FCC Test Report

Report No.:	RF130322C25D
FCC ID:	A8J-ECB600
Test Model:	ECB600
Received Date:	Jul. 13, 2015
Test Date:	Jul. 17 ~ Jul. 31, 2015
Issued Date:	Aug. 06, 2015
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.
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Release Control Record

Issue No.	Description	Date Issued
RF130322C25D	Original release	Aug. 06, 2015

1 Certificate of Conformity

Product:	Wireless-N 300+300Mbps Dual Band Concurrent AP/CB
Brand:	EnGenius
Test Model:	ECB600
Sample Status:	Engineering sample
Applicant:	EnGenius Technologies
Test Date:	Jul. 17 ~ Jul. 31, 2015
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

The above equipment 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. 06, 2015

Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Aug. 06, 2015

Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emissions	NA	Refer to original report
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.6dB at 5456.00MHz.
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 IPEX 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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports0	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless-N 300+300Mbps Dual Band Concurrent AP/CB
Brand	EnGenius
Test Model	ECB600
Status of EUT	Engineering sample
Power Supply Rating	12Vdc (Adapter) 48Vdc (POE)
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
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 300Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)
Output Power	5180 ~ 5240MHz: 170.563mW 5745 ~ 5825MHz: 155.899mW
Antenna Type	Dipole antenna with 5dBi gain
Antenna Connector	IPEX
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

1. This is a supplementary report of RF130322C25-1. This report shall be combined together with its original report.
2. This report is prepared for FCC class II permissive change. The difference compared with the original report is updating FCC KDB to new rule. Therefore, all test items had been an addendum test to this report except conducted emission.
3. 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 (HT20)	2TX
802.11n (HT40)	2TX

4. The EUT uses following adapter and POE. (POE is for support unit only)

Adapter	
Brand	Powertron Electronics Corp.
Model	PA1024-2HUB / PA1024-120HUB200
Input	100-240Vac, 50-60Hz, 0.6A
Output	12Vdc, 2.0A, 24.0W
Power Line	1.5m non-shielded cable with one core

POE	
Brand	PD-6083G300
Model	100-250Vac, 50/60Hz, 0.5A
Output	48Vdc, 0.35A

3.2 Description of Test Modes

For 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

For 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40):

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	APCM	
A	√	√	√	Powered by adapter
B	-	√	-	Powered by POE

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane.**
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (HT40)		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)
A, B	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0

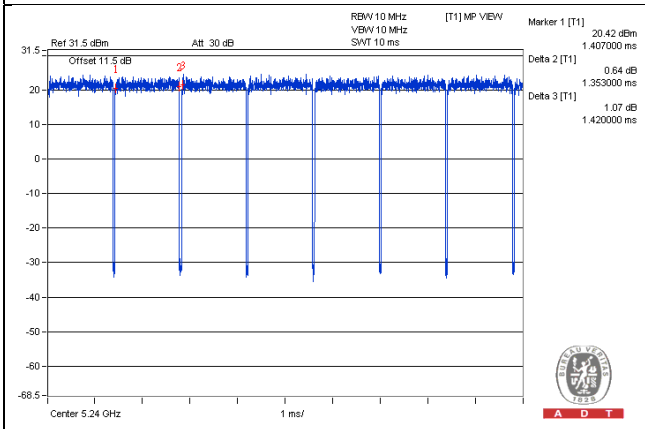
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	18deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
RE<1G	18deg. C, 70%RH	120Vac, 60Hz 48Vdc	Nick Hsu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Hsu

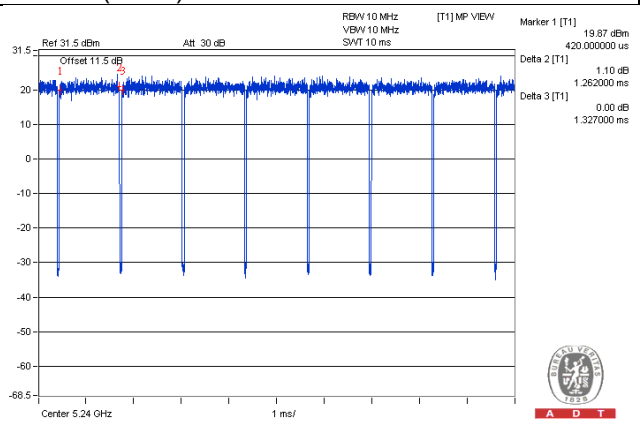
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor is required.
802.11a: Duty cycle = 1.353/1.420 = 0.953, Duty factor = 10 * log(1/0.953) = 0.21
802.11n (HT20): Duty cycle = 1.262/1.327 = 0.951, Duty factor = 10 * log(1/0.951) = 0.22
802.11n (HT40): Duty cycle = 0.627/0.677 = 0.926, Duty factor = 10 * log(1/0.926) = 0.33

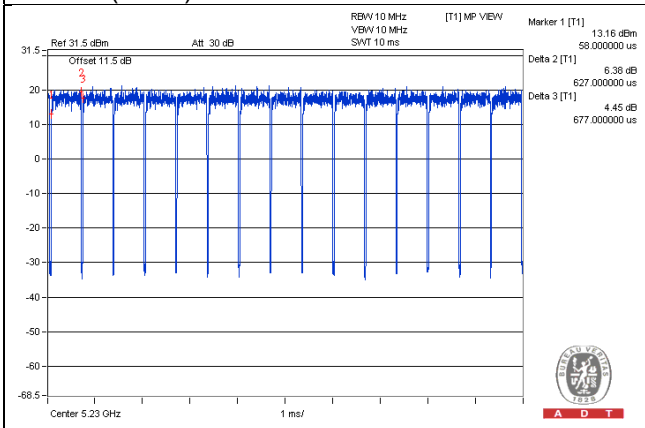
802.11a



802.11n (HT20)



802.11n (HT40)



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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	D531	CN-0XM006-48643-81U-2973	QDS-BRCM1020	-
B.	POE	NA	PD-6083G300	NA	NA	For test mode B only Provided by Manufacturer

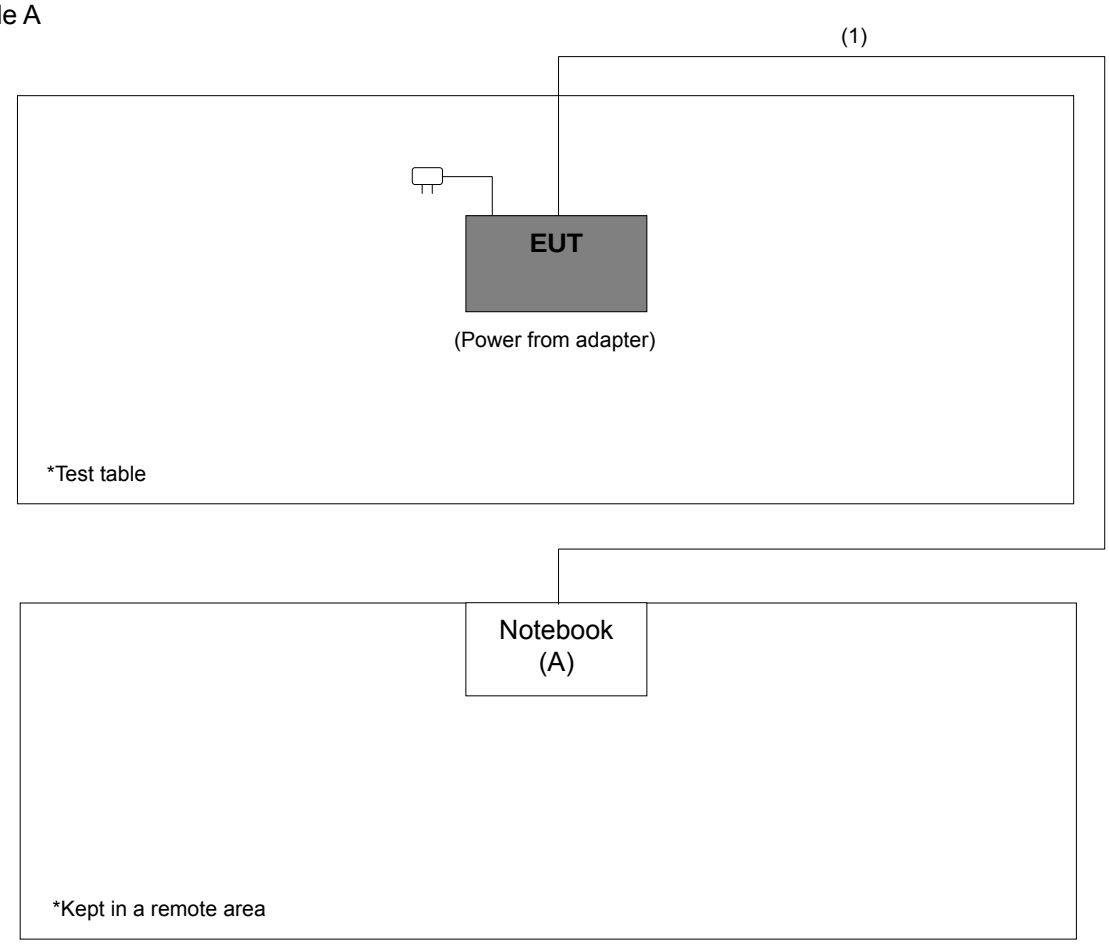
Note:

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

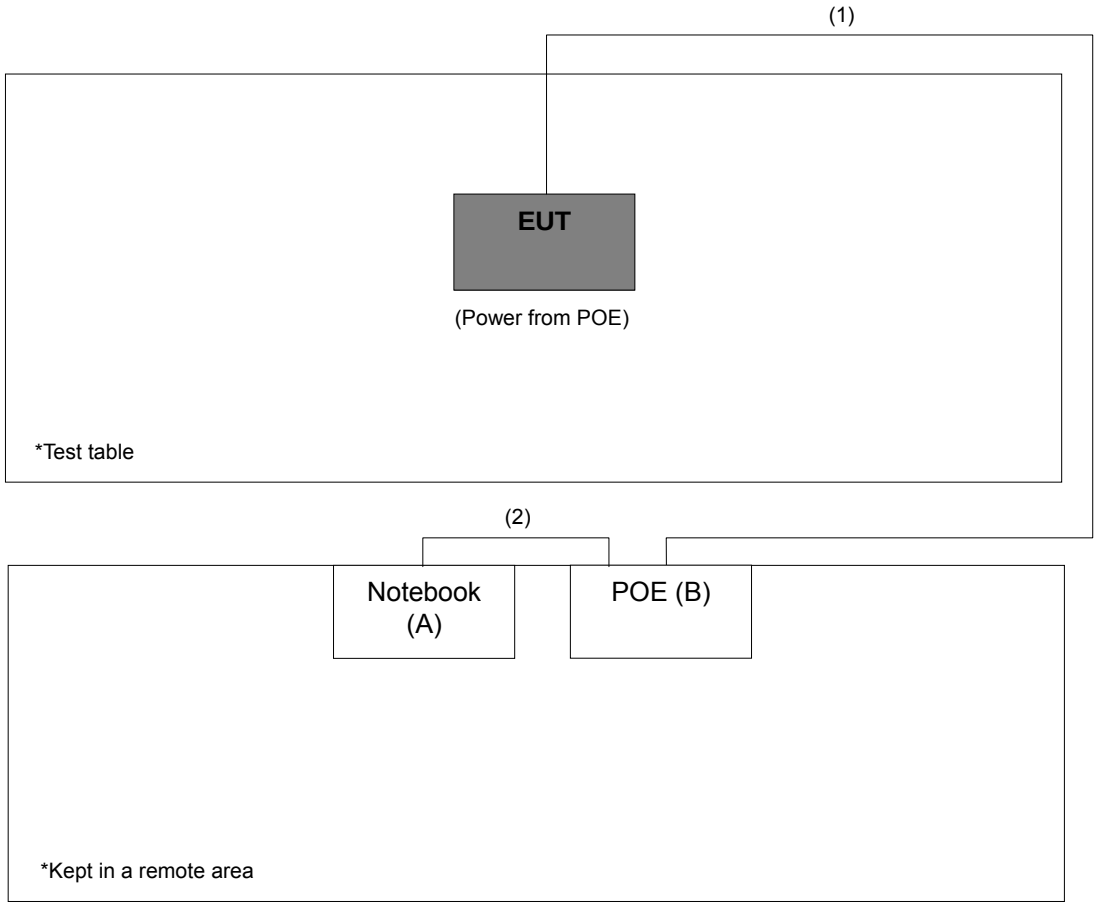
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 , Cat5e	1	3	N	0	-
2.	RJ45 , Cat5e	1	1.8	N	0	For test mode B only

3.4.1 Configuration of System under Test

Test mode A



Test mode B



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)
789033 D02 General UNII Test Procedures New Rules v01
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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.

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).

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Apr. 10, 2015	Apr. 09, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Aug. 29, 2014	Aug. 28, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	9120D	209	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8447D	2944A10738	Oct.18, 2014	Oct. 17, 2015
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214378/4	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6 +309224/4	Aug. 22, 2014	Aug. 21, 2015
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 BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
High Speed Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
			Jul. 26, 2015	Jul. 25, 2016
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015
			Jul. 26, 2015	Jul. 25, 2016
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 09, 2014	Jun. 08, 2015
			Jun. 09, 2015	Jun. 08, 2016

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.

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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 height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

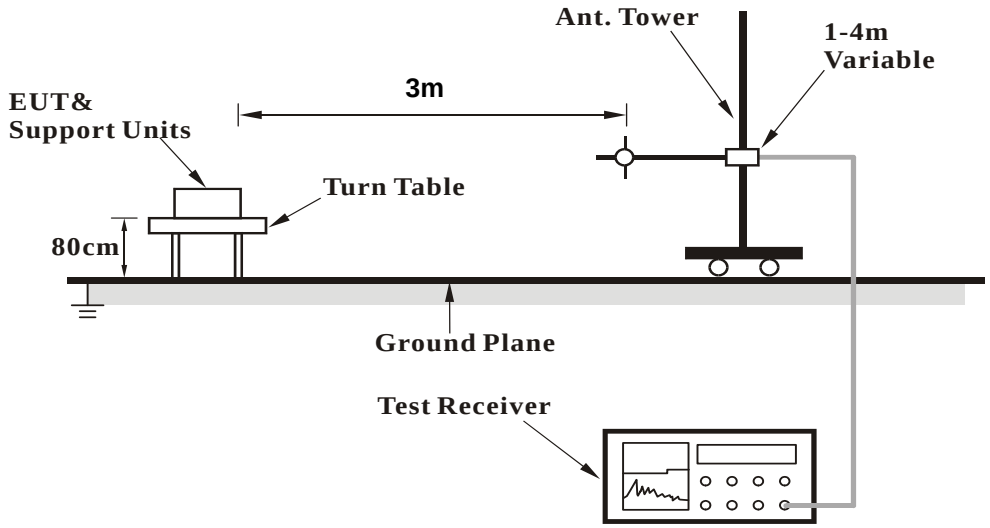
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

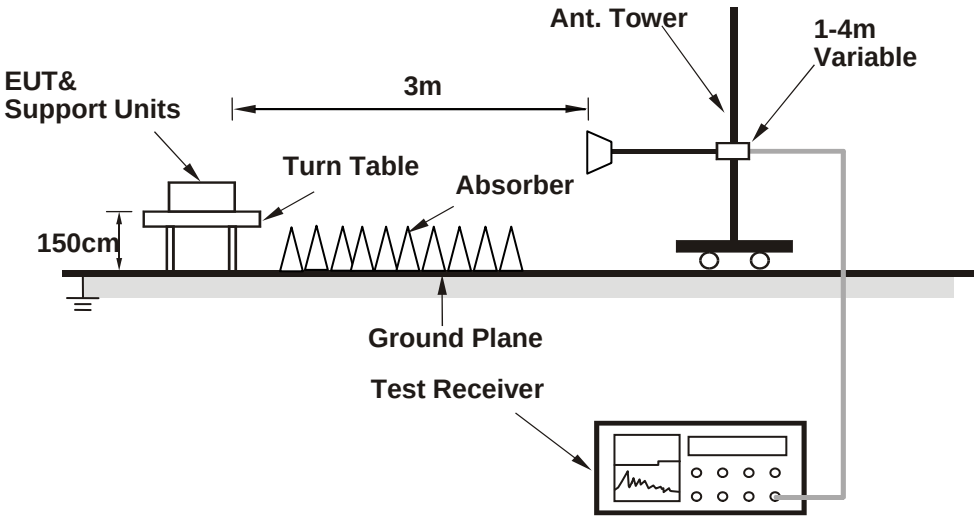
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz Data

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	55.7 PK	74.0	-18.3	1.00 H	335	49.70	6.00
2	5150.00	44.2 AV	54.0	-9.8	1.00 H	335	38.20	6.00
3	*5180.00	105.4 PK			1.21 H	14	65.90	39.50
4	*5180.00	95.6 AV			1.21 H	14	56.10	39.50
5	5455.00	57.1 PK	74.0	-16.9	1.61 H	182	50.70	6.40
6	5455.00	44.9 AV	54.0	-9.1	1.61 H	182	38.50	6.40
7	#10360.00	59.7 PK	74.0	-14.3	1.57 H	286	41.30	18.40
8	#10360.00	47.4 AV	54.0	-6.6	1.57 H	286	29.00	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	69.1 PK	74.0	-4.9	1.98 V	226	63.10	6.00
2	5150.00	50.6 AV	54.0	-3.4	1.98 V	226	44.60	6.00
3	*5180.00	117.6 PK			2.04 V	121	78.10	39.50
4	*5180.00	108.1 AV			2.04 V	121	68.60	39.50
5	5455.00	63.2 PK	74.0	-10.8	2.21 V	348	56.80	6.40
6	5455.00	52.3 AV	54.0	-1.7	2.21 V	348	45.90	6.40
7	#10360.00	61.4 PK	74.0	-12.6	2.30 V	45	43.00	18.40
8	#10360.00	48.9 AV	54.0	-5.1	2.30 V	45	30.50	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 40	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	5120.00	56.9 PK	74.0	-17.1	1.46 H	327	50.90	6.00
2	5120.00	45.1 AV	54.0	-8.9	1.46 H	327	39.10	6.00
3	*5200.00	107.0 PK			1.39 H	11	67.40	39.60
4	*5200.00	96.8 AV			1.39 H	11	57.20	39.60
5	5456.00	58.7 PK	74.0	-15.3	1.47 H	304	52.30	6.40
6	5456.00	46.1 AV	54.0	-7.9	1.47 H	304	39.70	6.40
7	#10400.00	59.8 PK	74.0	-14.2	1.73 H	310	41.30	18.50
8	#10400.00	47.3 AV	54.0	-6.7	1.73 H	310	28.80	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5120.00	63.3 PK	74.0	-10.7	2.16 V	306	57.30	6.00
2	5120.00	51.5 AV	54.0	-2.5	2.16 V	306	45.50	6.00
3	*5200.00	119.3 PK			2.07 V	217	79.70	39.60
4	*5200.00	109.6 AV			2.07 V	217	70.00	39.60
5	5456.00	64.3 PK	74.0	-9.7	1.78 V	131	57.90	6.40
6	**5456.00**	**53.4 AV**	**54.0**	**-0.6**	**1.78 V**	**131**	**47.00**	**6.40**
7	#10400.00	62.0 PK	74.0	-12.0	2.18 V	41	43.50	18.50
8	#10400.00	49.1 AV	54.0	-4.9	2.18 V	41	30.60	18.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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) 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	*5240.00	104.4 PK			1.62 H	310	64.80	39.60
2	*5240.00	94.7 AV			1.62 H	310	55.10	39.60
3	5400.00	57.6 PK	74.0	-16.4	1.34 H	267	51.30	6.30
4	5400.00	44.9 AV	54.0	-9.1	1.34 H	267	38.60	6.30
5	#10480.00	60.2 PK	74.0	-13.8	1.58 H	312	41.20	19.00
6	#10480.00	47.5 AV	54.0	-6.5	1.58 H	312	28.50	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	119.0 PK			2.02 V	304	79.40	39.60
2	*5240.00	109.0 AV			2.02 V	304	69.40	39.60
3	5400.00	63.2 PK	74.0	-10.8	2.10 V	113	56.90	6.30
4	5400.00	52.2 AV	54.0	-1.8	2.10 V	113	45.90	6.30
5	#10480.00	61.7 PK	74.0	-12.3	2.01 V	340	42.70	19.00
6	#10480.00	49.1 AV	54.0	-4.9	2.01 V	340	30.10	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.

CHANNEL	TX Channel 149	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	#5714.90	58.2 PK	74.0	-15.8	2.45 H	226	51.40	6.80
2	#5714.90	45.4 AV	54.0	-8.6	2.45 H	226	38.60	6.80
3	#5722.90	64.0 PK	78.2	-14.2	2.04 H	230	57.20	6.80
4	#5725.00	52.3 PK	78.2	-25.9	2.10 H	212	45.50	6.80
5	*5745.00	104.6 PK			1.54 H	318	64.20	40.40
6	*5745.00	95.8 AV			1.54 H	318	55.40	40.40
7	11490.00	60.1 PK	74.0	-13.9	2.61 H	0	41.70	18.40
8	11490.00	47.6 AV	54.0	-6.4	2.61 H	0	29.20	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	#5714.90	68.9 PK	74.0	-5.1	2.32 V	345	62.10	6.80
2	#5714.90	51.0 AV	54.0	-3.0	2.32 V	345	44.20	6.80
3	#5722.90	76.6 PK	78.2	-1.6	2.32 V	337	69.80	6.80
4	#5725.00	64.1 PK	78.2	-14.1	2.17 V	351	57.30	6.80
5	*5745.00	115.8 PK			2.32 V	26	75.40	40.40
6	*5745.00	106.1 AV			2.32 V	26	65.70	40.40
7	11490.00	61.4 PK	74.0	-12.6	2.30 V	0	43.00	18.40
8	11490.00	48.8 AV	54.0	-5.2	2.30 V	0	30.40	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 157	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	5360.00	56.5 PK	74.0	-17.5	1.80 H	55	50.40	6.10
2	5360.00	44.2 AV	54.0	-9.8	1.80 H	55	38.10	6.10
3	*5785.00	106.0 PK			2.35 H	22	65.50	40.50
4	*5785.00	95.9 AV			2.35 H	22	55.40	40.50
5	11570.00	59.5 PK	74.0	-14.5	2.11 H	349	41.10	18.40
6	11570.00	48.0 AV	54.0	-6.0	2.11 H	349	29.60	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	5360.00	62.1 PK	74.0	-11.9	2.09 V	206	56.00	6.10
2	5360.00	52.4 AV	54.0	-1.6	2.09 V	206	46.30	6.10
3	*5785.00	116.0 PK			1.94 V	133	75.50	40.50
4	*5785.00	106.7 AV			1.94 V	133	66.20	40.50
5	11570.00	62.3 PK	74.0	-11.7	2.09 V	20	43.90	18.40
6	11570.00	49.9 AV	54.0	-4.1	2.09 V	20	31.50	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.

CHANNEL	TX Channel 165	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	5360.00	56.5 PK	74.0	-17.5	1.92 H	46	50.40	6.10
2	5360.00	44.4 AV	54.0	-9.6	1.92 H	46	38.30	6.10
3	*5825.00	106.4 PK			2.23 H	21	65.90	40.50
4	*5825.00	96.6 AV			2.23 H	21	56.10	40.50
5	#5850.00	47.7 PK	78.2	-30.5	2.28 H	24	40.80	6.90
6	#5852.10	63.5 PK	78.2	-14.7	2.27 H	22	56.50	7.00
7	#5860.10	61.7 PK	74.0	-12.3	2.29 H	24	54.70	7.00
8	#5860.10	45.4 AV	54.0	-8.6	2.29 H	24	38.40	7.00
9	11650.00	60.4 PK	74.0	-13.6	2.18 H	338	41.50	18.90
10	11650.00	48.5 AV	54.0	-5.5	2.18 H	338	29.60	18.90
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	5360.00	62.6 PK	74.0	-11.4	2.11 V	315	56.50	6.10
2	5360.00	52.5 AV	54.0	-1.5	2.11 V	315	46.40	6.10
3	*5825.00	115.5 PK			1.89 V	305	75.00	40.50
4	*5825.00	106.1 AV			1.89 V	305	65.60	40.50
5	#5850.00	55.0 PK	78.2	-23.2	2.30 V	351	48.10	6.90
6	#5852.10	74.1 PK	78.2	-4.1	1.78 V	306	67.10	7.00
7	#5860.10	69.3 PK	74.0	-4.7	1.85 V	306	62.30	7.00
8	#5860.10	47.9 AV	54.0	-6.1	1.85 V	306	40.90	7.00
9	11650.00	62.1 PK	74.0	-11.9	2.07 V	20	43.20	18.90
10	11650.00	50.5 AV	54.0	-3.5	2.07 V	20	31.60	18.90

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 (HT20)

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	56.7 PK	74.0	-17.3	1.30 H	45	50.70	6.00
2	5150.00	43.9 AV	54.0	-10.1	1.30 H	45	37.90	6.00
3	*5180.00	105.1 PK			1.35 H	17	65.60	39.50
4	*5180.00	95.0 AV			1.35 H	17	55.50	39.50
5	5400.00	57.2 PK	74.0	-16.8	1.43 H	59	50.90	6.30
6	5400.00	44.7 AV	54.0	-9.3	1.43 H	59	38.40	6.30
7	#10360.00	60.4 PK	74.0	-13.6	1.66 H	318	42.00	18.40
8	#10360.00	47.4 AV	54.0	-6.6	1.66 H	318	29.00	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	70.8 PK	74.0	-3.2	2.09 V	220	64.80	6.00
2	5150.00	51.6 AV	54.0	-2.4	2.09 V	220	45.60	6.00
3	*5180.00	117.4 PK			2.07 V	21	77.90	39.50
4	*5180.00	107.2 AV			2.07 V	21	67.70	39.50
5	5400.00	62.6 PK	74.0	-11.4	2.01 V	316	56.30	6.30
6	5400.00	52.4 AV	54.0	-1.6	2.01 V	316	46.10	6.30
7	#10360.00	60.0 PK	74.0	-14.0	2.07 V	340	41.60	18.40
8	#10360.00	47.8 AV	54.0	-6.2	2.07 V	340	29.40	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 40	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	5128.00	56.8 PK	74.0	-17.2	1.39 H	86	50.80	6.00
2	5128.00	44.7 AV	54.0	-9.3	1.39 H	86	38.70	6.00
3	*5200.00	105.2 PK			2.17 H	200	65.60	39.60
4	*5200.00	95.3 AV			2.17 H	200	55.70	39.60
5	5456.00	58.8 PK	74.0	-15.2	1.21 H	53	52.40	6.40
6	5456.00	45.7 AV	54.0	-8.3	1.21 H	53	39.30	6.40
7	#10400.00	60.1 PK	74.0	-13.9	1.38 H	350	41.60	18.50
8	#10400.00	47.3 AV	54.0	-6.7	1.38 H	350	28.80	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5125.00	61.1 PK	74.0	-12.9	2.19 V	331	55.10	6.00
2	5125.00	49.2 AV	54.0	-4.8	2.19 V	331	43.20	6.00
3	*5200.00	117.9 PK			2.30 V	12	78.30	39.60
4	*5200.00	108.8 AV			2.30 V	12	69.20	39.60
5	5456.00	62.7 PK	74.0	-11.3	2.14 V	346	56.30	6.40
6	5456.00	53.3 AV	54.0	-0.7	2.14 V	346	46.90	6.40
7	#10400.00	60.7 PK	74.0	-13.3	1.92 V	48	42.20	18.50
8	#10400.00	48.5 AV	54.0	-5.5	1.92 V	48	30.00	18.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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) 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	*5240.00	104.2 PK			1.61 H	308	64.60	39.60
2	*5240.00	94.5 AV			1.61 H	308	54.90	39.60
3	5400.00	57.2 PK	74.0	-16.8	1.44 H	274	50.90	6.30
4	5400.00	44.8 AV	54.0	-9.2	1.44 H	274	38.50	6.30
5	#10480.00	59.3 PK	74.0	-14.7	1.77 H	15	40.30	19.00
6	#10480.00	47.5 AV	54.0	-6.5	1.77 H	15	28.50	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	117.8 PK			2.02 V	234	78.20	39.60
2	*5240.00	108.1 AV			2.02 V	234	68.50	39.60
3	5400.00	62.6 PK	74.0	-11.4	2.02 V	315	56.30	6.30
4	5400.00	52.9 AV	54.0	-1.1	2.02 V	315	46.60	6.30
5	#10480.00	60.1 PK	74.0	-13.9	2.01 V	340	41.10	19.00
6	#10480.00	48.1 AV	54.0	-5.9	2.01 V	340	29.10	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.

CHANNEL	TX Channel 149	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	#5714.90	57.7 PK	74.0	-16.3	2.03 H	326	50.90	6.80
2	#5714.90	45.0 AV	54.0	-9.0	2.03 H	326	38.20	6.80
3	#5722.90	68.6 PK	78.2	-9.6	1.75 H	329	61.80	6.80
4	#5725.00	54.5 PK	78.2	-23.7	1.77 H	328	47.70	6.80
5	*5745.00	105.1 PK			1.95 H	332	64.70	40.40
6	*5745.00	95.0 AV			1.95 H	332	54.60	40.40
7	11490.00	59.7 PK	74.0	-14.3	1.93 H	328	41.30	18.40
8	11490.00	47.4 AV	54.0	-6.6	1.93 H	328	29.00	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	#5714.90	68.7 PK	74.0	-5.3	2.30 V	311	61.90	6.80
2	#5714.90	51.5 AV	54.0	-2.5	2.30 V	311	44.70	6.80
3	#5722.90	77.2 PK	78.2	-1.0	2.11 V	252	70.40	6.80
4	#5725.00	63.6 PK	78.2	-14.6	2.31 V	331	56.80	6.80
5	*5745.00	115.8 PK			2.23 V	23	75.40	40.40
6	*5745.00	105.9 AV			2.23 V	23	65.50	40.40
7	11490.00	61.5 PK	74.0	-12.5	2.22 V	348	43.10	18.40
8	11490.00	49.3 AV	54.0	-4.7	2.22 V	348	30.90	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 157	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	5360.00	56.8 PK	74.0	-17.2	1.60 H	292	50.70	6.10
2	5360.00	44.7 AV	54.0	-9.3	1.60 H	292	38.60	6.10
3	*5785.00	106.4 PK			1.39 H	320	65.90	40.50
4	*5785.00	96.2 AV			1.39 H	320	55.70	40.50
5	11570.00	61.0 PK	74.0	-13.0	2.07 H	331	42.60	18.40
6	11570.00	48.0 AV	54.0	-6.0	2.07 H	331	29.60	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	5360.00	61.9 PK	74.0	-12.1	2.15 V	320	55.80	6.10
2	5360.00	52.7 AV	54.0	-1.3	2.15 V	320	46.60	6.10
3	*5785.00	115.8 PK			2.24 V	25	75.30	40.50
4	*5785.00	105.9 AV			2.24 V	25	65.40	40.50
5	11570.00	61.8 PK	74.0	-12.2	2.24 V	1	43.40	18.40
6	11570.00	49.1 AV	54.0	-4.9	2.24 V	1	30.70	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 165	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	5400.00	57.3 PK	74.0	-16.7	1.26 H	293	51.00	6.30
2	5400.00	45.0 AV	54.0	-9.0	1.26 H	293	38.70	6.30
3	*5825.00	107.1 PK			1.46 H	319	66.60	40.50
4	*5825.00	97.0 AV			1.46 H	319	56.50	40.50
5	#5850.00	47.0 PK	78.2	-31.2	1.38 H	292	40.10	6.90
6	#5852.10	65.8 PK	78.2	-12.4	2.15 H	311	58.80	7.00
7	#5860.10	58.1 PK	74.0	-15.9	1.60 H	312	51.10	7.00
8	#5860.10	45.4 AV	54.0	-8.6	1.60 H	312	38.40	7.00
9	11650.00	59.5 PK	74.0	-14.5	2.08 H	0	40.60	18.90
10	11650.00	47.7 AV	54.0	-6.3	2.08 H	0	28.80	18.90
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	5400.00	62.7 PK	74.0	-11.3	2.07 V	313	56.40	6.30
2	5400.00	52.2 AV	54.0	-1.8	2.07 V	313	45.90	6.30
3	*5825.00	115.6 PK			1.87 V	222	75.10	40.50
4	*5825.00	106.0 AV			1.87 V	222	65.50	40.50
5	#5850.00	57.2 PK	78.2	-21.0	1.76 V	299	50.30	6.90
6	#5852.10	73.4 PK	78.2	-4.8	1.78 V	310	66.40	7.00
7	#5860.10	71.5 PK	74.0	-2.5	1.84 V	303	64.50	7.00
8	#5860.10	47.7 AV	54.0	-6.3	1.84 V	303	40.70	7.00
9	11650.00	61.0 PK	74.0	-13.0	2.04 V	350	42.10	18.90
10	11650.00	49.3 AV	54.0	-4.7	2.04 V	350	30.40	18.90

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 (HT40)

CHANNEL	TX Channel 38	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	56.2 PK	74.0	-17.8	1.48 H	54	50.20	6.00
2	5150.00	44.8 AV	54.0	-9.2	1.48 H	54	38.80	6.00
3	*5190.00	93.9 PK			1.27 H	17	54.40	39.50
4	*5190.00	85.4 AV			1.27 H	17	45.90	39.50
5	#10380.00	60.1 PK	74.0	-13.9	1.40 H	164	41.60	18.50
6	#10380.00	48.0 AV	54.0	-6.0	1.40 H	164	29.50	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.1 PK	74.0	-8.9	1.93 V	299	59.10	6.00
2	5150.00	52.4 AV	54.0	-1.6	1.93 V	299	46.40	6.00
3	*5190.00	106.4 PK			2.06 V	285	66.90	39.50
4	*5190.00	97.2 AV			2.06 V	285	57.70	39.50
5	#10380.00	59.8 PK	74.0	-14.2	1.78 V	194	41.30	18.50
6	#10380.00	47.3 AV	54.0	-6.7	1.78 V	194	28.80	18.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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) 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	*5230.00	101.2 PK			1.62 H	308	61.60	39.60
2	*5230.00	91.4 PK			1.52 H	123	51.80	39.60
3	5456.00	56.0 AV	74.0	-18.0	1.62 H	308	49.60	6.40
4	5456.00	44.5 AV	54.0	-9.5	1.52 H	123	38.10	6.40
5	#10460.00	60.3 PK	74.0	-13.7	1.37 H	167	41.40	18.90
6	#10460.00	47.3 AV	54.0	-6.7	1.37 H	167	28.40	18.90
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	114.1 PK			2.16 V	332	74.50	39.60
2	*5230.00	105.0 AV			2.16 V	332	65.40	39.60
3	5456.00	63.3 PK	74.0	-10.7	2.22 V	349	56.90	6.40
4	5456.00	52.7 AV	54.0	-1.3	2.22 V	349	46.30	6.40
5	#10460.00	59.4 PK	74.0	-14.6	1.72 V	100	40.50	18.90
6	#10460.00	48.0 AV	54.0	-6.0	1.72 V	100	29.10	18.90

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 151	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	#5714.90	59.5 PK	74.0	-14.5	1.71 H	326	52.70	6.80
2	#5714.90	46.9 AV	54.0	-7.1	1.71 H	326	40.10	6.80
3	#5722.90	61.6 PK	78.2	-16.6	2.23 H	322	54.80	6.80
4	#5725.00	47.9 PK	78.2	-30.3	2.10 H	321	41.10	6.80
5	*5755.00	96.4 PK			1.72 H	330	55.90	40.50
6	*5755.00	86.6 AV			1.72 H	330	46.10	40.50
7	11510.00	59.1 PK	74.0	-14.9	1.96 H	308	40.80	18.30
8	11510.00	47.2 AV	54.0	-6.8	1.96 H	308	28.90	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	#5714.90	67.7 PK	74.0	-6.3	2.14 V	84	60.90	6.80
2	#5714.90	52.6 AV	54.0	-1.4	2.14 V	84	45.80	6.80
3	#5722.90	71.7 PK	78.2	-6.5	2.19 V	130	64.90	6.80
4	#5725.00	58.2 PK	78.2	-20.0	2.20 V	130	51.40	6.80
5	*5755.00	106.1 PK			2.30 V	24	65.60	40.50
6	*5755.00	97.1 AV			2.30 V	24	56.60	40.50
7	11510.00	59.0 PK	74.0	-15.0	1.50 V	121	40.70	18.30
8	11510.00	46.6 AV	54.0	-7.4	1.50 V	121	28.30	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 159	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	5456.00	56.9 PK	74.0	-17.1	1.69 H	289	50.50	6.40
2	5456.00	45.0 AV	54.0	-9.0	1.69 H	289	38.60	6.40
3	*5795.00	104.7 PK			1.70 H	326	64.20	40.50
4	*5795.00	95.6 AV			1.70 H	326	55.10	40.50
5	#5850.00	46.3 PK	78.2	-31.9	1.54 H	327	39.40	6.90
6	#5852.10	60.4 PK	78.2	-17.8	2.23 H	312	53.40	7.00
7	#5860.10	61.3 PK	74.0	-12.7	2.04 H	321	54.30	7.00
8	#5860.10	46.1 AV	54.0	-7.9	2.04 H	321	39.10	7.00
9	11590.00	59.7 PK	74.0	-14.3	1.69 H	341	41.20	18.50
10	11590.00	47.8 AV	54.0	-6.2	1.69 H	341	29.30	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5456.00	61.6 PK	74.0	-12.4	2.12 V	347	55.20	6.40
2	5456.00	52.2 AV	54.0	-1.8	2.12 V	347	45.80	6.40
3	*5795.00	113.2 PK			1.66 V	306	72.70	40.50
4	*5795.00	103.3 AV			1.66 V	306	62.80	40.50
5	#5850.00	52.0 PK	78.2	-26.2	2.08 V	226	45.10	6.90
6	#5852.10	68.6 PK	78.2	-9.6	1.66 V	215	61.60	7.00
7	#5860.10	69.1 PK	74.0	-4.9	1.78 V	203	62.10	7.00
8	#5860.10	49.5 AV	54.0	-4.5	1.78 V	203	42.50	7.00
9	11590.00	60.0 PK	74.0	-14.0	1.60 V	11	41.50	18.50
10	11590.00	47.8 AV	54.0	-6.2	1.60 V	11	29.30	18.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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 Data

802.11a

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

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	30.3 QP	40.0	-9.7	1.99 H	84	45.10	-14.80
2	101.84	31.7 QP	43.5	-11.8	1.99 H	67	50.60	-18.90
3	156.28	35.9 QP	43.5	-7.6	1.50 H	101	49.90	-14.00
4	282.66	39.0 QP	46.0	-7.0	1.00 H	112	51.90	-12.90
5	500.42	35.2 QP	46.0	-10.8	1.50 H	202	43.50	-8.30
6	683.18	35.4 QP	46.0	-10.6	1.00 H	188	40.10	-4.70
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	39.66	38.1 QP	40.0	-1.9	1.00 V	13	53.30	-15.20
2	49.34	36.2 QP	40.0	-3.8	1.00 V	7	50.80	-14.60
3	68.79	32.4 QP	40.0	-7.6	1.00 V	7	48.40	-16.00
4	267.10	38.4 QP	46.0	-7.6	1.49 V	345	52.00	-13.60
5	375.98	35.7 QP	46.0	-10.3	1.49 V	16	46.60	-10.90
6	500.42	39.4 QP	46.0	-6.6	1.00 V	7	47.70	-8.30

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

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

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	30.2 QP	40.0	-9.8	2.00 H	207	45.00	-14.80
2	179.61	32.1 QP	43.5	-11.4	1.49 H	239	47.20	-15.10
3	216.55	33.2 QP	46.0	-12.8	1.00 H	238	49.80	-16.60
4	278.77	34.6 QP	46.0	-11.4	1.00 H	89	47.60	-13.00
5	624.85	33.3 QP	46.0	-12.7	1.00 H	182	38.70	-5.40
6	729.84	42.5 QP	46.0	-3.5	1.49 H	306	46.10	-3.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	33.79	34.9 QP	40.0	-5.1	1.00 V	263	50.80	-15.90
2	68.79	29.3 QP	40.0	-10.7	1.00 V	261	45.30	-16.00
3	160.17	31.2 QP	43.5	-12.3	1.00 V	325	45.00	-13.80
4	265.16	38.7 QP	46.0	-7.3	1.51 V	334	52.50	-13.80
5	449.87	32.9 QP	46.0	-13.1	1.00 V	1	42.10	-9.20
6	729.84	43.3 QP	46.0	-2.7	2.00 V	133	46.90	-3.60

Remarks:

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

4.2 Transmit Power Measurment

4.2.1 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)

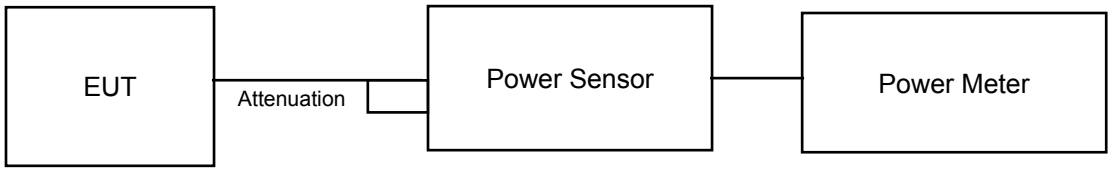
*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

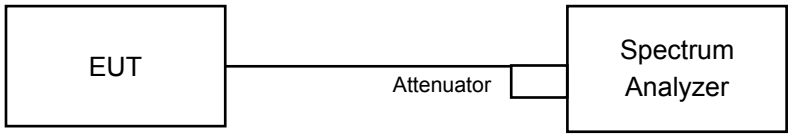
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.2.2 Test Setup

For Power Output Measurement



For 26dB and Occupied Bandwidth



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 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.

4.2.5 Deviation fromTest Standard

No deviation.

4.2.6 EUT Operating Conditions

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

4.2.7 Test Result

Power Output:

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.96	18.85	139.253	21.44	30	Pass
40	5200	18.34	20.10	**170.563**	22.32	30	Pass
48	5240	18.05	18.94	142.169	21.53	30	Pass
149	5745	18.44	19.07	150.547	21.78	30	Pass
157	5785	18.22	19.09	147.470	21.69	30	Pass
165	5825	18.35	19.06	148.929	21.73	30	Pass

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.35	18.14	119.488	20.77	30	Pass
40	5200	17.88	19.43	149.076	21.73	30	Pass
48	5240	17.51	18.55	127.978	21.07	30	Pass
149	5745	18.15	18.39	134.337	21.28	30	Pass
157	5785	18.75	19.08	**155.899**	21.93	30	Pass
165	5825	18.48	18.95	148.993	21.73	30	Pass

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	10.40	11.54	25.221	14.02	30	Pass
46	5230	16.40	17.42	98.860	19.95	30	Pass
151	5755	12.19	12.85	35.833	15.54	30	Pass
159	5795	18.25	19.11	148.304	21.71	30	Pass

26dB Bandwidth:

802.11a

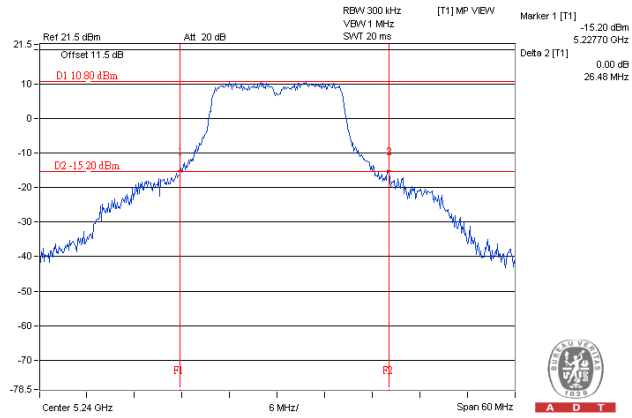
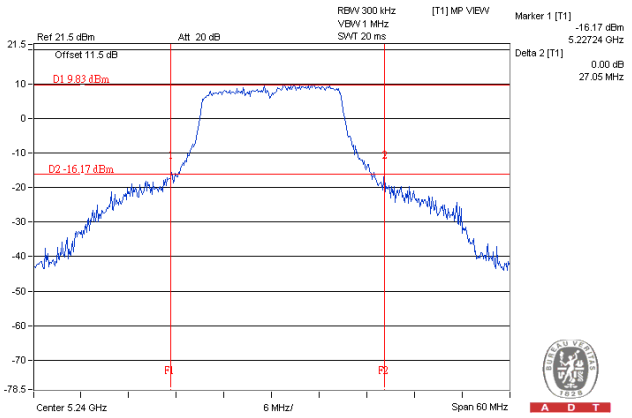
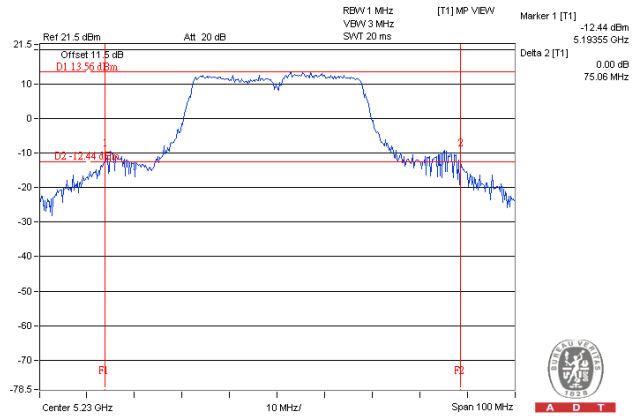
Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	23.47	24.39	Pass
40	5200	26.40	23.53	Pass
48	5240	26.48	24.21	Pass

802.11n (HT20)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	24.31	24.22	Pass
40	5200	26.37	24.60	Pass
48	5240	27.05	24.16	Pass

802.11n (HT40)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	51.21	50.00	Pass
46	5230	75.06	49.73	Pass

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

Occupied Bandwidth:

802.11a

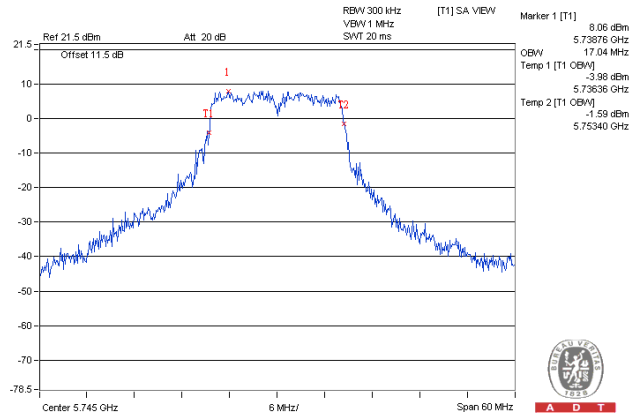
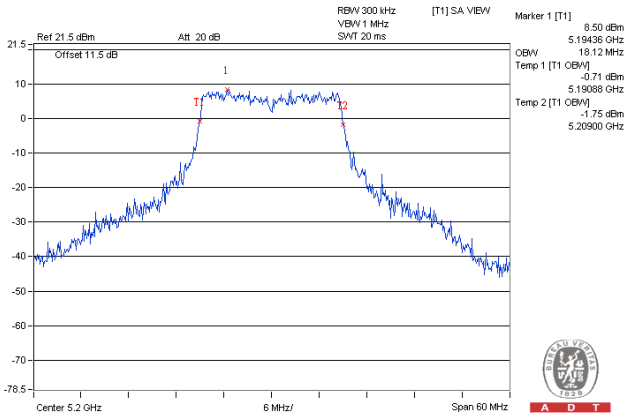
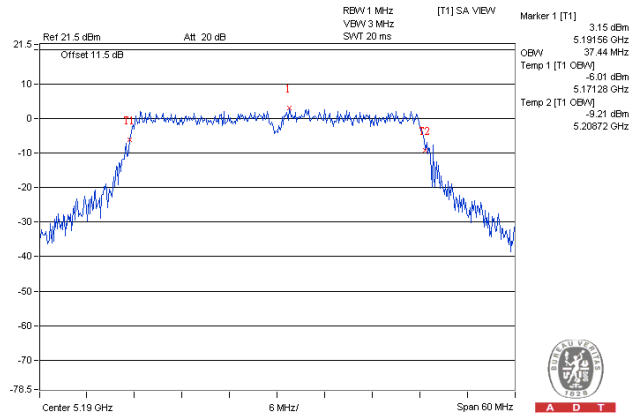
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.92	16.92
40	5200	16.92	16.80
48	5240	16.92	16.92
149	5745	17.04	16.80
157	5785	16.80	16.92
165	5825	16.80	16.68

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.00	18.12
40	5200	18.12	17.88
48	5240	18.00	17.88
149	5745	18.00	17.76
157	5785	18.00	17.88
165	5825	17.88	18.00

802.11n (HT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	37.44	37.20
46	5230	36.96	37.08
151	5755	37.08	36.84
159	5795	37.20	36.84

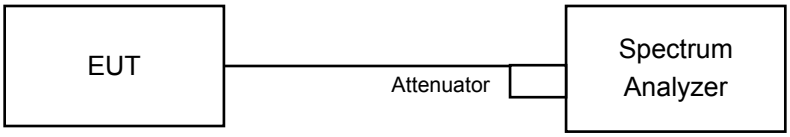
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

4.3 Peak Power Spectral Density Measurement

4.3.1 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/ 500kHz

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

For U-NII-1 band:

Using method SA-2

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.

b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS

c. Sweep time = auto, trigger set to “free run”.

d. Trace average at least 100 traces in power averaging mode.

e. Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.

b. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS

c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.

d. 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)

e. Sweep time = auto, trigger set to “free run”.

f. Trace average at least 100 traces in power averaging mode.

g. Record the max value and add 10 log (1/duty cycle)

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.3.6.

4.3.7 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	4.15	5.77	8.04	0.21	8.25	14.99	Pass
40	5200	5.68	6.98	9.39	0.21	9.60	14.99	Pass
48	5240	5.41	6.59	9.05	0.21	9.26	14.99	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi , so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

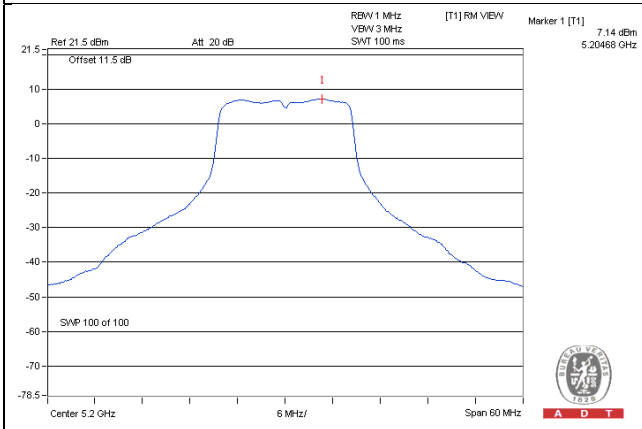
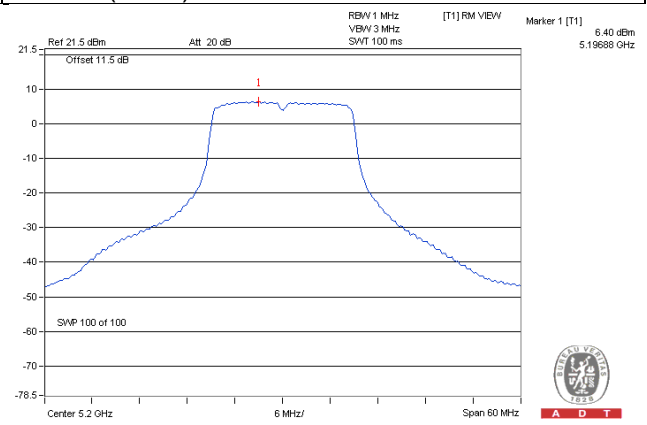
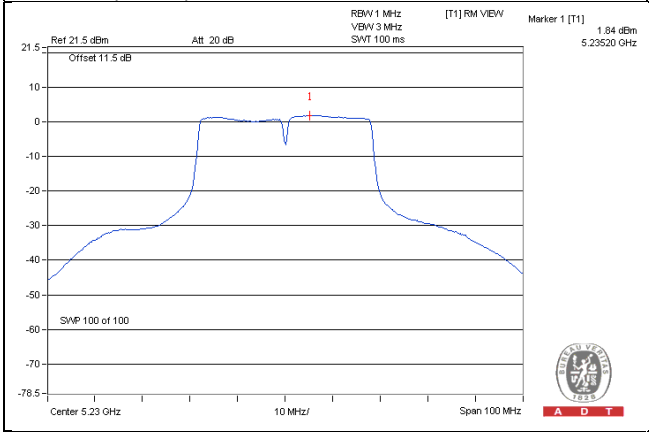
Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	2.92	4.62	6.86	0.22	7.08	14.99	Pass
40	5200	4.68	6.14	8.48	0.22	8.70	14.99	Pass
48	5240	5.07	4.91	8.00	0.22	8.22	14.99	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi , so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

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	-7.80	-5.27	-3.34	0.33	-3.01	14.99	Pass
46	5230	1.83	1.45	4.66	0.33	4.99	14.99	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi , so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 1 / CH 40	802.11n (HT20) / Chain 1 / CH 40
	
802.11n (HT40) / Chain 0 / CH 46	
	

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/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	149	5745	-2.73	-0.51	3.01	0.21	2.71	27.99	Pass
	157	5785	-3.63	-1.41	3.01	0.21	1.81	27.99	Pass
	165	5825	-3.80	-1.58	3.01	0.21	1.64	27.99	Pass
1	149	5745	-1.98	0.24	3.01	0.21	3.46	27.99	Pass
	157	5785	-2.48	-0.26	3.01	0.21	2.96	27.99	Pass
	165	5825	-2.72	-0.50	3.01	0.21	2.72	27.99	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi , so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Duty factor	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	149	5745	-3.62	-1.40	3.01	0.22	1.83	27.99	Pass
	157	5785	-3.35	-1.13	3.01	0.22	2.10	27.99	Pass
	165	5825	-3.72	-1.50	3.01	0.22	1.73	27.99	Pass
1	149	5745	-3.01	-0.79	3.01	0.22	2.44	27.99	Pass
	157	5785	-2.83	-0.61	3.01	0.22	2.62	27.99	Pass
	165	5825	-2.95	-0.73	3.01	0.22	2.50	27.99	Pass

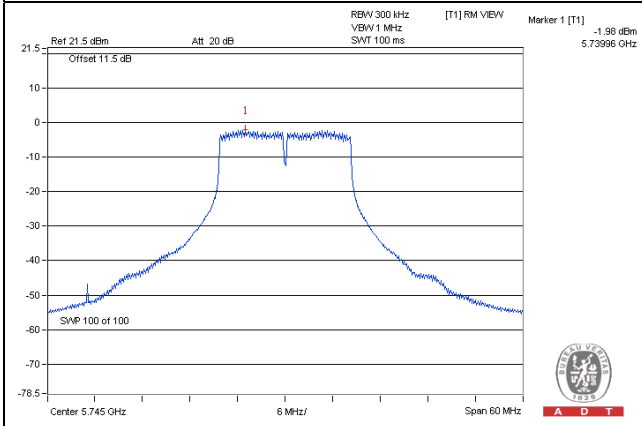
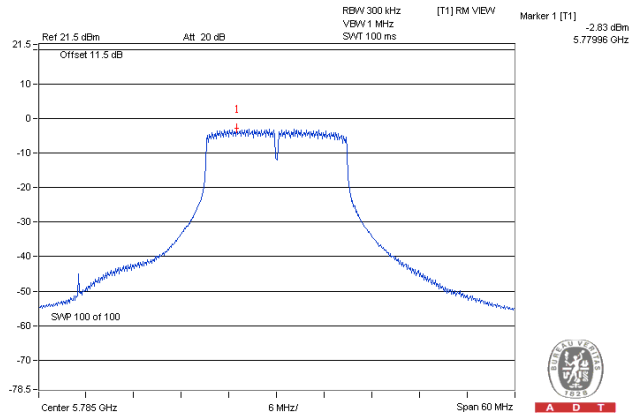
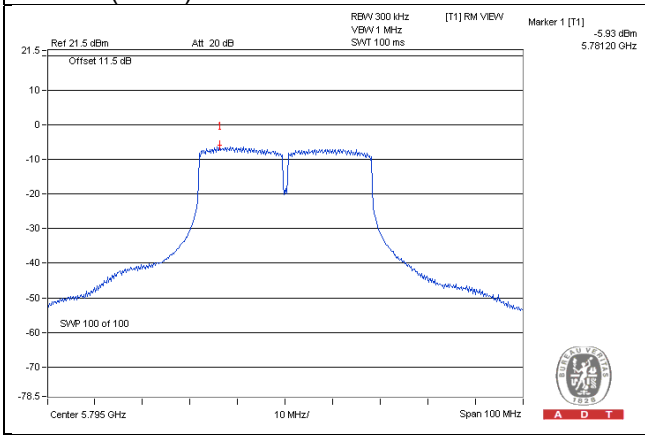
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi , so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Duty factor	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	151	5755	-13.17	-10.95	3.01	0.33	-7.61	27.99	Pass
	159	5795	-7.54	-5.32	3.01	0.33	-1.98	27.99	Pass
1	151	5755	-12.33	-10.11	3.01	0.33	-6.77	27.99	Pass
	159	5795	-5.93	-3.71	3.01	0.33	-0.37	27.99	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi , so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

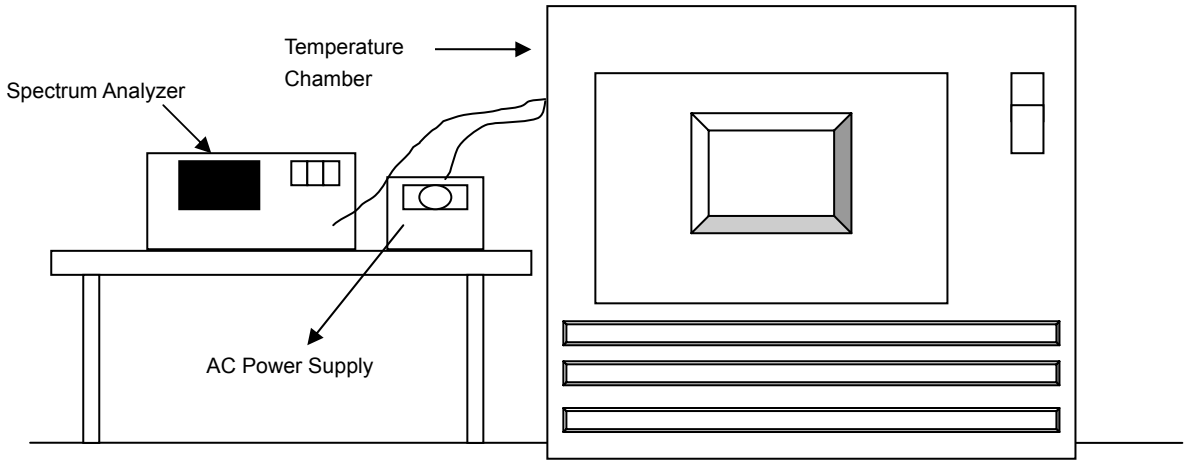
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

4.4 Frequency Stability

4.4.1 Limits of Frequency Stability Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test 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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

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

4.4.7 Test Results

Frequemcy Stability Versus Temp.									
Operating Frequency: 5180MHz									
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	5180.0047	0.00009	5180.0014	0.00003	5180.0006	0.00001	5180.0018	0.00003
40	120	5179.9872	-0.00025	5179.9851	-0.00029	5179.9856	-0.00028	5179.9851	-0.00029
30	120	5179.9823	-0.00034	5179.979	-0.00041	5179.9807	-0.00037	5179.9809	-0.00037
20	120	5180.0139	0.00027	5180.0158	0.00031	5180.0156	0.00030	5180.0175	0.00034
10	120	5180.0085	0.00016	5180.0045	0.00009	5180.0089	0.00017	5180.0067	0.00013
0	120	5179.9862	-0.00027	5179.9879	-0.00023	5179.9896	-0.00020	5179.9898	-0.00020
-10	120	5180.0249	0.00048	5180.0249	0.00048	5180.0241	0.00047	5180.0251	0.00048
-20	120	5179.9778	-0.00043	5179.9781	-0.00042	5179.981	-0.00037	5179.9786	-0.00041
-30	120	5180.0219	0.00042	5180.0207	0.00040	5180.0218	0.00042	5180.0246	0.00047

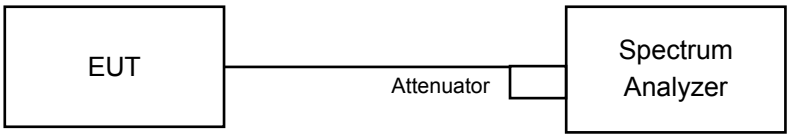
Frequemcy Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.014	0.00027	5180.0149	0.00029	5180.0149	0.00029	5180.0177	0.00034
	120	5180.0139	0.00027	5180.0158	0.00031	5180.0156	0.00030	5180.0175	0.00034
	102	5180.0143	0.00028	5180.0152	0.00029	5180.0154	0.00030	5180.0182	0.00035

4.5 6dB Bandwidth Measurment

4.5.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

802.11a

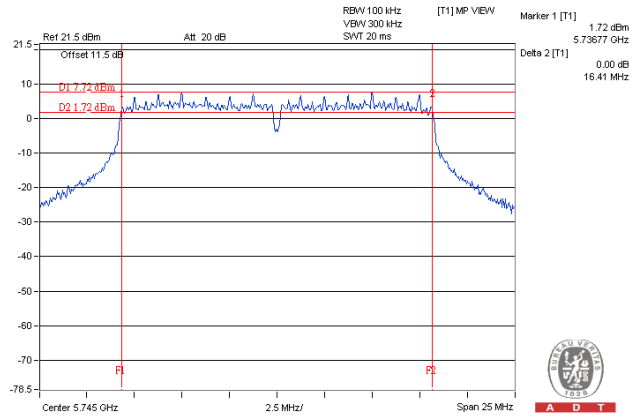
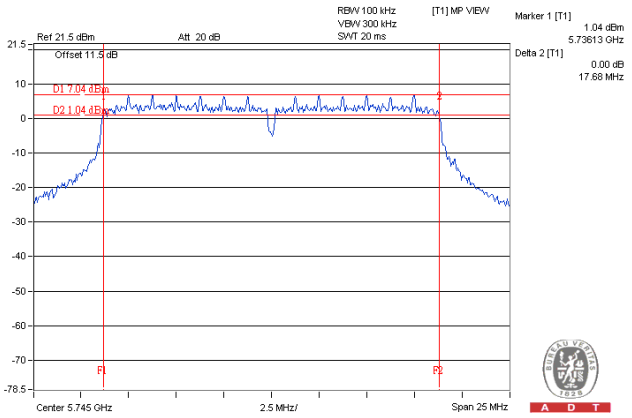
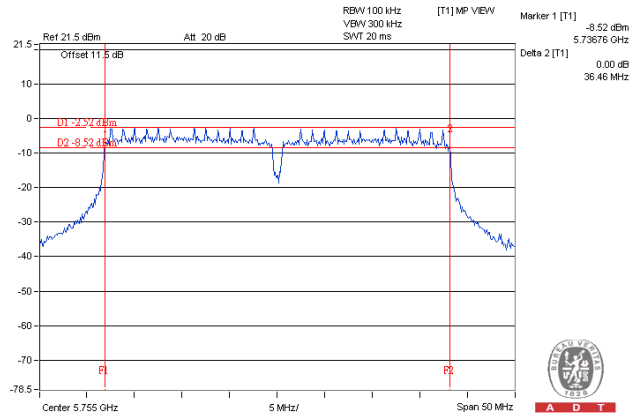
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.40	16.41	0.5	Pass
157	5785	16.12	16.40	0.5	Pass
165	5825	16.37	16.38	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.62	17.68	0.5	Pass
157	5785	17.00	17.37	0.5	Pass
165	5825	16.37	17.19	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.92	36.46	0.5	Pass
159	5795	35.87	36.45	0.5	Pass

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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