FCC TEST REPORT (15.407)

REPORT NO.:	RF140808C14
MODEL NO.:	EnStation5, EST500 (Refer to items 3.1 for more details)
FCC ID:	A8J-ENSTA5
RECEIVED:	Aug. 01, 2014
TESTED:	Aug. 01 ~ Aug. 08, 2014
ISSUED:	Aug. 12, 2014

APPLICANT:	EnGenius Technologies
ADDRESS:	1580 Scenic Avenue, Costa Mesa, CA92626

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140808C14	Original release	Aug. 12, 2014

1. CERTIFICATION

PRODUCT: 5GHz a/n N300 CPE
MODEL: EnStation5, EST500 (Refer to items 3.1 for more details)
BRAND: EnGenius, emplus (Refer to items 3.1 for more details)
APPLICANT: EnGenius Technologies
TESTED: Aug. 01 ~ Aug. 08, 2014
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**
ANSI C63.10-2009

The above equipment (model: EnStation5) 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 :** Aug. 12, 2014
Celine Chou / Specialist

APPROVED BY : Ken Liu **, DATE :** Aug. 12, 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 -11.85dB at 1.51172MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5455.00MHz.
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 I-PEX 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	5GHz a/n N300 CPE
MODEL NO.	EnStation5, EST500 (Refer to note for more details)
POWER SUPPLY	24Vdc (POE)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz & 5745 ~ 5825MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	44.437mW for 5180 ~ 5240MHz 31.850mW for 5745 ~ 5825MHz
ANTENNA TYPE	Patch antenna with 15.5dBi gain
ANTENNA CONNECTOR	I-PEX
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	POE

NOTE:

1. The following models are provided to this EUT.

Brand	Model	Description
EnGenius	EnStation5	All models are electrically identical, different model names and brand names are for marketing purpose.
emplus	EST500	

* The model of the EnStation5 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

3. The EUT consumes power from the following POE.

POE	
Brand	EnGenius
Model	EPE-1212
Rating	12-24Vdc

POE's Adapter	
Brand	Powertron
Model	PA1015-3HU
Input Power	100-240Vac, 50-60Hz, 0.4A
Output Power	24Vdc, 0.6A, 14.4W Max
Power Line	1.5m DC cable without core attached on adapter

4. The above EUT information is declared by manufacturer and for more detailed feature 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 5745 ~ 5825MHz

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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	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

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
-	802.11a	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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 73%RH	120Vac, 60Hz	Nick Hsu
RE<1G	23deg. C, 73%RH	120Vac, 60Hz	Jones Chang
PLC	25deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Hsu

3.3 DUTY CYCLE OF TEST SIGNAL

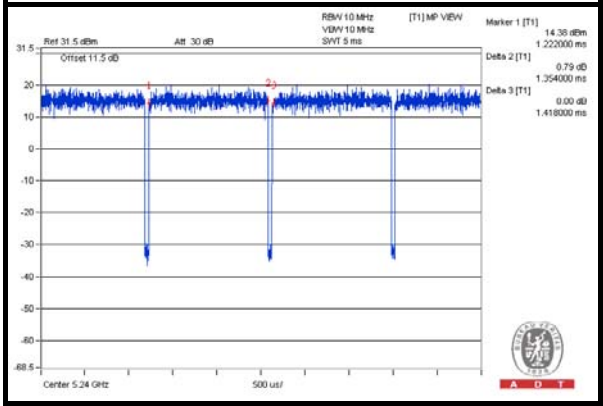
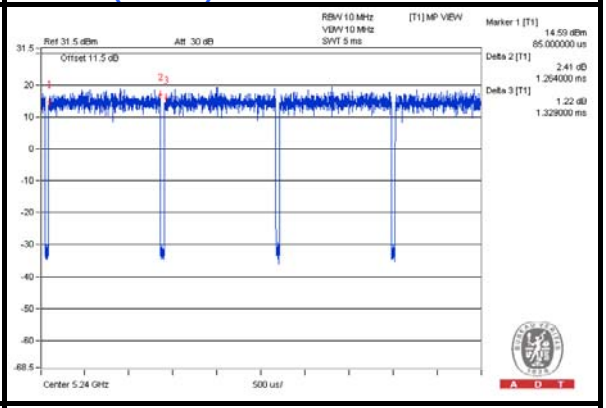
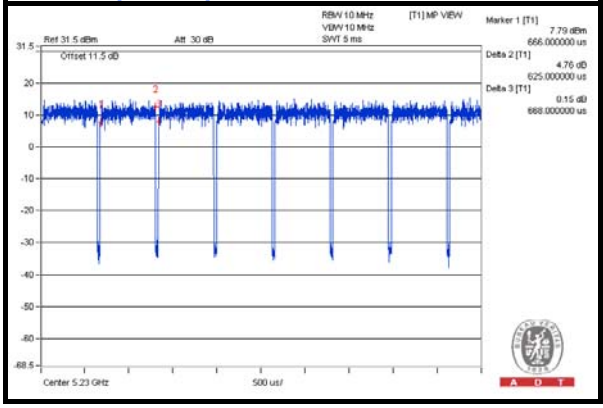
For U-NII-1 Band

Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = 1.354/1.418 = 0.955, Duty factor = 10 * log(1/0.955) = 0.20

802.11n (20MHz): Duty cycle = 1.264/1.329 = 0.951, Duty factor = 10 * log(1/0.951) = 0.22

802.11n (40MHz): Duty cycle = 0.625/0.668 = 0.936, Duty factor = 10 * log(1/0.936) = 0.29

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

For U-NII-3 Band

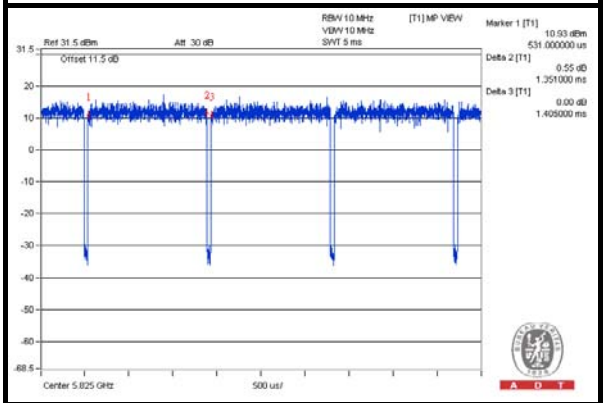
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = 1.351/1.405 = 0.962, Duty factor = 10 * log(1/0.962) = 0.17

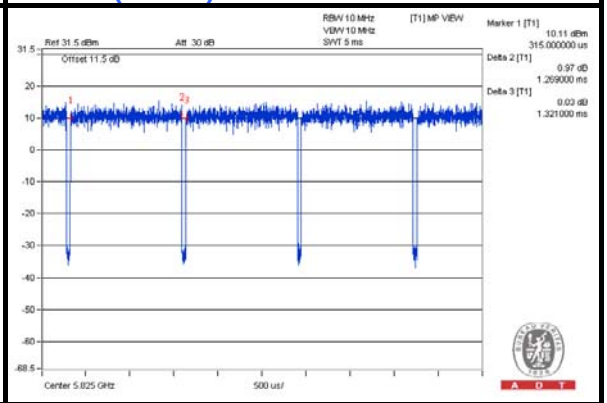
802.11n (20MHz): Duty cycle = 1.269/1.321 = 0.961, Duty factor = 10 * log(1/0.961) = 0.17

802.11n (40MHz): Duty cycle = 0.627/0.669 = 0.937, Duty factor = 10 * log(1/0.937) = 0.28

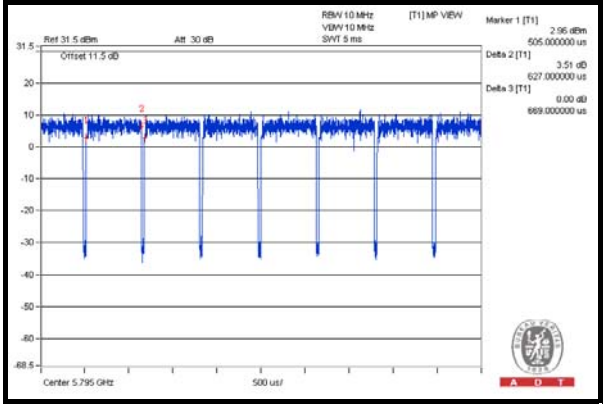
802.11a



802.11n (20MHz)



802.11n (40MHz)



3.4 DESCRIPTION OF SUPPORT UNITS

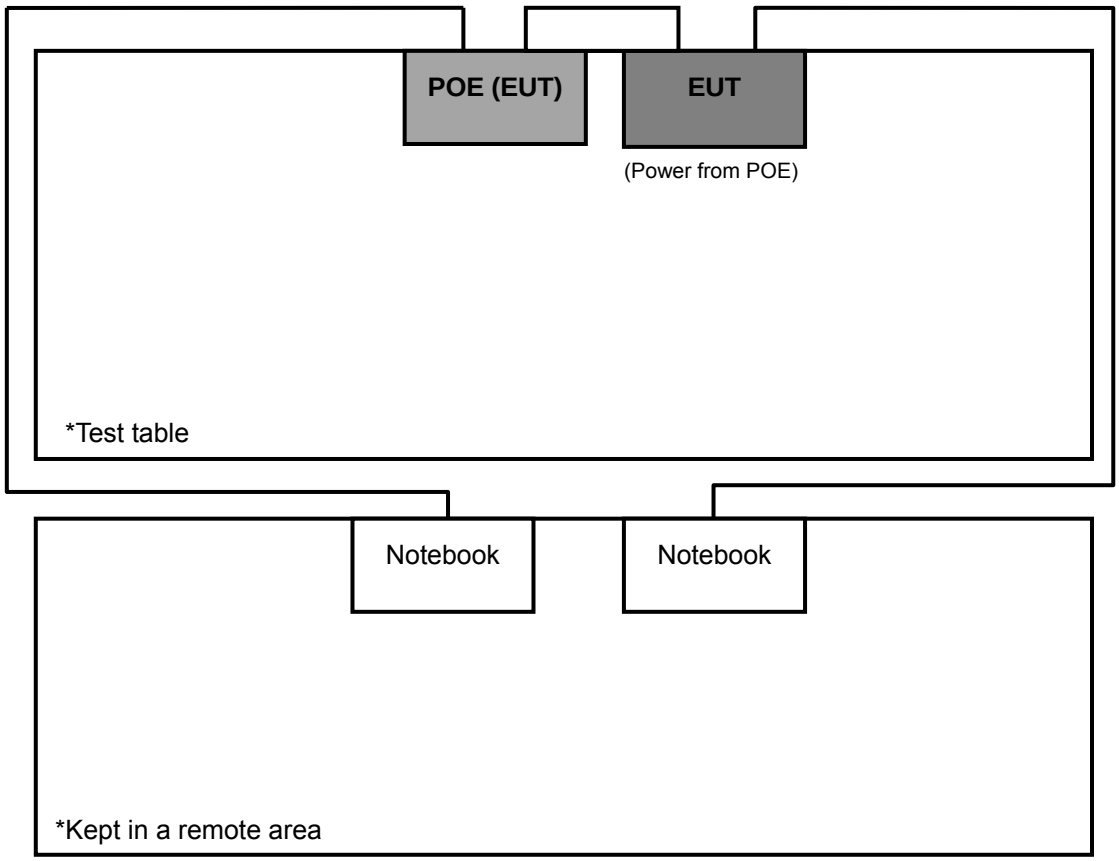
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5410	1HC2XM1	FCC Doc Approved
2	Notebook	Lenovo	20AYA00MTW	MP042ERE	FCC Doc Approved

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

NOTE:
1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1-2 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: 68.2 (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: 68.2 (dBμV/m) *1 PK: 78.2 (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:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/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	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
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, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 09, 2014	Jun. 08, 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 camber. 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:

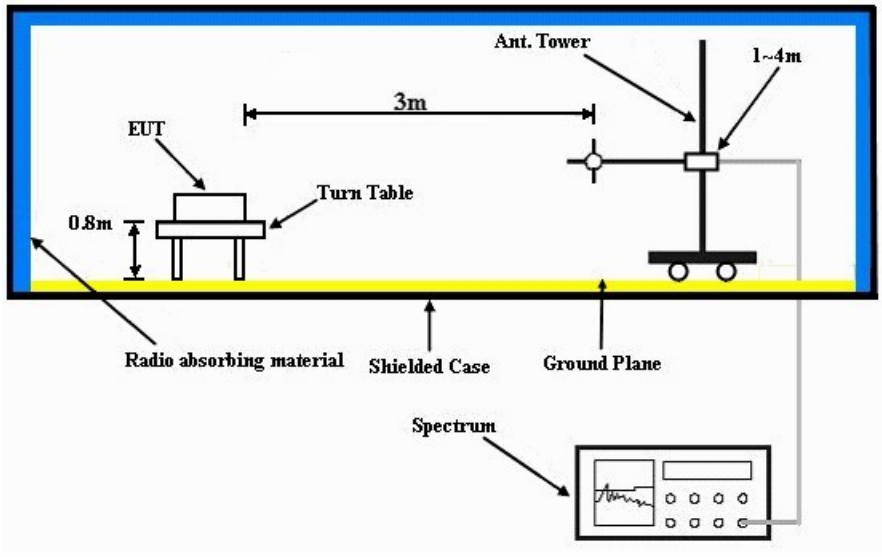
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

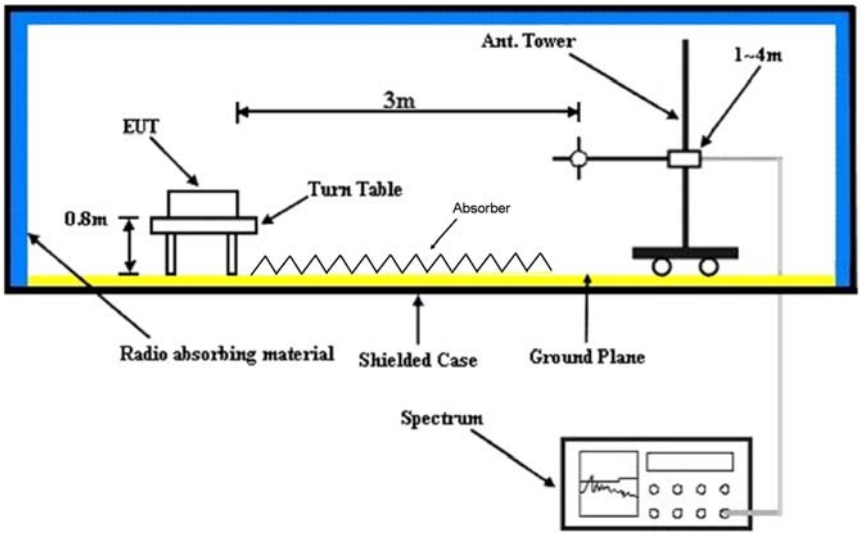
No deviation.

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 notebooks 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

802.11a

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

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	64.7 PK	74.0	-9.3	1.00 H	13	59.60	5.10
2	5150.00	50.8 AV	54.0	-3.2	1.00 H	13	45.70	5.10
3	*5180.00	116.8 PK			1.00 H	0	79.10	37.70
4	*5180.00	106.4 AV			1.00 H	0	68.70	37.70
5	5460.00	61.0 PK	74.0	-13.0	1.13 H	8	55.40	5.60
6	5460.00	47.7 AV	54.0	-6.3	1.13 H	8	42.10	5.60
7	#10360.00	61.1 PK	74.0	-12.9	1.09 H	205	42.80	18.30
8	#10360.00	47.7 AV	54.0	-6.3	1.09 H	205	29.40	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	60.3 PK	74.0	-13.7	1.41 V	342	55.20	5.10
2	5150.00	49.6 AV	54.0	-4.4	1.41 V	342	44.50	5.10
3	*5180.00	115.0 PK			1.43 V	332	77.30	37.70
4	*5180.00	101.9 AV			1.43 V	332	64.20	37.70
5	5455.00	64.2 PK	74.0	-9.8	1.44 V	349	58.60	5.60
6	5455.00	52.5 AV	54.0	-1.5	1.44 V	349	46.90	5.60
7	#5600.00	64.8 PK	68.2	-3.4	1.09 V	347	59.00	5.80
8	#10360.00	59.5 PK	74.0	-14.5	1.25 V	224	41.20	18.30
9	#10360.00	46.2 AV	54.0	-7.8	1.25 V	224	27.90	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	5120.00	63.4 PK	74.0	-10.6	1.00 H	2	58.30	5.10
2	5120.00	52.3 AV	54.0	-1.7	1.00 H	2	47.20	5.10
3	*5200.00	117.1 PK			1.00 H	2	79.30	37.80
4	*5200.00	106.5 AV			1.00 H	2	68.70	37.80
5	5350.00	59.6 PK	74.0	-14.4	1.00 H	355	54.20	5.40
6	5350.00	48.4 AV	54.0	-5.6	1.00 H	355	43.00	5.40
7	#10400.00	61.2 PK	74.0	-12.8	1.05 H	348	42.50	18.70
8	#10400.00	47.5 AV	54.0	-6.5	1.05 H	348	28.80	18.70
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	58.9 PK	74.0	-15.1	1.57 V	338	53.80	5.10
2	5150.00	47.7 AV	54.0	-6.3	1.57 V	338	42.60	5.10
3	*5200.00	115.8 PK			1.52 V	338	78.00	37.80
4	*5200.00	102.5 AV			1.52 V	338	64.70	37.80
5	5455.00	61.8 PK	74.0	-12.2	1.12 V	352	56.20	5.60
6	5455.00	51.1 AV	54.0	-2.9	1.12 V	352	45.50	5.60
7	#5640.00	62.9 PK	68.2	-5.3	1.18 V	0	57.10	5.80
8	#10400.00	59.1 PK	74.0	-14.9	1.03 V	264	40.40	18.70
9	#10400.00	45.9 AV	54.0	-8.1	1.03 V	264	27.20	18.70

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)
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	117.5 PK			1.00 H	0	79.60	37.90
2	*5240.00	104.4 AV			1.00 H	0	66.50	37.90
3	5350.00	58.9 PK	74.0	-15.1	1.02 H	354	53.50	5.40
4	5350.00	46.6 AV	54.0	-7.4	1.02 H	354	41.20	5.40
5	5460.00	60.6 PK	74.0	-13.4	1.01 H	8	55.00	5.60
6	5460.00	47.7 AV	54.0	-6.3	1.01 H	8	42.10	5.60
7	#10480.00	61.6 PK	74.0	-12.4	1.09 H	166	42.10	19.50
8	#10480.00	49.4 AV	54.0	-4.6	1.09 H	166	29.90	19.50
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	*5240.00	116.9 PK			1.63 V	349	79.00	37.90
2	*5240.00	103.8 AV			1.63 V	349	65.90	37.90
3	5350.00	58.5 PK	74.0	-15.5	1.35 V	349	53.10	5.40
4	5350.00	46.5 AV	54.0	-7.5	1.35 V	349	41.10	5.40
5	5455.00	62.4 PK	74.0	-11.6	1.22 V	351	56.80	5.60
6	5455.00	51.5 AV	54.0	-2.5	1.22 V	351	45.90	5.60
7	#5640.00	62.5 PK	68.2	-5.7	1.18 V	351	56.70	5.80
8	#10480.00	61.6 PK	74.0	-12.4	1.14 V	191	42.10	19.50
9	#10480.00	48.4 AV	54.0	-5.6	1.14 V	191	28.90	19.50

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)
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	63.1 PK	74.0	-10.9	1.00 H	2	58.00	5.10
2	5150.00	49.9 AV	54.0	-4.1	1.00 H	2	44.80	5.10
3	*5180.00	115.0 PK			1.00 H	0	77.30	37.70
4	*5180.00	102.6 AV			1.00 H	0	64.90	37.70
5	#10360.00	61.0 PK	74.0	-13.0	1.11 H	121	42.70	18.30
6	#10360.00	47.7 AV	54.0	-6.3	1.11 H	121	29.40	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	59.6 PK	74.0	-14.4	1.70 V	351	54.50	5.10
2	5150.00	48.4 AV	54.0	-5.6	1.70 V	351	43.30	5.10
3	*5180.00	112.8 PK			1.52 V	335	75.10	37.70
4	*5180.00	100.4 AV			1.52 V	335	62.70	37.70
5	5455.00	62.5 PK	74.0	-11.5	1.13 V	348	56.90	5.60
6	5455.00	51.4 AV	54.0	-2.6	1.13 V	348	45.80	5.60
7	#5640.00	62.0 PK	68.2	-6.2	1.08 V	349	56.20	5.80
8	#10360.00	60.8 PK	74.0	-13.2	1.38 V	280	42.50	18.30
9	#10360.00	47.7 AV	54.0	-6.3	1.38 V	280	29.40	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	62.9 PK	74.0	-11.1	1.00 H	4	57.80	5.10
2	5150.00	50.6 AV	54.0	-3.4	1.00 H	4	45.50	5.10
3	*5200.00	116.2 PK			1.15 H	1	78.40	37.80
4	*5200.00	103.8 AV			1.15 H	1	66.00	37.80
5	#10400.00	61.3 PK	74.0	-12.7	1.15 H	2	42.60	18.70
6	#10400.00	48.3 AV	54.0	-5.7	1.15 H	2	29.60	18.70
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	57.4 PK	74.0	-16.6	1.51 V	330	52.30	5.10
2	5150.00	46.4 AV	54.0	-7.6	1.51 V	330	41.30	5.10
3	*5200.00	115.5 PK			1.41 V	340	77.70	37.80
4	*5200.00	103.0 AV			1.41 V	340	65.20	37.80
5	5455.00	62.4 PK	74.0	-11.6	1.22 V	347	56.80	5.60
6	5455.00	52.1 AV	54.0	-1.9	1.22 V	347	46.50	5.60
7	#5640.00	62.7 PK	68.2	-5.5	1.18 V	350	56.90	5.80
8	#10400.00	61.2 PK	74.0	-12.8	1.11 V	232	42.50	18.70
9	#10400.00	47.9 AV	54.0	-6.1	1.11 V	232	29.20	18.70

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)
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	117.9 PK			1.00 H	0	80.00	37.90
2	*5240.00	107.2 AV			1.00 H	0	69.30	37.90
3	5350.00	62.7 PK	74.0	-11.3	1.03 H	357	57.30	5.40
4	5350.00	49.4 AV	54.0	-4.6	1.03 H	357	44.00	5.40
5	#10480.00	62.3 PK	74.0	-11.7	1.09 H	357	42.80	19.50
6	#10480.00	49.0 AV	54.0	-5.0	1.09 H	357	29.50	19.50
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	*5240.00	115.9 PK			1.51 V	344	78.00	37.90
2	*5240.00	103.2 AV			1.51 V	344	65.30	37.90
3	5350.00	61.5 PK	74.0	-12.5	1.23 V	345	56.10	5.40
4	5350.00	47.6 AV	54.0	-6.4	1.23 V	345	42.20	5.40
5	5455.00	62.0 PK	74.0	-12.0	1.24 V	346	56.40	5.60
6	5455.00	51.1 AV	54.0	-2.9	1.24 V	346	45.50	5.60
7	#5640.00	62.3 PK	68.2	-5.9	1.18 V	348	56.50	5.80
8	#10480.00	61.4 PK	74.0	-12.6	1.40 V	349	41.90	19.50
9	#10480.00	48.4 AV	54.0	-5.6	1.40 V	349	28.90	19.50

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)
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	68.0 PK	74.0	-6.0	1.00 H	1	62.90	5.10
2	5150.00	52.4 AV	54.0	-1.6	1.00 H	1	47.30	5.10
3	*5190.00	108.9 PK			1.00 H	0	71.10	37.80
4	*5190.00	95.8 AV			1.00 H	0	58.00	37.80
5	#10380.00	61.4 PK	74.0	-12.6	1.18 H	0	43.00	18.40
6	#10380.00	48.1 AV	54.0	-5.9	1.18 H	0	29.70	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	66.2 PK	74.0	-7.8	1.43 V	351	61.10	5.10
2	5150.00	50.7 AV	54.0	-3.3	1.43 V	351	45.60	5.10
3	*5190.00	107.6 PK			1.55 V	337	69.80	37.80
4	*5190.00	96.9 AV			1.55 V	337	59.10	37.80
5	5455.00	61.1 PK	74.0	-12.9	1.22 V	352	55.50	5.60
6	5455.00	50.6 AV	54.0	-3.4	1.22 V	352	45.00	5.60
7	#5600.00	61.2 PK	74.0	-12.8	1.18 V	347	55.40	5.80
8	#5600.00	50.4 AV	54.0	-3.6	1.18 V	347	44.60	5.80
9	#10380.00	61.6 PK	74.0	-12.4	1.27 V	310	43.20	18.40
10	#10380.00	48.5 AV	54.0	-5.5	1.27 V	310	30.10	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	*5230.00	113.8 PK			1.00 H	1	75.90	37.90
2	*5230.00	100.5 AV			1.00 H	1	62.60	37.90
3	5350.00	61.7 PK	74.0	-12.3	1.12 H	358	56.30	5.40
4	5350.00	49.3 AV	54.0	-4.7	1.12 H	358	43.90	5.40
5	#10460.00	62.0 PK	74.0	-12.0	1.12 H	5	42.80	19.20
6	#10460.00	48.8 AV	54.0	-5.2	1.12 H	5	29.60	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	*5230.00	113.7 PK			1.38 V	345	75.80	37.90
2	*5230.00	100.6 AV			1.38 V	345	62.70	37.90
3	5350.00	61.6 PK	74.0	-12.4	1.24 V	348	56.20	5.40
4	5350.00	49.8 AV	54.0	-4.2	1.24 V	348	44.40	5.40
5	5455.00	63.1 PK	74.0	-10.9	1.34 V	350	57.50	5.60
6	5455.00	52.4 AV	54.0	-1.6	1.34 V	350	46.80	5.60
7	#5640.00	62.6 PK	68.2	-5.6	1.18 V	350	56.80	5.80
8	#10460.00	61.8 PK	74.0	-12.2	1.14 V	221	42.60	19.20
9	#10460.00	48.8 AV	54.0	-5.2	1.14 V	221	29.60	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.

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	62.0 PK	74.0	-12.0	1.20 H	355	56.00	6.00
2	#5714.00	47.9 AV	54.0	-6.1	1.20 H	355	41.90	6.00
3	#5722.00	66.7 PK	78.2	-11.5	1.00 H	354	60.70	6.00
4	#5725.00	56.4 PK	78.2	-21.8	1.00 H	357	50.40	6.00
5	*5745.00	114.1 PK			1.00 H	356	75.60	38.50
6	*5745.00	101.9 AV			1.00 H	356	63.40	38.50
7	11490.00	63.3 PK	74.0	-10.7	1.13 H	286	42.90	20.40
8	11490.00	49.8 AV	54.0	-4.2	1.13 H	286	29.40	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	#5280.00	63.5 PK	68.2	-4.7	1.28 V	353	58.20	5.30
2	5455.00	54.1 PK	74.0	-19.9	1.13 V	349	48.50	5.60
3	5455.00	52.5 AV	54.0	-1.5	1.13 V	349	46.90	5.60
4	#5640.00	64.1 PK	68.2	-4.1	1.19 V	347	58.30	5.80
5	#5714.00	62.3 PK	74.0	-11.7	1.06 V	356	56.30	6.00
6	#5714.00	47.5 AV	54.0	-6.5	1.06 V	356	41.50	6.00
7	#5722.00	69.0 PK	78.2	-9.2	1.07 V	351	63.00	6.00
8	#5725.00	58.9 PK	78.2	-19.3	1.06 V	352	52.90	6.00
9	*5745.00	116.7 PK			1.08 V	355	78.20	38.50
10	*5745.00	104.0 AV			1.08 V	355	65.50	38.50
11	11490.00	63.4 PK	74.0	-10.6	1.16 V	298	43.00	20.40
12	11490.00	49.7 AV	54.0	-4.3	1.16 V	298	29.30	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.

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	112.7 PK			1.00 H	350	74.10	38.60
2	*5785.00	100.9 AV			1.00 H	350	62.30	38.60
3	11570.00	61.7 PK	74.0	-12.3	1.06 H	331	41.30	20.40
4	11570.00	48.5 AV	54.0	-5.5	1.06 H	331	28.10	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	#5280.00	63.2 PK	68.2	-5.0	1.16 V	346	57.90	5.30
2	5455.00	63.8 PK	74.0	-10.2	1.13 V	348	58.20	5.60
3	**5455.00**	**53.0 AV**	**54.0**	**-1.0**	**1.13 V**	**348**	**47.40**	**5.60**
4	#5640.00	63.0 PK	68.2	-5.2	1.00 V	345	57.20	5.80
5	*5785.00	116.0 PK			1.06 V	348	77.40	38.60
6	*5785.00	102.8 AV			1.06 V	348	64.20	38.60
7	11570.00	62.7 PK	74.0	-11.3	1.09 V	349	42.30	20.40
8	11570.00	48.8 AV	54.0	-5.2	1.09 V	349	28.40	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 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	111.3 PK			1.00 H	352	72.60	38.70
2	*5825.00	98.8 AV			1.00 H	352	60.10	38.70
3	#5850.00	46.5 PK	78.2	-31.7	1.14 H	351	40.30	6.20
4	#5853.00	59.7 PK	78.2	-18.5	1.09 H	351	53.30	6.40
5	#5861.00	58.7 PK	74.0	-15.3	1.00 H	349	52.30	6.40
6	#5861.00	45.5 AV	54.0	-8.5	1.00 H	349	39.10	6.40
7	11650.00	61.6 PK	74.0	-12.4	1.09 H	351	41.30	20.30
8	11650.00	48.0 AV	54.0	-6.0	1.09 H	351	27.70	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	#5280.00	63.9 PK	68.2	-4.3	1.17 V	343	58.60	5.30
2	5455.00	62.9 PK	74.0	-11.1	1.13 V	346	57.30	5.60
3	5455.00	52.7 AV	54.0	-1.3	1.13 V	346	47.10	5.60
4	#5680.00	63.9 PK	68.2	-4.3	1.00 V	343	57.90	6.00
5	*5825.00	113.7 PK			1.16 V	344	75.00	38.70
6	*5825.00	100.4 AV			1.16 V	344	61.70	38.70
7	#5850.00	46.9 PK	78.2	-31.3	1.05 V	340	40.70	6.20
8	#5853.00	59.6 PK	78.2	-18.6	1.05 V	349	53.20	6.10
9	#5861.00	59.2 PK	74.0	-14.8	1.04 V	347	52.80	6.40
10	#5861.00	45.8 AV	54.0	-8.2	1.04 V	347	39.40	6.40
11	11650.00	61.2 PK	74.0	-12.8	1.10 V	340	40.90	20.30
12	11650.00	48.1 AV	54.0	-5.9	1.10 V	340	27.80	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	#5660.00	60.7 PK	74.0	-13.3	1.10 H	352	54.80	5.90
2	#5660.00	48.6 AV	54.0	-5.4	1.10 H	352	42.70	5.90
3	#5722.00	72.9 PK	78.2	-5.3	1.00 H	352	66.90	6.00
4	#5725.00	74.3 PK	78.2	-3.9	1.00 H	353	68.30	6.00
5	*5745.00	113.4 PK			1.00 H	353	74.90	38.50
6	*5745.00	102.9 AV			1.00 H	353	64.40	38.50
7	11490.00	63.2 PK	74.0	-10.8	1.07 H	322	42.80	20.40
8	11490.00	49.5 AV	54.0	-4.5	1.07 H	322	29.10	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	#5280.00	63.2 PK	68.2	-5.0	1.18 V	350	57.90	5.30
2	5455.00	64.8 PK	74.0	-9.2	1.14 V	349	59.20	5.60
3	**5455.00**	**53.0 AV**	**54.0**	**-1.0**	**1.14 V**	**349**	**47.40**	**5.60**
4	#5680.00	64.5 PK	68.2	-3.7	1.00 V	349	58.50	6.00
5	#5714.00	61.4 PK	74.0	-12.6	1.07 V	359	55.40	6.00
6	#5714.00	46.8 AV	54.0	-7.2	1.07 V	359	40.80	6.00
7	#5722.00	72.5 PK	78.2	-5.7	1.08 V	344	66.50	6.00
8	#5725.00	75.6 PK	78.2	-2.6	1.08 V	343	69.60	6.00
9	*5745.00	114.7 PK			1.18 V	348	76.20	38.50
10	*5745.00	104.1 AV			1.18 V	348	65.60	38.50
11	11490.00	62.9 PK	74.0	-11.1	1.19 V	279	42.50	20.40
12	11490.00	49.5 AV	54.0	-4.5	1.19 V	279	29.10	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	111.2 PK			1.00 H	349	72.60	38.60
2	*5785.00	100.8 AV			1.00 H	349	62.20	38.60
3	11570.00	63.0 PK	74.0	-11.0	1.00 H	12	42.60	20.40
4	11570.00	49.2 AV	54.0	-4.8	1.00 H	12	28.80	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	#5280.00	64.6 PK	68.2	-3.6	1.17 V	345	59.30	5.30
2	5455.00	63.8 PK	74.0	-10.2	1.13 V	340	58.20	5.60
3	5455.00	52.8 AV	54.0	-1.2	1.13 V	340	47.20	5.60
4	#5640.00	62.9 PK	68.2	-5.3	1.00 V	344	57.10	5.80
5	*5785.00	114.0 PK			1.16 V	347	75.40	38.60
6	*5785.00	103.7 AV			1.16 V	347	65.10	38.60
7	11570.00	62.9 PK	74.0	-11.1	1.11 V	300	42.50	20.40
8	11570.00	49.2 AV	54.0	-4.8	1.11 V	300	28.80	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 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	110.1 PK			1.00 H	352	71.40	38.70
2	*5825.00	100.0 AV			1.00 H	352	61.30	38.70
3	#5850.00	61.0 PK	78.2	-17.2	1.12 H	341	54.80	6.20
4	#5853.00	61.6 PK	78.2	-16.6	1.08 H	355	55.20	6.40
5	#5861.00	57.9 PK	74.0	-16.1	1.00 H	351	51.50	6.40
6	#5861.00	46.5 AV	54.0	-7.5	1.00 H	351	40.10	6.40
7	11650.00	62.7 PK	74.0	-11.3	1.00 H	50	42.40	20.30
8	11650.00	49.1 AV	54.0	-4.9	1.00 H	50	28.80	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	#5280.00	63.1 PK	68.2	-5.1	1.05 V	350	57.80	5.30
2	5455.00	63.9 PK	74.0	-10.1	1.14 V	349	58.30	5.60
3	5455.00	52.9 AV	54.0	-1.1	1.14 V	349	47.30	5.60
4	#5680.00	63.4 PK	68.2	-4.8	1.08 V	346	57.40	6.00
5	*5825.00	110.7 PK			1.15 V	349	72.00	38.70
6	*5825.00	100.6 AV			1.15 V	349	61.90	38.70
7	#5850.00	61.0 PK	78.2	-17.2	1.15 V	347	54.80	6.20
8	#5853.00	61.1 PK	78.2	-17.1	1.16 V	349	54.70	6.40
9	#5861.00	56.4 PK	74.0	-17.6	1.13 V	340	50.00	6.40
10	#5861.00	45.4 AV	54.0	-8.6	1.13 V	340	39.00	6.40
11	11650.00	62.3 PK	74.0	-11.7	1.19 V	19	42.00	20.30
12	11650.00	48.8 AV	54.0	-5.2	1.19 V	19	28.50	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	#5714.00	66.6 PK	74.0	-7.4	1.00 H	348	60.60	6.00
2	#5714.00	51.1 AV	54.0	-2.9	1.00 H	348	45.10	6.00
3	#5722.00	71.6 PK	78.2	-6.6	1.00 H	350	65.60	6.00
4	#5725.00	70.9 PK	78.2	-7.3	1.00 H	350	64.90	6.00
5	*5755.00	108.1 PK			1.00 H	350	69.50	38.60
6	*5755.00	97.1 AV			1.00 H	350	58.50	38.60
7	11510.00	62.6 PK	74.0	-11.4	1.20 H	277	42.20	20.40
8	11510.00	49.0 AV	54.0	-5.0	1.20 H	277	28.60	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	#5280.00	62.6 PK	68.2	-5.6	1.06 V	344	57.30	5.30
2	5455.00	62.5 PK	74.0	-11.5	1.13 V	351	56.90	5.60
3	5455.00	52.6 AV	54.0	-1.4	1.13 V	351	47.00	5.60
4	#5680.00	63.9 PK	68.2	-4.3	1.00 V	345	57.90	6.00
5	#5714.00	70.1 PK	74.0	-3.9	1.00 V	345	64.10	6.00
6	#5714.00	52.8 AV	54.0	-1.2	1.00 V	345	46.80	6.00
7	#5723.00	73.7 PK	78.2	-4.5	1.00 V	349	67.70	6.00
8	#5725.00	74.0 PK	78.2	-4.2	1.00 V	349	68.00	6.00
9	*5755.00	109.6 PK			1.08 V	348	71.00	38.60
10	*5755.00	98.7 AV			1.08 V	348	60.10	38.60
11	11510.00	62.3 PK	74.0	-11.7	1.18 V	48	41.90	20.40
12	11510.00	48.5 AV	54.0	-5.5	1.18 V	48	28.10	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 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	106.2 PK			1.01 H	350	67.60	38.60
2	*5795.00	95.6 AV			1.01 H	350	57.00	38.60
3	#5850.00	58.0 PK	78.2	-20.2	1.09 H	333	51.80	6.20
4	#5853.00	58.7 PK	78.2	-19.5	1.03 H	339	52.30	6.40
5	#5861.00	56.9 PK	74.0	-17.1	1.00 H	343	50.50	6.40
6	#5861.00	45.3 AV	54.0	-8.7	1.00 H	343	38.90	6.40
7	11590.00	62.7 PK	74.0	-11.3	1.10 H	359	42.30	20.40
8	11590.00	48.8 AV	54.0	-5.2	1.10 H	359	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	#5280.00	62.8 PK	68.2	-5.4	1.17 V	348	57.50	5.30
2	5455.00	62.3 PK	74.0	-11.7	1.13 V	345	56.70	5.60
3	5455.00	52.4 AV	54.0	-1.6	1.13 V	345	46.80	5.60
4	#5680.00	62.8 PK	68.2	-5.4	1.00 V	349	56.80	6.00
5	*5795.00	109.9 PK			1.07 V	349	71.30	38.60
6	*5795.00	98.8 AV			1.07 V	349	60.20	38.60
7	#5850.00	59.1 PK	78.2	-19.1	1.05 V	352	52.90	6.20
8	#5853.00	58.1 PK	78.2	-20.1	1.07 V	348	51.70	6.40
9	#5861.00	59.9 PK	74.0	-14.1	1.05 V	345	53.50	6.40
10	#5861.00	47.2 AV	54.0	-6.8	1.05 V	345	40.80	6.40
11	11590.00	62.2 PK	74.0	-11.8	1.21 V	22	41.80	20.40
12	11590.00	48.6 AV	54.0	-5.4	1.21 V	22	28.20	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	32.3 QP	40.0	-7.7	2.00 H	25	46.90	-14.60
2	90.17	29.8 QP	43.5	-13.7	2.00 H	205	49.60	-19.80
3	107.67	30.1 QP	43.5	-13.4	1.49 H	235	47.60	-17.50
4	154.33	31.1 QP	43.5	-12.4	2.00 H	264	44.70	-13.60
5	675.40	36.5 QP	46.0	-9.5	1.00 H	114	41.30	-4.80
6	836.78	32.2 QP	46.0	-13.8	1.00 H	65	33.90	-1.70
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	47.61	38.5 QP	40.0	-1.5	1.00 V	333	53.10	-14.60
2	90.17	38.7 QP	43.5	-4.8	1.00 V	285	58.50	-19.80
3	117.39	39.2 QP	43.5	-4.3	1.00 V	39	55.60	-16.40
4	146.56	34.2 QP	43.5	-9.3	1.00 V	291	48.20	-14.00
5	267.10	27.7 QP	46.0	-18.3	1.49 V	162	41.10	-13.40
6	675.40	30.9 QP	46.0	-15.1	1.49 V	152	35.70	-4.80

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

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	Apr. 24, 2014	Apr. 23, 2015
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 10, 2014	Jul. 09, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 2.

3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

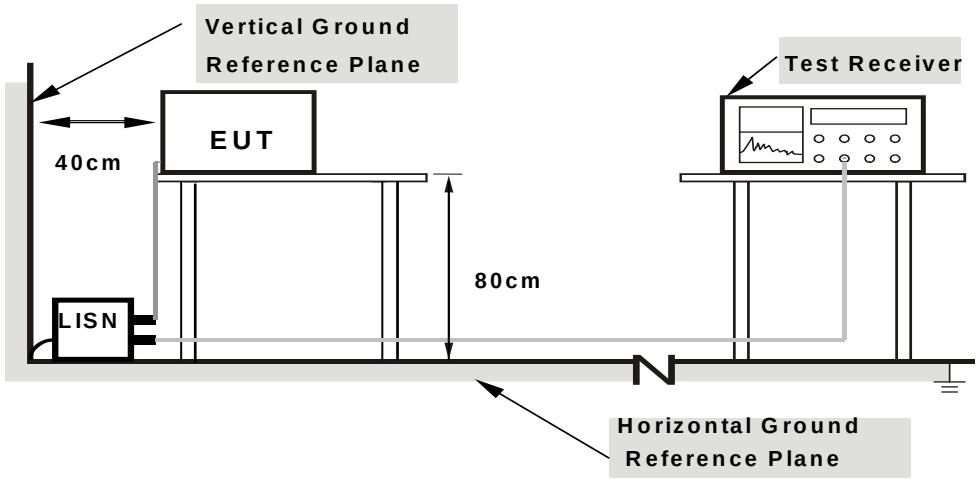
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

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

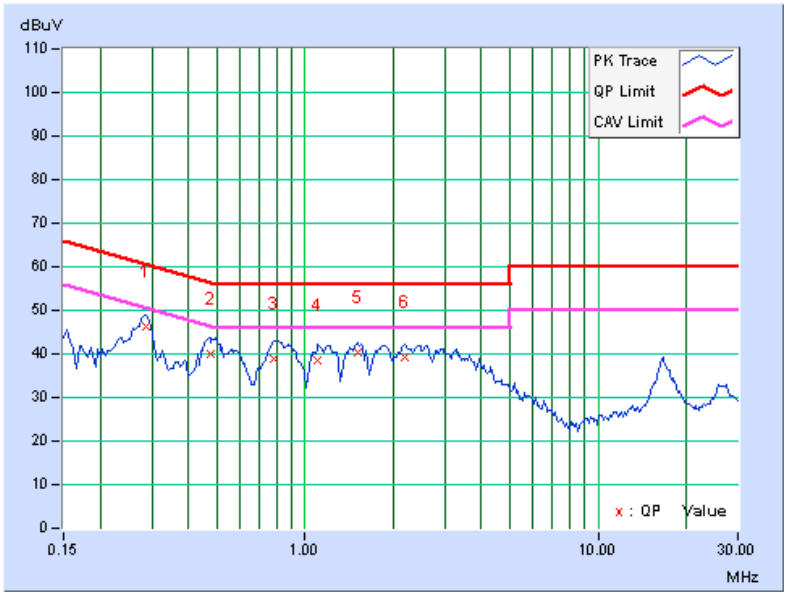
CONDUCTED WORST-CASE DATA: 802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.28619	0.23	46.18	37.83	46.41	38.06	60.63	50.63	-14.22	-12.57
2	0.47484	0.23	39.80	30.87	40.03	31.10	56.43	46.43	-16.40	-15.33
3	0.78281	0.27	38.64	30.11	38.91	30.38	56.00	46.00	-17.09	-15.62
4	1.10938	0.31	38.15	29.46	38.46	29.77	56.00	46.00	-17.54	-16.23
5	**1.51172**	**0.34**	**40.00**	**33.81**	**40.34**	**34.15**	**56.00**	**46.00**	**-15.66**	**-11.85**
6	2.19141	0.38	38.93	31.83	39.31	32.21	56.00	46.00	-16.69	-13.79

REMARKS:

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

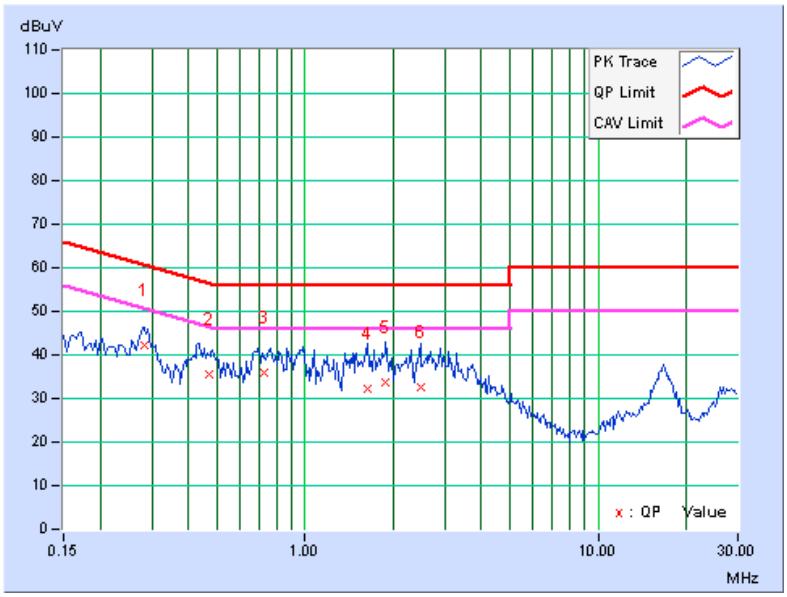


PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.28281	0.26	41.80	32.89	42.06	33.15	60.73	50.73	-18.67	-17.58
2	0.46778	0.30	35.27	25.91	35.57	26.21	56.55	46.55	-20.98	-20.34
3	0.72069	0.29	35.69	25.45	35.98	25.74	56.00	46.00	-20.02	-20.26
4	1.62500	0.35	31.81	20.71	32.16	21.06	56.00	46.00	-23.84	-24.94
5	1.89063	0.38	33.46	24.16	33.84	24.54	56.00	46.00	-22.16	-21.46
6	2.48438	0.41	32.20	23.06	32.61	23.47	56.00	46.00	-23.39	-22.53

REMARKS:

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



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 ≦ 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)

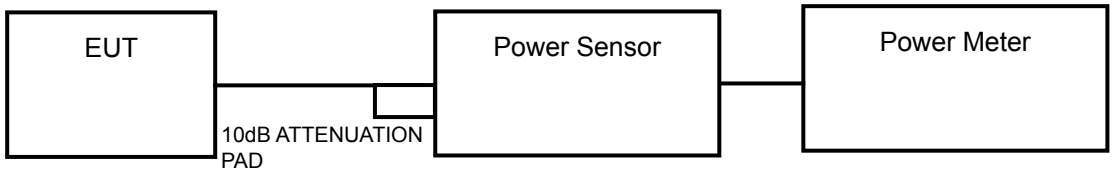
*B is the 26 dB emission bandwidth in megahertz

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 ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 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 ≥ 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

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.

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	13.41	13.10	42.345	16.27	30	PASS
40	5200	13.57	13.23	43.789	16.41	30	PASS
48	5240	13.78	13.13	**44.437**	16.48	30	PASS
149	5745	12.24	11.79	**31.850**	15.03	30	PASS
157	5785	11.35	11.07	26.440	14.22	30	PASS
165	5825	10.30	9.56	19.751	12.96	30	PASS

802.11n (20MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	12.33	11.90	32.588	15.13	30	PASS
40	5200	13.44	13.18	42.877	16.32	30	PASS
48	5240	13.52	13.33	44.019	16.44	30	PASS
149	5745	11.40	10.53	25.102	14.00	30	PASS
157	5785	10.65	9.92	21.431	13.31	30	PASS
165	5825	9.28	8.94	16.306	12.12	30	PASS

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	7.68	7.18	11.085	10.45	30	PASS
46	5230	13.44	12.51	39.904	16.01	30	PASS
151	5755	8.01	7.64	12.132	10.84	30	PASS
159	5795	8.63	8.02	13.634	11.35	30	PASS

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-1 band:

Using method SA-2

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 kHz, Set VBW ≥ 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 and add 10 log (1/duty cycle)

For U-NII-3 band:

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 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/duty cycle)
6) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)

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	-0.21	0.35	3.09	0.20	3.29	17	PASS
40	5200	0.45	0.08	3.28	0.20	3.48	17	PASS
48	5240	0.32	0.14	3.24	0.20	3.44	17	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 = 15.5dBi + 10log(2) = 18.51dBi < 23dBi , so the power density limit no need to reduced.
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	-1.68	-1.08	1.64	0.22	1.86	17	PASS
40	5200	-0.24	-0.03	2.87	0.22	3.09	17	PASS
48	5240	-0.45	-0.18	2.70	0.22	2.92	17	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 = 15.5dBi + 10log(2) = 18.51dBi < 23dBi , so the power density limit no need to reduced.
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	-9.35	-8.73	-6.02	0.29	-5.73	17	PASS
46	5230	-3.67	-2.97	-0.30	0.29	-0.01	17	PASS

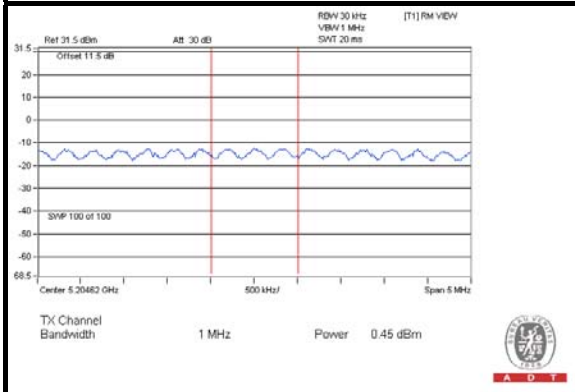
NOTE:

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:**

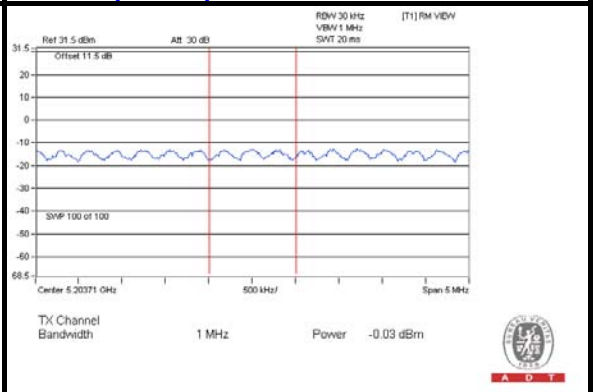
   Directional gain = 15.5dBi + 10log(2) = 18.51dBi < 23dBi , so the power density limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

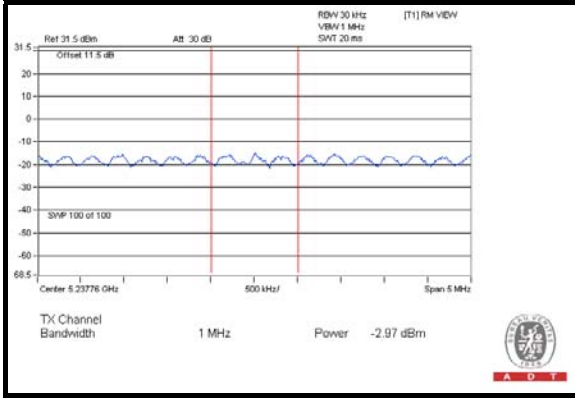
802.11a



802.11n (20MHz)



802.11n (40MHz)



For U-NII-3 Band

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	-9.79	-7.57	3.01	0.17	-4.39	17.49	PASS
	157	5785	-10.23	-8.01	3.01	0.17	-4.83	17.49	PASS
	165	5825	-11.68	-9.46	3.01	0.17	-6.28	17.49	PASS
1	149	5745	-9.39	-7.17	3.01	0.17	-3.99	17.49	PASS
	157	5785	-9.95	-7.73	3.01	0.17	-4.55	17.49	PASS
	165	5825	-11.69	-9.47	3.01	0.17	-6.29	17.49	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-3 Band:**

   Directional gain = 15.5dBi + 10log(2) = 18.51dBi > 6dBi , so the power density limit shall be reduced to 30-(18.51-6) = 17.49dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	-10.57	-8.35	3.01	0.17	-5.17	17.49	PASS
	157	5785	-11.38	-9.16	3.01	0.17	-5.98	17.49	PASS
	165	5825	-12.89	-10.67	3.01	0.17	-7.49	17.49	PASS
1	149	5745	-10.50	-8.28	3.01	0.17	-5.10	17.49	PASS
	157	5785	-11.07	-8.85	3.01	0.17	-5.67	17.49	PASS
	165	5825	-12.50	-10.28	3.01	0.17	-7.10	17.49	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-3 Band:**

   Directional gain = 15.5dBi + 10log(2) = 18.51dBi > 6dBi , so the power density limit shall be reduced to 30-(18.51-6) = 17.49dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	-17.82	-15.60	3.01	0.28	-12.31	17.49	PASS
	159	5795	-16.89	-14.67	3.01	0.28	-11.38	17.49	PASS
1	151	5755	-17.48	-15.26	3.01	0.28	-11.97	17.49	PASS
	159	5795	-16.75	-14.53	3.01	0.28	-11.24	17.49	PASS

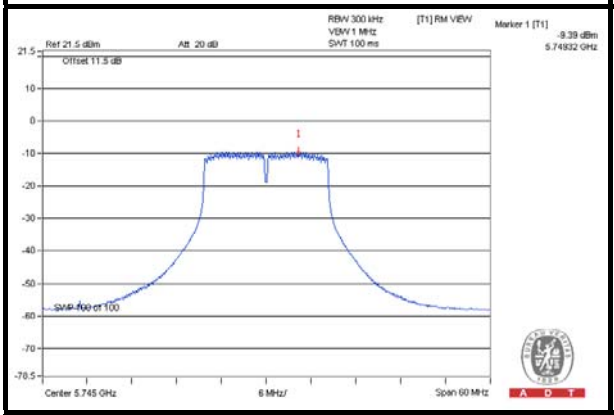
NOTE:

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-3 Band:**

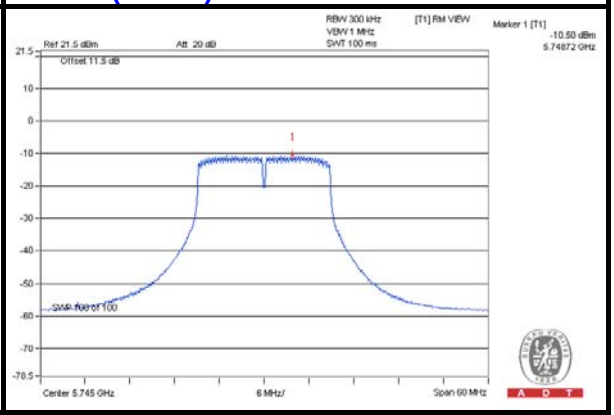
   Directional gain = 15.5dBi + 10log(2) = 18.51dBi > 6dBi , so the power density limit shall be reduced to 30-(18.51-6) = 17.49dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

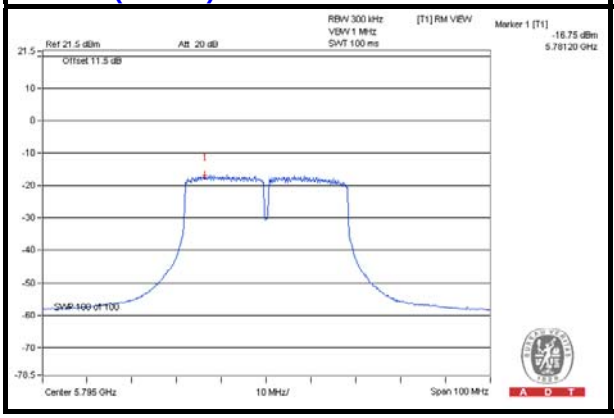
802.11a



802.11n (20MHz)



802.11n (40MHz)

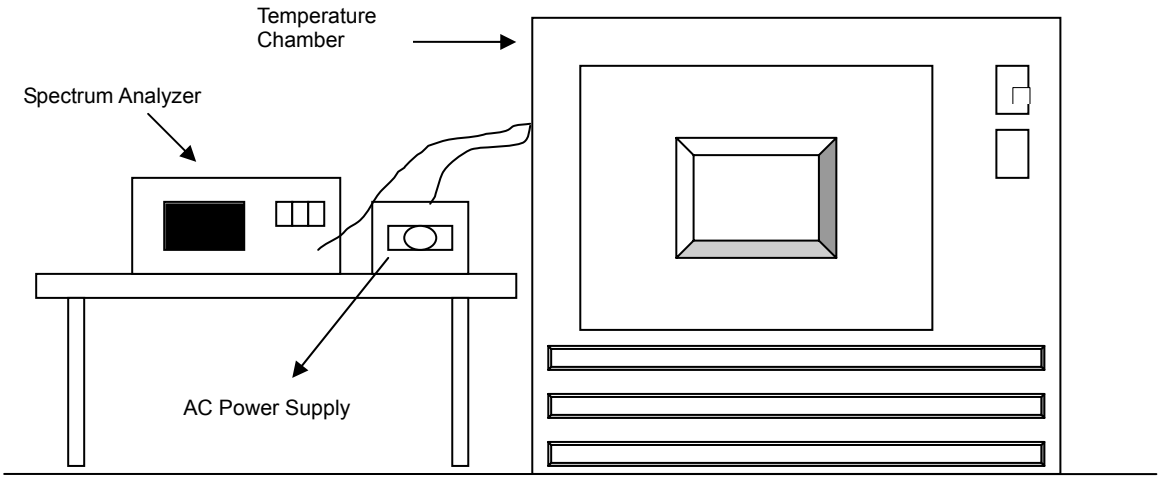


4.5 FREQUENCY STABILITY

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

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (℃)	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	5240.0139	0.00027	5240.0162	0.00031	5240.0161	0.00031	5240.0156	0.00030
40	120	5239.9900	-0.00019	5239.9895	-0.00020	5239.9856	-0.00027	5239.9868	-0.00025
30	120	5240.0162	0.00031	5240.0192	0.00037	5240.0166	0.00032	5240.0167	0.00032
20	120	5240.0175	0.00033	5240.0171	0.00033	5240.0215	0.00041	5240.0217	0.00041
10	120	5240.0238	0.00045	5240.0222	0.00042	5240.0209	0.00040	5240.0204	0.00039
0	120	5240.0173	0.00033	5240.0153	0.00029	5240.0179	0.00034	5240.0143	0.00027
-10	120	5239.9756	-0.00047	5239.9748	-0.00048	5239.9751	-0.00048	5239.9759	-0.00046
-20	120	5240.0103	0.00020	5240.0101	0.00019	5240.0122	0.00023	5240.0087	0.00017
-30	120	5239.9964	-0.00007	5239.9988	-0.00002	5239.9959	-0.00008	5239.9956	-0.00008

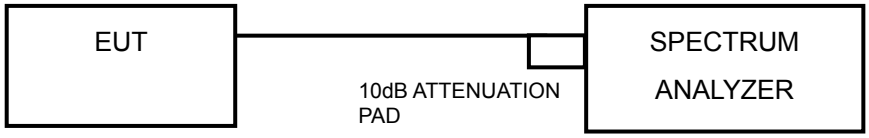
FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5240.0177	0.00034	5240.018	0.00034	5240.0205	0.00039	5240.0212	0.00040
	120	5240.0175	0.00033	5240.0171	0.00033	5240.0215	0.00041	5240.0217	0.00041
	102	5240.0175	0.00033	5240.018	0.00034	5240.0216	0.00041	5240.0227	0.00043

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

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

4.6.5 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

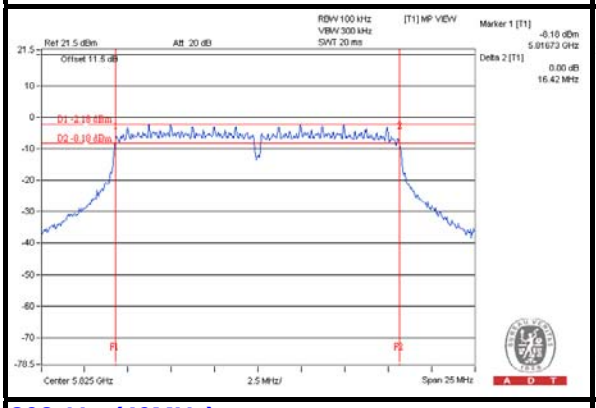
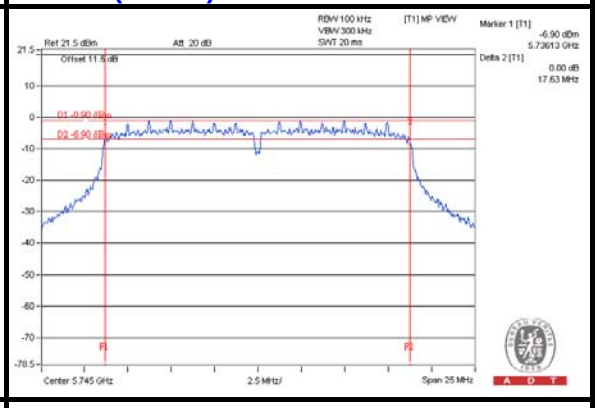
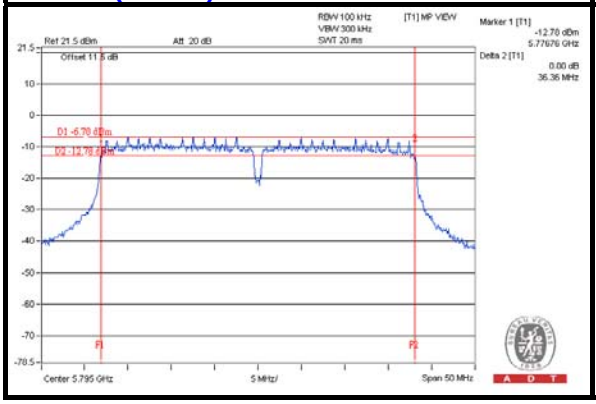
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.41	16.41	0.5	PASS
157	5785	16.39	16.41	0.5	PASS
165	5825	16.39	16.42	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.62	17.63	0.5	PASS
157	5785	17.62	17.60	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	36.33	36.35	0.5	PASS
159	5795	35.94	36.36	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	
	

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---