



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF130402C20-5  
**MODEL NO.:** PO88100  
**FCC ID:** NM8PO88100  
**RECEIVED:** Apr. 02, 2013  
**TESTED:** May 17, 2013 ~ May 27, 2013  
**ISSUED:** May 30, 2013

**APPLICANT:** HTC Corporation

**ADDRESS:** 23, Xinghua Rd., Taoyuan 330, Taiwan, R.O.C.

**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  
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# TABLE OF CONTENTS

RELEASE CONTROL RECORD.....	5
1. CERTIFICATION .....	6
2. SUMMARY OF TEST RESULTS .....	7
2.1 MEASUREMENT UNCERTAINTY.....	7
3. GENERAL INFORMATION.....	8
3.1 GENERAL DESCRIPTION OF EUT .....	8
3.2 DESCRIPTION OF TEST MODES .....	9
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	10
3.3 DESCRIPTION OF SUPPORT UNITS .....	14
3.3.1 CONFIGURATION OF SYSTEM UNDER TEST .....	14
3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	14
4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND).....	15
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	15
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	15
4.1.2 TEST INSTRUMENTS.....	16
4.1.3 TEST PROCEDURES .....	17
4.1.4 DEVIATION FROM TEST STANDARD .....	17
4.1.5 TEST SETUP.....	18
4.1.6 EUT OPERATING CONDITIONS .....	18
4.1.7 TEST RESULTS .....	19
4.2 CONDUCTED EMISSION MEASUREMENT .....	29
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	29
4.2.2 TEST INSTRUMENTS.....	29
4.2.3 TEST PROCEDURES .....	30
4.2.4 DEVIATION FROM TEST STANDARD .....	30
4.2.5 TEST SETUP.....	31
4.2.6 EUT OPERATING CONDITIONS .....	31
4.2.7 TEST RESULTS .....	32
4.3 6dB BANDWIDTH MEASUREMENT.....	34
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	34
4.3.2 TEST SETUP.....	34
4.3.3 TEST INSTRUMENTS.....	34
4.3.4 TEST PROCEDURE.....	34
4.3.5 DEVIATION FROM TEST STANDARD .....	34
4.3.6 EUT OPERATING CONDITIONS .....	34
4.3.7 TEST RESULTS .....	35
4.4 CONDUCTED OUTPUT POWER.....	36
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	36



4.4.2	TEST SETUP.....	36
4.4.3	TEST INSTRUMENTS.....	36
4.4.4	TEST PROCEDURES .....	36
4.4.5	DEVIATION FROM TEST STANDARD .....	36
4.4.6	EUT OPERATING CONDITIONS .....	36
4.4.7	TEST RESULTS .....	37
4.5	POWER SPECTRAL DENSITY MEASUREMENT.....	38
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	38
4.5.2	TEST SETUP.....	38
4.5.3	TEST INSTRUMENTS.....	38
4.5.4	TEST PROCEDURE.....	38
4.5.5	DEVIATION FROM TEST STANDARD .....	38
4.5.6	EUT OPERATING CONDITION.....	38
4.5.7	TEST RESULTS .....	39
4.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT.....	40
4.6.1	LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	40
4.6.2	TEST SETUP.....	40
4.6.3	TEST INSTRUMENTS.....	40
4.6.4	TEST PROCEDURE.....	40
4.6.5	DEVIATION FROM TEST STANDARD .....	41
4.6.6	EUT OPERATING CONDITION.....	41
4.6.7	TEST RESULTS .....	41
5.	TEST TYPES AND RESULTS (FOR 5.0GHz BAND) .....	45
5.1	RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	45
5.1.1	LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	45
5.1.2	TEST INSTRUMENTS.....	46
5.1.3	TEST PROCEDURES .....	46
5.1.4	DEVIATION FROM TEST STANDARD .....	46
5.1.5	TEST SETUP.....	46
5.1.6	EUT OPERATING CONDITIONS .....	46
5.1.7	TEST RESULTS .....	47
5.2	CONDUCTED EMISSION MEASUREMENT .....	56
5.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	56
5.2.2	TEST INSTRUMENTS.....	56
5.2.3	TEST PROCEDURES .....	56
5.2.4	DEVIATION FROM TEST STANDARD .....	56
5.2.5	TEST SETUP.....	56
5.2.6	EUT OPERATING CONDITIONS .....	56
5.2.7	TEST RESULTS .....	57
5.3	6dB BANDWIDTH MEASUREMENT.....	59



A D T

5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	59
5.3.2	TEST SETUP .....	59
5.3.3	TEST INSTRUMENTS.....	59
5.3.4	TEST PROCEDURE.....	59
5.3.5	DEVIATION FROM TEST STANDARD .....	59
5.3.6	EUT OPERATING CONDITIONS .....	59
5.3.7	TEST RESULTS .....	60
5.4	MAXIMUM OUTPUT POWER .....	61
5.4.1	LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT.....	61
5.4.2	TEST SETUP.....	61
5.4.3	INSTRUMENTS.....	61
5.4.4	TEST PROCEDURES .....	61
5.4.5	DEVIATION FROM TEST STANDARD .....	61
5.4.6	EUT OPERATING CONDITIONS .....	61
5.4.7	TEST RESULTS .....	62
5.5	POWER SPECTRAL DENSITY MEASUREMENT .....	63
5.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	63
5.5.2	TEST SETUP.....	63
5.5.3	TEST INSTRUMENTS.....	63
5.5.4	TEST PROCEDURE.....	63
5.5.5	DEVIATION FROM TEST STANDARD .....	63
5.5.6	EUT OPERATING CONDITION.....	63
5.5.7	TEST RESULTS .....	64
5.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	65
5.6.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT .....	65
5.6.2	TEST SETUP.....	65
5.6.3	TEST INSTRUMENTS.....	65
5.6.4	TEST PROCEDURE.....	65
5.6.5	DEVIATION FROM TEST STANDARD .....	65
5.6.6	EUT OPERATING CONDITION.....	65
5.6.7	TEST RESULTS .....	65
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	69
7.	INFORMATION ON THE TESTING LABORATORIES .....	70
8.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	71



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130402C20-5	Original release	May 30, 2013



# 1. CERTIFICATION

**PRODUCT:** Windows Phone  
**MODEL NO.:** PO88100  
**BRAND:** HTC  
**APPLICANT:** HTC Corporation  
**TESTED:** May 17, 2013 ~ May 27, 2013  
**TEST SAMPLE:** PRODUCTION UNIT  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: PO88100) 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** : Ivonne Wu , **DATE** : May 30, 2013  
Ivonne Wu / Senior Specialist

**APPROVED BY** : Sam chen , **DATE** : May 30, 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 -10.46dB at 2.19141MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.61dB at 2484MHz.
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  $k = 2$ .



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### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	Windows Phone
<b>MODEL NO.</b>	PO88100
<b>POWER SUPPLY</b>	5.0Vdc (adapter or host equipment) 3.75Vdc (Li-ion 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 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7
<b>OPERATING FREQUENCY</b>	<b>2.4GHz:</b> 2412 ~ 2462MHz <b>5.0GHz:</b> 5745 ~ 5805MHz
<b>NUMBER OF CHANNEL</b>	<b>2.4GHz:</b> 11 for 802.11b, 802.11g, 802.11n (20MHz) <b>5.0GHz:</b> 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	164.059mW for 2412 ~ 2462MHz 108.643mW for 5745 ~ 5805MHz
<b>ANTENNA TYPE</b>	<b>2.4GHz:</b> PIFA antenna with -1.47dBi gain <b>5.0GHz:</b> PIFA antenna with -4.98dBi 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 EUT's accessories list refers to Ext. Pho.
2. 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.

### 3.2 DESCRIPTION OF TEST MODES

#### FOR 2.4GHz:

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		

#### FOR 5.0GHz (5745 ~ 5805MHz):

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	157	5785MHz
153	5765MHz	161	5805MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### FOR 2.4GHz:

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

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).
- Following channel(s) was (were) selected for the final test as listed below.

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (20MHz)	1 to 11	6	OFDM	BPSK	MCS0

#### POWER LINE CONDUCTED EMISSION TEST:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (20MHz)	1 to 11	6	OFDM	BPSK	MCS0



**BANDEDGE MEASUREMENT:**

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	David Huang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	David Huang
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao



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**FOR 5.0GHz (5745 ~ 5805MHz):**

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

Where **RE≥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).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 161	149, 157, 161	OFDM	BPSK	6.0
802.11n (20MHz)	149 to 161	149, 157, 161	OFDM	BPSK	MCS0
802.11n (40MHz)	151 to 159	151, 159	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (20MHz)	149 to 161	149	OFDM	BPSK	MCS0

**POWER LINE CONDUCTED EMISSION TEST:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (20MHz)	149 to 161	149	OFDM	BPSK	MCS0

**BANDEDGE MEASUREMENT:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 161	149, 161	OFDM	BPSK	6.0
802.11n (20MHz)	149 to 161	149, 161	OFDM	BPSK	MCS0
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0

**ANTENNA PORT CONDUCTED MEASUREMENT:**

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 161	149, 157, 161	OFDM	BPSK	6.0
802.11n (20MHz)	149 to 161	149, 157, 161	OFDM	BPSK	MCS0
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0

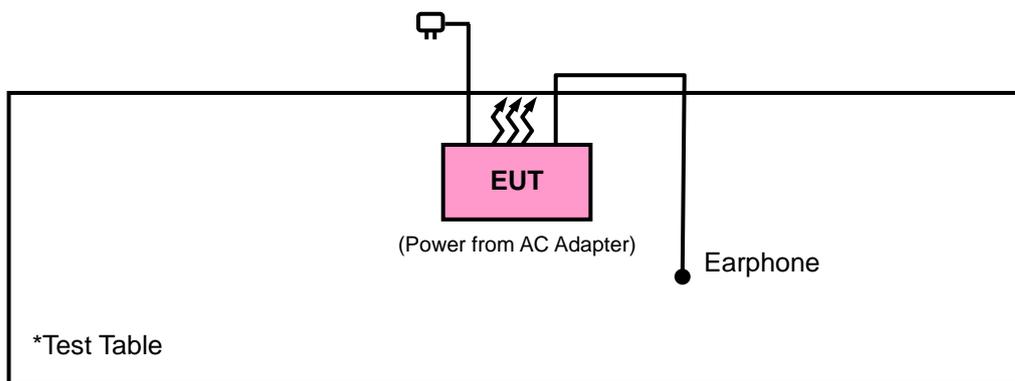
**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	David Huang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	David Huang
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao

### 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 v02

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 (FOR 2.4GHz BAND)

### 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. 19, 2012	Oct. 18, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
Software BV ADT	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
Power Meter	ML2495A	1232002	Aug. 10, 2012	Aug. 09, 2013
Power Sensor	MA2411B	1207325	Aug. 15, 2012	Aug. 14, 2013

- 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.

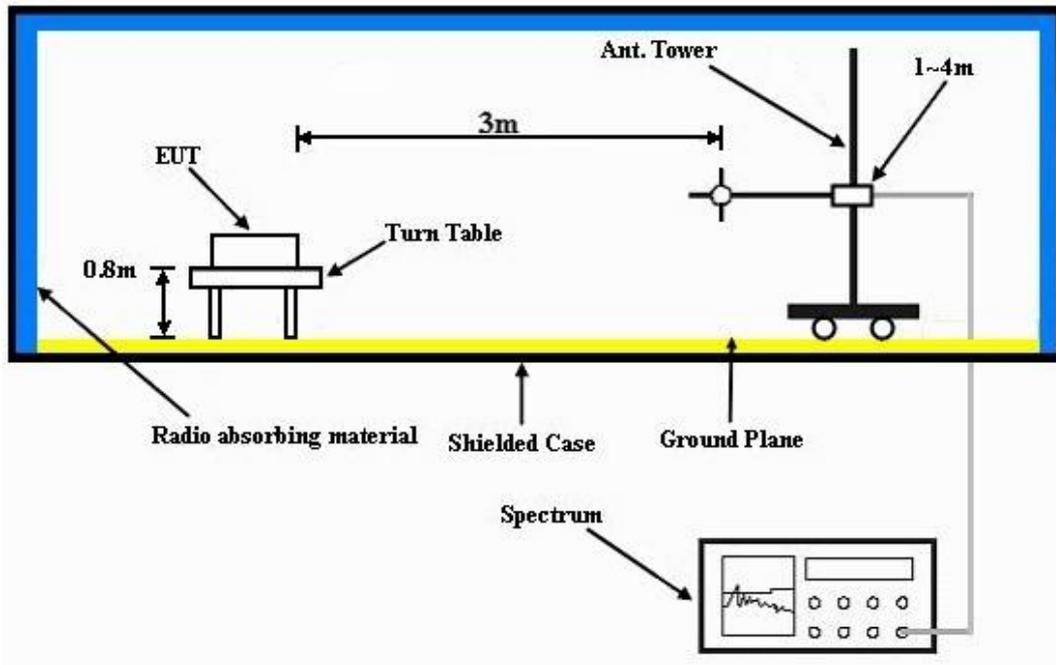
**NOTE:**

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.



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### 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	Kay Wu

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
2388	40.93	47.1	54	-13.07	31.93	5.4	43.5	138	130	Average
2388	49.97	56.14	74	-24.03	31.93	5.4	43.5	138	130	Peak
2412	94.11	100.27			31.96	5.43	43.55	138	130	Average
2412	96.95	103.11			31.96	5.43	43.55	138	130	Peak
2500	33.18	39.34	54	-20.82	32.1	5.53	43.79	138	130	Average
2500	47.99	54.15	74	-26.01	32.1	5.53	43.79	138	130	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
2388	42.3	48.47	54	-11.7	31.93	5.4	43.5	117	23	Average
2388	51.69	57.86	74	-22.31	31.93	5.4	43.5	117	23	Peak
2412	95.38	101.54			31.96	5.43	43.55	117	23	Average
2412	98.12	104.28			31.96	5.43	43.55	117	23	Peak
2484	33.26	39.4	54	-20.74	32.1	5.5	43.74	117	23	Average
2484	48.39	54.53	74	-25.61	32.1	5.5	43.74	117	23	Peak

#### REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 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	Kay Wu

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
2356	34.52	40.68	54	-19.48	31.87	5.37	43.4	135	129	Average
2356	48.8	54.96	74	-25.2	31.87	5.37	43.4	135	129	Peak
2437	93.81	99.99			32.01	5.46	43.65	135	129	Average
2437	96.72	102.9			32.01	5.46	43.65	135	129	Peak
2496	34.32	40.48	54	-19.68	32.1	5.53	43.79	135	129	Average
2496	49.13	55.29	74	-24.87	32.1	5.53	43.79	135	129	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
2370	36	42.18	54	-18	31.9	5.37	43.45	116	22	Average
2370	48.85	55.03	74	-25.15	31.9	5.37	43.45	116	22	Peak
2437	95.05	101.23			32.01	5.46	43.65	116	22	Average
2437	97.94	104.12			32.01	5.46	43.65	116	22	Peak
2496	34.85	41.01	54	-19.15	32.1	5.53	43.79	116	22	Average
2496	48.95	55.11	74	-25.05	32.1	5.53	43.79	116	22	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 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	Kay Wu

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
2316	32.46	38.59	54	-21.54	31.81	5.3	43.24	134	128	Average
2316	48.35	54.48	74	-25.65	31.81	5.3	43.24	134	128	Peak
2462	93.81	99.96			32.04	5.5	43.69	134	128	Average
2462	96.53	102.68			32.04	5.5	43.69	134	128	Peak
2488	41.12	47.28	54	-12.88	32.1	5.53	43.79	134	128	Average
2488	50.28	56.44	74	-23.72	32.1	5.53	43.79	134	128	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	32.71	38.89	54	-21.29	31.9	5.37	43.45	113	13	Average
2376	48.39	54.57	74	-25.61	31.9	5.37	43.45	113	13	Peak
2462	95.41	101.56			32.04	5.5	43.69	113	13	Average
2462	98.17	104.32			32.04	5.5	43.69	113	13	Peak
2488	42.73	48.89	54	-11.27	32.1	5.53	43.79	113	13	Average
2488	51.55	57.71	74	-22.45	32.1	5.53	43.79	113	13	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 2462MHz: Fundamental frequency.



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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	Kay Wu

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	50.15	56.32	54	-3.85	31.93	5.4	43.5	139	131	Average
2390	66.36	72.53	74	-7.64	31.93	5.4	43.5	139	131	Peak
2412	88.25	94.41			31.96	5.43	43.55	139	131	Average
2412	97.09	103.25			31.96	5.43	43.55	139	131	Peak
2500	34.08	40.24	54	-19.92	32.1	5.53	43.79	139	131	Average
2500	48.98	55.14	74	-25.02	32.1	5.53	43.79	139	131	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	50.86	57.03	54	-3.14	31.93	5.4	43.5	117	22	Average
2390	65.48	71.65	74	-8.52	31.93	5.4	43.5	117	22	Peak
2412	89.66	95.82			31.96	5.43	43.55	117	22	Average
2412	98.36	104.52			31.96	5.43	43.55	117	22	Peak
2484	34.17	40.31	54	-19.83	32.1	5.5	43.74	117	22	Average
2484	48.4	54.54	74	-25.6	32.1	5.5	43.74	117	22	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 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	Kay Wu

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	38.77	44.94	54	-15.23	31.93	5.4	43.5	105	130	Average
2386	49.47	55.64	74	-24.53	31.93	5.4	43.5	105	130	Peak
2437	88.62	94.8			32.01	5.46	43.65	105	130	Average
2437	96.17	102.35			32.01	5.46	43.65	105	130	Peak
2492	36.3	42.46	54	-17.7	32.1	5.53	43.79	105	130	Average
2492	48.81	54.97	74	-25.19	32.1	5.53	43.79	105	130	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	38.34	44.51	54	-15.66	31.93	5.4	43.5	114	26	Average
2386	50.54	56.71	74	-23.46	31.93	5.4	43.5	114	26	Peak
2437	89.36	95.54			32.01	5.46	43.65	114	26	Average
2437	97.65	103.83			32.01	5.46	43.65	114	26	Peak
2492	38.03	44.19	54	-15.97	32.1	5.53	43.79	114	26	Average
2492	49.63	55.79	74	-24.37	32.1	5.53	43.79	114	26	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 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	Kay Wu

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
2366	33.53	39.66	54	-20.47	31.9	5.37	43.4	137	128	Average
2366	48.78	54.91	74	-25.22	31.9	5.37	43.4	137	128	Peak
2462	88.19	94.34			32.04	5.5	43.69	137	128	Average
2462	96.3	102.45			32.04	5.5	43.69	137	128	Peak
2484	51.1	57.24	54	-2.9	32.1	5.5	43.74	137	128	Average
2484	69.53	75.67	74	-4.47	32.1	5.5	43.74	137	128	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
2372	33.57	39.75	54	-20.43	31.9	5.37	43.45	116	9	Average
2372	48.61	54.79	74	-25.39	31.9	5.37	43.45	116	9	Peak
2462	88.63	94.78			32.04	5.5	43.69	116	9	Average
2462	96.55	102.7			32.04	5.5	43.69	116	9	Peak
2484	51.18	57.32	54	-2.82	32.1	5.5	43.74	116	9	Average
2484	69.03	75.17	74	-4.97	32.1	5.5	43.74	116	9	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 2462MHz: Fundamental frequency.



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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	Kay Wu

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	49.73	55.9	54	-4.27	31.93	5.4	43.5	108	130	Average
2390	63.78	69.95	74	-10.22	31.93	5.4	43.5	108	130	Peak
2412	87.67	93.83			31.96	5.43	43.55	108	130	Average
2412	96.03	102.19			31.96	5.43	43.55	108	130	Peak
2500	33.95	40.11	54	-20.05	32.1	5.53	43.79	108	130	Average
2500	48	54.16	74	-26	32.1	5.53	43.79	108	130	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	50.31	56.48	54	-3.69	31.93	5.4	43.5	115	25	Average
2390	68.46	74.63	74	-5.54	31.93	5.4	43.5	115	25	Peak
2412	89.21	95.37			31.96	5.43	43.55	115	25	Average
2412	97.47	103.63			31.96	5.43	43.55	115	25	Peak
2494	34.17	40.33	54	-19.83	32.1	5.53	43.79	115	25	Average
2494	48.45	54.61	74	-25.55	32.1	5.53	43.79	115	25	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
- 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	Kay Wu

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	38.3	44.47	54	-15.7	31.93	5.4	43.5	105	129	Average
2386	50.06	56.23	74	-23.94	31.93	5.4	43.5	105	129	Peak
2437	88.27	94.45			32.01	5.46	43.65	105	129	Average
2437	96.94	103.12			32.01	5.46	43.65	105	129	Peak
2484	36.55	42.69	54	-17.45	32.1	5.5	43.74	105	129	Average
2484	49.2	55.34	74	-24.8	32.1	5.5	43.74	105	129	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	39.27	45.44	54	-14.73	31.93	5.4	43.5	116	24	Average
2386	50.15	56.32	74	-23.85	31.93	5.4	43.5	116	24	Peak
2437	89.37	95.55			32.01	5.46	43.65	116	24	Average
2437	97.31	103.49			32.01	5.46	43.65	116	24	Peak
2486	37.79	43.9	54	-16.21	32.1	5.53	43.74	116	24	Average
2486	49.48	55.59	74	-24.52	32.1	5.53	43.74	116	24	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 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	Kay Wu

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	33.42	39.59	54	-20.58	31.93	5.4	43.5	134	127	Average
2390	49.34	55.51	74	-24.66	31.93	5.4	43.5	134	127	Peak
2462	87.51	93.66			32.04	5.5	43.69	134	127	Average
2462	95.48	101.63			32.04	5.5	43.69	134	127	Peak
2484	52.69	58.83	54	-1.31	32.1	5.5	43.74	134	127	Average
2484	68.74	74.88	74	-5.26	32.1	5.5	43.74	134	127	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
2382	33.65	39.77	54	-20.35	31.93	5.4	43.45	115	23	Average
2382	48.7	54.82	74	-25.3	31.93	5.4	43.45	115	23	Peak
2462	89.15	95.3			32.04	5.5	43.69	115	23	Average
2462	97.73	103.88			32.04	5.5	43.69	115	23	Peak
<b>2484</b>	<b>53.39</b>	<b>59.53</b>	<b>54</b>	<b>-0.61</b>	<b>32.1</b>	<b>5.5</b>	<b>43.74</b>	<b>115</b>	<b>23</b>	<b>Average</b>
2484	69.23	75.37	74	-4.77	32.1	5.5	43.74	115	23	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 2462MHz: Fundamental frequency.



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**BELOW 1GHz WORST-CASE DATA: 802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
41.61	25.98	42.79	40	-14.02	13.56	0.68	31.05	100	121	Peak
110.73	26.56	47.19	43.5	-16.94	10.09	1.13	31.85	100	119	Peak
172.02	27.09	45.82	43.5	-16.41	11.57	1.45	31.75	100	237	Peak
374.2	26.14	41.02	46	-19.86	14.73	2.32	31.93	100	139	Peak
467.3	26.97	39.54	46	-19.03	16.68	2.67	31.92	100	149	Peak
662.6	26.86	35.12	46	-19.14	20.36	3.29	31.91	100	157	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
30.54	34.32	52.73	40	-5.68	12.14	0.57	31.12	100	102	Peak
41.88	34.4	51.21	40	-5.6	13.56	0.68	31.05	100	124	QP
107.76	25.14	46.08	43.5	-18.36	9.81	1.11	31.86	100	114	Peak
473.6	28.56	40.96	46	-17.44	16.79	2.69	31.88	100	163	Peak
573	25.5	35.59	46	-20.5	18.99	3.01	32.09	100	189	Peak
662.6	27.46	35.72	46	-18.54	20.36	3.29	31.91	100	171	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

## 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	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 06, 2012	Jul. 05, 2013
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.

#### 4.2.3 TEST PROCEDURES

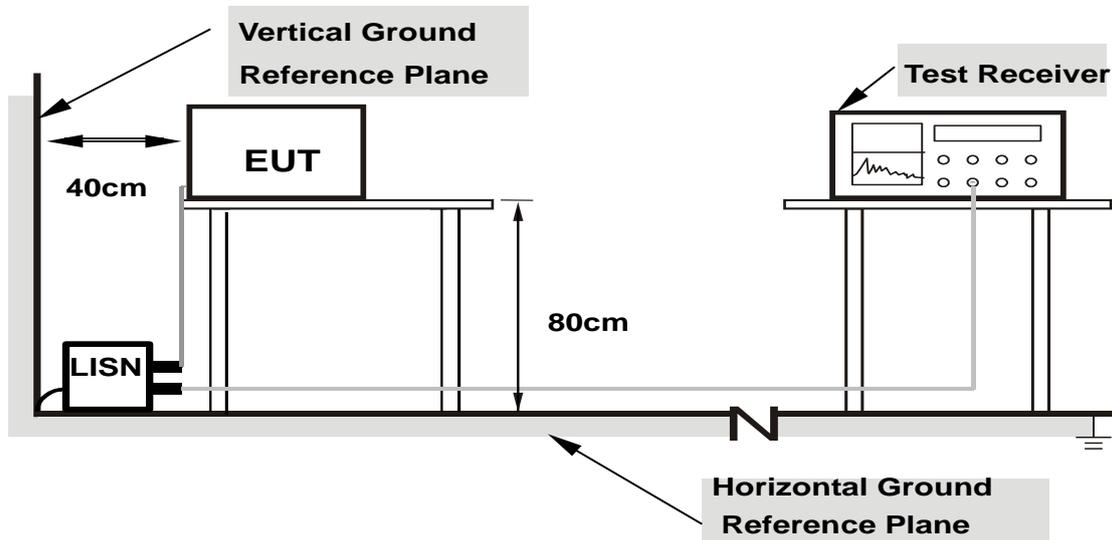
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

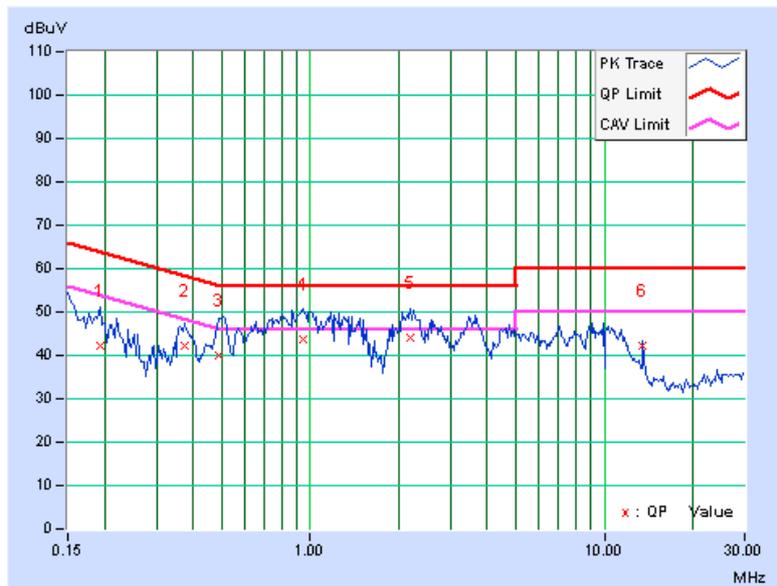
**CONDUCTED WORST-CASE DATA : 802.11n (20MHz)**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	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	0.19297	0.12	41.95	29.35	42.07	29.47	63.91
2	0.37266	0.15	41.91	32.92	42.06	33.07	58.44	48.44	-16.39	-15.38
3	0.48594	0.16	39.76	23.68	39.92	23.84	56.24	46.24	-16.32	-22.40
4	0.94688	0.20	43.45	32.04	43.65	32.24	56.00	46.00	-12.35	-13.76
<b>5</b>	<b>2.19141</b>	<b>0.24</b>	<b>43.70</b>	<b>35.30</b>	<b>43.94</b>	<b>35.54</b>	<b>56.00</b>	<b>46.00</b>	<b>-12.06</b>	<b>-10.46</b>
6	13.55859	0.86	41.22	37.61	42.08	38.47	60.00	50.00	-17.92	-11.53

**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.





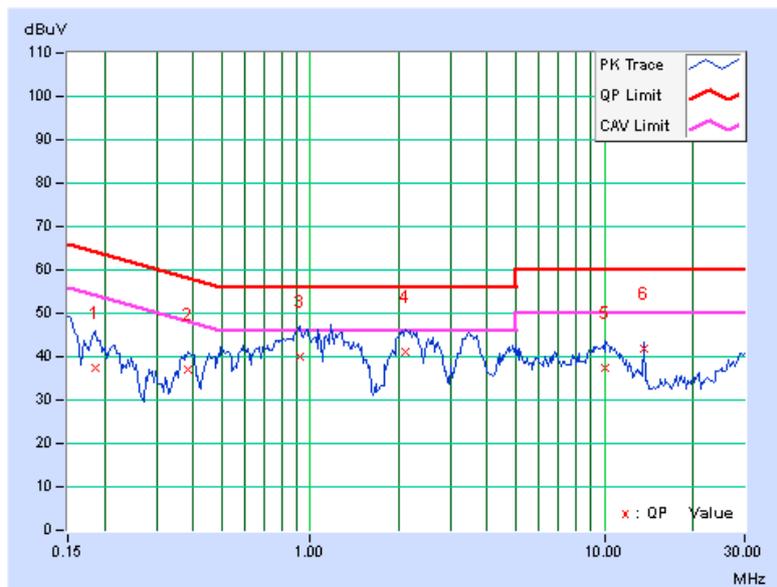
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PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.18516	0.17	37.14	22.62	37.31	22.79	64.25
2	0.38438	0.21	36.88	28.35	37.09	28.56	58.18	48.18	-21.10	-19.63
3	0.92734	0.25	39.83	28.73	40.08	28.98	56.00	46.00	-15.92	-17.02
4	2.12109	0.29	40.72	32.40	41.01	32.69	56.00	46.00	-14.99	-13.31
5	10.10547	0.59	36.70	29.31	37.29	29.90	60.00	50.00	-22.71	-20.10
6	13.56250	0.71	41.28	37.95	41.99	38.66	60.00	50.00	-18.01	-11.34

**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.

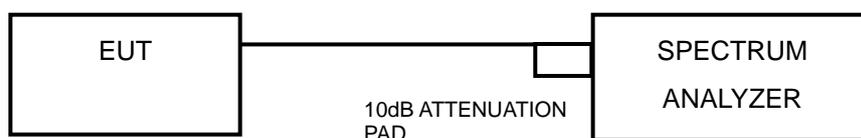


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 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) = approximately 1% of the emission bandwidth
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  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.



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#### 4.3.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.65	0.5	PASS
6	2437	8.42	0.5	PASS
11	2462	8.18	0.5	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.37	0.5	PASS
6	2437	16.42	0.5	PASS
11	2462	16.42	0.5	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.59	0.5	PASS
6	2437	17.63	0.5	PASS
11	2462	17.64	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 power sensor was used on the output port of the EUT. A power meter 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.



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#### 4.4.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	98.855	19.95	30	PASS
6	2437	109.144	20.38	30	PASS
11	2462	112.460	20.51	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	149.279	21.74	30	PASS
6	2437	159.221	22.02	30	PASS
11	2462	159.956	22.04	30	PASS

##### 802.11n (20MHz)

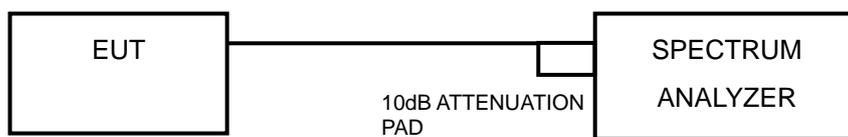
CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	150.314	21.77	30	PASS
6	2437	164.059	22.15	30	PASS
11	2462	163.305	22.13	30	PASS

## 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

- Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- 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



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## 4.5.7 TEST RESULTS

### 802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-7.38	8	PASS
6	2437	-6.86	8	PASS
11	2462	-7.56	8	PASS

### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.97	8	PASS
6	2437	-10.53	8	PASS
11	2462	-11.55	8	PASS

### 802.11n (20MHz)

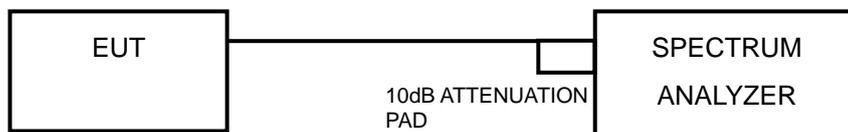
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.60	8	PASS
6	2437	-11.86	8	PASS
11	2462	-11.39	8	PASS

## 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.

## 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

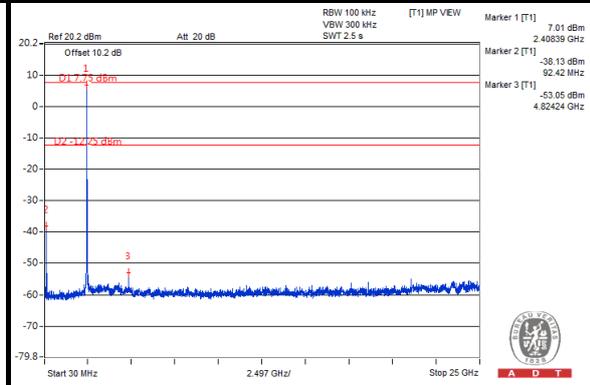
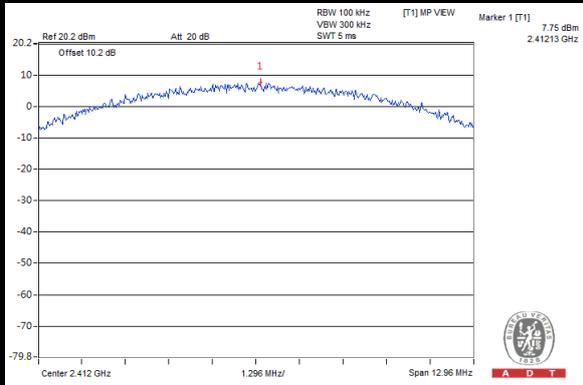
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



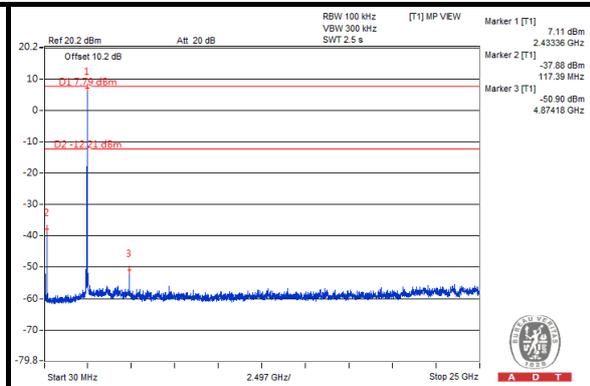
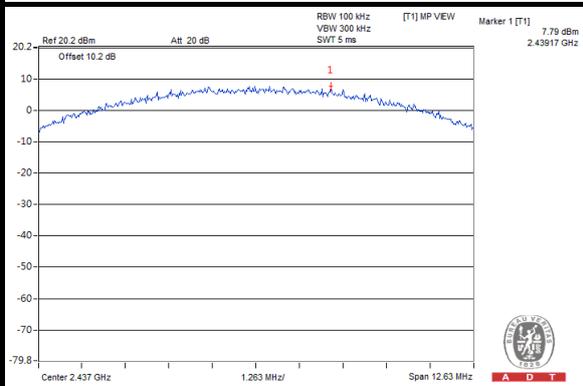
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### 802.11b

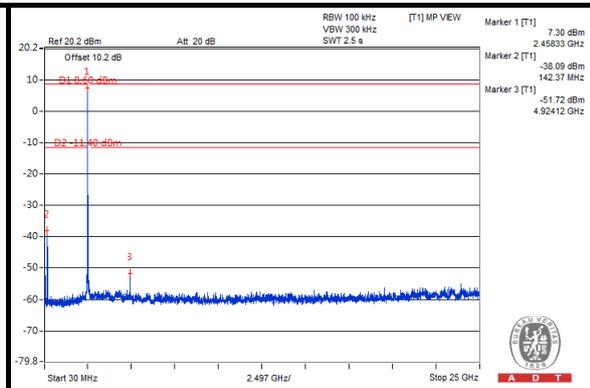
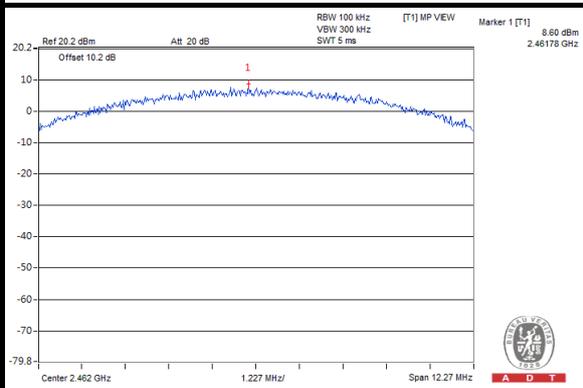
#### CH 1



#### CH 6



#### CH 11

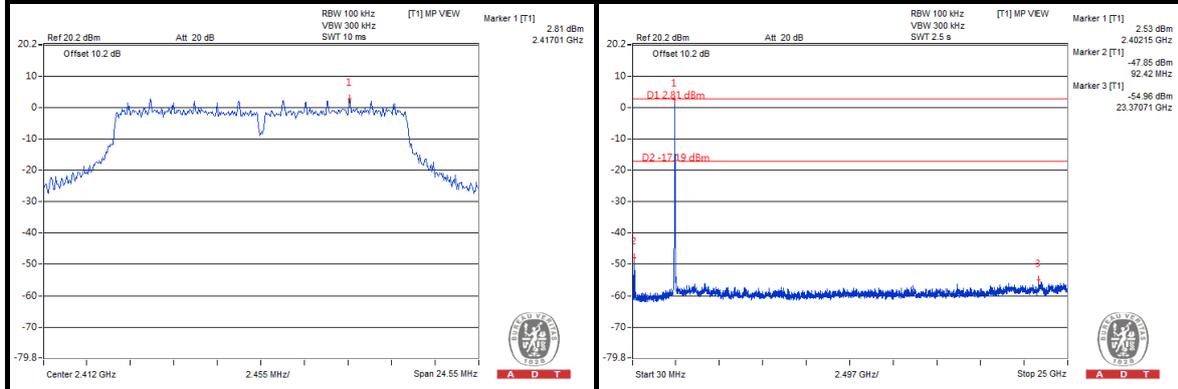




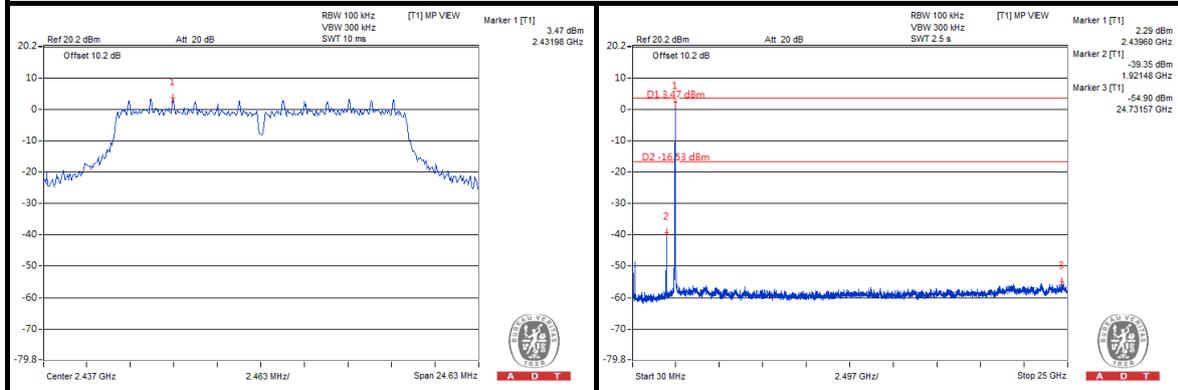
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### 802.11g

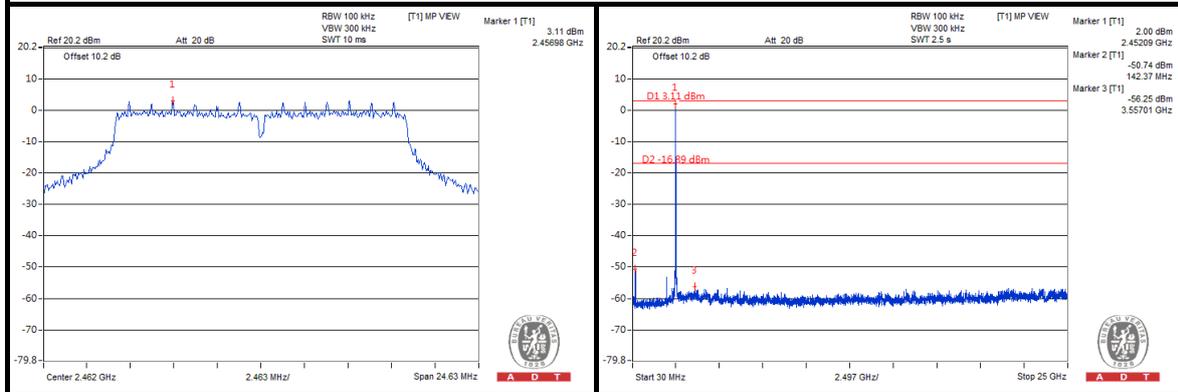
#### CH 1



#### CH 6



#### CH 11

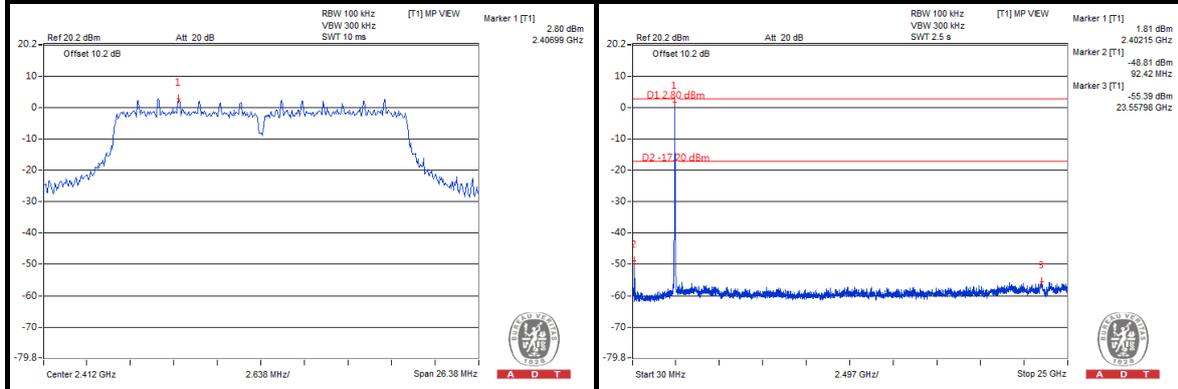




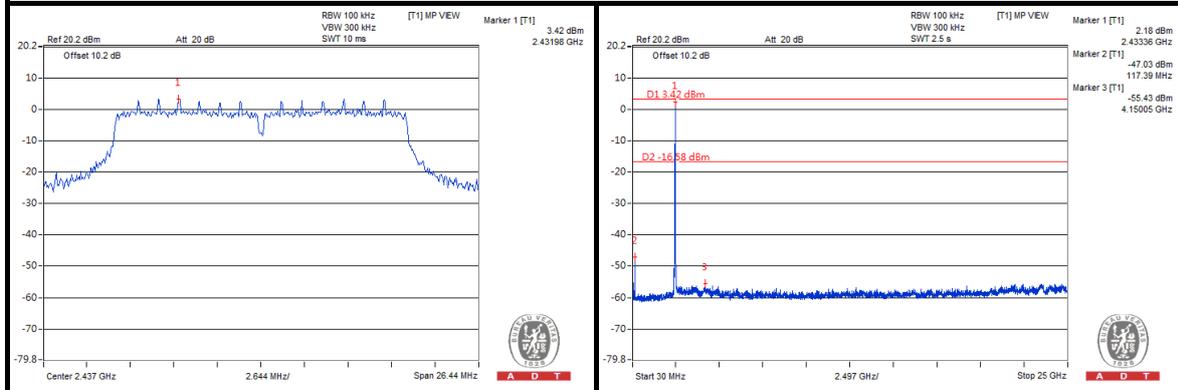
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### 802.11n (20MHz)

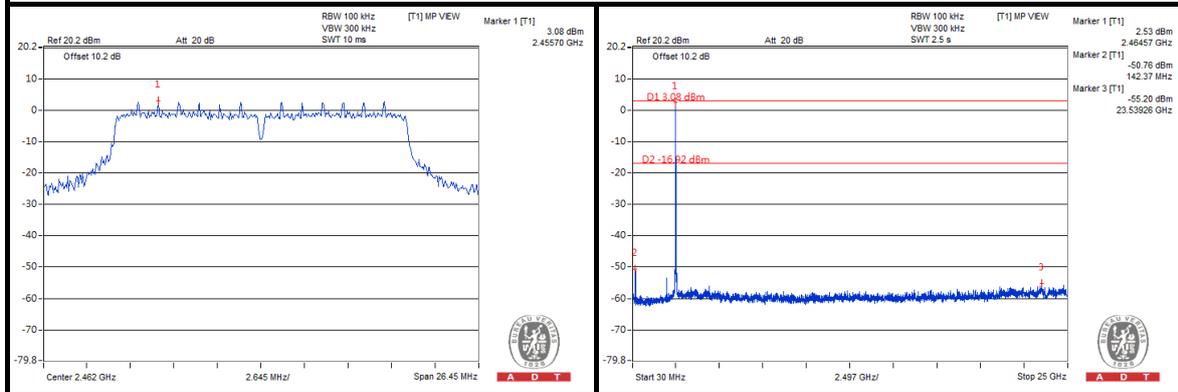
#### CH 1



#### CH 6



#### CH 11



## 5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

### 5.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 5.1.1 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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### 5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

### 5.1.3 TEST PROCEDURES

Same as item 4.1.3.

### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

### 5.1.5 TEST SETUP

Same as item 4.1.5.

### 5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



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### 5.1.7 TEST RESULTS

#### ABOVE 1GHz WORST-CASE DATA : 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	57.02	58.47	63.66	-6.64	34.67	8.65	44.77	100	338	Average
5725	68.44	69.89	70.9	-2.46	34.67	8.65	44.77	100	338	Peak
5745	83.66	85.06			34.7	8.66	44.76	100	338	Average
5745	90.9	92.3			34.7	8.66	44.76	100	338	Peak
5825	35.8	37.1	63.66	-27.86	34.81	8.69	44.8	100	338	Average
5825	49.86	51.16	70.9	-21.04	34.81	8.69	44.8	100	338	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
5725	63.48	64.93	70.49	-7.01	34.67	8.65	44.77	104	287	Average
5725	70.56	72.01	78.2	-7.64	34.67	8.65	44.77	104	287	Peak
5745	90.49	91.89			34.7	8.66	44.76	104	287	Average
5745	98.2	99.6			34.7	8.66	44.76	104	287	Peak
5825	49.65	50.95	70.49	-20.84	34.81	8.69	44.8	104	287	Average
5825	48.36	49.66	78.2	-29.84	34.81	8.69	44.8	104	287	Peak

#### REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5745MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	36.28	37.73	63.06	-26.78	34.67	8.65	44.77	100	339	Average
5725	47.13	48.58	70.17	-23.04	34.67	8.65	44.77	100	339	Peak
5785	83.06	84.37			34.76	8.68	44.75	100	339	Average
5785	90.17	91.48			34.76	8.68	44.75	100	339	Peak
5825	36.39	37.69	63.06	-26.67	34.81	8.69	44.8	100	339	Average
5825	50.02	51.32	70.17	-20.15	34.81	8.69	44.8	100	339	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
5725	37.74	39.19	69.7	-31.96	34.67	8.65	44.77	103	287	Average
5725	49.94	51.39	77.35	-27.41	34.67	8.65	44.77	103	287	Peak
5785	89.7	91.01			34.76	8.68	44.75	103	287	Average
5785	97.35	98.66			34.76	8.68	44.75	103	287	Peak
5825	37.53	38.83	69.7	-32.17	34.81	8.69	44.8	103	287	Average
5825	49.28	50.58	77.35	-28.07	34.81	8.69	44.8	103	287	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5785MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	36.95	38.4	61.3	-24.35	34.67	8.65	44.77	100	340	Average
5725	47.37	48.82	68.81	-21.44	34.67	8.65	44.77	100	340	Peak
5805	81.3	82.6			34.79	8.68	44.77	100	340	Average
5805	88.81	90.11			34.79	8.68	44.77	100	340	Peak
5825	52.89	54.19	61.3	-8.41	34.81	8.69	44.8	100	340	Average
5825	64.89	66.19	68.81	-3.92	34.81	8.69	44.8	100	340	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
5725	35.73	37.18	68.45	-32.72	34.67	8.65	44.77	103	287	Average
5725	49.53	50.98	75.31	-25.78	34.67	8.65	44.77	103	287	Peak
5805	88.45	89.75			34.79	8.68	44.77	103	287	Average
5805	95.31	96.61			34.79	8.68	44.77	103	287	Peak
5825	57.81	59.11	68.45	-10.64	34.81	8.69	44.8	103	287	Average
5825	70.32	71.62	75.31	-4.99	34.81	8.69	44.8	103	287	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5805MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



A D T

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	58.27	59.72	63.26	-4.99	34.67	8.65	44.77	100	337	Average
5725	67.8	69.25	70.91	-3.11	34.67	8.65	44.77	100	337	Peak
5745	83.26	84.66			34.7	8.66	44.76	100	337	Average
5745	90.91	92.31			34.7	8.66	44.76	100	337	Peak
5825	35.91	37.21	63.26	-27.35	34.81	8.69	44.8	100	337	Average
5825	48.98	50.28	70.91	-21.93	34.81	8.69	44.8	100	337	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
5725	63.84	65.29	69.75	-5.91	34.67	8.65	44.77	102	286	Average
5725	72.71	74.16	77.25	-4.54	34.67	8.65	44.77	102	286	Peak
5745	89.75	91.15			34.7	8.66	44.76	102	286	Average
5745	97.25	98.65			34.7	8.66	44.76	102	286	Peak
5825	35.72	37.02	69.75	-34.03	34.81	8.69	44.8	102	286	Average
5825	48.67	49.97	77.25	-28.58	34.81	8.69	44.8	102	286	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5745MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	36.43	37.88	62.97	-26.54	34.67	8.65	44.77	100	338	Average
5725	48.66	50.11	70.33	-21.67	34.67	8.65	44.77	100	338	Peak
5785	82.97	84.28			34.76	8.68	44.75	100	338	Average
5785	90.33	91.64			34.76	8.68	44.75	100	338	Peak
5825	36.81	38.11	62.97	-26.16	34.81	8.69	44.8	100	338	Average
5825	50.39	51.69	70.33	-19.94	34.81	8.69	44.8	100	338	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
5725	38.03	39.48	69.45	-31.42	34.67	8.65	44.77	102	282	Average
5725	49.24	50.69	76.96	-27.72	34.67	8.65	44.77	102	282	Peak
5785	89.45	90.76			34.76	8.68	44.75	102	282	Average
5785	96.96	98.27			34.76	8.68	44.75	102	282	Peak
5825	38.17	39.47	69.45	-31.28	34.81	8.69	44.8	102	282	Average
5825	51.92	53.22	76.96	-25.04	34.81	8.69	44.8	102	282	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5785MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	35.6	37.05	61.42	-25.82	34.67	8.65	44.77	194	340	Average
5725	48.58	50.03	68.68	-20.1	34.67	8.65	44.77	194	340	Peak
5805	81.42	82.72			34.79	8.68	44.77	194	340	Average
5805	88.68	89.98			34.79	8.68	44.77	194	340	Peak
5825	55.16	56.46	61.42	-6.26	34.81	8.69	44.8	194	340	Average
5825	64.02	65.32	68.68	-4.66	34.81	8.69	44.8	194	340	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
5725	35.55	37	67.61	-32.06	34.67	8.65	44.77	102	285	Average
5725	47.93	49.38	74.52	-26.59	34.67	8.65	44.77	102	285	Peak
5805	87.61	88.91			34.79	8.68	44.77	102	285	Average
5805	94.52	95.82			34.79	8.68	44.77	102	285	Peak
5825	60.6	61.9	67.61	-7.01	34.81	8.69	44.8	102	285	Average
5825	71.03	72.33	74.52	-3.49	34.81	8.69	44.8	102	285	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5805MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



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802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	52.12	53.57	58.04	-5.92	34.67	8.65	44.77	100	339	Average
5725	61.03	62.48	64.7	-3.67	34.67	8.65	44.77	100	339	Peak
5755	78.04	79.44			34.7	8.66	44.76	100	339	Average
5755	84.7	86.1			34.7	8.66	44.76	100	339	Peak
5825	36.24	37.54	58.04	-21.8	34.81	8.69	44.8	100	339	Average
5825	49.47	50.77	64.7	-15.23	34.81	8.69	44.8	100	339	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
5725	57.99	59.44	64.86	-6.87	34.67	8.65	44.77	104	287	Average
5725	68.6	70.05	72.06	-3.46	34.67	8.65	44.77	104	287	Peak
5755	84.86	86.26			34.7	8.66	44.76	104	287	Average
5755	92.06	93.46			34.7	8.66	44.76	104	287	Peak
5825	36.73	38.03	64.86	-28.13	34.81	8.69	44.8	104	287	Average
5825	48.86	50.16	72.06	-23.2	34.81	8.69	44.8	104	287	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5755MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
5725	36.32	37.77	57.61	-21.29	34.67	8.65	44.77	100	338	Average
5725	48.9	50.35	64.37	-15.47	34.67	8.65	44.77	100	338	Peak
5795	77.61	78.91			34.76	8.68	44.74	100	338	Average
5795	84.37	85.67			34.76	8.68	44.74	100	338	Peak
5825	47.88	49.18	57.61	-9.73	34.81	8.69	44.8	100	338	Average
5825	57.1	58.4	64.37	-7.27	34.81	8.69	44.8	100	338	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
5725	36.77	38.22	63.54	-26.77	34.67	8.65	44.77	102	286	Average
5725	48.31	49.76	70.4	-22.09	34.67	8.65	44.77	102	286	Peak
5795	83.54	84.84			34.76	8.68	44.74	102	286	Average
5795	90.4	91.7			34.76	8.68	44.74	102	286	Peak
5825	54.75	56.05	63.54	-8.79	34.81	8.69	44.8	102	286	Average
5825	65.92	67.22	70.4	-4.48	34.81	8.69	44.8	102	286	Peak

**REMARKS:**

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
2. 5795MHz: Fundamental frequency.
3. 5725MHz & 5825MHz: Out of restricted band



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**BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

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
55.92	26.48	44.67	40	-13.52	12.35	0.8	31.34	100	125	Peak
111.27	25.17	45.7	43.5	-18.33	10.18	1.14	31.85	100	152	Peak
172.56	25.62	44.45	43.5	-17.88	11.47	1.46	31.76	100	132	Peak
371.4	26.75	41.7	46	-19.25	14.66	2.31	31.92	100	154	Peak
467.3	26.36	38.93	46	-19.64	16.68	2.67	31.92	100	124	Peak
659.1	26.6	34.94	46	-19.4	20.33	3.28	31.95	100	113	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
30.54	34.71	53.12	40	-5.29	12.14	0.57	31.12	100	163	Peak
41.88	33.43	50.24	40	-6.57	13.56	0.68	31.05	100	159	QP
107.49	25.22	46.16	43.5	-18.28	9.81	1.11	31.86	100	154	Peak
473.6	27.47	39.87	46	-18.53	16.79	2.69	31.88	100	112	Peak
563.2	25.54	35.85	46	-20.46	18.77	2.99	32.07	100	176	Peak
662.6	26.78	35.04	46	-19.22	20.36	3.29	31.91	100	125	Peak

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

## 5.2 CONDUCTED EMISSION MEASUREMENT

### 5.2.1 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.

### 5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

### 5.2.3 TEST PROCEDURES

Same as item 4.2.3.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

### 5.2.5 TEST SETUP

Same as item 4.2.5.

### 5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

### 5.2.7 TEST RESULTS

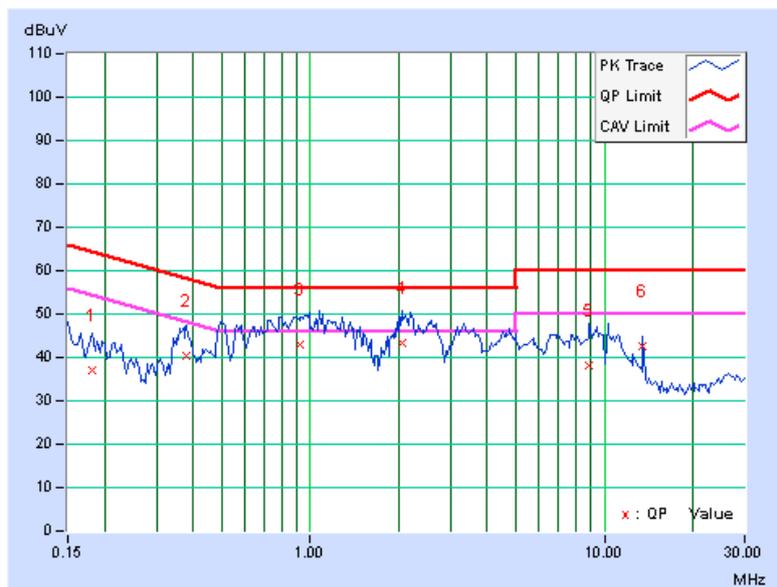
**CONDUCTED WORST-CASE DATA : 802.11a**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
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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	0.18125	0.12	36.96	25.70	37.08	25.82	64.43	54.43	-27.35	-28.61
2	0.38047	0.15	40.23	32.92	40.38	33.07	58.27	48.27	-17.89	-15.20
3	0.92344	0.20	42.63	31.80	42.83	32.00	56.00	46.00	-13.17	-14.00
4	2.05469	0.23	43.20	34.41	43.43	34.64	56.00	46.00	-12.57	-11.36
5	8.91406	0.60	37.40	28.12	38.00	28.72	60.00	50.00	-22.00	-21.28
6	13.55859	0.86	41.89	38.18	42.75	39.04	60.00	50.00	-17.25	-10.96

**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.

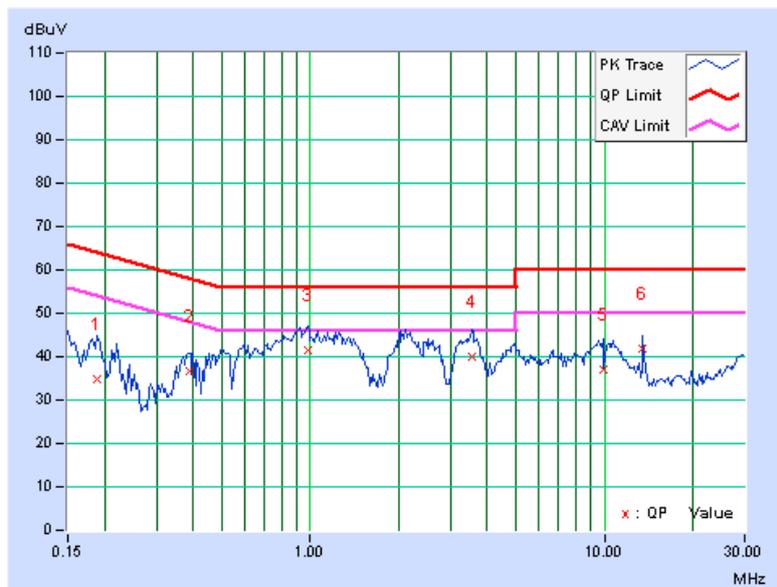


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.18906	0.17	34.76	21.34	34.93	21.51	64.08
2	0.38828	0.21	36.54	26.90	36.75	27.11	58.10	48.10	-21.35	-20.99
3	0.97813	0.25	41.14	31.40	41.39	31.65	56.00	46.00	-14.61	-14.35
4	3.53125	0.36	39.66	31.08	40.02	31.44	56.00	46.00	-15.98	-14.56
5	9.91797	0.59	36.36	28.73	36.95	29.32	60.00	50.00	-23.05	-20.68
6	13.55859	0.71	41.20	37.87	41.91	38.58	60.00	50.00	-18.09	-11.42

**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.



### **5.3 6dB BANDWIDTH MEASUREMENT**

#### **5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT**

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

#### **5.3.2 TEST SETUP**

Same as item 4.3.2.

#### **5.3.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

#### **5.3.4 TEST PROCEDURE**

Same as item 4.3.4.

#### **5.3.5 DEVIATION FROM TEST STANDARD**

No deviation.

#### **5.3.6 EUT OPERATING CONDITIONS**

Same as item 4.3.6.



### 5.3.7 TEST RESULTS

#### 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.36	0.5	PASS
157	5785	16.41	0.5	PASS
161	5805	16.41	0.5	PASS

#### 802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	17.61	0.5	PASS
157	5785	17.62	0.5	PASS
161	5805	17.61	0.5	PASS

#### 802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	35.84	0.5	PASS
159	5795	35.67	0.5	PASS



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## **5.4 MAXIMUM OUTPUT POWER**

### **5.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT**

For systems using digital modulation in the 5725–5850 MHz bands: 1 Watt (30dBm)

### **5.4.2 TEST SETUP**

Same as Item 4.4.2.

### **5.4.3 INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.4.4 TEST PROCEDURES**

Same as Item 4.4.4.

### **5.4.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.4.6 EUT OPERATING CONDITIONS**

Same as Item 4.3.6.



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## 5.4.7 TEST RESULTS

### 802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	107.647	20.32	30	PASS
157	5785	103.753	20.16	30	PASS
161	5805	103.753	20.16	30	PASS

### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	108.643	20.36	30	PASS
157	5785	103.276	20.14	30	PASS
161	5805	104.232	20.18	30	PASS

### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
151	5755	96.605	19.85	30	PASS
159	5795	95.060	19.78	30	PASS

## **5.5 POWER SPECTRAL DENSITY MEASUREMENT**

### **5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT**

The Maximum of Power Spectral Density Measurement is 8dBm.

### **5.5.2 TEST SETUP**

Same as item 4.5.2.

### **5.5.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.5.4 TEST PROCEDURE.**

Same as item 4.5.4.

### **5.5.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.5.6 EUT OPERATING CONDITION**

Same as item 4.3.6.



## 5.5.7 TEST RESULTS

### 802.11a

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-9.74	8	PASS
157	5785	-9.79	8	PASS
161	5805	-9.98	8	PASS

### 802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-10.17	8	PASS
157	5785	-10.12	8	PASS
161	5805	-9.37	8	PASS

### 802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	Limit (dBm/3kHz)	PASS /FAIL
151	5755	-14.92	8	PASS
159	5795	-14.52	8	PASS

## **5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

### **5.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT**

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### **5.6.2 TEST SETUP**

Same as Item 4.6.2

### **5.6.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.6.4 TEST PROCEDURE**

Same as Item 4.6.4

### **5.6.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.6.6 EUT OPERATING CONDITION**

Same as Item 4.3.6

### **5.6.7 TEST RESULTS**

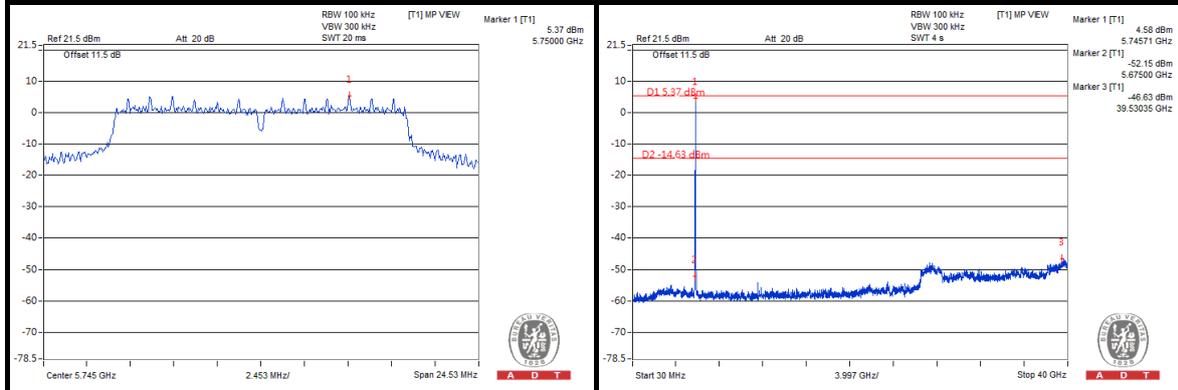
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



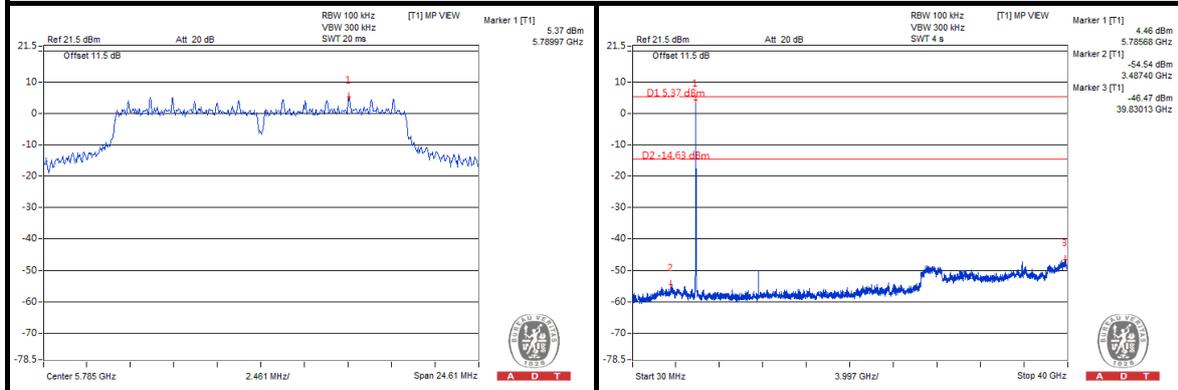
A D T

### 802.11a

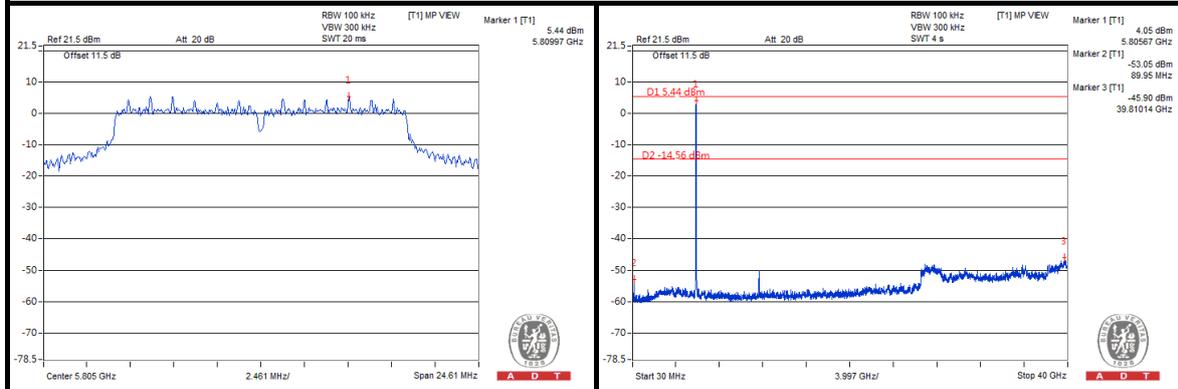
#### CH 149



#### CH 157



#### CH 161

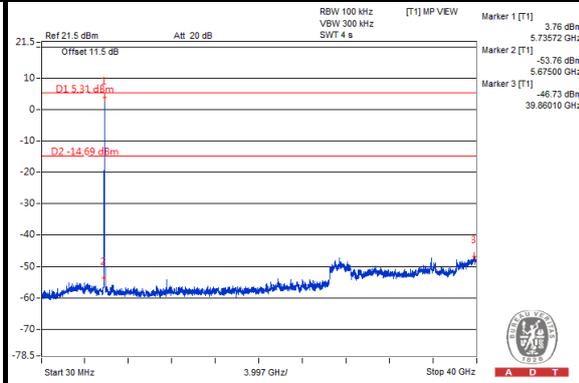
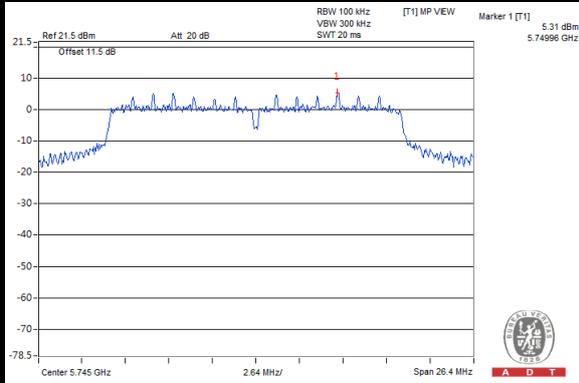




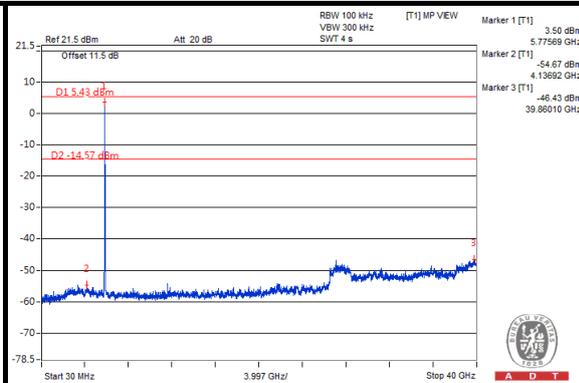
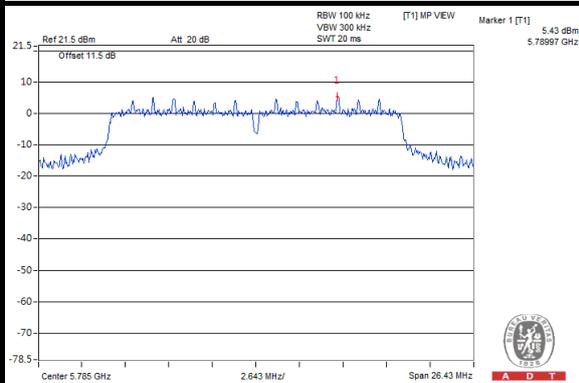
A D T

### 802.11n (20MHz)

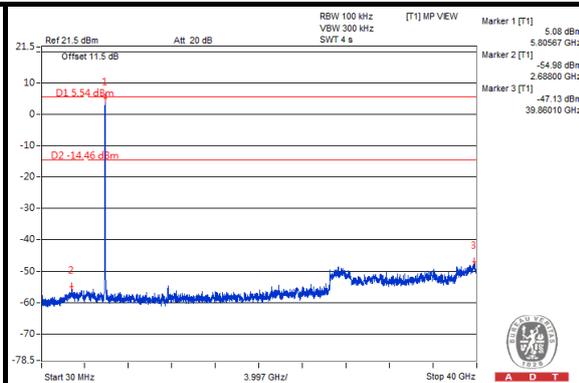
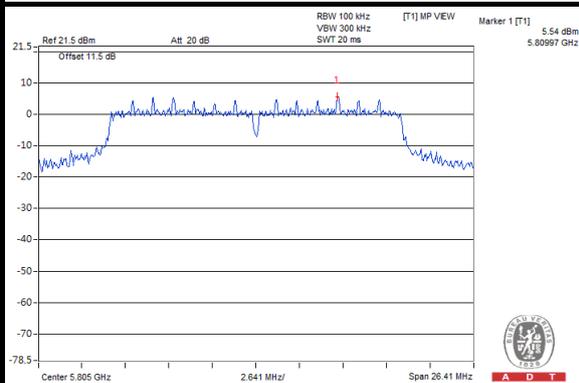
#### CH 149



#### CH 157



#### CH 161

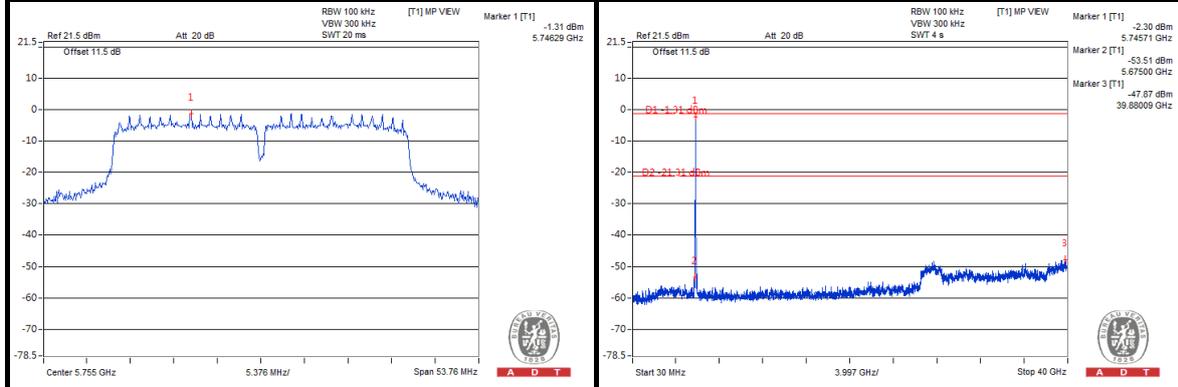




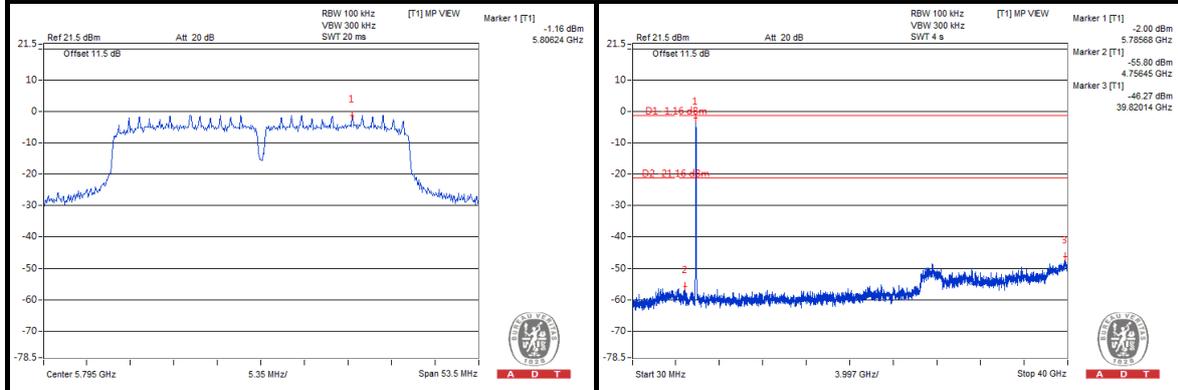
A D T

### 802.11n (40MHz)

#### CH 151



#### CH 159





A D T

## 6. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



## 7. 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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**Hsin Chu EMC/RF Lab:**

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**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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## 8. 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---