FCC Test Report

Report No.:	RF160920C16A
FCC ID:	WBV-AP122
Test Model:	AP122
Received Date:	Sep. 21, 2016
Test Date:	Oct. 06 ~ Dec. 30, 2016
Issued Date:	Dec. 30, 2016
Applicant:	Aerohive Networks Inc.
Address:	1011 McCarthy Blvd, Milpitas, CA 95035, USA
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.)

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF160920C16A	Original release	Dec. 30, 2016

1 Certificate of Conformity

Product:	Access Point
Brand:	Aerohive
Test Model:	AP122
Sample Status:	Engineering sample
Applicant:	Aerohive Networks Inc.
Test Date:	Oct. 06 ~ Dec. 30, 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 : _____ , **Date:** Dec. 30, 2016

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Dec. 30, 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 -8.46dB at 0.41560MHz.
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 5350.00, 5470.00, 5850.00MHz.
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(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	3.86 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	Access Point
Brand	Aerohive
Test Model	AP122
Status of EUT	Engineering sample
Power Supply Rating	53Vdc (POE)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps 802.11ac: up to 866.5Mbps
Operating Frequency	5260 ~ 5320MHz, 5500 ~ 5710MHz
Number of Channel	5260 ~ 5320MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5500 ~ 5710MHz: 11 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 6 for 802.11n (HT40), 802.11ac (VHT40) 3 for 802.11ac (VHT80)
Output Power	CDD Mode 5260 ~ 5320MHz: 183.456mW 5500 ~ 5710MHz: 150.737mW Beamforming Mode 5260 ~ 5320MHz: 145.724mW 5500 ~ 5710MHz: 150.737mW
Antenna Type	Refer to Note 6
Antenna Connector	Refer to Note 6
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of the original report no.: RF160920C16-1. The difference compared with original report 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 2 completed transmitters and 2 receivers.

Modulation Mode	Beamforming Mode	TX/RX Function
802.11a	Not Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11n (HT20)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11n (HT40)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11ac (VHT20)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11ac (VHT40)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)
802.11ac (VHT80)	Support	1RX(Radio 1:RSDB on), 2TX/2RX (Radio 2)

*The modulation and bandwidth are similar for 802.11n mode for HT20/HT40 and 802.11ac mode for VHT20/VHT40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

* CDD mode is the worst case for final radiated emission and power line conducted emission tests after pretesting CDD mode and beamforming mode.

3. The EUT uses the following POE. (Support unit only)

PoE	
Brand	CERIO
Model	POE-S53VG
Input Power	100-240Vac~50-60Hz
Output Power	53Vdc / 0.57A

4. Spurious emission of the simultaneous operation (WLAN 2.4GHz and WLAN 5GHz and BT) has been evaluated and no non-compliance was found.

5. There are 2 WiFi Radio modules for the EUT.

Radio	Support Function
Radio 1	a. RSDB off: 2.4GHz: 2Tx/2Rx b. RSDB on: 2.4GHz: 1Tx/1Rx+ 5GHz:1Rx
Radio 2	5GHz: 2Tx/2Rx

6. The following antenna was provided to the EUT.

Antenna No.	Chain No.	Antenna Net Gain (dBi)	Frequency range	Antenna Type	Connecter Type
ANT0_2.4G (White)	chain0	3.26	2.4~2.4835GHz	PIFA	i-pex(MHF)
ANT1_2.4G RSDB_Ant0_5G (Black)	chain1	3.8 (2.4G) 4.61 (5G)	2.4~2.4835GHz 5.15~5.85GHz	PIFA	i-pex(MHF)
ANT0_5G (Yellow)	chain0	5.44	5.15~5.85GHz	PIFA	i-pex(MHF)
ANT1_5G (Red)	chain1	4.91	5.15~5.85GHz	Dipole	i-pex(MHF)
BT (Blue)	-	3.96	2.4~2.4835GHz	PIFA	i-pex(MHF)

7. The power settings are list as below.

	802.11a	802.11n (HT20)		802.11n (HT40)		802.11ac (VHT80)
CH 52	72	72	CH 54	78	CH 58	58
CH 60	72	72	CH 62	60	CH 106	52
CH 64	66	64	CH 102	54	CH 122	68
CH 100	65	65	CH 110	73	CH 138 For U-NII-2C	75
CH 116	74	76	CH 134	64	CH 138 For U-NII-3	75
CH 140	62	62	CH 142 For U-NII-2C	75		
			CH 142 For U-NII-3	75		

8. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

For 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 ~ 5710MHz

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		

6 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	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	138	5690 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 **Z-plane.**

Radiated Emission Test (Above 1GHz):

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	6.5
	802.11ac (VHT40)		54 to 62	54, 62	OFDM	13.5
	802.11ac (VHT80)		58	58	OFDM	58.5
-	802.11a	5500-5710	100 to 140	100, 116, 140	OFDM	6.0
	802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	6.5
	802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	13.5
	802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	58.5

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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5260-5320	52 to 64	52	OFDM	6
-	802.11a	5500-5710	100 to 140		OFDM	6

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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5260-5320	52 to 64	52	OFDM	6
-	802.11a	5500-5710	100 to 140		OFDM	6

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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	6.5
	802.11ac (VHT40)		54 to 62	54, 62	OFDM	13.5
	802.11ac (VHT80)		58	58	OFDM	58.5
-	802.11a	5500-5710	100 to 140	100, 116, 140	OFDM	6.0
	802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	6.5
	802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	13.5
	802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	58.5
Beamforming Mode						
-	802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	6.5
	802.11ac (VHT40)		54 to 62	54, 62	OFDM	13.5
	802.11ac (VHT80)		58	58	OFDM	58.5
-	802.11ac (VHT20)	5500-5710	100 to 140	100, 116, 140	OFDM	6.5
	802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	13.5
	802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	58.5

Test Condition:

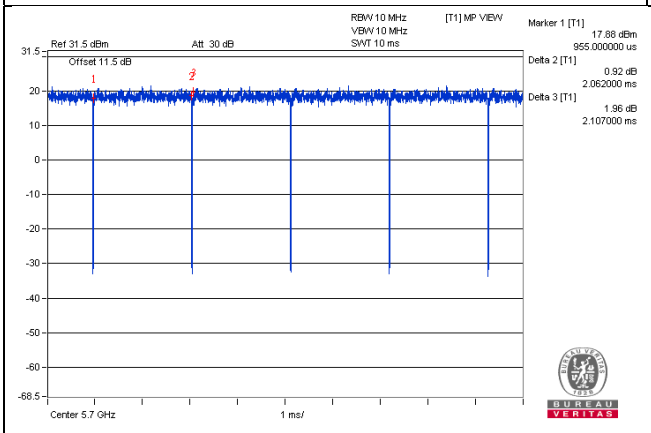
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	20 deg. C, 69% RH	120Vac, 60Hz	Bond Tseng
PLC	25 deg. C, 69% RH	120Vac, 60Hz	Bond Tseng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Nick Hsu

3.3 Duty Cycle of Test Signal

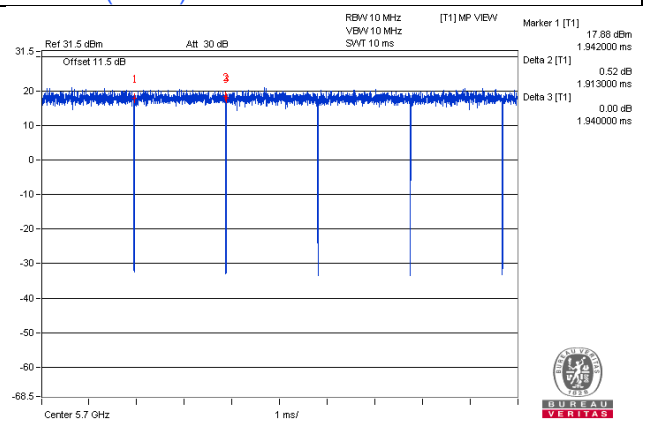
Duty cycle of test signal is > 98%, duty factor is not required
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.062/2.107 = 0.979, Duty factor = 10 * log(1/0.979) = 0.09
802.11n (HT20): Duty cycle = 1.913/1.940 = 0.986
802.11n (HT40): Duty cycle = 0.941/0.971 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14
802.11ac (VHT80): Duty cycle = 0.459/0.489 = 0.939, Duty factor = 10 * log(1/0.939) = 0.27

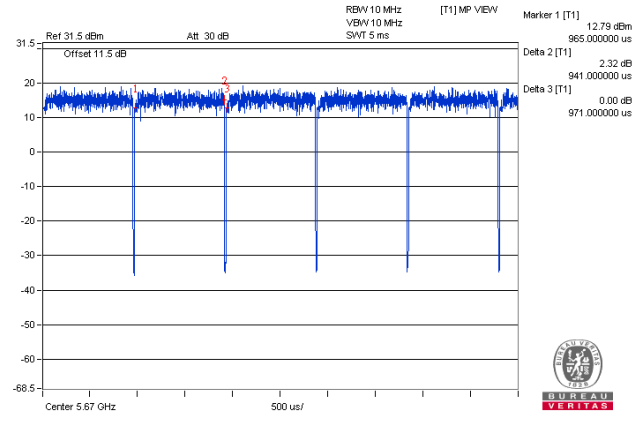
802.11a



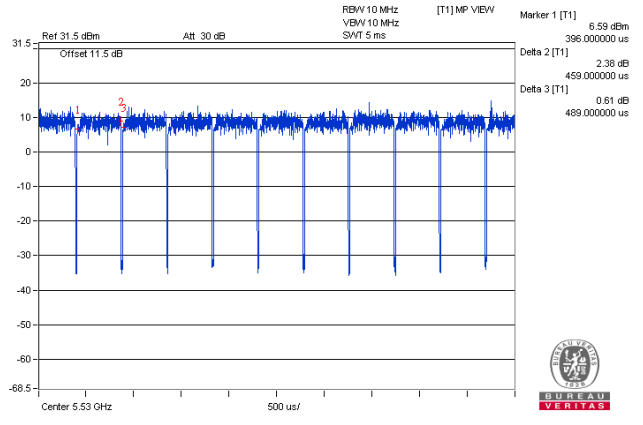
802.11n (HT20)



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.

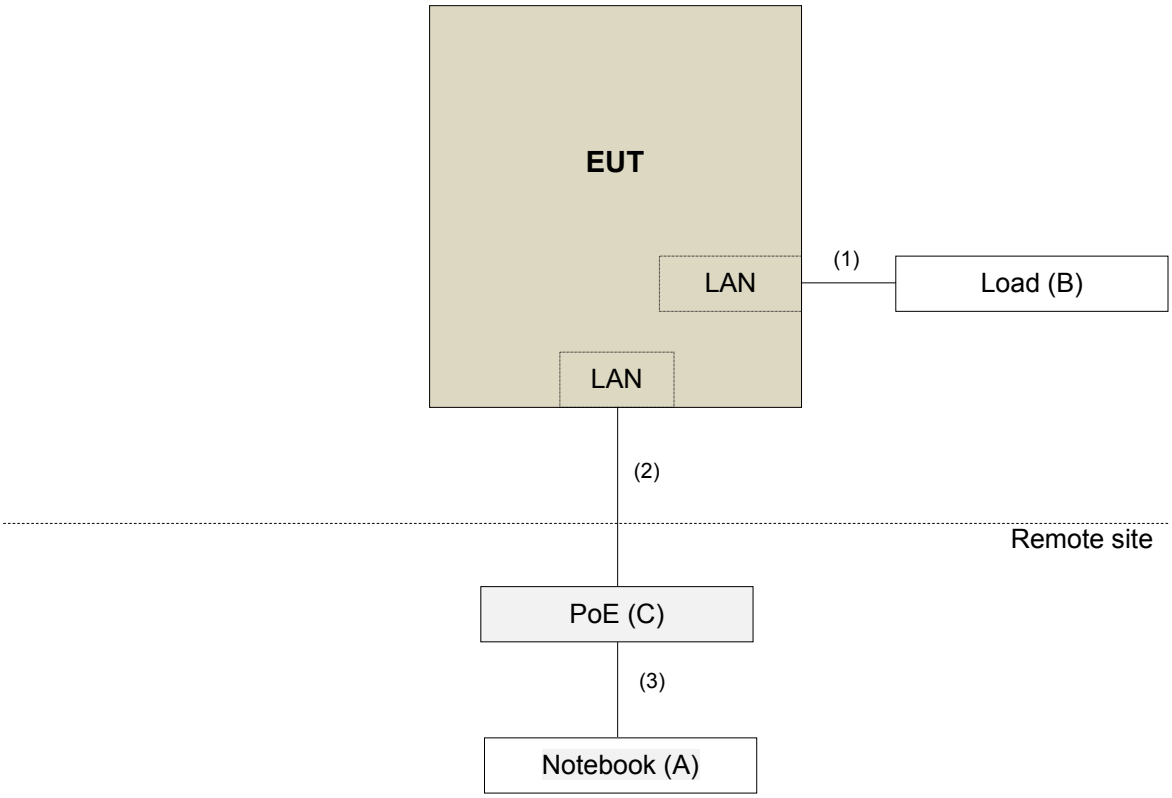
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-
C.	PoE	CERIO	POE-S53VG	NA	NA	Provided by client

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45	1	1.8	N	0	-
2.	RJ45	1	10	N	0	-
3.	RJ45	1	1.8	N	0	-

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

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of Unwanted Emission Out of the Restricted Bands

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v01r03			Field Strength at 3m	
			PK:74 (dBμV/m)	AV:54 (dBμV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8(dBμV/m) *3 PK:122.2 (dBμV/m) *4
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*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.

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	ESIB7	100187	Apr. 18, 2016	Apr. 17, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Apr. 19, 2016	Apr. 18, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Jan. 18, 2016	Jan. 17, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02 (309222 +248780)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03 (274092)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2015	Oct. 17, 2016
			Oct. 17, 2016	Oct. 16, 2017
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 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 3.
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 988962.
5. The IC Site Registration No. is IC 7450F-3.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:

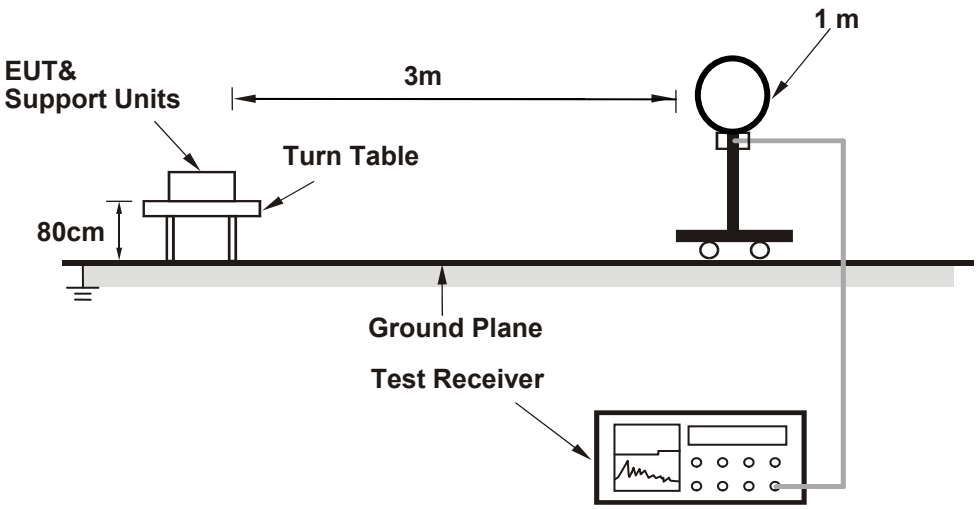
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

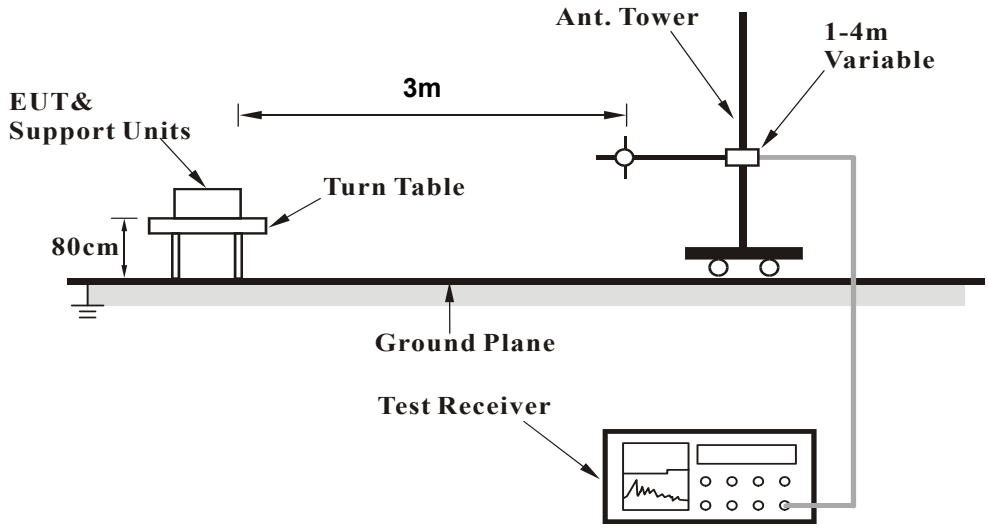
No deviation.

4.1.5 Test Setup

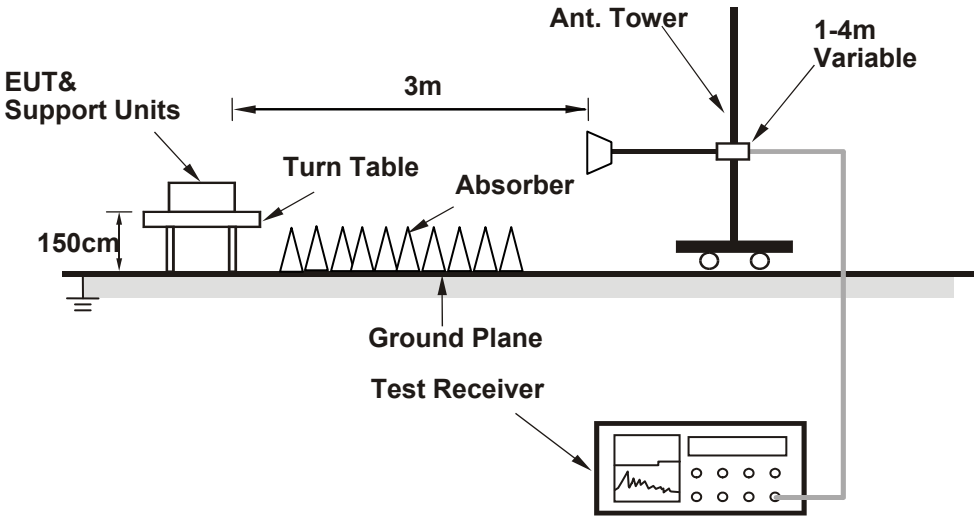
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

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	4818.00	58.6 PK	74.0	-15.4	1.83 H	80	54.9	3.7
2	4818.00	47.0 AV	54.0	-7.0	1.83 H	80	43.3	3.7
3	5150.00	59.7 PK	74.0	-14.3	1.83 H	79	55.1	4.6
4	5150.00	46.0 AV	54.0	-8.0	1.83 H	79	41.4	4.6
5	*5260.00	110.7 PK			1.75 H	86	67.8	42.9
6	*5260.00	100.8 AV			1.75 H	86	57.9	42.9
7	#10520.00	60.9 PK	74.0	-13.1	1.44 H	275	44.9	16.0
8	#10520.00	48.1 AV	54.0	-5.9	1.44 H	275	32.1	16.0
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	4818.00	58.5 PK	74.0	-15.5	1.92 V	24	54.8	3.7
2	4818.00	45.0 AV	54.0	-9.0	1.92 V	24	41.3	3.7
3	5150.00	58.6 PK	74.0	-15.4	1.99 V	12	54.0	4.6
4	5150.00	45.7 AV	54.0	-8.3	1.99 V	12	41.1	4.6
5	*5260.00	109.2 PK			3.60 V	15	66.3	42.9
6	*5260.00	98.9 AV			3.60 V	15	56.0	42.9
7	#10520.00	60.2 PK	74.0	-13.8	1.54 V	182	44.2	16.0
8	#10520.00	46.5 AV	54.0	-7.5	1.54 V	182	30.5	16.0

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 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	110.7 PK			1.82 H	81	67.8	42.9
2	*5300.00	100.5 AV			1.82 H	81	57.6	42.9
3	5350.00	63.8 PK	74.0	-10.2	1.96 H	77	59.1	4.7
4	5350.00	49.2 AV	54.0	-4.8	1.96 H	77	44.5	4.7
5	10600.00	60.9 PK	74.0	-13.1	1.38 H	241	44.6	16.3
6	10600.00	47.2 AV	54.0	-6.8	1.38 H	241	30.9	16.3
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	*5300.00	109.3 PK			3.70 V	19	66.4	42.9
2	*5300.00	99.0 AV			3.70 V	19	56.1	42.9
3	5350.00	63.1 PK	74.0	-10.9	3.81 V	19	58.4	4.7
4	5350.00	49.1 AV	54.0	-4.9	3.81 V	19	44.4	4.7
5	10600.00	60.4 PK	74.0	-13.6	1.61 V	189	44.1	16.3
6	10600.00	46.9 AV	54.0	-7.1	1.61 V	189	30.6	16.3

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.

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	108.2 PK			1.80 H	90	65.3	42.9
2	*5320.00	98.1 AV			1.80 H	90	55.2	42.9
3	5350.00	68.0 PK	74.0	-6.0	1.86 H	87	63.3	4.7
4	5350.00	52.9 AV	54.0	-1.1	1.86 H	87	48.2	4.7
5	10640.00	61.3 PK	74.0	-12.7	1.49 H	255	44.9	16.4
6	10640.00	47.6 AV	54.0	-6.4	1.49 H	255	31.2	16.4
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	*5320.00	106.7 PK			3.52 V	15	63.8	42.9
2	*5320.00	97.1 AV			3.52 V	15	54.2	42.9
3	5350.00	68.4 PK	74.0	-5.6	3.66 V	12	63.7	4.7
4	5350.00	50.2 AV	54.0	-3.8	3.66 V	12	45.5	4.7
5	10640.00	60.9 PK	74.0	-13.1	1.59 V	181	44.5	16.4
6	10640.00	47.3 AV	54.0	-6.7	1.59 V	181	30.9	16.4

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.

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	61.6 PK	74.0	-12.4	1.94 H	74	56.8	4.8
2	5460.00	48.4 AV	54.0	-5.6	1.94 H	74	43.6	4.8
3	#5470.00	69.2 PK	74.0	-4.8	1.91 H	76	64.3	4.9
4	**#5470.00**	**53.0 AV**	**54.0**	**-1.0**	**1.91 H**	**76**	**48.1**	**4.9**
5	*5500.00	109.7 PK			2.07 H	90	66.5	43.2
6	*5500.00	99.5 AV			2.07 H	90	56.3	43.2
7	11000.00	62.4 PK	74.0	-11.6	1.49 H	289	45.1	17.3
8	11000.00	49.1 AV	54.0	-4.9	1.49 H	289	31.8	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	5460.00	60.2 PK	74.0	-13.8	3.92 V	19	55.4	4.8
2	5460.00	47.3 AV	54.0	-6.7	3.92 V	19	42.5	4.8
3	#5470.00	65.8 PK	74.0	-8.2	3.91 V	27	60.9	4.9
4	#5470.00	50.3 AV	54.0	-3.7	3.91 V	27	45.4	4.9
5	*5500.00	105.9 PK			3.91 V	24	62.7	43.2
6	*5500.00	96.8 AV			3.91 V	24	53.6	43.2
7	11000.00	62.1 PK	74.0	-11.9	1.55 V	173	44.8	17.3
8	11000.00	48.7 AV	54.0	-5.3	1.55 V	173	31.4	17.3

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 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	112.8 PK			1.84 H	80	69.4	43.4
2	*5580.00	102.6 AV			1.84 H	80	59.2	43.4
3	11160.00	62.2 PK	74.0	-11.8	1.48 H	284	45.6	16.6
4	11160.00	48.7 AV	54.0	-5.3	1.48 H	284	32.1	16.6
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	*5580.00	110.1 PK			3.93 V	11	66.7	43.4
2	*5580.00	100.3 AV			3.93 V	11	56.9	43.4
3	11160.00	61.6 PK	74.0	-12.4	1.61 V	175	45.0	16.6
4	11160.00	48.0 AV	54.0	-6.0	1.61 V	175	31.4	16.6

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.

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	106.2 PK			1.91 H	98	62.7	43.5
2	*5700.00	97.0 AV			1.91 H	98	53.5	43.5
3	#5725.00	69.5 PK	74.0	-4.5	1.87 H	77	64.4	5.1
4	#5725.00	52.9 AV	54.0	-1.1	1.87 H	77	47.8	5.1
5	11400.00	61.6 PK	74.0	-12.4	1.26 H	291	45.1	16.5
6	11400.00	47.9 AV	54.0	-6.1	1.26 H	291	31.4	16.5
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	*5700.00	103.8 PK			3.87 V	24	60.3	43.5
2	*5700.00	94.7 AV			3.87 V	24	51.2	43.5
3	#5725.00	67.8 PK	74.0	-6.2	3.85 V	18	62.7	5.1
4	#5725.00	51.4 AV	54.0	-2.6	3.85 V	18	46.3	5.1
5	11400.00	61.0 PK	74.0	-13.0	1.48 V	182	44.5	16.5
6	11400.00	47.5 AV	54.0	-6.5	1.48 V	182	31.0	16.5

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 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	4820.00	59.6 PK	74.0	-14.4	1.99 H	83	55.9	3.7
2	4820.00	46.4 AV	54.0	-7.6	1.99 H	83	42.7	3.7
3	5150.00	58.7 PK	74.0	-15.3	1.84 H	88	54.1	4.6
4	5150.00	46.0 AV	54.0	-8.0	1.84 H	88	41.4	4.6
5	*5260.00	113.0 PK			1.83 H	87	70.1	42.9
6	*5260.00	102.2 AV			1.83 H	87	59.3	42.9
7	#10520.00	61.1 PK	74.0	-12.9	1.49 H	271	45.1	16.0
8	#10520.00	47.7 AV	54.0	-6.3	1.49 H	271	31.7	16.0
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	4820.00	58.0 PK	74.0	-16.0	3.78 V	1	54.3	3.7
2	4820.00	45.2 AV	54.0	-8.8	3.78 V	1	41.5	3.7
3	5150.00	58.6 PK	74.0	-15.4	3.94 V	25	54.0	4.6
4	5150.00	45.7 AV	54.0	-8.3	3.94 V	25	41.1	4.6
5	*5260.00	109.9 PK			3.79 V	18	67.0	42.9
6	*5260.00	99.3 AV			3.79 V	18	56.4	42.9
7	#10520.00	60.7 PK	74.0	-13.3	1.49 V	176	44.7	16.0
8	#10520.00	47.4 AV	54.0	-6.6	1.49 V	176	31.4	16.0

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 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	111.4 PK			1.81 H	88	68.5	42.9
2	*5300.00	101.7 AV			1.81 H	88	58.8	42.9
3	5350.00	67.1 PK	74.0	-6.9	1.82 H	75	62.4	4.7
4	5350.00	50.2 AV	54.0	-3.8	1.82 H	75	45.5	4.7
5	10600.00	61.6 PK	74.0	-12.4	1.51 H	288	45.3	16.3
6	10600.00	48.2 AV	54.0	-5.8	1.51 H	288	31.9	16.3
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	*5300.00	110.6 PK			3.97 V	18	67.7	42.9
2	*5300.00	100.5 AV			3.97 V	18	57.6	42.9
3	5350.00	65.7 PK	74.0	-8.3	3.84 V	18	61.0	4.7
4	5350.00	49.8 AV	54.0	-4.2	3.84 V	18	45.1	4.7
5	10600.00	61.3 PK	74.0	-12.7	1.59 V	168	45.0	16.3
6	10600.00	47.9 AV	54.0	-6.1	1.59 V	168	31.6	16.3

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.

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	108.2 PK			1.81 H	90	65.3	42.9
2	*5320.00	98.5 AV			1.81 H	90	55.6	42.9
3	5350.00	68.3 PK	74.0	-5.7	1.88 H	75	63.6	4.7
4	5350.00	52.9 AV	54.0	-1.1	1.88 H	75	48.2	4.7
5	10640.00	61.4 PK	74.0	-12.6	1.51 H	260	45.0	16.4
6	10640.00	47.9 AV	54.0	-6.1	1.51 H	260	31.5	16.4
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	*5320.00	107.2 PK			3.68 V	19	64.3	42.9
2	*5320.00	96.4 AV			3.68 V	19	53.5	42.9
3	5350.00	65.3 PK	74.0	-8.7	3.65 V	13	60.6	4.7
4	5350.00	49.1 AV	54.0	-4.9	3.65 V	13	44.4	4.7
5	10640.00	61.0 PK	74.0	-13.0	1.50 V	178	44.6	16.4
6	10640.00	47.6 AV	54.0	-6.4	1.50 V	178	31.2	16.4

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.

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	61.8 PK	74.0	-12.2	2.12 H	77	57.0	4.8
2	5460.00	48.6 AV	54.0	-5.4	2.12 H	77	43.8	4.8
3	#5470.00	69.7 PK	74.0	-4.3	1.99 H	86	64.8	4.9
4	#5470.00	52.8 AV	54.0	-1.2	1.99 H	86	47.9	4.9
5	*5500.00	110.0 PK			1.91 H	82	66.8	43.2
6	*5500.00	99.4 AV			1.91 H	82	56.2	43.2
7	11100.00	61.6 PK	74.0	-12.4	1.61 H	289	45.2	16.4
8	11100.00	47.9 AV	54.0	-6.1	1.61 H	289	31.5	16.4
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	60.2 PK	74.0	-13.8	3.90 V	5	55.4	4.8
2	5460.00	47.6 AV	54.0	-6.4	3.90 V	5	42.8	4.8
3	#5470.00	68.5 PK	74.0	-5.5	3.87 V	17	63.6	4.9
4	#5470.00	51.1 AV	54.0	-2.9	3.87 V	17	46.2	4.9
5	*5500.00	106.8 PK			3.84 V	23	63.6	43.2
6	*5500.00	97.0 AV			3.84 V	23	53.8	43.2
7	11000.00	61.8 PK	74.0	-12.2	1.49 V	166	44.5	17.3
8	11000.00	48.3 AV	54.0	-5.7	1.49 V	166	31.0	17.3

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 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	112.6 PK			1.92 H	84	69.2	43.4
2	*5580.00	102.0 AV			1.92 H	84	58.6	43.4
3	11160.00	62.2 PK	74.0	-11.8	1.59 H	284	45.6	16.6
4	11160.00	48.4 AV	54.0	-5.6	1.59 H	284	31.8	16.6
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	*5580.00	109.1 PK			3.78 V	35	65.7	43.4
2	*5580.00	98.9 AV			3.78 V	35	55.5	43.4
3	11160.00	61.4 PK	74.0	-12.6	1.44 V	172	44.8	16.6
4	11160.00	47.8 AV	54.0	-6.2	1.44 V	172	31.2	16.6

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.

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	105.9 PK			1.95 H	80	62.4	43.5
2	*5700.00	96.6 AV			1.95 H	80	53.1	43.5
3	#5725.00	68.2 PK	74.0	-5.8	1.83 H	79	63.1	5.1
4	#5725.00	52.6 AV	54.0	-1.4	1.83 H	79	47.5	5.1
5	11400.00	61.6 PK	74.0	-12.4	1.42 H	299	45.1	16.5
6	11400.00	48.0 AV	54.0	-6.0	1.42 H	299	31.5	16.5
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	*5700.00	104.3 PK			3.87 V	3	60.8	43.5
2	*5700.00	94.6 AV			3.87 V	3	51.1	43.5
3	#5725.00	66.8 PK	74.0	-7.2	3.87 V	16	61.7	5.1
4	#5725.00	50.7 AV	54.0	-3.3	3.87 V	16	45.6	5.1
5	11400.00	61.3 PK	74.0	-12.7	1.53 V	177	44.8	16.5
6	11400.00	47.7 AV	54.0	-6.3	1.53 V	177	31.2	16.5

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 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	61.3 PK	74.0	-12.7	1.81 H	90	56.7	4.6
2	5150.00	47.8 AV	54.0	-6.2	1.81 H	90	43.2	4.6
3	*5270.00	109.5 PK			1.87 H	83	66.6	42.9
4	*5270.00	99.2 AV			1.87 H	83	56.3	42.9
5	5350.00	65.6 PK	74.0	-8.4	1.94 H	85	60.9	4.7
6	5350.00	52.5 AV	54.0	-1.5	1.94 H	85	47.8	4.7
7	#10540.00	61.4 PK	74.0	-12.6	1.53 H	278	45.2	16.2
8	#10540.00	48.1 AV	54.0	-5.9	1.53 H	278	31.9	16.2
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	5150.00	59.4 PK	74.0	-14.6	3.98 V	9	54.8	4.6
2	5150.00	46.1 AV	54.0	-7.9	3.98 V	9	41.5	4.6
3	*5270.00	107.3 PK			3.80 V	19	64.4	42.9
4	*5270.00	97.2 AV			3.80 V	19	54.3	42.9
5	5350.00	62.6 PK	74.0	-11.4	3.94 V	19	57.9	4.7
6	5350.00	50.1 AV	54.0	-3.9	3.94 V	19	45.4	4.7
7	#10540.00	61.0 PK	74.0	-13.0	1.61 V	159	44.8	16.2
8	#10540.00	47.4 AV	54.0	-6.6	1.61 V	159	31.2	16.2

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 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	104.0 PK			1.72 H	85	61.1	42.9
2	*5310.00	94.5 AV			1.72 H	85	51.6	42.9
3	5350.00	68.5 PK	74.0	-5.5	1.80 H	87	63.8	4.7
4	**5350.00**	**53.0 AV**	**54.0**	**-1.0**	**1.80 H**	**87**	**48.3**	**4.7**
5	10620.00	61.5 PK	74.0	-12.5	1.49 H	271	45.0	16.5
6	10620.00	48.0 AV	54.0	-6.0	1.49 H	271	31.5	16.5
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	*5310.00	103.2 PK			3.94 V	19	60.3	42.9
2	*5310.00	93.5 AV			3.94 V	19	50.6	42.9
3	5350.00	67.3 PK	74.0	-6.7	3.90 V	20	62.6	4.7
4	5350.00	51.1 AV	54.0	-2.9	3.90 V	20	46.4	4.7
5	10620.00	61.0 PK	74.0	-13.0	1.55 V	173	44.5	16.5
6	10620.00	47.5 AV	54.0	-6.5	1.55 V	173	31.0	16.5

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.

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	62.9 PK	74.0	-11.1	2.02 H	88	58.1	4.8
2	5460.00	49.1 AV	54.0	-4.9	2.02 H	88	44.3	4.8
3	#5470.00	67.4 PK	74.0	-6.6	1.90 H	78	62.5	4.9
4	**#5470.00**	**53.0 AV**	**54.0**	**-1.0**	**1.90 H**	**78**	**48.1**	**4.9**
5	*5510.00	104.4 PK			1.95 H	86	61.2	43.2
6	*5510.00	94.4 AV			1.95 H	86	51.2	43.2
7	11020.00	62.1 PK	74.0	-11.9	1.51 H	266	44.9	17.2
8	11020.00	49.0 AV	54.0	-5.0	1.51 H	266	31.8	17.2
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	5460.00	61.6 PK	74.0	-12.4	3.89 V	12	56.8	4.8
2	5460.00	47.4 AV	54.0	-6.6	3.89 V	12	42.6	4.8
3	#5470.00	64.4 PK	74.0	-9.6	3.94 V	21	59.5	4.9
4	#5470.00	50.1 AV	54.0	-3.9	3.94 V	21	45.2	4.9
5	*5510.00	100.9 PK			3.86 V	26	57.7	43.2
6	*5510.00	91.0 AV			3.86 V	26	47.8	43.2
7	11020.00	61.8 PK	74.0	-12.2	1.55 V	188	44.6	17.2
8	11020.00	48.5 AV	54.0	-5.5	1.55 V	188	31.3	17.2

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 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	5460.00	63.1 PK	74.0	-10.9	1.86 H	91	58.3	4.8
2	5460.00	50.3 AV	54.0	-3.7	1.86 H	91	45.5	4.8
3	#5470.00	67.9 PK	74.0	-6.1	2.17 H	83	63.0	4.9
4	#5470.00	52.8 AV	54.0	-1.2	2.17 H	83	47.9	4.9
5	*5550.00	109.8 PK			1.94 H	87	66.5	43.3
6	*5550.00	99.8 AV			1.94 H	87	56.5	43.3
7	11100.00	61.7 PK	74.0	-12.3	1.43 H	291	45.3	16.4
8	11100.00	48.2 AV	54.0	-5.8	1.43 H	291	31.8	16.4
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	63.1 PK	74.0	-10.9	3.91 V	2	58.3	4.8
2	5460.00	49.6 AV	54.0	-4.4	3.91 V	2	44.8	4.8
3	#5470.00	65.7 PK	74.0	-8.3	3.92 V	25	60.8	4.9
4	#5470.00	51.9 AV	54.0	-2.1	3.92 V	25	47.0	4.9
5	*5550.00	108.3 PK			3.94 V	24	65.0	43.3
6	*5550.00	98.3 AV			3.94 V	24	55.0	43.3
7	11100.00	61.3 PK	74.0	-12.7	1.55 V	186	44.9	16.4
8	11100.00	47.8 AV	54.0	-6.2	1.55 V	186	31.4	16.4

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.

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	105.9 PK			1.88 H	86	62.4	43.5
2	*5670.00	96.0 AV			1.88 H	86	52.5	43.5
3	#5725.00	67.6 PK	74.0	-6.4	1.92 H	85	62.5	5.1
4	#5725.00	52.9 AV	54.0	-1.1	1.92 H	85	47.8	5.1
5	11340.00	62.3 PK	74.0	-11.7	1.45 H	299	45.2	17.1
6	11340.00	48.9 AV	54.0	-5.1	1.45 H	299	31.8	17.1
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	103.3 PK			3.94 V	24	59.8	43.5
2	*5670.00	93.0 AV			3.94 V	24	49.5	43.5
3	#5725.00	66.1 PK	74.0	-7.9	3.85 V	2	61.0	5.1
4	#5725.00	52.8 AV	54.0	-1.2	3.85 V	2	47.7	5.1
5	11340.00	61.9 PK	74.0	-12.1	1.58 V	162	44.8	17.1
6	11340.00	48.6 AV	54.0	-5.4	1.58 V	162	31.5	17.1

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 142	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	#5470.00	57.4 PK	74.0	-16.6	2.36 H	105	51.1	6.3
2	#5470.00	45.8 AV	54.0	-8.2	2.36 H	105	39.5	6.3
3	*5710.00	112.7 PK			2.30 H	81	71.8	40.9
4	*5710.00	102.8 AV			2.30 H	81	61.9	40.9
5	#5850.00	59.5 PK	74.0	-14.5	2.11 H	54	52.5	7.0
6	#5850.00	47.2 AV	54.0	-6.8	2.11 H	54	40.2	7.0
7	11420.00	61.7 PK	74.0	-12.3	1.57 H	314	41.1	20.6
8	11420.00	48.8 AV	54.0	-5.2	1.57 H	314	28.2	20.6
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	#5470.00	56.4 PK	74.0	-17.6	1.33 V	122	50.1	6.3
2	#5470.00	45.6 AV	54.0	-8.4	1.33 V	122	39.3	6.3
3	*5710.00	106.5 PK			1.27 V	91	65.6	40.9
4	*5710.00	96.0 AV			1.27 V	91	55.1	40.9
5	#5850.00	58.4 PK	74.0	-15.6	1.20 V	69	51.4	7.0
6	#5850.00	46.4 AV	54.0	-7.6	1.20 V	69	39.4	7.0
7	11420.00	62.5 PK	74.0	-11.5	1.09 V	263	41.9	20.6
8	11420.00	49.1 AV	54.0	-4.9	1.09 V	263	28.5	20.6

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 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	5150.00	61.5 PK	74.0	-12.5	1.78 H	76	56.9	4.6
2	5150.00	48.9 AV	54.0	-5.1	1.78 H	76	44.3	4.6
3	*5290.00	102.9 PK			1.86 H	88	60.0	42.9
4	*5290.00	93.5 AV			1.86 H	88	50.6	42.9
5	5350.00	67.4 PK	74.0	-6.6	1.72 H	87	62.7	4.7
6	5350.00	52.7 AV	54.0	-1.3	1.72 H	87	48.0	4.7
7	#10580.00	61.6 PK	74.0	-12.4	1.46 H	281	45.3	16.3
8	#10580.00	48.3 AV	54.0	-5.7	1.46 H	281	32.0	16.3
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	60.2 PK	74.0	-13.8	3.71 V	23	55.6	4.6
2	5150.00	48.1 AV	54.0	-5.9	3.71 V	23	43.5	4.6
3	*5290.00	101.1 PK			3.60 V	14	58.2	42.9
4	*5290.00	91.9 AV			3.60 V	14	49.0	42.9
5	5350.00	65.5 PK	74.0	-8.5	3.80 V	48	60.8	4.7
6	5350.00	51.2 AV	54.0	-2.8	3.80 V	48	46.5	4.7
7	#10580.00	61.1 PK	74.0	-12.9	1.57 V	163	44.8	16.3
8	#10580.00	48.0 AV	54.0	-6.0	1.57 V	163	31.7	16.3

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 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	66.0 PK	74.0	-8.0	1.76 H	78	61.2	4.8
2	5460.00	51.5 AV	54.0	-2.5	1.76 H	78	46.7	4.8
3	#5470.00	67.5 PK	74.0	-6.5	1.85 H	81	62.6	4.9
4	#5470.00	52.5 AV	54.0	-1.5	1.85 H	81	47.6	4.9
5	*5530.00	100.9 PK			2.14 H	87	57.7	43.2
6	*5530.00	91.3 AV			2.14 H	87	48.1	43.2
7	#5725.00	58.7 PK	74.0	-15.3	1.96 H	90	53.6	5.1
8	#5725.00	46.7 AV	54.0	-7.3	1.96 H	90	41.6	5.1
9	11060.00	61.9 PK	74.0	-12.1	1.43 H	257	45.1	16.8
10	11060.00	48.8 AV	54.0	-5.2	1.43 H	257	32.0	16.8
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	5460.00	65.8 PK	74.0	-8.2	4.00 V	21	61.0	4.8
2	5460.00	51.3 AV	54.0	-2.7	4.00 V	21	46.5	4.8
3	#5470.00	66.9 PK	74.0	-7.1	3.81 V	17	62.0	4.9
4	#5470.00	51.9 AV	54.0	-2.1	3.81 V	17	47.0	4.9
5	*5530.00	99.4 PK			3.79 V	38	56.2	43.2
6	*5530.00	90.5 AV			3.79 V	38	47.3	43.2
7	#5725.00	58.4 PK	74.0	-15.6	3.62 V	53	53.3	5.1
8	#5725.00	46.4 AV	54.0	-7.6	3.62 V	53	41.3	5.1
9	11060.00	61.6 PK	74.0	-12.4	1.66 V	170	44.8	16.8
10	11060.00	48.5 AV	54.0	-5.5	1.66 V	170	31.7	16.8

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 122	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	66.8 PK	74.0	-7.2	1.76 H	83	62.0	4.8
2	5460.00	51.3 AV	54.0	-2.7	1.76 H	83	46.5	4.8
3	#5470.00	67.4 PK	74.0	-6.6	2.01 H	85	62.5	4.9
4	#5470.00	52.2 AV	54.0	-1.8	2.01 H	85	47.3	4.9
5	*5610.00	107.3 PK			1.81 H	92	63.9	43.4
6	*5610.00	97.3 AV			1.81 H	92	53.9	43.4
7	#5725.00	67.7 PK	74.0	-6.3	1.92 H	90	62.6	5.1
8	#5725.00	52.7 AV	54.0	-1.3	1.92 H	90	47.6	5.1
9	11220.00	62.0 PK	74.0	-12.0	1.57 H	258	45.3	16.7
10	11220.00	49.0 AV	54.0	-5.0	1.57 H	258	32.3	16.7
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	5460.00	65.7 PK	74.0	-8.3	3.85 V	25	60.9	4.8
2	5460.00	50.6 AV	54.0	-3.4	3.85 V	25	45.8	4.8
3	#5470.00	66.7 PK	74.0	-7.3	3.99 V	28	61.8	4.9
4	#5470.00	51.3 AV	54.0	-2.7	3.99 V	28	46.4	4.9
5	*5610.00	105.6 PK			3.78 V	31	62.2	43.4
6	*5610.00	95.6 AV			3.78 V	31	52.2	43.4
7	#5725.00	67.3 PK	74.0	-6.7	3.81 V	9	62.2	5.1
8	#5725.00	51.5 AV	54.0	-2.5	3.81 V	9	46.4	5.1
9	11220.00	61.8 PK	74.0	-12.2	1.62 V	193	45.1	16.7
10	11220.00	48.7 AV	54.0	-5.3	1.62 V	193	32.0	16.7

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 138	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	#5470.00	60.3 PK	74.0	-13.7	1.10 H	48	54.0	6.3
2	#5470.00	47.6 AV	54.0	-6.4	1.10 H	48	41.3	6.3
3	*5690.00	109.3 PK			1.14 H	76	68.5	40.8
4	*5690.00	99.0 AV			1.14 H	76	58.2	40.8
5	#5850.00	65.1 PK	74.0	-8.9	1.18 H	90	58.1	7.0
6	**#5850.00**	**53.0 AV**	**54.0**	**-1.0**	**1.18 H**	**90**	**46.0**	**7.0**
7	11380.00	61.2 PK	74.0	-12.8	1.00 H	225	40.7	20.5
8	11380.00	49.2 AV	54.0	-4.8	1.00 H	225	28.7	20.5
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	#5470.00	56.8 PK	74.0	-17.2	1.19 V	83	50.5	6.3
2	#5470.00	45.4 AV	54.0	-8.6	1.19 V	83	39.1	6.3
3	*5690.00	103.9 PK			1.26 V	97	63.1	40.8
4	*5690.00	92.2 AV			1.26 V	97	51.4	40.8
5	#5850.00	58.2 PK	74.0	-15.8	1.30 V	112	51.2	7.0
6	#5850.00	46.4 AV	54.0	-7.6	1.30 V	112	39.4	7.0
7	11380.00	61.4 PK	74.0	-12.6	1.07 V	189	40.9	20.5
8	11380.00	49.0 AV	54.0	-5.0	1.07 V	189	28.5	20.5

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 52	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	57.16	29.6 QP	40.0	-10.4	1.01 H	65	43.9	-14.3
2	92.08	37.5 QP	43.5	-6.0	2.00 H	281	56.9	-19.4
3	150.28	35.8 QP	43.5	-7.7	1.25 H	88	49.2	-13.4
4	171.62	33.6 QP	43.5	-9.9	2.00 H	283	47.2	-13.6
5	375.32	33.9 QP	46.0	-12.1	1.01 H	228	43.2	-9.3
6	897.18	40.6 QP	46.0	-5.4	2.00 H	252	37.8	2.8
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	33.88	31.0 QP	40.0	-9.0	1.00 V	320	46.4	-15.4
2	150.28	33.5 QP	43.5	-10.0	1.00 V	199	46.9	-13.4
3	171.62	33.0 QP	43.5	-10.5	1.24 V	185	46.6	-13.6
4	375.32	38.2 QP	46.0	-7.8	1.24 V	330	47.5	-9.3
5	600.36	35.0 QP	46.0	-11.0	1.00 V	227	38.9	-3.9
6	897.18	37.8 QP	46.0	-8.2	1.99 V	55	35.0	2.8

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (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
			Nov. 16, 2016	Nov. 15, 2017
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
			Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
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.

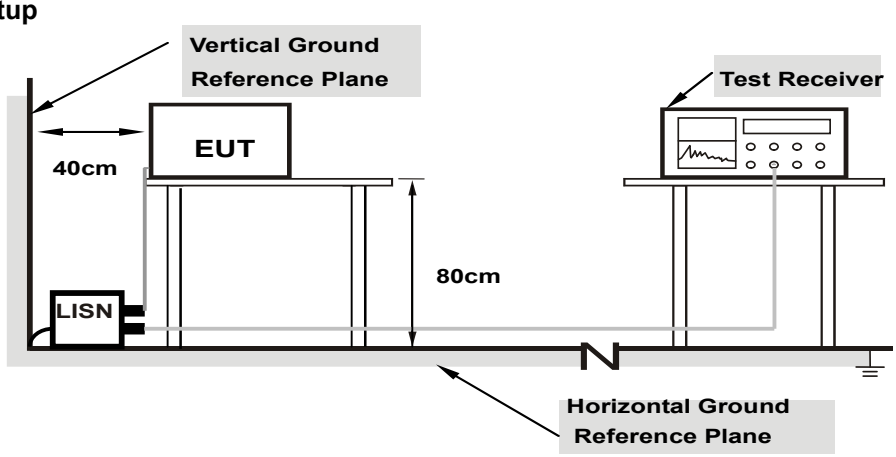
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

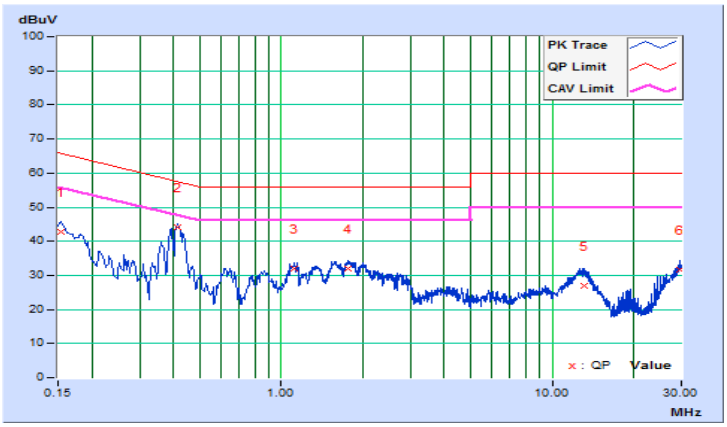
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [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	0.15391	10.02	32.63	18.33	42.65	28.35	65.79	55.79	-23.14	-27.44
2	**0.41560**	**10.12**	**34.01**	**28.96**	**44.13**	**39.08**	**57.54**	**47.54**	**-13.41**	**-8.46**
3	1.11928	10.21	21.80	15.56	32.01	25.77	56.00	46.00	-23.99	-20.23
4	1.77032	10.25	21.71	15.67	31.96	25.92	56.00	46.00	-24.04	-20.08
5	13.07646	10.91	16.01	9.70	26.92	20.61	60.00	50.00	-33.08	-29.39
6	29.63531	11.98	19.70	15.09	31.68	27.07	60.00	50.00	-28.32	-22.93

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.

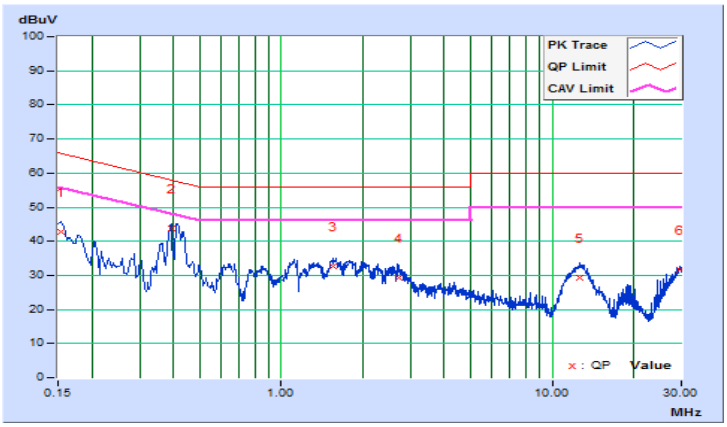


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15391	10.03	32.73	18.82	42.76	28.85	65.79	55.79	-23.03	-26.94
2	0.39219	10.13	33.67	26.06	43.80	36.19	58.02	48.02	-14.22	-11.83
3	1.56151	10.25	22.32	17.11	32.57	27.36	56.00	46.00	-23.43	-18.64
4	2.70714	10.33	18.96	11.57	29.29	21.90	56.00	46.00	-26.71	-24.10
5	12.70892	10.97	18.46	12.31	29.43	23.28	60.00	50.00	-30.57	-26.72
6	29.63922	12.15	19.34	14.77	31.49	26.92	60.00	50.00	-28.51	-23.08

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,

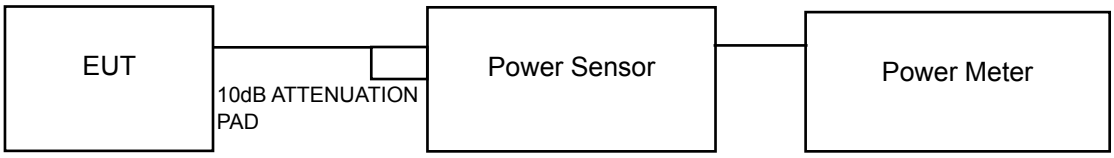
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

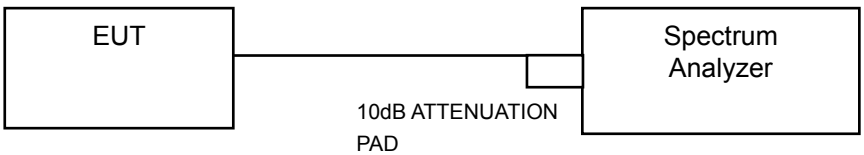
4.3.2 Test Setup

For Power Output Measurement

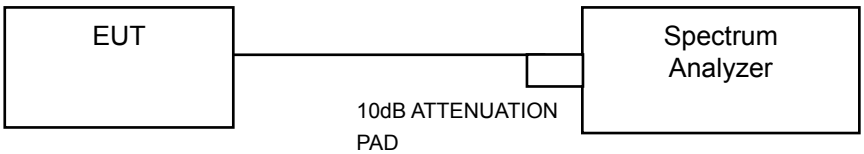
For 802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ac (VHT20), 802.11ac (VHT40)



For 802.11ac (VHT80)



For 26dB Bandwidth



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), 802.11ac (VHT20), 802.11ac (VHT40)
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 ≥ 3 MHz
5) Number of points in sweep ≥ 2 Span / RBW.
6) Sweep time ≤ (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.

For 26dB Bandwidth
1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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:

CDD Mode

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	18.47	17.62	128.117	21.08	24.00	Pass
60	5300	18.51	17.74	130.387	21.15	24.00	Pass
64	5320	16.78	16.20	89.330	19.51	24.00	Pass
100	5500	16.30	15.54	78.468	18.95	24.00	Pass
116	5580	18.21	18.09	130.639	21.16	24.00	Pass
140	5700	15.45	15.29	68.881	18.38	24.00	Pass

Note:
Chain 0
1. 11dBm + 10log(21.88) = 24.40 dBm > 24dBm
2. 11dBm + 10log(31.15) = 25.93 dBm > 24dBm
3. 11dBm + 10log(21.74) = 24.37 dBm > 24dBm
4. 11dBm + 10log(22.02) = 24.43 dBm > 24dBm
5. 11dBm + 10log(34.05) = 26.32 dBm > 24dBm
6. 11dBm + 10log(21.94) = 24.41 dBm > 24dBm

Chain 1
1. 11dBm + 10log(21.70) = 24.36 dBm > 24dBm
2. 11dBm + 10log(21.66) = 24.36 dBm > 24dBm
3. 11dBm + 10log(21.82) = 24.39 dBm > 24dBm
4. 11dBm + 10log(21.76) = 24.38 dBm > 24dBm
5. 11dBm + 10log(21.55) = 24.33 dBm > 24dBm
6. 11dBm + 10log(21.81) = 24.39 dBm > 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	18.52	17.68	129.735	21.13	24.00	Pass
60	5300	18.61	17.58	129.891	21.14	24.00	Pass
64	5320	16.55	16.02	85.180	19.30	24.00	Pass
100	5500	16.03	15.82	78.281	18.94	24.00	Pass
116	5580	18.52	18.24	137.802	21.39	24.00	Pass
140	5700	15.29	15.13	66.390	18.22	24.00	Pass

Note:
Chain 0
1. 11dBm + 10log(26.24) = 25.19 dBm > 24dBm
2. 11dBm + 10log(25.01) = 24.98 dBm > 24dBm
3. 11dBm + 10log(22.18) = 24.46 dBm > 24dBm
4. 11dBm + 10log(22.10) = 24.44 dBm > 24dBm
5. 11dBm + 10log(41.13) = 27.14 dBm > 24dBm
6. 11dBm + 10log(22.03) = 24.43 dBm > 24dBm

Chain 1
1. 11dBm + 10log(21.85) = 24.39 dBm > 24dBm
2. 11dBm + 10log(21.83) = 24.39 dBm > 24dBm
3. 11dBm + 10log(22.10) = 24.44 dBm > 24dBm
4. 11dBm + 10log(22.01) = 24.43 dBm > 24dBm
5. 11dBm + 10log(26.27) = 25.19 dBm > 24dBm
6. 11dBm + 10log(22.09) = 24.44 dBm > 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	19.32	19.91	**183.456**	22.64	24.00	Pass
62	5310	16.29	15.49	77.960	18.92	24.00	Pass
102	5510	14.00	13.91	49.723	16.97	24.00	Pass
110	5550	19.01	18.52	**150.737**	21.78	24.00	Pass
134	5670	16.40	16.12	84.578	19.27	24.00	Pass
142	5710 For U-NII-2C	16.30	16.57	90.869	19.58	24.00	Pass
142	5710 For U-NII-3	5.88	6.68	8.802	9.45	30.00	Pass

Note:
Chain 0
1. 11dBm + 10log(84.72) = 30.28 dBm > 24dBm
2. 11dBm + 10log(41.89) = 27.22 dBm > 24dBm
3. 11dBm + 10log(41.86) = 27.22 dBm > 24dBm
4. 11dBm + 10log(97.81) = 30.90 dBm > 24dBm
5. 11dBm + 10log(42.30) = 27.26 dBm > 24dBm
6. 11dBm + 10log(5725.00 - 5663.46) = 28.89 dBm > 24dBm.

Chain 1
1. 11dBm + 10log(93.20) = 30.69 dBm > 24dBm
2. 11dBm + 10log(41.64) = 27.20 dBm > 24dBm
3. 11dBm + 10log(41.62) = 27.19 dBm > 24dBm
4. 11dBm + 10log(66.11) = 29.20 dBm > 24dBm
5. 11dBm + 10log(41.75) = 27.21 dBm > 24dBm
6. 11dBm + 10log(5725.00 - 5664.35) = 28.83 dBm > 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	15.22	14.58	61.974	17.92	24.00	Pass
106	5530	13.00	12.68	38.488	15.85	24.00	Pass
122	5610	17.23	16.72	99.834	19.99	24.00	Pass
138	5690 For U-NII-2C	14.63	15.38	67.683	18.30	24.00	Pass
138	5690 For U-NII-3	0.29	1.97	2.815	4.49	30.00	Pass

Note:
Chain 0
1. 11dBm + 10log(82.81) = 30.18 dBm > 24dBm
2. 11dBm + 10log(82.44) = 30.16 dBm > 24dBm
3. 11dBm + 10log(173.53) = 33.39 dBm > 24dBm
4. 11dBm + 10log(5725.00 - 5610.00) = 31.61 dBm > 24dBm.

Chain 1
1. 11dBm + 10log(82.51) = 30.17 dBm > 24dBm
2. 11dBm + 10log(82.59) = 30.17 dBm > 24dBm
3. 11dBm + 10log(118.93) = 31.75 dBm > 24dBm
4. 11dBm + 10log(5725.00 - 5610.00) = 31.61 dBm > 24dBm.

Beamforming Mode

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	18.52	17.68	129.735	21.13	21.81	Pass
60	5300	18.61	17.58	129.891	21.14	21.81	Pass
64	5320	16.55	16.02	85.180	19.30	21.81	Pass
100	5500	16.03	15.82	78.281	18.94	21.81	Pass
116	5580	18.52	18.24	137.802	21.39	21.81	Pass
140	5700	15.29	15.13	66.390	18.22	21.81	Pass

*Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/N] = 8.19dBi > 6dBi, so the power limit shall be reduced to 24-(8.19-6) = 21.81dBm.

Note:

Chain 0

1. 11dBm + 10log(26.24) = 25.19 dBm > 24dBm
2. 11dBm + 10log(25.01) = 24.98 dBm > 24dBm
3. 11dBm + 10log(22.18) = 24.46 dBm > 24dBm
4. 11dBm + 10log(22.10) = 24.44 dBm > 24dBm
5. 11dBm + 10log(41.13) = 27.14 dBm > 24dBm
6. 11dBm + 10log(22.03) = 24.43 dBm > 24dBm

Chain 1

1. 11dBm + 10log(21.85) = 24.39 dBm > 24dBm
2. 11dBm + 10log(21.83) = 24.39 dBm > 24dBm
3. 11dBm + 10log(22.10) = 24.44 dBm > 24dBm
4. 11dBm + 10log(22.01) = 24.43 dBm > 24dBm
5. 11dBm + 10log(26.27) = 25.19 dBm > 24dBm
6. 11dBm + 10log(22.09) = 24.44 dBm > 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	18.32	18.91	**145.724**	21.64	21.81	Pass
62	5310	16.29	15.49	77.960	18.92	21.81	Pass
102	5510	14.00	13.91	49.723	16.97	21.81	Pass
110	5550	19.01	18.52	**150.737**	21.78	21.81	Pass
134	5670	16.40	16.12	84.578	19.27	21.81	Pass
142	5710 For U-NII-2C	16.30	16.57	90.869	19.58	21.81	Pass
142	5710 For U-NII-3	5.88	6.68	8.802	9.45	27.81	Pass

* For U-NII-2A, U-NII-2C: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/N] = 8.19dBi > 6dBi, so the power limit shall be reduced to 24-(8.19-6) = 21.81dBm.
* For U-NII-3: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/N] = 8.19dBi > 6dBi, so the power limit shall be reduced to 30-(8.19-6) = 27.81dBm.

Note:
Chain 0
1. 11dBm + 10log(84.72) = 30.28 dBm > 24dBm
2. 11dBm + 10log(41.89) = 27.22 dBm > 24dBm
3. 11dBm + 10log(41.86) = 27.22 dBm > 24dBm
4. 11dBm + 10log(97.81) = 30.90 dBm > 24dBm
5. 11dBm + 10log(42.30) = 27.26 dBm > 24dBm
6. 11dBm + 10log(5725.00 - 5663.46) = 28.89 dBm > 24dBm.

Chain 1
1. 11dBm + 10log(93.20) = 30.69 dBm > 24dBm
2. 11dBm + 10log(41.64) = 27.20 dBm > 24dBm
3. 11dBm + 10log(41.62) = 27.19 dBm > 24dBm
4. 11dBm + 10log(66.11) = 29.20 dBm > 24dBm
5. 11dBm + 10log(41.75) = 27.21 dBm > 24dBm
6. 11dBm + 10log(5725.00 - 5664.35) = 28.83 dBm > 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	15.22	14.58	61.974	17.92	21.81	Pass
106	5530	13.00	12.68	38.488	15.85	21.81	Pass
122	5610	17.23	16.72	99.834	19.99	21.81	Pass
138	5690 For U-NII-2C	14.63	15.38	67.683	18.30	21.81	Pass
138	5690 For U-NII-3	0.29	1.97	2.815	4.49	27.81	Pass

* For U-NII-2A, U-NII-2C: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 8.19dBi > 6dBi, so the power limit shall be reduced to 24-(8.19-6) = 21.81dBm.
* For U-NII-3: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 8.19dBi > 6dBi, so the power limit shall be reduced to 30-(8.19-6) = 27.81dBm.

Note:
Chain 0
1. 11dBm + 10log(82.81) = 30.18 dBm > 24dBm
2. 11dBm + 10log(82.44) = 30.16 dBm > 24dBm
3. 11dBm + 10log(173.53) = 33.39 dBm > 24dBm
4. 11dBm + 10log(5725.00 - 5663.46) = 28.89 dBm > 24dBm.

Chain 1
1. 11dBm + 10log(82.51) = 30.17 dBm > 24dBm
2. 11dBm + 10log(82.59) = 30.17 dBm > 24dBm
3. 11dBm + 10log(118.93) = 31.75 dBm > 24dBm
4. 11dBm + 10log(5725.00 - 5664.35) = 28.83 dBm > 24dBm.

26dB BANDWIDTH:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.88	21.70
60	5300	31.15	21.66
64	5320	21.74	21.82
100	5500	22.02	21.76
116	5580	34.05	21.55
140	5700	21.94	21.81

802.11n (HT20)

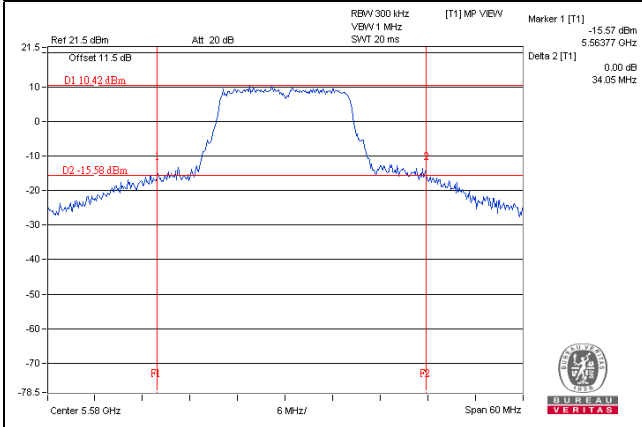
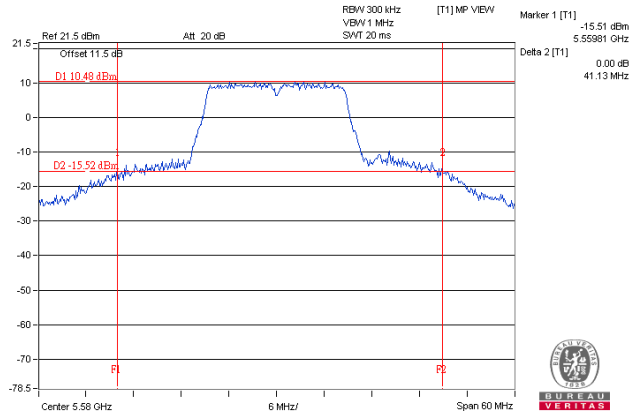
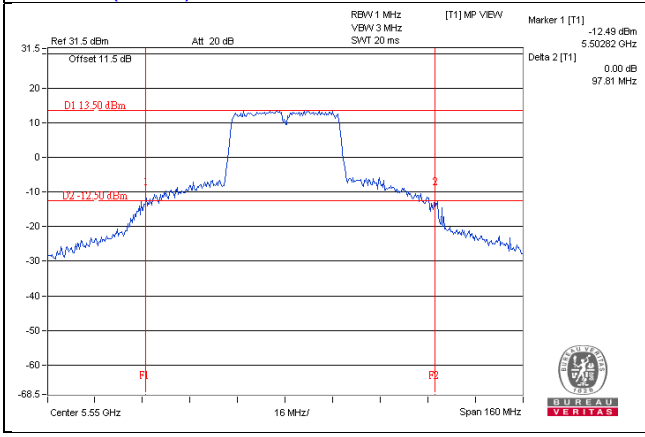
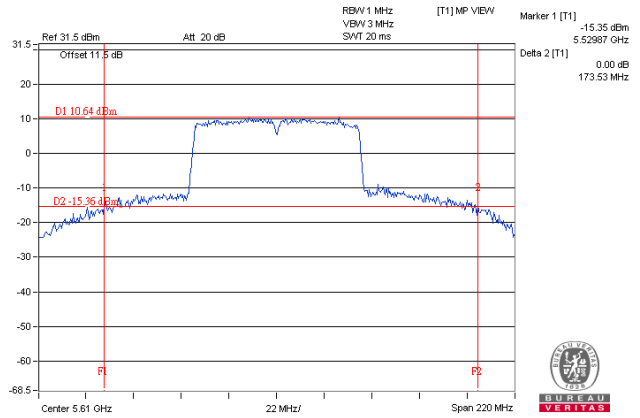
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	26.24	21.85
60	5300	25.01	21.83
64	5320	22.18	22.10
100	5500	22.10	22.01
116	5580	41.13	26.27
140	5700	22.03	22.09

802.11n (HT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	84.72	93.20
62	5310	41.89	41.64
102	5510	41.86	41.62
110	5550	97.81	66.11
134	5670	42.30	41.75
142	5710 For U-NII-2C	61.54	60.65

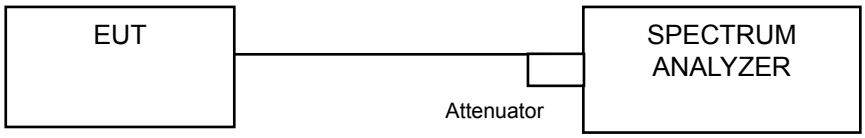
802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	82.81	82.51
106	5530	82.44	82.59
122	5610	173.53	118.93
138	5690 For U-NII-2C	118.65	121.65

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 Results

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	17.04	16.92
60	5300	17.40	17.16
64	5320	16.92	17.16
100	5500	16.92	16.92
116	5580	17.52	17.04
140	5700	17.16	16.92

802.11n (HT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	18.24	18.24
60	5300	18.24	18.12
64	5320	18.12	18.00
100	5500	18.12	18.00
116	5580	19.08	18.24
140	5700	18.12	18.12

802.11n (HT40)

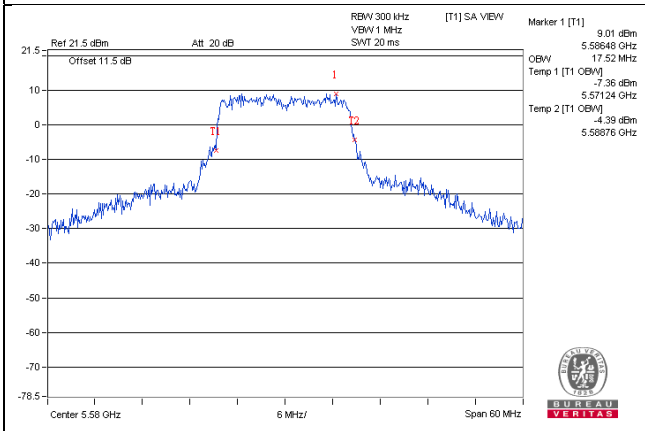
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	37.20	37.08
62	5310	36.72	36.72
102	5510	36.72	36.72
110	5550	37.32	36.96
134	5670	36.84	36.60
142	5710 For U-NII-2C	33.60	33.60
142	5710 For U-NII-3	3.60	3.48

802.11ac (VHT80)

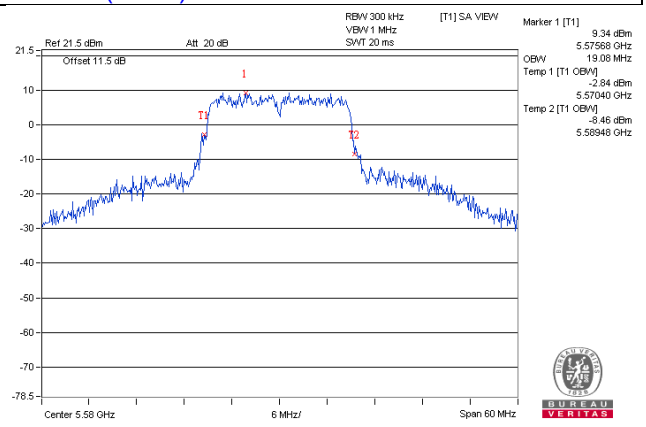
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	75.84	75.84
106	5530	76.08	76.08
122	5610	76.32	76.08
138	5690 For U-NII-2C	73.40	73.40
138	5690 For U-NII-3	3.16	3.16

Spectrum Plot of Worst Value

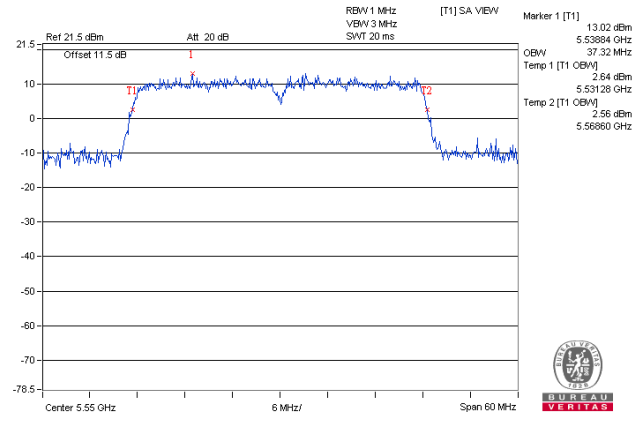
802.11a



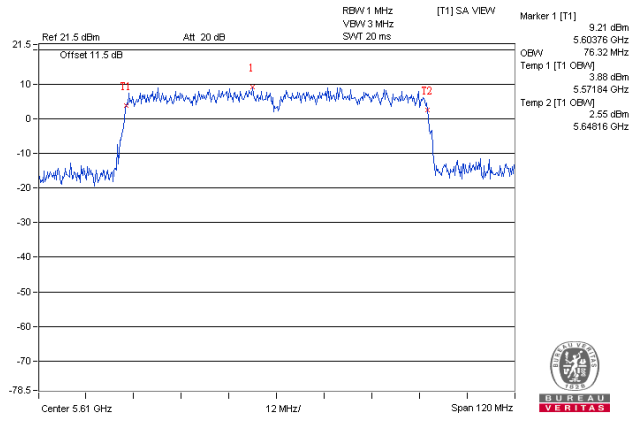
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



EUT MAXIMUM CONDUCTED POWER

CDD Mode

802.11a

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	130.387	21.15
5470~5725	130.639	21.16

Note: Manufacturer provides Transmit Power Control description to meet this requirement.

802.11n (HT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	129.891	21.14
5470~5725	137.802	21.39

Note: Manufacturer provides Transmit Power Control description to meet this requirement.

802.11n (HT40)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	183.456	22.64
5470~5725	150.737	21.78

Note: Manufacturer provides Transmit Power Control description to meet this requirement.

802.11ac (VHT80)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	61.974	17.92
5470~5725	99.834	19.99

Note: Manufacturer provides Transmit Power Control description to meet this requirement.

Beamforming Mode

802.11ac (VHT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	129.891	21.14
5470~5725	137.802	21.39

Note: Manufacturer provides Transmit Power Control description to meet this requirement.

802.11ac (VHT40)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	145.724	21.64
5470~5725	150.737	21.78

Note: Manufacturer provides Transmit Power Control description to meet this requirement.

802.11ac (VHT80)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	61.974	17.92
5470~5725	99.834	19.99

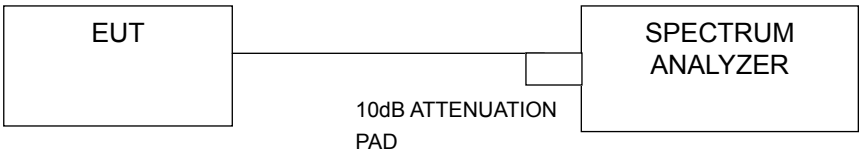
Note: Manufacturer provides Transmit Power Control description to meet this requirement.

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
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value

Using method SA-2
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Sweep time = auto, trigger set to “free run”.
4) Trace average at least 100 traces in power averaging mode.
5) Record the max value and add 10 log (1/duty cycle)

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 w/o Duty Factor (dBm)		Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	5.33	5.27	0.09	8.40	8.81	Pass
60	5300	5.44	5.34	0.09	8.49	8.81	Pass
64	5320	4.10	3.16	0.09	6.76	8.81	Pass
100	5500	2.97	2.52	0.09	5.85	8.81	Pass
116	5580	5.38	5.44	0.09	8.51	8.81	Pass
140	5700	2.11	1.60	0.09	4.96	8.81	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 11-(8.19-6) = 8.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
52	5260	5.45	5.47	8.47	8.81	Pass
60	5300	5.34	5.28	8.32	8.81	Pass
64	5320	3.48	2.29	5.94	8.81	Pass
100	5500	2.70	2.06	5.40	8.81	Pass
116	5580	5.10	5.64	8.39	8.81	Pass
140	5700	1.73	1.14	4.46	8.81	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 11-(8.19-6) = 8.81dBm.

802.11n (HT40)

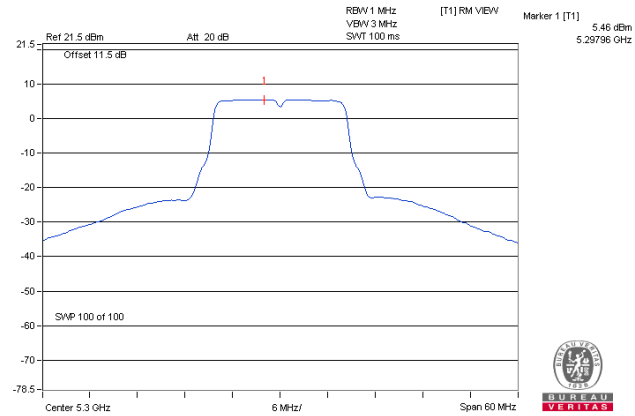
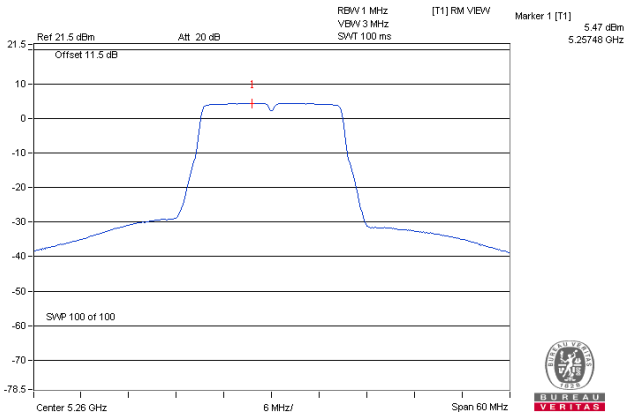
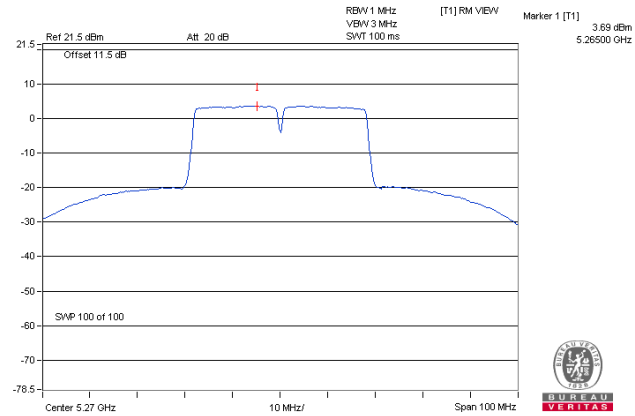
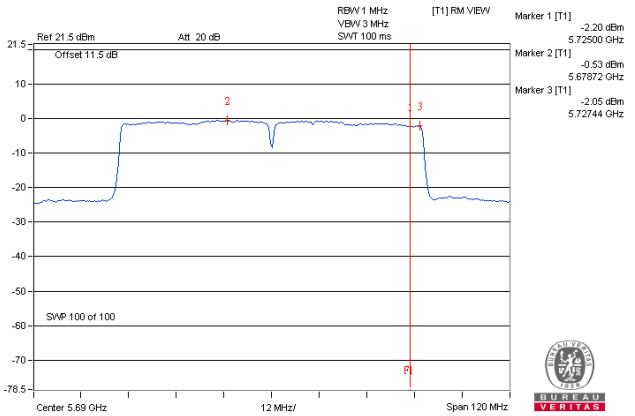
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm)		Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
54	5270	3.48	3.69	0.14	6.73	8.81	Pass
62	5310	0.18	-1.01	0.14	2.77	8.81	Pass
102	5510	-2.35	-3.11	0.14	0.43	8.81	Pass
110	5550	2.52	1.84	0.14	5.34	8.81	Pass
134	5670	-0.22	-0.82	0.14	2.64	8.81	Pass
142	5710 For U-NII-2C	2.05	2.18	0.14	5.26	8.81	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 11-(8.19-6) = 8.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	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	-3.80	-4.86	0.27	-1.01	8.81	Pass
106	5530	-6.47	-7.15	0.27	-3.51	8.81	Pass
122	5610	-1.05	-1.52	0.27	2.00	8.81	Pass
138	5690 For U-NII-2C	-1.40	-0.53	0.27	2.34	8.81	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$] = 8.19dBi > 6dBi, therefore the limit shall be reduced to 11-(8.19-6) = 8.81dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

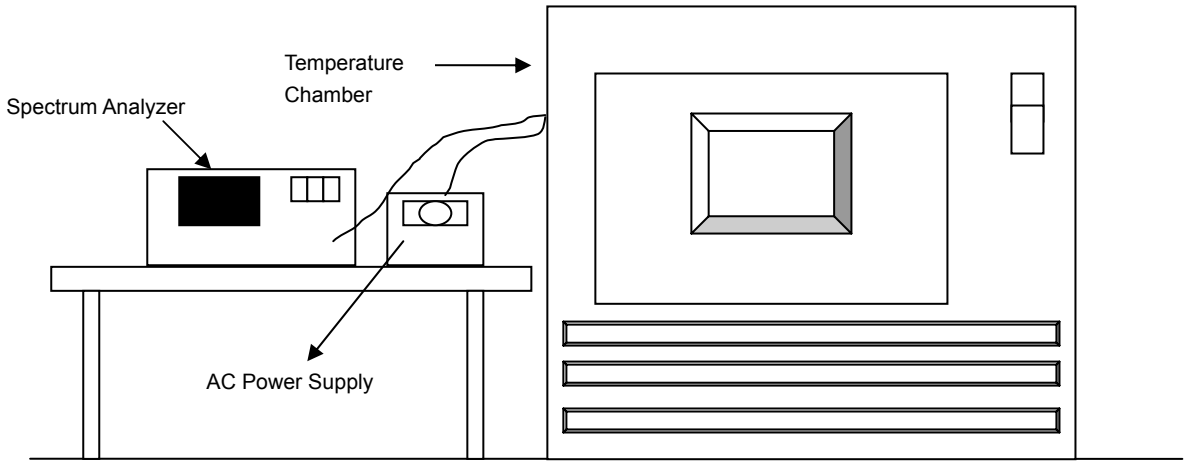
Spectrum Plot of Worst Value	
802.11a / Chain 0 / Ch 60	802.11n (HT20) / Chain 1 / Ch 52
	
802.11n (HT40) / Chain 1 / Ch 54	802.11ac (VHT80) / Chain 1 / Ch 138
	

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: 5320MHz									
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	5320.0008	0.00002	5320.0025	0.00005	5320.0044	0.00008	5320.0022	0.00004
40	120	5320.0046	0.00009	5320.0078	0.00015	5320.0078	0.00015	5320.0054	0.00010
30	120	5319.9778	-0.00042	5319.9785	-0.00040	5319.9804	-0.00037	5319.9793	-0.00039
20	120	5319.9843	-0.00030	5319.9804	-0.00037	5319.9812	-0.00035	5319.982	-0.00034
10	120	5320.0228	0.00043	5320.0227	0.00043	5320.0226	0.00042	5320.0228	0.00043
0	120	5320.0038	0.00007	5320.0041	0.00008	5320.0043	0.00008	5320.0058	0.00011
-10	120	5320.0259	0.00049	5320.0247	0.00046	5320.0238	0.00045	5320.0246	0.00046
-20	120	5319.9955	-0.00008	5319.9941	-0.00011	5319.991	-0.00017	5319.9928	-0.00014
-30	120	5319.9896	-0.00020	5319.9903	-0.00018	5319.9875	-0.00023	5319.9911	-0.00017

Frequency Stability Versus Voltage									
Operating Frequency: 5320MHz									
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	5319.9842	-0.00030	5319.9802	-0.00037	5319.9815	-0.00035	5319.9812	-0.00035
	120	5319.9843	-0.00030	5319.9804	-0.00037	5319.9812	-0.00035	5319.9820	-0.00034
	102	5319.9845	-0.00029	5319.9796	-0.00038	5319.9803	-0.00037	5319.9826	-0.00033

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

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