

# FCC TEST REPORT

**REPORT NO.:** RF991202C08

**MODEL NO.:** F-07C

**FCC ID:** VQK-F07C

**RECEIVED:** Mar. 01, 2011

**TESTED:** Mar. 23 ~ Mar. 24, 2011

**ISSUED:** Mar. 30, 2011

**APPLICANT:** FUJITSU LIMITED

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

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**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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## TABLE OF CONTENTS

RELEASE CONTROL RECORD.....	3
1. CERTIFICATION.....	4
2. SUMMARY OF TEST RESULTS .....	5
2.1 MEASUREMENT UNCERTAINTY.....	5
3. GENERAL INFORMATION .....	6
3.1 GENERAL DESCRIPTION OF EUT .....	6
3.2 DESCRIPTION OF TEST MODES .....	7
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST .....	7
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	8
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	9
3.4 DESCRIPTION OF SUPPORT UNITS .....	9
4. TEST TYPES AND RESULTS .....	10
4.1 RADIATED EMISSION MEASUREMENT .....	10
4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	10
4.1.2 TEST INSTRUMENTS.....	11
4.1.3 TEST PROCEDURES .....	12
4.1.4 DEVIATION FROM TEST STANDARD .....	12
4.1.5 TEST SETUP .....	13
4.1.6 EUT OPERATING CONDITIONS .....	13
4.1.7 TEST RESULTS .....	14
4.2 CONDUCTED EMISSION MEASUREMENT .....	24
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	24
4.2.2 TEST INSTRUMENTS.....	24
4.2.3 TEST PROCEDURES .....	25
4.2.4 DEVIATION FROM TEST STANDARD .....	25
4.2.5 TEST SETUP .....	26
4.2.6 EUT OPERATING CONDITIONS .....	26
4.2.7 TEST RESULTS .....	27
5. PHOTOGRAPHS OF THE TEST CONFIGURATION.....	29
6. INFORMATION ON THE TESTING LABORATORIES .....	30
7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....	31



## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Mar. 30, 2011

## 1. CERTIFICATION

**PRODUCT:** Mobile phone

**MODEL:** F-07C

**BRAND:** FOMA

**APPLICANT:** FUJITSU LIMITED

**TESTED:** Mar. 23 ~ Mar. 24, 2011

**TEST SAMPLE:** ENGINEERING SAMPLE

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

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (Model: F-07C) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , DATE: Mar. 30, 2011  
Andrea Hsia / Specialist

APPROVED BY :  , DATE: Mar. 30, 2011  
Gary Chang / Assistant 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 AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.85dB at 0.306MHz.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -5.5dB at 2483.50MHz.

### 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	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	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  $k = 2$ .



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### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

EUT	Mobile phone
MODEL NO.	F-07C
FCC ID	VQK-F07C
POWER SUPPLY	3.7Vdc (Li-ion battery) 5.0Vdc (Adapter)
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 65Mbps
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11
ANTENNA TYPE	$\lambda/4$ monopole antenna with -7dBi
ANTENNA CONNECTOR	NA
DATA CABLE	1.5m USB cable
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Battery, Adapter, Micphone (Brand: DoCoMo, 0.7m)

**NOTE:**

1. The EUT is a Mobile phone. The test data are separated into following test reports.

	TEST STANDARD	REFERENCE REPORT
WLAN	FCC Part 15, Subpart C (Section 15.247)	RF991202C08
BLUETOOTH	FCC Part 15, Subpart C (Section 15.247)	RF991202C08-1
RFID	FCC Part 15, Subpart C (Section 15.225, 15.215)	RF991202C08-2
WCDMA 850	FCC Part 22	RF991202C08-3
PCS 1900	FCC Part 24	RF991202C08-4

2. The test items for conducted emission and radiated emission were tested by clients' requests and presented in this report.
3. The EUT uses the following Li-ion battery & Adapter:

BATTERY	
BRAND	Fujitsu Limited
MODEL	F20
RATING	3.7Vdc, 1400mAh

ADAPTER	
BRAND	Fujitsu Limited
MODEL	F04
INPUT POWER	100-240Vac
OUTPUT POWER	5Vdc, 1A

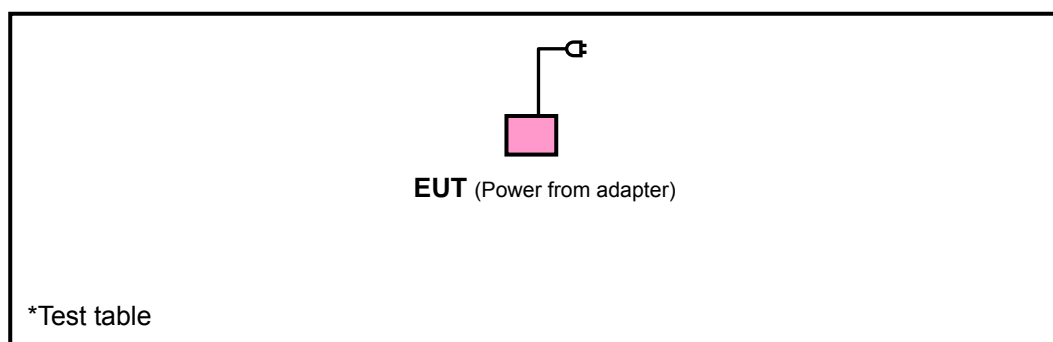
4. IMEI Code: 354128040009657.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

## 3.2 DESCRIPTION OF TEST MODES

11 channels are provided as below:

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 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	
-	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission

#### 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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS	EUT MONITOR
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	X	Open
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	X	Open
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	X	Open

#### 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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS	EUT MONITOR
802.11g	1 to 11	6	OFDM	BPSK	6.0	X	Open

#### POWER LINE CONDUCTED EMISSION TEST:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	EUT MONITOR
802.11g	1 to 11	6	OFDM	BPSK	6.0	Open

#### TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	24deg. C, 65%RH, 1005 hPa	120Vac, 60Hz	Brad Wu
RE<1G	24deg. C, 65%RH, 1005 hPa	120Vac, 60Hz	Brad Wu
PLC	24deg. C, 65%RH, 1005 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 (Section 15.247)**

**ANSI C63.4-2003**

**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.

### **3.4 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit.

## 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	100033	Jul. 29, 2010	Jul. 28, 2011
Spectrum Analyzer Agilent	E4446A	MY48250266	Aug. 11, 2010	Aug. 10, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 27, 2010	Apr. 26, 2011
HORN Antenna SCHWARZBECK	9120D	9120D-405	Feb. 08, 2011	Feb. 07, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8447D	2944A10633	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8449B	3008A01964	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	238141/4	May 14, 2010	May 13, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	12738/6	May 14, 2010	May 13, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	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 ADT.	TT100.	TT93021703	NA	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 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. 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.

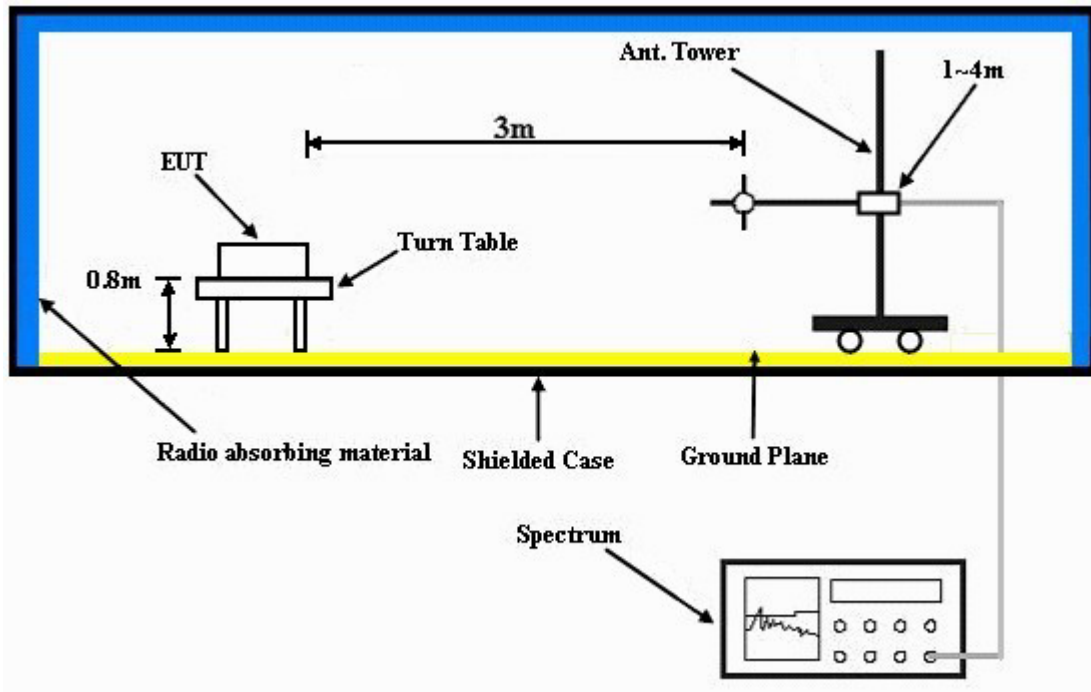
**NOTE:**

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

Set the EUT under transmitting condition.

#### 4.1.7 TEST RESULTS

##### 802.11b

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	24deg. C, 65%RH 1005 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	52.5 PK	74.0	-21.5	1.04 H	155	22.00	30.50
2	2390.00	42.6 AV	54.0	-11.4	1.04 H	155	12.10	30.50
3	*2412.00	99.6 PK			1.04 H	155	69.00	30.60
4	*2412.00	96.0 AV			1.04 H	155	65.40	30.60
5	4824.00	44.1 PK	74.0	-29.9	1.05 H	246	8.00	36.10
6	4824.00	31.1 AV	54.0	-22.9	1.05 H	246	-5.00	36.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	43.8 PK	74.0	-30.2	1.62 V	75	13.30	30.50
2	2390.00	33.0 AV	54.0	-21.0	1.62 V	75	2.50	30.50
3	*2412.00	88.0 PK			1.62 V	75	57.40	30.60
4	*2412.00	84.4 AV			1.62 V	75	53.80	30.60
5	4824.00	43.6 PK	74.0	-30.4	1.08 V	136	7.50	36.10
6	4824.00	30.8 AV	54.0	-23.2	1.08 V	136	-5.30	36.10

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1005 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	100.2 PK			1.04 H	145	69.60	30.60
2	*2437.00	96.6 AV			1.04 H	145	66.00	30.60
3	4874.00	43.8 PK	74.0	-30.2	1.10 H	129	7.60	36.20
4	4874.00	30.9 AV	54.0	-23.1	1.10 H	129	-5.30	36.20
5	7311.00	49.0 PK	74.0	-25.0	1.05 H	236	6.40	42.60
6	7311.00	36.1 AV	54.0	-17.9	1.05 H	236	-6.50	42.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	88.5 PK			1.65 V	74	57.90	30.60
2	*2437.00	85.0 AV			1.65 V	74	54.40	30.60
3	4874.00	43.4 PK	74.0	-30.6	1.00 V	138	7.20	36.20
4	4874.00	30.6 AV	54.0	-23.4	1.00 V	138	-5.60	36.20
5	7311.00	48.8 PK	74.0	-25.2	1.00 V	124	6.20	42.60
6	7311.00	36.0 AV	54.0	-18.0	1.00 V	124	-6.60	42.60

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1005 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	*2462.00	100.7 PK			1.05 H	213	70.00	30.70
2	*2462.00	96.9 AV			1.05 H	213	66.20	30.70
3	2483.50	55.3 PK	74.0	-18.7	1.05 H	213	24.50	30.80
4	2483.50	45.4 AV	54.0	-8.6	1.05 H	213	14.60	30.80
5	4924.00	45.8 PK	74.0	-28.2	1.00 H	24	9.50	36.30
6	4924.00	33.1 AV	54.0	-20.9	1.00 H	24	-3.20	36.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	88.9 PK			1.63 V	80	58.20	30.70
2	*2462.00	85.4 AV			1.63 V	80	54.70	30.70
3	2483.50	45.6 PK	74.0	-28.4	1.63 V	80	14.80	30.80
4	2483.50	35.8 AV	54.0	-18.2	1.63 V	80	5.00	30.80
5	4924.00	45.3 PK	74.0	-28.7	1.04 V	221	9.00	36.30
6	4924.00	32.8 AV	54.0	-21.2	1.04 V	221	-3.50	36.30

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



# 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	24deg. C, 65%RH 1005 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	63.7 PK	74.0	-10.3	1.34 H	234	33.20	30.50
2	2390.00	48.0 AV	54.0	-6.0	1.34 H	234	17.50	30.50
3	*2412.00	101.2 PK			1.34 H	234	70.60	30.60
4	*2412.00	90.1 AV			1.34 H	234	59.50	30.60
5	4824.00	43.3 PK	74.0	-30.7	1.05 H	116	7.20	36.10
6	4824.00	30.5 AV	54.0	-23.5	1.05 H	116	-5.60	36.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.6 PK	74.0	-19.4	1.05 V	83	24.10	30.50
2	2390.00	43.8 AV	54.0	-10.2	1.05 V	83	13.30	30.50
3	*2412.00	92.2 PK			1.05 V	83	61.60	30.60
4	*2412.00	81.5 AV			1.05 V	83	50.90	30.60
5	4824.00	43.1 PK	74.0	-30.9	1.04 V	265	7.00	36.10
6	4824.00	30.2 AV	54.0	-23.8	1.04 V	265	-5.90	36.10

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH 1005 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	101.8 PK			1.30 H	235	71.20	30.60
2	*2437.00	90.6 AV			1.30 H	235	60.00	30.60
3	4874.00	43.8 PK	74.0	-30.2	1.05 H	111	7.60	36.20
4	4874.00	30.6 AV	54.0	-23.4	1.05 H	111	-5.60	36.20
5	7311.00	49.4 PK	74.0	-24.6	1.05 H	26	6.80	42.60
6	7311.00	36.1 AV	54.0	-17.9	1.05 H	26	-6.50	42.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	92.7 PK			1.06 V	84	62.10	30.60
2	*2437.00	82.0 AV			1.06 V	84	51.40	30.60
3	4874.00	43.3 PK	74.0	-30.7	1.01 V	86	7.10	36.20
4	4874.00	30.4 AV	54.0	-23.6	1.01 V	86	-5.80	36.20
5	7311.00	49.1 PK	74.0	-24.9	1.10 V	195	6.50	42.60
6	7311.00	35.8 AV	54.0	-18.2	1.10 V	195	-6.80	42.60

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

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	24deg. C, 65%RH 1005 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	*2462.00	102.1 PK			1.28 H	236	71.40	30.70
2	*2462.00	90.8 AV			1.28 H	236	60.10	30.70
3	2483.50	65.3 PK	74.0	-8.7	1.28 H	236	34.50	30.80
4	2483.50	48.2 AV	54.0	-5.8	1.28 H	236	17.40	30.80
5	4924.00	44.0 PK	74.0	-30.0	1.05 H	129	7.70	36.30
6	4924.00	30.8 AV	54.0	-23.2	1.05 H	129	-5.50	36.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	93.1 PK			1.04 V	85	62.40	30.70
2	*2462.00	82.4 AV			1.04 V	85	51.70	30.70
3	2483.50	61.0 PK	74.0	-13.0	1.04 V	85	30.20	30.80
4	2483.50	44.0 AV	54.0	-10.0	1.04 V	85	13.20	30.80
5	4924.00	44.3 PK	74.0	-29.7	1.01 V	45	8.00	36.30
6	4924.00	31.0 AV	54.0	-23.0	1.01 V	45	-5.30	36.30

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

# 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	24deg. C, 65%RH 1005 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	64.6 PK	74.0	-9.4	1.33 H	235	34.10	30.50
2	2390.00	48.3 AV	54.0	-5.7	1.33 H	235	17.80	30.50
3	*2412.00	100.8 PK			1.33 H	235	70.20	30.60
4	*2412.00	89.7 AV			1.33 H	235	59.10	30.60
5	4824.00	43.6 PK	74.0	-30.4	1.04 H	121	7.50	36.10
6	4824.00	30.7 AV	54.0	-23.3	1.04 H	121	-5.40	36.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.9 PK	74.0	-19.1	1.06 V	80	24.40	30.50
2	2390.00	44.0 AV	54.0	-10.0	1.06 V	80	13.50	30.50
3	*2412.00	92.0 PK			1.06 V	80	61.40	30.60
4	*2412.00	81.2 AV			1.06 V	80	50.60	30.60
5	4824.00	43.4 PK	74.0	-30.6	1.02 V	139	7.30	36.10
6	4824.00	30.5 AV	54.0	-23.5	1.02 V	139	-5.60	36.10

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



A D T

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	24deg. C, 65%RH 1005 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	102.3 PK			1.31 H	233	71.70	30.60
2	*2437.00	90.8 AV			1.31 H	233	60.20	30.60
3	4874.00	43.6 PK	74.0	-30.4	1.05 H	112	7.40	36.20
4	4874.00	30.5 AV	54.0	-23.5	1.05 H	112	-5.70	36.20
5	7311.00	49.2 PK	74.0	-24.8	1.00 H	15	6.60	42.60
6	7311.00	35.8 AV	54.0	-18.2	1.00 H	15	-6.80	42.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	93.3 PK			1.05 V	81	62.70	30.60
2	*2437.00	82.4 AV			1.05 V	81	51.80	30.60
3	4874.00	43.2 PK	74.0	-30.8	1.05 V	141	7.00	36.20
4	4874.00	30.0 AV	54.0	-24.0	1.05 V	141	-6.20	36.20
5	7311.00	49.0 PK	74.0	-25.0	1.13 V	101	6.40	42.60
6	7311.00	35.5 AV	54.0	-18.5	1.13 V	101	-7.10	42.60

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

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	24deg. C, 65%RH 1005 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	*2462.00	102.5 PK			1.32 H	232	71.80	30.70
2	*2462.00	91.0 AV			1.32 H	232	60.30	30.70
3	2483.50	65.6 PK	74.0	-8.4	1.32 H	232	34.80	30.80
4	2483.50	48.5 AV	54.0	-5.5	1.32 H	232	17.70	30.80
5	4924.00	43.8 PK	74.0	-30.2	1.10 H	134	7.50	36.30
6	4924.00	30.6 AV	54.0	-23.4	1.10 H	134	-5.70	36.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	93.6 PK			1.06 V	82	62.90	30.70
2	*2462.00	82.7 AV			1.06 V	82	52.00	30.70
3	2483.50	61.2 PK	74.0	-12.8	1.06 V	82	30.40	30.80
4	2483.50	44.3 AV	54.0	-9.7	1.06 V	82	13.50	30.80
5	4924.00	44.1 PK	74.0	-29.9	1.05 V	236	7.80	36.30
6	4924.00	30.9 AV	54.0	-23.1	1.05 V	236	-5.40	36.30

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

# 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	24deg. C, 65%RH 1005 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	150.45	22.5 QP	43.5	-21.0	1.50 H	79	7.90	14.60
2	232.11	24.8 QP	46.0	-21.2	1.00 H	79	12.70	12.10
3	339.04	24.2 QP	46.0	-21.8	1.00 H	190	8.30	15.90
4	533.47	29.2 QP	46.0	-16.8	1.50 H	337	8.20	21.00
5	698.74	27.0 QP	46.0	-19.0	1.00 H	16	2.90	24.10
6	871.78	26.6 QP	46.0	-19.4	1.50 H	214	0.10	26.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	78.51	26.8 QP	40.0	-13.2	2.00 V	127	17.10	9.70
2	150.45	22.5 QP	43.5	-21.0	1.00 V	298	7.90	14.60
3	424.59	24.6 QP	46.0	-21.4	2.00 V	61	6.50	18.10
4	535.42	25.0 QP	46.0	-21.0	1.50 V	226	4.00	21.00
5	698.74	29.4 QP	46.0	-16.6	1.50 V	151	5.30	24.10
6	871.78	32.5 QP	46.0	-13.5	1.50 V	157	6.00	26.50

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

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
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	100291	Nov. 30, 2010	Nov. 29, 2011
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jun. 28, 2010	Jun. 27, 2011
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jul. 12, 2010	Jul. 11, 2011
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 11, 2010	Jun. 10, 2011
Software ADT	ADT_Conc_ V7.3.7	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.



#### 4.2.3 TEST PROCEDURES

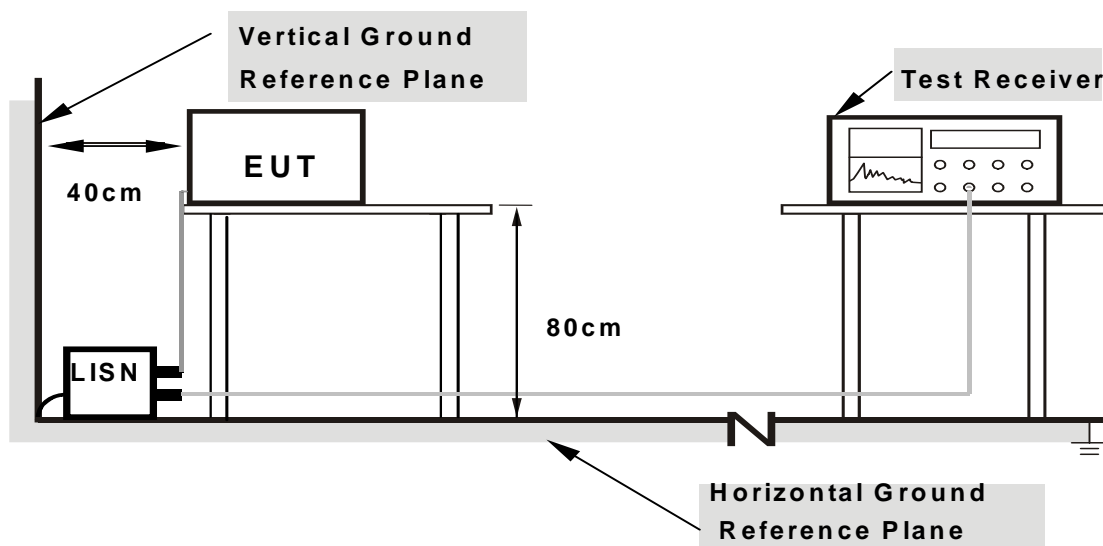
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

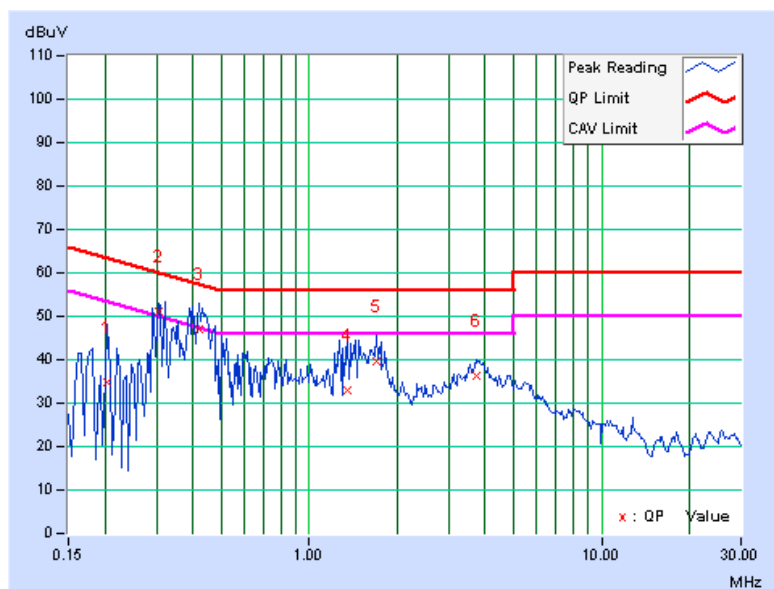
## 4.2.7 TEST RESULTS

### CONDUCTED WORST-CASE DATA : 802.11g

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.14	34.73	-	34.87	-	63.42	53.42	-28.55	-
2	0.306	0.15	50.87	42.08	51.02	42.23	60.07	50.07	-9.06	-7.85
3	0.420	0.15	46.83	-	46.98	-	57.46	47.46	-10.48	-
4	1.344	0.20	32.93	-	33.13	-	56.00	46.00	-22.87	-
5	1.703	0.21	39.35	-	39.56	-	56.00	46.00	-16.44	-
6	3.738	0.34	35.95	-	36.29	-	56.00	46.00	-19.71	-

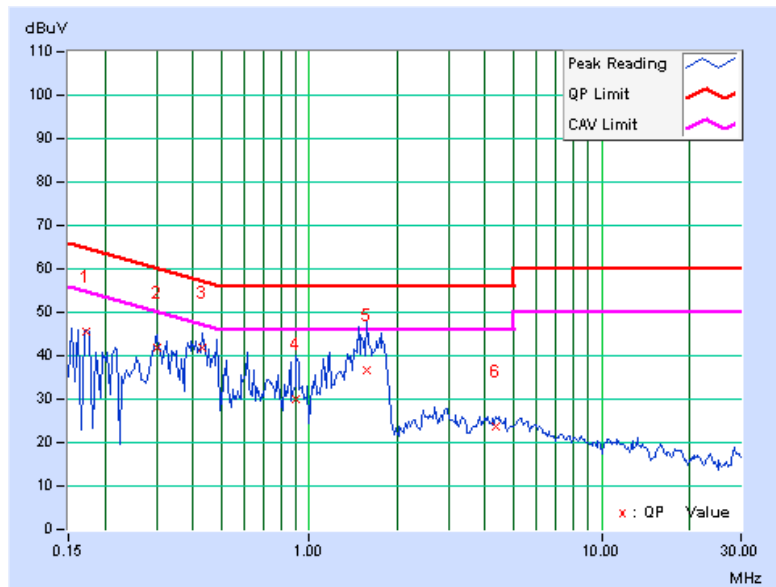
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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	Freq.	Corr.	Reading Value		Emission Level		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	0.173	0.13	45.40	-	45.53	-	64.79	54.79	-19.27	-
2	0.302	0.14	41.79	-	41.93	-	60.18	50.18	-18.25	-
3	0.431	0.14	41.54	-	41.68	-	57.23	47.23	-15.55	-
4	0.904	0.17	29.73	-	29.90	-	56.00	46.00	-26.10	-
5	1.582	0.20	36.36	-	36.56	-	56.00	46.00	-19.44	-
6	4.355	0.35	23.33	-	23.68	-	56.00	46.00	-32.32	-

- 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.



## 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](http://www.adt.com.tw/index.5.phtml). If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**

Tel: 886-3-3183232

Fax: 886-3-3185050

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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---**