

# FCC TEST REPORT (WLAN)

**REPORT NO.:** RF130823C23-2

MODEL NO.: F-02F

FCC ID: VQK-F02F

**RECEIVED:** Aug. 23, 2013

**TESTED:** Sep. 03 ~ Oct. 02, 2013

**ISSUED:** Oct. 08, 2013

**APPLICANT:** FUJITSU LIMITED

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Kawasaki 211-8588, Japan

**ISSUED BY:** Bureau Veritas Consumer Products Services

(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist.,

New Taipei City, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei

Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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# **RELEASE CONTROL RECORD**

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130823C23-2	Original release	Oct. 08, 2013

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# 1. CERTIFICATION

**PRODUCT:** Tablet PC

**MODEL NO.:** F-02F

**BRAND: FUJITSU** 

**APPLICANT:** FUJITSU LIMITED

**TESTED:** Sep. 03 ~ Oct. 02, 2013

**TEST SAMPLE:** ENGINEERING SAMPLE

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

ANSI C63.10-2009

The above equipment (model: F-02F) 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: Oct. 08, 2013

Ivy/Lin / Specialist

APPROVED BY : \_\_\_\_\_\_\_ , DATE : \_\_\_\_\_ Oct. 08, 2013

Ken Liu / Senior 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 -9.15dB at 0.40000MHz.				
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.5dB at 4824.00MHz.				
15.247(d)	Band Edge Measurement	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:

MEASUREMENT	FREQUENCY	UNCERTAINTY	
Conducted emissions	150kHz~30MHz	2.44dB	
	30MHz ~ 200MHz	3.34 dB	
Dadiated emissions	200MHz ~1000MHz	3.35 dB	
Radiated 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	Tablet PC
MODEL NO.	F-02F
POWER SUPPLY	3.8Vdc (battery) 12.0Vdc (cradle) 5Vdc (adapter or host equipment)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 72.2Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz)
OUTPUT POWER	85.507mW
ANTENNA TYPE	λ/4 Monopole antenna with -4.0 dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

# NOTE:

1. The EUT provides 1 completed transmitter and 1 receiver.

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

2. The EUT contains the following accessories.

No.	Product	Brand	Model	Description
1	Adapter (For cradle)	NTT docomo	TA08017-B222	Input: 100-240Vac, 1000mA Output: 12.0Vdc, 3000mA 1m shielded AC cable without core 1.8m shielded DC cable with 1 core
2	Cradle	NTT docomo	CA50601-1841	Input : 12.0V, 2000mA Output: 12.0V, 2000mA
3	Battery	Fujitsu Limited	CA54310-0048	3.8Vdc, 9600mA



3. The EUT uses following support unit.

No.	Product	Brand	Model	Description
				Input: 100-240Vac, 0.22A, 50-60Hz
1	Adapter	NTT docomo	AC Adaptor 04	Output: 5.0V, 1.8A
				1.05m DC cable with 2 cores

- 4. SW version is R23.5e.
- 5. HW version is V2.0.0.
- 6. IMEI Code: 357614050011474, 357614050009494
- 7. The above EUT information is declared by manufacturer and for more detailed feature 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		



# 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE	APPLICABLE TO			DESCRIPTION		
MODE	RE≥1G	RE<1G	PLC	APCM	DESCRIPTION	
Α	<b>√</b>	$\checkmark$	<b>√</b>	√	Power form adapter	
В	-	$\checkmark$	$\checkmark$	-	Power from host equipment	
С	-	V	V	-	Power from cradle	

Where

**RE≥1G:** Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

**PLC:** Power Line Conducted Emission

**APCM:** Antenna Port Conducted Measurement

#### NOTE:

- 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
- 2. "-"means no effect.

#### **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
Α	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
А	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
Α	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2

#### **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B, C	802.11g	1 to 11	11	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B, C	802.11g	1 to 11	11	OFDM	BPSK	6.0

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# **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
Α	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
Α	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
Α	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2

#### **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
Α	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
Α	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
Α	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2

# **TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	25deg. C, 65%RH, 23deg. C, 69%RH	120Vac, 60Hz	Chris Lin, Brad Tung
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen

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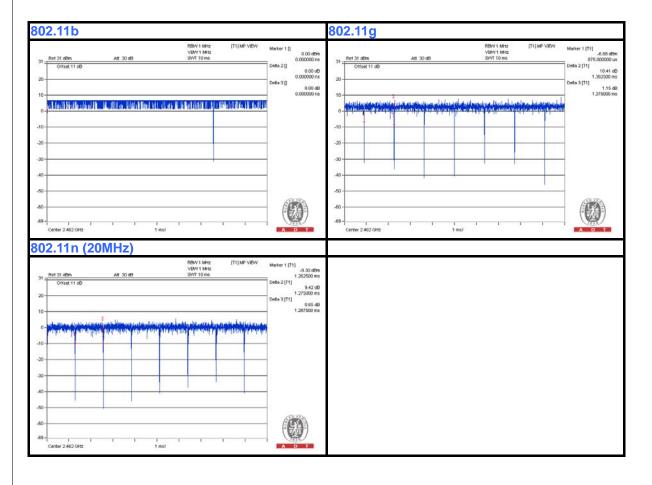
# 3.3 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is > 98 %, duty factor is not required.

**802.11b:** Duty cycle > 98 %

**802.11g:** Duty cycle = 1.362500/1.375000 = 0.991

**802.11n (20MHz):** Duty cycle = 1.275000/1.287500 = 0.990





# 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	DELL	E5420	BPQ7MQ1	FCC DoC Approved

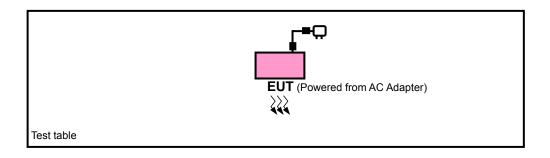
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

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

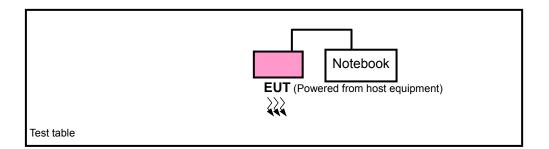


# 3.4.1 CONFIGURATION OF SYSTEM UNDER TEST

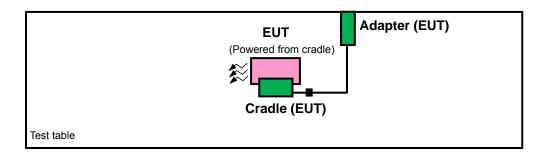
# **Test Mode A**



# **Test Mode B**



# **Test Mode C**



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# 3.5 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)
558074 D01 DTS Meas Guidance v03r01
ANSI C63.10-2009

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.



# 4. TEST TYPES AND RESULTS

# 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

# 4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. 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. 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	ESI7	838496/016	Dec. 25, 2012	Dec. 24, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jan. 31, 2013	Jan. 30, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Mar. 20, 2013	Mar. 19, 2014
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Dec. 22, 2012	Dec. 21, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8449B	3008A01964	Oct. 25, 2012	Oct. 24, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 23, 2013	Aug. 22, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/4	Aug. 23, 2013	Aug. 22, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Jul. 29, 2013	Jul. 28, 2014
Power Sensor	MA2411B	0738171	Jul. 29, 2013	Jul. 28, 2014

**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 3.
- 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 988962.
- 5. The IC Site Registration No. is IC 7450F-3.



#### 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. Height of receiving 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 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 1kHz(Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

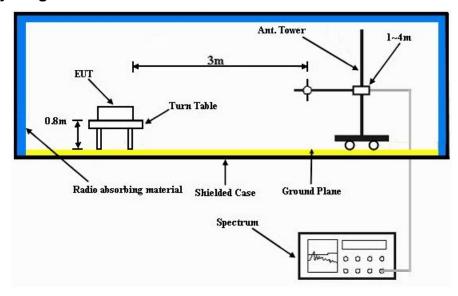
#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

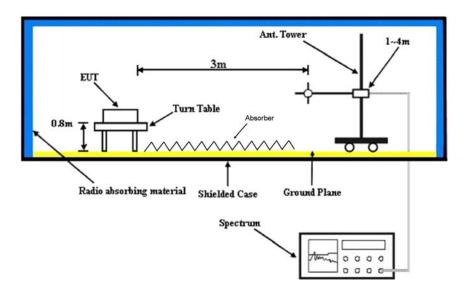


# 4.1.5 TEST SETUP

# Frequency range 30MHz~1GHz



# Frequency range above 1GHz



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

# 4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.



# 4.1.7 TEST RESULTS

#### **ABOVE 1GHz DATA:**

#### 802.11b

<b>EUT TEST CONDITION</b>		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, 65%RH	TESTED BY	Chris Lin	

	ANTENNA DOLADITY & TEST DISTANCE, HODIZONTAL AT 2 M							
	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.2 PK	74.0	-17.8	1.02 H	330	24.00	32.20
2	2390.00	44.5 AV	54.0	-9.5	1.02 H	330	12.30	32.20
3	*2412.00	96.3 PK			1.00 H	328	64.00	32.30
4	*2412.00	91.3 AV			1.00 H	328	59.00	32.30
5	4824.00	54.7 PK	74.0	-19.3	1.29 H	140	48.20	6.50
6	4824.00	49.7 AV	54.0	-4.3	1.29 H	140	43.20	6.50
		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	2390.00	55.6 PK	74.0	-18.4	1.10 V	270	23.40	32.20
2	2390.00	44.7 AV	54.0	-9.3	1.10 V	270	12.50	32.20
3	*2412.00	98.2 PK			1.01 V	263	65.90	32.30
4	*2412.00	93.0 AV			1.01 V	263	60.70	32.30
5	4824.00	56.9 PK	74.0	-17.1	1.24 V	267	50.40	6.50
6	4824.00	52.5 AV	54.0	-1.5	1.24 V	267	46.00	6.50

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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	25deg. C, 65%RH	TESTED BY	Chris Lin	

	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	95.6 PK			1.00 H	331	63.20	32.40	
2	*2437.00	91.3 AV			1.00 H	331	58.90	32.40	
3	4874.00	51.7 PK	74.0	-22.3	1.00 H	214	45.10	6.60	
4	4874.00	44.3 AV	54.0	-9.7	1.00 H	214	37.70	6.60	
		ANTENNA	POLARITY	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)	
<b>NO</b> .	FREQ. (MHz) *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) 98.1 PK		-20.8	<b>HEIGHT (m)</b> 1.00 V	ANGLE (Degree)	(dBuV) 65.70	FACTOR (dB/m) 32.40	

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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	25deg. C, 65%RH	TESTED BY	Chris Lin	

		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	*2462.00	93.6 PK			1.18 H	335	62.30	31.30		
2	*2462.00	89.4 AV			1.18 H	335	58.10	31.30		
3	2483.50	55.2 PK	74.0	-18.8	1.20 H	340	23.80	31.40		
4	2483.50	43.4 AV	54.0	-10.6	1.20 H	340	12.00	31.40		
5	4924.00	50.0 PK	74.0	-24.0	1.14 H	140	45.20	4.80		
6	4924.00	42.3 AV	54.0	-11.7	1.14 H	140	37.50	4.80		
		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										
ı	*2462.00	97.1 PK			1.00 V	263	64.70	32.40		
2	*2462.00 *2462.00	97.1 PK 93.0 AV			1.00 V 1.00 V	263 263	64.70 60.60	32.40 32.40		
<u> </u>			74.0	-18.0						
2	*2462.00	93.0 AV	74.0 54.0	-18.0 -9.4	1.00 V	263	60.60	32.40		
3	*2462.00 2483.50	93.0 AV 56.0 PK			1.00 V 1.02 V	263 265	60.60 23.50	32.40 32.50		

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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

<b>EUT TEST CONDITION</b>		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, 65%RH	TESTED BY	Chris Lin	

		ANTENNA I	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	54.5 PK	74.0	-19.5	1.05 H	338	23.50	31.00
2	2390.00	43.0 AV	54.0	-11.0	1.05 H	338	12.00	31.00
3	*2412.00	94.1 PK			1.00 H	333	63.00	31.10
4	*2412.00	84.9 AV			1.00 H	333	53.80	31.10
5	4824.00	47.6 PK	74.0	-26.4	1.09 H	143	43.20	4.40
6	4824.00	35.9 AV	54.0	-18.1	1.09 H	143	31.50	4.40
		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	54.2 PK	74.0	-19.8	1.05 V	290	23.20	31.00
2	2390.00	43.1 AV	54.0	-10.9	1.05 V	290	12.10	31.00
3	*2412.00	94.3 PK			1.00 V	288	63.20	31.10
4	*2412.00	85.8 AV			1.00 V	288	54.70	31.10
				22.2	4.0434	070	40.00	4.40
5	4824.00	51.0 PK	74.0	-23.0	1.24 V	279	46.60	4.40

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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	25deg. C, 65%RH	TESTED BY	Chris Lin	

	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	94.6 PK			1.00 H	336	63.40	31.20	
2	*2437.00	84.5 AV			1.00 H	336	53.30	31.20	
3	4874.00	45.6 PK	74.0	-28.4	1.12 H	257	41.10	4.50	
4	4874.00	33.2 AV	54.0	-20.8	1.12 H	257	28.70	4.50	
	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
		ANIENNA	POLARII	Y & TEST DI	STANCE: V	<u>ERTICAL A</u>	T 3 M		
NO.	FREQ. (MHz)	EMISSION	LIMIT	MARGIN (dB)	ΔΝΤΈΝΝΔ	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)	
<b>NO</b> .	FREQ. (MHz) *2437.00	EMISSION LEVEL	LIMIT		ANTENNA	TABLE ANGLE	RAW VALUE	FACTOR	
	` ,	EMISSION LEVEL (dBuV/m)	LIMIT		ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	FACTOR (dB/m)	
1	*2437.00	EMISSION LEVEL (dBuV/m) 95.8 PK	LIMIT		ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	FACTOR (dB/m) 31.20	

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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	25deg. C, 65%RH	TESTED BY	Chris Lin	

		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	92.1 PK			1.41 H	333	60.80	31.30
2	*2462.00	83.4 AV			1.41 H	333	52.10	31.30
3	2483.50	54.8 PK	74.0	-19.2	1.10 H	325	23.40	31.40
4	2483.50	43.1 AV	54.0	-10.9	1.10 H	325	11.70	31.40
5	4924.00	46.0 PK	74.0	-28.0	1.07 H	52	41.20	4.80
6	4924.00	34.9 AV	54.0	-19.1	1.07 H	52	30.10	4.80
		ANTENNA	POLARITY	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	95.0 PK			1.00 V	258	63.70	31.30
2	*2462.00	86.2 AV			1.00 V	258	54.90	31.30
3	2483.50	54.9 PK	74.0	-19.1	1.02 V	260	23.50	31.40
4	2483.50	43.4 AV	54.0	-10.6	1.02 V	260	12.00	31.40
5	4924.00	48.3 PK	74.0	-25.7	1.23 V	217	43.50	4.80
6	4924.00	37.6 AV	54.0	-16.4	1.23 V	217	32.80	4.80

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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)

<b>EUT TEST CONDITION</b>		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, 65%RH	TESTED BY	Chris Lin	

		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	54.1 PK	74.0	-19.9	1.10 H	340	23.10	31.00
2	2390.00	43.0 AV	54.0	-11.0	1.10 H	340	12.00	31.00
3	*2412.00	93.2 PK			1.00 H	337	62.10	31.10
4	*2412.00	83.6 AV			1.00 H	337	52.50	31.10
5	4824.00	45.8 PK	74.0	-28.2	1.06 H	162	41.40	4.40
6	4824.00	33.3 AV	54.0	-20.7	1.06 H	162	28.90	4.40
		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	54.3 PK	74.0	-19.7	1.10 V	265	23.30	31.00
2	2390.00	43.1 AV	54.0	-10.9	1.10 V	265	12.10	31.00
3	*2412.00	94.7 PK			1.00 V	262	63.60	31.10
4	*2412.00	85.1 AV			1.00 V	262	54.00	31.10
5	4824.00	48.4 PK	74.0	-25.6	1.09 V	175	44.00	4.40
6	4824.00	36.8 AV	54.0	-17.2	1.09 V	175	32.40	4.40

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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	25deg. C, 65%RH	TESTED BY	Chris Lin	

	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	93.0 PK			1.00 H	334	61.80	31.20			
2	*2437.00	82.7 AV			1.00 H	334	51.50	31.20			
3	4874.00	46.0 PK	74.0	-28.0	1.08 H	62	41.50	4.50			
4	4874.00	34.7 AV	54.0	-19.3	1.08 H	62	30.20	4.50			
		ANTENNA	POLARITY	Y & TEST DI	STANCE: V	ERTICAL A	T 3 M				
	EMISSION LIMIT ANTENNA TABLE RAW VALUE CO										
NO.	FREQ. (MHz)	LEVEL		MARGIN (dB)		ANGLE		FACTOR (dB/m)			
<b>NO.</b>	*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) 94.3 PK		MARGIN (dB) -25.9	<b>HEIGHT (m)</b> 1.00 V	ANGLE (Degree)	(dBuV) 63.10	FACTOR (dB/m) 31.20			

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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	25deg. C, 65%RH	TESTED BY	Chris Lin	

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M									
NO.	FREQ. (MHz)	EMISSION	LIMIT (dBuV/m)	MARGIN (dB)	ANTFNNA	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)		
1	*2462.00	92.7 PK			1.00 H	337	61.40	31.30		
2	*2462.00	84.0 AV			1.00 H	337	52.70	31.30		
3	2483.50	54.9 PK	74.0	-19.1	1.10 H	340	23.50	31.40		
4	2483.50	42.9 AV	54.0	-11.1	1.10 H	340	11.50	31.40		
5	4924.00	46.0 PK	74.0	-28.0	1.15 H	236	41.20	4.80		
6	4924.00	35.0 AV	54.0	-19.0	1.15 H	236	30.20	4.80		
		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	*2462.00	94.7 PK			1.00 V	260	63.40	31.30		
2	*2462.00	85.3 AV			1.00 V	260	54.00	31.30		
3	2483.50	55.4 PK	74.0	-18.6	1.10 V	270	24.00	31.40		
4	2483.50	43.3 AV	54.0	-10.7	1.10 V	270	11.90	31.40		
5	4924.00	48.6 PK	74.0	-25.4	1.02 V	56	43.80	4.80		

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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 11	FREQUENCY RANGE	Below 1000MHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak	
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Chris Lin	
TEST MODE	Α			

	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	57.07	28.0 QP	40.0	-12.0	1.25 H	43	42.60	-14.60		
2	185.13	23.4 QP	43.5	-20.1	1.00 H	16	39.20	-15.80		
3	359.77	20.9 QP	46.0	-25.1	1.50 H	319	32.00	-11.10		
4	575.15	21.4 QP	46.0	-24.6	1.00 H	68	28.30	-6.90		
5	788.60	25.1 QP	46.0	-20.9	1.50 H	4	27.40	-2.30		
6	930.25	27.9 QP	46.0	-18.1	1.50 H	202	27.70	0.20		
		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	57.07	28.4 QP	40.0	-11.6	1.25 V	285	43.00	-14.60		
2	103.64	18.5 QP	43.5	-25.0	1.00 V	14	36.50	-18.00		
3	408.28	17.6 QP	46.0	-28.4	1.50 V	321	27.80	-10.20		
4	588.74	22.1 QP	46.0	-23.9	1.00 V	212	28.50	-6.40		
5	716.80	24.5 QP	46.0	-21.5	1.25 V	87	28.60	-4.10		
6	918.60	27.3 QP	46.0	-18.7	1.00 V	212	27.30	0.00		

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



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak	
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Chris Lin	
TEST MODE	В			

	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	57.07	29.0 QP	40.0	-11.0	1.25 H	62	43.60	-14.60		
2	165.73	37.5 QP	43.5	-6.0	1.00 H	209	51.80	-14.30		
3	225.88	35.9 QP	46.0	-10.1	1.50 H	305	52.20	-16.30		
4	280.21	33.2 QP	46.0	-12.8	1.50 H	101	45.90	-12.70		
5	666.35	37.6 QP	46.0	-8.4	2.00 H	73	42.50	-4.90		
6	840.99	35.3 QP	46.0	-10.7	1.00 H	51	36.90	-1.60		
		ANTENNA	POLARIT	/ & TEST DI	STANCE: V	ERTICAL A	T 3 M			
NO.	FREQ. (MHz)	EMISSION	LIMIT	LIMIT BUV/m)  MARGIN (dB)  ANTENNA HEIGHT (m)  TABLE ANGLE (Degree)  (dBuV)				CORRECTION		
	TINEQ. (IVITIZ)	LEVEL (dBuV/m)	(dBuV/m)	MARGIN (dB)	, <b>_</b>	ANGLE (Degree)		FACTOR (dB/m)		
1	57.07			MARGIN (dB) -6.8	, <b>_</b>	7				
1 2	, ,	(dBuV/m)	(dBuV/m)	,	HEIGHT (m)	(Degree)	(dBuV)	(dB/m)		
	57.07	(dBuV/m) 33.2 QP	(dBuV/m) 40.0	-6.8	<b>HEIGHT (m)</b>	(Degree)	(dBuV) 47.80	(dB/m) -14.60		
2	57.07 165.73	(dBuV/m) 33.2 QP 33.2 QP	(dBuV/m) 40.0 43.5	-6.8 -10.3	1.25 V 1.00 V	( <b>Degree</b> ) 131 189	(dBuV) 47.80 47.50	(dB/m) -14.60 -14.30		
3	57.07 165.73 231.70	(dBuV/m) 33.2 QP 33.2 QP 37.4 QP	(dBuV/m) 40.0 43.5 46.0	-6.8 -10.3 -8.6	1.25 V 1.00 V 1.00 V	(Degree)  131  189  116	(dBuV) 47.80 47.50 53.20	(dB/m) -14.60 -14.30 -15.80		

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



EUT TEST CONDITION		MEASUREMENT DETAIL		
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz	
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak	
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Chris Lin	
TEST MODE	С			

		ANTENNA	POLARITY	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	57.07	27.9 QP	40.0	-12.1	1.50 H	292	42.50	-14.60					
2	144.38	33.6 QP	43.5	-9.9	1.00 H	288	47.60	-14.00					
3	359.77	40.0 QP	46.0	-6.0	1.25 H	332	51.10	-11.10					
4	408.28	29.2 QP	46.0	-16.8	1.00 H	20	39.40	-10.20					
5	736.21	25.8 QP	46.0	-20.2	1.50 H	280	29.50	-3.70					
6	943.83	28.6 QP	46.0	-17.4	1.50 H	322	28.30	0.30					
		ANTENNA	A POLARITY	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	57.07	25.9 QP	40.0	-14.1	1.25 V	238	40.50	-14.60					
2	144.38	27.9 QP	43.5	-15.6	1.00 V	30	41.90	-14.00					
3	359.77	31.6 QP	46.0	-14.4	1.50 V	305	42.70	-11.10					
3	359.77 493.66		46.0 46.0	-14.4 -22.0	1.50 V 1.00 V	305 172	42.70 32.60	-11.10 -8.60					
_		31.6 QP											

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
  - Pre-Amplifier 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	100289	Nov. 16, 2012	Nov. 15, 2013
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	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 1.
- 3. The VCCI Site Registration No. is C-2040.



# 4.2.3 TEST PROCEDURES

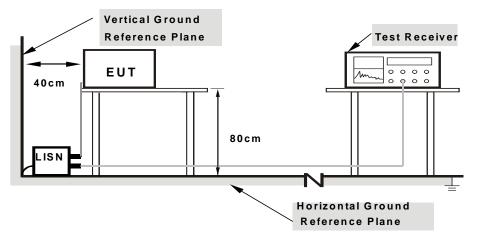
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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.

#### 4.2.4 DEVIATION FROM TEST STANDARD

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.



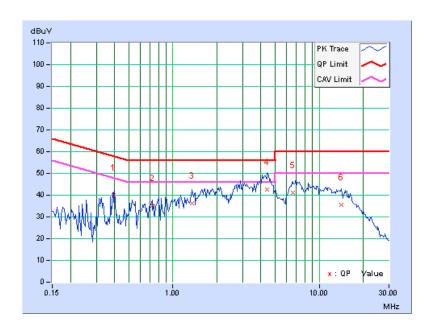
# 4.2.7 TEST RESULTS

# **CONDUCTED WORST-CASE DATA: 802.11g**

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	A		

	Freq. Corr. Reading Value		<b>Emission Level</b>		Limit		Margin			
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.39609	0.23	39.71	33.75	39.94	33.98	57.93	47.93	-18.00	-13.96
2	0.72422	0.24	35.11	28.29	35.35	28.53	56.00	46.00	-20.65	-17.47
3	1.35938	0.26	36.16	25.66	36.42	25.92	56.00	46.00	-19.58	-20.08
4	4.42578	0.42	42.24	28.29	42.66	28.71	56.00	46.00	-13.34	-17.29
5	6.62109	0.54	40.55	35.22	41.09	35.76	60.00	50.00	-18.91	-14.24
6	14.12891	0.93	34.73	29.05	35.66	29.98	60.00	50.00	-24.34	-20.02

- 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

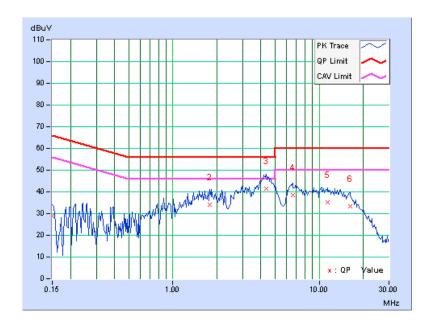




PHASE	Line 2	6dB BANDWIDTH	9kHz	
TEST MODE	A			

	Freq.	Corr.	Reading Value		<b>Emission Level</b>		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.16	28.78	20.98	28.94	21.14	66.00	56.00	-37.06	-34.86
2	1.78906	0.27	33.78	25.53	34.05	25.80	56.00	46.00	-21.95	-20.20
3	4.33984	0.39	40.93	27.58	41.32	27.97	56.00	46.00	-14.68	-18.03
4	6.57813	0.47	38.12	32.38	38.59	32.85	60.00	50.00	-21.41	-17.15
5	11.41016	0.65	34.70	28.54	35.35	29.19	60.00	50.00	-24.65	-20.81
6	16.23828	0.80	32.63	27.43	33.43	28.23	60.00	50.00	-26.57	-21.77

- 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

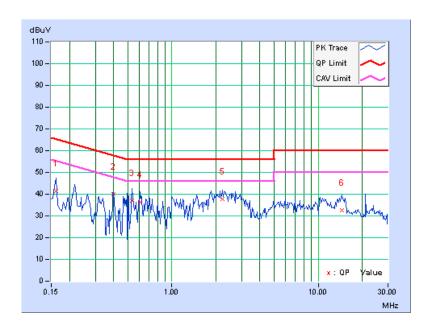




PHASE	Line 1	6dB BANDWIDTH	9kHz	
TEST MODE	В			

	Freq. Corr. Reading Value		<b>Emission Level</b>		Limit		Margin			
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.16	41.31	32.62	41.47	32.78	65.38	55.38	-23.91	-22.60
2	0.40000	0.23	39.79	38.47	40.02	38.70	57.85	47.85	-17.83	-9.15
3	0.53672	0.23	36.65	32.34	36.88	32.57	56.00	46.00	-19.12	-13.43
4	0.60313	0.24	35.91	28.67	36.15	28.91	56.00	46.00	-19.85	-17.09
5	2.21875	0.30	37.64	32.68	37.94	32.98	56.00	46.00	-18.06	-13.02
6	14.51172	0.95	31.64	24.04	32.59	24.99	60.00	50.00	-27.41	-25.01

- 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



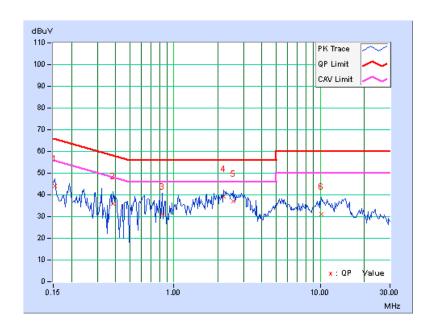


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	В		

	Freq.	Corr.	Reading Value		<b>Emission Level</b>		Limit		Margin	
No		Factor	[dB	(uV)]	[dB	(uV)]	[dB	(uV)]	(d	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.17	43.97	34.20	44.14	34.37	65.79	55.79	-21.65	-21.42
2	0.38438	0.23	35.77	25.98	36.00	26.21	58.18	48.18	-22.18	-21.97
3	0.83750	0.25	30.94	19.80	31.19	20.05	56.00	46.00	-24.81	-25.95
4	2.20313	0.29	38.84	34.53	39.13	34.82	56.00	46.00	-16.87	-11.18
5	2.55078	0.31	36.90	32.27	37.21	32.58	56.00	46.00	-18.79	-13.42
6	10.23438	0.61	30.65	22.32	31.26	22.93	60.00	50.00	-28.74	-27.07

#### **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



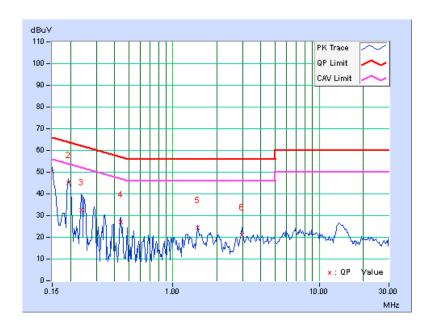


PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	С		

	Freq.	Corr.	Reading Value		<b>Emission Level</b>		Limit		Margin	
No		Factor	[dB	(uV)]	[dB (	(uV)]	[dB	(uV)]	(d	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.16	50.23	37.84	50.39	38.00	66.00	56.00	-15.61	-18.00
2	0.19297	0.16	45.18	35.10	45.34	35.26	63.91	53.91	-18.57	-18.65
3	0.23594	0.17	32.55	16.45	32.72	16.62	62.24	52.24	-29.52	-35.62
4	0.43906	0.23	26.69	24.08	26.92	24.31	57.08	47.08	-30.16	-22.77
5	1.48438	0.27	24.14	24.03	24.41	24.30	56.00	46.00	-31.59	-21.70
6	2.97266	0.34	20.94	16.02	21.28	16.36	56.00	46.00	-34.72	-29.64

#### **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



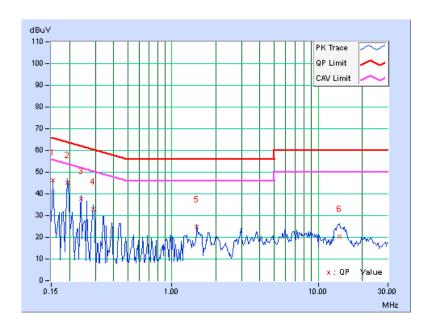


PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	С		

	Freq.	Corr.	Reading Value		<b>Emission Level</b>		Limit		Margin	
No		Factor	[dB	(uV)]	[dB	(uV)]	[dB	(uV)]	(d	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.17	46.02	26.16	46.19	26.33	65.79	55.79	-19.60	-29.46
2	0.19297	0.17	45.18	35.18	45.35	35.35	63.91	53.91	-18.56	-18.56
3	0.23984	0.18	37.43	25.89	37.61	26.07	62.10	52.10	-24.49	-26.03
4	0.29063	0.20	32.67	20.03	32.87	20.23	60.51	50.51	-27.63	-30.27
5	1.48438	0.26	24.40	23.95	24.66	24.21	56.00	46.00	-31.34	-21.79
6	13.96484	0.73	19.55	11.94	20.28	12.67	60.00	50.00	-39.72	-37.33

#### **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



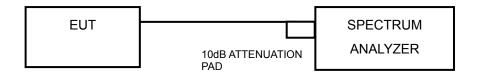


#### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 TEST PROCEDURE

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW)  $\geq$  3 x RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. 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

#### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 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

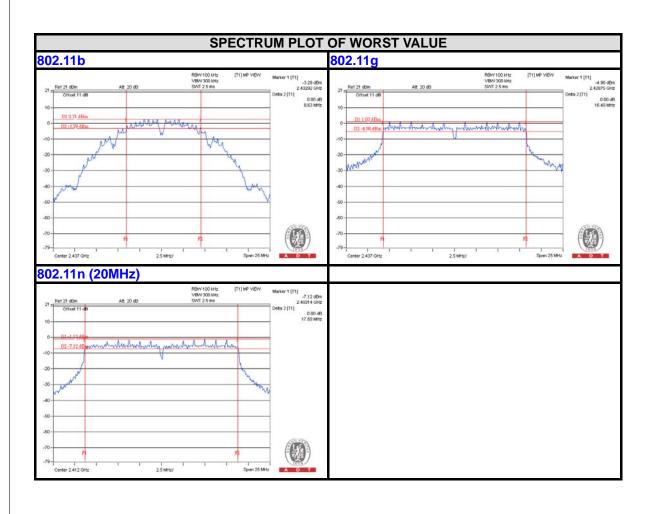
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL	
1	2412	2412 8.58		PASS	
6	2437	8.63	0.5	PASS	
11	2462	8.58	0.5	PASS	

# 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.47	0.5	PASS
6	2437	16.49	0.5	PASS
11	2462	16.43	0.5	PASS

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	BANDWIDTH MINIMUM LIMIT	
1	2412 17.69		0.5	PASS
6	2437	17.66	0.5	PASS
11	2462	17.65	0.5	PASS





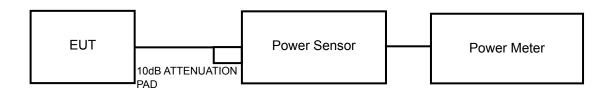


#### 4.4 CONDUCTED OUTPUT POWER

## 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

#### 4.4.2 TEST SETUP



## 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.4.4 TEST PROCEDURES

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



	782B
A A S. DEVIATION EDOM TEGT OTANDADD	
4.4.5 DEVIATION FROM TEST STANDARD	
No deviation.	
4.4.6 EUT OPERATING CONDITIONS	
Same as Item 4.3.6.	

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# 4.4.7 TEST RESULTS

## **FOR PEAK POWER**

## 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	25.882	14.13	30	PASS
6	2437	27.606	14.41	30	PASS
11	2462	30.130	14.79	30	PASS

# 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	73.790	18.68	30	PASS
6	2437	80.538	19.06	30	PASS
11	2462	85.507	19.32	30	PASS

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	68.234	18.34	30	PASS
6	2437	77.804	18.91	30	PASS
11	2462	75.683	18.79	30	PASS



## **FOR AVERAGE POWER**

## 802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	14.757	11.69
6	2437	14.388	11.58
11	2462	16.749	12.24

# 802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	9.078	9.58
6	2437	9.908	9.96
11	2462	10.162	10.07

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	8.933	9.51
6	2437	9.057	9.57
11	2462	9.908	9.96

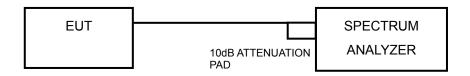


#### 4.5 POWER SPECTRAL DENSITY MEASUREMENT

#### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

#### 4.5.2 TEST SETUP



#### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.5.4 TEST PROCEDURE

- a. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
- b. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- c. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

#### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



# 4.5.7 TEST RESULTS

# 802.11b

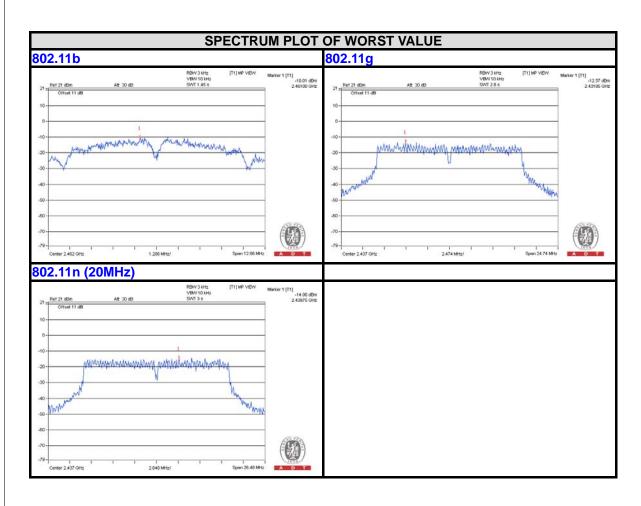
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.53	8	PASS
6	2437	-11.27	8	PASS
11	2462	-10.01	8	PASS

## 802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.72	8	PASS
6	2437	-12.57	8	PASS
11	2462	-12.61	8	PASS

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-15.87	8	PASS
6	2437	-14.06	8	PASS
11	2462	-14.90	8	PASS





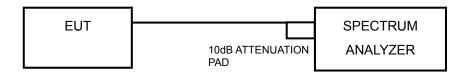


#### 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

## 4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

## 4.6.2 TEST SETUP



#### 4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.6.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

- 1. Set the RBW = 100 kHz.
- 2. Set the VBW ≥ 300 kHz.
- 3. Detector = peak.
- 4. Sweep time = auto couple.
- 5. Trace mode = max hold.
- 6. Allow trace to fully stabilize.
- 7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

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#### **MEASUREMENT PROCEDURE OOBE**

- 1. Set RBW = 100 kHz.
- 2. Set VBW ≥ 300 kHz.
- 3. Set span to encompass the spectrum to be examined.
- 4. Detector = peak.
- 5. Trace Mode = max hold.
- 6. Sweep = auto couple.

## 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

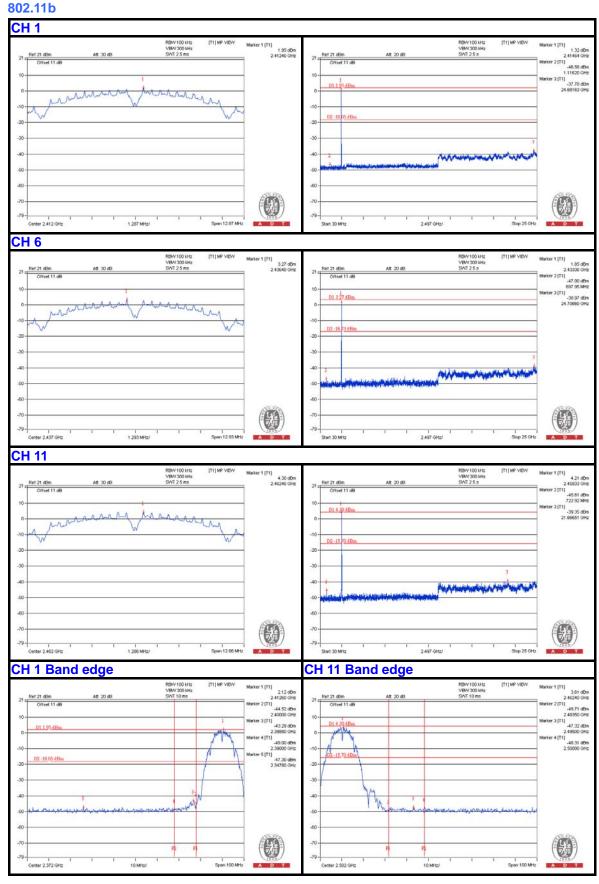
#### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.6.7 TEST RESULTS

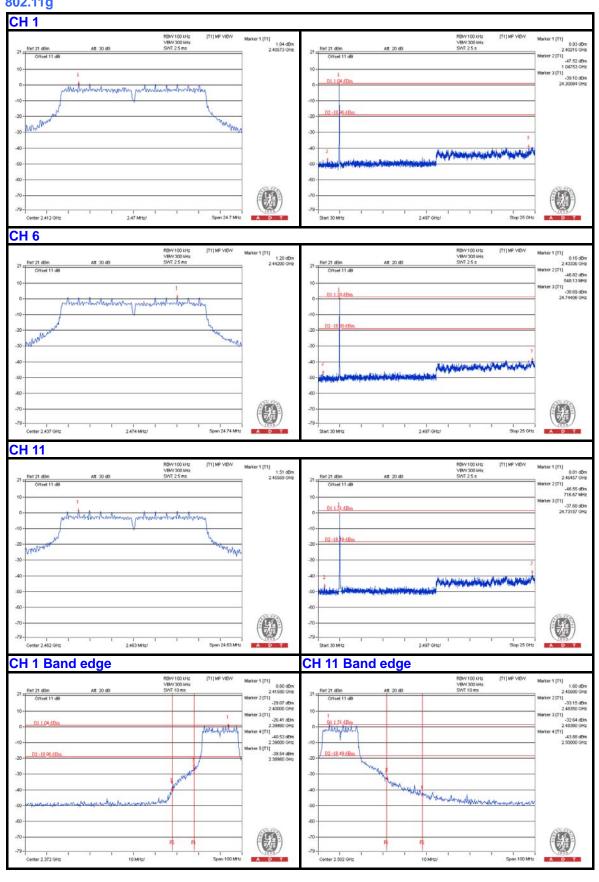
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



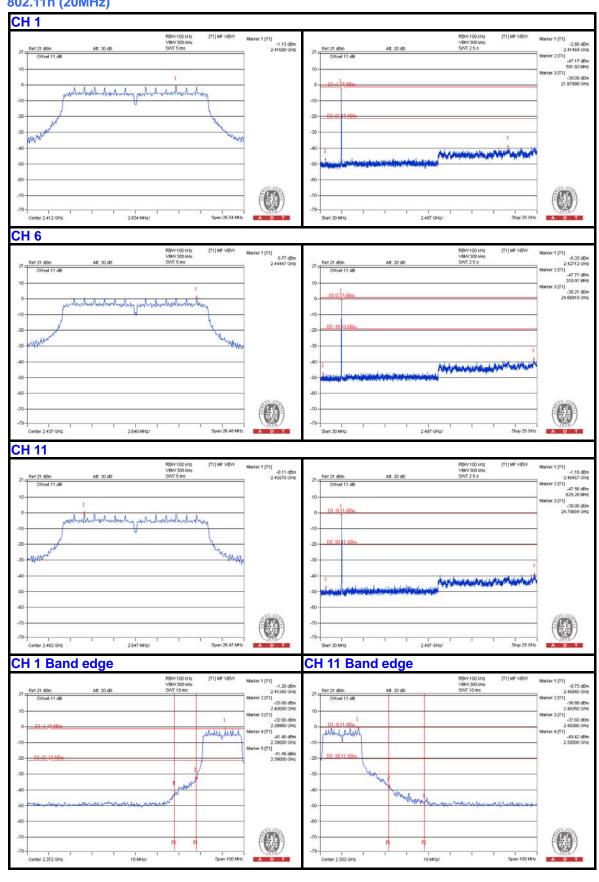














5. PHOTOGRAPHS OF THE TEST CONFIGURATION
Please refer to the attached file (Test Setup Photo).



# 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.

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

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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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# 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.

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