

FCC TEST REPORT

REPORT NO.: RF990720C09A

MODEL NO.: TEW-648UBM

FCC ID: XU8TEW648UBM

RECEIVED: Jul. 20, 2010

TESTED: Jul. 23 ~ Aug. 16, 2010

ISSUED: Sep. 29, 2010

APPLICANT: TRENDNET, Inc.

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ISSUED BY: Bureau Veritas Consumer Products Services (H.K.)

Ltd., Taoyuan Branch

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1. CERTIFICATION

PRODUCT: 150Mbps Micro Wireless N USB Adapter

MODEL: TEW-648UBM

BRAND: TRENDnet

APPLICANT: TRENDNET, Inc.

TESTED: Jul. 23 ~ Aug. 16, 2010

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart C (Section 15.247)

ANSI C63.4-2003

The above equipment (Model: TEW-648UBM) 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

TECHNICAL ACCEPTANCE

Responsible for RF

APPROVED BY



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 AND LIMIT	RESULT	REMARK				
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -15.67dB at 20.660MHz.				
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.				
15.247(b)	Maximum Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.				
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2483.50MHz.				
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.				
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	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:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	onducted emissions 150kHz~30MHz	
	30MHz ~ 200MHz	2.93 dB
Radiated emissions	200MHz ~1000MHz	2.95 dB
Nadiated emissions	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	150Mbps Micro Wireless N USB Adapter	
MODEL NO.	TEW-648UBM	
FCC ID	XU8TEW648UBM	
POWER SUPPLY	5Vdc	
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS	
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK for OFDM	
MODULATION TECHNOLOGY	DSSS, OFDM	
	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps	
TRANSFER RATE	802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps	
	802.11n: up to 135.0Mbps	
OPERATING FREQUENCY	2412 ~ 2462MHz	
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz)	
NOWIBER OF CHANNEL	7 for 802.11n (40MHz)	
OUTPUT POWER	316.2mW	
ANTENNA TYPE	PIFA antenna with 2.0dBi gain	
ANTENNA CONNECTOR	NA	
DATA CABLE	NA	
I/O PORTS	USB	
ACCESSORY DEVICES	NA	

NOTE:

- 1. This report is issued as a duplicate report to the original report no.: RF990720C09. The differences are changing the product name, model name, brand name, applicant and FCC ID.
- 2. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

3. 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

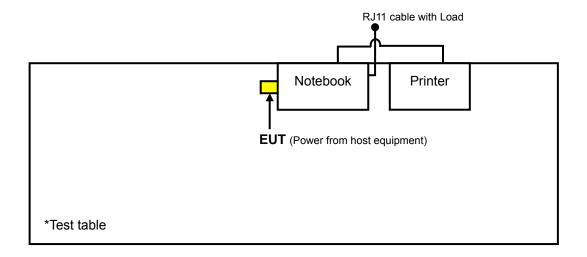
11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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		

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

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

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE		APPLICA	ABLE TO	DESCRIPTION	
MODE	RE≥1G	RE<1G	PLC	APCM	DESSAIL HON
-	V	V	\checkmark	\checkmark	-

Where

RE≥1G: Radiated Emission above 1GHz

PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (ABOVE 1GHz):

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	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5

RADIATED EMISSION TEST (BELOW 1GHz):

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	TESTED	MODULATION	MODULATION	DATA RATE
	CHANNEL	CHANNEL	TECHNOLOGY	TYPE	(Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6.0

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	TESTED	MODULATION	MODULATION	DATA RATE
	CHANNEL	CHANNEL	TECHNOLOGY	TYPE	(Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6.0



BANDEDGE MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	6.5
802.11n (40MHz)	1 to 7	1, 7	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	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	25deg. C, 65%RH, 1009 hPa	120Vac, 60Hz	Brad Wu
RE<1G	26deg. C, 56%RH, 1016 hPa	120Vac, 60Hz	Brad Wu
PLC	25deg. C, 67%RH, 1006 hPa	120Vac, 60Hz	Sun Lin
APCM	25deg. C, 65%RH, 1009 hPa	120Vac, 60Hz	Brad Wu



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

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.

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	HP	nx6215	CND5390CMP	NA
2	LASER	HP	HP LASERJET 1300	CNBKK91189	NA
_	PRINTER	1115	TIF LASERJET 1300	CNDKK91109	INA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.5m RJ11 UTP cable.
2	1.8m shielded USB cable.

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



4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 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.



4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Dec. 21, 2009	Dec. 20, 2010
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Jul. 09, 2010	Jul. 08, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Apr. 30, 2010	Apr. 29, 2011
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 05, 2010	Jan. 04, 2011
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Dec. 25, 2009	Dec. 24, 2010
Preamplifier Agilent	8449B	3008A01910	Sep. 11, 2009	Sep. 10, 2010
Preamplifier Agilent	8447D	2944A10638	Dec. 21, 2009	Dec. 20, 2010
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218190/4 231241/4	May 14, 2010	May 13, 2011
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Aug. 17, 2009	Aug. 16, 2010
Software	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn Table Controller EMCO	2090	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 HwaYa Chamber 9.
- 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 4. The FCC Site Registration No. is 460141.
- 5. The IC Site Registration No. is IC 7450F-4.



4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

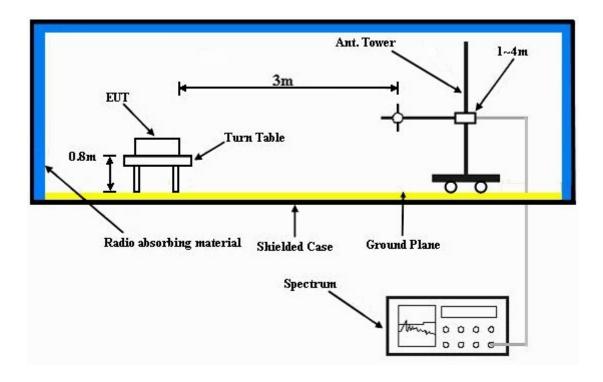
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
- 3. The resolution 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.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- a. Plugged the EUT to notebook system and placed on a testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the system in full functions.



4.1.7 TEST RESULTS

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 1 FREQUENCY RANG		1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)	
1	2390.00	57.3 PK	74.0	-16.7	1.25 H	84	25.00	32.30	
2	2390.00	47.7 AV	54.0	-6.3	1.25 H	84	15.40	32.30	
3	*2412.00	103.4 PK			1.28 H	71	71.00	32.40	
4	*2412.00	99.5 AV			1.28 H	71	67.10	32.40	
5	4824.00	56.0 PK	74.0	-18.0	1.29 H	306	17.60	38.40	
6	4824.00	52.2 AV	54.0	-1.8	1.29 H	306	13.80	38.40	
		ANTENNA	A POLARIT	/ & TEST DI	STANCE: V	ERTICAL A	T 3 M		
NO.	NO. FREQ. (MHz) LEVEL LIMIT (dBuV/m) MARGIN (dB) HEIGHT (m) ANGLE (dBuV) FACTOR							CORRECTION FACTOR (dB/m)	
1	2390.00	56.1 PK	74.0	-17.9	1.01 V	125	23.80	32.30	
2	2390.00	45.3 AV	54.0	-8.7	1.01 V	125	13.00	32.30	
3	*2412.00	97.9 PK			1.01 V	125	65.50	32.40	
4	*2412.00	92.8 AV			1.01 V	125	60.40	32.40	
						_			
5	4824.00	55.7 PK	74.0	-18.3	1.10 V	8	17.30	38.40	

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

	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	102.4 PK			1.28 H	73	70.00	32.40
2	*2437.00	98.6 AV			1.28 H	73	66.20	32.40
3	4874.00	56.2 PK	74.0	-17.8	1.22 H	301	17.70	38.50
4	4874.00	52.4 AV	54.0	-1.6	1.22 H	301	13.90	38.50
		ANTENNA	POLARITY	/ & TEST DI	STANCE: V	ERTICAL A	T 3 M	
NO.	I I LIMIT I ANTENNA I RAW VALUE I							
1	*2437.00	96.8 PK			1.03 V	126	64.40	32.40
2	*2437.00	91.7 AV			1.03 V	126	59.30	32.40
3	4874.00	55.9 PK	74.0	-18.1	1.09 V	11	17.40	38.50
4	4874.00	52.6 AV	54.0	-1.4	1.09 V	11	14.10	38.50

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

		ANTENNA	POLARITY	& TEST DIS	TANCE: HO	RIZONTAL	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	102.6 PK			1.29 H	78	70.10	32.50
2	*2462.00	98.9 AV			1.29 H	78	66.40	32.50
3	2483.50	57.6 PK	74.0	-16.4	1.29 H	78	25.00	32.60
4	2483.50	48.0 AV	54.0	-6.0	1.29 H	78	15.40	32.60
5	4924.00	56.4 PK	74.0	-17.6	1.20 H	298	17.80	38.60
6	4924.00	52.5 AV	54.0	-1.5	1.20 H	298	13.90	38.60
		ANTENNA	A POLARIT	/ & TEST DI	STANCE: V	ERTICAL A	T 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	97.0 PK			1.05 V	124	64.50	32.50
2	*2462.00	91.9 AV			1.05 V	124	59.40	32.50
3	2483.50	56.8 PK	74.0	-17.2	1.05 V	124	24.20	32.60
4	2483.50	46.2 AV	54.0	-7.8	1.05 V	124	13.60	32.60
5	4924.00	56.1 PK	74.0	-17.9	1.10 V	24	17.50	38.60
6	4924.00	52.8 AV	54.0	-1.2	1.10 V	24	14.20	38.60

- 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.



802.11g

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	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

		ANTENNA	POLARITY	& TEST DIS	TANCE: HO	RIZONTAL	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	70.9 PK	74.0	-3.1	1.26 H	82	38.60	32.30
2	2390.00	52.5 AV	54.0	-1.5	1.26 H	82	20.20	32.30
3	*2412.00	106.9 PK			1.26 H	82	74.50	32.40
4	*2412.00	96.6 AV			1.26 H	82	64.20	32.40
5	4824.00	60.6 PK	74.0	-13.4	1.10 H	254	22.20	38.40
6	4824.00	46.1 AV	54.0	-7.9	1.10 H	254	7.70	38.40
		ANTENNA	POLARIT	/ & TEST DI	STANCE: V	ERTICAL A	T 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	64.2 PK	74.0	-9.8	1.02 V	131	31.90	32.30
2	2390.00	49.3 AV	54.0	-4.7	1.02 V	131	17.00	32.30
3	*2412.00	101.4 PK			1.02 V	131	69.00	32.40
4	*2412.00	91.2 AV			1.02 V	131	58.80	32.40
5	4824.00	61.6 PK	74.0	-12.4	1.05 V	29	23.20	38.40
6	4824.00	46.9 AV	54.0	-7.1	1.05 V	29	8.50	38.40

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

	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	107.2 PK			1.26 H	75	74.80	32.40		
2	*2437.00	96.8 AV			1.26 H	75	64.40	32.40		
3	4874.00	61.2 PK	74.0	-12.8	1.10 H	249	22.70	38.50		
4	4874.00	46.6 AV	54.0	-7.4	1.10 H	249	8.10	38.50		
		ANTENNA	POLARITY	/ & TEST DI	STANCE: V	ERTICAL A	T 3 M			
NO.	NO. FREQ. (MHz) ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M LIMIT (dBuV/m) MARGIN (dB) MARGIN (dB) HEIGHT (m) CORRECTION FACTOR (dBuV) (dBuV) (dB/m)									
		(dBuV/m)	(ubuv/iii)		TILIGITI (III)	(Degree)	(ubuv)	(dB/m)		
1	*2437.00	(dBuV/m) 101.5 PK	(dBdv/iii)		1.05 V	(Degree) 142	69.10	(dB/m) 32.40		
1 2	*2437.00 *2437.00	,	(ubuv/iii)		` '	, ,	` ′	, ,		
•		101.5 PK	74.0	-12.0	1.05 V	142	69.10	32.40		

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

		ANTENNA	POLARITY	& TEST DIS	TANCE: HO	RIZONTAL	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	107.4 PK			1.28 H	105	74.90	32.50
2	*2462.00	97.0 AV			1.28 H	105	64.50	32.50
3	2483.50	70.8 PK	74.0	-3.2	1.28 H	105	38.20	32.60
4	2483.50	52.9 AV	54.0	-1.1	1.28 H	105	20.30	32.60
5	4924.00	59.2 PK	74.0	-14.8	1.40 H	120	20.60	38.60
6	4924.00	45.6 AV	54.0	-8.4	1.40 H	120	7.00	38.60
		ANTENNA	A POLARIT	Y & TEST DI	STANCE: V	ERTICAL A	T 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	101.6 PK			1.02 V	129	69.10	32.50
2	*2462.00	91.5 AV			1.02 V	129	59.00	32.50
3	2483.50	64.0 PK	74.0	-10.0	1.02 V	129	31.40	32.60
4	2483.50	49.2 AV	54.0	-4.8	1.02 V	129	16.60	32.60
5	4924.00	61.8 PK	74.0	-12.2	1.40 V	106	23.20	38.60
	4924.00	47.0 AV	54.0	-7.0	1.40 V	106	8.40	38.60

- 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.



802.11n (20MHz)

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	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

		ANTENNA	POLARITY	& TEST DIS	TANCE: HO	RIZONTAL	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	70.6 PK	74.0	-3.4	1.29 H	73	38.30	32.30
2	2390.00	52.1 AV	54.0	-1.9	1.29 H	73	19.80	32.30
3	*2412.00	106.6 PK			1.29 H	73	74.20	32.40
4	*2412.00	96.2 AV			1.29 H	73	63.80	32.40
5	4824.00	60.4 PK	74.0	-13.6	1.09 H	261	22.00	38.40
6	4824.00	45.8 AV	54.0	-8.2	1.09 H	261	7.40	38.40
		ANTENNA	POLARIT	/ & TEST DI	STANCE: V	ERTICAL A	T 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	63.9 PK	74.0	-10.1	1.01 V	129	31.60	32.30
2	2390.00	49.0 AV	54.0	-5.0	1.01 V	129	16.70	32.30
3	*2412.00	101.0 PK			1.01 V	129	68.60	32.40
4	*2412.00	90.8 AV			1.01 V	129	58.40	32.40
5	4824.00	61.4 PK	74.0	-12.6	1.09 V	25	23.00	38.40
6	4824.00	46.6 AV	54.0	-7.4	1.09 V	25	8.20	38.40

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

		ANTENNA	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	106.9 PK			1.28 H	74	74.50	32.40				
2	*2437.00	96.5 AV			1.28 H	74	64.10	32.40				
3	4874.00	60.9 PK	74.0	-13.1	1.12 H	258	22.40	38.50				
4	4874.00	46.2 AV	54.0	-7.8	1.12 H	258	7.70	38.50				
		ANTENNA	POLARITY	/ & TEST DI	STANCE: V	ERTICAL A	T 3 M					
	NO. FREQ. (MHz) ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M EMISSION LEWEL (dBuV/m) MARGIN (dB) ANTENNA HEIGHT (m) TABLE ANGLE (Degree) CORRECTIO FACTOR (dBuV) (dBuV)											
NO.	FREQ. (MHz)	LEVEL		MARGIN (dB)		ANGLE	_	FACTOR				
NO.	*2437.00	LEVEL		MARGIN (dB)		ANGLE	_	FACTOR				
		LEVEL (dBuV/m)		MARGIN (dB)	HEIGHT (m)	ANGLE (Degree)	(dBuV)	FACTOR (dB/m)				
1	*2437.00	LEVEL (dBuV/m) 101.1 PK		-12.8	HEIGHT (m) 1.00 V	ANGLE (Degree)	(dBuV) 68.70	FACTOR (dB/m) 32.40				

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

		ANTENNA	POLARITY	& TEST DIS	TANCE: HO	RIZONTAL	AT 3 M	
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.1 PK			1.29 H	104	73.60	32.50
2	*2462.00	95.8 AV			1.29 H	104	63.30	32.50
3	2483.50	72.9 PK	74.0	-1.1	1.29 H	104	40.30	32.60
4	2483.50	53.0 AV	54.0	-1.0	1.29 H	104	20.40	32.60
5	4924.00	63.4 PK	74.0	-10.6	1.25 H	92	24.80	38.60
6	4924.00	47.8 AV	54.0	-6.2	1.25 H	92	9.20	38.60
		ANTENNA	A POLARIT	/ & TEST DI	STANCE: V	ERTICAL A	T 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	100.3 PK			1.01 V	125	67.80	32.50
2	*2462.00	90.2 AV			1.01 V	125	57.70	32.50
3	2483.50	63.8 PK	74.0	-10.2	1.01 V	125	31.20	32.60
4	2483.50	48.9 AV	54.0	-5.1	1.01 V	125	16.30	32.60
5	4924.00	61.5 PK	74.0	-12.5	1.39 V	121	22.90	38.60
6	4924.00	46.8 AV	54.0	-7.2	1.39 V	121	8.20	38.60

- 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.



802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

		ANTENNA	POLARITY	& TEST DIS	TANCE: HO	RIZONTAL	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	1.28 H	82	35.80	32.30
2	2390.00	52.5 AV	54.0	-1.5	1.28 H	82	20.20	32.30
3	*2422.00	103.2 PK			1.25 H	83	70.80	32.40
4	*2422.00	94.0 AV			1.25 H	83	61.60	32.40
5	4844.00	58.1 PK	74.0	-15.9	1.27 H	30	19.70	38.40
6	4844.00	45.3 AV	54.0	-8.7	1.27 H	30	6.90	38.40
		ANTENNA	POLARIT	Y & TEST DI	STANCE: V	ERTICAL A	T 3 M	
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.1 PK	74.0	-11.9	1.00 V	12	29.80	32.30
2	2390.00	48.7 AV	54.0	-5.3	1.00 V	12	16.40	32.30
3	*2422.00	99.2 PK			1.00 V	124	66.80	32.40
4	*2422.00	89.1 AV			1.00 V	124	56.70	32.40
5	4844.00	59.2 PK	74.0	-14.8	1.12 V	356	20.80	38.40
6	4844.00	45.7 AV	54.0	-8.3	1.12 V	356	7.30	38.40

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
ENVIRONMENTAL CONDITIONS	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

	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	102.6 PK			1.24 H	86	70.20	32.40		
2	*2437.00	93.6 AV			1.24 H	86	61.20	32.40		
3	4874.00	62.7 PK	74.0	-11.3	1.02 H	2	24.20	38.50		
4	4874.00	47.5 AV	54.0	-6.5	1.02 H	2	9.00	38.50		
		ANTENNA	POLARITY	/ & TEST DI	STANCE: V	ERTICAL A	T 3 M			
NO.	NO. FREQ. (MHz) EMISSION LEVEL (dBuV/m) LEVEL (dBuV/m) MARGIN (dB) ANTENNA HEIGHT (m) TABLE ANGLE (Degree) (dBuV) CORRECTION (dB/m)									
1	*2437.00	98.6 PK			1.01 V	125	66.20	32.40		
2	*2437.00	88.5 AV			1.01 V	125	56.10	32.40		
3	4874.00	63.2 PK	74.0	-10.8	1.08 V	2	24.70	38.50		
4	4874.00	48.7 AV	54.0	-5.3	1.08 V	2	10.20	38.50		

- 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission level Limit value.
- 5. " * ": Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)	
	26deg. C, 56%RH 1016 hPa	TESTED BY	Brad Wu	

	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	101.2 PK			1.24 H	83	68.70	32.50		
2	*2452.00	92.3 AV			1.24 H	83	59.80	32.50		
3	2483.50	68.4 PK	74.0	-5.6	1.23 H	84	35.80	32.60		
4	2483.50	52.9 AV	54.0	-1.1	1.23 H	84	20.30	32.60		
5	4904.00	58.8 PK	74.0	-15.2	1.01 H	354	20.30	38.50		
6	4904.00	45.8 AV	54.0	-8.2	1.01 H	354	7.30	38.50		
		ANTENNA	POLARITY	/ & TEST DI	STANCE: V	ERTICAL A	T 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 V	124	65.10	32.50		
2	*2452.00	87.3 AV			1.00 V	124	54.80	32.50		
3	2483.50	64.2 PK	74.0	-9.8	1.00 V	124	31.60	32.60		
4	2483.50	50.0 AV	54.0	-4.0	1.00 V	124	17.40	32.60		
5	4904.00	59.2 PK	74.0	-14.8	1.06 V	17	20.70	38.50		

- 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.



BELOW 1GHz WORST-CASE DATA: 802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak	
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1009 hPa	TESTED BY	Brad Wu	

	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	76.56	27.7 QP	40.0	-12.3	1.50 H	292	18.40	9.30		
2	401.26	31.0 QP	46.0	-15.0	1.50 H	283	14.80	16.20		
3	523.75	37.2 QP	46.0	-8.8	1.00 H	34	17.20	20.00		
4	799.84	38.2 QP	46.0	-7.8	1.50 H	328	12.80	25.40		
5	852.33	41.4 QP	46.0	-4.6	1.00 H	190	15.70	25.70		
6	949.55	37.8 QP	46.0	-8.2	1.00 H	313	11.30	26.50		
		ANTENNA	A POLARITY	Y & TEST DI	STANCE: V	ERTICAL A	T 3 M			
NO.	FREQ. (MHz)	NO. FREQ. (MHz) EMISSION LIMIT (dBuV/m) MARGIN (dB) ANTENNA HEIGHT (m) TABLE ANGLE (dBuV) FACTOR (dB/m)								
1	76.56	27.5 QP	40.0	-12.5	1.25 V	115	18.20	9.30		
2	76.56 199.05	27.5 QP 29.0 QP	40.0 43.5	-12.5 -14.5	1.25 V 1.50 V	115 220	18.20 18.30	9.30 10.70		
-										
2	199.05	29.0 QP	43.5	-14.5	1.50 V	220	18.30	10.70		
2	199.05 480.97	29.0 QP 35.0 QP	43.5 46.0	-14.5 -11.0	1.50 V 1.00 V	220	18.30 16.30	10.70 18.70		

- 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.



4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED	LIMIT (dBµV)
	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 0.50MHz.
- 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Sep. 24, 2009	Sep. 23, 2010
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 31, 2009	Dec. 30, 2010
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Aug. 24, 2009	Aug. 23, 2010
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jul. 08, 2010	Jul. 07, 2011
Software ADT	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 HwaYa Shielded Room 2.
- 3. The VCCI Site Registration No. is C-2047.



4.2.3 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) was not recorded.

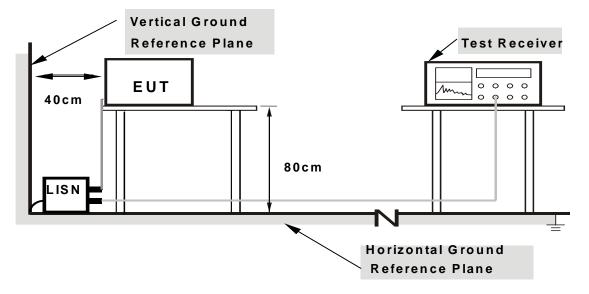
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

424	DEV	IATION	$FR \cap M$	TEST	STAND	ARD
7.4.7	DLV		I IXCIVI	$I \perp \cup I$	OIAINL	-

No deviation.



4.2.5 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 attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



4.2.7 TEST RESULTS

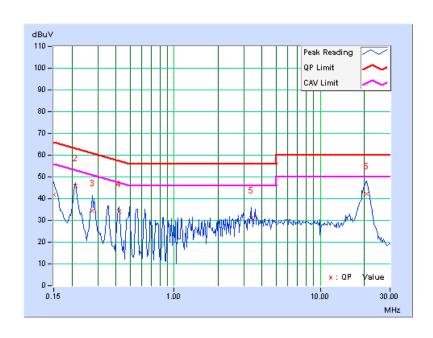
CONDUCTED WORST-CASE DATA: 802.11g

PHASE	Line 1	6dB BANDWIDTH	9kHz

No Freq.	Corr.	Readin	g Value	Emis Le	sion vel	Lir	nit	Mar	gin	
INO		Factor	[dB ((uV)]	[dB ((uV)]	[dB	(uV)]	(dl	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.16	41.65	-	41.81	-	66.00	56.00	-24.19	-
2	0.213	0.16	45.61	-	45.77	-	63.11	53.11	-17.34	-
3	0.275	0.17	34.26	-	34.43	-	60.97	50.97	-26.54	-
4	0.420	0.18	33.72	-	33.90	-	57.46	47.46	-23.56	-
5	3.371	0.34	30.83	-	31.17	-	56.00	46.00	-24.83	-
6	20.738	0.68	41.52	-	42.20	-	60.00	50.00	-17.80	-

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.



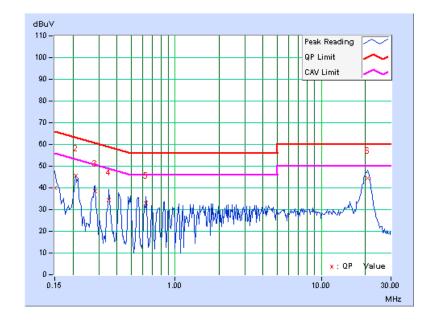


PHASE	Line 2	6dB BANDWIDTH	9kHz
	LIIIO Z	COD DANIE THE	OIII IZ

No Freq.	Corr.	Reading	g Value	Emis Le	ssion vel	Lir	nit	Mar	gin	
INO		Factor	[dB ((uV)]	[dB ((uV)]	[dB	(uV)]	(dl	3)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.12	39.96	-	40.08	-	66.00	56.00	-25.92	_
2	0.209	0.13	45.45	-	45.58	-	63.26	53.26	-17.68	-
3	0.283	0.14	38.37	-	38.51	-	60.73	50.73	-22.22	-
4	0.353	0.15	34.38	-	34.53	-	58.89	48.89	-24.36	_
5	0.634	0.18	32.90	-	33.08	-	56.00	46.00	-22.92	-
6	20.660	0.91	43.42	-	44.33	-	60.00	50.00	-15.67	-

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.





4.3 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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

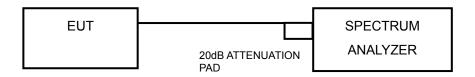
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

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.

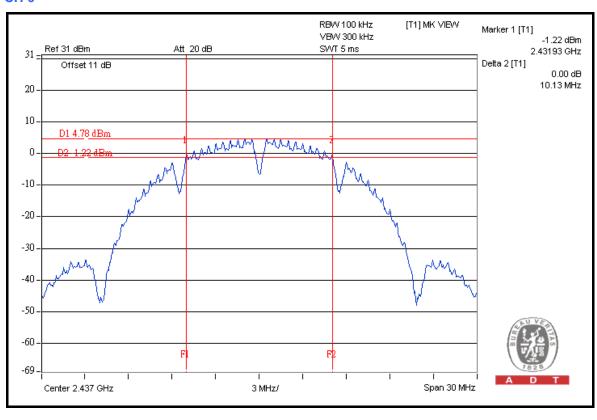


4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.12	0.5	PASS
6	2437	10.13	0.5	PASS
11	2462	10.12	0.5	PASS

CH 6

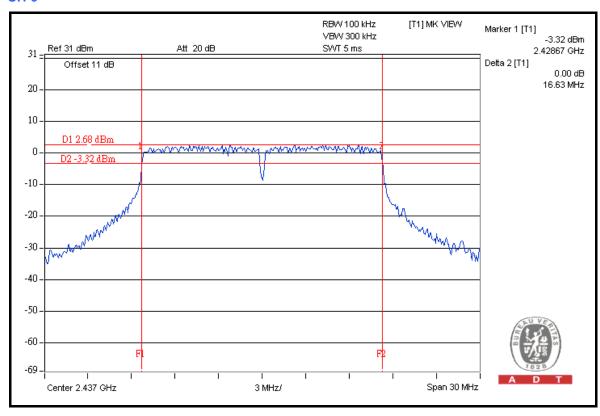




802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.60	0.5	PASS
6	2437	16.63	0.5	PASS
11	2462	16.61	0.5	PASS

CH 6

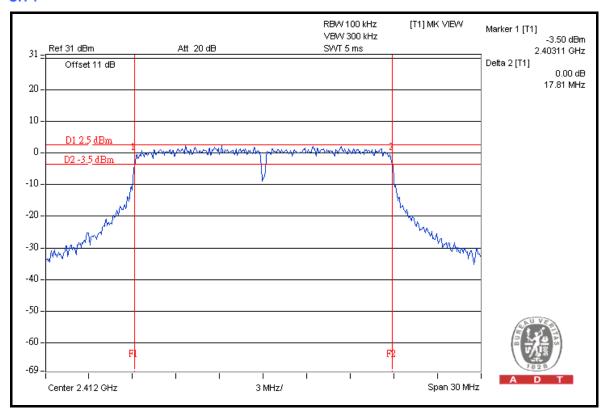




802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.81	0.5	PASS
6	2437	17.77	0.5	PASS
11	2462	17.76	0.5	PASS

CH₁

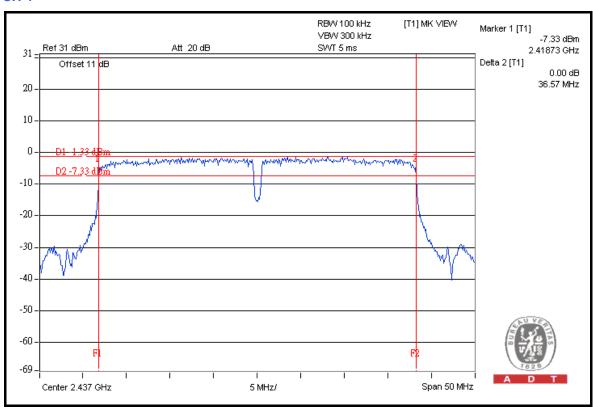




802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2422	36.55	0.5	PASS
4	2437	36.57	0.5	PASS
7	2452	36.57	0.5	PASS

CH 4





4.4 MAXIMUM OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
High Speed Peak Power Meter	ML2495A	0842014	Apr. 21, 2010	Apr. 20, 2011
Power Sensor	MA2411B	0738404	Apr. 21, 2010	Apr. 20, 2011

NOTE:

- 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 2. Measurement Bandwidth of ML2495A is 65MHz greater than 6dB bandwidth of emission.

4.4.3 TEST PROCEDURES

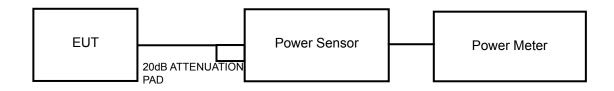
A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.



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

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	79.4	19.0	30	PASS
6	2437	56.2	17.5	30	PASS
11	2462	45.7	16.6	30	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	309.0	24.9	30	PASS
6	2437	316.2	25.0	30	PASS
11	2462	257.0	24.1	30	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	295.1	24.7	30	PASS
6	2437	302.0	24.8	30	PASS
11	2462	234.4	23.7	30	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	POWER OUTPUT (mW)	POWER OUTPUT (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2422	275.4	24.4	30	PASS
4	2437	263.0	24.2	30	PASS
7	2452	204.2	23.1	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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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.

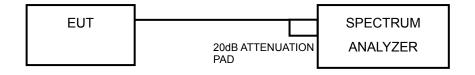
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.



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.

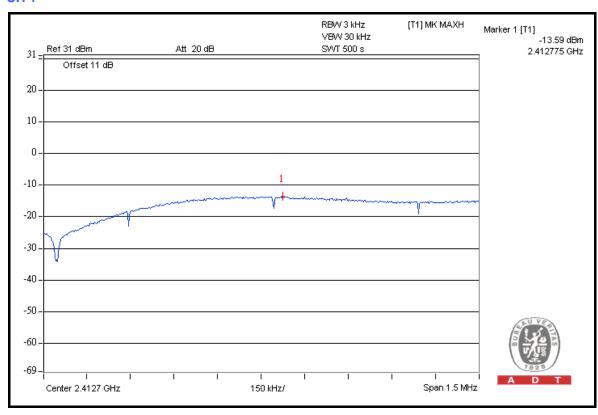


4.5.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-13.59	8	PASS
6	2437	-15.24	8	PASS
11	2462	-15.93	8	PASS

CH₁

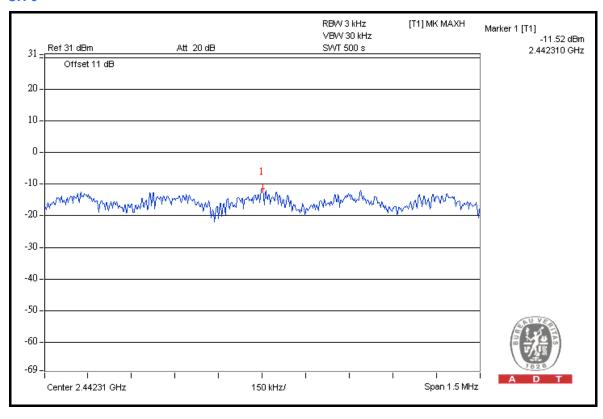




802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-11.74	8	PASS
6	2437	-11.52	8	PASS
11	2462	-12.72	8	PASS

CH 6

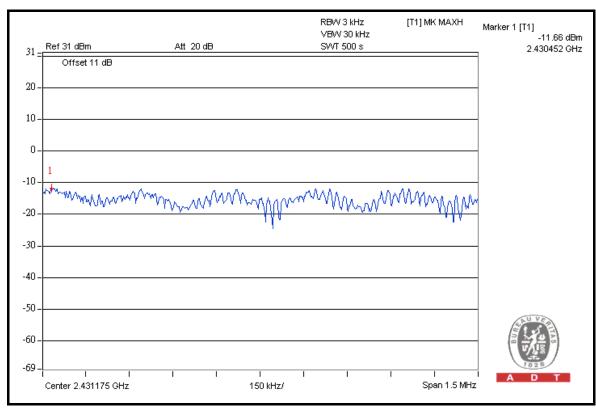




802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-11.68	8	PASS
6	2437	-11.66	8	PASS
11	2462	-12.58	8	PASS

CH 6

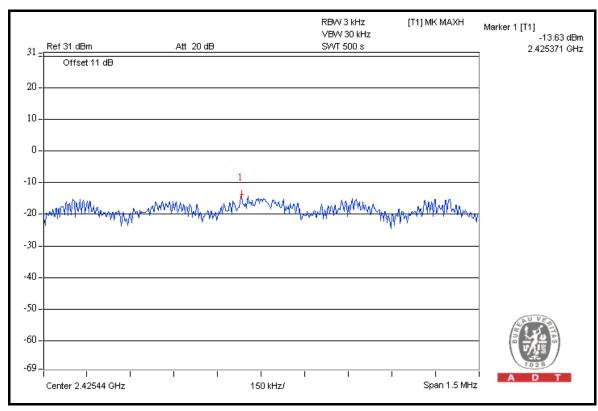




802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2422	-13.63	8	PASS
4	2437	-13.75	8	PASS
7	2452	-15.07	8	PASS

CH 1





4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Jan. 11, 2010	Jan. 10, 2011

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 lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 300kMHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW =100kHz, VBW = 300kHz; Average RBW = 1MHz, VBW = 10Hz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6.



4.6.6 TEST RESULTS

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).

802.11b

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	103.4	53.61	49.79	74.00
2412.00 (AV)	99.5	60.04	39.46	54.00

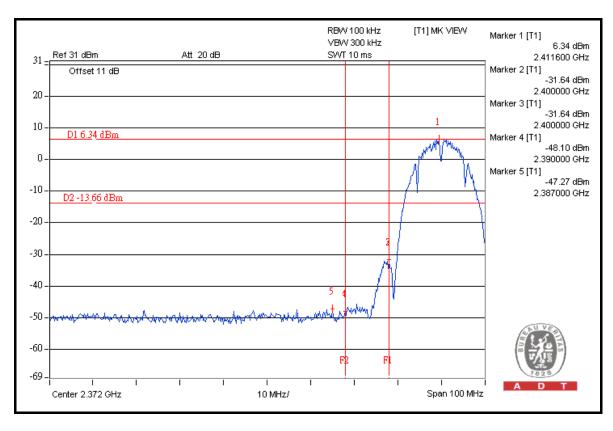
RESTRICT BAND (2483.5 ~ 2500 MHz)

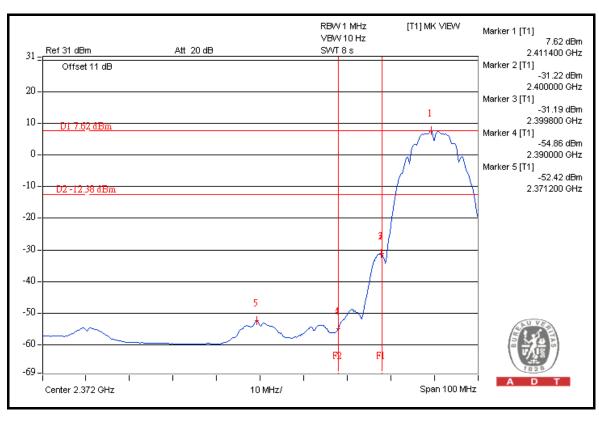
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	102.6	51.93	50.67	74.00
2462.00 (AV)	98.9	58.89	40.01	54.00

NOTE:

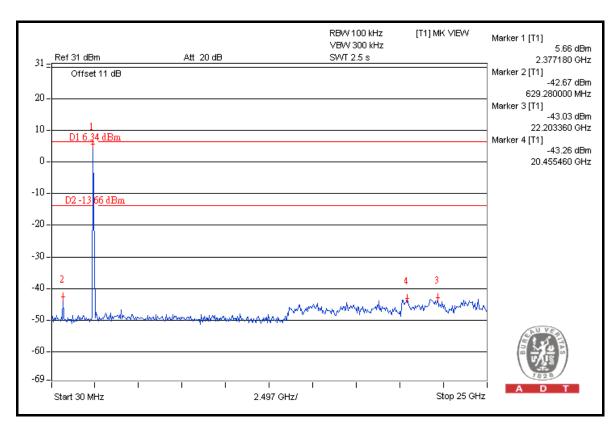
- 1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
- 2. Maximum field strength in restrict band = Fundamental emission Delta.

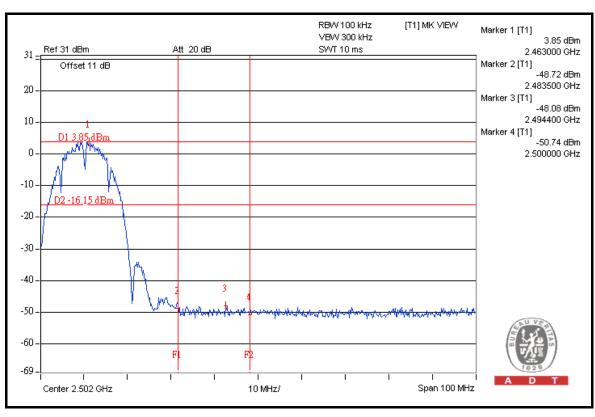




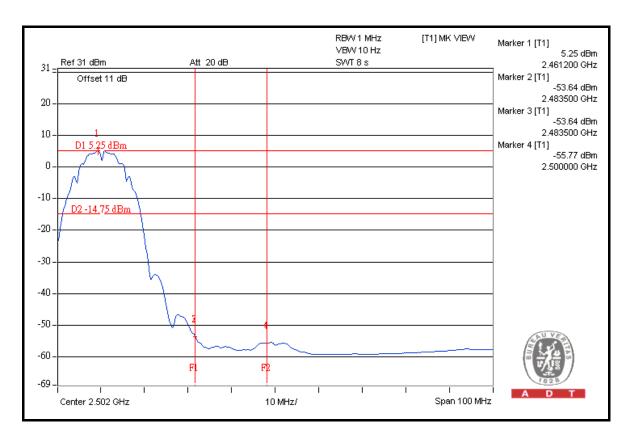


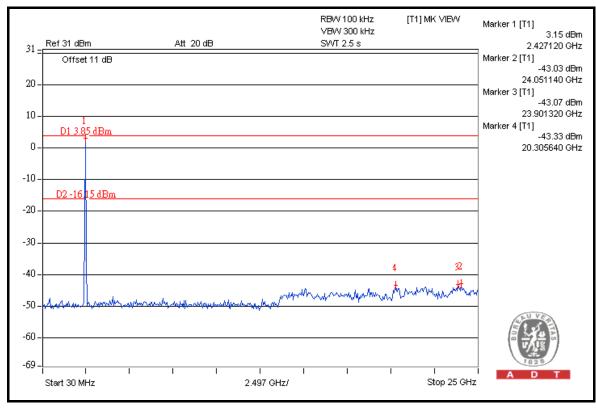














802.11g

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	106.9	45.92	60.98	74.00
2412.00 (AV)	96.6	50.98	45.62	54.00

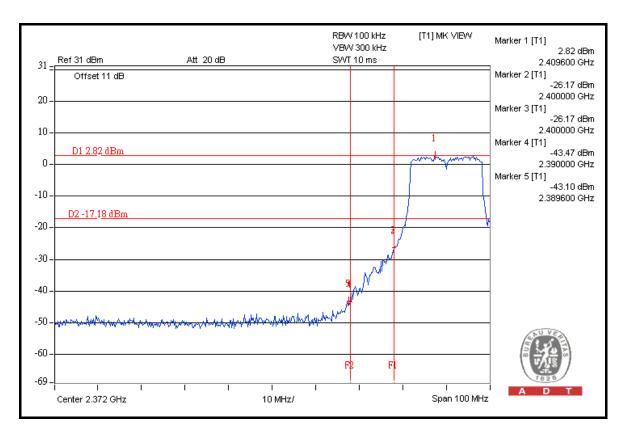
RESTRICT BAND (2483.5 ~ 2500 MHz)

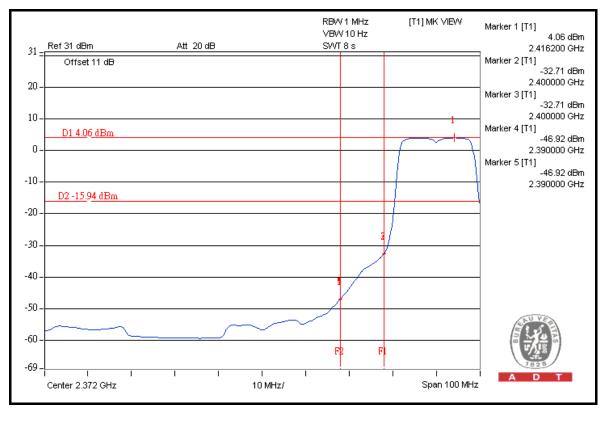
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	107.4	43.42	63.98	74.00
2462.00 (AV)	97.0	49.65	47.35	54.00

NOTE:

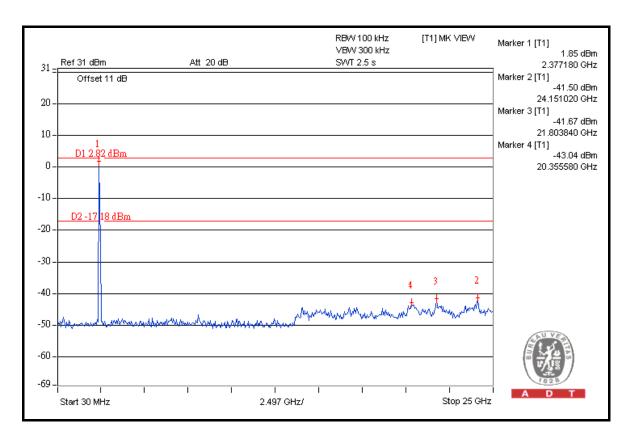
- 1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
- 2. Maximum field strength in restrict band = Fundamental emission Delta.

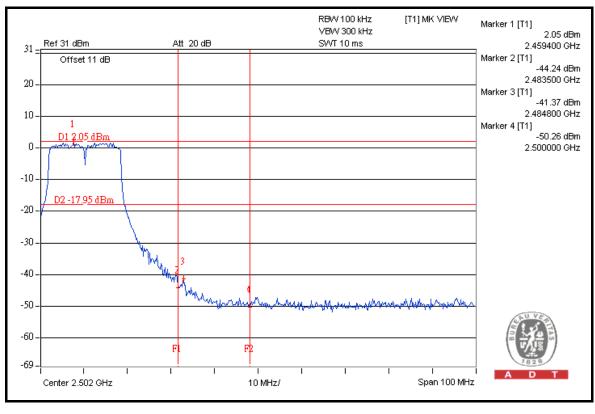




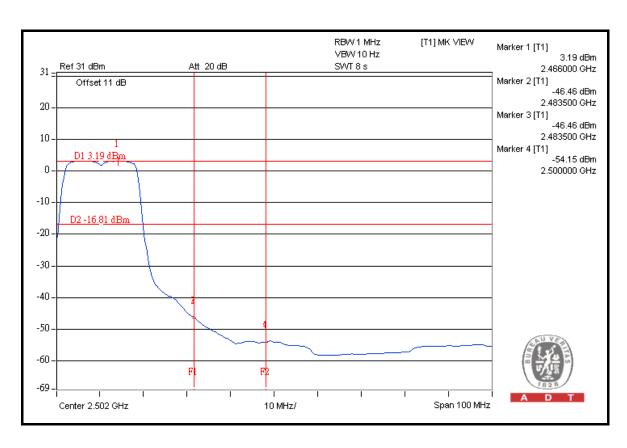


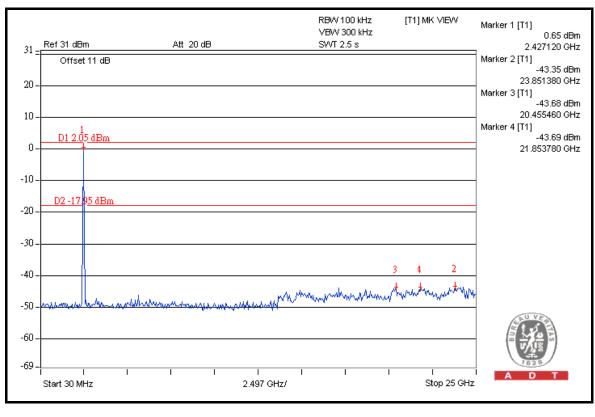














802.11n (20MHz)

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2412.00 (PK)	106.6	42.54	64.06	74.00
2412.00 (AV)	96.2	50.49	45.71	54.00

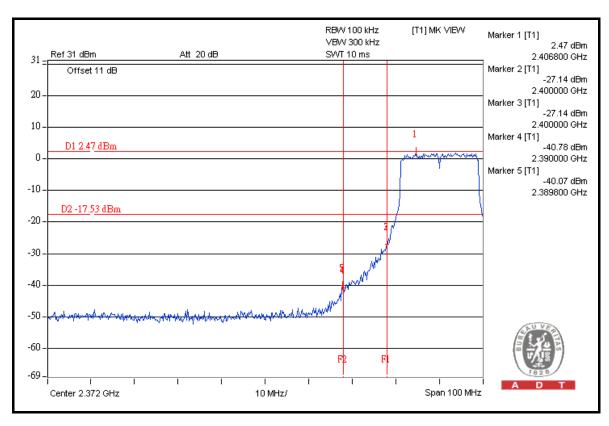
RESTRICT BAND (2483.5 ~ 2500 MHz)

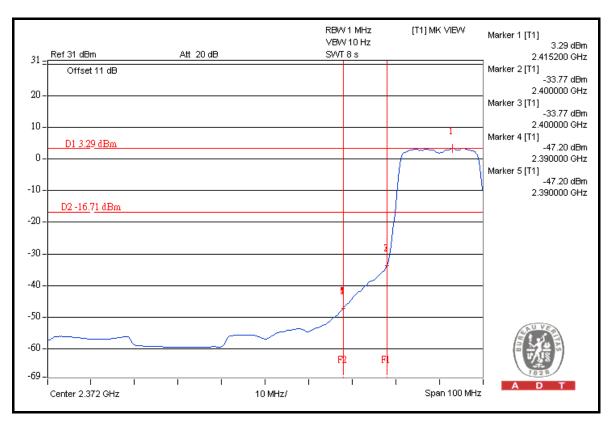
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2462.00 (PK)	106.1	44.56	61.54	74.00
2462.00 (AV)	95.8	49.73	46.07	54.00

NOTE:

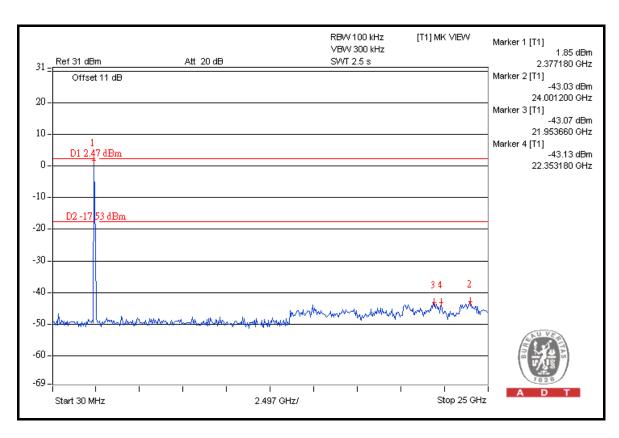
- 1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
- 2. Maximum field strength in restrict band = Fundamental emission Delta.

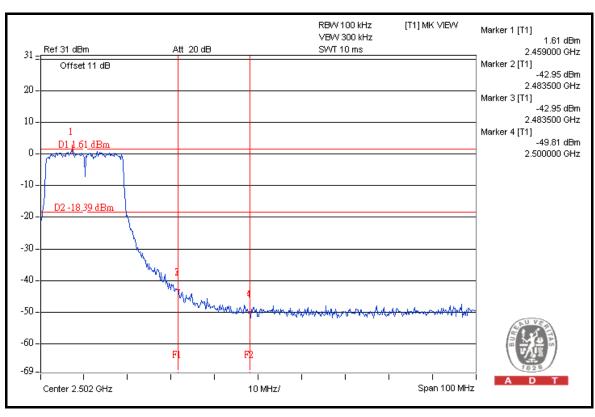




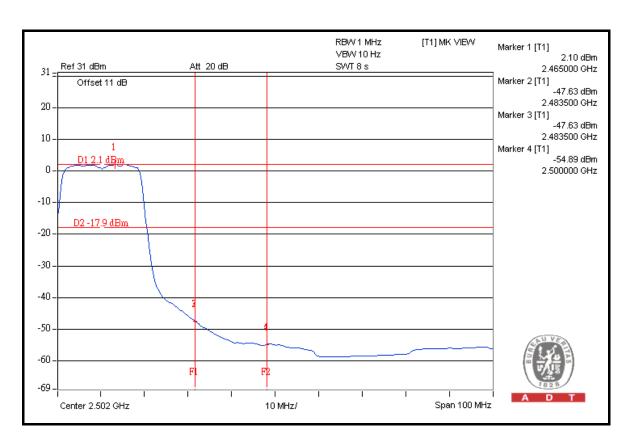


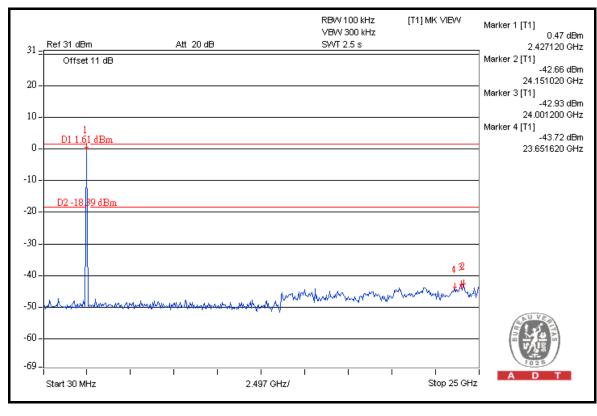














802.11n (40MHz)

RESTRICT BAND (2310 ~ 2390 MHz)

FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2422.00 (PK)	103.2	37.93	65.27	74.00
2422.00 (AV)	94.0	43.39	50.61	54.00

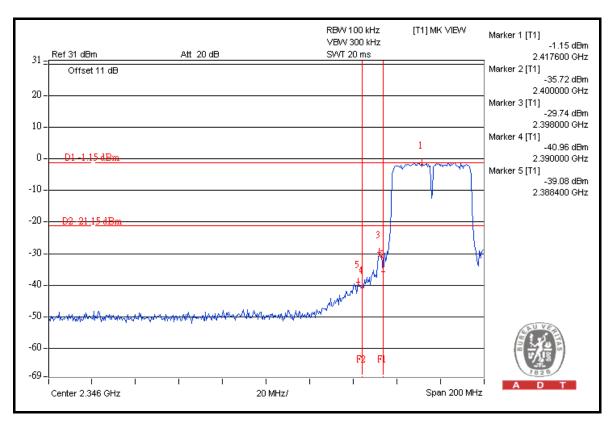
RESTRICT BAND (2483.5 ~ 2500 MHz)

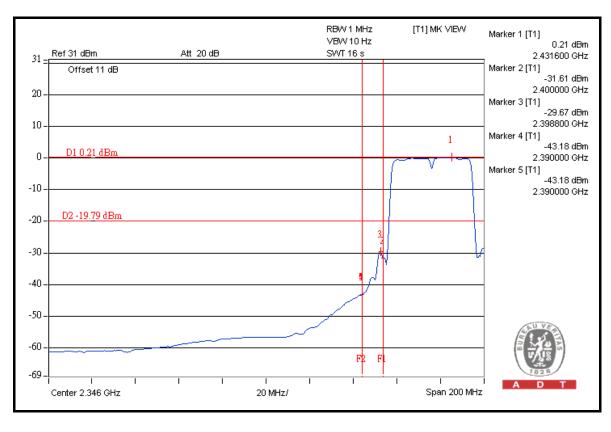
FREQUENCY (MHz)	FUNDAMENTAL EMISSION (dBuV/m)	DELTA (dB)	MAXIMUM FIELD STRENGTH IN RESTRICT BAND (dBuV/m)	LIMIT (dBuV/m)
2452.00 (PK)	101.2	40.32	60.88	74.00
2452.00 (AV)	92.3	45.36	46.94	54.00

NOTE:

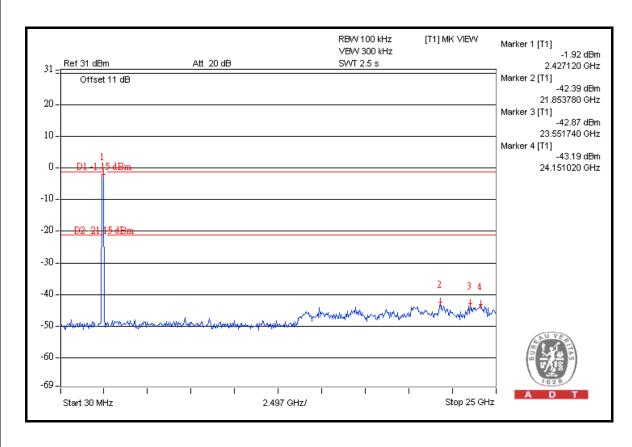
- 1. Delta = Amplitude between the peak of the fundamental and the peak of the band edge emission. Please check following 3 pages.
- 2. Maximum field strength in restrict band = Fundamental emission Delta.

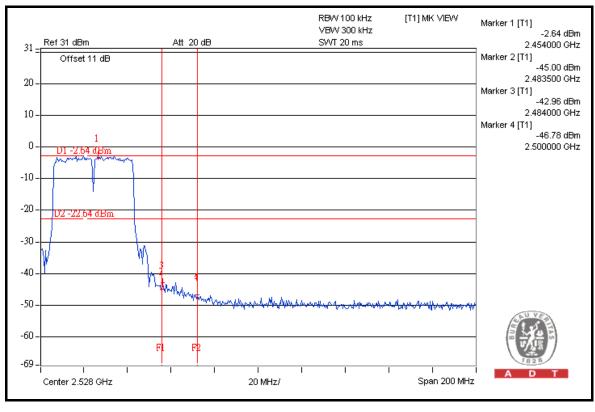




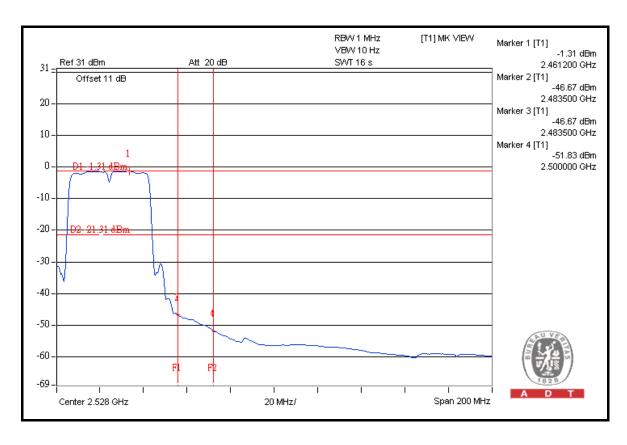


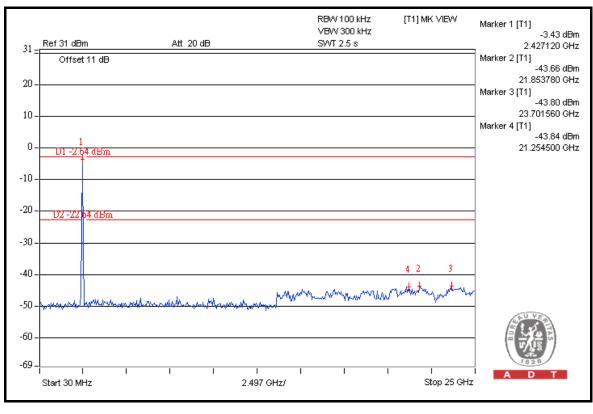














5. PHOTOGRAPHS OF THE TEST CONFIGURATION
Please refer to the attached file (Test Setup Photo).



6. INFORMATION ON THE TESTING LABORATORIES

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

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to

Linko EMC/RF Lab: Hsin Chu EMC/RF Lab:

Tel: 886-2-26052180 Tel: 886-3-5935343 Fax: 886-2-26051924 Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

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

Web Site: www.adt.com.tw

contact us at the following:

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



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

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

---END---

Report No.: RF990720C09A 67

Reference No.: 990927C11