

FCC Test Report

Report No.: RF150513C20-1

FCC ID: E2K-APL290B7

Test Model: APL29-0B7

Received Date: May 13, 2015

Test Date: May 28 ~ Jun. 03, 2015

Issued Date: Jun. 05, 2015

Applicant: Dell Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Release Control Record

Issue No.	Description	Date Issued
RF150513C20-1	Original release.	Jun. 05, 2015

1 Certificate of Conformity

Product: Wireless Network Security Appliance

Brand: DELL, DELL SONICWALL, SONICWALL (Refer to item 3.1 for more details)

Test Model: APL29-0B7

Sample Status: Engineering sample

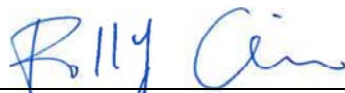
Applicant: Dell Inc.

Test Date: May 28 ~ Jun. 03, 2015

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2009

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 :


Polly Chien / Specialist

Date:

Jun. 05, 2015

Approved by :


Ken Liu / Senior Manager

Date:

Jun. 05, 2015

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -17.57dB at 0.43543MHz.
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 5240.00MHz, 5280.00MHz.
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 R-SMA & TNC 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	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	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 Network Security Appliance
Brand	DELL, DELL SONICWALL, SONICWALL (Refer to note for more details)
Test Model	APL29-0B7
Status of EUT	Engineering sample
Power Supply Rating	12Vdc (Adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps 802.11ac: up to 1299.9Mbps
Operating Frequency	5180 ~ 5240MHz & 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	5180 ~ 5240MHz: 245.939mW 5745 ~ 5825MHz: 116.357mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	1.8m non-shielded RJ45 cable without core

Note:

1. The following brands are for marketing purpose.

Brand	Model	Difference
SONICWALL DELL SONICWALL DELL	APL29-0B7	For marketing purpose.

2. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

Modulation Mode	TX Function
802.11a	3TX
802.11n (HT20)	3TX
802.11n (HT40)	3TX
802.11ac (VHT20)	3TX
802.11ac (VHT40)	3TX
802.11ac (VHT80)	3TX

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

3. The following antennas were provided to the EUT.

No.	Type	Gain(dBi)		Connector
		2.4GHz Band	5GHz Band	
1	DIPOLE	2.5	2.5	TNC
2	DIPOLE	2.5	2.5	TNC
3	DIPOLE	3	3	R-SMA

4. The EUT consumes power from the following adapters.

Adapter 1	
Brand	AMIGO
Model	AMS118-1203000F2
Input Power	100-240Vac, 50/60Hz, 1.0A Max
Output Power	12Vdc, 3.0A
Power Line	AC 1.75m non-shielded power line without core DC 1.5m power cable with 1 core attached on adapter

Adapter 2	
Brand	Sunny COMPUTER TECHNOLOGY CO.,LTD.
Model	SYS1546-3612-T3
Input Power	100-240Vac, 50-60Hz, 1.5A Max
Output Power	12Vdc, 3.0A, 36W MAX
Power Line	AC 1.75m non-shielded power line without core DC 1.85m power cable with 1 core attached on adapter

*After pre-tested two of adapters found adapter 1 was the worst case, therefore chosen for final tests and presented in the test report.

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

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:

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

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11ac (VHT80)		42	42	OFDM	BPSK	97.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (VHT80)		155	155	OFDM	BPSK	97.5

Radiated Emission Test (Below 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320 5745-5825	36 to 64 149 to 165	40	OFDM	BPSK	6.0

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	5180-5320 5745-5825	36 to 64 149 to 165	40	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)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11ac (VHT80)		42	42	OFDM	BPSK	97.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (VHT80)		155	155	OFDM	BPSK	97.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	22deg. C, 67%RH	120Vac, 60Hz	Jones Chang
RE<1G	22deg. C, 67%RH	120Vac, 60Hz	Jones Chang
PLC	20deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Antony Lee

3.3 Duty Cycle of Test Signal

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

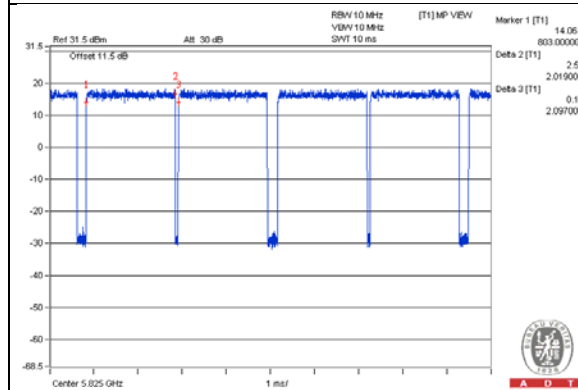
802.11a: Duty cycle = $2.019/2.097 = 0.963$, Duty factor = $10 * \log(1/0.963) = 0.16$

802.11n (20MHz): Duty cycle = $1.877/1.952 = 0.962$, Duty factor = $10 * \log(1/0.962) = 0.17$

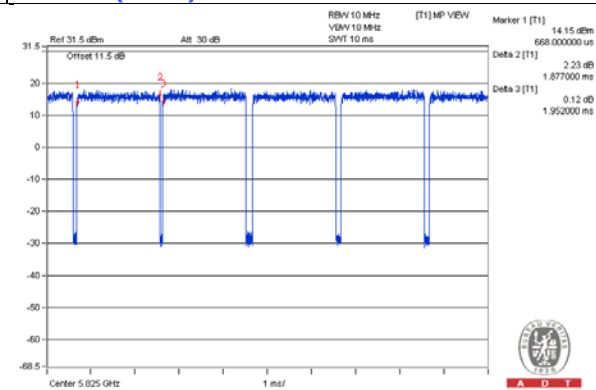
802.11n (40MHz): Duty cycle = $0.922/1.032 = 0.893$, Duty factor = $10 * \log(1/0.893) = 0.49$

802.11ac (VHT80): Duty cycle = $0.450/0.520 = 0.865$, Duty factor = $10 * \log(1/0.865) = 0.63$

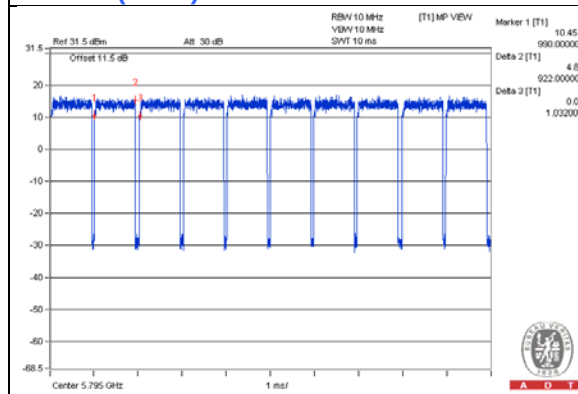
802.11a



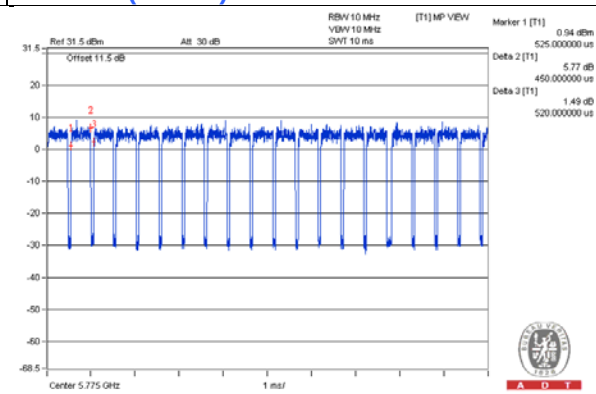
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



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.

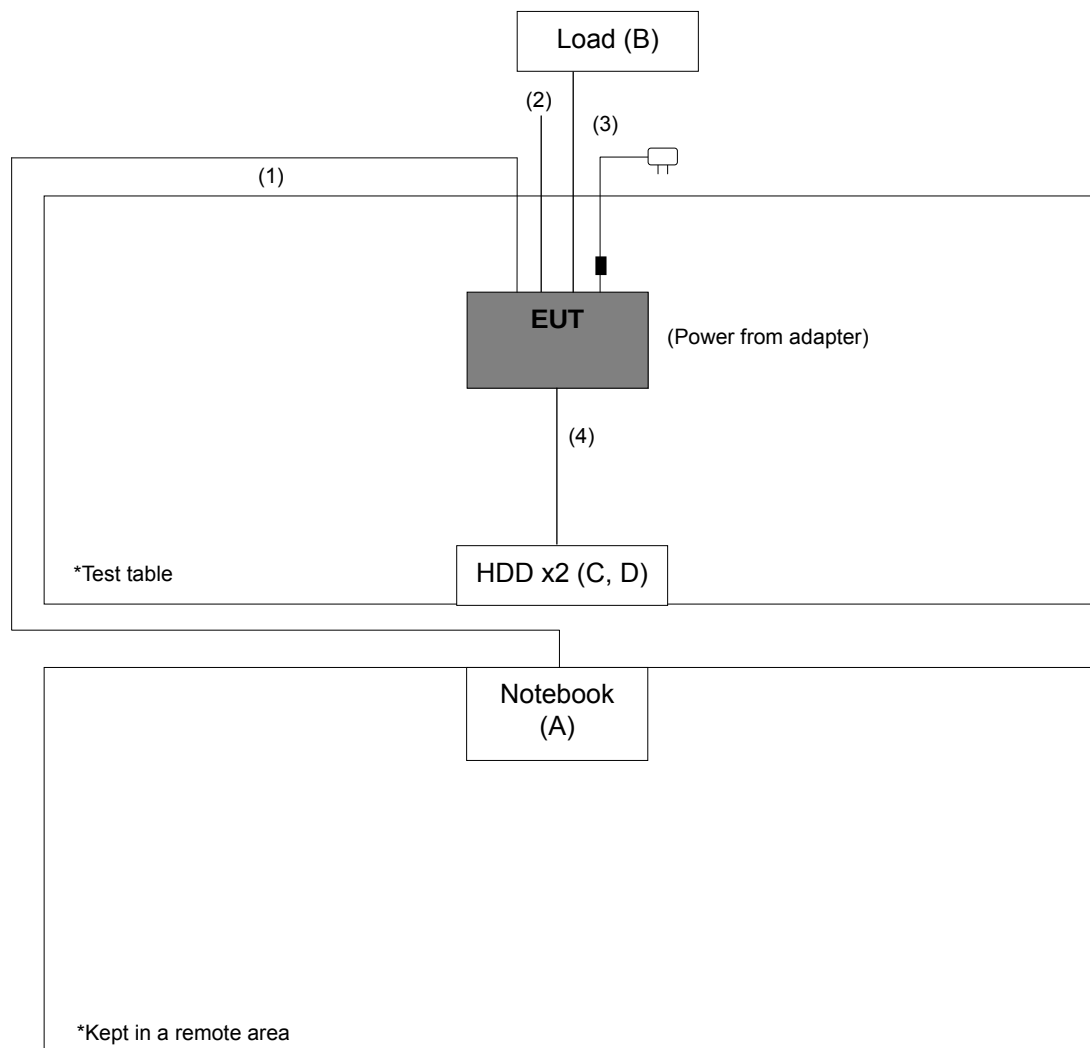
No.	Product	Brand	Model No.	Serial No.	FCC ID
A	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved
B	Load	NA	NA	NA	NA
C	USB 3.0 HDD	TOSHIBA	V63700-B	53E2CFNUTSX4	NA
D	USB 3.0 HDD	TOSHIBA	V63700-B	633APITLTSX4	NA

No.	Signal Cable Description Of The Above Support Units
1	3m RJ45 cable.
2	1.5m non-shielded console cable w/o core
3	1.8m RJ45 cable X8.
4	0.5m USB cable w/o core x2

Note:

1. All power cords of the above support units are non-shielded (1.8 m).
2. Item A acted as a communication partner to transfer data.
3. The console cable was provided by the client.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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 Procedure 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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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 Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/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(dBuV/m) ^{*1} PK:78.2 (dBuV/m) ^{*2}

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

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

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

4.1.2 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
High Speed Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 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.

4.1.3 Test Procedure

- a. The EUT was placed on the top of a rotating table 0.8 meters 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:

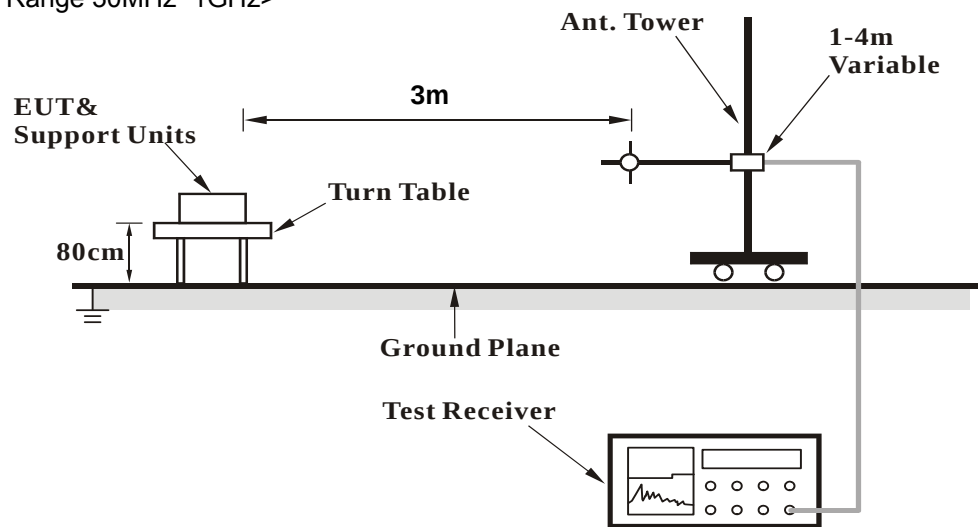
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. 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 ($10 \log(1/\text{duty cycle})$).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

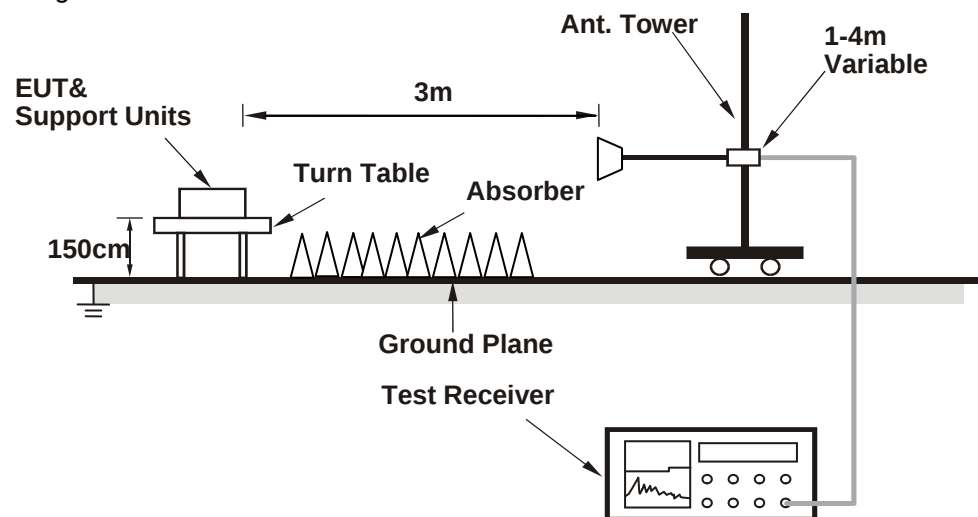
No deviation.

4.1.5 Test Setup

<Frequency Range 30MHz~1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

- Connected the EUT with HDDs and placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- 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.
- 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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.5 PK	74.0	-16.5	1.34 H	113	51.50	6.00
2	5150.00	46.3 AV	54.0	-7.7	1.34 H	113	40.30	6.00
3	*5180.00	105.8 PK			1.62 H	12	66.30	39.50
4	*5180.00	95.3 AV			1.62 H	12	55.80	39.50
5	#6906.00	54.4 PK	68.2	-13.8	1.00 H	355	42.90	11.50
6	#10360.00	60.9 PK	74.0	-13.1	1.29 H	123	42.50	18.40
7	#10360.00	47.9 AV	54.0	-6.1	1.29 H	123	29.50	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.1 PK	74.0	-3.9	2.18 V	345	64.10	6.00
2	5150.00	52.3 AV	54.0	-1.7	2.18 V	345	46.30	6.00
3	*5180.00	119.8 PK			2.15 V	350	80.30	39.50
4	*5180.00	109.7 AV			2.15 V	350	70.20	39.50
5	#6906.00	58.9 PK	68.2	-9.3	1.68 V	359	47.40	11.50
6	#10360.00	60.9 PK	74.0	-13.1	1.29 V	76	42.50	18.40
7	#10360.00	47.8 AV	54.0	-6.2	1.29 V	76	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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	5000.00	57.8 PK	74.0	-16.2	1.52 H	36	52.10	5.70
2	5000.00	46.3 AV	54.0	-7.7	1.52 H	36	40.60	5.70
3	*5200.00	107.7 PK			1.48 H	197	68.10	39.60
4	*5200.00	97.4 AV			1.48 H	197	57.80	39.60
5	#6933.00	56.0 PK	68.2	-12.2	1.48 H	55	44.30	11.70
6	#10400.00	61.3 PK	74.0	-12.7	1.34 H	100	42.80	18.50
7	#10400.00	48.2 AV	54.0	-5.8	1.34 H	100	29.70	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	64.3 PK	74.0	-9.7	2.12 V	307	58.60	5.70
2	5000.00	52.7 AV	54.0	-1.3	2.12 V	307	47.00	5.70
3	*5200.00	120.5 PK			2.12 V	313	80.90	39.60
4	*5200.00	110.5 AV			2.12 V	313	70.90	39.60
5	#6933.00	58.5 PK	68.2	-9.7	1.55 V	332	46.80	11.70
6	#10400.00	67.1 PK	74.0	-6.9	1.27 V	134	48.60	18.50
7	#10400.00	52.8 AV	54.0	-1.2	1.27 V	134	34.30	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	5000.00	56.3 PK	74.0	-17.7	1.58 H	332	50.60	5.70
2	5000.00	45.2 AV	54.0	-8.8	1.58 H	332	39.50	5.70
3	*5240.00	109.1 PK			1.49 H	358	69.50	39.60
4	*5240.00	98.6 AV			1.49 H	358	59.00	39.60
5	5350.00	58.1 PK	74.0	-15.9	1.13 H	54	52.00	6.10
6	5350.00	46.1 AV	54.0	-7.9	1.13 H	54	40.00	6.10
7	#6986.00	56.3 PK	68.2	-11.9	1.23 H	128	44.00	12.30
8	#10480.00	63.0 PK	74.0	-11.0	1.00 H	148	44.00	19.00
9	#10480.00	49.9 AV	54.0	-4.1	1.00 H	148	30.90	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	5000.00	61.9 PK	74.0	-12.1	2.15 V	343	56.20	5.70
2	5000.00	50.1 AV	54.0	-3.9	2.15 V	343	44.40	5.70
3	*5240.00	121.7 PK			1.94 V	347	82.10	39.60
4	*5240.00	111.4 AV			1.94 V	347	71.80	39.60
5	5350.00	59.1 PK	74.0	-14.9	1.64 V	353	53.00	6.10
6	5350.00	47.6 AV	54.0	-6.4	1.64 V	353	41.50	6.10
7	#6986.00	67.3 PK	68.2	-10.9	1.54 V	331	55.00	12.30
8	#10480.00	66.7 PK	74.0	-7.3	1.44 V	210	47.70	19.00
9	#10480.00	52.5 AV	54.0	-1.5	1.44 V	210	33.50	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	5100.00	55.9 PK	74.0	-18.1	1.51 H	134	50.10	5.80
2	5100.00	44.8 AV	54.0	-9.2	1.51 H	134	39.00	5.80
3	#5240.00	58.5 PK	68.2	-9.7	1.30 H	150	52.50	6.00
4	#5714.00	57.5 PK	74.0	-16.5	1.42 H	10	50.70	6.80
5	#5714.00	46.3 AV	54.0	-7.7	1.42 H	10	39.50	6.80
6	#5722.00	65.7 PK	78.2	-12.5	1.42 H	19	58.90	6.80
7	#5725.00	58.4 PK	78.2	-19.8	1.42 H	19	51.60	6.80
8	*5745.00	105.3 PK			1.53 H	10	64.90	40.40
9	*5745.00	95.1 AV			1.53 H	10	54.70	40.40
10	11490.00	60.8 PK	74.0	-13.2	1.20 H	88	42.40	18.40
11	11490.00	47.0 AV	54.0	-7.0	1.20 H	88	28.60	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	5100.00	63.4 PK	74.0	-10.6	2.12 V	349	57.60	5.80
2	5100.00	50.9 AV	54.0	-3.1	2.12 V	349	45.10	5.80
3	#5240.00	67.2 PK	68.2	-1.0	2.12 V	346	61.20	6.00
4	#5722.00	76.3 PK	78.2	-1.9	2.05 V	354	69.50	6.80
5	#5725.00	66.8 PK	78.2	-11.4	2.05 V	354	60.00	6.80
6	*5745.00	116.7 PK			2.04 V	346	76.30	40.40
7	*5745.00	106.4 AV			2.04 V	346	66.00	40.40
8	11490.00	61.1 PK	74.0	-12.9	1.61 V	140	42.70	18.40
9	11490.00	48.0 AV	54.0	-6.0	1.61 V	140	29.60	18.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
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	5140.00	57.6 PK	74.0	-16.4	1.66 H	333	51.60	6.00
2	5140.00	46.5 AV	54.0	-7.5	1.66 H	333	40.50	6.00
3	#5280.00	59.5 PK	74.0	-14.5	1.47 H	22	53.40	6.10
4	#5280.00	48.1 AV	54.0	-5.9	1.47 H	22	42.00	6.10
5	5350.00	58.6 PK	74.0	-15.4	1.70 H	343	52.50	6.10
6	5350.00	47.8 AV	54.0	-6.2	1.70 H	343	41.70	6.10
7	*5785.00	106.4 PK			1.31 H	19	65.90	40.50
8	*5785.00	95.8 AV			1.31 H	19	55.30	40.50
9	11570.00	60.4 PK	74.0	-13.6	1.56 H	119	42.00	18.40
10	11570.00	46.7 AV	54.0	-7.3	1.56 H	119	28.30	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	5140.00	64.3 PK	74.0	-9.7	1.80 V	138	58.30	6.00
2	5140.00	52.1 AV	54.0	-1.9	1.80 V	138	46.10	6.00
3	#5280.00	67.2 PK	68.2	-1.0	2.12 V	334	61.10	6.10
4	5350.00	65.1 PK	74.0	-8.9	1.80 V	143	59.00	6.10
5	5350.00	52.8 AV	54.0	-1.2	1.80 V	143	46.70	6.10
6	*5785.00	117.1 PK			2.00 V	344	76.60	40.50
7	*5785.00	106.6 AV			2.00 V	344	66.10	40.50
8	11507.00	61.4 PK	74.0	-12.6	1.76 V	126	43.10	18.30
9	11507.00	48.8 AV	54.0	-5.2	1.76 V	126	30.50	18.30

REMARKS:

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

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	5100.00	57.2 PK	74.0	-16.8	1.52 H	138	51.40	5.80
2	5100.00	44.4 AV	54.0	-9.6	1.52 H	138	38.60	5.80
3	#5280.00	58.1 PK	68.2	-10.1	1.50 H	22	52.00	6.10
4	*5825.00	103.6 PK			1.46 H	355	63.10	40.50
5	*5825.00	93.2 AV			1.46 H	355	52.70	40.50
6	#5850.00	57.0 PK	78.2	-21.2	1.47 H	201	50.10	6.90
7	#5853.00	58.9 PK	78.2	-19.3	1.47 H	201	51.90	7.00
8	#5861.00	57.5 PK	74.0	-16.5	1.57 H	333	50.50	7.00
9	#5861.00	46.3 AV	54.0	-7.7	1.57 H	333	39.30	7.00
10	11650.00	60.7 PK	74.0	-13.3	1.17 H	155	41.80	18.90
11	11650.00	47.7 AV	54.0	-6.3	1.17 H	155	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	#5120.00	65.2 PK	74.0	-8.8	2.00 V	351	59.20	6.00
2	#5120.00	52.1 AV	54.0	-1.9	2.00 V	351	46.10	6.00
3	#5280.00	67.1 PK	68.2	-1.1	2.00 V	333	61.00	6.10
4	#5360.00	65.4 PK	74.0	-8.6	1.99 V	140	59.30	6.10
5	#5360.00	51.8 AV	54.0	-2.2	1.99 V	140	45.70	6.10
6	*5825.00	118.1 PK			2.01 V	350	77.60	40.50
7	*5825.00	105.9 AV			2.01 V	350	65.40	40.50
8	#5850.00	61.9 PK	78.2	-16.3	2.00 V	349	55.00	6.90
9	#5853.00	63.8 PK	78.2	-14.4	2.00 V	349	56.80	7.00
10	#5861.00	59.1 PK	74.0	-14.9	1.99 V	350	52.10	7.00
11	#5861.00	47.8 AV	54.0	-6.2	1.99 V	350	40.80	7.00
12	#11650.00	61.1 PK	74.0	-12.9	1.54 V	144	42.20	18.90
13	#11650.00	47.9 AV	54.0	-6.1	1.54 V	144	29.00	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT20)

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	5000.00	57.2 PK	74.0	-16.8	1.60 H	133	51.50	5.70
2	5000.00	46.3 AV	54.0	-7.7	1.60 H	133	40.60	5.70
3	*5180.00	105.2 PK			1.52 H	196	65.70	39.50
4	*5180.00	95.3 AV			1.52 H	196	55.80	39.50
5	#6906.00	54.7 PK	68.2	-13.5	1.20 H	150	43.20	11.50
6	#10360.00	60.7 PK	74.0	-13.3	1.04 H	155	42.30	18.40
7	#10360.00	47.5 AV	54.0	-6.5	1.04 H	155	29.10	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.5 PK	74.0	-5.5	2.17 V	323	62.50	6.00
2	5150.00	52.9 AV	54.0	-1.1	2.17 V	323	46.90	6.00
3	*5180.00	118.4 PK			2.13 V	354	78.90	39.50
4	*5180.00	108.1 AV			2.13 V	354	68.60	39.50
5	#6906.00	59.0 PK	68.2	-9.2	1.62 V	357	47.50	11.50
6	#10360.00	61.4 PK	74.0	-12.6	1.30 V	144	43.00	18.40
7	#10360.00	48.3 AV	54.0	-5.7	1.30 V	144	29.90	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	5000.00	56.0 PK	74.0	-18.0	1.45 H	156	50.30	5.70
2	5000.00	45.1 AV	54.0	-8.9	1.45 H	156	39.40	5.70
3	*5200.00	107.9 PK			1.52 H	200	68.30	39.60
4	*5200.00	97.2 AV			1.52 H	200	57.60	39.60
5	#6933.00	56.1 PK	68.2	-12.1	1.20 H	214	44.40	11.70
6	#10400.00	61.9 PK	74.0	-12.1	1.16 H	145	43.40	18.50
7	#10400.00	48.8 AV	54.0	-5.2	1.16 H	145	30.30	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	5000.00	63.2 PK	74.0	-10.8	2.04 V	308	57.50	5.70
2	5000.00	52.7 AV	54.0	-1.3	2.04 V	308	47.00	5.70
3	*5200.00	120.7 PK			2.06 V	356	81.10	39.60
4	*5200.00	110.4 AV			2.06 V	356	70.80	39.60
5	#6933.00	58.7 PK	68.2	-9.5	1.57 V	333	47.00	11.70
6	#10400.00	66.5 PK	74.0	-7.5	1.32 V	169	48.00	18.50
7	#10400.00	52.8 AV	54.0	-1.2	1.32 V	169	34.30	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	5000.00	55.9 PK	74.0	-18.1	1.49 H	253	50.20	5.70
2	5000.00	44.8 AV	54.0	-9.2	1.49 H	253	39.10	5.70
3	*5240.00	106.9 PK			1.62 H	201	67.30	39.60
4	*5240.00	96.6 AV			1.62 H	201	57.00	39.60
5	5350.00	46.7 PK	74.0	-27.3	1.47 H	243	40.60	6.10
6	5350.00	45.6 AV	54.0	-8.4	1.47 H	243	39.50	6.10
7	#10480.00	62.8 PK	74.0	-11.2	1.01 H	147	43.80	19.00
8	#10480.00	49.7 AV	54.0	-4.3	1.01 H	147	30.70	19.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	61.7 PK	74.0	-12.3	1.56 V	178	56.00	5.70
2	5000.00	51.4 AV	54.0	-2.6	1.56 V	178	45.70	5.70
3	*5240.00	121.2 PK			2.01 V	350	81.60	39.60
4	*5240.00	110.8 AV			2.01 V	350	71.20	39.60
5	5350.00	64.2 PK	74.0	-9.8	1.00 V	303	58.10	6.10
6	5350.00	51.0 AV	54.0	-3.0	1.00 V	303	44.90	6.10
7	#10480.00	62.9 PK	74.0	-11.1	1.79 V	306	43.90	19.00
8	#10480.00	49.3 AV	54.0	-4.7	1.79 V	306	30.30	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	#5280.00	57.0 PK	68.2	-11.2	1.61 H	129	50.90	6.10
2	5350.00	56.6 PK	74.0	-17.4	1.56 H	50	50.50	6.10
3	5350.00	45.8 AV	54.0	-8.2	1.56 H	50	39.70	6.10
4	#5722.00	62.1 PK	78.2	-16.1	1.50 H	345	55.30	6.80
5	#5725.00	58.1 PK	78.2	-20.1	1.50 H	345	51.30	6.80
6	*5745.00	104.3 PK			1.47 H	359	63.90	40.40
7	*5745.00	94.1 AV			1.47 H	359	53.70	40.40
8	11490.00	60.4 PK	74.0	-13.6	1.00 H	162	42.00	18.40
9	11490.00	47.4 AV	54.0	-6.6	1.00 H	162	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	#5280.00	66.6 PK	68.2	-1.6	2.08 V	8	60.50	6.10
2	5350.00	64.6 PK	74.0	-9.4	1.98 V	141	58.50	6.10
3	5350.00	52.2 AV	54.0	-1.8	1.98 V	141	46.10	6.10
4	#5722.00	75.3 PK	78.2	-2.9	1.97 V	345	68.50	6.80
5	#5725.00	67.0 PK	78.2	-11.2	1.97 V	342	60.20	6.80
6	*5745.00	115.3 PK			1.97 V	351	74.90	40.40
7	*5745.00	105.5 AV			1.97 V	351	65.10	40.40
8	11490.00	61.0 PK	74.0	-13.0	1.58 V	341	42.60	18.40
9	11490.00	47.7 AV	54.0	-6.3	1.58 V	341	29.30	18.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
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	#5280.00	57.9 PK	68.2	-10.3	1.43 H	359	51.80	6.10
2	*5785.00	105.1 PK			1.54 H	9	64.60	40.50
3	*5785.00	94.8 AV			1.54 H	9	54.30	40.50
4	11570.00	60.9 PK	74.0	-13.1	1.09 H	175	42.50	18.40
5	11570.00	47.7 AV	54.0	-6.3	1.09 H	175	29.30	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	#5280.00	66.3 PK	68.2	-1.9	1.97 V	289	60.20	6.10
2	*5785.00	116.8 PK			2.05 V	305	76.30	40.50
3	*5785.00	106.6 AV			2.05 V	305	66.10	40.50
4	11570.00	61.4 PK	74.0	-12.6	1.83 V	305	43.00	18.40
5	11570.00	48.3 AV	54.0	-5.7	1.83 V	305	29.90	18.40

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- " # ": 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	#5280.00	58.3 PK	68.2	-9.9	1.40 H	156	52.20	6.10
2	*5825.00	103.9 PK			1.53 H	7	63.40	40.50
3	*5825.00	93.6 AV			1.53 H	7	53.10	40.50
4	#5850.00	57.1 PK	78.2	-21.1	1.67 H	94	50.20	6.90
5	#5853.00	59.9 PK	78.2	-18.3	1.67 H	94	52.90	7.00
6	#5861.00	56.8 PK	74.0	-17.2	1.70 H	282	49.80	7.00
7	#5861.00	45.6 AV	54.0	-8.4	1.70 H	282	38.60	7.00
8	11650.00	60.8 PK	74.0	-13.2	1.02 H	150	41.90	18.90
9	11650.00	48.0 AV	54.0	-6.0	1.02 H	150	29.10	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	#5280.00	66.4 PK	68.2	-1.8	1.99 V	6	60.30	6.10
2	*5825.00	114.4 PK			2.00 V	194	73.90	40.50
3	*5825.00	104.0 AV			2.00 V	194	63.50	40.50
4	#5850.00	57.4 PK	78.2	-20.8	2.00 V	199	50.50	6.90
5	#5853.00	62.6 PK	78.2	-15.6	2.01 V	199	55.60	7.00
6	#5861.00	57.7 PK	74.0	-16.3	2.00 V	194	50.70	7.00
7	#5861.00	46.6 AV	54.0	-7.4	2.00 V	194	39.60	7.00
8	11650.00	61.2 PK	74.0	-12.8	1.81 V	350	42.30	18.90
9	11650.00	48.4 AV	54.0	-5.6	1.81 V	350	29.50	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT40)

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	58.6 PK	74.0	-15.4	1.43 H	116	52.60	6.00
2	5150.00	46.6 AV	54.0	-7.4	1.43 H	116	40.60	6.00
3	*5190.00	96.1 PK			1.48 H	197	56.60	39.50
4	*5190.00	86.4 AV			1.48 H	197	46.90	39.50
5	#10380.00	60.3 PK	74.0	-13.7	1.02 H	154	41.80	18.50
6	#10380.00	47.2 AV	54.0	-6.8	1.02 H	154	28.70	18.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.9 PK	74.0	-4.1	2.16 V	343	63.90	6.00
2	5150.00	52.7 AV	54.0	-1.3	2.16 V	343	46.70	6.00
3	*5190.00	109.2 PK			2.14 V	0	69.70	39.50
4	*5190.00	99.4 AV			2.14 V	0	59.90	39.50
5	#10380.00	60.7 PK	74.0	-13.3	1.39 V	253	42.20	18.50
6	#10380.00	47.5 AV	54.0	-6.5	1.39 V	253	29.00	18.50

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- " # ": 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	104.2 PK			1.34 H	150	64.60	39.60
2	*5230.00	94.1 AV			1.34 H	150	54.50	39.60
3	5350.00	58.0 PK	74.0	-16.0	1.49 H	284	51.90	6.10
4	5350.00	46.0 AV	54.0	-8.0	1.49 H	284	39.90	6.10
5	#6973.00	55.2 PK	74.0	-18.8	1.40 H	359	42.90	12.30
6	#6973.00	42.6 AV	54.0	-11.4	1.40 H	359	30.30	12.30
7	#10460.00	61.0 PK	74.0	-13.0	1.06 H	128	42.10	18.90
8	#10460.00	47.8 AV	54.0	-6.2	1.06 H	128	28.90	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	117.2 PK			2.02 V	351	77.60	39.60
2	*5230.00	107.1 AV			2.02 V	351	67.50	39.60
3	5350.00	58.7 PK	74.0	-15.3	2.00 V	19	52.60	6.10
4	5350.00	47.6 AV	54.0	-6.4	2.00 V	19	41.50	6.10
5	#6973.00	55.9 PK	74.0	-18.1	1.66 V	331	43.60	12.30
6	#6973.00	45.3 AV	54.0	-8.7	1.66 V	331	33.00	12.30
7	#10460.00	62.2 PK	74.0	-11.8	1.68 V	33	43.30	18.90
8	#10460.00	48.9 AV	54.0	-5.1	1.68 V	33	30.00	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	59.1 PK	74.0	-14.9	1.35 H	5	52.30	6.80
2	#5714.00	47.0 AV	54.0	-7.0	1.35 H	5	40.20	6.80
3	#5722.00	62.7 PK	78.2	-15.5	1.48 H	8	55.90	6.80
4	#5725.00	59.2 PK	78.2	-19.0	1.48 H	8	52.40	6.80
5	*5755.00	99.1 PK			1.49 H	9	58.60	40.50
6	*5755.00	89.1 AV			1.49 H	9	48.60	40.50
7	11510.00	59.8 PK	74.0	-14.2	1.13 H	178	41.50	18.30
8	11510.00	46.8 AV	54.0	-7.2	1.13 H	178	28.50	18.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	69.0 PK	74.0	-5.0	2.01 V	20	62.20	6.80
2	#5714.00	52.5 AV	54.0	-1.5	2.01 V	20	45.70	6.80
3	#5722.00	75.4 PK	78.2	-2.8	1.77 V	186	68.60	6.80
4	#5725.00	62.7 PK	78.2	-15.5	1.77 V	186	55.90	6.80
5	*5755.00	110.6 PK			1.95 V	188	70.10	40.50
6	*5755.00	100.3 AV			1.95 V	188	59.80	40.50
7	11510.00	60.4 PK	74.0	-13.6	1.60 V	191	42.10	18.30
8	11510.00	47.3 AV	54.0	-6.7	1.60 V	191	29.00	18.30

REMARKS:

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

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	#5240.00	58.6 PK	68.2	-9.6	1.59 H	0	52.60	6.00
2	*5795.00	101.9 PK			1.57 H	357	61.40	40.50
3	*5795.00	91.4 AV			1.57 H	357	50.90	40.50
4	#5850.00	56.8 PK	78.2	-21.4	1.47 H	9	49.90	6.90
5	#5853.00	60.7 PK	78.2	-17.5	1.49 H	9	53.70	7.00
6	#5861.00	57.1 PK	74.0	-16.9	1.49 H	359	50.10	7.00
7	#5861.00	45.5 AV	54.0	-8.5	1.47 H	359	38.50	7.00
8	11590.00	60.0 PK	74.0	-14.0	1.03 H	149	41.50	18.50
9	11590.00	46.9 AV	54.0	-7.1	1.03 H	149	28.40	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	#5240.00	66.3 PK	68.2	-1.9	1.95 V	348	60.30	6.00
2	*5795.00	111.6 PK			2.02 V	347	71.10	40.50
3	*5795.00	101.8 AV			2.02 V	347	61.30	40.50
4	#5850.00	59.0 PK	78.2	-19.2	2.00 V	22	52.10	6.90
5	#5853.00	62.9 PK	78.2	-15.3	2.00 V	22	55.90	7.00
6	#5861.00	58.5 PK	74.0	-15.5	2.02 V	356	51.50	7.00
7	#5861.00	47.5 AV	54.0	-6.5	2.02 V	356	40.50	7.00
8	11590.00	61.0 PK	74.0	-13.0	1.77 V	356	42.50	18.50
9	11590.00	47.8 AV	54.0	-6.2	1.77 V	356	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.5 PK	74.0	-17.5	1.44 H	156	50.50	6.00
2	5150.00	45.2 AV	54.0	-8.8	1.44 H	156	39.20	6.00
3	*5210.00	91.2 PK			1.48 H	358	51.60	39.60
4	*5210.00	81.4 AV			1.48 H	358	41.80	39.60
5	#10420.00	60.0 PK	74.0	-14.0	1.09 H	160	41.40	18.60
6	#10420.00	47.1 AV	54.0	-6.9	1.09 H	160	28.50	18.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.5 PK	74.0	-5.5	2.16 V	342	62.50	6.00
2	5150.00	52.7 AV	54.0	-1.3	2.16 V	342	46.70	6.00
3	*5210.00	104.7 PK			2.03 V	352	65.10	39.60
4	*5210.00	94.5 AV			2.03 V	352	54.90	39.60
5	#10420.00	61.2 PK	74.0	-12.8	1.79 V	131	42.60	18.60
6	#10420.00	48.2 AV	54.0	-5.8	1.79 V	131	29.60	18.60

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	57.7 PK	74.0	-16.3	1.45 H	0	50.90	6.80
2	#5714.00	46.6 AV	54.0	-7.4	1.45 H	0	39.80	6.80
3	#5722.00	63.5 PK	78.2	-14.7	1.48 H	10	56.70	6.80
4	#5725.00	57.9 PK	78.2	-20.3	1.48 H	10	51.10	6.80
5	*5775.00	102.8 PK			1.55 H	9	62.30	40.50
6	*5775.00	82.5 AV			1.55 H	9	42.00	40.50
7	11550.00	59.4 PK	74.0	-14.6	1.10 H	176	41.00	18.40
8	11550.00	46.6 AV	54.0	-7.4	1.10 H	176	28.20	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	#5714.00	70.3 PK	74.0	-3.7	1.74 V	143	63.50	6.80
2	#5714.00	52.5 AV	54.0	-1.5	1.74 V	143	45.70	6.80
3	#5722.00	71.4 PK	78.2	-6.8	1.73 V	185	64.60	6.80
4	#5725.00	65.6 PK	78.2	-12.6	1.73 V	185	58.80	6.80
5	*5775.00	103.6 PK			2.02 V	248	63.10	40.50
6	*5775.00	93.0 AV			2.02 V	248	52.50	40.50
7	11550.00	60.3 PK	74.0	-13.7	1.55 V	275	41.90	18.40
8	11550.00	47.0 AV	54.0	-7.0	1.55 V	275	28.60	18.40

REMARKS:

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

Below 1GHz Worst-Case Data:

802.11a

CHANNEL	TX Channel 40	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	28.7 QP	40.0	-11.3	1.49 H	218	43.30	-14.60
2	368.21	32.0 QP	46.0	-14.0	1.00 H	76	43.20	-11.20
3	500.42	35.3 QP	46.0	-10.7	1.49 H	176	43.70	-8.40
4	624.85	35.3 QP	46.0	-10.7	1.00 H	36	40.90	-5.60
5	747.34	43.4 QP	46.0	-2.6	1.00 H	343	46.70	-3.30
6	875.67	40.2 QP	46.0	-5.8	1.49 H	190	41.30	-1.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.11	37.0 QP	40.0	-3.0	1.00 V	183	52.70	-15.70
2	39.61	35.1 QP	40.0	-4.9	1.00 V	0	50.10	-15.00
3	500.42	35.2 QP	46.0	-10.8	1.00 V	164	43.60	-8.40
4	624.85	36.7 QP	46.0	-9.3	1.00 V	93	42.30	-5.60
5	747.34	41.5 QP	46.0	-4.5	1.50 V	18	44.80	-3.30
6	875.67	35.8 QP	46.0	-10.2	1.00 V	195	36.90	-1.10

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 02, 2015	Mar. 01, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 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 1.

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

4.2.3 Test Procedure

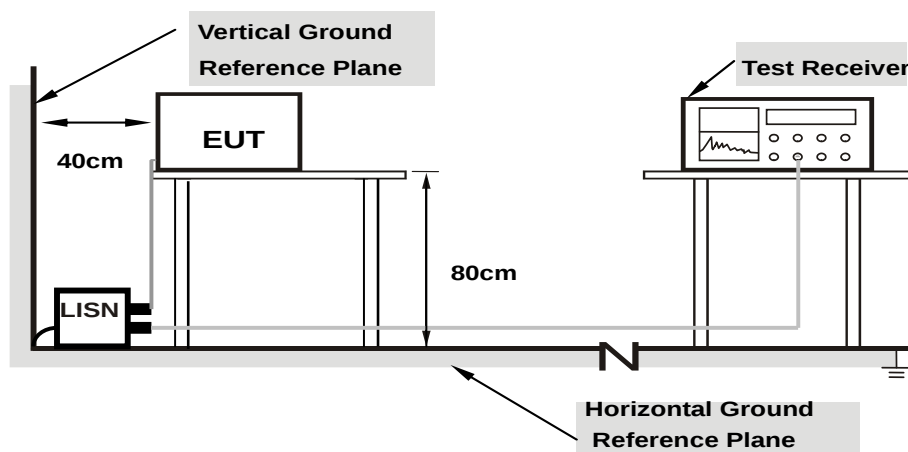
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

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.

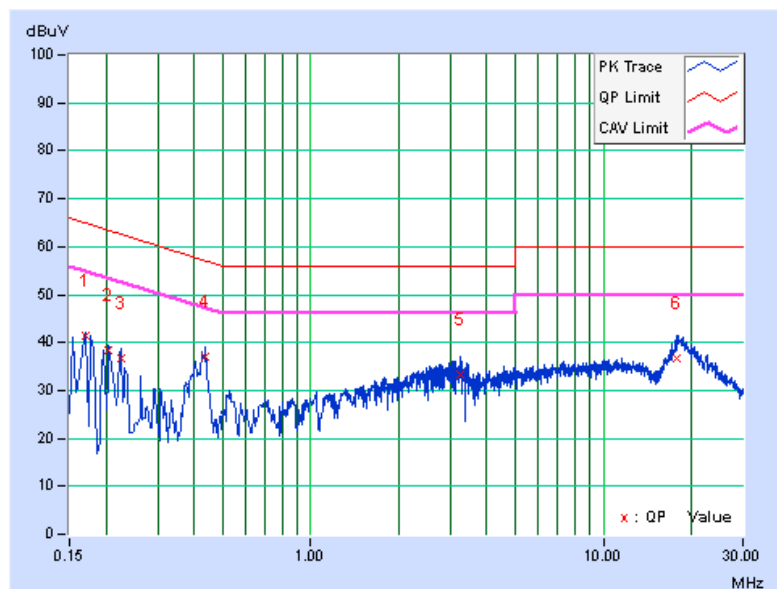
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16955	0.05	41.41	24.04	41.46	24.09	64.98	54.98	-23.52	-30.89
2	0.20474	0.06	38.42	24.81	38.48	24.87	63.42	53.42	-24.94	-28.55
3	0.22429	0.06	36.66	24.68	36.72	24.74	62.66	52.66	-25.94	-27.92
4	0.43543	0.06	37.01	29.52	37.07	29.58	57.15	47.15	-20.08	-17.57
5	3.23890	0.16	33.29	25.29	33.45	25.45	56.00	46.00	-22.55	-20.55
6	17.80756	0.80	36.05	30.76	36.85	31.56	60.00	50.00	-23.15	-18.44

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.

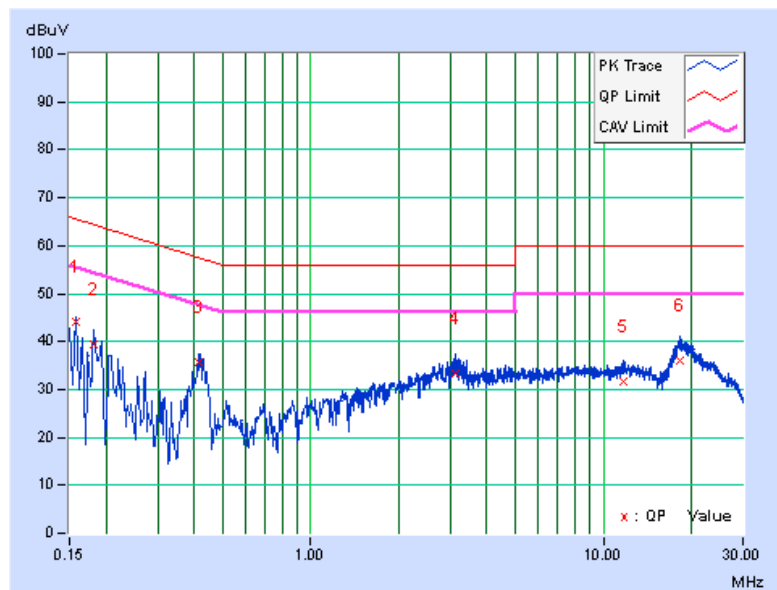


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.05	43.95	31.63	44.00	31.68	65.58	55.58	-21.58	-23.90
2	0.18128	0.05	39.48	26.38	39.53	26.43	64.43	54.43	-24.90	-28.00
3	0.41670	0.06	35.49	27.62	35.55	27.68	57.51	47.51	-21.96	-19.83
4	3.14115	0.16	33.12	25.29	33.28	25.45	56.00	46.00	-22.72	-20.55
5	11.66495	0.47	31.05	25.63	31.52	26.10	60.00	50.00	-28.48	-23.90
6	18.16728	0.67	35.45	30.12	36.12	30.79	60.00	50.00	-23.88	-19.21

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.



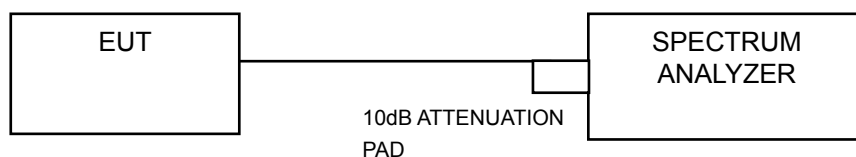
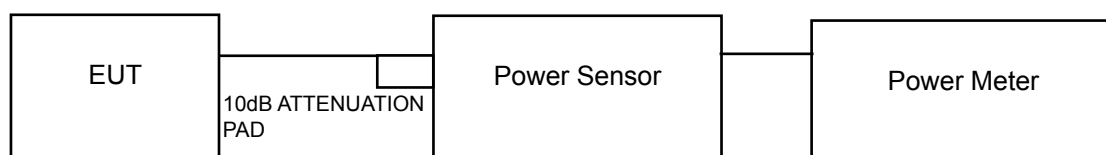
4.3 Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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 Procedure

FOR AVERAGE POWER MEASUREMENT

For 802.11a, 802.11n (HT20), 802.11n (HT40)

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

For 802.11ac (VHT80)

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

POWER OUTPUT:

802.11a

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	16.42	16.30	18.71	160.813	22.06	30	PASS
40	5200	19.16	18.45	19.71	245.939	23.91	30	PASS
48	5240	16.90	17.10	18.40	169.447	22.29	30	PASS
149	5745	14.92	13.71	15.67	91.440	19.61	30	PASS
157	5785	16.08	14.77	16.61	116.357	20.66	30	PASS
165	5825	15.12	13.90	15.58	93.197	19.69	30	PASS

802.11n (HT20)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	16.49	16.05	16.84	133.144	21.24	30	PASS
40	5200	19.16	18.36	19.65	243.22	23.86	30	PASS
48	5240	16.80	18.50	18.60	191.102	22.81	30	PASS
149	5745	13.95	13.31	14.53	74.639	18.73	30	PASS
157	5785	15.22	13.94	15.83	96.322	19.84	30	PASS
165	5825	14.17	13.70	14.76	79.487	19.00	30	PASS

802.11n (HT40)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
38	5190	11.43	9.84	11.58	37.926	15.79	30	PASS
46	5230	18.76	17.70	18.61	206.657	23.15	30	PASS
151	5755	11.80	11.02	12.62	46.064	16.63	30	PASS
159	5795	14.00	13.41	14.95	78.308	18.94	30	PASS

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
42	5210	9.11	7.63	9.06	21.995	13.42	30	PASS
155	5775	7.80	7.06	8.88	18.835	12.75	30	PASS

26dB BANDWIDTH:

802.11a

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	26.93	27.12	28.75	Pass
40	5200	40.12	40.41	40.33	Pass
48	5240	28.31	29.83	29.16	Pass

802.11n (HT20)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	27.63	28.89	29.35	Pass
40	5200	42.93	42.29	42.08	Pass
48	5240	30.05	29.42	31.37	Pass

802.11n (HT40)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
38	5190	47.62	45.62	46.79	Pass
46	5230	92.81	75.59	46.48	Pass

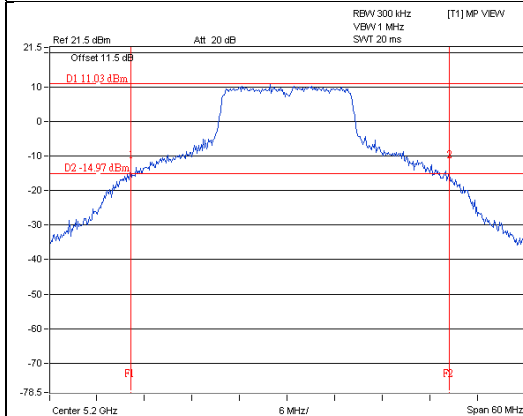
802.11ac (VHT80)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
42	5210	88.63	88.03	89.37	Pass

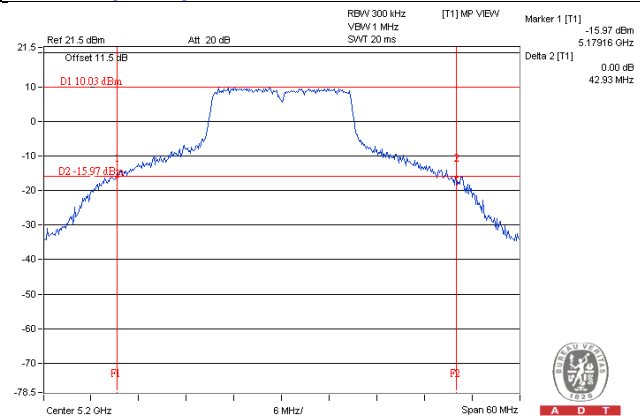
SPECTRUM PLOT OF WORST VALUE

802.11a

802.11n (HT20)



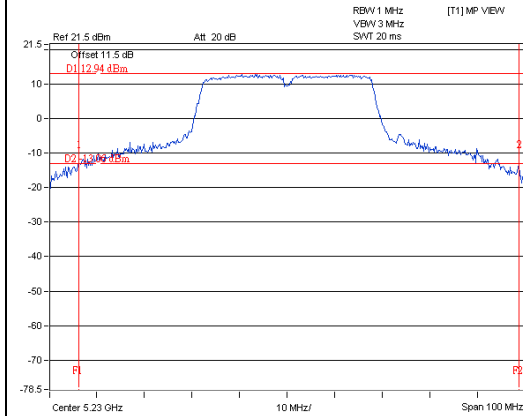
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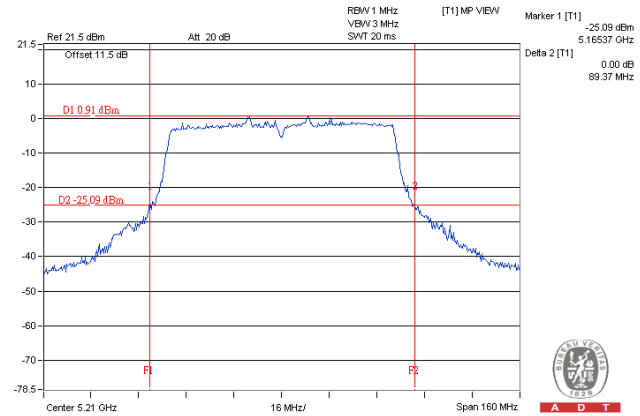
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



A D T

Occupied Bandwidth:

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	16.92	17.04	17.16	Pass
40	5200	21.72	21.84	21.24	Pass
48	5240	17.16	17.28	17.28	Pass
149	5745	16.78	16.87	16.78	Pass
157	5785	16.92	16.92	16.92	Pass
165	5825	16.80	16.80	16.80	Pass

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	18.12	18.24	18.12	Pass
40	5200	22.80	21.96	22.20	Pass
48	5240	18.36	17.16	18.36	Pass
149	5745	18.00	18.00	17.88	Pass
157	5785	18.00	18.12	18.00	Pass
165	5825	18.00	18.00	18.00	Pass

802.11n (HT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
38	5190	37.08	36.96	37.08	Pass
46	5230	38.28	37.68	37.08	Pass
151	5755	37.08	37.08	37.08	Pass
159	5795	36.96	37.08	36.96	Pass

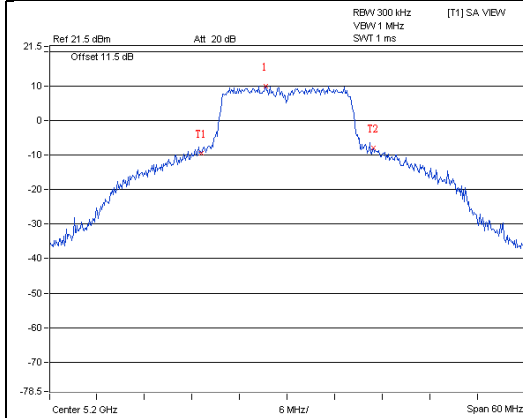
802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
42	5210	76.08	76.32	75.84	Pass
155	5775	76.08	76.08	76.08	Pass

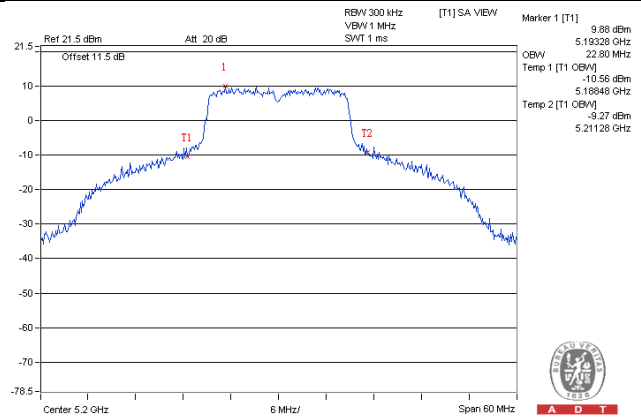
SPECTRUM PLOT OF WORST VALUE

802.11a

802.11n (HT20)



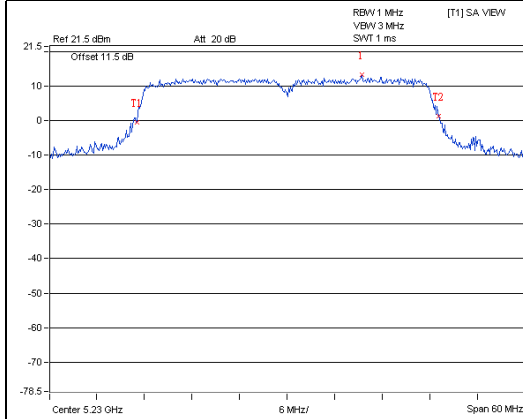
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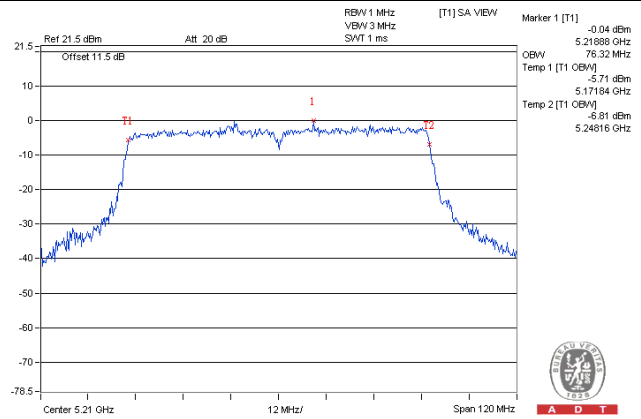
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



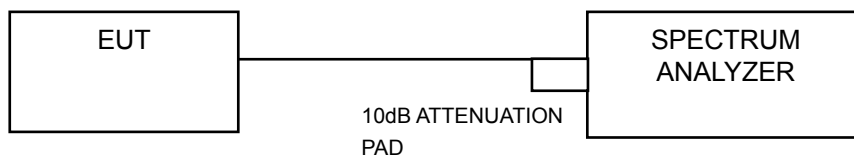
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4.4 Peak Power Spectral Density Measurement

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/ 500kHz

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

For U-NII-1 band:

Using method SA-2 alternative

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = 20ms.
- 5) Perform a single sweep.
- 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 $\geq$ 1 MHz, Detector = RMS
- 3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- 4) 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 $BWCF = 10\log(500\text{ kHz}/300\text{ kHz})$
- 5) Sweep time = auto, trigger set to "free run".
- 6) Trace average at least 100 traces in power averaging mode.
- 7) Record the max value and add 10 log (1/duty cycle)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 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	Chain 2					
36	5180	2.84	2.95	3.20	7.77	0.16	7.93	15.56	PASS
40	5200	5.69	5.76	5.39	10.39	0.16	10.55	15.56	PASS
48	5240	3.50	3.95	3.77	8.52	0.16	8.68	15.56	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.44-6) = 15.56\text{dBm}$.
- 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	Chain 2					
36	5180	2.74	2.92	2.90	7.62	0.17	7.79	15.56	PASS
40	5200	5.24	5.11	4.98	9.88	0.17	10.05	15.56	PASS
48	5240	3.21	3.68	3.42	8.21	0.17	8.38	15.56	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.44-6) = 15.56\text{dBm}$.
- 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	Chain 2					
38	5190	-5.29	-6.35	-6.40	-1.21	0.49	-0.72	15.56	PASS
46	5230	1.86	1.33	-5.96	4.98	0.49	5.47	15.56	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 = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.44-6) = 15.56\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

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	Chain 2					
42	5210	-11.02	-11.89	-11.82	-6.79	0.63	-6.16	15.56	PASS

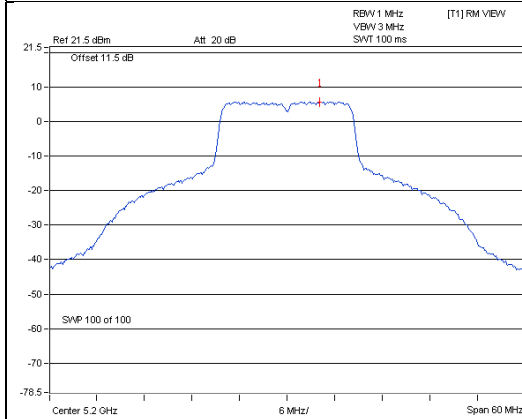
NOTE:

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 = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.44-6) = 15.56\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

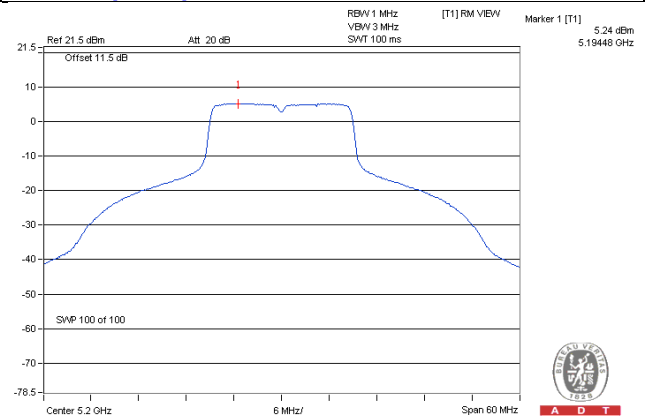
SPECTRUM PLOT OF WORST VALUE

802.11a

802.11n (HT20)



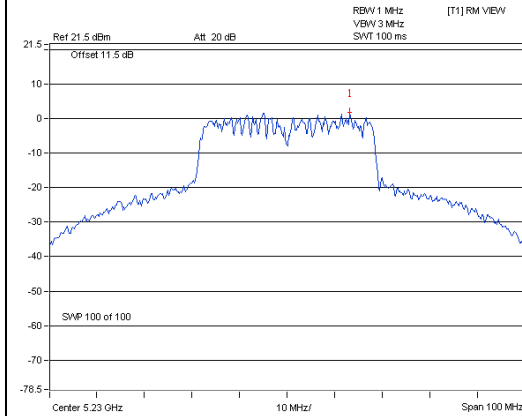
A D T



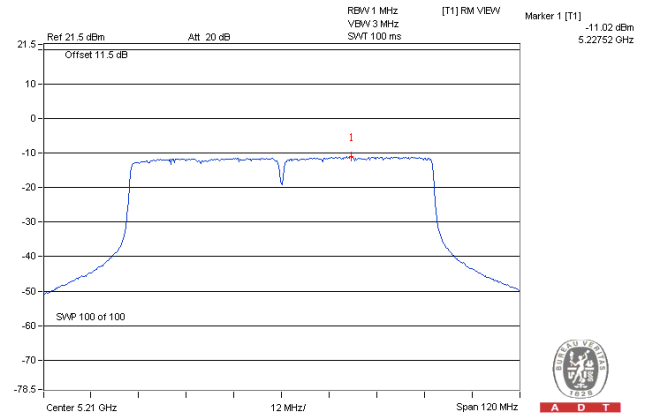
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



A D T

For U-NII-3 Band

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	-7.65	-5.43	4.77	0.16	-0.50	28.56	PASS
	157	5785	-7.19	-4.97	4.77	0.16	-0.04	28.56	PASS
	165	5825	-7.91	-5.69	4.77	0.16	-0.76	28.56	PASS
1	149	5745	-6.60	-4.38	4.77	0.16	0.55	28.56	PASS
	157	5785	-7.50	-5.28	4.77	0.16	-0.35	28.56	PASS
	165	5825	-6.76	-4.54	4.77	0.16	0.39	28.56	PASS
2	149	5745	-6.38	-4.16	4.77	0.16	0.77	28.56	PASS
	157	5785	-5.57	-3.35	4.77	0.16	1.58	28.56	PASS
	165	5825	-6.42	-4.20	4.77	0.16	0.73	28.56	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.44 - 6) = 28.56 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	-8.81	-6.59	4.77	0.17	-1.65	28.56	PASS
	157	5785	-7.73	-5.51	4.77	0.17	-0.57	28.56	PASS
	165	5825	-8.86	-6.64	4.77	0.17	-1.70	28.56	PASS
1	149	5745	-7.65	-5.43	4.77	0.17	-0.49	28.56	PASS
	157	5785	-7.00	-4.78	4.77	0.17	0.16	28.56	PASS
	165	5825	-8.08	-5.86	4.77	0.17	-0.92	28.56	PASS
2	149	5745	-7.24	-5.02	4.77	0.17	-0.08	28.56	PASS
	157	5785	-6.48	-4.26	4.77	0.17	0.68	28.56	PASS
	165	5825	-7.21	-4.99	4.77	0.17	-0.05	28.56	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.44 - 6) = 28.56 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	-13.99	-11.77	4.77	0.49	-6.51	28.56	PASS
	159	5795	-11.49	-9.27	4.77	0.49	-4.01	28.56	PASS
1	151	5755	-13.21	-10.99	4.77	0.49	-5.73	28.56	PASS
	159	5795	-11.39	-9.17	4.77	0.49	-3.91	28.56	PASS
2	151	5755	-12.58	-10.36	4.77	0.49	-5.10	28.56	PASS
	159	5795	-10.10	-7.88	4.77	0.49	-2.62	28.56	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.44 - 6) = 28.56 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	-21.41	-19.19	4.77	0.63	-13.79	28.56	PASS
1	151	5755	-20.98	-18.76	4.77	0.63	-13.36	28.56	PASS
2	151	5755	-20.20	-17.98	4.77	0.63	-12.58	28.56	PASS

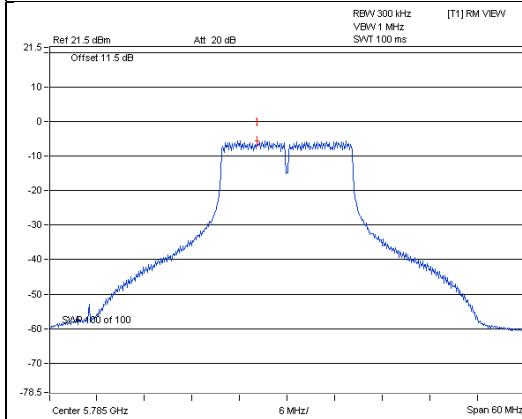
NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/3] = 7.44 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.44 - 6) = 28.56 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

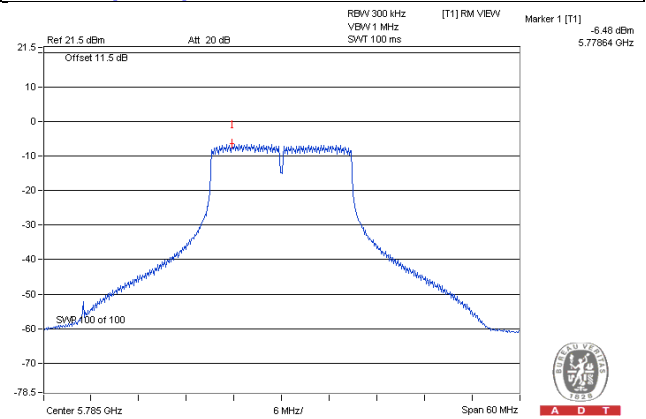
SPECTRUM PLOT OF WORST VALUE

802.11a

802.11n (HT20)



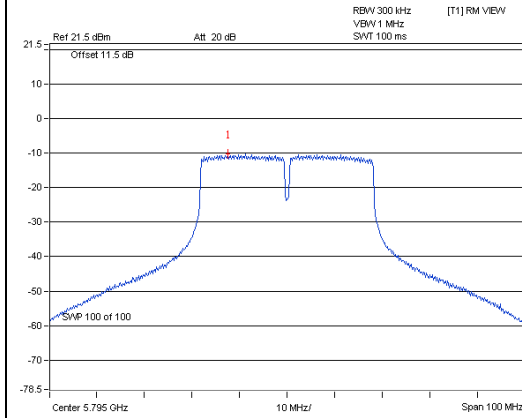
A D T



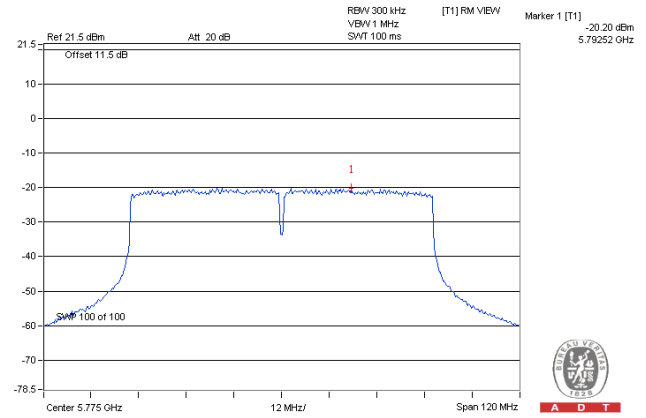
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



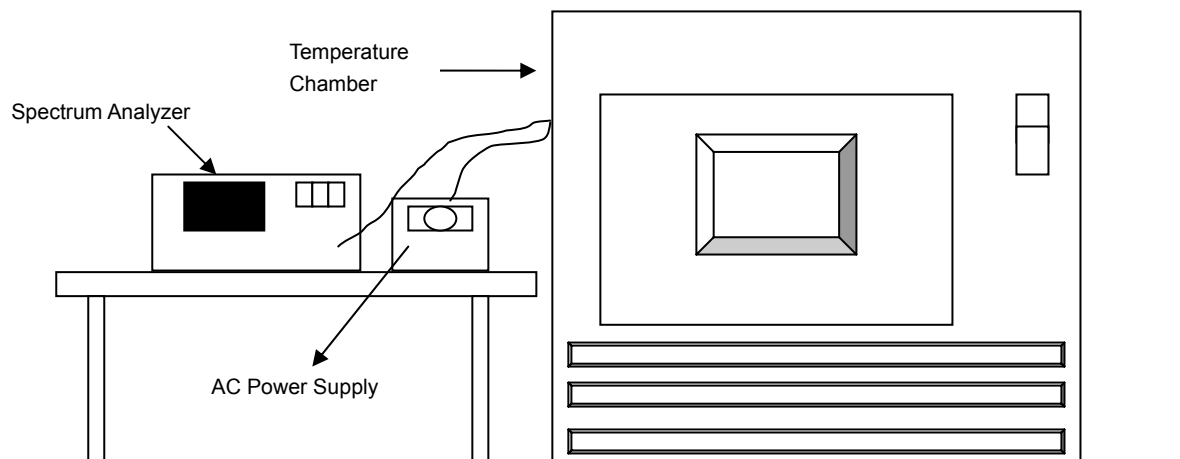
A D T

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 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5240.00040	0.00001	5239.99870	-0.00002	5239.99980	0.00000	5240.00170	0.00003
40	120	5240.01720	0.00033	5240.01520	0.00029	5240.01700	0.00032	5240.01380	0.00026
30	120	5240.02340	0.00045	5240.02230	0.00043	5240.02370	0.00045	5240.02580	0.00049
20	120	5239.99970	-0.00001	5239.99780	-0.00004	5240.00010	0.00000	5240.00080	0.00002
10	120	5240.00090	0.00002	5239.99790	-0.00004	5240.00050	0.00001	5240.00000	0.00000
0	120	5240.01880	0.00036	5240.01960	0.00037	5240.02000	0.00038	5240.02010	0.00038
-10	120	5240.02490	0.00048	5240.02610	0.00050	5240.02280	0.00044	5240.02230	0.00043
-20	120	5240.02360	0.00045	5240.02850	0.00054	5240.02430	0.00046	5240.02340	0.00045
-30	120	5240.01750	0.00033	5240.01710	0.00033	5240.01680	0.00032	5240.02010	0.00038

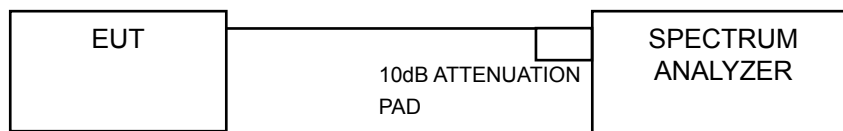
FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5239.9996	-0.00001	5239.9983	-0.00003	5239.9999	0.00000	5240.0004	0.00001
	120	5239.9997	-0.00001	5239.9978	-0.00004	5240.0001	0.00000	5240.0008	0.00002
	102	5240.0005	0.00001	5239.9982	-0.00003	5240.0003	0.00001	5240.0001	0.00000

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

789033 D02 General UNII Test Procedures New Rules v01 (C)

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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	Chain 2		
149	5745	16.37	16.38	16.38	0.5	PASS
157	5785	16.39	16.39	16.40	0.5	PASS
165	5825	16.40	16.38	16.40	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.62	17.63	17.61	0.5	PASS
157	5785	17.61	17.63	17.62	0.5	PASS
165	5825	17.62	17.60	17.62	0.5	PASS

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.45	36.12	36.40	0.5	PASS
159	5795	36.14	36.38	35.84	0.5	PASS

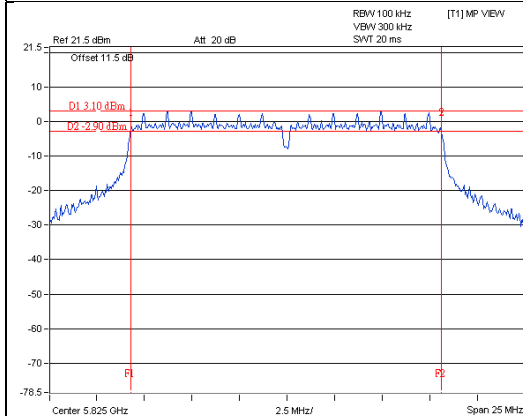
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	76.07	76.42	75.97	0.5	PASS

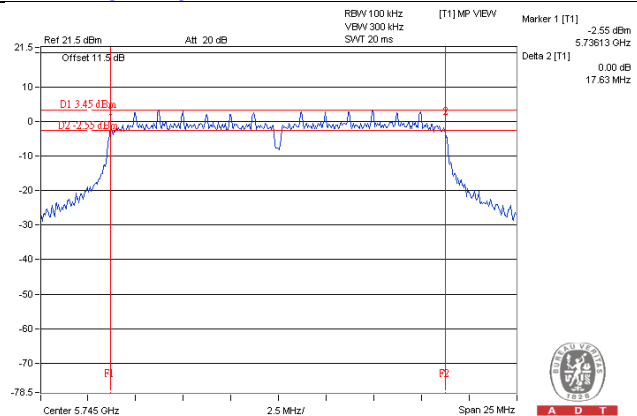
SPECTRUM PLOT OF WORST VALUE

802.11a

802.11n (HT20)



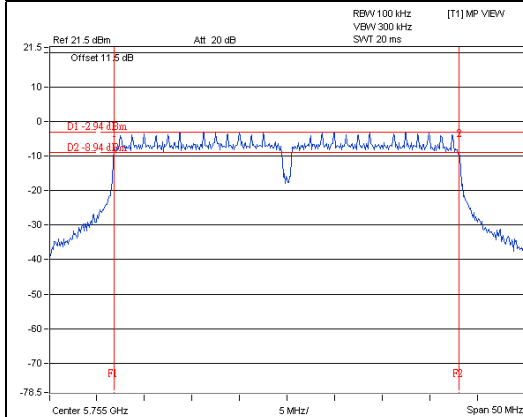
A D T



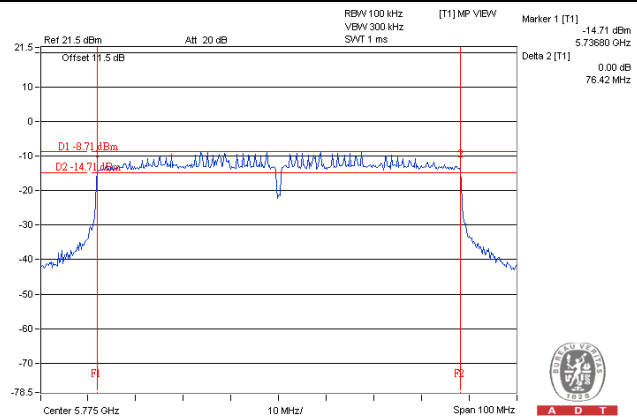
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



A D T

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 Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety

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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