



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF131104C19-1  
**MODEL NO.:** VX675 WIFI-BT  
**FCC ID:** B32VX675WIFIBT  
**RECEIVED:** Nov. 04, 2013  
**TESTED:** Nov. 07, 2013 ~ Nov. 23, 2013  
**ISSUED:** Nov. 28, 2013

**APPLICANT:** VeriFone, Inc.

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Rocklin CA 95765 USA

**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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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF131104C19-1	Original release	Nov. 28, 2013



# 1. CERTIFICATION

**PRODUCT:** Point of Sale Terminal  
**MODEL NO.:** VX675 WIFI-BT  
**BRAND:** VeriFone  
**APPLICANT:** VeriFone, Inc.  
**TESTED:** Nov. 07, 2013 ~ Nov. 23, 2013  
**TEST SAMPLE:** Identical Prototype  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: VX675 WIFI-BT) 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** : Evonne Liu , **DATE** : Nov. 28, 2013  
Evonne Liu / Specialist

**APPROVED BY** : Sam Chen , **DATE** : Nov. 28, 2013  
Sam Chen / 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	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -13.40dB at 0.41563MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.4dB at 4824MHz.
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	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 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  $k = 2$ .



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	Point of Sale Terminal
<b>MODEL NO.</b>	VX675 WIFI-BT
<b>POWER SUPPLY</b>	5Vdc (adapter) 3.6Vdc (battery)
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	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
<b>OPERATING FREQUENCY</b>	2412 ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11 for 802.11b, 802.11g, 802.11n (20MHz)
<b>OUTPUT POWER</b>	137.404mW
<b>ANTENNA TYPE</b>	PCB antenna with 0.8dBi gain
<b>ANTENNA CONNECTOR</b>	NA
<b>DATA CABLE</b>	Refer to Note as below
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Refer to Note as below

**NOTE:**

1. The diversity antenna are identical.
2. The EUT has following accessories.

ITEM	BRAND	MODEL	DESCRIPTION
Adapter 1	VeriFone	SC1402	I/P: 100-240Vac, 50-60Hz, 150mA O/P: 5Vdc, 1A
Adapter 2	VeriFone	MU06-E050100-A1	I/P: 100-240Vac, 50/60Hz, 0.2A O/P: 5Vdc, 1A
Battery	VeriFone	BPK265-001	Rating : 3.6V, 2200mAh
WLAN/BT Module 1	Ampak	GB86321D	with diversity
WLAN/BT Module 2	Ampak	GB86321G	w/o diversity

\*\* The EUT was tested with WLAN/BT Module 2.

3. The EUT provides one completed transmitter and one receiver.

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

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



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### 3.2 DESCRIPTION OF TEST MODES

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 MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE $<$ 1G	PLC	APCM	
A	-	√	-	-	Adapter 1
B	√	√	√	√	Adapter 2

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

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on X-plane.

#### **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).

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	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	MCS0

#### **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	802.11g	1 to 11	1	OFDM	BPSK	6.0
B	802.11g	1 to 11	1	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	802.11g	1 to 11	1	OFDM	BPSK	6.0
B	802.11g	1 to 11	1	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	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	MCS0

**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)
B	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	MCS0

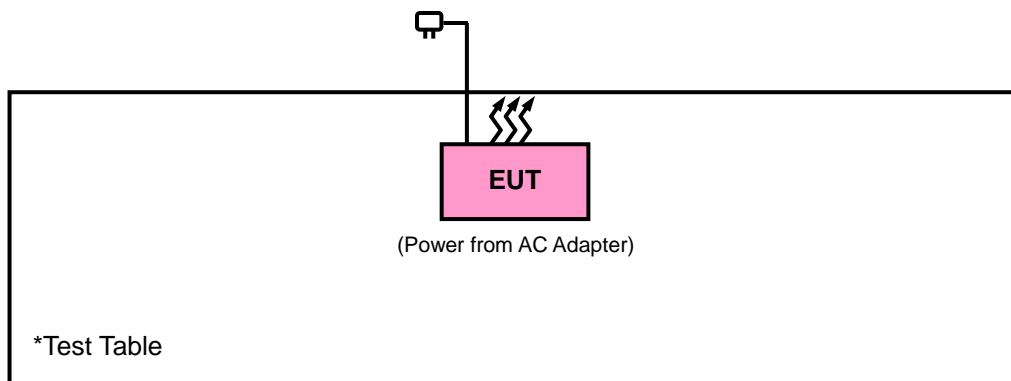
**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Anson Lin
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
APCM	25deg. C, 65%RH	120Vac, 60Hz	Demon Lin

### 3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.

#### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.4 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 C63.10-2009

KDB 558074 D01 DTS Meas Guidance v03r01

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.



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#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 15, 2013	Apr. 14, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2012	Dec. 16, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 07, 2013	Jan. 06, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 25, 2012	Dec. 24, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 184045	980116	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2012	Dec. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
Software	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. The test was performed in HwaYa Chamber 10.
  4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  5. The FCC Site Registration No. is 690701.
  6. The IC Site Registration No. is IC 7450F-10.

#### 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.

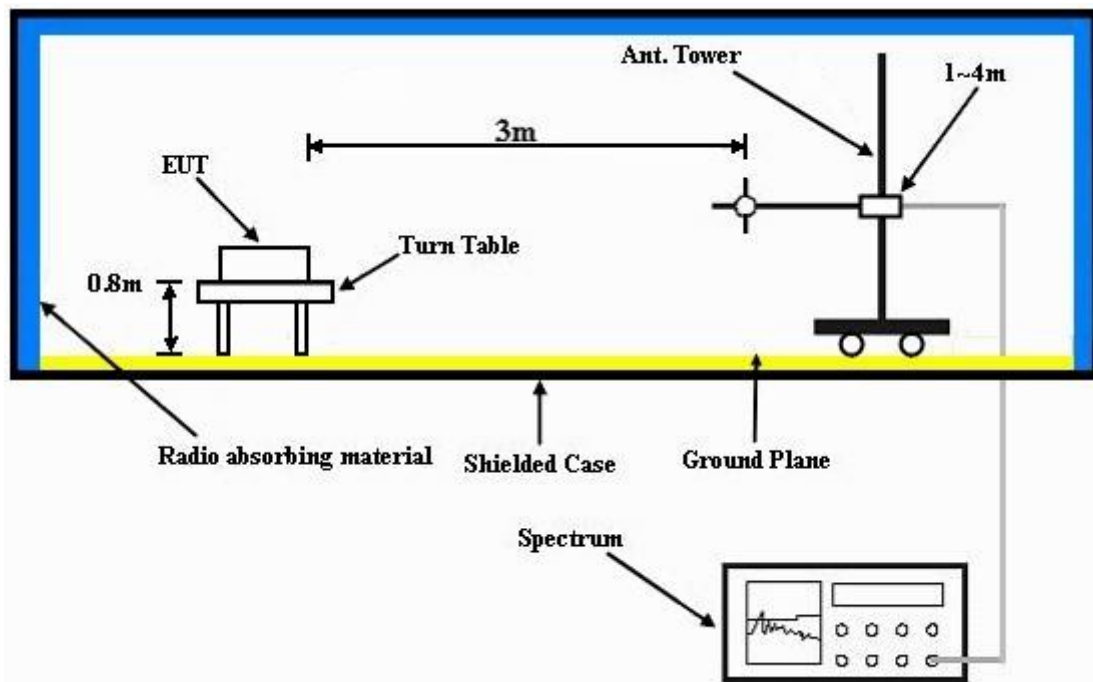
**NOTE:**

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 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. 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 WORST-CASE DATA

#### 802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	43.42	50.49	54	-10.58	26.91	3.54	37.52	100	227	Average
2390	55.35	62.42	74	-18.65	26.91	3.54	37.52	100	227	Peak
2412	104.43	111.45			26.96	3.54	37.52	100	227	Average
2412	108.53	115.55			26.96	3.54	37.52	100	227	Peak
2490	41.05	47.55	54	-12.95	27.2	3.62	37.32	100	227	Average
2490	52.41	58.91	74	-21.59	27.2	3.62	37.32	100	227	Peak
4824	46.14	62.46	54	-7.86	30.99	5.77	53.08	100	174	Average
4824	49.61	65.93	74	-24.39	30.99	5.77	53.08	100	174	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	40.26	47.33	54	-13.74	26.91	3.54	37.52	116	196	Average
2390	52.49	59.56	74	-21.51	26.91	3.54	37.52	116	196	Peak
2412	101.25	108.27			26.96	3.54	37.52	116	196	Average
2412	105.35	112.37			26.96	3.54	37.52	116	196	Peak
2496	37.8	44.23	54	-16.2	27.2	3.62	37.25	116	196	Average
2496	52.25	58.68	74	-21.75	27.2	3.62	37.25	116	196	Peak
4824	52.6	68.92	54	-1.4	30.99	5.77	53.08	102	99	Average
4824	54.41	70.73	74	-19.59	30.99	5.77	53.08	102	99	Peak

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2386	37.33	44.4	54	-16.67	26.91	3.52	37.5	100	228	Average
2386	51.43	58.5	74	-22.57	26.91	3.52	37.5	100	228	Peak
2437	103.31	110.15			27.06	3.56	37.46	100	228	Average
2437	107.06	113.9			27.06	3.56	37.46	100	228	Peak
2500	36.66	43.09	54	-17.34	27.2	3.62	37.25	100	228	Average
2500	52.35	58.78	74	-21.65	27.2	3.62	37.25	100	228	Peak
4874	43.78	59.97	54	-10.22	31.06	5.8	53.05	110	139	Average
4874	47.72	63.91	74	-26.28	31.06	5.8	53.05	110	139	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2376	35.13	42.25	54	-18.87	26.86	3.52	37.5	113	201	Average
2376	51.43	58.55	74	-22.57	26.86	3.52	37.5	113	201	Peak
2437	100.41	107.25			27.06	3.56	37.46	113	201	Average
2437	104.15	110.99			27.06	3.56	37.46	113	201	Peak
2500	35.42	41.85	54	-18.58	27.2	3.62	37.25	113	201	Average
2500	51.61	58.04	74	-22.39	27.2	3.62	37.25	113	201	Peak
4874	50.54	66.73	54	-3.46	31.06	5.8	53.05	100	102	Average
4874	52.88	69.07	74	-21.12	31.06	5.8	53.05	100	102	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2386	38.32	45.39	54	-15.68	26.91	3.52	37.5	100	230	Average
2386	52.1	59.17	74	-21.9	26.91	3.52	37.5	100	230	Peak
2462	101.53	108.24			27.1	3.58	37.39	100	230	Average
2462	105.78	112.49			27.1	3.58	37.39	100	230	Peak
2484	42.08	48.65	54	-11.92	27.15	3.6	37.32	100	230	Average
2484	55.22	61.79	74	-18.78	27.15	3.6	37.32	100	230	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2326	34.87	42.14	54	-19.13	26.72	3.48	37.47	113	90	Average
2326	50.49	57.76	74	-23.51	26.72	3.48	37.47	113	90	Peak
2462	99.5	106.21			27.1	3.58	37.39	113	90	Average
2462	103.73	110.44			27.1	3.58	37.39	113	90	Peak
2484	40.27	46.84	54	-13.73	27.15	3.6	37.32	113	90	Average
2484	53.3	59.87	74	-20.7	27.15	3.6	37.32	113	90	Peak
4924	52.53	68.61	54	-1.47	31.12	5.83	53.03	100	103	Average
4924	50.17	66.25	74	-23.83	31.12	5.83	53.03	100	103	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	49.77	56.84	54	-4.23	26.91	3.54	37.52	100	228	Average
2390	66.18	73.25	74	-7.82	26.91	3.54	37.52	100	228	Peak
2412	97.72	104.74			26.96	3.54	37.52	100	228	Average
2412	107.34	114.36			26.96	3.54	37.52	100	228	Peak
2488	40.06	46.56	54	-13.94	27.2	3.62	37.32	100	228	Average
2488	52.96	59.46	74	-21.04	27.2	3.62	37.32	100	228	Peak

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	45.08	52.15	54	-8.92	26.91	3.54	37.52	143	184	Average
2390	61.4	68.47	74	-12.6	26.91	3.54	37.52	143	184	Peak
2412	93.68	100.7			26.96	3.54	37.52	143	184	Average
2412	103.57	110.59			26.96	3.54	37.52	143	184	Peak
2488	36.85	43.35	54	-17.15	27.2	3.62	37.32	143	184	Average
2488	51.7	58.2	74	-22.3	27.2	3.62	37.32	143	184	Peak
4824	37.58	53.9	54	-16.42	30.99	5.77	53.08	101	99	Average
4824	47.96	64.28	74	-26.04	30.99	5.77	53.08	101	99	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2386	38.57	45.64	54	-15.43	26.91	3.52	37.5	100	228	Average
2386	52.49	59.56	74	-21.51	26.91	3.52	37.5	100	228	Peak
2437	97.28	104.12			27.06	3.56	37.46	100	228	Average
2437	106.76	113.6			27.06	3.56	37.46	100	228	Peak
2486	38.6	45.17	54	-15.4	27.15	3.6	37.32	100	228	Average
2486	52.51	59.08	74	-21.49	27.15	3.6	37.32	100	228	Peak

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2386	35.98	43.05	54	-18.02	26.91	3.52	37.5	112	200	Average
2386	50.77	57.84	74	-23.23	26.91	3.52	37.5	112	200	Peak
2437	94.28	101.12			27.06	3.56	37.46	112	200	Average
2437	103.44	110.28			27.06	3.56	37.46	112	200	Peak
2488	37.57	44.07	54	-16.43	27.2	3.62	37.32	112	200	Average
2488	51.63	58.13	74	-22.37	27.2	3.62	37.32	112	200	Peak
4874	35.49	51.68	54	-18.51	31.06	5.8	53.05	100	118	Average
4874	48.28	64.47	74	-25.72	31.06	5.8	53.05	100	118	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2382	38.51	45.63	54	-15.49	26.86	3.52	37.5	100	229	Average
2382	52.51	59.63	74	-21.49	26.86	3.52	37.5	100	229	Peak
2462	95.78	102.49			27.1	3.58	37.39	100	229	Average
2462	105.47	112.18			27.1	3.58	37.39	100	229	Peak
2484	48.07	54.64	54	-5.93	27.15	3.6	37.32	100	229	Average
2484	64.67	71.24	74	-9.33	27.15	3.6	37.32	100	229	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2356	33.95	41.13	54	-20.05	26.81	3.5	37.49	125	21	Average
2356	50.33	57.51	74	-23.67	26.81	3.5	37.49	125	21	Peak
2462	89.68	96.39			27.1	3.58	37.39	125	21	Average
2462	99.47	106.18			27.1	3.58	37.39	125	21	Peak
2484	40.36	46.93	54	-13.64	27.15	3.6	37.32	125	21	Average
2484	55.14	61.71	74	-18.86	27.15	3.6	37.32	125	21	Peak
4924	34.84	50.92	54	-19.16	31.12	5.83	53.03	100	103	Average
4924	46.42	62.5	74	-27.58	31.12	5.83	53.03	100	103	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.64	58.71	54	-2.36	26.91	3.54	37.52	100	228	Average
2390	68.56	75.63	74	-5.44	26.91	3.54	37.52	100	228	Peak
2412	97.62	104.64			26.96	3.54	37.52	100	228	Average
2412	107.02	114.04			26.96	3.54	37.52	100	228	Peak
2492	40.21	46.64	54	-13.79	27.2	3.62	37.25	100	228	Average
2492	53.69	60.12	74	-20.31	27.2	3.62	37.25	100	228	Peak

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	48.53	55.6	54	-5.47	26.91	3.54	37.52	115	194	Average
2390	64.81	71.88	74	-9.19	26.91	3.54	37.52	115	194	Peak
2412	94.63	101.65			26.96	3.54	37.52	115	194	Average
2412	104.46	111.48			26.96	3.54	37.52	115	194	Peak
2494	37.34	43.77	54	-16.66	27.2	3.62	37.25	115	194	Average
2494	52.45	58.88	74	-21.55	27.2	3.62	37.25	115	194	Peak
4824	36.97	53.29	54	-17.03	30.99	5.77	53.08	100	97	Average
4824	49.38	65.7	74	-24.62	30.99	5.77	53.08	100	97	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	38.72	45.79	54	-15.28	26.91	3.54	37.52	100	226	Average
2390	52.58	59.65	74	-21.42	26.91	3.54	37.52	100	226	Peak
2437	97.13	103.97			27.06	3.56	37.46	100	226	Average
2437	106.3	113.14			27.06	3.56	37.46	100	226	Peak
2484	38.81	45.38	54	-15.19	27.15	3.6	37.32	100	226	Average
2484	52.49	59.06	74	-21.51	27.15	3.6	37.32	100	226	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2366	36.13	43.3	54	-17.87	26.81	3.52	37.5	114	199	Average
2366	51.11	58.28	74	-22.89	26.81	3.52	37.5	114	199	Peak
2437	94.37	101.21			27.06	3.56	37.46	114	199	Average
2437	103.93	110.77			27.06	3.56	37.46	114	199	Peak
2484	37.15	43.72	54	-16.85	27.15	3.6	37.32	114	199	Average
2484	52.24	58.81	74	-21.76	27.15	3.6	37.32	114	199	Peak
4874	37.28	53.47	54	-16.72	31.06	5.8	53.05	100	102	Average
4874	48.06	64.25	74	-25.94	31.06	5.8	53.05	100	102	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	38.91	45.98	54	-15.09	26.91	3.54	37.52	100	227	Average
2390	52.46	59.53	74	-21.54	26.91	3.54	37.52	100	227	Peak
2462	95.48	102.19			27.1	3.58	37.39	100	227	Average
2462	105.28	111.99			27.1	3.58	37.39	100	227	Peak
2484	49.16	55.73	54	-4.84	27.15	3.6	37.32	100	227	Average
2484	65.22	71.79	74	-8.78	27.15	3.6	37.32	100	227	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2376	34.77	41.89	54	-19.23	26.86	3.52	37.5	108	123	Average
2376	50.02	57.14	74	-23.98	26.86	3.52	37.5	108	123	Peak
2462	92.56	99.27			27.1	3.58	37.39	108	123	Average
2462	102.1	108.81			27.1	3.58	37.39	108	123	Peak
2484	47.72	54.29	54	-6.28	27.15	3.6	37.32	108	123	Average
2484	62.02	68.59	74	-11.98	27.15	3.6	37.32	108	123	Peak
4924	35.63	51.71	54	-18.37	31.12	5.83	53.03	100	102	Average
4924	45.9	61.98	74	-28.1	31.12	5.83	53.03	100	102	Peak

**REMARKS:**

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.





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**BELOW 1GHz WORST-CASE DATA: 802.11g**

**MODE A**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
40.53	19.69	36.49	40	-20.31	13.55	0.67	31.02	100	136	Peak
152.04	28.06	45.66	43.5	-15.44	12.71	1.35	31.66	100	260	Peak
246.27	34.18	52.92	46	-11.82	11.32	1.82	31.88	100	193	Peak
348.3	23.74	39.26	46	-22.26	14.1	2.22	31.84	100	141	Peak
654.9	25.01	33.47	46	-20.99	20.27	3.26	31.99	100	253	Peak
972.7	28.81	32.6	54	-25.19	23.92	4.12	31.83	100	122	Peak

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
40.26	26.85	43.65	40	-13.15	13.55	0.67	31.02	100	255	Peak
137.46	30.63	48.83	43.5	-12.87	12.21	1.28	31.69	100	306	Peak
246.27	29.81	48.55	46	-16.19	11.32	1.82	31.88	100	177	Peak
372.1	21.3	36.23	46	-24.7	14.68	2.32	31.93	100	202	Peak
616.4	24.13	33.32	46	-21.87	19.81	3.14	32.14	100	312	Peak
961.5	28.72	32.69	54	-25.28	23.85	4.1	31.92	100	291	Peak



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**MODE B**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Anson Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
58.89	19.57	38.06	40	-20.43	12.04	0.82	31.35	100	235	Peak
132.6	32.96	51.63	43.5	-10.54	11.88	1.26	31.81	100	128	Peak
230.07	37.42	56.92	46	-8.58	10.62	1.74	31.86	100	147	Peak
370	22.81	37.79	46	-23.19	14.63	2.31	31.92	100	245	Peak
706	25.31	32.72	46	-20.69	20.9	3.45	31.76	100	236	Peak
974.1	28.74	32.52	54	-25.26	23.92	4.12	31.82	100	187	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
31.08	31.66	50.07	40	-8.34	12.14	0.57	31.12	100	162	Peak
132.6	28.64	47.31	43.5	-14.86	11.88	1.26	31.81	100	109	Peak
217.65	29.45	49.35	46	-16.55	10.09	1.68	31.67	100	311	Peak
370	19.92	34.9	46	-26.08	14.63	2.31	31.92	100	169	Peak
676.6	25.46	33.41	46	-20.54	20.54	3.34	31.83	100	138	Peak
945.4	28.9	32.92	46	-17.1	23.77	4.07	31.86	100	289	Peak

## 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	100290	Dec. 24, 2012	Dec. 23, 2013
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100312	Jul. 02, 2013	Jul. 01, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 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 2.
3. The VCCI Site Registration No. is C-2047.



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#### 4.2.3 TEST PROCEDURES

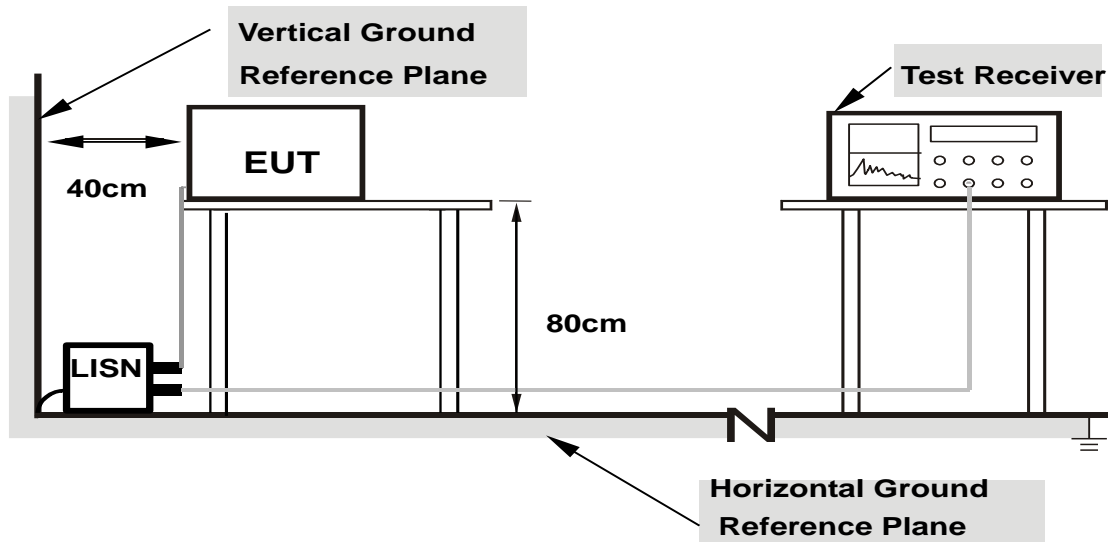
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

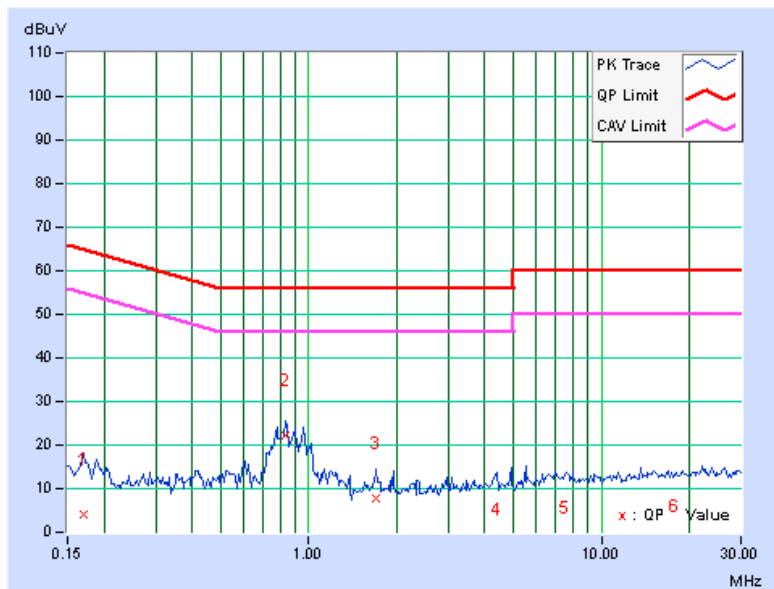
**MODE A**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
--------------	--------	----------------------	------

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	0.16953	0.17	3.87	-0.73	4.04	-0.56	64.98
2	0.83750	0.25	22.04	17.07	22.29	17.32	56.00	46.00	-33.71	-28.68
3	1.69922	0.28	7.32	4.30	7.60	4.58	56.00	46.00	-48.40	-41.42
4	4.37891	0.37	-7.74	-9.85	-7.37	-9.48	56.00	46.00	-63.37	-55.48
5	7.52734	0.41	-7.38	-9.36	-6.97	-8.95	60.00	50.00	-66.97	-58.95
6	17.73438	0.59	-7.31	-9.66	-6.72	-9.07	60.00	50.00	-66.72	-59.07

**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.





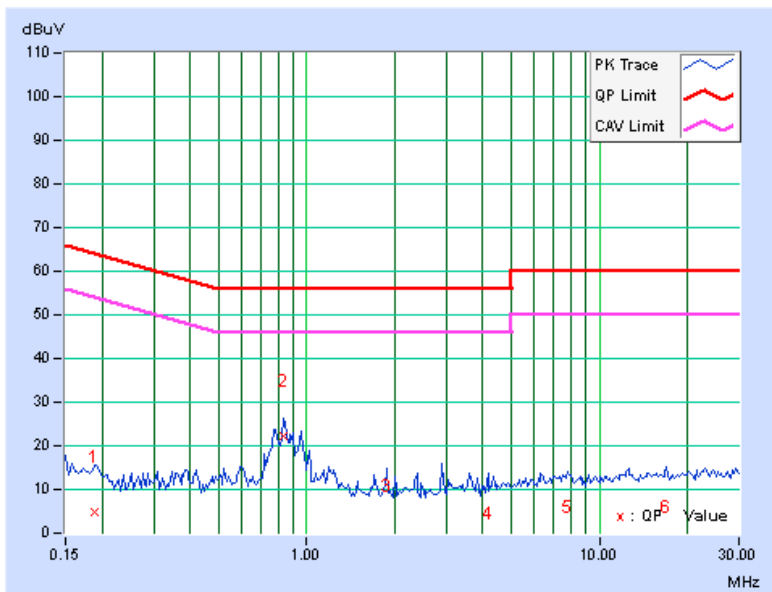
A D T

PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

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	0.18906	0.18	4.77	0.03	4.95	0.21	64.08
2	0.83750	0.24	22.08	17.03	22.32	17.27	56.00	46.00	-33.68	-28.73
3	1.89063	0.27	-2.13	-5.17	-1.86	-4.90	56.00	46.00	-57.86	-50.90
4	4.16406	0.39	-8.49	-10.28	-8.10	-9.89	56.00	46.00	-64.10	-55.89
5	7.79688	0.45	-7.24	-9.33	-6.79	-8.88	60.00	50.00	-66.79	-58.88
6	17.04297	0.66	-7.17	-9.50	-6.51	-8.84	60.00	50.00	-66.51	-58.84

**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.



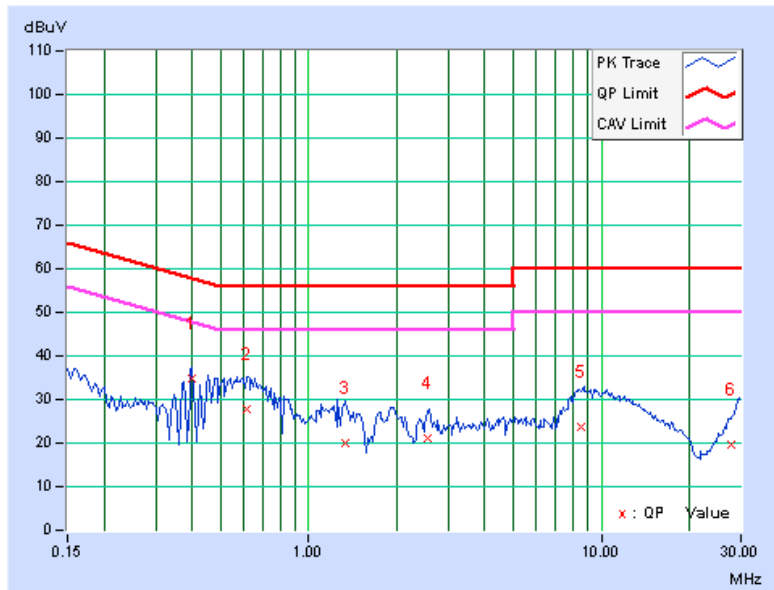
**MODE B**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
--------------	--------	----------------------	------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.40000	0.21	34.45	31.90	34.66	32.11	57.85	47.85	-23.19	-15.74
2	0.61094	0.23	27.61	14.58	27.84	14.81	56.00	46.00	-28.16	-31.19
3	1.33203	0.27	19.61	7.75	19.88	8.02	56.00	46.00	-36.12	-37.98
4	2.55859	0.31	20.69	7.95	21.00	8.26	56.00	46.00	-35.00	-37.74
5	8.49219	0.41	23.43	14.63	23.84	15.04	60.00	50.00	-36.16	-34.96
6	27.66016	0.55	18.97	9.76	19.52	10.31	60.00	50.00	-40.48	-39.69

**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.



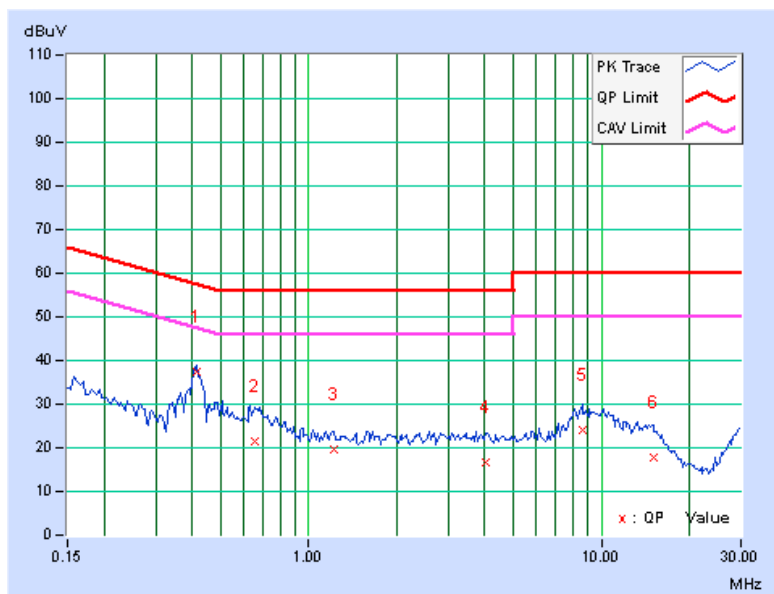


PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

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	0.41563	0.25	36.99	33.89	37.24	34.14	57.54
2	0.65781	0.24	21.38	14.45	21.62	14.69	56.00	46.00	-34.38	-31.31
3	1.21484	0.24	19.23	14.42	19.47	14.66	56.00	46.00	-36.53	-31.34
4	4.01563	0.39	16.20	9.71	16.59	10.10	56.00	46.00	-39.41	-35.90
5	8.58594	0.46	23.46	16.77	23.92	17.23	60.00	50.00	-36.08	-32.77
6	15.05859	0.61	17.30	9.40	17.91	10.01	60.00	50.00	-42.09	-39.99

**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.

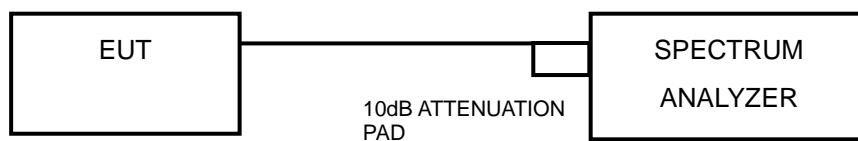


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 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

- Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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	8.07	0.5	PASS
6	2437	8.12	0.5	PASS
11	2462	8.09	0.5	PASS

#### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.44	0.5	PASS
6	2437	15.16	0.5	PASS
11	2462	15.16	0.5	PASS

#### 802.11n (20MHz)

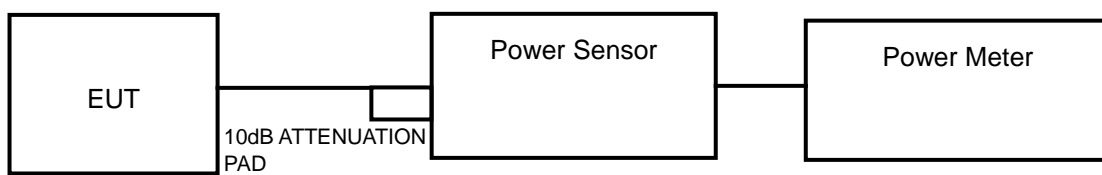
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.15	0.5	PASS
6	2437	15.15	0.5	PASS
11	2462	15.21	0.5	PASS

## 4.4 CONDUCTED OUTPUT POWER

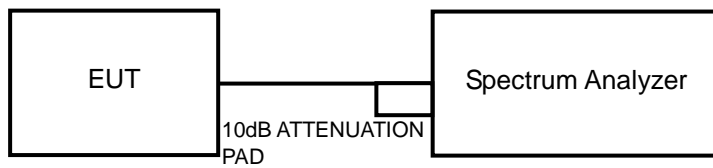
### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

### 4.4.2 TEST SETUP



or



#### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.4.4 TEST PROCEDURES

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

#### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

#### 4.4.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	63.680	18.04	30	PASS
6	2437	54.075	17.33	30	PASS
11	2462	54.702	17.38	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	137.404	21.38	30	PASS
6	2437	132.130	21.21	30	PASS
11	2462	127.057	21.04	30	PASS

##### 802.11n (20MHz)

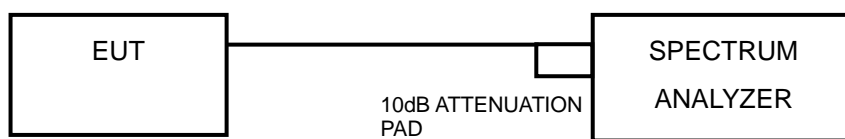
CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	122.462	20.88	30	PASS
6	2437	110.662	20.44	30	PASS
11	2462	114.288	20.58	30	PASS

## 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 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	-7.65	8	PASS
6	2437	-8.58	8	PASS
11	2462	-7.65	8	PASS

### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.82	8	PASS
6	2437	-13.53	8	PASS
11	2462	-12.77	8	PASS

### 802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.02	8	PASS
6	2437	-13.73	8	PASS
11	2462	-12.32	8	PASS

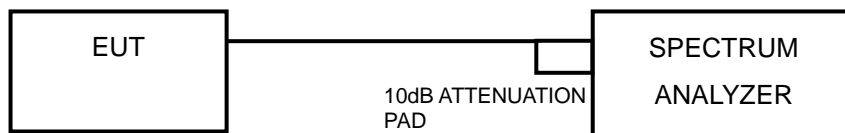


## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  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  $\geq$  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 OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  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

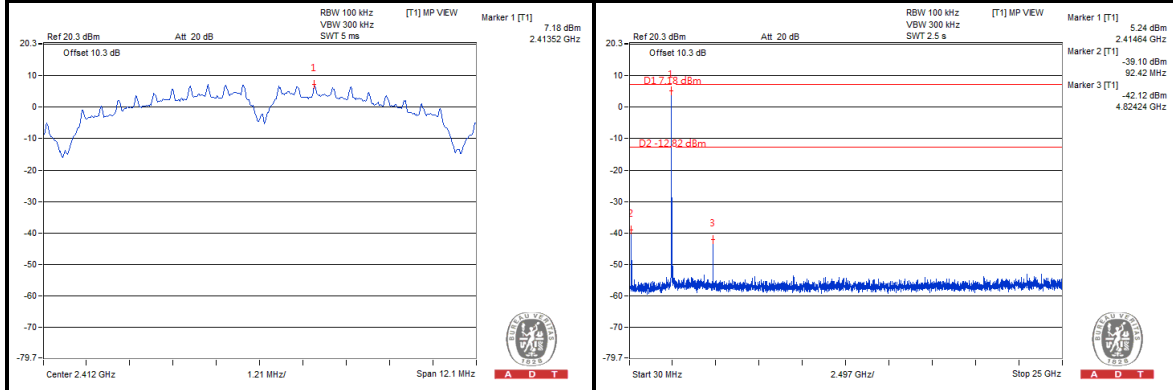
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



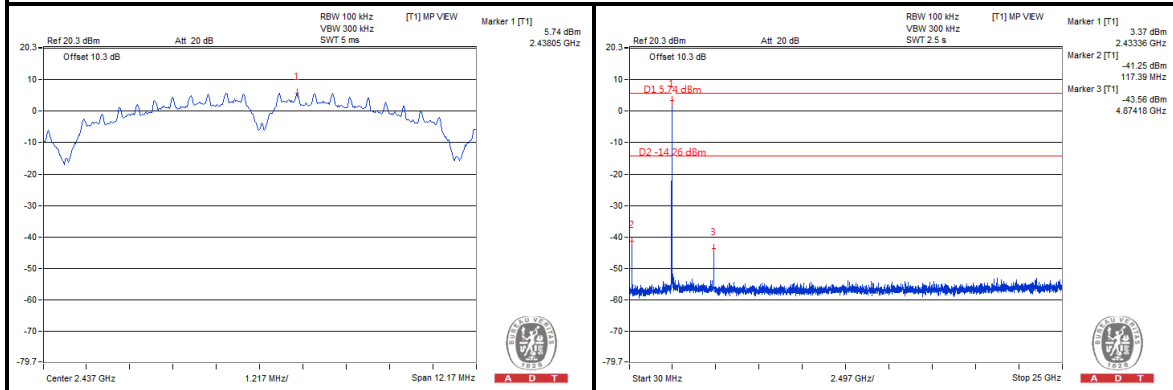
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### 802.11b

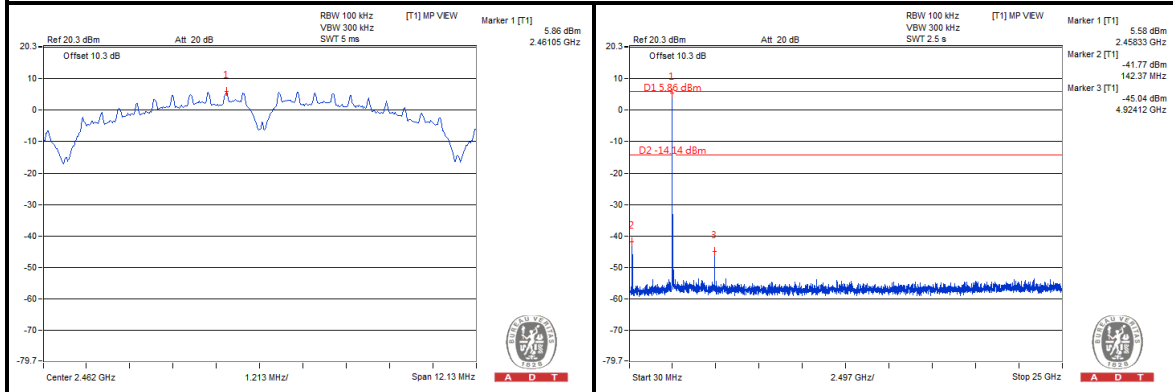
#### CH 1



#### CH 6



#### CH 11

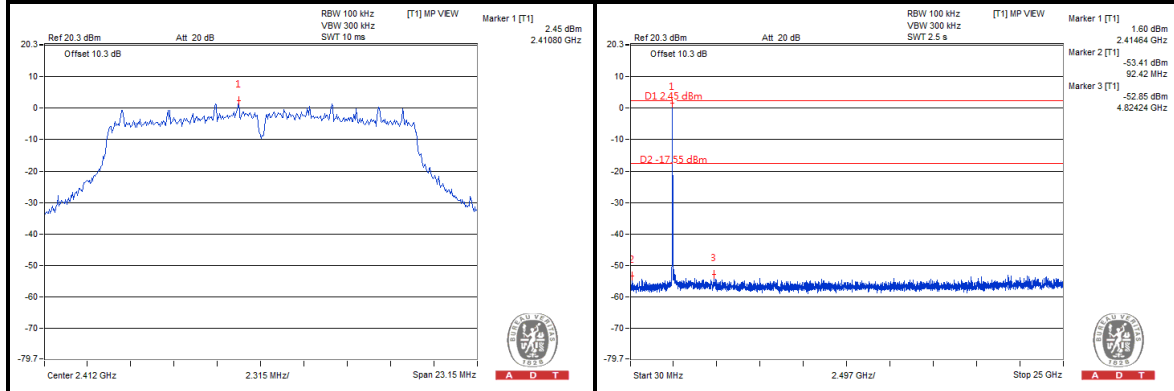




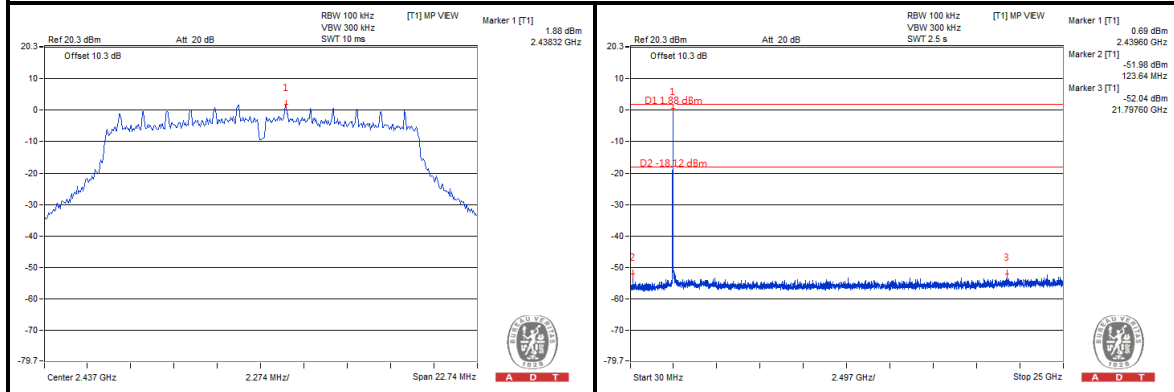
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### 802.11g

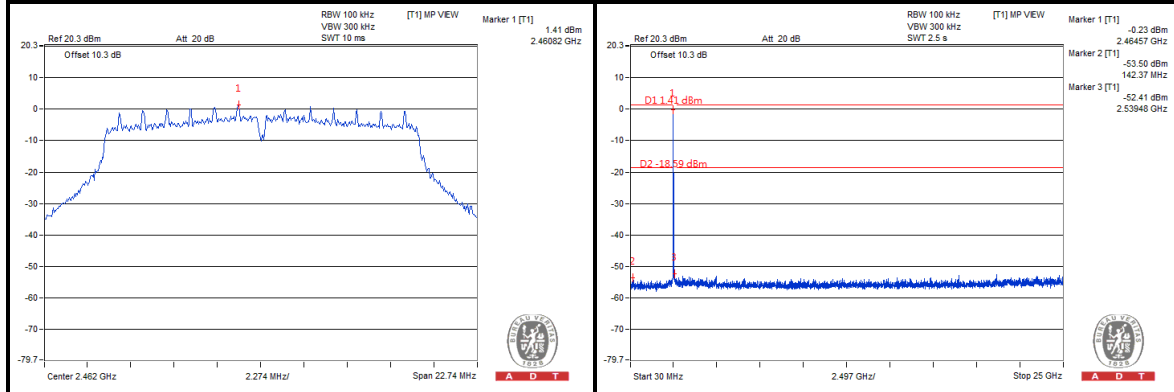
#### CH 1



#### CH 6



#### CH 11

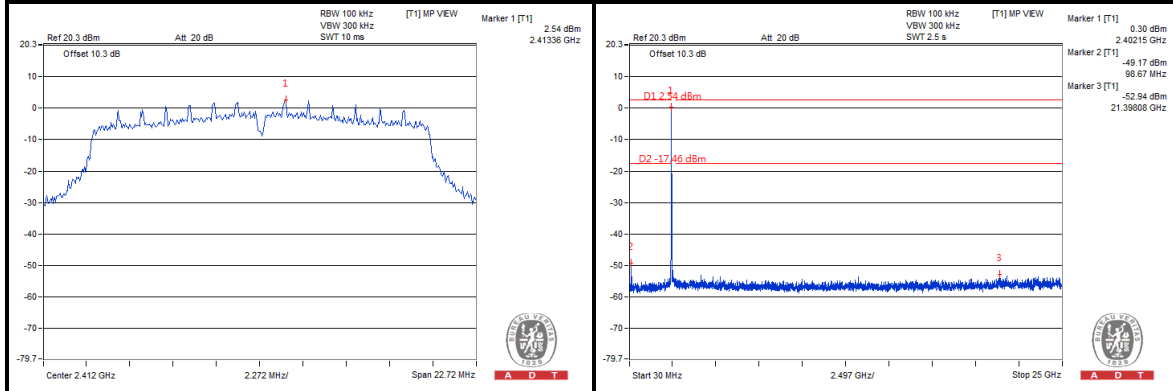




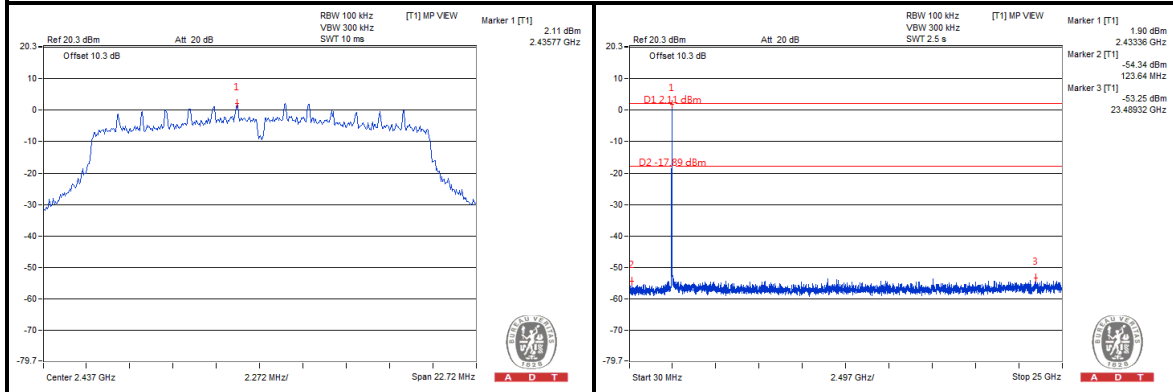
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### 802.11n (20MHz)

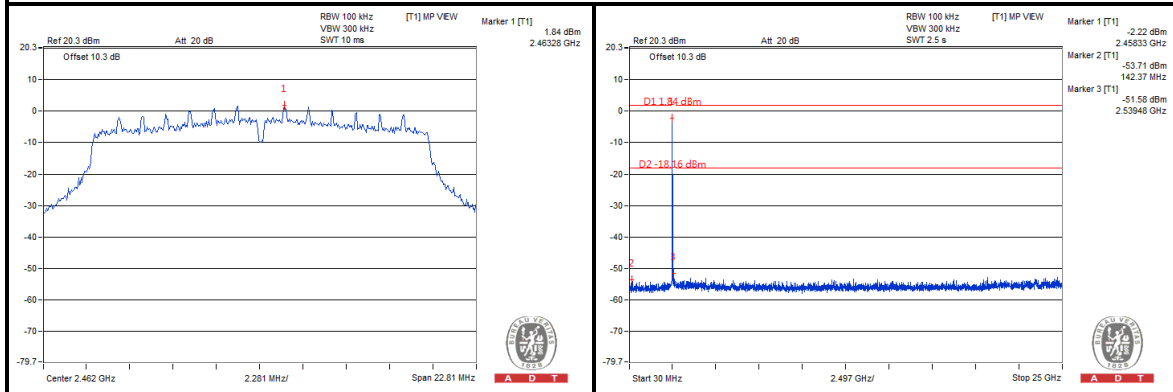
#### CH 1



#### CH 6



#### CH 11





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## 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:

**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:**

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Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

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

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.

**---END---**