

FCC TEST REPORT (15.407)

REPORT NO.: RF110209C16B-1

MODEL NO.: RUNTKA863WJQZ

FCC ID: NKR-S236

RECEIVED: Oct. 24, 2013

TESTED: Nov. 15 ~ Nov. 20, 2013

ISSUED: Nov. 27, 2013

APPLICANT: Wistron NeWeb Corp.

ADDRESS: 20 Park Avenue II, Hsinchu Science Park, Hsinchu
30076, Taiwan, R.O.C.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF110209C16B-1	Original release	Nov. 27, 2013

1. CERTIFICATION

PRODUCT: 802.11 abgn USB Module

MODEL: RUNTKA863WJQZ

BRAND: SHARP Corporation

APPLICANT: Wistron NeWeb Corp.

TESTED: Nov. 15 ~ Nov. 20, 2013

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10-2009

The above equipment (model: RUNTKA863WJQZ) 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 : Sunttee Liu , **DATE :** Nov. 27, 2013
Sunttee Liu / Specialist

APPROVED BY : Ken Liu , **DATE :** Nov. 27, 2013
Ken Liu / Senior 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 -12.89dB at 2.09327MHz.
15.407(b)(1/2/3) (b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.6dB at 5350.00MHz.
15.407(a)(1/2)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a)(1/2)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 MEASUREMENT UNCERTAINTY

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

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

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	802.11 abgn USB Module
MODEL NO.	RUNTKA863WJQZ
POWER SUPPLY	5Vdc (host equipment)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz, 5260 ~ 5320MHz & 5500 ~ 5700MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 802.11a, 802.11n (20MHz): 4 802.11n (40MHz): 2 5260 ~ 5320MHz: 802.11a, 802.11n (20MHz): 4 802.11n (40MHz): 2 5500 ~ 5700MHz: 802.11a, 802.11n (20MHz): 8 802.11n (40MHz): 3
OUTPUT POWER	5180 ~ 5240MHz: 42.341mW 5260 ~ 5320MHz: 41.881mW 5500 ~ 5700MHz: 43.782mW
ANTENNA TYPE	Refer to Note
ANTENNA CONNECTOR	NA
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	NA

NOTE:

1. The EUT incorporates a MIMO function. The EUT provides 2 completed transmitters and 2 receivers.

MODULATION MODE	TX FUNCTION	DESCRIPTION
802.11a	1TX	Chain 0
802.11n (20MHz)	2TX	Chain 0 / 1
802.11n (40MHz)	2TX	Chain 0 / 1

2. The EUT uses following antennas.

Frequency Band	Type	Connector	Gain (dBi)	
			Chain 0	Chain 1
5180~5240MHz	Printed	NA	0.83	2.15
5260~5320MHz	Printed	NA	1.83	2.24
5500~5700MHz	Printed	NA	2.12	1.91

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

3.2 DESCRIPTION OF TEST MODES

FOR 5180 ~ 5240MHz

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

FOR 5260 ~ 5320MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

FOR 5500 ~ 5700MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	116	5580 MHz
104	5520 MHz	132	5660 MHz
108	5540 MHz	136	5680 MHz
112	5560 MHz	140	5700 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	134	5670 MHz
110	5550 MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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 802.11a mode of EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
The 802.11n mode of 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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-	802.11n (20MHz)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
-	802.11n (40MHz)		54 to 62	54, 62	OFDM	BPSK	15.0
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-	802.11n (20MHz)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
-	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	BPSK	15.0

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)
-	802.11n (20MHz)	5180-5700	36 to 140	116	OFDM	BPSK	7.2

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)
-	802.11n (20MHz)	5180-5700	36 to 140	116	OFDM	BPSK	7.2

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	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
A	802.11n (20MHz)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
A	802.11n (40MHz)		54 to 62	54, 62	OFDM	BPSK	15.0
A	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
A	802.11n (20MHz)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
A	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	21deg. C, 68%RH	120Vac, 60Hz	Brad Tung Jones Chang
RE<1G	21deg. C, 68%RH	120Vac, 60Hz	Jones Chang
PLC	20deg. C, 60%RH	120Vac, 60Hz	Brad Tung
APCM	25deg. C, 60%RH	120Vac, 60Hz	Cedric Wu

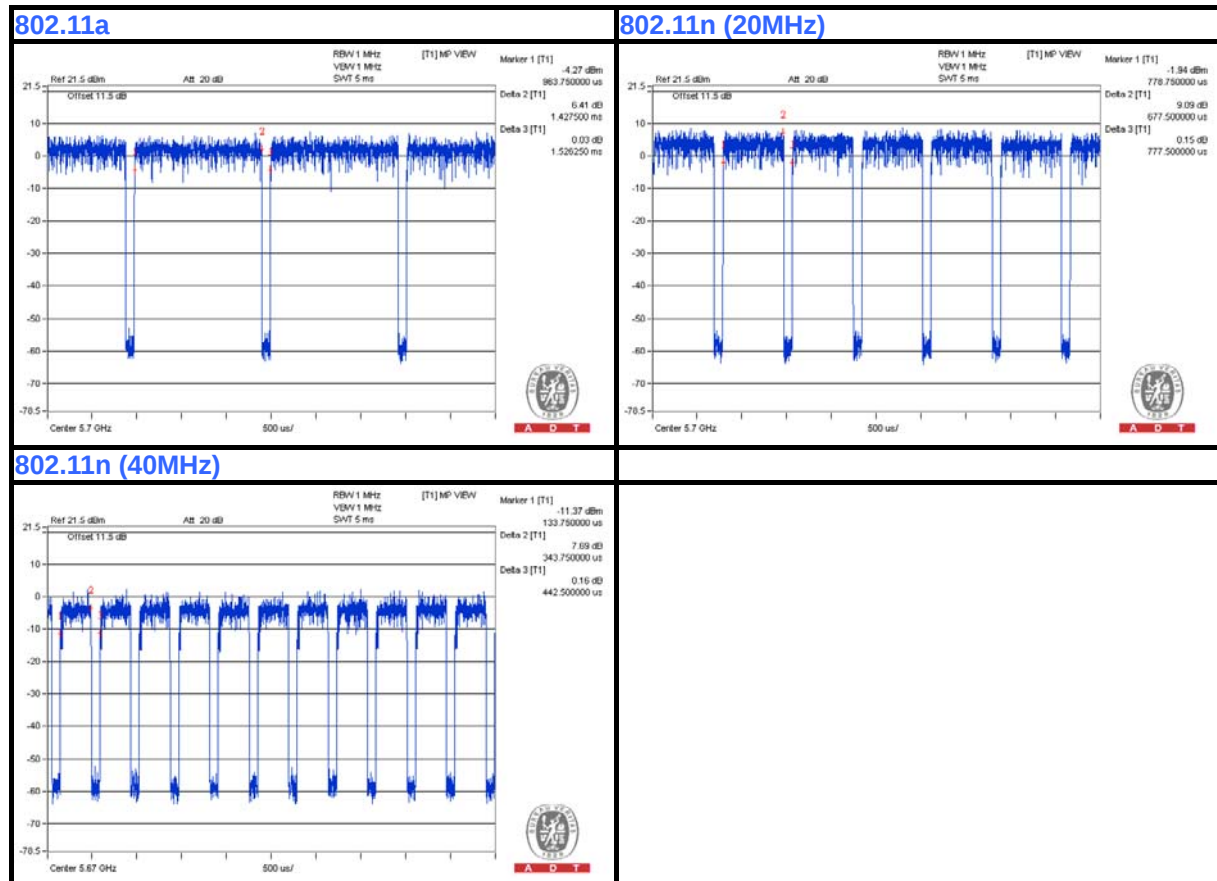
3.3 DUTY CYCLE OF TEST SIGNAL

MODULATION TYPE: BPSK

802.11a: Duty cycle = $1.427/1.526 = 0.935$, Duty factor = $10 * \log(1/0.935) = 0.29$

802.11n (20MHz): Duty cycle = $0.677/0.777 = 0.871$, Duty factor = $10 * \log(1/0.871) = 0.6$

802.11n (40MHz): Duty cycle = $0.344/0.442 = 0.778$, Duty factor = $10 * \log(1/0.778) = 1.09$



MODULATION TYPE: QPSK

802.11a: Duty cycle = $0.722/0.822 = 0.878$, Duty factor = $10 * \log(1/0.878) = 0.56$

802.11n (20MHz): Duty cycle = $0.47/0.57 = 0.825$, Duty factor = $10 * \log(1/0.825) = 0.84$

802.11n (40MHz): Duty cycle = $0.21/0.28 = 0.75$, Duty factor = $10 * \log(1/0.75) = 1.25$



MODULATION TYPE: 16QAM

802.11a: Duty cycle = $0.37/0.471 = 0.786$, Duty factor = $10 * \log(1/0.786) = 1.05$

802.11n (20MHz): Duty cycle = $0.25/0.29 = 0.862$, Duty factor = $10 * \log(1/0.862) = 0.64$

802.11n (40MHz): Duty cycle = $0.12/0.19 = 0.632$, Duty factor = $10 * \log(1/0.632) = 2$



MODULATION TYPE: 64QAM

802.11a: Duty cycle = $0.196/0.295 = 0.664$, Duty factor = $10 * \log(1/0.664) = 1.78$

802.11n (20MHz): Duty cycle = $0.12/0.2 = 0.6$, Duty factor = $10 * \log(1/0.6) = 2.22$

802.11n (40MHz): Duty cycle = $0.05/0.12 = 0.417$, Duty factor = $10 * \log(1/0.417) = 3.8$



3.4 DESCRIPTION OF SUPPORT UNITS

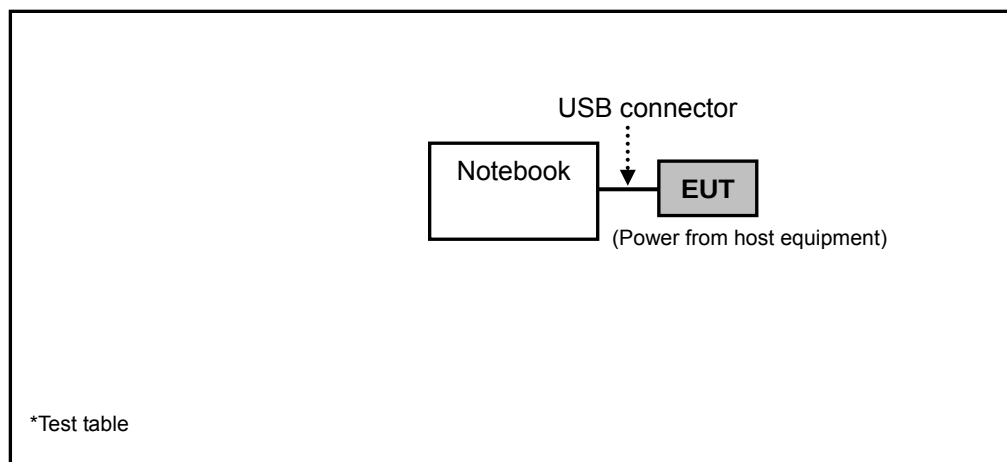
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D531	CN-0XM006-48643-8 1U-2973	QDS-BRCM1020
2	USB connector	NA	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

NOTE: All power cords of the above support units are non-shielded (1.8m).

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



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 r03

662911 D01 Multiple Transmitter Output v02

ANSI C63.10-2009

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

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

APPLICABLE TO	LIMIT	
√	FIELD STRENGTH AT 3m (dBμV/m)	
	PK	AV
	74	54
	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	Sep. 09, 2013	Sep. 08, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Oct. 24, 2013	Oct. 23, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Dec. 22, 2012	Dec. 21, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 28, 2013	Oct. 27, 2014
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 26, 2013	Aug. 25, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2013	Oct. 17, 2014
High Speed Peak Power Meter	ML2495A	0824011	Jul. 29, 2013	Jul. 28, 2014
Power Sensor	MA2411B	0738171	Jul. 29, 2013	Jul. 28, 2014
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 10, 2013	Jun. 09, 2014

- 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 4.
 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 460141.
 6. The IC Site Registration No. is IC7450F-4.

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:

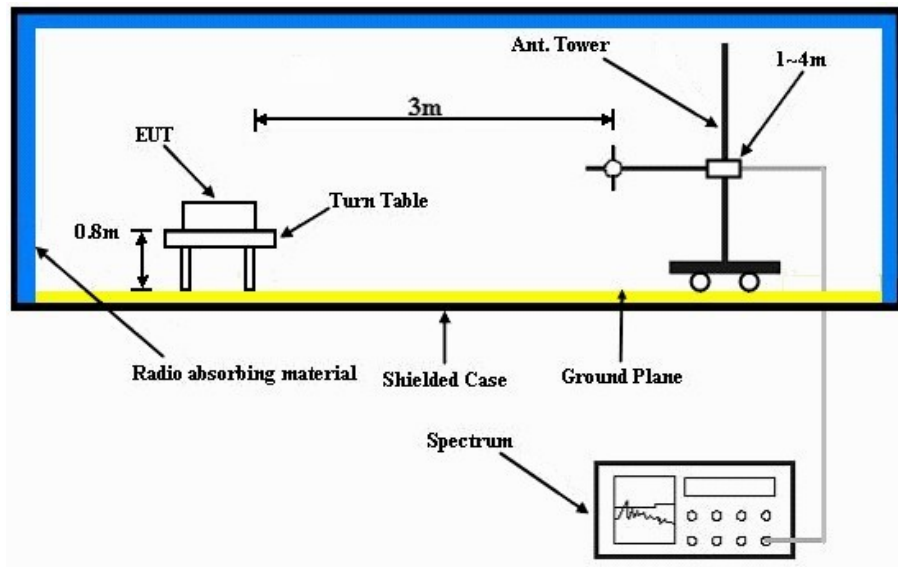
1. Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (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.

4.1.5 DEVIATION FROM TEST STANDARD

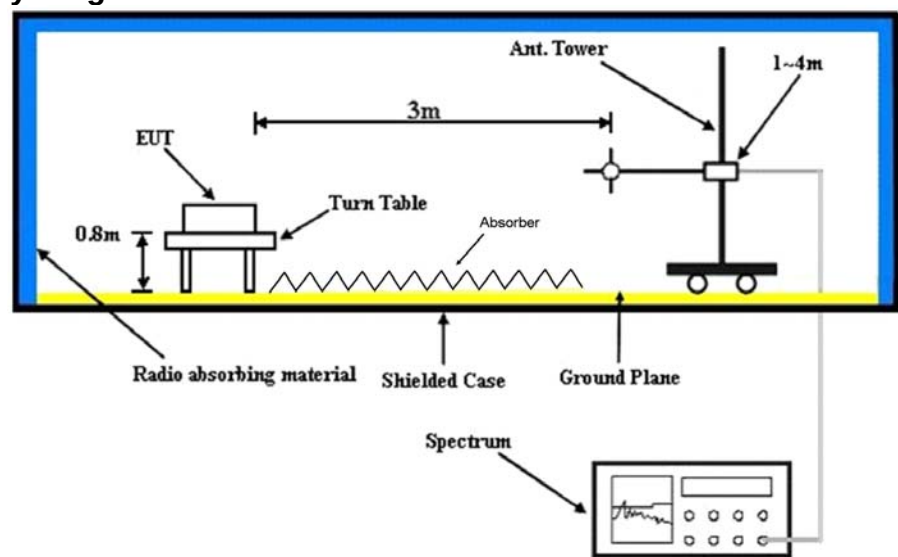
No deviation.

4.1.6 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

4.1.7 EUT OPERATING CONDITION

- a. Connected the EUT into a notebook through a USB connector and placed on a testing table.
- b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

4.1.8 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA :

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.6 PK	74.0	-16.4	1.00 H	41	52.20	5.40
2	5150.00	46.9 AV	54.0	-7.1	1.00 H	41	41.50	5.40
3	*5180.00	104.9 PK			1.00 H	41	65.60	39.30
4	*5180.00	94.3 AV			1.00 H	41	55.00	39.30
5	#10360.00	62.5 PK	74.0	-11.5	1.00 H	183	46.50	16.00
6	#10360.00	48.7 AV	54.0	-5.3	1.00 H	183	32.70	16.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.1 PK	74.0	-15.9	1.40 V	290	52.70	5.40
2	5150.00	47.3 AV	54.0	-6.7	1.40 V	290	41.90	5.40
3	*5180.00	104.3 PK			1.40 V	290	65.00	39.30
4	*5180.00	92.8 AV			1.40 V	290	53.50	39.30
5	#10360.00	62.0 PK	74.0	-12.0	1.00 V	222	46.00	16.00
6	#10360.00	48.0 AV	54.0	-6.0	1.00 V	222	32.00	16.00

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	105.0 PK			1.00 H	50	65.70	39.30
2	*5200.00	94.6 AV			1.00 H	50	55.30	39.30
3	#10400.00	62.8 PK	74.0	-11.2	1.00 H	237	46.60	16.20
4	#10400.00	49.1 AV	54.0	-4.9	1.00 H	237	32.90	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	104.4 PK			1.37 V	295	65.10	39.30
2	*5200.00	92.9 AV			1.37 V	295	53.60	39.30
3	#10400.00	62.3 PK	74.0	-11.7	1.00 V	245	46.10	16.20
4	#10400.00	48.4 AV	54.0	-5.6	1.00 V	245	32.20	16.20

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	105.3 PK			1.00 H	45	66.00	39.30
2	*5240.00	95.0 AV			1.00 H	45	55.70	39.30
3	#10480.00	63.5 PK	74.0	-10.5	1.00 H	223	46.70	16.80
4	#10480.00	49.6 AV	54.0	-4.4	1.00 H	223	32.80	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	104.8 PK			1.33 V	292	65.50	39.30
2	*5240.00	93.1 AV			1.33 V	292	53.80	39.30
3	#10480.00	63.0 PK	74.0	-11.0	1.00 V	205	46.20	16.80
4	#10480.00	49.0 AV	54.0	-5.0	1.00 V	205	32.20	16.80

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5260.00	105.8 PK			1.00 H	52	66.50	39.30
2	*5260.00	94.3 AV			1.00 H	52	55.00	39.30
3	#10520.00	63.8 PK	74.0	-10.2	1.00 H	180	47.00	16.80
4	#10520.00	49.8 AV	54.0	-4.2	1.00 H	180	33.00	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5260.00	104.9 PK			1.37 V	300	65.60	39.30
2	*5260.00	93.3 AV			1.37 V	300	54.00	39.30
3	#10520.00	63.1 PK	74.0	-10.9	1.02 V	201	46.30	16.80
4	#10520.00	49.1 AV	54.0	-4.9	1.02 V	201	32.30	16.80

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	105.7 PK			1.00 H	55	66.30	39.40
2	*5300.00	94.6 AV			1.00 H	55	55.20	39.40
3	10600.00	63.6 PK	74.0	-10.4	1.00 H	156	47.10	16.50
4	10600.00	49.4 AV	54.0	-4.6	1.00 H	156	32.90	16.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	104.4 PK			1.36 V	282	65.00	39.40
2	*5300.00	93.4 AV			1.36 V	282	54.00	39.40
3	10600.00	63.1 PK	74.0	-10.9	1.05 V	203	46.60	16.50
4	10600.00	48.5 AV	54.0	-5.5	1.05 V	203	32.00	16.50

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	105.2 PK			1.00 H	180	65.80	39.40
2	*5320.00	94.2 AV			1.00 H	180	54.80	39.40
3	5350.00	61.0 PK	74.0	-13.0	1.00 H	180	55.50	5.50
4	5350.00	48.5 AV	54.0	-5.5	1.00 H	180	43.00	5.50
5	10640.00	63.2 PK	74.0	-10.8	1.05 H	186	46.40	16.80
6	10640.00	49.6 AV	54.0	-4.4	1.05 H	186	32.80	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	104.2 PK			1.37 V	257	64.80	39.40
2	*5320.00	93.2 AV			1.37 V	257	53.80	39.40
3	5350.00	60.5 PK	74.0	-13.5	1.37 V	257	55.00	5.50
4	5350.00	47.5 AV	54.0	-6.5	1.37 V	257	42.00	5.50
5	10640.00	63.0 PK	74.0	-11.0	1.00 V	178	46.20	16.80
6	10640.00	48.9 AV	54.0	-5.1	1.00 V	178	32.10	16.80

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	59.5 PK	74.0	-14.5	1.00 H	195	53.90	5.60
2	5460.00	46.5 AV	54.0	-7.5	1.00 H	195	40.90	5.60
3	#5470.00	64.2 PK	74.0	-9.8	1.00 H	195	58.60	5.60
4	#5470.00	48.1 AV	54.0	-5.9	1.00 H	195	42.50	5.60
5	*5500.00	105.5 PK			1.00 H	195	65.90	39.60
6	*5500.00	94.9 AV			1.00 H	195	55.30	39.60
7	11000.00	63.5 PK	74.0	-10.5	1.00 H	200	45.00	18.50
8	11000.00	49.2 AV	54.0	-4.8	1.00 H	200	30.70	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	58.1 PK	74.0	-15.9	1.30 V	286	52.50	5.60
2	5460.00	45.6 AV	54.0	-8.4	1.30 V	286	40.00	5.60
3	#5470.00	63.5 PK	74.0	-10.5	1.30 V	286	57.90	5.60
4	#5470.00	48.5 AV	54.0	-5.5	1.30 V	286	42.90	5.60
5	*5500.00	103.9 PK			1.30 V	286	64.30	39.60
6	*5500.00	93.6 AV			1.30 V	286	54.00	39.60
7	11000.00	63.0 PK	74.0	-11.0	1.07 V	203	44.50	18.50
8	11000.00	48.7 AV	54.0	-5.3	1.07 V	203	30.20	18.50

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	105.5 PK			1.00 H	189	65.70	39.80
2	*5580.00	94.9 AV			1.00 H	189	55.10	39.80
3	11160.00	63.2 PK	74.0	-10.8	1.00 H	207	44.80	18.40
4	11160.00	48.9 AV	54.0	-5.1	1.00 H	207	30.50	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	103.9 PK			1.30 V	288	64.10	39.80
2	*5580.00	93.6 AV			1.30 V	288	53.80	39.80
3	11160.00	62.6 PK	74.0	-11.4	1.04 V	175	44.20	18.40
4	11160.00	48.4 AV	54.0	-5.6	1.04 V	175	30.00	18.40

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 140	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	106.0 PK			1.00 H	213	65.90	40.10
2	*5700.00	95.1 AV			1.00 H	213	55.00	40.10
3	#5725.00	61.3 PK	74.0	-12.7	1.00 H	213	55.00	6.30
4	#5725.00	48.5 AV	54.0	-5.5	1.00 H	213	42.20	6.30
5	11140.00	63.1 PK	74.0	-10.9	1.00 H	238	44.60	18.50
6	11140.00	49.0 AV	54.0	-5.0	1.00 H	238	30.50	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	103.3 PK			1.25 V	288	63.20	40.10
2	*5700.00	93.1 AV			1.25 V	288	53.00	40.10
3	#5725.00	59.3 PK	74.0	-14.7	1.25 V	288	53.00	6.30
4	#5725.00	47.1 AV	54.0	-6.9	1.25 V	288	40.80	6.30
5	11140.00	62.9 PK	74.0	-11.1	1.00 V	198	44.40	18.50
6	11140.00	48.6 AV	54.0	-5.4	1.00 V	198	30.10	18.50

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.1 PK	74.0	-15.9	1.04 H	160	52.70	5.40
2	5150.00	45.3 AV	54.0	-8.7	1.04 H	160	39.90	5.40
3	*5180.00	103.5 PK			1.04 H	160	64.20	39.30
4	*5180.00	93.2 AV			1.04 H	160	53.90	39.30
5	#10360.00	58.7 PK	74.0	-15.3	1.00 H	53	42.70	16.00
6	#10360.00	46.6 AV	54.0	-7.4	1.00 H	53	30.60	16.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.3 PK	74.0	-11.7	1.03 V	219	56.90	5.40
2	5150.00	48.7 AV	54.0	-5.3	1.03 V	219	43.30	5.40
3	*5180.00	107.6 PK			1.03 V	219	68.30	39.30
4	*5180.00	96.8 AV			1.03 V	219	57.50	39.30
5	#10360.00	58.5 PK	74.0	-15.5	1.08 V	24	42.50	16.00
6	#10360.00	46.4 AV	54.0	-7.6	1.08 V	24	30.40	16.00

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	103.6 PK			1.07 H	152	64.30	39.30
2	*5200.00	93.3 AV			1.07 H	152	54.00	39.30
3	#10400.00	59.0 PK	74.0	-15.0	1.00 H	180	42.80	16.20
4	#10400.00	46.9 AV	54.0	-7.1	1.00 H	180	30.70	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	107.8 PK			1.05 V	223	68.50	39.30
2	*5200.00	97.0 AV			1.05 V	223	57.70	39.30
3	#10400.00	58.7 PK	74.0	-15.3	1.00 V	160	42.50	16.20
4	#10400.00	46.7 AV	54.0	-7.3	1.00 V	160	30.50	16.20

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	103.3 PK			1.06 H	166	64.00	39.30
2	*5240.00	92.7 AV			1.06 H	166	53.40	39.30
3	#10480.00	59.3 PK	74.0	-14.7	1.00 H	49	42.50	16.80
4	#10480.00	47.2 AV	54.0	-6.8	1.00 H	49	30.40	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	107.5 PK			1.02 V	216	68.20	39.30
2	*5240.00	96.7 AV			1.02 V	216	57.40	39.30
3	#10480.00	59.1 PK	74.0	-14.9	1.00 V	158	42.30	16.80
4	#10480.00	47.0 AV	54.0	-7.0	1.00 V	158	30.20	16.80

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5260.00	103.5 PK			1.04 H	172	64.20	39.30
2	*5260.00	92.9 AV			1.04 H	172	53.60	39.30
3	#10520.00	59.4 PK	74.0	-14.6	1.00 H	58	42.60	16.80
4	#10520.00	47.3 AV	54.0	-6.7	1.00 H	58	30.50	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5260.00	107.5 PK			1.08 V	230	68.20	39.30
2	*5260.00	96.9 AV			1.08 V	230	57.60	39.30
3	#10520.00	59.2 PK	74.0	-14.8	1.10 V	53	42.40	16.80
4	#10520.00	47.1 AV	54.0	-6.9	1.10 V	53	30.30	16.80

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	104.0 PK			1.07 H	146	64.60	39.40
2	*5300.00	93.4 AV			1.07 H	146	54.00	39.40
3	10600.00	59.3 PK	74.0	-14.7	1.00 H	60	42.80	16.50
4	10600.00	47.4 AV	54.0	-6.6	1.00 H	60	30.90	16.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	108.0 PK			1.04 V	200	68.60	39.40
2	*5300.00	97.3 AV			1.04 V	200	57.90	39.40
3	10600.00	59.1 PK	74.0	-14.9	1.03 V	15	42.60	16.50
4	10600.00	47.1 AV	54.0	-6.9	1.03 V	15	30.60	16.50

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	103.5 PK			1.06 H	170	64.10	39.40
2	*5320.00	92.5 AV			1.06 H	170	53.10	39.40
3	5350.00	61.0 PK	74.0	-13.0	1.06 H	170	55.50	5.50
4	5350.00	47.0 AV	54.0	-7.0	1.06 H	170	41.50	5.50
5	10640.00	59.3 PK	74.0	-14.7	1.00 H	60	42.50	16.80
6	10640.00	47.2 AV	54.0	-6.8	1.00 H	60	30.40	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	108.2 PK			1.00 V	232	68.80	39.40
2	*5320.00	97.0 AV			1.00 V	232	57.60	39.40
3	5350.00	62.9 PK	74.0	-11.1	1.00 V	232	57.40	5.50
4	5350.00	48.8 AV	54.0	-5.2	1.00 V	232	43.30	5.50
5	10640.00	59.0 PK	74.0	-15.0	1.00 V	28	42.20	16.80
6	10640.00	47.0 AV	54.0	-7.0	1.00 V	28	30.20	16.80

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	57.6 PK	74.0	-16.4	1.00 H	171	52.00	5.60
2	5460.00	44.6 AV	54.0	-9.4	1.00 H	171	39.00	5.60
3	#5470.00	62.0 PK	74.0	-12.0	1.00 H	171	56.40	5.60
4	#5470.00	46.8 AV	54.0	-7.2	1.00 H	171	41.20	5.60
5	*5500.00	103.9 PK			1.00 H	171	64.30	39.60
6	*5500.00	92.6 AV			1.00 H	171	53.00	39.60
7	11000.00	60.6 PK	74.0	-13.4	1.00 H	50	42.10	18.50
8	11000.00	48.5 AV	54.0	-5.5	1.00 H	50	30.00	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	60.5 PK	74.0	-13.5	1.00 V	236	54.90	5.60
2	5460.00	46.5 AV	54.0	-7.5	1.00 V	236	40.90	5.60
3	#5470.00	70.2 PK	74.0	-3.8	1.00 V	236	64.60	5.60
4	#5470.00	50.7 AV	54.0	-3.3	1.00 V	236	45.10	5.60
5	*5500.00	108.2 PK			1.00 V	236	68.60	39.60
6	*5500.00	97.6 AV			1.00 V	236	58.00	39.60
7	11000.00	60.0 PK	74.0	-14.0	1.05 V	70	41.50	18.50
8	11000.00	48.0 AV	54.0	-6.0	1.05 V	70	29.50	18.50

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	103.8 PK			1.00 H	164	64.20	39.60
2	*5580.00	92.5 AV			1.00 H	164	52.90	39.60
3	11000.00	60.5 PK	74.0	-13.5	1.00 H	41	42.00	18.50
4	11000.00	48.3 AV	54.0	-5.7	1.00 H	41	29.80	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	108.1 PK			1.00 V	233	68.50	39.60
2	*5580.00	97.5 AV			1.00 V	233	57.90	39.60
3	11000.00	59.9 PK	74.0	-14.1	1.00 V	88	41.40	18.50
4	11000.00	48.2 AV	54.0	-5.8	1.00 V	88	29.70	18.50

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 140	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	106.1 PK			1.00 H	160	66.00	40.10
2	*5700.00	94.2 AV			1.00 H	160	54.10	40.10
3	#5725.00	66.8 PK	74.0	-7.2	1.00 H	160	60.50	6.30
4	#5725.00	49.5 AV	54.0	-4.5	1.00 H	160	43.20	6.30
5	11400.00	60.2 PK	74.0	-13.8	1.00 H	86	42.00	18.20
6	11400.00	48.3 AV	54.0	-5.7	1.00 H	86	30.10	18.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	111.1 PK			1.20 V	294	71.00	40.10
2	*5700.00	99.2 AV			1.20 V	294	59.10	40.10
3	#5725.00	70.2 PK	74.0	-3.8	1.20 V	294	63.90	6.30
4	#5725.00	53.1 AV	54.0	-0.9	1.20 V	294	46.80	6.30
5	11400.00	59.9 PK	74.0	-14.1	1.00 V	150	41.70	18.20
6	11400.00	48.4 AV	54.0	-5.6	1.00 V	150	30.20	18.20

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.3 PK	74.0	-15.7	1.01 H	167	52.90	5.40
2	5150.00	48.2 AV	54.0	-5.8	1.01 H	167	42.80	5.40
3	*5190.00	97.9 PK			1.01 H	167	58.60	39.30
4	*5190.00	86.9 AV			1.01 H	167	47.60	39.30
5	#10380.00	57.5 PK	74.0	-16.5	1.00 H	255	41.40	16.10
6	#10380.00	46.7 AV	54.0	-7.3	1.00 H	255	30.60	16.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.1 PK	74.0	-6.9	1.18 V	222	61.70	5.40
2	5150.00	53.2 AV	54.0	-0.8	1.18 V	222	47.80	5.40
3	*5190.00	103.8 PK			1.18 V	223	64.50	39.30
4	*5190.00	93.4 AV			1.18 V	223	54.10	39.30
5	#10380.00	57.9 PK	74.0	-16.1	1.00 V	108	41.80	16.10
6	#10380.00	47.4 AV	54.0	-6.6	1.00 V	108	31.30	16.10

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	98.2 PK			1.00 H	18	58.90	39.30
2	*5230.00	87.2 AV			1.00 H	18	47.90	39.30
3	5350.00	56.8 PK	74.0	-17.2	1.00 H	18	51.30	5.50
4	5350.00	45.1 AV	54.0	-8.9	1.00 H	18	39.60	5.50
5	#10460.00	58.3 PK	74.0	-15.7	1.00 H	203	41.70	16.60
6	#10460.00	47.4 AV	54.0	-6.6	1.00 H	203	30.80	16.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	105.4 PK			1.15 V	221	66.10	39.30
2	*5230.00	94.2 AV			1.15 V	221	54.90	39.30
3	5350.00	56.3 PK	74.0	-17.7	1.15 V	221	50.80	5.50
4	5350.00	45.0 AV	54.0	-9.0	1.15 V	221	39.50	5.50
5	#10460.00	58.7 PK	74.0	-15.3	1.00 V	283	42.10	16.60
6	#10460.00	48.5 AV	54.0	-5.5	1.00 V	283	31.90	16.60

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 54	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.4 PK	74.0	-18.6	1.00 H	22	50.00	5.40
2	5150.00	44.8 AV	54.0	-9.2	1.00 H	22	39.40	5.40
3	*5270.00	101.2 PK			1.00 H	22	61.80	39.40
4	*5270.00	90.4 AV			1.00 H	22	51.00	39.40
5	#10540.00	57.8 PK	74.0	-16.2	1.00 H	319	41.10	16.70
6	#10540.00	47.2 AV	54.0	-6.8	1.00 H	319	30.50	16.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.1 PK	74.0	-17.9	1.00 V	234	50.70	5.40
2	5150.00	45.1 AV	54.0	-8.9	1.00 V	234	39.70	5.40
3	*5270.00	104.2 PK			1.01 V	234	64.80	39.40
4	*5270.00	93.3 AV			1.01 V	234	53.90	39.40
5	#10540.00	58.2 PK	74.0	-15.8	1.00 V	299	41.50	16.70
6	#10540.00	47.9 AV	54.0	-6.1	1.00 V	299	31.20	16.70

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	99.3 PK			1.10 H	17	59.90	39.40
2	*5310.00	88.5 AV			1.10 H	17	49.10	39.40
3	5350.00	61.8 PK	74.0	-12.2	1.10 H	17	56.30	5.50
4	5350.00	49.5 AV	54.0	-4.5	1.10 H	17	44.00	5.50
5	10620.00	58.4 PK	74.0	-15.6	1.01 H	352	41.70	16.70
6	10620.00	47.5 AV	54.0	-6.5	1.01 H	352	30.80	16.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	104.6 PK			1.01 V	222	65.20	39.40
2	*5310.00	94.3 AV			1.01 V	222	54.90	39.40
3	5350.00	68.2 PK	74.0	-5.8	1.12 V	224	62.70	5.50
4	5350.00	53.4 AV	54.0	-0.6	1.12 V	224	47.90	5.50
5	10620.00	58.9 PK	74.0	-15.1	1.01 V	222	42.20	16.70
6	10620.00	48.7 AV	54.0	-5.3	1.01 V	222	32.00	16.70

REMARKS:

- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
- Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission level – Limit value.
- " * ": Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	58.4 PK	74.0	-15.6	1.00 H	340	52.80	5.60
2	5460.00	45.1 AV	54.0	-8.9	1.00 H	340	39.50	5.60
3	#5470.00	50.2 PK	74.0	-23.8	1.00 H	340	44.60	5.60
4	#5470.00	49.3 AV	54.0	-4.7	1.00 H	340	43.70	5.60
5	*5510.00	98.9 PK			1.03 H	11	59.30	39.60
6	*5510.00	88.0 AV			1.03 H	11	48.40	39.60
7	11020.00	59.5 PK	74.0	-14.5	1.11 H	359	40.90	18.60
8	11020.00	48.4 AV	54.0	-5.6	1.11 H	359	29.80	18.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	59.6 PK	74.0	-14.4	1.00 V	316	54.00	5.60
2	5460.00	48.1 AV	54.0	-5.9	1.00 V	316	42.50	5.60
3	#5470.00	66.1 PK	74.0	-7.9	1.00 V	316	60.50	5.60
4	#5470.00	53.3 AV	54.0	-0.7	1.00 V	316	47.70	5.60
5	*5510.00	101.9 PK			1.00 V	233	62.30	39.60
6	*5510.00	91.8 AV			1.00 V	233	52.20	39.60
7	11020.00	59.7 PK	74.0	-14.3	1.00 V	72	41.10	18.60
8	11020.00	49.5 AV	54.0	-4.5	1.00 V	72	30.90	18.60

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5550.00	101.6 PK			1.07 H	12	61.80	39.80
2	*5550.00	90.4 AV			1.07 H	12	50.60	39.80
3	11100.00	59.6 PK	74.0	-14.4	1.00 H	358	41.00	18.60
4	11100.00	48.6 AV	54.0	-5.4	1.00 H	359	30.00	18.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5550.00	107.2 PK			1.13 V	293	67.40	39.80
2	*5550.00	96.3 AV			1.13 V	293	56.50	39.80
3	11100.00	59.9 PK	74.0	-14.1	1.15 V	19	41.30	18.60
4	11100.00	48.9 AV	54.0	-5.1	1.15 V	19	30.30	18.60

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 134	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	102.2 PK			1.14 H	10	62.20	40.00
2	*5670.00	91.4 AV			1.14 H	10	51.40	40.00
3	#5725.00	57.5 PK	74.0	-16.5	1.00 H	19	51.20	6.30
4	#5725.00	46.6 AV	54.0	-7.4	1.00 H	19	40.30	6.30
5	11340.00	58.8 PK	74.0	-15.2	1.00 H	23	40.50	18.30
6	11340.00	47.8 AV	54.0	-6.2	1.00 H	23	29.50	18.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	106.4 PK			1.09 V	292	66.40	40.00
2	*5670.00	95.7 AV			1.09 V	292	55.70	40.00
3	#5725.00	57.5 PK	74.0	-16.5	1.09 V	292	51.20	6.30
4	#5725.00	46.4 AV	54.0	-7.6	1.09 V	292	40.10	6.30
5	11340.00	59.2 PK	74.0	-14.8	1.00 V	333	40.90	18.30
6	11340.00	48.0 AV	54.0	-6.0	1.00 V	333	29.70	18.30

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 68%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	189.01	36.4 QP	43.5	-7.1	1.50 H	104	52.50	-16.10
2	245.28	41.2 QP	46.0	-4.8	1.01 H	349	55.90	-14.70
3	359.77	34.6 QP	46.0	-11.4	1.01 H	6	46.10	-11.50
4	497.54	42.4 QP	46.0	-3.6	1.50 H	281	51.40	-9.00
5	631.42	36.3 QP	46.0	-9.7	1.50 H	267	42.50	-6.20
6	800.24	41.2 QP	46.0	-4.8	1.01 H	8	44.30	-3.10
7	959.35	35.9 QP	46.0	-10.1	1.01 H	13	36.50	-0.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.13	38.6 QP	40.0	-1.4	1.00 V	34	52.70	-14.10
2	239.46	37.5 QP	46.0	-8.5	1.00 V	305	52.40	-14.90
3	497.54	32.5 QP	46.0	-13.5	1.00 V	285	41.50	-9.00
4	633.36	35.9 QP	46.0	-10.1	1.00 V	167	42.00	-6.10
5	798.30	33.1 QP	46.0	-12.9	1.49 V	12	36.30	-3.20
6	949.65	38.2 QP	46.0	-7.8	1.00 V	292	38.90	-0.70

REMARKS:

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

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	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. 16, 2012	Nov. 15, 2013
			Nov. 15, 2013	Nov. 14, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 17, 2013	Jul. 16, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 TEST PROCEDURES

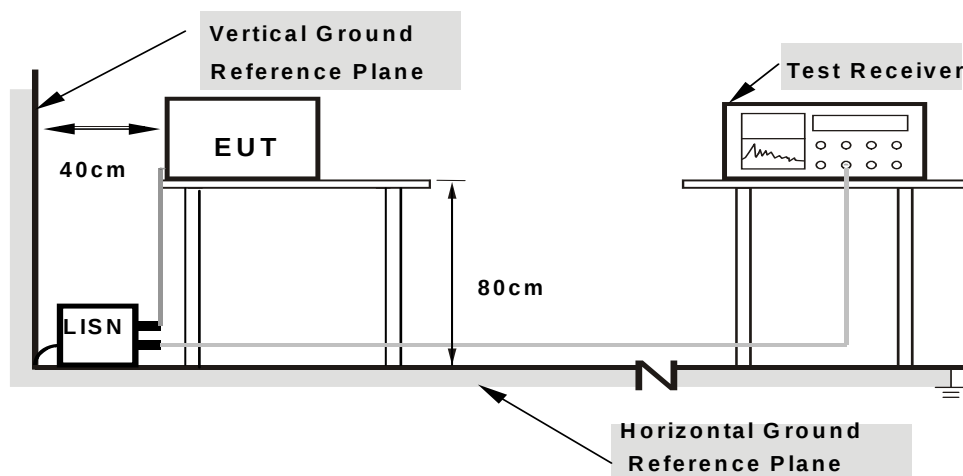
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

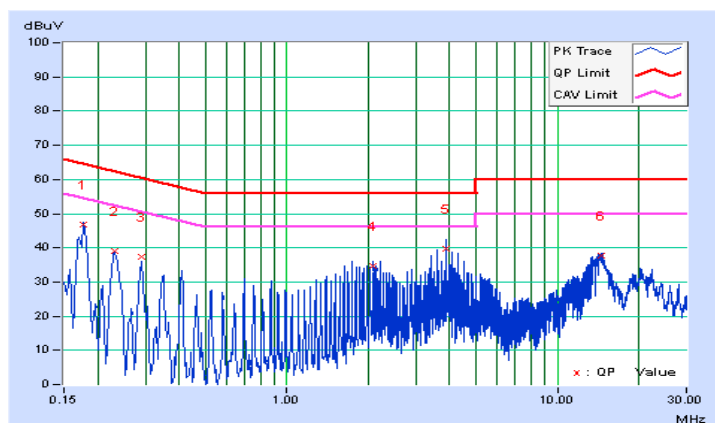
CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
CHANNEL	Channel 116		

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	0.17737	0.16	46.77	38.98	46.93	39.14	64.61	54.61	-17.68	-15.47
2	0.22972	0.17	39.02	35.65	39.19	35.82	62.46	52.46	-23.27	-16.64
3	0.29076	0.19	37.22	33.68	37.41	33.87	60.50	50.50	-23.09	-16.63
4	2.09327	0.30	34.41	32.81	34.71	33.11	56.00	46.00	-21.29	-12.89
5	3.89578	0.39	39.20	26.99	39.59	27.38	56.00	46.00	-16.41	-18.62
6	14.58572	0.95	36.64	32.94	37.59	33.89	60.00	50.00	-22.41	-16.11

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.

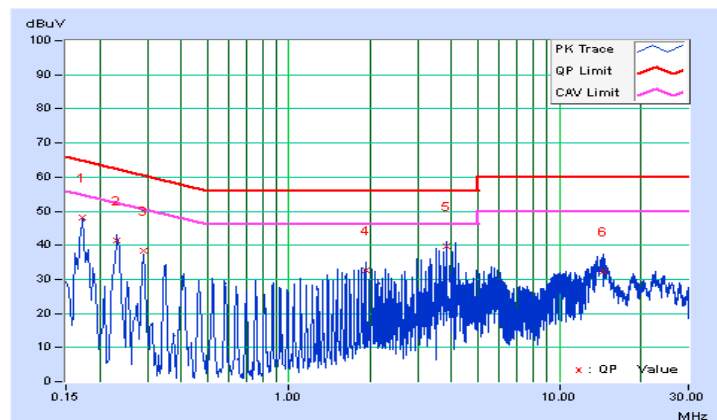


PHASE	Line 2	6dB BANDWIDTH	9kHz
CHANNEL	Channel 116		

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	0.17346	0.17	47.85	41.33	48.02	41.50	64.79	54.79	-16.78	-13.30
2	0.23211	0.18	41.12	35.57	41.30	35.75	62.37	52.37	-21.07	-16.62
3	0.29076	0.20	38.16	35.36	38.36	35.56	60.50	50.50	-22.14	-14.94
4	1.91732	0.28	32.25	29.34	32.53	29.62	56.00	46.00	-23.47	-16.38
5	3.83322	0.37	39.35	28.00	39.72	28.37	56.00	46.00	-16.28	-17.63
6	14.46842	0.74	31.66	25.23	32.40	25.97	60.00	50.00	-27.60	-24.03

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
5.250 ~ 5.350GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.470 ~ 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB

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

Per KDB 662911 D01 Multiple Transmitter Output v02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

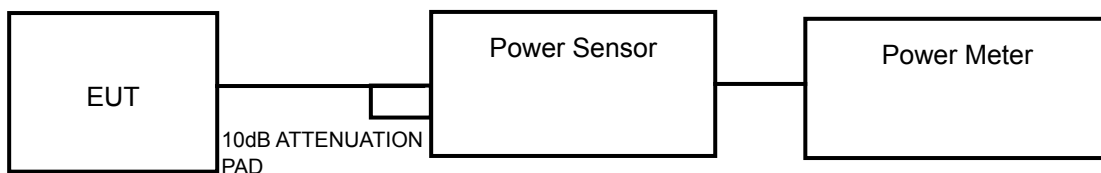
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

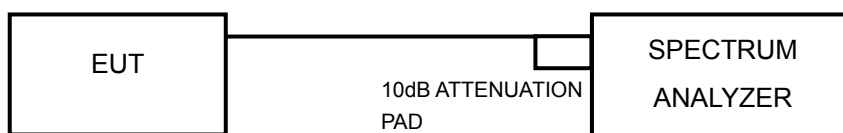
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	19.364	12.87	16.76	PASS
40	5200	19.187	12.83	16.76	PASS
48	5240	21.038	13.23	16.73	PASS
52	5260	21.232	13.27	23.76	PASS
60	5300	20.559	13.13	23.73	PASS
64	5320	21.627	13.35	23.80	PASS
100	5500	21.677	13.36	23.71	PASS
116	5580	20.045	13.02	23.71	PASS
140	5700	20.845	13.19	23.69	PASS

NOTE:

1. $4\text{dBm} + 10\log(18.87) = 16.76\text{dBm} < 17\text{dBm}$.
2. $4\text{dBm} + 10\log(18.88) = 16.76\text{dBm} < 17\text{dBm}$.
3. $4\text{dBm} + 10\log(18.75) = 16.73\text{dBm} < 17\text{dBm}$.
4. $11\text{dBm} + 10\log(18.89) = 23.76\text{dBm} < 24\text{dBm}$.
5. $11\text{dBm} + 10\log(18.75) = 23.73\text{dBm} < 24\text{dBm}$.
6. $11\text{dBm} + 10\log(19.05) = 23.80\text{dBm} < 24\text{dBm}$.
7. $11\text{dBm} + 10\log(18.67) = 23.71\text{dBm} < 24\text{dBm}$.
8. $11\text{dBm} + 10\log(18.66) = 23.71\text{dBm} < 24\text{dBm}$.
9. $11\text{dBm} + 10\log(18.59) = 23.69\text{dBm} < 24\text{dBm}$.

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	13.79	12.65	42.341	16.27	16.79	PASS
40	5200	13.90	12.47	42.207	16.25	16.80	PASS
48	5240	13.62	12.52	40.879	16.12	16.79	PASS
52	5260	13.41	12.82	41.071	16.14	23.80	PASS
60	5300	13.65	12.72	41.881	16.22	23.79	PASS
64	5320	13.68	12.30	40.317	16.05	23.81	PASS
100	5500	14.00	12.33	42.219	16.26	23.80	PASS
116	5580	13.97	12.75	43.782	16.41	23.80	PASS
140	5700	13.51	12.89	41.893	16.22	23.79	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(19.03) = 16.79\text{dBm} < 17\text{dBm}$.
2. $4\text{dBm} + 10\log(19.08) = 16.81\text{dBm} < 17\text{dBm}$.
3. $4\text{dBm} + 10\log(19.06) = 16.80\text{dBm} < 17\text{dBm}$.
4. $11\text{dBm} + 10\log(19.05) = 23.80\text{dBm} < 24\text{dBm}$.
5. $11\text{dBm} + 10\log(19.07) = 23.80\text{dBm} < 24\text{dBm}$.
6. $11\text{dBm} + 10\log(19.09) = 23.81\text{dBm} < 24\text{dBm}$.
7. $11\text{dBm} + 10\log(19.05) = 23.80\text{dBm} < 24\text{dBm}$.
8. $11\text{dBm} + 10\log(19.07) = 23.80\text{dBm} < 24\text{dBm}$.
9. $11\text{dBm} + 10\log(19.16) = 23.82\text{dBm} < 24\text{dBm}$.

CHAIN 1

1. $4\text{dBm} + 10\log(19.16) = 16.82\text{dBm} < 17\text{dBm}$.
2. $4\text{dBm} + 10\log(19.05) = 16.80\text{dBm} < 17\text{dBm}$.
3. $4\text{dBm} + 10\log(19.03) = 16.79\text{dBm} < 17\text{dBm}$.
4. $11\text{dBm} + 10\log(19.21) = 23.84\text{dBm} < 24\text{dBm}$.
5. $11\text{dBm} + 10\log(19.02) = 23.79\text{dBm} < 24\text{dBm}$.
6. $11\text{dBm} + 10\log(19.14) = 23.82\text{dBm} < 24\text{dBm}$.
7. $11\text{dBm} + 10\log(19.13) = 23.82\text{dBm} < 24\text{dBm}$.
8. $11\text{dBm} + 10\log(19.24) = 23.84\text{dBm} < 24\text{dBm}$.
9. $11\text{dBm} + 10\log(19.00) = 23.79\text{dBm} < 24\text{dBm}$.

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	11.12	10.70	24.691	13.93	17	PASS
46	5230	12.17	11.15	29.514	14.70	17	PASS
54	5270	12.14	11.36	30.045	14.78	24	PASS
62	5310	11.85	11.28	28.739	14.58	24	PASS
102	5510	10.43	9.85	20.702	13.16	24	PASS
110	5550	12.58	11.49	32.206	15.08	24	PASS
134	5670	12.70	11.40	32.425	15.11	24	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(40.29) = 20.05\text{dBm} > 17\text{dBm}$.
2. $4\text{dBm} + 10\log(40.53) = 20.08\text{dBm} > 17\text{dBm}$.
3. $11\text{dBm} + 10\log(40.32) = 27.06\text{dBm} > 24\text{dBm}$.
4. $11\text{dBm} + 10\log(40.17) = 27.04\text{dBm} > 24\text{dBm}$.
5. $11\text{dBm} + 10\log(40.22) = 27.04\text{dBm} > 24\text{dBm}$.
6. $11\text{dBm} + 10\log(40.64) = 27.09\text{dBm} > 24\text{dBm}$.
7. $11\text{dBm} + 10\log(40.21) = 27.04\text{dBm} > 24\text{dBm}$.

CHAIN 1

1. $4\text{dBm} + 10\log(39.85) = 20.00\text{dBm} > 17\text{dBm}$.
2. $4\text{dBm} + 10\log(40.17) = 20.04\text{dBm} > 17\text{dBm}$.
3. $11\text{dBm} + 10\log(39.81) = 27.00\text{dBm} > 24\text{dBm}$.
4. $11\text{dBm} + 10\log(39.88) = 27.01\text{dBm} > 24\text{dBm}$.
5. $11\text{dBm} + 10\log(40.02) = 27.02\text{dBm} > 24\text{dBm}$.
6. $11\text{dBm} + 10\log(41.23) = 27.15\text{dBm} > 24\text{dBm}$.
7. $11\text{dBm} + 10\log(39.81) = 27.00\text{dBm} > 24\text{dBm}$.

26dB BANDWIDTH:

802.11a

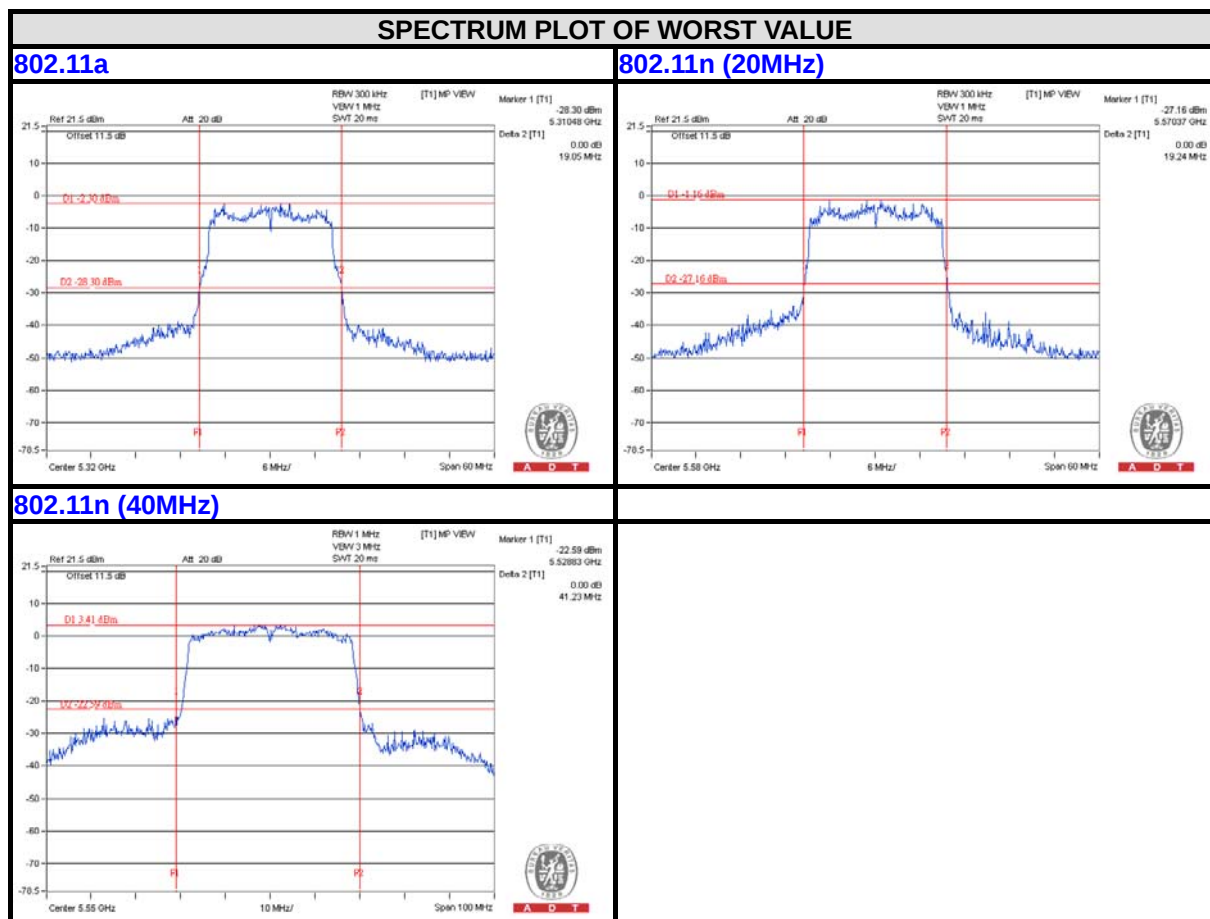
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	18.87	PASS
40	5200	18.88	PASS
48	5240	18.75	PASS
52	5260	18.89	PASS
60	5300	18.75	PASS
64	5320	19.05	PASS
100	5500	18.67	PASS
116	5580	18.66	PASS
140	5700	18.59	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	19.03	19.16	PASS
40	5200	19.08	19.05	PASS
48	5240	19.06	19.03	PASS
52	5260	19.05	19.21	PASS
60	5300	19.07	19.02	PASS
64	5320	19.09	19.14	PASS
100	5500	19.05	19.13	PASS
116	5580	19.07	19.24	PASS
140	5700	19.16	19.00	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	40.29	39.85	PASS
46	5230	40.53	40.17	PASS
54	5270	40.32	39.81	PASS
62	5310	40.17	39.88	PASS
102	5510	40.22	40.02	PASS
110	5550	40.64	41.23	PASS
134	5670	40.21	39.81	PASS



EUT MAXIMUM CONDUCTED POWER

802.11a

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER (mW)	OUTPUT POWER (dBm)
5250~5350	21.627	13.35
5470~5725	21.677	13.36

NOTE: Manufacturer provides Transmit Power Control description to meet this requirement.

802.11n (20MHz)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER (mW)	OUTPUT POWER (dBm)
5250~5350	41.881	16.22
5470~5725	43.782	16.41

NOTE: Manufacturer provides Transmit Power Control description to meet this requirement.

802.11n (40MHz)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER (mW)	OUTPUT POWER (dBm)
5250~5350	30.045	14.78
5470~5725	32.425	15.11

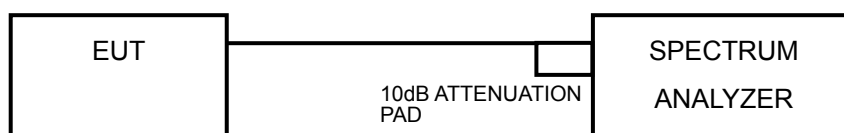
NOTE: Manufacturer provides Transmit Power Control description to meet this requirement.

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
5.250 ~ 5.350GHz	11dBm
5.470 ~ 5.725GHz	11dBm

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

- 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 = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value.

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

802.11a

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	-4.30	0.29	-4.01	4	PASS
40	5200	-4.72	0.29	-4.43	4	PASS
48	5240	-3.12	0.29	-2.83	4	PASS
52	5260	-3.76	0.29	-3.47	11	PASS
60	5300	-2.48	0.29	-2.19	11	PASS
64	5320	-2.46	0.29	-2.17	11	PASS
100	5500	-1.51	0.29	-1.22	11	PASS
116	5580	-3.20	0.29	-2.91	11	PASS
140	5700	-4.34	0.29	-4.05	11	PASS

NOTE: 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	-5.31	-4.26	-1.74	0.6	-1.14	4	PASS
40	5200	-3.91	-4.38	-1.13	0.6	-0.53	4	PASS
48	5240	-3.51	-5.62	-1.43	0.6	-0.83	4	PASS
52	5260	-4.19	-3.81	-0.99	0.6	-0.39	11	PASS
60	5300	-2.69	-3.32	0.02	0.6	0.62	11	PASS
64	5320	-3.36	-3.05	-0.19	0.6	0.41	11	PASS
100	5500	-3.95	-3.40	-0.66	0.6	-0.06	11	PASS
116	5580	-3.19	-3.52	-0.34	0.6	0.26	11	PASS
140	5700	-2.92	-3.67	-0.27	0.6	0.33	11	PASS

NOTE:

- 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.
- Directional gain of 5180~5240MHz = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 4.53\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.
 Directional gain of 5260~5320MHz = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 5.05\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.
 Directional gain of 5500~5700MHz = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 5.03\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

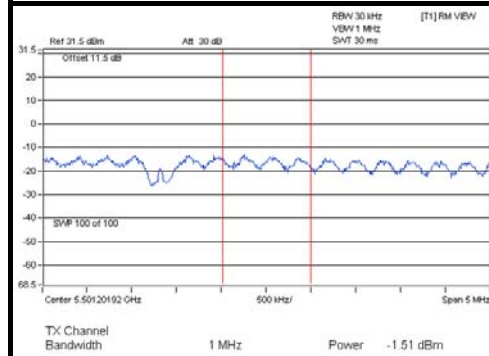
CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-11.75	-11.41	-8.57	1.09	-7.48	4	PASS
46	5230	-10.35	-11.12	-7.71	1.09	-6.62	4	PASS
54	5270	-10.57	-10.34	-7.44	1.09	-6.35	11	PASS
62	5310	-9.87	-10.61	-7.21	1.09	-6.12	11	PASS
102	5510	-10.75	-12.05	-8.34	1.09	-7.25	11	PASS
110	5550	-9.14	-10.58	-6.79	1.09	-5.70	11	PASS
134	5670	-9.20	-11.82	-7.30	1.09	-6.21	11	PASS

NOTE:

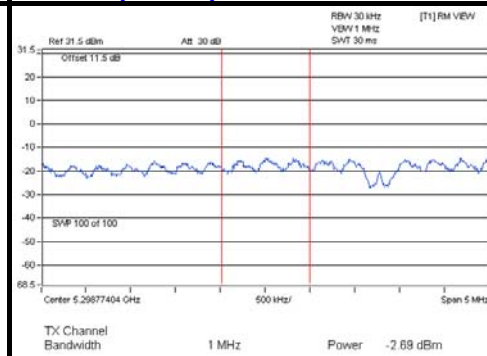
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain of 5180~5240MHz = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 4.53\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.
 Directional gain of 5260~5320MHz = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 5.05\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.
 Directional gain of 5500~5700MHz = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 5.03\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.
- Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

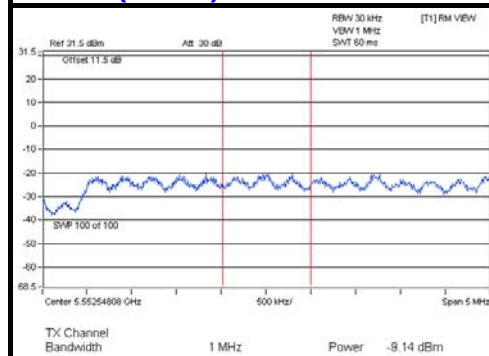
802.11a



802.11n (20MHz)



802.11n (40MHz)

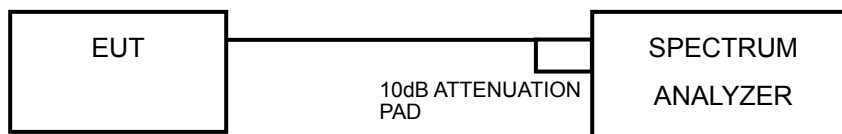


4.5 PEAK POWER EXCURSION MEASUREMENT

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.
Find the worst channel and modulation mode as above test procedure, and follow KDB 789033 D01 General UNII Test Procedures v01r03 and repeat step 1 to 5 for final testing of each modulation mode on a single channel (all modulation types) in a single operating band to compliance with the peak excursion requirement.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

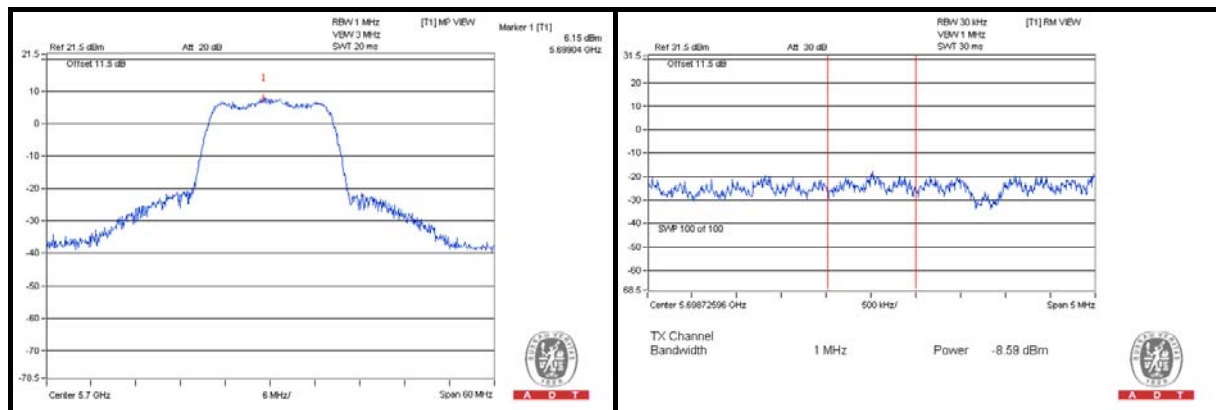
4.5.6 EUT OPERATING CONDITIONS

Same as 4.2.6

4.5.7 TEST RESULTS

MODULATION MODE	MODULATION TYPE	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS /FAIL
802.11a	BPSK	5700	7.51	-4.34	-4.05	11.56	13	PASS
	QPSK		8.44	-3.85	-3.29	11.73	13	PASS
	16QAM		8.09	-5.92	-4.87	12.96	13	PASS
	64QAM		6.15	-8.59	-6.81	12.96	13	PASS
802.11n (20MHz)	BPSK	5700	9	-2.92	-2.32	11.32	13	PASS
	QPSK		14.18	1.26	2.1	12.08	13	PASS
	16QAM		13.72	1.5	2.14	11.58	13	PASS
	64QAM		14.05	-0.18	2.04	12.01	13	PASS
802.11n (40MHz)	BPSK	5670	4.01	-9.2	-8.11	12.12	13	PASS
	QPSK		9.51	-3.52	-2.27	11.78	13	PASS
	16QAM		9.26	-4.41	-2.41	11.67	13	PASS
	64QAM		9.48	-4.98	-1.18	10.66	13	PASS

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

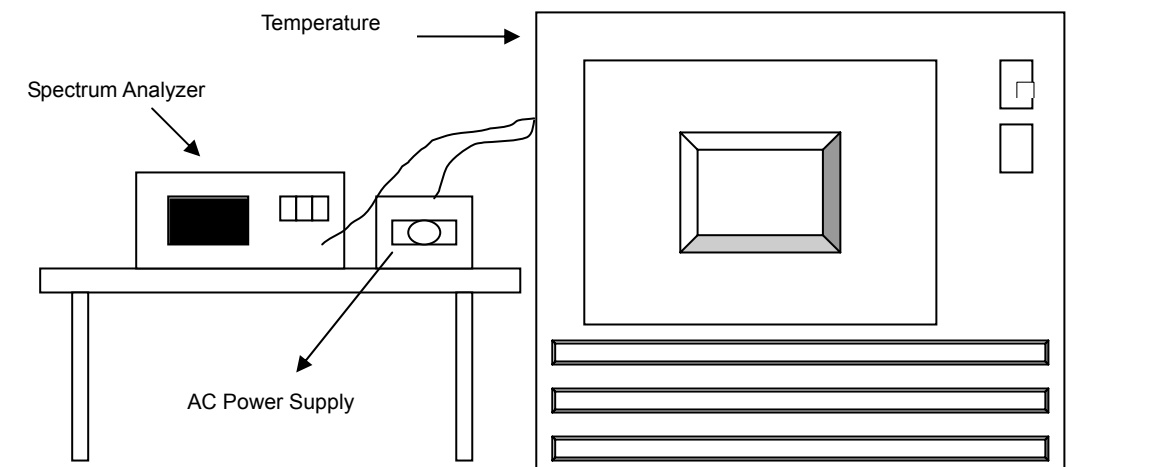


4.6 FREQUENCY STABILITY

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

- a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

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: 5320MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5320.0183	0.00034	5320.0257	0.00048	5320.0214	0.00040	5320.0215	0.00040
40	120	5319.9881	-0.00022	5319.9907	-0.00017	5319.9942	-0.00011	5319.987	-0.00024
30	120	5320.0157	0.00030	5320.0191	0.00036	5320.0157	0.00030	5320.0181	0.00034
20	120	5320.0115	0.00022	5320.0124	0.00023	5320.0112	0.00021	5320.0196	0.00037
10	120	5319.9817	-0.00034	5319.9837	-0.00031	5319.9819	-0.00034	5319.9826	-0.00033
0	120	5319.9814	-0.00035	5319.9772	-0.00043	5319.9797	-0.00038	5319.9795	-0.00039
-10	120	5320.0098	0.00018	5320.0114	0.00021	5320.0178	0.00033	5320.0139	0.00026
-20	120	5320.0234	0.00044	5320.0204	0.00038	5320.0131	0.00025	5320.0187	0.00035
-30	120	5319.9981	-0.00004	5319.9947	-0.00010	5319.9919	-0.00015	5319.9949	-0.00010

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5320.0107	0.00020	5320.0128	0.00024	5320.012	0.00023	5320.0199	0.00037
	120	5320.0115	0.00022	5320.0124	0.00023	5320.0112	0.00021	5320.0196	0.00037
	102	5320.0121	0.00023	5320.0131	0.00025	5320.0113	0.00021	5320.0206	0.00039

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:

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Web Site: www.bureauveritas-adt.com

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

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

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

---END---