



FCC TEST REPORT (15.407)

REPORT NO.: RF991008C05-1 R1

MODEL NO.: ISB7005

FCC ID: MXF-S981116N

RECEIVED: Oct. 08, 2010

TESTED: Oct. 08 to 29, 2010

ISSUED: Mar. 03, 2011

APPLICANT: Gemtek Technology Co., Ltd.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Feb. 21, 2011
RF991008C05-1 R1	<ol style="list-style-type: none">1. Remove all the U-NII band 2 and 3 product information and test data from test report.2. Revise the limit for emission frequencies which not falling in restricted band from 88.3dBuV/m to 68.3dBuV/m, also remove the average test result.3. Modify the test standard.4. Modify the information of item 3.1 notes.5. Modify the information of antennas	Mar. 03, 2011



1. CERTIFICATION

PRODUCT: Internet Protocol Wireless Set Top Box
BRAND NAME: Cisco
MODEL NO.: ISB7005
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Oct. 08 to 29, 2010
APPLICANT: Gemtek Technology Co., Ltd.
STANDARDS: FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10-2009

The above equipment (Model: ISB7005) 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 : Carol Liao , **DATE:** Mar. 03, 2011
(Carol Liao, Specialist)

APPROVED BY : May Chen , **DATE:** Mar. 03, 2011
(May Chen, Deputy Manager)



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2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

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 -1.74 dB at 0.451 MHz
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 -0.7dB at 5150.00MHz
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	No antenna connector is used.

NOTE:

1. The EUT was operating in 5.15~5.25GHz and 5.725~5.85GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz. For the 5.725~5.85GHz 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)	3.76 dB
Radiated emissions (1GHz -18GHz)	2.19 dB
Radiated emissions (18GHz -40GHz)	2.55 dB



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Internet Protocol Wireless Set Top Box
MODEL NO.	ISB7005
FCC ID	MXF-S981116N
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300 Mbps
FREQUENCY RANGE	For 15.407 802.11a: 5.18 ~ 5.24GHz
	For 15.247 802.11a: 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 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
MAXIMUM OUTPUT POWER	For 15.407 802.11a: 14.1mW 802.11n (20MHz): 31.0mW 802.11n (40MHz): 48.2mW
	For 15.247 802.11a: 213.8mW 802.11n (20MHz): 443.4mW 802.11n (40MHz): 423.4mW
ANTENNA TYPE	Please see note 1
ANTENNA CONNECTOR	Please see note 1
DATA CABLE	NA



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I/O PORTS	USB port x 2 COMPNT VIDEO port (Y/Pb/Pr) x 1 S-VIDEO port x 1 HDMI port x 1 Coaxial port x 1 RJ45 x 1 Fiber port x 1 AV port x 2
ASSOCIATED DEVICES	Adapter x 1 Remote control x 1

NOTE:

1. There are three antennas provided to this EUT, please refer to the following table:

Chain	Manufacture	Model	Antenna Gain (dBi)	Antenna Type	Connector	Remark
Chain (0) Antenna (1)	Airgain	M2450DLC	5	PCB	NA	-
Chain (1) Antenna (2)	Airgain	M5X05C	4	PIFA	NA	Rx only
Chain (2) Antenna (3)	Airgain	M2450DLCB	4	PCB	NA	-

2. The EUT must be supplied with a power adapter as following table:

Brand:	OEM
Model No.:	ADS0202-U120167
Input power :	AC 100-240V 0.6A 50~60Hz AC input cable (Unshielded, 1.5m)
Output power :	DC 12V 1.67A DC output cable (Unshielded, 1.8m)

3. The EUT is actually a 2x2 radio with diversity.
4. The EUT is a 2x2 with 2 spatial streams without beam forming.
5. The EUT complies with 802.11n standards and backwards compatible with 802. 11a products.
6. The above EUT information was declared by 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

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	
-	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission **RE < 1G**: Radiated Emission below 1GHz
RE ≥ 1G: Radiated Emission above 1GHz **APCM**: Antenna Port Conducted 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 (40MHz)	38 to 46	46	OFDM	BPSK	13.5

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 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 (40MHz)	38 to 46	46	OFDM	BPSK	13.5



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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 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 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, 48	OFDM	BPSK	6
802.11n (20MHz)	36 to 48	36, 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 by investigations.



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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

※ Bandwidth as show worst chain in report by investigations.

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE ³ G	25deg. C, 70%RH, 1012 hPa	120Vac, 60Hz	Eric Lee
RE<1G	28deg. C, 72%RH, 1012 hPa	120Vac, 60Hz	Rex Huang
PLC	24deg. C, 66%RH, 1012 hPa	120Vac, 60Hz	Wen Yu
APCM	25deg. C, 60%RH, 1012 hPa	120Vac, 60Hz	Eric Lee



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 C63.10-2009

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.



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3.4 DESCRIPTION OF SUPPORT UNITS

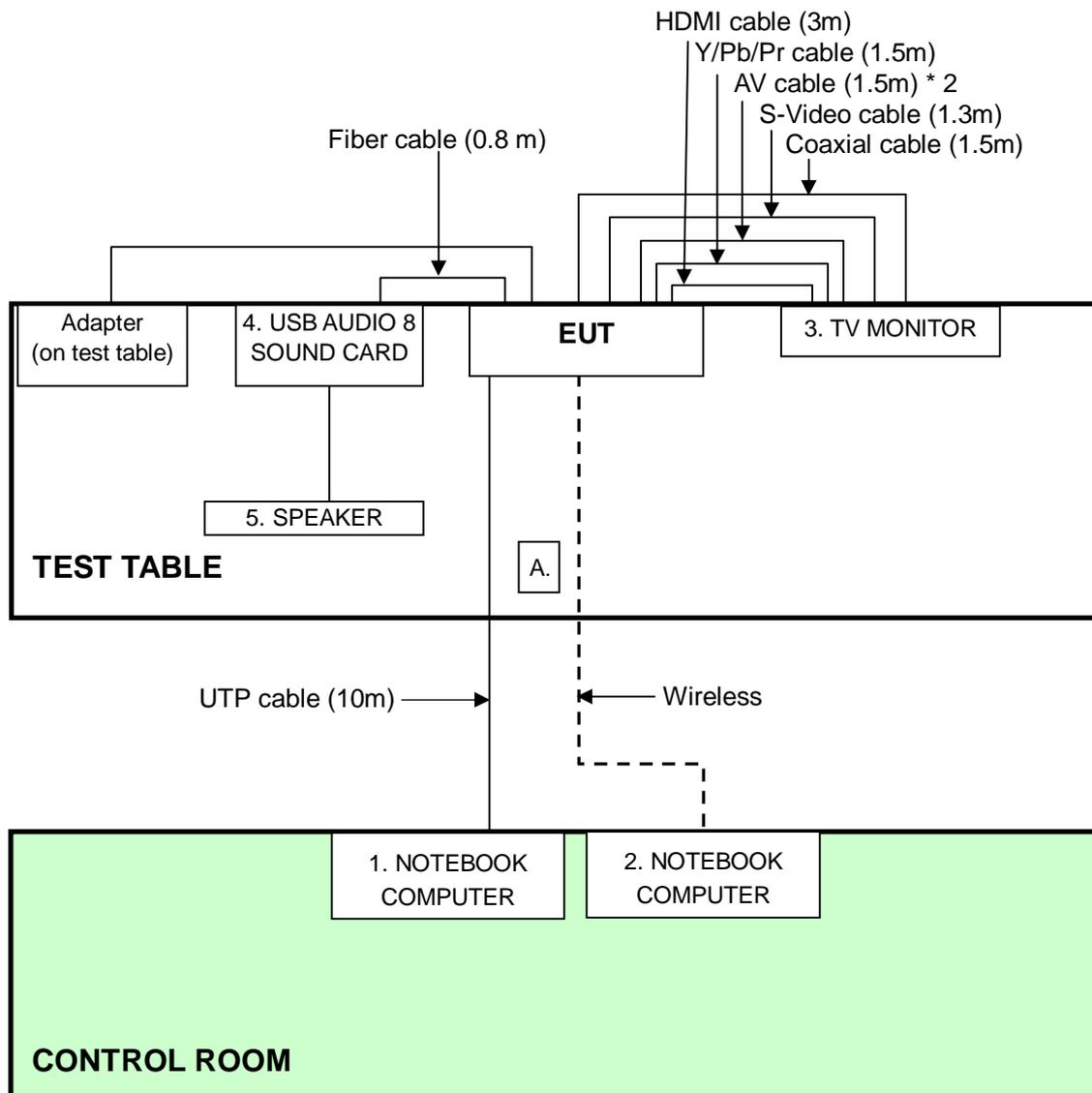
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166-5CA-0448	PIW632500516610
2	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
3	TV MONITOR	Panasonic	TH-L26K10W	9540684	NA
4	USB AUDIO 8 sound card	CASE	DSA-0101F-05 UP	5204	NA
5	SPEAKERS	J-S	JY2003	090404619	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable (10m)
2	NA
3	HDMI cable (3m)/ Y/Pb/Pr cable (1.5m) / AV cable (1.5m) / S-Video cable (1.3m) / Coaxial cable (1.5m)
4	Fiber cable (0.8 m)
5	Audio cable (1.3m)

NOTE: 1. All power cords of the above support units are non shielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



NOTE: 1. Item A is the remote control of the EUT.



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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. 29, 2010

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 09, 2010	Mar. 08, 2011
Line-Impedance Stabilization Network (for EUT)	NSLK 8127	8127-522	Sep. 22, 2010	Sep. 21, 2011
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Oct. 25, 2010	Oct. 24, 2011
RF Cable (JYEBAO)	5DFB	COBCAB-001	Nov. 24, 2009	Nov. 23, 2010
50 ohms Terminator	50	3	Oct. 27, 2010	Oct. 26, 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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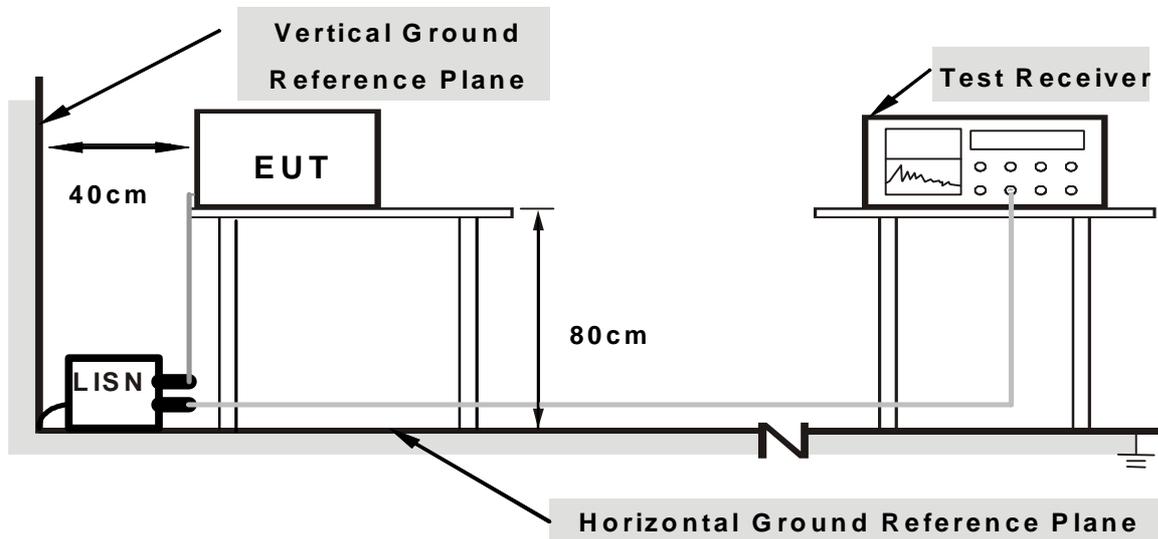
4.1.3 TEST PROCEDURES

- 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.
- b. The two LISNs 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 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

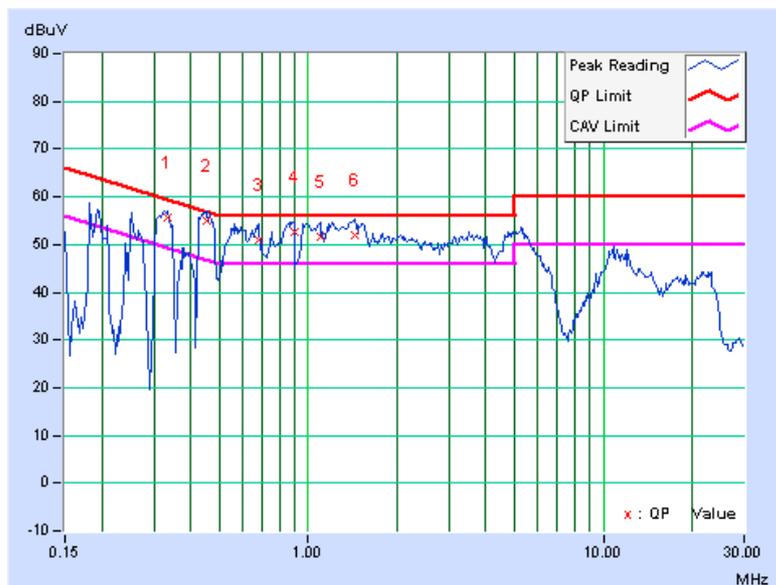
1. Placed the EUT on testing table.
2. Prepared other computer systems (support unit 1, 2) to act as communication partners and placed them outside of testing area.
3. The communication partners ran test program “Broadcom wl command” to enable EUT under transmission/receiving condition continuously at specific channel frequency via one UTP cable and wireless.

4.1.7 TEST RESULTS

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.334	0.09	55.54	43.16	55.63	43.25	59.36	49.36	-3.73	-6.11
2	0.451	0.09	54.99	41.19	55.08	41.28	56.86	46.86	-1.78	-5.58
3	0.682	0.09	50.71	37.72	50.80	37.81	56.00	46.00	-5.20	-8.19
4	0.897	0.10	52.61	33.75	52.71	33.85	56.00	46.00	-3.29	-12.15
5	1.096	0.10	51.66	35.78	51.76	35.88	56.00	46.00	-4.24	-10.12
6	1.432	0.10	51.94	37.93	52.04	38.03	56.00	46.00	-3.96	-7.97

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



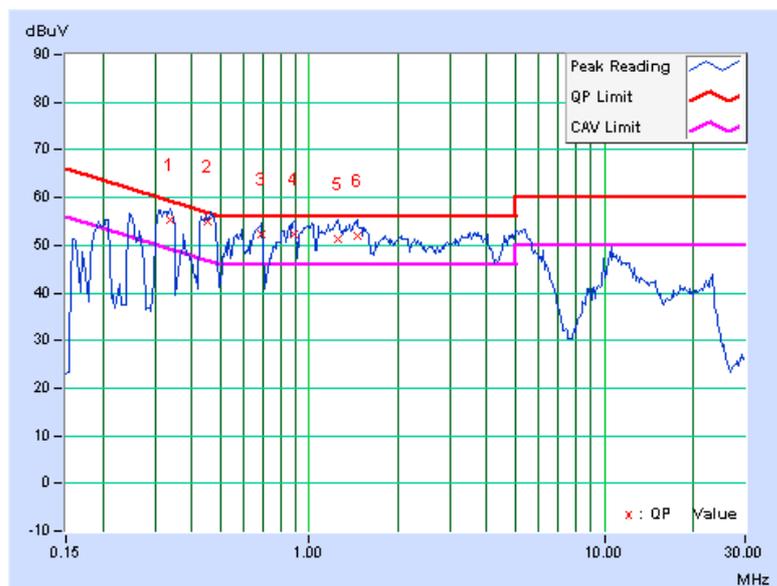


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PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.338	0.10	55.24	42.62	55.34	42.72	59.26	49.26	-3.92	-6.54
2	0.451	0.10	55.01	40.38	55.11	40.48	56.85	46.85	-1.74	-6.37
3	0.690	0.10	52.30	35.88	52.40	35.98	56.00	46.00	-3.60	-10.02
4	0.885	0.11	52.18	35.74	52.29	35.85	56.00	46.00	-3.71	-10.15
5	1.245	0.11	51.21	36.90	51.32	37.01	56.00	46.00	-4.68	-8.99
6	1.452	0.11	52.02	36.64	52.13	36.75	56.00	46.00	-3.87	-9.25

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. 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 (dBuV/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.



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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. 21 to 27, 2010

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 23, 2010	Aug. 22, 2011
Agilent Pre-Selector	N9039A	MY46520310	Aug. 23, 2010	Aug. 22, 2011
Agilent Signal Generator	N5181A	MY49060347	July 30, 2010	July 29, 2011
LIG NEX1 Test Receiver	ER-265	L09068005	Aug. 30, 2010	Aug. 29, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 18, 2009	Nov. 17, 2010
Agilent Pre-Amplifier	8449B	3008A02465	Mar. 01, 2010	Feb. 28, 2011
Miteq Pre-Amplifier	AFS33-1800265 0-30-8P-44	881786	NA	NA
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 28, 2010	Apr. 27, 2011
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 16, 2009	Nov. 15, 2010
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-205 RF104-207 RF104-208	Dec. 24, 2009	Dec. 23, 2010
RF Cable	NA	CHHCAB_001	NA	NA
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 a 3 meters chamber room. 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 antenna is a broadband antenna, and its height 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

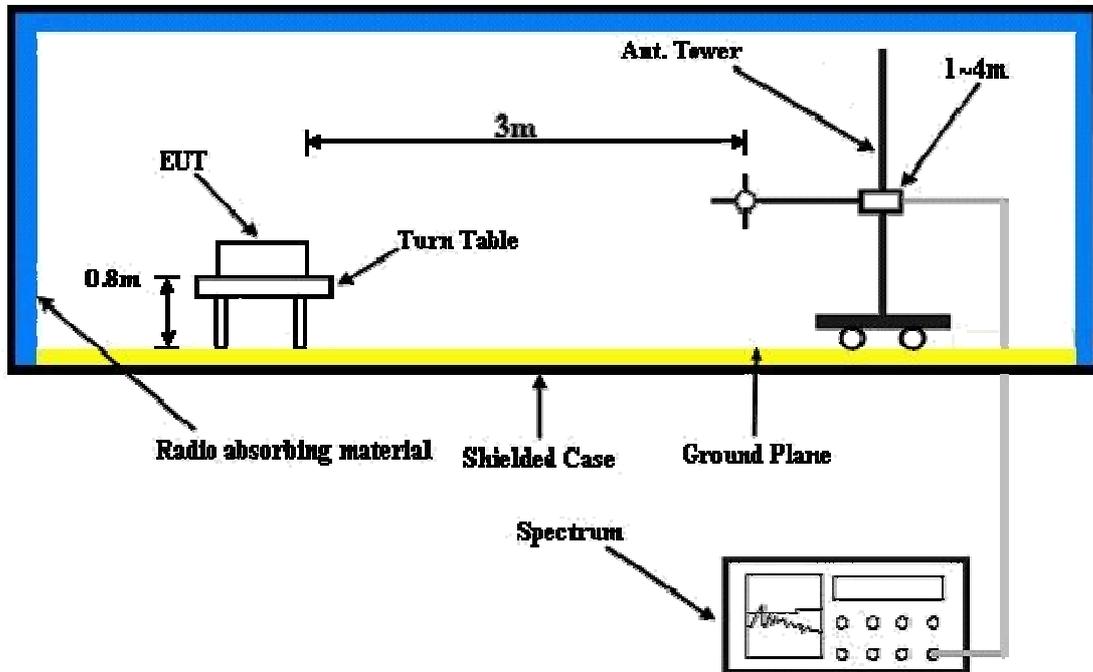
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and 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 1 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

Same as 4.1.6



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4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA : 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 72%RH 1012 hPa	TESTED BY	Rex 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	174.95	37.9 QP	43.5	-5.6	1.50 H	288	24.25	13.65
2	250.00	40.6 QP	46.0	-5.4	1.25 H	206	27.69	12.95
3	300.00	43.2 QP	46.0	-2.8	1.25 H	247	28.27	14.91
4	325.01	45.0 QP	46.0	-1.0	1.06 H	268	29.34	15.66
5	599.97	42.4 QP	46.0	-3.6	1.50 H	329	19.82	22.54
6	624.96	42.0 QP	46.0	-4.0	1.25 H	327	19.22	22.76
7	675.05	40.5 QP	46.0	-5.5	1.25 H	325	17.28	23.19

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	34.1 QP	40.0	-5.9	1.00 V	268	21.26	12.88
2	98.45	38.0 QP	43.5	-5.5	1.00 V	61	28.05	9.91
3	187.74	41.6 QP	43.5	-1.9	1.50 V	156	29.45	12.13
4	250.03	40.4 QP	46.0	-5.7	1.25 V	0	27.40	12.95
5	324.99	42.9 QP	46.0	-3.2	1.25 V	336	27.19	15.66
6	599.97	41.8 QP	46.0	-4.2	1.00 V	226	19.30	22.54

- 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	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

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	58.4 PK	74.0	-15.6	1.29 H	70	17.23	41.17
2	5150.00	46.4 AV	54.0	-7.6	1.29 H	70	5.23	41.17
3	*5180.00	96.4 PK			1.31 H	62	55.17	41.23
4	*5180.00	85.6 AV			1.31 H	62	44.37	41.23
5	#10360.00	50.7 PK	68.3	-17.6	1.48 H	205	2.76	47.94
6	15540.00	65.3 PK	74.0	-8.7	1.50 H	358	12.77	52.53
7	15540.00	50.6 AV	54.0	-3.4	1.50 H	358	-1.93	52.53
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	67.6 PK	74.0	-6.4	1.34 V	140	26.43	41.17
2	5150.00	53.3 AV	54.0	-0.7	1.34 V	140	12.13	41.17
3	*5180.00	107.3 PK			1.15 V	121	66.07	41.23
4	*5180.00	96.5 AV			1.15 V	121	55.27	41.23
5	#10360.00	63.1 PK	68.3	-5.2	1.31 V	170	15.16	47.94
6	15540.00	63.9 PK	74.0	-10.1	1.34 V	170	11.37	52.53
7	15540.00	49.9 AV	54.0	-4.1	1.34 V	170	-2.63	52.53

- 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	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

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	96.5 PK			1.29 H	60	55.23	41.27
2	*5200.00	85.9 AV			1.29 H	60	44.63	41.27
3	#10400.00	50.2 PK	68.3	-18.1	1.30 H	305	2.22	47.98
4	15600.00	65.4 PK	74.0	-8.6	1.45 H	45	12.70	52.70
5	15600.00	50.3 AV	54.0	-3.7	1.45 H	45	-2.40	52.70

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	106.9 PK			1.20 V	123	65.63	41.27
2	*5200.00	96.4 AV			1.20 V	123	55.13	41.27
3	#10400.00	62.2 PK	68.3	-6.1	1.12 V	189	14.22	47.98
4	15600.00	63.5 PK	74.0	-10.5	1.26 V	148	10.80	52.70
5	15600.00	49.3 AV	54.0	-4.7	1.26 V	148	-3.40	52.70

- 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	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

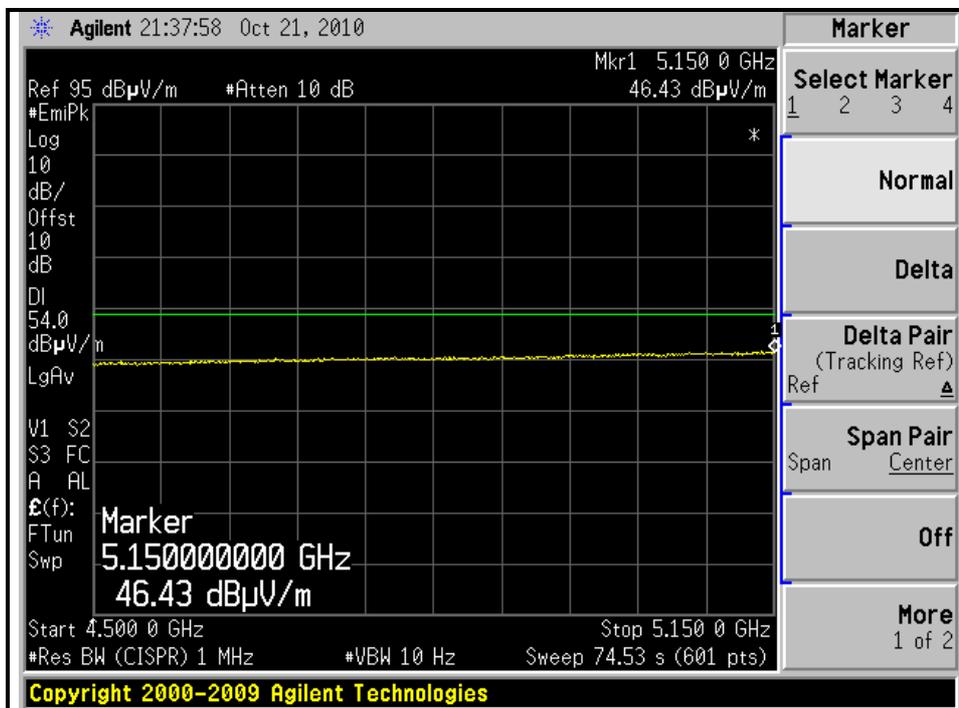
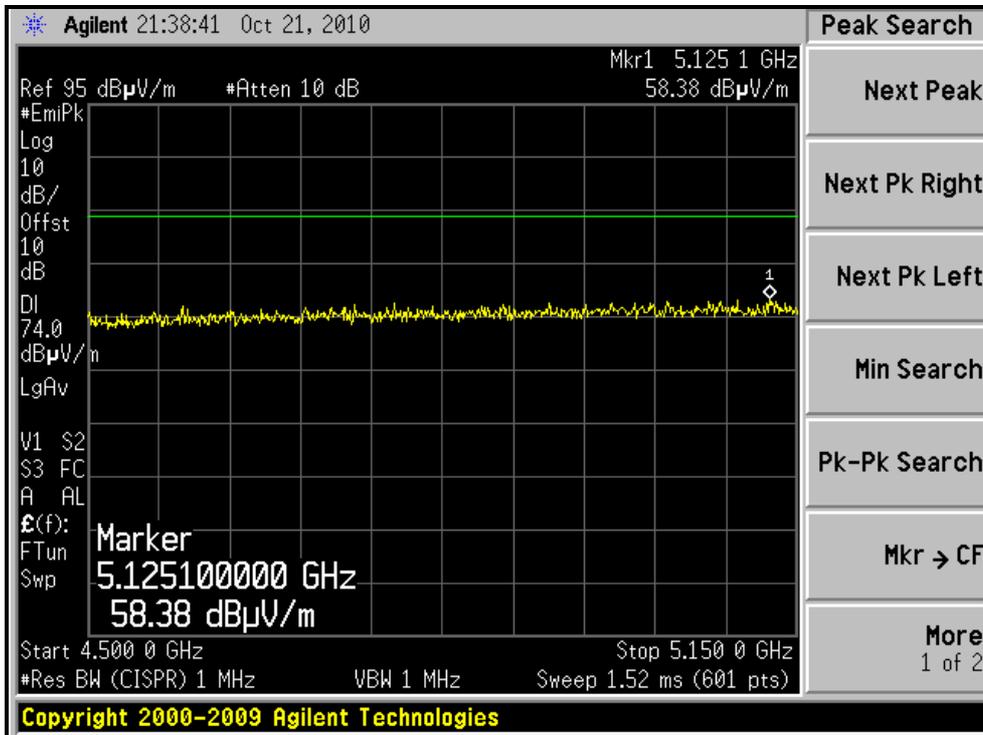
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NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	97.1 PK			1.31 H	71	55.75	41.35
2	*5240.00	86.1 AV			1.31 H	71	44.75	41.35
3	#10480.00	50.8 PK	68.3	-17.5	1.34 H	88	2.74	48.06
4	15720.00	65.6 PK	74.0	-8.4	1.28 H	49	12.58	53.02
5	15720.00	50.2 AV	54.0	-3.8	1.28 H	49	-2.82	53.02
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	107.2 PK			1.13 V	165	65.85	41.35
2	*5240.00	96.2 AV			1.13 V	165	54.85	41.35
3	#10480.00	62.4 PK	68.3	-5.9	1.15 V	68	14.34	48.06
4	15720.00	63.6 PK	74.0	-10.4	1.68 V	141	10.58	53.02
5	15720.00	49.2 AV	54.0	-4.8	1.68 V	141	-3.82	53.02

- 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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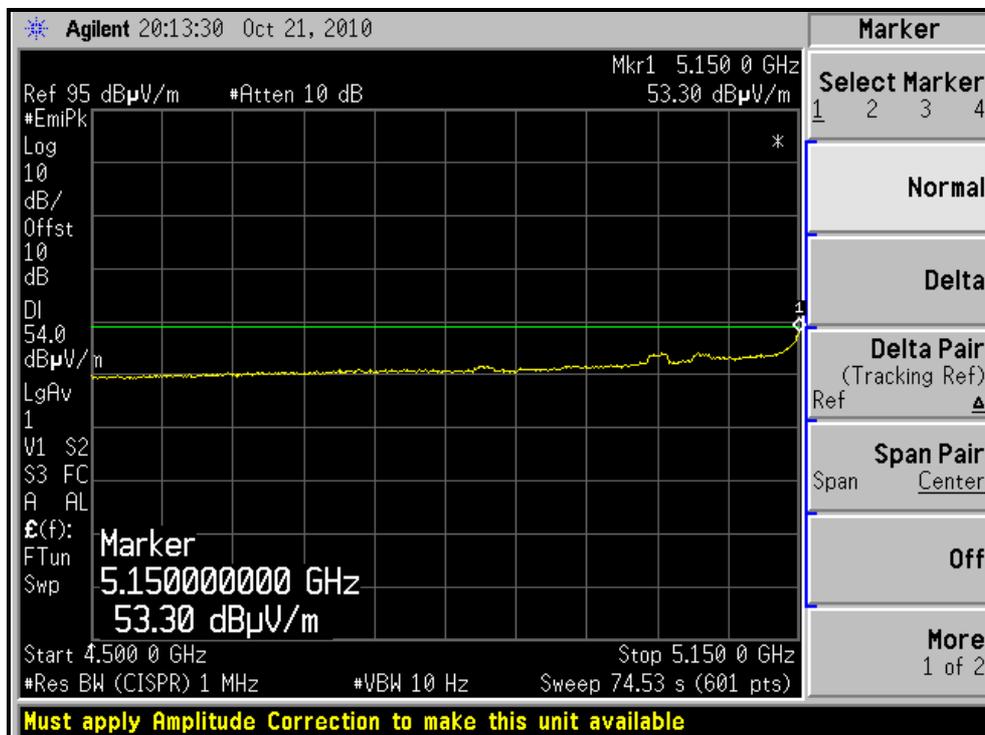
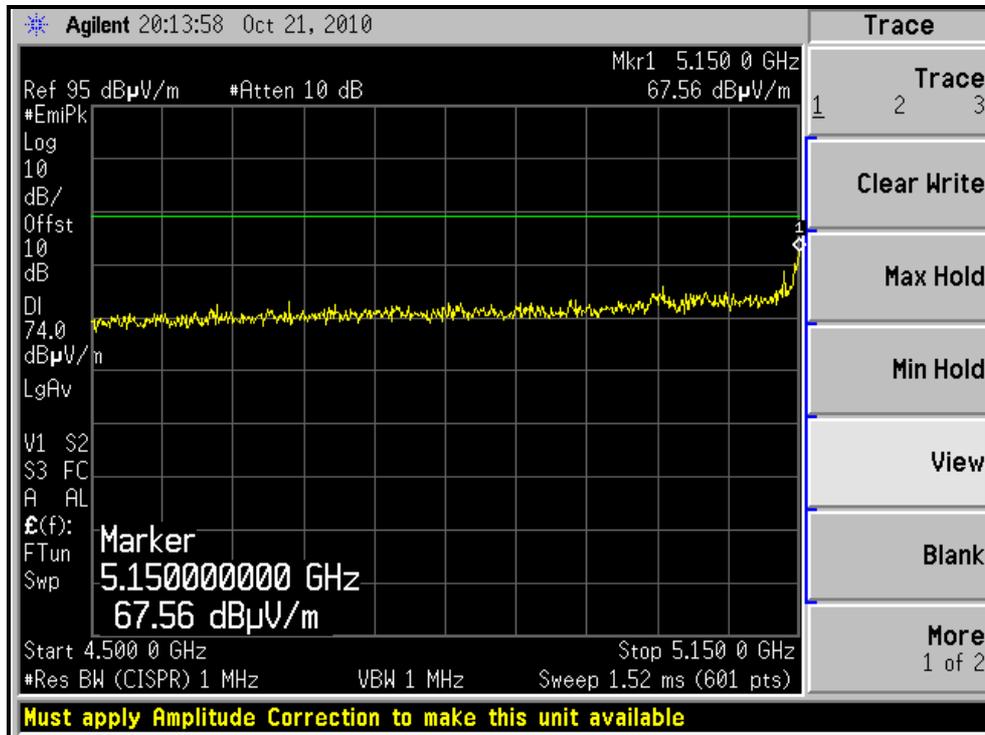
RESTRICTED BANDEDGE (802.11a MODE, CH36, HORIZONTAL)





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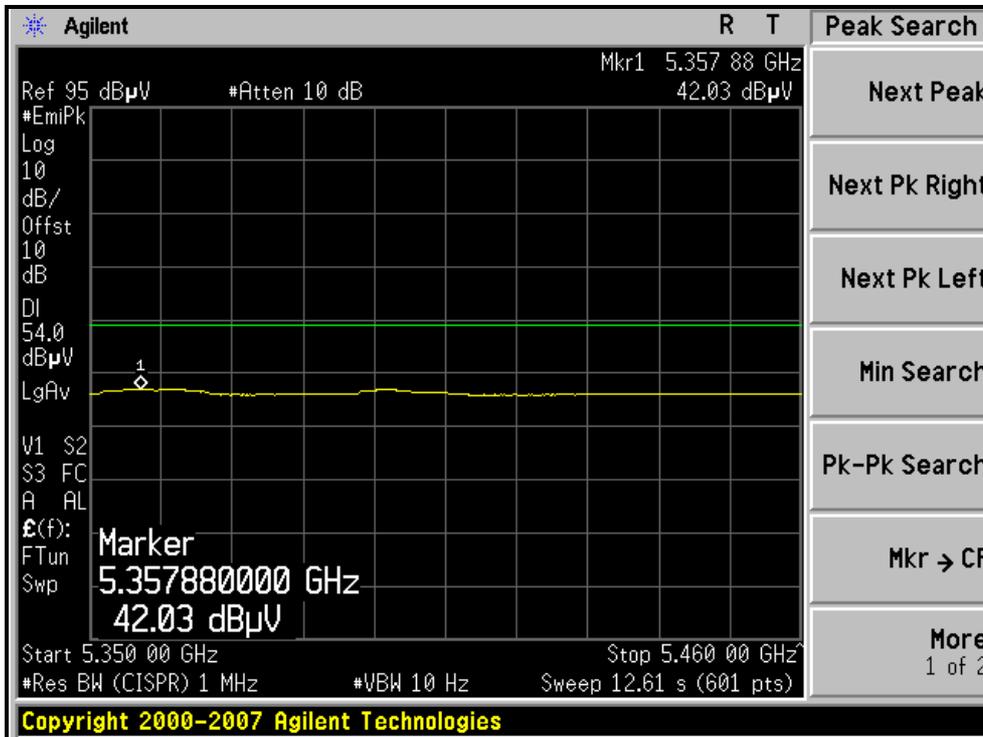
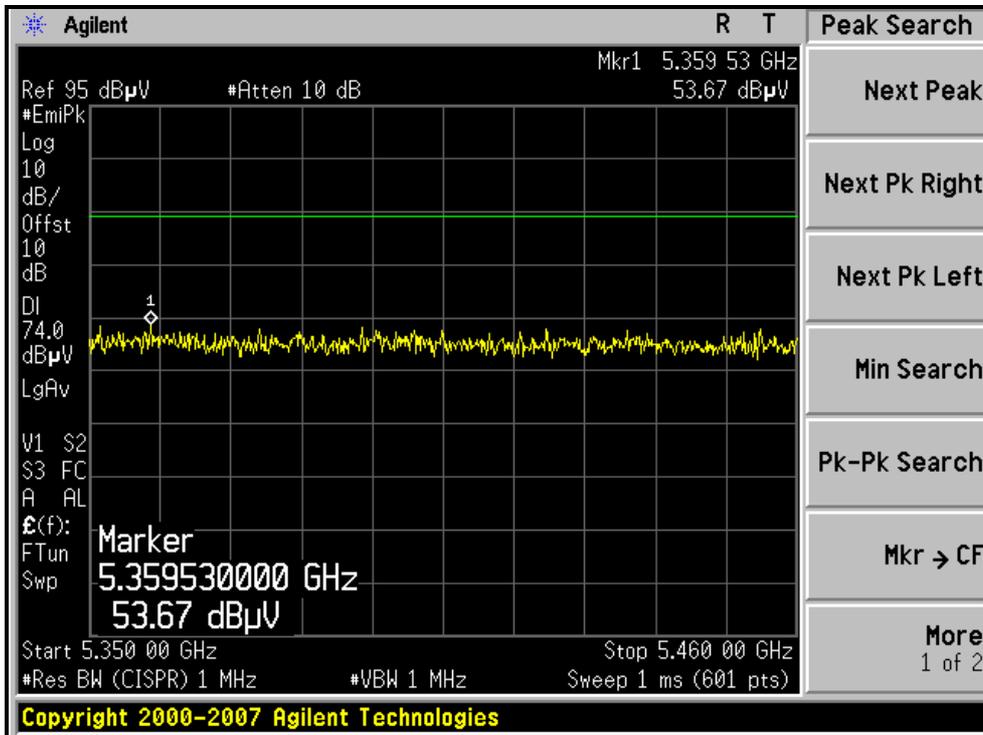
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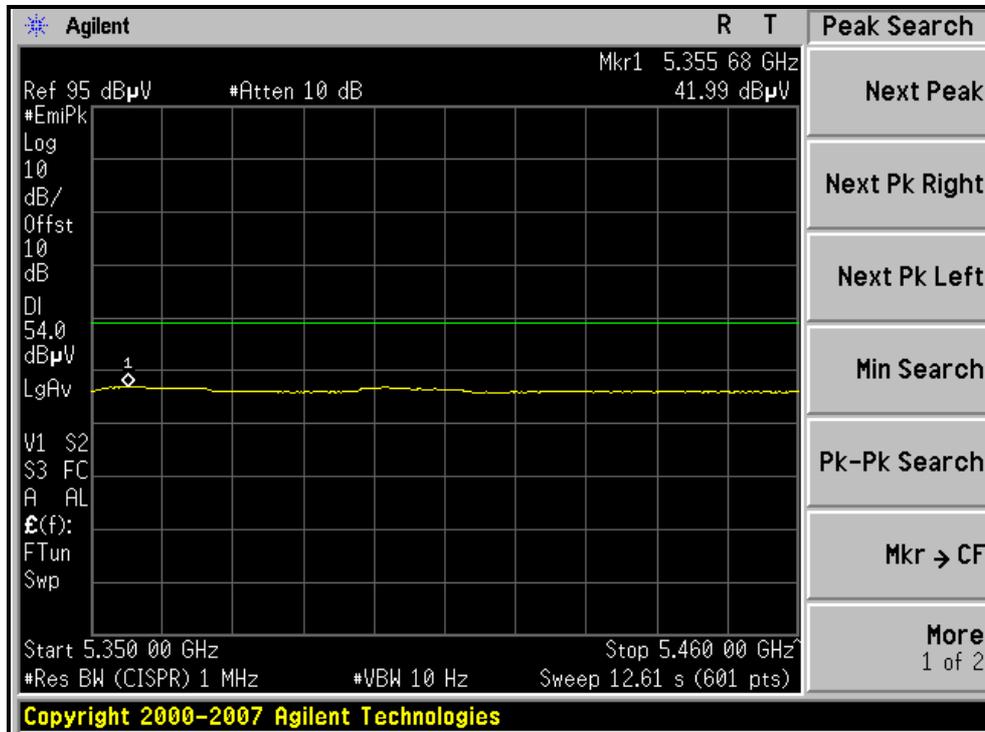
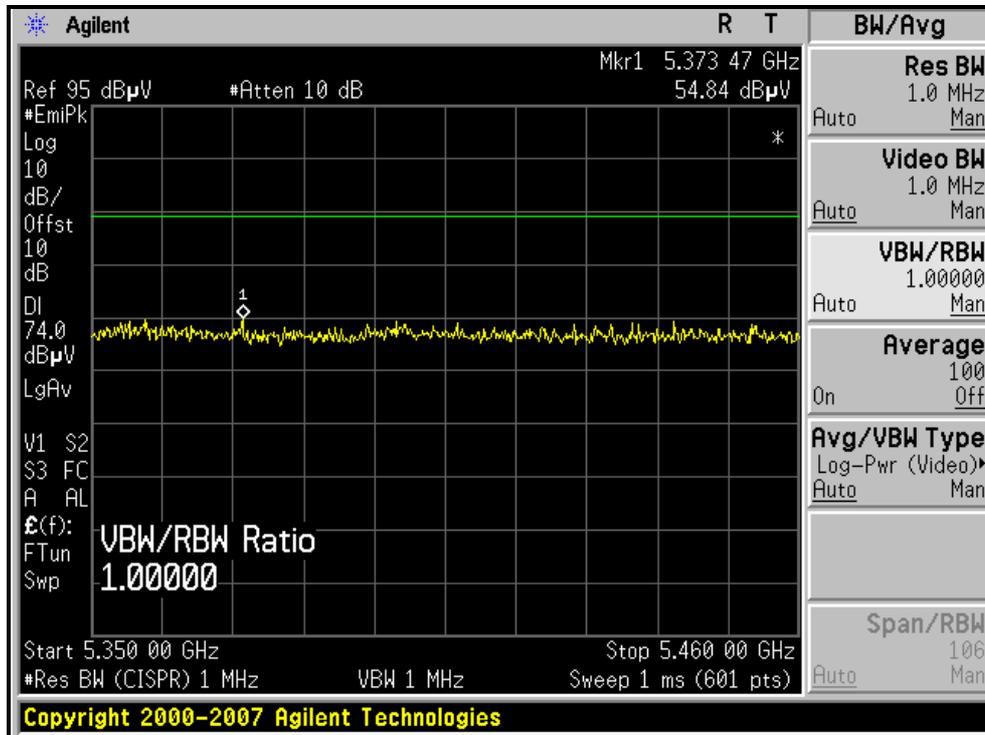
RESTRICTED BANDEDGE (802.11a MODE, CH48, HORIZONTAL)





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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	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

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	58.8 PK	74.0	-15.2	1.31 H	62	17.63	41.17
2	5150.00	46.6 AV	54.0	-7.4	1.31 H	62	5.43	41.17
3	*5180.00	103.0 PK			1.28 H	71	61.77	41.23
4	*5180.00	91.4 AV			1.28 H	71	50.17	41.23
5	#10360.00	50.2 PK	68.3	-18.1	1.24 H	51	2.30	47.94
6	15540.00	65.3 PK	74.0	-8.7	1.11 H	24	12.77	52.53
7	15540.00	53.2 AV	54.0	-0.8	1.11 H	24	0.67	52.53
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	5148.90	62.0 PK	74.0	-12.0	1.04 V	112	20.83	41.17
2	5148.90	51.8 AV	54.0	-2.2	1.04 V	112	10.63	41.17
3	*5180.00	108.0 PK			1.05 V	115	66.77	41.23
4	*5180.00	96.6 AV			1.05 V	115	55.37	41.23
5	#10360.00	59.2 PK	68.3	-9.1	1.38 V	65	11.26	47.94
6	15540.00	61.9 PK	74.0	-12.1	1.29 V	244	9.37	52.53
7	15540.00	50.1 AV	54.0	-3.9	1.29 V	244	-2.43	52.53

- 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	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

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	102.9 PK			1.28 H	71	61.63	41.27
2	*5200.00	91.3 AV			1.28 H	71	50.03	41.27
3	#10400.00	52.2 PK	68.3	-16.1	1.24 H	51	4.26	47.98
4	15600.00	64.5 PK	74.0	-9.5	1.54 H	57	11.80	52.70
5	15600.00	53.1 AV	54.0	-0.9	1.54 H	57	0.40	52.70

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	107.9 PK			1.04 V	112	66.63	41.27
2	*5200.00	95.9 AV			1.04 V	112	54.63	41.27
3	#10400.00	60.2 PK	68.3	-8.1	1.46 V	305	12.22	47.98
4	15600.00	61.7 PK	74.0	-12.3	1.32 V	284	9.00	52.70
5	15600.00	50.3 AV	54.0	-3.7	1.32 V	284	-2.40	52.70

- 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	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

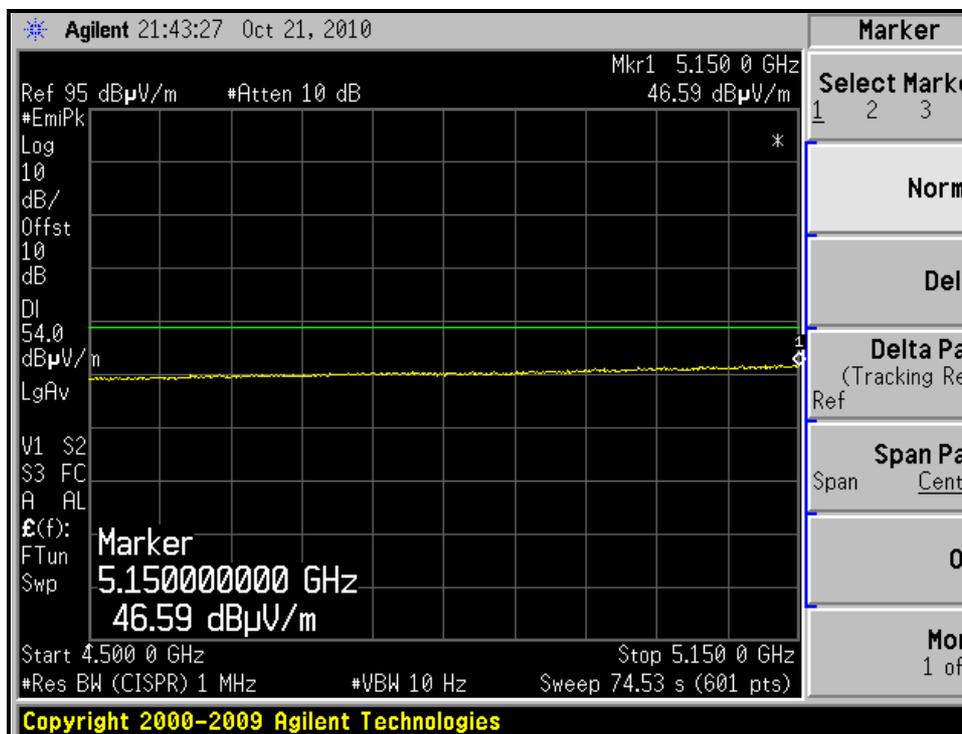
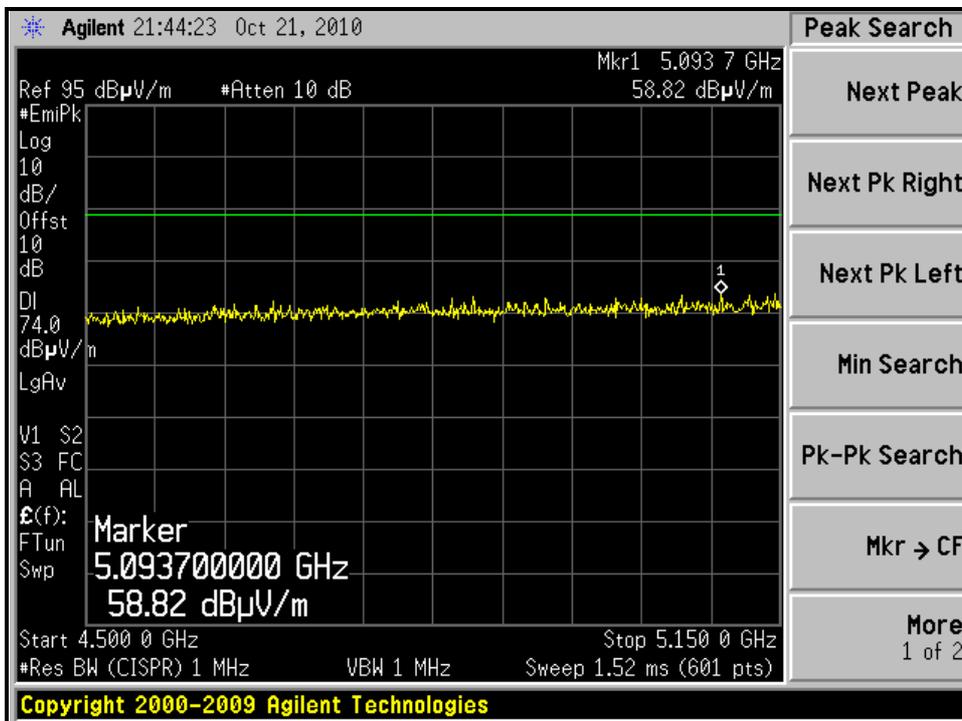
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1	*5240.00	103.2 PK			1.33 H	69	61.85	41.35
2	*5240.00	91.1 AV			1.33 H	69	49.75	41.35
3	#10480.00	54.3 PK	68.3	-14.0	1.62 H	326	6.24	48.06
4	15720.00	64.5 PK	74.0	-9.5	1.82 H	245	11.48	53.02
5	15720.00	52.9 AV	54.0	-1.1	1.82 H	245	-0.12	53.02
ANTENNA 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	108.1 PK			1.04 V	112	66.75	41.35
2	*5240.00	96.8 AV			1.04 V	112	55.45	41.35
3	#10480.00	59.9 PK	68.3	-8.4	1.50 V	314	11.84	48.06
4	15720.00	61.3 PK	74.0	-12.7	1.66 V	295	8.28	53.02
5	15720.00	50.6 AV	54.0	-3.4	1.66 V	295	-2.42	53.02

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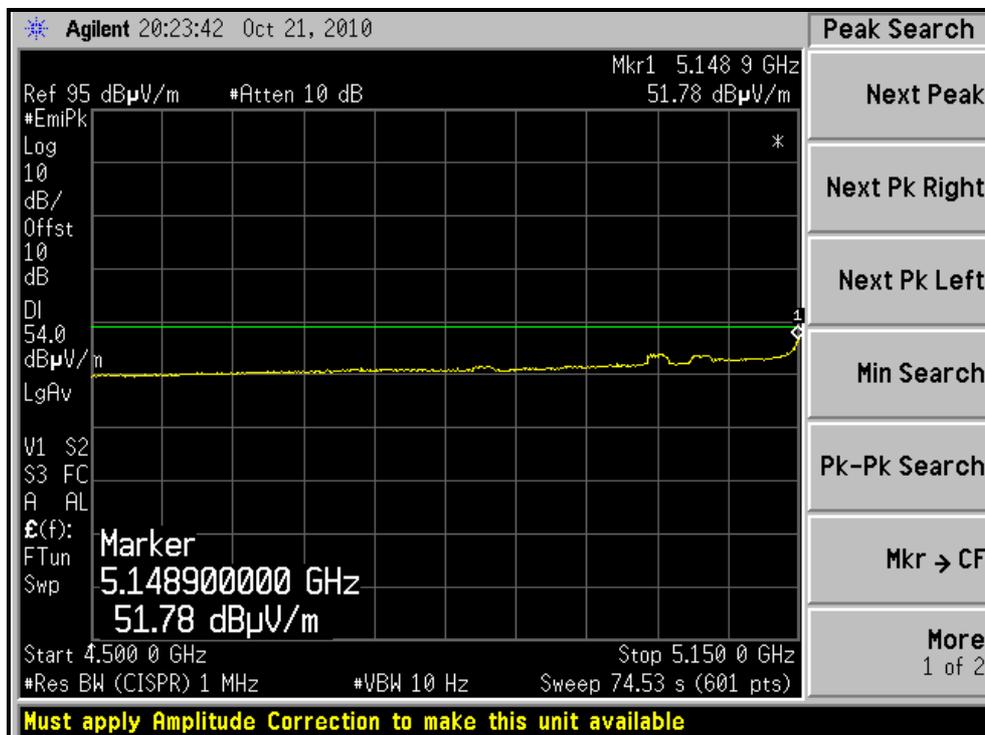
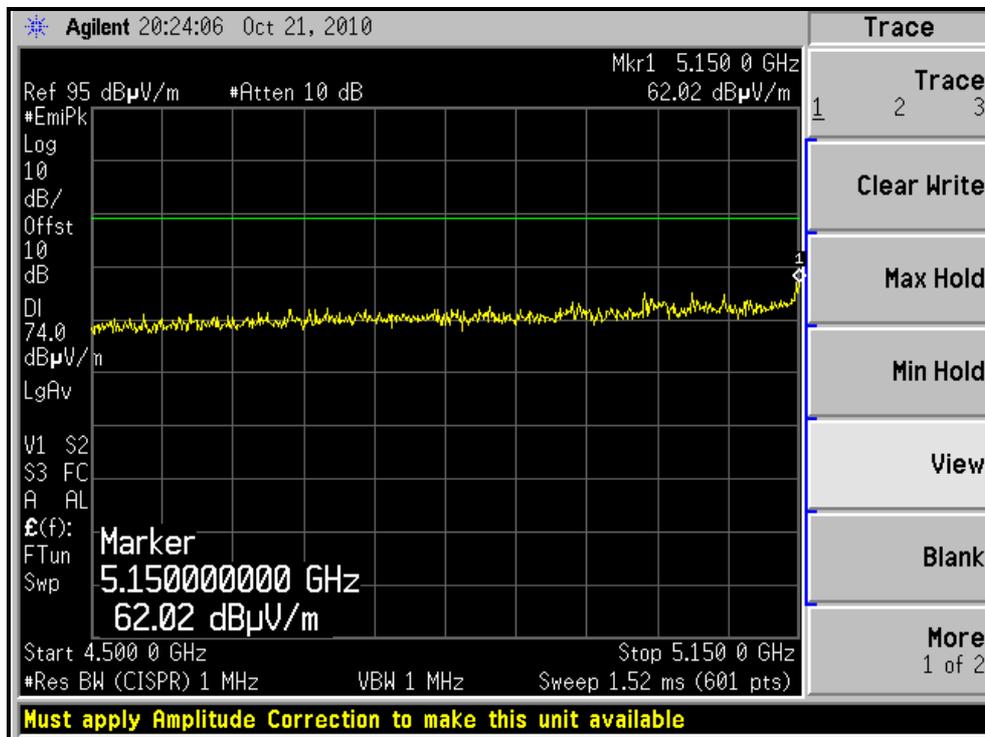
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH36, HORIZONTAL)





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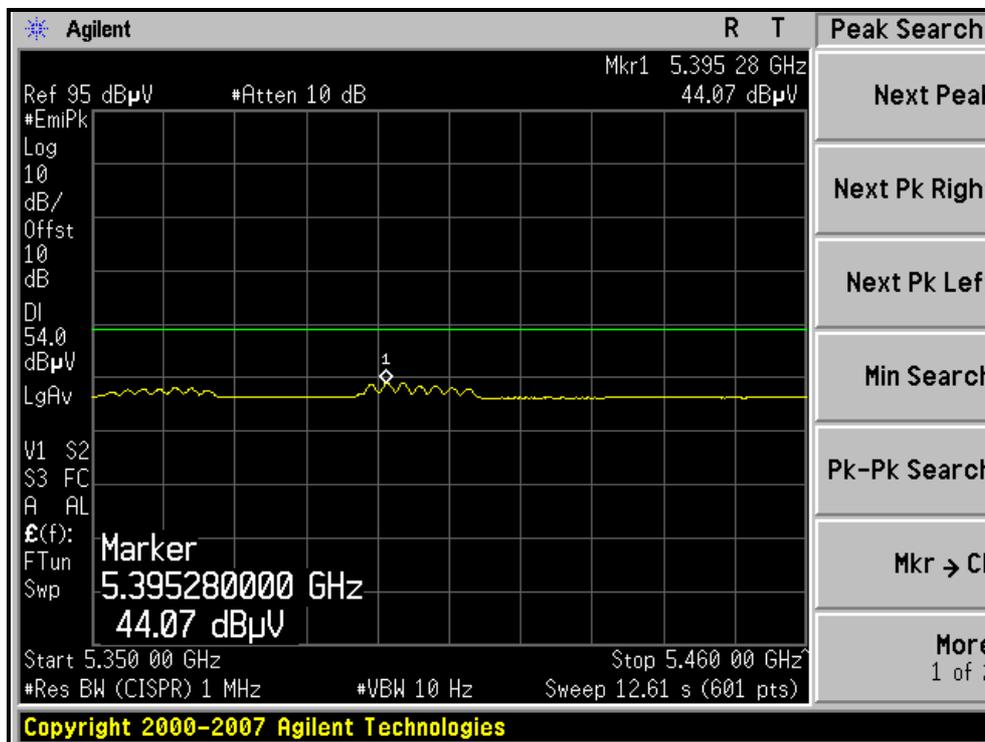
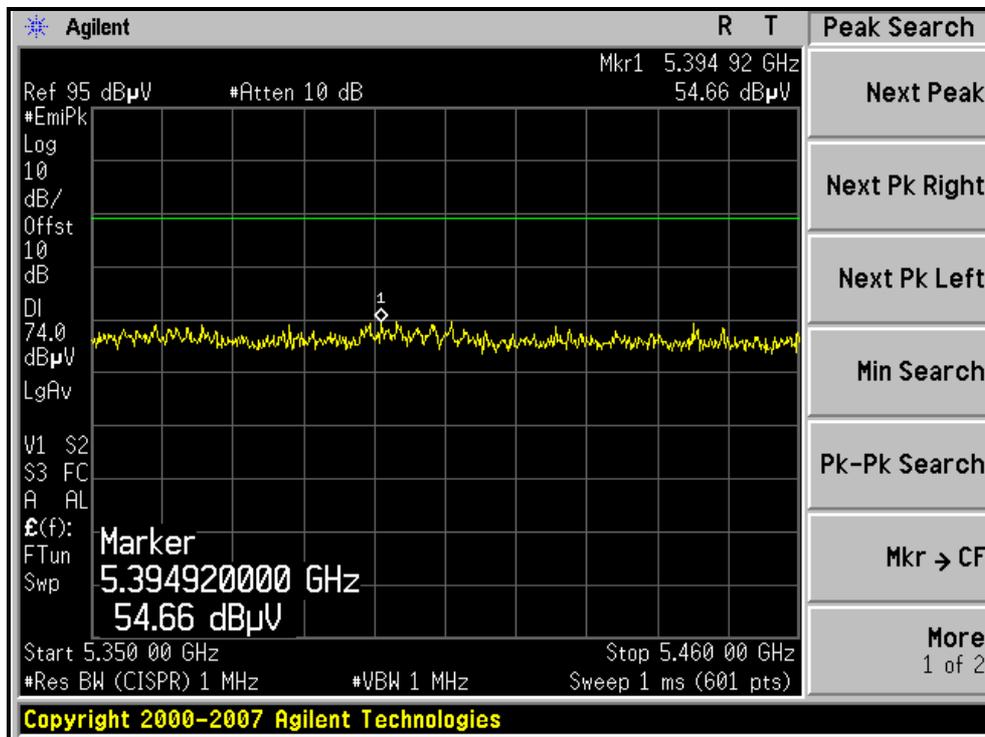
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH36, VERTICAL)





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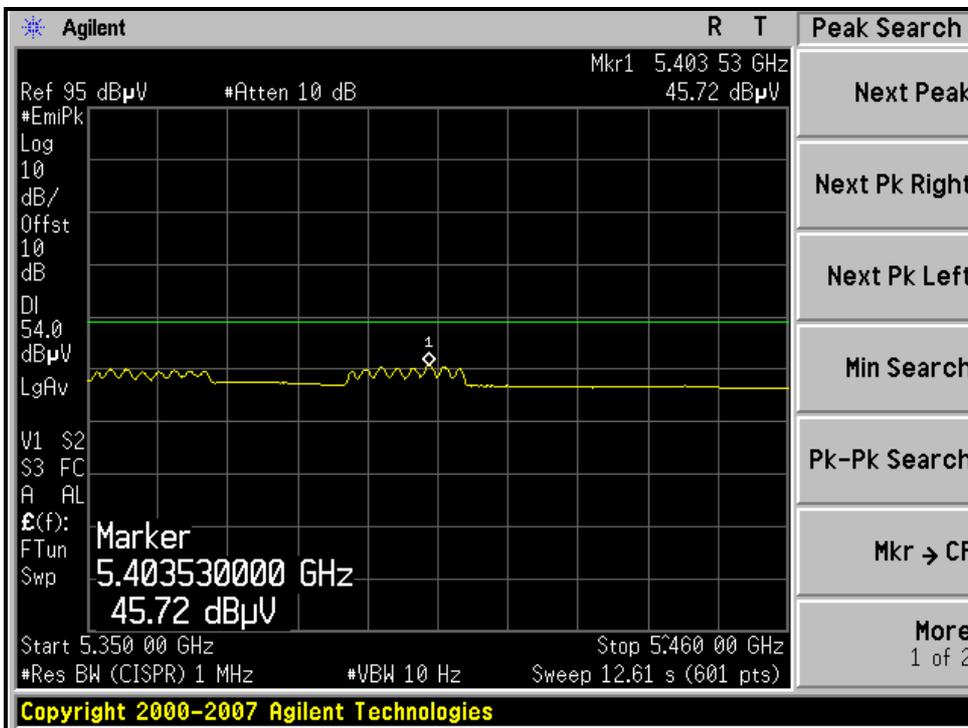
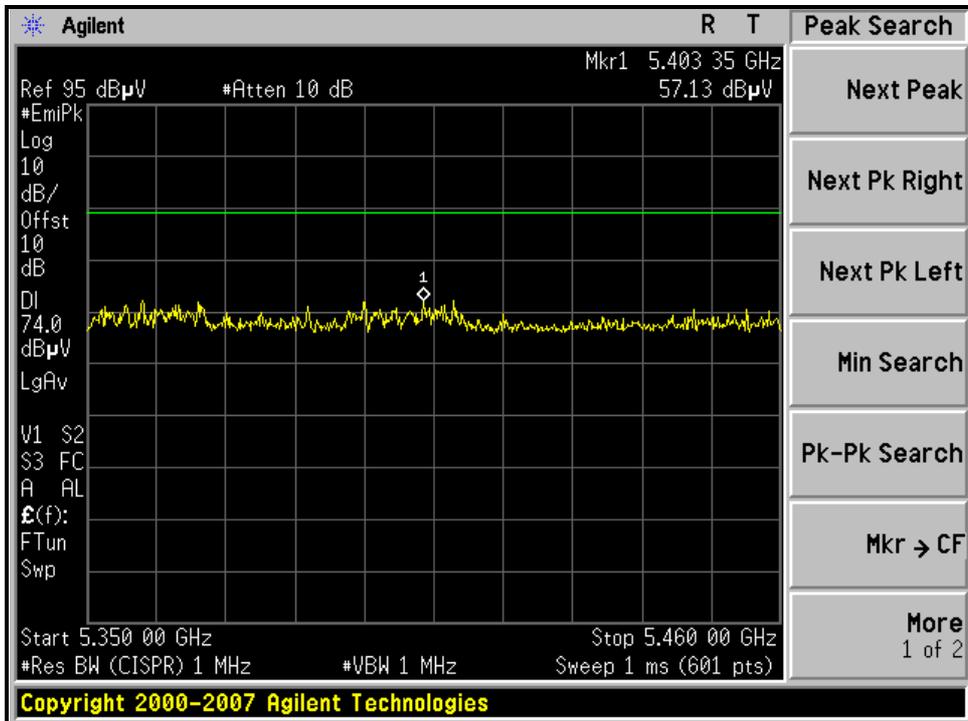
RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH 48, HORIZONTAL)





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RESTRICTED BANDEDGE (802.11n (20MHz) MODE,CH 48, 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	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

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	5148.90	61.2 PK	74.0	-12.8	1.31 H	288	20.03	41.17
2	5148.90	50.7 AV	54.0	-3.3	1.31 H	288	9.53	41.17
3	*5190.00	99.6 PK			1.30 H	266	58.35	41.25
4	*5190.00	87.7 AV			1.30 H	266	46.45	41.25
5	#10380.00	50.6 PK	68.3	-17.7	1.25 H	85	2.64	47.96
6	15570.00	66.1 PK	74.0	-7.9	1.47 H	54	13.48	52.62
7	15570.00	51.1 AV	54.0	-2.9	1.47 H	54	-1.52	52.62

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	66.0 PK	74.0	-8.0	1.04 V	113	24.83	41.17
2	5150.00	53.2 AV	54.0	-0.8	1.04 V	113	12.03	41.17
3	*5190.00	106.1 PK			1.05 V	114	64.85	41.25
4	*5190.00	93.0 AV			1.05 V	114	51.75	41.25
5	#10380.00	62.2 PK	68.3	-6.1	1.46 V	80	14.24	47.96
6	15570.00	63.9 PK	74.0	-10.1	1.36 V	100	11.28	52.62
7	15570.00	50.3 AV	54.0	-3.7	1.36 V	100	-2.32	52.62

- 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	25deg. C, 70%RH 1012 hPa	TESTED BY	Eric Lee

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	101.9 PK			1.22 H	288	60.57	41.33
2	*5230.00	89.6 AV			1.22 H	288	48.27	41.33
3	#10460.00	57.2 PK	68.3	-11.1	1.54 H	360	9.16	48.04
4	15690.00	66.9 PK	74.0	-7.1	1.11 H	25	13.96	52.94
5	15690.00	50.8 AV	54.0	-3.2	1.11 H	25	-2.14	52.94

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

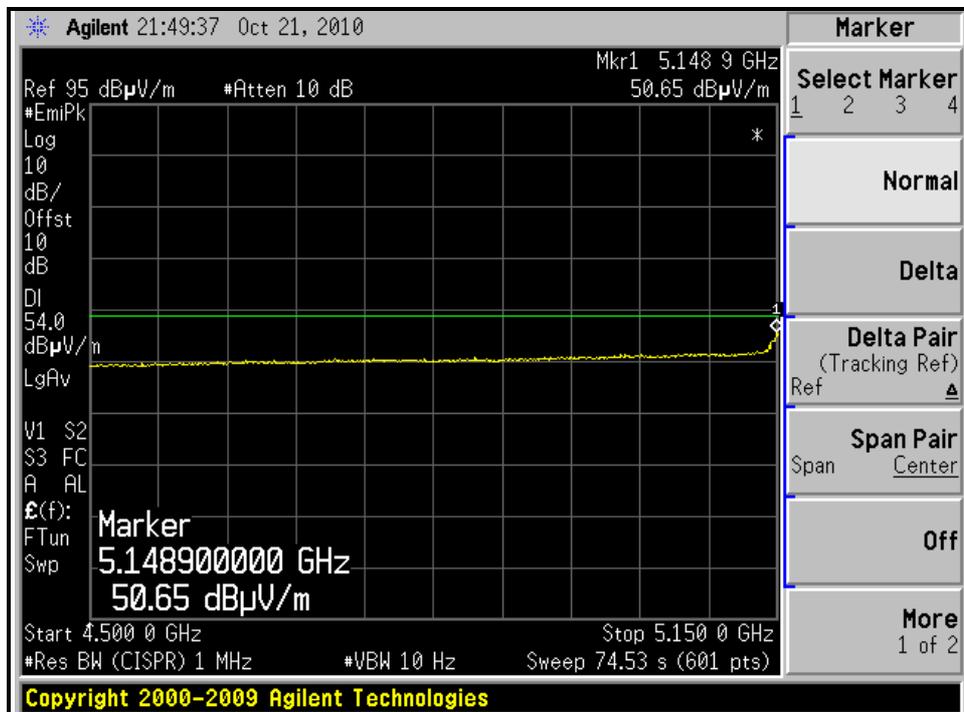
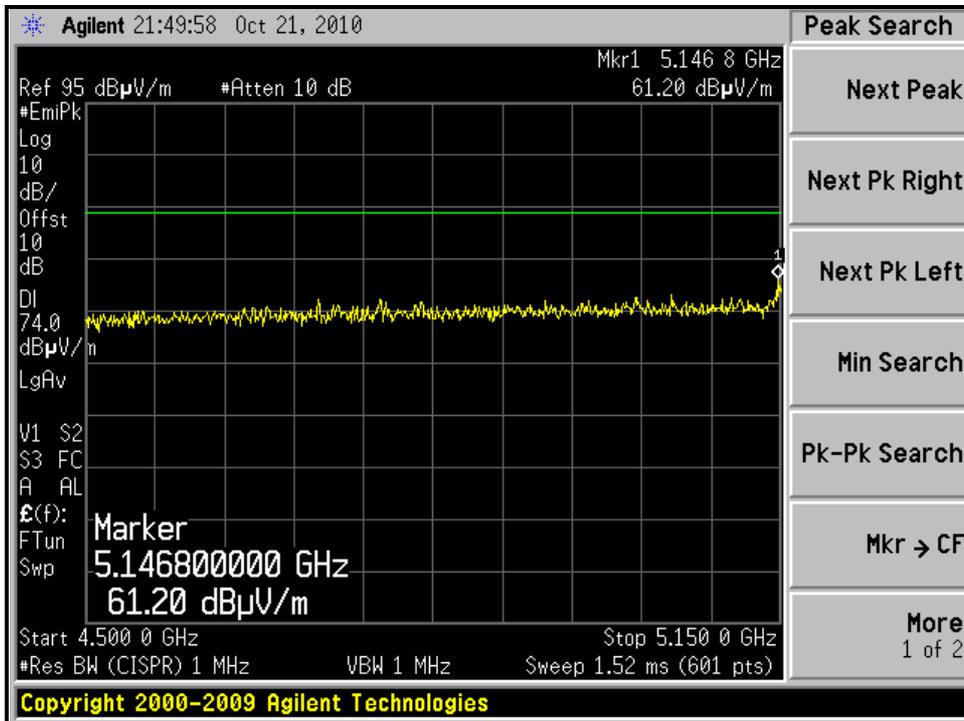
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	108.6 PK			1.14 V	267	67.27	41.33
2	*5230.00	94.5 AV			1.14 V	267	53.17	41.33
3	#10460.00	61.8 PK	68.3	-6.5	1.50 V	77	13.76	48.04
4	15690.00	64.2 PK	74.0	-9.8	1.41 V	142	11.26	52.94
5	15690.00	51.2 AV	54.0	-2.8	1.41 V	142	-1.74	52.94

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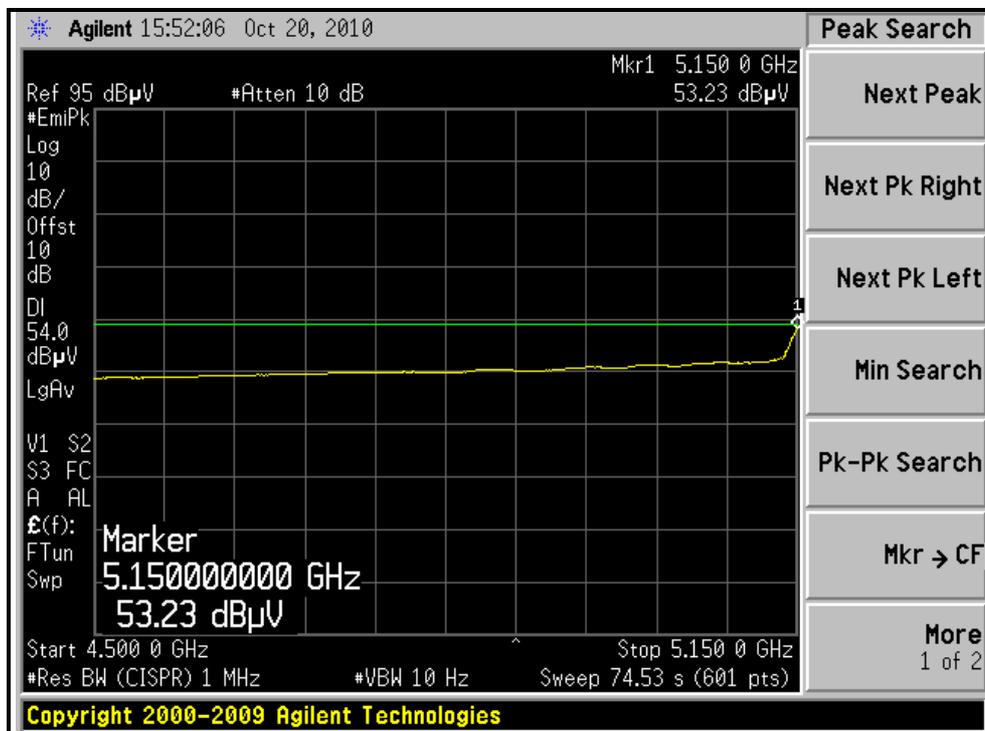
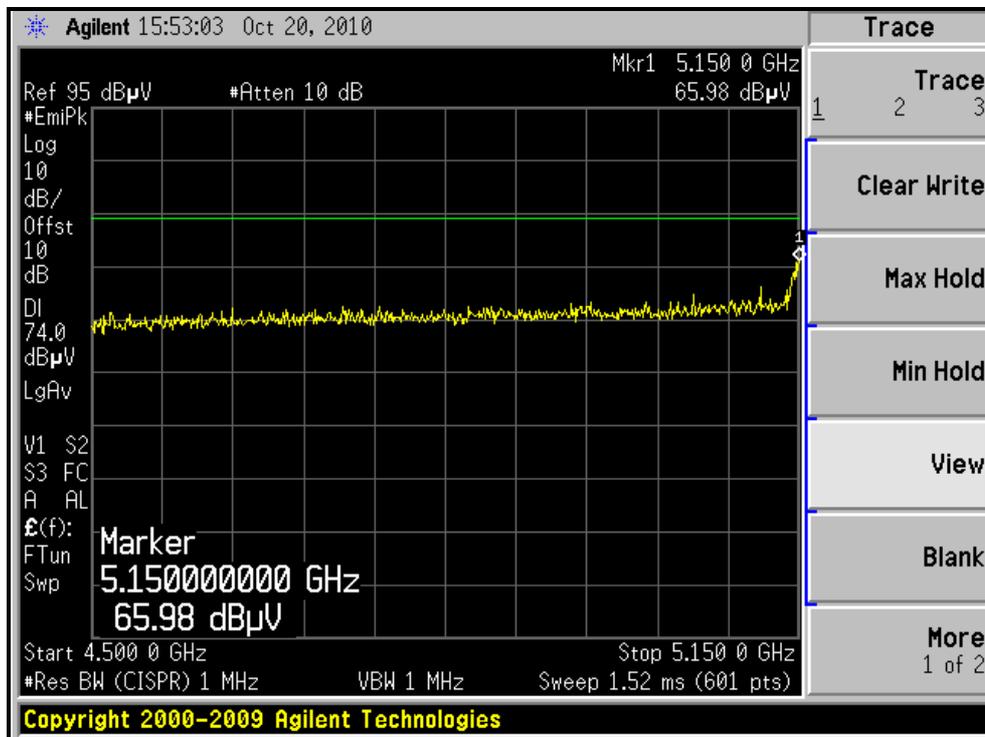
RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH38, HORIZONTAL)





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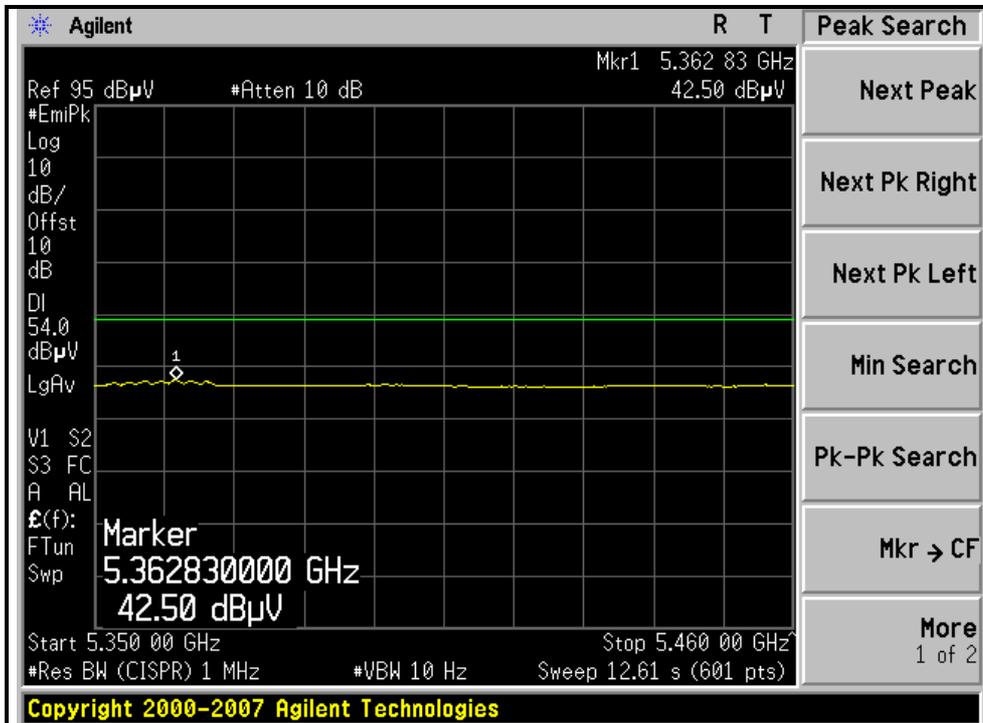
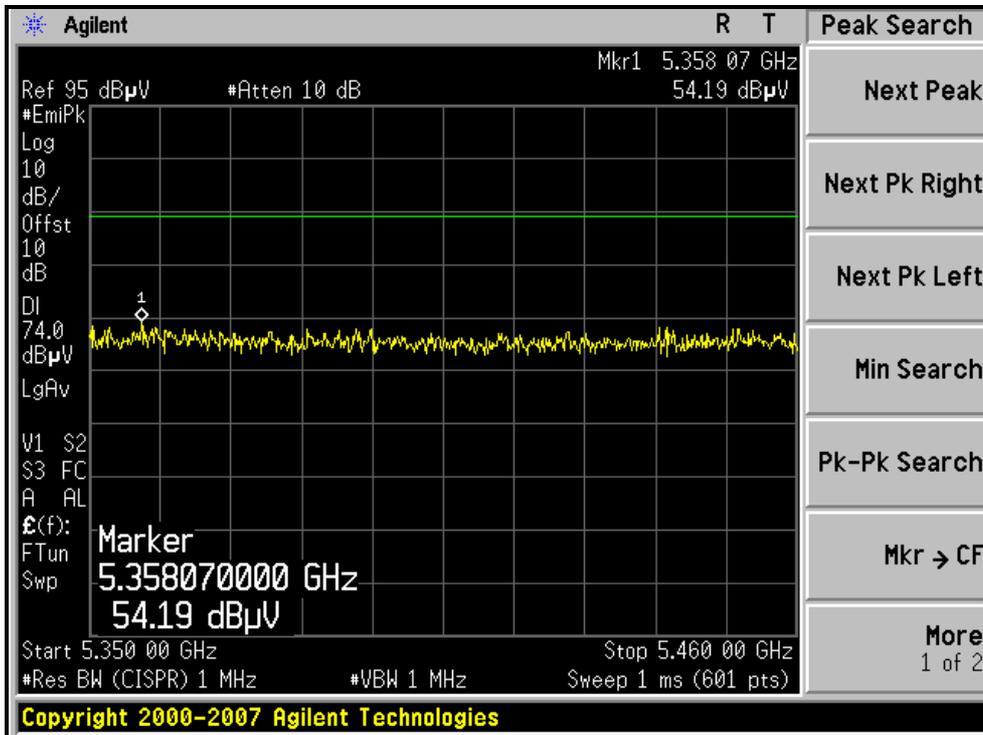
RESTRICTED BANDEDGE (802.11n (40MHz) MODE,CH38, VERTICAL)





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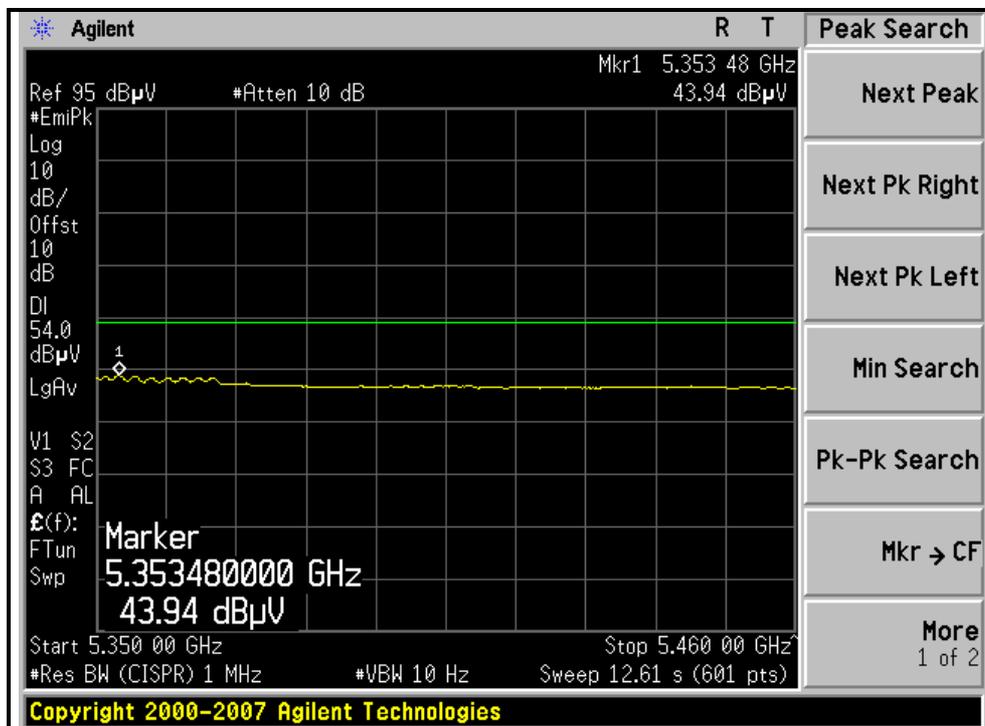
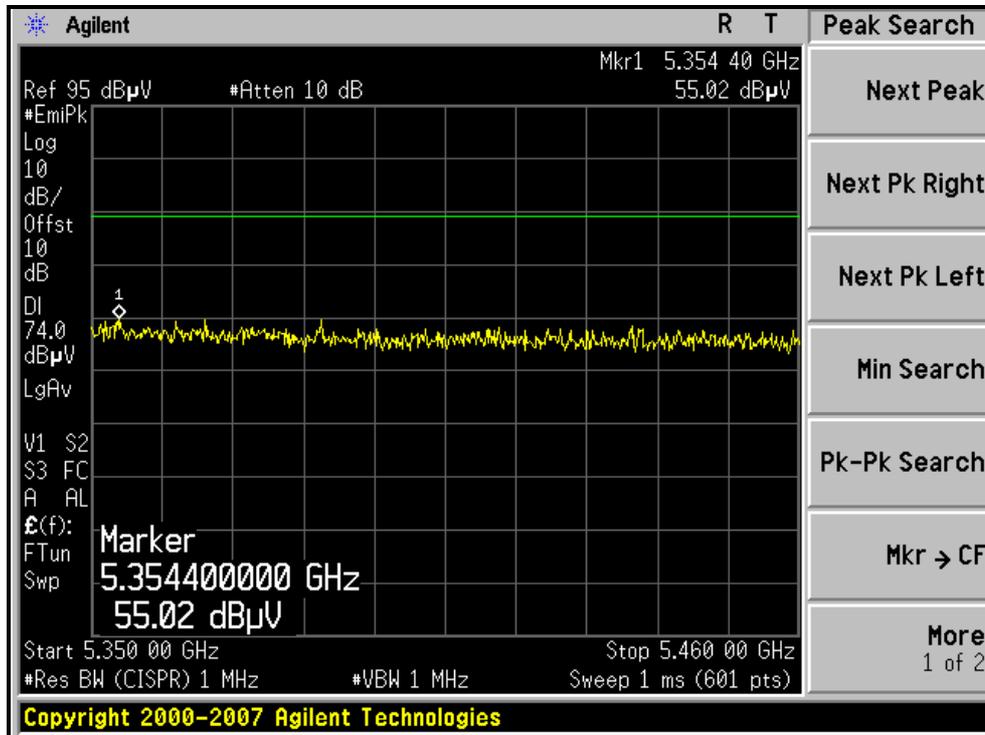
RESTRICTED BANDEDGE (802.11n (40MHz) MODE, CH46, HORIZONTAL)





A D T

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011

NOTE:

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

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 3M.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

NOTE:

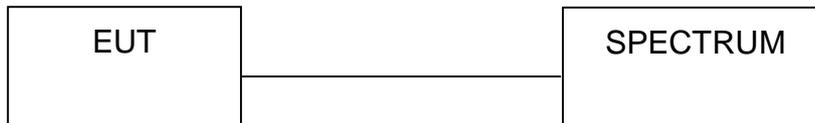
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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:

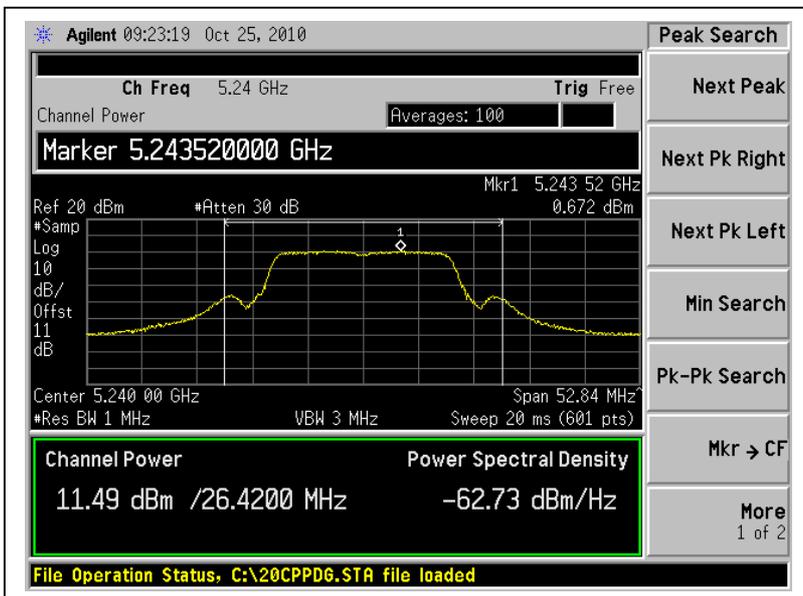
CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (mW)	OUTPUT POWER (dBm)	OUTPUT POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/ FAIL
36	5180	13.8	11.4	17.0	20.17	PASS
40	5200	13.8	11.4	17.0	20.67	PASS
48	5240	14.1	11.5	17.0	20.83	PASS

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

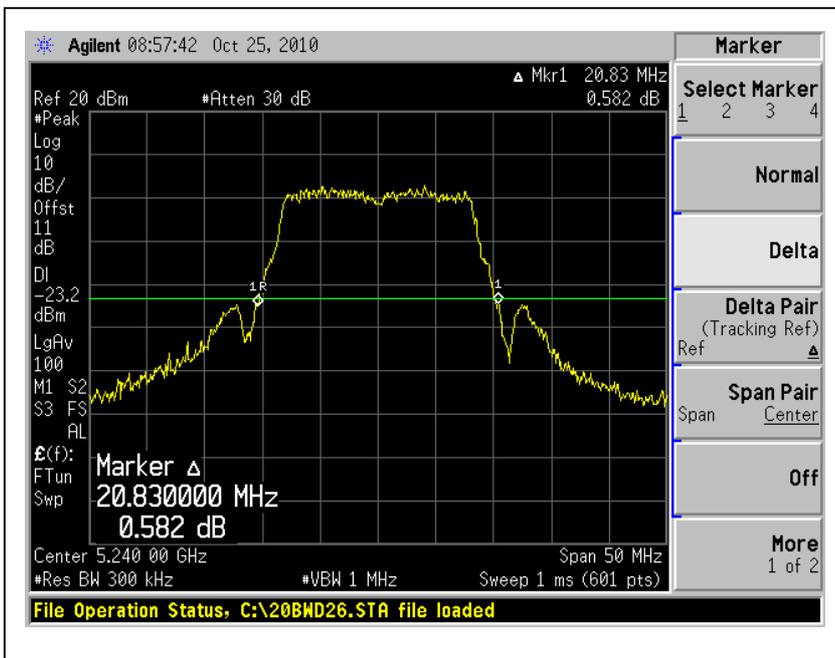


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Output Power: CH48



26dB Occupied Bandwidth: CH48





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802.11n (20MHz) OFDM MODULATION:

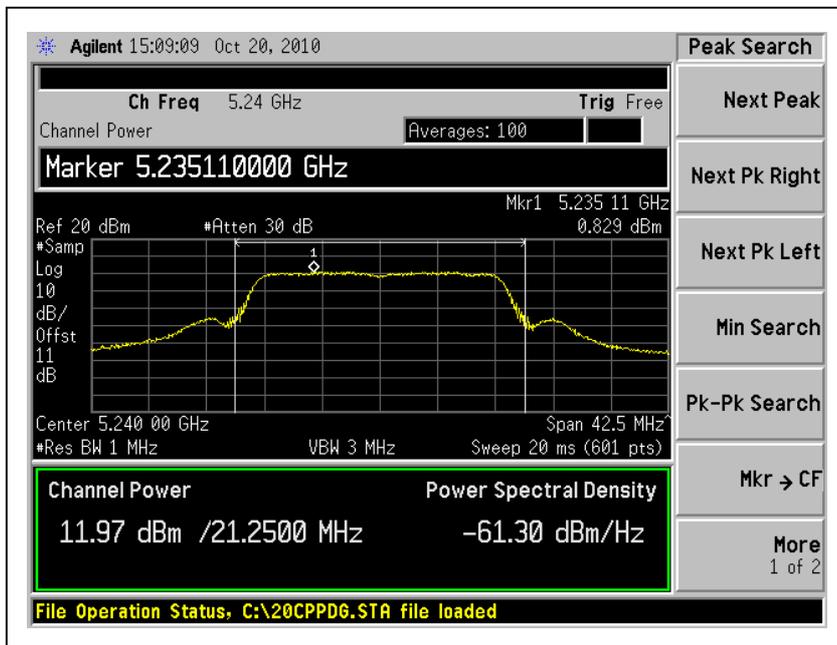
CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (dBm)		TOTAL OUTPUT POWER (mW)	TOTAL OUTPUT POWER (dBm)	OUTPUT POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/ FAIL
		Chain 0	Chain 2					
36	5180	11.8	11.6	29.6	14.7	17.0	20.92	PASS
40	5200	11.9	11.3	29.0	14.6	17.0	21	PASS
48	5240	12.0	11.8	31.0	14.9	17.0	21.25	PASS

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

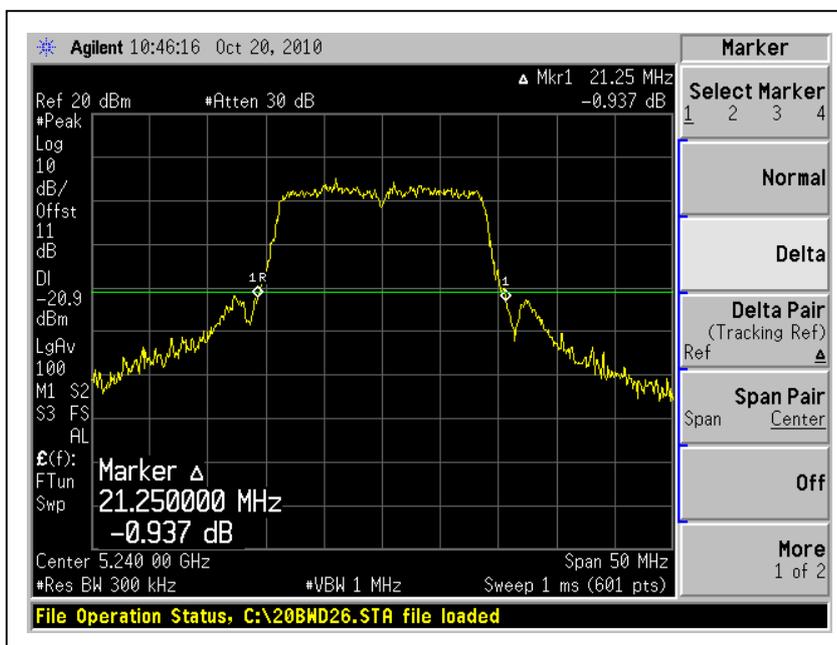


A D T

Output Power:
For Chain (0) :CH48



26dB Occupied Bandwidth:
CH48



802.11n (40MHz) OFDM MODULATION:

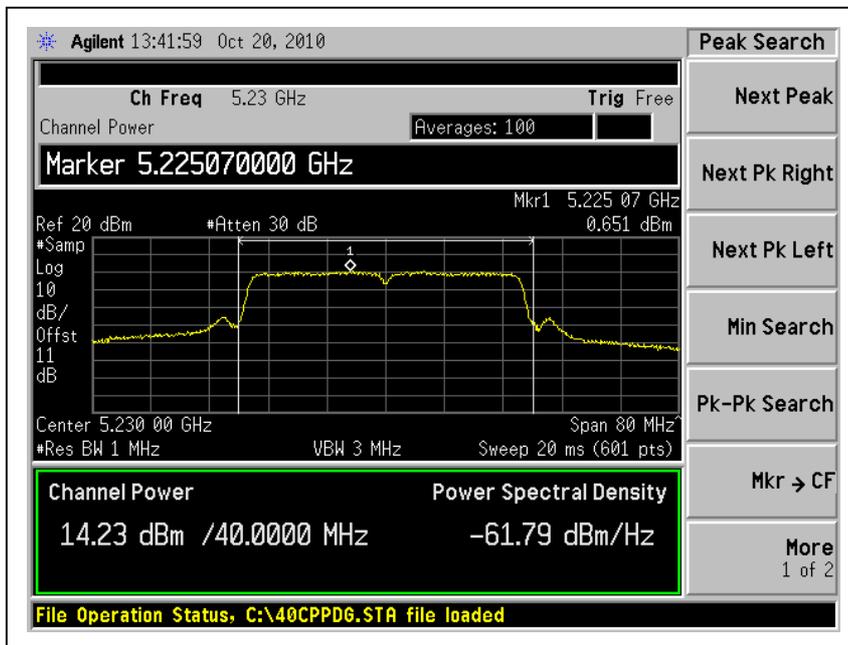
CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (dBm)		TOTAL OUTPUT POWER (mW)	TOTAL OUTPUT POWER (dBm)	OUTPUT POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/ FAIL
		Chain 0	Chain 2					
38	5190	11.1	11.4	26.7	14.3	17.0	41.83	PASS
46	5230	13.4	14.2	48.2	16.8	17.0	40	PASS

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

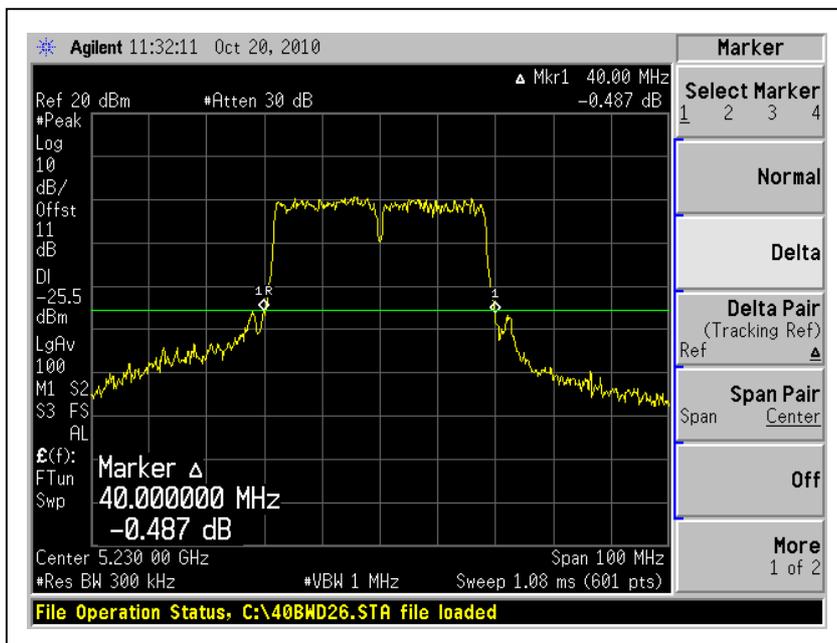


A D T

Output Power:
For Chain (2) :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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011

NOTE:

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

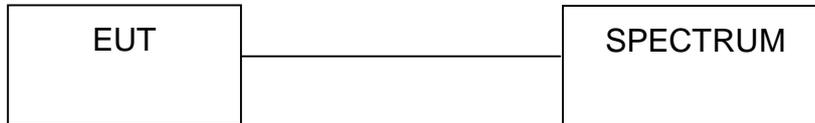
4.4.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set the spectrum bandwidth span to view the entire spectrum.
3. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and using trace average across 100 traces in power averaging mode for trace 2 (RB=1MHz, VB=3MHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

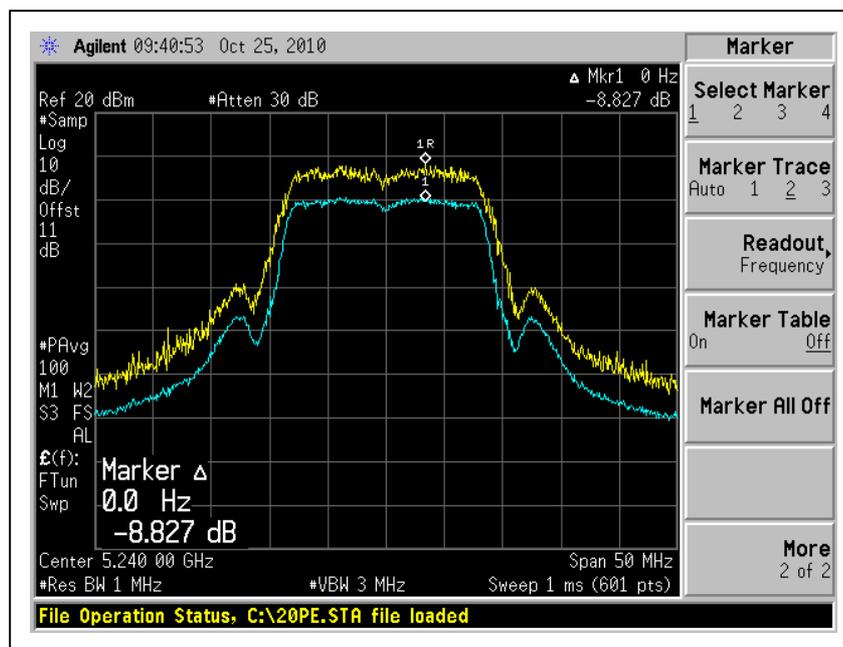
The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

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
36	5180	7.7	13	PASS
40	5200	7.7	13	PASS
48	5240	8.8	13	PASS

CH48



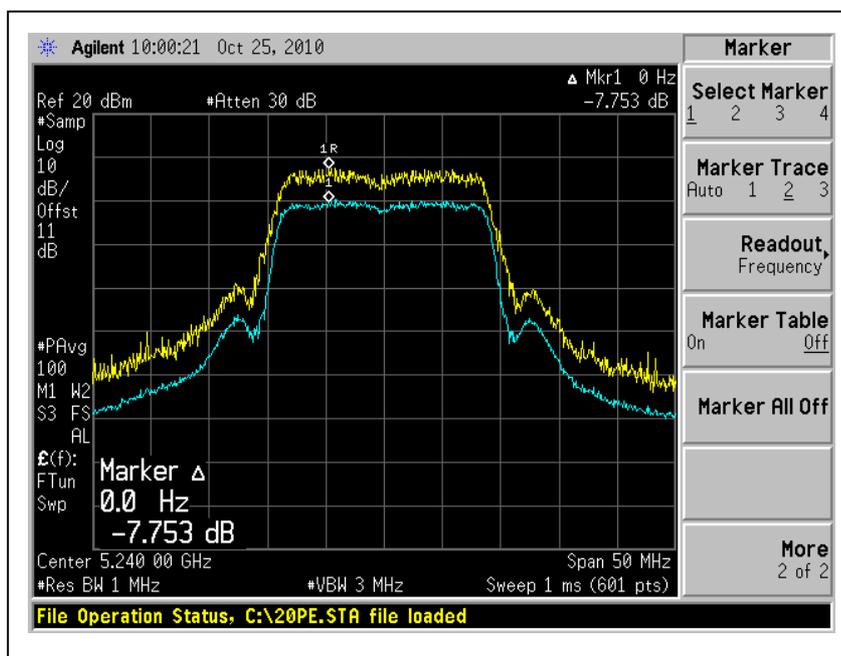


A D T

802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
36	5180	7.3	13	PASS
40	5200	7.0	13	PASS
48	5240	7.8	13	PASS

CH48



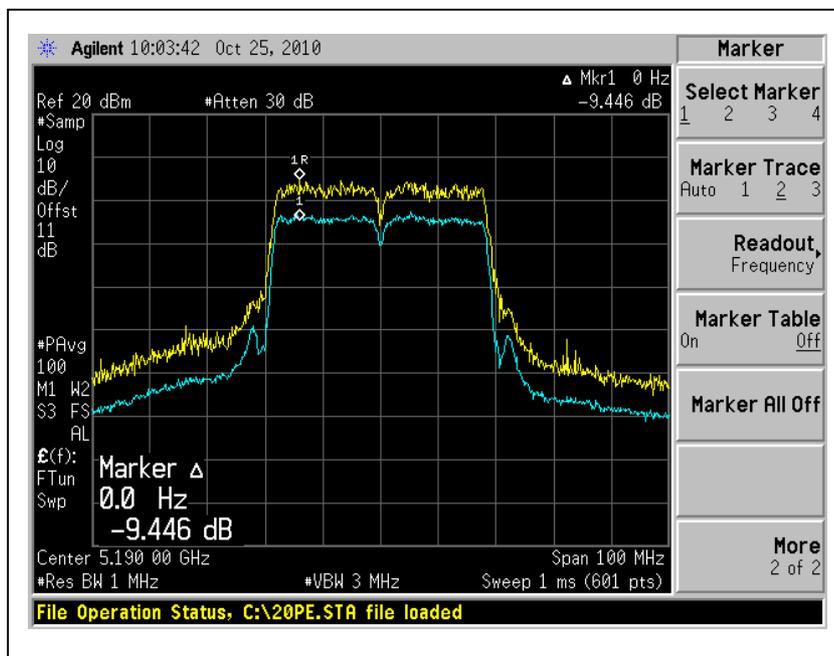


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802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
38	5190	9.4	13	PASS
46	5230	8.1	13	PASS

CH38





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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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011

NOTE:

1. 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 the spectrum analyzer detector for SAMPLE
3. Set the spectrum analyzer for POWER AVERAGING
4. Set RBW=1MHz, VBW=3MHz.
5. Set the AVERAGING to 100 sweeps
6. Use PEAK SEARCH on spectrum analyzer to find maximum level on the display
7. Record result as PPSD

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



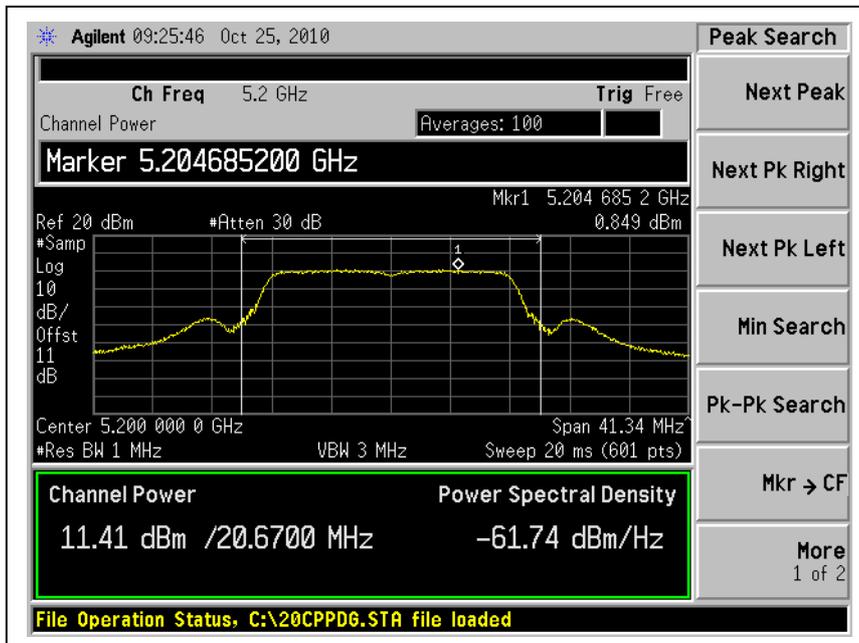
A D T

4.5.7 TEST RESULTS

802.11a OFDM MODULATION

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	0.5	4	PASS
40	5200	0.8	4	PASS
48	5240	0.7	4	PASS

CH40



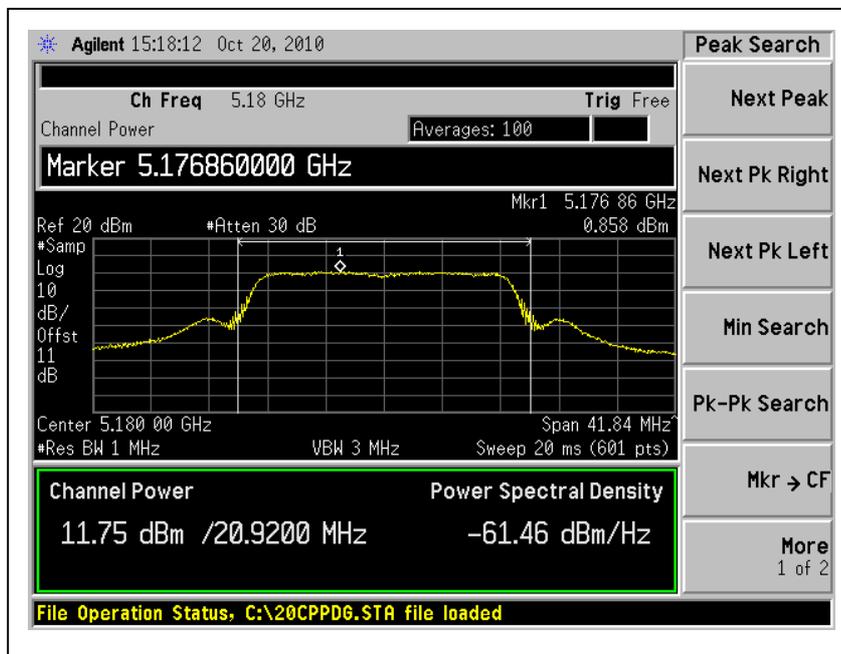


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802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		TOTAL OUTPUT POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
		Chain (0)	Chain (2)			
36	5180	0.9	0.5	3.7	4	PASS
40	5200	0.8	0.2	3.5	4	PASS
48	5240	0.8	0.7	3.8	4	PASS

For Chain (0) : CH36



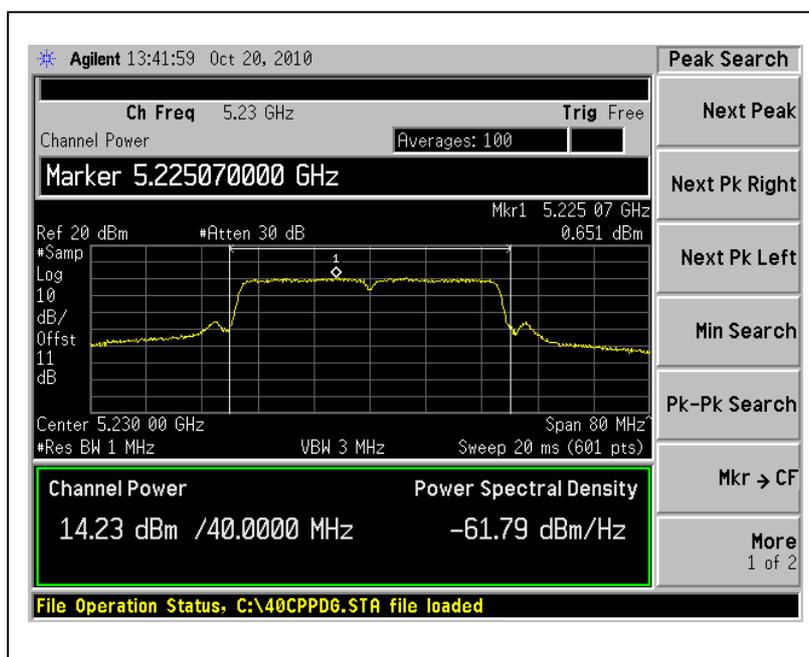


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802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)		TOTAL OUTPUT POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
		Chain (0)	Chain (2)			
38	5190	-2.9	-2.6	0.3	4	PASS
46	5230	-0.3	0.7	3.2	4	PASS

For Chain (2) : CH46



4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer	E4446A	MY48250254	July 14, 2010	July 13, 2011

NOTE:

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

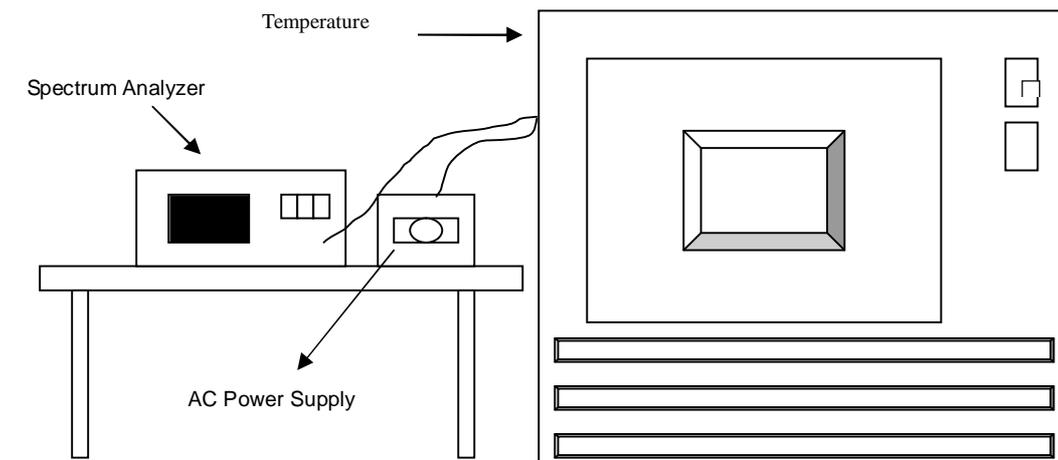
4.6.3 TEST PROCEDURE

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 0, 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)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5180.0152	0.000293	5180.0138	0.000266	5180.0120	0.000232	5180.0123	0.000237
	110	5180.015	0.000290	5180.0158	0.000305	5180.0140	0.000270	5180.0147	0.000284
	93.5	5180.015	0.000290	5180.0128	0.000247	5180.0120	0.000232	5180.0145	0.000280
40	126.5	5180.021	0.000405	5180.0215	0.000415	5180.0218	0.000421	5180.0219	0.000423
	110	5180.021	0.000405	5180.0214	0.000413	5180.0218	0.000421	5180.0225	0.000434
	93.5	5180.0212	0.000409	5180.0212	0.000409	5180.0218	0.000421	5180.0223	0.000431
30	126.5	5180.0146	0.000282	5180.0098	0.000189	5180.0060	0.000116	5180.0053	0.000102
	110	5180.0146	0.000282	5180.0128	0.000247	5180.0090	0.000174	5180.0077	0.000149
	93.5	5180.0146	0.000282	5180.0088	0.000170	5180.0070	0.000135	5180.0063	0.000122
20	126.5	5180.0076	0.000147	5180.0028	0.000054	5180.0030	0.000058	5180.0033	0.000064
	110	5180.0076	0.000147	5180.0058	0.000112	5180.0040	0.000077	5180.0039	0.000075
	93.5	5180.0056	0.000108	5180.0028	0.000054	5180.0030	0.000058	5180.0037	0.000071
10	126.5	5179.9768	0.000448	5179.9767	0.000450	5179.9767	0.000450	5179.9755	0.000473
	110	5179.9768	0.000448	5179.9769	0.000446	5179.9768	0.000448	5179.9763	0.000458
	93.5	5179.9768	0.000448	5179.9767	0.000450	5179.9766	0.000452	5179.9757	0.000469
0	126.5	5179.9917	0.000160	5179.9916	0.000162	5179.9915	0.000164	5179.9917	0.000160
	110	5179.9918	0.000158	5179.992	0.000154	5179.9919	0.000156	5179.9915	0.000164
	93.5	5179.9917	0.000160	5179.9916	0.000162	5179.9915	0.000164	5179.9912	0.000170
-10	126.5	5179.9727	0.000527	5179.9824	0.000340	5179.9823	0.000342	5179.9826	0.000336
	110	5179.9728	0.000525	5179.9824	0.000340	5179.9825	0.000338	5179.9822	0.000344
	93.5	5179.9827	0.000334	5179.9827	0.000334	5179.9822	0.000344	5179.9825	0.000338
-20	126.5	5179.9962	0.000073	5179.9959	0.000079	5179.9958	0.000081	5179.9947	0.000102
	110	5179.9962	0.000073	5179.9961	0.000075	5179.9961	0.000075	5179.9945	0.000106
	93.5	5179.9962	0.000073	5179.9959	0.000079	5179.9958	0.000081	5179.9942	0.000112
-30	126.5	5179.997	0.000058	5179.997	0.000058	5179.9969	0.000060	5179.9959	0.000079
	110	5179.997	0.000058	5179.997	0.000058	5179.9971	0.000056	5179.9957	0.000083
	93.5	5179.997	0.000058	5179.9969	0.000060	5179.9968	0.000062	5179.9955	0.000087

4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.7.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010

NOTE:

1. 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 100 MHz / 200 MHz 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:

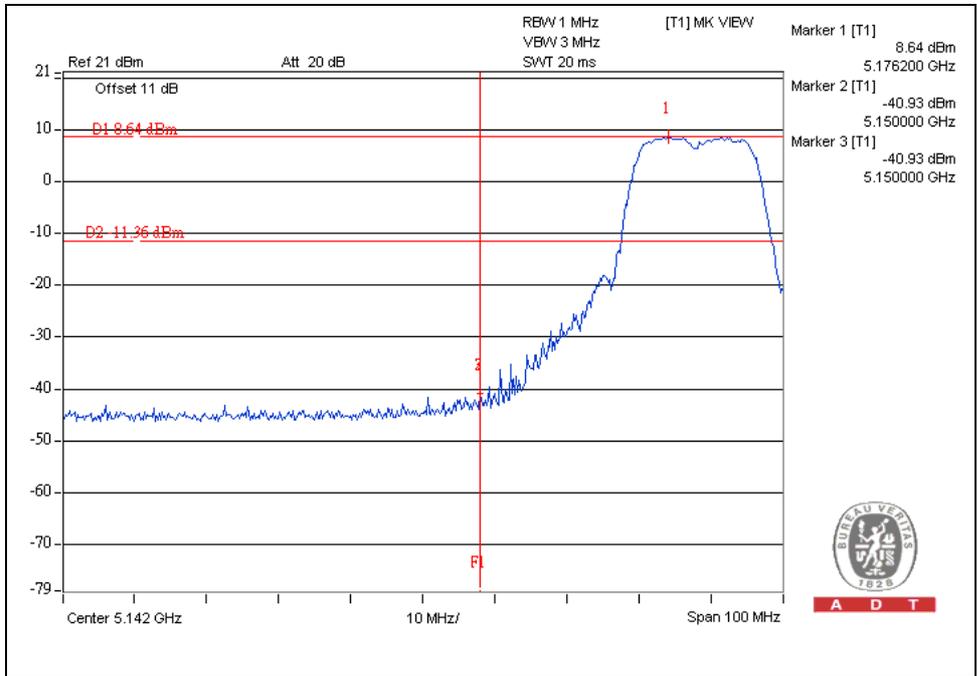
The spectrum plots (Peak RBW=1MHz, VBW=3MHz) are attached on the following pages.



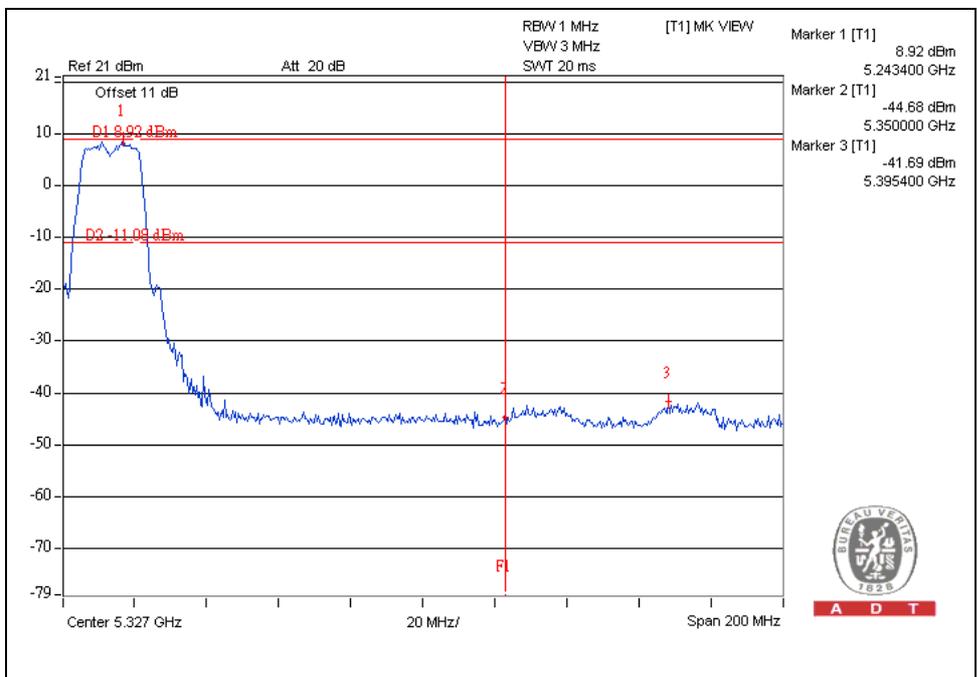
A D T

802.11a OFDM MODULATION

CH 36



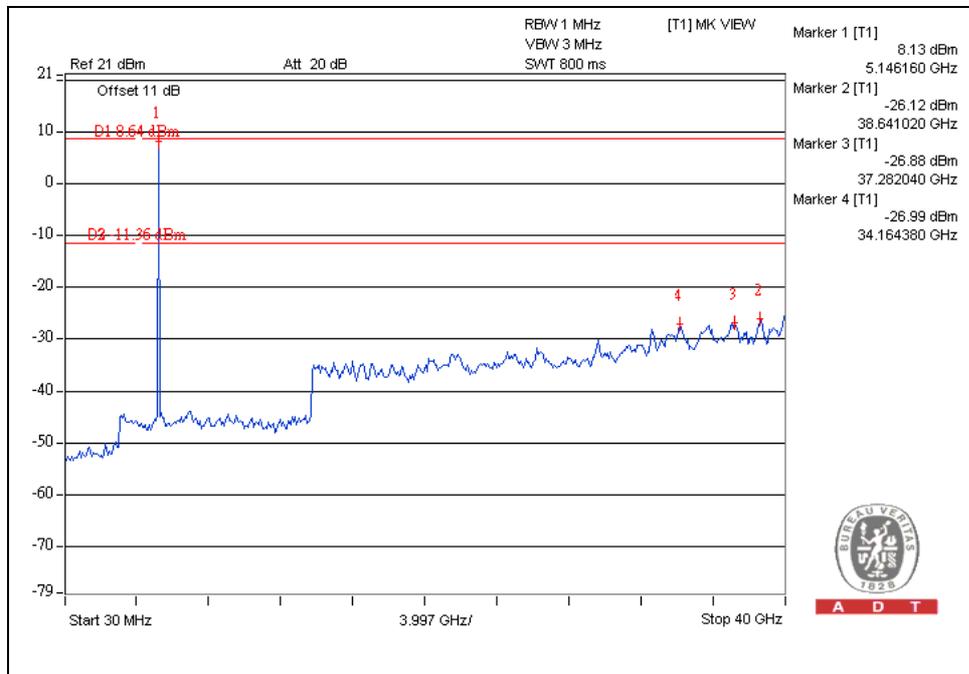
CH 48



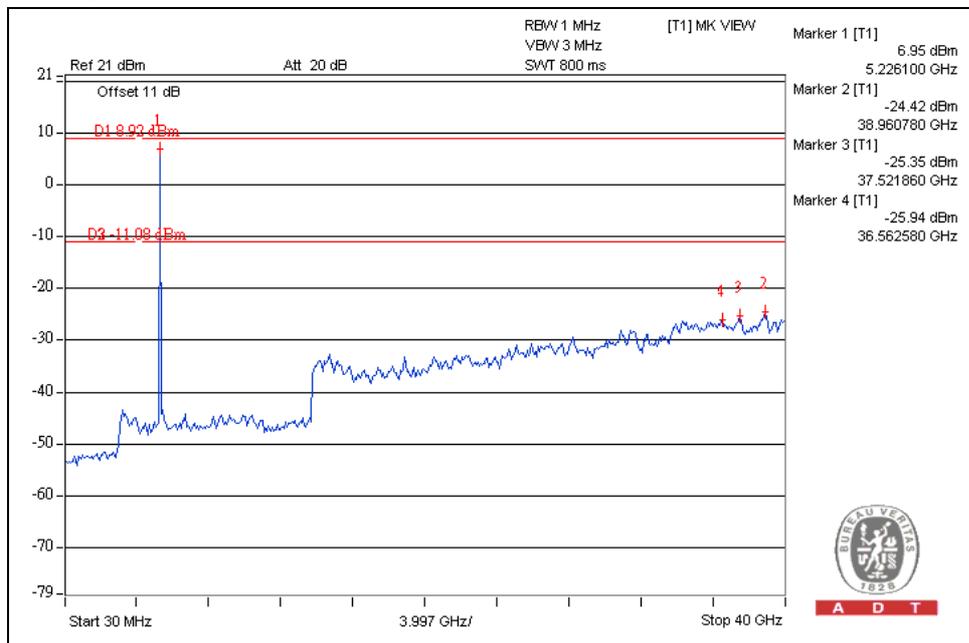


A D T

CH 36



CH 48

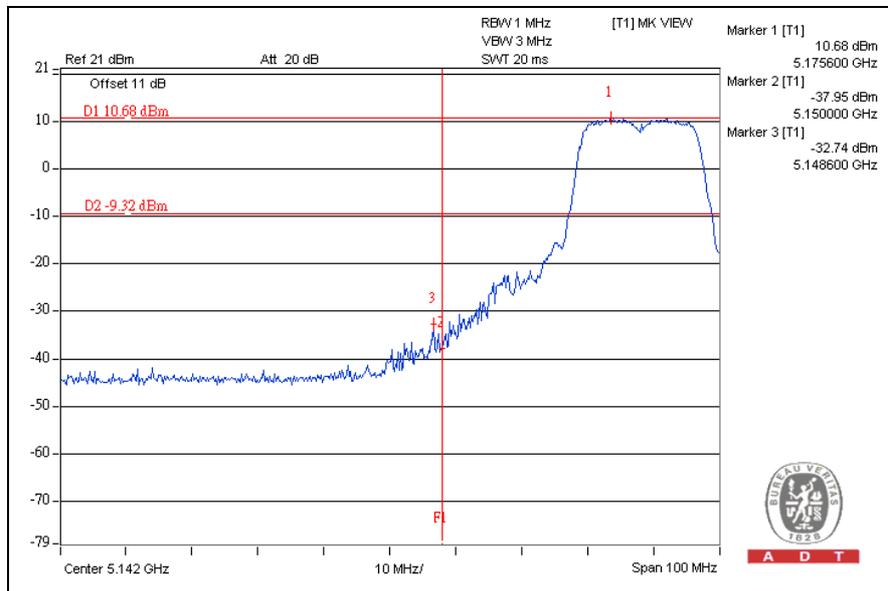




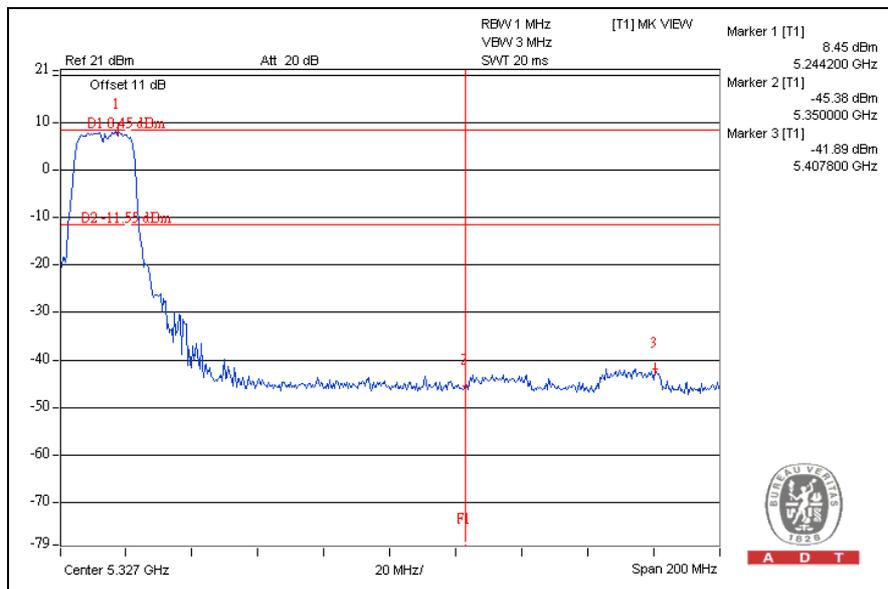
A D T

802.11n (20MHz) OFDM MODULATION:

CH36



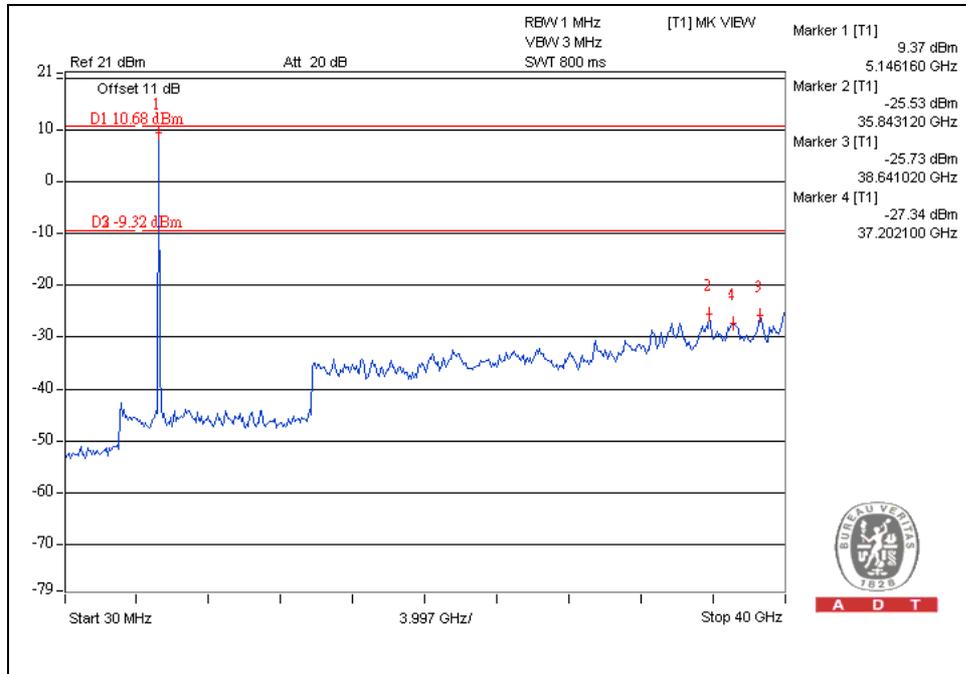
CH48



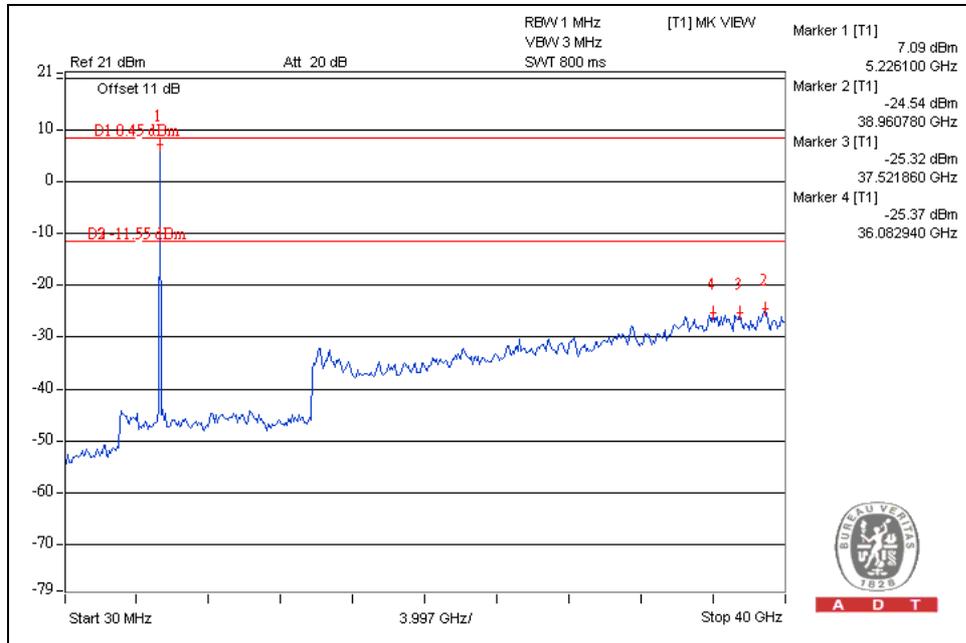


A D T

CH36



CH48

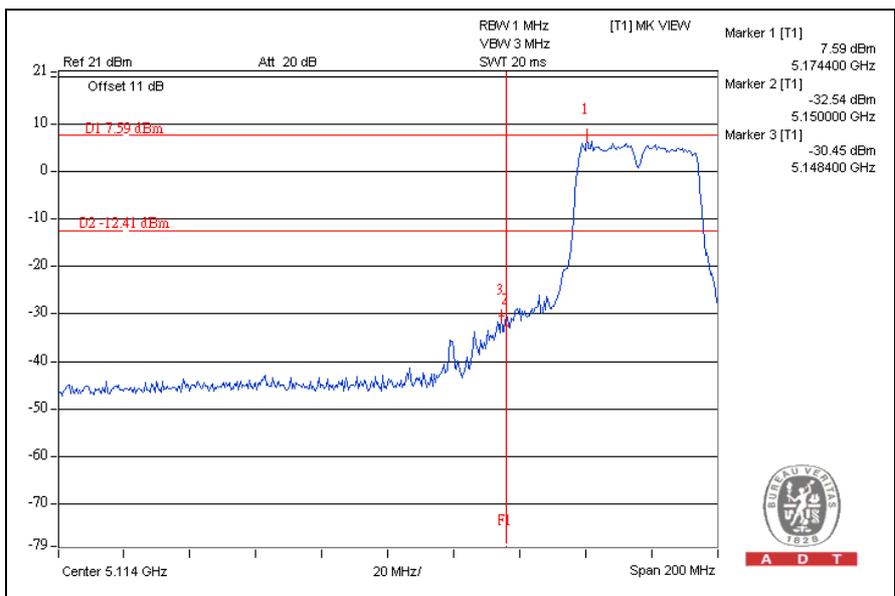




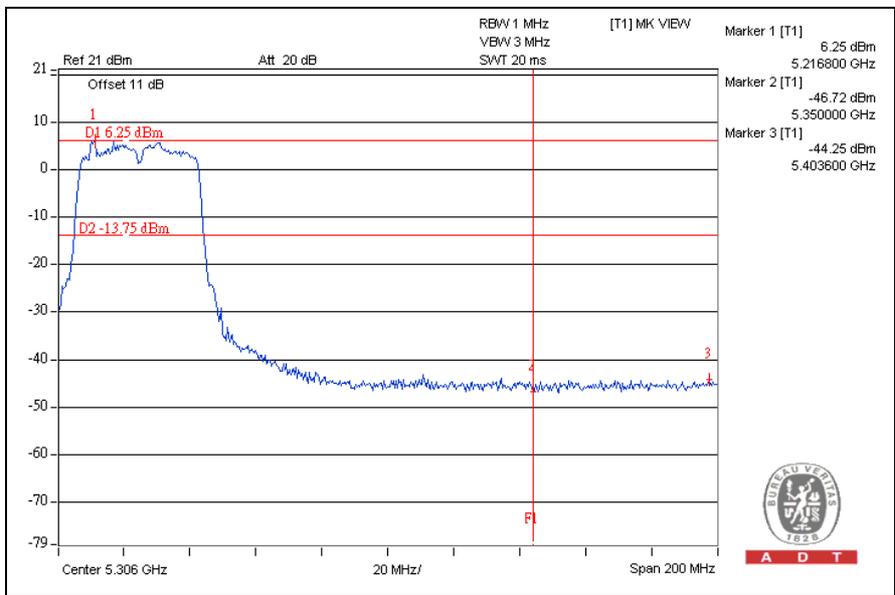
A D T

802.11n (40MHz) OFDM MODULATION:

CH38



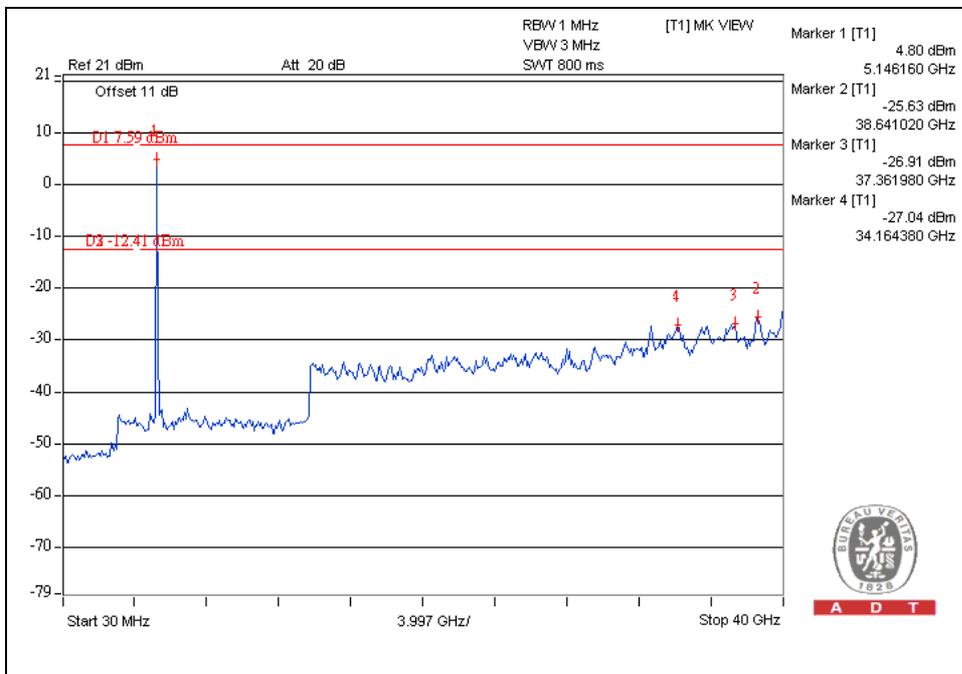
CH46



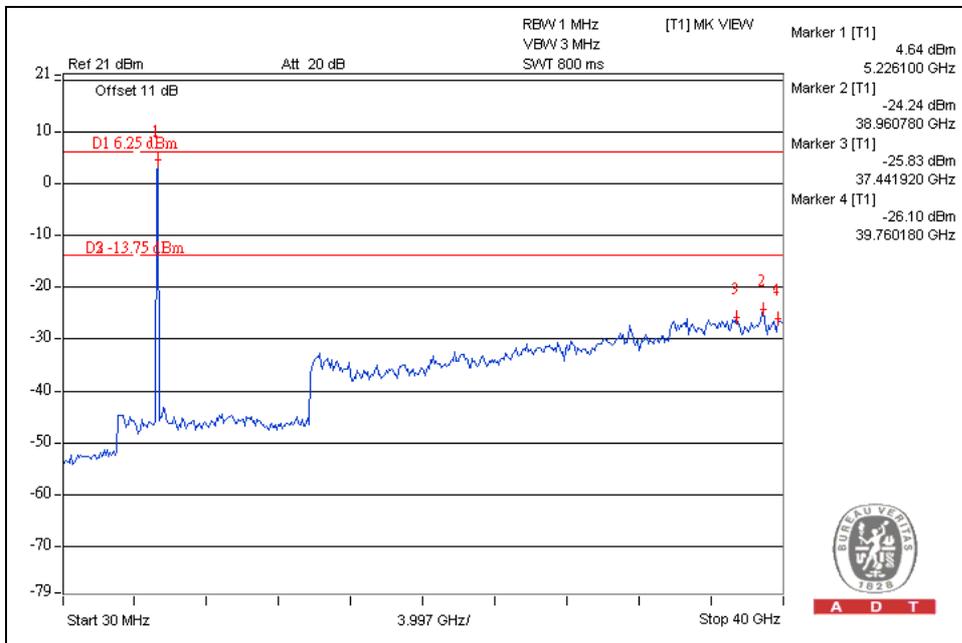


A D T

CH38



CH46





A D T

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 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.com.tw

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 ---