



FCC TEST REPORT

REPORT NO.: RF111207E02

MODEL NO.: DY-WL5

FCC ID: ACJ-DY-WL5

RECEIVED: Dec. 08, 2011

TESTED: Dec. 13 to 15, 2011

ISSUED: Jan. 09, 2012

APPLICANT: Panasonic Corporation of North America

ADDRESS: One Panasonic Way, 4B-8, Secaucus, New Jersey,
United States, 07094

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF111207E02	Original release	Jan. 09, 2012



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1. CERTIFICATION

PRODUCT: WIRELESS LAN ADAPTOR
BRAND NAME: Panasonic
MODEL NO.: DY-WL5
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Dec. 13 to 15, 2011
APPLICANT: Panasonic Corporation of North America
STANDARDS: FCC Part 15, Subpart C (Section 15.247)
ANSI C63.4-2003
ANSI C63.10-2009

The above equipment (Model: DY-WL5) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , **DATE:** Jan. 09, 2012
(Lori Chung, Specialist)

APPROVED BY :  , **DATE:** Jan. 09, 2012
(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 (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -15.86dB at 0.380MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.6dB at 2483.50MHz.
15.247(d)	Conducted Out-Band Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

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)	3.81 dB
Radiated emissions (1GHz -18GHz)	2.19 dB
Radiated emissions (18GHz -40GHz)	2.56 dB



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	WIRELESS LAN ADAPTOR
MODEL NO.	DY-WL5
FCC ID	ACJ-DY-WL5
POWER SUPPLY	DC 5V from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: Up to 11Mbps 802.11g: Up to 54Mbps 802.11n (20MHz): Up to 72.2Mbps 802.11n (40MHz): Up to 150Mbps
FREQUENCY OPERATING	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
MAXIMUM OUTPUT POWER	802.11b: 104.7mW 802.11g: 239.9mW 802.11n (20MHz): 239.9mW 802.11n (40MHz): 141.3mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

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

Transmitter Circuit	Antenna Type	Antenna Gain without cable loss(dBi)	Diversity Function	Connector Type
Chain 0	PCB Print	1.08	Yes	NA
Chain 1	PCB Print	1.13	Yes	NA

2. The EUT is 1 * 1 spatial SISO (1Tx & 1Rx) without beam forming function.
3. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 7.
4. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



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3.2 DESCRIPTION OF TEST MODES

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

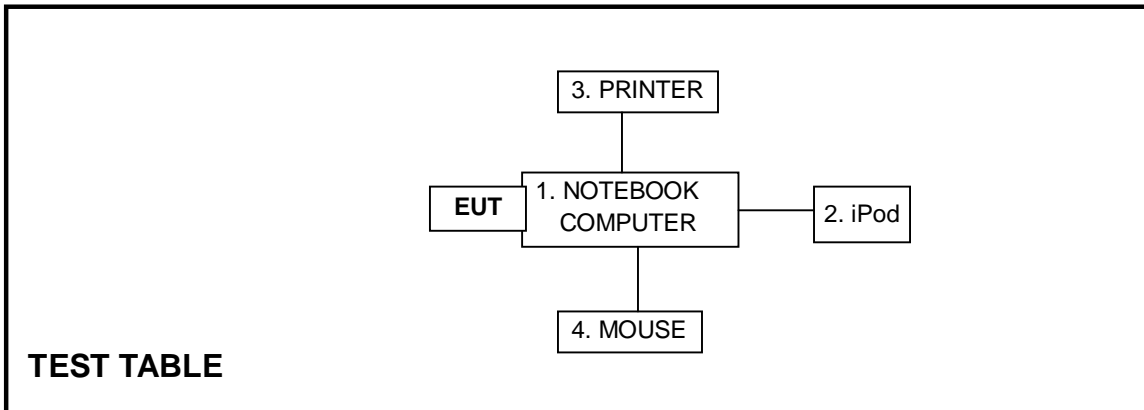
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

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

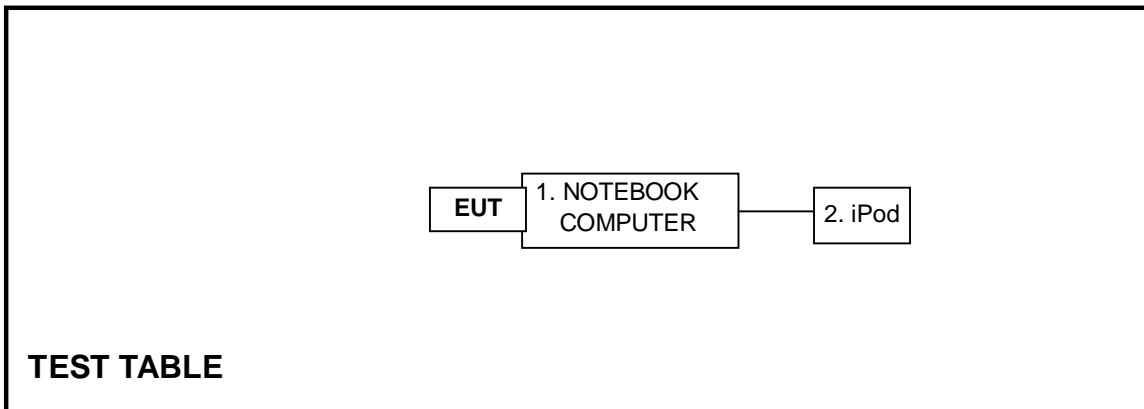
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

For conducted test item:



For other test items:





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3.2.2 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	iPod	Apple	MC749TA/A	CC4DMFJUDFDM	NA
3	PRINTER	EPSON	LQ-300+II	G88Y074015	FCC DoC
4	MOUSE	DELL	MOC5UO	I14066PS	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	USB cable (0.1m)
3	Printer data cable (1.8m)
4	Data cable (1.5m)

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



3.2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

RADIATED EMISSION TEST (BELOW 1 GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	1	OFDM	BPSK	6

POWER LINE CONDUCTED EMISSION TEST:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	1	OFDM	BPSK	6



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CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 11	OFDM	BPSK	6
802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	6.5
802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

※ TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	24deg. C, 67%RH,	120Vac, 60Hz	Andy Ho
RE ³ 1G	17deg. C, 64%RH	120Vac, 60Hz	Nick Chang
RE<1G	25deg. C, 69%RH	120Vac, 60Hz	Nick Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Kent Liu
OB	25deg. C, 60%RH	120Vac, 60Hz	Kent Liu

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C. (15.247)

ANSI C63.4-2003

ANSI C63.10-2009

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

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

Test date: Dec. 13, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 09, 2011	Mar. 08, 2012
Line-Impedance Stabilization Network (for EUT)	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Line-Impedance Stabilization Network (for Peripheral)	ESH3-Z5	848773/004	Nov. 01, 2011	Oct. 31, 2012
RF Cable (JYEBAO)	5DFB	COCCAB-002	Aug. 29, 2011	Aug. 28, 2012
50 ohms Terminator	50	3	Nov. 02, 2011	Nov. 01, 2012
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

Note:

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

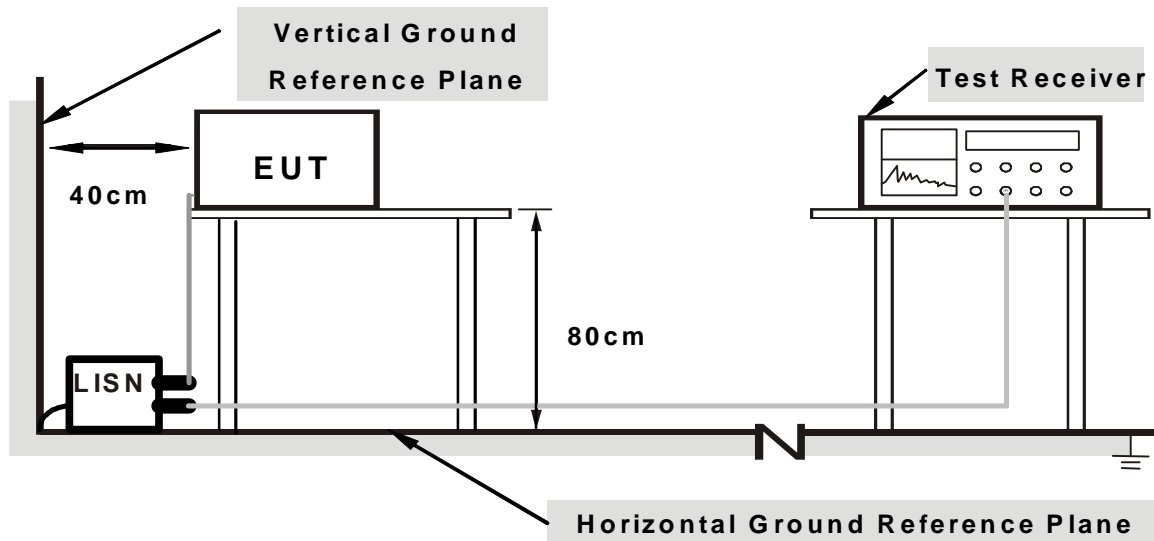
4.1.3 TEST PROCEDURES

- 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

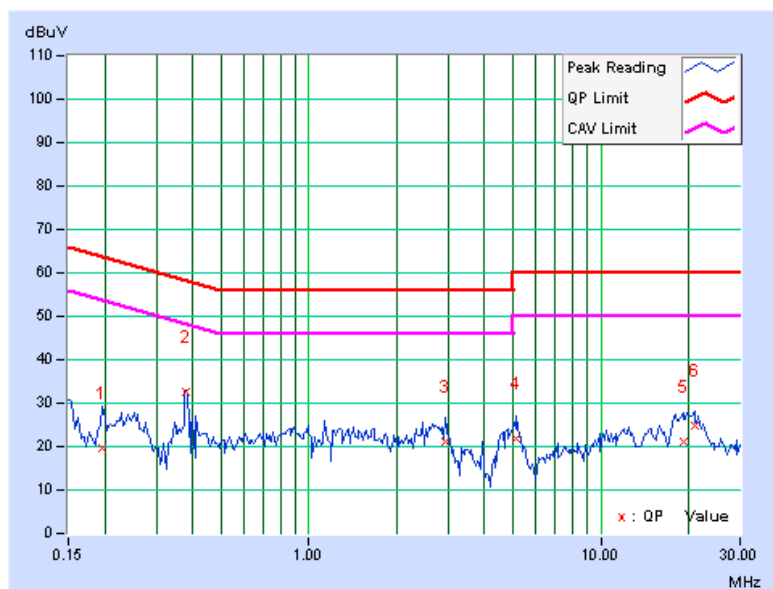
1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “RT5x7xV1.0.3.4” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.10	19.54	15.91	19.64	16.01	63.74	53.74	-44.10	-37.73
2	0.380	0.11	32.48	32.30	32.59	32.41	58.27	48.27	-25.68	-15.86
3	2.938	0.26	20.84	16.34	21.10	16.60	56.00	46.00	-34.90	-29.40
4	5.156	0.36	21.49	13.77	21.85	14.13	60.00	50.00	-38.15	-35.87
5	19.109	0.76	20.46	17.94	21.22	18.70	60.00	50.00	-38.78	-31.30
6	20.898	0.80	23.90	18.98	24.70	19.78	60.00	50.00	-35.30	-30.22

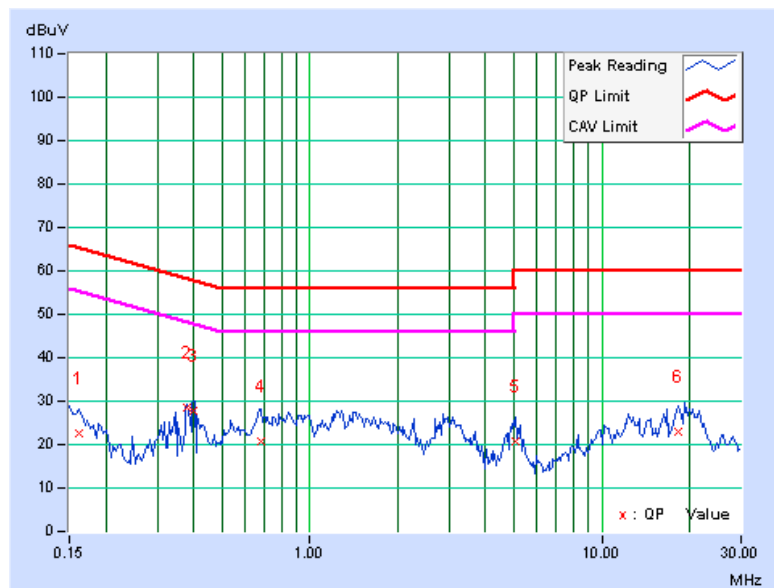
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq. [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	0.162	0.08	22.64	18.54	22.72	18.62	65.38
2	0.380	0.11	28.26	27.27	28.37	27.38	58.27	48.27	-29.90	-20.89
3	0.399	0.11	27.59	26.98	27.70	27.09	57.88	47.88	-30.18	-20.79
4	0.677	0.12	20.65	17.25	20.77	17.37	56.00	46.00	-35.23	-28.63
5	5.082	0.27	20.64	11.90	20.91	12.17	60.00	50.00	-39.09	-37.83
6	18.320	0.62	22.25	18.45	22.87	19.07	60.00	50.00	-37.13	-30.93

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power:

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

Test date: Dec. 15, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250254	July 12, 2011	July 11, 2012
Agilent Pre-Selector	N9039A	MY46520311	July 12, 2011	July 11, 2012
Agilent Signal Generator	N5181A	MY49060517	July 12, 2011	July 11, 2012
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-03	Nov. 15, 2011	Nov. 14, 2012
Agilent Pre-Amplifier	8449B	3008A02578	July 04, 2011	July 03, 2012
SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-360	Apr. 14, 2011	Apr. 13, 2012
AISI Horn_Antenna	AIH.8018	0000320091110	Nov. 14, 2011	Nov. 13, 2012
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 07, 2011	Oct. 06, 2012
RF CABLE	NA	RF104-201 RF104-203 RF104-204	Dec. 27, 2010	Dec. 26, 2011
RF Cable	NA	CHGCAB_001	Oct. 07, 2011	Oct. 06, 2012
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

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

2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in 966 Chamber No. G.

4. The FCC Site Registration No. is 966073.

5. The VCCI Site Registration No. is G-137.

6. The CANADA Site Registration No. is IC 7450H-2.

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 3 meters chamber room for below 1GHz test and 10 meters open site for above 1GHz test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

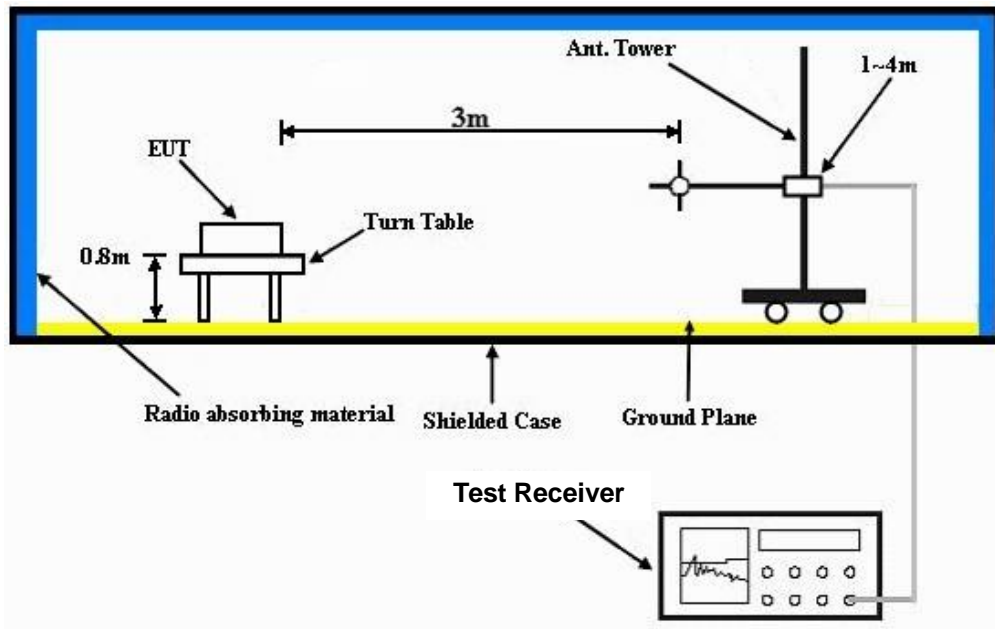
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA : 802.11g OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	17deg. C, 64%RH	TESTED BY	Nick Chang

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	136.58	30.3 QP	43.5	-13.3	1.25 H	277	16.29	13.96
2	232.38	34.1 QP	46.0	-11.9	1.00 H	360	21.40	12.66
3	408.01	24.2 QP	46.0	-21.8	2.00 H	144	6.07	18.12
4	647.93	26.9 QP	46.0	-19.1	1.00 H	39	4.12	22.78
5	749.65	30.8 QP	46.0	-15.2	1.25 H	259	6.35	24.41
6	848.30	38.0 QP	46.0	-8.1	1.00 H	178	11.33	26.62
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	59.96	34.2 QP	40.0	-5.8	1.00 V	245	20.50	13.68
2	161.80	31.6 QP	43.5	-11.9	1.50 V	52	17.07	14.51
3	313.62	27.5 QP	46.0	-18.5	1.50 V	360	11.85	15.68
4	549.76	25.8 QP	46.0	-20.2	1.00 V	74	4.31	21.47
5	748.71	28.7 QP	46.0	-17.3	2.00 V	107	4.32	24.38
6	848.77	33.9 QP	46.0	-12.1	1.50 V	355	7.26	26.63

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



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ABOVE 1GHz WORST-CASE DATA

802.11b 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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	2386.30	61.1 PK	74.0	-12.9	1.00 H	116	29.52	31.58
2	2386.30	51.7 AV	54.0	-2.3	1.00 H	116	20.12	31.58
3	*2412.00	107.7 PK			1.00 H	115	76.04	31.66
4	*2412.00	105.3 AV			1.00 H	115	73.64	31.66
5	4824.00	52.3 PK	74.0	-21.7	1.12 H	111	13.23	39.07
6	4824.00	47.4 AV	54.0	-6.6	1.12 H	111	8.33	39.07

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	2386.30	61.8 PK	74.0	-12.2	1.00 V	111	30.22	31.58
2	2386.30	52.3 AV	54.0	-1.7	1.00 V	111	20.72	31.58
3	*2412.00	107.0 PK			1.00 V	111	75.34	31.66
4	*2412.00	104.6 AV			1.00 V	111	72.94	31.66
5	4824.00	51.7 PK	74.0	-22.3	1.14 V	296	12.63	39.07
6	4824.00	46.2 AV	54.0	-7.8	1.14 V	296	7.13	39.07

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	108.0 PK			1.00 H	116	76.25	31.75
2	*2437.00	105.7 AV			1.00 H	116	73.95	31.75
3	4874.00	54.2 PK	74.0	-19.8	1.22 H	113	14.97	39.23
4	4874.00	51.2 AV	54.0	-2.8	1.22 H	113	11.97	39.23
5	7311.00	53.8 PK	74.0	-20.2	1.20 H	134	7.23	46.57
6	7311.00	43.1 AV	54.0	-10.9	1.20 H	134	-3.47	46.57
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	106.8 PK			1.00 V	117	75.05	31.75
2	*2437.00	104.4 AV			1.00 V	117	72.65	31.75
3	4874.00	52.2 PK	74.0	-21.8	1.13 V	281	12.97	39.23
4	4874.00	46.5 AV	54.0	-7.5	1.13 V	281	7.27	39.23
5	7311.00	54.7 PK	74.0	-19.3	1.06 V	252	8.13	46.57
6	7311.00	42.8 AV	54.0	-11.2	1.06 V	252	-3.77	46.57

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	104.3 PK			1.00 H	110	72.47	31.83
2	*2462.00	101.8 AV			1.00 H	110	69.97	31.83
3	2483.50	60.6 PK	74.0	-13.4	1.00 H	110	28.70	31.90
4	2483.50	52.7 AV	54.0	-1.3	1.00 H	110	20.80	31.90
5	4924.00	51.0 PK	74.0	-23.0	1.22 H	113	11.61	39.39
6	4924.00	43.2 AV	54.0	-10.8	1.22 H	113	3.81	39.39
7	7386.00	53.4 PK	74.0	-20.6	1.25 H	100	6.93	46.47
8	7386.00	43.2 AV	54.0	-10.8	1.25 H	100	-3.27	46.47

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	102.8 PK			1.00 V	98	70.97	31.83
2	*2462.00	100.5 AV			1.00 V	98	68.67	31.83
3	2483.50	59.4 PK	74.0	-14.6	1.00 V	98	27.50	31.90
4	2483.50	50.6 AV	54.0	-3.4	1.00 V	98	18.70	31.90
5	4924.00	50.1 PK	74.0	-23.9	1.06 V	258	10.71	39.39
6	4924.00	41.2 AV	54.0	-12.8	1.06 V	258	1.81	39.39
7	7386.00	54.6 PK	74.0	-19.4	1.05 V	254	8.13	46.47
8	7386.00	42.6 AV	54.0	-11.4	1.05 V	254	-3.87	46.47

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	68.5 PK	74.0	-5.5	1.00 H	111	36.91	31.59
2	2390.00	52.8 AV	54.0	-1.2	1.00 H	111	21.21	31.59
3	*2412.00	107.3 PK			1.00 H	110	75.64	31.66
4	*2412.00	97.2 AV			1.00 H	110	65.56	31.66
5	4824.00	50.1 PK	74.0	-23.9	1.35 H	63	11.03	39.07
6	4824.00	37.5 AV	54.0	-16.5	1.35 H	63	-1.57	39.07
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	67.3 PK	74.0	-6.7	1.00 V	112	35.71	31.59
2	2390.00	51.1 AV	54.0	-2.9	1.00 V	112	19.51	31.59
3	*2412.00	107.3 PK			1.00 V	112	75.64	31.66
4	*2412.00	96.6 AV			1.00 V	112	64.94	31.66
5	4824.00	47.6 PK	74.0	-26.4	1.15 V	308	8.53	39.07
6	4824.00	34.7 AV	54.0	-19.3	1.15 V	308	-4.37	39.07

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	64.3 PK	74.0	-9.7	1.00 H	110	32.71	31.59
2	2390.00	48.4 AV	54.0	-5.6	1.00 H	110	16.81	31.59
3	*2437.00	108.9 PK			1.00 H	118	77.15	31.75
4	*2437.00	97.9 AV			1.00 H	118	66.15	31.75
5	2483.50	70.2 PK	74.0	-3.8	1.00 H	110	38.32	31.90
6	2483.50	53.3 AV	54.0	-0.7	1.00 H	110	21.40	31.90
7	4874.00	50.3 PK	74.0	-23.7	1.36 H	67	11.07	39.23
8	4874.00	38.2 AV	54.0	-15.8	1.36 H	67	-1.03	39.23
9	7311.00	51.9 PK	74.0	-22.2	1.36 H	65	5.28	46.57
10	7311.00	40.1 AV	54.0	-13.9	1.36 H	65	-6.47	46.57

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	107.8 PK			1.01 V	118	76.05	31.75
2	*2437.00	97.2 AV			1.01 V	118	65.45	31.75
3	4874.00	47.7 PK	74.0	-26.3	1.14 V	295	8.47	39.23
4	4874.00	35.2 AV	54.0	-18.8	1.14 V	295	-4.03	39.23
5	7311.00	52.9 PK	74.0	-21.1	1.04 V	247	6.33	46.57
6	7311.00	41.1 AV	54.0	-12.9	1.04 V	247	-5.47	46.57

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	102.8 PK			1.00 H	110	70.97	31.83
2	*2462.00	93.0 AV			1.00 H	110	61.17	31.83
3	2483.50	72.0 PK	74.0	-2.0	1.00 H	110	40.10	31.90
4	2483.50	53.4 AV	54.0	-0.6	1.00 H	110	21.50	31.90
5	4924.00	47.8 PK	74.0	-26.2	1.32 H	64	8.41	39.39
6	4924.00	35.7 AV	54.0	-18.3	1.32 H	64	-3.69	39.39
7	7386.00	51.7 PK	74.0	-22.3	1.36 H	51	5.23	46.47
8	7386.00	40.4 AV	54.0	-13.6	1.36 H	51	-6.07	46.47

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	102.7 PK			1.00 V	115	70.87	31.83
2	*2462.00	92.3 AV			1.00 V	115	60.47	31.83
3	2483.50	71.1 PK	74.0	-2.9	1.00 V	115	39.20	31.90
4	2483.50	52.8 AV	54.0	-1.2	1.00 V	115	20.90	31.90
5	4924.00	45.6 PK	74.0	-28.4	1.13 V	281	6.21	39.39
6	4924.00	33.5 AV	54.0	-20.5	1.13 V	281	-5.89	39.39
7	7386.00	52.9 PK	74.0	-21.1	1.08 V	247	6.43	46.47
8	7386.00	41.0 AV	54.0	-13.0	1.08 V	247	-5.47	46.47

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	69.5 PK	74.0	-4.5	1.00 H	110	37.91	31.59
2	2390.00	52.8 AV	54.0	-1.2	1.00 H	110	21.21	31.59
3	*2412.00	105.8 PK			1.00 H	109	74.14	31.66
4	*2412.00	96.3 AV			1.00 H	109	64.64	31.66
5	4824.00	48.0 PK	74.0	-26.0	1.35 H	75	8.93	39.07
6	4824.00	35.7 AV	54.0	-18.3	1.35 H	75	-3.37	39.07
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	68.8 PK	74.0	-5.2	1.00 V	106	37.21	31.59
2	2390.00	51.2 AV	54.0	-2.8	1.00 V	106	19.61	31.59
3	*2412.00	105.3 PK			1.00 V	105	73.64	31.66
4	*2412.00	95.7 AV			1.00 V	105	64.04	31.66
5	4824.00	47.7 PK	74.0	-26.3	1.10 V	294	8.63	39.07
6	4824.00	35.0 AV	54.0	-19.0	1.10 V	294	-4.07	39.07

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	63.0 PK	74.0	-11.0	1.00 H	110	31.41	31.59
2	2390.00	49.5 AV	54.0	-4.5	1.00 H	110	17.91	31.59
3	*2437.00	107.0 PK			1.00 H	118	75.25	31.75
4	*2437.00	97.8 AV			1.00 H	118	66.05	31.75
5	2483.50	71.5 PK	74.0	-2.5	1.00 H	114	39.60	31.90
6	2483.50	53.0 AV	54.0	-1.0	1.00 H	114	21.10	31.90
7	4874.00	47.9 PK	74.0	-26.1	1.26 H	42	8.67	39.23
8	4874.00	35.7 AV	54.0	-18.3	1.26 H	42	-3.53	39.23
9	7311.00	51.3 PK	74.0	-22.7	1.42 H	35	4.73	46.57
10	7311.00	39.7 AV	54.0	-14.3	1.42 H	35	-6.87	46.57

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	106.7 PK			1.00 V	103	74.95	31.75
2	*2437.00	96.8 AV			1.00 V	103	65.05	31.75
3	4874.00	47.8 PK	74.0	-26.2	1.10 V	307	8.57	39.23
4	4874.00	35.1 AV	54.0	-18.9	1.10 V	307	-4.13	39.23
5	7311.00	53.2 PK	74.0	-20.8	1.01 V	240	6.63	46.57
6	7311.00	41.5 AV	54.0	-12.5	1.01 V	240	-5.07	46.57

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	102.9 PK			1.00 H	110	71.07	31.83
2	*2462.00	93.1 AV			1.00 H	110	61.27	31.83
3	2483.50	72.7 PK	74.0	-1.3	1.00 H	110	40.80	31.90
4	2483.50	52.9 AV	54.0	-1.1	1.00 H	110	21.00	31.90
5	4924.00	47.0 PK	74.0	-27.0	1.30 H	36	7.61	39.39
6	4924.00	34.8 AV	54.0	-19.2	1.30 H	36	-4.59	39.39
7	7386.00	51.3 PK	74.0	-22.7	1.32 H	41	4.83	46.47
8	7386.00	39.8 AV	54.0	-14.2	1.32 H	41	-6.67	46.47

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	101.5 PK			1.00 V	113	69.67	31.83
2	*2462.00	91.7 AV			1.00 V	113	59.87	31.83
3	2483.50	71.3 PK	74.0	-2.7	1.00 V	113	39.40	31.90
4	2483.50	51.3 AV	54.0	-2.7	1.00 V	113	19.40	31.90
5	4924.00	45.9 PK	74.0	-28.1	1.09 V	281	6.51	39.39
6	4924.00	33.9 AV	54.0	-20.1	1.09 V	281	-5.49	39.39
7	7386.00	52.7 PK	74.0	-21.3	1.12 V	251	6.23	46.47
8	7386.00	40.8 AV	54.0	-13.2	1.12 V	251	-5.67	46.47

- 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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802.11n (40MHz) OFDM MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 69%RH	TESTED BY	Nick Chang

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	70.5 PK	74.0	-3.5	1.00 H	111	38.91	31.59
2	2390.00	52.6 AV	54.0	-1.4	1.00 H	111	21.01	31.59
3	*2422.00	100.3 PK			1.00 H	117	68.61	31.69
4	*2422.00	91.2 AV			1.00 H	117	59.51	31.69
5	4844.00	47.3 PK	74.0	-26.7	1.28 H	58	8.17	39.13
6	4844.00	35.4 AV	54.0	-18.6	1.28 H	58	-3.73	39.13
7	7266.00	52.0 PK	74.0	-22.0	1.31 H	72	5.40	46.60
8	7266.00	40.1 AV	54.0	-13.9	1.31 H	72	-6.50	46.60

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	68.1 PK	74.0	-5.9	1.00 V	275	36.51	31.59
2	2390.00	51.6 AV	54.0	-2.4	1.00 V	275	20.01	31.59
3	*2422.00	100.1 PK			1.00 V	276	68.41	31.69
4	*2422.00	90.8 AV			1.00 V	276	59.11	31.69
5	4844.00	46.8 PK	74.0	-27.2	1.04 V	296	7.67	39.13
6	4844.00	34.2 AV	54.0	-19.8	1.04 V	296	-4.93	39.13
7	7266.00	52.9 PK	74.0	-21.1	1.04 V	233	6.30	46.60
8	7266.00	41.0 AV	54.0	-13.0	1.04 V	233	-5.60	46.60

- 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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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	25deg. C, 69%RH	TESTED BY	Nick Chang

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	59.5 PK	74.0	-14.5	1.00 H	111	27.91	31.59
2	2390.00	47.4 AV	54.0	-6.6	1.00 H	111	15.81	31.59
3	*2437.00	101.1 PK			1.00 H	118	69.35	31.75
4	*2437.00	91.2 AV			1.00 H	118	59.45	31.75
5	2483.50	69.4 PK	74.0	-4.6	1.00 H	109	37.50	31.90
6	2483.50	53.2 AV	54.0	-0.8	1.00 H	109	21.30	31.90
7	4874.00	47.8 PK	74.0	-26.2	1.33 H	64	8.57	39.23
8	4874.00	35.7 AV	54.0	-18.3	1.33 H	64	-3.53	39.23
9	7311.00	52.4 PK	74.0	-21.6	1.40 H	75	5.83	46.57
10	7311.00	40.5 AV	54.0	-13.5	1.40 H	75	-6.07	46.57

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	100.4 PK			1.00 V	111	68.65	31.75
2	*2437.00	90.9 AV			1.00 V	111	59.15	31.75
3	4874.00	46.2 PK	74.0	-27.8	1.05 V	282	6.97	39.23
4	4874.00	33.9 AV	54.0	-20.1	1.05 V	282	-5.33	39.23
5	7311.00	53.2 PK	74.0	-20.8	1.07 V	243	6.63	46.57
6	7311.00	41.1 AV	54.0	-12.9	1.07 V	243	-5.47	46.57

- 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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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 69%RH	TESTED BY	Nick Chang

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	97.6 PK			1.00 H	109	65.80	31.80
2	*2452.00	87.9 AV			1.00 H	109	56.10	31.80
3	2483.50	73.0 PK	74.0	-1.0	1.00 H	109	41.10	31.90
4	2483.50	52.3 AV	54.0	-1.7	1.00 H	109	20.40	31.90
5	4904.00	47.6 PK	74.0	-26.4	1.21 H	78	8.28	39.32
6	4904.00	35.4 AV	54.0	-18.6	1.21 H	78	-3.92	39.32
7	7356.00	51.4 PK	74.0	-22.6	1.35 H	50	4.89	46.51
8	7356.00	39.8 AV	54.0	-14.2	1.35 H	50	-6.71	46.51

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	97.1 PK			1.00 V	112	65.30	31.80
2	*2452.00	87.2 AV			1.00 V	112	55.40	31.80
3	2483.50	70.7 PK	74.0	-3.3	1.00 V	112	38.80	31.90
4	2483.50	50.9 AV	54.0	-3.1	1.00 V	112	19.00	31.90
5	4904.00	45.6 PK	74.0	-28.4	1.07 V	277	6.28	39.32
6	4904.00	33.4 AV	54.0	-20.6	1.07 V	277	-5.92	39.32
7	7356.00	52.7 PK	74.0	-21.3	1.10 V	259	6.19	46.51
8	7356.00	41.0 AV	54.0	-13.0	1.10 V	259	-5.51	46.51

- 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.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Test date: Nov. 02, 2011

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

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

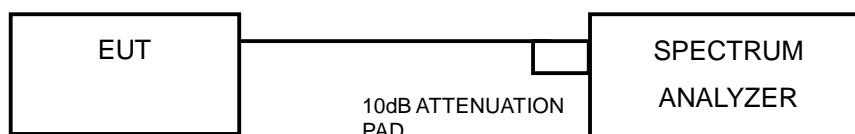
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

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 lowest, middle and highest channel frequencies individually.



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4.3.7 TEST RESULTS

802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	11.28	0.5	PASS
6	2437	11.28	0.5	PASS
11	2462	11.28	0.5	PASS

802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.52	0.5	PASS
6	2437	16.53	0.5	PASS
11	2462	16.56	0.5	PASS

802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.68	0.5	PASS
6	2437	17.69	0.5	PASS
11	2462	17.68	0.5	PASS

802.11n (40 MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.11	0.5	PASS
6	2437	36.23	0.5	PASS
9	2452	36.38	0.5	PASS



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4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 902 –928 MHz, 2400–2483.5 MHz, and 5725 –5850 MHz bands: 1 Watt (30dBm)

4.4.2 INSTRUMENTS

Test date: Dec. 15, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Anritsu Power Meter	ML2495A	0824006	May 04, 2011	May 03, 2012
Pulse Power Sensor	MA2411B	0738172	May 03, 2011	May 02, 2012

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

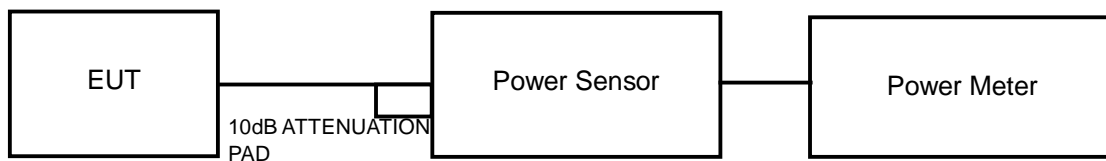
4.4.3 TEST PROCEDURES

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



4.4.7 TEST RESULTS

802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	104.7	20.2	30	PASS
6	2437	102.3	20.1	30	PASS
11	2462	104.7	20.2	30	PASS

802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	239.9	23.8	30	PASS
6	2437	234.4	23.7	30	PASS
11	2462	147.9	21.7	30	PASS

802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
1	2412	234.4	23.7	30	PASS
6	2437	239.9	23.8	30	PASS
11	2462	144.5	21.6	30	PASS

802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
3	2422	141.3	21.5	30	PASS
6	2437	141.3	21.5	30	PASS
9	2452	107.2	20.3	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Test date: Dec. 15, 2011

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

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

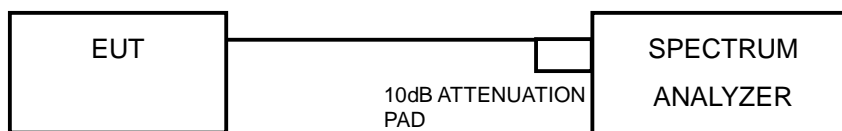
4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b DSSS MODULATION:

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-3.1	8	PASS
6	2437	-3.6	8	PASS
11	2462	-4.0	8	PASS

802.11g OFDM MODULATION:

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-6.0	8	PASS
6	2437	-6.4	8	PASS
11	2462	-8.6	8	PASS

802.11n (20MHZ) OFDM MODULATION:

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-5.6	8	PASS
6	2437	-6.0	8	PASS
11	2462	-8.3	8	PASS

802.11n (40MHZ) OFDM MODULATION:

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-6.2	8	PASS
6	2437	-6.6	8	PASS
9	2452	-8.6	8	PASS

4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

Test date: Dec. 15, 2011

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

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

4.6.3 TEST PROCEDURE

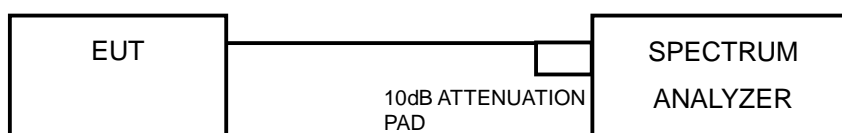
The transmitter output was connected to the spectrum analyzer via a low loss cable. Set RBW of spectrum analyzer to 100kHz and VBW of spectrum analyzer to 300kHz with suitable frequency span including 100 MHz or 200 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW = 100kHz, VBW = 300kHz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

The conducted emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ since the limit is relative emission limit. Only worst data of each operating mode is presented.

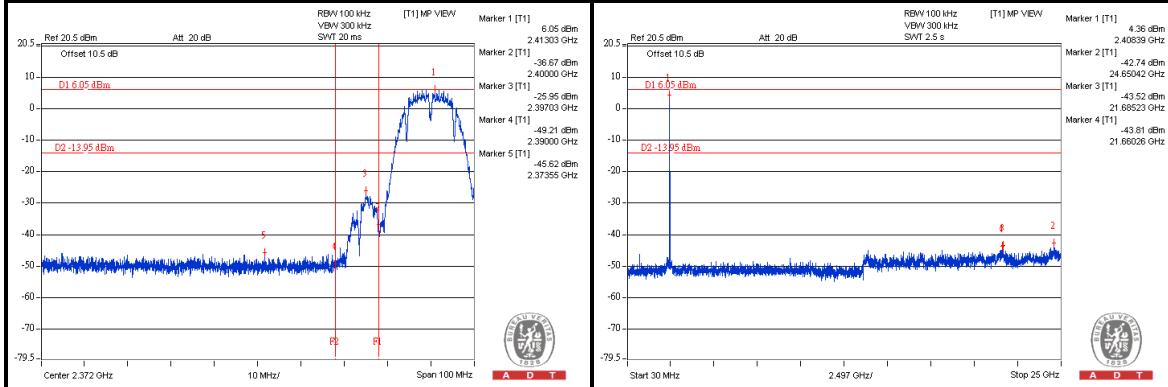
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).



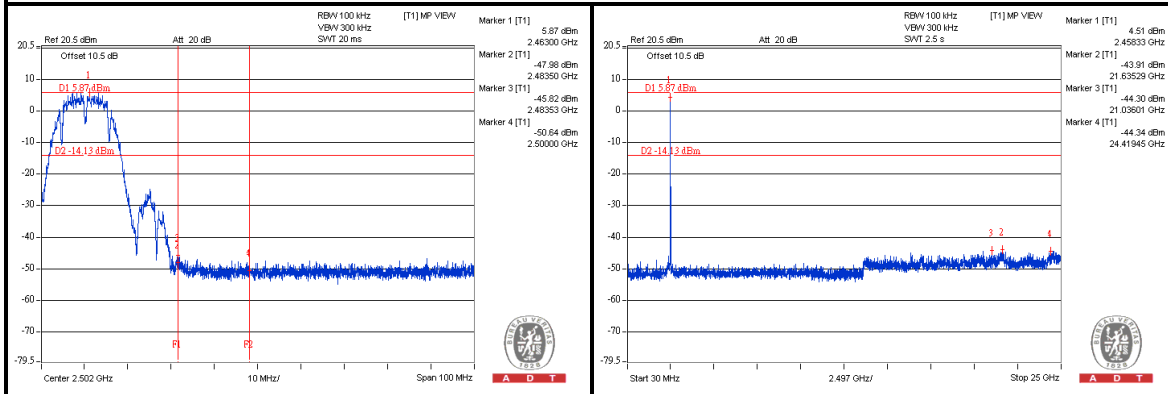
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802.11b DSSS MODULATION:

CH 1



CH 11

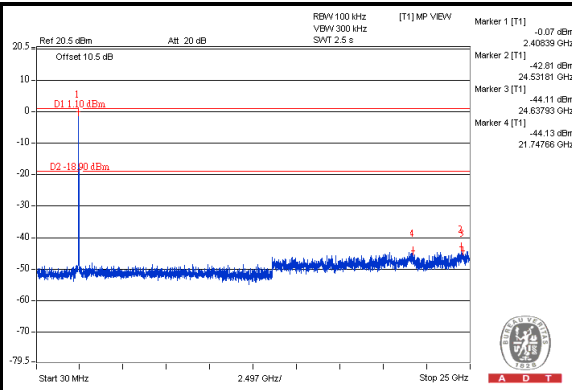
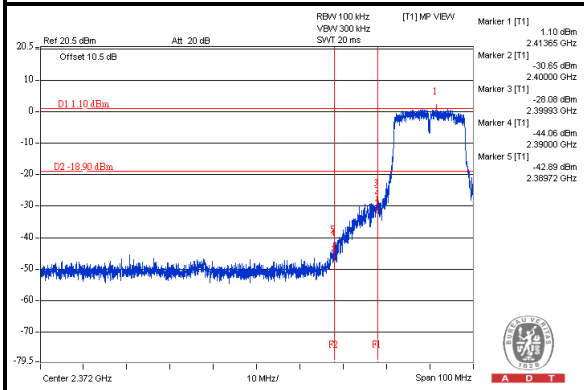




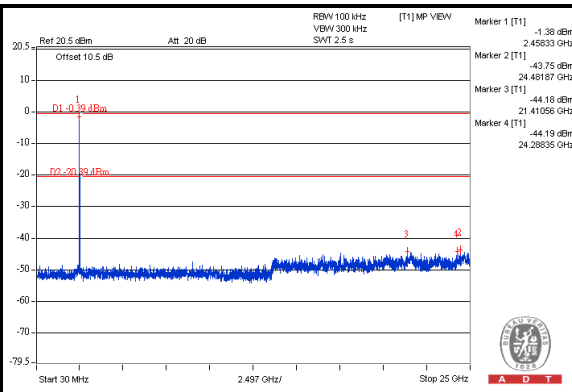
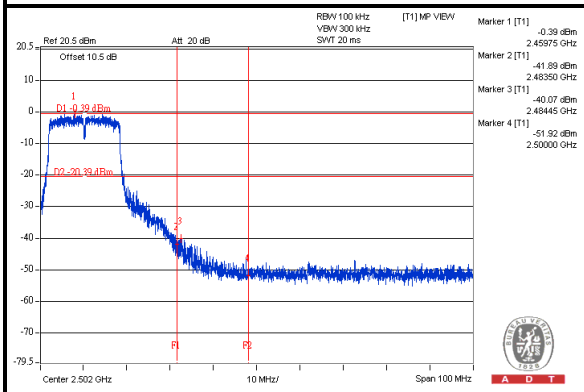
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802.11g OFDM MODULATION:

CH 1



CH 11

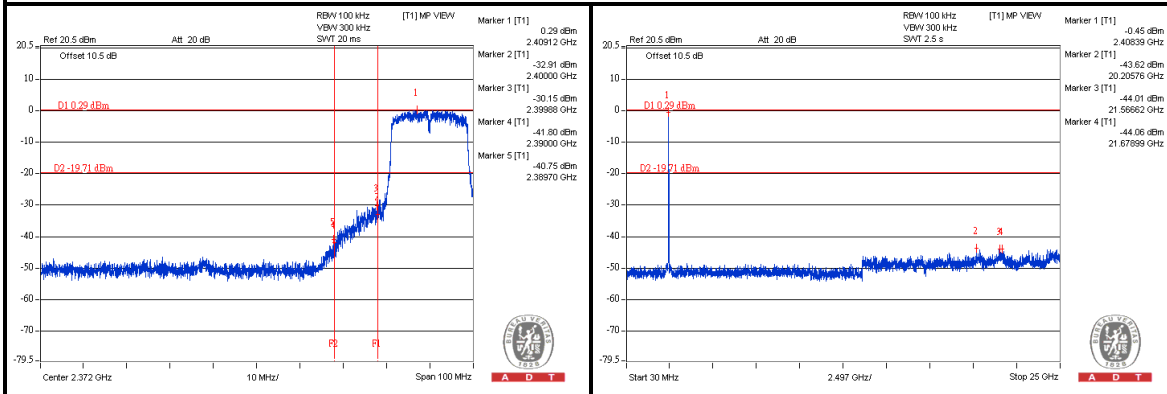




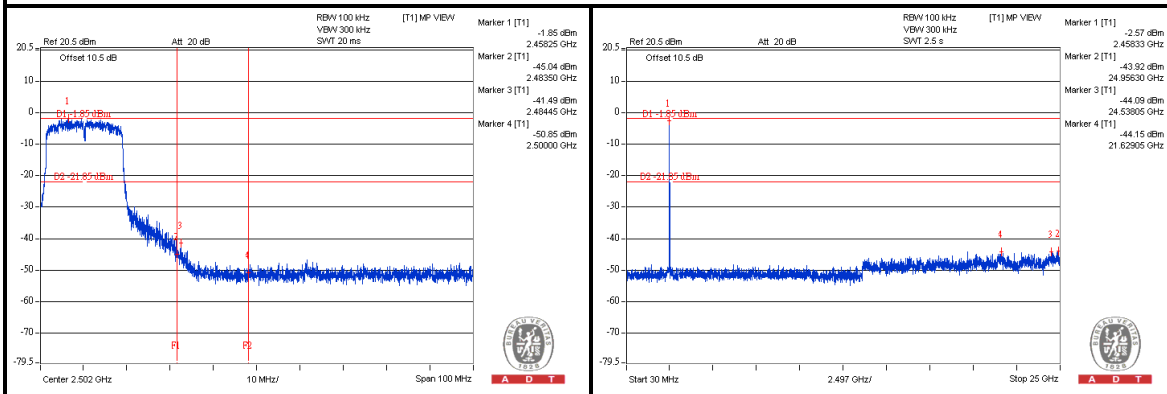
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802.11n (20MHz) OFDM MODULATION:

CH 1



CH 11

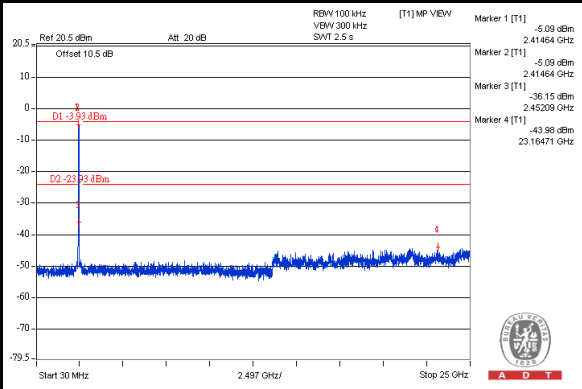
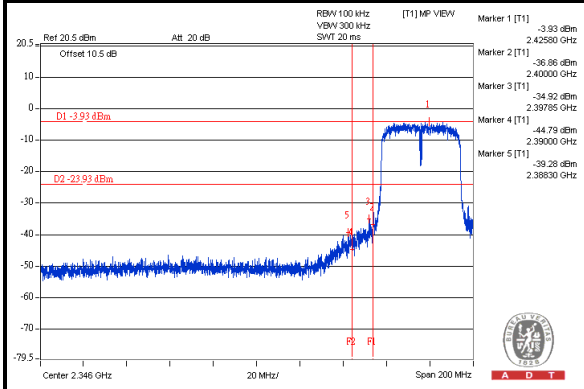




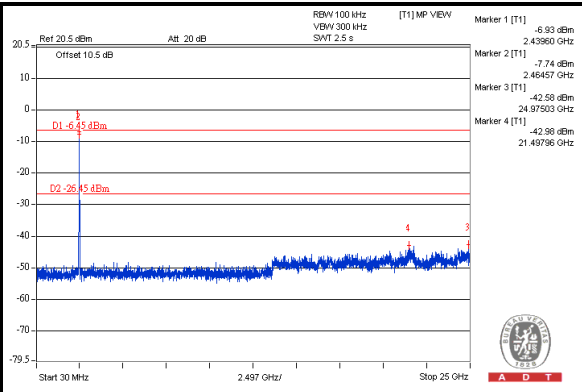
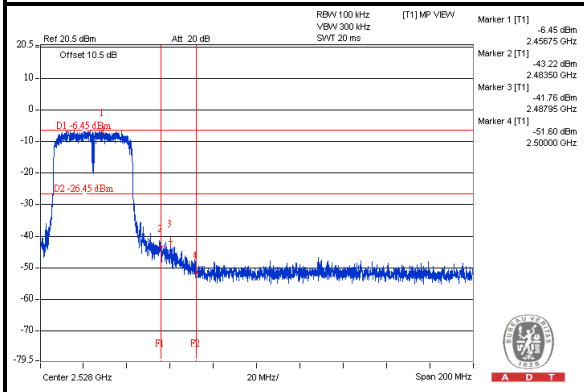
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802.11n (40MHz) OFDM MODULATION:

CH 3



CH 9





5. INFORMATION ON THE TESTING LABORATORIES

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

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

www.adt.com.tw/index.5.phtml.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

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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 modifications were made to the EUT by the lab during the test.

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