

FCC TEST REPORT (15.407)

REPORT NO.: RF980606H02-1

MODEL NO.: WRT610N ver.2

RECEIVED: June 06, 2009

TESTED: June 23 to July 03, 2009

ISSUED: July 07, 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: Simultaneous Dual-Band Wireless-N Gigabit Router
BRAND NAME: Cisco Linksys
MODEL NO.: WRT610N ver.2
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: June 23 to July 03, 2009
APPLICANT: Cisco-Linksys LLC
STANDARDS: FCC Part 15, Subpart E (Section 15.407),
ANSI C63.4-2003

The above equipment (Model: WRT610N ver.2) 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:** July 07, 2009
(Carol Liao, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** July 07, 2009
Responsible for RF (Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** July 07, 2009
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

[For 802.11a](#)

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	Test Type	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -8.50dB at 1.625MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.06dB at 10480MHz
15.407(a/1/2/3)	Peak 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.

NOTE:

1. The EUT was operating in 2.400 ~ 2.4835GHz, 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 2.400 ~ 2.4835GHz and 5.725~5.85GHz RF parameters was recorded in another 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	Simultaneous Dual-Band Wireless-N Gigabit Router
MODEL NO.	WRT610N ver.2
FCC ID	Q87-WRT610NV2
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 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps Draft 802.11n (20MHz, 800ns GI): 130 / 117 / 104 / 78 / 52 / 39 / 26 / 13 / 6.5 / 5.5 / 5.0 / 4.5 / 4.0 / 3.5 / 3.0 / 2.5 / 2.0 / 1.5 / 1.0 / 0.5 / 0.2 / 0.1Mbps Draft 802.11n (40MHz, 800ns GI): 270 / 243 / 216 / 162 / 108 / 81 / 54 / 27 / 13.5 / 12.15 / 10.8 / 8.1 / 5.4 / 4.05 / 2.7 / 1.35Mbps
FREQUENCY RANGE	For 15.407 802.11a: 5.18 ~ 5.24GHz
	For 15.247 802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	For 15.407 4 for 802.11a, draft 802.11n (20MHz) 2 for draft 802.11n (40MHz)
	For 15.247(2.4GHz) 11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz) For 15.247(5GHz) 5 for 802.11a, draft 802.11n (20MHz) 2 for draft 802.11n (40MHz)

MAXIMUM OUTPUT POWER	For 15.407 802.11a: 32.137mW draft 802.11n (20MHz): 33.070mW draft 802.11n (40MHz): 42.099mW For 15.247(2.4GHz) 802.11b: 400.867mW 802.11g: 691.831mW draft 802.11n (20MHz): 990.966mW draft 802.11n (40MHz): 583.833mW For 15.247(5GHz) 802.11a: 399.945mW draft 802.11n (20MHz): 788.397mW draft 802.11n (40MHz): 750.741mW
ANTENNA TYPE	Please see note 1
DATA CABLE	RJ45 cable x 1 (Unshielded, 1.8m)
I/O PORT	LAN port x 4 ,WAN port x 1, USB port x 1
ASSOCIATED DEVICES	NA

NOTE:

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

Transmitter / Circuit	Antenna Gain		Antenna Type	Connector
	For 2.4GHz Gain (dBi)	For 5GHz Gain (dBi)		
Chain(0)	4	3.5	PIFA	NA
Chain(1)	4	3.5	PIFA	NA
Chain(2)	4	3.5	PIFA	NA

2. There are two power adapters provided to this EUT, please refer to the following table:

Adapter	Brand	Model No.	Spec.
Adapter 1	Bestec	NA0241WAA	Input: 100-240V, 0.5A, 50-60Hz Output: DC12V, 2A DC output cable (unshielded, 1.5m)
Adapter 2	LEADER	MU24-B120200-A1	Input: 100-240V, 0.5A, 50-60Hz Output: DC12V, 2A DC output cable (unshielded, 1.5m)

For radiated test, the EUT was pre-tested with above adapters, the worse case was found in adapter 1. Therefore only the test data of the adapter was recorded in this report.

3. For radiated test, The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Level-set
Mode B	Tower-set

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

4. The EUT incorporates a MIMO function with draft 802.11n. Physically, the EUT provides two completed transmit and three completed receivers.
5. The EUT is 2 * 3 spatial MIMO (2Tx & 3Rx) without beam forming function. The antenna configurations are two transmitter antennas and three receiver antennas, as there are 3 PIFA antennas. Spatial multiplexing modes for simultaneous transmission using 2 antennas, and for simultaneous receiver using 3 antennas. The 11a and 11bg legacy mode is limited to single transmitter only.
6. When the EUT operating in draft 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
7. The EUT complies with draft 802.11n standards and backwards compatible with 802.11a, 802.11b, 802.11g products.
8. 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

Operated in 5150MHz ~ 5250MHz bands:

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

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

Two channels are provided for draft 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 ³ 1G	APCM	
-	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission

RE < 1G: Radiated Emission below 1GHz

RE ³ 1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

ANTENNA COMBINATION MODE:

COMBINATION MODE	OPERATION MODE	CHAIN(0) (TX)	CHAIN(1) (TX)	CHAIN(2) (TX)
A	802.11 a	√		
B			√	
C	DRAFT 802.11n(20MHz) for MCS0~15	√	√	
D			√	√
E		√		√
F	DRAFT 802.11n(40MHz) for MCS0~15	√	√	
G			√	√
H		√		√

Note:

1. The above information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.
2. Antenna 1 ~3 are PIFA antennas.
3. We choose the worst mode (decided by pre-test) for final test. Mode A, C and F the worst modes, was selected as representative mode for this report.

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)	TX COMBINATION
For 5 GHz Draft 802.11n (40MHz)	38 to 46	38	OFDM	BPSK	13.5	F

- ☒ The EUT was tested with the following test modes:

Test Mode	Description
Mode A	Adapter 1
Mode B	Adapter 2

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)	TX COMBINATION
For 5 GHz Draft 802.11n (40MHz)	38 to 46	38	OFDM	BPSK	13.5	F

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)	TX COMBINATION
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5	C
For 5 GHz Draft 802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5	F

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)	TX COMBINATION
802.11a	36 to 48	36, 48	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	36 to 48	36, 48	OFDM	BPSK	6.5	C
For 5 GHz Draft 802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5	F

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)	TX COMBINATION
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6	A
For 5 GHz Draft 802.11n (20MHz)	36 to 48	36, 40, 48	OFDM	BPSK	6.5	C
For 5 GHz Draft 802.11n (40MHz)	38 to 46	38, 46	OFDM	BPSK	13.5	F

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

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.

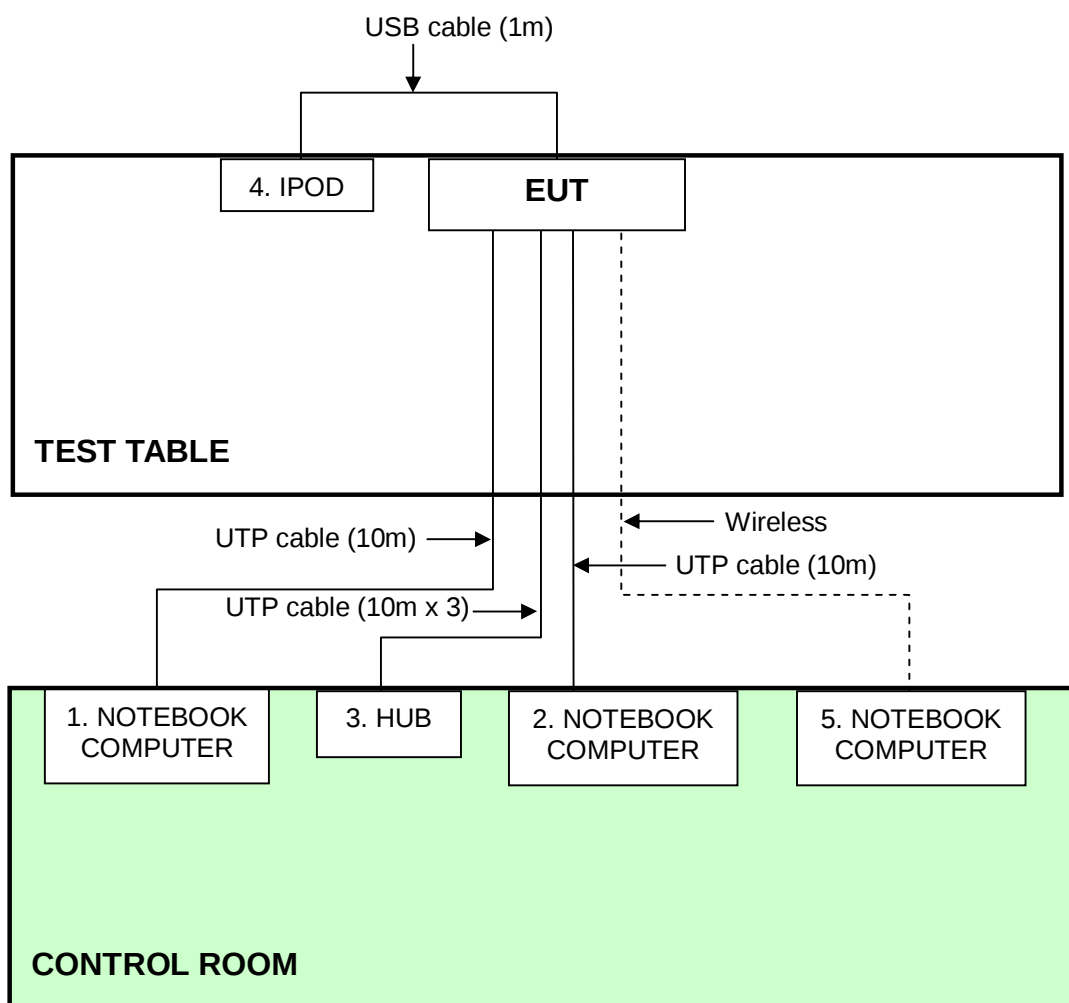
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	6976685584	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166-5CA-0448	PIW632500516610
3	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC
4	IPOD	Apple	A1137	6U6078FMUPR	FCC DoC
5	NOTEBOOK COMPUTER (For conducted emission test only)	DELL	PP05L	CN-04Y212-48643-38E-0145	FCC DoC

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

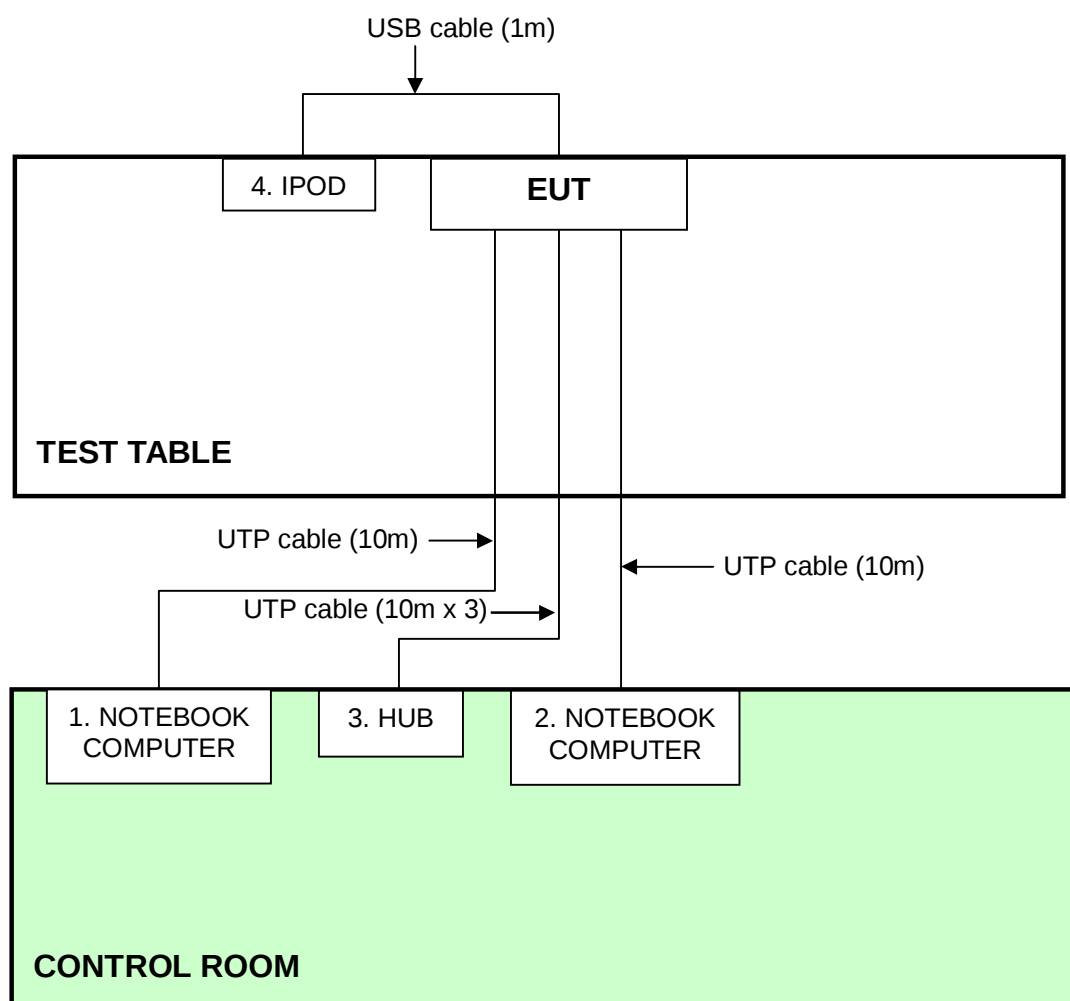
NOTE: All power cords of the above support units are non shielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted Emission test:



For other test:



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

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 04, 2009	May 03, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100072	June 08, 2009	June 07, 2010
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_Conc_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.

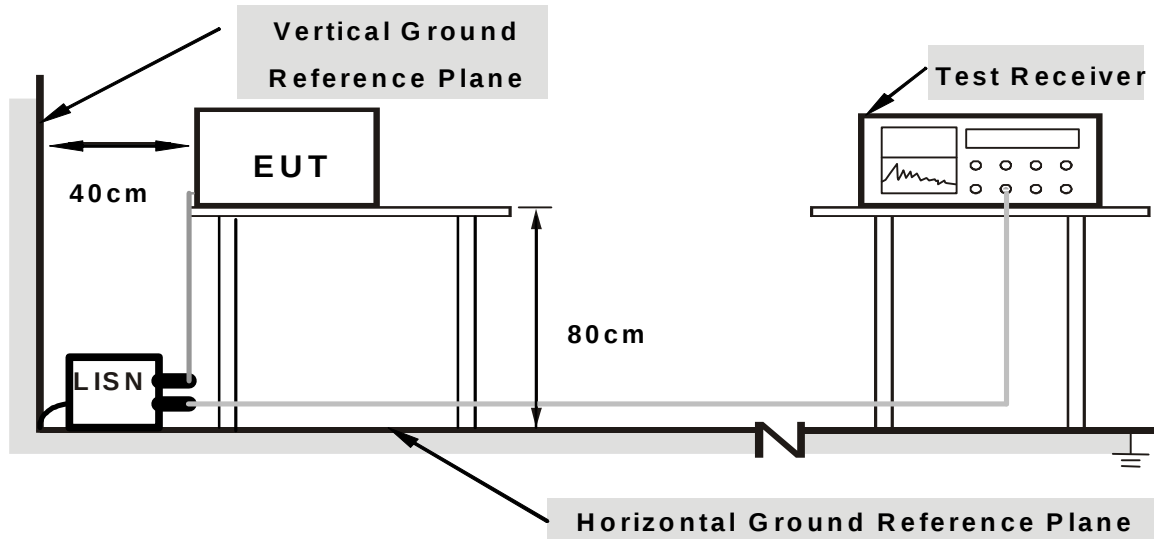
4.1.3 TEST PROCEDURES

- 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
- b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 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, 5) 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.

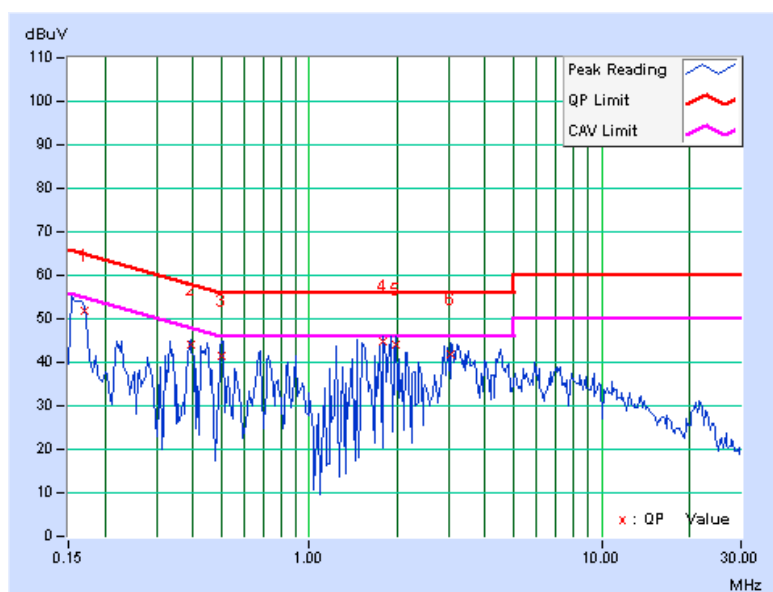
4.1.7 TEST RESULTS-Adapter 1

DRAFT 802.11n (40MHz) OFDM MODULATION:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 965hPa	TESTED BY	Timmy Hu

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	0.170	0.23	51.79	-	52.02	-	64.94	54.94	-12.92	-
2	0.392	0.08	44.05	-	44.13	-	58.02	48.02	-13.88	-
3	0.500	0.08	41.48	-	41.56	-	56.00	46.00	-14.44	-
4	1.793	0.07	44.65	-	44.72	-	56.00	46.00	-11.28	-
5	1.977	0.07	44.12	-	44.19	-	56.00	46.00	-11.81	-
6	3.035	0.11	41.62	-	41.73	-	56.00	46.00	-14.27	-

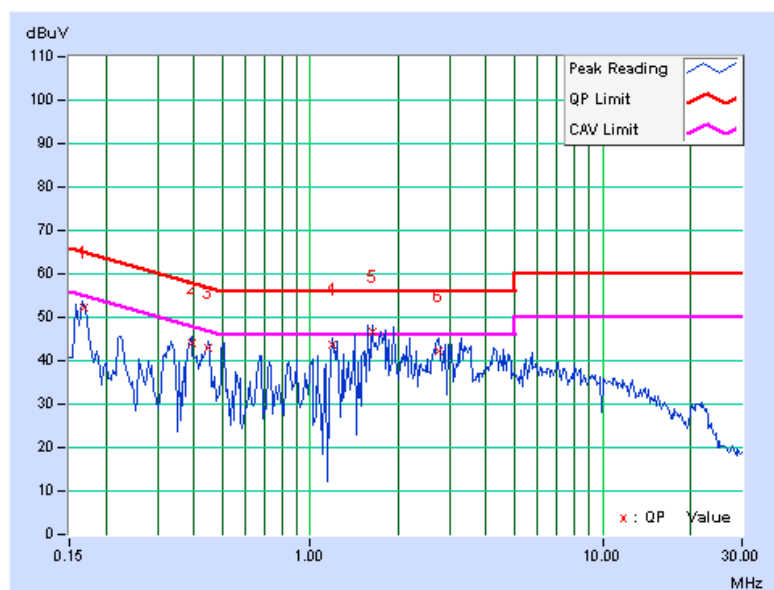
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 38	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 965hPa	TESTED BY	Timmy Hu

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	0.169	0.24	51.95	-	52.19	-	65.01	55.01	-12.82	-
2	0.392	0.09	43.87	-	43.96	-	58.02	48.02	-14.05	-
3	0.447	0.09	42.89	-	42.98	-	56.93	46.93	-13.95	-
4	1.188	0.08	43.51	-	43.59	-	56.00	46.00	-12.41	-
5	1.625	0.09	46.65	37.41	46.74	37.50	56.00	46.00	-9.26	-8.50
6	2.742	0.12	42.26	-	42.38	-	56.00	46.00	-13.62	-

- 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.



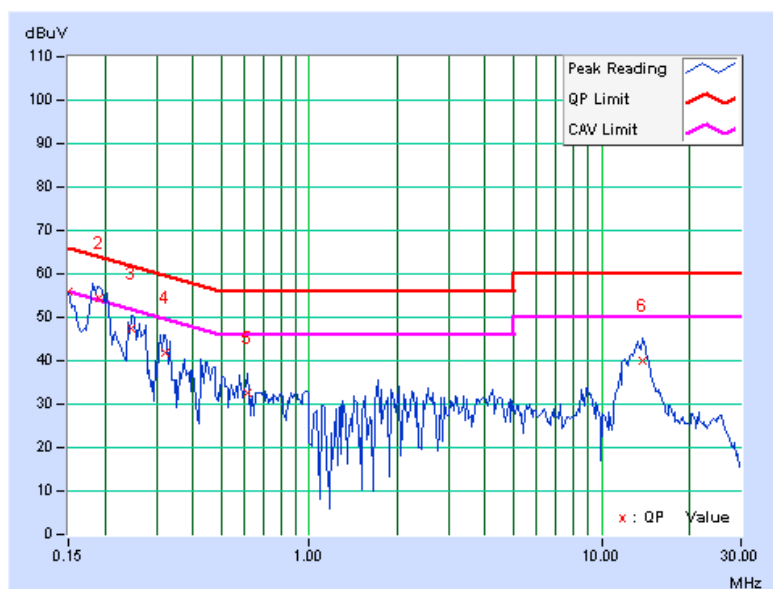
4.1.8 TEST RESULTS-Adapter 2

DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	PHASE	Line (L)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 965hPa	TESTED BY	Timmy Hu

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.28	55.58	-	55.86	-	66.00	56.00	-10.14	-
2	0.191	0.19	54.19	41.29	54.38	41.48	63.98	53.98	-9.60	-12.50
3	0.248	0.15	47.40	-	47.55	-	61.84	51.84	-14.29	-
4	0.322	0.12	41.85	-	41.97	-	59.66	49.66	-17.69	-
5	0.611	0.07	32.44	-	32.51	-	56.00	46.00	-23.49	-
6	13.762	0.32	39.67	-	39.99	-	60.00	50.00	-20.01	-

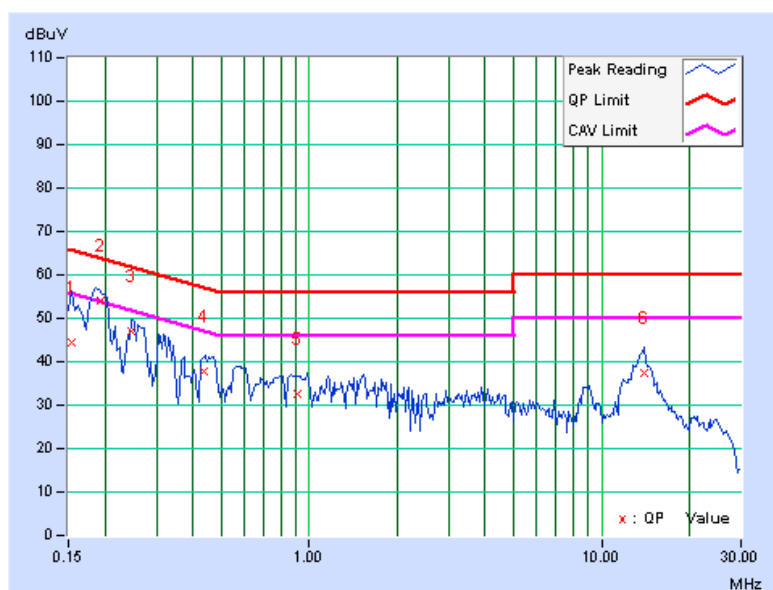
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 38	PHASE	Neutral (N)
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	13.5Mbps	INPUT POWER	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 965hPa	TESTED BY	Timmy Hu

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	0.154	0.27	44.28	-	44.55	-	65.79	55.79	-21.24	-
2	0.193	0.19	53.81	40.84	54.00	41.03	63.89	53.89	-9.89	-12.86
3	0.248	0.16	46.85	-	47.01	-	61.84	51.84	-14.83	-
4	0.435	0.09	37.61	-	37.70	-	57.15	47.15	-19.45	-
5	0.912	0.08	32.69	-	32.77	-	56.00	46.00	-23.23	-
6	14.035	0.36	36.94	-	37.30	-	60.00	50.00	-22.70	-

- 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.

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

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.

4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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.

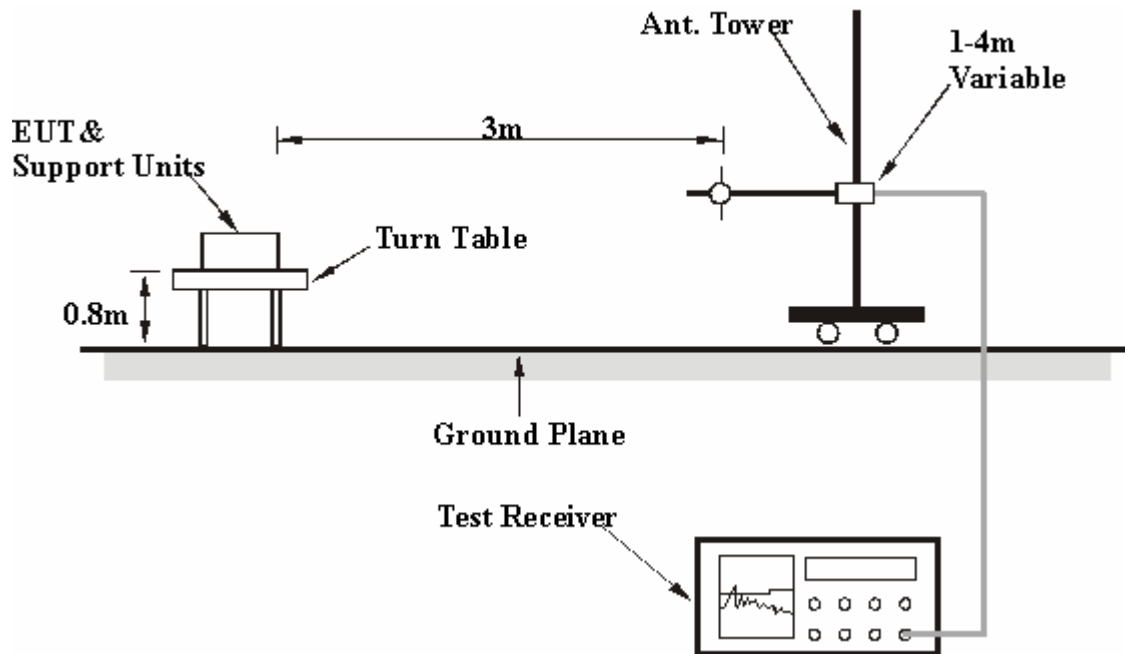
NOTE:

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 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



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

4.2.7 EUT OPERATING CONDITION

1. Placed the EUT on testing table.
2. Prepared other computer systems (support units 1 ~ 3) to act as communication partners and placed them outside of testing area.
3. The communication partner runs test program" MFGTEST" to enable EUT under transmission condition continuously at specific channel frequency via UTP cables.



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Below 1GHz Test Data

4.2.8 TEST RESULTS

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	30.0deg. C, 61.0%RH 965hPa	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	125.00	25.98 QP	43.50	-17.52	1.54 H	24	12.91	13.07
2	200.01	25.10 QP	43.50	-18.40	1.02 H	356	12.71	12.39
3	250.00	41.00 QP	46.00	-5.00	1.02 H	236	26.75	14.25
4	375.00	36.32 QP	46.00	-9.68	1.02 H	32	17.51	18.81
5	500.00	36.24 QP	46.00	-9.76	1.11 H	52	13.75	22.49
6	625.00	38.53 QP	46.00	-7.47	1.58 H	79	13.25	25.29
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	29.80 QP	43.50	-13.70	1.04 V	180	16.73	13.07
2	200.01	24.30 QP	43.50	-19.20	1.30 V	356	11.91	12.39
3	240.00	25.14 QP	46.00	-20.86	1.81 V	330	11.26	13.88
4	250.00	32.56 QP	46.00	-13.44	1.02 V	335	18.31	14.25
5	375.01	36.47 QP	46.00	-9.53	1.73 V	14	17.66	18.81
6	500.00	34.25 QP	46.00	-11.75	1.58 V	79	11.76	22.49
7	625.00	40.46 QP	46.00	-5.54	1.75 V	27	15.18	25.28
8	875.00	44.23 QP	46.00	-1.77	1.19 V	359	14.94	29.29

- 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 Test Data

4.2.9 TEST RESULTS

802.11a OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	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	59.46 PK	74.00	-14.54	1.04 H	159	22.20	37.26
2	5150.00	46.21 AV	54.00	-7.79	1.04 H	159	8.95	37.26
3	*5180.00	109.90 PK			1.02 H	146	72.64	37.26
4	*5180.00	96.80 AV			1.02 H	146	59.54	37.26
5	#10360.00	66.20 PK	68.30	-2.10	1.47 H	51	19.56	46.64
6	15540.00	69.90 PK	74.00	-4.10	1.24 H	51	22.35	47.55
7	15540.00	52.90 AV	54.00	-1.10	1.24 H	51	5.35	47.55
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	5000.50	57.81 PK	74.00	-16.19	1.00 V	14	20.55	37.26
2	5000.50	49.07 AV	54.00	-4.93	1.00 V	14	11.81	37.26
3	*5180.00	104.88 PK			1.00 V	208	67.62	37.26
4	*5180.00	92.62 AV			1.00 V	208	55.36	37.26
5	#10360.00	65.19 PK	68.30	-3.11	1.37 V	317	18.55	46.64
6	15540.00	65.78 PK	74.00	-8.22	1.08 V	319	18.23	47.55
7	15540.00	48.84 AV	54.00	-5.16	1.08 V	319	1.29	47.55

- 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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	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	110.20 PK			1.00 H	143	72.94	37.26
2	*5200.00	96.90 AV			1.00 H	143	59.64	37.26
3	#10400.00	66.30 PK	68.30	-2.00	1.38 H	47	19.63	46.67
4	15600.00	67.80 PK	74.00	-6.20	1.18 H	47	20.36	47.44
5	15600.00	50.50 AV	54.00	-3.50	1.18 H	47	3.06	47.44
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	106.23 PK			1.01 V	348	68.97	37.26
2	*5200.00	94.17 AV			1.01 V	348	56.91	37.26
3	#10400.00	64.70 PK	68.30	-3.60	1.45 V	318	18.03	46.67
4	15600.00	65.48 PK	74.00	-8.52	1.14 V	5	18.04	47.44
5	15600.00	49.59 AV	54.00	-4.41	1.14 V	5	2.15	47.44

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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	TESTED BY	Eric Lee

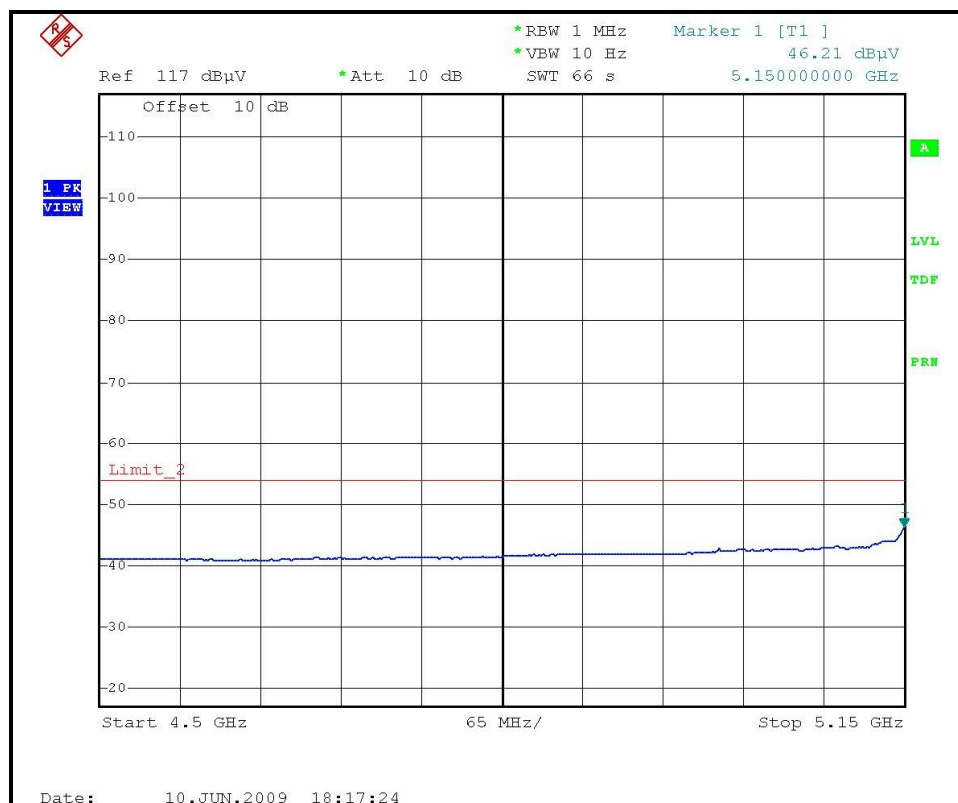
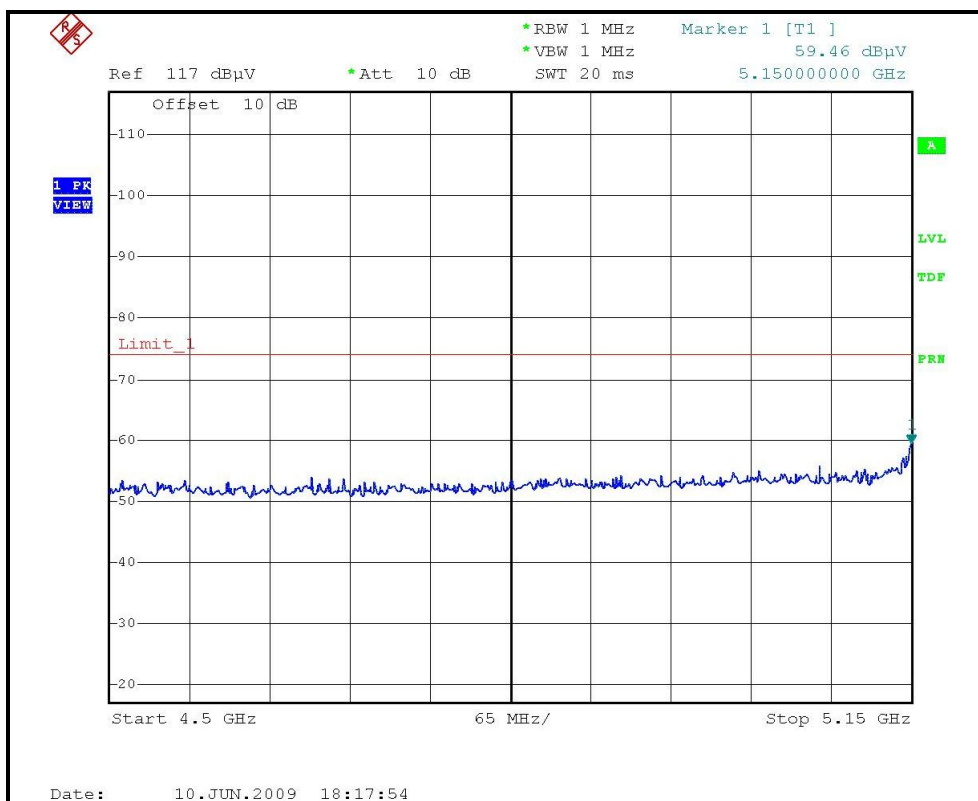
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	110.40 PK			1.00 H	142	73.14	37.26
2	*5240.00	97.20 AV			1.00 H	142	59.94	37.26
3	5350.00	53.03 PK	74.00	-20.97	1.04 H	157	15.77	37.26
4	5350.00	42.52 AV	54.00	-11.48	1.04 H	157	5.26	37.26
5	#10480.00	67.24 PK	68.30	-1.06	1.29 H	59	20.51	46.73
6	15720.00	66.10 PK	74.00	-7.90	1.14 H	57	18.89	47.21
7	15720.00	46.90 AV	54.00	-7.10	1.14 H	57	-0.31	47.21
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	104.38 PK			1.30 V	2	67.12	37.26
2	*5240.00	92.04 AV			1.30 V	2	54.78	37.26
3	5350.00	56.89 PK	74.00	-17.11	1.00 V	167	19.63	37.26
4	5350.00	43.31 AV	54.00	-10.69	1.00 V	167	6.05	37.26
5	#10480.00	64.62 PK	68.30	-3.68	1.52 V	317	17.89	46.73
6	15720.00	62.36 PK	74.00	-11.64	1.13 V	235	15.15	47.21
7	15720.00	46.98 AV	54.00	-7.02	1.13 V	235	-0.23	47.21

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.

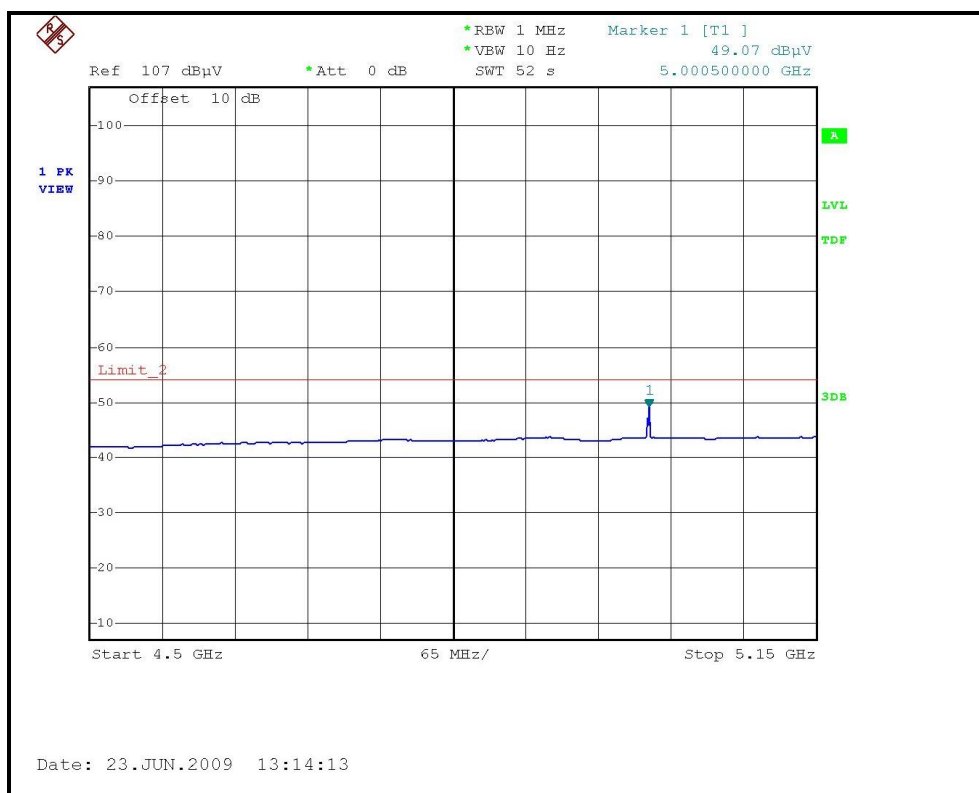
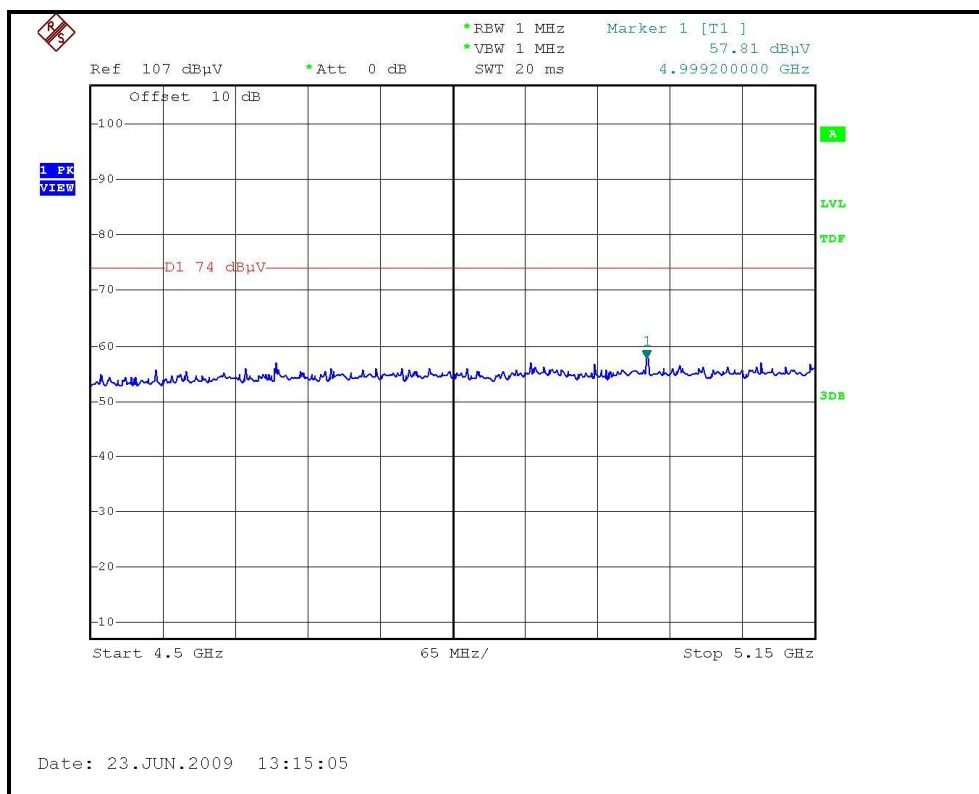


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RESTRICTED BANDEDGE (802.11a MODE, CH36, HORIZONTAL)



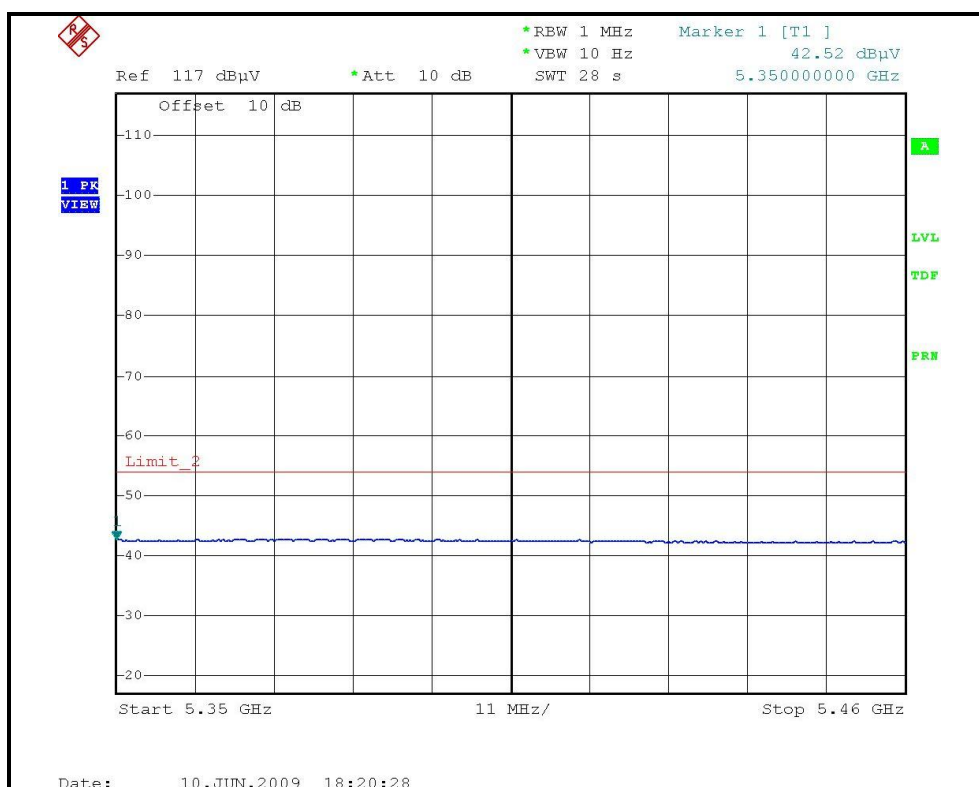
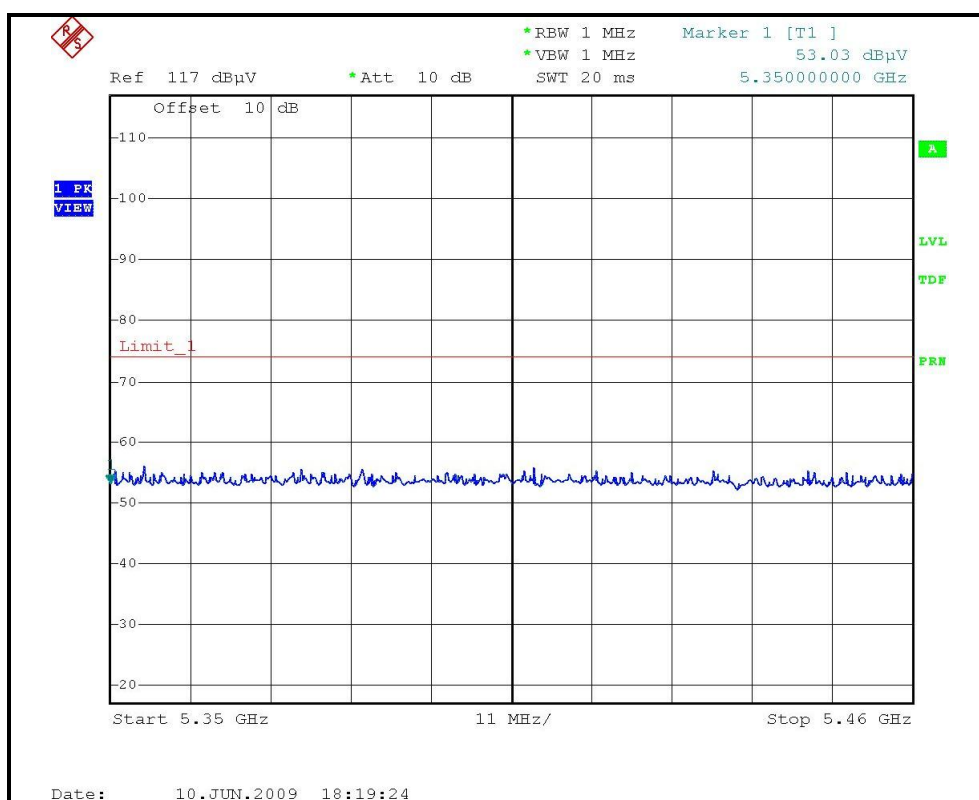
RESTRICTED BANDEDGE (802.11a MODE, CH36, VERTICAL)



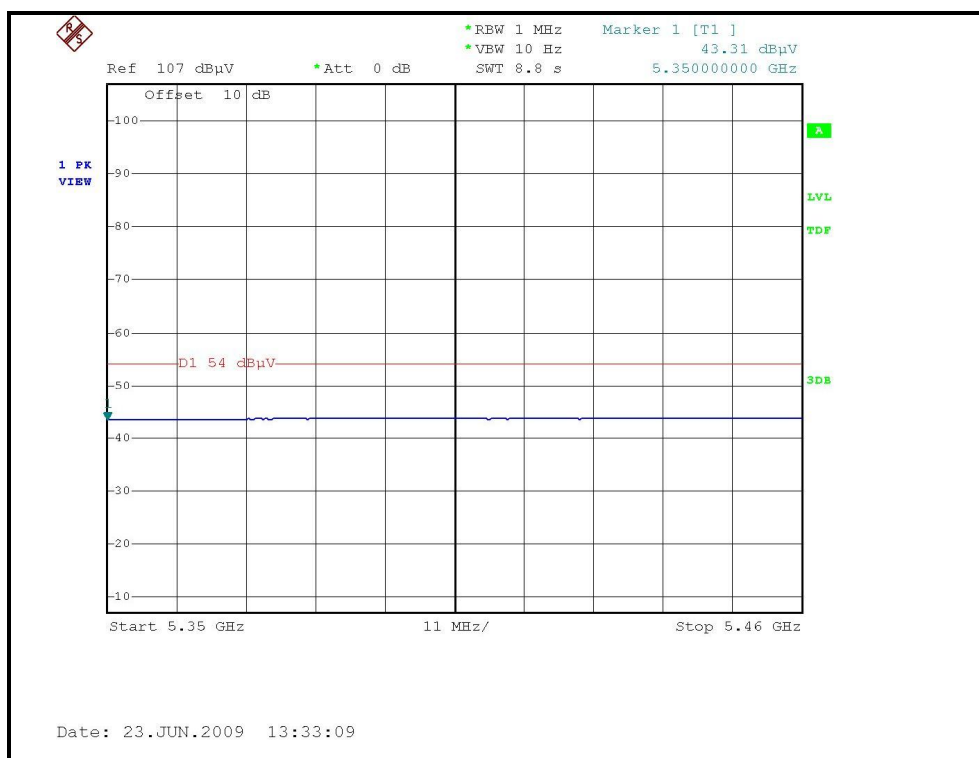
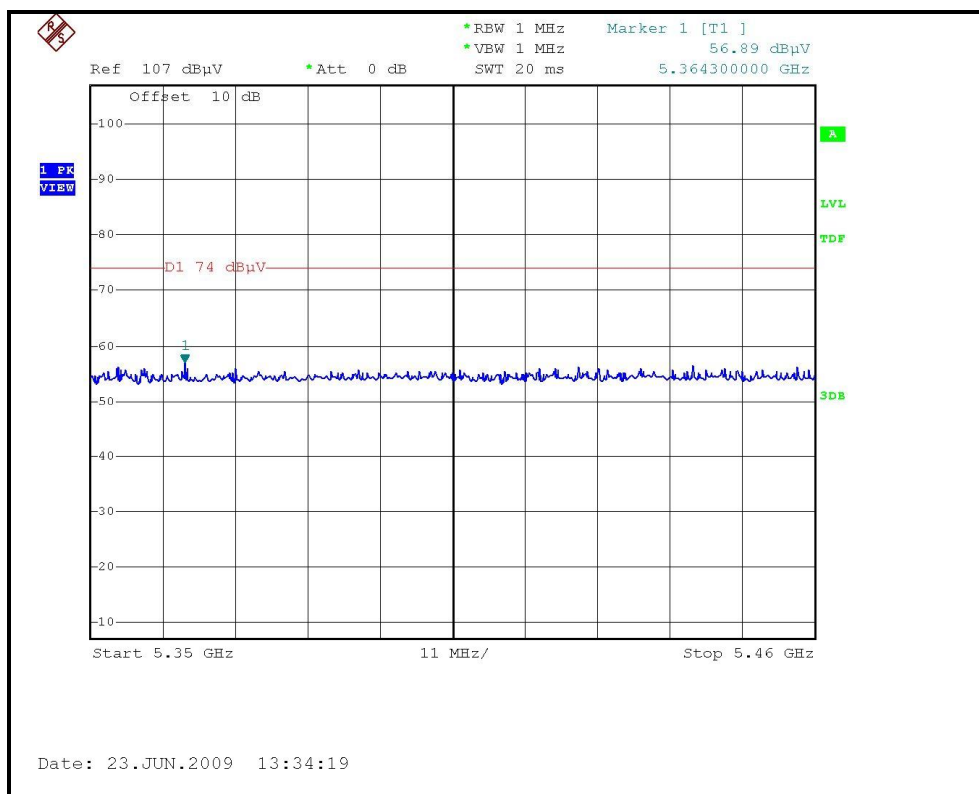


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RESTRICTED BANDEDGE (802.11a MODE, CH48, HORIZONTAL)



RESTRICTED BANDEDGE (802.11a MODE, CH48, VERTICAL)





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DRAFT 802.11n (20MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	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	56.20 PK	74.00	-17.80	1.34 H	103	18.94	37.26
2	5150.00	45.89 AV	54.00	-8.11	1.34 H	103	8.63	37.26
3	*5180.00	108.60 PK			1.31 H	108	71.34	37.26
4	*5180.00	96.20 AV			1.31 H	108	58.94	37.26
5	#10360.00	63.90 PK	68.30	-4.40	1.45 H	46	17.26	46.64
6	15540.00	64.90 PK	74.00	-9.10	1.19 H	62	17.35	47.55
7	15540.00	49.75 AV	54.00	-4.25	1.19 H	62	2.20	47.55
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	53.84 PK	74.00	-20.16	1.00 V	194	16.58	37.26
2	5150.00	43.06 AV	54.00	-10.94	1.00 V	194	5.80	37.26
3	*5180.00	103.30 PK			1.00 V	192	66.04	37.26
4	*5180.00	91.10 AV			1.00 V	192	53.84	37.26
5	#10360.00	61.30 PK	68.30	-7.00	1.44 V	193	14.66	46.64
6	15540.00	61.80 PK	74.00	-12.20	1.28 V	231	14.25	47.55
7	15540.00	46.90 AV	54.00	-7.10	1.28 V	231	-0.65	47.55

- 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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	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	108.40 PK			1.34 H	109	71.14	37.26
2	*5200.00	96.10 AV			1.34 H	109	58.84	37.26
3	#10400.00	63.40 PK	68.30	-4.90	1.26 H	261	16.73	46.67
4	15600.00	65.00 PK	74.00	-9.00	1.19 H	57	17.56	47.44
5	15600.00	49.72 AV	54.00	-4.28	1.19 H	57	2.28	47.44
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	104.23 PK			1.00 V	354	66.97	37.26
2	*5200.00	91.52 AV			1.00 V	354	54.26	37.26
3	#10400.00	62.16 PK	68.30	-6.14	1.64 V	314	15.49	46.67
4	15600.00	64.67 PK	74.00	-9.33	1.03 V	153	17.23	47.44
5	15600.00	49.70 AV	54.00	-4.30	1.03 V	153	2.26	47.44

- 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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	TESTED BY	Eric Lee

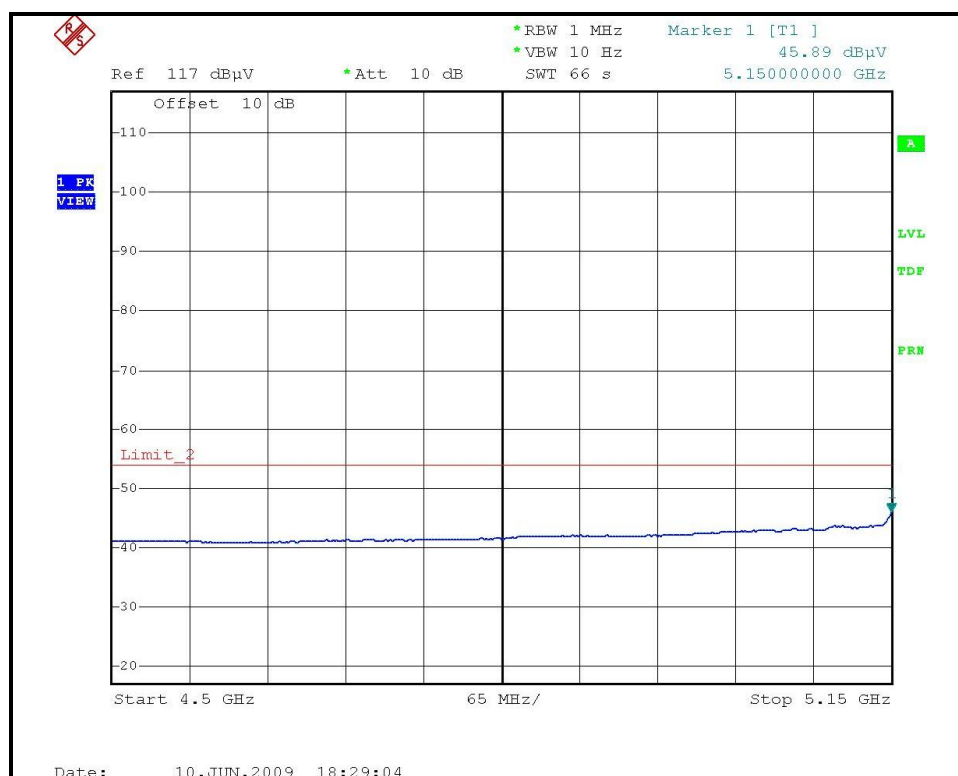
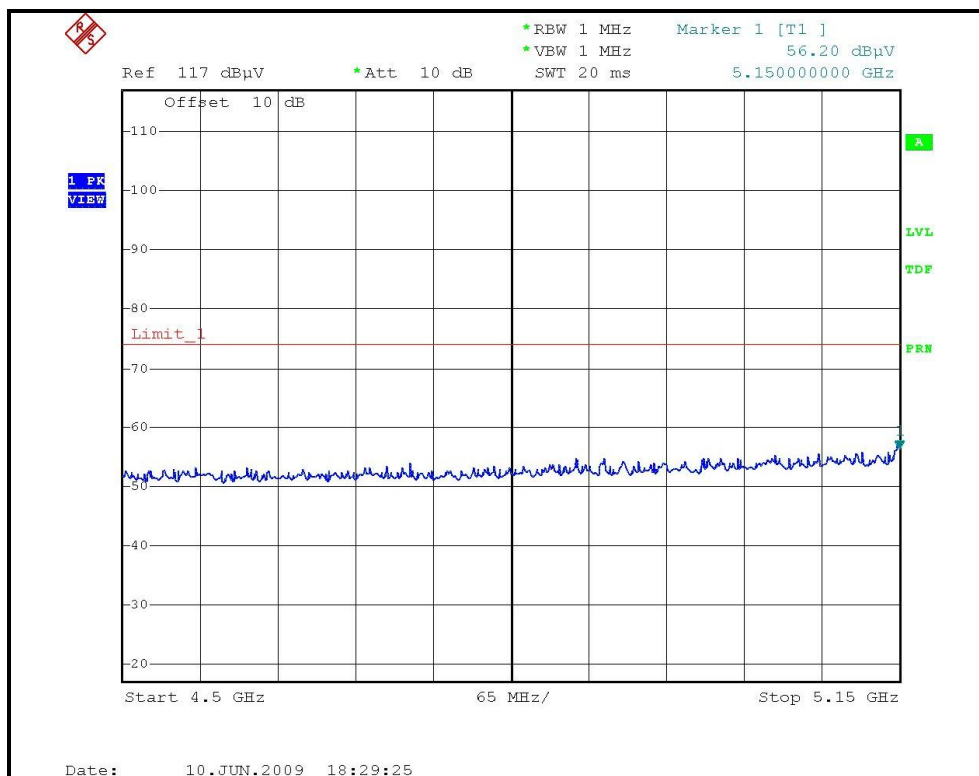
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	108.40 PK			1.36 H	88	71.14	37.26
2	*5240.00	96.14 AV			1.36 H	88	58.88	37.26
3	5350.00	54.57 PK	74.00	-19.43	1.34 H	105	17.31	37.26
4	5350.00	43.19 AV	54.00	-10.81	1.34 H	105	5.93	37.26
5	#10480.00	65.80 PK	68.30	-2.50	1.41 H	36	19.07	46.73
6	15720.00	64.90 PK	74.00	-9.10	1.30 H	72	17.69	47.21
7	15720.00	49.82 AV	54.00	-4.18	1.30 H	72	2.61	47.21
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	104.87 PK			1.00 V	342	67.61	37.26
2	*5240.00	92.77 AV			1.00 V	342	55.51	37.26
3	5350.00	57.07 PK	74.00	-16.93	1.00 V	42	19.81	37.26
4	5350.00	43.20 AV	54.00	-10.80	1.00 V	42	5.94	37.26
5	#10480.00	64.06 PK	68.30	-4.24	1.63 V	314	17.33	46.73
6	15720.00	62.82 PK	74.00	-11.18	1.01 V	162	15.61	47.21
7	15720.00	48.21 AV	54.00	-5.79	1.01 V	162	1.00	47.21

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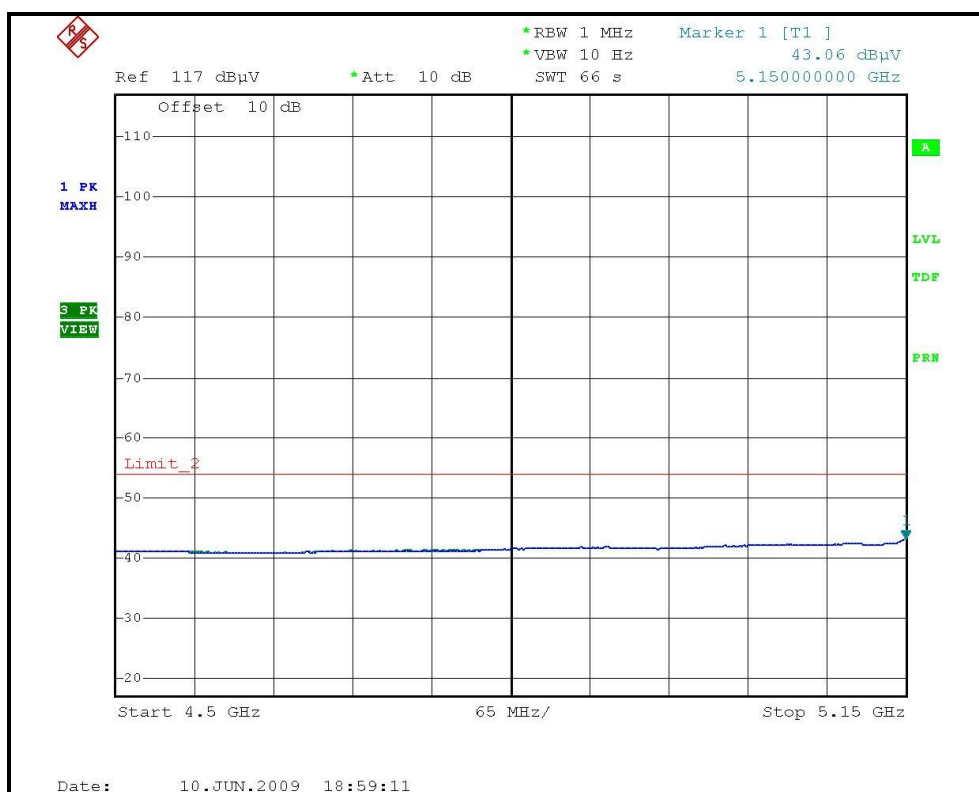
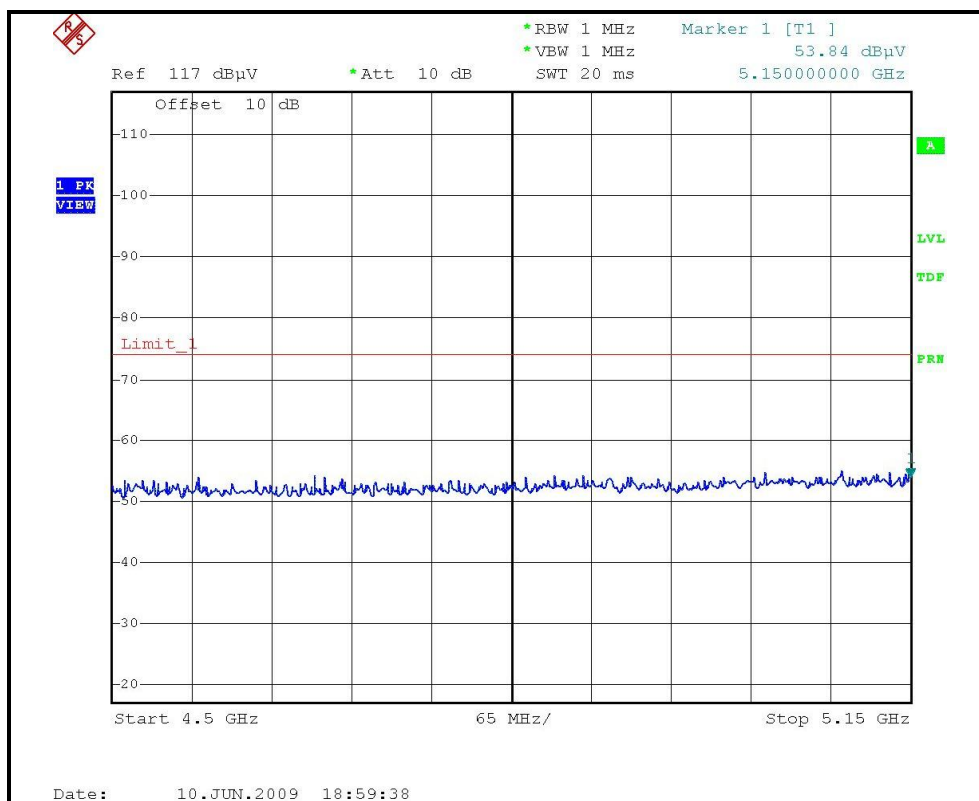
RESTRICTED BANDEDGE (DRAFT 802.11n (20MHz) MODE,CH36, HORIZONTAL)





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





Ref 117 dBμV *Att 10 dB *RBW 1 MHz Marker 1 [T1] 54.57 dBμV
 *VW 1 MHz SWT 20 ms 5.350000000 GHz

Offset 10 dB

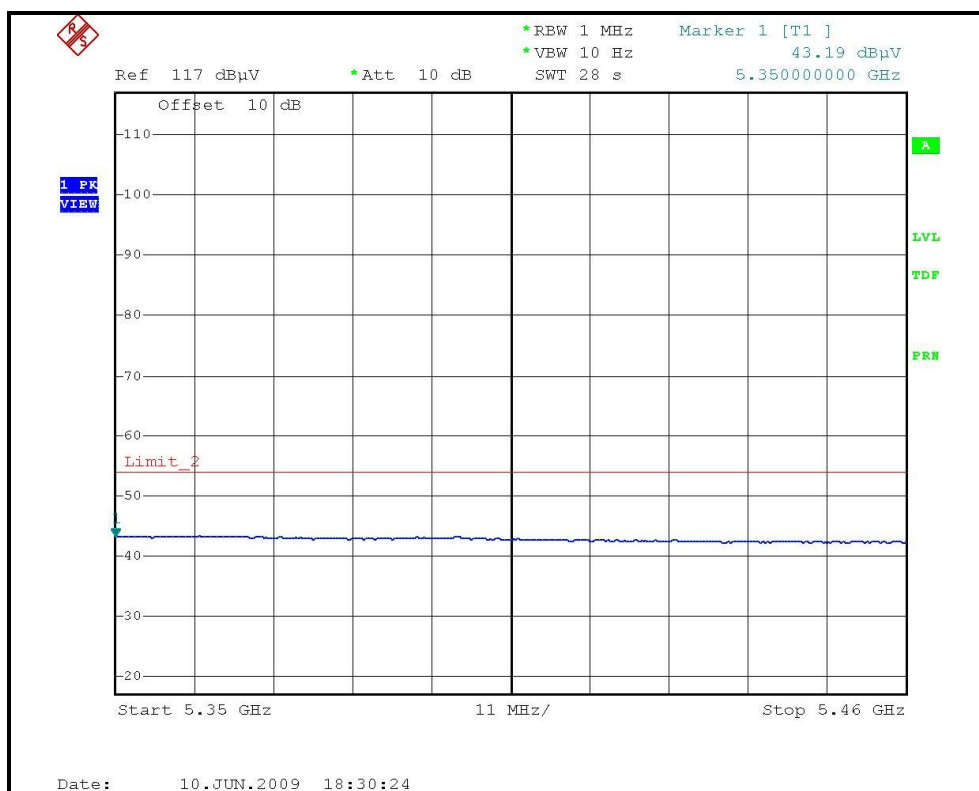
1 PK VIEW

Limit_1

Start 5.35 GHz 11 MHz/ Stop 5.46 GHz

A
LVL
TDF
PRN

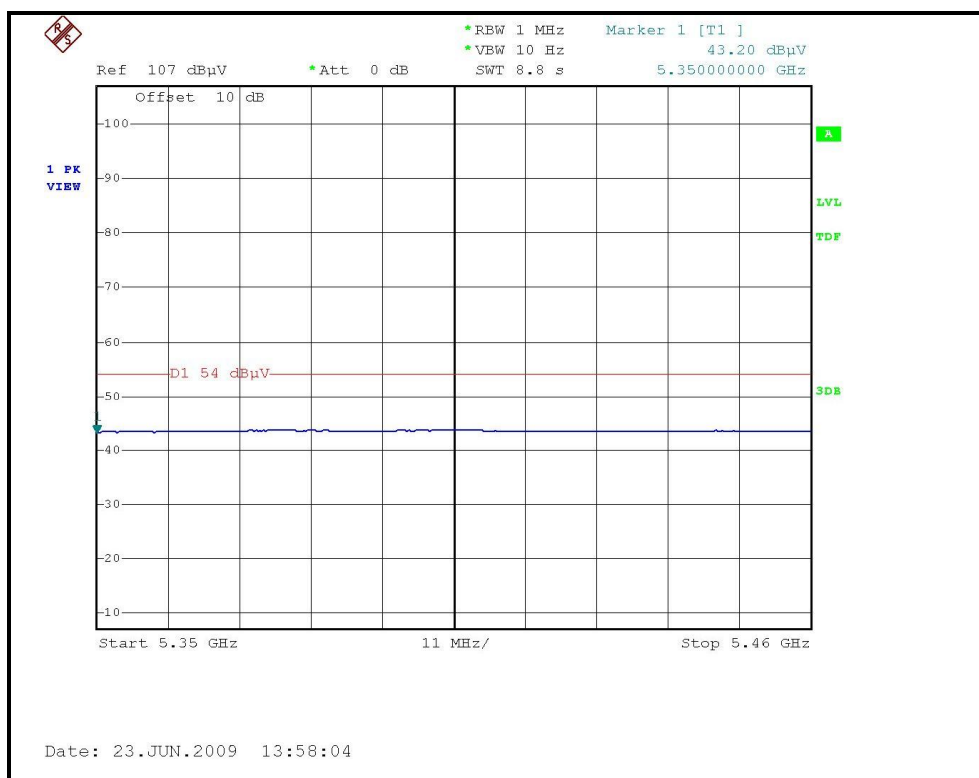
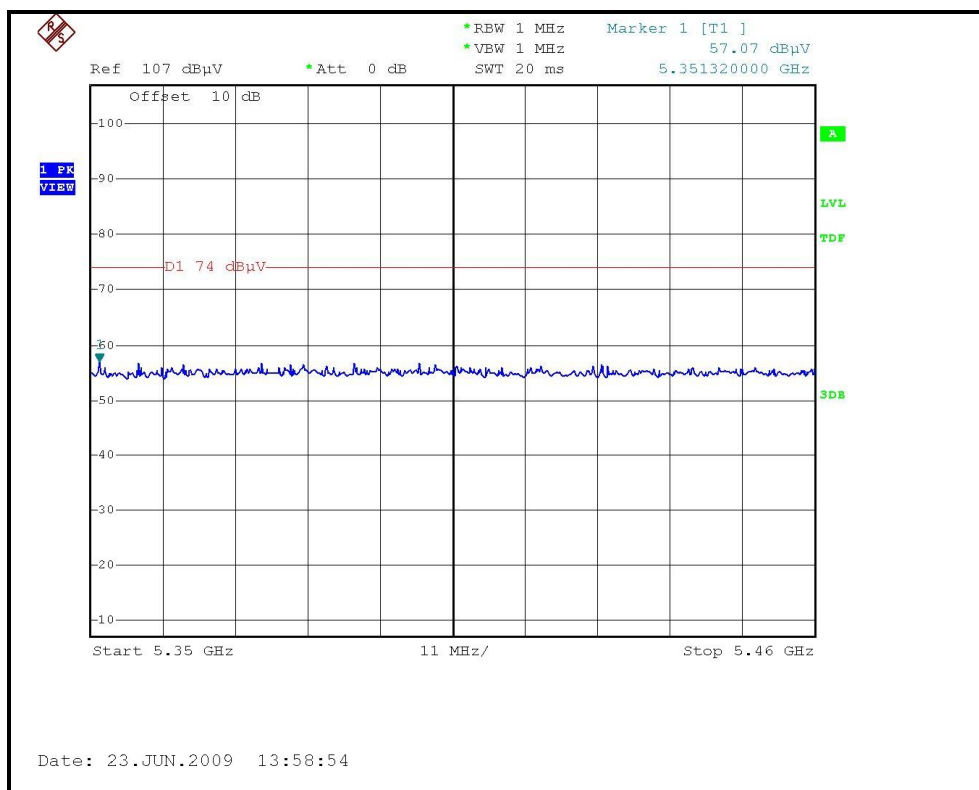
Date: 10.JUN.2009 18:30:03





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





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DRAFT 802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	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	63.83 PK	74.00	-10.17	1.45 H	83	26.57	37.26
2	5150.00	50.66 AV	54.00	-3.34	1.45 H	83	13.40	37.26
3	*5190.00	106.40 PK			1.37 H	79	69.14	37.26
4	*5190.00	92.10 AV			1.37 H	79	54.84	37.26
5	#10380.00	61.00 PK	68.30	-7.30	1.39 H	255	14.35	46.65
6	15570.00	62.70 PK	74.00	-11.30	1.31 H	39	15.20	47.50
7	15570.00	48.90 AV	54.00	-5.10	1.31 H	39	1.40	47.50
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	64.68 PK	74.00	-9.32	1.26 V	358	27.42	37.26
2	5150.00	49.85 AV	54.00	-4.15	1.26 V	358	12.59	37.26
3	*5190.00	104.41 PK			1.21 V	357	67.15	37.26
4	*5190.00	90.33 AV			1.21 V	357	53.07	37.26
5	#10380.00	60.21 PK	68.30	-8.09	1.47 V	317	13.56	46.65
6	15570.00	60.66 PK	74.00	-13.34	1.02 V	127	13.16	47.50
7	15570.00	47.37 AV	54.00	-6.63	1.02 V	127	-0.13	47.50

- 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 (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	29.0deg. C, 65.0%RH 965hPa	TESTED BY	Eric Lee

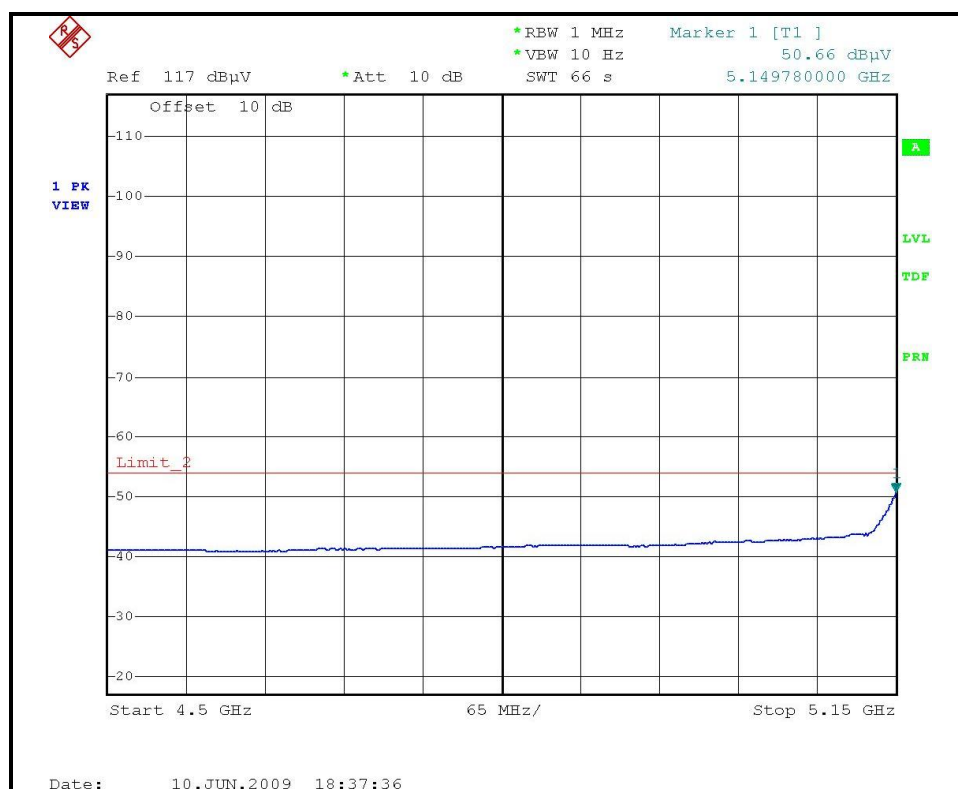
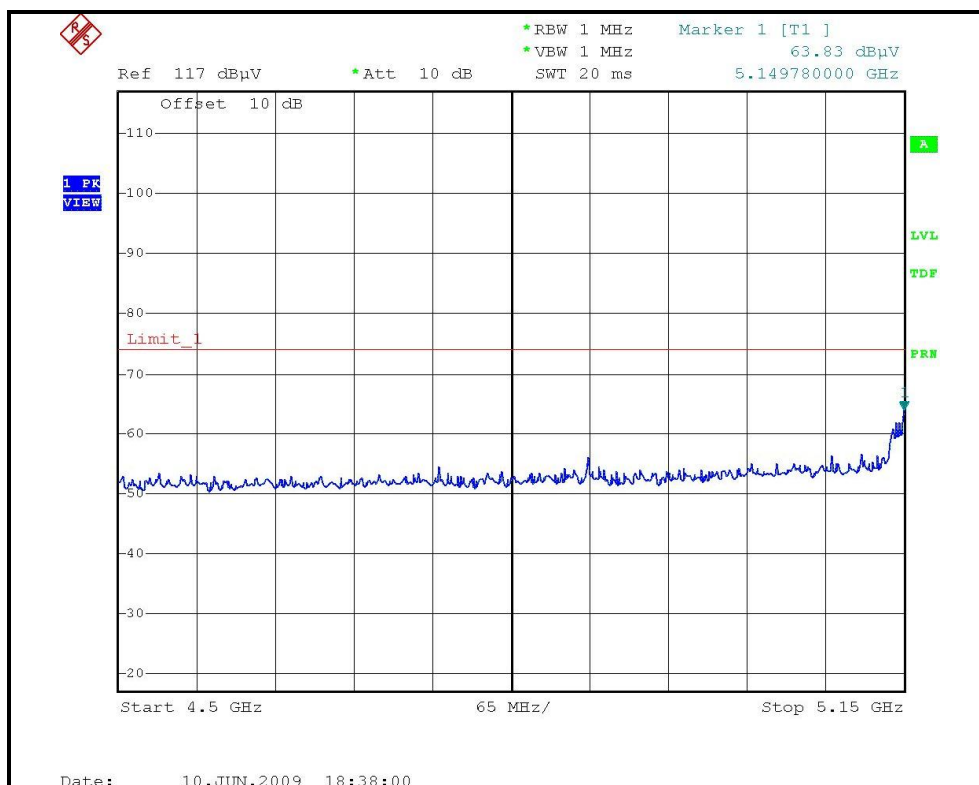
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	106.90 PK			1.38 H	87	69.64	37.26
2	*5230.00	92.32 AV			1.38 H	87	55.06	37.26
3	5350.00	53.58 PK	74.00	-20.42	1.43 H	95	16.32	37.26
4	5350.00	42.83 AV	54.00	-11.17	1.43 H	95	5.57	37.26
5	#10460.00	62.60 PK	68.30	-5.70	1.33 H	64	15.88	46.72
6	15690.00	65.30 PK	74.00	-8.70	1.39 H	63	18.03	47.27
7	15690.00	50.10 AV	54.00	-3.90	1.39 H	63	2.83	47.27
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	103.00 PK			1.26 V	12	65.74	37.26
2	*5230.00	89.16 AV			1.26 V	12	51.90	37.26
3	5350.00	57.26 PK	74.00	-16.74	1.00 V	78	20.00	37.26
4	5350.00	43.17 AV	54.00	-10.83	1.00 V	78	5.91	37.26
5	#10460.00	61.77 PK	68.30	-6.53	1.48 V	315	15.05	46.72
6	15690.00	61.88 PK	74.00	-12.12	1.00 V	164	14.61	47.27
7	15690.00	47.56 AV	54.00	-6.44	1.00 V	164	0.29	47.27

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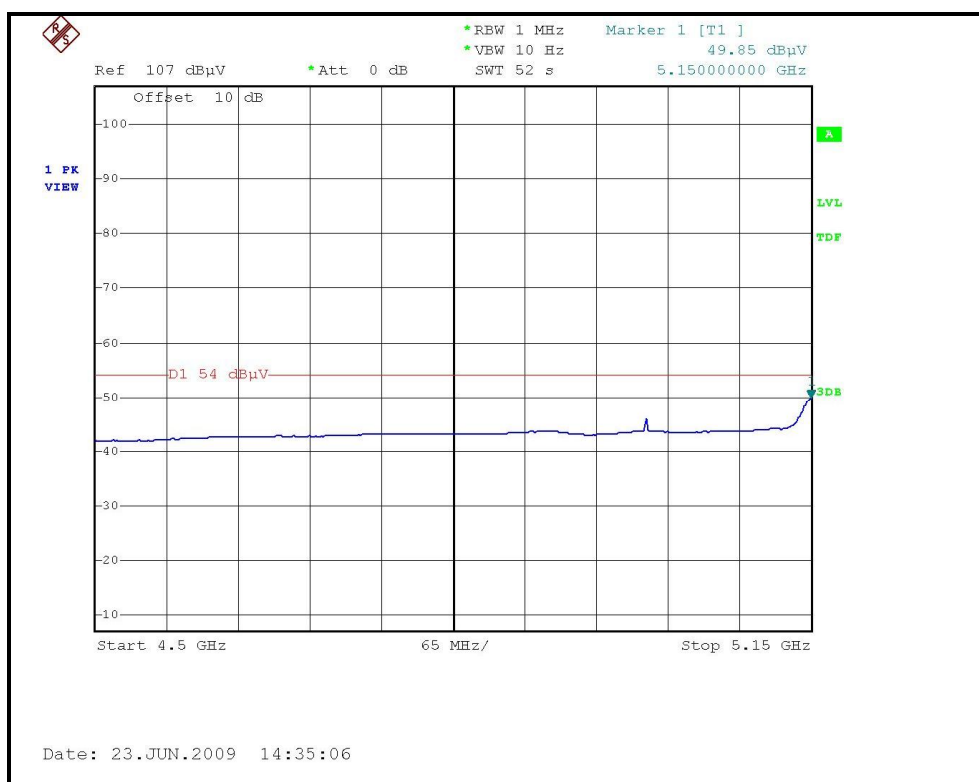
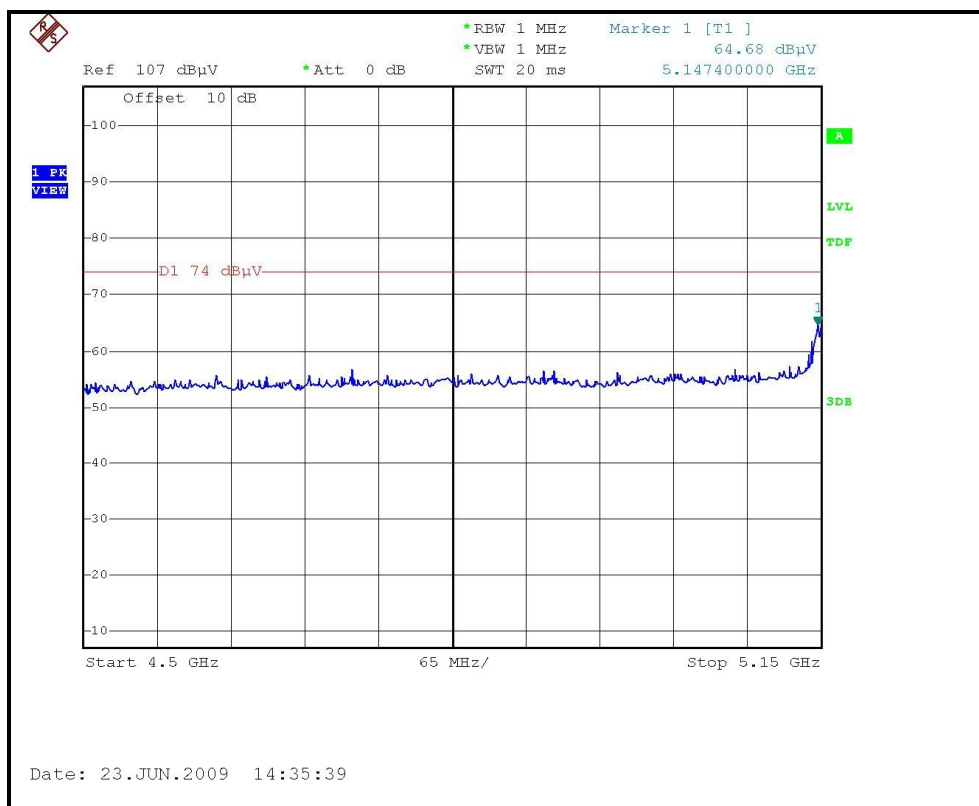
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH38, HORIZONTAL)





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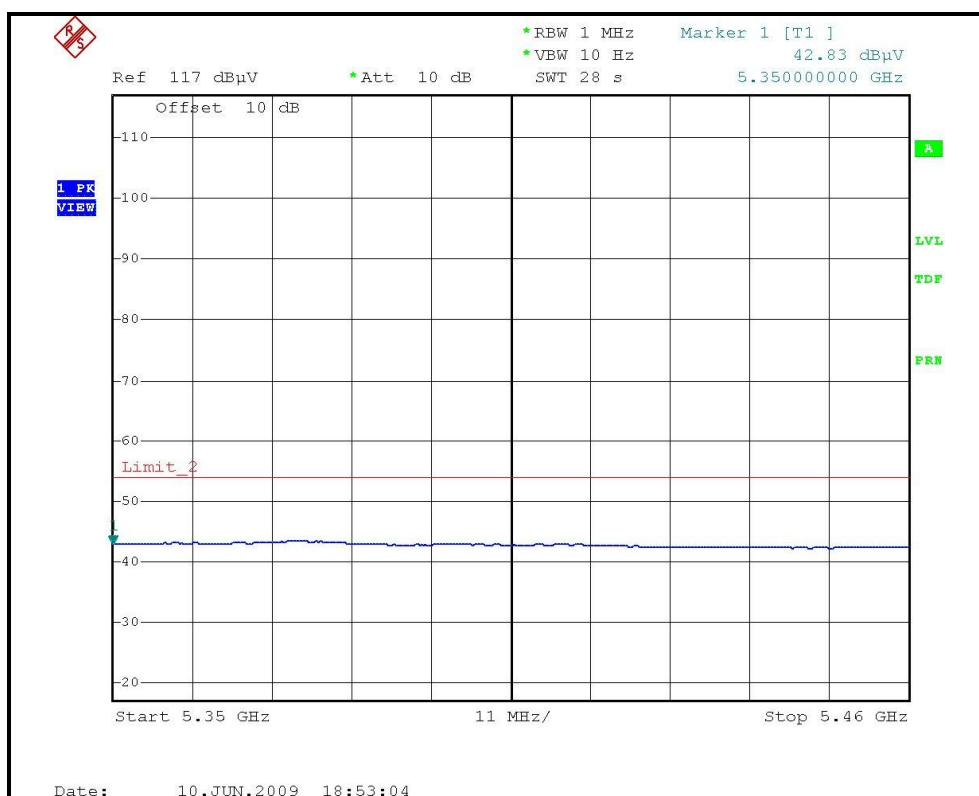
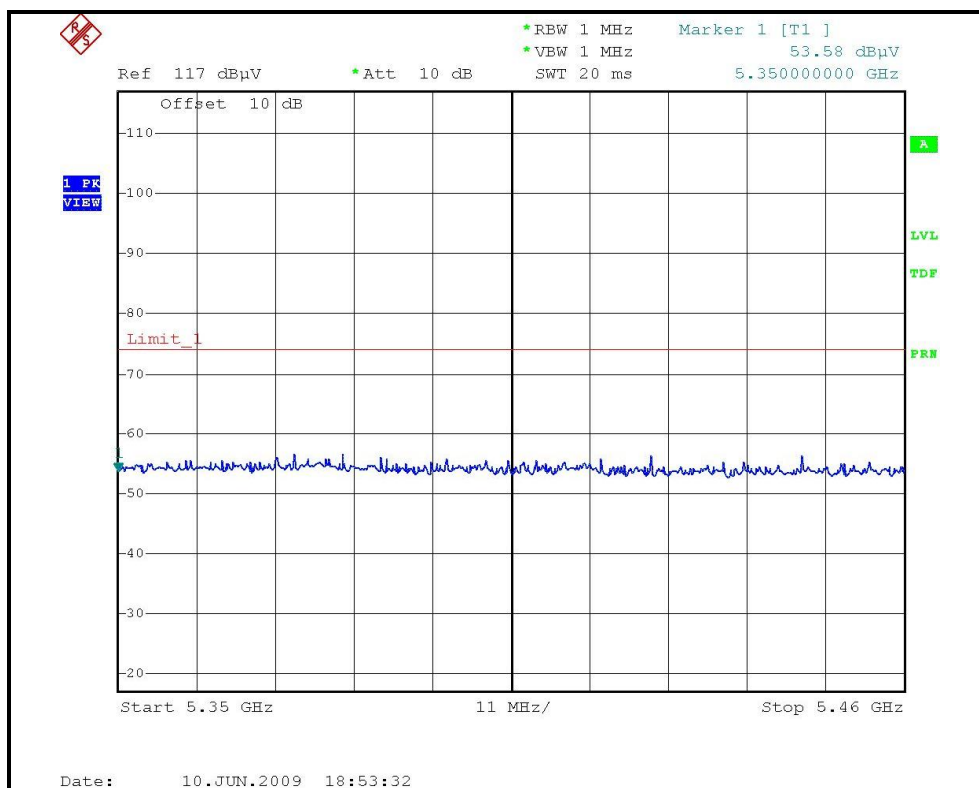
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE,CH38, VERTICAL)





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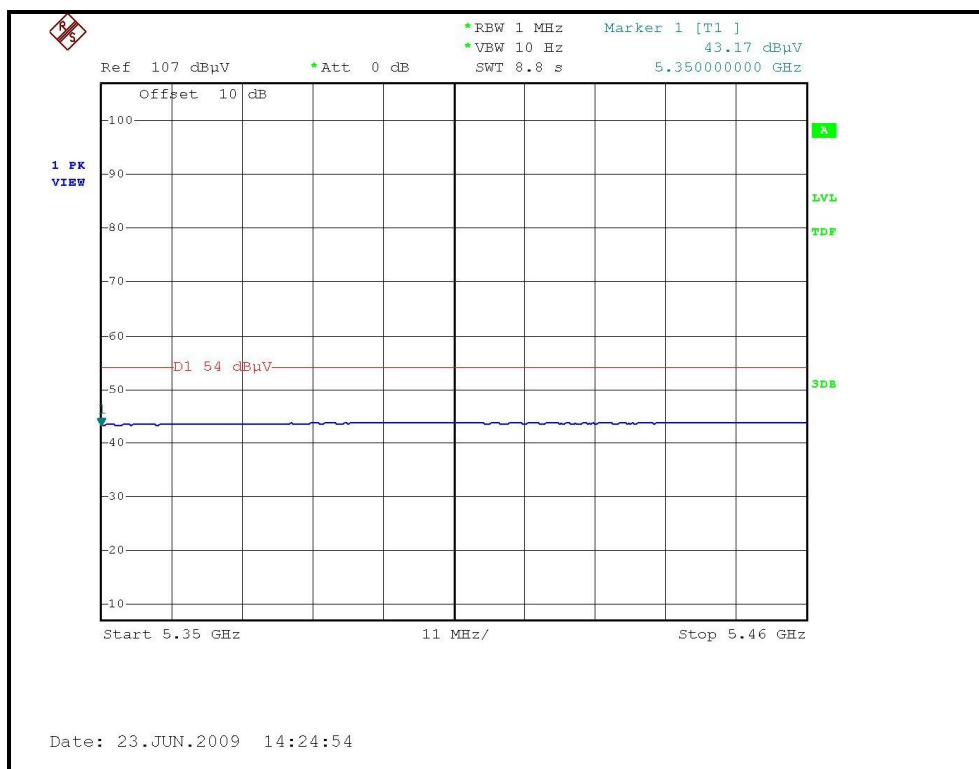
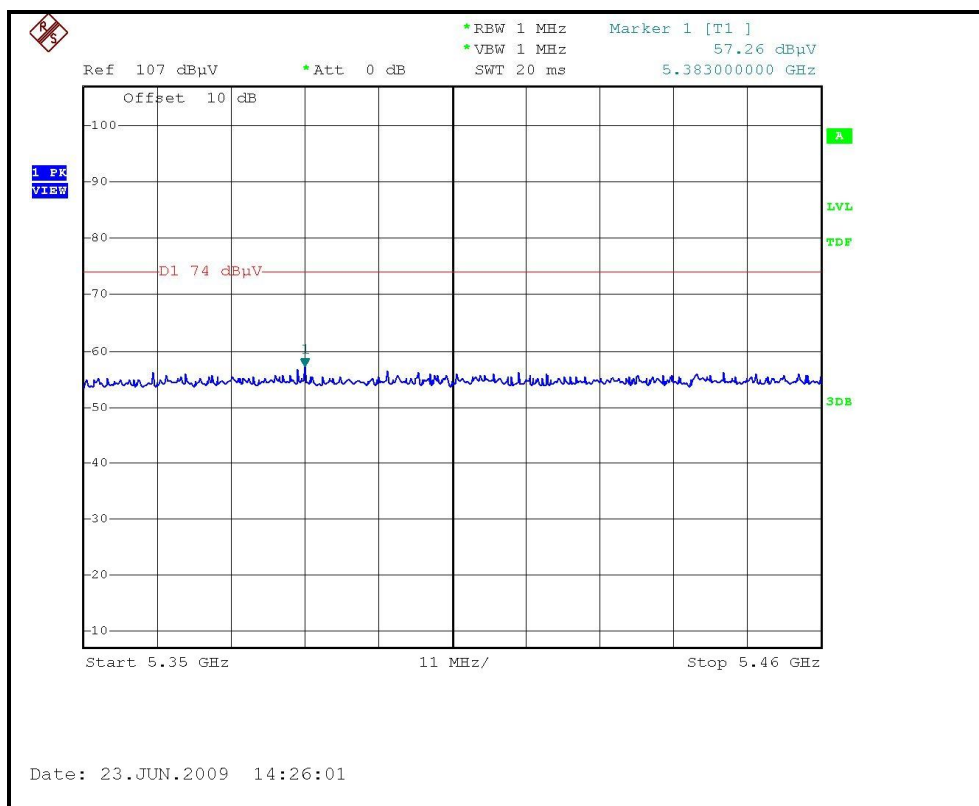
RESTRICTED BANDEDGE (DRAFT 802.11n (40MHz) MODE, CH46, HORIZONTAL)





A D T

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



4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK 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
ADVANTEST SPECTRUM ANALYZER	U3772	160100280	July 26, 2008	July 25, 2009

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 300kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

NOTE:

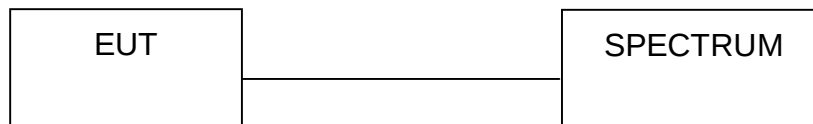
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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.



4.3.7 TEST RESULTS

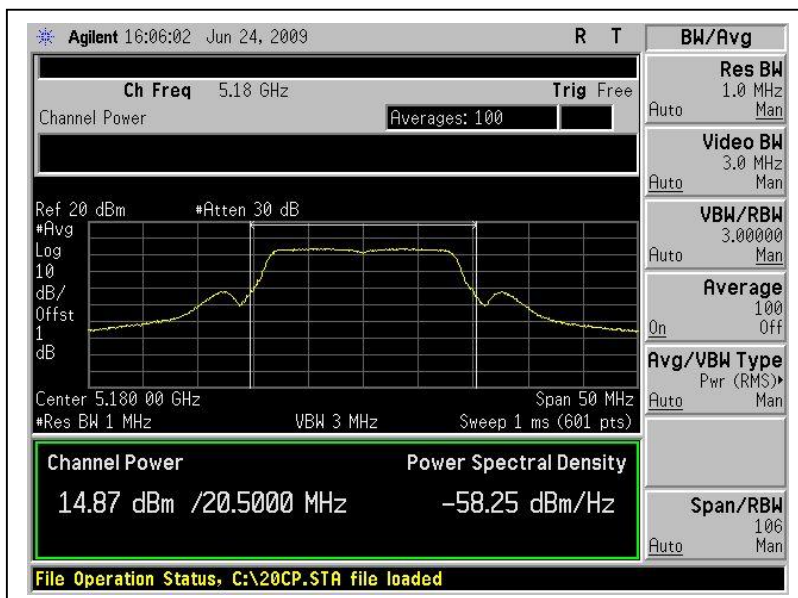
802.11a OFDM MODULATION:

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

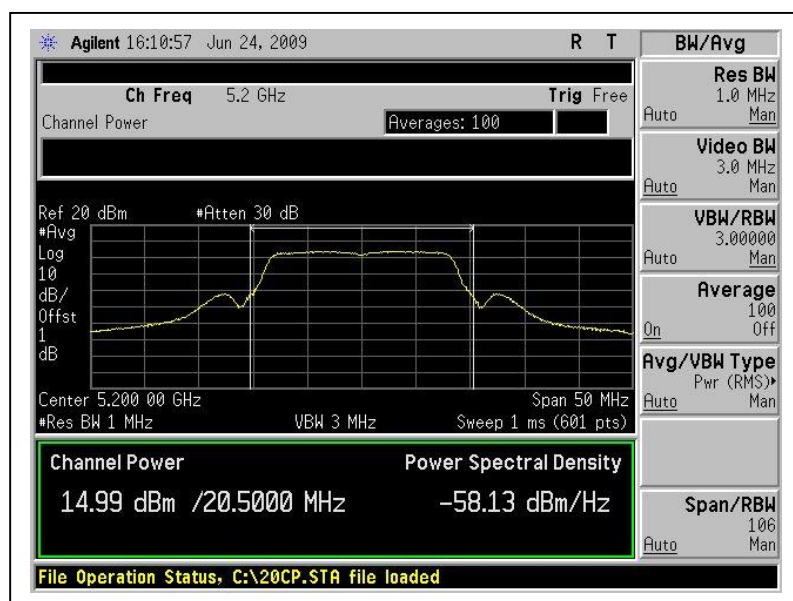
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
36	5180	14.87	30.690	17	20.5	PASS
40	5200	14.99	31.550	17	20.5	PASS
48	5240	15.07	32.137	17	20.67	PASS

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

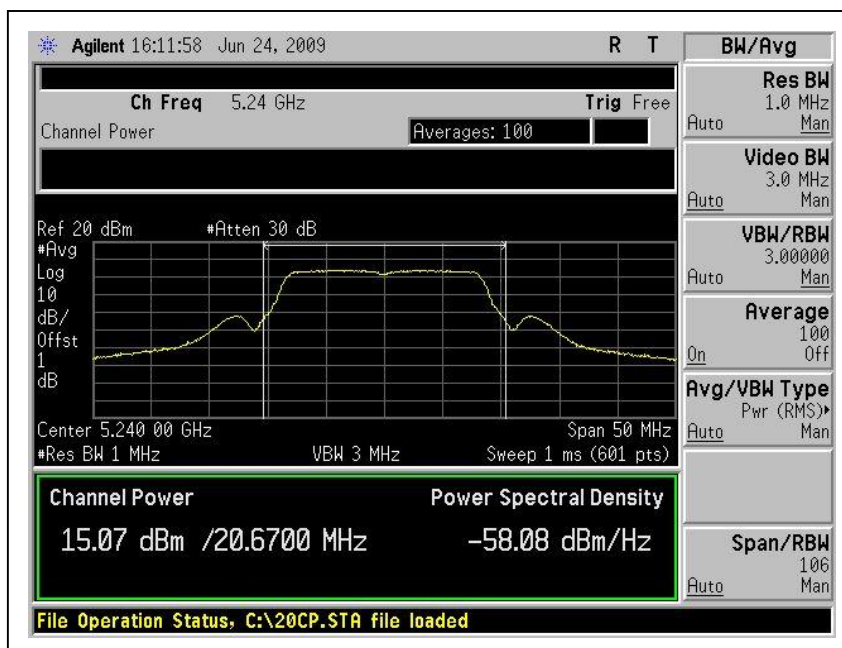
Peak Power Output: CH36



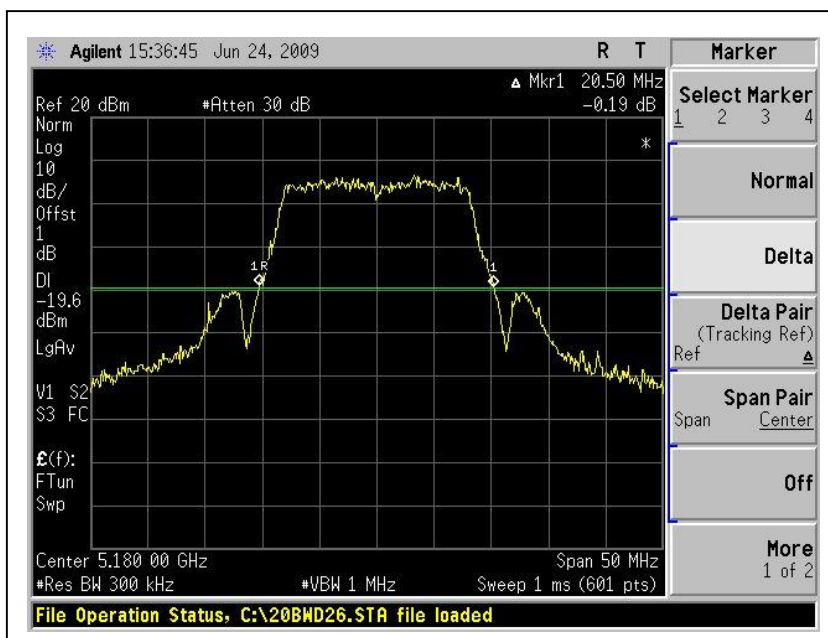
CH40



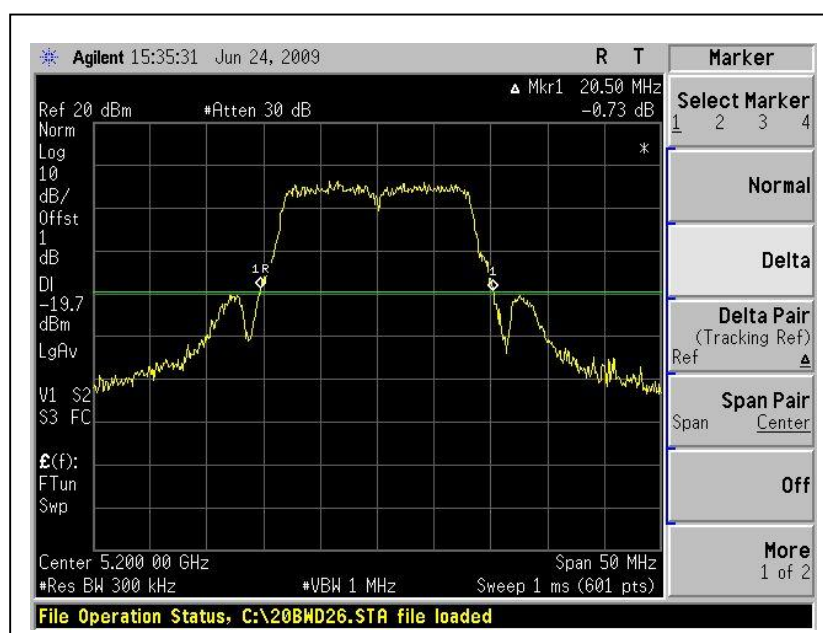
CH48



26dB Occupied Bandwidth: CH36



CH40



CH48

