



# FCC TEST REPORT (15.247)

**REPORT NO.:** RF130716C14-4  
**MODEL NO.:** 0P4E100  
**FCC ID:** NM80P4E100  
**RECEIVED:** Jul. 16, 2013  
**TESTED:** Jul. 19, 2013 ~ Jul. 30, 2013  
**ISSUED:** Aug. 08, 2013

**APPLICANT:** HTC Corporation

**ADDRESS:** No. 23, Xinghua Rd., Taoyuan City, Taiwan

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

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist.,  
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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
RF130716C14-4	Original release	Aug. 08, 2013

## 1. CERTIFICATION

**PRODUCT:** Smartphone  
**MODEL NO.:** 0P4E100  
**BRAND:** HTC  
**APPLICANT:** HTC Corporation  
**TESTED:** Jul. 19, 2013 ~ Jul. 30, 2013  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: 0P4E100) 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** : Aug. 08, 2013  
Ivonne Wu / Senior Specialist

**APPROVED BY** : Sam Chen , **DATE** : Aug. 08, 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 -2.45dB at 0.50938MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.62dB at 2484.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

### 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	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>	Smartphone
<b>MODEL NO.</b>	0P4E100
<b>POWER SUPPLY</b>	5.0Vdc (adapter or host equipment) 3.8Vdc (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>	306.196mW for 2412 ~ 2462MHz 200.909mW for 5745 ~ 5805MHz
<b>ANTENNA TYPE</b>	<b>2.4GHz:</b> PIFA antenna with -3dBi gain <b>5.0GHz:</b> PIFA antenna with -4dBi 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 Y-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)
802.11g	1 to 11	6	OFDM	BPSK	6.0

#### **POWER LINE CONDUCTED EMISSION TEST:**

TEST CONDITION
BT Link + WLAN (2.4G) Link + Earphone + USB Cable + Adapter + NFC Link



**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	Kay Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
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 Z-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)
802.11a	149 to 161	157	OFDM	BPSK	6.0

**POWER LINE CONDUCTED EMISSION TEST:**

TEST CONDITION
BT Link + WLAN (5G) Link + Earphone + USB Cable + Adapter + NFC Link



**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

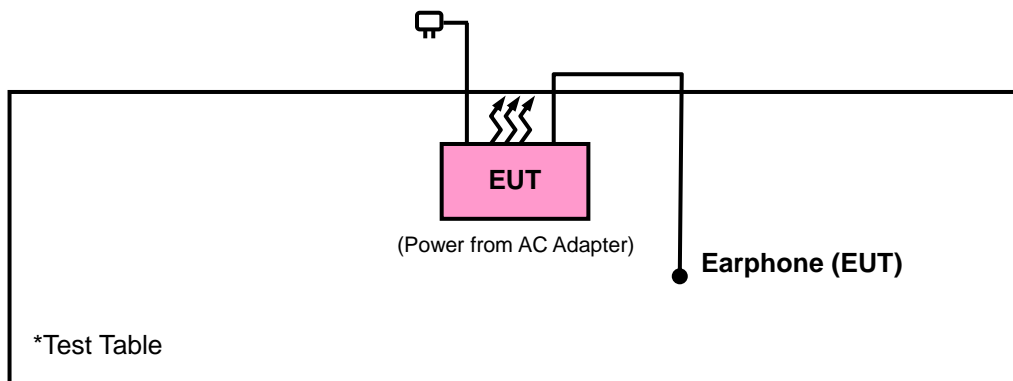
**TEST CONDITION:**

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



#### 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	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.

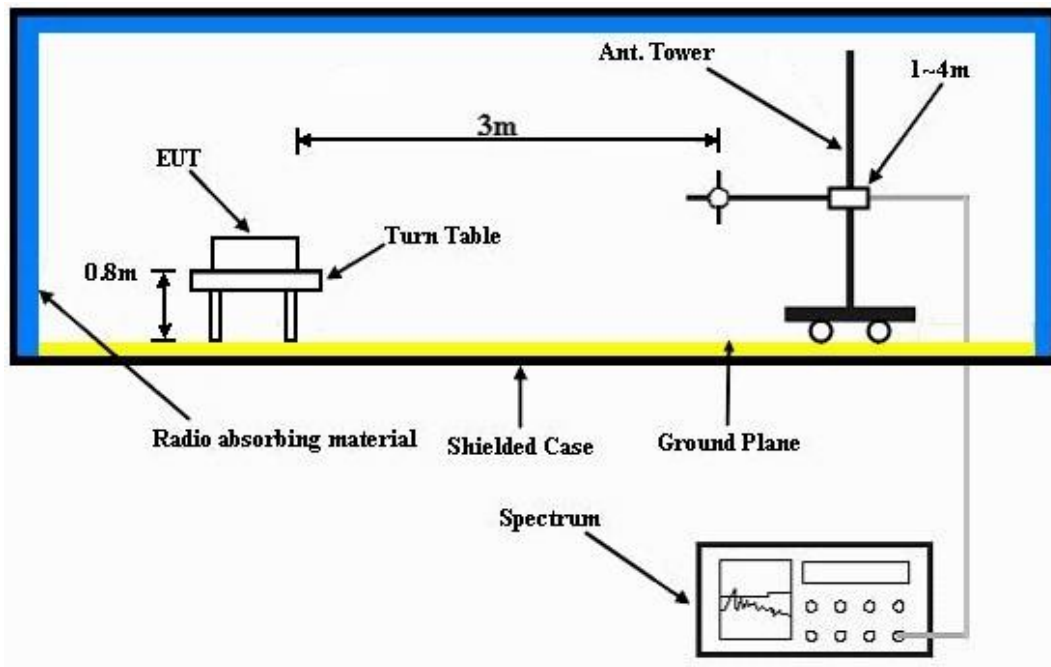
**NOTE:**

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

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.1.5 TEST SETUP



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
2386	45.53	43.69	54	-8.47	31.93	5.4	35.49	101	124	Average
2386	57.04	55.2	74	-16.96	31.93	5.4	35.49	101	124	Peak
2412	105.44	103.52			31.96	5.43	35.47	101	124	Average
2412	107.88	105.96			31.96	5.43	35.47	101	124	Peak
2488	43.3	41.09	54	-10.7	32.1	5.53	35.42	101	124	Average
2488	56.2	53.99	74	-17.8	32.1	5.53	35.42	101	124	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	44.02	42.16	54	-9.98	31.93	5.4	35.47	167	183	Average
2390	57.17	55.31	74	-16.83	31.93	5.4	35.47	167	183	Peak
2412	104	102.08			31.96	5.43	35.47	167	183	Average
2412	105.53	103.61			31.96	5.43	35.47	167	183	Peak
2486	42.27	40.06	54	-11.73	32.1	5.53	35.42	167	183	Average
2486	56.24	54.03	74	-17.76	32.1	5.53	35.42	167	183	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
2346	41	39.3	54	-13	31.87	5.33	35.5	100	122	Average
2346	56.04	54.34	74	-17.96	31.87	5.33	35.5	100	122	Peak
2437	105.73	103.72			32.01	5.46	35.46	100	122	Average
2437	108.29	106.28			32.01	5.46	35.46	100	122	Peak
2484	42.91	40.73	54	-11.09	32.1	5.5	35.42	100	122	Average
2484	56.82	54.64	74	-17.18	32.1	5.5	35.42	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
2388	40.54	38.7	54	-13.46	31.93	5.4	35.49	110	78	Average
2388	55.37	53.53	74	-18.63	31.93	5.4	35.49	110	78	Peak
2437	102.94	100.93			32.01	5.46	35.46	110	78	Average
2437	105.74	103.73			32.01	5.46	35.46	110	78	Peak
2484	41.29	39.11	54	-12.71	32.1	5.5	35.42	110	78	Average
2484	55.42	53.24	74	-18.58	32.1	5.5	35.42	110	78	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
2332	41	39.35	54	-13	31.84	5.33	35.52	101	120	Average
2332	55.59	53.94	74	-18.41	31.84	5.33	35.52	101	120	Peak
2462	105.84	103.74			32.04	5.5	35.44	101	120	Average
2462	108.48	106.38			32.04	5.5	35.44	101	120	Peak
2484	58.17	55.99	74	-15.83	32.1	5.5	35.42	101	120	Peak
2484	47.32	45.14	54	-6.68	32.1	5.5	35.42	101	120	Average
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
2354	40.54	38.84	54	-13.46	31.87	5.33	35.5	183	21	Average
2354	55.44	53.74	74	-18.56	31.87	5.33	35.5	183	21	Peak
2462	100.38	98.28			32.04	5.5	35.44	183	21	Average
2462	102.9	100.8			32.04	5.5	35.44	183	21	Peak
2486	42.9	40.69	54	-11.1	32.1	5.53	35.42	183	21	Average
2486	55.85	53.64	74	-18.15	32.1	5.53	35.42	183	21	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	49.45	47.59	54	-4.55	31.93	5.4	35.47	101	122	Average
2390	63.92	62.06	74	-10.08	31.93	5.4	35.47	101	122	Peak
2412	97.52	95.6			31.96	5.43	35.47	101	122	Average
2412	105.57	103.65			31.96	5.43	35.47	101	122	Peak
2492	42.83	40.61	54	-11.17	32.1	5.53	35.41	101	122	Average
2492	56.49	54.27	74	-17.51	32.1	5.53	35.41	101	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
2390	48.62	46.76	54	-5.38	31.93	5.4	35.47	100	19	Average
2390	61.87	60.01	74	-12.13	31.93	5.4	35.47	100	19	Peak
2412	93.98	92.06			31.96	5.43	35.47	100	19	Average
2412	101.98	100.06			31.96	5.43	35.47	100	19	Peak
2484	40.88	38.7	54	-13.12	32.1	5.5	35.42	100	19	Average
2484	56.16	53.98	74	-17.84	32.1	5.5	35.42	100	19	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	40.83	38.99	54	-13.17	31.93	5.4	35.49	103	239	Average
2386	55.33	53.49	74	-18.67	31.93	5.4	35.49	103	239	Peak
2437	96.81	94.8			32.01	5.46	35.46	103	239	Average
2437	104.57	102.56			32.01	5.46	35.46	103	239	Peak
2486	41.74	39.53	54	-12.26	32.1	5.53	35.42	103	239	Average
2486	56.05	53.84	74	-17.95	32.1	5.53	35.42	103	239	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	41.67	39.81	54	-12.33	31.93	5.4	35.47	100	21	Average
2390	55.94	54.08	74	-18.06	31.93	5.4	35.47	100	21	Peak
2437	94.53	92.52			32.01	5.46	35.46	100	21	Average
2437	101.6	99.59			32.01	5.46	35.46	100	21	Peak
2500	41.11	38.89	54	-12.89	32.1	5.53	35.41	100	21	Average
2500	55.85	53.63	74	-18.15	32.1	5.53	35.41	100	21	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
2332	40.51	38.86	54	-13.49	31.84	5.33	35.52	128	120	Average
2332	55.7	54.05	74	-18.3	31.84	5.33	35.52	128	120	Peak
2462	98.51	96.41			32.04	5.5	35.44	128	120	Average
2462	105.8	103.7			32.04	5.5	35.44	128	120	Peak
2484	51.38	49.2	54	-2.62	32.1	5.5	35.42	128	120	Average
2484	64.43	62.25	74	-9.57	32.1	5.5	35.42	128	120	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	40.82	38.98	54	-13.18	31.93	5.4	35.49	101	23	Average
2388	53.28	51.44	74	-20.72	31.93	5.4	35.49	101	23	Peak
2462	94.9	92.8			32.04	5.5	35.44	101	23	Average
2462	102.9	100.8			32.04	5.5	35.44	101	23	Peak
2484	45.57	43.39	54	-8.43	32.1	5.5	35.42	101	23	Average
2484	57.69	55.51	74	-16.31	32.1	5.5	35.42	101	23	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	45	43.14	54	-9	31.93	5.4	35.47	102	123	Average
2390	58.14	56.28	74	-15.86	31.93	5.4	35.47	102	123	Peak
2412	92.4	90.48			31.96	5.43	35.47	102	123	Average
2412	101.25	99.33			31.96	5.43	35.47	102	123	Peak
2486	41.45	39.24	54	-12.55	32.1	5.53	35.42	102	123	Average
2486	55.77	53.56	74	-18.23	32.1	5.53	35.42	102	123	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
2310	43.92	42.36	54	-10.08	31.79	5.3	35.53	100	19	Average
2310	53.55	51.99	74	-20.45	31.79	5.3	35.53	100	19	Peak
2412	88.51	86.59			31.96	5.43	35.47	100	19	Average
2412	96.75	94.83			31.96	5.43	35.47	100	19	Peak
2500	40.83	38.61	54	-13.17	32.1	5.53	35.41	100	19	Average
2500	56.32	54.1	74	-17.68	32.1	5.53	35.41	100	19	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
2358	40.51	38.77	54	-13.49	31.87	5.37	35.5	128	121	Average
2358	54.81	53.07	74	-19.19	31.87	5.37	35.5	128	121	Peak
2437	93.93	91.92			32.01	5.46	35.46	128	121	Average
2437	101.23	99.22			32.01	5.46	35.46	128	121	Peak
2492	41.35	39.13	54	-12.65	32.1	5.53	35.41	128	121	Average
2492	55.75	53.53	74	-18.25	32.1	5.53	35.41	128	121	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
2384	40.28	38.44	54	-13.72	31.93	5.4	35.49	103	76	Average
2384	55.31	53.47	74	-18.69	31.93	5.4	35.49	103	76	Peak
2437	91.12	89.11			32.01	5.46	35.46	103	76	Average
2437	98.88	96.87			32.01	5.46	35.46	103	76	Peak
2500	41.24	39.02	54	-12.76	32.1	5.53	35.41	103	76	Average
2500	56.38	54.16	74	-17.62	32.1	5.53	35.41	103	76	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
2384	40.51	38.67	54	-13.49	31.93	5.4	35.49	128	122	Average
2384	54.87	53.03	74	-19.13	31.93	5.4	35.49	128	122	Peak
2462	94.02	91.92			32.04	5.5	35.44	128	122	Average
2462	101.07	98.97			32.04	5.5	35.44	128	122	Peak
2484	46.49	44.31	54	-7.51	32.1	5.5	35.42	128	122	Average
2484	57.21	55.03	74	-16.79	32.1	5.5	35.42	128	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
2366	40.34	38.56	54	-13.66	31.9	5.37	35.49	100	120	Average
2366	55.45	53.67	74	-18.55	31.9	5.37	35.49	100	120	Peak
2462	89.91	87.81			32.04	5.5	35.44	100	120	Average
2462	98.03	95.93			32.04	5.5	35.44	100	120	Peak
2484	47.04	44.86	54	-6.96	32.1	5.5	35.42	100	120	Average
2484	59.66	57.48	74	-14.34	32.1	5.5	35.42	100	120	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: 802.11g**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)
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
30	27.6	39.53	40	-12.4	19.6	0.74	32.27	102	252	Peak
60.78	28.83	50.4	40	-11.17	9.76	0.9	32.23	157	77	Peak
103.17	33.35	52.74	43.5	-10.15	11.59	1.28	32.26	112	227	Peak
374.9	18.04	29.93	46	-27.96	18	2.26	32.15	100	54	Peak
593.3	22.5	30.32	46	-23.5	21.5	2.87	32.19	100	157	Peak
703.9	25.21	31.09	46	-20.79	23.1	3.11	32.09	100	224	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	34.1	46.03	40	-5.9	19.6	0.74	32.27	100	358	QP
47.01	36.34	56.5	40	-3.66	11.16	0.9	32.22	100	55	Peak
62.67	32.41	53.48	40	-7.59	10.26	0.9	32.23	132	247	Peak
386.1	18.2	29.84	46	-27.8	18.2	2.34	32.18	100	122	Peak
512.1	21.44	30.18	46	-24.56	20.68	2.7	32.12	123	312	Peak
613.6	23.74	31.25	46	-22.26	21.8	2.87	32.18	100	0	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	100312	Jul. 02, 2013	Jul. 01, 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.

#### 4.2.3 TEST PROCEDURES

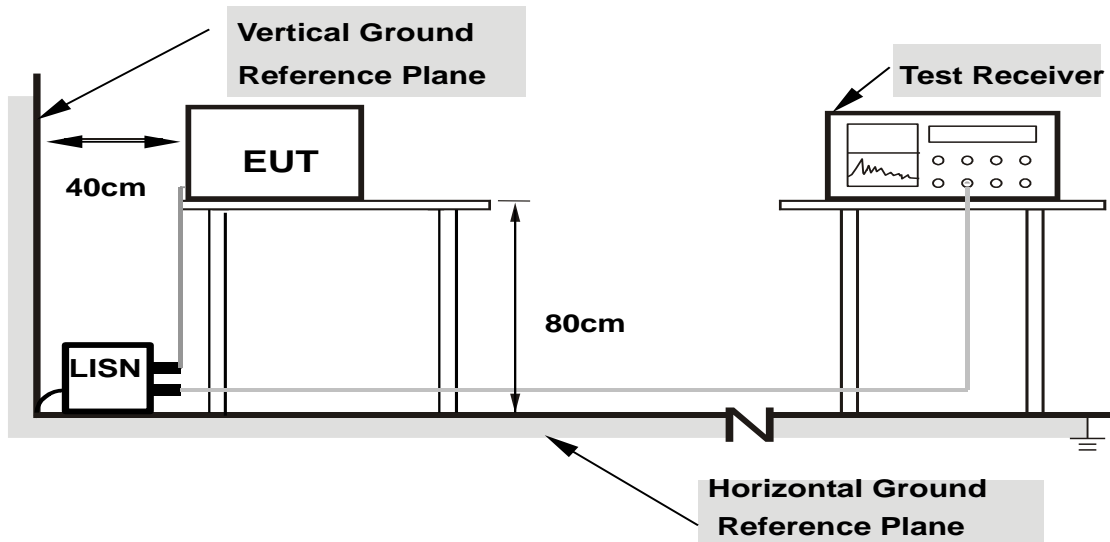
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

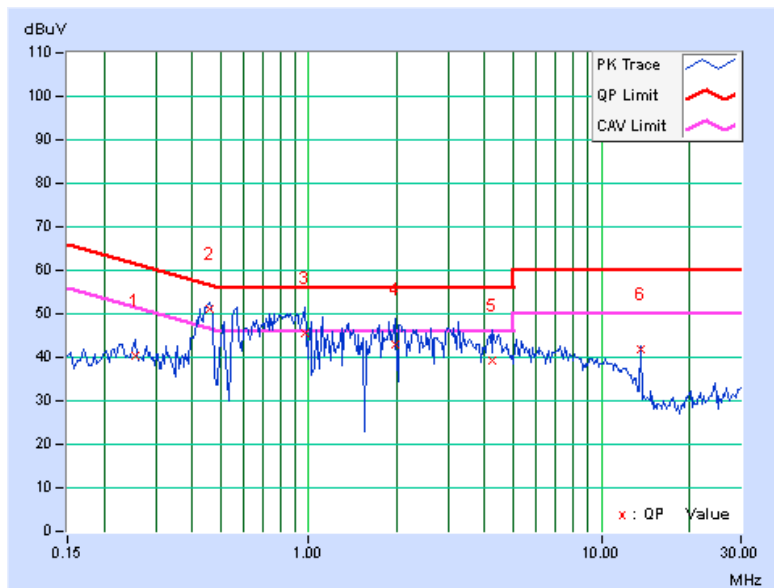
**CONDUCTED WORST-CASE DATA :**

<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	0.25547	0.18	40.22	30.03	40.40	30.21	61.58
2	0.45859	0.22	50.82	42.23	51.04	42.45	56.72	46.72	-5.68	-4.27
3	0.97031	0.27	45.41	39.19	45.68	39.46	56.00	46.00	-10.32	-6.54
4	1.98047	0.28	42.51	27.73	42.79	28.01	56.00	46.00	-13.21	-17.99
5	4.23047	0.37	38.88	27.05	39.25	27.42	56.00	46.00	-16.75	-18.58
6	13.56250	0.50	41.29	39.54	41.79	40.04	60.00	50.00	-18.21	-9.96

**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



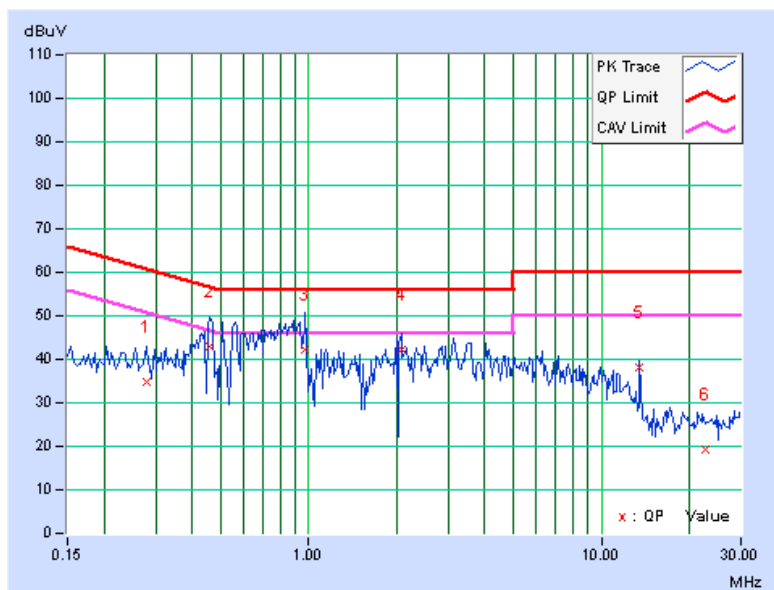


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.27891	0.21	34.79	26.50	35.00	26.71	60.85
2	0.45859	0.25	42.71	23.23	42.96	23.48	56.72	46.72	-13.76	-23.24
3	0.97422	0.23	42.12	32.24	42.35	32.47	56.00	46.00	-13.65	-13.53
4	2.08984	0.28	41.86	25.77	42.14	26.05	56.00	46.00	-13.86	-19.95
5	13.55859	0.57	37.62	36.61	38.19	37.18	60.00	50.00	-21.81	-12.82
6	22.69922	0.71	18.61	9.74	19.32	10.45	60.00	50.00	-40.68	-39.55

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

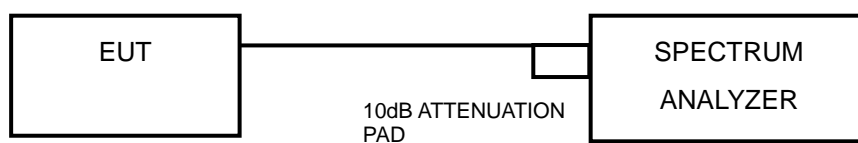


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 TEST PROCEDURE

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  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	8.05	0.5	PASS
6	2437	8.06	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	16.39	0.5	PASS
6	2437	16.44	0.5	PASS
11	2462	16.48	0.5	PASS

##### 802.11n (20MHz)

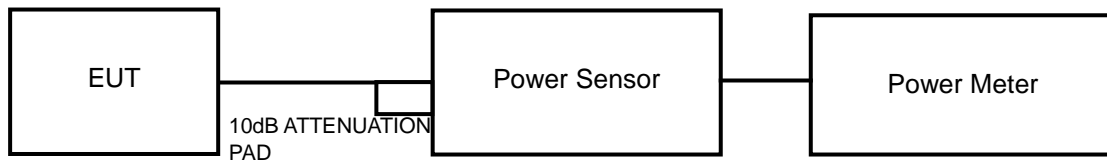
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.63	0.5	PASS
6	2437	17.66	0.5	PASS
11	2462	17.7	0.5	PASS

## 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	125.026	20.97	30	PASS
6	2437	126.474	21.02	30	PASS
11	2462	130.017	21.14	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	283.792	24.53	30	PASS
6	2437	306.196	24.86	30	PASS
11	2462	299.916	24.77	30	PASS

##### 802.11n (20MHz)

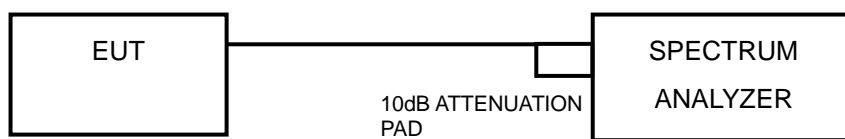
CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	184.502	22.66	30	PASS
6	2437	189.234	22.77	30	PASS
11	2462	199.067	22.99	30	PASS

## 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



#### 4.5.7 TEST RESULTS

##### 802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-4.55	8	PASS
6	2437	-4.10	8	PASS
11	2462	-4.41	8	PASS

##### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-10.17	8	PASS
6	2437	-10.26	8	PASS
11	2462	-10.47	8	PASS

##### 802.11n (20MHz)

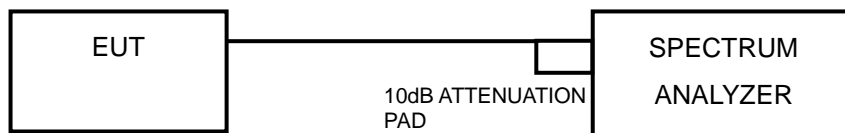
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.70	8	PASS
6	2437	-13.64	8	PASS
11	2462	-14.26	8	PASS

## 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

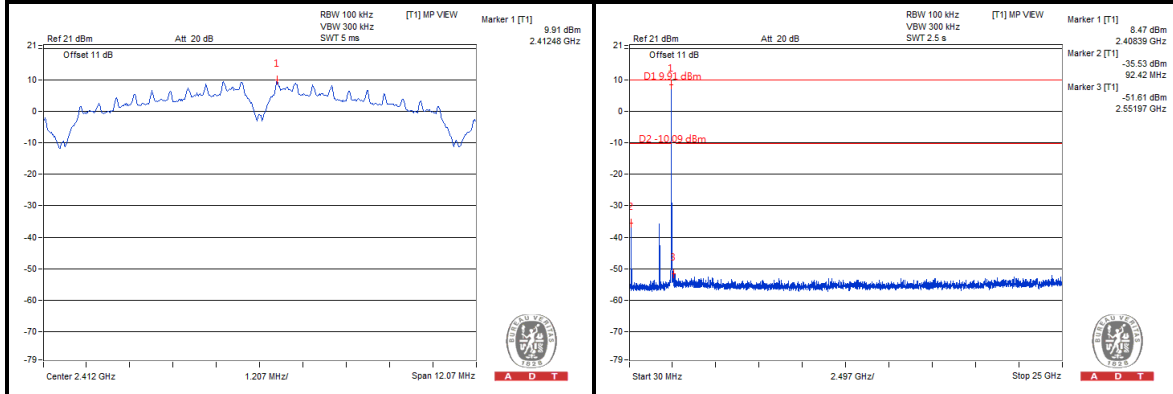
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



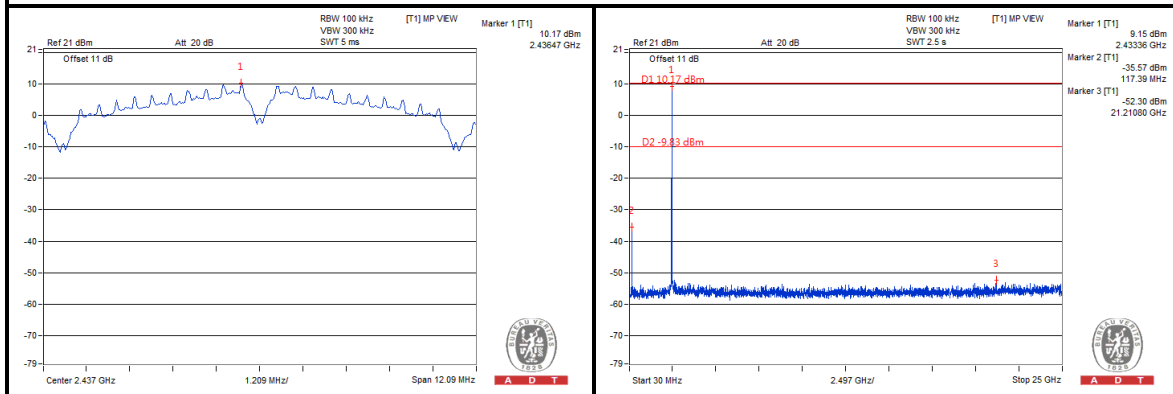
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### 802.11b

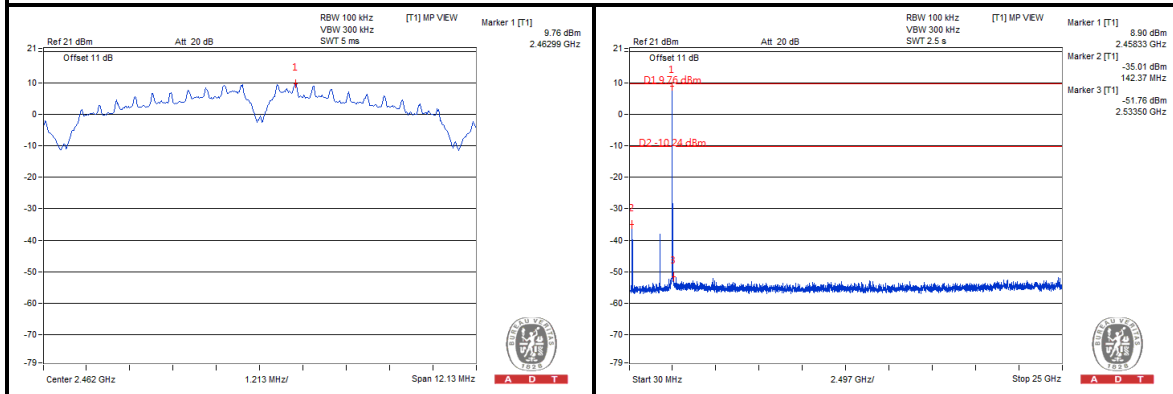
#### CH 1



#### CH 6



#### CH 11

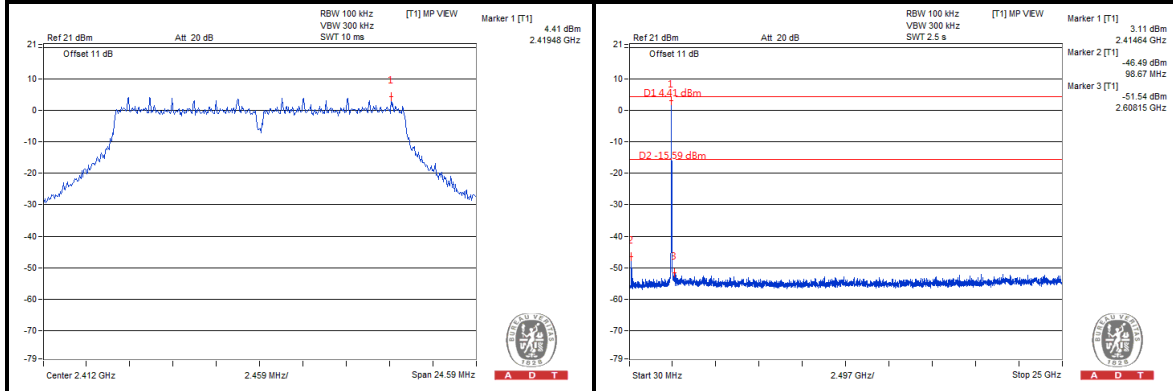




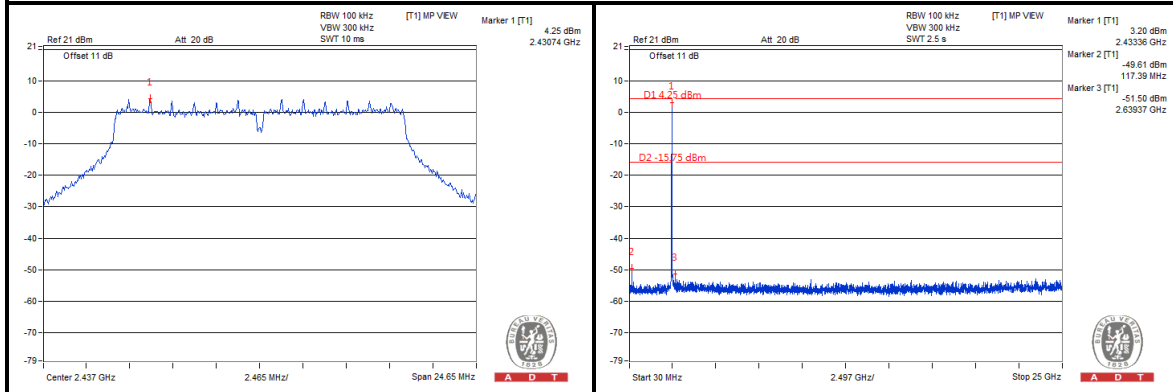
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### 802.11g

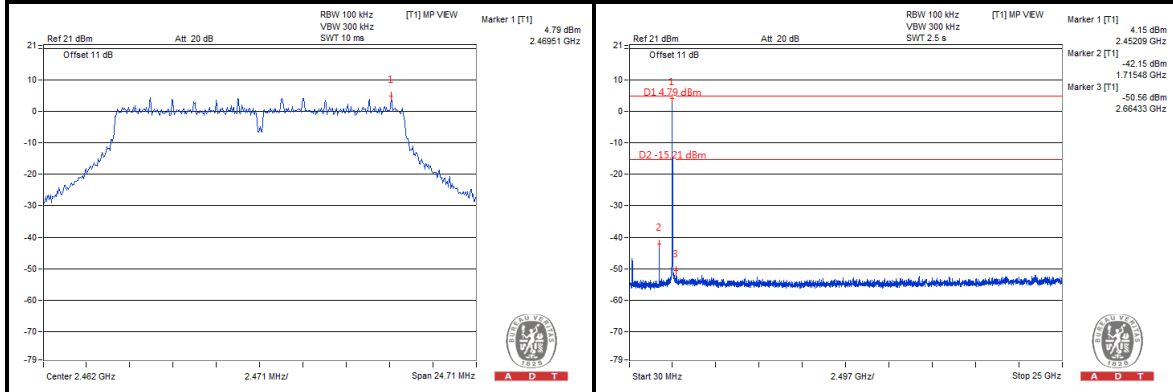
#### CH 1



#### CH 6



#### CH 11

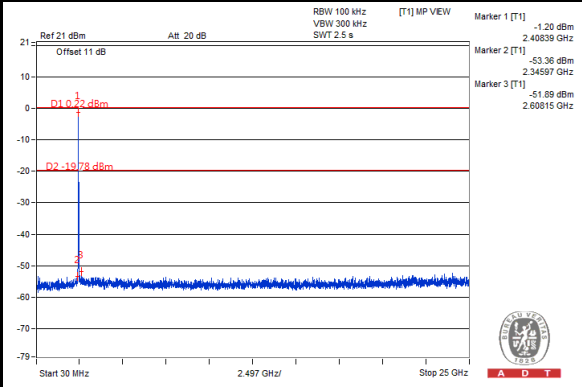
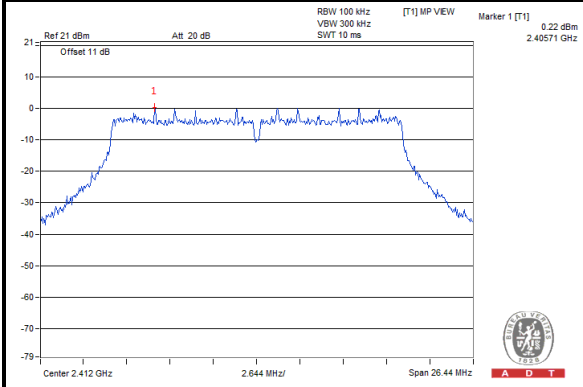




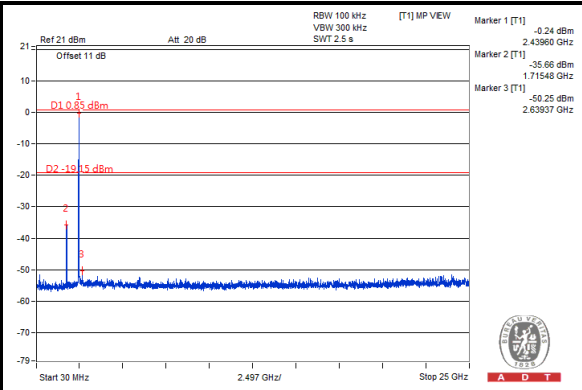
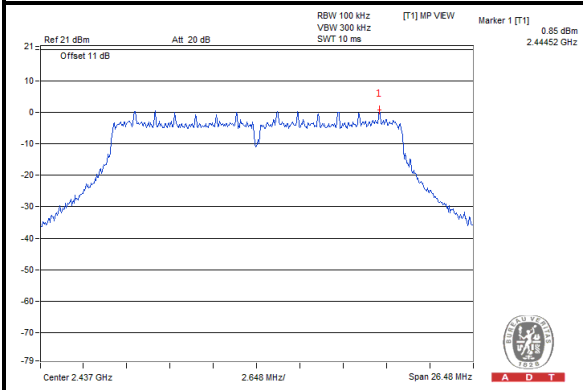
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### 802.11n (20MHz)

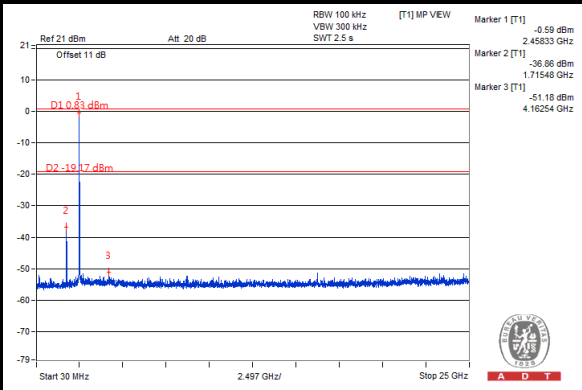
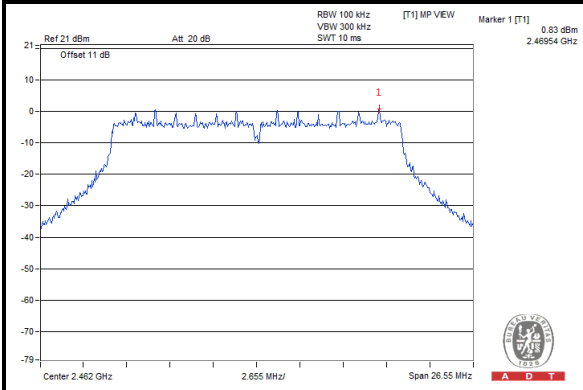
#### CH 1



#### 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	59.01	49.8	77.88	-18.87	34.67	8.65	34.11	121	84	Average
5725	72.36	63.15	85.33	-12.97	34.67	8.65	34.11	121	84	Peak
5745	97.88	88.63			34.7	8.66	34.11	121	84	Average
5745	105.33	96.08			34.7	8.66	34.11	121	84	Peak
5825	44.6	35.23	77.88	-33.28	34.81	8.69	34.13	121	84	Average
5825	55.58	46.21	85.33	-29.75	34.81	8.69	34.13	121	84	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	61.38	52.17	80.34	-18.96	34.67	8.65	34.11	100	164	Average
5725	77.36	68.15	87.81	-10.45	34.67	8.65	34.11	100	164	Peak
5745	100.34	91.09			34.7	8.66	34.11	100	164	Average
5745	107.81	98.56			34.7	8.66	34.11	100	164	Peak
5825	44.84	35.47	80.34	-35.5	34.81	8.69	34.13	100	164	Average
5825	56.03	46.66	87.81	-31.78	34.81	8.69	34.13	100	164	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	45.27	36.06	77.42	-32.15	34.67	8.65	34.11	108	87	Average
5725	57.95	48.74	83.87	-25.92	34.67	8.65	34.11	108	87	Peak
5785	97.42	88.11			34.76	8.68	34.13	108	87	Average
5785	103.87	94.56			34.76	8.68	34.13	108	87	Peak
5825	45.92	36.55	77.42	-31.5	34.81	8.69	34.13	108	87	Average
5825	57.53	48.16	83.87	-26.34	34.81	8.69	34.13	108	87	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	46.88	37.67	79.74	-32.86	34.67	8.65	34.11	100	170	Average
5725	56.49	47.28	86.71	-30.22	34.67	8.65	34.11	100	170	Peak
5785	99.74	90.43			34.76	8.68	34.13	100	170	Average
5785	106.71	97.4			34.76	8.68	34.13	100	170	Peak
5825	47.14	37.77	79.74	-32.6	34.81	8.69	34.13	100	170	Average
5825	60.66	51.29	86.71	-26.05	34.81	8.69	34.13	100	170	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	46.06	36.85	77.18	-31.12	34.67	8.65	34.11	121	85	Average
5725	55.4	46.19	84.04	-28.64	34.67	8.65	34.11	121	85	Peak
5805	97.18	87.84			34.79	8.68	34.13	121	85	Average
5805	104.04	94.7			34.79	8.68	34.13	121	85	Peak
5825	56.13	46.76	77.18	-21.05	34.81	8.69	34.13	121	85	Average
5825	70.42	61.05	84.04	-13.62	34.81	8.69	34.13	121	85	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	46.06	36.85	79.13	-33.07	34.67	8.65	34.11	100	181	Average
5725	56.65	47.44	86.02	-29.37	34.67	8.65	34.11	100	181	Peak
5805	99.13	89.79			34.79	8.68	34.13	100	181	Average
5805	106.02	96.68			34.79	8.68	34.13	100	181	Peak
5825	58.04	48.67	79.13	-21.09	34.81	8.69	34.13	100	181	Average
5825	70.63	61.26	86.02	-15.39	34.81	8.69	34.13	100	181	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 (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	61.64	52.43	78.06	-16.42	34.67	8.65	34.11	110	82	Average
5725	72.92	63.71	84.91	-11.99	34.67	8.65	34.11	110	82	Peak
5745	98.06	88.81			34.7	8.66	34.11	110	82	Average
5745	104.91	95.66			34.7	8.66	34.11	110	82	Peak
5825	43.79	34.42	78.06	-34.27	34.81	8.69	34.13	110	82	Average
5825	56.49	47.12	84.91	-28.42	34.81	8.69	34.13	110	82	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	62.98	53.77	80.21	-17.23	34.67	8.65	34.11	100	158	Average
5725	73.14	63.93	86.77	-13.63	34.67	8.65	34.11	100	158	Peak
5745	100.21	90.96			34.7	8.66	34.11	100	158	Average
5745	106.77	97.52			34.7	8.66	34.11	100	158	Peak
5825	44.34	34.97	80.21	-35.87	34.81	8.69	34.13	100	158	Average
5825	56.6	47.23	86.77	-30.17	34.81	8.69	34.13	100	158	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	45.26	36.05	76.97	-31.71	34.67	8.65	34.11	108	87	Average
5725	55.51	46.3	83.64	-28.13	34.67	8.65	34.11	108	87	Peak
5785	96.97	87.66			34.76	8.68	34.13	108	87	Average
5785	103.64	94.33			34.76	8.68	34.13	108	87	Peak
5825	45.97	36.6	76.97	-31	34.81	8.69	34.13	108	87	Average
5825	56.55	47.18	83.64	-27.09	34.81	8.69	34.13	108	87	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	47.15	37.94	79.04	-31.89	34.67	8.65	34.11	100	172	Average
5725	57.43	48.22	85.67	-28.24	34.67	8.65	34.11	100	172	Peak
5785	99.04	89.73			34.76	8.68	34.13	100	172	Average
5785	105.67	96.36			34.76	8.68	34.13	100	172	Peak
5825	47.27	37.9	79.04	-31.77	34.81	8.69	34.13	100	172	Average
5825	57.32	47.95	85.67	-28.35	34.81	8.69	34.13	100	172	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	45.12	35.91	78.05	-32.93	34.67	8.65	34.11	120	85	Average
5725	55.38	46.17	84.56	-29.18	34.67	8.65	34.11	120	85	Peak
5805	98.05	88.71			34.79	8.68	34.13	120	85	Average
5805	104.56	95.22			34.79	8.68	34.13	120	85	Peak
5825	59.09	49.72	78.05	-18.96	34.81	8.69	34.13	120	85	Average
5825	67.79	58.42	84.56	-16.77	34.81	8.69	34.13	120	85	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	46.29	37.08	79.63	-33.34	34.67	8.65	34.11	100	157	Average
5725	56.62	47.41	86.35	-29.73	34.67	8.65	34.11	100	157	Peak
5805	99.63	90.29			34.79	8.68	34.13	100	157	Average
5805	106.35	97.01			34.79	8.68	34.13	100	157	Peak
5825	61.32	51.95	79.63	-18.31	34.81	8.69	34.13	100	157	Average
5825	73.7	64.33	86.35	-12.65	34.81	8.69	34.13	100	157	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	61.48	52.27	73.94	-12.46	34.67	8.65	34.11	120	86	Average
5725	71.6	62.39	81.16	-9.56	34.67	8.65	34.11	120	86	Peak
5755	93.94	84.69			34.7	8.66	34.11	120	86	Average
5755	101.16	91.91			34.7	8.66	34.11	120	86	Peak
5825	45.37	36	73.94	-28.57	34.81	8.69	34.13	120	86	Average
5825	55.96	46.59	81.16	-25.2	34.81	8.69	34.13	120	86	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	64.18	54.97	76.63	-12.45	34.67	8.65	34.11	100	166	Average
5725	71.31	62.1	83.11	-11.8	34.67	8.65	34.11	100	166	Peak
5755	96.63	87.38			34.7	8.66	34.11	100	166	Average
5755	103.11	93.86			34.7	8.66	34.11	100	166	Peak
5825	46.13	36.76	76.63	-30.5	34.81	8.69	34.13	100	166	Average
5825	56.82	47.45	83.11	-26.29	34.81	8.69	34.13	100	166	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	47.17	37.96	73.98	-26.81	34.67	8.65	34.11	110	86	Average
5725	58.29	49.08	81.4	-23.11	34.67	8.65	34.11	110	86	Peak
5795	93.98	84.67			34.76	8.68	34.13	110	86	Average
5795	101.4	92.09			34.76	8.68	34.13	110	86	Peak
5825	58.17	48.8	73.98	-15.81	34.81	8.69	34.13	110	86	Average
5825	70.69	61.32	81.4	-10.71	34.81	8.69	34.13	110	86	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	49.1	39.89	75.72	-26.62	34.67	8.65	34.11	100	165	Average
5725	58.74	49.53	82.23	-23.49	34.67	8.65	34.11	100	165	Peak
5795	95.72	86.41			34.76	8.68	34.13	100	165	Average
5795	102.23	92.92			34.76	8.68	34.13	100	165	Peak
5825	59.84	50.47	75.72	-15.88	34.81	8.69	34.13	100	165	Average
5825	71.03	61.66	82.23	-11.2	34.81	8.69	34.13	100	165	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 : 802.11a**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)
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
30	27.66	39.59	40	-12.34	19.6	0.74	32.27	100	13	Peak
60.51	29.44	51.09	40	-10.56	9.68	0.9	32.23	100	255	Peak
102.9	32.37	51.76	43.5	-11.13	11.59	1.28	32.26	153	24	Peak
444.9	19.26	30.47	46	-26.74	18.45	2.49	32.15	100	224	Peak
548.5	22.04	30.71	46	-23.96	20.77	2.76	32.2	100	127	Peak
811.7	25.5	30.68	46	-20.5	23.5	3.32	32	100	147	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	33.96	45.89	40	-6.04	19.6	0.74	32.27	100	360	QP
45.66	35.96	55.65	40	-4.04	11.63	0.9	32.22	100	253	Peak
62.67	33.11	54.18	40	-6.89	10.26	0.9	32.23	100	244	Peak
426	18.64	29.74	46	-27.36	18.67	2.41	32.18	100	155	Peak
485.5	20.63	30.27	46	-25.37	19.84	2.63	32.11	100	252	Peak
615.7	23.97	31.42	46	-22.03	21.8	2.93	32.18	100	45	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

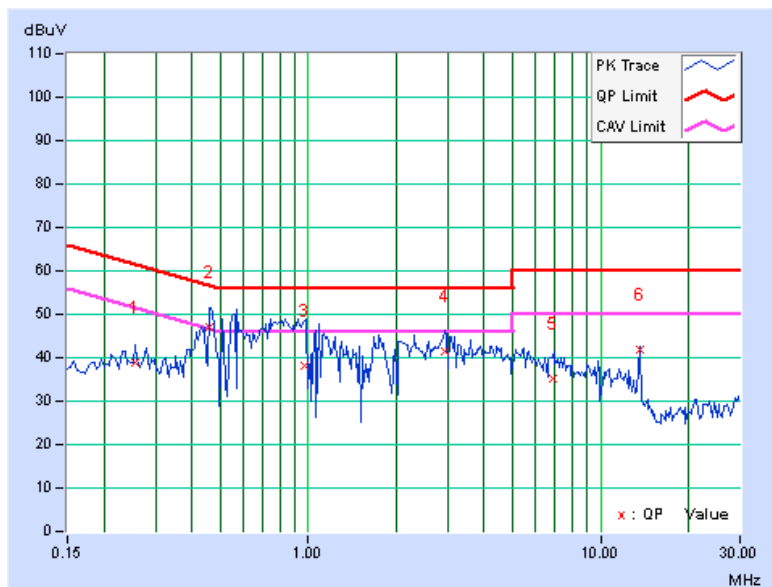
**CONDUCTED WORST-CASE DATA : 802.11a**

<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	0.25547	0.18	38.68	30.03	38.86	30.21	61.58	51.58	-22.72	-21.37
2	0.45859	0.22	46.71	29.58	46.93	29.80	56.72	46.72	-9.79	-16.92
3	0.96641	0.27	38.02	17.37	38.29	17.64	56.00	46.00	-17.71	-28.36
4	2.92578	0.32	41.26	29.90	41.58	30.22	56.00	46.00	-14.42	-15.78
5	6.88281	0.40	34.96	24.60	35.36	25.00	60.00	50.00	-24.64	-25.00
6	13.56250	0.50	41.39	39.62	41.89	40.12	60.00	50.00	-18.11	-9.88

**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

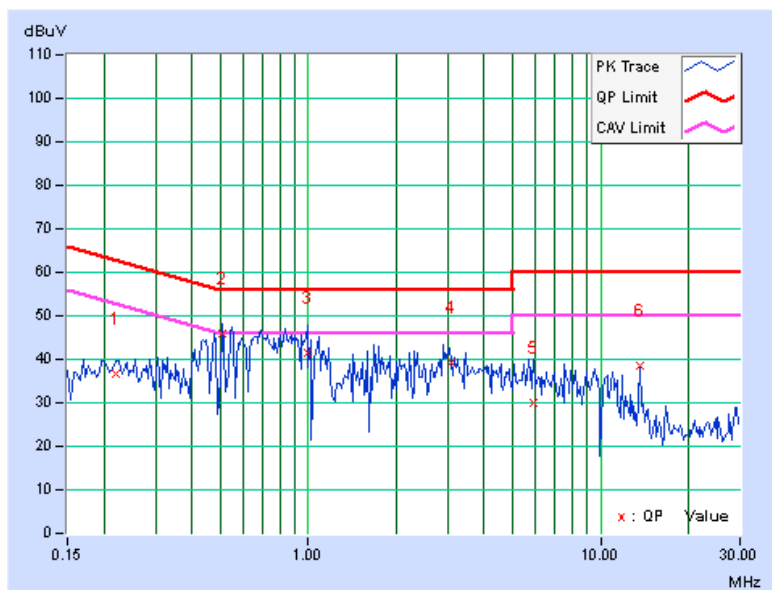


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.22031	0.19	36.64	28.12	36.83	28.31	62.81
2	<b>0.50938</b>	<b>0.25</b>	<b>45.56</b>	<b>43.30</b>	<b>45.81</b>	<b>43.55</b>	<b>56.00</b>	<b>46.00</b>	<b>-10.19</b>	<b>-2.45</b>
3	0.98984	0.23	41.18	31.66	41.41	31.89	56.00	46.00	-14.59	-14.11
4	3.06641	0.34	38.92	31.46	39.26	31.80	56.00	46.00	-16.74	-14.20
5	5.90234	0.42	29.62	21.23	30.04	21.65	60.00	50.00	-29.96	-28.35
6	13.56250	0.57	38.07	37.20	38.64	37.77	60.00	50.00	-21.36	-12.23

**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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### **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	16.41	0.5	PASS
157	5785	16.45	0.5	PASS
161	5805	16.44	0.5	PASS

#### 802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	17.63	0.5	PASS
157	5785	17.69	0.5	PASS
161	5805	17.67	0.5	PASS

#### 802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	36.41	0.5	PASS
159	5795	36.48	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	187.932	22.74	30	PASS
157	5785	200.909	23.03	30	PASS
161	5805	193.197	22.86	30	PASS

### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	196.789	22.94	30	PASS
157	5785	199.986	23.01	30	PASS
161	5805	192.309	22.84	30	PASS

### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
151	5755	182.390	22.61	30	PASS
159	5795	184.927	22.67	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	-14.39	8	PASS
157	5785	-14.16	8	PASS
161	5805	-13.92	8	PASS

### 802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-13.69	8	PASS
157	5785	-13.83	8	PASS
161	5805	-14.56	8	PASS

### 802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	Limit (dBm/3kHz)	PASS /FAIL
151	5755	-16.40	8	PASS
159	5795	-16.21	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**

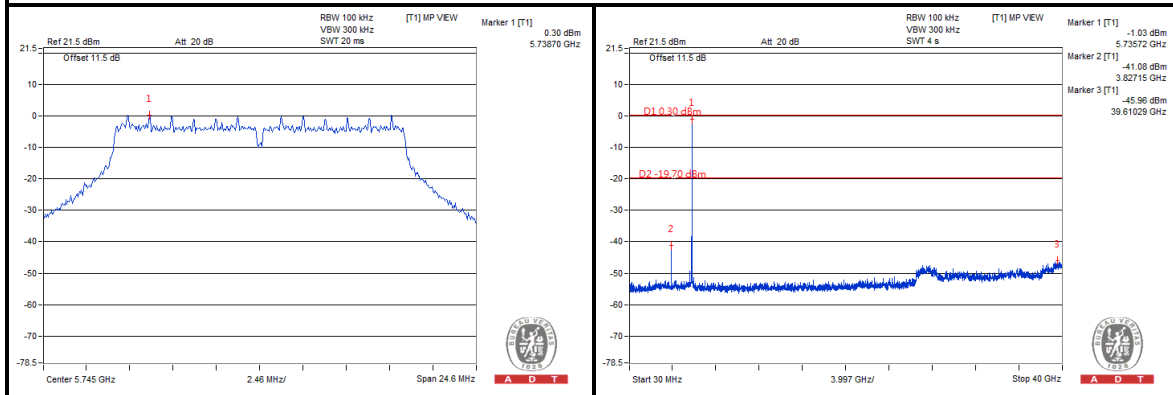
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



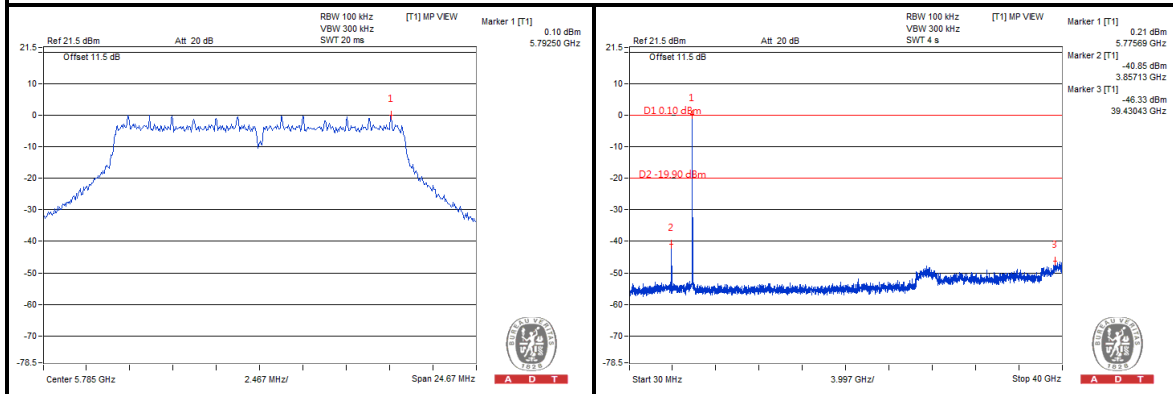
A D T

### 802.11a

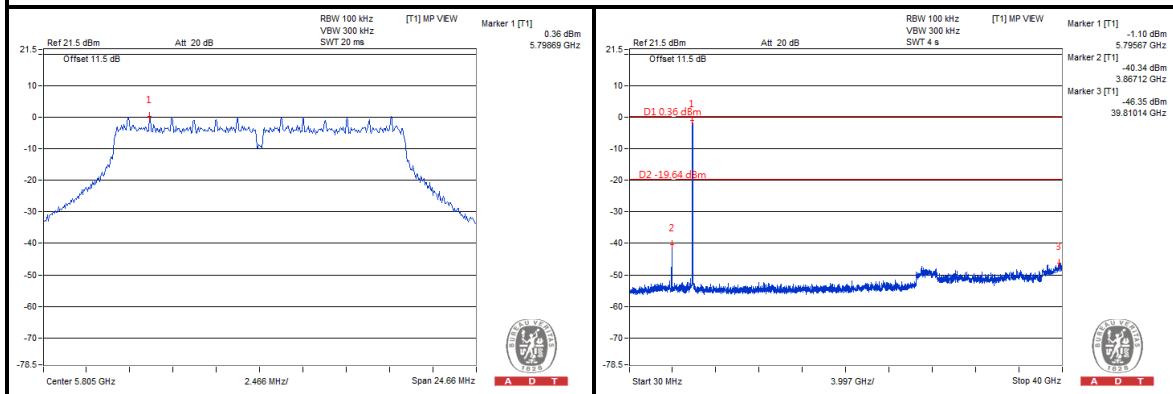
#### CH 149



#### CH 157



#### CH 161

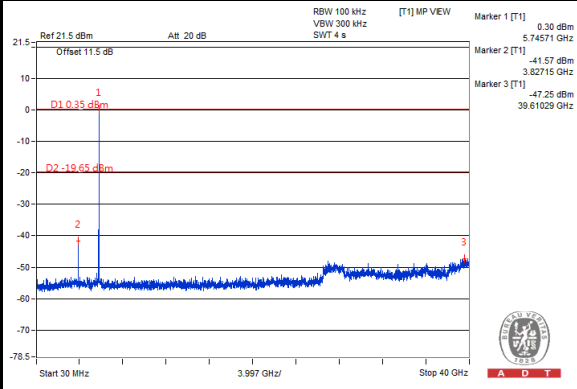
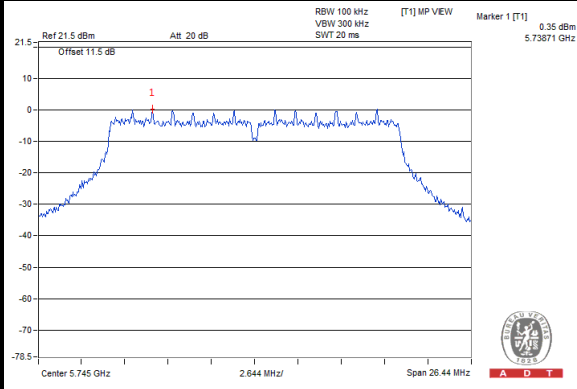




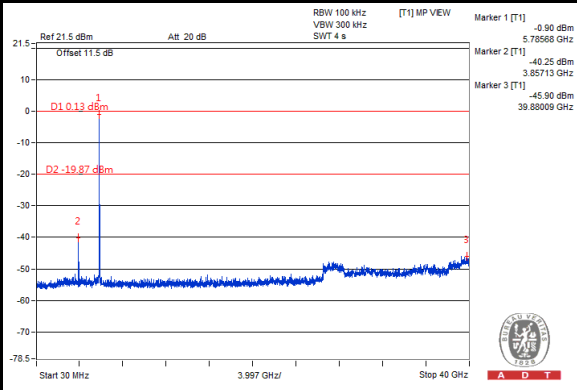
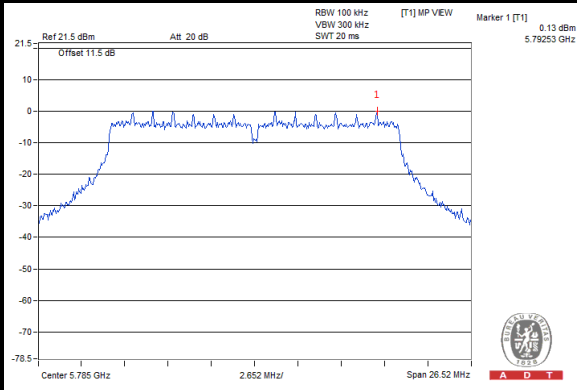
A D T

### 802.11n (20MHz)

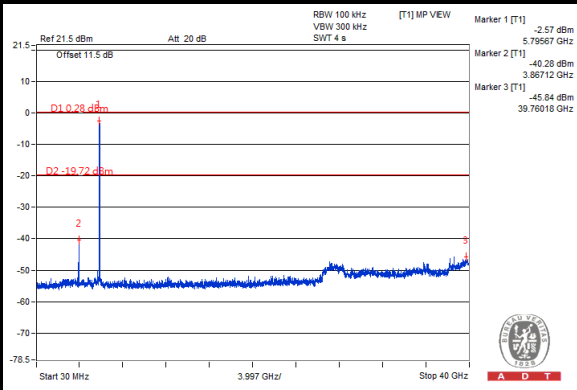
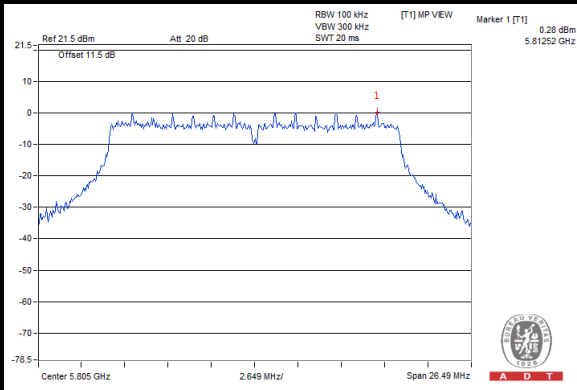
#### CH 149



#### CH 157



#### CH 161

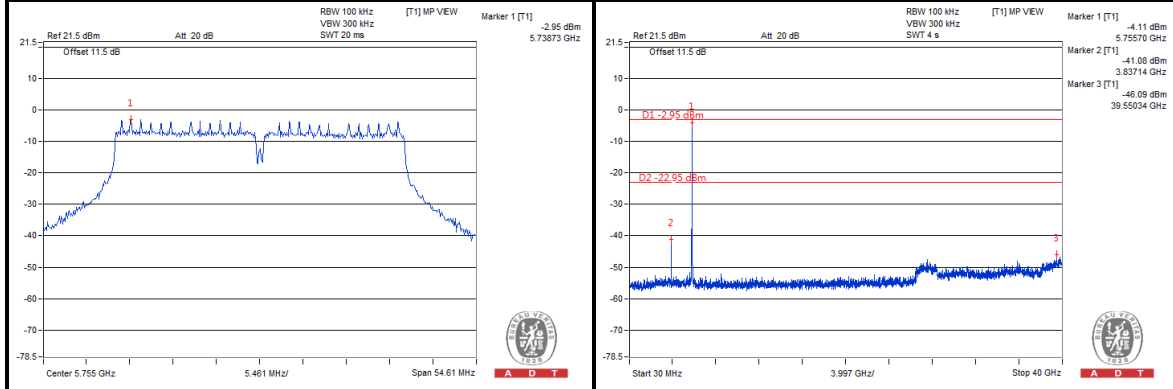




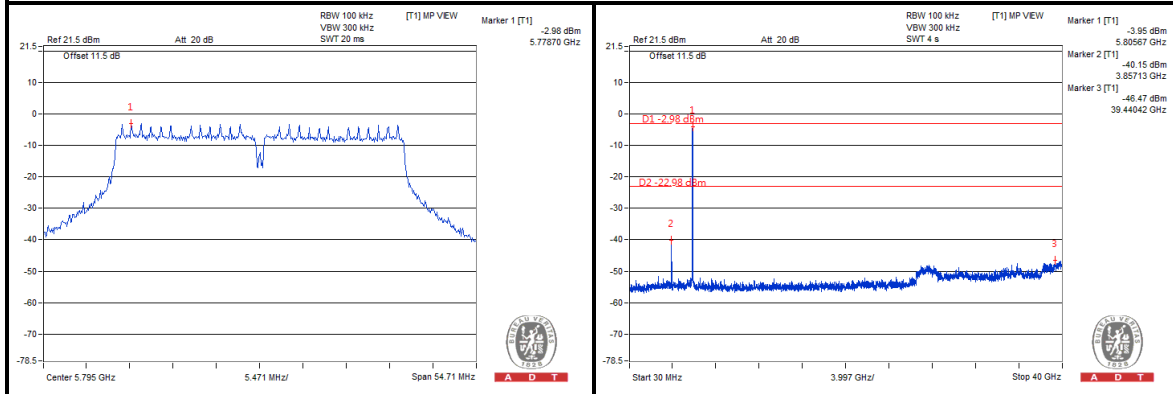
A D T

### 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:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**

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Fax: 886-3-5935342

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**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---