

FCC TEST REPORT (15.407)

REPORT NO.: RF140605C26-1
MODEL NO.: NBG6616 (Refer to item 3.1 for more details)
FCC ID: I88NBG6616
RECEIVED: Jun. 05, 2014
TESTED: Jun. 12 ~ Jul. 07, 2014
ISSUED: Jul. 14, 2014

APPLICANT: ZyXEL Communications Corporation

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

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140605C26-1	Original release	Jul. 14, 2014

1. CERTIFICATION

PRODUCT: Simultaneous Dual-Band Wireless AC1200 HD Media Router

MODEL: NBG6616 (Refer to item 3.1 for more details)

BRAND: ZyXEL

APPLICANT: ZyXEL Communications Corporation

TESTED: Jun. 12 ~ Jul. 07, 2014

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10-2009

The above equipment (model: NBG6616) 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 : Celine Chou , **DATE :** Jul. 14, 2014
Celine Chou / Specialist

APPROVED BY : Ken Liu , **DATE :** Jul. 14, 2014
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 Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -21.09dB at 0.21647MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5150.00, 5714.00, 11570.00 and 15720.00MHz.
15.407(b)(1/2/3/4/6)	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6dB bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is RSMA not a standard connector.

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	3.34 dB
	200MHz ~1000MHz	3.35 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	Simultaneous Dual-Band Wireless AC1200 HD Media Router
MODEL NO.	NBG6616 (Refer to note for more details)
POWER SUPPLY	12Vdc from Adapter
MODULATION TYPE	256QAM, 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 300.0Mbps 802.11ac: up to 866.7Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz, 5745 ~ 5825MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz)
OUTPUT POWER	554.664mW for 5180 ~ 5240MHz 135.922mW for 5745 ~ 5825MHz
ANTENNA TYPE	Refer to note
ANTENNA CONNECTOR	Refer to note
DATA CABLE	0.9m non-shielded RJ45 cable without core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

- The following product names & models are provided to this EUT.

Brand	Model	DESCRIPTION
ZyXEL	NBG6616	For marketing purpose
	EMG2826-Q10A	
	EMG2806-Q10A	

* The model of the NBG6616 was chosen for final test.

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

MODULATION MODE	TX FUNCTION
802.11a	2TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX
802.11ac (20MHz)	2TX
802.11ac (40MHz)	2TX
802.11ac (80MHz)	2TX

* The modulation and bandwidth are similar for 802.11n mode for 20MHz / 40MHz and 802.11ac mode for 20MHz / 40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

3. The EUT uses following antennas.

Antenna Item	Brand	Model	Antenna Type	Connector	Gain(dBi)	
					2.4GHz	5GHz
1	WHA YU	C496-510124-A	Dipole	RSMA	3.4	4.3
2	WHA YU	C496-510125-A			3.5	4.0

4. The EUT uses following RF control IC.

BRAND:	Qualcomm Atheros
MODEL:	QCA9557
	QCA9882

5. The EUT consumes power from the following adapter.

ADAPTER	
BRAND:	DVE
MODEL:	DSA-24PFD-15 FUS 120200
INPUT:	100-240Vac, 50/60Hz, 0.8A
OUTPUT:	12Vdc, 2A
POWER LINE:	1.5m cable without core attached on adapter

6. 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), 802.11ac (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), 802.11ac (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
42	5210MHz

FOR 5745 ~ 5825MHz:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
155	5775MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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
-	802.11ac (80MHz)		42	42	OFDM	BPSK	65.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)		155	155	OFDM	BPSK	65.0

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)
-	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165				

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)
-	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165				

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)
-	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
-	802.11ac (80MHz)		42	42	OFDM	BPSK	65.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)		155	155	OFDM	BPSK	65.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	21deg. C, 65%RH	120Vac, 60Hz	Jones Chang
RE<1G	21deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
APCM	24deg. C, 64%RH	120Vac, 60Hz	Frank Liu

3.3 DUTY CYCLE OF TEST SIGNAL

For U-NII-1 Band

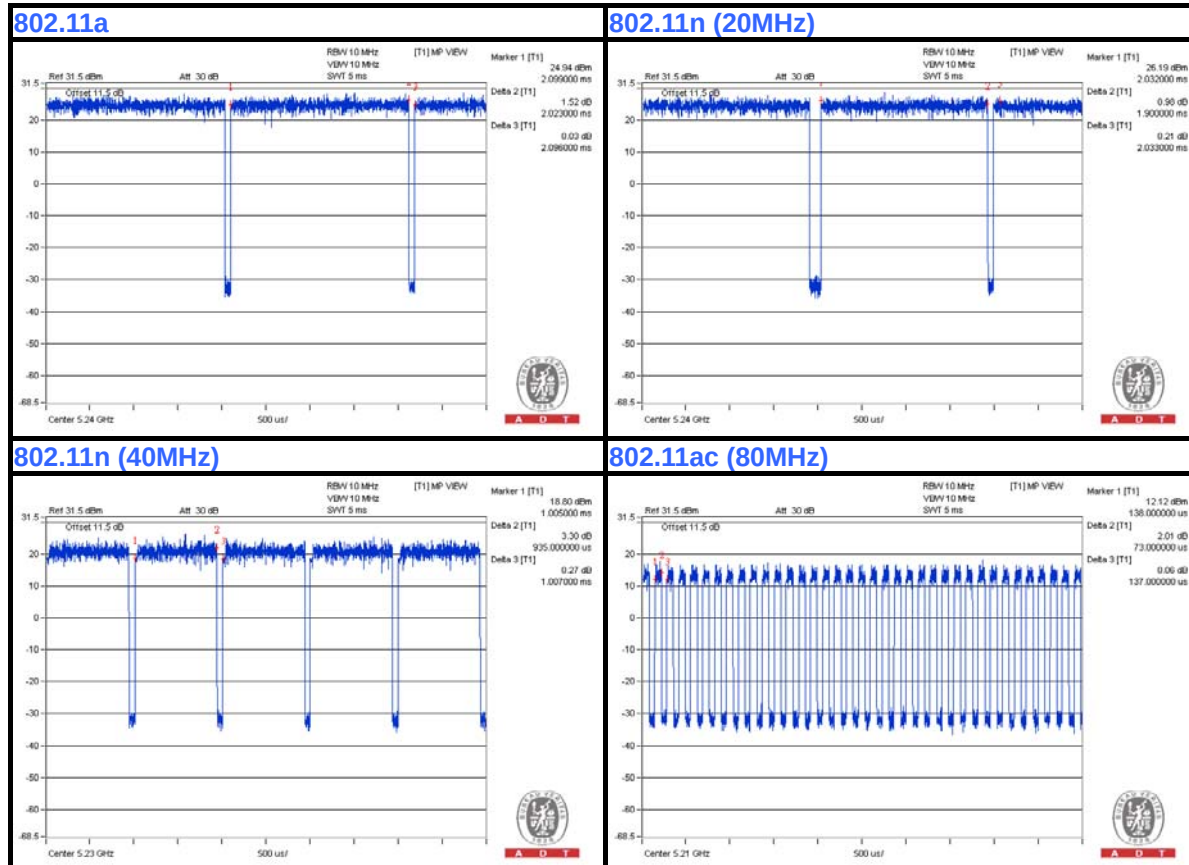
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11a: Duty cycle = $2.023/2.096 = 0.965$, Duty factor = $10 * \log(1/0.965) = 0.15$

802.11n (20MHz): Duty cycle = $1.900/2.033 = 0.935$, Duty factor = $10 * \log(1/0.935) = 0.29$

802.11n (40MHz): Duty cycle = $0.935/1.007 = 0.929$, Duty factor = $10 * \log(1/0.929) = 0.32$

802.11ac (80MHz): Duty cycle = $0.073/0.137 = 0.533$, Duty factor = $10 * \log(1/0.533) = 2.73$



For U-NII-3 Band

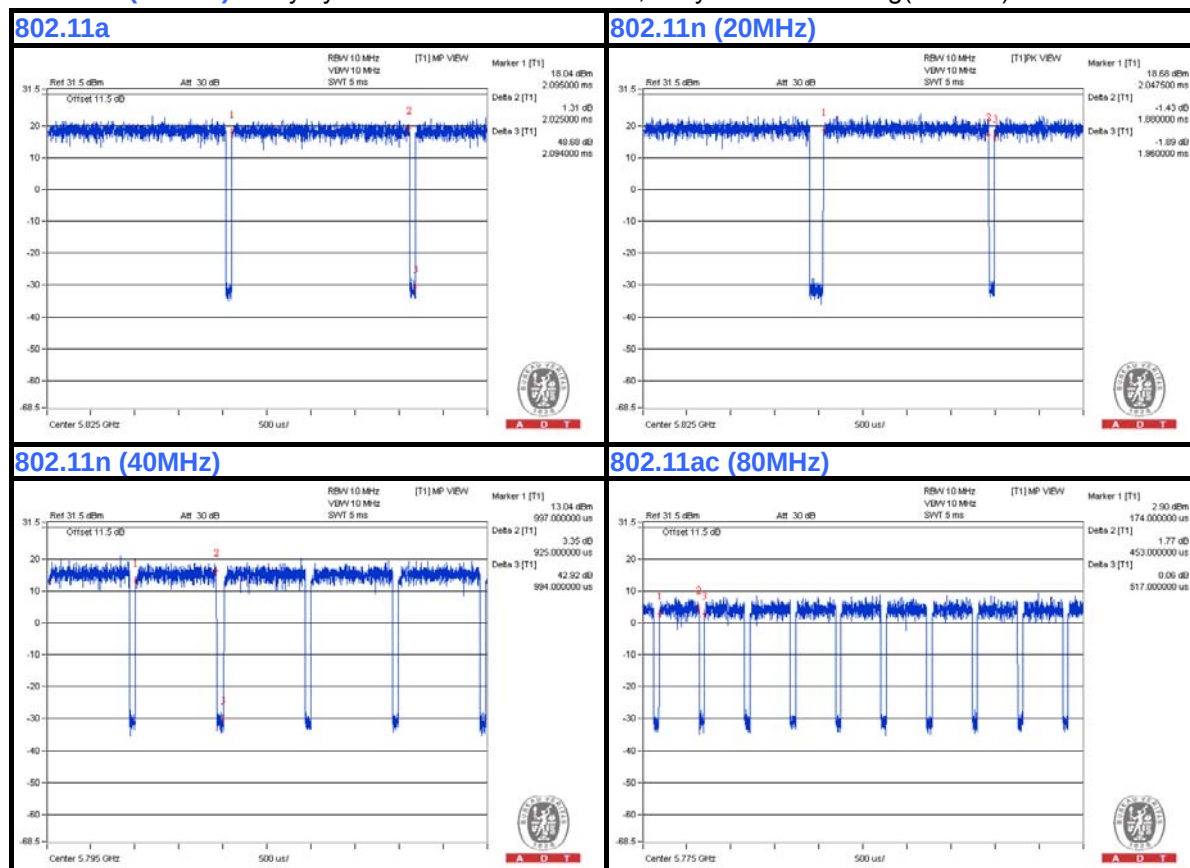
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11a: Duty cycle = $2.025/2.094 = 0.967$, Duty factor = $10 * \log(1/0.967) = 0.15$

802.11n (20MHz): Duty cycle = $1.880/1.960 = 0.959$, Duty factor = $10 * \log(1/0.959) = 0.18$

802.11n (40MHz): Duty cycle = $0.925/0.994 = 0.931$, Duty factor = $10 * \log(1/0.931) = 0.31$

802.11ac (80MHz): Duty cycle = $0.453/0.517 = 0.876$, Duty factor = $10 * \log(1/0.876) = 0.57$



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.

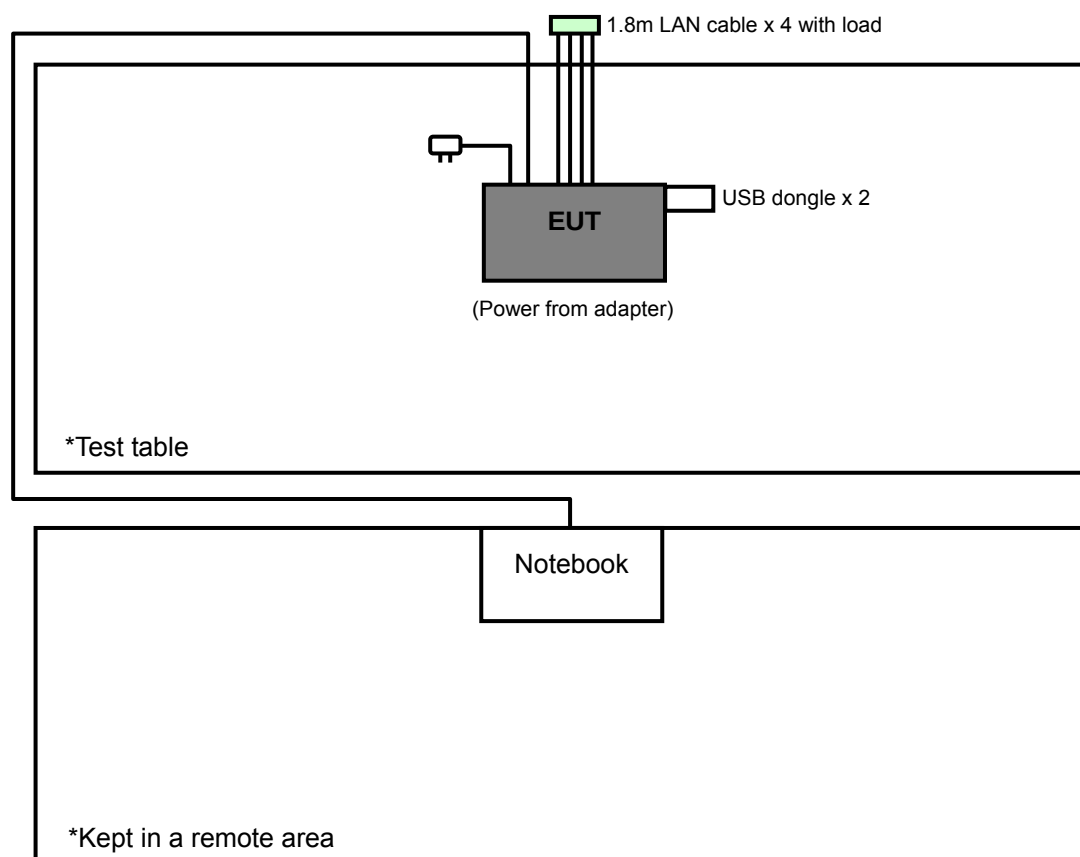
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved
2	USB Flash	Transcend	V85	569992-8209	NA
3	USB Flash	Transcend	V85	538455 4490	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m LAN cable
2	NA
3	NA

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 acted as a communication partner to transfer data.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01

662911 D01 Multiple Transmitter Output v02r01

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

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01	FIELD STRENGTH AT 3m	
	PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.3 (dBµV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK: -27 (dBm/MHz) ^{*1} PK: -17 (dBm/MHz) ^{*2}	PK: 68.3 (dBµV/m) ^{*1} PK: 78.3 (dBµV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

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	ESIB7	100187	Jan. 02, 2014	Jan. 01, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Mar. 03, 2014	Mar. 02, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	9120D	209	Sep. 12, 2013	Sep. 11, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 07, 2013	Oct. 06, 2014
Preamplifier Agilent	8449B	3008A01964	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214378/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6 +309224/4	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	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2013	Oct. 17, 2014
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2013	Jul. 25, 2014
Power Sensor	MA2411B	0738171	Jul. 26, 2013	Jul. 25, 2014
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 10, 2014	Jun. 09, 2015

- 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 Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 988962.
5. The IC Site Registration No. is IC 7450F-3.

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:

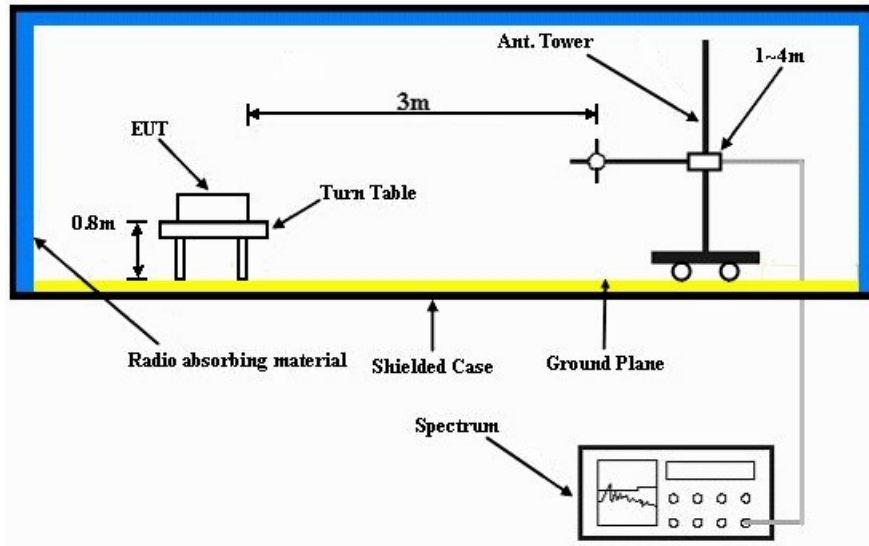
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (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

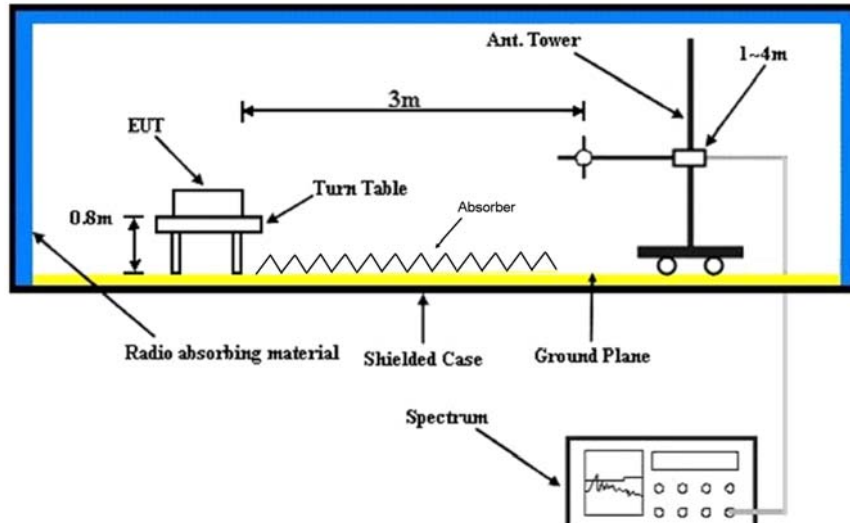
No deviation.

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. Placed the EUT on the testing table.
- b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
- c. The communication partner was connected with the EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable the EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".

4.1.8 TEST RESULTS

ABOVE 1GHz DATA

For U-NII-1 Band

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	57.9 PK	74.0	-16.1	1.05 H	129	52.80	5.10
2	5150.00	48.1 AV	54.0	-5.9	1.05 H	129	43.00	5.10
3	*5180.00	104.0 PK			1.05 H	119	66.30	37.70
4	*5180.00	93.8 AV			1.05 H	119	56.10	37.70
5	#10360.00	61.4 PK	68.3	-6.9	1.14 H	189	43.10	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	5150.00	67.4 PK	74.0	-6.6	1.21 V	58	62.30	5.10
2	5150.00	52.3 AV	54.0	-1.7	1.21 V	58	47.20	5.10
3	*5180.00	118.4 PK			1.07 V	348	80.70	37.70
4	*5180.00	108.1 AV			1.07 V	348	70.40	37.70
5	#10360.00	63.3 PK	68.3	-5.0	1.03 V	250	45.00	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)
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.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	55.7 PK	74.0	-18.3	1.20 H	269	50.60	5.10
2	5150.00	45.2 AV	54.0	-8.8	1.20 H	269	40.10	5.10
3	*5200.00	108.0 PK			1.14 H	117	70.20	37.80
4	*5200.00	97.9 AV			1.14 H	117	60.10	37.80
5	#10400.00	62.3 PK	68.3	-6.0	1.00 H	212	43.60	18.70
6	15600.00	63.3 PK	74.0	-10.7	1.10 H	123	44.20	19.10
7	15600.00	50.1 AV	54.0	-3.9	1.10 H	123	31.00	19.10
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	72.4 PK	74.0	-1.6	1.07 V	331	67.30	5.10
2	5150.00	53.0 AV	54.0	-1.0	1.07 V	331	47.90	5.10
3	*5200.00	121.2 PK			1.05 V	347	83.40	37.80
4	*5200.00	111.0 AV			1.05 V	347	73.20	37.80
5	#10400.00	64.7 PK	68.3	-3.6	1.38 V	258	46.00	18.70
6	15600.00	65.2 PK	74.0	-8.8	1.39 V	249	46.10	19.10
7	15600.00	51.5 AV	54.0	-2.5	1.39 V	249	32.40	19.10

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)
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.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	108.9 PK			1.14 H	117	71.00	37.90
2	*5240.00	99.5 AV			1.14 H	117	61.60	37.90
3	5350.00	56.4 PK	74.0	-17.6	1.14 H	340	51.00	5.40
4	5350.00	46.2 AV	54.0	-7.8	1.14 H	340	40.80	5.40
5	#10480.00	63.0 PK	68.3	-5.3	1.22 H	220	43.50	19.50
6	15720.00	65.0 PK	74.0	-9.0	1.10 H	68	46.00	19.00
7	15720.00	50.7 AV	54.0	-3.3	1.10 H	68	31.70	19.00
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	*5240.00	121.5 PK			1.19 V	256	83.60	37.90
2	*5240.00	111.2 AV			1.19 V	256	73.30	37.90
3	5350.00	58.9 PK	74.0	-15.1	1.18 V	53	53.50	5.40
4	5350.00	49.9 AV	54.0	-4.1	1.18 V	53	44.50	5.40
5	#10480.00	66.1 PK	68.3	-2.2	1.16 V	241	46.60	19.50
6	15720.00	67.5 PK	74.0	-6.5	1.15 V	237	48.50	19.00
7	15720.00	52.9 AV	54.0	-1.1	1.15 V	237	33.90	19.00

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)
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)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	56.4 PK	74.0	-17.6	1.13 H	123	51.30	5.10
2	5150.00	46.1 AV	54.0	-7.9	1.13 H	123	41.00	5.10
3	*5180.00	103.9 PK			1.03 H	117	66.20	37.70
4	*5180.00	93.8 AV			1.03 H	117	56.10	37.70
5	#10360.00	60.8 PK	68.3	-7.5	1.29 H	259	42.50	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	5150.00	67.9 PK	74.0	-6.1	1.19 V	103	62.80	5.10
2	5150.00	52.6 AV	54.0	-1.4	1.19 V	103	47.50	5.10
3	*5180.00	117.7 PK			1.18 V	88	80.00	37.70
4	*5180.00	107.7 AV			1.18 V	88	70.00	37.70
5	#10360.00	62.9 PK	68.3	-5.4	1.21 V	239	44.60	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)
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.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	57.3 PK	74.0	-16.7	1.12 H	75	52.20	5.10
2	5150.00	46.9 AV	54.0	-7.1	1.12 H	75	41.80	5.10
3	*5200.00	107.7 PK			1.45 H	20	69.90	37.80
4	*5200.00	97.9 AV			1.45 H	20	60.10	37.80
5	#10400.00	60.8 PK	68.3	-7.5	1.15 H	222	42.10	18.70
6	15600.00	64.5 PK	74.0	-9.5	1.20 H	19	45.40	19.10
7	15600.00	50.0 AV	54.0	-4.0	1.20 H	19	30.90	19.10
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	72.0 PK	74.0	-2.0	1.01 V	295	66.90	5.10
2	5150.00	52.8 AV	54.0	-1.2	1.01 V	295	47.70	5.10
3	*5200.00	121.3 PK			1.31 V	96	83.50	37.80
4	*5200.00	111.3 AV			1.31 V	96	73.50	37.80
5	#10400.00	62.7 PK	68.3	-5.6	1.13 V	91	44.00	18.70
6	15600.00	63.6 PK	74.0	-10.4	1.16 V	84	44.50	19.10
7	15600.00	50.4 AV	54.0	-3.6	1.16 V	84	31.30	19.10

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)
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.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	107.5 PK			1.10 H	196	69.60	37.90
2	*5240.00	97.8 AV			1.10 H	196	59.90	37.90
3	5350.00	56.7 PK	74.0	-17.3	1.10 H	256	51.30	5.40
4	5350.00	45.8 AV	54.0	-8.2	1.10 H	256	40.40	5.40
5	#10480.00	61.6 PK	68.3	-6.7	1.43 H	56	42.10	19.50
6	15720.00	64.4 PK	74.0	-9.6	1.24 H	289	45.40	19.00
7	15720.00	49.8 AV	54.0	-4.2	1.24 H	289	30.80	19.00
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	*5240.00	122.1 PK			1.05 V	326	84.20	37.90
2	*5240.00	111.9 AV			1.05 V	326	74.00	37.90
3	5350.00	59.3 PK	74.0	-14.7	1.15 V	118	53.90	5.40
4	5350.00	48.1 AV	54.0	-5.9	1.15 V	118	42.70	5.40
5	#10480.00	64.0 PK	68.3	-4.3	1.20 V	234	44.50	19.50
6	15720.00	66.8 PK	74.0	-7.2	1.20 V	242	47.80	19.00
7	15720.00	53.0 AV	54.0	-1.0	1.20 V	242	34.00	19.00

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)
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)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	57.1 PK	74.0	-16.9	1.08 H	287	52.00	5.10
2	5150.00	46.4 AV	54.0	-7.6	1.08 H	287	41.30	5.10
3	*5190.00	96.5 PK			1.00 H	200	58.70	37.80
4	*5190.00	87.3 AV			1.00 H	200	49.50	37.80
5	#10380.00	59.8 PK	68.3	-8.5	1.06 H	68	41.40	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	5150.00	68.1 PK	74.0	-5.9	1.07 V	331	63.00	5.10
2	5150.00	53.0 AV	54.0	-1.0	1.07 V	331	47.90	5.10
3	*5190.00	111.8 PK			1.07 V	352	74.00	37.80
4	*5190.00	102.1 AV			1.07 V	352	64.30	37.80
5	#10380.00	61.2 PK	68.3	-7.1	1.16 V	104	42.80	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)
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.

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	56.1 PK	74.0	-17.9	1.03 H	300	51.00	5.10
2	5150.00	47.4 AV	54.0	-6.6	1.03 H	300	42.30	5.10
3	*5230.00	105.6 PK			1.00 H	201	67.70	37.90
4	*5230.00	95.4 AV			1.00 H	201	57.50	37.90
5	5350.00	55.7 PK	74.0	-18.3	1.10 H	208	50.30	5.40
6	5350.00	45.9 AV	54.0	-8.1	1.10 H	208	40.50	5.40
7	#10460.00	60.3 PK	68.3	-8.0	1.03 H	73	41.10	19.20
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	5150.00	68.2 PK	74.0	-5.8	1.19 V	334	63.10	5.10
2	5150.00	52.9 AV	54.0	-1.1	1.19 V	334	47.80	5.10
3	*5230.00	118.8 PK			1.17 V	353	80.90	37.90
4	*5230.00	108.8 AV			1.17 V	353	70.90	37.90
5	5350.00	61.9 PK	74.0	-12.1	1.20 V	140	56.50	5.40
6	5350.00	48.9 AV	54.0	-5.1	1.20 V	140	43.50	5.40
7	#10460.00	62.1 PK	68.3	-6.2	1.18 V	89	42.90	19.20

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)
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.

802.11ac (80MHz)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	55.6 PK	74.0	-18.4	1.00 H	247	50.50	5.10
2	5150.00	44.9 AV	54.0	-9.1	1.00 H	247	39.80	5.10
3	*5210.00	92.1 PK			1.00 H	202	54.30	37.80
4	*5210.00	81.7 AV			1.00 H	202	43.90	37.80
5	#10420.00	60.3 PK	68.3	-8.0	1.06 H	128	41.50	18.80
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	5150.00	68.3 PK	74.0	-5.7	1.18 V	335	63.20	5.10
2	5150.00	53.0 AV	54.0	-1.0	1.18 V	335	47.90	5.10
3	*5210.00	106.0 PK			1.17 V	332	68.20	37.80
4	*5210.00	95.7 AV			1.17 V	332	57.90	37.80
5	#10420.00	61.4 PK	68.3	-6.9	1.26 V	288	42.60	18.80

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)
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.

For U-NII-3 Band

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5714.00	57.6 PK	68.3	-10.7	1.06 H	16	51.60	6.00
2	#5722.00	59.0 PK	78.3	-19.3	1.47 H	203	53.00	6.00
3	#5725.00	45.0 PK	78.3	-33.3	1.33 H	224	39.00	6.00
4	*5745.00	103.9 PK			1.00 H	307	65.40	38.50
5	*5745.00	94.4 AV			1.00 H	307	55.90	38.50
6	11490.00	63.0 PK	74.0	-11.0	1.16 H	32	42.60	20.40
7	11490.00	48.8 AV	54.0	-5.2	1.16 H	32	28.40	20.40
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	#5714.00	66.7 PK	68.3	-1.6	1.17 V	67	60.70	6.00
2	#5722.00	71.0 PK	78.3	-7.3	1.09 V	49	65.00	6.00
3	#5725.00	59.9 PK	78.3	-18.4	1.28 V	288	53.90	6.00
4	*5745.00	115.7 PK			1.00 V	121	77.20	38.50
5	*5745.00	105.7 AV			1.00 V	121	67.20	38.50
6	11490.00	66.5 PK	74.0	-7.5	1.61 V	84	46.10	20.40
7	11490.00	52.9 AV	54.0	-1.1	1.61 V	84	32.50	20.40

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)
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.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*5785.00	105.7 PK			1.33 H	307	67.10	38.60
2	*5785.00	95.8 AV			1.33 H	307	57.20	38.60
3	11570.00	64.0 PK	74.0	-10.0	1.14 H	205	43.60	20.40
4	11570.00	50.4 AV	54.0	-3.6	1.14 H	205	30.00	20.40
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	*5785.00	115.8 PK			1.00 V	122	77.20	38.60
2	*5785.00	106.2 AV			1.00 V	122	67.60	38.60
3	11570.00	68.6 PK	74.0	-5.4	1.00 V	81	48.20	20.40
4	11570.00	53.0 AV	54.0	-1.0	1.00 V	81	32.60	20.40

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*5825.00	105.5 PK			1.15 H	307	66.80	38.70
2	*5825.00	95.6 AV			1.15 H	307	56.90	38.70
3	#5850.00	44.9 PK	78.3	-33.4	1.06 H	302	38.70	6.20
4	#5853.00	59.6 PK	78.3	-18.7	1.19 H	206	53.20	6.40
5	#5861.00	58.4 PK	68.3	-9.9	1.17 H	148	52.00	6.40
6	11650.00	64.2 PK	74.0	-9.8	1.33 H	228	43.90	20.30
7	11650.00	50.3 AV	54.0	-3.7	1.33 H	228	30.00	20.30
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	*5825.00	116.5 PK			1.00 V	113	77.80	38.70
2	*5825.00	107.2 AV			1.00 V	113	68.50	38.70
3	#5850.00	53.4 PK	78.3	-24.9	1.00 V	292	47.20	6.20
4	#5853.00	66.7 PK	78.3	-11.6	1.35 V	261	60.30	6.40
5	#5861.00	64.3 PK	68.3	-4.0	1.10 V	181	57.90	6.40
6	11650.00	68.2 PK	74.0	-5.8	1.04 V	77	47.90	20.30
7	11650.00	52.7 AV	54.0	-1.3	1.04 V	77	32.40	20.30

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)
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)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5714.00	57.2 PK	68.3	-11.1	1.33 H	148	51.20	6.00
2	#5722.00	59.7 PK	78.3	-18.6	1.33 H	148	53.70	6.00
3	#5725.00	46.0 PK	78.3	-32.3	1.05 H	214	40.00	6.00
4	*5745.00	105.3 PK			1.06 H	308	66.80	38.50
5	*5745.00	95.3 AV			1.06 H	308	56.80	38.50
6	11490.00	64.0 PK	74.0	-10.0	1.05 H	221	43.60	20.40
7	11490.00	50.5 AV	54.0	-3.5	1.05 H	221	30.10	20.40
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	#5714.00	66.4 PK	68.3	-1.9	1.01 V	109	60.40	6.00
2	#5722.00	68.2 PK	78.3	-10.1	1.14 V	147	62.20	6.00
3	#5725.00	59.2 PK	78.3	-19.1	1.35 V	288	53.20	6.00
4	*5745.00	116.3 PK			1.10 V	114	77.80	38.50
5	*5745.00	106.6 AV			1.10 V	114	68.10	38.50
6	11490.00	66.3 PK	74.0	-7.7	1.78 V	284	45.90	20.40
7	11490.00	52.5 AV	54.0	-1.5	1.78 V	284	32.10	20.40

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)
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.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*5785.00	105.3 PK			1.32 H	307	66.70	38.60
2	*5785.00	96.1 AV			1.32 H	307	57.50	38.60
3	11570.00	64.3 PK	74.0	-9.7	1.12 H	306	43.90	20.40
4	11570.00	50.8 AV	54.0	-3.2	1.12 H	306	30.40	20.40
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	*5785.00	117.8 PK			1.00 V	120	79.20	38.60
2	*5785.00	108.5 AV			1.00 V	120	69.90	38.60
3	11570.00	66.0 PK	74.0	-8.0	1.05 V	80	45.60	20.40
4	11570.00	52.3 AV	54.0	-1.7	1.05 V	80	31.90	20.40

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*5825.00	105.8 PK			1.13 H	305	67.10	38.70
2	*5825.00	95.7 AV			1.13 H	305	57.00	38.70
3	#5850.00	45.2 PK	78.3	-33.1	1.05 H	87	39.00	6.20
4	#5853.00	60.4 PK	78.3	-17.9	1.22 H	336	54.00	6.40
5	#5861.00	58.0 PK	68.3	-10.3	1.05 H	77	51.60	6.40
6	11650.00	63.4 PK	74.0	-10.6	1.13 H	54	43.10	20.30
7	11650.00	50.4 AV	54.0	-3.6	1.13 H	54	30.10	20.30
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	*5825.00	116.9 PK			1.01 V	180	78.20	38.70
2	*5825.00	107.7 AV			1.01 V	180	69.00	38.70
3	#5850.00	58.9 PK	78.3	-19.4	1.33 V	229	52.70	6.20
4	#5853.00	69.3 PK	78.3	-9.0	1.10 V	250	62.90	6.40
5	#5861.00	64.8 PK	68.3	-3.5	1.00 V	266	58.40	6.40
6	11650.00	68.0 PK	74.0	-6.0	1.29 V	76	47.70	20.30
7	11650.00	52.5 AV	54.0	-1.5	1.29 V	76	32.20	20.30

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)
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)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*5755.00	99.7 PK			1.43 H	307	61.10	38.60
2	*5755.00	90.2 AV			1.43 H	307	51.60	38.60
3	#5850.00	45.2 PK	78.3	-33.1	1.09 H	236	39.00	6.20
4	#5853.00	60.4 PK	78.3	-17.9	1.17 H	145	54.00	6.40
5	#5861.00	58.1 PK	68.3	-10.2	1.26 H	302	51.70	6.40
6	11510.00	63.0 PK	74.0	-11.0	1.14 H	58	42.60	20.40
7	11510.00	48.8 AV	54.0	-5.2	1.14 H	58	28.40	20.40
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	#5714.00	66.9 PK	68.3	-1.4	1.20 V	257	60.90	6.00
2	#5722.00	72.7 PK	78.3	-5.6	1.24 V	280	66.70	6.00
3	#5725.00	63.4 PK	78.3	-14.9	1.43 V	123	57.40	6.00
4	*5755.00	110.9 PK			1.20 V	113	72.30	38.60
5	*5755.00	102.2 AV			1.20 V	113	63.60	38.60
6	11510.00	64.0 PK	74.0	-10.0	1.58 V	284	43.60	20.40
7	11510.00	50.9 AV	54.0	-3.1	1.58 V	284	30.50	20.40

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)
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.

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*5795.00	102.2 PK			1.27 H	307	63.60	38.60
2	*5795.00	92.4 AV			1.27 H	307	53.80	38.60
3	#5850.00	45.2 PK	78.3	-33.1	1.05 H	44	39.00	6.20
4	#5853.00	60.0 PK	78.3	-18.3	1.03 H	217	53.60	6.40
5	#5861.00	57.6 PK	68.3	-10.7	1.22 H	333	51.20	6.40
6	11590.00	63.0 PK	74.0	-11.0	1.33 H	225	42.60	20.40
7	11590.00	50.4 AV	54.0	-3.6	1.33 H	225	30.00	20.40
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	*5795.00	114.3 PK			1.00 V	116	75.70	38.60
2	*5795.00	103.9 AV			1.00 V	116	65.30	38.60
3	#5850.00	54.3 PK	78.3	-24.0	1.11 V	149	48.10	6.20
4	#5853.00	69.6 PK	78.3	-8.7	1.00 V	187	63.20	6.40
5	#5861.00	66.5 PK	68.3	-1.8	1.01 V	178	60.10	6.40
6	11590.00	65.1 PK	74.0	-8.9	1.00 V	87	44.70	20.40
7	11590.00	52.7 AV	54.0	-1.3	1.00 V	87	32.30	20.40

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)
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.

802.11ac (80MHz)

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5714.00	57.0 PK	68.3	-11.3	1.05 H	230	51.00	6.00
2	#5722.00	59.7 PK	78.3	-18.6	1.07 H	144	53.70	6.00
3	#5725.00	43.8 PK	78.3	-34.5	1.33 H	145	37.80	6.00
4	*5775.00	94.3 PK			1.36 H	42	55.70	38.60
5	*5775.00	82.2 AV			1.36 H	42	43.60	38.60
6	#5850.00	44.2 PK	78.3	-34.1	1.22 H	107	38.00	6.20
7	#5853.00	58.8 PK	78.3	-19.5	1.11 H	52	52.40	6.40
8	#5861.00	57.0 PK	68.3	-11.3	1.09 H	62	50.60	6.40
9	11550.00	63.0 PK	74.0	-11.0	1.23 H	58	42.60	20.40
10	11550.00	47.9 AV	54.0	-6.1	1.23 H	58	27.50	20.40
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	#5714.00	67.3 PK	68.3	-1.0	1.12 V	144	61.30	6.00
2	#5722.00	72.5 PK	78.3	-5.8	1.00 V	108	66.50	6.00
3	#5725.00	58.1 PK	78.3	-20.2	1.16 V	106	52.10	6.00
4	*5775.00	103.8 PK			1.01 V	121	65.20	38.60
5	*5775.00	92.8 AV			1.01 V	121	54.20	38.60
6	#5850.00	47.4 PK	78.3	-30.9	1.52 V	276	41.20	6.20
7	#5853.00	59.7 PK	78.3	-18.6	1.33 V	205	53.30	6.40
8	#5861.00	59.7 PK	68.3	-8.6	1.27 V	44	53.30	6.40
9	11550.00	64.0 PK	74.0	-10.0	1.17 V	45	43.60	20.40
10	11550.00	50.1 AV	54.0	-3.9	1.17 V	45	29.70	20.40

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)
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

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	57.12	32.1 QP	40.0	-7.9	2.00 H	303	46.70	-14.60
2	222.38	28.2 QP	46.0	-17.8	1.01 H	96	44.40	-16.20
3	374.04	29.6 QP	46.0	-16.4	1.01 H	89	40.30	-10.70
4	500.42	33.4 QP	46.0	-12.6	2.00 H	356	41.70	-8.30
5	624.85	31.8 QP	46.0	-14.2	1.25 H	199	37.30	-5.50
6	961.21	39.0 QP	54.0	-15.0	1.51 H	231	38.30	0.70
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	45.45	35.0 QP	40.0	-5.0	1.00 V	312	49.70	-14.70
2	144.61	31.8 QP	43.5	-11.7	1.00 V	347	45.90	-14.10
3	374.04	29.7 QP	46.0	-16.3	1.24 V	141	40.40	-10.70
4	500.42	36.0 QP	46.0	-10.0	1.24 V	292	44.30	-8.30
5	624.85	30.4 QP	46.0	-15.6	1.00 V	107	35.90	-5.50
6	875.67	32.6 QP	46.0	-13.4	1.24 V	6	33.70	-1.10

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)
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 (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	100289	Nov. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 13, 2014	Feb. 12, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 17, 2013	Jul. 16, 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

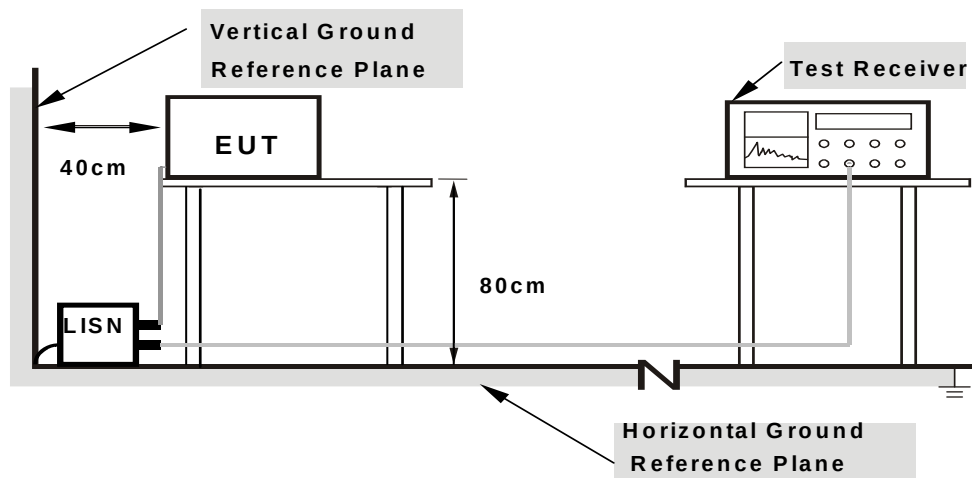
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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) were 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 : 802.11a

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.08	42.72	25.87	42.80	25.95	65.79	55.79	-22.99	-29.84
2	0.16967	0.08	40.77	30.43	40.85	30.51	64.98	54.98	-24.13	-24.47
3	0.22434	0.07	37.29	28.21	37.36	28.28	62.66	52.66	-25.30	-24.38
4	0.43543	0.08	26.35	20.42	26.43	20.50	57.15	47.15	-30.72	-26.65
5	3.34447	0.20	29.57							

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

No	Freq.	Corr. Factor	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	0.16955	0.05	41.00	29.12	41.05	29.17	64.98	54.98	-23.93	-25.81
2	0.19665	0.05	37.82	26.94	37.87	26.99	63.75	53.75	-25.88	-26.76
3	0.21647	0.05	39.66	31.81	39.71	31.86	62.95	52.95	-23.24	-21.09
4	2.80098	0.17	28.02							

4.3 TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A		---	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C		---	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√	---	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

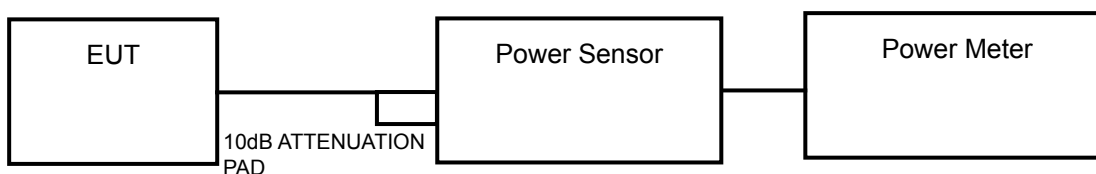
Array Gain = 0 dB (i.e., no array gain) for NANT $\leq$ 4;

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



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

For 802.11a, 802.11n (20MHz), 802.11n (40MHz)

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 802.11ac (80MHz)

- 1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- 2) Set sweep trigger to "free run".
- 3) Set RBW = 1 MHz.
- 4) Set VBW $\geq$ 3 MHz
- 5) Number of points in sweep $\geq$ 2 Span / RBW.
- 6) Sweep time $\leq$ (number of points in sweep) * T
- 7) Detector = RMS.
- 8) Trace mode = max hold.
- 9) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

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

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	19.24	19.45	172.051	22.36	30	PASS
40	5200	24.43	24.43	554.664	27.44	30	PASS
48	5240	23.54	23.74	462.536	26.65	30	PASS
149	5745	16.58	17.40	100.453	20.02	30	PASS
157	5785	17.37	17.33	108.651	20.36	30	PASS
165	5825	17.05	17.81	111.094</			

802.11n (40MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	16.78	16.10	88.381	19.46	30	PASS
46	5230	22.74	23.16	394.946	25.97	30	PASS
151	5755	16.70	16.09	87.418	19.42	30	PASS
159	5795	18.47	18.17	135.922	21.33	30	PASS

802.11ac (80MHz)

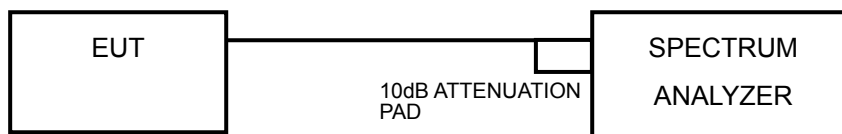
CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)</
-------	----------------	----------------------------------	--	------------------------	---------------------------

4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Mobile and Portable client device	11dBm/ MHz
U-NII-2A		---	11dBm/ MHz
U-NII-2C		---	11dBm/ MHz
U-NII-3	√	---	30dBm/ MHz

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

For U-NII-3 band:

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 500 kHz, Set VBW $\geq$ 3 RBW, Detector = RMS
- 3) Sweep time = auto, trigger set to “free run”.
- 4) Trace average at least 100 traces in power averaging mode.
- 5) 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

For U-NII-1 Band

802.11a

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	5.92	6.21	9.08	0.15	9.23	15.84	PASS
40	5200	10.66	10.65	13.67	0.15	13.82	15.84	PASS
48	5240	9.81	10.37	13.11	0.15	13.26	15.84	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. For U-NII-1 Band:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.16 - 6) = 15.84\text{dBm}$.

3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

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	5.17	5.56	8.38	0.29	8.67	15.84	PASS
40	5200	9.55	10.29	12.95	0.29	13.24	15.84	PASS
48	5240	8.91	8.91	11.92	0.29	12.21	15.84	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. For U-NII-1 Band:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.16 - 6) = 15.84\text{dBm}$.

3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

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	-0.76	-0.23	2.52	0.32	2.84	15.84	PASS
46	5230	6.06	6.26	9.17	0.32	9.49	15.84	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.
- For U-NII-1 Band:**
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.16 - 6) = 15.84\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz):

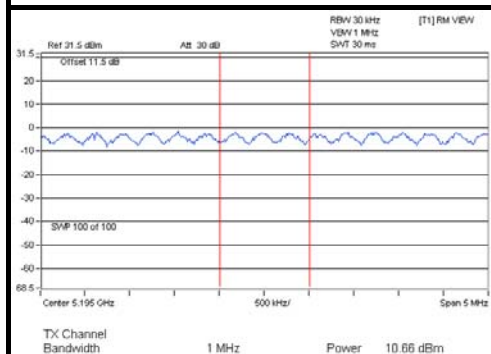
CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
42	5210	-4.46	-5.07	-1.74	2.73	0.99	15.84	PASS

NOTE:

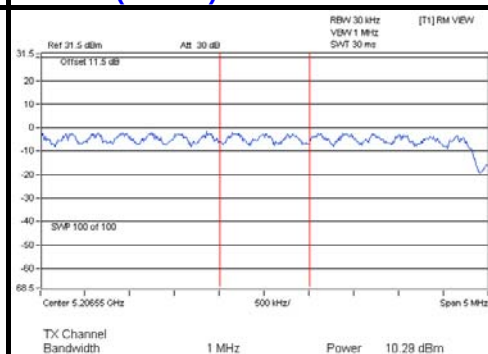
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.16 - 6) = 15.84\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

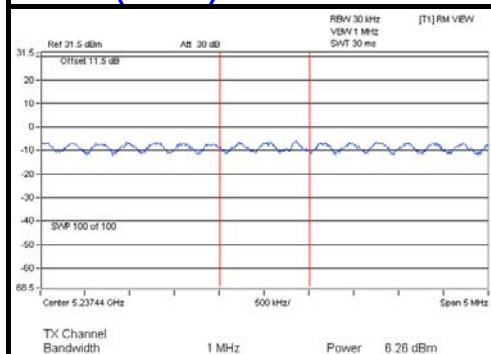
802.11a



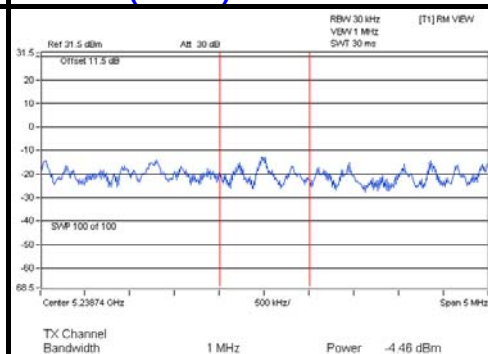
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



For U-NII-3 Band

802.11a

TX chain	Chan	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD without Duty Factor (dBm/500kHz)	Duty Factor	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	8.30	3.01	11.31	0.15	11.46	28.84	PASS
	157	5785	9.34	3.01	12.35	0.15	12.50	28.84	PASS
	165	5825	9.06	3.01	12.07	0.15	12.22	28.84	PASS
1	149	5745	10.25	3.01	13.26	0.15	13.41	28.84	PASS
	157	5785	10.49	3.01	13.50	0.15	13.65	28.84	PASS
	165	5825	9.67	3.01	12.68	0.15	12.83	28.84	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.
- For U-NII-3 Band:**
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.16 - 6) = 28.84\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Chan	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD without Duty Factor (dBm/500kHz)	Duty Factor	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	9.37	3.01	12.38	0.18	12.56	28.84	PASS
	157	5785	9.82	3.01	12.83	0.18	13.01	28.84	PASS
	165	5825	8.88	3.01	11.89	0.18	12.07	28.84	PASS
1	149	5745	10.19	3.01	13.20	0.18	13.38	28.84	PASS
	157	5785	9.98	3.01	12.99	0.18	13.17	28.84	PASS
	165	5825	9.61	3.01	12.62	0.18	12.80	28.84	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.
- For U-NII-3 Band:**
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.16 - 6) = 28.84\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

TX chain	Chan	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD without Duty Factor (dBm/500kHz)	Duty Factor	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	5.37	3.01	8.38	0.31	8.69	28.84	PASS
	159	5795	6.65	3.01	9.66	0.31	9.97	28.84	PASS
1	151	5755	4.54	3.01	7.55	0.31	7.86	28.84	PASS
	159	5795	6.80	3.01	9.81	0.31	10.12	28.84	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.
- For U-NII-3 Band:**
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.16 - 6) = 28.84\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

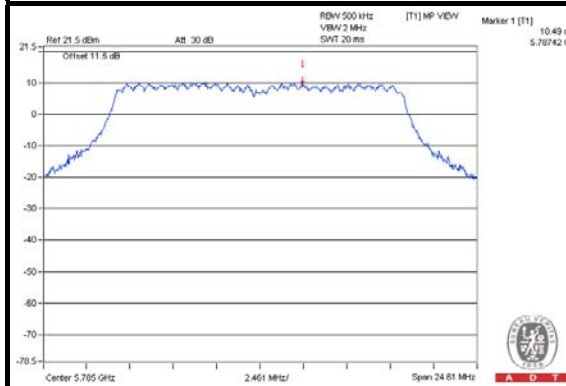
TX chain	Chan	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD without Duty Factor (dBm/500kHz)	Duty Factor	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	155	5775	-3.45	3.01	-0.44	0.57	0.13	28.84	PASS
1	155	5775	-1.47	3.01	1.54	0.57	2.11	28.84	PASS

NOTE:

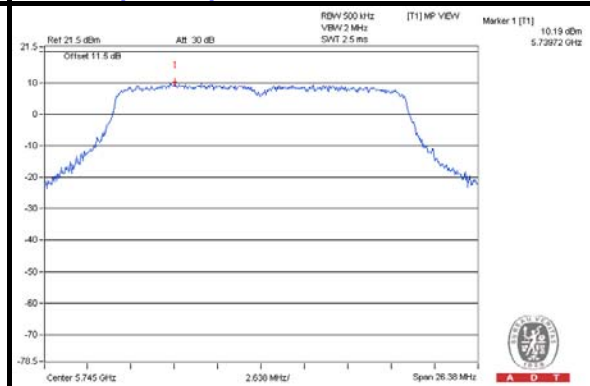
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-3 Band:**
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16 > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.16 - 6) = 28.84\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

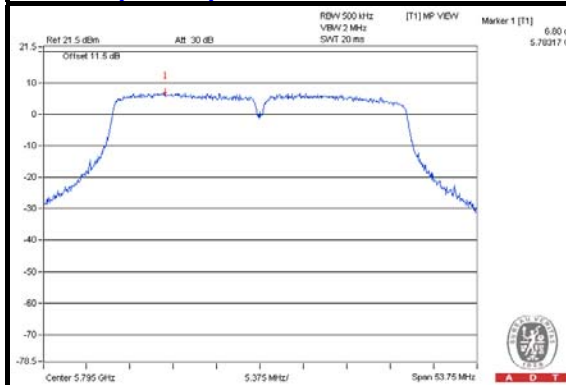
802.11a



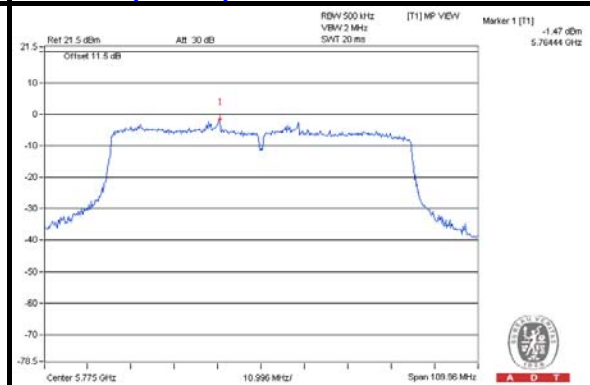
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

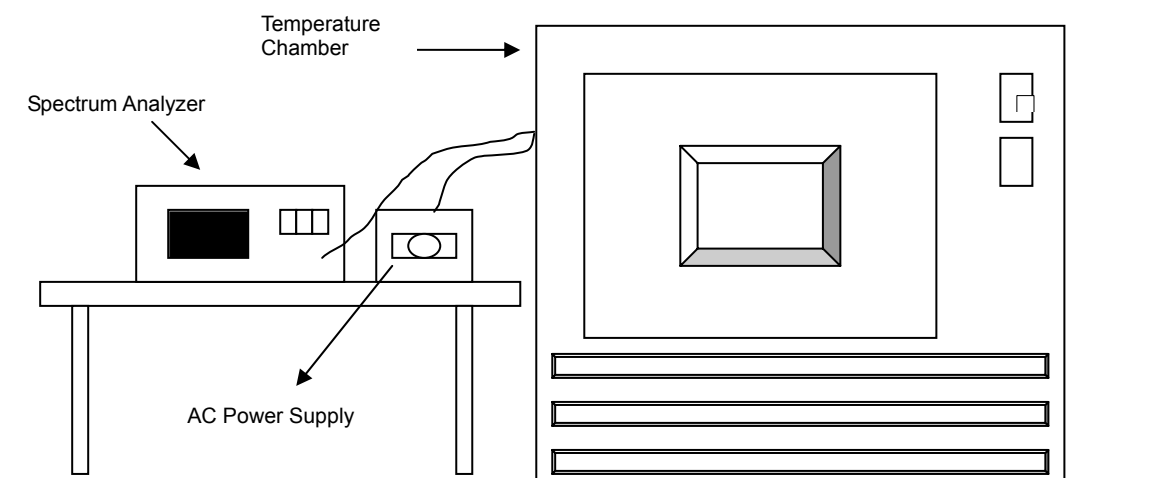


4.5 FREQUENCY STABILITY

4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

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

- 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.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

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

4.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
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	5239.9901	-0.00019	5239.9908	-0.00018	5239.9941	-0.00011	5239.9899	-0.00019
40	120	5240.0069	0.00013	5240.0134	0.00026	5240.0088	0.00017	5240.0109	0.00021
30	120	5240.0138	0.00026	5240.0131	0.00025	5240.0118	0.00023	5240.0127	0.00024
20	120	5239.9722	-0.00053	5239.9758	-0.00046	5239.9808	-0.00037	5239.9811	-0.00036
10	120	5239.9984	-0.00003	5240.0049	0.00009	5240.0013	0.00002	5240.0000	0.00000
0	120	5240.0085	0.00016	5240.0079	0.00015	5240.0097	0.00019	5240.0107	0.00020
-10	120	5240.0312	0.00060	5240.0284	0.00054	5240.0236	0.00045	5240.0221	0.00042
-20	120	5240.0114	0.00022	5240.0149	0.00028	5240.0157	0.00030	5240.0136	0.00026
-30	120	5240.0226	0.00043	5240.0220	0.00042	5240.0285	0.00054	5240.0234	0.00045

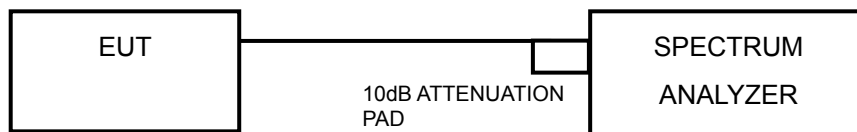
FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5239.9718	-0.00054	5239.9756	-0.00047	5239.9817	-0.00035	5239.9821	-0.00034
	120	5239.9722	-0.00053	5239.9758	-0.00046	5239.9808	-0.00037	5239.9811	-0.00036
	102	5239.9717	-0.00054	5239.9757	-0.00046	5239.9817	-0.00035	5239.9804	-0.00037

4.6 6dB BANDWIDTH MEASUREMENT

4.6.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.42	16.45	0.5	PASS
157	5785	16.33	16.41	0.5	PASS
165	5825	16.35	16.39	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.33	17.59	0.5	PASS
157	5785	17.21	17.64	0.5	PASS
165	5825	17.62	17.61	0.5	PASS

802.11n (40MHz)

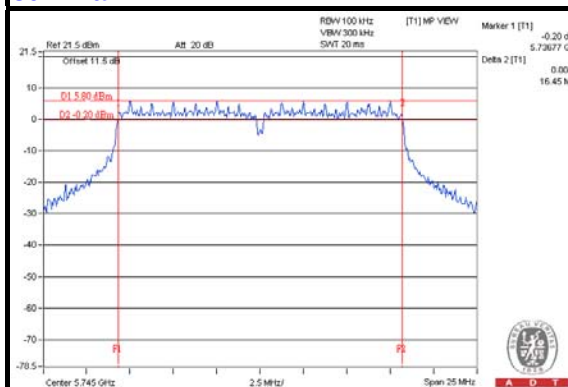
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	35.80	36.13	0.5	PASS
159	5795	35.97	35.84	0.5	PASS

802.11ac (80MHz)

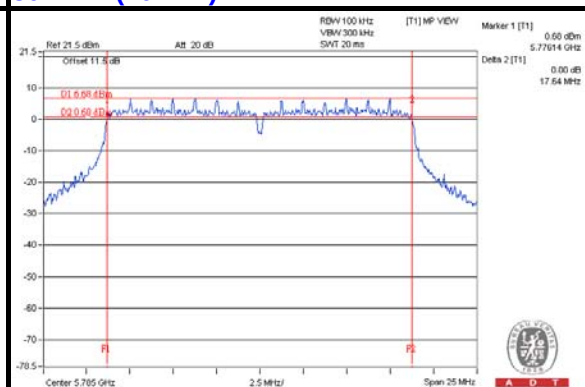
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
155	5775	72.86	73.31	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

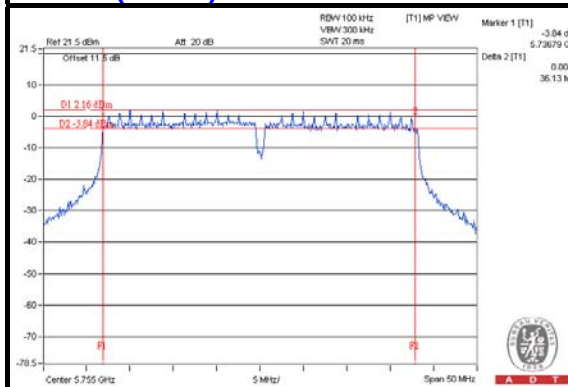
802.11a



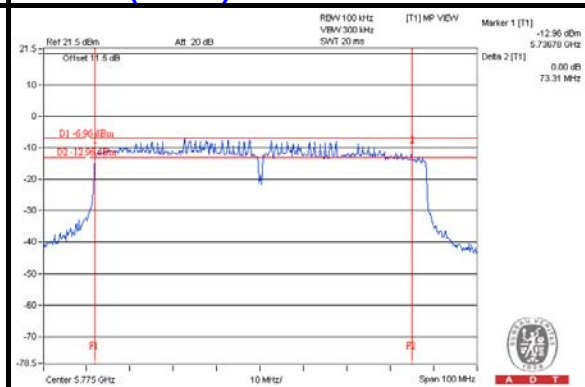
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



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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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---