



FCC TEST REPORT (15.407)

REPORT NO.: RF130320C22-2
MODEL NO.: MT11X-A1
(Refer to item 3.1 for more details)
FCC ID: HFS-BZ1
RECEIVED: Mar. 20, 2013
TESTED: Apr. 14, 2013 ~ May 02, 2013
ISSUED: May 06, 2013

APPLICANT: QUANTA COMPUTER INC.

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

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist.,
New Taipei City, Taiwan (R.O.C)

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130320C22-2	Original release	May 06, 2013

1. CERTIFICATION

PRODUCT: Tablet PC
MODEL NO.: MT11X-A1 (Refer to item 3.1 for more details)
BRAND: VIZIO
APPLICANT: QUANTA COMPUTER INC.
TESTED: Apr. 14, 2013 ~ May 02, 2013
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**
ANSI C63.10-2009

The above equipment (model: MT11X-A1) 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 : Vera Huang , **DATE** : May 06, 2013

Vera Huang / Specialist

APPROVED BY : Sam chen , **DATE** : May 06, 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 E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -3.98dB at 0.16562MHz.
15.407(b/1/2/3) (b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.74dB at 30MHz.
15.407(a/1/2)	Peak Transmit Power	N/A	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	N/A	Meet the requirement of limit.
15.407(a/1/2)	Peak Power Spectral Density	N/A	Meet the requirement of limit.
15.407(g)	Frequency Stability	N/A	Meet the requirement of limit.
15.203	Antenna Requirement	N/A	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Tablet PC
MODEL NO.	MT11X-A1 (Refer to NOTE as below)
POWER SUPPLY	12Vdc (adapter or host equipment) 7.4Vdc (Li-ion battery)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7
OPERATING FREQUENCY	5180 ~ 5240MHz
NUMBER OF CHANNEL	4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	19.364mW
ANTENNA TYPE	Monopole antenna with 1.34dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The following models are provided to the EUT.

MODEL NO.	DIFFERENCE
MT11X-A1	All models are identically, different model names are for marketing purpose.
MT11X-A1S	

2. The following wireless modules are collocated in the EUT.

ITEM	BRAND	MODEL
WLAN/BT module	Atheros	AR5B22

3. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter	Vizio	W13-024N1A	Input: 100-240Vac, 0.6A, 50-60Hz Output: 12Vdc, 2.0A
Battery	SMP	SQU-1205	Rating: 7.4Vdc, 4700mAh

4. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

MODULATION MODE	TX FUNCTION
802.11b	2TX
802.11g	2TX
802.11a	2TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

5. 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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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 **Z-plane** for 5180~5320MHz and **Y-plane** for 5500~5700MHz.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.0
B	802.11a		36 to 48	36, 44, 48	OFDM	BPSK	6.0
	802.11n (20MHz)		36 to 48	36, 44, 48	OFDM	BPSK	6.5
	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5

RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	802.11n (40MHz)	5180-5240	38 to 46	46	OFDM	BPSK	13.5

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	802.11n (40MHz)	5180-5240	38 to 46	46	OFDM	BPSK	13.5



BANDEDGE MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A & B	802.11a	5180-5240	36 to 48	36, 48	OFDM	BPSK	6.0
	802.11n (20MHz)		36 to 48	36, 48	OFDM	BPSK	6.5
	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A & B	802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.0
	802.11n (20MHz)		36 to 48	36, 44, 48	OFDM	BPSK	6.5
	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5

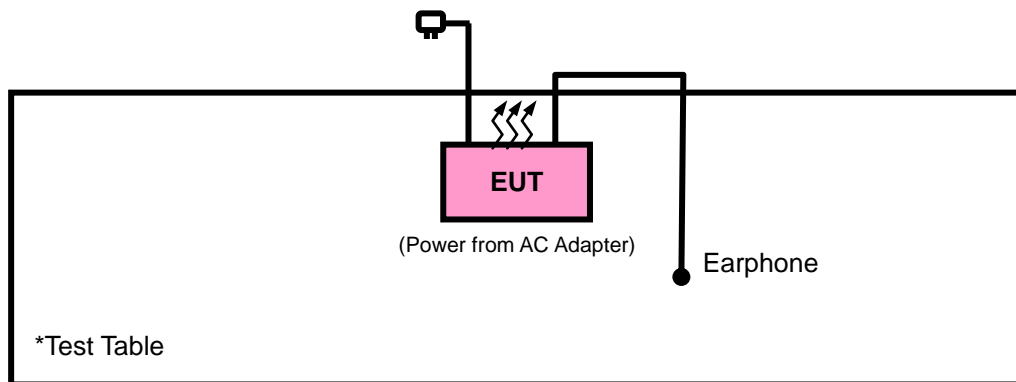
TEST CONDITION:

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

If duty cycle is < 98%, duty factor shall be considered.

802.11a: Duty cycle of test signal is > 98 %, duty factor is not required.

802.11n (20MHz): Duty cycle = 2.50/2.56 = 0.976, Duty factor = $10 * \log(1/0.976) = 0.10$

802.11n (40MHz): Duty cycle = 1.21/1.27 = 0.952, Duty factor = $10 * \log(1/0.952) = 0.21$



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

789033 D01 General UNII Test Procedures v01 r02

662911 D01 Multiple Transmitter Output v01 r02

ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

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 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m)
PK	PK
-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$



4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Aug. 21, 2012	Aug. 20, 2013
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

- 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.

4.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

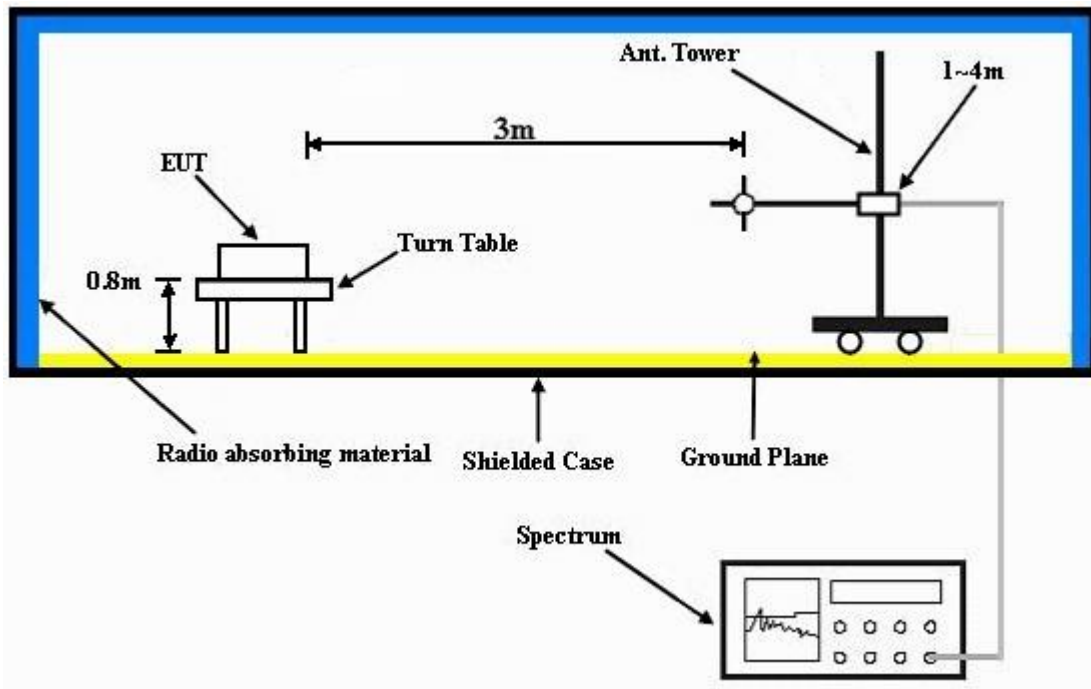
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) 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 for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

4.1.6 TEST SETUP



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

4.1.7 EUT OPERATING CONDITION

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



4.1.8 TEST RESULTS

ABOVE 1GHz DATA:

MODE A

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5150	43.31	41.98	54	-10.69	31.32	7.33	37.32	100	179	Average
5150	58.33	57	74	-15.67	31.32	7.33	37.32	100	179	Peak
5180	93.84	92.51			31.35	7.32	37.34	100	179	Average
5180	102.94	101.61			31.35	7.32	37.34	100	179	Peak
5350	39.63	37.93	54	-14.37	31.48	7.4	37.18	100	179	Average
5350	54.19	52.49	74	-19.81	31.48	7.4	37.18	100	179	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
5150	42.49	41.16	54	-11.51	31.32	7.33	37.32	106	167	Average
5150	59.22	57.89	74	-14.78	31.32	7.33	37.32	106	167	Peak
5180	91.21	89.88			31.35	7.32	37.34	106	167	Average
5180	100.51	99.18			31.35	7.32	37.34	106	167	Peak
5350	39.62	37.92	54	-14.38	31.48	7.4	37.18	106	167	Average
5350	54.21	52.51	74	-19.79	31.48	7.4	37.18	106	167	Peak

REMARKS: 5180MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 44	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5150	38.33	38.02	54	-15.67	31.32	6.31	37.32	100	181	Average
5150	54.89	54.58	74	-19.11	31.32	6.31	37.32	100	181	Peak
5220	90.9	90.63			31.37	6.26	37.36	100	181	Average
5220	100.14	99.87			31.37	6.26	37.36	100	181	Peak
5460	38.6	37.66	54	-15.4	31.56	6.46	37.08	100	181	Average
5460	56.01	55.07	74	-17.99	31.56	6.46	37.08	100	181	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
5150	38.09	37.78	54	-15.91	31.32	6.31	37.32	100	238	Average
5150	54.46	54.15	74	-19.54	31.32	6.31	37.32	100	238	Peak
5220	84.99	84.72			31.37	6.26	37.36	100	238	Average
5220	94.36	94.09			31.37	6.26	37.36	100	238	Peak
5460	38.39	37.45	54	-15.61	31.56	6.46	37.08	100	238	Average
5460	55.59	54.65	74	-18.41	31.56	6.46	37.08	100	238	Peak

REMARKS: 5220MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5150	39.32	37.99	54	-14.68	31.32	7.33	37.32	100	182	Average
5150	47.79	46.46	74	-26.21	31.32	7.33	37.32	100	182	Peak
5240	92.32	90.91			31.39	7.34	37.32	100	182	Average
5240	101.02	99.61			31.39	7.34	37.32	100	182	Peak
5350	39.54	37.84	54	-14.46	31.48	7.4	37.18	100	182	Average
5350	48.21	46.51	74	-25.79	31.48	7.4	37.18	100	182	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
5150	39.9	38.57	54	-14.1	31.32	7.33	37.32	106	168	Average
5150	49.79	48.46	74	-24.21	31.32	7.33	37.32	106	168	Peak
5240	90.92	89.51			31.39	7.34	37.32	106	168	Average
5240	100.2	98.79			31.39	7.34	37.32	106	168	Peak
5350	39.52	37.82	54	-14.48	31.48	7.4	37.18	106	168	Average
5350	49.88	48.18	74	-24.12	31.48	7.4	37.18	106	168	Peak

REMARKS: 5240MHz: Fundamental frequency.



MODE B

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5146	39.69	38.36	54	-14.31	31.32	7.33	37.32	100	195	Average
5146	54.64	53.31	74	-19.36	31.32	7.33	37.32	100	195	Peak
5180	92.36	91.03			31.35	7.32	37.34	100	195	Average
5180	102.11	100.78			31.35	7.32	37.34	100	195	Peak
5430	39.98	38.09	54	-14.02	31.55	7.47	37.13	100	195	Average
5430	55.26	53.37	74	-18.74	31.55	7.47	37.13	100	195	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
5070	39.73	38.45	54	-14.27	31.25	7.3	37.27	104	180	Average
5070	55.5	54.22	74	-18.5	31.25	7.3	37.27	104	180	Peak
5180	91.51	90.18			31.35	7.32	37.34	104	180	Average
5180	100.55	99.22			31.35	7.32	37.34	104	180	Peak
5446	39.88	37.98	54	-14.12	31.56	7.47	37.13	104	180	Average
5446	55.22	53.32	74	-18.78	31.56	7.47	37.13	104	180	Peak

REMARKS: 5180MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 44	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5150	38.23	37.92	54	-15.77	31.32	6.31	37.32	106	357	Average
5150	52.97	52.66	74	-21.03	31.32	6.31	37.32	106	357	Peak
5220	93.92	93.65			31.37	6.26	37.36	106	357	Average
5220	102.93	102.66			31.37	6.26	37.36	106	357	Peak
5460	38.43	37.49	54	-15.57	31.56	6.46	37.08	106	357	Average
5460	52.77	51.83	74	-21.23	31.56	6.46	37.08	106	357	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
5150	38.16	37.85	54	-15.84	31.32	6.31	37.32	100	10	Average
5150	52.62	52.31	74	-21.38	31.32	6.31	37.32	100	10	Peak
5220	92.61	92.34			31.37	6.26	37.36	100	10	Average
5220	101.29	101.02			31.37	6.26	37.36	100	10	Peak
5460	38.46	37.52	54	-15.54	31.56	6.46	37.08	100	10	Average
5460	54.06	53.12	74	-19.94	31.56	6.46	37.08	100	10	Peak

REMARKS: 5220MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5008	39.05	37.93	54	-14.95	31.21	7.14	37.23	100	36	Average
5008	56.15	55.03	74	-17.85	31.21	7.14	37.23	100	36	Peak
5240	94.44	93.03			31.39	7.34	37.32	100	36	Average
5240	104.67	103.26			31.39	7.34	37.32	100	36	Peak
5416	39.72	37.97	54	-14.28	31.53	7.4	37.18	100	36	Average
5416	54.89	53.14	74	-19.11	31.53	7.4	37.18	100	36	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
5086	39.61	38.31	54	-14.39	31.27	7.3	37.27	105	177	Average
5086	54.91	53.61	74	-19.09	31.27	7.3	37.27	105	177	Peak
5240	90.84	89.43			31.39	7.34	37.32	105	177	Average
5240	100.16	98.75			31.39	7.34	37.32	105	177	Peak
5416	39.8	38.05	54	-14.2	31.53	7.4	37.18	105	177	Average
5416	55.9	54.15	74	-18.1	31.53	7.4	37.18	105	177	Peak

REMARKS: 5240MHz: Fundamental frequency.



802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5048	39.15	37.91	54	-14.85	31.24	7.25	37.25	100	39	Average
5048	55.42	54.18	74	-18.58	31.24	7.25	37.25	100	39	Peak
5180	92.66	91.33			31.35	7.32	37.34	100	39	Average
5180	102.65	101.32			31.35	7.32	37.34	100	39	Peak
5456	39.35	37.34	54	-14.65	31.56	7.53	37.08	100	39	Average
5456	56.45	54.44	74	-17.55	31.56	7.53	37.08	100	39	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
5014	38.54	37.42	54	-15.46	31.21	7.14	37.23	100	278	Average
5014	55.44	54.32	74	-18.56	31.21	7.14	37.23	100	278	Peak
5180	86.93	85.6			31.35	7.32	37.34	100	278	Average
5180	97.19	95.86			31.35	7.32	37.34	100	278	Peak
5394	38.95	37.22	54	-15.05	31.51	7.4	37.18	100	278	Average
5394	55.99	54.26	74	-18.01	31.51	7.4	37.18	100	278	Peak

REMARKS: 5180MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 44	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5150	38.25	37.94	54	-15.75	31.32	6.31	37.32	100	219	Average
5150	52.7	52.39	74	-21.3	31.32	6.31	37.32	100	219	Peak
5220	91.64	91.37			31.37	6.26	37.36	100	219	Average
5220	101.93	101.66			31.37	6.26	37.36	100	219	Peak
5460	38.45	37.51	54	-15.55	31.56	6.46	37.08	100	219	Average
5460	53.57	52.63	74	-20.43	31.56	6.46	37.08	100	219	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
5150	37.92	37.61	54	-16.08	31.32	6.31	37.32	103	24	Average
5150	51.48	51.17	74	-22.52	31.32	6.31	37.32	103	24	Peak
5220	85.92	85.65			31.37	6.26	37.36	103	24	Average
5220	95.45	95.18			31.37	6.26	37.36	103	24	Peak
5460	38.14	37.2	54	-15.86	31.56	6.46	37.08	103	24	Average
5460	52.68	51.74	74	-21.32	31.56	6.46	37.08	103	24	Peak

REMARKS: 5220MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5100	38.83	37.48	54	-15.17	31.28	7.35	37.28	100	36	Average
5100	55.65	54.3	74	-18.35	31.28	7.35	37.28	100	36	Peak
5240	92.16	90.75			31.39	7.34	37.32	100	36	Average
5240	102.31	100.9			31.39	7.34	37.32	100	36	Peak
5458	39.38	37.37	54	-14.62	31.56	7.53	37.08	100	36	Average
5458	55.83	53.82	74	-18.17	31.56	7.53	37.08	100	36	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
5022	38.53	37.35	54	-15.47	31.23	7.19	37.24	104	190	Average
5022	56.74	55.56	74	-17.26	31.23	7.19	37.24	104	190	Peak
5240	89.06	87.65			31.39	7.34	37.32	104	190	Average
5240	99.6	98.19			31.39	7.34	37.32	104	190	Peak
5424	39	37.25	54	-15	31.53	7.4	37.18	104	190	Average
5424	55.44	53.69	74	-18.56	31.53	7.4	37.18	104	190	Peak

REMARKS: 5240MHz: Fundamental frequency.



802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5150	47.61	46.28	54	-6.39	31.32	7.33	37.32	100	19	Average
5150	58.71	57.38	74	-15.29	31.32	7.33	37.32	100	19	Peak
5190	86.95	85.62			31.35	7.32	37.34	100	19	Average
5190	96.13	94.8			31.35	7.32	37.34	100	19	Peak
5350	39.34	37.64	54	-14.66	31.48	7.4	37.18	100	19	Average
5350	53.63	51.93	74	-20.37	31.48	7.4	37.18	100	19	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
5150	46.04	44.71	54	-7.96	31.32	7.33	37.32	106	180	Average
5150	58.78	57.45	74	-15.22	31.32	7.33	37.32	106	180	Peak
5190	85.8	84.47			31.35	7.32	37.34	106	180	Average
5190	96.99	95.66			31.35	7.32	37.34	106	180	Peak
5350	39.5	37.8	54	-14.5	31.48	7.4	37.18	106	180	Average
5350	53.72	52.02	74	-20.28	31.48	7.4	37.18	106	180	Peak

REMARKS: 5190MHz: Fundamental frequency.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
5150	39.84	38.51	54	-14.16	31.32	7.33	37.32	100	36	Average
5150	53.17	51.84	74	-20.83	31.32	7.33	37.32	100	36	Peak
5230	92.06	90.65			31.39	7.34	37.32	100	36	Average
5230	102.51	101.1			31.39	7.34	37.32	100	36	Peak
5350	39.48	37.78	54	-14.52	31.48	7.4	37.18	100	36	Average
5350	54.17	52.47	74	-19.83	31.48	7.4	37.18	100	36	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
5150	39.61	38.28	54	-14.39	31.32	7.33	37.32	104	180	Average
5150	55.1	53.77	74	-18.9	31.32	7.33	37.32	104	180	Peak
5230	89.88	88.47			31.39	7.34	37.32	104	180	Average
5230	100.53	99.12			31.39	7.34	37.32	104	180	Peak
5350	39.51	37.81	54	-14.49	31.48	7.4	37.18	104	180	Average
5350	53.71	52.01	74	-20.29	31.48	7.4	37.18	104	180	Peak

REMARKS: 5230MHz: Fundamental frequency.



BELOW 1GHz WORST-CASE DATA : 802.11n (40MHz)

MODE B

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 54	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

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
105.33	31.36	52.53	43.5	-12.14	9.62	1.1	31.89	100	112	Peak
145.02	36.98	54.74	43.5	-6.52	12.54	1.32	31.62	100	203	Peak
172.83	32.94	51.77	43.5	-10.56	11.47	1.46	31.76	100	49	Peak
325.9	26.06	42.19	46	-19.94	13.57	2.14	31.84	100	118	Peak
584.9	25.16	34.99	46	-20.84	19.26	3.04	32.13	100	139	Peak
713	27.99	35.24	46	-18.01	21	3.47	31.72	100	177	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	37.26	55.85	40	-2.74	11.98	0.57	31.14	100	111	Peak
74.01	34.22	55.19	40	-5.78	9.81	0.93	31.71	100	198	Peak
143.94	34.67	52.52	43.5	-8.83	12.47	1.31	31.63	100	256	Peak
455.4	27.54	40.44	46	-18.46	16.45	2.64	31.99	100	123	Peak
586.3	27.54	37.32	46	-18.46	19.3	3.05	32.13	100	175	Peak
864.2	32.38	37.41	46	-13.62	23.05	3.86	31.94	100	193	Peak

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ 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

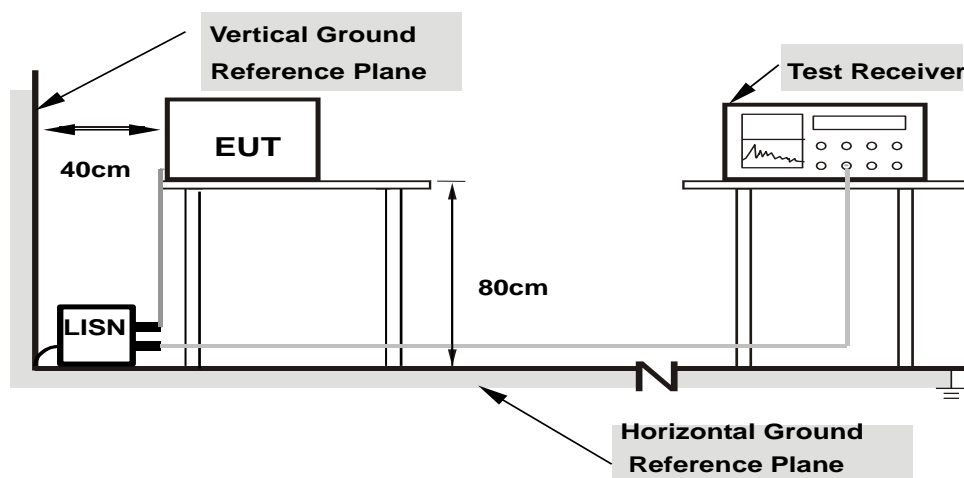
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

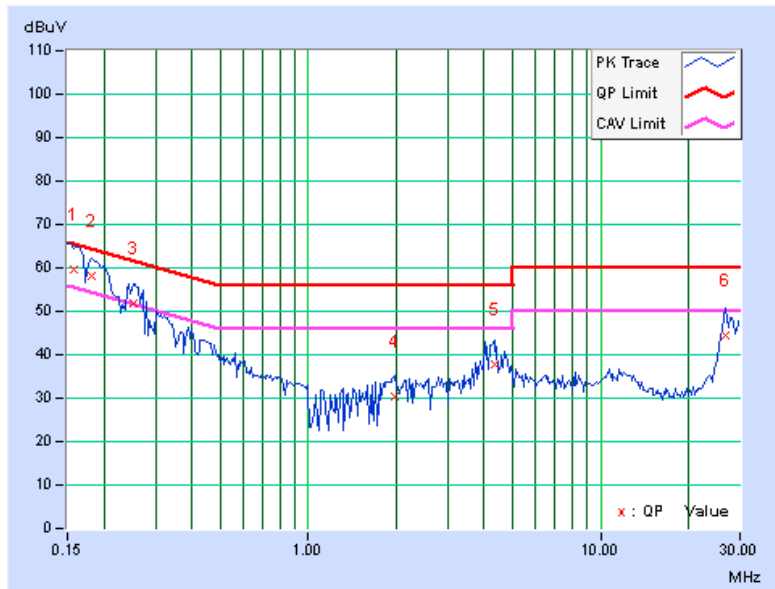
CONDUCTED WORST-CASE DATA : 802.11n (40MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
--------------	--------	----------------------	------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.12	59.38	42.65	59.50	42.77	65.58	55.58	-6.07	-12.80
2	0.18125	0.12	58.06	40.02	58.18	40.14	64.43	54.43	-6.25	-14.29
3	0.25156	0.13	51.85	36.47	51.98	36.60	61.71	51.71	-9.73	-15.11
4	1.96875	0.23	30.17	19.52	30.40	19.75	56.00	46.00	-25.60	-26.25
5	4.32813	0.37	37.31	26.62	37.68	26.99	56.00	46.00	-18.32	-19.01
6	26.87891	1.42	42.89	31.39	44.31	32.81	60.00	50.00	-15.69	-17.19

REMARKS:

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

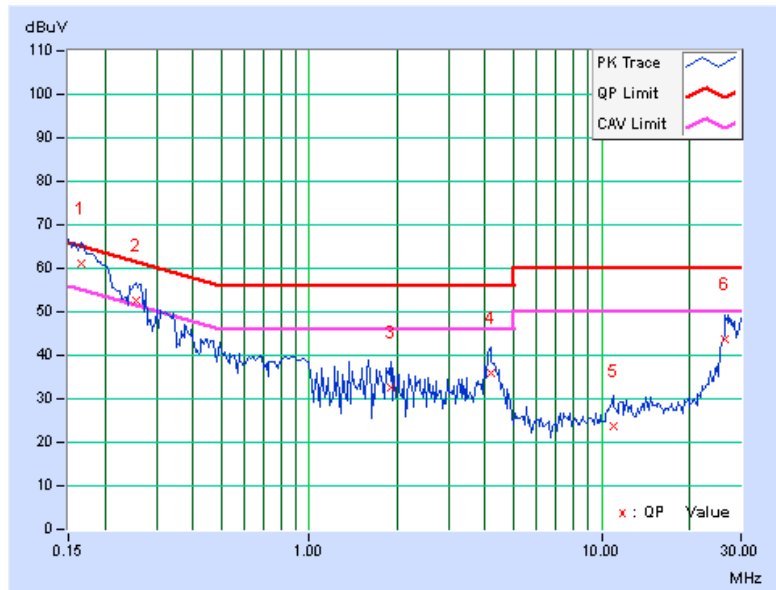


PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.17	61.02	45.22	61.19	45.39	65.18	55.18	-3.98	-9.78
2	0.25547	0.18	52.47	35.60	52.65	35.78	61.58	51.58	-8.93	-15.80
3	1.89844	0.28	32.44	22.57	32.72	22.85	56.00	46.00	-23.28	-23.15
4	4.16016	0.39	35.53	23.73	35.92	24.12	56.00	46.00	-20.08	-21.88
5	10.96094	0.62	22.94	17.15	23.56	17.77	60.00	50.00	-36.44	-32.23
6	26.56250	1.07	42.60	31.13	43.67	32.20	60.00	50.00	-16.33	-17.80

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 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

FREQUENCY BAND	LIMIT
5.150 ~ 5.250GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT \leq 4;

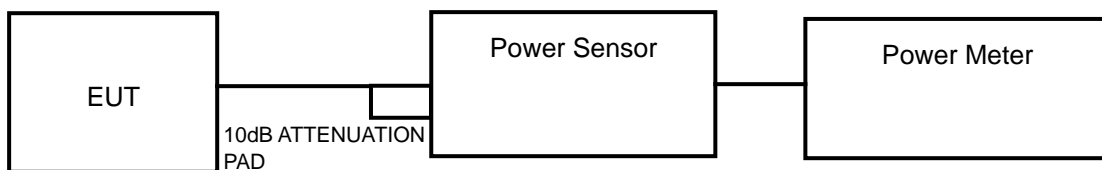
Array Gain = 0 dB (i.e., no array gain) for channel widths \geq 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT \geq 5.

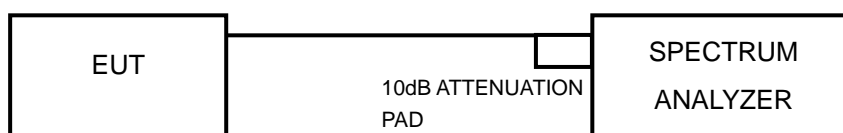
For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB BANDWIDTH



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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 specific channel frequencies individually.

4.3.7 TEST RESULTS

POWER OUTPUT:

MODE A

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	3.639	5.61	17	PASS
44	5220	2.825	4.51	17	PASS
48	5240	2.904	4.63	17	PASS

MODE B

POWER OUTPUT: 802.11a

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	9.53	9.46	17.824	12.51	17	PASS
44	5220	9.58	9.33	17.660	12.47	17	PASS
48	5240	9.43	9.42	17.539	12.44	17	PASS

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	9.33	9.30	17.100	12.33	17	PASS
44	5220	9.55	9.52	17.989	12.55	17	PASS
48	5240	9.51	9.48	17.824	12.51	17	PASS

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	9.65	9.62	18.408	12.65	17	PASS
46	5230	9.87	9.84	19.364	12.87	17	PASS



26dB BANDWIDTH:

MODE A

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	28.90	PASS
44	5220	27.63	PASS
48	5240	28.23	PASS

MODE B

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	25.28	25.26	PASS
44	5220	25.04	25.25	PASS
48	5240	26.99	24.40	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	25.55	24.43	PASS
44	5220	25.72	25.23	PASS
48	5240	25.16	24.86	PASS

802.11n (40MHz)

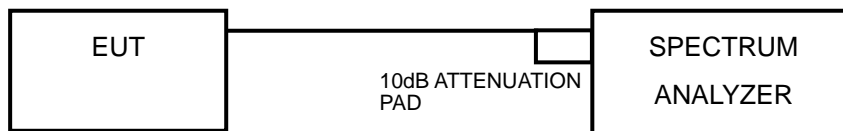
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	44.80	43.88	PASS
46	5230	55.12	45.71	PASS

4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.150 ~ 5.250GHz	4dBm

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

Using method SA-2 alternative

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 KHz, Set VBW \geq 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = 3 second.
- 5) Perform a single sweep.
- 6) Record the max value and add $10 \log (1/\text{duty cycle})$

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.4.7 TEST RESULTS

MODE A 802.11a

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	3.42	4	PASS
44	5220	3.37	4	PASS
48	5240	3.28	4	PASS

MODE B 802.11a

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	-0.31	-0.14	2.79	4	PASS
44	5220	0.66	1.13	3.91	4	PASS
48	5240	0.46	0.76	3.62	4	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $1.34\text{dBi} + 10\log(2) = 4.35 < 6\text{dBi}$, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.



802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	-0.44	-0.65	2.47	0.10	2.57	4	PASS
44	5220	-0.65	-0.62	2.38	0.10	2.48	4	PASS
48	5240	-0.92	-0.89	2.11	0.10	2.21	4	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $1.34\text{dBi} + 10\log(2) = 4.35 < 6\text{dBi}$, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-4.28	-4.98	-1.61	0.21	-1.40	4	PASS
46	5230	0.06	0.08	3.08	0.21	3.29	4	PASS

NOTE:

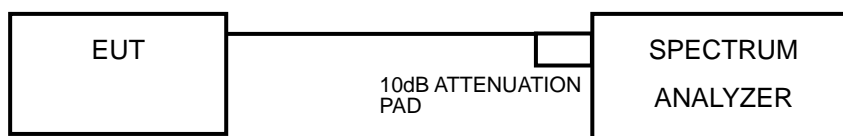
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $1.34\text{dBi} + 10\log(2) = 4.35 < 6\text{dBi}$, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

4.5 PEAK POWER EXCURSION MEASUREMENT

4.5.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Shall not exceed 13 dB.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.5.4 TEST PROCEDURE

- 1) Set RBW = 1 MHz, VBW \geq 3 MHz, Detector = peak.
- 2) Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
- 3) Use the peak search function to find the peak of the spectrum.
- 4) Measure the PPSD.
- 5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITIONS

Same as 4.2.6

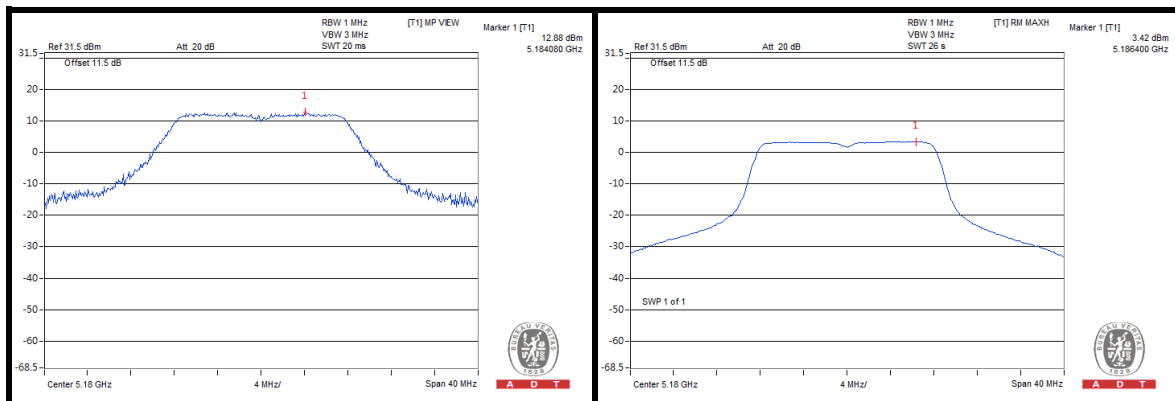
4.5.7 TEST RESULTS

MODE A

802.11a

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD (dBm)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS /FAIL
36	5180	12.88	3.42	9.46	13	PASS
44	5220	12.73	3.37	9.36	13	PASS
48	5240	12.65	3.28	9.37	13	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

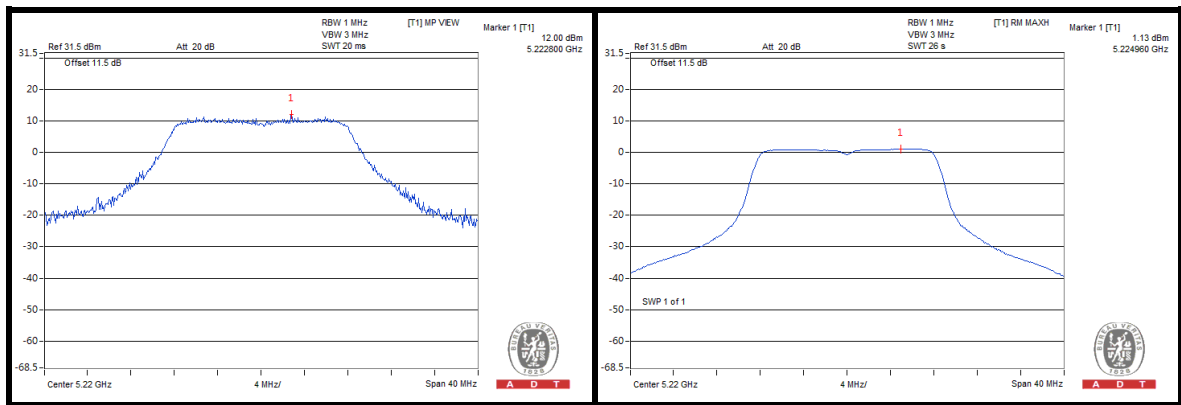




MODE B

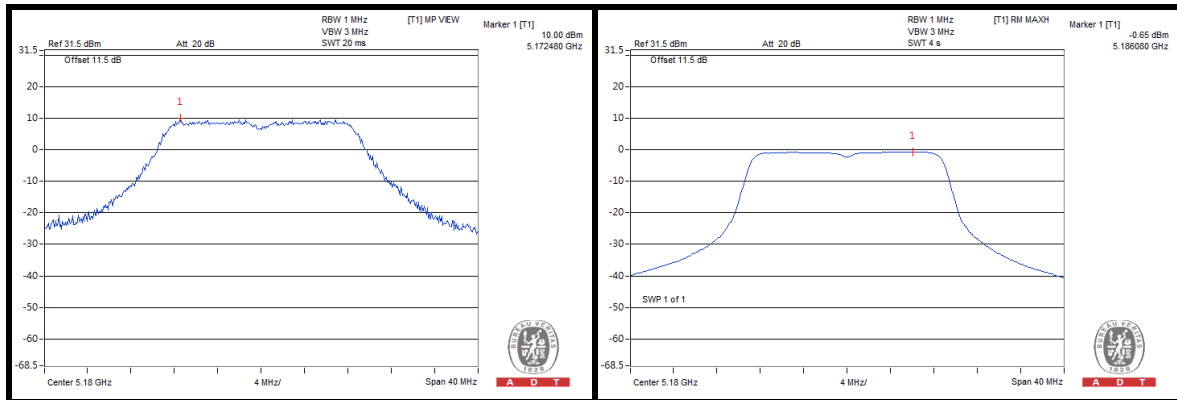
802.11a

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS /FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
36	5180	8.51	10.46	-0.31	-0.14	8.82	10.60	13	PASS
44	5220	9.70	12.00	0.66	1.13	9.04	10.87	13	PASS
48	5240	9.98	10.66	0.46	0.76	9.52	9.90	13	PASS



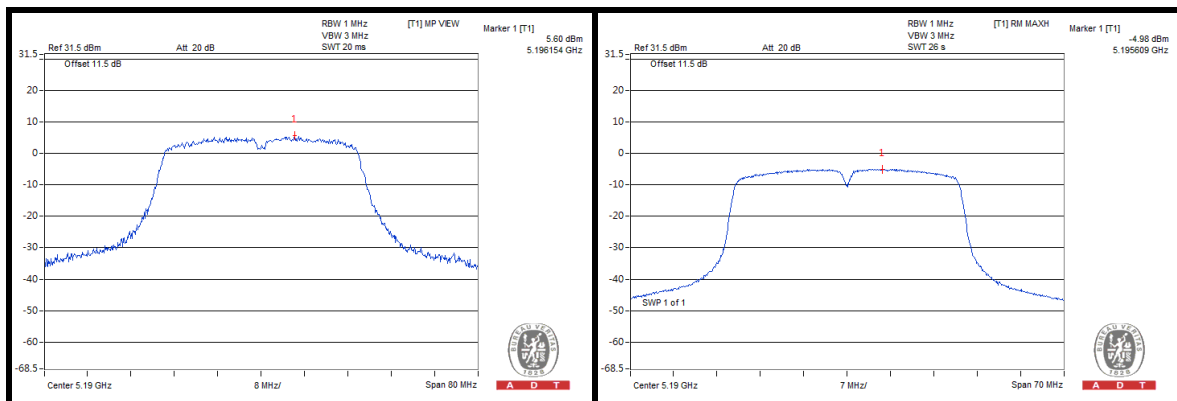
802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD WITHOUT DUTY FACTOR (dBm)		PPSD WITH DUTY FACTOR (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS /FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
36	5180	9.55	10.00	-0.44	-0.65	-0.34	-0.55	9.89	10.55	13	PASS
44	5220	9.28	9.50	-0.65	-0.62	-0.55	-0.52	9.83	10.02	13	PASS
48	5240	9.59	9.43	-0.92	-0.89	-0.82	-0.79	10.41	10.22	13	PASS



802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD WITHOUT DUTY FACTOR (dBm)		PPSD WITH DUTY FACTOR (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS /FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
38	5190	5.78	5.60	-4.28	-4.98	-4.07	-4.77	9.85	10.37	13	PASS
46	5230	10.46	9.82	0.06	0.08	0.27	0.29	10.19	9.53	13	PASS

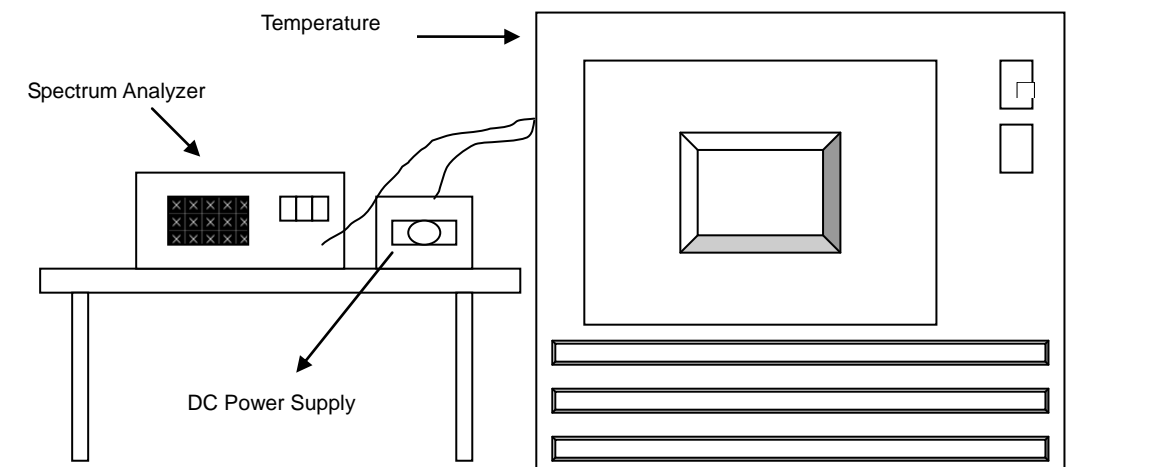


4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.6.4 TEST PROCEDURE

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5220MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-
35	120	5220.041080	7.870	5220.041296	7.911	5220.041191	7.891	5220.041219	7.896
30	120	5220.042006	8.047	5220.041654	7.980	5220.042302	8.104	5220.042111	8.067
20	120	5220.044859	8.594	5220.044948	8.611	5220.045157	8.651	5220.044945	8.610
10	120	5220.043853	8.401	5220.044096	8.448	5220.044212	8.470	5220.043984	8.426
0	120	5220.041227	7.898	5220.040855	7.827	5220.040939	7.843	5220.041012	7.857
-10	-	-	-	-	-	-	-	-	-
-20	-	-	-	-	-	-	-	-	-
-30	-	-	-	-	-	-	-	-	-

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5220MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	102	5220.044970	8.615	5220.045198	8.659	5220.044655	8.555	5220.044482	8.521
	120	5220.044859	8.594	5220.044948	8.611	5220.045157	8.651	5220.044945	8.610
	138	5220.045994	8.811	5220.046715	8.949	5220.046121	8.835	5220.046625	8.932

NOTE:

1. The applicant defined the normal operating temperature of the EUT is from 0°C to 35°C.
2. The EUT would shut down automatically when exceed 0-35 degree C range.



A D T

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.



A D T

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---