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FCC TEST REPORT (15.407)

REPORT NO.: RF110826C07-1

MODEL NO.: APL24-08F

FCC ID: QWU-08F

RECEIVED: Aug. 26, 2011

TESTED: Oct. 03 to 12, 2011

ISSUED: Oct. 18, 2011

APPLICANT: SonicWALL, Inc.

ADDRESS: 2001 Logic Drive San Jose, CA 95124, USA

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

LAB ADDRESS : No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

TEST LOCATION (1): No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

TEST LOCATION (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF110826C07-1	Original release	Oct. 18, 2011



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1. CERTIFICATION

PRODUCT: Wireless 802.11 abgn Device

BRAND NAME: SonicWALL

MODEL NO.: APL24-08F

TEST SAMPLE: ENGINEERING SAMPLE

APPLICANT: SonicWALL, Inc.

TESTED: Oct. 03 to 12, 2011

STANDARDS: FCC Part 15, Subpart E (Section 15.407)

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (Model: APL24-08F) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : , **DATE:** Oct. 18, 2011
(Claire Kuan, Specialist)

APPROVED BY : , **DATE:** Oct. 18, 2011
(May Chen, Deputy Manager)



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2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11a

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	Test Type	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -8.62dB at 0.173MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.3dB at 15570.00MHz
15.407(a/1/2/3)	Output Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connectors are RTNC and RSMA not standard connectors.

NOTE:

1. The EUT was operating in 2400 ~ 2483.5MHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz. For the 2400 ~ 2483.5MHz and 5.725~5.850GHz RF parameters was recorded in another test report.



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2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.89 dB
Radiated emissions (1GHz -18GHz)	2.19 dB
Radiated emissions (18GHz -40GHz)	2.56 dB



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless 802.11 abgn Device
MODEL NO.	APL24-08F
FCC ID	QWU-08F
POWER SUPPLY	12Vdc (Adapter)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	For 15.407 5GHz: 5.18 ~ 5.24GHz For 15.247 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	For 15.407 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) For 15.247(2.4GHz) 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) For 15.247(5GHz) 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
MAXIMUM OUTPUT POWER	For 15.407 802.11a: 19.3mW 802.11n (20MHz): 29.0mW 802.11n (40MHz): 29.2mW For 15.247(2.4GHz) 802.11b: 154.8mW 802.11g: 500.4mW 802.11n (20MHz): 474.6mW 802.11n (40MHz): 722.4mW For 15.247(5GHz) 802.11a: 426.5mW 802.11n (20MHz): 481.2mW 802.11n (40MHz): 504.7mW



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ANTENNA TYPE	Refer to note for more details
DATA CABLE	1.8m non-shielded RJ45 cable without core
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter

NOTE:

1. The frequency bands used in this EUT are listed as below.

Frequency Band (MHz)	2412~2462	5180~5240	5745~5825
802.11b	√	-	-
802.11g	√	-	-
802.11a	-	√	√
802.11n (20MHz)	√	√	√
802.11n (40MHz)	√	√	√

2. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 2 receivers.

MODULATION MODE	TX FUNCTION
802.11b	3TX
802.11g	3TX
802.11a	3TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX

3. The antennas used in this EUT are listed as below table:

Transmitter Circuit	ANTENNA TYPE	ANTENNA CONNECTOR	GAIN (dBi)	
			2.4GHz BAND	5.0GHz BAND
Chain (0)	Dipole	RTNC	2.5	2.5
Chain (1)	Dipole	RSMA	3.0	3.0
Chain (2)	Dipole	RTNC	2.5	2.5



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4. The EUT is powered by the following adapters. After pre-testing, the adapter 1 is the worst case for final test.

ADAPTER 1	
BRAND:	Sunny COMPUTER TECHNOLOGY CO,LTD.
MODEL:	SYS1359-3612-T3
INPUT:	100-240Vac, 1.5A MAX ,50-60Hz
OUTPUT:	12Vdc, 3.0A
POWER LINE:	AC 1.8m non-shielded cable without core DC 1.8m non-shielded cable with 1 core

ADAPTER 2	
BRAND:	SINO-AMERICAN
MODEL:	SA142B-12V
INPUT:	100-240Vac, 50-60Hz, 1.2A
OUTPUT:	12Vdc, 3.0A
POWER LINE:	AC 1.8m non-shielded cable without core DC 1.6m non-shielded cable with 1 core

5. 2.4GHz and 5GHz technology cannot transmit at same time.
6. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



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3.2 DESCRIPTION OF TEST MODES

Operated in 5150MHz ~ 5250MHz bands:

Four channels are provided for 802.11a and 802.11n (20MHz):

CHANNEL	FREQUENCY
36	5180 MHz
40	5200 MHz
44	5220 MHz
48	5240 MHz

Two channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY
38	5190 MHz
46	5230 MHz



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3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	OB	
MODE 1	√	√	√	√	√	Adapter 1
MODE 2	√	-	-	-	-	Adapter 2

Where **PLC**: Power Line Conducted Emission**RE < 1G**: Radiated Emission below 1GHz**RE ³ 1G**: Radiated Emission above 1GHz**APCM**: Antenna Port Conducted Measurement**OB**: Conducted Out-Band Emission Measurement

POWER LINE CONDUCTED EMISSION TEST:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)
802.11n (20MHz)	36 to 48	48	OFDM	BPSK	6.5

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
802.11n (20MHz)	36 to 48	48	OFDM	BPSK	6.5	X



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RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6	X
802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5	X
802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5	X

ANTENNA PORT CONDUCTED MEASUREMENT:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5

※ Conducted out band emission as show worst chain in report base on preliminary measurement.

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5



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TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	25deg. C, 68%RH	120Vac, 60Hz	Frank Liu
	26deg. C, 68%RH	120Vac, 60Hz	Frank Liu
RE ³ 1G	21deg. C, 67%RH	120Vac, 60Hz	Kent Liu
RE<1G	23deg. C, 72%RH	120Vac, 60Hz	Evan Huang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang
OB	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang



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3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



3.4 DESCRIPTION OF SUPPORT UNITS

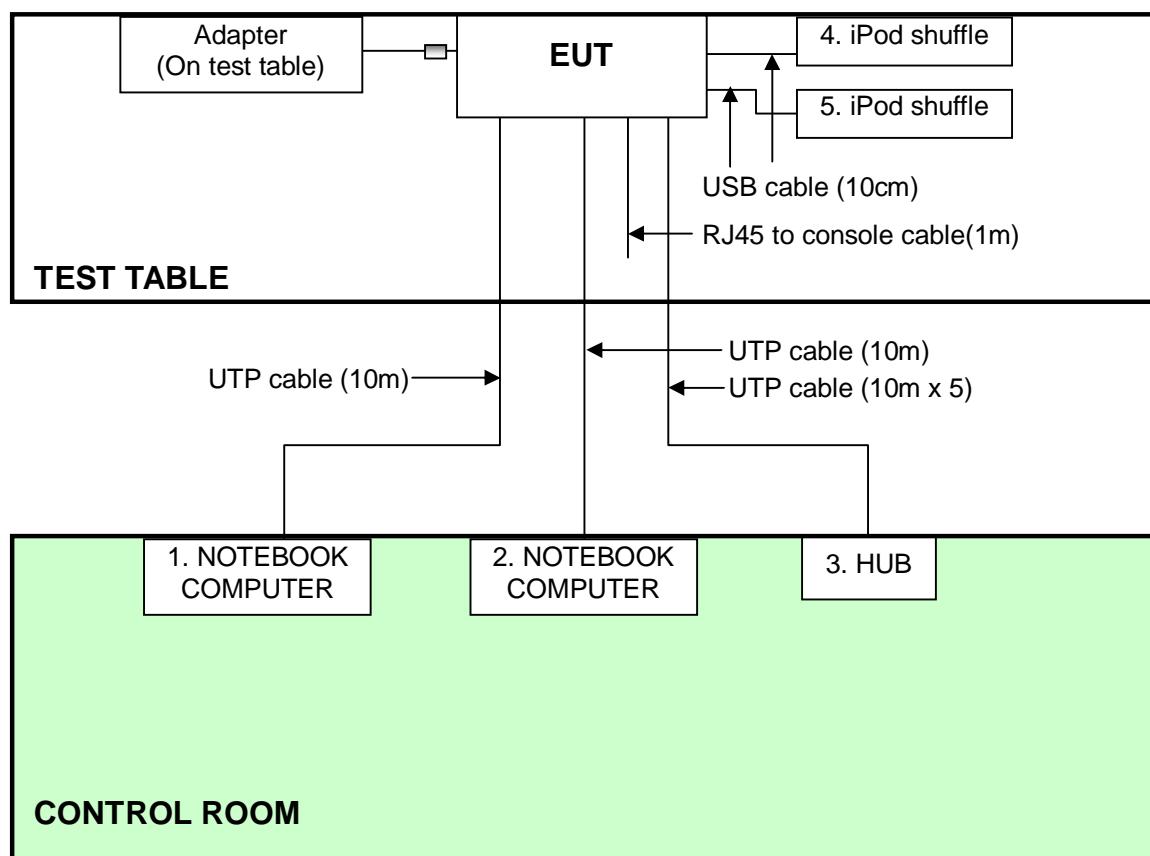
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70 166-5CA-0448	PIW632500516610
3	HUB	ZyXEL	ES-116P	S060H0200021 5	FCC DoC
4	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFD M	FCC DoC
5	iPod shuffle	Apple	MC749TA/A	CC4DN25WDF DM	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable, 10m
2	UTP cable, 10m
3	UTP cable, 10m
4	10 cm shielded cable, terminated with USB connector, w/o core.
5	10 cm shielded cable, terminated with USB connector, w/o core.

NOTE: All power cords of the above support units are non shielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST





4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

Test date: Oct. 08 to 12, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 09, 2011	Mar. 08, 2012
Line-Impedance Stabilization Network (for EUT)	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Nov. 03, 2010	Nov. 02, 2011
RF Cable (JYEBAO)	5DFB	COCCAB-002	Aug. 29, 2011	Aug. 28, 2012
50 ohms Terminator	50	3	Nov. 03, 2010	Nov. 02, 2011
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.



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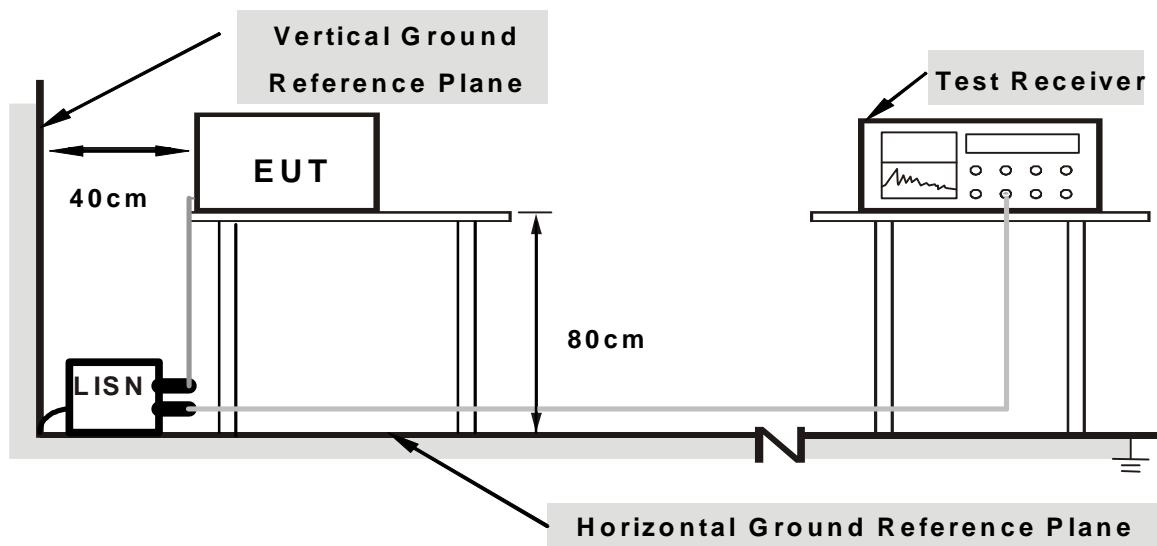
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs
- b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared computer system (support units 1~2) to act as communication partner and placed it outside of testing area.
3. The communication partners ran test program “Art.exe” to enable EUT under transmission/receiving condition continuously via UTP cables transmission.



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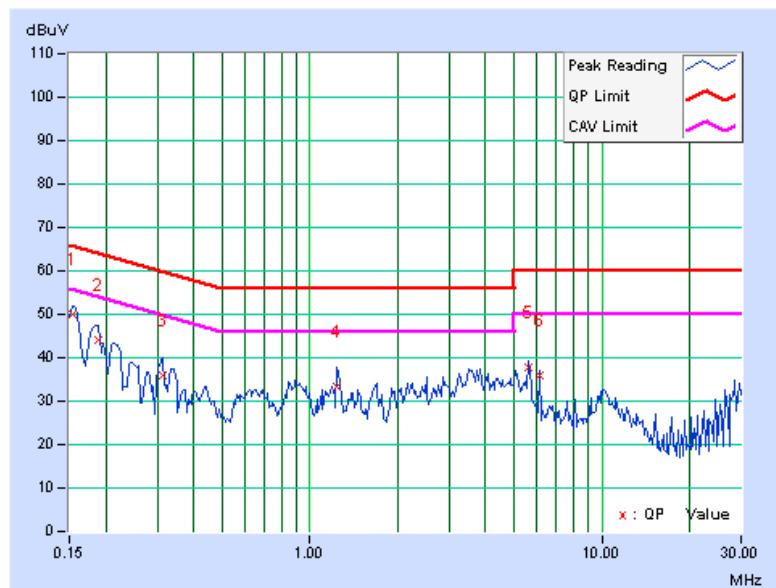
4.1.7 TEST RESULTS (MODE 1)

PHASE		Line (L)		6dB BANDWIDTH		9 kHz	
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	(dB)
1	0.154	0.09	49.77	40.24	49.86	40.33	65.79	55.79	-15.93	-15.46
2	0.189	0.10	44.08	32.10	44.18	32.20	64.08	54.08	-19.90	-21.88
3	0.314	0.11	35.66	24.94	35.77	25.05	59.86	49.86	-24.10	-24.82
4	1.238	0.16	33.21	24.50	33.37	24.66	56.00	46.00	-22.63	-21.34
5	5.590	0.38	37.55	36.30	37.93	36.68	60.00	50.00	-22.07	-13.32
6	6.098	0.40	35.49	35.04	35.89	35.44	60.00	50.00	-24.11	-14.56

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

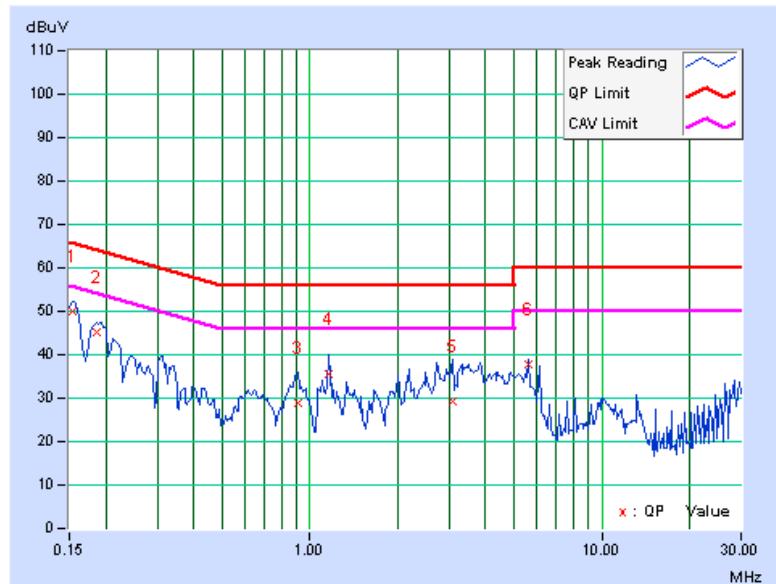


PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.08	49.78	40.33	49.86	40.41	65.79	55.79	-15.93	-15.38
2	0.185	0.09	45.16	35.96	45.25	36.05	64.25	54.25	-19.01	-18.21
3	0.908	0.13	28.79	21.92	28.92	22.05	56.00	46.00	-27.08	-23.95
4	1.160	0.14	35.29	24.00	35.43	24.14	56.00	46.00	-20.57	-21.86
5	3.070	0.21	29.16	21.98	29.37	22.19	56.00	46.00	-26.63	-23.81
6	5.586	0.28	37.68	35.85	37.96	36.13	60.00	50.00	-22.04	-13.87

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



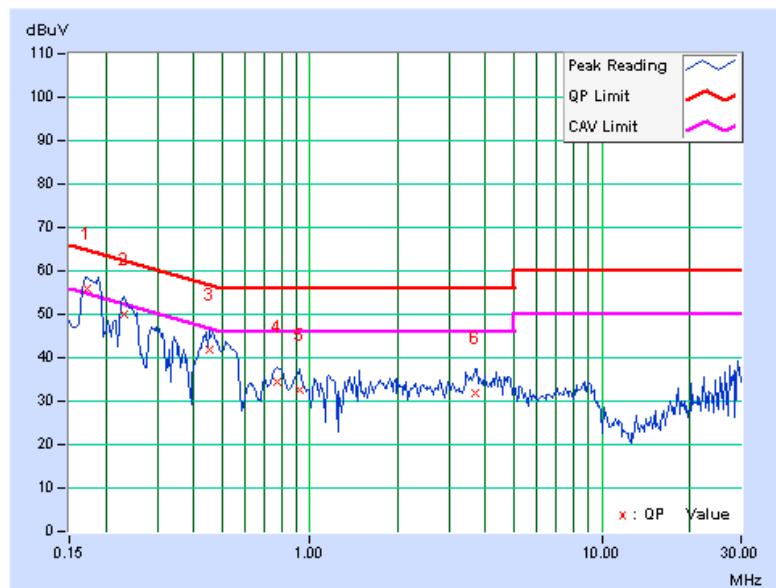
4.1.8 TEST RESULTS (MODE 2)

PHASE		Line (L)		6dB BANDWIDTH		9 kHz	
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.09	55.97	44.56	56.06	44.65	64.79	54.79	-8.73	-10.14
2	0.232	0.10	49.94	39.87	50.04	39.97	62.38	52.38	-12.34	-12.41
3	0.451	0.11	41.85	27.47	41.96	27.58	56.86	46.86	-14.90	-19.28
4	0.771	0.13	34.22	21.88	34.35	22.01	56.00	46.00	-21.65	-23.99
5	0.927	0.15	32.27	21.53	32.42	21.68	56.00	46.00	-23.58	-24.32
6	3.684	0.30	31.44	24.55	31.74	24.85	56.00	46.00	-24.26	-21.15

REMARKS:

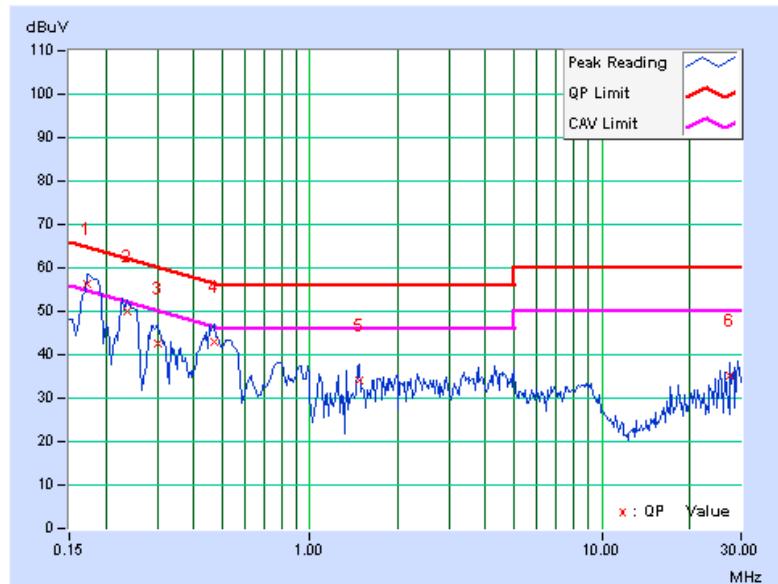
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.08	56.09	44.99	56.17	45.07	64.79	54.79	-8.62	-9.72
2	0.236	0.09	49.78	39.99	49.87	40.08	62.24	52.24	-12.36	-12.15
3	0.302	0.10	42.56	31.32	42.66	31.42	60.18	50.18	-17.52	-18.76
4	0.470	0.11	42.91	32.26	43.02	32.37	56.51	46.51	-13.49	-14.14
5	1.480	0.15	33.78	23.16	33.93	23.31	56.00	46.00	-22.07	-22.69
6	27.387	0.83	34.20	27.56	35.03	28.39	60.00	50.00	-24.97	-21.61

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor + Reading Value.





4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_uV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. Section 15.205 restricted bands of operation shall compliance with the limits in Section 15.209.



4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

NOTE:

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$



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4.2.3 TEST INSTRUMENTS

Test date: Oct. 03 to 04, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 29, 2011	Aug. 28, 2012
Agilent Pre-Selector	N9039A	MY46520310	Aug. 29, 2011	Aug. 28, 2012
Agilent Signal Generator	N5181A	MY49060347	July 25, 2011	July 24, 2012
LIG NEX1 Test Receiver	ER-265	L09068005	Oct. 25, 2010	Oct. 24, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 16, 2010	Nov. 15, 2011
Agilent Pre-Amplifier	8449B	3008A02465	Feb. 28, 2011	Feb. 27, 2012
Miteq Pre-Amplifier	AFS33-1800265 0-30-8P-44	881786	Nov. 16, 2010	Nov. 15, 2011
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 14, 2011	Apr. 13, 2012
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 22, 2010	Nov. 21, 2011
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-205 RF104-207 RF104-202	Dec. 28, 2010	Dec. 27, 2011
RF Cable	NA	CHHCAB_001	Oct. 17, 2010	Oct. 16, 2011
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.



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4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meters chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

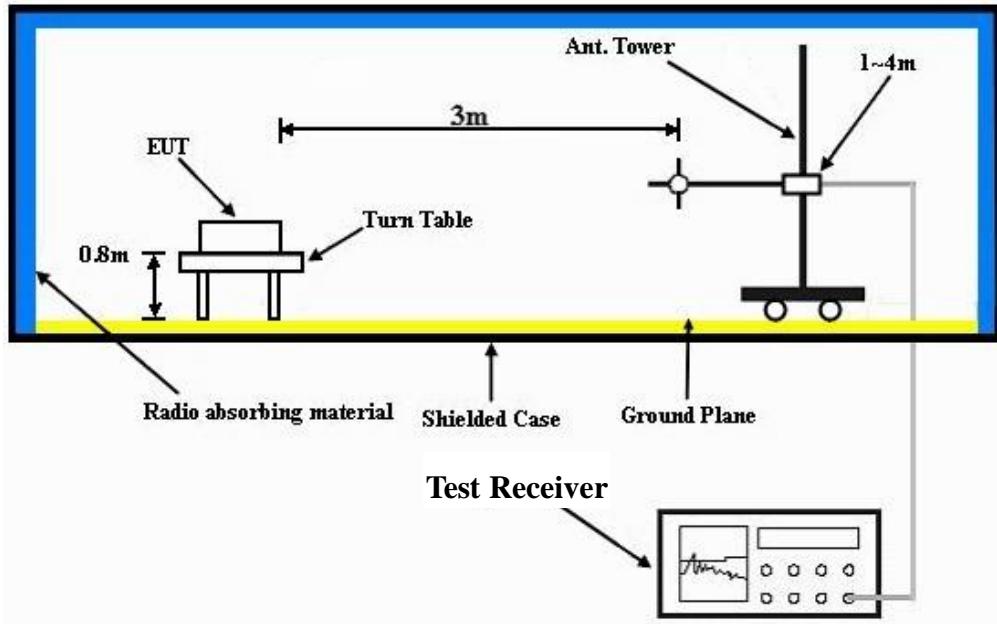
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.7 EUT OPERATING CONDITION

1. Placed the EUT on testing table.
2. Prepared computer system (support units 1~2) to act as communication partner and placed it outside of testing area.
3. The communication partners ran test program “Art.exe” to enable EUT under transmission/receiving condition continuously via UTP cables transmission.



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4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 48		FREQUENCY RANGE
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION
ENVIRONMENTAL CONDITIONS		23deg. C, 72%RH		TESTED BY
				Evan Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	229.00	42.2 QP	46.0	-3.8	1.25 H	307	29.92	12.27
2	253.00	41.9 QP	46.0	-4.1	1.00 H	54	28.75	13.17
3	474.30	35.9 QP	46.0	-10.1	1.74 H	317	16.87	18.99
4	520.00	39.2 QP	46.0	-6.9	1.51 H	276	19.19	19.96
5	574.30	38.2 QP	46.0	-7.8	1.51 H	281	17.08	21.09
6	754.00	38.6 QP	46.0	-7.4	1.01 H	287	15.24	23.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	63.30	36.8 QP	40.0	-3.3	1.00 V	49	23.78	12.97
2	144.00	35.1 QP	43.5	-8.4	1.76 V	86	20.83	14.25
3	216.72	39.0 QP	46.0	-7.0	1.49 V	1	27.14	11.82
4	522.00	35.4 QP	46.0	-10.6	1.01 V	15	15.42	20.01
5	748.00	38.9 QP	46.0	-7.1	1.01 V	334	15.65	23.22
6	980.53	41.3 QP	54.0	-12.7	1.49 V	356	14.56	26.77

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



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ABOVE 1GHz WORST-CASE DATA

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		FREQUENCY RANGE		1 ~ 40GHz
INPUT POWER		DETECTOR FUNCTION		Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		TESTED BY		Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.6 PK	74.0	-15.4	1.29 H	294	17.80	40.80
2	5150.00	46.6 AV	54.0	-7.4	1.29 H	294	5.80	40.80
3	*5180.00	107.1 PK			1.26 H	295	66.29	40.81
4	*5180.00	98.2 AV			1.26 H	295	57.39	40.81
5	#10360.00	52.4 PK	68.3	-15.9	1.24 H	302	4.90	47.50
6	15540.00	62.4 PK	74.0	-11.6	1.21 H	286	9.97	52.43
7	15540.00	50.7 AV	54.0	-3.3	1.21 H	286	-1.73	52.43

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.3 PK	74.0	-10.7	1.45 V	315	22.50	40.80
2	5150.00	48.4 AV	54.0	-5.6	1.45 V	315	7.60	40.80
3	*5180.00	114.2 PK			1.46 V	320	73.39	40.81
4	*5180.00	104.9 AV			1.46 V	320	64.09	40.81
5	#10360.00	50.3 PK	68.3	-18.0	1.36 V	275	2.80	47.50
6	15540.00	63.2 PK	74.0	-10.8	1.40 V	46	10.77	52.43
7	15540.00	51.2 AV	54.0	-2.8	1.40 V	46	-1.23	52.43

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. “#”: The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 40		FREQUENCY RANGE 1 ~ 40GHz
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		21deg. C, 67%RH		TESTED BY Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	107.0 PK			1.28 H	294	66.18	40.82
2	*5200.00	97.5 AV			1.28 H	294	56.68	40.82
3	#10400.00	52.7 PK	68.3	-15.6	1.27 H	299	5.12	47.58
4	15600.00	61.7 PK	74.0	-12.3	1.26 H	96	9.54	52.16
5	15600.00	50.4 AV	54.0	-3.6	1.26 H	96	-1.76	52.16

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	115.9 PK			1.45 V	36	75.08	40.82
2	*5200.00	106.6 AV			1.45 V	36	65.78	40.82
3	#10400.00	50.6 PK	68.3	-17.7	1.41 V	277	3.02	47.58
4	15600.00	63.3 PK	74.0	-10.7	1.40 V	32	11.14	52.16
5	15600.00	51.3 AV	54.0	-2.7	1.40 V	32	-0.86	52.16

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 48		FREQUENCY RANGE 1 ~ 40GHz
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		21deg. C, 67%RH		TESTED BY Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	106.7 PK			1.25 H	290	65.78	40.92
2	*5240.00	97.9 AV			1.25 H	290	56.98	40.92
3	5350.00	57.1 PK	74.0	-16.9	1.00 H	235	15.96	41.14
4	5350.00	46.1 AV	54.0	-7.9	1.00 H	235	4.98	41.14
5	#10480.00	52.6 PK	68.3	-15.7	1.32 H	309	5.00	47.60
6	15720.00	62.0 PK	74.0	-12.0	1.22 H	86	9.80	52.20
7	15720.00	50.7 AV	54.0	-3.3	1.22 H	86	-1.50	52.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	114.7 PK			1.47 V	36	73.78	40.92
2	*5240.00	105.3 AV			1.47 V	36	64.38	40.92
3	5350.00	57.5 PK	74.0	-16.6	1.32 V	25	16.31	41.14
4	5350.00	46.0 AV	54.0	-8.0	1.32 V	25	4.87	41.14
5	#10480.00	50.9 PK	68.3	-17.4	1.45 V	271	3.30	47.60
6	15720.00	64.0 PK	74.0	-10.0	1.42 V	27	11.80	52.20
7	15720.00	51.9 AV	54.0	-2.1	1.42 V	27	-0.30	52.20

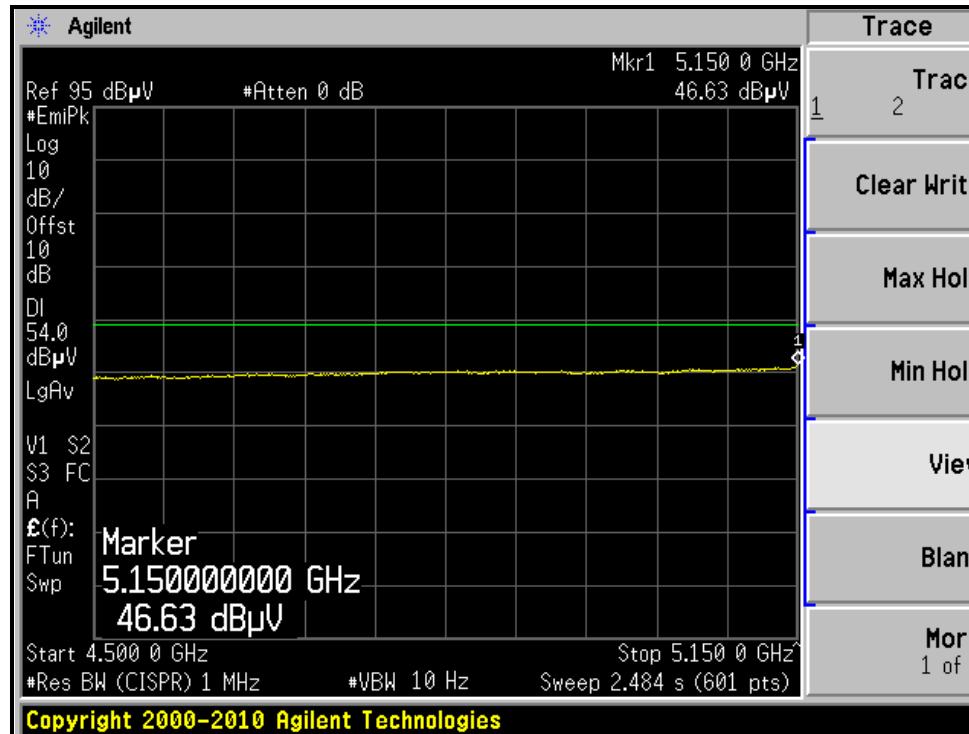
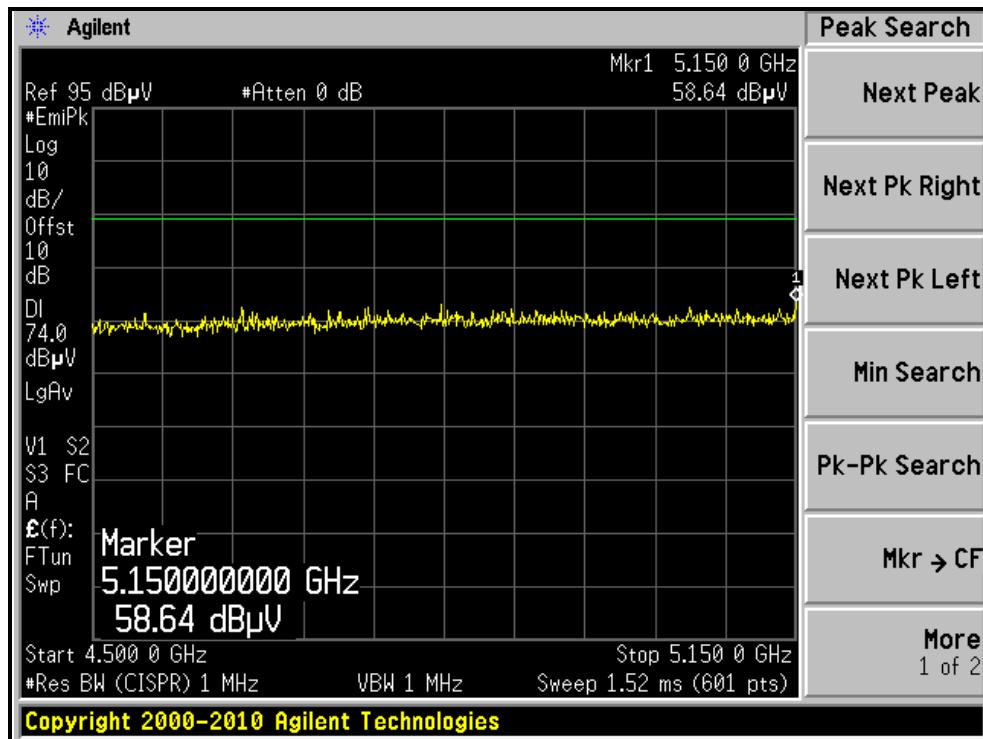
REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.



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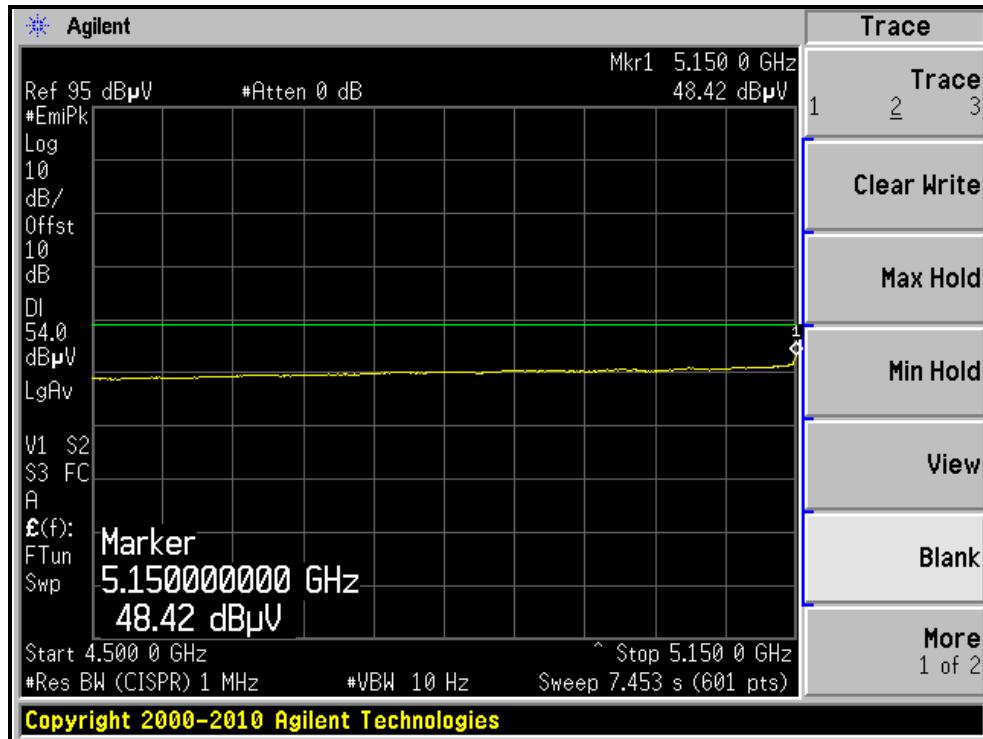
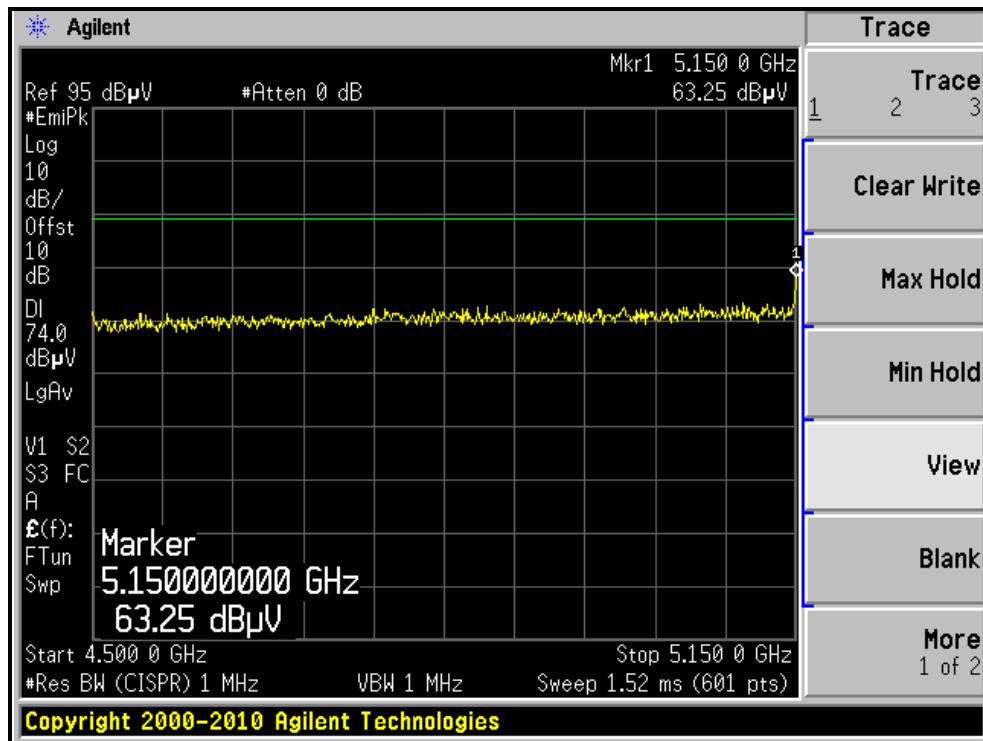
RESTRICTED BANDEDGE (802.11a MODE, CH36, HORIZONTAL)





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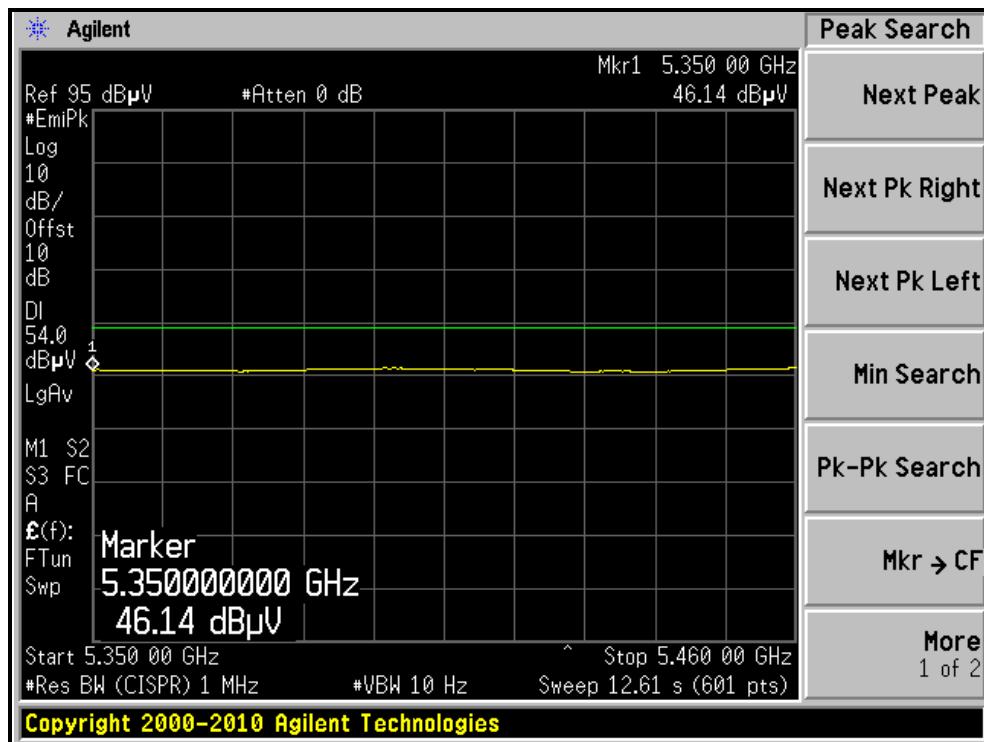
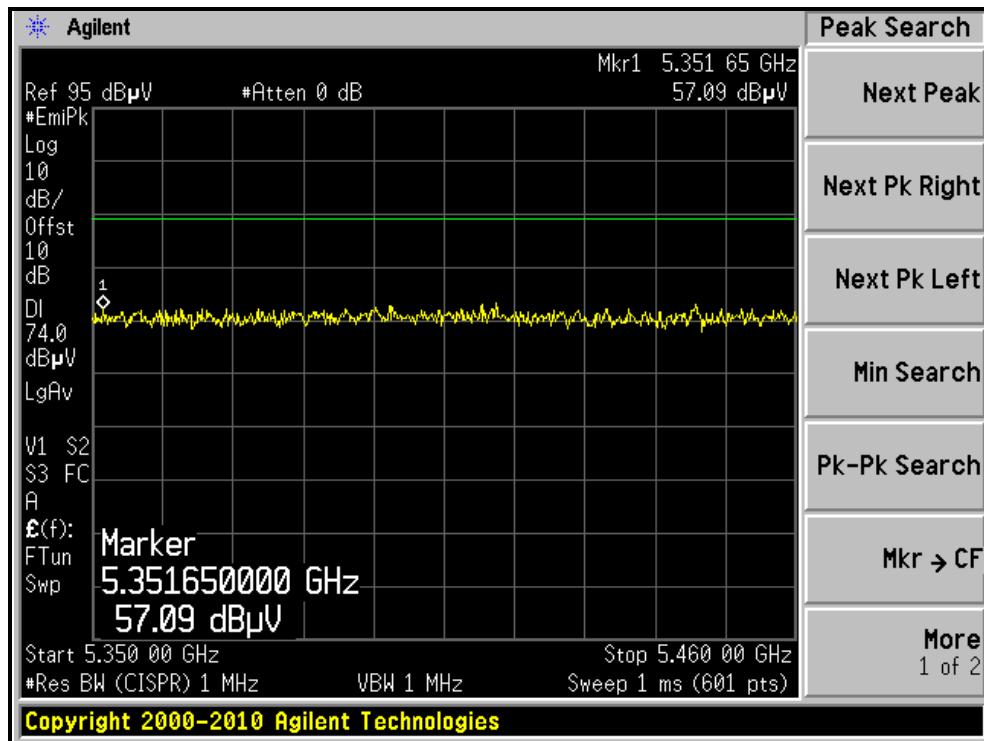
RESTRICTED BANDEDGE (802.11a MODE, CH36, VERTICAL)





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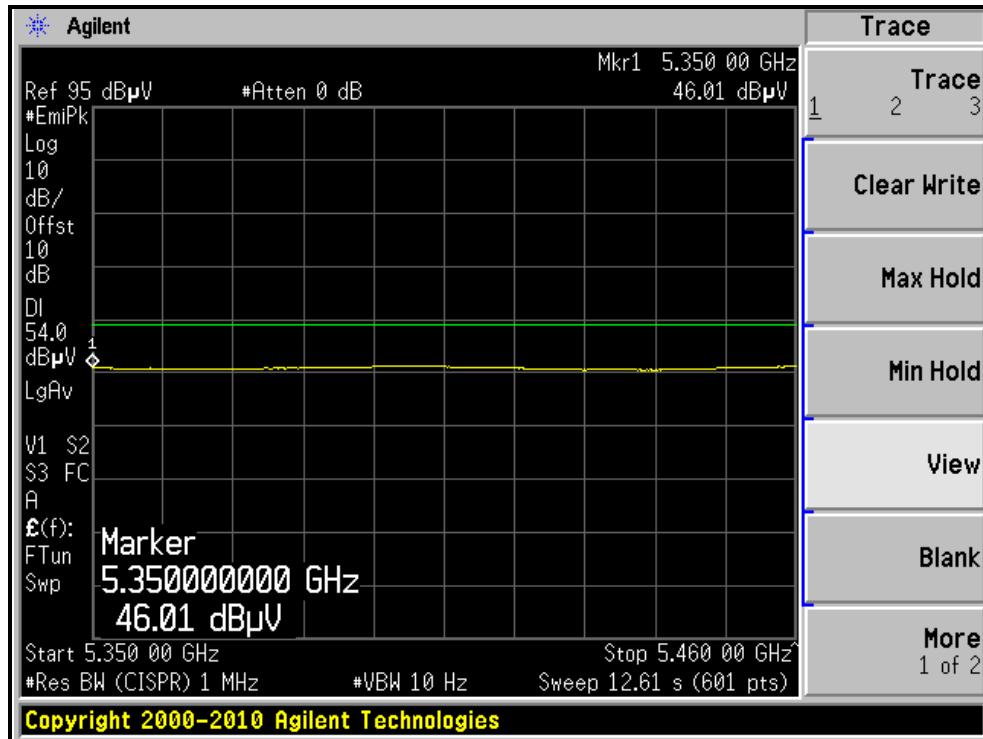
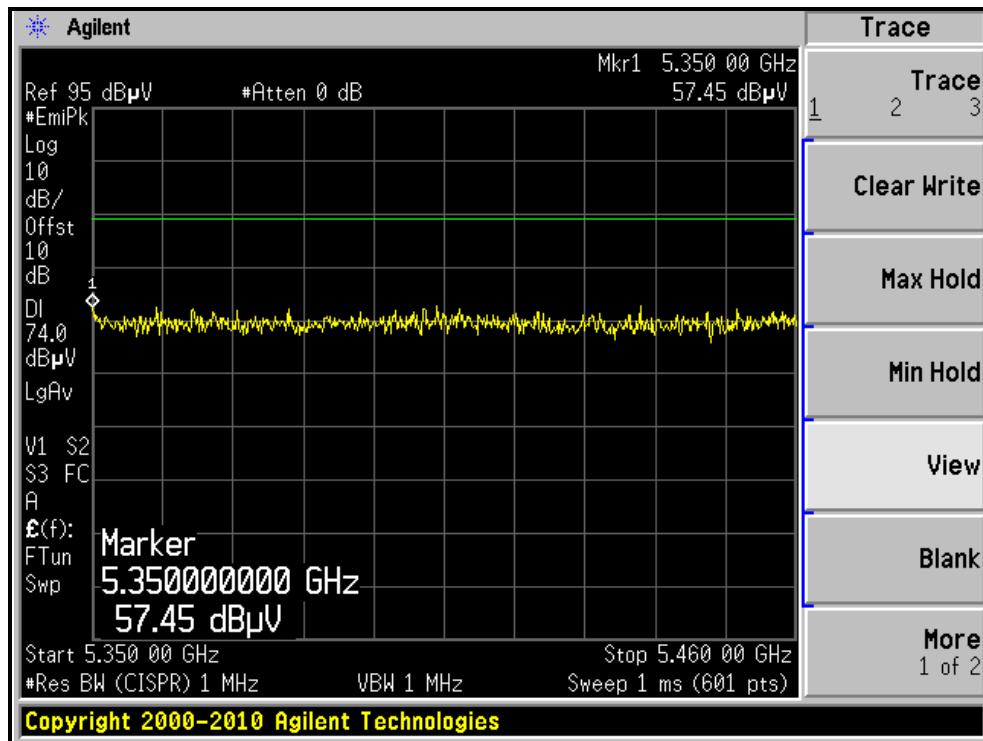
RESTRICTED BANDEDGE (802.11a MODE, CH48, HORIZONTAL)





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RESTRICTED BANDEDGE (802.11a MODE, CH48, VERTICAL)





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802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 36		FREQUENCY RANGE 1 ~ 40GHz
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		21deg. C, 67%RH		TESTED BY Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.3 PK	74.0	-13.7	1.29 H	291	19.50	40.80
2	5150.00	46.7 AV	54.0	-7.3	1.29 H	291	5.90	40.80
3	*5180.00	105.8 PK			1.28 H	295	64.99	40.81
4	*5180.00	96.1 AV			1.28 H	295	55.29	40.81
5	#10360.00	52.7 PK	68.3	-15.6	1.30 H	308	5.20	47.50
6	15540.00	61.9 PK	74.0	-12.1	1.23 H	85	9.47	52.43
7	15540.00	50.7 AV	54.0	-3.3	1.23 H	85	-1.73	52.43

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.2 PK	74.0	-10.8	1.42 V	319	22.40	40.80
2	5150.00	47.7 AV	54.0	-6.3	1.42 V	319	6.90	40.80
3	*5180.00	114.5 PK			1.40 V	159	73.69	40.81
4	*5180.00	105.7 AV			1.40 V	159	64.89	40.81
5	#10360.00	50.3 PK	68.3	-18.0	1.45 V	278	2.80	47.50
6	15540.00	64.1 PK	74.0	-9.9	1.37 V	29	11.67	52.43
7	15540.00	51.8 AV	54.0	-2.2	1.37 V	29	-0.63	52.43

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 40		FREQUENCY RANGE 1 ~ 40GHz
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		21deg. C, 67%RH		TESTED BY Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	107.9 PK			1.23 H	295	67.08	40.82
2	*5200.00	97.8 AV			1.23 H	295	56.98	40.82
3	#10400.00	52.6 PK	68.3	-15.7	1.27 H	318	5.02	47.58
4	15600.00	61.4 PK	74.0	-12.6	1.23 H	85	9.24	52.16
5	15600.00	50.5 AV	54.0	-3.5	1.23 H	85	-1.66	52.16

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	115.7 PK			1.48 V	39	74.88	40.82
2	*5200.00	106.0 AV			1.48 V	39	65.18	40.82
3	#10400.00	53.2 PK	68.3	-15.1	1.28 V	224	5.62	47.58
4	15600.00	64.4 PK	74.0	-9.6	1.41 V	24	12.24	52.16
5	15600.00	52.0 AV	54.0	-2.0	1.41 V	24	-0.16	52.16

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 48		FREQUENCY RANGE 1 ~ 40GHz
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		21deg. C, 67%RH		TESTED BY Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	106.1 PK			1.24 H	296	65.18	40.92
2	*5240.00	96.5 AV			1.24 H	296	55.58	40.92
3	5350.00	57.5 PK	74.0	-16.5	1.12 H	321	16.36	41.14
4	5350.00	46.0 AV	54.0	-8.0	1.12 H	321	4.83	41.14
5	#10480.00	52.6 PK	68.3	-15.7	1.31 H	308	5.00	47.60
6	15720.00	61.4 PK	74.0	-12.6	1.22 H	81	9.20	52.20
7	15720.00	50.4 AV	54.0	-3.6	1.22 H	81	-1.80	52.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	115.0 PK			1.47 V	43	74.08	40.92
2	*5240.00	104.9 AV			1.47 V	43	63.98	40.92
3	5350.00	57.2 PK	74.0	-16.8	1.24 V	223	16.09	41.14
4	5350.00	46.0 AV	54.0	-8.0	1.24 V	223	4.88	41.14
5	#10480.00	50.3 PK	68.3	-18.0	1.48 V	289	2.70	47.60
6	15720.00	64.8 PK	74.0	-9.2	1.43 V	35	12.60	52.20
7	15720.00	52.4 AV	54.0	-1.6	1.43 V	35	0.20	52.20

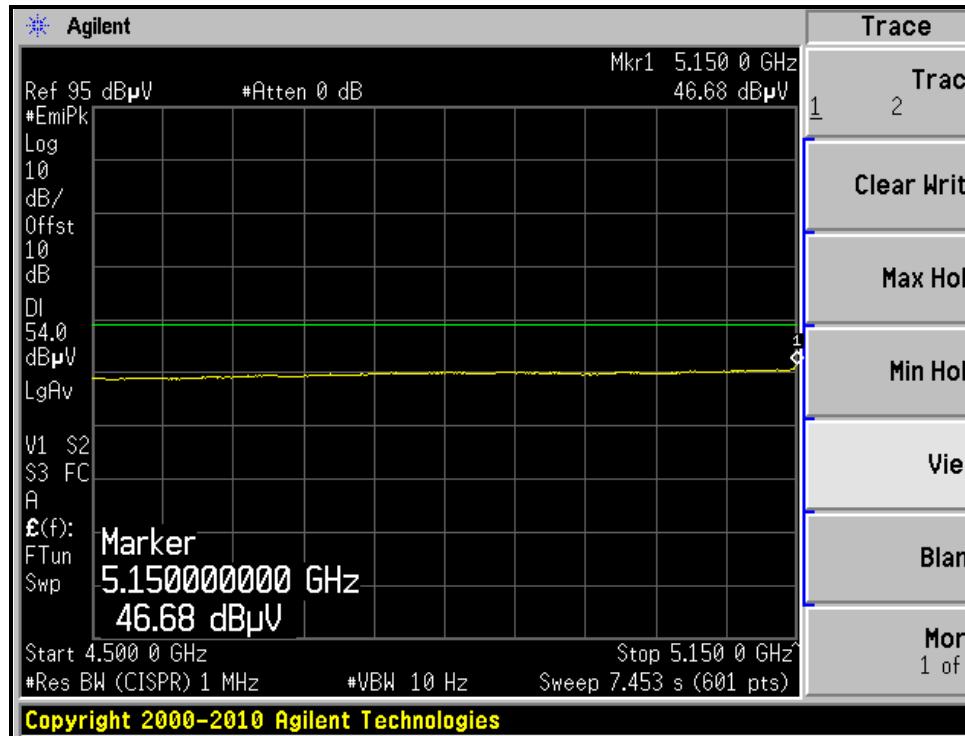
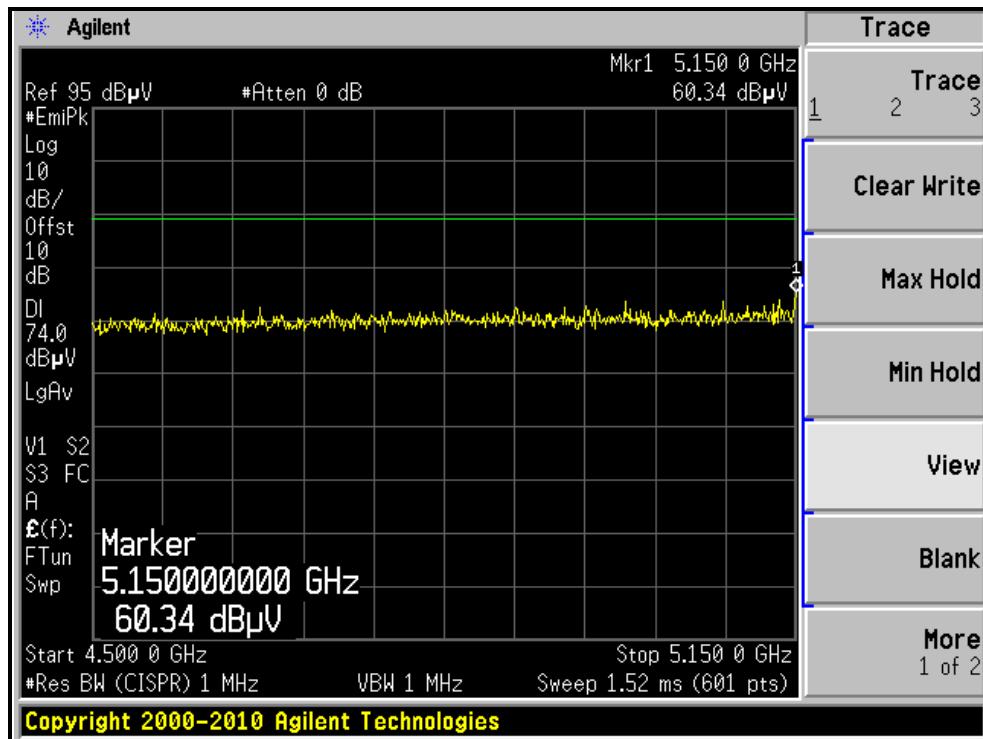
REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.



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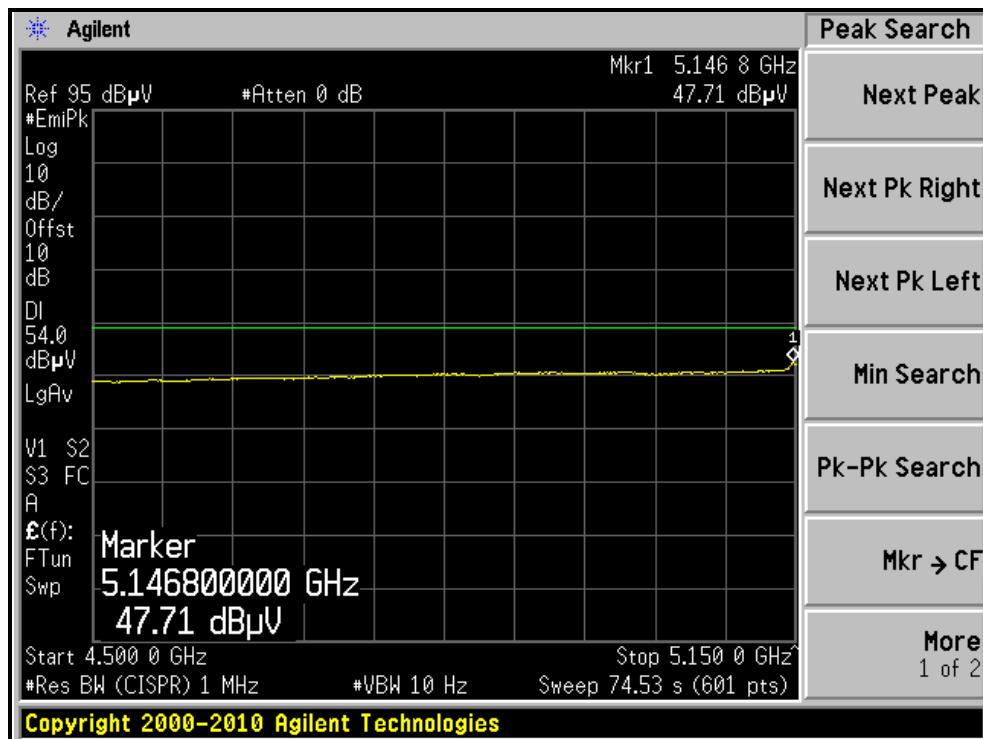
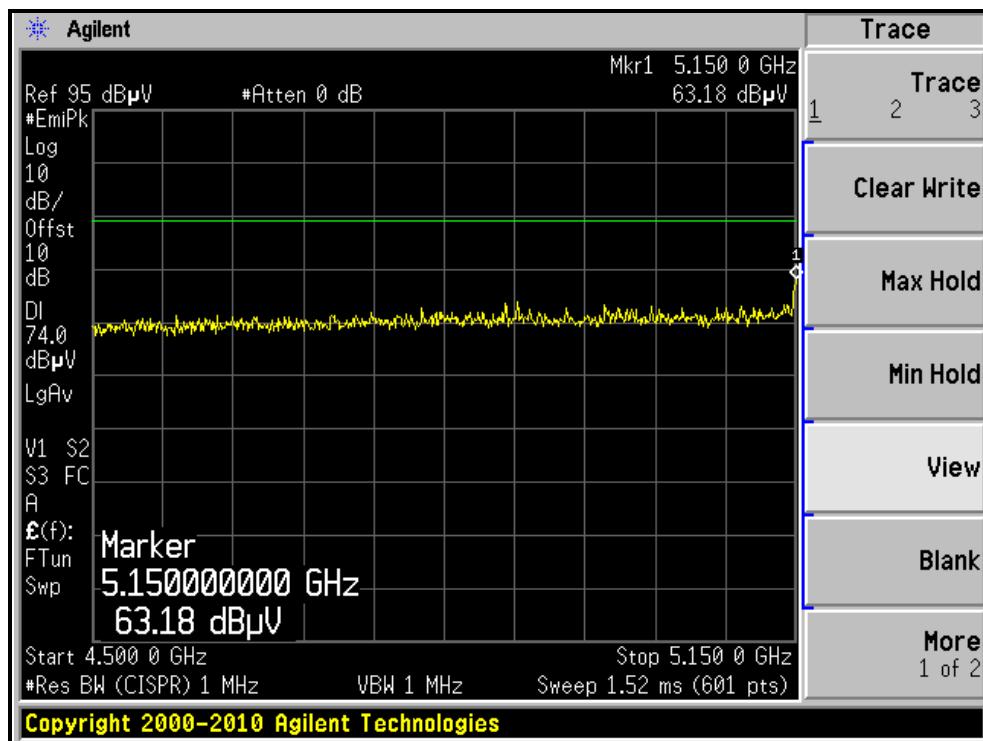
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH36, HORIZONTAL)





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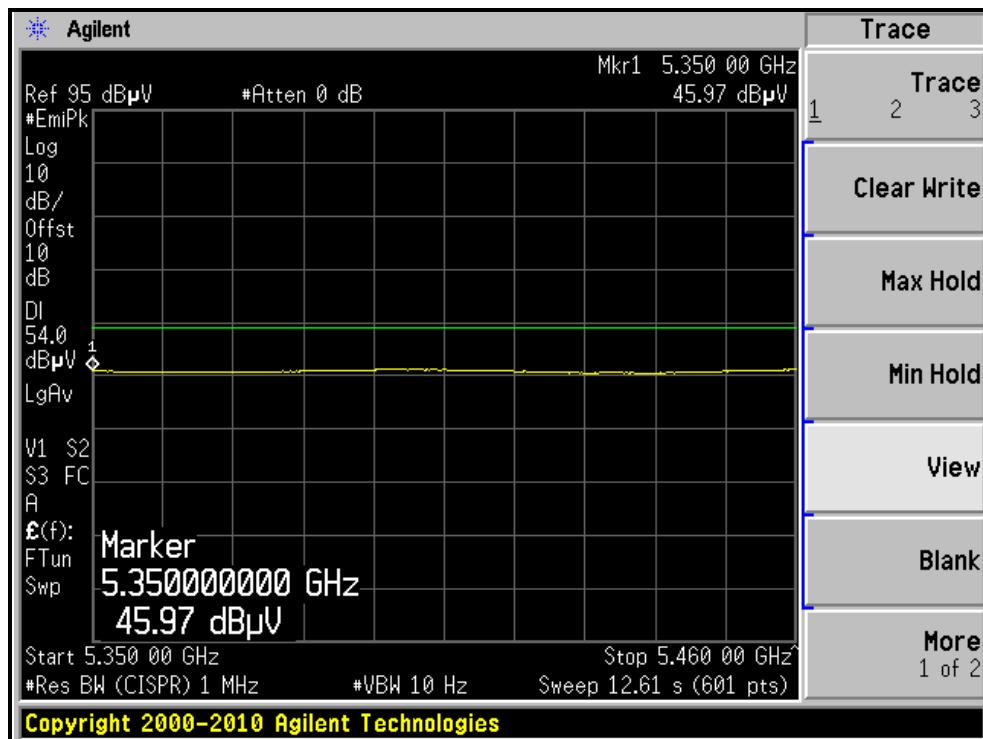
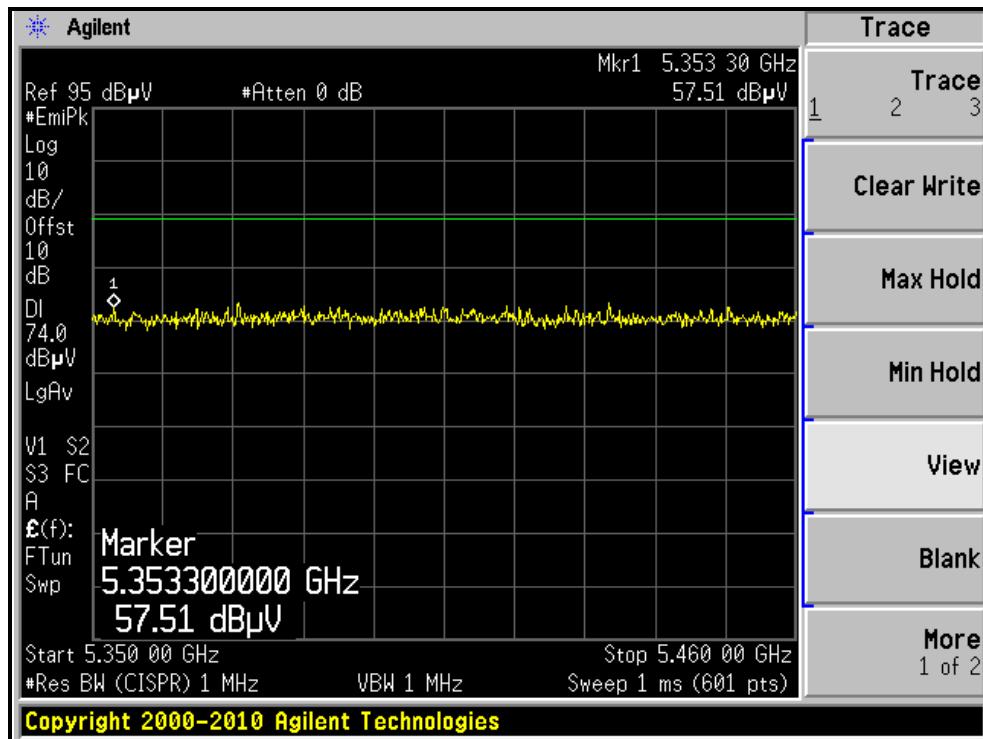
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH36, VERTICAL)





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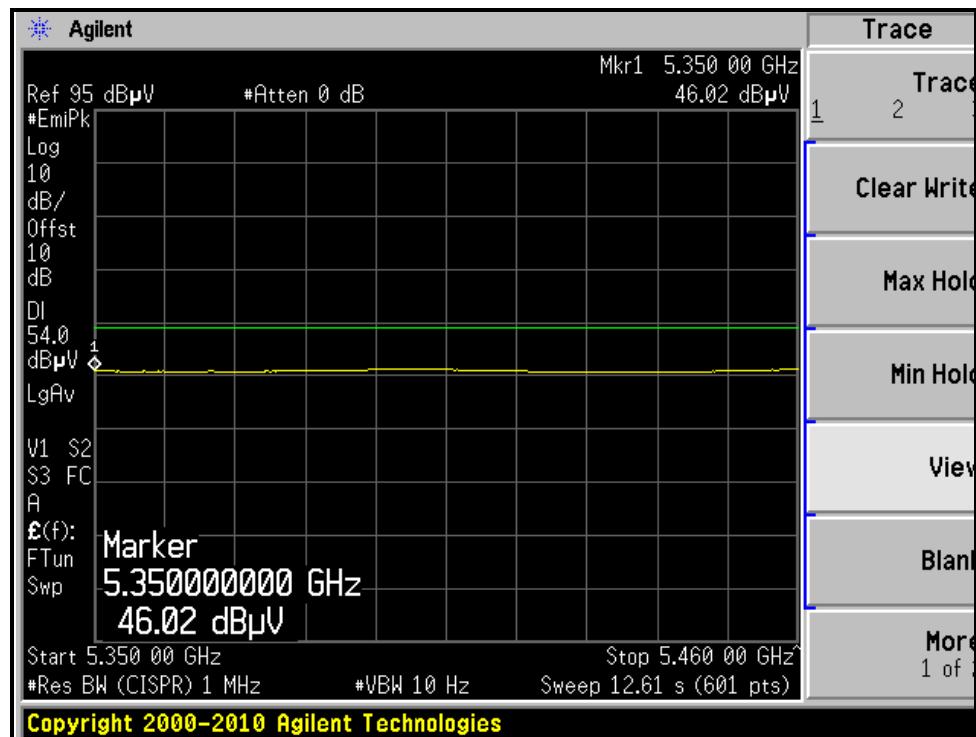
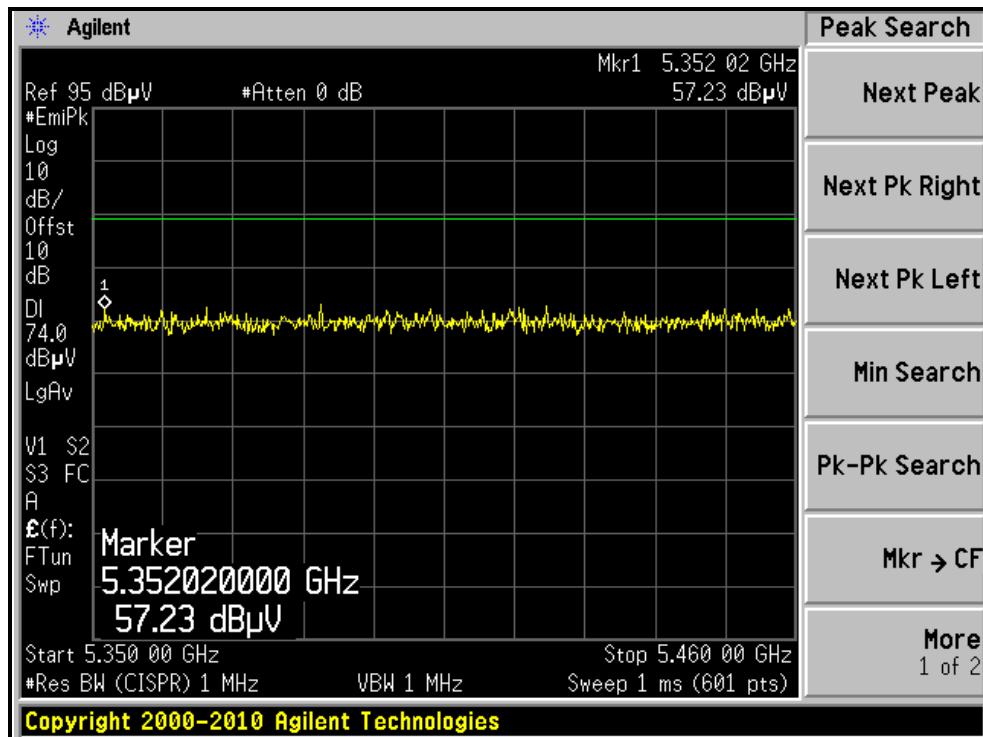
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH48, HORIZONTAL)





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RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH48, VERTICAL)





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802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 38		FREQUENCY RANGE 1 ~ 40GHz
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		21deg. C, 67%RH		TESTED BY Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.1 PK	74.0	-14.9	1.30 H	295	18.30	40.80
2	5150.00	48.3 AV	54.0	-5.7	1.30 H	295	7.50	40.80
3	*5190.00	100.0 PK			1.59 H	300	59.19	40.81
4	*5190.00	90.8 AV			1.59 H	300	49.99	40.81
5	#10380.00	52.2 PK	68.3	-16.1	1.28 H	308	4.66	47.54
6	15570.00	62.3 PK	74.0	-11.7	1.22 H	69	10.00	52.30
7	15570.00	51.1 AV	54.0	-2.9	1.22 H	69	-1.20	52.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.2 PK	74.0	-10.8	1.60 V	357	22.40	40.80
2	5150.00	52.5 AV	54.0	-1.5	1.60 V	357	11.70	40.80
3	*5190.00	106.8 PK			1.60 V	3	65.99	40.81
4	*5190.00	97.6 AV			1.60 V	3	56.79	40.81
5	#10380.00	50.7 PK	68.3	-17.6	1.47 V	281	3.16	47.54
6	15570.00	65.2 PK	74.0	-8.8	1.39 V	47	12.90	52.30
7	15570.00	52.7 AV	54.0	-1.3	1.39 V	47	0.40	52.30

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL		Channel 46		FREQUENCY RANGE 1 ~ 40GHz
INPUT POWER		120Vac, 60 Hz		DETECTOR FUNCTION Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS		21deg. C, 67%RH		TESTED BY Kent Liu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	103.5 PK			1.30 H	295	62.61	40.89
2	*5230.00	93.5 AV			1.30 H	295	52.61	40.89
3	5350.00	57.7 PK	74.0	-16.3	1.00 H	12	16.54	41.14
4	5350.00	46.0 AV	54.0	-8.0	1.00 H	12	4.88	41.14
5	#10460.00	52.6 PK	68.3	-15.7	1.29 H	315	5.00	47.60
6	15690.00	62.6 PK	74.0	-11.4	1.19 H	67	10.49	52.11
7	15690.00	51.4 AV	54.0	-2.6	1.19 H	67	-0.71	52.11
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	111.2 PK			1.44 V	38	70.31	40.89
2	*5230.00	101.7 AV			1.44 V	38	60.81	40.89
3	5350.00	58.4 PK	74.0	-15.6	1.22 V	31	17.26	41.14
4	5350.00	46.0 AV	54.0	-8.0	1.22 V	31	4.86	41.14
5	#10460.00	50.3 PK	68.3	-18.0	1.50 V	268	2.70	47.60
6	15690.00	65.3 PK	74.0	-8.7	1.43 V	42	13.19	52.11
7	15690.00	52.6 AV	54.0	-1.4	1.43 V	42	0.49	52.11

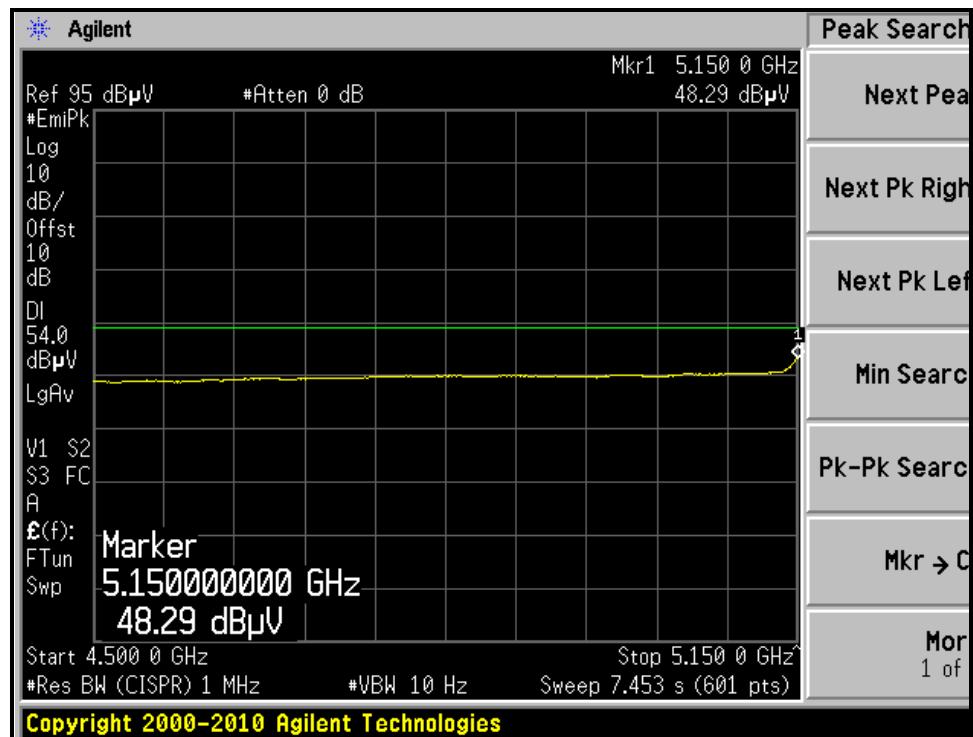
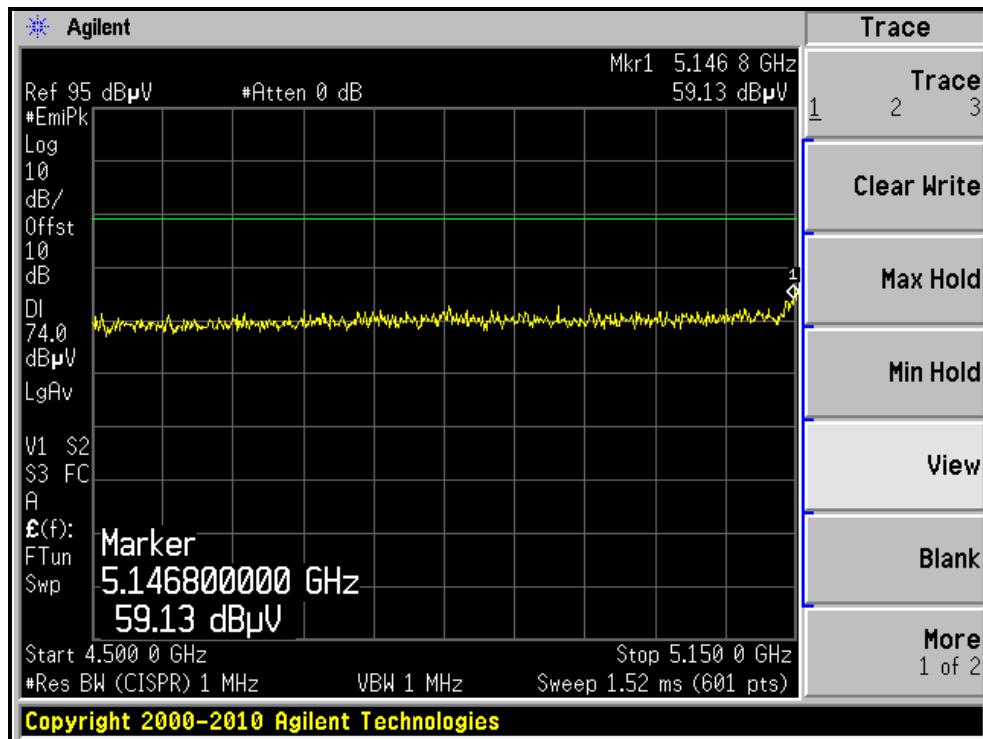
REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “*”: Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.



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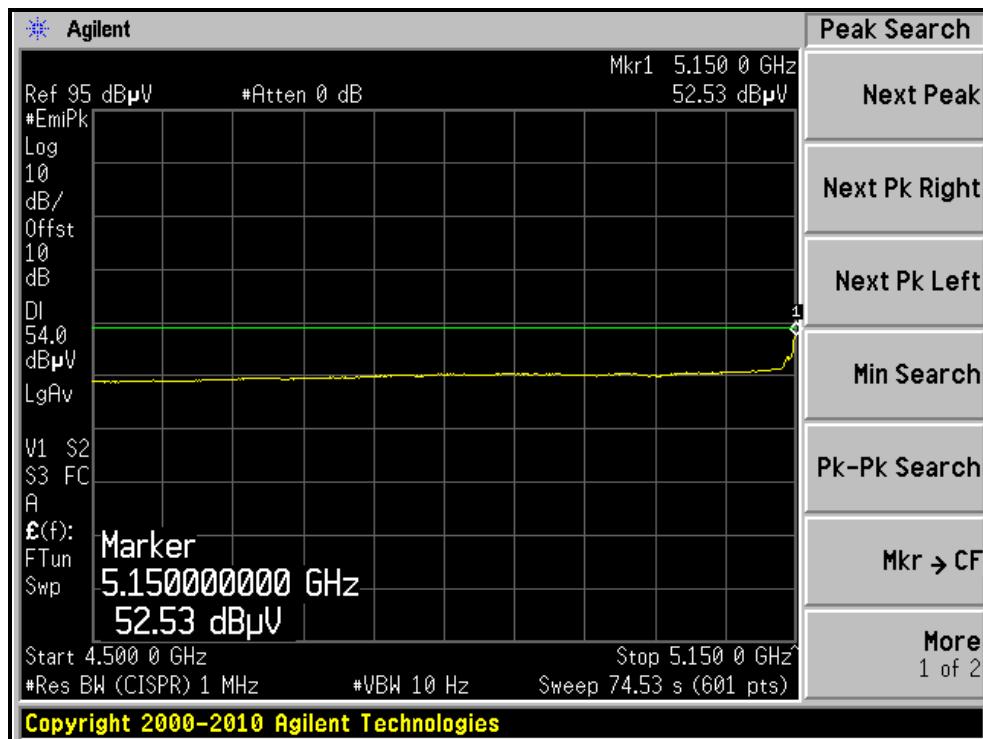
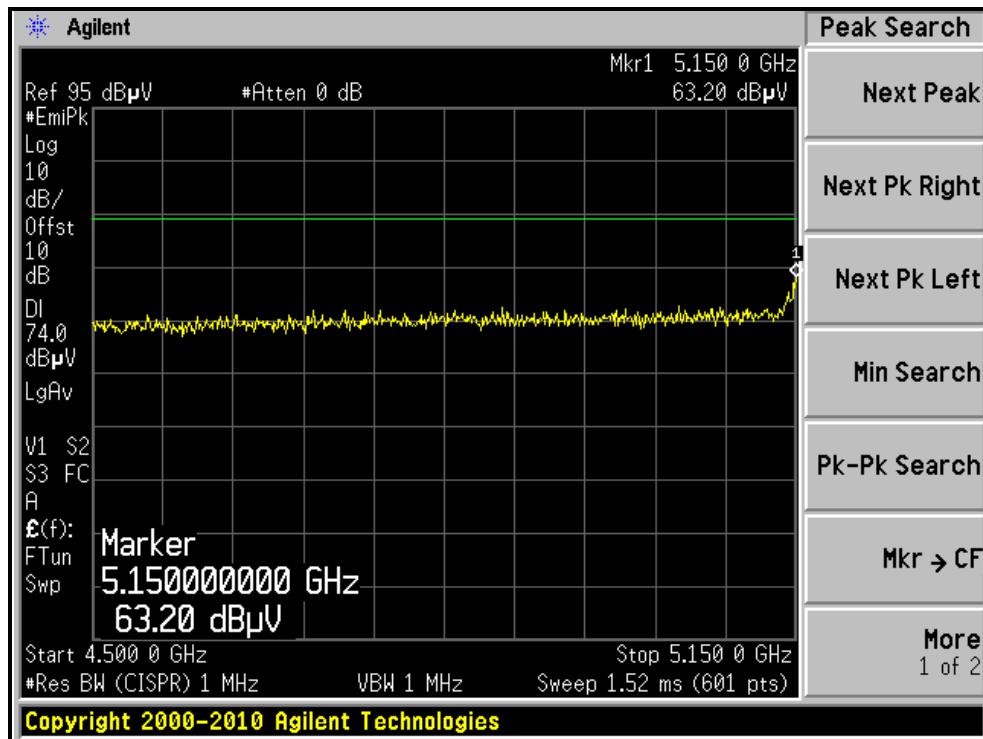
RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH38, HORIZONTAL)





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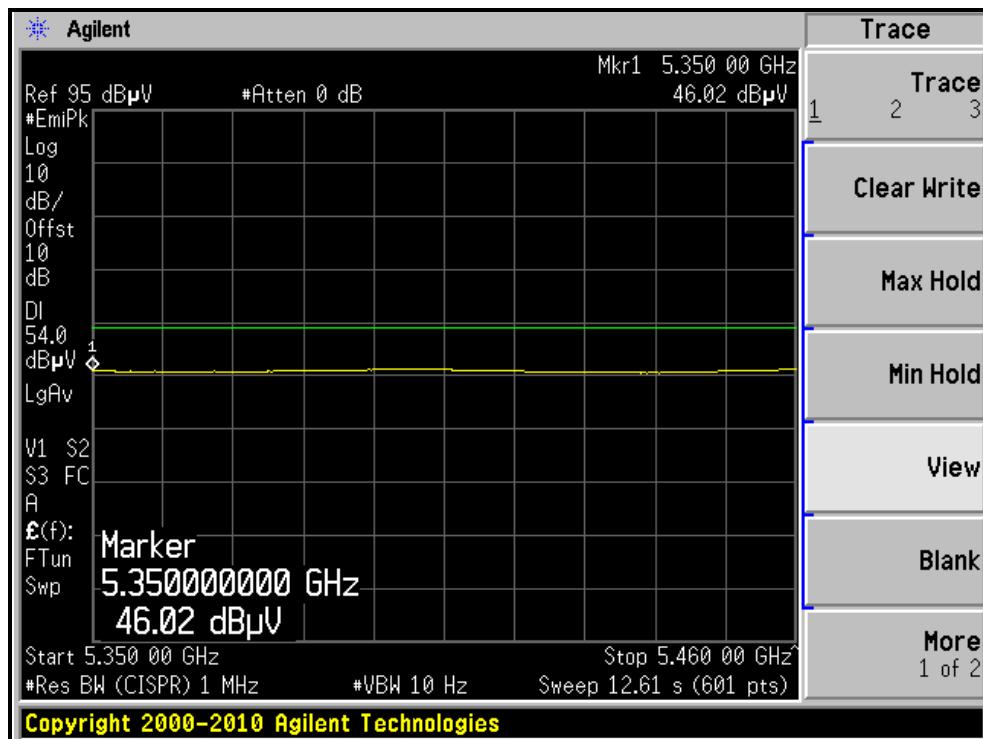
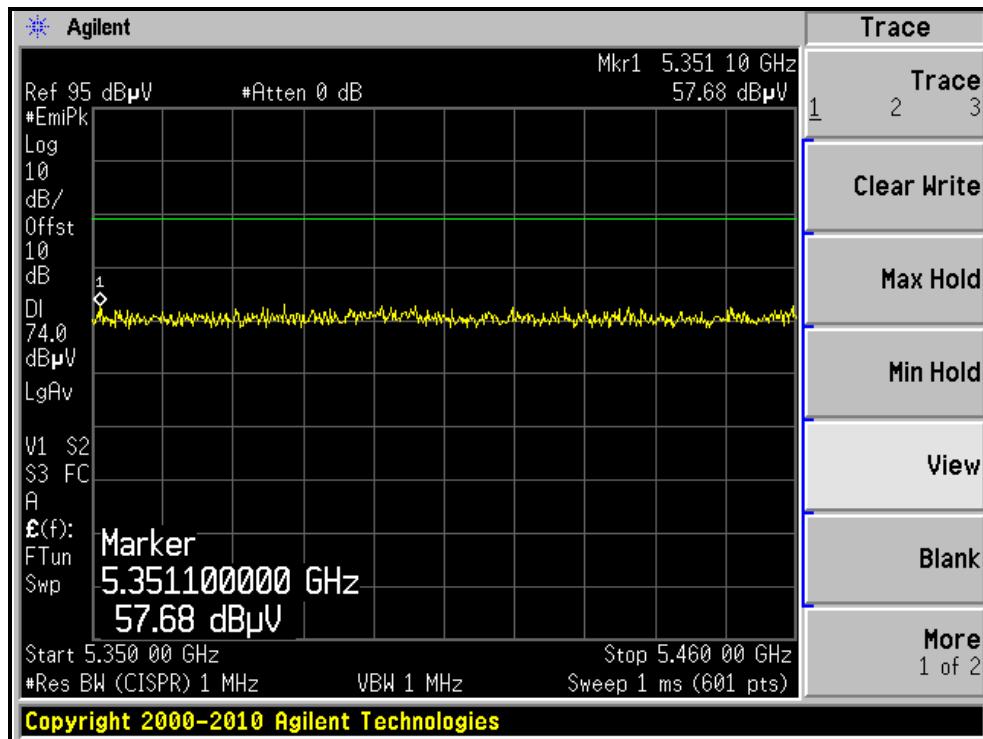
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH38, VERTICAL)





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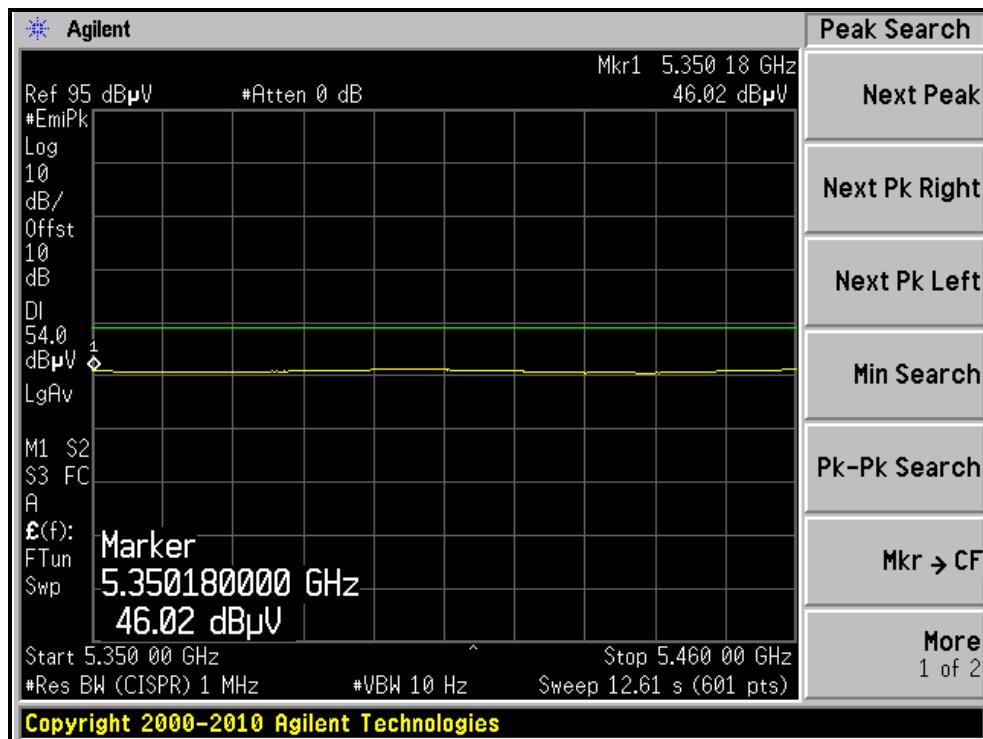
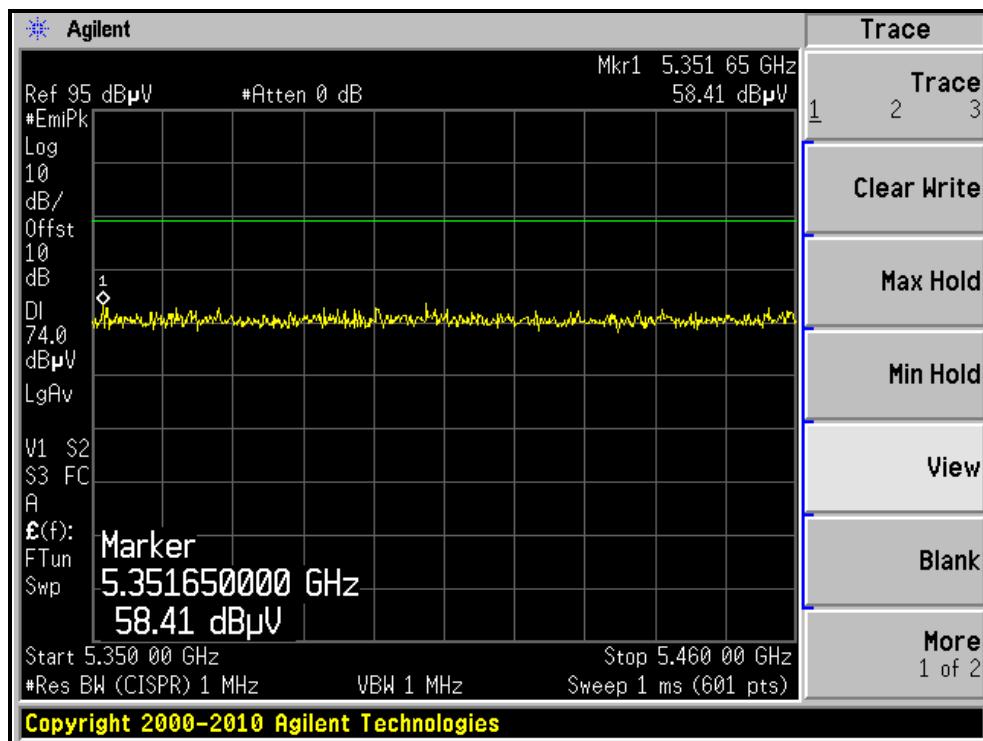
RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH46, HORIZONTAL)





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RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH46, VERTICAL)





4.3 OUTPUT TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF OUTPUT TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.47 – 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST INSTRUMENTS

Test date: Oct. 05, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 12, 2011	July 11, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.



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4.3.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 3MHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

NOTE:

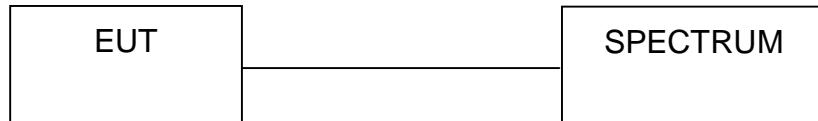
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



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4.3.7 TEST RESULTS

802.11a OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (dBm)			TOTAL OUTPUT POWER (mW)	TOTAL OUTPUT POWER (dBm)	OUTPUT POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)				
36	5180	8.9	7.0	8.0	19.1	12.8	15.6	PASS
40	5200	8.5	6.6	8.5	18.7	12.7	15.6	PASS
48	5240	8.7	6.7	8.6	19.3	12.9	15.6	PASS

$$\text{Directional gain} = 10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$$

$$\text{Effective Legacy Gain (dBi)} = 7.4$$

The effective legacy gain is 7.4dBi, therefore the limit needs to reduce.

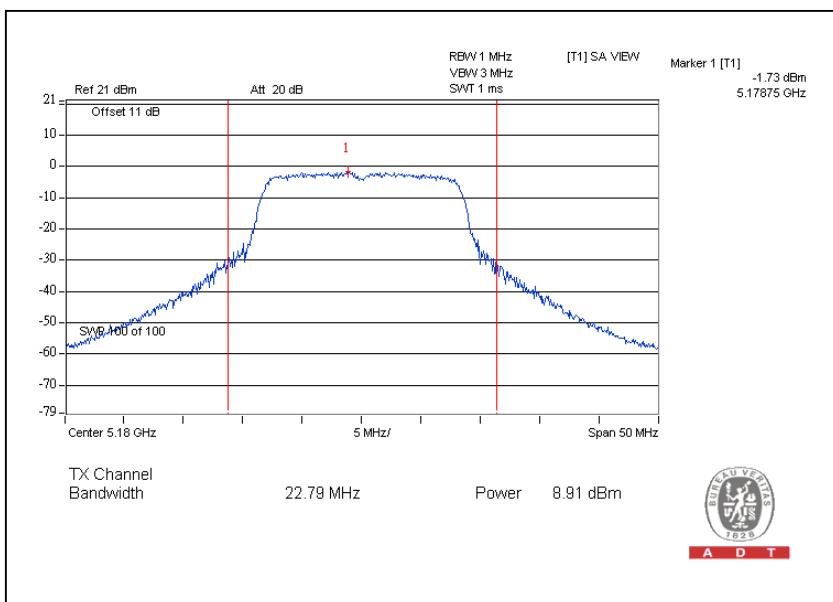
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)		
		CHAIN(0)	CHAIN(1)	CHAIN(2)
36	5180	22.79	21.56	22.78
40	5200	22.44	21.99	22.90
48	5240	22.84	22.40	22.17

NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

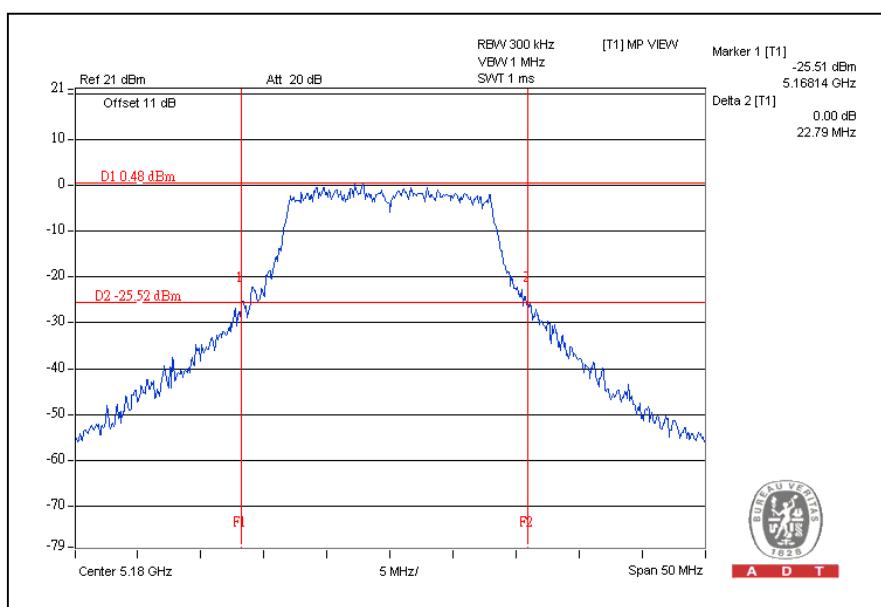


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**Power Output:
For CHAIN(0)
CH36**



**26dB Occupied Bandwidth:
CH36**





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802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (dBm)			TOTAL OUTPUT POWER (mW)	TOTAL OUTPUT POWER (dBm)	OUTPUT POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)				
36	5180	10.4	8.5	9.3	26.6	14.2	17	PASS
40	5200	10.4	8.5	9.8	27.6	14.4	17	PASS
48	5240	10.8	8.7	9.8	29.0	14.6	17	PASS

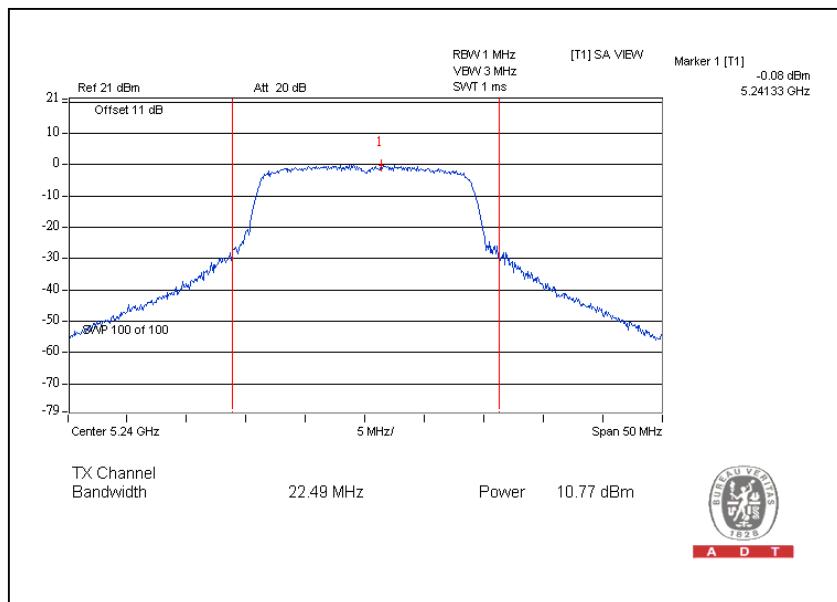
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)		
		CHAIN(0)	CHAIN(1)	CHAIN(2)
36	5180	23.87	22.62	23.41
40	5200	22.71	22.85	23.03
48	5240	22.49	22.61	23.44

NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

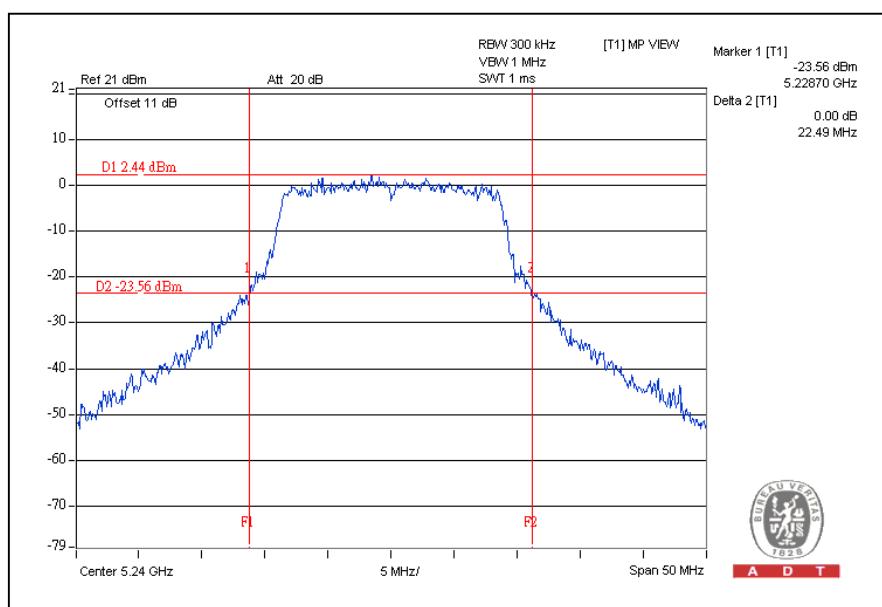


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**Power Output:
For CHAIN(0)
CH48**



**26dB Occupied Bandwidth:
CH48**





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802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (dBm)			TOTAL OUTPUT POWER (mW)	TOTAL OUTPUT POWER (dBm)	OUTPUT POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)				
38	5190	10.3	8.7	9.8	27.7	14.4	17	PASS
46	5230	10.7	8.7	10.0	29.2	14.7	17	PASS

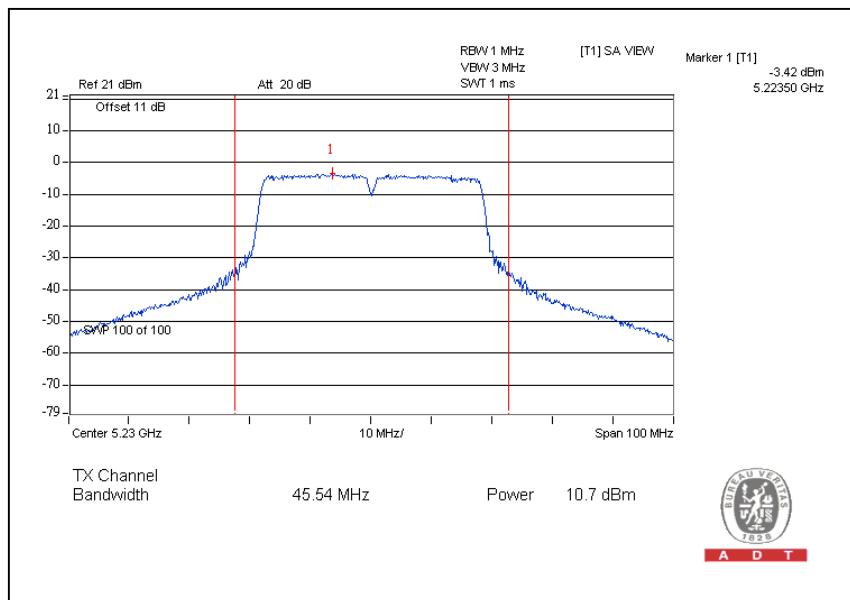
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc OCCUPIED BANDWIDTH (MHz)		
		CHAIN(0)	CHAIN(1)	CHAIN(2)
38	5190	44.62	43.09	43.58
46	5230	45.54	43.20	44.28

NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

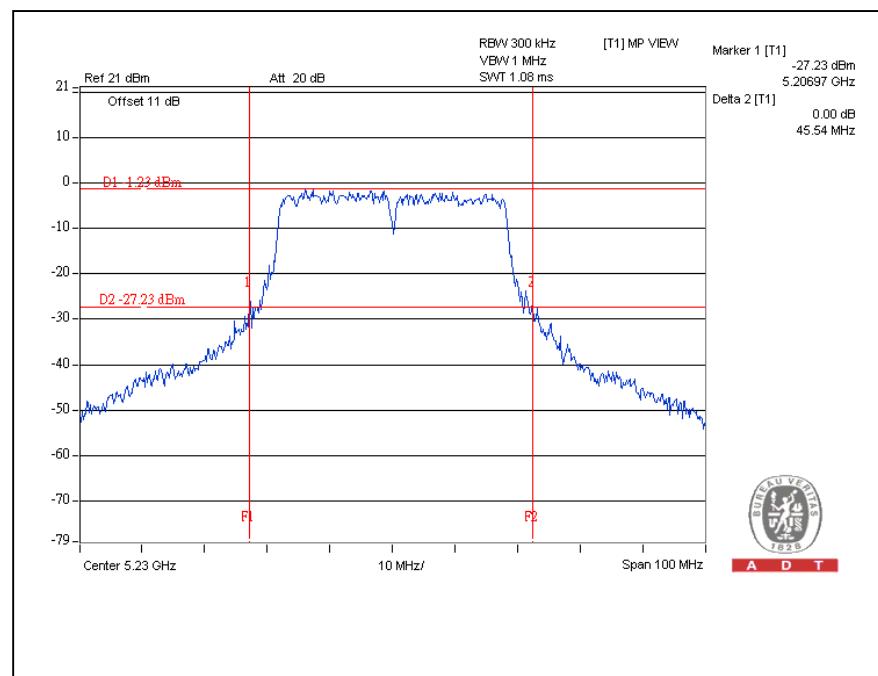


A D T

Power Output:
For CHAIN(0)
CH46



26dB Occupied Bandwidth:
CH46





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4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.47 – 5.725GHz	13dB
5.725 – 5.825 GHz	13dB

4.4.2 TEST INSTRUMENTS

Test date: Oct. 05, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 12, 2011	July 11, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURE

1. Connect the cable from the spectrum analyzer to the EUT antenna port using an appropriate RF attenuator.
2. Verify the antenna port selected is the active one if the system has more then one antenna.
3. Verify the unlicensed wireless device is set to operate at 100 % duty cycle at the maximum allowed power for operation.
4. Testing shall be done on the center frequency of each U-NII band.
5. Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be 13 dB for all frequencies across the emission bandwidth.
 - a. First trace: set RBW = 1 MHz, VBW = 3 MHz with peak detector and max hold settings.
 - b. Second trace: set RBW = 1 MHz, VBW = 3 MHz with sample detector and trace average across 100 traces in power averaging mode.

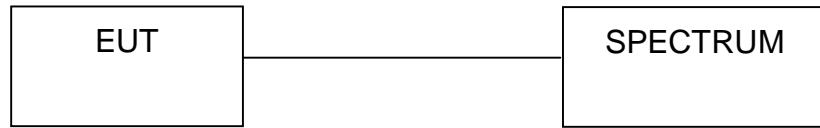
4.4.4 DEVIATION FROM TEST STANDARD

No deviation



A D T

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



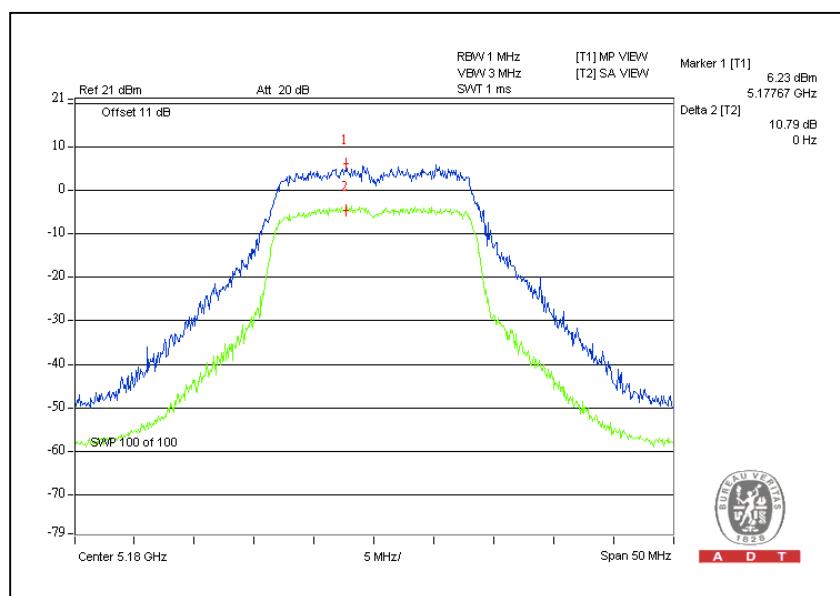
A D T

4.4.7 TEST RESULTS

802.11a OFDM MODULATION

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)		
36	5180	9.1	10.8	10.1	13	PASS
40	5200	9.5	10.3	10.7	13	PASS
48	5240	8.8	8.9	9.1	13	PASS

For CHAIN(1)
CH36





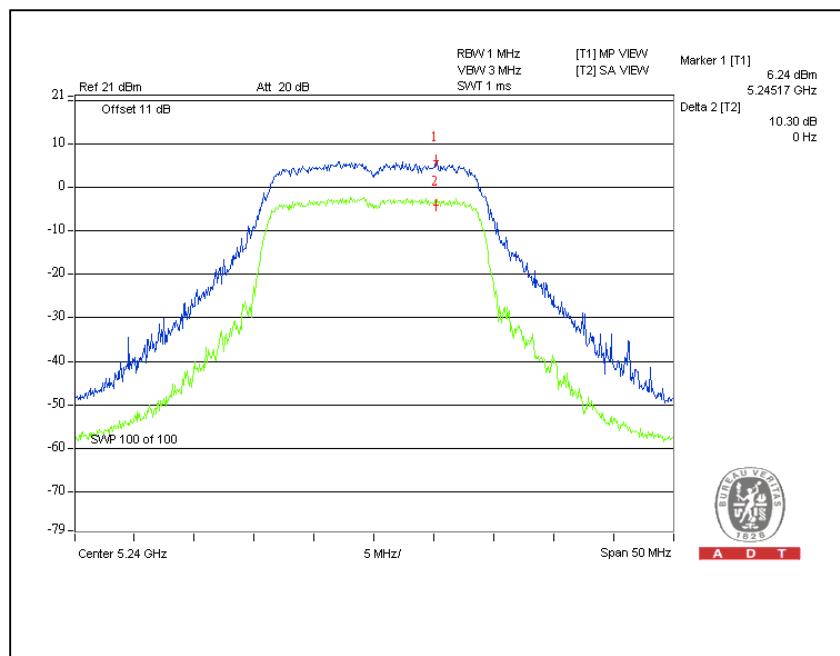
A D T

802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)		
36	5180	8.4	9.6	10.2	13	PASS
40	5200	8.7	9.3	10.0	13	PASS
48	5240	8.9	10.3	10.0	13	PASS

For CHAIN(1)

CH48



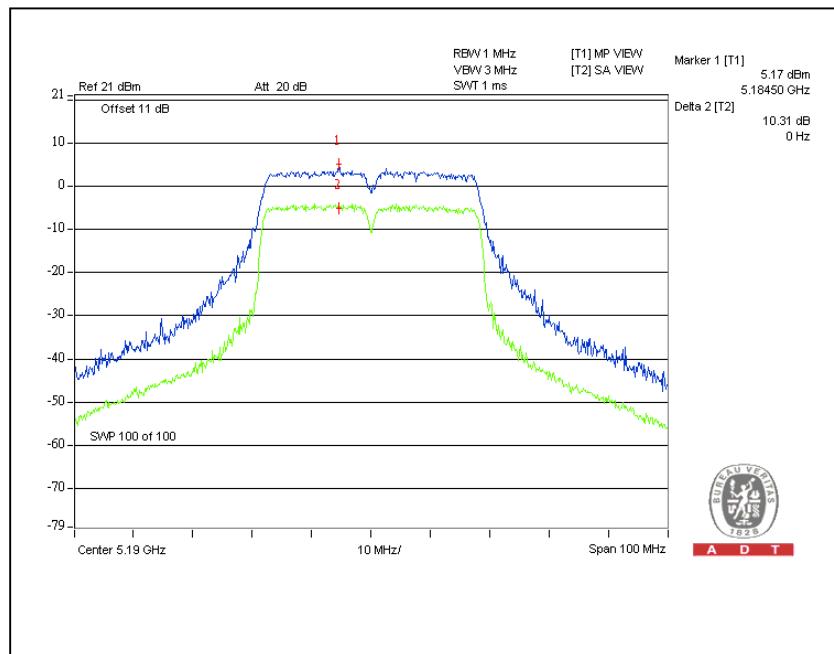


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802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)			PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)		
38	5190	10.3	9.3	10.1	13	PASS
46	5230	8.3	9.8	9.5	13	PASS

For CHAIN(0)
CH38





4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.47 – 5.725GHz	11dBm
5.725 ~ 5.825GHz	17dBm

4.5.2 TEST INSTRUMENTS

Test date: Oct. 05, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 12, 2011	July 11, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

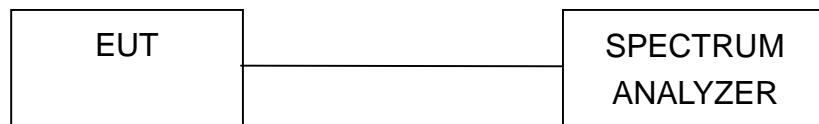
4.5.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6



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4.5.7 TEST RESULTS

802.11a OFDM MODULATION

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)			TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)			
36	5180	-1.7	-3.6	-2.8	2.1	2.6	PASS
40	5200	-2.0	-3.9	-2.0	2.2	2.6	PASS
48	5240	-1.9	-3.2	-1.8	2.5	2.6	PASS

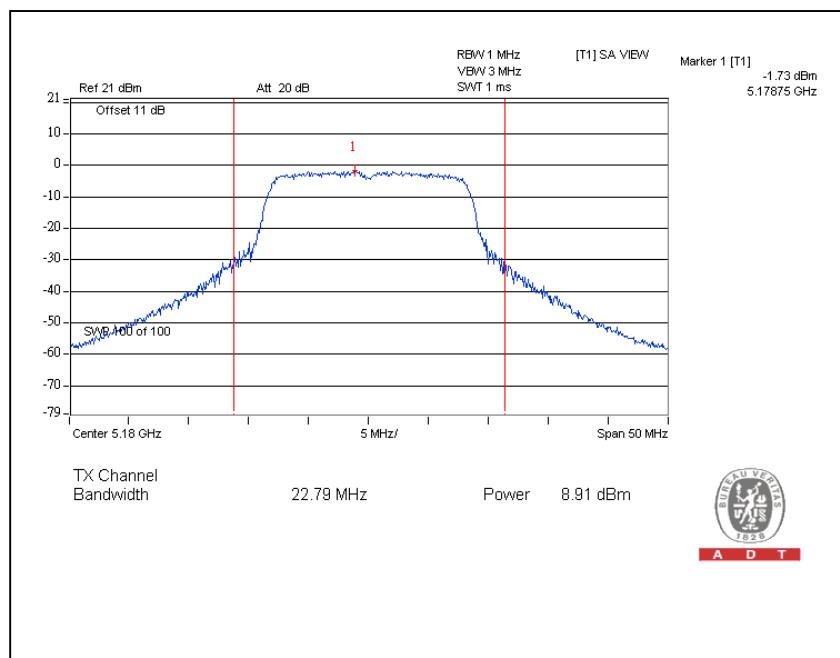
$$\text{Directional gain} = 10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$$

$$\text{Effective Legacy Gain (dBi)} = 7.4$$

The effective legacy gain is 7.4dBi, therefore the limit needs to reduce.

For CHAIN(0)

CH36



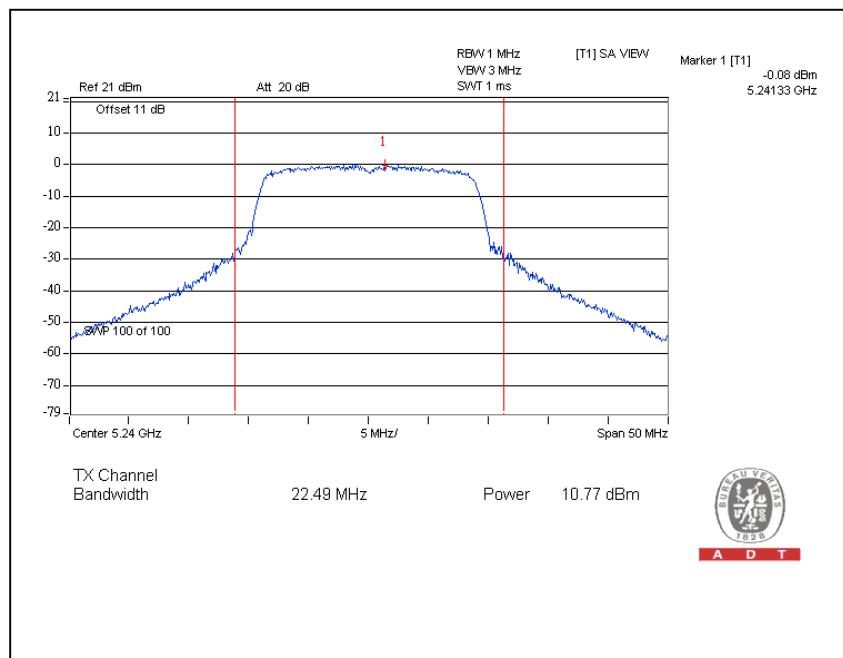


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802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)			TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)			
36	5180	-0.5	-2.3	-1.6	3.4	4	PASS
40	5200	-0.5	-2.2	-1.0	3.6	4	PASS
48	5240	-0.1	-2.1	-1.0	3.8	4	PASS

For CHAIN(0)
CH48



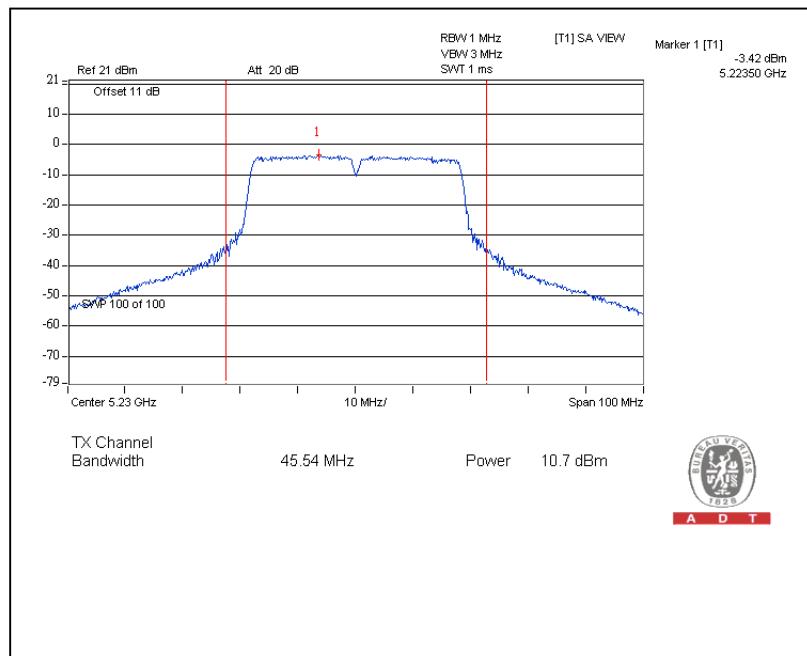


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802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)			TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(2)			
38	5190	-4.0	-5.3	-4.5	0.2	4	PASS
46	5230	-3.4	-5.3	-3.8	0.7	4	PASS

For CHAIN(0)
CH46





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4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within the band of the operating frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.6.2 TEST INSTRUMENTS

Test date: Oct. 05, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

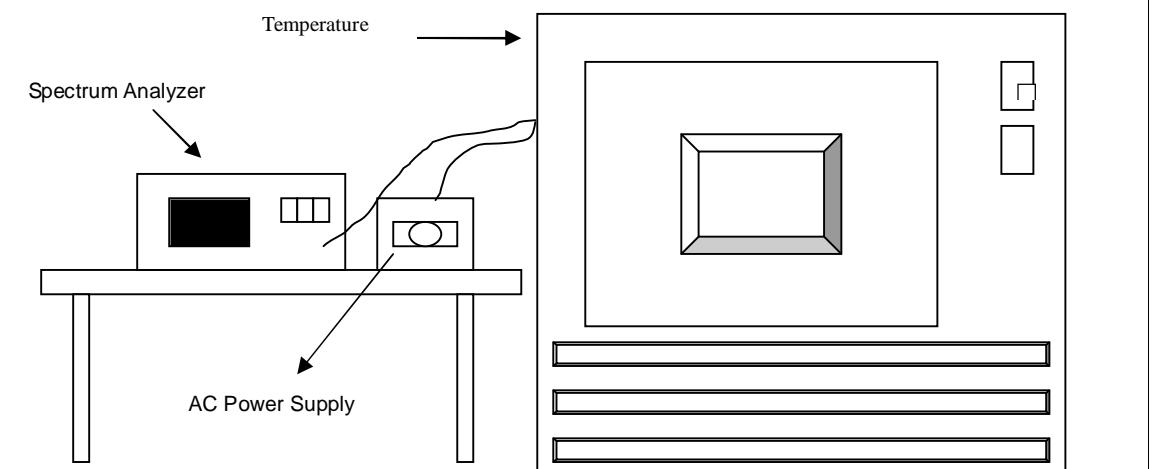
4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



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4.6.7 TEST RESULTS

Operating frequency: 5180MHz									
Temp. (°C)	Power supply (VAC)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(ppm)	(MHz)	(ppm)	(MHz)	(ppm)	(MHz)	(ppm)
50	138	5179.9852	-2.8571	5179.988	-2.3166	5179.9913	-1.6795	5179.9919	-1.5637
	120	5179.9858	-2.7413	5179.9888	-2.1622	5179.9898	-1.9691	5179.9926	-1.4286
	102	5179.9854	-2.8185	5179.9881	-2.2973	5179.9906	-1.8147	5179.9931	-1.3320
40	138	5179.9756	-4.7104	5179.9801	-3.8417	5179.9778	-4.2857	5179.9774	-4.3629
	120	5179.9763	-4.5753	5179.9801	-3.8417	5179.9783	-4.1892	5179.9771	-4.4208
	102	5179.9757	-4.6911	5179.9792	-4.0154	5179.9769	-4.4595	5179.9775	-4.3436
30	138	5180.0021	0.4054	5180.0042	0.8108	5180.0017	0.3282	5179.9984	-0.3089
	120	5180.0021	0.4054	5180.0031	0.5985	5180.0024	0.4633	5179.9998	-0.0386
	102	5180.0015	0.2896	5180.0043	0.8301	5180.0009	0.1737	5179.9999	-0.0193
20	138	5180.003	0.5792	5180.0006	0.1158	5179.9974	-0.5019	5179.9916	-1.6216
	120	5180.0033	0.6371	5180.0002	0.0386	5179.9964	-0.6950	5179.9914	-1.6602
	102	5180.0035	0.6757	5180.0006	0.1158	5179.9966	-0.6564	5179.993	-1.3514
10	138	5180.0196	3.7838	5180.0231	4.4595	5180.0252	4.8649	5180.0287	5.5405
	120	5180.0182	3.5135	5180.0217	4.1892	5180.0246	4.7490	5180.0277	5.3475
	102	5180.0188	3.6293	5180.0224	4.3243	5180.0265	5.1158	5180.0278	5.3668
0	138	5179.9873	-2.4517	5179.9867	-2.5676	5179.988	-2.3166	5179.9903	-1.8726
	120	5179.9864	-2.6255	5179.987	-2.5097	5179.9889	-2.1429	5179.9898	-1.9691
	102	5179.9865	-2.6062	5179.9857	-2.7606	5179.9871	-2.4903	5179.9896	-2.0077
-10	138	5179.9808	-3.7066	5179.9848	-2.9344	5179.9837	-3.1467	5179.9822	-3.4363
	120	5179.9797	-3.9189	5179.9859	-2.7220	5179.984	-3.0888	5179.9817	-3.5328
	102	5179.9803	-3.8031	5179.9859	-2.7220	5179.9837	-3.1467	5179.9822	-3.4363
-20	138	5180.0003	0.0579	5180.0005	0.0965	5179.9991	-0.1737	5180.0006	0.1158
	120	5179.9991	-0.1737	5179.9989	-0.2124	5179.9979	-0.4054	5180.0008	0.1544
	102	5179.9997	-0.0579	5180.0002	0.0386	5179.9992	-0.1544	5180.0004	0.0772
-30	138	5179.9959	-0.7915	5180.0003	0.0579	5179.9993	-0.1351	5180.0000	0.0000
	120	5179.9961	-0.7529	5180.0004	0.0772	5179.9992	-0.1544	5180.0017	0.3282
	102	5179.9959	-0.7915	5179.9999	-0.0193	5179.9977	-0.4440	5179.9999	-0.0193



4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.7.1 TEST INSTRUMENTS

Test date: Oct. 05, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	FSP 40	100060	May 11, 2011	May 10, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.7.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set RBW of spectrum analyzer to 1MHz with suitable frequency span including 100MHz or 200MHz bandwidth from band edge. The band edges was measured and recorded.

4.7.3 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.7.4 TEST RESULTS

For 5.15 to 5.25GHz band:

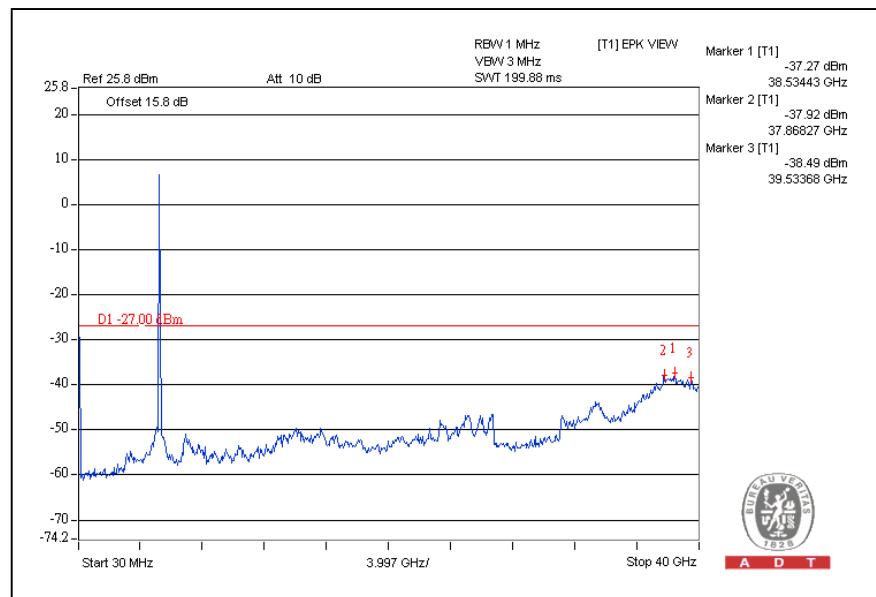
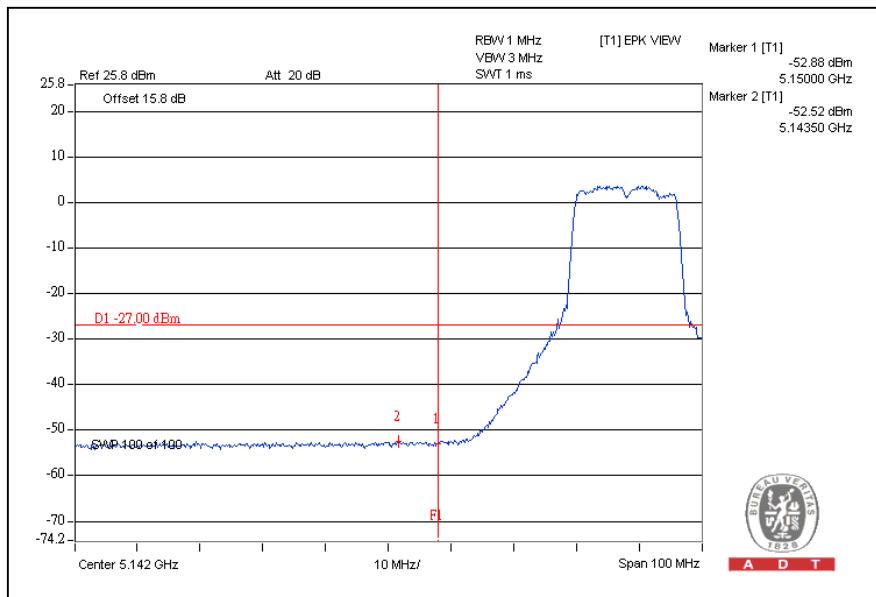
The spectrum plots (Peak RBW=1MHz, VBW=3MHz) are attached on the following pages.



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Performing measurements: Measure and add $10 \log(N)$ dB 802.11a OFDM modulation

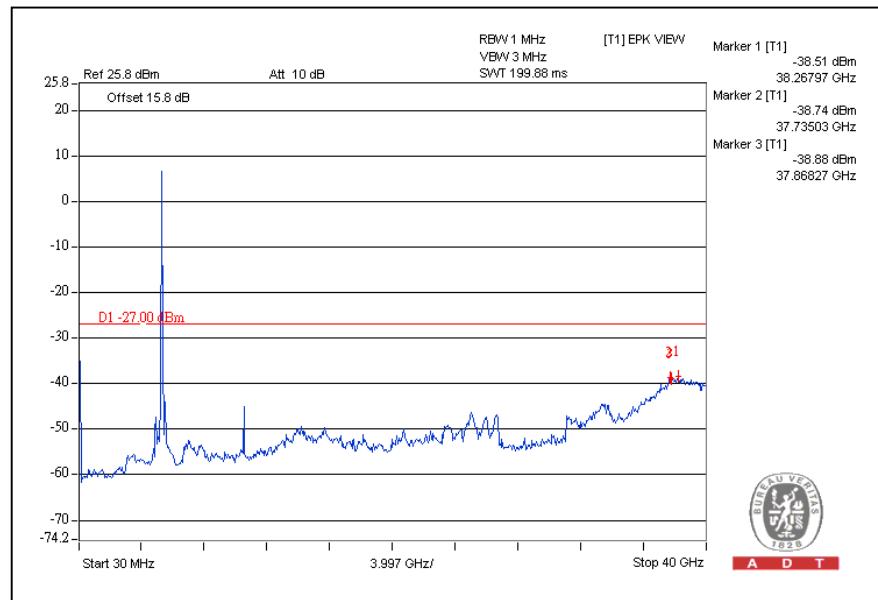
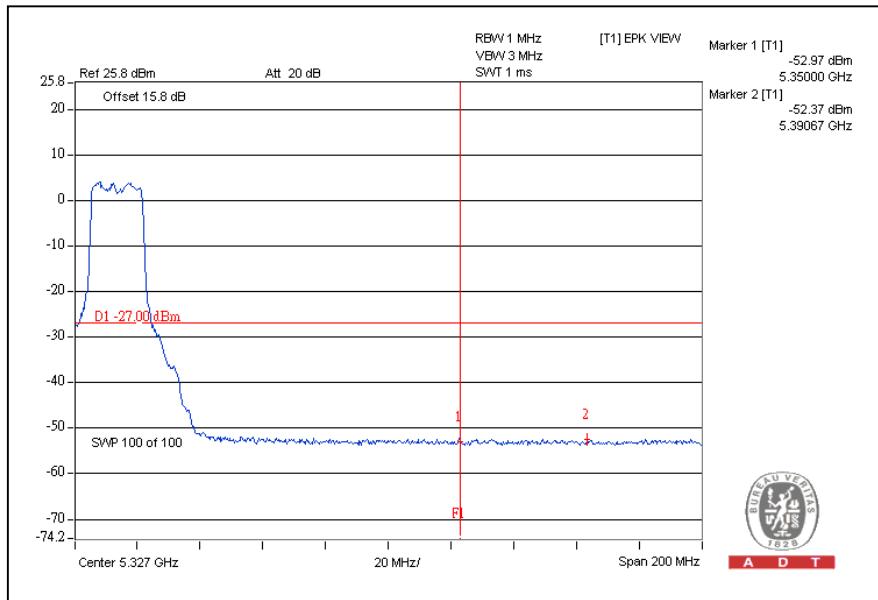
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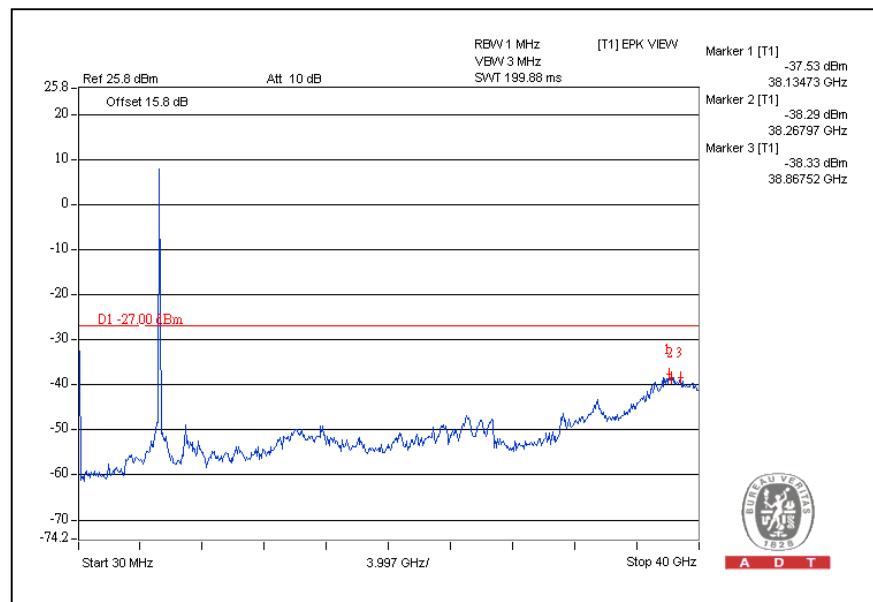
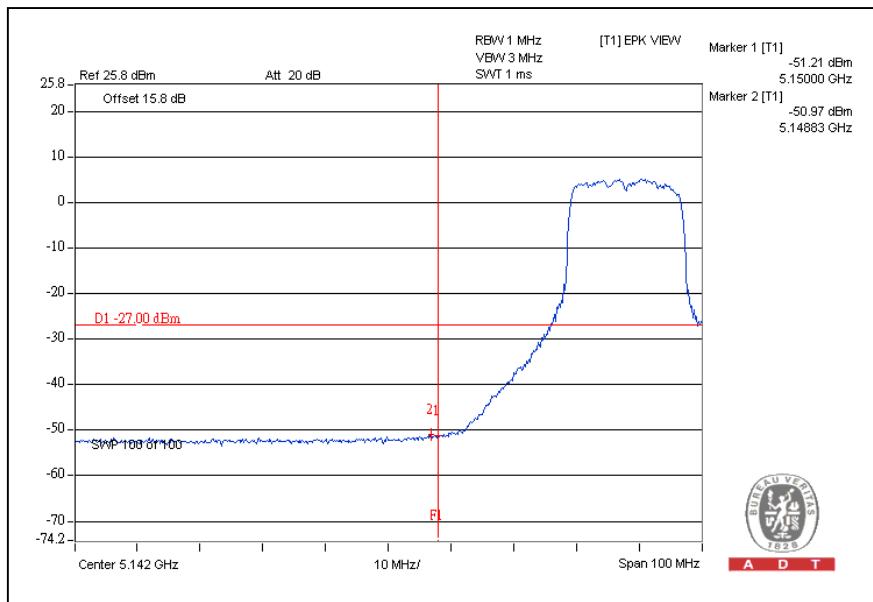




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802.11n (20MHz) OFDM MODULATION:

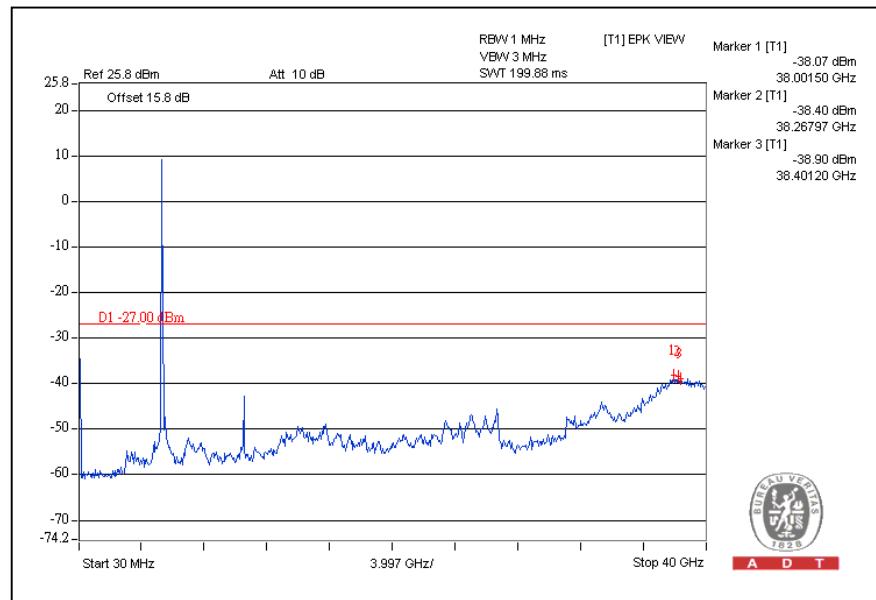
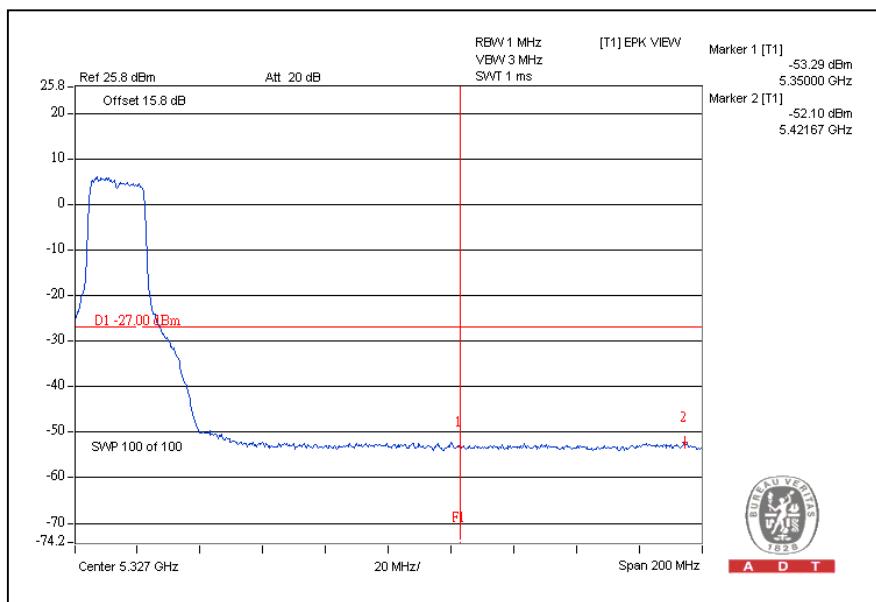
CH36





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CH48

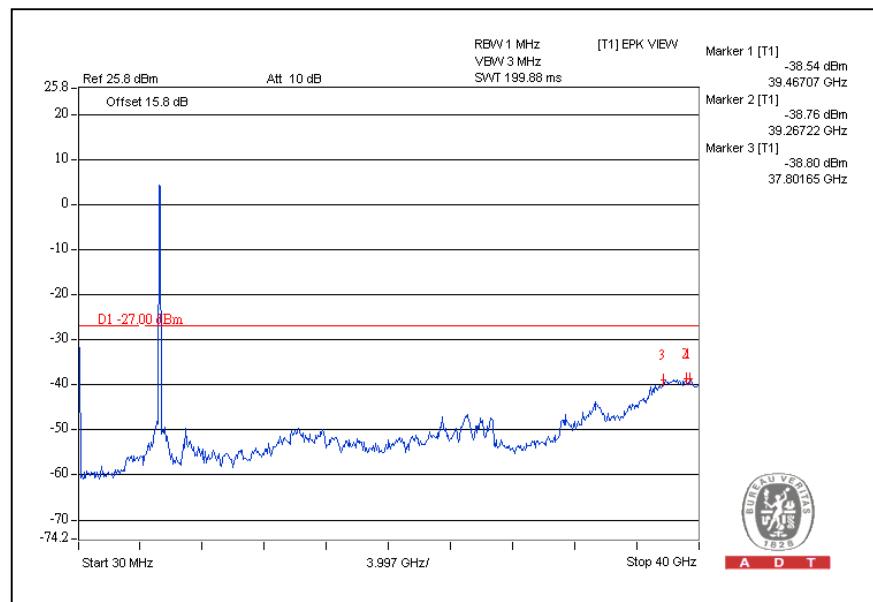
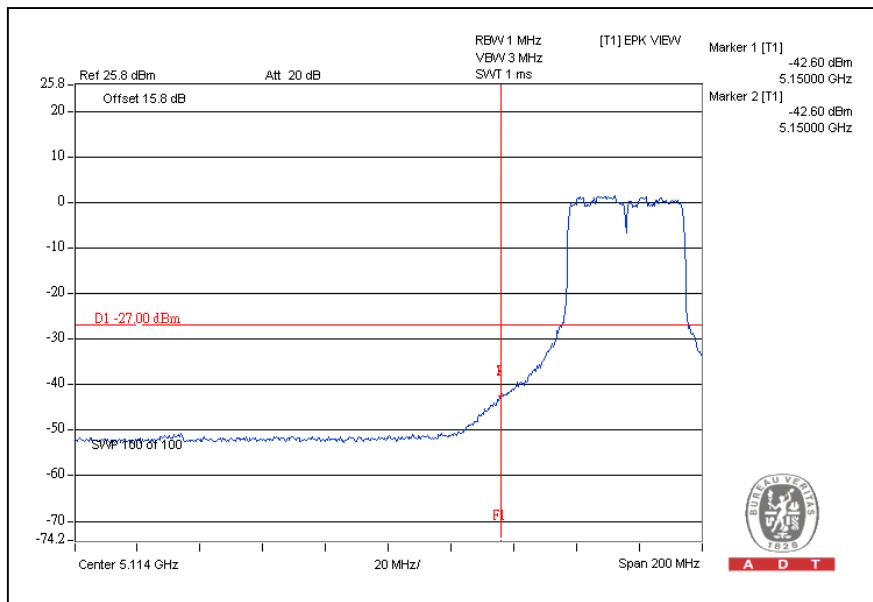




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802.11n (40MHz) OFDM MODULATION:

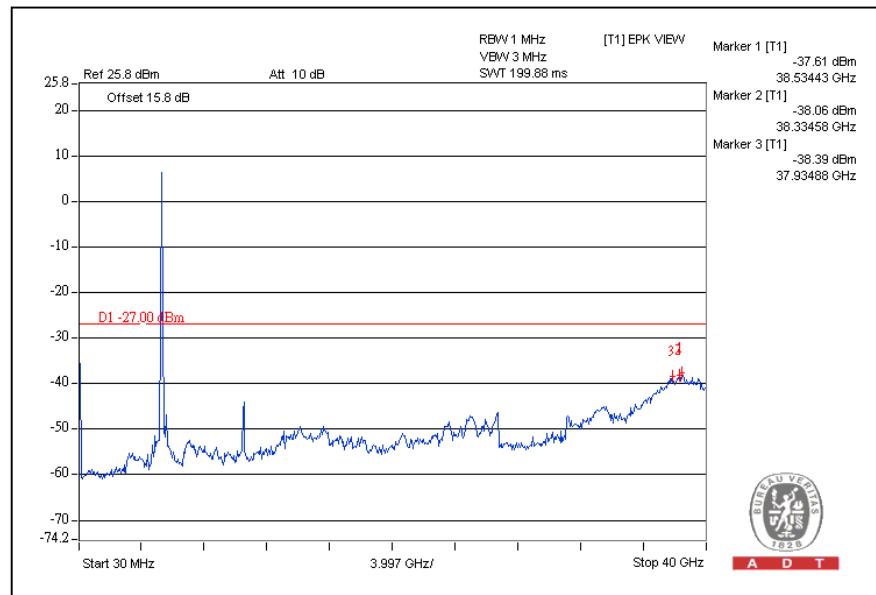
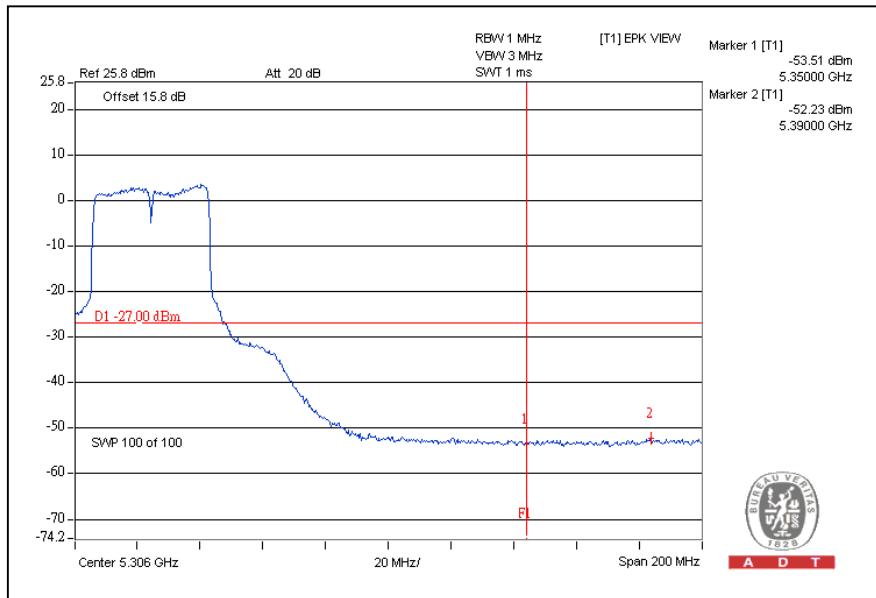
CH38





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CH46





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5. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5.phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232
Fax: 886-3-3185050

Email: service.adt@tw.bureauveritas.com

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.



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6.APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

--- END ---