FCC Test Report

Report No.:	RF150821C10C
FCC ID:	ZQ6-AP6356SDXX
Test Model:	AP6356SD
Received Date:	Aug. 21, 2015
Test Date:	Nov. 27, 2015 ~ Aug. 26, 2016
Issued Date:	Aug. 31, 2016
Applicant:	AMPAK Technology Inc.
Address:	3F, No. 1, Jen AI Road, Hsinchu Industrial Park, Hsinchu, Taiwan, 30352
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF150821C10C	Original release	Aug. 31, 2016

1 Certificate of Conformity

Product:	WLAN module for 802.11abgn(2x2) + 11ac + BT4.1
Brand:	Ampak
Test Model:	AP6356SD
Sample Status:	Engineering Sample
Applicant:	AMPAK Technology Inc.
Test Date:	Nov. 27, 2015 ~ Aug. 26, 2016
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. 31, 2016

Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Aug. 31, 2016

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
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.86dB at 1.06494MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.2dB at 45.42MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	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	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 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	WLAN module for 802.11abgn(2x2) + 11ac + BT4.1
Brand	Ampak
Test Model	AP6356SD
Status of EUT	Engineering Sample
Power Supply Rating	5Vdc (host equipment)
Modulation Type	256QAM, 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 150Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5260 ~ 5320MHz, 5500 ~ 5700MHz
Number of Channel	5260 ~ 5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5500 ~ 5700MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 11, 802.11n (HT40), 802.11ac (VHT40): 5, 802.11ac (VHT80): 2
Output Power	5260 ~ 5320MHz: 19.232mW 5500 ~ 5700MHz: 18.774mW
Antenna Type	PIFA antenna with 5.5dBi gain
Antenna Connector	IPEX
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the original report (BV ADT report no.: RF150821C10-1) is adding 5.26GHz to 5.32GHz and 5.50GHz to 5.70GHz by software.
2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	TX Function
802.11a	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (VHT80)	2TX

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

3.2 Description of Test Modes

For 5260 ~ 5320MHz

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

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

For 5500 ~ 5700MHz

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz

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

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

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

Radiated Emission Test (Above 1GHz):

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

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-	802.11n (HT20)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
-	802.11n (HT40)		54 to 62	54, 62	OFDM	BPSK	15.0
-	802.11ac (VHT80)		58	58	OFDM	BPSK	97.5
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-	802.11n (HT20)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
-	802.11n (HT40)		102 to 134	102, 110, 134	OFDM	BPSK	15.0
-	802.11ac (VHT80)		106	106	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	5260-5320	52 to 64	52	OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140		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	5260-5320	52 to 64	52	OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140		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.

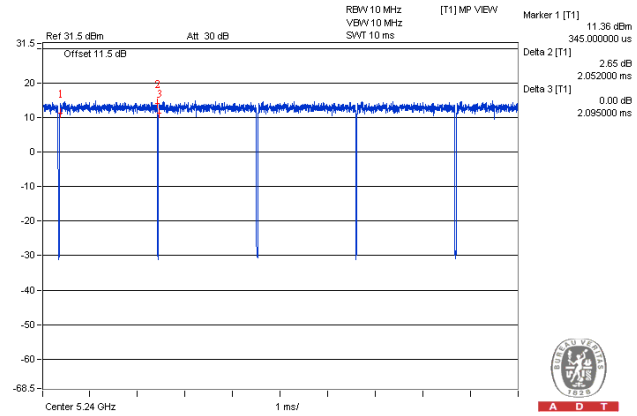
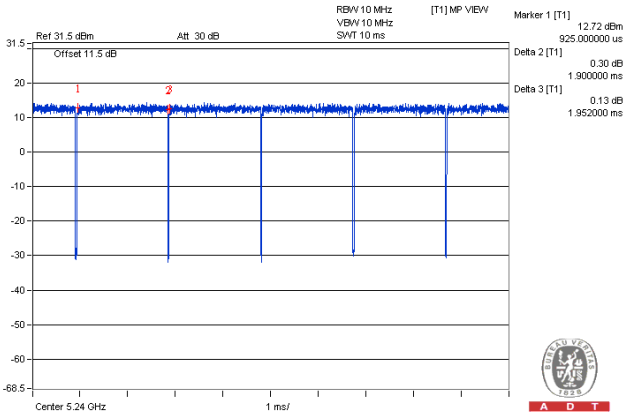
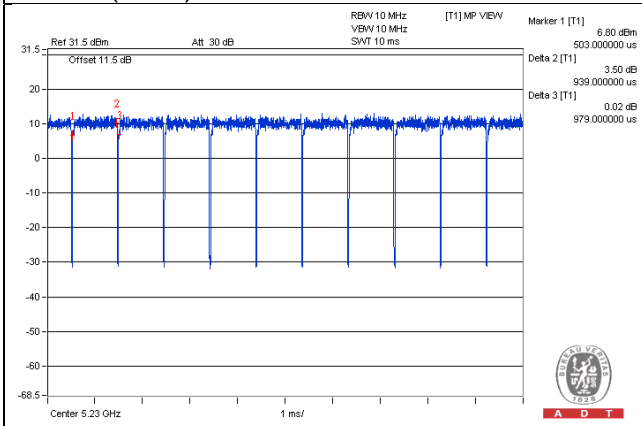
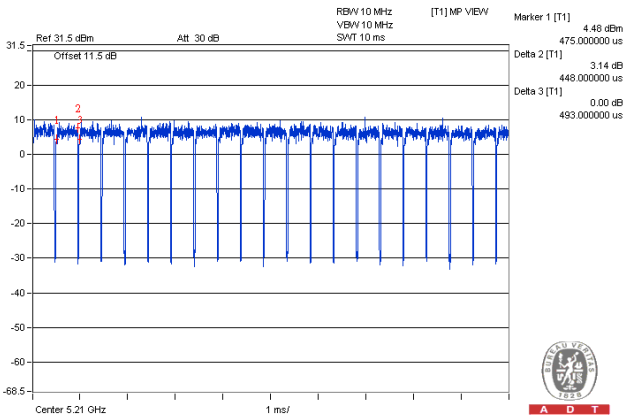
EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-	802.11n (HT20)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
-	802.11n (HT40)		54 to 62	54, 62	OFDM	BPSK	15.0
-	802.11ac (VHT80)		58	58	OFDM	BPSK	97.5
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-	802.11n (HT20)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
-	802.11n (HT40)		102 to 134	102, 110, 134	OFDM	BPSK	15.0
-	802.11ac (VHT80)		106	106	OFDM	BPSK	97.5

Test Condition:

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

3.3 Duty Cycle of Test Signal

802.11a: Duty cycle of test signal is > 98%, duty factor is not required.
802.11n (HT20), 802.11n (HT40), 802.11ac (VHT80): Duty cycle of test signal is < 98 %, duty factor is required.
802.11n (HT20): Duty cycle = 1.900/1.952 = 0.973, Duty factor = 10 * log(1/0.973) = 0.12
802.11n (HT40): Duty cycle = 0.939/0.979 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18
802.11ac (VHT80): Duty cycle = 0.448/0.493 = 0.909, Duty factor = 10 * log(1/0.909) = 0.42

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.

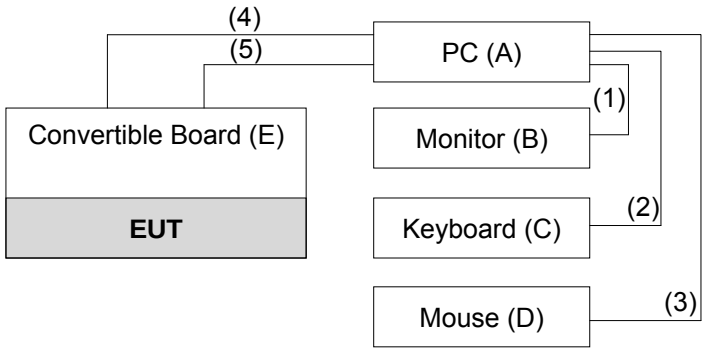
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	PC	Ampak	AC00301	NA	NA	Provided by manufacturer
B.	Monitor	Samsung	173v	NA	NA	-
C.	Keyboard	DELL	KB4021	CN-05V23T-71581-1A K-00IX-A01	FCC DoC Approved	-
D.	Mouse	DELL	MS111-P	CN-011D3V-71581-1C J-092J	FCC DoC Approved	-
E.	Convertible Board	NA	NA	NA	NA	Provided by manufacturer

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	D-sub cable	1	1.8	Y	2	-
2.	USB cable	1	1.8	Y	0	-
3.	USB cable	1	1.8	Y	0	-
4.	Mini USB cable	2	1	Y	0	Provided by manufacturer
5.	Convertible cable	1	0.5	N	0	Provided by manufacturer

Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedures New Rules v01r03

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01

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

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v01r03</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK:105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK:122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note: 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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 12, 2015	Oct. 11, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jul. 08, 2015	Jul. 07, 2016
			Jul. 08, 2016	Jul. 07, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 07, 2015	Jan. 06, 2016
			Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Jan. 08, 2015	Jan. 07, 2016
			Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2015	Jan. 17, 2016
			Jan. 18, 2016	Jan. 17, 2017
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-02(295012+ 309220)	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	Aug. 09, 2015	Aug. 08, 2016
			Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2015	Oct. 17, 2016
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
			Jul. 09, 2016	Jul. 08, 2017
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016
			Jul. 09, 2016	Jul. 08, 2017
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2015	Jun. 07, 2016
			Jun. 08, 2016	Jun. 07, 2017

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 4.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.

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:

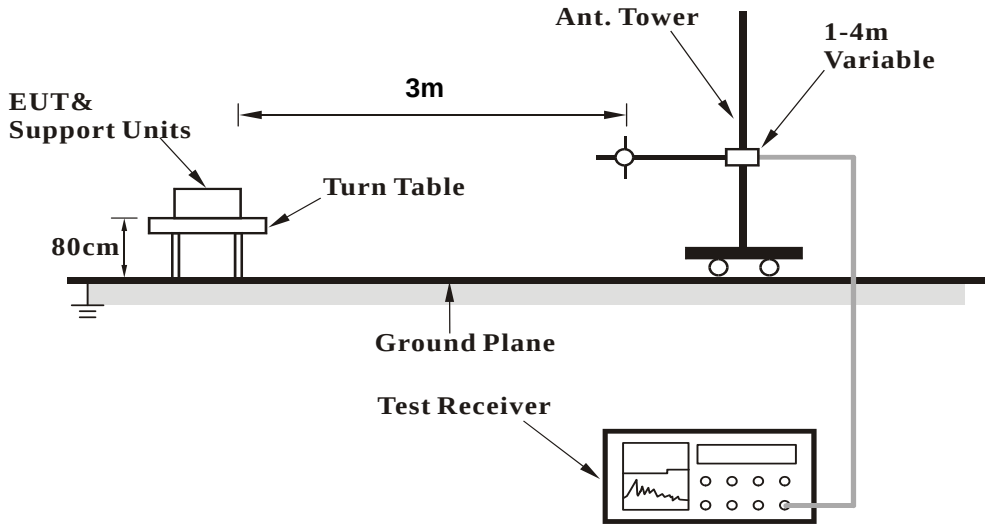
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

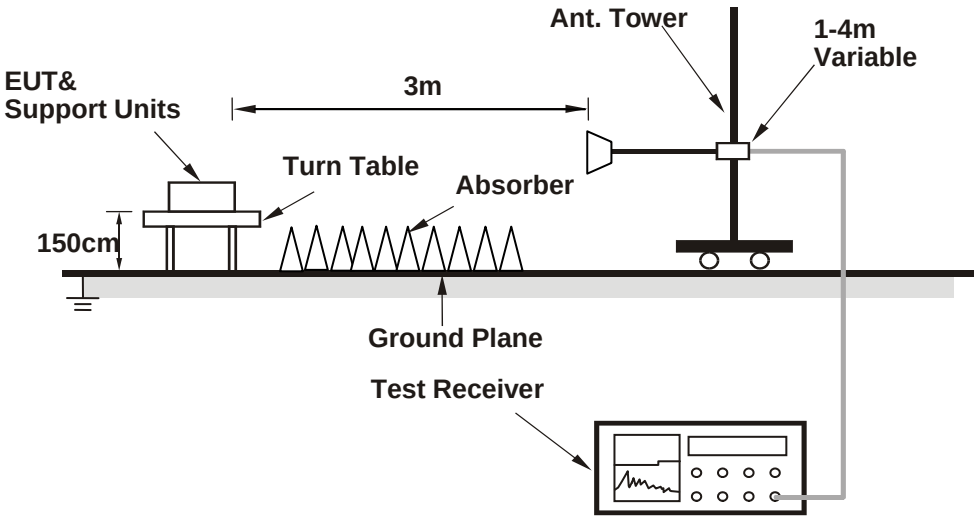
No deviation.

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. Conntected EUT with PC via Convertible Board through mini USB cable.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data

802.11a

CHANNEL	TX Channel 52	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	1.62 H	62	51.2	5.0
2	5150.00	43.4 AV	54.0	-10.6	1.62 H	62	38.4	5.0
3	*5260.00	95.4 PK			1.51 H	54	56.2	39.2
4	*5260.00	85.3 AV			1.51 H	54	46.1	39.2
5	#10520.00	58.8 PK	74.0	-15.2	1.25 H	74	41.5	17.3
6	#10520.00	45.7 AV	54.0	-8.3	1.25 H	74	28.4	17.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.6 PK	74.0	-16.4	2.10 V	68	52.6	5.0
2	5150.00	45.5 AV	54.0	-8.5	2.10 V	68	40.5	5.0
3	*5260.00	103.4 PK			1.89 V	55	64.2	39.2
4	*5260.00	93.8 AV			1.89 V	55	54.6	39.2
5	#10520.00	59.9 PK	74.0	-14.1	1.17 V	41	42.6	17.3
6	#10520.00	47.3 AV	54.0	-6.7	1.17 V	41	30.0	17.3

Remark:

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 60	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	*5300.00	96.2 PK			1.35 H	49	56.9	39.3
2	*5300.00	86.2 AV			1.35 H	49	46.9	39.3
3	10600.00	59.4 PK	74.0	-14.6	1.28 H	74	41.6	17.8
4	10600.00	46.2 AV	54.0	-7.8	1.28 H	74	28.4	17.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	103.8 PK			1.70 V	54	64.5	39.3
2	*5300.00	93.6 AV			1.70 V	54	54.3	39.3
3	10600.00	60.4 PK	74.0	-13.6	1.07 V	41	42.6	17.8
4	10600.00	47.2 AV	54.0	-6.8	1.07 V	41	29.4	17.8

Remark:

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 64	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	*5320.00	96.1 PK			1.00 H	352	56.7	39.4
2	*5320.00	86.2 AV			1.00 H	352	46.8	39.4
3	5350.00	56.6 PK	74.0	-17.4	1.23 H	341	51.2	5.4
4	5350.00	43.8 AV	54.0	-10.2	1.23 H	341	38.4	5.4
5	#10520.00	59.2 PK	74.0	-14.8	1.07 H	41	41.9	17.3
6	#10520.00	45.7 AV	54.0	-8.3	1.07 H	41	28.4	17.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	104.2 PK			1.86 V	55	64.8	39.4
2	*5320.00	93.8 AV			1.86 V	55	54.4	39.4
3	5350.00	57.8 PK	74.0	-16.2	1.80 V	63	52.4	5.4
4	5350.00	45.5 AV	54.0	-8.5	1.80 V	63	40.1	5.4
5	10640.00	60.1 PK	74.0	-13.9	1.07 V	85	42.6	17.5
6	10640.00	47.4 AV	54.0	-6.6	1.07 V	85	29.9	17.5

Remark:

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 100	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	5460.00	56.0 PK	74.0	-18.0	2.41 H	260	50.4	5.6
2	5460.00	43.0 AV	54.0	-11.0	2.41 H	260	37.4	5.6
3	#5470.00	57.3 PK	74.0	-16.7	2.41 H	260	51.6	5.7
4	#5470.00	44.1 AV	54.0	-9.9	2.41 H	260	38.4	5.7
5	*5500.00	96.2 PK			2.28 H	233	56.5	39.7
6	*5500.00	86.5 AV			2.28 H	233	46.8	39.7
7	11000.00	59.8 PK	74.0	-14.2	1.08 H	96	41.3	18.5
8	11000.00	46.9 AV	54.0	-7.1	1.08 H	96	28.4	18.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	58.2 PK	74.0	-15.8	2.40 V	310	52.6	5.6
2	5460.00	44.3 AV	54.0	-9.7	2.40 V	310	38.7	5.6
3	#5470.00	58.3 PK	74.0	-15.7	2.40 V	310	52.6	5.7
4	#5470.00	45.8 AV	54.0	-8.2	2.40 V	310	40.1	5.7
5	*5500.00	105.2 PK			2.37 V	305	65.5	39.7
6	*5500.00	95.2 AV			2.37 V	305	55.5	39.7
7	11000.00	61.1 PK	74.0	-12.9	1.07 V	84	42.6	18.5
8	11000.00	47.9 AV	54.0	-6.1	1.07 V	84	29.4	18.5

Remark:

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 116	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	*5580.00	97.7 PK			2.40 H	231	58.0	39.7
2	*5580.00	86.4 AV			2.40 H	231	46.7	39.7
3	11160.00	60.6 PK	74.0	-13.4	1.08 H	52	42.6	18.0
4	11160.00	47.5 AV	54.0	-6.5	1.08 H	52	29.5	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	104.4 PK			2.24 V	307	64.7	39.7
2	*5580.00	94.6 AV			2.24 V	307	54.9	39.7
3	11160.00	59.6 PK	74.0	-14.4	1.08 V	55	41.6	18.0
4	11160.00	46.4 AV	54.0	-7.6	1.08 V	55	28.4	18.0

Remark:

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 140	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	*5700.00	97.0 PK			2.35 H	233	56.9	40.1
2	*5700.00	87.2 AV			2.35 H	233	47.1	40.1
3	#5725.00	57.3 PK	74.0	-16.7	2.40 H	228	51.2	6.1
4	#5725.00	44.5 AV	54.0	-9.5	2.40 H	228	38.4	6.1
5	11400.00	59.7 PK	74.0	-14.3	1.07 H	41	41.5	18.2
6	11400.00	46.3 AV	54.0	-7.7	1.07 H	41	28.1	18.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	105.0 PK			2.05 V	298	64.9	40.1
2	*5700.00	95.0 AV			2.05 V	298	54.9	40.1
3	#5725.00	58.7 PK	74.0	-15.3	2.15 V	314	52.6	6.1
4	#5725.00	47.0 AV	54.0	-7.0	2.15 V	314	40.9	6.1
5	11400.00	60.8 PK	74.0	-13.2	1.08 V	55	42.6	18.2
6	11400.00	47.9 AV	54.0	-6.1	1.08 V	55	29.7	18.2

Remark:

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 52	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	56.8 PK	74.0	-17.2	1.00 H	76	51.8	5.0
2	5150.00	43.8 AV	54.0	-10.2	1.00 H	76	38.8	5.0
3	*5260.00	95.7 PK			1.00 H	73	56.5	39.2
4	*5260.00	84.8 AV			1.00 H	73	45.6	39.2
5	#10520.00	58.2 PK	74.0	-15.8	1.00 H	76	40.9	17.3
6	#10520.00	45.4 AV	54.0	-8.6	1.00 H	76	28.1	17.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.8 PK	74.0	-16.2	1.00 V	87	52.8	5.0
2	5150.00	46.0 AV	54.0	-8.0	1.00 V	87	41.0	5.0
3	*5260.00	104.4 PK			1.00 V	84	65.2	39.2
4	*5260.00	93.8 AV			1.00 V	84	54.6	39.2
5	#10520.00	59.8 PK	74.0	-14.2	1.17 V	47	42.5	17.3
6	#10520.00	47.1 AV	54.0	-6.9	1.17 V	47	29.8	17.3

Remark:

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 60	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	*5300.00	95.4 PK			1.03 H	45	56.1	39.3
2	*5300.00	84.9 AV			1.03 H	45	45.6	39.3
3	10600.00	58.9 PK	74.0	-15.1	1.00 H	72	41.1	17.8
4	10600.00	46.1 AV	54.0	-7.9	1.00 H	72	28.3	17.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	105.6 PK			1.15 V	83	66.3	39.3
2	*5300.00	94.8 AV			1.15 V	83	55.5	39.3
3	10600.00	60.1 PK	74.0	-13.9	1.02 V	40	42.3	17.8
4	10600.00	47.0 AV	54.0	-7.0	1.02 V	40	29.2	17.8

Remark:

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 64	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	*5320.00	95.3 PK			1.00 H	60	55.9	39.4
2	*5320.00	84.9 AV			1.00 H	60	45.5	39.4
3	5350.00	56.8 PK	74.0	-17.2	1.00 H	55	51.4	5.4
4	5350.00	44.7 AV	54.0	-9.3	1.00 H	55	39.3	5.4
5	10640.00	58.8 PK	74.0	-15.2	1.00 H	44	41.3	17.5
6	10640.00	45.4 AV	54.0	-8.6	1.00 H	44	27.9	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	104.0 PK			1.00 V	90	64.6	39.4
2	*5320.00	93.7 AV			1.00 V	90	54.3	39.4
3	5350.00	58.6 PK	74.0	-15.4	1.00 V	88	53.2	5.4
4	5350.00	46.1 AV	54.0	-7.9	1.00 V	88	40.7	5.4
5	10640.00	60.0 PK	74.0	-14.0	1.01 V	87	42.5	17.5
6	10640.00	47.0 AV	54.0	-7.0	1.01 V	87	29.5	17.5

Remark:

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 100	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	5460.00	56.8 PK	74.0	-17.2	1.00 H	85	51.2	5.6
2	5460.00	43.2 AV	54.0	-10.8	1.00 H	85	37.6	5.6
3	#5470.00	57.5 PK	74.0	-16.5	1.00 H	85	51.8	5.7
4	#5470.00	44.7 AV	54.0	-9.3	1.00 H	85	39.0	5.7
5	*5500.00	96.8 PK			1.00 H	81	57.1	39.7
6	*5500.00	86.1 AV			1.00 H	81	46.4	39.7
7	11000.00	59.4 PK	74.0	-14.6	1.00 H	95	40.9	18.5
8	11000.00	46.7 AV	54.0	-7.3	1.00 H	95	28.2	18.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	58.0 PK	74.0	-16.0	1.70 V	52	52.4	5.6
2	5460.00	43.9 AV	54.0	-10.1	1.70 V	52	38.3	5.6
3	#5470.00	58.9 PK	74.0	-15.1	1.70 V	52	53.2	5.7
4	#5470.00	45.7 AV	54.0	-8.3	1.70 V	52	40.0	5.7
5	*5500.00	104.7 PK			1.77 V	52	65.0	39.7
6	*5500.00	94.4 AV			1.77 V	52	54.7	39.7
7	11000.00	60.7 PK	74.0	-13.3	1.02 V	82	42.2	18.5
8	11000.00	47.1 AV	54.0	-6.9	1.02 V	82	28.6	18.5

Remark:

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 116	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	*5580.00	97.2 PK			1.74 H	182	57.5	39.7
2	*5580.00	86.8 AV			1.74 H	182	47.1	39.7
3	11160.00	59.2 PK	74.0	-14.8	1.00 H	57	41.2	18.0
4	11160.00	45.9 AV	54.0	-8.1	1.00 H	57	27.9	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	103.8 PK			1.00 V	111	64.1	39.7
2	*5580.00	93.7 AV			1.00 V	111	54.0	39.7
3	11160.00	59.5 PK	74.0	-14.5	1.05 V	55	41.5	18.0
4	11160.00	46.0 AV	54.0	-8.0	1.05 V	55	28.0	18.0

Remark:

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 140	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	*5700.00	98.5 PK			1.62 H	183	58.4	40.1
2	*5700.00	88.2 AV			1.62 H	183	48.1	40.1
3	#5725.00	57.7 PK	74.0	-16.3	1.63 H	184	51.6	6.1
4	#5725.00	45.1 AV	54.0	-8.9	1.63 H	184	39.0	6.1
5	11400.00	59.3 PK	74.0	-14.7	1.00 H	47	41.1	18.2
6	11400.00	46.0 AV	54.0	-8.0	1.00 H	47	27.8	18.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	104.5 PK			1.00 V	88	64.4	40.1
2	*5700.00	93.6 AV			1.00 V	88	53.5	40.1
3	#5725.00	58.6 PK	74.0	-15.4	1.00 V	80	52.5	6.1
4	#5725.00	46.1 AV	54.0	-7.9	1.00 V	80	40.0	6.1
5	11400.00	59.9 PK	74.0	-14.1	1.00 V	50	41.7	18.2
6	11400.00	47.1 AV	54.0	-6.9	1.00 V	50	28.9	18.2

Remark:

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 54	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	57.4 PK	74.0	-16.6	1.17 H	74	52.4	5.0
2	5150.00	44.6 AV	54.0	-9.4	1.17 H	74	39.6	5.0
3	*5270.00	92.6 PK			1.12 H	72	53.4	39.2
4	*5270.00	82.0 AV			1.12 H	72	42.8	39.2
5	#10540.00	57.8 PK	74.0	-16.2	1.00 H	71	40.3	17.5
6	#10540.00	45.2 AV	54.0	-8.8	1.00 H	71	27.7	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.00 V	83	53.0	5.0
2	5150.00	46.1 AV	54.0	-7.9	1.00 V	83	41.1	5.0
3	*5270.00	101.7 PK			1.00 V	84	62.5	39.2
4	*5270.00	91.1 AV			1.00 V	84	51.9	39.2
5	#10540.00	59.2 PK	74.0	-14.8	1.12 V	46	41.7	17.5
6	#10540.00	47.0 AV	54.0	-7.0	1.12 V	46	29.5	17.5

Remark:

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 62	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	*5310.00	91.9 PK			1.01 H	45	52.6	39.3
2	*5310.00	81.1 AV			1.01 H	45	41.8	39.3
3	5350.00	57.1 PK	74.0	-16.9	1.04 H	41	51.7	5.4
4	5350.00	45.4 AV	54.0	-8.6	1.04 H	41	40.0	5.4
5	10620.00	58.5 PK	74.0	-15.5	1.00 H	45	40.8	17.7
6	10620.00	45.2 AV	54.0	-8.8	1.00 H	45	27.5	17.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	101.3 PK			1.00 V	84	62.0	39.3
2	*5310.00	91.0 AV			1.00 V	84	51.7	39.3
3	5350.00	59.2 PK	74.0	-14.8	1.00 V	87	53.8	5.4
4	5350.00	46.4 AV	54.0	-7.6	1.00 V	87	41.0	5.4
5	10620.00	59.4 PK	74.0	-14.6	1.05 V	81	41.7	17.7
6	10620.00	46.8 AV	54.0	-7.2	1.05 V	81	29.1	17.7

Remark:

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 102	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	5460.00	56.0 PK	74.0	-18.0	1.05 H	298	50.3	5.7
2	5460.00	43.9 AV	54.0	-10.1	1.05 H	298	38.2	5.7
3	#5470.00	56.6 PK	74.0	-17.4	1.05 H	298	50.9	5.7
4	#5470.00	44.7 AV	54.0	-9.3	1.05 H	298	39.0	5.7
5	*5510.00	93.9 PK			1.00 H	322	54.2	39.7
6	*5510.00	83.4 AV			1.00 H	322	43.7	39.7
7	11020.00	59.5 PK	74.0	-14.5	1.00 H	195	41.1	18.4
8	11020.00	46.9 AV	54.0	-7.1	1.00 H	195	28.5	18.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	57.4 PK	74.0	-16.6	1.19 V	57	51.7	5.7
2	5460.00	45.2 AV	54.0	-8.8	1.19 V	57	39.5	5.7
3	#5470.00	57.1 PK	74.0	-16.9	1.19 V	57	51.4	5.7
4	#5470.00	46.0 AV	54.0	-8.0	1.19 V	57	40.3	5.7
5	*5510.00	99.0 PK			1.00 V	52	59.3	39.7
6	*5510.00	88.7 AV			1.00 V	52	49.0	39.7
7	11020.00	59.7 PK	74.0	-14.3	1.00 V	160	41.3	18.4
8	11020.00	47.2 AV	54.0	-6.8	1.00 V	160	28.8	18.4

Remark:

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 110	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	*5550.00	93.8 PK			1.00 H	218	54.0	39.8
2	*5550.00	83.8 AV			1.00 H	218	44.0	39.8
3	11100.00	60.0 PK	74.0	-14.0	1.10 H	188	41.1	18.9
4	11100.00	47.3 AV	54.0	-6.7	1.10 H	188	28.4	18.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5550.00	99.6 PK			1.00 V	53	59.8	39.8
2	*5550.00	89.3 AV			1.00 V	53	49.5	39.8
3	11100.00	60.2 PK	74.0	-13.8	1.08 V	113	41.3	18.9
4	11100.00	47.6 AV	54.0	-6.4	1.08 V	113	28.7	18.9

Remark:

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 134	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	*5670.00	92.4 PK			1.17 H	215	52.6	39.8
2	*5670.00	83.0 AV			1.17 H	215	43.2	39.8
3	#5725.00	57.1 PK	74.0	-16.9	1.20 H	223	51.3	5.8
4	#5725.00	43.9 AV	54.0	-10.1	1.20 H	223	38.1	5.8
5	11340.00	60.1 PK	74.0	-13.9	1.00 H	168	41.0	19.1
6	11340.00	47.0 AV	54.0	-7.0	1.00 H	168	27.9	19.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	100.8 PK			1.44 V	43	61.0	39.8
2	*5670.00	90.8 AV			1.44 V	43	51.0	39.8
3	#5725.00	55.8 PK	74.0	-18.2	1.38 V	55	50.0	5.8
4	#5725.00	44.1 AV	54.0	-9.9	1.38 V	55	38.3	5.8
5	11340.00	60.3 PK	74.0	-13.7	1.00 V	90	41.2	19.1
6	11340.00	47.3 AV	54.0	-6.7	1.00 V	90	28.2	19.1

Remark:

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

802.11ac (VHT80)

CHANNEL	TX Channel 58	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	*5290.00	87.5 PK			1.00 H	72	48.3	39.2
2	*5290.00	76.7 AV			1.00 H	72	37.5	39.2
3	5350.00	57.8 PK	74.0	-16.2	1.01 H	75	52.4	5.4
4	5350.00	45.9 AV	54.0	-8.1	1.01 H	75	40.5	5.4
5	#10580.00	58.2 PK	74.0	-15.8	1.00 H	44	40.6	17.6
6	#10580.00	44.3 AV	54.0	-9.7	1.00 H	44	26.7	17.6
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	*5290.00	97.8 PK			1.00 V	83	58.6	39.2
2	*5290.00	86.9 AV			1.00 V	83	47.7	39.2
3	5350.00	59.5 PK	74.0	-14.5	1.01 V	89	54.1	5.4
4	5350.00	46.9 AV	54.0	-7.1	1.01 V	89	41.5	5.4
5	#10580.00	58.5 PK	74.0	-15.5	1.08 V	80	40.9	17.6
6	#10580.00	46.6 AV	54.0	-7.4	1.08 V	80	29.0	17.6

Remark:

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 106	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	5460.00	55.0 PK	74.0	-19.0	1.12 H	246	49.3	5.7
2	5460.00	44.7 AV	54.0	-9.3	1.12 H	246	39.0	5.7
3	#5470.00	56.0 PK	74.0	-18.0	1.12 H	246	50.3	5.7
4	#5470.00	44.6 AV	54.0	-9.4	1.12 H	246	38.9	5.7
5	*5530.00	91.7 PK			1.00 H	239	52.0	39.7
6	*5530.00	81.6 AV			1.00 H	239	41.9	39.7
7	11060.00	60.5 PK	74.0	-13.5	1.00 H	88	41.9	18.6
8	11060.00	47.4 AV	54.0	-6.6	1.00 H	88	28.8	18.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	56.1 PK	74.0	-17.9	1.06 V	32	50.4	5.7
2	5460.00	45.4 AV	54.0	-8.6	1.06 V	32	39.7	5.7
3	#5470.00	56.7 PK	74.0	-17.3	1.06 V	32	51.0	5.7
4	#5470.00	45.6 AV	54.0	-8.4	1.06 V	32	39.9	5.7
5	*5530.00	97.3 PK			1.00 V	49	57.6	39.7
6	*5530.00	87.1 AV			1.00 V	49	47.4	39.7
7	11060.00	60.7 PK	74.0	-13.3	1.00 V	193	42.1	18.6
8	11060.00	47.6 AV	54.0	-6.4	1.00 V	193	29.0	18.6

Remark:

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

Below 1GHz worst-case data: 802.11a

CHANNEL	TX Channel 52	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	117.22	38.7 QP	43.5	-4.8	1.00 H	12	55.0	-16.3
2	190.95	40.2 QP	43.5	-3.3	1.00 H	243	56.5	-16.3
3	336.48	43.0 QP	46.0	-3.0	1.00 H	169	55.0	-12.0
4	367.53	41.4 QP	46.0	-4.6	1.00 H	8	53.0	-11.6
5	730.38	40.4 QP	46.0	-5.6	1.00 H	8	44.9	-4.5
6	794.42	40.6 QP	46.0	-5.4	1.00 H	351	43.7	-3.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	**45.42**	**38.8 QP**	**40.0**	**-1.2**	**1.00 V**	**295**	**52.9**	**-14.1**
2	119.16	36.1 QP	43.5	-7.4	1.25 V	182	52.4	-16.3
3	165.73	38.7 QP	43.5	-4.8	2.50 V	176	52.7	-14.0
4	367.53	42.9 QP	46.0	-3.1	1.50 V	266	54.5	-11.6
5	792.48	42.9 QP	46.0	-3.1	1.25 V	52	46.0	-3.1
6	873.97	38.0 QP	46.0	-8.0	1.50 V	152	40.1	-2.1

Remark:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2014	Dec. 25, 2015
			Dec. 26, 2015	Dec. 25, 2016
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
			Feb. 26, 2016	Feb. 25, 2017
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100220	Nov. 13, 2015	Nov. 12, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 Test Procedures

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

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

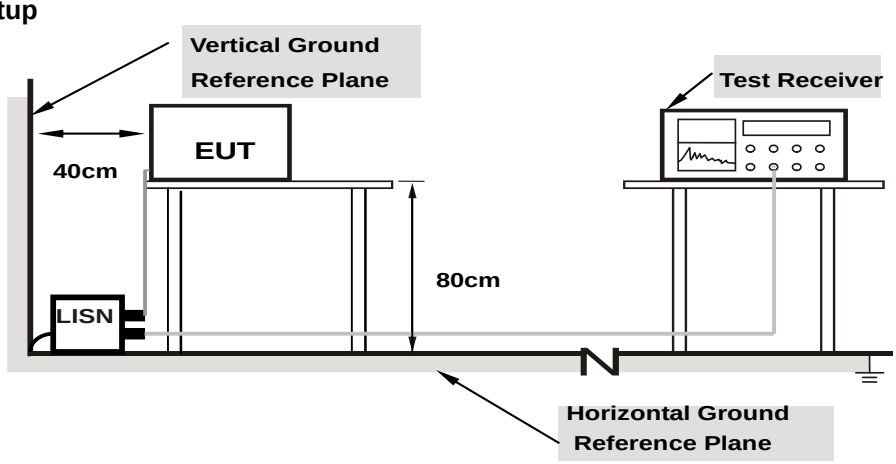
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

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.

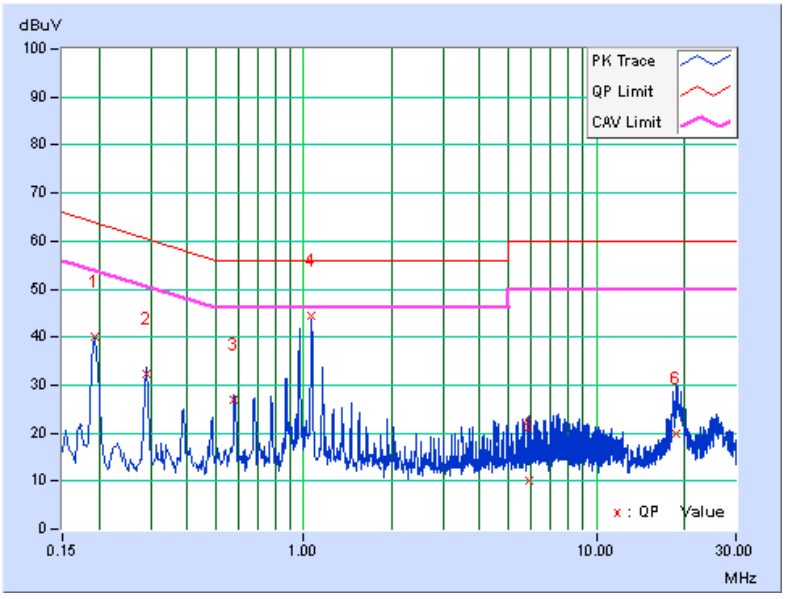
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19305	10.03	30.02	28.87	40.05	38.90	63.90	53.90	-23.85	-15.00
2	0.29076	10.07	22.11	21.27	32.18	31.34	60.50	50.50	-28.32	-19.16
3	0.58010	10.14	16.95	13.27	27.09	23.41	56.00	46.00	-28.91	-22.59
4	**1.06494**	**10.20**	**34.19**	**28.94**	**44.39**	**39.14**	**56.00**	**46.00**	**-11.61**	**-6.86**
5	5.89770	10.51	-0.42	-4.98	10.09	5.53	60.00	50.00	-49.91	-44.47
6	18.85544	11.28	8.62	0.55	19.90	11.83	60.00	50.00	-40.10	-38.17

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.

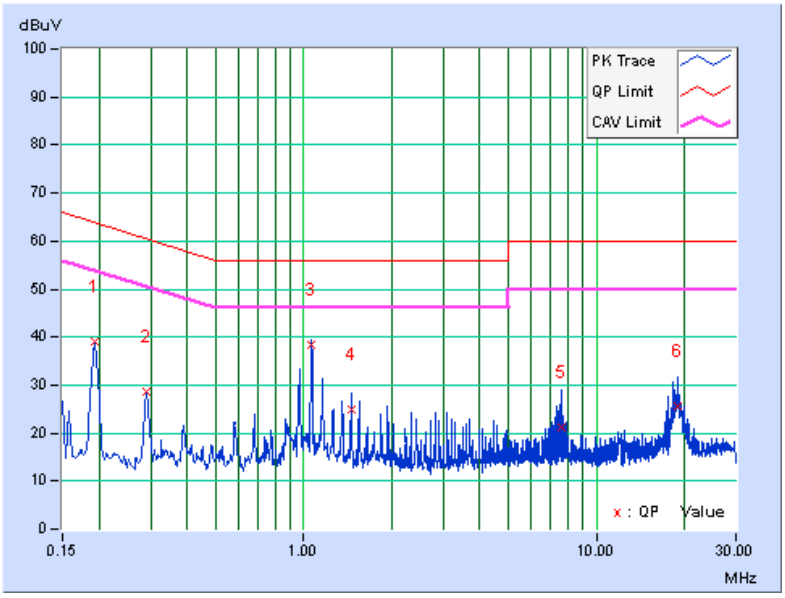


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19305	10.04	28.87	25.41	38.91	35.45	63.90	53.90	-24.99	-18.45
2	0.29076	10.08	18.45	15.05	28.53	25.13	60.50	50.50	-31.97	-25.37
3	1.06494	10.21	28.24	23.08	38.45	33.29	56.00	46.00	-17.55	-12.71
4	1.45287	10.24	14.65	12.06	24.89	22.30	56.00	46.00	-31.11	-23.70
5	7.55945	10.65	10.55	1.31	21.20	11.96	60.00	50.00	-38.80	-38.04
6	18.94537	11.40	14.28	8.05	25.68	19.45	60.00	50.00	-34.32	-30.55

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 Measurment

4.3.1 Limits of Transmit Power Measurement

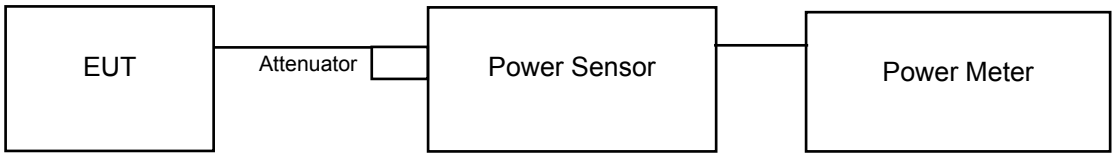
Operation Band	EUT Category		LIMIT
U-NII-1	---	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
	---	Fixed point-to-point Access Point	1 Watt (30 dBm)
	---	Indoor Access Point	1 Watt (30 dBm)
	---	Mobile and Portable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

*B is the 26 dB emission bandwidth in megahertz

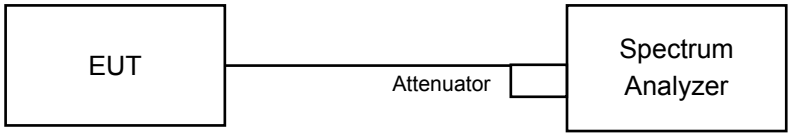
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

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



For 802.11ac (VHT80)



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)

a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

b. Set sweep trigger to “free run”.

c. Set RBW = 1 MHz.

d. Set VBW ≥ 3 MHz

e. Number of points in sweep ≥ 2 Span / RBW.

f. Sweep time ≤ (number of points in sweep) * T

g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.

h. Detector = RMS.

i. Trace mode = max hold.

j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’ s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

4.3.5 Deviation fromTest 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

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	9.29	9.01	16.454	12.16	24	Pass
60	5300	9.21	9.32	16.888	12.28	24	Pass
64	5320	9.04	9.46	16.848	12.27	24	Pass
100	5500	9.02	9.50	16.893	12.28	24	Pass
116	5580	9.06	9.62	17.216	12.36	24	Pass
140	5700	9.01	9.22	16.318	12.13	24	Pass

Note:
Chain 0
1. 11dBm + 10log (21.78) = 24.38 > 24dBm
2. 11dBm + 10log (21.78) = 24.38 > 24dBm
3. 11dBm + 10log (21.79) = 24.38 > 24dBm
4. 11dBm + 10log (21.77) = 24.38 > 24dBm
5. 11dBm + 10log (21.84) = 24.39 > 24dBm
6. 11dBm + 10log (21.84) = 24.39 > 24dBm

Chain 1
1. 11dBm + 10log (21.85) = 24.39 > 24dBm
2. 11dBm + 10log (22.00) = 24.42 > 24dBm
3. 11dBm + 10log (21.87) = 24.40 > 24dBm
4. 11dBm + 10log (21.92) = 24.41 > 24dBm
5. 11dBm + 10log (21.91) = 24.41 > 24dBm
6. 11dBm + 10log (21.91) = 24.41 > 24dBm

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	9.77	9.68	18.774	12.74	24	Pass
60	5300	9.84	9.82	**19.232**	12.84	24	Pass
64	5320	9.76	9.70	18.795	12.74	24	Pass
100	5500	9.57	9.66	18.304	12.63	24	Pass
116	5580	9.67	9.78	**18.774**	12.74	24	Pass
140	5700	8.80	9.66	16.833	12.26	24	Pass

Note:
Chain 0
1. 11dBm + 10log (21.93) = 24.41 > 24dBm
2. 11dBm + 10log (21.90) = 24.40 > 24dBm
3. 11dBm + 10log (22.01) = 24.43 > 24dBm
4. 11dBm + 10log (22.07) = 24.44 > 24dBm
5. 11dBm + 10log (22.05) = 24.43 > 24dBm
6. 11dBm + 10log (22.11) = 24.45 > 24dBm

Chain 1
1. 11dBm + 10log (22.13) = 24.45 > 24dBm
2. 11dBm + 10log (22.05) = 24.43 > 24dBm
3. 11dBm + 10log (22.21) = 24.47 > 24dBm
4. 11dBm + 10log (22.08) = 24.44 > 24dBm
5. 11dBm + 10log (22.10) = 24.44 > 24dBm
6. 11dBm + 10log (22.09) = 24.44 > 24dBm

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
54	5270	9.47	9.45	17.661	12.47	24	Pass
62	5310	9.52	9.46	17.785	12.50	24	Pass
102	5510	7.88	9.23	14.513	11.62	24	Pass
110	5550	7.71	9.05	13.937	11.44	24	Pass
134	5670	7.73	9.08	14.020	11.47	24	Pass

Note:
Chain 0
1. 11dBm + 10log (41.17) = 27.15 > 24dBm
2. 11dBm + 10log (41.01) = 27.13 > 24dBm
3. 11dBm + 10log (41.08) = 27.14 > 24dBm
4. 11dBm + 10log (41.13) = 27.14 > 24dBm
5. 11dBm + 10log (41.17) = 27.15 > 24dBm

Chain 1
1. 11dBm + 10log (41.35) = 27.16 > 24dBm
2. 11dBm + 10log (41.35) = 27.16 > 24dBm
3. 11dBm + 10log (41.30) = 27.16 > 24dBm
4. 11dBm + 10log (41.39) = 27.17 > 24dBm
5. 11dBm + 10log (41.38) = 27.17 > 24dBm

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
58	5290	9.31	9.49	17.423	12.41	24	Pass
106	5530	9.11	9.52	17.101	12.33	24	Pass

Note:
Chain 0
1. 11dBm + 10log (82.52) = 30.17 > 24dBm
2. 11dBm + 10log (82.32) = 30.16 > 24dBm
Chain 1
1. 11dBm + 10log (82.84) = 30.18 > 24dBm
2. 11dBm + 10log (82.65) = 30.17 > 24dBm

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
52	5260	21.78	21.85	Pass
60	5300	21.78	22.00	Pass
64	5320	21.79	21.87	Pass
100	5500	21.77	21.92	Pass
116	5580	21.84	21.91	Pass
140	5700	21.84	21.91	Pass

802.11n (HT20)

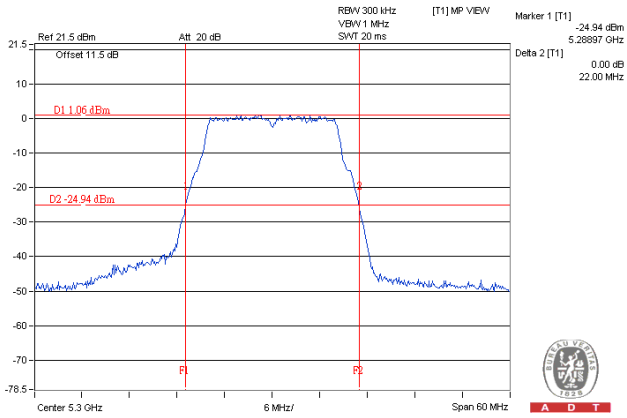
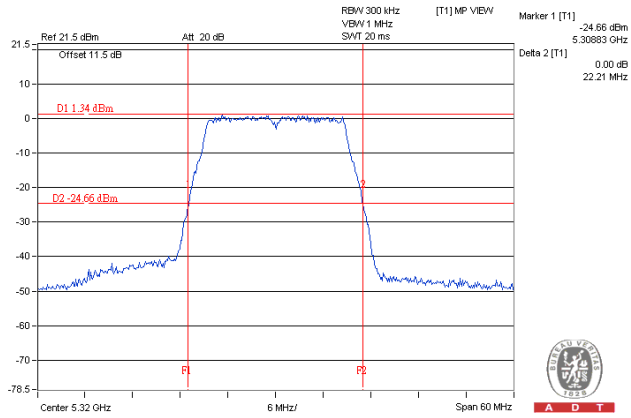
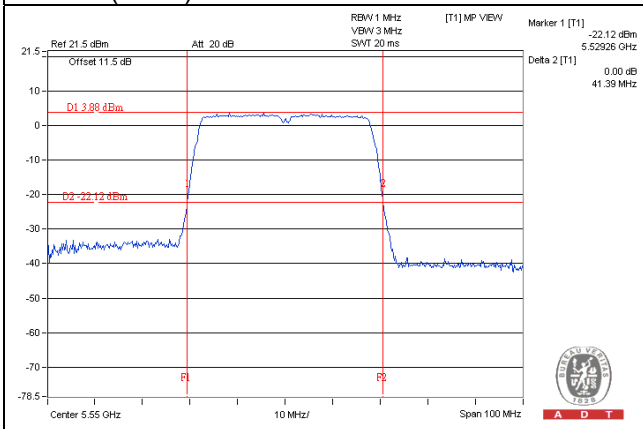
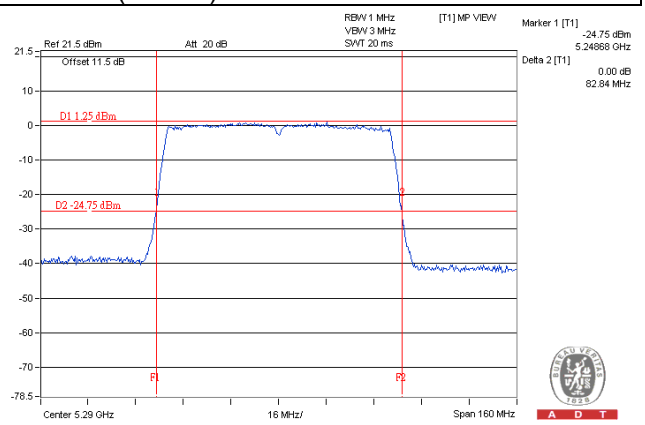
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
52	5260	21.93	22.13	Pass
60	5300	21.90	22.05	Pass
64	5320	22.01	22.21	Pass
100	5500	22.07	22.08	Pass
116	5580	22.05	22.10	Pass
140	5700	22.11	22.09	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
54	5270	41.17	41.35	Pass
62	5310	41.01	41.35	Pass
102	5510	41.08	41.30	Pass
110	5550	41.13	41.39	Pass
134	5670	41.17	41.38	Pass

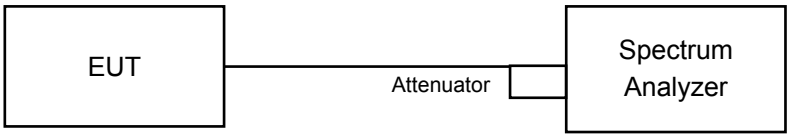
802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
58	5290	82.52	82.84	Pass
106	5530	82.32	82.65	Pass

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sample. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	17.16	17.16
60	5300	17.16	17.28
64	5320	17.16	17.04
100	5500	17.04	17.16
116	5580	17.16	17.28
140	5700	17.16	17.16

802.11n (HT20)

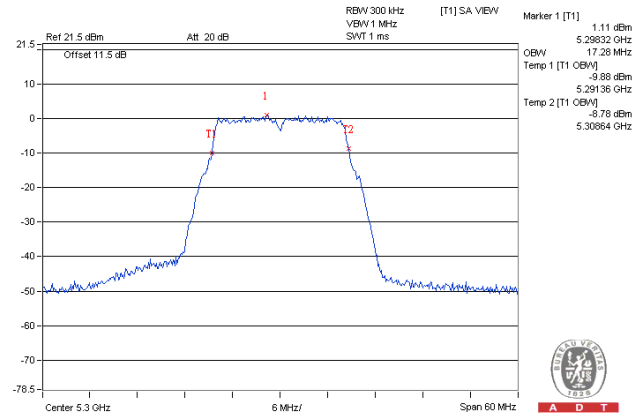
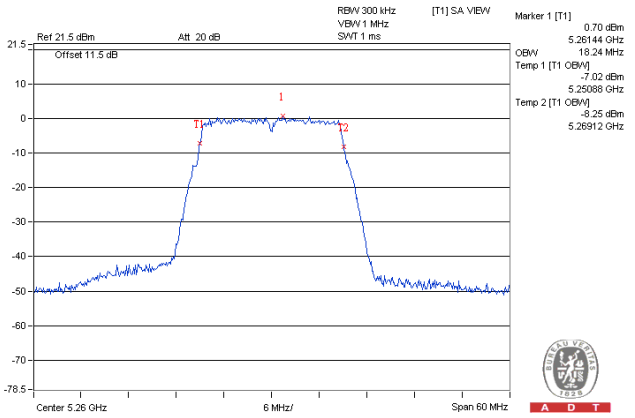
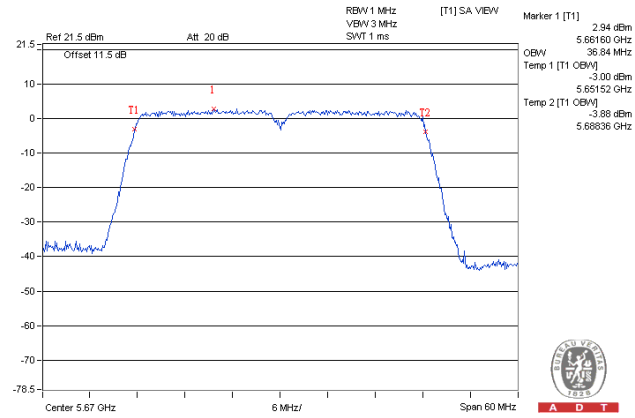
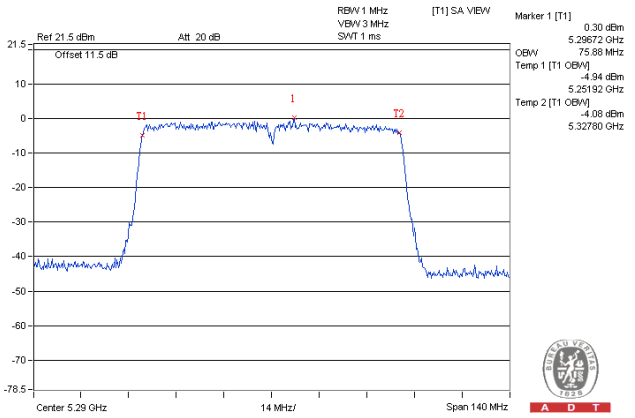
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	18.00	18.24
60	5300	18.00	18.24
64	5320	18.00	18.24
100	5500	18.12	18.12
116	5580	18.00	18.24
140	5700	18.00	18.24

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	36.72	36.72
62	5310	36.60	36.72
102	5510	36.72	36.72
110	5550	36.72	36.72
134	5670	36.60	36.84

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	75.88	75.88
106	5530	75.88	75.88

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

EUT MAXIMUM CONDUCTED POWER

802.11a

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	16.888	12.28
5470~5725	17.216	12.36

802.11n (HT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	19.232	12.84
5470~5725	18.774	12.74

802.11n (HT40)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	17.785	12.50
5470~5725	14.513	11.62

802.11ac (VHT80)

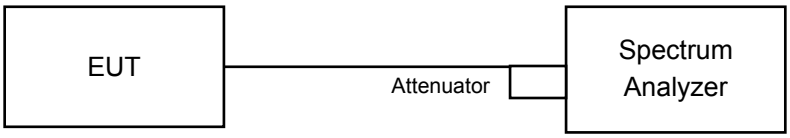
Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	17.423	12.41
5470~5725	17.101	12.33

4.5 Peak Power Spectral Density Measurement

4.5.1 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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

Using method SA-1, Duty cycle >98%:

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

Using method SA-2, Duty cycle <98%

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)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as Item 4.3.6.

4.5.7 Test Results

802.11a

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
52	5260	-5.97	-4.39	-2.10	8.49	Pass
60	5300	-4.74	-5.44	-2.06	8.49	Pass
64	5320	-4.89	-4.95	-1.91	8.49	Pass
100	5500	-3.74	-5.51	-1.52	8.49	Pass
116	5580	-3.80	-5.84	-1.69	8.49	Pass
140	5700	-4.00	-6.40	-2.02	8.49	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi, so the power density limit shall be reduced to 11-(8.51-6) = 8.49dBm.

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					
52	5260	-7.08	-5.24	-3.05	0.12	-2.93	8.49	Pass
60	5300	-5.62	-5.03	-2.31	0.12	-2.19	8.49	Pass
64	5320	-4.33	-6.56	-2.29	0.12	-2.17	8.49	Pass
100	5500	-4.34	-6.18	-2.15	0.12	-2.03	8.49	Pass
116	5580	-4.78	-6.17	-2.41	0.12	-2.29	8.49	Pass
140	5700	-5.11	-6.55	-2.76	0.12	-2.64	8.49	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi, so the power density limit shall be reduced to 11-(8.51-6) = 8.49dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

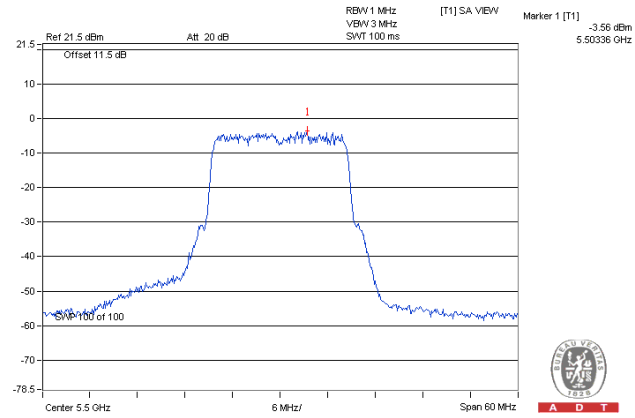
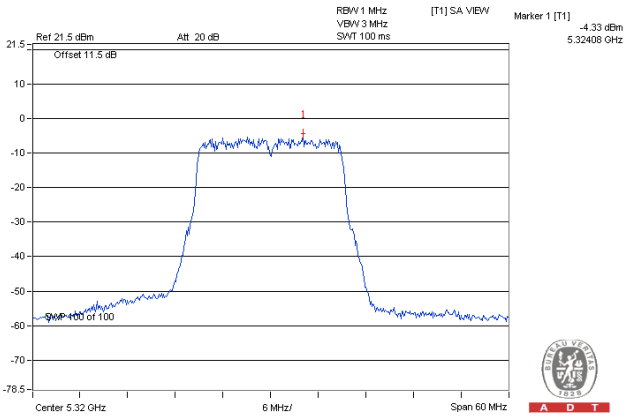
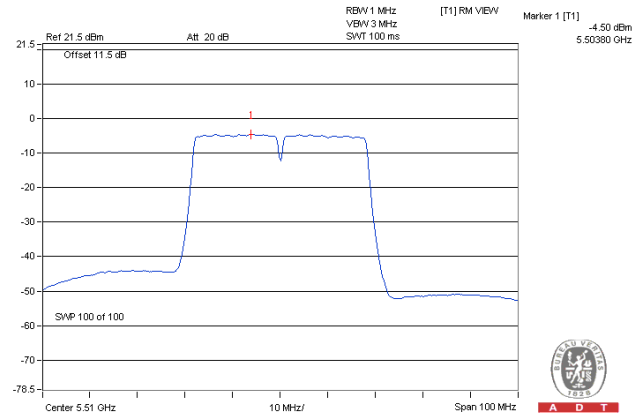
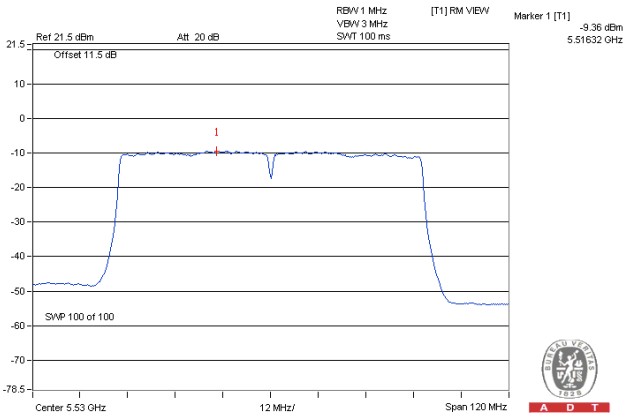
Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
54	5270	-5.84	-6.23	-3.02	0.18	-2.84	8.49	Pass
62	5310	-5.69	-5.94	-2.80	0.18	-2.62	8.49	Pass
102	5510	-4.50	-6.54	-2.39	0.18	-2.21	8.49	Pass
110	5550	-5.94	-6.81	-3.34	0.18	-3.16	8.49	Pass
134	5670	-6.67	-7.25	-3.94	0.18	-3.76	8.49	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi, so the power density limit shall be reduced to 11-(8.51-6) = 8.49dBm.
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					
58	5290	-10.65	-9.68	-7.13	0.42	-6.71	8.49	Pass
106	5530	-9.36	-9.99	-6.66	0.42	-6.24	8.49	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi, so the power density limit shall be reduced to 11-(8.51-6) = 8.49dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

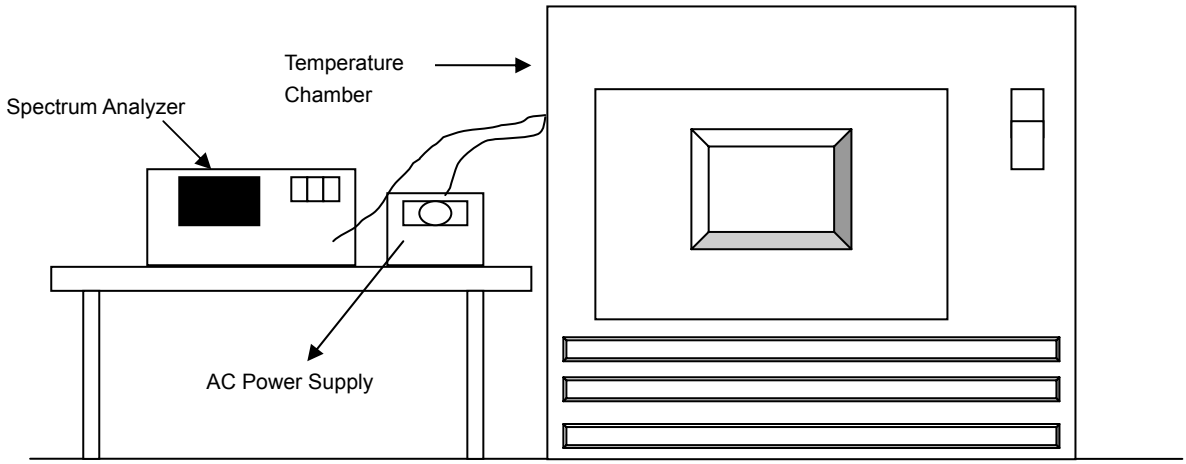
Spectrum Plot of Worst Value	
802.11a / Chain 0 / CH 100	802.11n (HT20) / Chain 0 / CH 64
	
802.11n (HT40)/ Chain 0 / CH 102	802.11ac (VHT80) / Chain 0 / CH 106
	

4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5260MHz									
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	5260.0115	0.00022	5260.0138	0.00026	5260.0131	0.00025	5260.011	0.00021
40	120	5260.0111	0.00021	5260.011	0.00021	5260.0132	0.00025	5260.011	0.00021
30	120	5259.9819	-0.00034	5259.9843	-0.00030	5259.9828	-0.00033	5259.9816	-0.00035
20	120	5260.0006	0.00001	5259.9999	0.00000	5260.0021	0.00004	5260.0031	0.00006
10	120	5260.0009	0.00002	5260.0013	0.00002	5260.0037	0.00007	5259.9996	-0.00001
0	120	5260.0099	0.00019	5260.0122	0.00023	5260.0091	0.00017	5260.0115	0.00022
-10	120	5259.9937	-0.00012	5259.9941	-0.00011	5259.9956	-0.00008	5259.9946	-0.00010
-20	120	5259.9824	-0.00033	5259.9805	-0.00037	5259.9792	-0.00040	5259.9798	-0.00038
-30	120	5259.9955	-0.00009	5259.9954	-0.00009	5259.9941	-0.00011	5259.9961	-0.00007

Frequency Stability Versus Voltage									
Operating Frequency: 5260MHz									
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	5260.0003	0.00001	5259.9994	-0.00001	5260.0011	0.00002	5260.0034	0.00006
	120	5260.0006	0.00001	5259.9999	0.00000	5260.0021	0.00004	5260.0031	0.00006
	102	5260.0015	0.00003	5260.0008	0.00002	5260.0027	0.00005	5260.0028	0.00005

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:

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Web Site: www.bureauveritas-adt.com

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

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