

FCC SUPPLEMENTARY TEST REPORT

REPORT NO.: RF971208H06A

MODEL NO.: WRT160N v3

RECEIVED: March 09, 2009

TESTED: May 07 to 18, 2009

ISSUED: May 20, 2009

APPLICANT: Cisco-Linksys, LLC

ADDRESS: 121 Theory Drive, Irvine, CA 92617, USA

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

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

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1. CERTIFICATION

PRODUCT: Wireless-N Broadband Router
BRAND NAME: Linksys
MODEL NO.: WRT160N v3
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: May 07 to 18, 2009
APPLICANT: Cisco-Linksys, LLC
STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

The above equipment (Model: WRT160N v3) 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 : Claire Kuan , **DATE:** May 20, 2009
(Claire Kuan, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** May 20, 2009
Responsible for RF (Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** May 20, 2009
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -6.06dB at 0.157MHz.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.18dB at 4824.00MHz.

NOTE:

1. This report is prepared for FCC class II permissive change. Only conducted emission, radiated emission and maximum peak output power were presented in this test report.

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)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless-N Broadband Router
MODEL NO.	WRT160N v3
FCC ID	Q87-WRT160NV3
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps Draft 802.11n (20MHz, 800ns GI): 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps Draft 802.11n (40MHz, 800ns GI): 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5Mbps Draft 802.11n (20MHz, 400ns GI): 72.2 / 65 / 57.8 / 43.3 / 28.9 / 21.7 / 14.4 / 7.2Mbps Draft 802.11n (40MHz, 400ns GI): 150 / 135 / 120 / 90 / 60 / 45 / 30 / 15Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz)
MAXIMUM OUTPUT POWER	802.11b: 133.968mW 802.11g: 305.492mW draft 802.11n (20MHz): 746.508mW draft 802.11n (40MHz): 807.710mW
ANTENNA TYPE	Pifa antenna without connector (Antenna gain : 1.5dBi)
DATA CABLE	NA
I/O PORT	WAN Port x 1, LAN Port x 4
ASSOCIATED DEVICES	Adapter x 1

NOTE:

- This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF971208H06 design is as the following:
 - u Modify the DC 3.3V input circuit, and AX3113 chip have replaced to MPS9141 chip.
 - u Change the RF chip to pin to pin compatible new version. no RF characteristic changed
 - u Add on new adapter as following:

Newly	
Brand:	LEADER
Model No.:	MU06-G6120050-A1
Input power :	AC100-240V, 0.5A, 50-60Hz
Output power :	DC 12V, 0.5A DC output cable (Unshielded, 1.5m)
Original	
Brand:	Bestec
Model No.:	EA0061WAA
Input power :	AC100-240V, 0.5A, 50-60Hz
Output power :	DC 12V, 0.5A DC output cable (Unshielded, 1.8m)

- The EUT was pre-tested in chamber under the following modes:

Test Mode	Description
Mode A	Level-set (Put on tabletop)
Mode B	Tower-set (Wall-mounted)

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the modes were recorded in this report.

- The EUT incorporates a MIMO function with draft 802.11n. Physically, the card provides two completed transmits and two receivers.
- The EUT is 2 * 2 spatial MIMO without beam forming function. The antenna configuration is two transmitter antennas and two receiver antennas, as there are 2 antennas. Spatial multiplexing modes for simultaneous transmission using 2 antennas, and for simultaneous receiver using 2 antennas.
- The EUT complies with draft 802.11n standards and backwards compatible with 802.11b, 802.11g products.
- 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.

3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided for 802.11b, 802.11g, draft 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

Seven channels are provided for draft 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

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)
Draft 802.11n (40MHz)	1 to 7	4	OFDM	BPSK	27

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)
Draft 802.11n (40MHz)	1 to 7	4	OFDM	BPSK	27

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)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	13
Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	27

BANDEDGE 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)
802.11b	1 to 11	1, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 11	OFDM	BPSK	6
Draft 802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	13
Draft 802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	27

ANTENNA PORT CONDUCTED 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)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
Draft 802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	13
Draft 802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	27

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless-N Broadband Router. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)

ANSI C63.4-2003

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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.

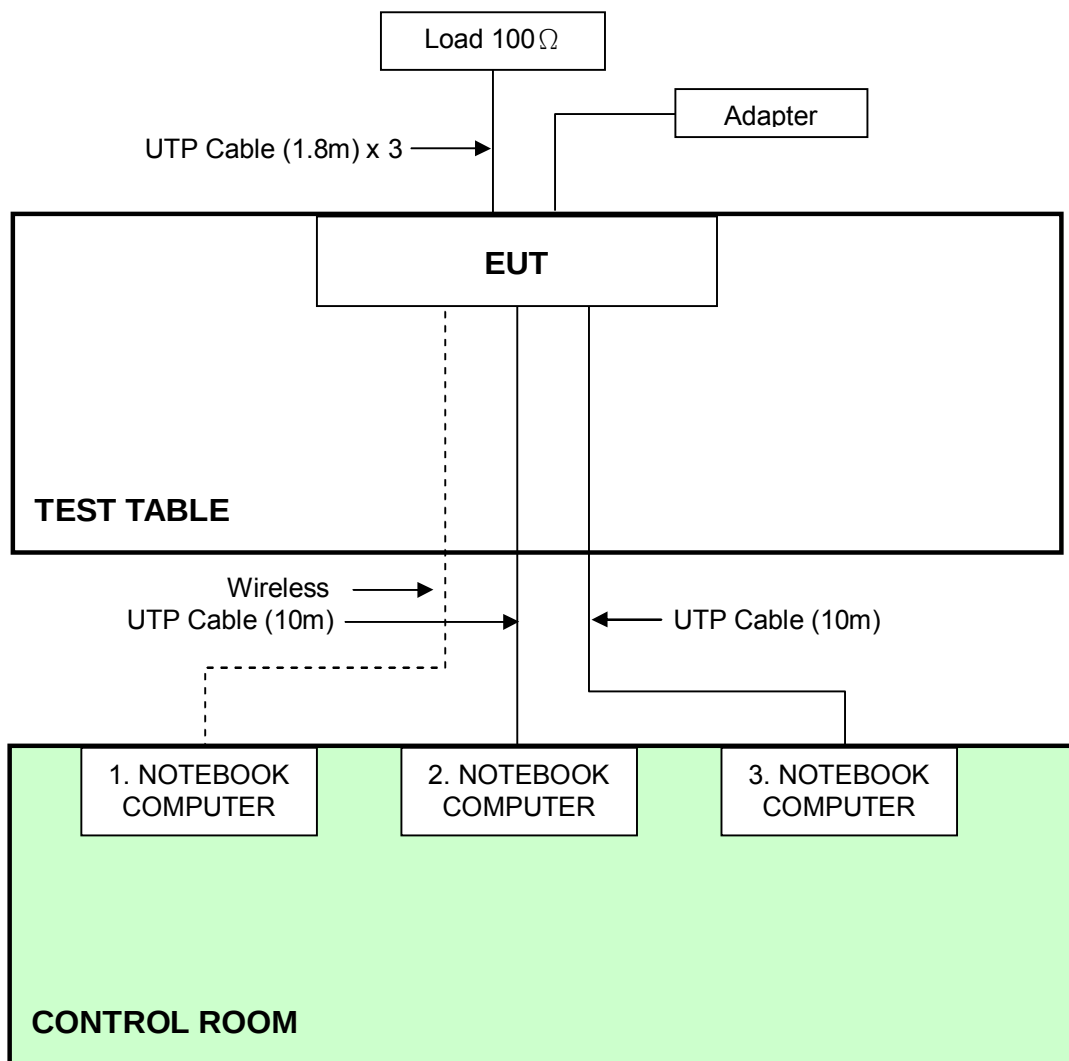
Conducted test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	12252644560	FCC
2	NOTEBOOK COMPUTER	HP	HSTNN-S19C	JP96X-4Y88K-BXX Y8-K27B3-M86FT	FCC DoC
3	NOTEBOOK COMPUTER	DELL	PPT	17044664176	E2K24GBRL
Radiated test – below 1 GHz					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	D1T5W1S 28407620224	QDS-BRCM1019
2	NOTEBOOK COMPUTER	DELL	PP05L	14307680656	E2K24CLNS
Radiated test – above 1 GHz					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	6976685584	DoC
2	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166 -5CA-0448	PIW632500516610
3	HUB	AVSYS	110H8	01-20E-000002	DoC

Conducted test	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	UTP Cable (10m)
3	UTP Cable (10m)
Radiated test – below 1 GHz	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP Cable (10m)
2	UTP Cable (10m)
Radiated test – above 1 GHz	
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP Cable (10m)
2	UTP Cable (10m)
3	UTP Cable (10m)

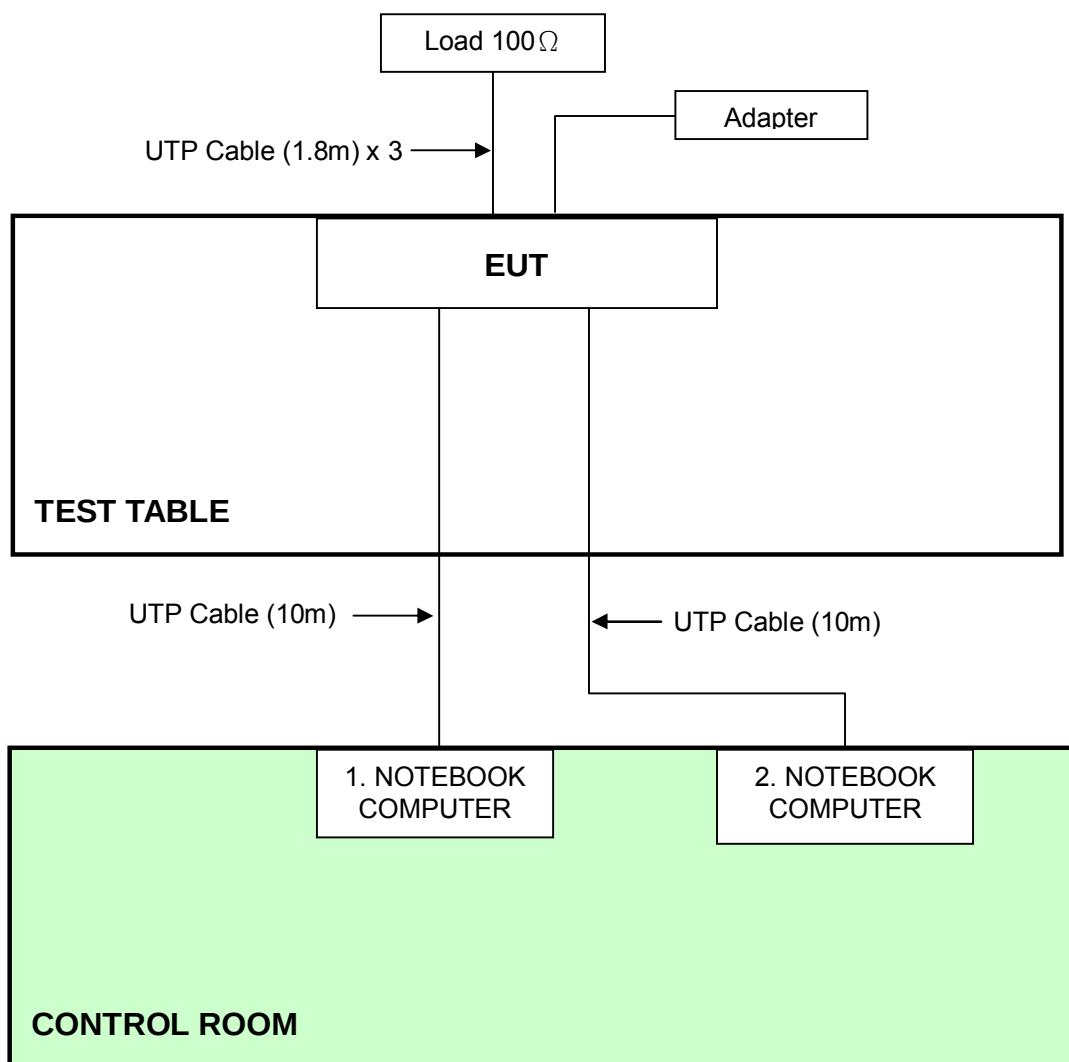
NOTE: All power cords of the above support units are non shielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST

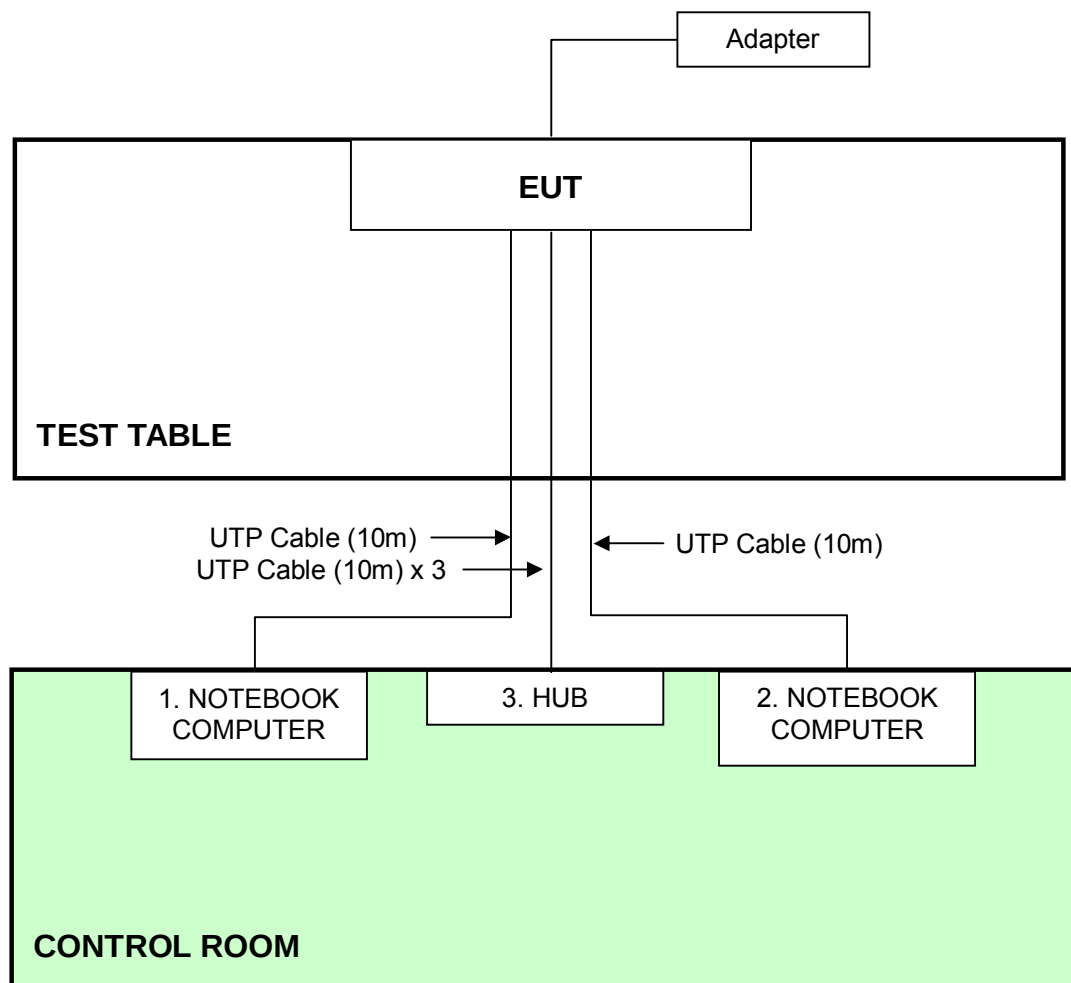
For Conducted test:



For Radiated test - below 1 GHz:



For Radiated test - above 1 GHz:



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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	100287	Mar. 05, 2009	Mar. 04, 2010
Line-Impedance Stabilization Network (for EUT)	KNW-407	8-1395-12	May 06, 2009	May 05, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 13, 2008	June 12, 2009
RF Cable (JYEBAO)	5DFB	COACAB-001	Dec 15, 2008	Dec 14, 2009
50 ohms Terminator	50	3	Nov. 05, 2008	Nov. 04, 2009
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. A.
 3. The VCCI Con A Registration No. is C-817.

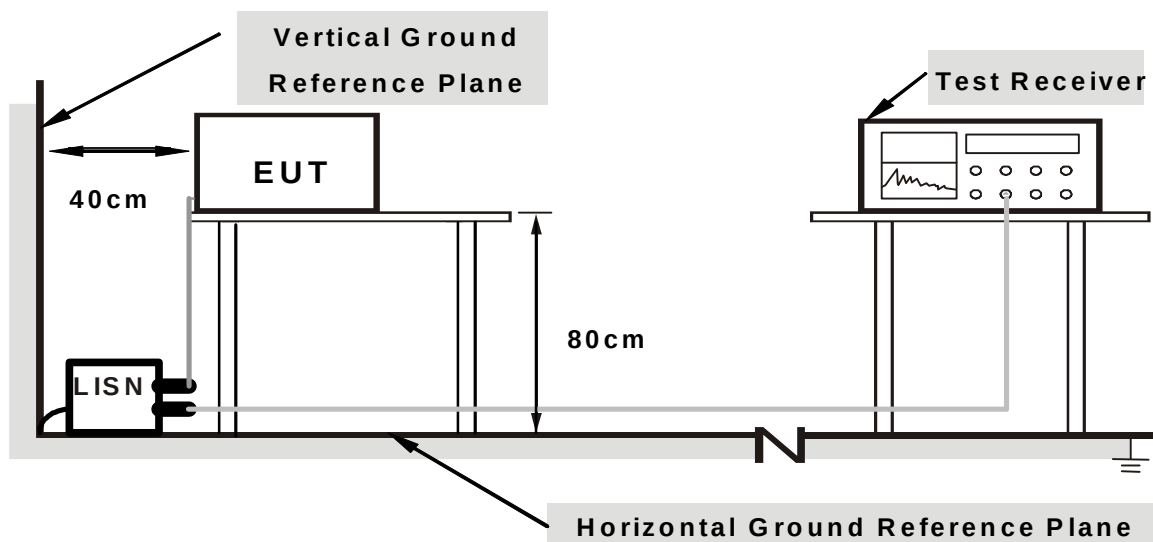
4.1.3 TEST PROCEDURES

- 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 provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were 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 units 1 ~ 3) to act as communication partners and placed them outside of testing area.
3. The communication partners run test program “Ping.exe” to enable EUT under transmission/receiving condition continuously via UTP cables and wireless transmission.

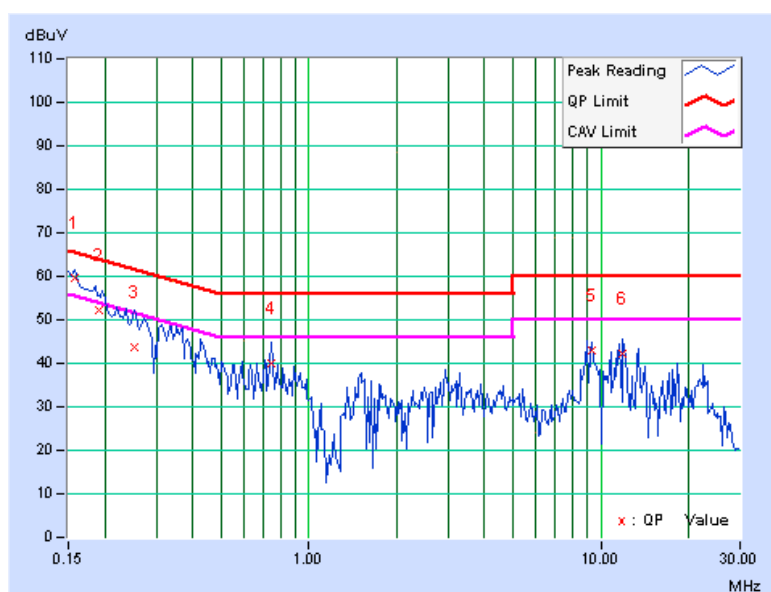
4.1.7 TEST RESULTS

DRAFT 802.11N (40MHZ) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	PHASE	Line (L)
MODULATION TYPE	OFDM	6dB BANDWIDTH	9 kHz
TRANSFER RATE	27Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 960hPa	TESTED BY	Eagle Chen

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.157	0.60	58.97	47.01	59.57	47.61	65.63	55.63	-6.06	-8.02
2	0.192	0.53	51.60	-	52.13	-	63.95	53.95	-11.82	-
3	0.252	0.48	43.34	-	43.82	-	61.71	51.71	-17.88	-
4	0.744	0.40	39.68	-	40.08	-	56.00	46.00	-15.92	-
5	9.328	0.52	42.60	-	43.12	-	60.00	50.00	-16.88	-
6	11.891	0.56	41.65	-	42.21	-	60.00	50.00	-17.79	-

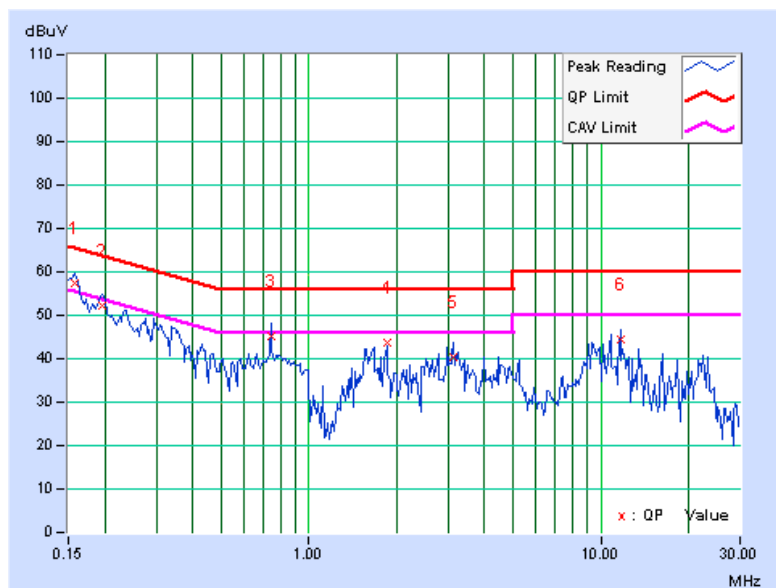
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	PHASE	Neutral (N)
MODULATION TYPE	OFDM	6dB BANDWIDTH	9 kHz
TRANSFER RATE	27Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 960hPa	TESTED BY	Eagle Chen

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.35	56.94	45.46	57.29	45.81	65.58	55.58	-8.29	-9.77
2	0.197	0.27	51.92	-	52.19	-	63.74	53.74	-11.56	-
3	0.740	0.16	45.06	-	45.22	-	56.00	46.00	-10.78	-
4	1.852	0.18	43.56	-	43.74	-	56.00	46.00	-12.26	-
5	3.125	0.21	40.12	-	40.33	-	56.00	46.00	-15.67	-
6	11.648	0.36	44.05	-	44.41	-	60.00	50.00	-15.59	-

- 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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 9, 2008	Dec. 8, 2009
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 9, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 9, 2008	Sep. 8, 2009
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
R&S Loop Antenna	HFH2-Z2	100070	Jan. 14, 2008	Jan. 13, 2010
RF Switches	EMH-011	08009	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 15, 2008	Aug. 14, 2009
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
Software	ADT_Radiated_V7.6.15.9.2	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, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in Open Site No. C.

4. The FCC Site Registration No. is 656396.

5. The VCCI Site Registration No. is R-1626.

6. The CANADA Site Registration No. is IC 7450G-3.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 10 dB 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 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

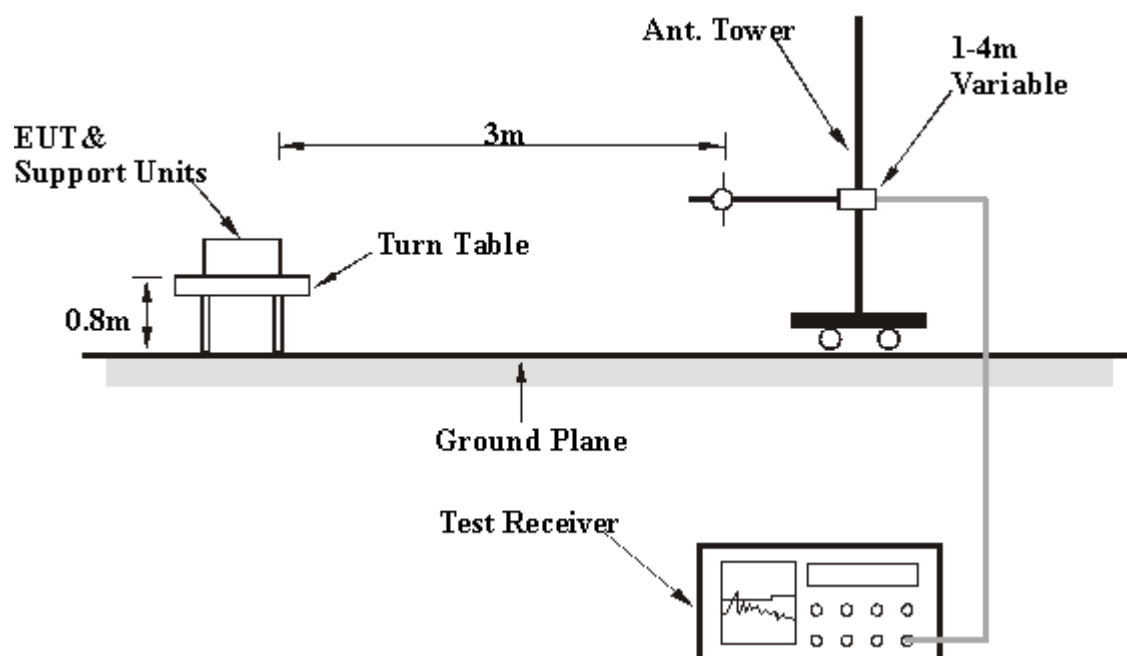
NOTE:

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 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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared other computer systems (support units 1 ~ 2) to act as communication partners and placed them outside of testing area.
3. The communication partners run test program “MFGTEST” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

Below 1GHz Test Data

4.2.7 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 63%RH 960hPa	TESTED BY	Wen Yu

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	125.00	33.73 QP	43.50	-9.77	1.47 H	109	19.61	14.12
2	200.00	36.03 QP	43.50	-7.47	1.49 H	133	23.05	12.98
3	250.00	40.62 QP	46.00	-5.38	1.26 H	269	25.20	15.42
4	266.67	43.96 QP	46.00	-2.04	1.00 H	124	27.99	15.97
5	300.00	38.56 QP	46.00	-7.44	1.00 H	130	21.54	17.02
6	333.33	38.26 QP	46.00	-7.74	1.00 H	138	19.88	18.38
7	400.00	40.36 QP	46.00	-5.64	1.00 H	146	19.22	21.14
8	500.00	40.71 QP	46.00	-5.29	1.48 H	140	18.05	22.66
9	533.34	39.62 QP	46.00	-6.38	1.38 H	144	16.16	23.46
10	600.00	40.36 QP	46.00	-5.64	1.23 H	228	15.59	24.77

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	125.00	31.01 QP	43.50	-12.49	1.00 V	64	16.89	14.12
2	200.00	30.84 QP	43.50	-12.66	1.00 V	19	17.86	12.98
3	250.00	35.38 QP	46.00	-10.62	1.28 V	174	19.96	15.42
4	266.67	36.33 QP	46.00	-9.67	1.00 V	175	20.36	15.97
5	300.00	35.60 QP	46.00	-10.40	1.38 V	198	18.58	17.02
6	375.00	31.32 QP	46.00	-14.68	1.29 V	190	11.22	20.10
7	400.00	40.49 QP	46.00	-5.51	1.00 V	182	19.35	21.14
8	500.00	42.56 QP	46.00	-3.44	1.00 V	109	19.90	22.66
9	750.00	36.22 QP	46.00	-9.78	1.30 V	279	7.76	28.46
10	875.00	35.53 QP	46.00	-10.47	1.23 V	0	4.81	30.72

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.

Above 1GHz Test Data

4.2.8 TEST RESULTS

802.11b DSSS MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	2390.00	57.10 PK	74.00	-16.90	1.49 H	74	26.82	30.28
2	2390.00	46.43 AV	54.00	-7.57	1.49 H	74	16.15	30.28
3	*2412.00	111.58 PK			1.49 H	87	81.22	30.36
4	*2412.00	107.01 AV			1.49 H	87	76.65	30.36
5	4824.00	57.37 PK	74.00	-16.63	1.32 H	34	20.58	36.79
6	4824.00	53.82 AV	54.00	-0.18	1.32 H	34	17.03	36.79
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	2390.00	55.15 PK	74.00	-18.85	1.00 V	114	24.87	30.28
2	2390.00	44.31 AV	54.00	-9.69	1.00 V	114	14.03	30.28
3	*2412.00	105.10 PK			1.00 V	113	74.74	30.36
4	*2412.00	100.90 AV			1.00 V	113	70.54	30.36
5	4824.00	54.24 PK	74.00	-19.76	1.46 V	355	17.45	36.79
6	4824.00	49.98 AV	54.00	-4.02	1.46 V	355	13.19	36.79

- 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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	*2437.00	113.67 PK			1.51 H	76	83.21	30.46
2	*2437.00	109.23 AV			1.51 H	76	78.77	30.46
3	4874.00	57.29 PK	74.00	-16.71	1.16 H	38	20.37	36.92
4	4874.00	53.58 AV	54.00	-0.42	1.16 H	38	16.66	36.92
5	7311.00	54.53 PK	74.00	-19.47	1.02 H	31	11.39	43.14
6	7311.00	44.06 AV	54.00	-9.94	1.02 H	31	0.92	43.14
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	*2437.00	106.30 PK			1.00 V	168	75.84	30.46
2	*2437.00	102.20 AV			1.00 V	168	71.74	30.46
3	4874.00	54.56 PK	74.00	-19.44	1.00 V	355	17.64	36.92
4	4874.00	50.05 AV	54.00	-3.95	1.00 V	355	13.13	36.92
5	7311.00	52.56 PK	74.00	-21.44	1.15 V	313	9.42	43.14
6	7311.00	39.45 AV	54.00	-14.55	1.15 V	313	-3.69	43.14

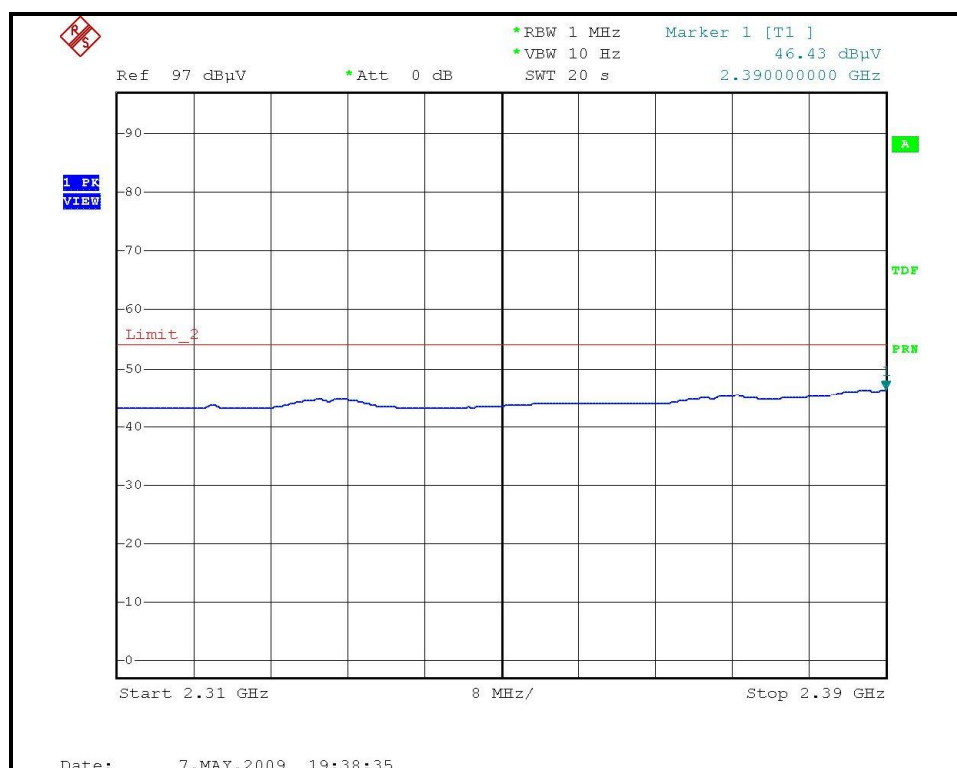
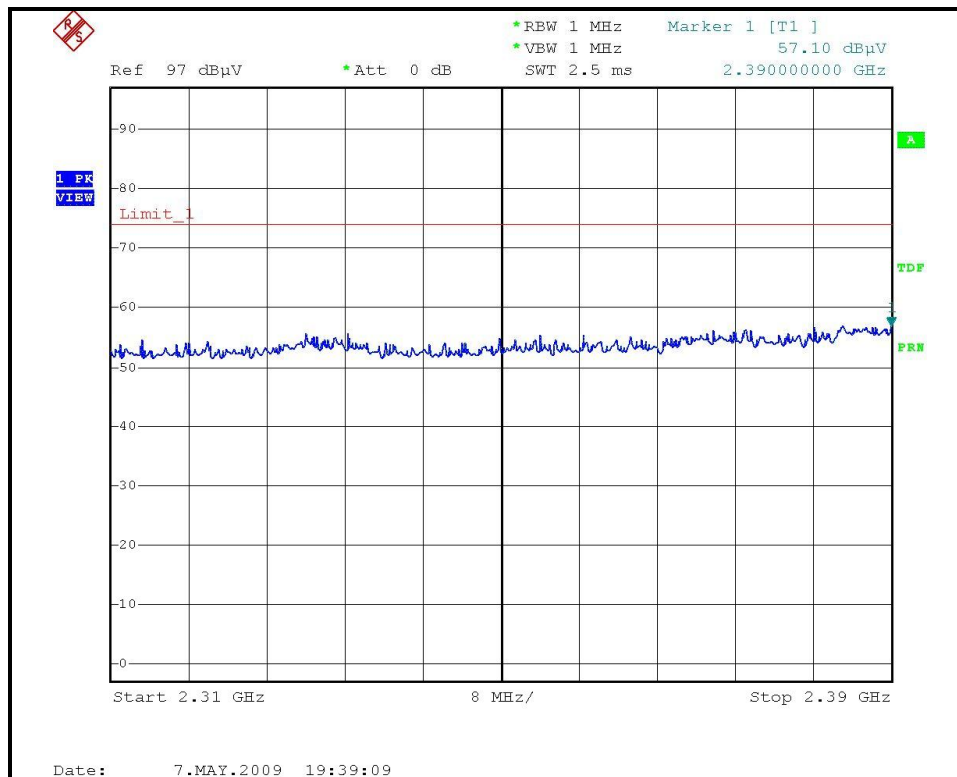
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	*2462.00	112.84 PK			1.50 H	78	82.29	30.55
2	*2462.00	108.42 AV			1.50 H	78	77.87	30.55
3	2483.50	60.62 PK	74.00	-13.38	1.43 H	72	29.99	30.63
4	2483.50	48.47 AV	54.00	-5.53	1.43 H	72	17.84	30.63
5	4924.00	56.60 PK	74.00	-17.40	1.32 H	32	19.54	37.06
6	4924.00	52.69 AV	54.00	-1.31	1.32 H	32	15.63	37.06
7	7386.00	54.91 PK	74.00	-19.09	1.00 H	30	11.78	43.13
8	7386.00	44.52 AV	54.00	-9.48	1.00 H	30	1.39	43.13
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	*2462.00	104.80 PK			1.00 V	277	74.25	30.55
2	*2462.00	100.60 AV			1.00 V	277	70.05	30.55
3	2483.50	56.04 PK	74.00	-17.96	1.00 V	277	25.41	30.63
4	2483.50	44.64 AV	54.00	-9.36	1.00 V	277	14.01	30.63
5	4924.00	54.42 PK	74.00	-19.58	1.10 V	347	17.36	37.06
6	4924.00	50.00 AV	54.00	-4.00	1.10 V	347	12.94	37.06
7	7386.00	52.33 PK	74.00	-21.67	1.33 V	341	9.20	43.13
8	7386.00	39.27 AV	54.00	-14.73	1.33 V	341	-3.86	43.13

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.

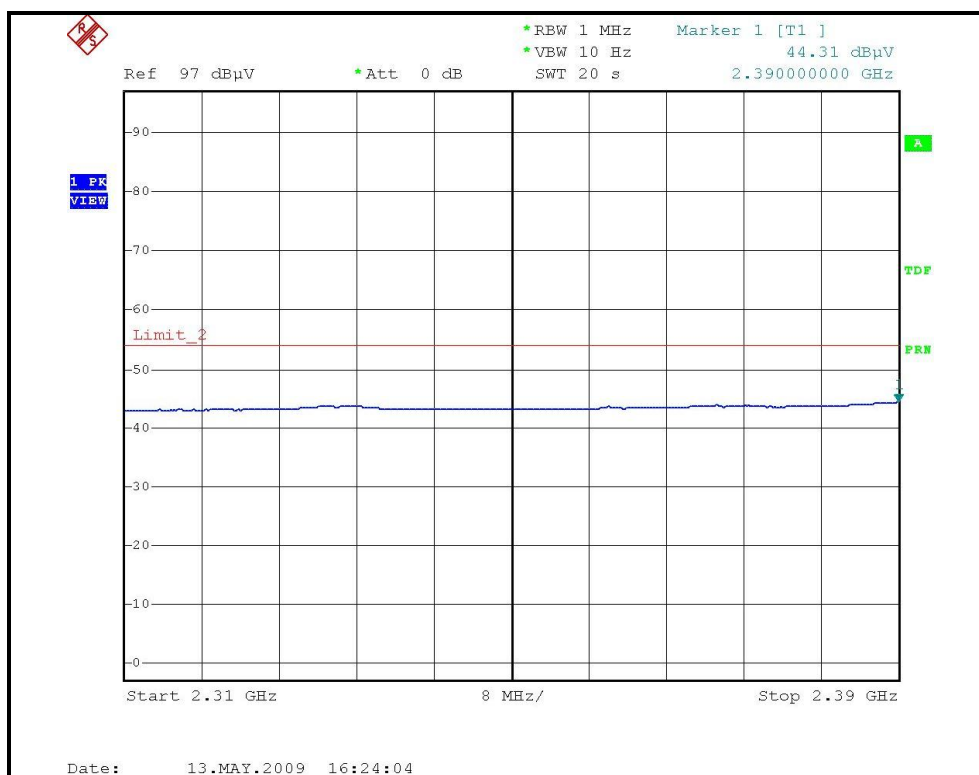
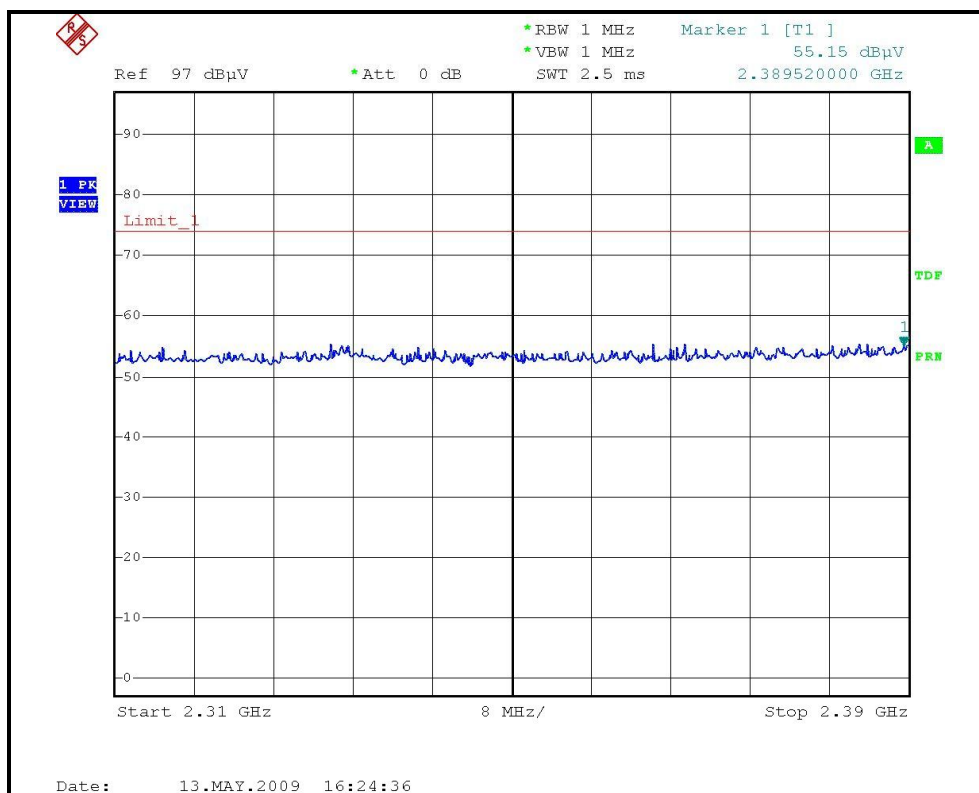
RESTRICTED BANDEDGE (802.11b MODE,CH1, HORIZONTAL)



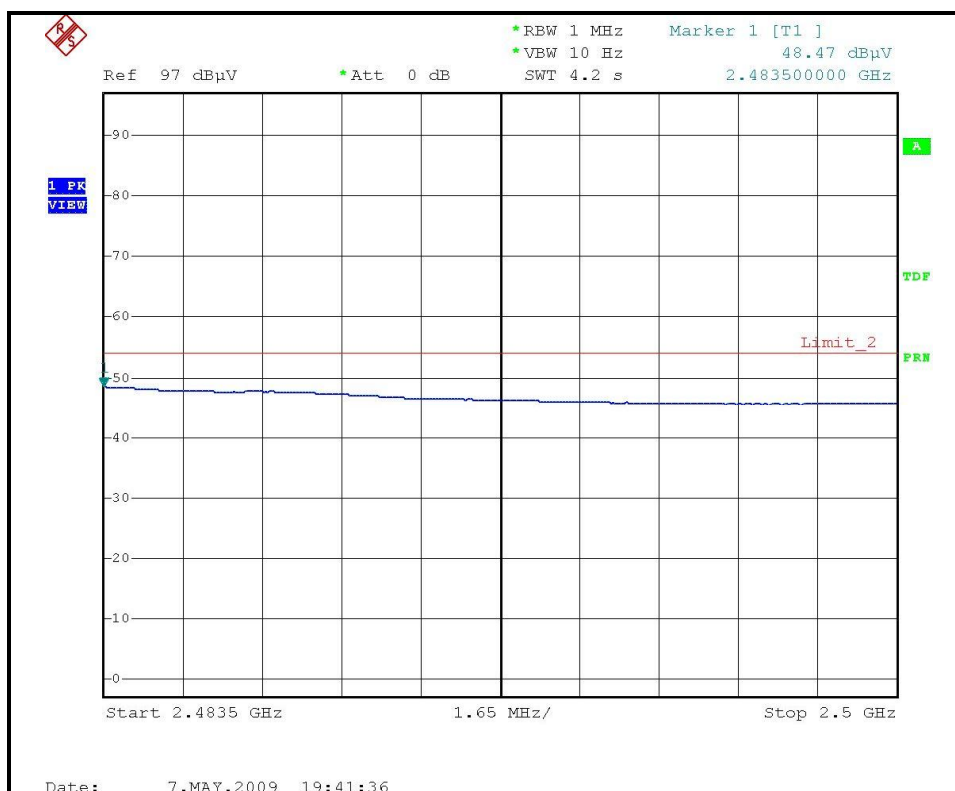
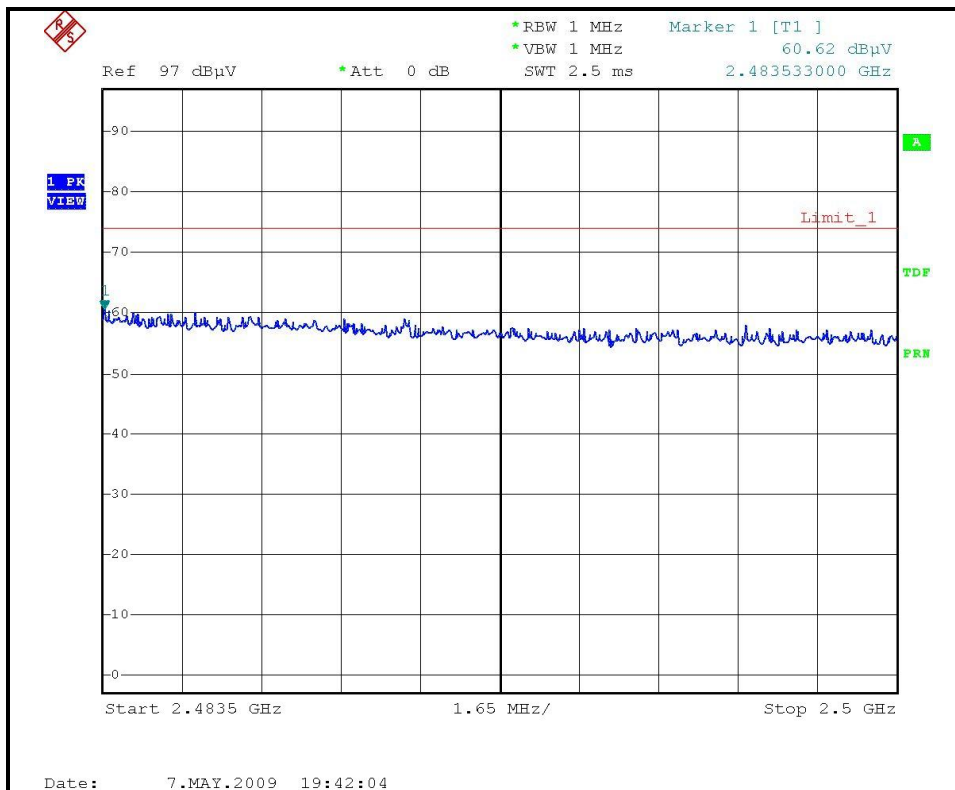


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RESTRICTED BANDEDGE (802.11b MODE,CH1, VERTICAL)



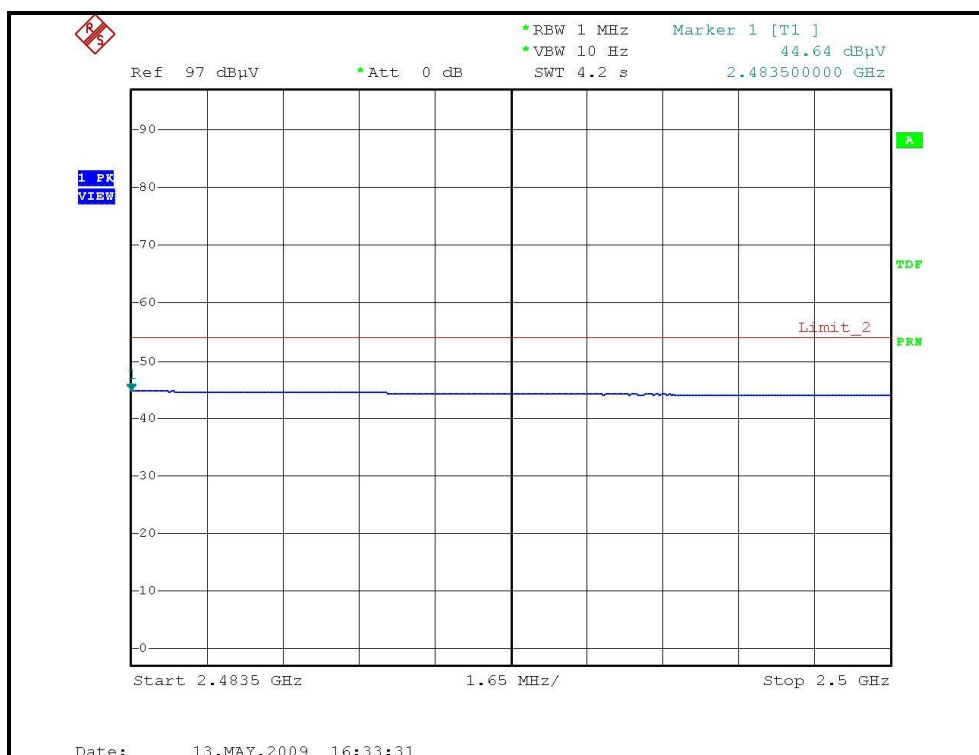
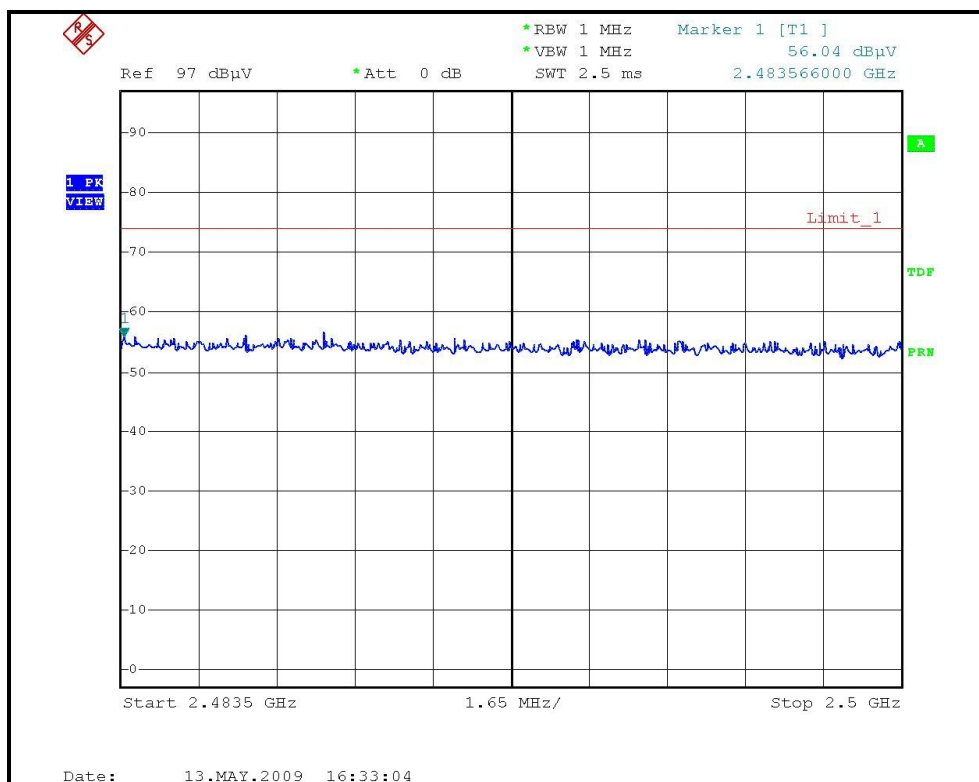
RESTRICTED BANDEDGE (802.11b MODE,CH11, HORIZONTAL)





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RESTRICTED BANDEDGE (802.11b MODE,CH11, VERTICAL)



802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	2390.00	56.21 PK	74.00	-17.79	1.50 H	73	25.93	30.28
2	2390.00	48.59 AV	54.00	-5.41	1.50 H	73	18.31	30.28
3	*2412.00	112.32 PK			1.50 H	75	81.96	30.36
4	*2412.00	100.69 AV			1.50 H	75	70.33	30.36
5	4824.00	54.39 PK	74.00	-19.61	1.28 H	42	17.60	36.79
6	4824.00	41.11 AV	54.00	-12.89	1.28 H	42	4.32	36.79
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	2390.00	62.72 PK	74.00	-11.28	1.00 V	113	32.44	30.28
2	2390.00	45.46 AV	54.00	-8.54	1.00 V	113	15.18	30.28
3	*2412.00	105.70 PK			1.00 V	113	75.34	30.36
4	*2412.00	93.70 AV			1.00 V	113	63.34	30.36
5	4824.00	52.48 PK	74.00	-21.52	1.45 V	355	15.69	36.79
6	4824.00	39.01 AV	54.00	-14.99	1.45 V	355	2.22	36.79

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	*2437.00	113.04 PK			1.48 H	77	82.58	30.46
2	*2437.00	102.41 AV			1.48 H	77	71.95	30.46
3	4874.00	54.57 PK	74.00	-19.43	1.20 H	40	17.65	36.92
4	4874.00	41.25 AV	54.00	-12.75	1.20 H	40	4.33	36.92
5	7311.00	52.71 PK	74.00	-21.29	1.02 H	30	9.57	43.14
6	7311.00	38.94 AV	54.00	-15.06	1.02 H	30	-4.20	43.14
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	*2437.00	106.00 PK			1.00 V	168	75.54	30.46
2	*2437.00	95.30 AV			1.00 V	168	64.84	30.46
3	4874.00	52.61 PK	74.00	-21.39	1.00 V	355	15.69	36.92
4	4874.00	39.26 AV	54.00	-14.74	1.00 V	355	2.34	36.92
5	7311.00	52.67 PK	74.00	-21.33	1.15 V	312	9.53	43.14
6	7311.00	38.26 AV	54.00	-15.74	1.15 V	312	-4.88	43.14

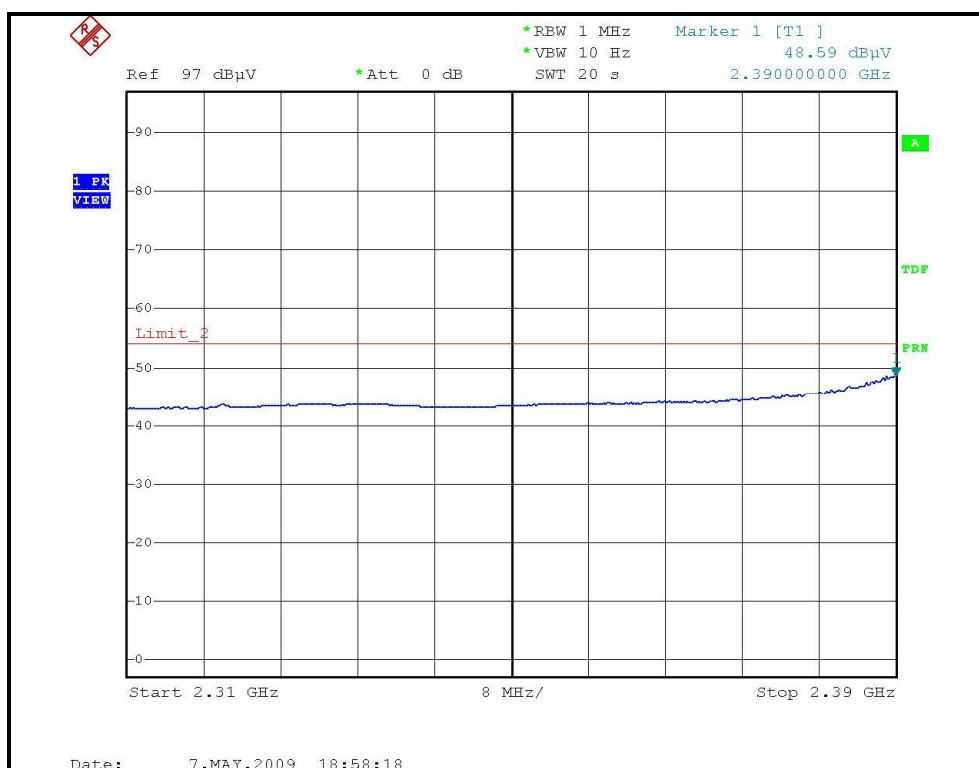
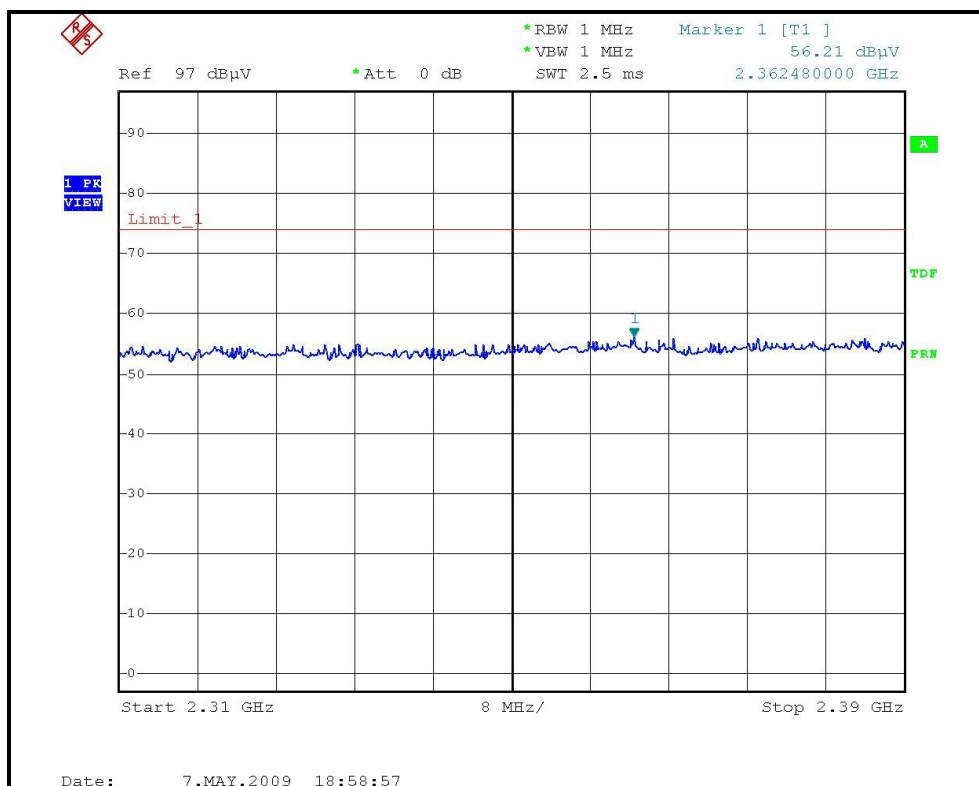
REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * ”: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	*2462.00	112.90 PK			1.51 H	70	82.35	30.55
2	*2462.00	101.70 AV			1.51 H	70	71.15	30.55
3	2483.50	71.37 PK	74.00	-2.63	1.51 H	71	40.74	30.63
4	2483.50	51.06 AV	54.00	-2.94	1.51 H	71	20.43	30.63
5	4924.00	54.52 PK	74.00	-19.48	1.30 H	34	17.46	37.06
6	4924.00	41.38 AV	54.00	-12.62	1.30 H	34	4.32	37.06
7	7386.00	52.78 PK	74.00	-21.22	1.00 H	31	9.65	43.13
8	7386.00	38.99 AV	54.00	-15.01	1.00 H	31	-4.14	43.13
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	*2462.00	104.00 PK			1.00 V	277	73.45	30.55
2	*2462.00	93.80 AV			1.00 V	277	63.25	30.55
3	2483.50	65.16 PK	74.00	-8.84	1.00 V	276	34.53	30.63
4	2483.50	45.75 AV	54.00	-8.25	1.00 V	276	15.12	30.63
5	4924.00	52.65 PK	74.00	-21.35	1.10 V	350	15.59	37.06
6	4924.00	39.33 AV	54.00	-14.67	1.10 V	350	2.27	37.06
7	7386.00	52.74 PK	74.00	-21.26	1.34 V	342	9.61	43.13
8	7386.00	38.36 AV	54.00	-15.64	1.34 V	342	-4.77	43.13

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.

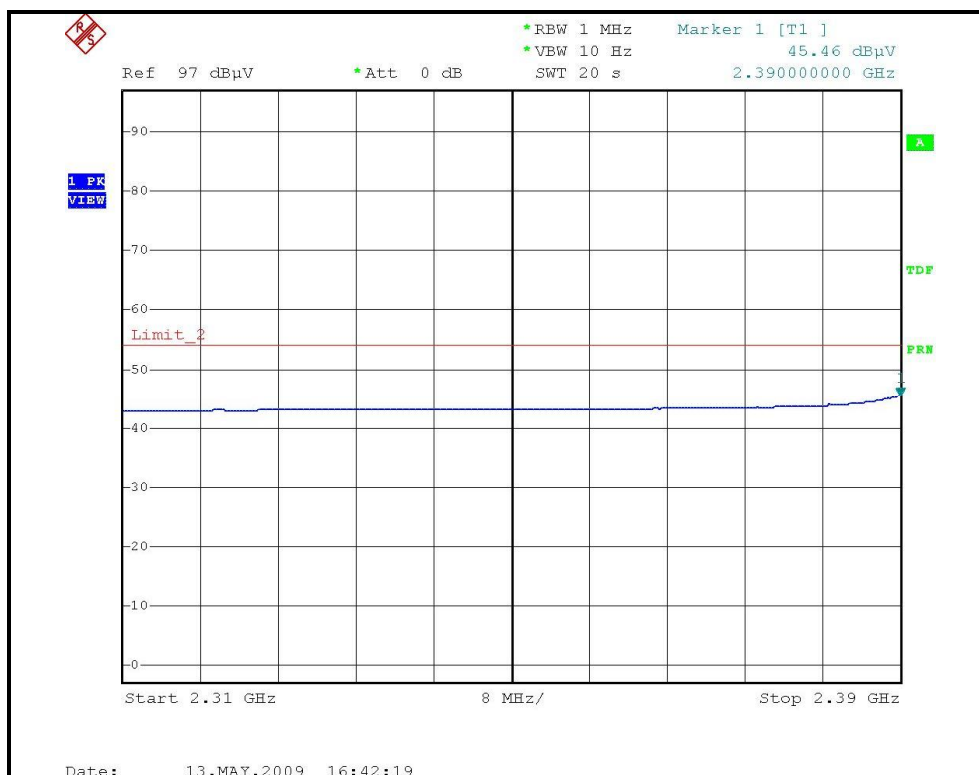
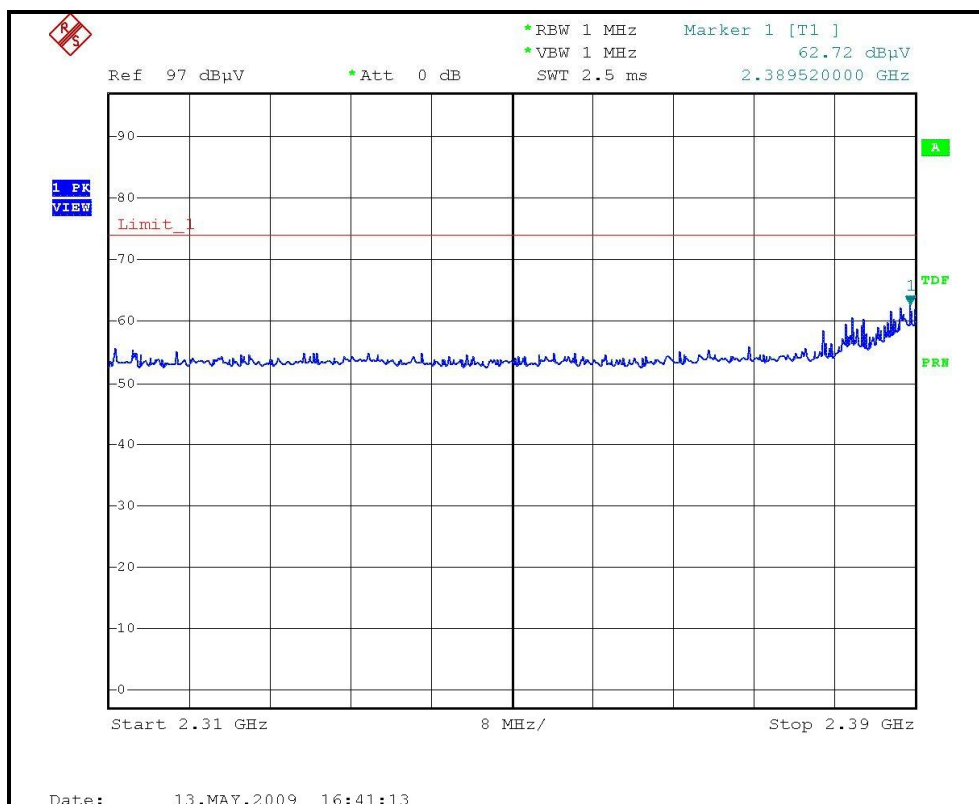
RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL)



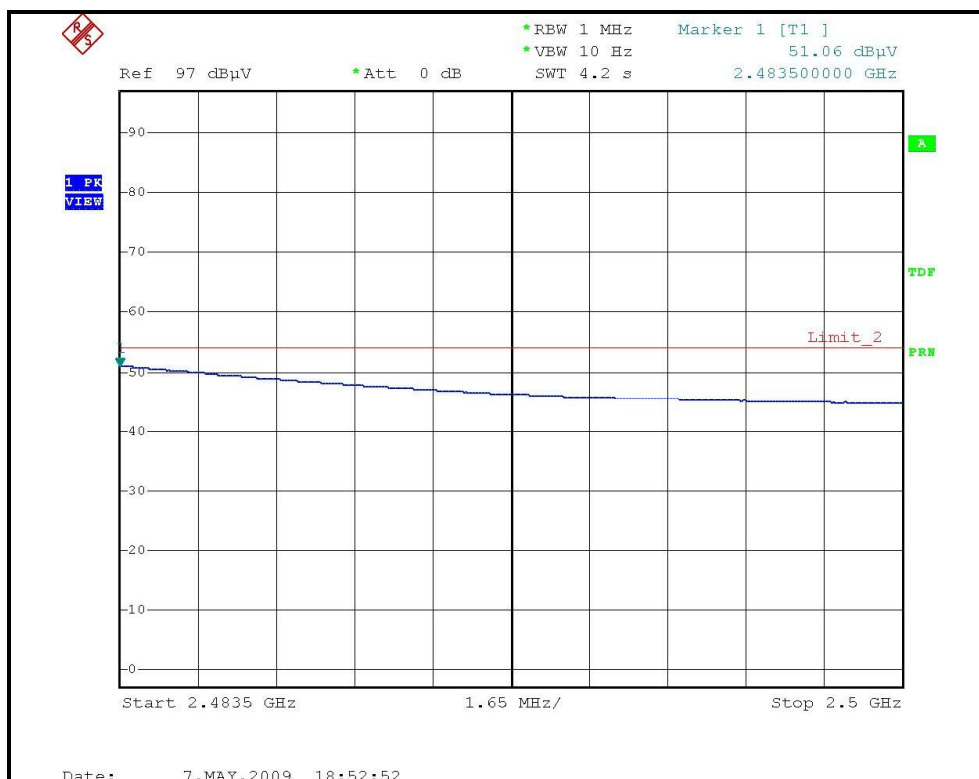
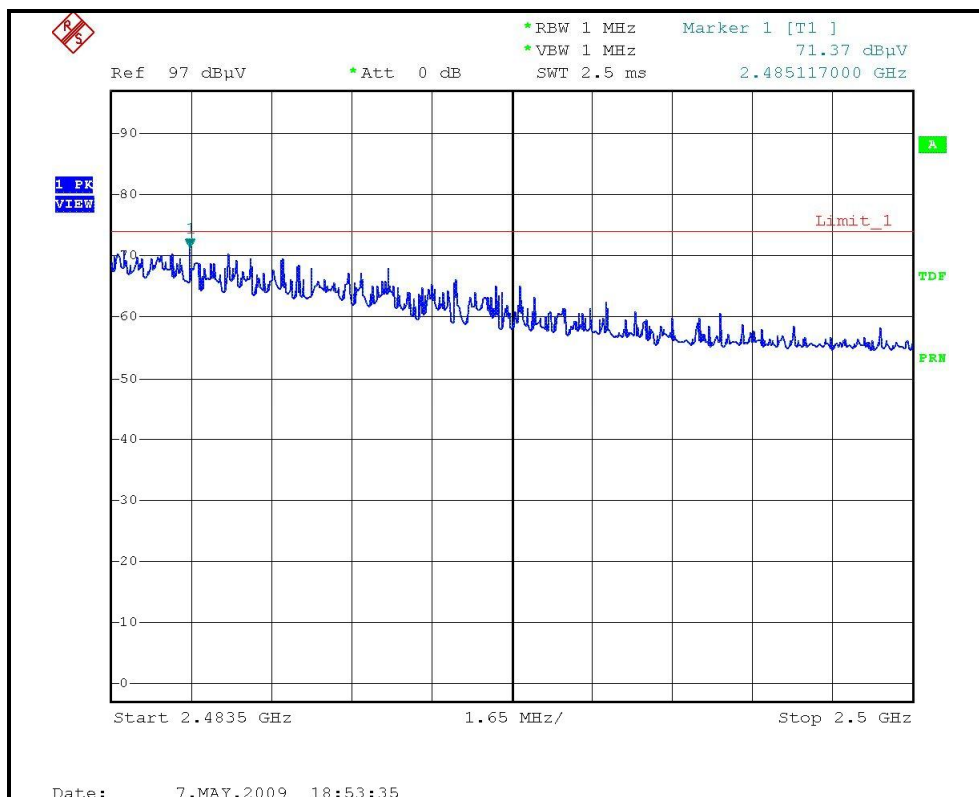


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RESTRICTED BANDEGE (802.11g MODE,CH1, VERTICAL)



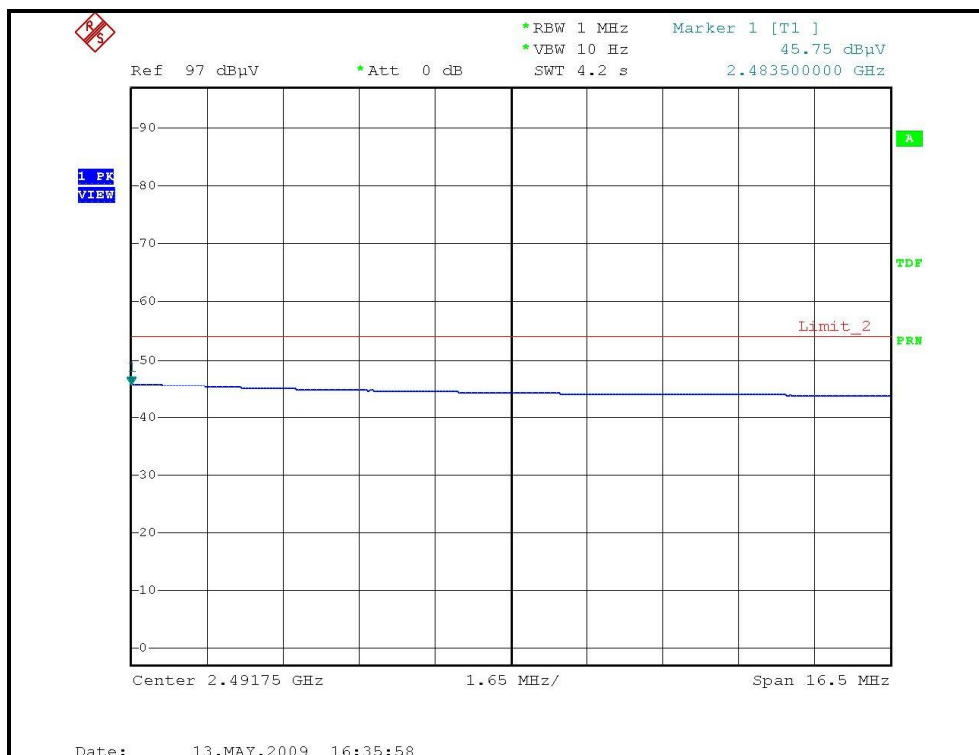
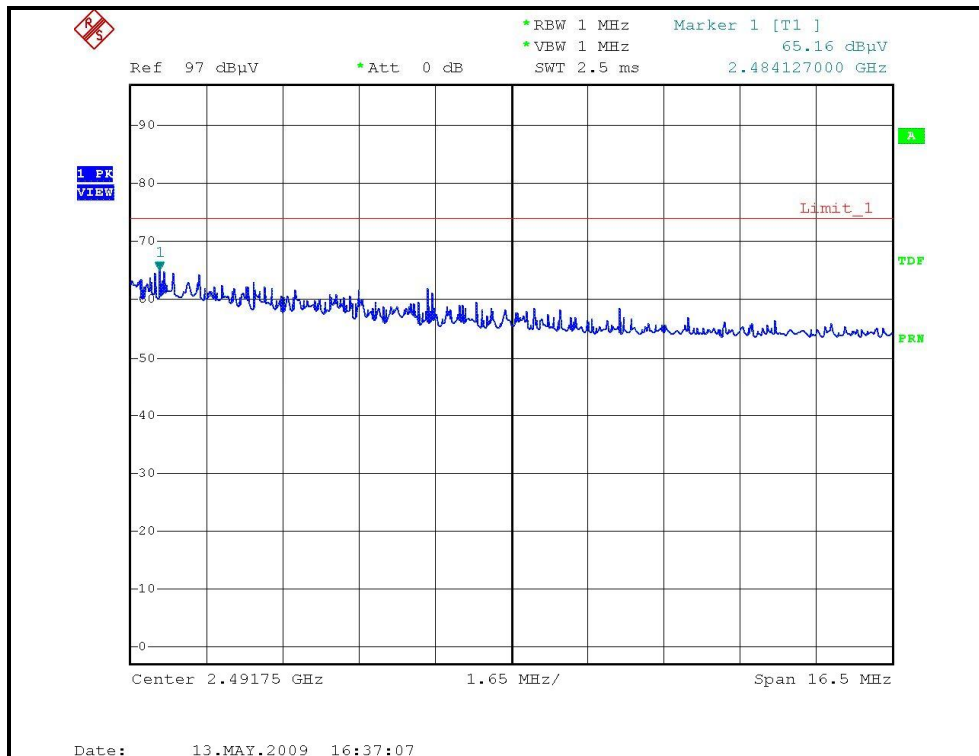
RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL)





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RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL)



DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	2390.00	72.48 PK	74.00	-1.52	1.92 H	261	42.20	30.28
2	2390.00	52.62 AV	54.00	-1.38	1.92 H	261	22.34	30.28
3	*2412.00	113.23 PK			1.91 H	261	82.87	30.36
4	*2412.00	102.41 AV			1.91 H	261	72.05	30.36
5	4824.00	54.47 PK	74.00	-19.53	1.28 H	41	17.68	36.79
6	4824.00	41.26 AV	54.00	-12.74	1.28 H	41	4.47	36.79
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	2389.00	64.49 PK	74.00	-9.51	1.35 V	166	34.21	30.28
2	2389.00	46.88 AV	54.00	-7.12	1.35 V	166	16.60	30.28
3	*2412.00	105.40 PK			1.35 V	166	75.04	30.36
4	*2412.00	95.10 AV			1.35 V	166	64.74	30.36
5	4824.00	52.51 PK	74.00	-21.49	1.44 V	355	15.72	36.79
6	4824.00	39.11 AV	54.00	-14.89	1.44 V	355	2.32	36.79

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	*2437.00	113.59 PK			1.49 H	285	83.13	30.46
2	*2437.00	103.17 AV			1.49 H	285	72.71	30.46
3	4874.00	54.66 PK	74.00	-19.34	1.21 H	36	17.74	36.92
4	4874.00	41.38 AV	54.00	-12.62	1.21 H	36	4.46	36.92
5	7311.00	52.82 PK	74.00	-21.18	1.01 H	31	9.68	43.14
6	7311.00	38.96 AV	54.00	-15.04	1.01 H	31	-4.18	43.14
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	*2437.00	106.70 PK			1.28 V	166	76.24	30.46
2	*2437.00	95.50 AV			1.28 V	166	65.04	30.46
3	4874.00	52.72 PK	74.00	-21.28	1.00 V	356	15.80	36.92
4	4874.00	39.33 AV	54.00	-14.67	1.00 V	356	2.41	36.92
5	7311.00	52.86 PK	74.00	-21.14	1.16 V	312	9.72	43.14
6	7311.00	38.40 AV	54.00	-15.60	1.16 V	312	-4.74	43.14

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

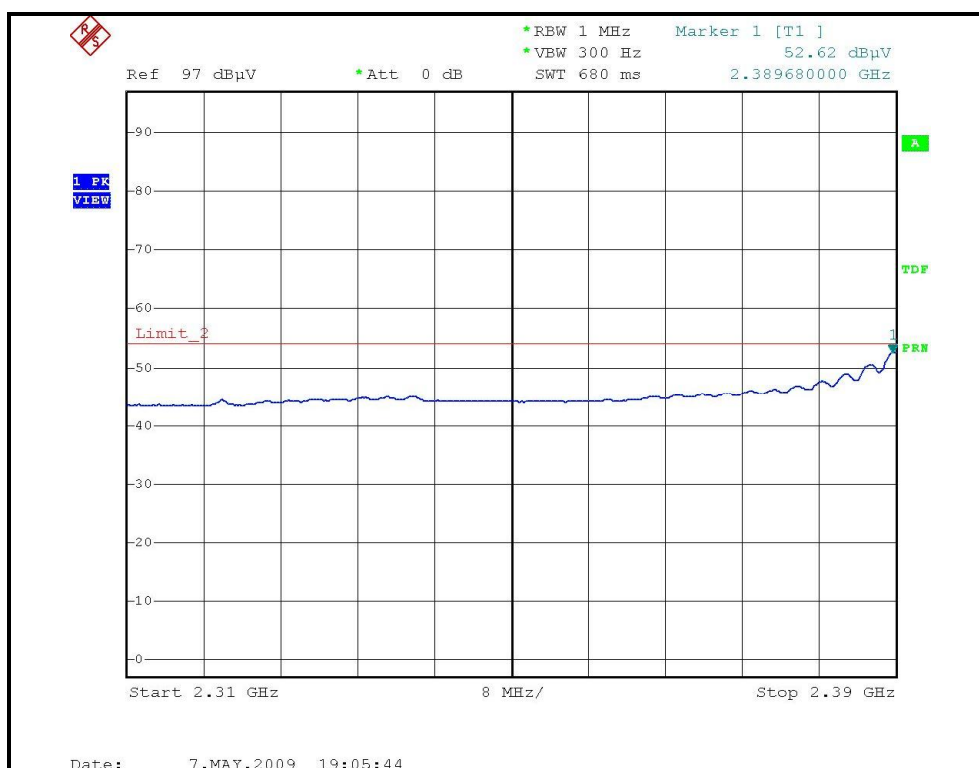
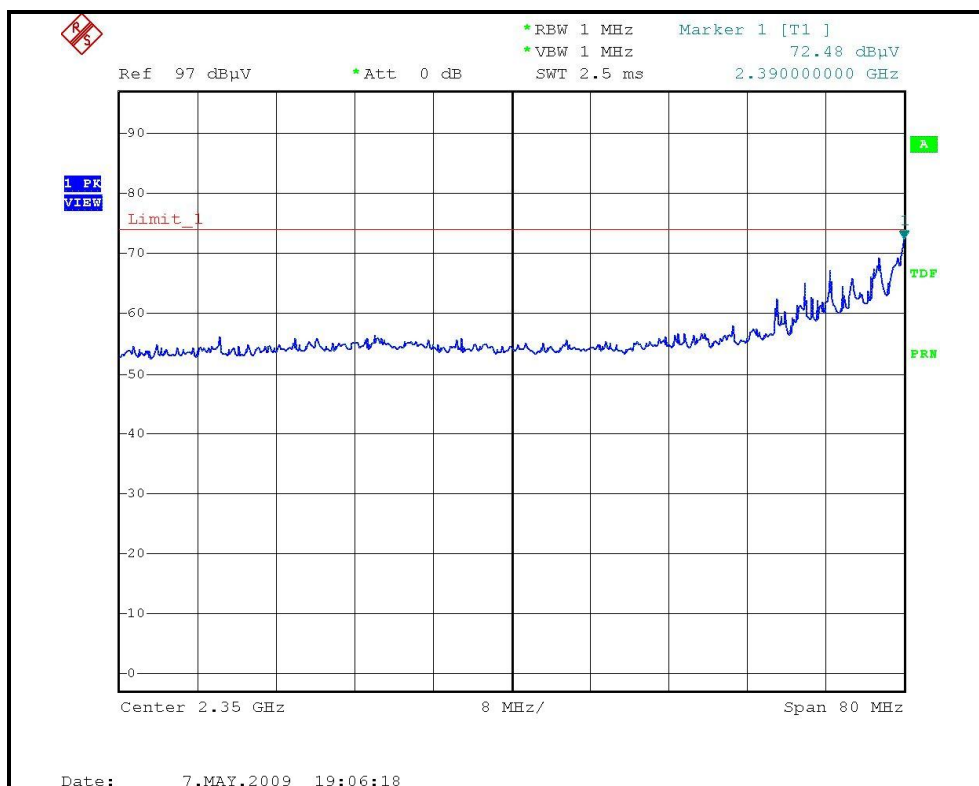
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.65 PK			1.89 H	288	81.10	30.55
2	*2462.00	100.73 AV			1.89 H	288	70.18	30.55
3	2483.50	60.89 PK	74.00	-13.11	1.90 H	267	30.26	30.63
4	2483.50	50.35 AV	54.00	-3.65	1.90 H	267	19.72	30.63
5	4924.00	54.62 PK	74.00	-19.38	1.30 H	33	17.56	37.06
6	4924.00	41.45 AV	54.00	-12.55	1.30 H	33	4.39	37.06
7	7386.00	52.88 PK	74.00	-21.12	1.00 H	30	9.75	43.13
8	7386.00	39.27 AV	54.00	-14.73	1.00 H	30	-3.86	43.13
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	*2462.00	106.20 PK			1.29 V	167	75.65	30.55
2	*2462.00	95.40 AV			1.29 V	167	64.85	30.55
3	2483.50	65.17 PK	74.00	-8.83	1.29 V	167	34.54	30.63
4	2483.50	46.82 AV	54.00	-7.18	1.29 V	167	16.19	30.63
5	4924.00	52.74 PK	74.00	-21.26	1.10 V	350	15.68	37.06
6	4924.00	39.47 AV	54.00	-14.53	1.10 V	350	2.41	37.06
7	7386.00	52.83 PK	74.00	-21.17	1.34 V	343	9.70	43.13
8	7386.00	38.42 AV	54.00	-15.58	1.34 V	343	-4.71	43.13

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.



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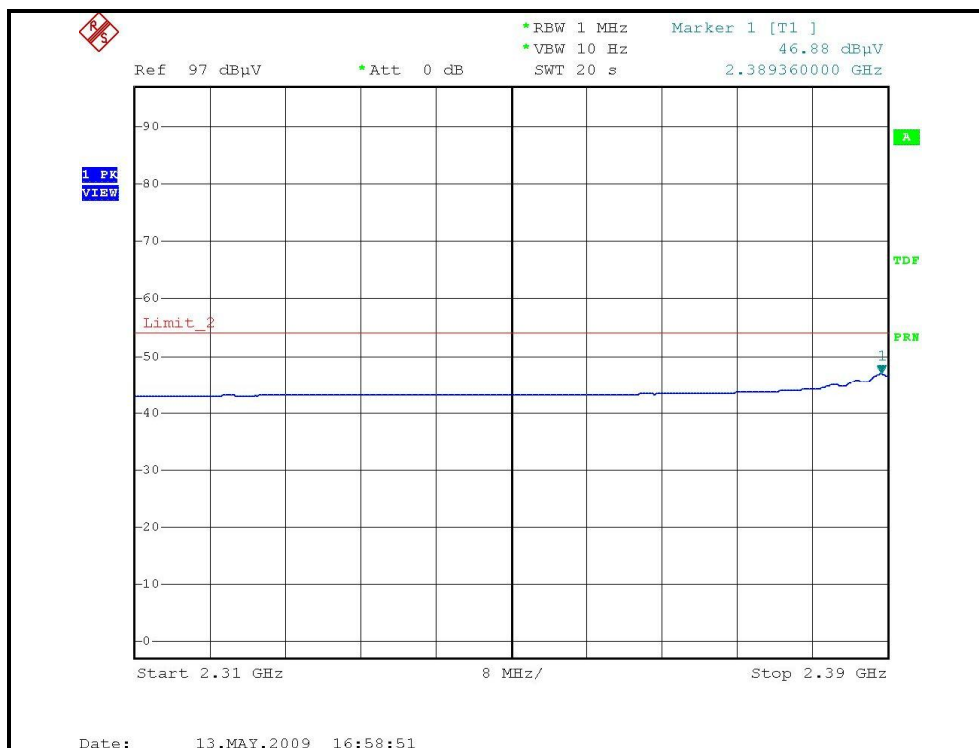
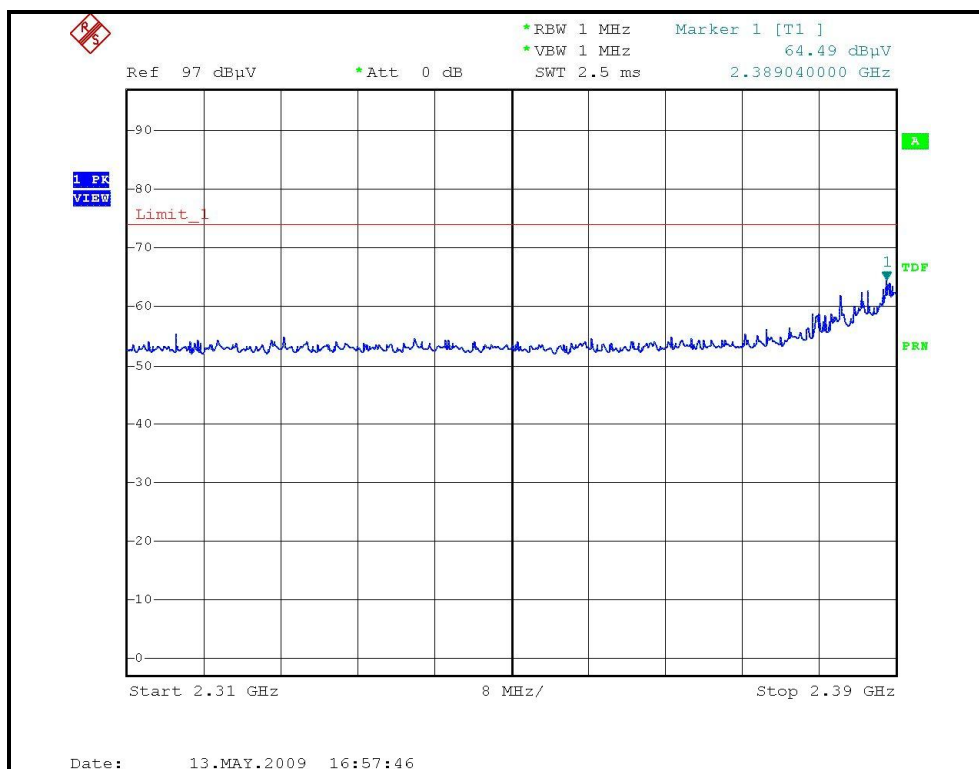
RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH1, HORIZONTAL)





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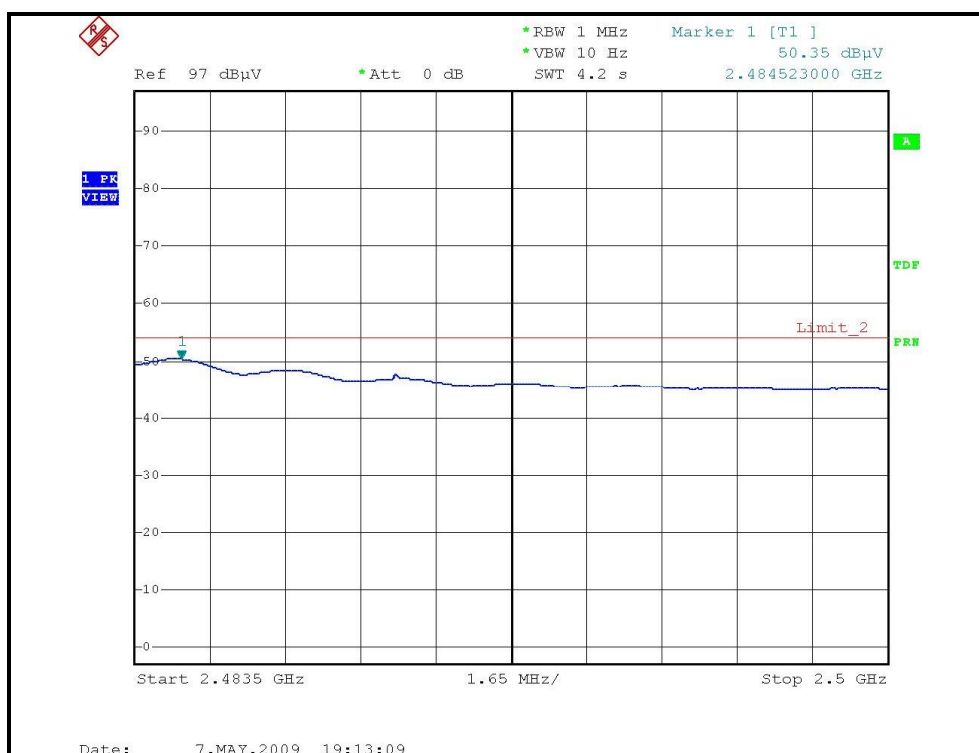
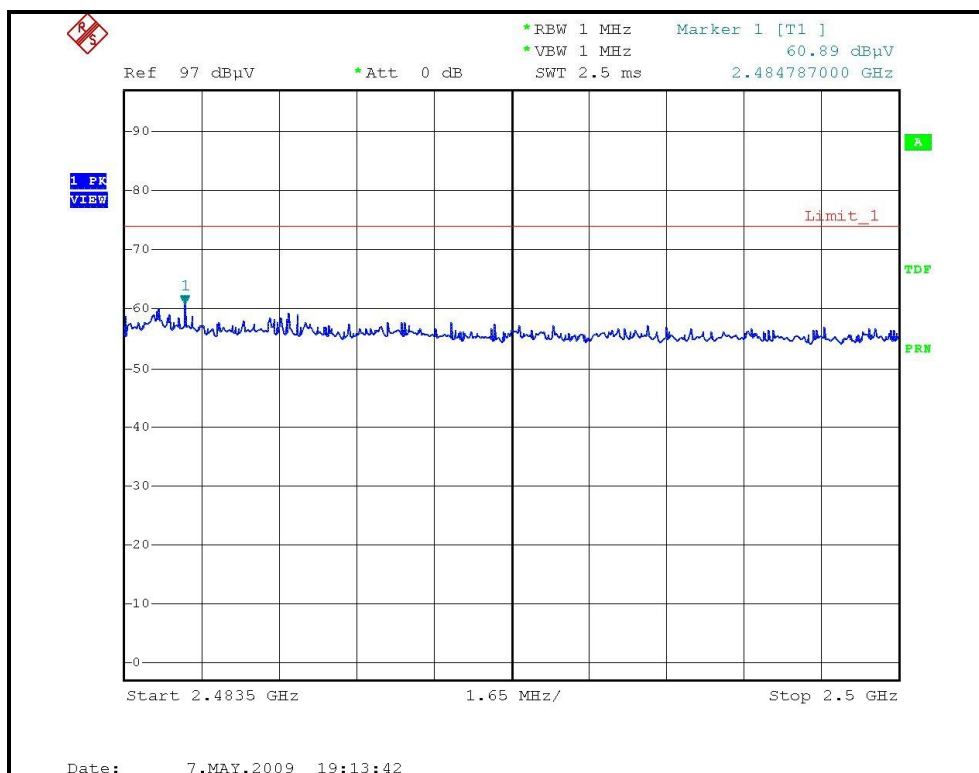
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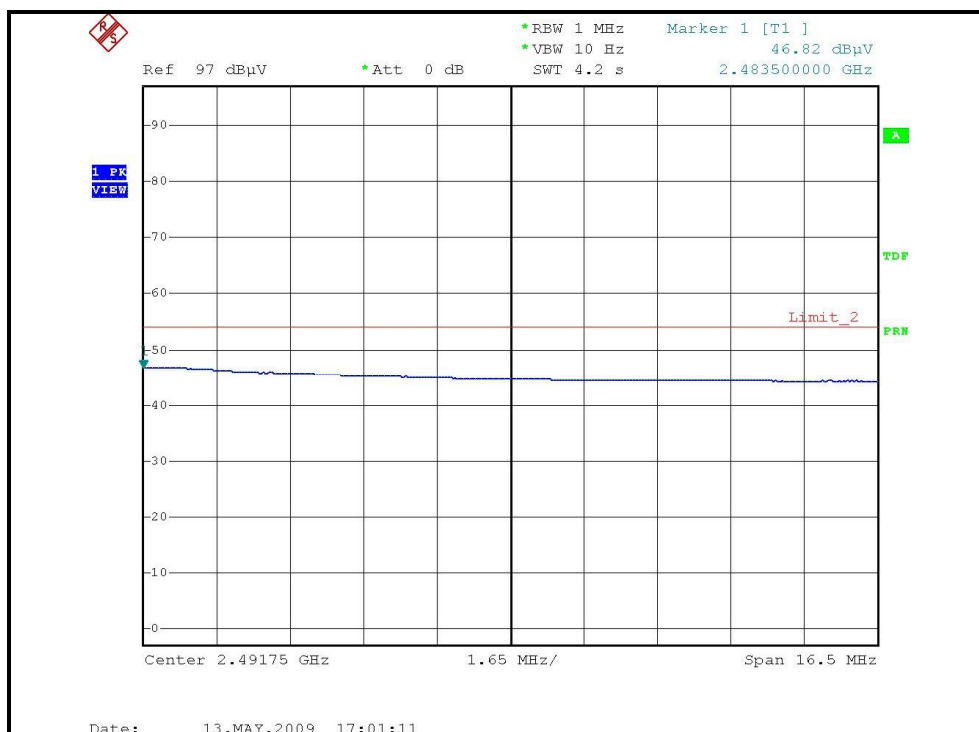
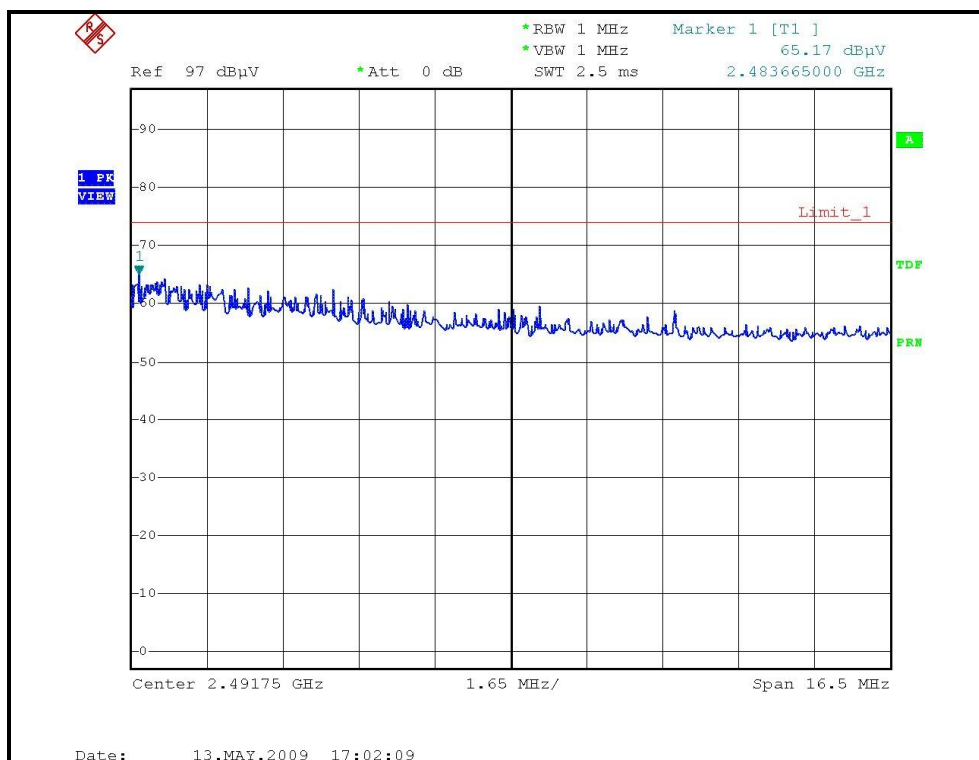


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RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH11, HORIZONTAL)



RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH11, VERTICAL)



DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	2390.00	64.36 PK	74.00	-9.64	1.52 H	177	34.08	30.28
2	2390.00	51.26 AV	54.00	-2.74	1.52 H	177	20.98	30.28
3	*2422.00	110.43 PK			1.50 H	278	80.03	30.40
4	*2422.00	98.65 AV			1.50 H	278	68.25	30.40
5	4844.00	54.45 PK	74.00	-19.55	1.26 H	45	17.61	36.84
6	4844.00	41.26 AV	54.00	-12.74	1.26 H	45	4.42	36.84
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	2389.00	57.97 PK	74.00	-16.03	1.29 V	167	27.69	30.28
2	2389.00	45.99 AV	54.00	-8.01	1.29 V	167	15.71	30.28
3	*2422.00	101.40 PK			1.29 V	167	71.00	30.40
4	*2422.00	90.60 AV			1.29 V	167	60.20	30.40
5	4844.00	52.57 PK	74.00	-21.43	1.44 V	355	15.73	36.84
6	4844.00	39.16 AV	54.00	-14.84	1.44 V	355	2.32	36.84

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

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	*2437.00	112.05 PK			1.48 H	282	81.59	30.46
2	*2437.00	100.83 AV			1.48 H	282	70.37	30.46
3	4874.00	54.62 PK	74.00	-19.38	1.21 H	41	17.70	36.92
4	4874.00	41.36 AV	54.00	-12.64	1.21 H	41	4.44	36.92
5	7311.00	52.83 PK	74.00	-21.17	1.02 H	32	9.69	43.14
6	7311.00	39.03 AV	54.00	-14.97	1.02 H	32	-4.11	43.14
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	*2437.00	103.34 PK			1.28 V	167	72.88	30.46
2	*2437.00	92.30 AV			1.28 V	167	61.84	30.46
3	4874.00	52.60 PK	74.00	-21.40	1.00 V	356	15.68	36.92
4	4874.00	39.21 AV	54.00	-14.79	1.00 V	356	2.29	36.92
5	7311.00	52.63 PK	74.00	-21.37	1.16 V	311	9.49	43.14
6	7311.00	38.17 AV	54.00	-15.83	1.16 V	311	-4.97	43.14

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	30deg. C, 55%RH 960hPa	TESTED BY	Wen Yu

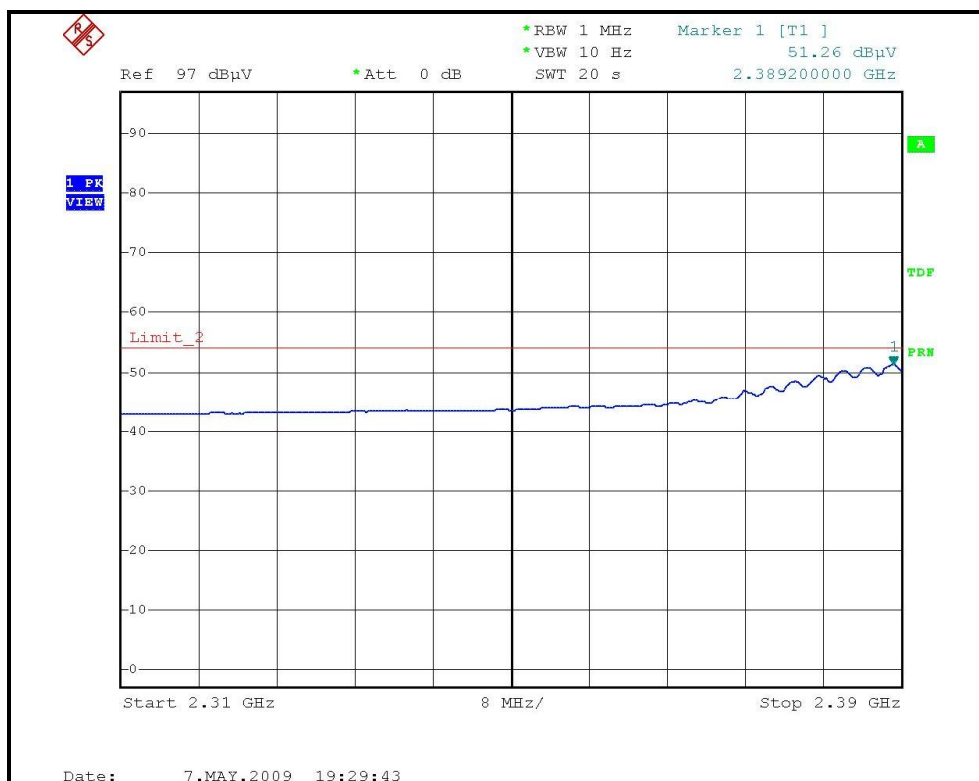
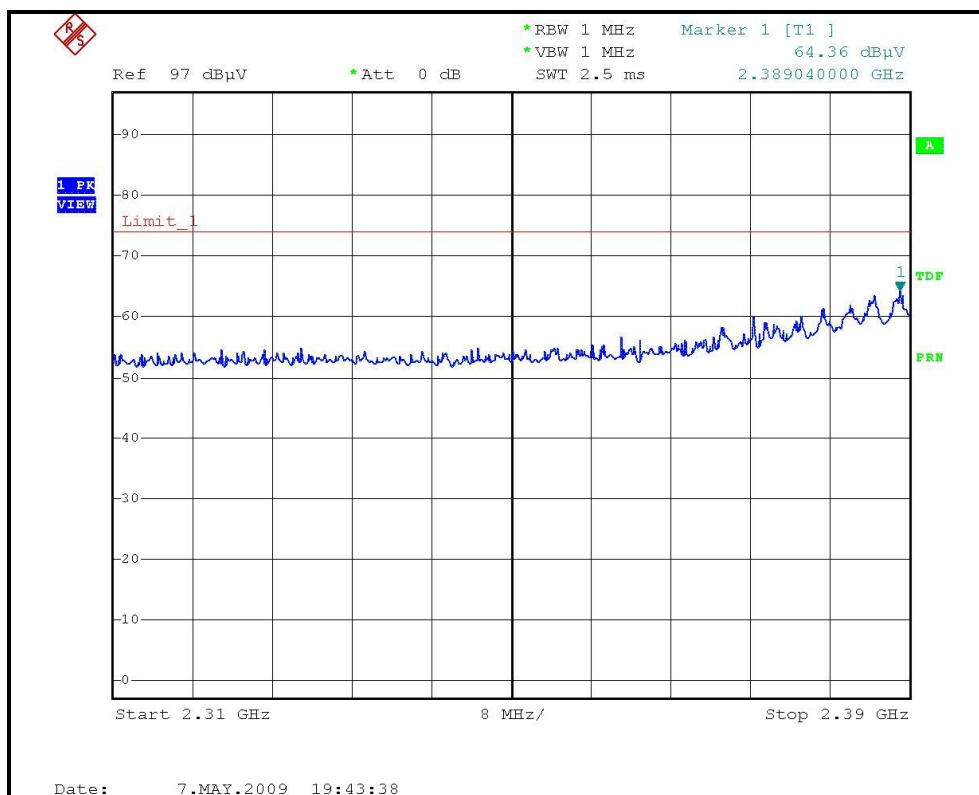
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	111.69 PK			1.51 H	269	81.18	30.51
2	*2452.00	97.38 AV			1.51 H	269	66.87	30.51
3	2483.50	71.90 PK	74.00	-2.10	1.51 H	288	41.27	30.63
4	2483.50	51.46 AV	54.00	-2.54	1.51 H	288	20.83	30.63
5	4904.00	54.58 PK	74.00	-19.42	1.30 H	35	17.58	37.00
6	4904.00	41.36 AV	54.00	-12.64	1.30 H	35	4.36	37.00
7	7356.00	52.81 PK	74.00	-21.19	1.00 H	32	9.68	43.13
8	7356.00	38.92 AV	54.00	-15.08	1.00 H	32	-4.21	43.13
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	*2452.00	101.80 PK			1.29 V	166	71.29	30.51
2	*2452.00	91.10 AV			1.29 V	166	60.59	30.51
3	2484.00	61.11 PK	74.00	-12.89	1.29 V	166	30.48	30.63
4	2484.00	46.44 AV	54.00	-7.56	1.29 V	166	15.81	30.63
5	4904.00	52.77 PK	74.00	-21.23	1.10 V	351	15.77	37.00
6	4904.00	39.42 AV	54.00	-14.58	1.10 V	351	2.42	37.00
7	7356.00	52.83 PK	74.00	-21.17	1.33 V	344	9.70	43.13
8	7356.00	38.42 AV	54.00	-15.58	1.33 V	344	-4.71	43.13

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.



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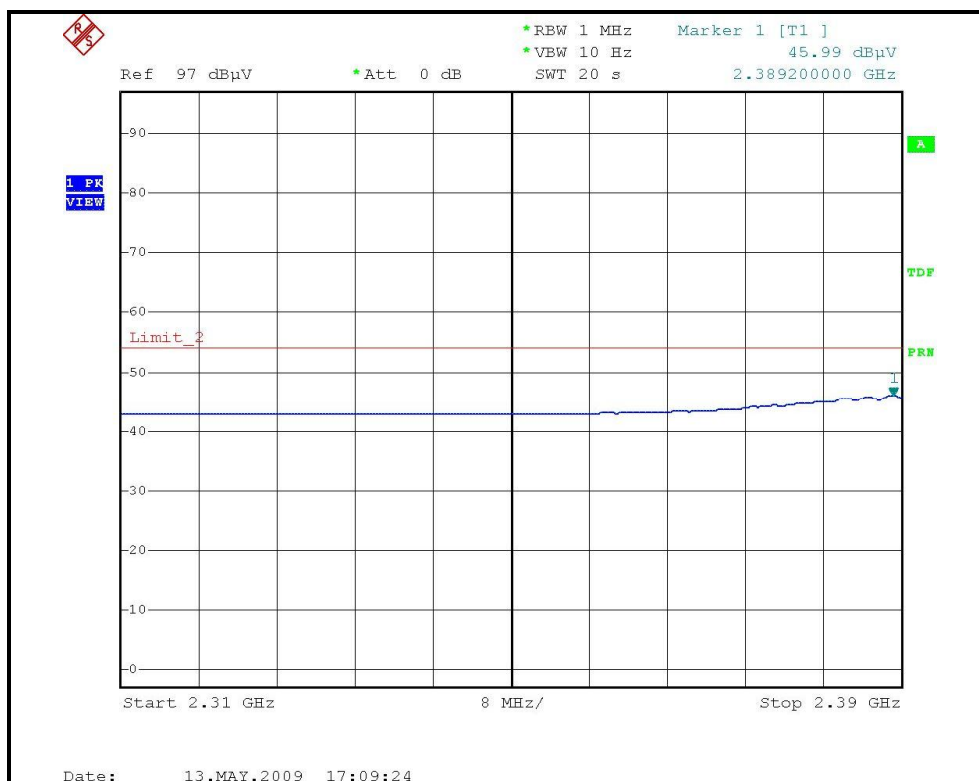
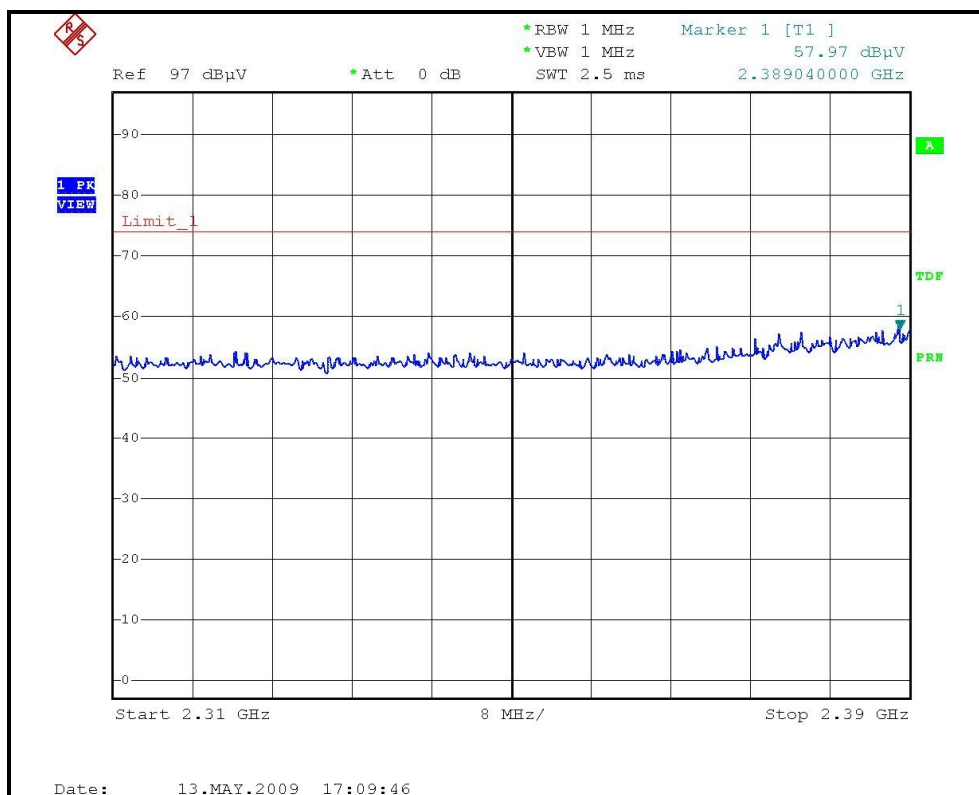
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH1, HORIZONTAL)



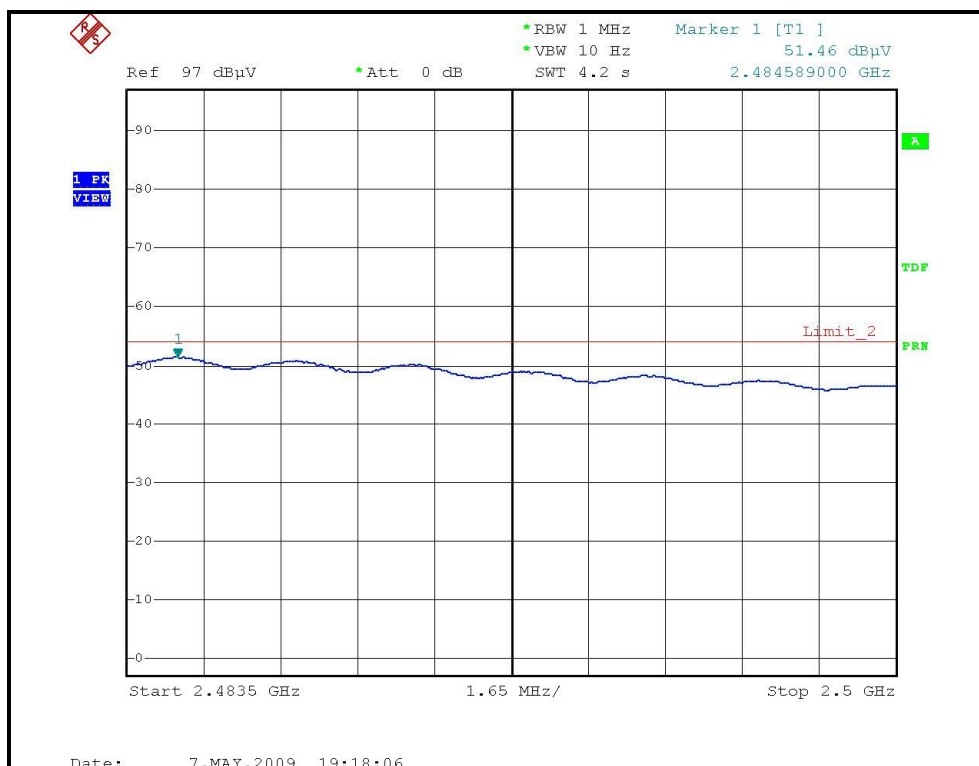
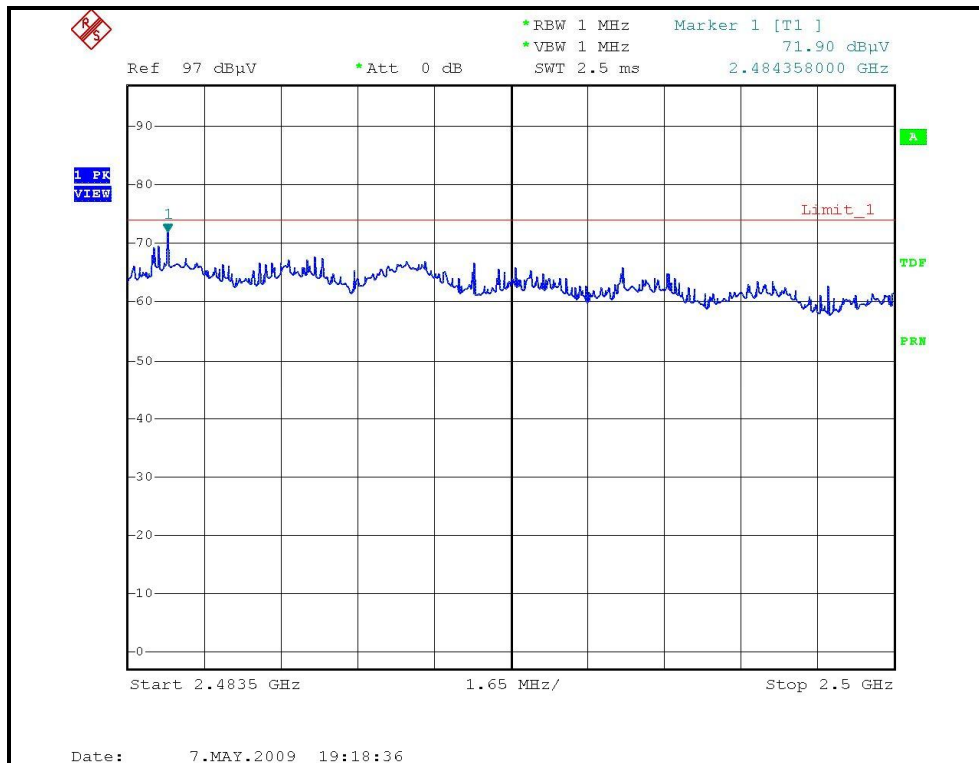


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RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH1, VERTICAL)



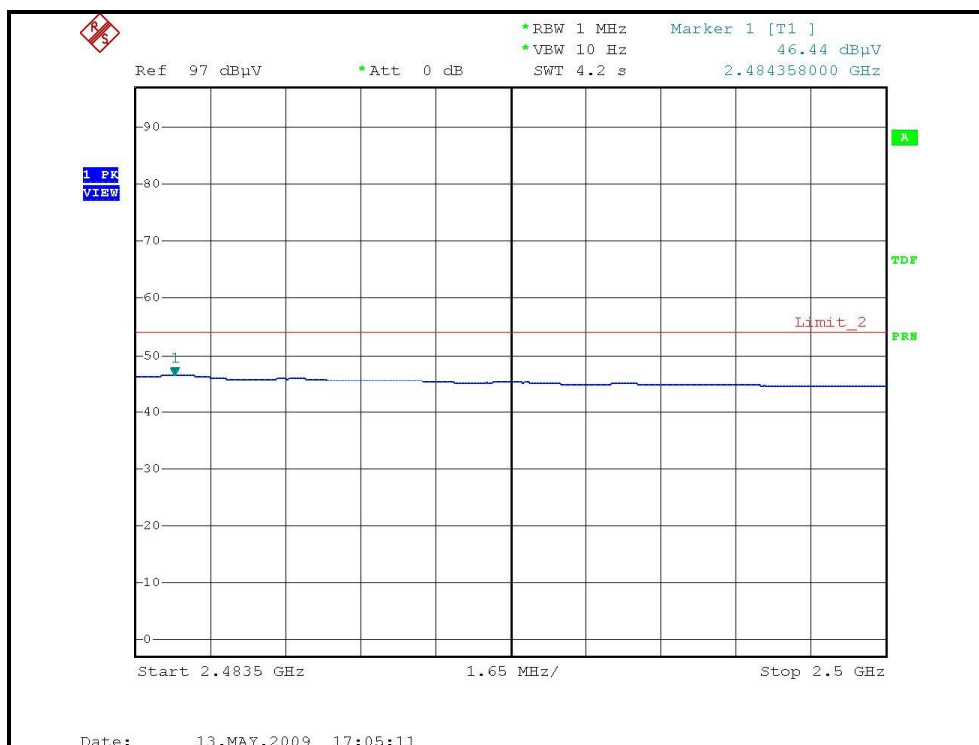
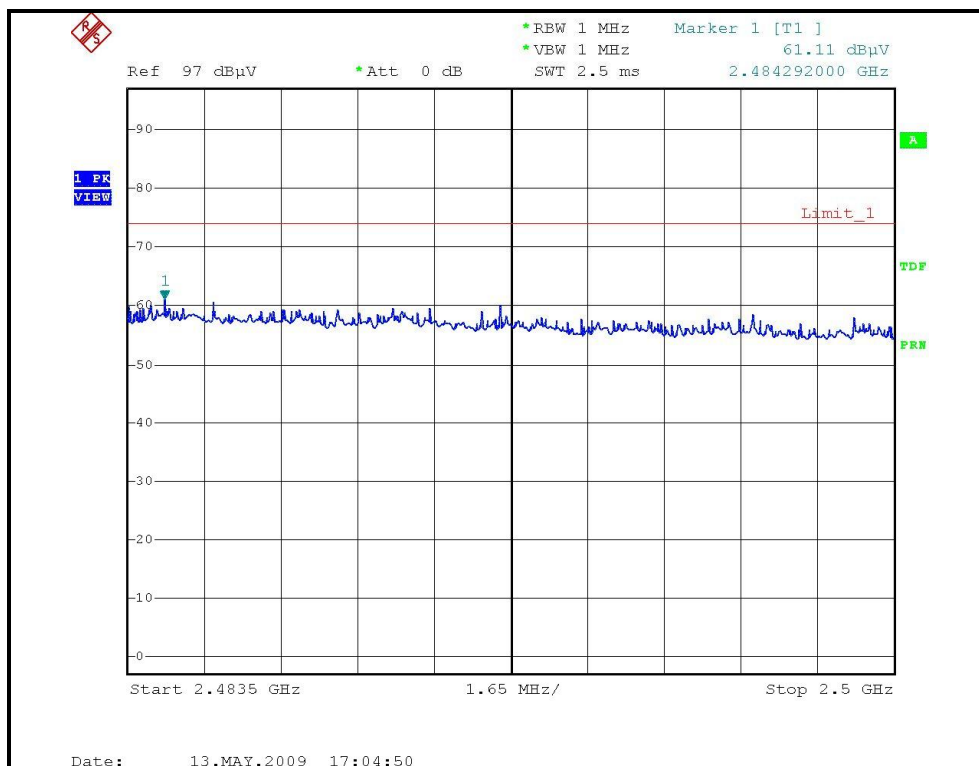
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH7, HORIZONTAL)





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RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH7, VERTICAL)





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4.3 MAXIMUM PEAK OUTPUT POWER

4.3.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.3.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 13, 2008	Aug. 12, 2009
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 26, 2007	May 07, 2009
Anritsu Power Meter	ML2495A	0824006	June 14, 2008	June 13, 2009
Pulse Power Sensor	MA2411B	0738172	April 17, 2009	April 16, 2010

NOTE:

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

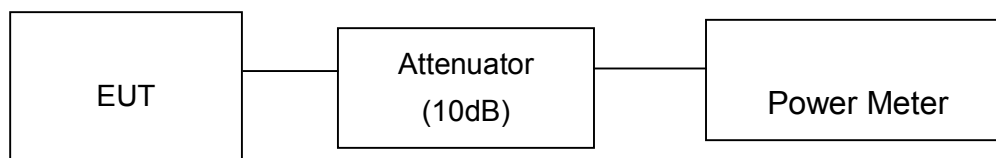
4.3.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator; the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the power level.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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4.3.7 TEST RESULTS

802.11b DSSS MODULATION:

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 96hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	133.968	21.27	30	PASS
6	2437	132.434	21.22	30	PASS
11	2462	129.718	21.13	30	PASS

802.11g OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 965hPa
TESTED BY	Wen Yu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	266.073	24.25	30	PASS
6	2437	305.492	24.85	30	PASS
11	2462	291.743	24.65	30	PASS



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DRAFT 802.11n (20MHz) OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	13Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 963hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	2412	371.535	374.973	25.70	25.74	746.508	28.73	30	PASS
6	2437	357.273	370.681	25.53	25.69	727.954	28.62	30	PASS
11	2462	347.536	354.813	25.41	25.50	702.349	28.47	30	PASS

DRAFT 802.11n (40MHz) OFDM MODULATION:

MODULATION TYPE	BPSK	TRANSFER RATE	27Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 60%RH, 963hPa
TESTED BY	Frank Liu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)	CHAIN(0)	CHAIN(1)				
1	2422	286.418	389.045	24.57	25.90	675.463	28.30	30	PASS
4	2437	390.841	416.869	25.92	26.20	807.710	29.07	30	PASS
7	2452	283.139	380.189	24.52	25.80	663.328	28.22	30	PASS



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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 by the following approval agencies according to ISO/IEC 17025.

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA(MOU)
Russia	CERTIS(MOU)

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

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.

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