725 GHz	-0.69 dBi (peak)
			5.785 GHz	-0.77 dBi (peak)
			5.850 GHz	-0.37 dBi (peak)
120800011800J (ANT#1)	arcadyan	PIFA Antenna	2.400 GHz	1.44 dBi (peak)
			2.450 GHz	0.83 dBi (peak)
			2.500 GHz	0.80 dBi (peak)
			5.150 GHz	0.61 dBi (peak)
			5.250 GHz	0.12 dBi (peak)
			5.350 GHz	0.37 dBi (peak)
			5.470 GHz	1.56 dBi (peak)
			5.600 GHz	0.73 dBi (peak)
			5.725 GHz	-0.87 dBi (peak)
			5.785 GHz	-0.98 dBi (peak)
			5.850 GHz	-0.69 dBi (peak)
Bluetooth Antenna				
---	arcadyan	PCB Antenna	2.400 GHz	-5.64 dBi (peak)
			2.450 GHz	-5.03 dBi (peak)
			2.500 GHz	-3.28 dBi (peak)

1.3. Data Rate Relative to Output Power

NII 802.11a (5.2GHz)			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)
36	BPSK	6	9.52
36	BPSK	9	9.39
36	QPSK	12	9.41
36	QPSK	18	9.44
36	16-QAM	24	9.46
36	16-QAM	36	9.43
36	64-QAM	48	9.26
36	64-QAM	54	9.32

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	9.40	38	BPSK	6.5	12.21
36	QPSK	13	9.34	38	QPSK	13	12.09
36	QPSK	19.5	9.31	38	QPSK	19.5	12.07
36	16-QAM	26	9.25	38	16-QAM	26	12.15
36	16-QAM	39	9.21	38	16-QAM	39	11.91
36	64-QAM	52	9.05	38	64-QAM	52	11.86
36	64-QAM	58.6	9.13	38	64-QAM	58.6	11.63
36	64-QAM	65	9.03	38	64-QAM	65	11.61

1.4. 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

1.5. Tested Supporting System Details

1.5.1. NOTEBOOK PC

Model Number	:	N20A
Serial Number	:	8BN0AS413979471
FCC ID	:	By DoC
BSMI ID	:	R31018
Brand	:	ASUS
AC Adapter	:	Delta, M/N SADP-65KB B, DC Cord: Non-Shielded, Undetachable, 1.8m Bonded a ferrite core
Power Cord	:	Non-Shielded, Detachable, 1.8m

1.6. Description of Test Facility

Name of Firm	:	AUDIX Technology Corporation EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Location & Facility (C8/AC)	:	No. 8 Shielded Room No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Semi-Anechoic Chamber No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan May 11, 2012 File on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

1.7. 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 peak output power	$\pm 0.33\text{dBm}$
Power spectral density	$\pm 0.13\text{dB}$
Peak power Excursion	$\pm 0.14\text{dB}$

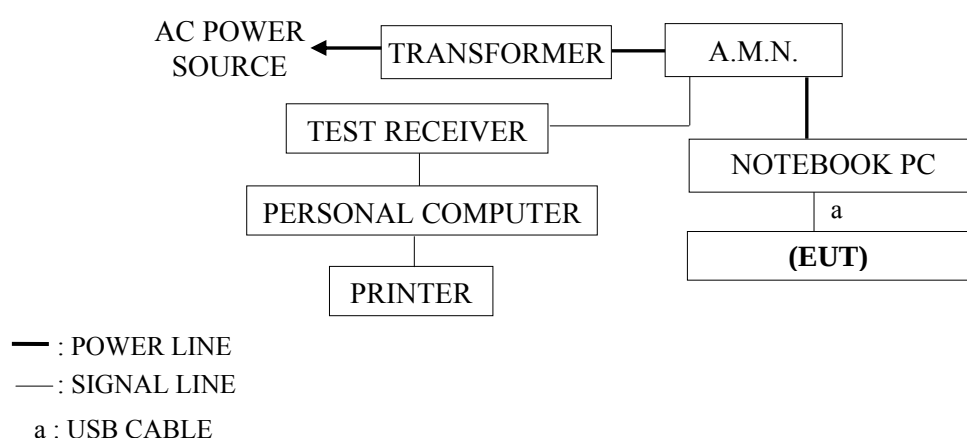
2. CONDUCTED EMISSION MEASUREMENT

2.1. Test Equipment

The following test equipment was used during the 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	Aug. 22, 13'	Aug. 21, 14'
2.	A.M.N.	R&S	ESH2-Z5	100366	Mar. 19, 13'	Mar. 18, 14'
3.	L.I.S.N.	Kyoritsu	KNW-407	8-881-13	Jan. 21, 13'	Jan. 30, 14'

2.2. Block Diagram of Test Setup



EUT: Wi-Fi/Bluetooth Dongle

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 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 “M Tool” to set EUT (Wi-Fi/Bluetooth Dongle) 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/Bluetooth Dongle M/N : AN-WF500

Test Date : Sep. 13, 2013 Temperature : 25 Humidity : 56%

The details are as follows :

Mode	Reference Test Data	
	Neutral	Line
1.	# 12	# 11

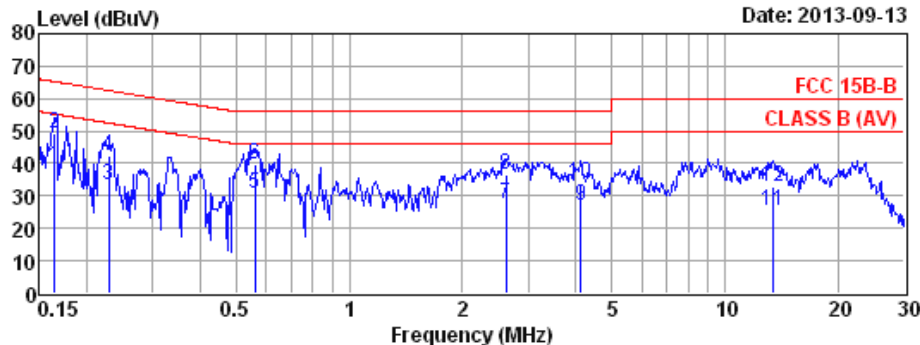


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Data: 12

File: D:\test data\REPORT\2013\1M1309XXX\1M1309091-C-D.EM6 (12)

Date: 2013-09-13



Site no. : No.8 Shielded Room Data no. : 12
Dis. / Ant. : ESH2-Z5 366 Ant. pol. : NEUTRAL
Limit : FCC 15B-B
Env. / Ins. : 25°C / 56% ESCS (265) Engineer : Jack_Wu
EUT : AH-WF500
Power Rating : 120Vac/60Hz
Test Mode : Operation

	Freq. (MHz)	AMN. Factor (dB)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.164	0.21	0.04	39.04	39.29	55.25	15.96	Average
2	0.164	0.21	0.04	49.04	49.29	65.25	15.96	QP
3	0.229	0.21	0.04	33.29	33.54	52.48	18.94	Average
4	0.229	0.21	0.04	42.29	42.54	62.48	19.94	QP
5	0.561	0.23	0.04	30.33	30.60	46.00	15.40	Average
6	0.561	0.23	0.04	39.33	39.60	56.00	16.40	QP
7	2.608	0.29	0.09	27.15	27.53	46.00	18.47	Average
8	2.608	0.29	0.09	36.15	36.53	56.00	19.47	QP
9	4.136	0.31	0.12	26.39	26.82	46.00	19.18	Average
10	4.136	0.31	0.12	33.39	33.82	56.00	22.18	QP
11	13.337	0.50	0.21	24.88	25.59	50.00	24.41	Average
12	13.337	0.50	0.21	31.88	32.59	60.00	27.41	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.

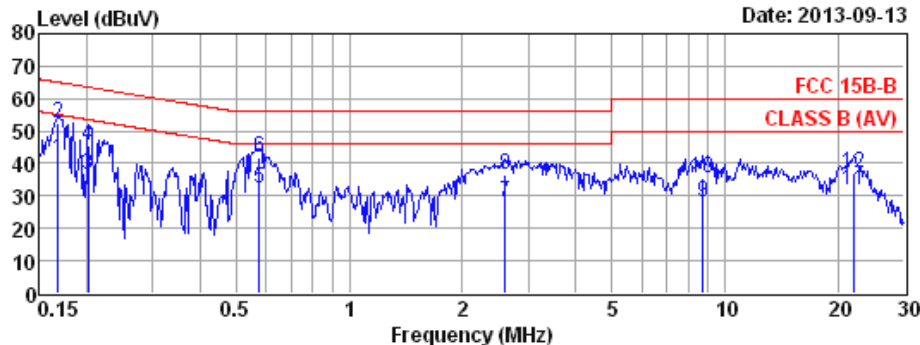


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Data: 11

File: D:\test data\REPORT\2013\C1M1309XXX\C1M1309091-C-D.EM6 (12)

Date: 2013-09-13



Site no. : No.8 Shielded Room Data no. : 11
Dis. / Ant. : ESH2-Z5 366 Ant. pol. : LINE
Limit : FCC 15B-B
Env. / Ins. : 25°C / 56% ESCS (265) Engineer : Jack_Wu
EUT : AH-WF500
Power Rating : 120Vac/60Hz
Test Mode : Operation

	Freq. (MHz)	AMN. Factor (dB)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.168	0.11	0.04	41.27	41.42	55.08	13.66	Average
2	0.168	0.11	0.04	52.08	52.23	65.08	12.85	QP
3	0.202	0.11	0.04	36.47	36.62	53.54	16.92	Average
4	0.202	0.11	0.04	45.44	45.59	63.54	17.95	QP
5	0.576	0.13	0.04	32.29	32.46	46.00	13.54	Average
6	0.576	0.13	0.04	41.84	42.01	56.00	13.99	QP
7	2.594	0.18	0.09	27.56	27.83	46.00	18.17	Average
8	2.594	0.18	0.09	36.07	36.34	56.00	19.66	QP
9	8.729	0.24	0.18	27.60	28.02	50.00	21.98	Average
10	8.729	0.24	0.18	35.24	35.66	60.00	24.34	QP
11	21.946	0.60	0.26	30.91	31.77	50.00	18.23	Average
12	21.946	0.60	0.26	36.39	37.25	60.00	22.75	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)

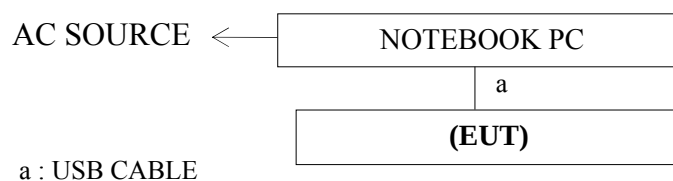
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 18, 13'	Aug. 17, 14'
2	Test Receiver	R & S	ESCS30	100338	Jul. 01, 13'	Jun. 30, 14'
3	Amplifier	HP	8447D	2944A06305	Feb. 19, 13'	Feb. 18, 14'
4	Log Periodic Antenna	Schwarzbeck	UHALP 9108-A	0810	Mar. 02, 13'	Mar. 01, 14'
5	Biconical Antenna	CHASE	VBA6106A	1264	Mar. 02, 13'	Mar. 01, 14'

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. 18, 13'	Aug. 17, 14'
2	Test Receiver	R & S	ESCS30	100338	Jul. 01, 13'	Jun. 30, 14'
3	Pre-Amplifier	HP	8449B	3008A02676	Mar. 01, 13'	Feb. 28, 14'
4	5GHz Notch Filter	Microwave Circuits	N0258771	459776	Jan. 05, 13'	Jan. 03, 14'
5	Horn Antenna	EMCO	3115	9112-3775	May 07, 13'	May 06, 14'
6	Horn Antenna	EMCO	3116	2653	Oct. 15, 12'	Oct. 14, 13'

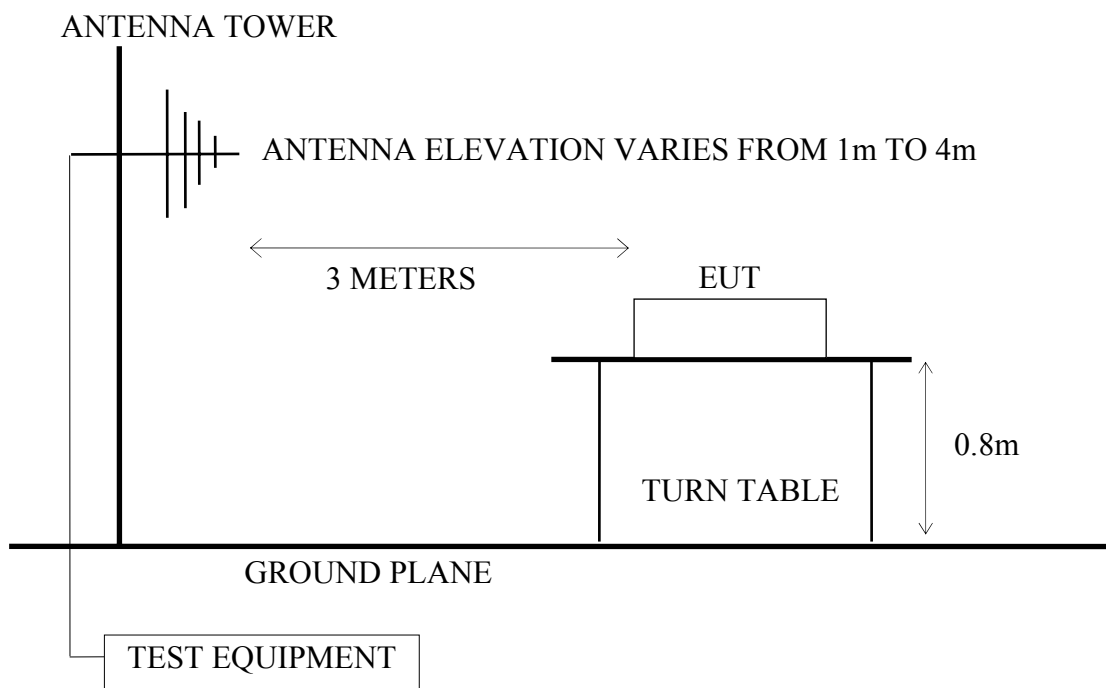
3.2. Test Setup

3.2.1. Block Diagram of connection between EUT and simulators

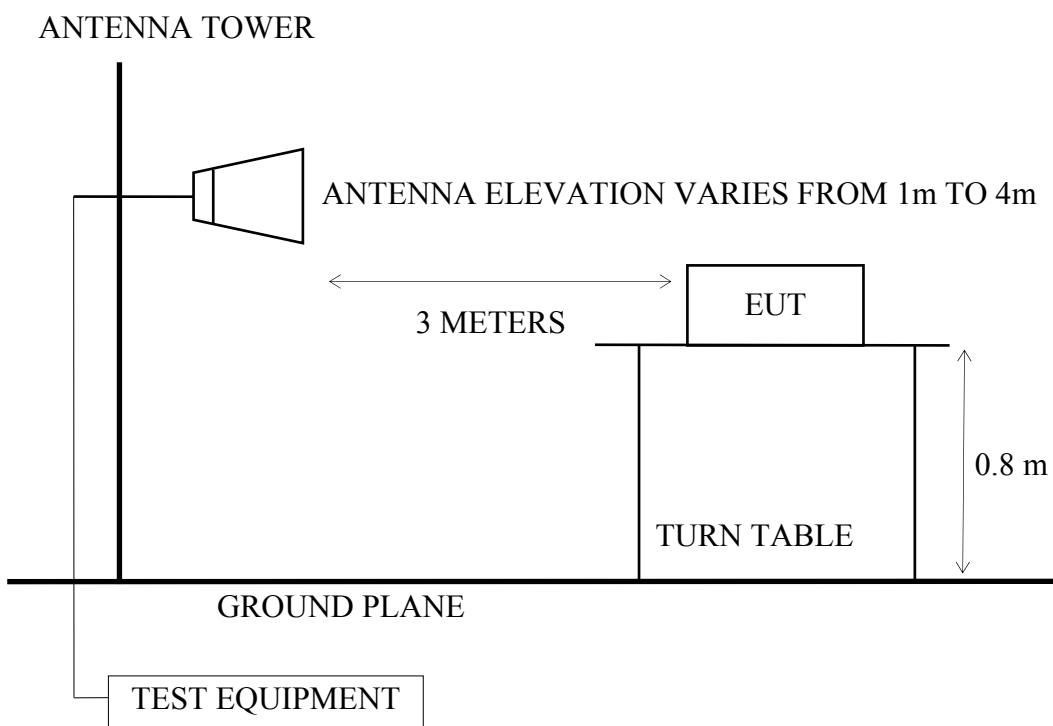


EUT: Wi-Fi/Bluetooth Dongle

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/Bluetooth Dongle) 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 “M Tool”.

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 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 1GHz 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/Bluetooth Dongle

M/N : AN-WF500

Test Date : Oct. 09, 2013 Temperature : 24 Humidity : 40%

For Frequency Range 30MHz~1000MHz:

The EUT emitted the fundamental frequency with data code at the stand, side and lying conditions.

The EUT select **worst position “lying”** and with following test modes was 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	# 13	# 14
2.	NII 802.11n-HT20 (5.2GHz)	CH 48	5240MHz	Transmit	# 13	# 14
3.	NII 802.11n-HT40 (5.2GHz)	CH 46	5230MHz	Transmit	# 13	# 14

* Above all final readings were measured with Peak detector.

For Frequency above 1GHz:

The emissions (up to 40GHz) not reported are too low to be measured.

For Restricted Bands:

The EUT select **worst position “lying”** and with following test modes was performed during this section testing and all the test results are listed in section 3.6.2. (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. : Audix NO.1 Chamber Data no. : 13
 Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C
 Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
 EUT : AN-WF500
 Power Rating : DC 5V
 Test Mode : Tx 5240 MHz (802.11 a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	288.02	13.58	3.80	13.18	30.56	46.00	15.44	Peak
2	335.55	14.90	4.20	13.24	32.34	46.00	13.66	Peak
3	398.60	16.48	4.80	8.91	30.19	46.00	15.81	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. : Audix NO.1 Chamber Data no. : 14
 Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : VERTICAL
 Limit : FCC PART 15C
 Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
 EUT : AN-WF500
 Power Rating : DC 5V
 Test Mode : Tx 5240 MHz (802.11 a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	30.97	19.24	1.10	14.33	34.67	40.00	5.33	Peak
2	44.55	11.30	1.36	22.22	34.88	40.00	5.12	Peak
3	213.33	10.63	3.10	15.37	29.10	43.50	14.40	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. : Audix NO.1 Chamber Data no. : 13
 Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C
 Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
 EUT : AN-WF500
 Power Rating : DC 5V
 Test Mode : Tx 5240 MHz (802.11 n20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	288.02	13.58	3.80	13.18	30.56	46.00	15.44	Peak
2	335.55	14.90	4.20	13.77	32.87	46.00	13.13	Peak
3	399.57	16.50	4.80	7.78	29.08	46.00	16.92	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. : Audix NO.1 Chamber Data no. : 14
 Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : VERTICAL
 Limit : FCC PART 15C
 Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
 EUT : AN-WF500
 Power Rating : DC 5V
 Test Mode : Tx 5240 MHz (802.11 n20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	30.97	19.24	1.10	14.15	34.49	40.00	5.51	Peak
2	45.52	10.97	1.40	22.71	35.08	40.00	4.92	Peak
3	214.30	10.64	3.11	16.27	30.02	43.50	13.48	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. : Audix NO.1 Chamber Data no. : 13
 Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C
 Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
 EUT : AN-WF500
 Power Rating : DC 5V
 Test Mode : Tx 5230 MHz (802.11 n40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	56.19	7.92	1.60	25.00	34.52	40.00	5.48	Peak
2	74.62	7.07	1.80	24.47	33.34	40.00	6.66	Peak
3	335.55	14.90	4.20	12.79	31.89	46.00	14.11	Peak

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

Site no. : Audix NO.1 Chamber Data no. : 14
 Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : VERTICAL
 Limit : FCC PART 15C
 Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
 EUT : AN-WF500
 Power Rating : DC 5V
 Test Mode : Tx 5230 MHz (802.11 n40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	30.97	19.24	1.10	14.53	34.87	40.00	5.13	Peak
2	44.55	11.30	1.36	22.43	35.09	40.00	4.91	Peak
3	212.36	10.62	3.13	17.01	30.76	43.50	12.74	Peak

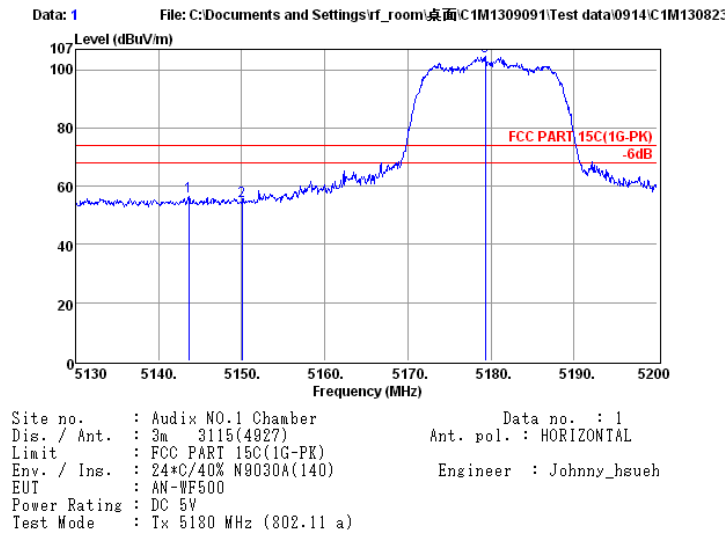
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

3.6.2. Restricted Bands Measurement Results

Date of Test : Oct. 09, 2013 Temperature : 24

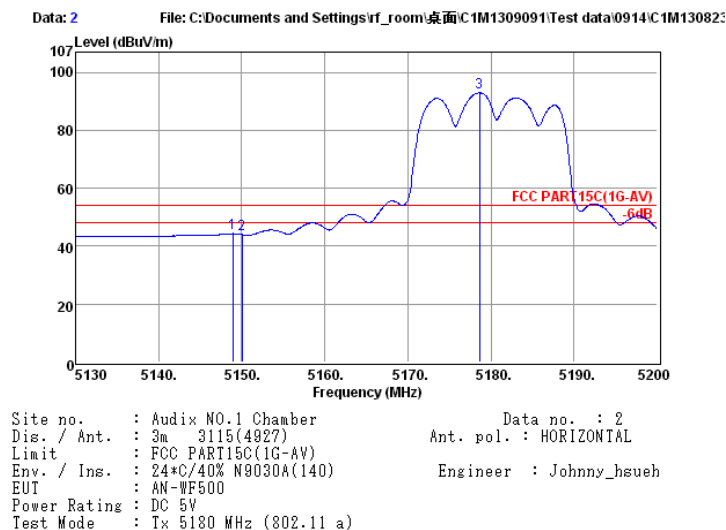
EUT : Wi-Fi/Bluetooth Dongle Humidity : 40%

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



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5148.85	33.64	9.43	13.23	56.35	74.00	17.65	Peak
2	5150.02	33.64	9.43	11.70	54.77	74.00	19.23	Peak
3	5178.85	33.69	9.46	61.51	104.66	74.00	-30.66	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 (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5148.90	33.64	9.43	1.23	44.35	54.00	9.65	Average
2	5150.02	33.64	9.43	0.88	43.95	54.00	10.05	Average
3	5178.85	33.69	9.46	49.78	92.93	54.00	-38.93	Average

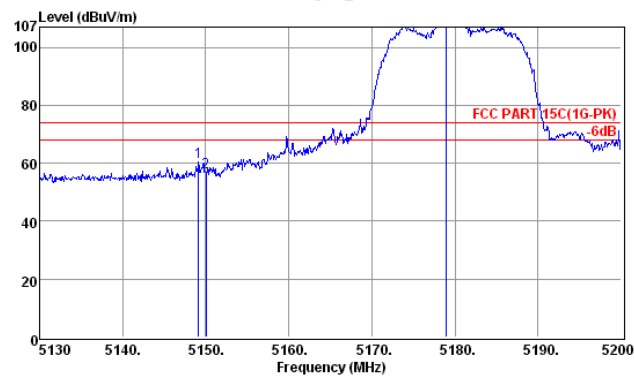
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Oct. 09, 2013 Temperature : 24

EUT : Wi-Fi/Bluetooth Dongle Humidity : 40%

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

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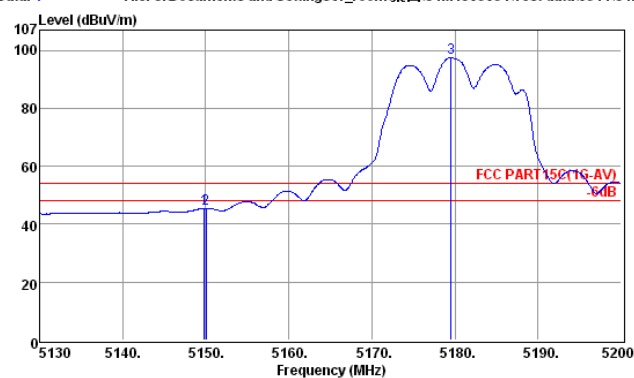


Site no. : Audix NO.1 Chamber Data no. : 3
Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hseuh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5180 MHz (802.11 a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.11	33.64	9.43	17.81	60.38	74.00	13.62	Peak
2	5150.02	33.64	9.43	18.66	58.73	74.00	17.27	Peak
3	5179.00	33.69	9.46	66.22	109.37	74.00	-35.37	Peak

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

Data: 4 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M130823



Site no. : Audix NO.1 Chamber Data no. : 4
Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-AV)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hseuh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5180 MHz (802.11 a)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.81	33.64	9.43	2.44	45.51	54.00	8.4	Average
2	5150.02	33.64	9.43	2.43	45.50	54.00	8.5	Average
3	5179.56	33.69	9.46	54.33	97.54	54.00	-43.54	Average

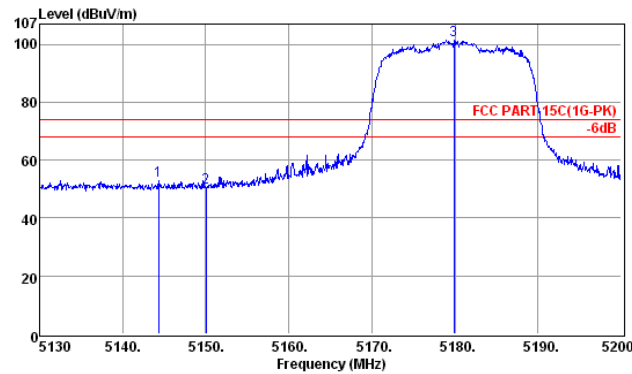
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Oct. 09, 2013 Temperature : 24

EUT : Wi-Fi/Bluetooth Dongle Humidity : 40%

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

Data: 1 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M13082

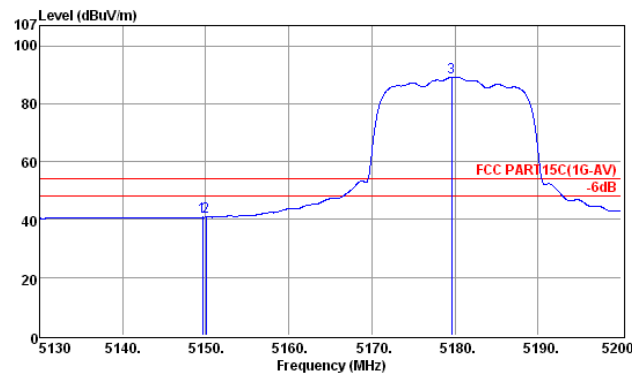


Site no. : Audix NO.1 Chamber Data no. : 1
Dis. / Ant. : 3m 3115(4827) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5180 MHz (802.11 n20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5144.35	33.84	9.43	9.91	52.98	74.00	21.02	Peak
2	5150.02	33.84	9.43	7.47	50.54	74.00	23.46	Peak
3	5179.91	33.89	9.46	58.27	101.42	74.00	-27.42	Peak

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

Data: 2 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M13082



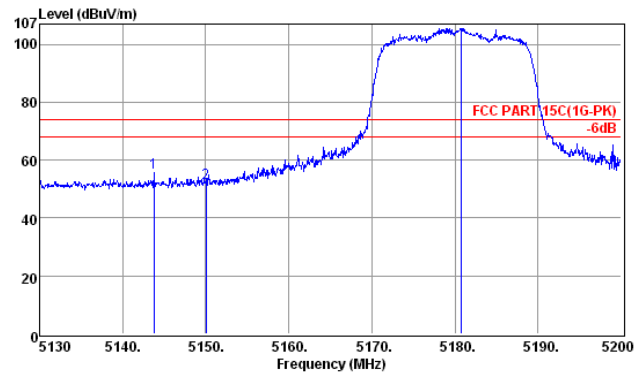
Site no. : Audix NO.1 Chamber Data no. : 2
Dis. / Ant. : 3m 3115(4827) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C(1G-AV)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5180 MHz (802.11 n20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.80	33.84	9.43	-2.23	40.79	54.00	13.21	Average
2	5150.02	33.84	9.43	-2.25	40.82	54.00	13.18	Average
3	5179.83	33.89	9.46	48.06	89.21	54.00	-35.21	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 : Oct. 09, 2013 Temperature : 24
EUT : Wi-Fi/Bluetooth Dongle Humidity : 40%
Test Mode : NII 802.11n-HT20 (5.2GHz), Transmit, Channel: 36, Frequency: 5180MHz

Data: 3 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M13082

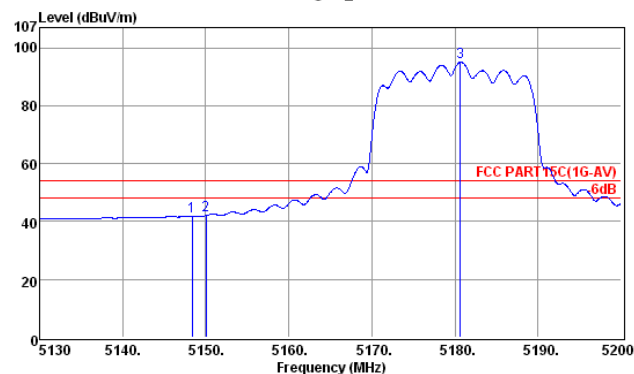


Site no. : Audix NO.1 Chamber Data no. : 3
Dis. / Ant. : 3m 3115(4827) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5180 MHz (802.11 n20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.79	33.84	9.43	12.47	55.54	74.00	18.46	Peak
2	5150.02	33.84	9.43	9.19	52.28	74.00	21.72	Peak
3	5180.75	33.89	9.46	62.38	105.53	74.00	-31.51	Peak

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

Data: 4 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M13082



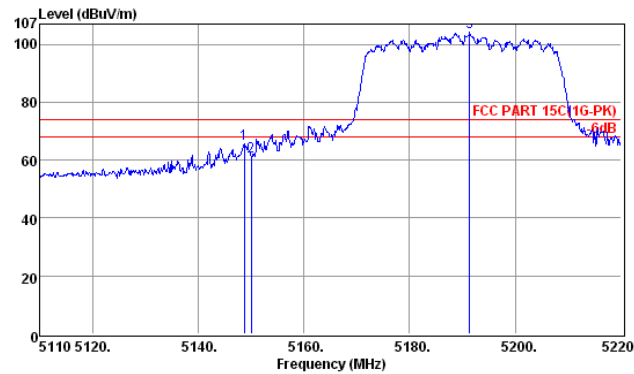
Site no. : Audix NO.1 Chamber Data no. : 4
Dis. / Ant. : 3m 3115(4827) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-AV)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5180 MHz (802.11 n20)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.34	33.84	9.43	-1.11	41.98	54.00	12.02	Average
2	5150.02	33.84	9.43	-1.02	42.05	54.00	11.95	Average
3	5180.88	33.89	9.46	51.35	95.10	54.00	-41.10	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 : Oct. 09, 2013 Temperature : 24
EUT : Wi-Fi/Bluetooth Dongle Humidity : 40%
Test Mode : NII 802.11n-HT40 (5.2GHz), Transmit, Channel: 38, Frequency: 5190MHz

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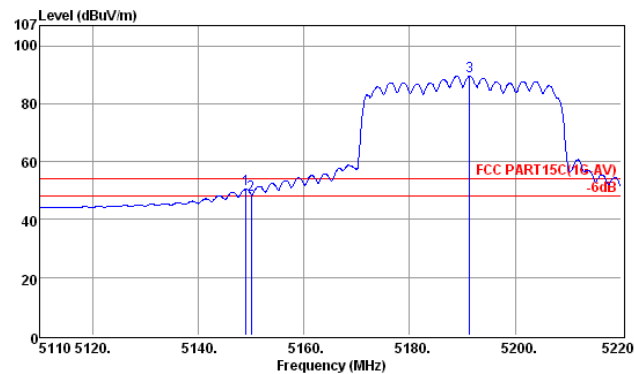


Site no. : Audix NO.1 Chamber Data no. : 1
Dis. / Ant. : 3m 3115(4827) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5190MHz (802.11 n40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5148.72	33.84	9.43	22.48	65.53	74.00	8.47	Peak
2	5150.04	33.84	9.43	18.28	61.35	74.00	12.65	Peak
3	5191.40	33.72	9.48	60.82	104.02	74.00	-30.02	Peak

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

Data: 2 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M13082



Site no. : Audix NO.1 Chamber Data no. : 2
Dis. / Ant. : 3m 3115(4827) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C(1G-AV)
Env. / Ins. : 24°C/40% N9030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5190MHz (802.11 n40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.05	33.84	9.43	7.38	50.45	54.00	3.5	Average
2	5150.04	33.84	9.43	5.58	48.85	54.00	5.3	Average
3	5191.40	33.72	9.48	48.29	89.49	54.00	-35.4	Average

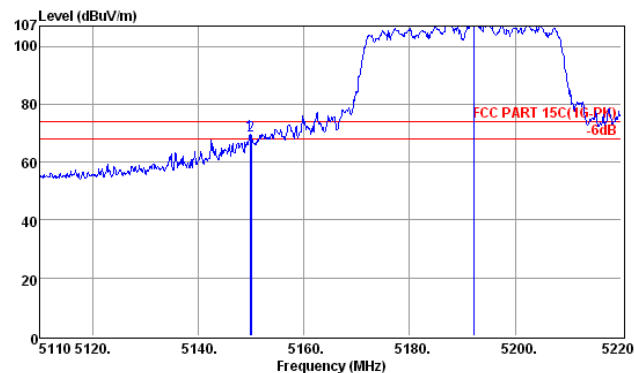
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Oct. 09, 2013 Temperature : 24

EUT : Wi-Fi/Bluetooth Dongle Humidity : 40%

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

Data: 3 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M13082

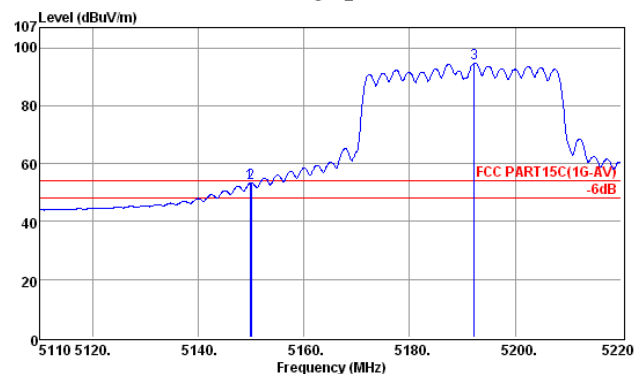


Site no. : Audix NO.1 Chamber Data no. : 3
Dis. / Ant. : 3m 3115(4827) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-PK)
Env. / Ins. : 24°C/40% N8030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5190MHz (802.11 n40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.82	33.84	9.43	28.71	69.78	74.00	4.2	Peak
2	5150.04	33.84	9.43	28.00	69.07	74.00	4.9	Peak
3	5192.17	33.72	9.48	65.40	108.60	74.00	-34.8	Peak

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

Data: 4 File: C:\Documents and Settings\rf_room\桌面\1M1309091\Test data\0914\1M13082



Site no. : Audix NO.1 Chamber Data no. : 4
Dis. / Ant. : 3m 3115(4827) Ant. pol. : VERTICAL
Limit : FCC PART 15C(1G-AV)
Env. / Ins. : 24°C/40% N8030A(140) Engineer : Johnny_hsueh
EUT : AN-WF500
Power Rating : DC 5V
Test Mode : Tx 5190MHz (802.11 n40)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	5149.82	33.84	9.43	10.18	53.25	54.00	0.7	Average
2	5150.04	33.84	9.43	10.28	53.35	54.00	0.6	Average
3	5192.28	33.72	9.48	51.52	94.72	54.00	-40.7	Average

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

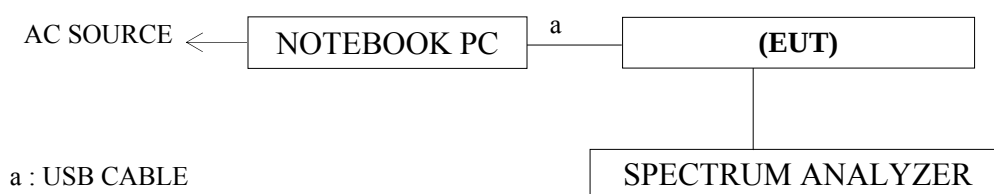
4. 26dB BANDWIDTH MEASUREMENT

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	Jul. 30, 13'	Jul. 29, 14'

4.2. Block Diagram of Test Setup



EUT: Wi-Fi/Bluetooth Dongle

4.3. Operating Condition of EUT

The test program “M Tool” 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 v01r03

The measurement guideline was according to RSS-Gen.

4.5. Test Results

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

Test Date : Sep. 12, 2013 Temperature : 27 Humidity : 55%

Mode	Type of Network	Channel	Frequency	26dB Bandwidth
1	802.11a (UNII Band I)	CH 36	5180MHz	18.90 MHz
2		CH 40	5200MHz	18.70 MHz
3		CH 48	5240MHz	18.95 MHz
4	802.11n-HT20 (UNII Band I)	CH 36	5180MHz	19.20 MHz
5		CH 40	5200MHz	19.10 MHz
6		CH 48	5240MHz	18.95 MHz
7	802.11n-HT40 (UNII Band I)	CH 38	5190MHz	40.08 MHz
8		CH 46	5230MHz	40.16 MHz

Agilent Spectrum Analyzer - Swept SA

Marker 1 Δ 18.900000000 MHz

Ref Offset 4 dB
Ref 20.00 dBm

10 dB/div
Log

Center 5.18000 GHz
#Res 180 kHz
VBW 560 kHz

Span 50.00 MHz
Sweep 1.53 ms (1001 pts)

Marker 1 Δ 18.90 MHz
1.565 dB

Marker 2 $\times$ 2

Marker 3 $\blacklozenge$ 18.2

Marker 4 $\times$ 2

Marker 5 $\times$ 2

Marker 6 $\times$ 2

Marker 7 $\times$ 2

Marker 8 $\times$ 2

Marker 9 $\times$ 2

Marker 10 $\times$ 2

Marker 11 $\times$ 2

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Marker 207 $\times$ 2

Marker 208 $\times$ 2

Marker 209 $\times$ 2

Marker 210 $\times$ 2

Marker 211 $\times$ 2

Marker 212 $\times$ 2

Marker 213 $\times$ 2

Agilent Spectrum Analyzer - Swept SA

Marker 1 Δ 18.70000000 MHz

PNO: Fast IFGain: Low Trig: Free Run Atten: 26 dB

Avg Type: Log-Pwr AvgHold: >100/100

09:52:58 PM Sep 12, 2013

TRACE 1 2 3 4 5 6
TYPE [M] W W W W W W W W
DET [P] P P N N N N

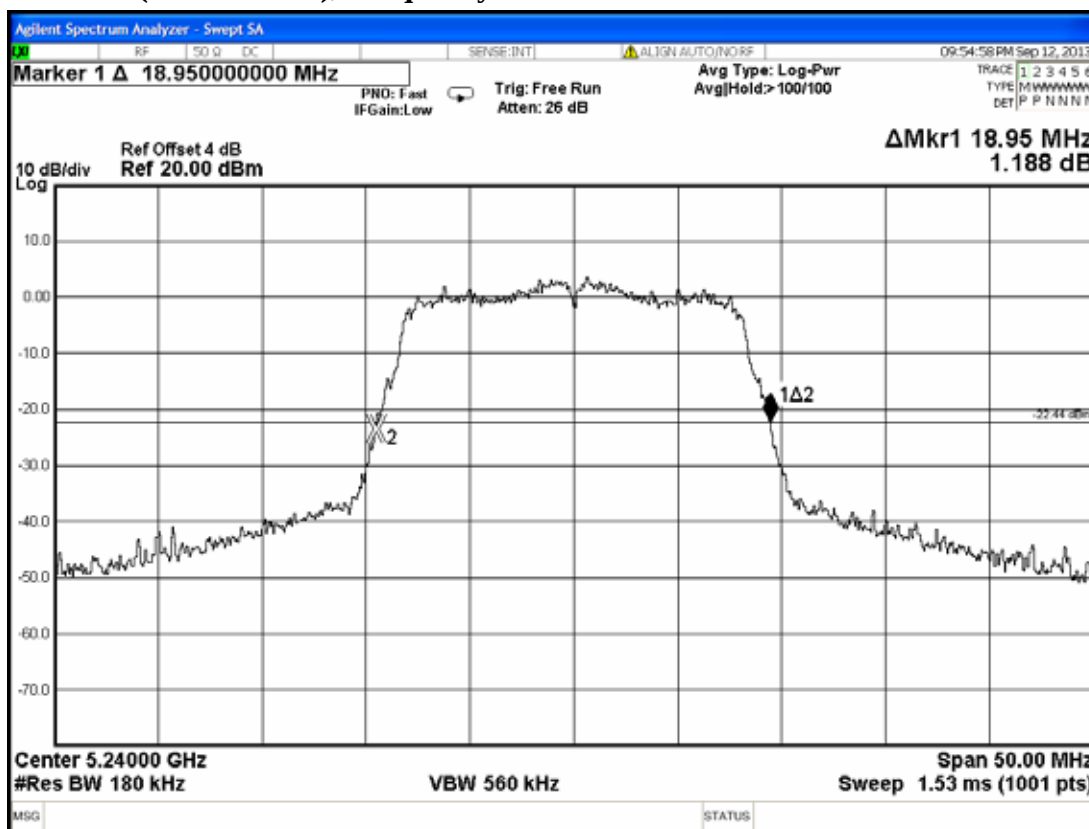
Ref Offset 4 dB
Ref 20.00 dBm

Δ Mkr1 18.70 MHz
0.823 dB

10 dB/div
Log

Center 5.2000 GHz
#Res BW 180 kHz
VBW 560 kHz
Span 50.00 MHz
Sweep 1.53 ms (1001 pts)

802.11a (UNII Band I), Frequency: 5240MHz



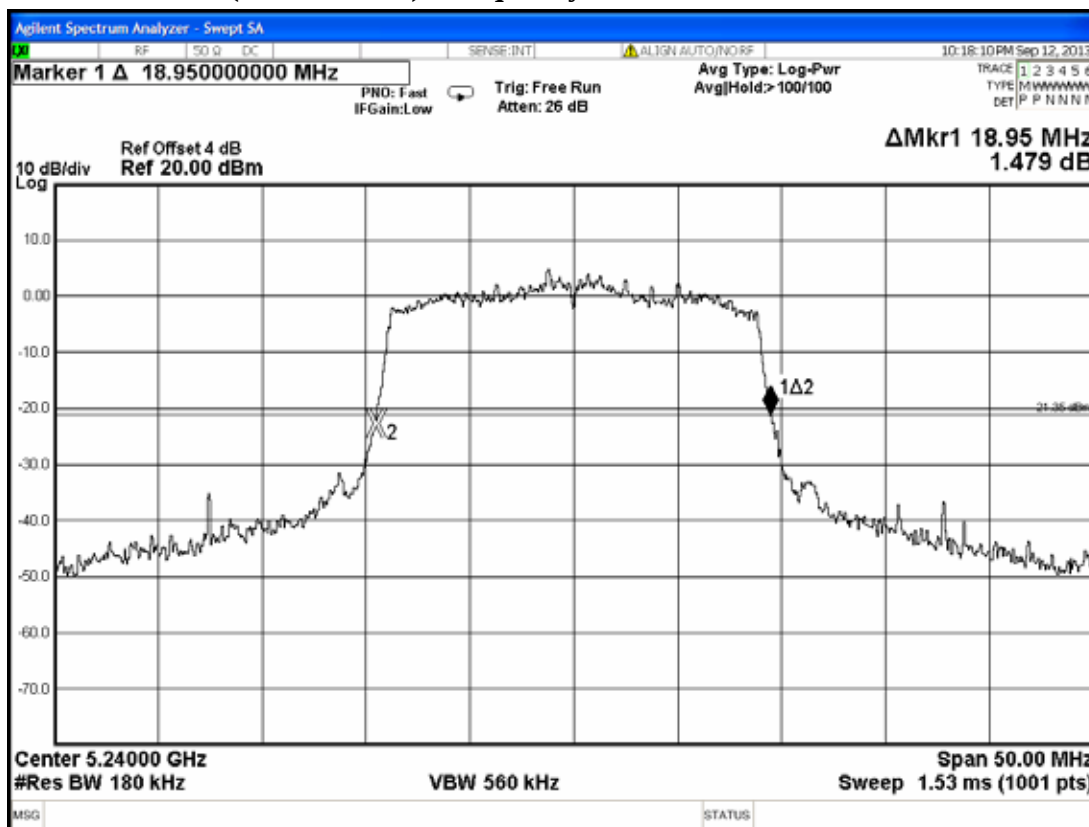
802.11n-HT20 (UNII Band I), Frequency: 5180MHz



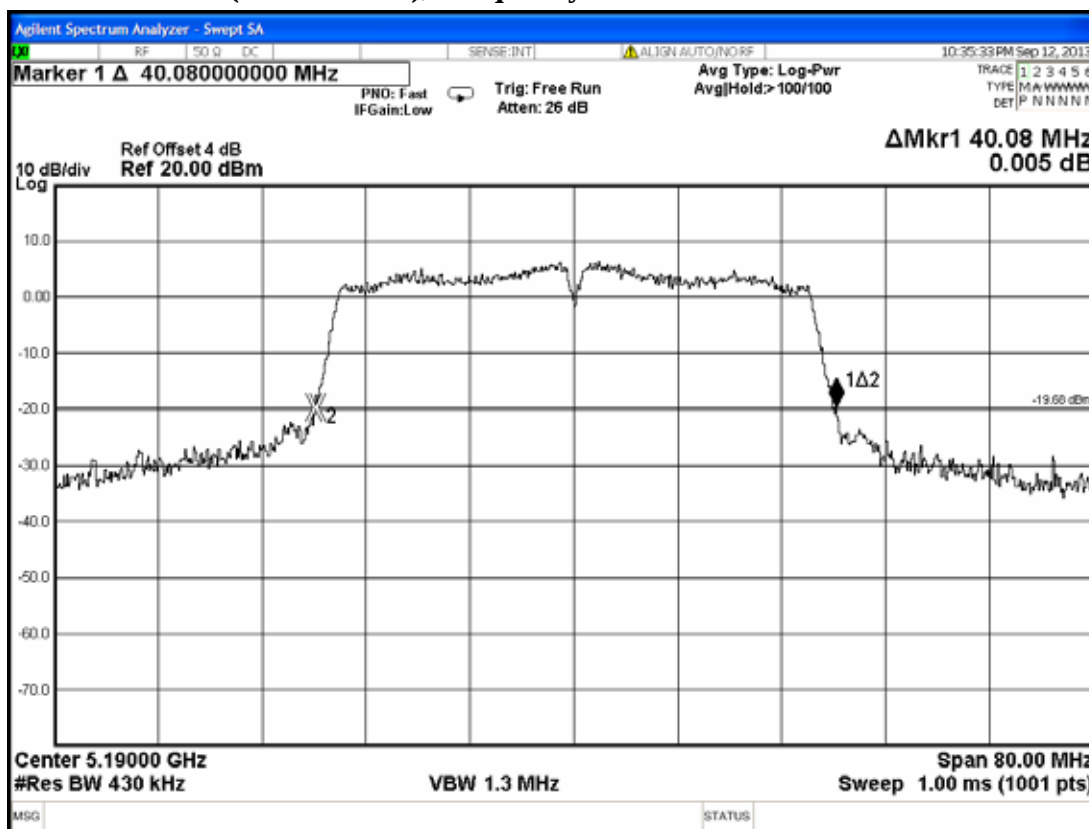
802.11n-HT20 (UNII Band I), Frequency: 5200MHz



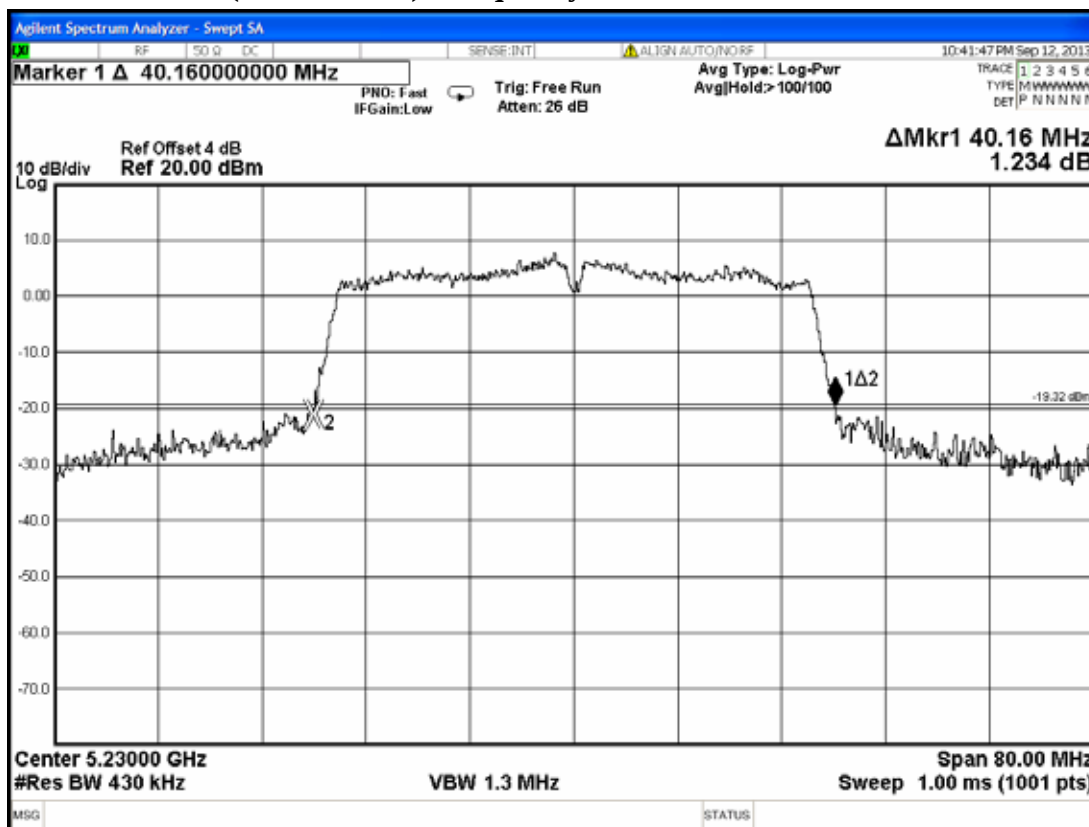
802.11n-HT20 (UNII Band I), Frequency: 5240MHz



802.11n-HT40 (UNII Band I), Frequency: 5190MHz



802.11n-HT40 (UNII Band I), Frequency: 5230MHz



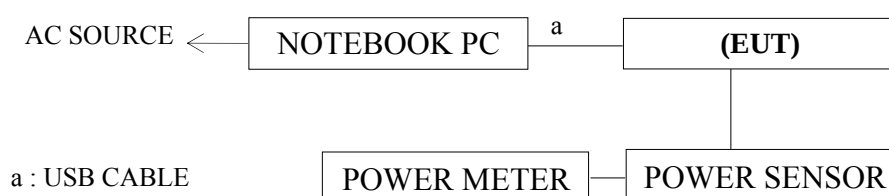
5. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

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	ML2495A	1145008	Oct. 30, 12'	Oct. 29, 13'
2.	Power Sensor	Anritsu	MA2411B	1126096	Oct. 30, 12'	Oct. 29, 13'

5.2. Block Diagram of Test Setup



EUT: Wi-Fi/Bluetooth Dongle

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)	16.78dBm

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)	16.83dBm

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)	20.04dBm

Remark: B= 26dB Bandwidth

5.4. Operating Condition of EUT

The test program “M Tool” 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 v01r03

The measurement guideline was according to RSS-Gen.

5.6. Test Results

PASSED. All the test results are listed below.

Test Date : Sep. 13, 2013 Temperature : 26 Humidity : 52%

Mode	Type of Network	Channel	Frequency	Maximum Output Power (dBm)		Total Maximum Output Power (dBm)	Power Setting
				Ant.0	Ant.1		
1	802.11a (UNII Band I)	CH 36	5180MHz	9.13	9.75	12.46	37
2		CH 40	5200MHz	9.39	9.72	12.57	38
3		CH 48	5240MHz	9.42	10.03	12.75	39
4	802.11n-HT20 (UNII Band I)	CH 36	5180MHz	8.83	9.32	12.09	37
5		CH 40	5200MHz	9.22	9.46	12.35	38
6		CH 48	5240MHz	9.30	9.85	12.59	39
7	802.11n-HT40 (UNII Band I)	CH 38	5190MHz	11.87	11.44	14.67	48
8		CH 46	5230MHz	12.70	12.41	15.57	51

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	Jul. 30, 13'	Jul. 29, 14'

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 “M Tool” 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 v01r03

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

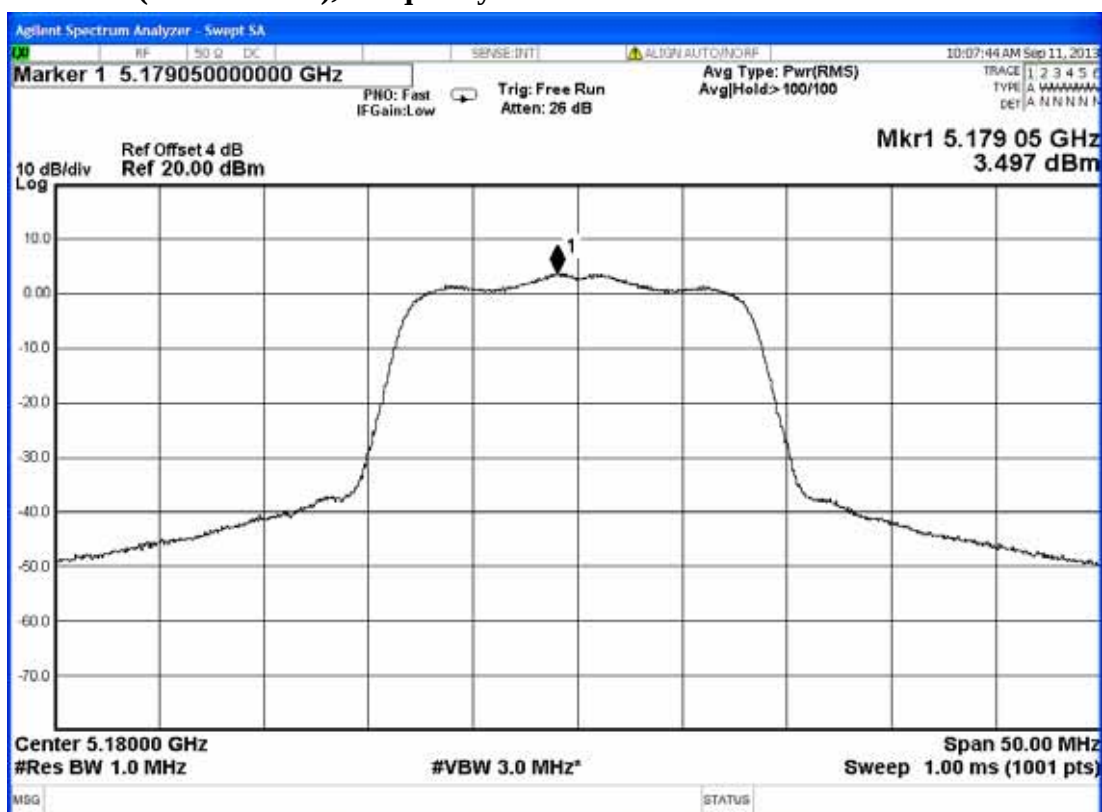
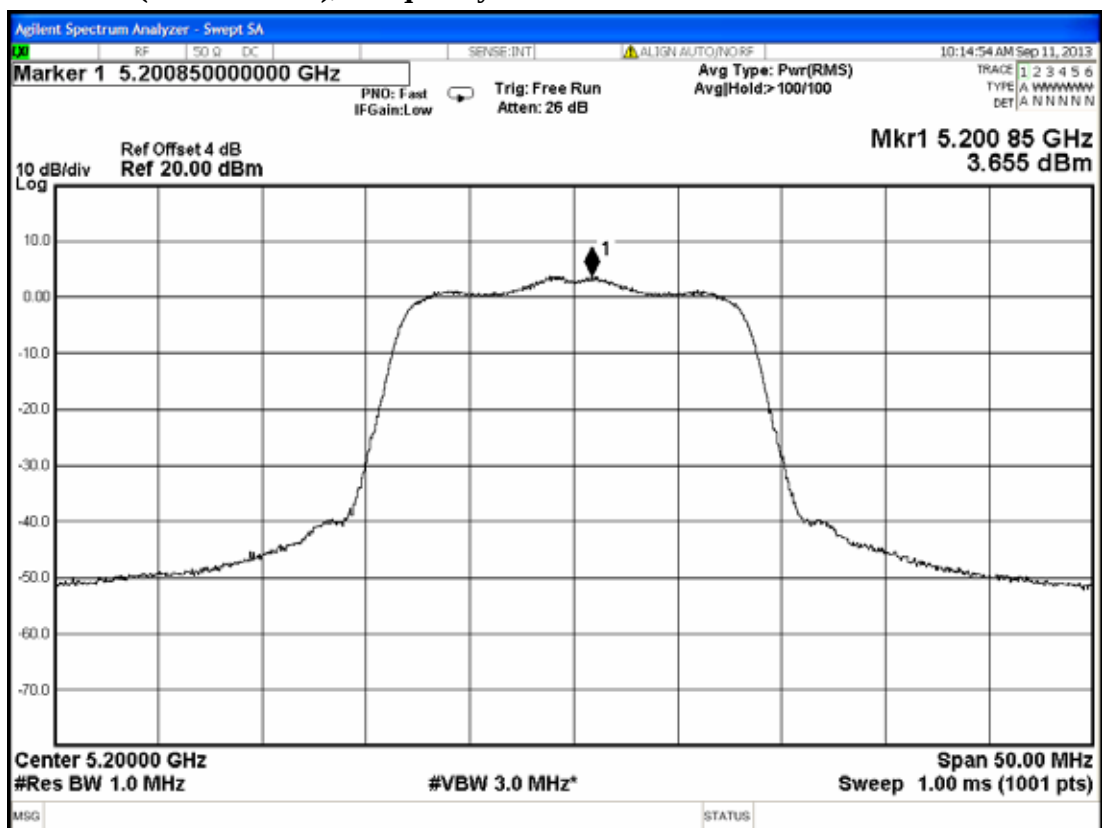
PASSED. All the test results are attached in next pages.

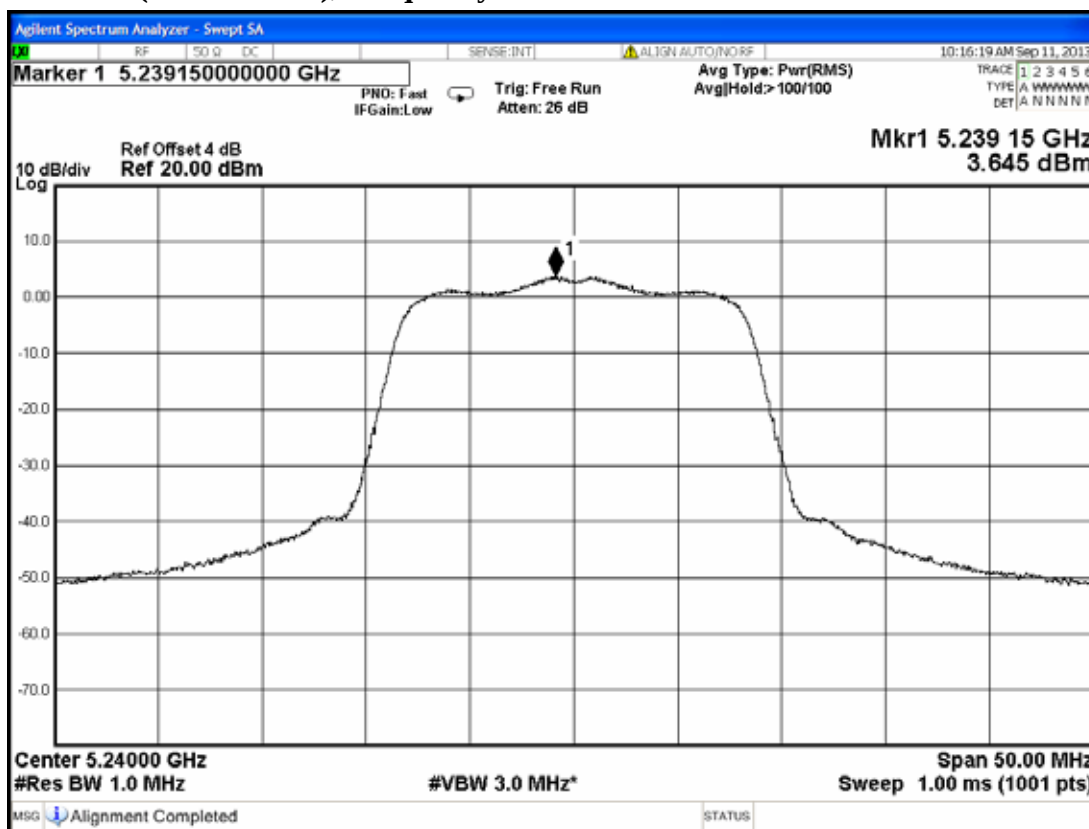
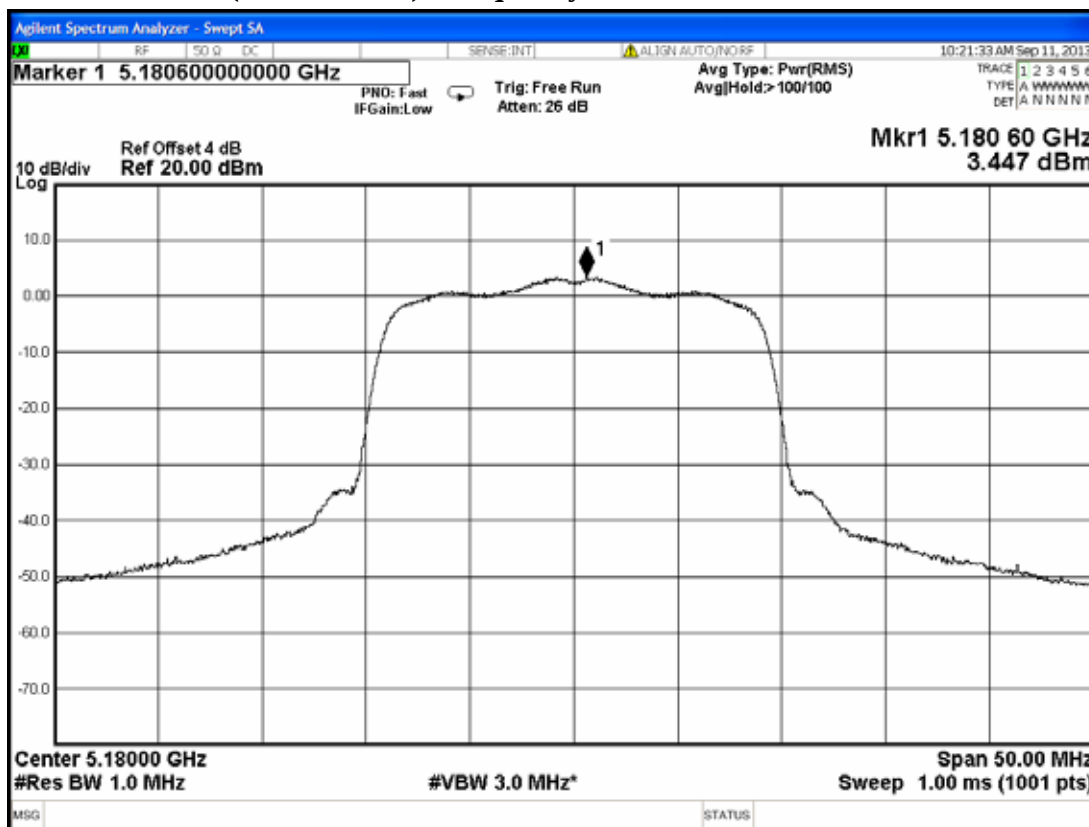
Pursuant to KDB 662911, the test result has been included 3 dB is calculated from $10\log(N)$, where N is the number of outputs.

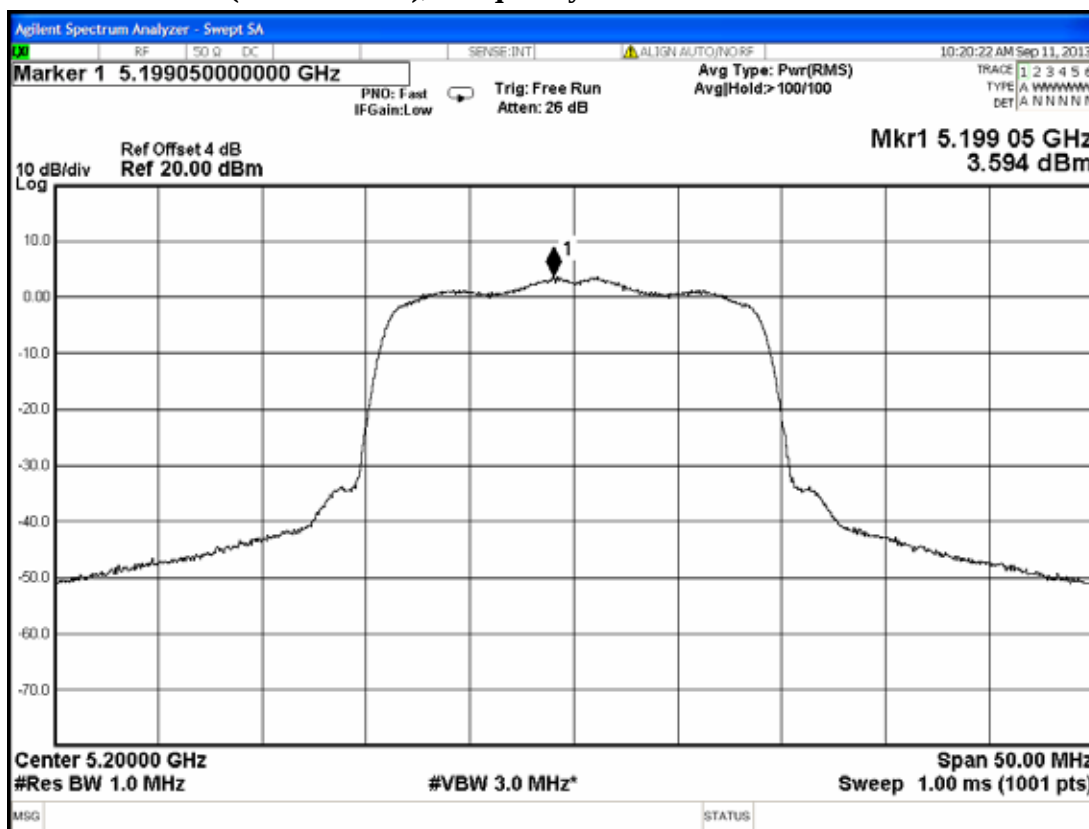
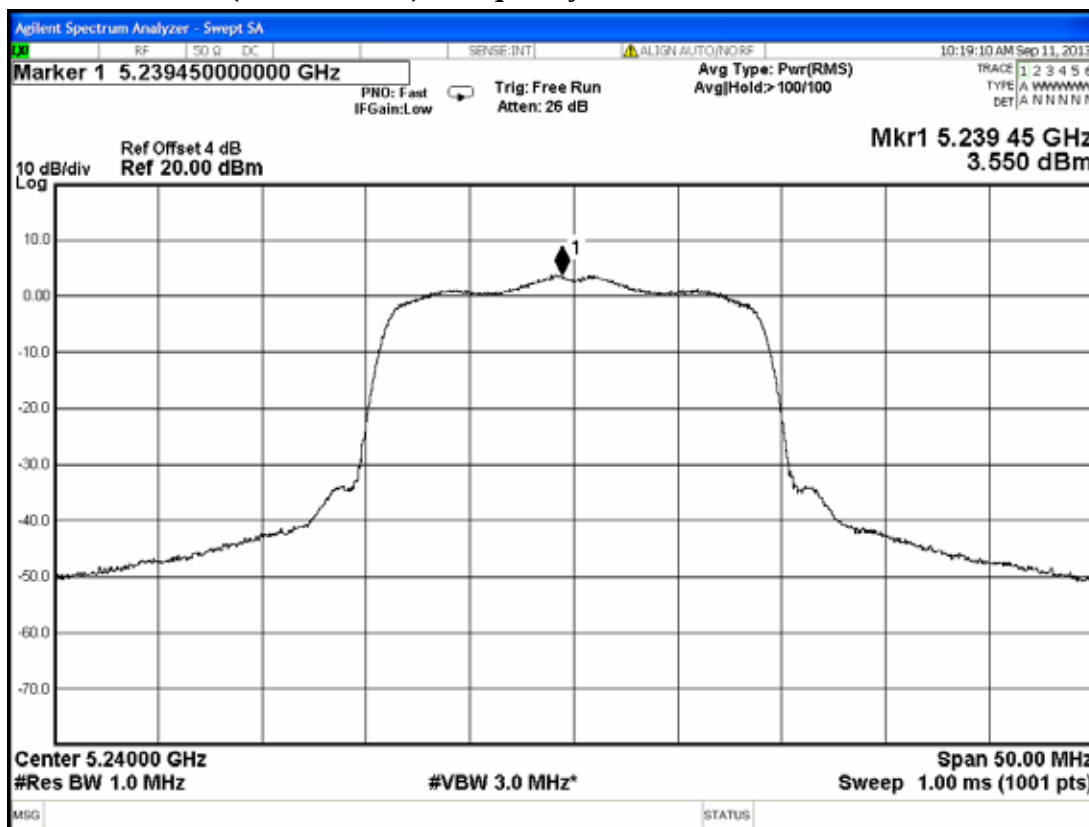
Test Date : Sep. 11, 2013 Temperature : 26 Humidity : 50%

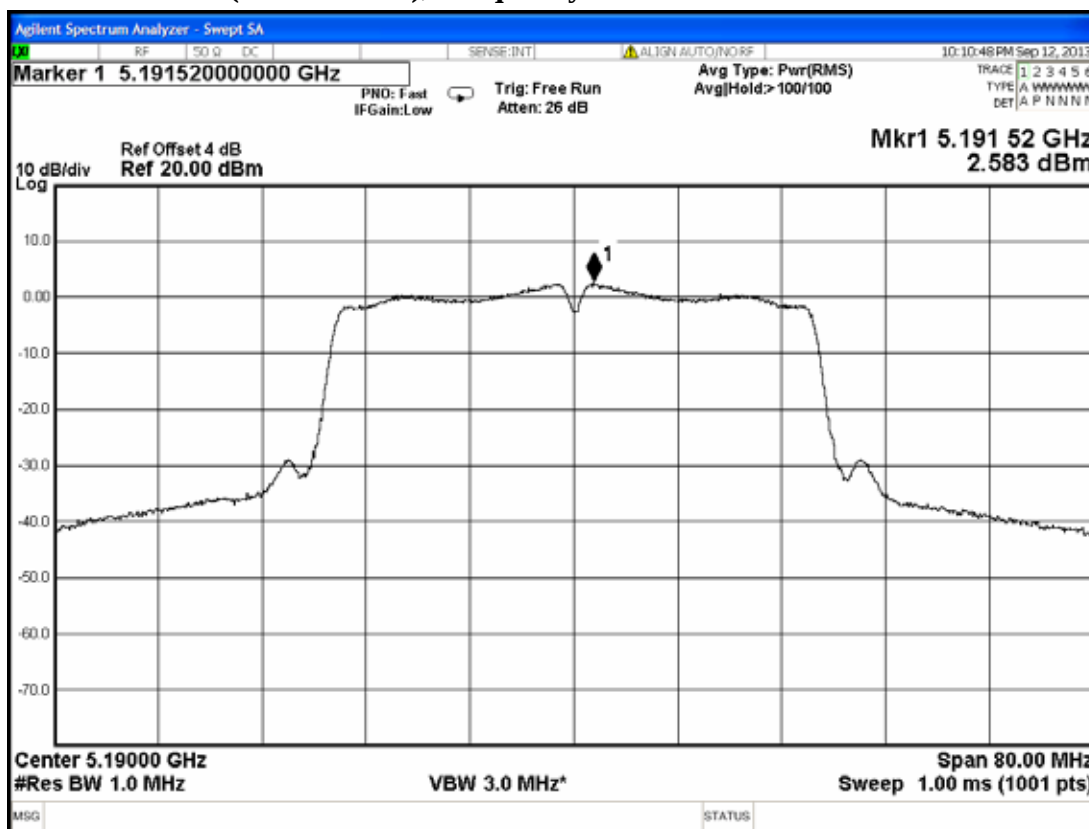
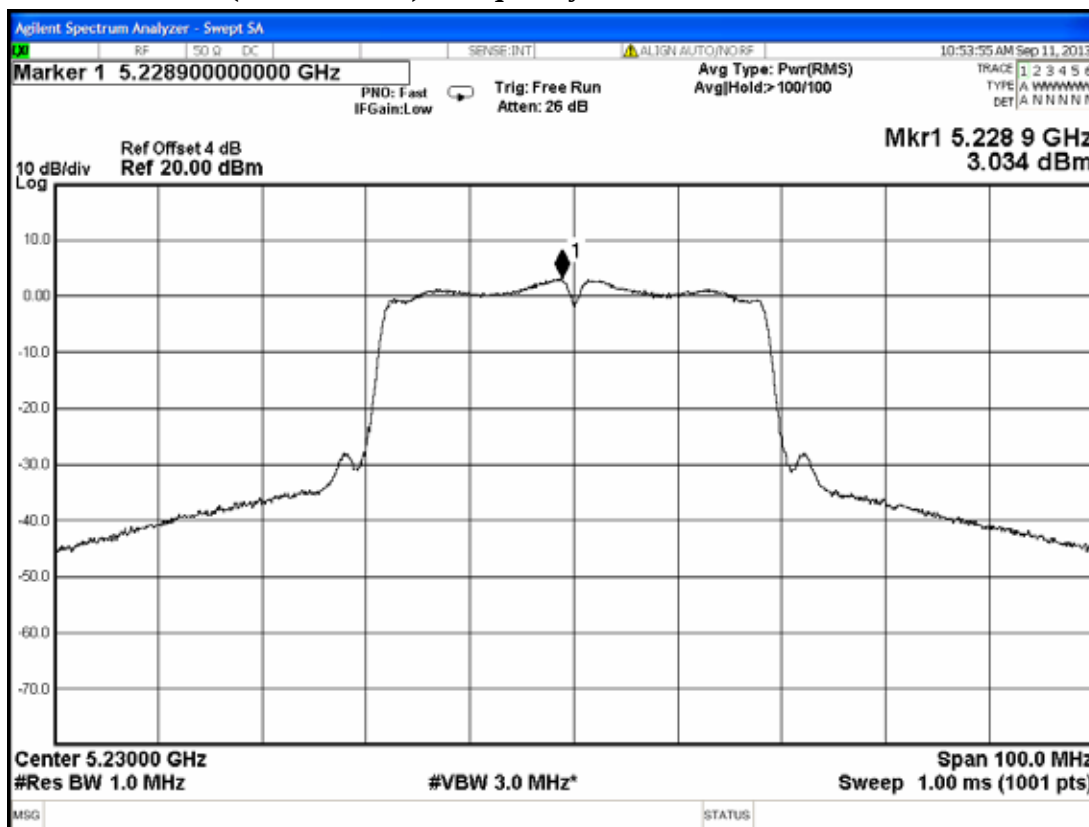
Mode	Type of Network	Channel	Frequency	Power Spectral Density (dBm)
1	802.11a (UNII Band I)	CH 36	5180MHz	3.497
2		CH 40	5200MHz	3.655
3		CH 48	5240MHz	3.645
4	802.11n-HT20 (UNII Band I)	CH 36	5180MHz	3.447
5		CH 40	5200MHz	3.594
6		CH 48	5240MHz	3.550
7	802.11n-HT40 (UNII Band I)	CH 38	5190MHz	2.583
8		CH 46	5230MHz	3.034

[Limit: 4dBm]

802.11a (UNII Band I), Frequency: 5180MHz**802.11a (UNII Band I), Frequency: 5200MHz**

802.11a (UNII Band I), Frequency: 5240MHz**802.11n-HT20 (UNII Band I), Frequency: 5180MHz**

802.11n-HT20 (UNII Band I), Frequency: 5200MHz**802.11n-HT20 (UNII Band I), Frequency: 5240MHz**

802.11n-HT40 (UNII Band I), Frequency: 5190MHz**802.11n-HT40 (UNII Band I), 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	Jul. 30, 13'	Jul. 29, 14'

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 “M Tool” 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 v01r03

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

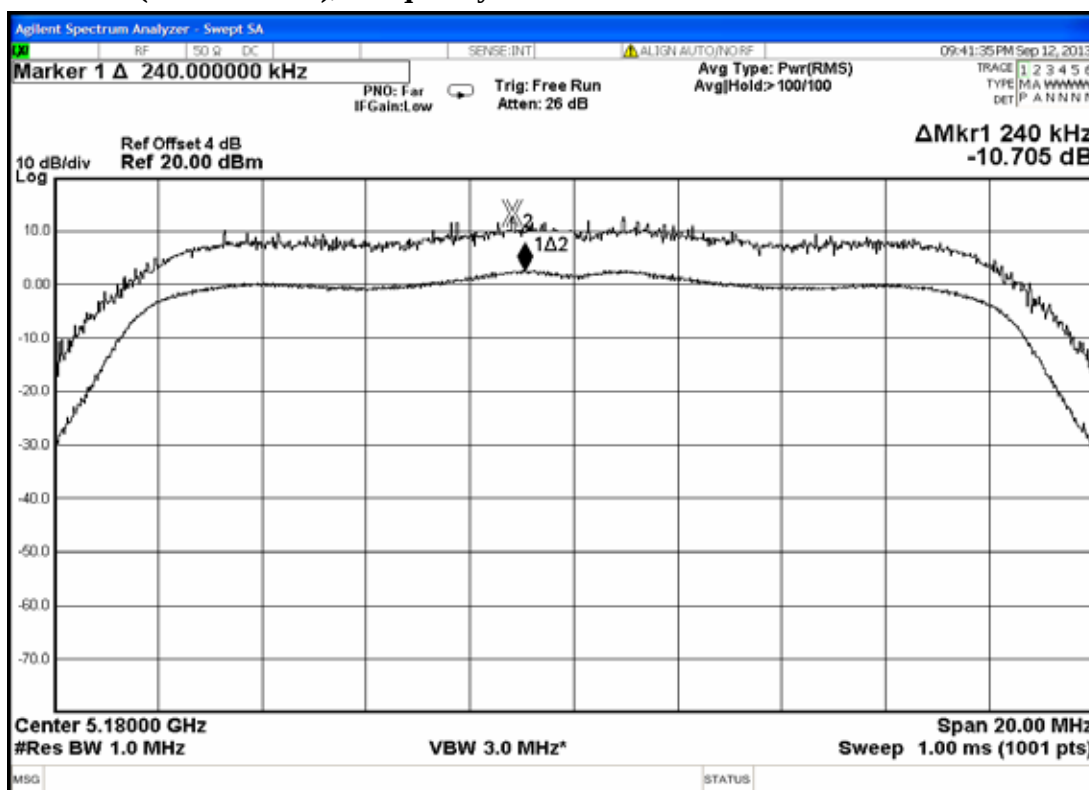
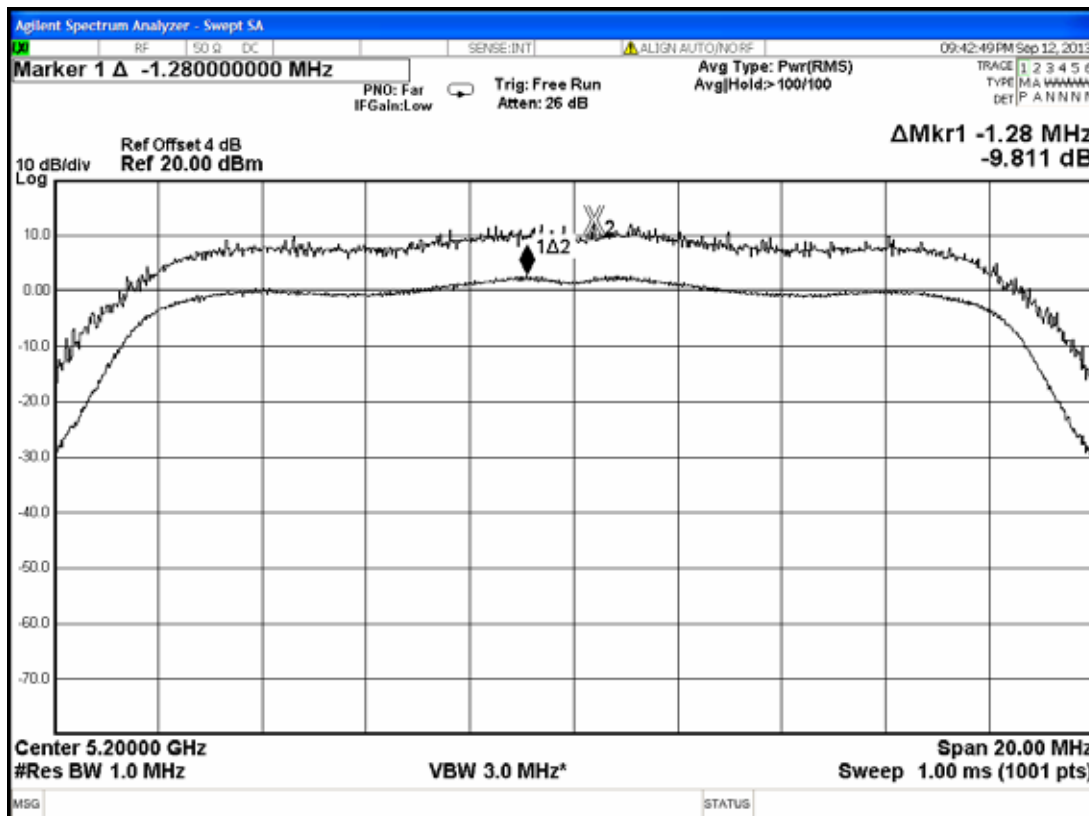
PASSED. All the test results are attached in next pages.

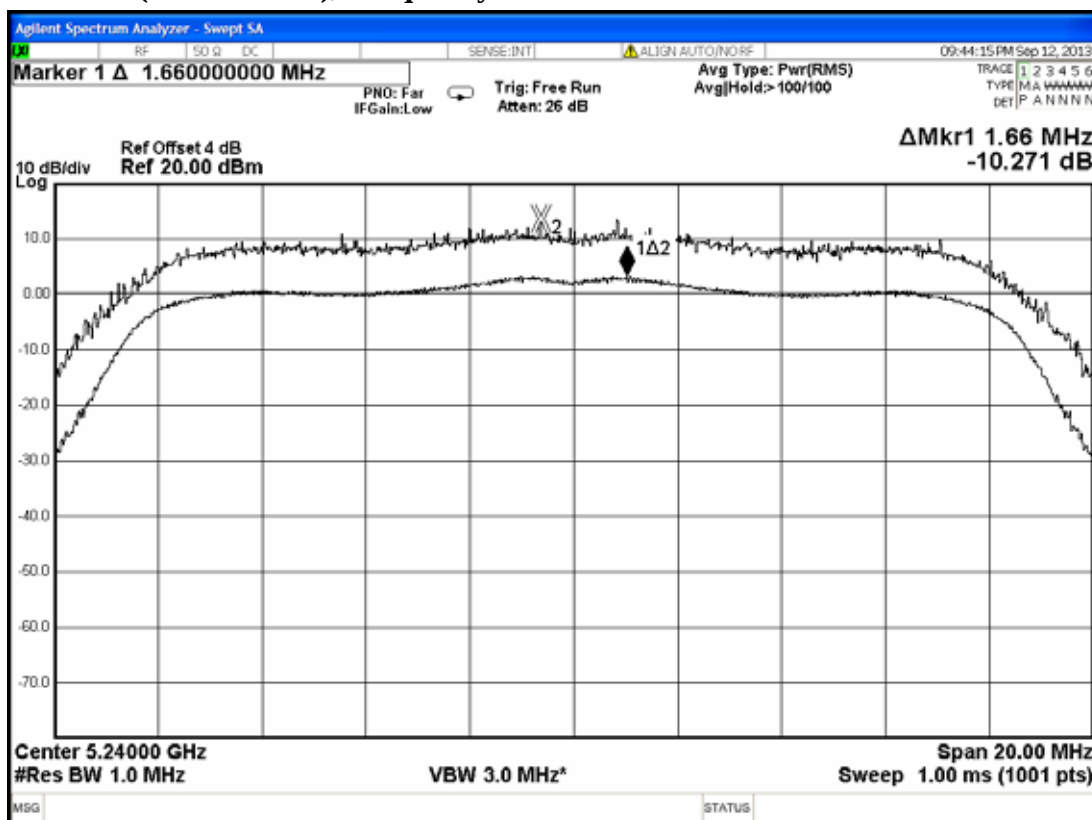
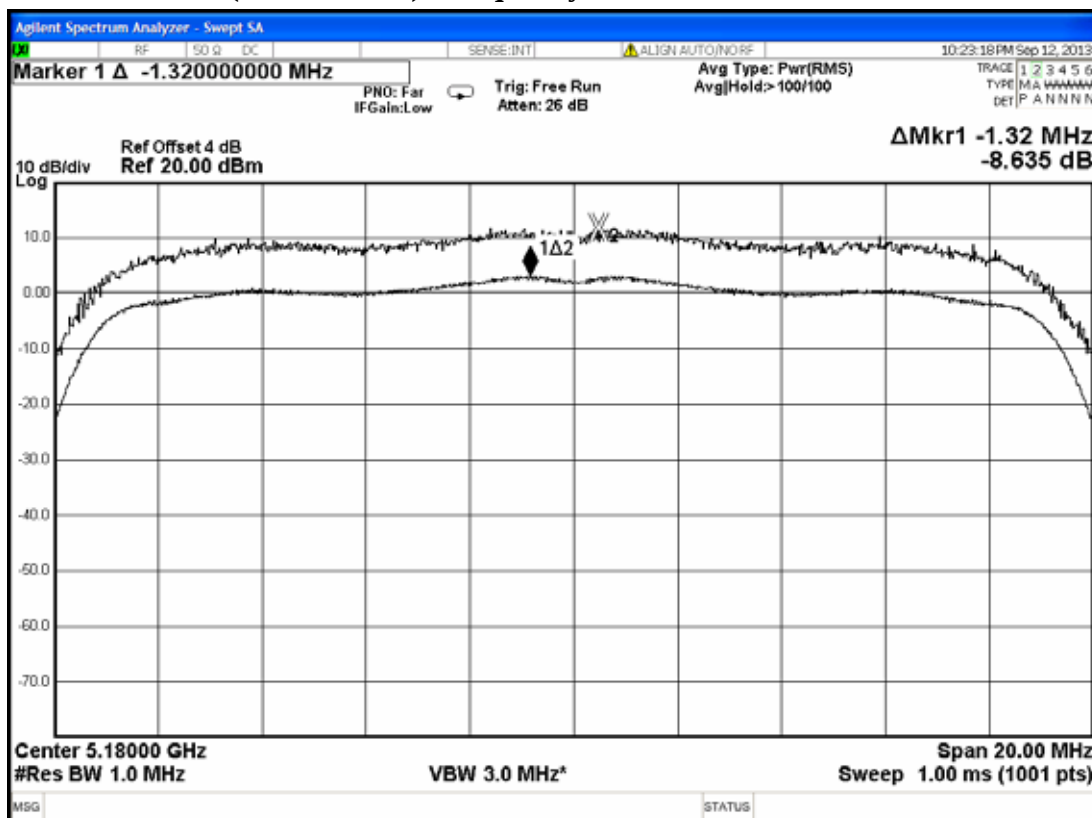
Pursuant to KDB 662911, the test result has been included 3 dB is calculated from $10\log(N)$, where N is the number of outputs.

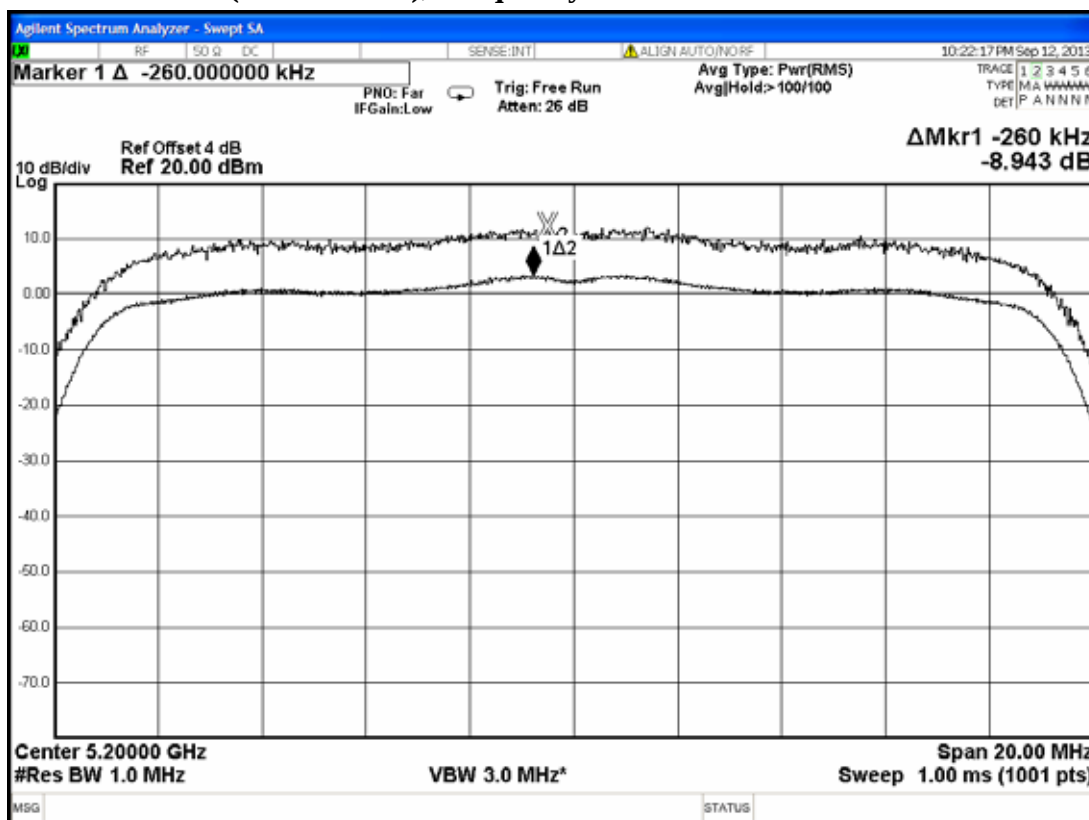
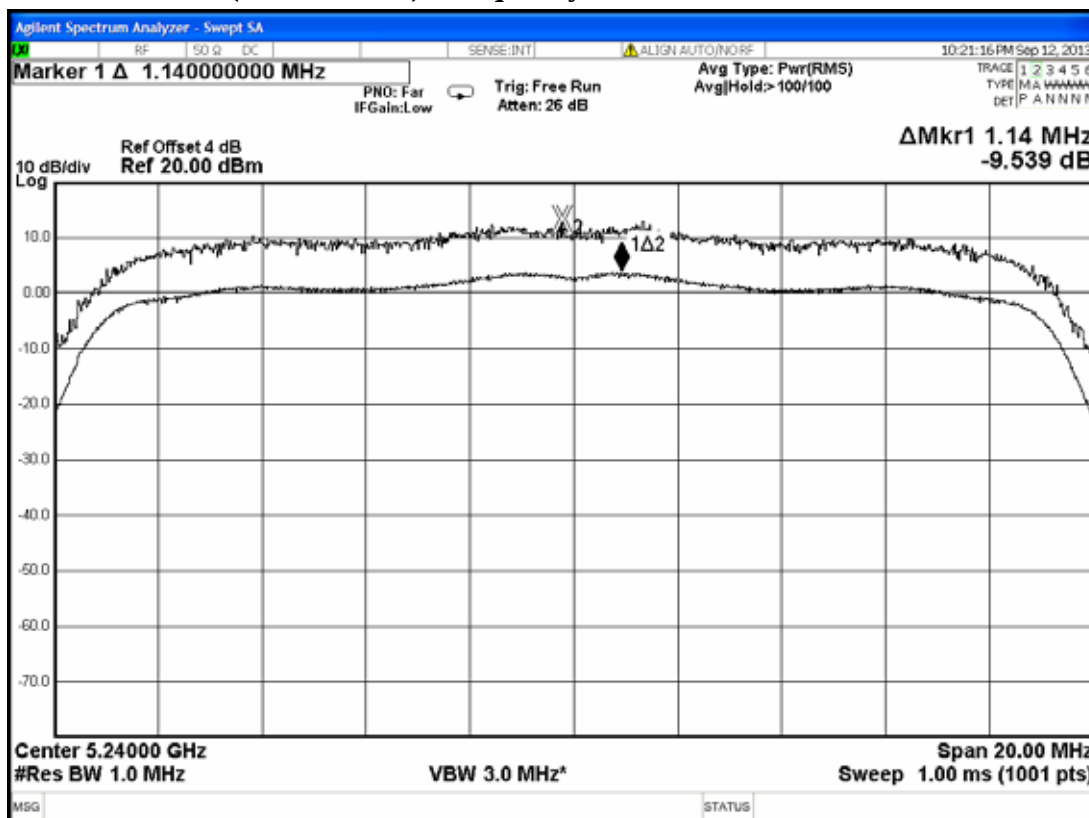
Test Date : Sep. 12, 2013 Temperature : 27 Humidity : 55%

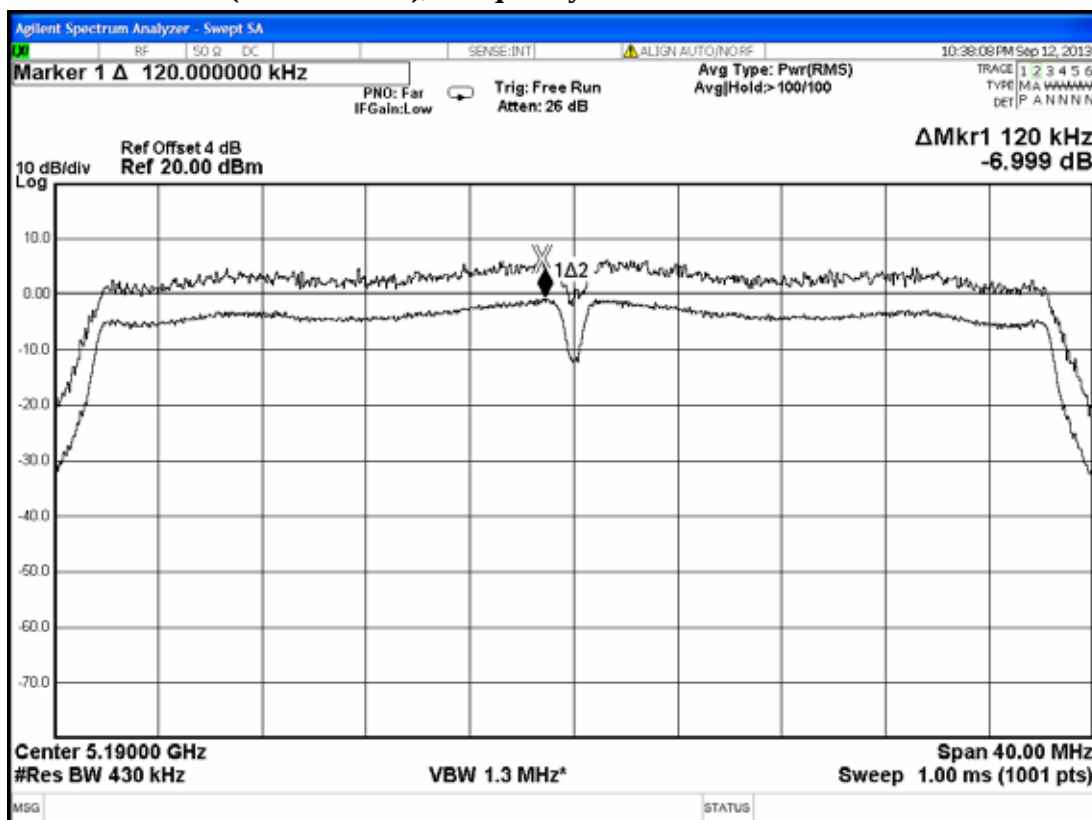
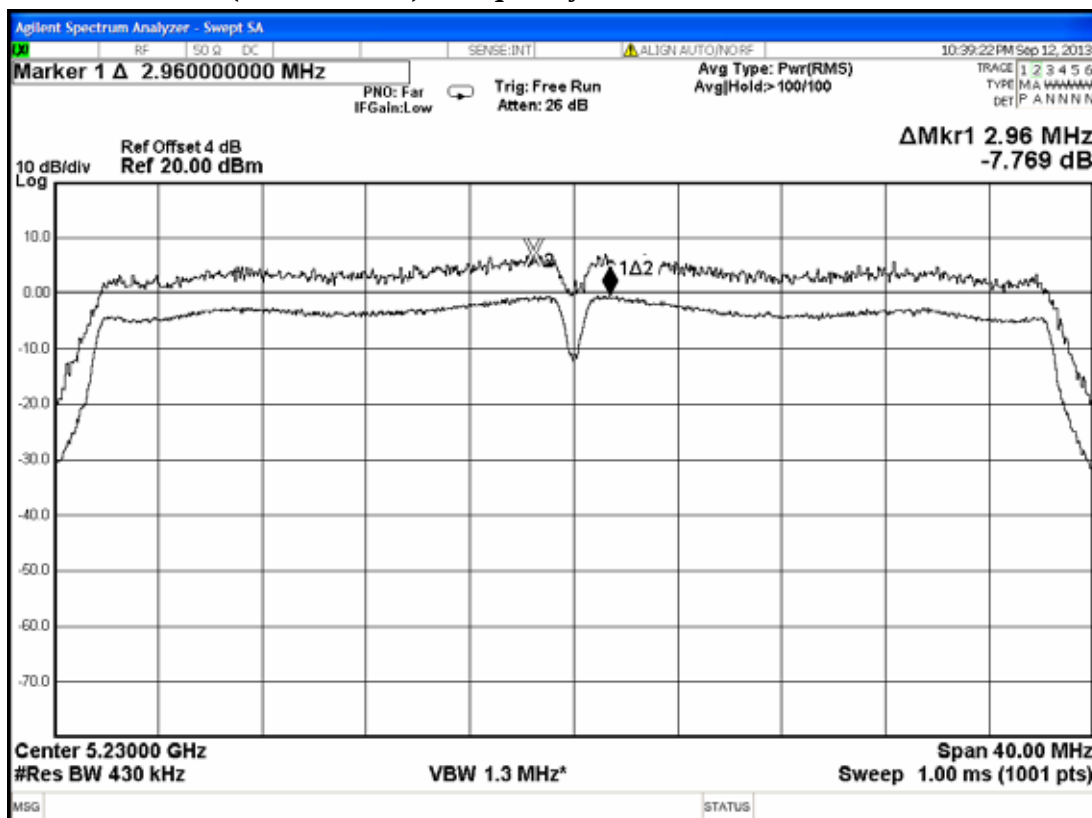
Mode	Type of Network	Channel	Frequency	Peak Power Excursion (dB)
1	802.11a (UNII Band I)	CH 36	5180MHz	-10.705
2		CH 40	5200MHz	-9.811
3		CH 48	5240MHz	-10.271
4	802.11n-HT20 (UNII Band I)	CH 36	5180MHz	-8.635
5		CH 40	5200MHz	-8.943
6		CH 48	5240MHz	-9.539
7	802.11n-HT40 (UNII Band I)	CH 38	5190MHz	-6.999
8		CH 46	5230MHz	-7.769

[Limit: 13dBm]

802.11a (UNII Band I), Frequency: 5180MHz**802.11a (UNII Band I), Frequency: 5200MHz**

802.11a (UNII Band I), Frequency: 5240MHz**802.11n-HT20 (UNII Band I), Frequency: 5180MHz**

802.11n-HT20 (UNII Band I), Frequency: 5200MHz**802.11n-HT20 (UNII Band I), Frequency: 5240MHz**

802.11n-HT40 (UNII Band I), Frequency: 5190MHz**802.11n-HT40 (UNII Band I), 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	Jul. 30, 13'	Jul. 29, 14'

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 “M Tool” was used to enable the EUT to transmit data at different channel frequency individually.

8.5. Test Procedure

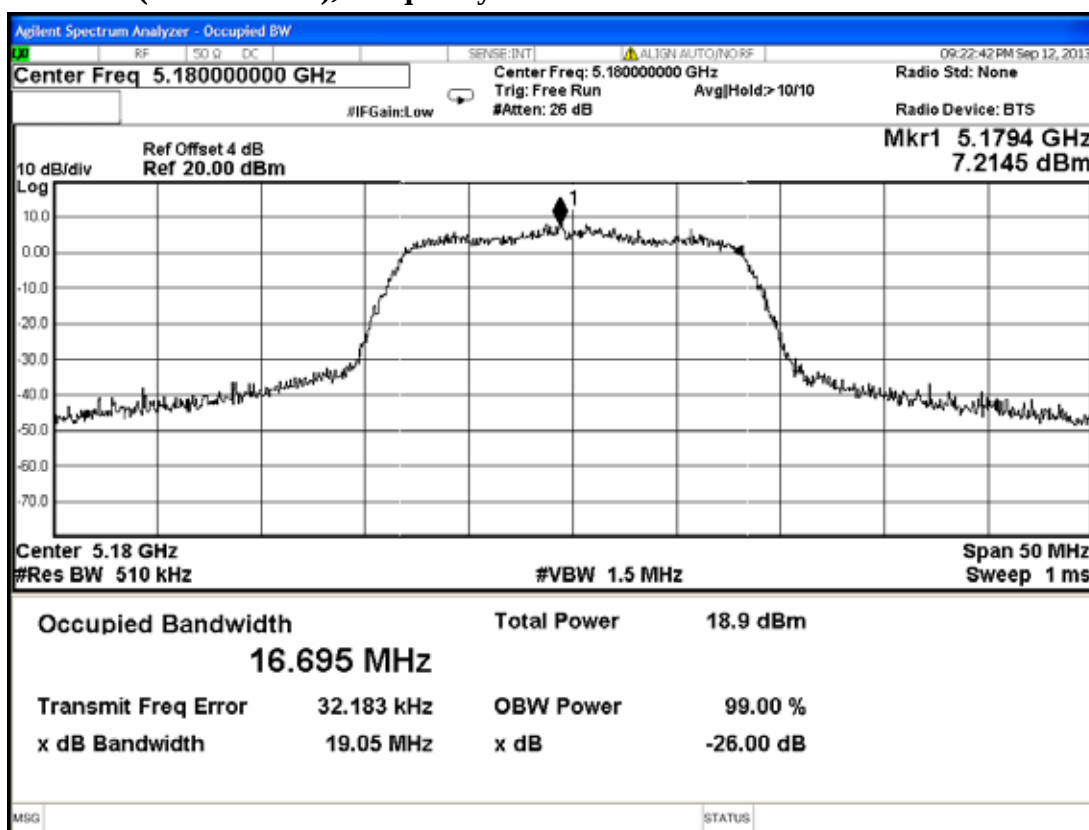
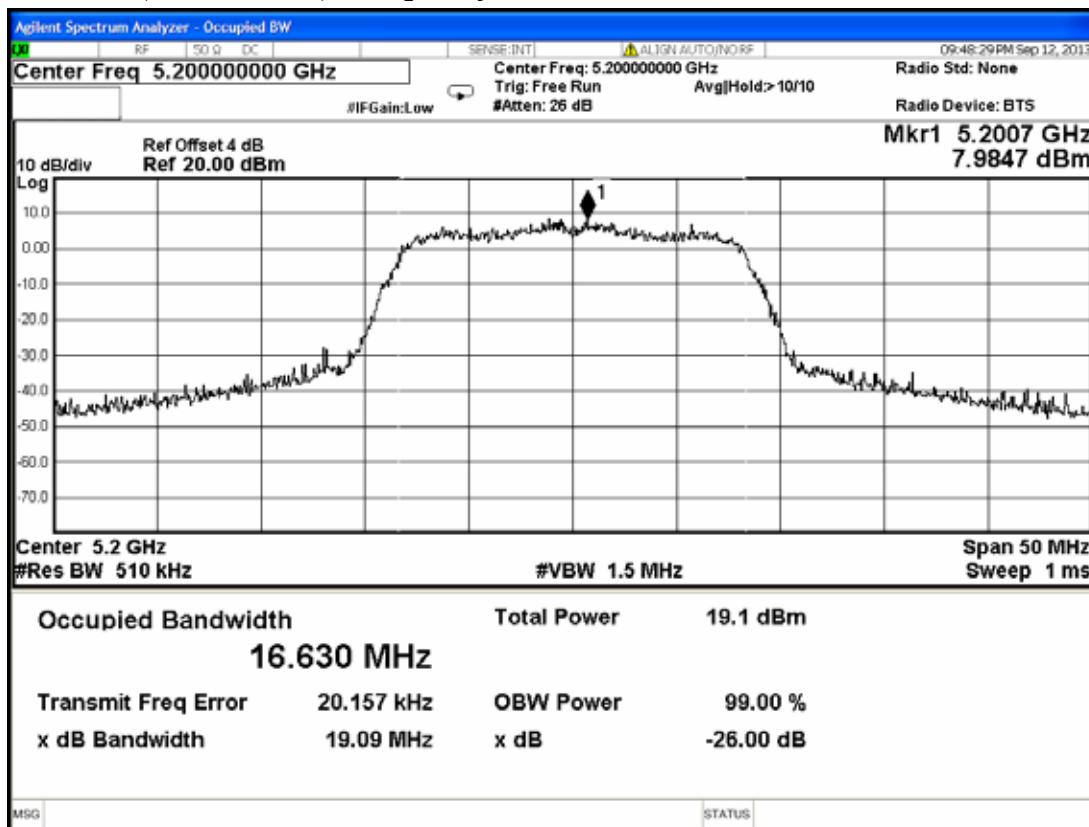
The RF output of EUT was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 20kHz RBW=1% of span, VBW=3 x RBW, Span shall be set to encompass complete signal even lobe. The measurement guideline was according to RSS-Gen.

8.6. Test Results

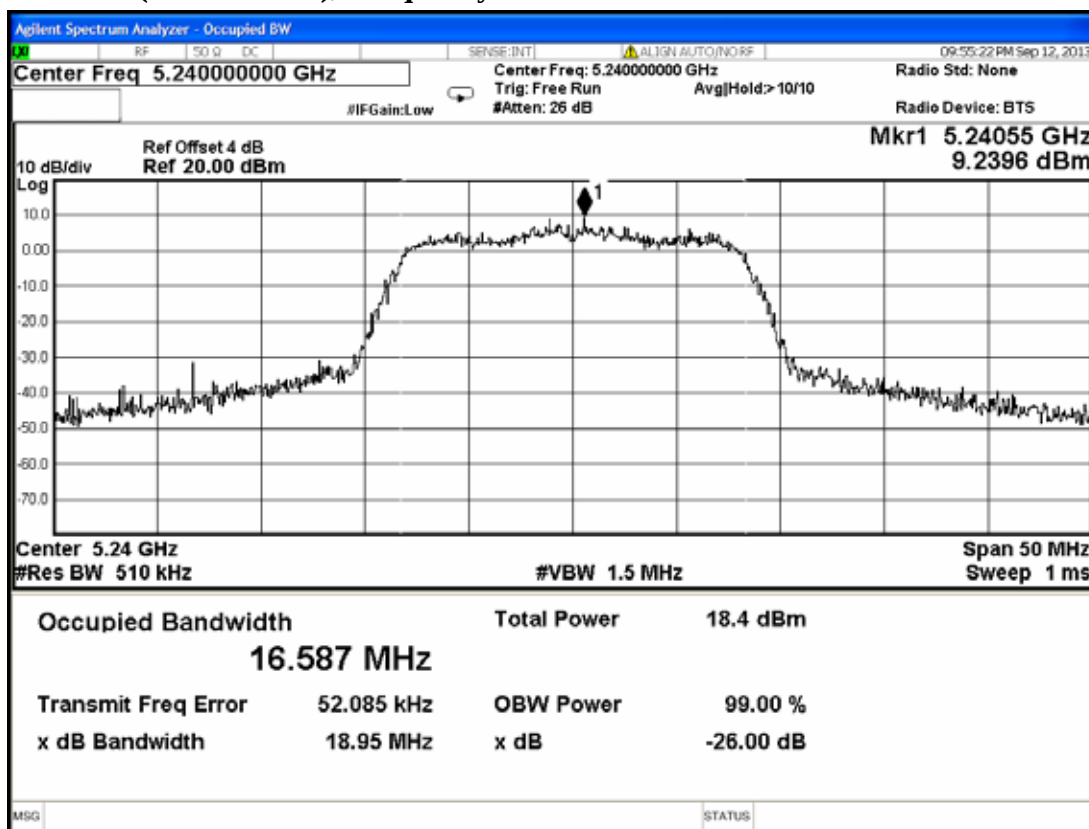
PASSED. All the test results are attached in next pages.

Test Date : Sep. 12, 2013 Temperature : 27 Humidity : 55%

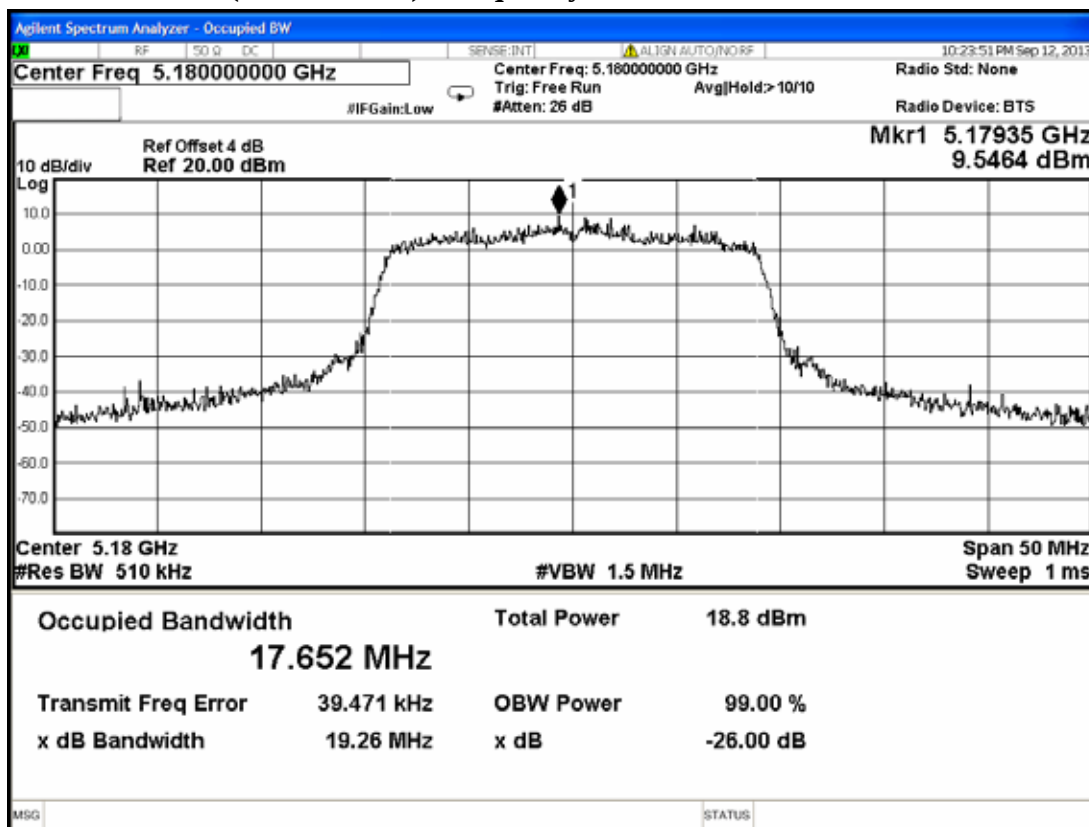
Mode	Type of Network	Channel	Frequency	Occupied Bandwidth (MHz)
1	802.11a (UNII Band I)	CH 36	5180MHz	16.695
2		CH 40	5200MHz	16.630
3		CH 48	5240MHz	16.587
4	802.11n-HT20 (UNII Band I)	CH 36	5180MHz	17.652
5		CH 40	5200MHz	17.630
6		CH 48	5240MHz	17.662
7	802.11n-HT40 (UNII Band I)	CH 38	5190MHz	36.469
8		CH 46	5230MHz	36.428

802.11a (UNII Band I), Frequency: 5180MHz**802.11a (UNII Band I), Frequency: 5200MHz**

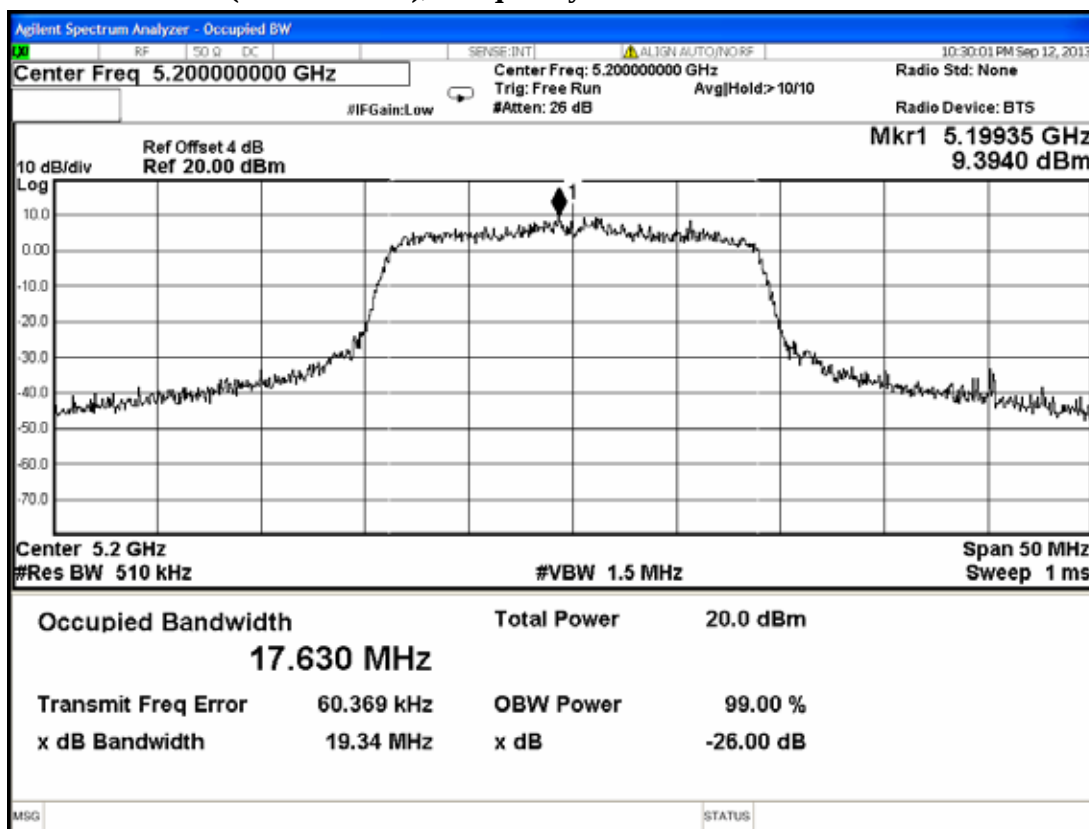
802.11a (UNII Band I), Frequency: 5240MHz



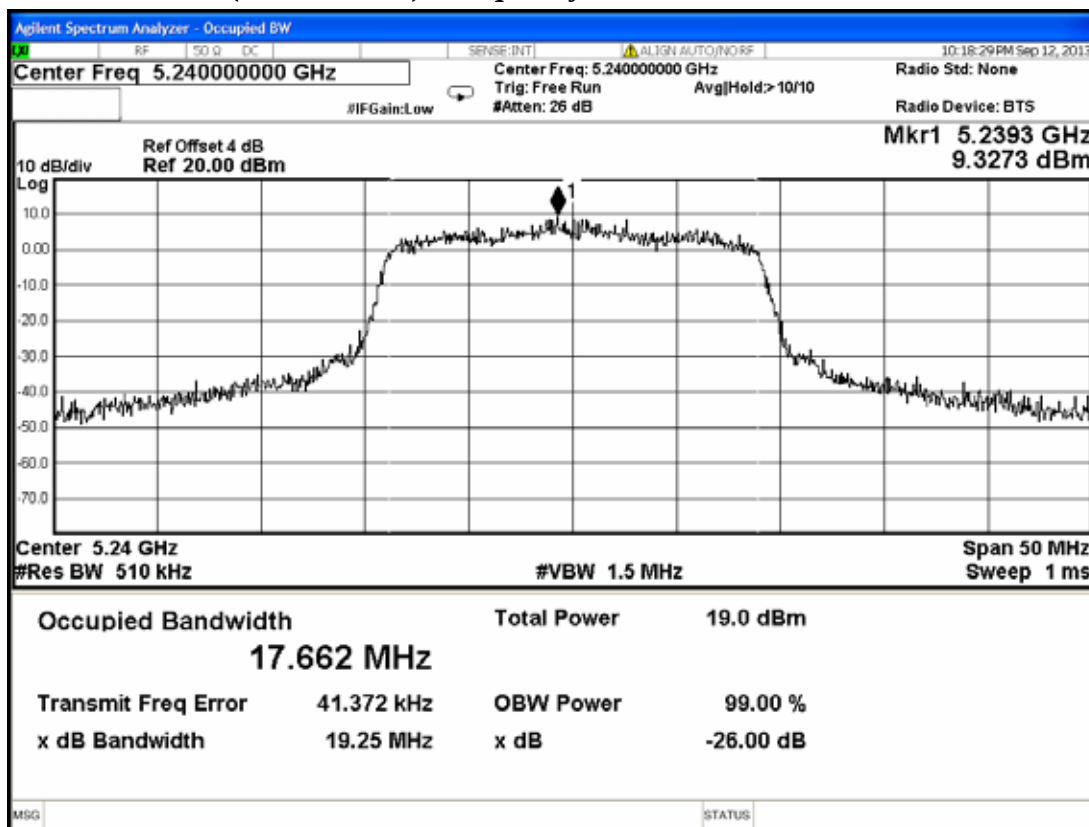
802.11n-HT20 (UNII Band I), Frequency: 5180MHz



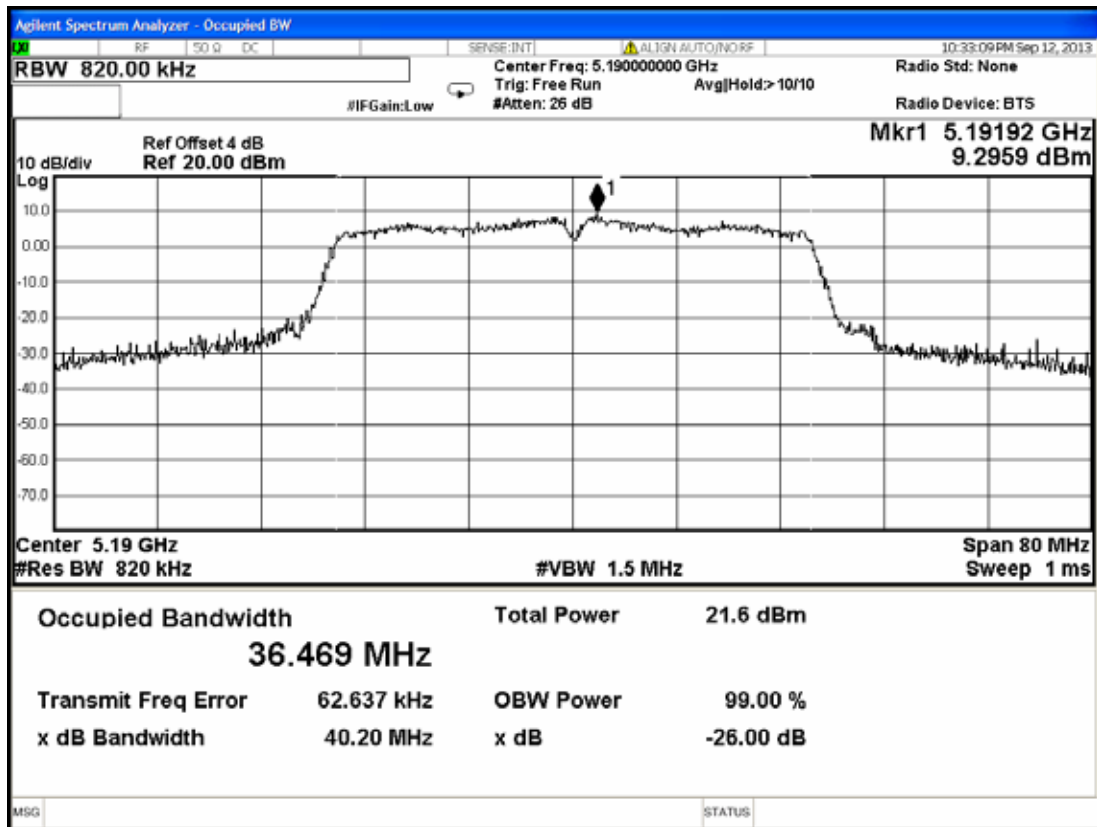
802.11n-HT20 (UNII Band I), Frequency: 5200MHz



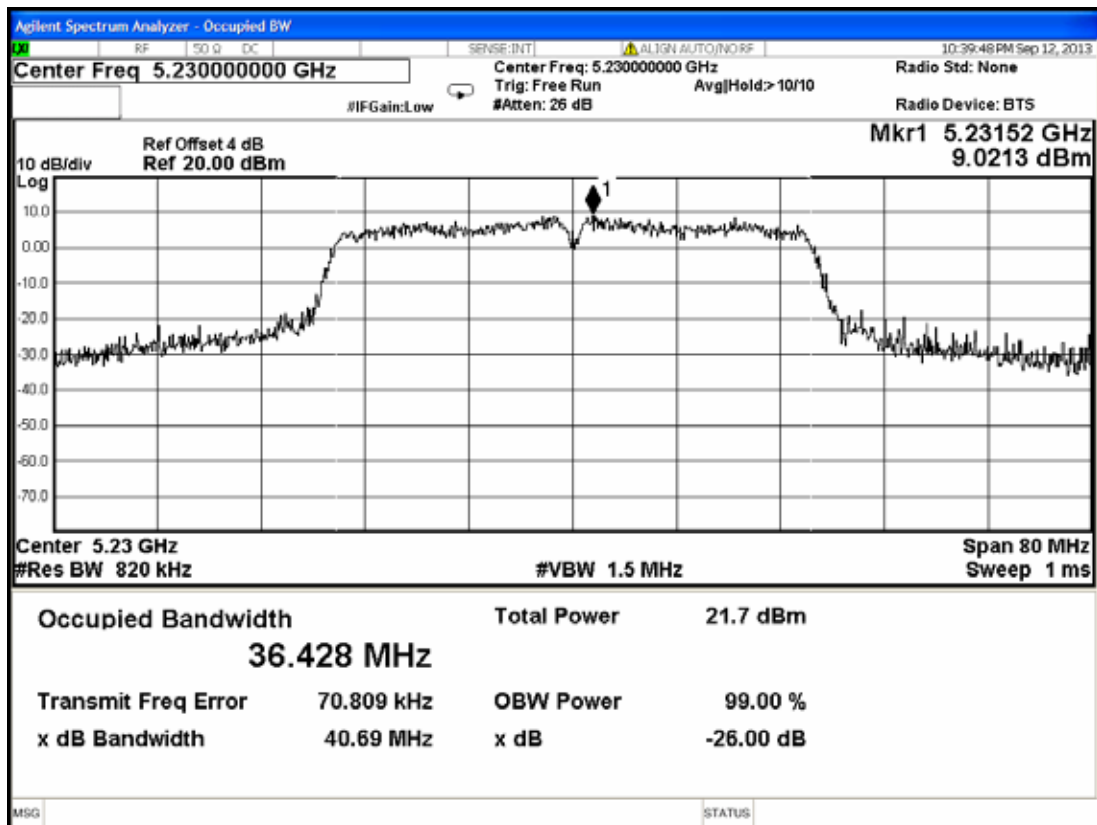
802.11n-HT20 (UNII Band I), Frequency: 5240MHz



802.11n-HT40 (UNII Band I), Frequency: 5190MHz



802.11n-HT40 (UNII Band I), Frequency: 5230MHz



9. DEVIATION TO TEST SPECIFICATIONS

【NONE】

10. PHOTOGRAPHS

10.1. Photos of Conducted Emission Measurement



FRONT VIEW OF CONDUCTED MEASUREMENT

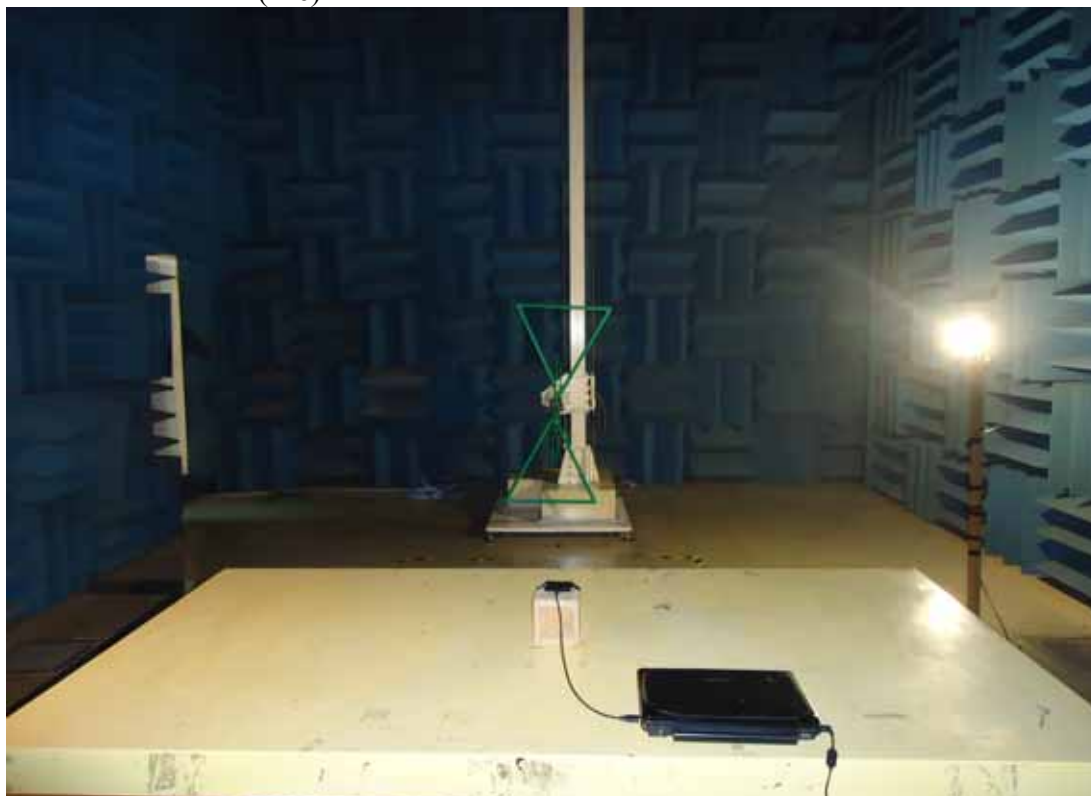


BACK VIEW OF CONDUCTED MEASUREMENT

10.2.Photos of Radiated Measurement at Semi-Anechoic Chamber

10.2.1. Frequency Range 30MHz-1GHz

(Lie)



(Side)



(Stand)



10.2.2. Frequency Range Above 1GHz
(Lie)



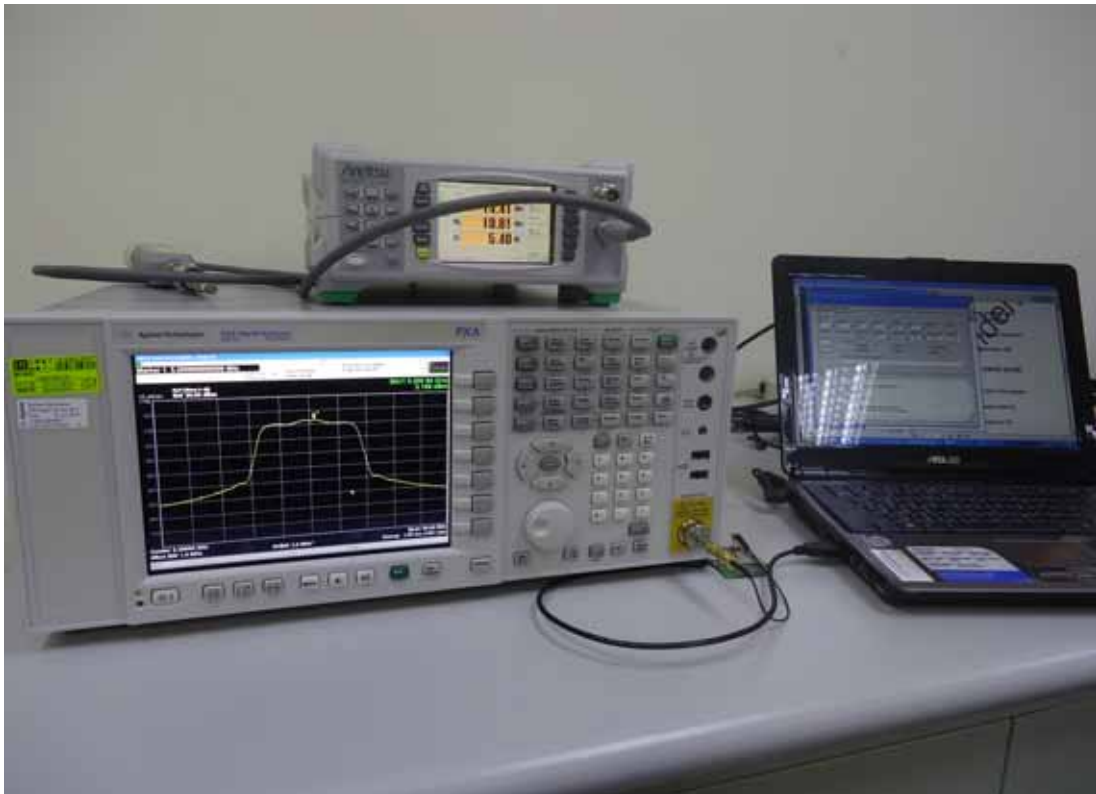
(Side)



(Stand)



10.3.Photo of Section RF Conducted Measurement



10.4.Photo of Maximum Peak Output Power Measurement

