

FCC Test Report

Report No.: RF160308E11-1

FCC ID: I88WAP6806

Test Model: WAP6806

Received Date: Mar. 08, 2016

Test Date: Mar. 22 to Apr. 13, 2016

Issued Date: May 13, 2016

Applicant: ZyXEL Communications Corporation

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(R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF160308E11-1	Original release.	May 13, 2016

1 Certificate of Conformity

Product: Dual-Band Wireless AC2100 Access Point

Brand: ZyXEL

Test Model: WAP6806

Sample Status: ENGINEERING SAMPLE

Applicant: ZyXEL Communications Corporation

Test Date: Mar. 22 to Apr. 13, 2016

Standard: 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 : Midoli Peng, **Date:** May 13, 2016
Midoli Peng / Specialist

Approved by : May Chen, **Date:** May 13, 2016
May Chen / 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 -9.48dB at 0.30234MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5715.00MHz, 5725.00MHz, 5150.00MHz & 5860.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.31 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.40 dB
	6GHz ~ 18GHz	3.73 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Dual-Band Wireless AC2100 Access Point
Brand	ZyXEL
Test Model	WAP6806
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	For 15.407 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	For 15.247 2.412 ~ 2.462GHz
Number of Channel	For 15.407 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	For 15.407 5.18 ~ 5.24GHz CDD Mode 620.954mW Beamforming Mode 313.331mW 5.745 ~ 5.825GHz CDD Mode 471.699mW Beamforming Mode 301.727mW
	For 15.247 1TX mode 489.779mW 2TX mode 832.385mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

- 2.4GHz and 5GHz technology can transmit at same time.
- The antennas provided to the EUT, please refer to the following table:

2.4GHz								
No.	Transmitter Circuit	P/N	Ant. Gain (dBi) Including cable loss	Frequency range (MHz to MHz)	Antenna Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
1	Chain (0)	N2420GSS-PK1-G115UR3	3.32	2400~2483.5	Dipole	IPEX	0.437	115
2	Chain (1)	N2420GS-PK1-B40UR2	3.2	2400~2483.5	Dipole	IPEX	0.152	40
5GHz								
No.	Transmitter Circuit	P/N	Ant. Gain (dBi) Including cable loss	Frequency range (MHz to MHz)	Antenna Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
3	Chain (0)	N5X20B-PK1-W50U	3.5	5150~5850	Dipole	IPEX	0.25	50
4	Chain (1)	N5X20B-PK1-G45U	3.5	5150~5850	Dipole	IPEX	0.225	45
5	Chain (2)	N5X20B-PK1-G45U	4.39	5150~5850	Dipole	IPEX	0.225	45
6	Chain (3)	N5X20B-PK1-B65U	4.11	5150~5850	Dipole	IPEX	0.325	65

- The EUT power needs to be supplied from one power adapter, the information is as below table:

Brand	Model No.	Spec.
UMEC	UP0121M-12PA	Input: 100-240V, 0.4A, 50/60Hz Output: 12V, 1A DC output cable(1.5m, unshielded)

- The power setting are list as below:

Modulation Mode	Frequency (MHz)	CDD Mode	Beamforming Mode
		Power Setting	Power Setting
802.11a	5180	20	-
	5200	20	-
	5240	20	-
	5745	17	-
	5785	23	-
	5825	19	-
802.11ac (VHT20)	5180	20	20
	5200	20	20
	5240	20	20
	5745	18	18
	5785	23	20
	5825	21	21
802.11ac (VHT40)	5190	16	16
	5230	23	19
	5755	16	16
	5795	22	20
802.11ac (VHT80)	5210	15	15
	5775	17	17

5. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX (Fixed Chain 0)	1RX
802.11g	6 ~ 54Mbps	1TX (Fixed Chain 0)	1RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX

Note. : 1. 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)
2. All of modulation mode support beamforming function except 2.4GHz and 802.11a modulation mode.

6. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.

7. 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 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 2 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.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

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.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	5180-5240 5745-5825	38 to 46	46	OFDM	BPSK	13.5

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.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	5180-5240 5745-5825	38 to 46	46	OFDM	BPSK	13.5

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.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode (Only for Max Average Transmit Power)						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	25deg. C, 72%RH	120Vac, 60Hz	Andy Ho
RE<1G	23deg. C, 66%RH	120Vac, 60Hz	Andy Ho
PLC	20deg. C, 60%RH	120Vac, 60Hz	Wythe Lin
APCM	22deg. C, 66%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

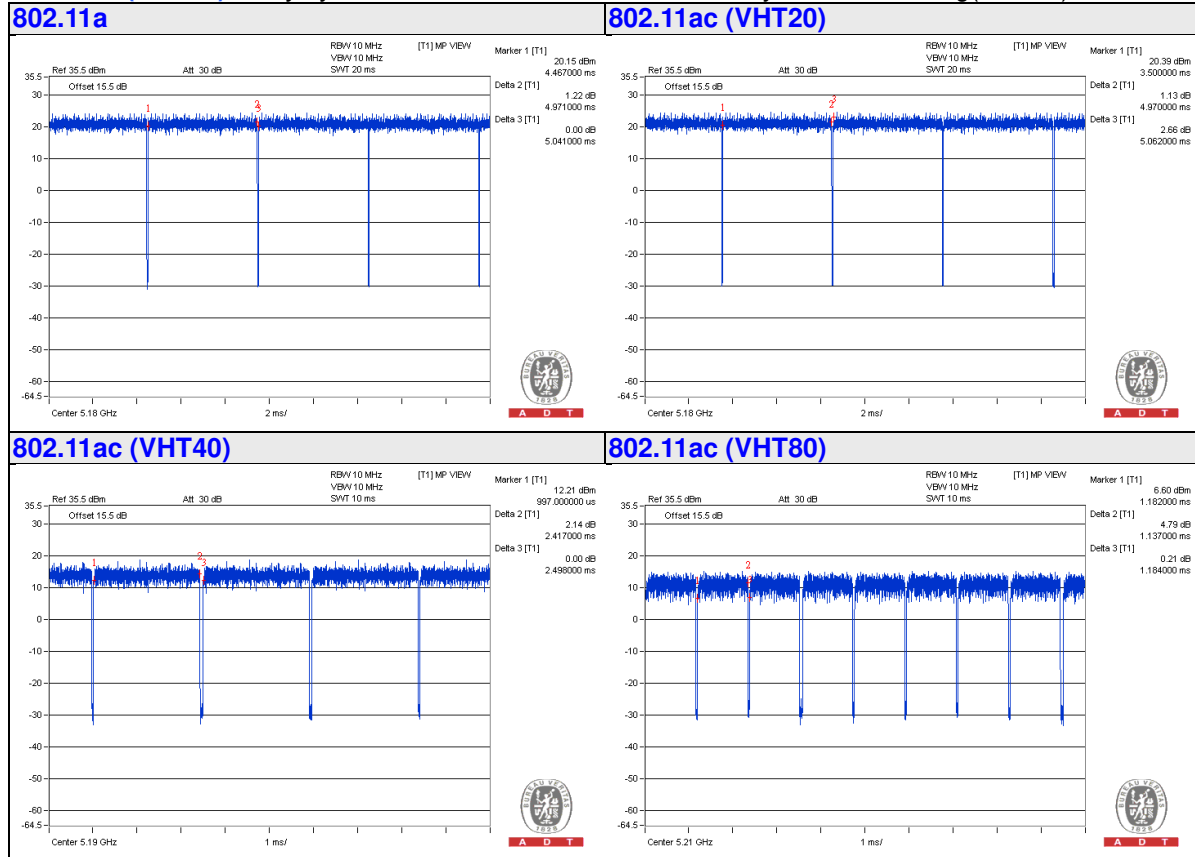
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = $4.971 \text{ ms} / 5.041 \text{ ms} = 0.986$

802.11ac (VHT20): Duty cycle = $4.97 \text{ ms} / 5.062 \text{ ms} = 0.982$

802.11ac (VHT40): Duty cycle = $2.417 \text{ ms} / 2.498 \text{ ms} = 0.968$, Duty factor = $10 * \log(1/0.968) = 0.14$

802.11ac (VHT80): Duty cycle = $1.137 \text{ ms} / 1.184 \text{ ms} = 0.96$, Duty factor = $10 * \log(1/0.96) = 0.18$



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.

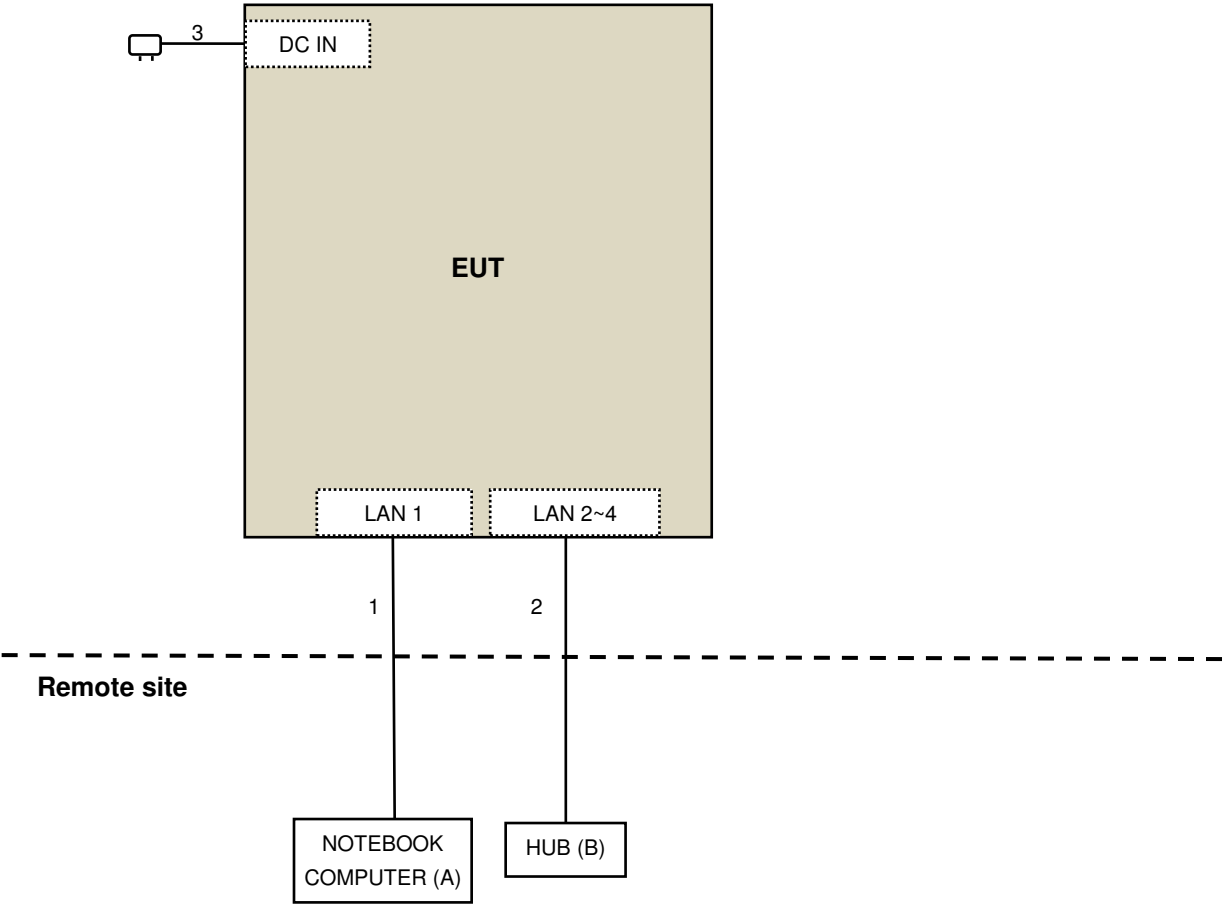
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	NOTEBOOK COMPUTER	HP	Pavilion 14-ab023TU	5CD5340WXZ	FCC DoC	Provided by Lab
B.	HUB	PCI	FX-05EA	NA	NA	Provided by Lab

Note:

1. 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.	RJ45 cable	1	10	No	0	Provided by Lab
2.	RJ45 cable	3	10	No	0	Provided by Lab
3.	DC cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedure New Rules v01r02

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:

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

LimitS OF UNWANTED EMISSION OUT OF THE RESTRICTED Bands

Applicable To	Limit	
KDB 789033 D02 General UNII Test Procedure New Rules v01r02	FIELD STRENGTH at 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
Applicable To	EIRP Limit	Equivalent Field Strength at 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) ^{*1} PK:-17 (dBm/MHz) ^{*2}	PK: 68.2(dBμV/m) ^{*1} PK:78.2 (dBμV/m) ^{*2}

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

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

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

4.1.2 Test Instruments

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 12, 2015	Aug. 11, 2016
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Jan. 20, 2016	Jan. 19, 2017
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 05, 2016	Apr. 04, 2017
RF Cable	EMC104-SM- SM-2000 EMC104-SM- SM-5000 EMC104-SM- SM-5000	150317 150321 150322	Mar. 30, 2016	Mar. 29, 2017
Spectrum Analyzer Keysight	N9030A	MY54490520	July 26, 2015	July 25, 2016
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Boresight Antenna Fixture	NA	NA	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 08, 2015	May 07, 2016
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-S P-AR	MAA0812-008	Jan. 15, 2016	Jan. 14, 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 966 Chamber No. 3.
3. The FCC Site Registration No. is 147459
4. The CANADA Site Registration No. is 20331-1
6. Tested Date: Apr. 06 to 13, 2016

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY54450088	July 24, 2015	July 23, 2016
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 03, 2015	Apr. 02, 2016
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. 4.
5. The FCC Site Registration No. is 292998
6. The CANADA Site Registration No. is 20331-2
- 7 Tested Date: Mar. 22, 2016

4.1.3 Test Procedure

- 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:

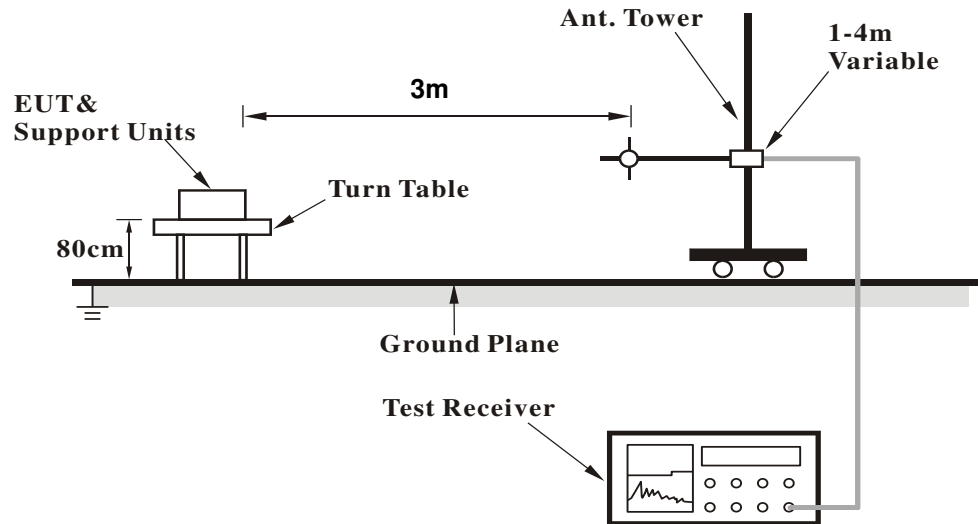
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

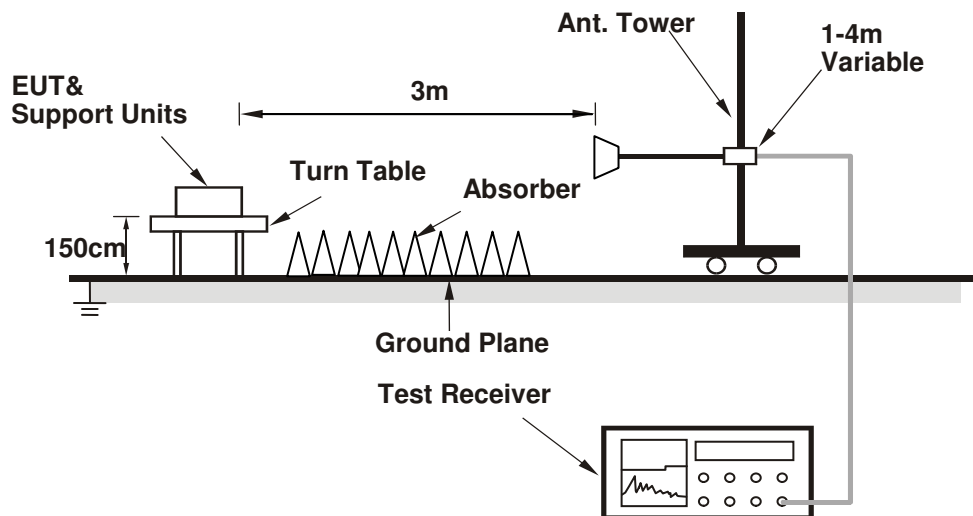
No deviation.

4.1.5 Test Setup

<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 Condition

- Connected the EUT with the support unit A (Notebook Computer) which is placed on remote site.
- Contorlling software (MT7603 QAV0.0.0.71) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data :

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.6 PK	74.0	-15.4	2.81 H	238	58.01	0.59
2	5150.00	48.7 AV	54.0	-5.3	2.81 H	238	48.11	0.59
3	*5180.00	113.6 PK			2.81 H	238	112.91	0.69
4	*5180.00	104.8 AV			2.81 H	238	104.11	0.69
5	#10360.00	56.4 PK	74.0	-17.6	1.85 H	314	45.68	10.72
6	#10360.00	47.1 AV	54.0	-6.9	1.85 H	314	36.38	10.72
7	15540.00	58.8 PK	74.0	-15.2	1.43 H	266	46.10	12.70
8	15540.00	46.8 AV	54.0	-7.2	1.43 H	266	34.10	12.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.5 PK	74.0	-11.5	1.81 V	260	61.91	0.59
2	5150.00	53.1 AV	54.0	-0.9	1.81 V	260	52.51	0.59
3	*5180.00	118.7 PK			1.81 V	260	118.01	0.69
4	*5180.00	110.4 AV			1.81 V	260	109.71	0.69
5	#10360.00	60.8 PK	74.0	-13.2	1.61 V	265	50.08	10.72
6	#10360.00	49.8 AV	54.0	-4.2	1.61 V	265	39.08	10.72
7	15540.00	56.6 PK	74.0	-17.4	1.43 V	249	43.90	12.70
8	15540.00	45.6 AV	54.0	-8.4	1.43 V	249	32.90	12.70

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.7 PK	74.0	-21.3	2.86 H	231	52.11	0.59
2	5150.00	43.9 AV	54.0	-10.1	2.86 H	231	43.31	0.59
3	*5200.00	114.3 PK			2.86 H	231	113.55	0.75
4	*5200.00	104.2 AV			2.86 H	231	103.45	0.75
5	5440.00	50.3 PK	74.0	-23.7	2.86 H	231	49.02	1.28
6	5440.00	42.2 AV	54.0	-11.8	2.86 H	231	40.92	1.28
7	#6933.33	49.7 PK	74.0	-24.3	2.86 H	231	44.72	4.98
8	#6933.33	48.6 AV	54.0	-5.4	2.86 H	231	43.62	4.98
9	#10400.00	58.8 PK	74.0	-15.2	2.51 H	273	47.76	11.04
10	#10400.00	46.7 AV	54.0	-7.3	2.51 H	273	35.66	11.04
11	15600.00	56.3 PK	74.0	-17.7	1.38 H	272	43.56	12.74
12	15600.00	44.2 AV	54.0	-9.8	1.38 H	272	31.46	12.74

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	56.6 PK	74.0	-17.4	1.69 V	256	56.01	0.59
2	5150.00	48.3 AV	54.0	-5.7	1.69 V	256	47.71	0.59
3	*5200.00	119.4 PK			1.69 V	256	118.65	0.75
4	*5200.00	109.8 AV			1.69 V	256	109.05	0.75
5	5440.00	54.2 PK	74.0	-19.8	1.69 V	256	52.92	1.28
6	5440.00	46.6 AV	54.0	-7.4	1.69 V	256	45.32	1.28
7	#6933.33	57.7 PK	74.0	-16.3	1.64 V	270	52.72	4.98
8	#6933.33	53.5 AV	54.0	-0.5	1.64 V	270	48.52	4.98
9	#10400.00	61.8 PK	74.0	-12.2	1.61 V	258	50.76	11.04
10	#10400.00	50.3 AV	54.0	-3.7	1.61 V	258	39.26	11.04
11	15600.00	55.8 PK	74.0	-18.2	1.51 V	251	43.06	12.74
12	15600.00	45.4 AV	54.0	-8.6	1.51 V	251	32.66	12.74

REMARKS:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.7 PK			2.87 H	233	112.81	0.89
2	*5240.00	103.7 AV			2.87 H	233	102.81	0.89
3	5350.00	51.4 PK	74.0	-22.6	2.87 H	233	50.24	1.16
4	5350.00	41.6 AV	54.0	-12.4	2.87 H	233	40.44	1.16
5	#6986.00	54.3 PK	74.0	-19.7	2.65 H	221	49.00	5.30
6	#6986.00	49.4 AV	54.0	-4.6	2.65 H	221	44.10	5.30
7	#10480.00	58.6 PK	74.0	-15.4	2.57 H	276	47.77	10.83
8	#10480.00	46.7 AV	54.0	-7.3	2.57 H	276	35.87	10.83
9	15720.00	56.6 PK	74.0	-17.4	1.39 H	274	44.62	11.98
10	15720.00	44.4 AV	54.0	-9.6	1.39 H	274	32.42	11.98

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	118.2 PK			1.66 V	259	117.31	0.89
2	*5240.00	109.3 AV			1.66 V	259	108.41	0.89
3	5350.00	55.5 PK	74.0	-18.5	1.66 V	259	54.34	1.16
4	5350.00	45.4 AV	54.0	-8.6	1.66 V	259	44.24	1.16
5	#6986.00	58.3 PK	74.0	-15.7	1.50 V	219	53.00	5.30
6	#6986.00	53.7 AV	54.0	-0.3	1.50 V	219	48.40	5.30
7	#10480.00	61.9 PK	74.0	-12.1	1.57 V	268	51.07	10.83
8	#10480.00	50.4 AV	54.0	-3.6	1.57 V	268	39.57	10.83
9	15720.00	55.5 PK	74.0	-18.5	1.46 V	247	43.52	11.98
10	15720.00	45.1 AV	54.0	-8.9	1.46 V	247	33.12	11.98

REMARKS:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	59.5 PK	74.0	-14.5	2.45 H	297	57.80	1.70
2	#5715.00	48.4 AV	54.0	-5.6	2.45 H	297	46.70	1.70
3	#5725.00	62.8 PK	78.2	-15.4	2.60 H	236	61.09	1.71
4	*5745.00	111.7 PK			2.60 H	247	109.96	1.74
5	*5745.00	103.1 AV			2.60 H	247	101.36	1.74
6	11490.00	55.4 PK	74.0	-18.6	2.61 H	273	42.99	12.41
7	11490.00	41.9 AV	54.0	-12.1	2.61 H	273	29.49	12.41
8	#17235.00	66.9 PK	74.0	-7.1	1.36 H	272	50.18	16.72
9	#17235.00	52.0 AV	54.0	-2.0	1.36 H	272	35.28	16.72

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	#5715.00	66.6 PK	74.0	-7.4	1.61 V	234	64.90	1.70
2	#5715.00	53.9 AV	54.0	-0.1	1.61 V	234	52.20	1.70
3	#5725.00	78.1 PK	78.2	-0.1	2.14 V	264	76.39	1.71
4	*5745.00	116.7 PK			1.78 V	253	114.96	1.74
5	*5745.00	108.7 AV			1.78 V	253	106.96	1.74
6	11490.00	58.7 PK	74.0	-15.3	1.50 V	236	46.29	12.41
7	11490.00	45.6 AV	54.0	-8.4	1.50 V	236	33.19	12.41
8	#17235.00	68.0 PK	74.0	-6.0	1.78 V	274	51.28	16.72
9	#17235.00	52.7 AV	54.0	-1.3	1.78 V	274	35.98	16.72

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	54.7 PK	74.0	-19.3	2.61 H	252	53.00	1.70
2	#5715.00	44.9 AV	54.0	-9.1	2.61 H	252	43.20	1.70
3	#5725.00	46.8 PK	78.2	-31.4	2.50 H	289	45.09	1.71
4	*5785.00	116.3 PK			2.61 H	252	114.50	1.80
5	*5785.00	107.2 AV			2.61 H	252	105.40	1.80
6	#5850.00	47.3 PK	78.2	-30.9	2.61 H	227	45.48	1.82
7	#5860.00	54.8 PK	74.0	-19.2	2.54 H	224	52.98	1.82
8	#5860.00	44.6 AV	54.0	-9.4	2.54 H	224	42.78	1.82
9	11570.00	57.1 PK	74.0	-16.9	2.56 H	258	44.92	12.18
10	11570.00	41.7 AV	54.0	-12.3	2.56 H	258	29.52	12.18
11	#17355.00	66.4 PK	74.0	-7.6	1.41 H	263	49.13	17.27
12	#17355.00	52.2 AV	54.0	-1.8	1.41 H	263	34.93	17.27

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	#5715.00	61.8 PK	74.0	-12.2	1.68 V	231	60.10	1.70
2	#5715.00	50.4 AV	54.0	-3.6	1.68 V	231	48.70	1.70
3	#5725.00	62.1 PK	78.2	-16.1	1.68 V	242	60.39	1.71
4	*5785.00	121.3 PK			1.70 V	248	119.50	1.80
5	*5785.00	112.8 AV			1.70 V	248	111.00	1.80
6	#5850.00	62.6 PK	78.2	-15.6	1.71 V	243	60.78	1.82
7	#5860.00	61.9 PK	74.0	-12.1	1.54 V	242	60.08	1.82
8	#5860.00	50.1 AV	54.0	-3.9	1.54 V	242	48.28	1.82
9	11570.00	58.2 PK	74.0	-15.8	1.54 V	239	46.02	12.18
10	11570.00	45.4 AV	54.0	-8.6	1.54 V	239	33.22	12.18
11	#17355.00	67.5 PK	74.0	-6.5	1.83 V	269	50.23	17.27
12	#17355.00	52.3 AV	54.0	-1.7	1.83 V	269	35.03	17.27

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	110.7 PK			2.57 H	241	108.87	1.83
2	*5825.00	102.2 AV			2.57 H	241	100.37	1.83
3	#5850.00	53.5 PK	78.2	-24.7	2.57 H	241	51.68	1.82
4	#5860.00	59.5 PK	74.0	-14.5	2.62 H	239	57.68	1.82
5	#5860.00	48.2 AV	54.0	-5.8	2.62 H	239	46.38	1.82
6	11650.00	56.9 PK	74.0	-17.1	2.61 H	266	44.87	12.03
7	11650.00	41.6 AV	54.0	-12.4	2.61 H	266	29.57	12.03
8	#17475.00	66.8 PK	74.0	-7.2	1.44 H	266	49.04	17.76
9	#17475.00	52.5 AV	54.0	-1.5	1.44 H	266	34.74	17.76

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	*5825.00	115.7 PK			1.58 V	248	113.87	1.83
2	*5825.00	107.8 AV			1.58 V	248	105.97	1.83
3	#5850.00	68.8 PK	78.2	-9.4	1.58 V	248	66.98	1.82
4	#5860.00	66.6 PK	74.0	-7.4	1.73 V	275	64.78	1.82
5	#5860.00	53.7 AV	54.0	-0.3	1.73 V	275	51.88	1.82
6	11650.00	58.7 PK	74.0	-15.3	1.55 V	240	46.67	12.03
7	11650.00	45.8 AV	54.0	-8.2	1.55 V	240	33.77	12.03
8	#17475.00	67.6 PK	74.0	-6.4	1.80 V	272	49.84	17.76
9	#17475.00	52.7 AV	54.0	-1.3	1.80 V	272	34.94	17.76

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 (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.8 PK	74.0	-15.2	2.59 H	255	58.21	0.59
2	5150.00	48.7 AV	54.0	-5.3	2.59 H	255	48.11	0.59
3	*5180.00	113.5 PK			2.59 H	255	112.81	0.69
4	*5180.00	104.3 AV			2.59 H	255	103.61	0.69
5	#10360.00	56.5 PK	74.0	-17.5	1.83 H	305	45.78	10.72
6	#10360.00	47.0 AV	54.0	-7.0	1.83 H	305	36.28	10.72
7	15540.00	59.2 PK	74.0	-14.8	1.47 H	262	46.50	12.70
8	15540.00	46.9 AV	54.0	-7.1	1.47 H	262	34.20	12.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	72.1 PK	74.0	-1.9	1.58 V	220	71.51	0.59
2	5150.00	53.9 AV	54.0	-0.1	1.58 V	220	53.31	0.59
3	*5180.00	118.5 PK			1.85 V	255	117.81	0.69
4	*5180.00	109.9 AV			1.85 V	255	109.21	0.69
5	#10360.00	60.8 PK	74.0	-13.2	1.62 V	259	50.08	10.72
6	#10360.00	49.9 AV	54.0	-4.1	1.62 V	259	39.18	10.72
7	15540.00	56.5 PK	74.0	-17.5	1.49 V	257	43.80	12.70
8	15540.00	45.2 AV	54.0	-8.8	1.49 V	257	32.50	12.70

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.2 PK	74.0	-18.8	2.60 H	241	54.61	0.59
2	5150.00	47.2 AV	54.0	-6.8	2.60 H	241	46.61	0.59
3	*5200.00	113.5 PK			2.60 H	241	112.75	0.75
4	*5200.00	103.2 AV			2.60 H	241	102.45	0.75
5	5350.00	52.6 PK	74.0	-21.4	2.60 H	241	51.44	1.16
6	5350.00	38.5 AV	54.0	-15.5	2.60 H	241	37.34	1.16
7	#10400.00	58.5 PK	74.0	-15.5	2.54 H	272	47.46	11.04
8	#10400.00	46.7 AV	54.0	-7.3	2.54 H	272	35.66	11.04
9	15600.00	56.2 PK	74.0	-17.8	1.44 H	280	43.46	12.74
10	15600.00	44.3 AV	54.0	-9.7	1.44 H	280	31.56	12.74

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	58.7 PK	74.0	-15.3	1.68 V	271	58.11	0.59
2	5150.00	47.6 AV	54.0	-6.4	1.68 V	271	47.01	0.59
3	*5200.00	118.5 PK			1.68 V	271	117.75	0.75
4	*5200.00	108.7 AV			1.68 V	271	107.95	0.75
5	5350.00	55.3 PK	74.0	-18.7	1.68 V	271	54.14	1.16
6	5350.00	45.3 AV	54.0	-8.7	1.68 V	271	44.14	1.16
7	#10400.00	61.4 PK	74.0	-12.6	1.57 V	260	50.36	11.04
8	#10400.00	50.1 AV	54.0	-3.9	1.57 V	260	39.06	11.04
9	15600.00	55.2 PK	74.0	-18.8	1.44 V	253	42.46	12.74
10	15600.00	44.9 AV	54.0	-9.1	1.44 V	253	32.16	12.74

REMARKS:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.7 PK			2.87 H	229	112.81	0.89
2	*5240.00	103.6 AV			2.87 H	229	102.71	0.89
3	5350.00	52.6 PK	74.0	-21.4	2.87 H	229	51.44	1.16
4	5350.00	38.6 AV	54.0	-15.4	2.87 H	229	37.44	1.16
5	#10480.00	58.1 PK	74.0	-15.9	2.50 H	278	47.27	10.83
6	#10480.00	46.3 AV	54.0	-7.7	2.50 H	278	35.47	10.83
7	15720.00	56.9 PK	74.0	-17.1	1.43 H	287	44.92	11.98
8	15720.00	44.8 AV	54.0	-9.2	1.43 H	287	32.82	11.98
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	119.0 PK			2.28 V	272	118.11	0.89
2	*5240.00	109.1 AV			2.28 V	272	108.21	0.89
3	5350.00	56.2 PK	74.0	-17.8	2.28 V	272	55.04	1.16
4	5350.00	43.7 AV	54.0	-10.3	2.28 V	272	42.54	1.16
5	#10480.00	61.9 PK	74.0	-12.1	1.55 V	257	51.07	10.83
6	#10480.00	50.3 AV	54.0	-3.7	1.55 V	257	39.47	10.83
7	15720.00	55.2 PK	74.0	-18.8	1.42 V	267	43.22	11.98
8	15720.00	44.7 AV	54.0	-9.3	1.42 V	267	32.72	11.98

REMARKS:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	59.7 PK	74.0	-14.3	2.91 H	223	58.00	1.70
2	#5715.00	48.4 AV	54.0	-5.6	2.91 H	223	46.70	1.70
3	#5725.00	63.4 PK	78.2	-14.8	2.91 H	223	61.69	1.71
4	*5745.00	112.3 PK			2.91 H	223	110.56	1.74
5	*5745.00	101.5 AV			2.91 H	223	99.76	1.74
6	11490.00	56.2 PK	74.0	-17.8	2.54 H	257	43.79	12.41
7	11490.00	40.9 AV	54.0	-13.1	2.54 H	257	28.49	12.41
8	#17235.00	67.0 PK	74.0	-7.0	1.36 H	267	50.28	16.72
9	#17235.00	52.7 AV	54.0	-1.3	1.36 H	267	35.98	16.72

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	#5715.00	61.3 PK	74.0	-12.7	2.22 V	232	59.60	1.70
2	#5715.00	51.1 AV	54.0	-2.9	2.22 V	232	49.40	1.70
3	#5725.00	78.0 PK	78.2	-0.2	2.22 V	232	76.29	1.71
4	*5745.00	117.3 PK			2.22 V	232	115.56	1.74
5	*5745.00	107.0 AV			2.22 V	232	105.26	1.74
6	11490.00	58.0 PK	74.0	-16.0	1.53 V	225	45.59	12.41
7	11490.00	45.1 AV	54.0	-8.9	1.53 V	225	32.69	12.41
8	#17235.00	66.7 PK	74.0	-7.3	1.82 V	258	49.98	16.72
9	#17235.00	51.5 AV	54.0	-2.5	1.82 V	258	34.78	16.72

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	46.5 PK	78.2	-31.7	2.91 H	223	44.79	1.71
2	*5785.00	116.8 PK			2.91 H	223	115.00	1.80
3	*5785.00	105.8 AV			2.91 H	223	104.00	1.80
4	#5850.00	46.8 PK	78.2	-31.4	2.91 H	223	44.98	1.82
5	11570.00	56.6 PK	74.0	-17.4	2.52 H	249	44.42	12.18
6	11570.00	41.3 AV	54.0	-12.7	2.52 H	249	29.12	12.18
7	#17355.00	67.0 PK	74.0	-7.0	1.39 H	264	49.73	17.27
8	#17355.00	52.7 AV	54.0	-1.3	1.39 H	264	35.43	17.27

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	#5725.00	63.4 PK	78.2	-14.8	2.70 V	271	61.69	1.71
2	*5785.00	121.8 PK			2.70 V	271	120.00	1.80
3	*5785.00	111.3 AV			2.70 V	271	109.50	1.80
4	#5850.00	61.9 PK	78.2	-16.3	2.70 V	271	60.08	1.82
5	11570.00	58.0 PK	74.0	-16.0	1.51 V	237	45.82	12.18
6	11570.00	45.2 AV	54.0	-8.8	1.51 V	237	33.02	12.18
7	#17355.00	66.8 PK	74.0	-7.2	1.83 V	265	49.53	17.27
8	#17355.00	51.9 AV	54.0	-2.1	1.83 V	265	34.63	17.27

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	115.6 PK			2.92 H	227	113.77	1.83
2	*5825.00	104.5 AV			2.92 H	227	102.67	1.83
3	#5850.00	53.7 PK	78.2	-24.5	2.92 H	227	51.88	1.82
4	#5860.00	60.1 PK	74.0	-13.9	2.92 H	227	58.28	1.82
5	#5860.00	48.7 AV	54.0	-5.3	2.92 H	227	46.88	1.82
6	11650.00	56.0 PK	74.0	-18.0	2.54 H	247	43.97	12.03
7	11650.00	40.9 AV	54.0	-13.1	2.54 H	247	28.87	12.03
8	#17475.00	66.4 PK	74.0	-7.6	1.36 H	260	48.64	17.76
9	#17475.00	52.3 AV	54.0	-1.7	1.36 H	260	34.54	17.76

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	*5825.00	120.6 PK			2.18 V	270	118.77	1.83
2	*5825.00	110.0 AV			2.18 V	270	108.17	1.83
3	#5850.00	77.8 PK	78.2	-0.4	2.18 V	270	75.98	1.82
4	#5860.00	68.5 PK	74.0	-5.5	2.18 V	270	66.68	1.82
5	#5860.00	53.9 AV	54.0	-0.1	2.18 V	270	52.08	1.82
6	11650.00	58.5 PK	74.0	-15.5	1.51 V	234	46.47	12.03
7	11650.00	45.6 AV	54.0	-8.4	1.51 V	234	33.57	12.03
8	#17475.00	66.4 PK	74.0	-7.6	1.80 V	272	48.64	17.76
9	#17475.00	51.5 AV	54.0	-2.5	1.80 V	272	33.74	17.76

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 (VHT40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.6 PK	74.0	-14.4	2.93 H	213	59.01	0.59
2	5150.00	48.8 AV	54.0	-5.2	2.93 H	213	48.21	0.59
3	*5190.00	108.1 PK			2.93 H	213	107.39	0.71
4	*5190.00	97.1 AV			2.93 H	213	96.39	0.71
5	5350.00	55.1 PK	74.0	-18.9	2.93 H	213	53.94	1.16
6	5350.00	40.7 AV	54.0	-13.3	2.93 H	213	39.54	1.16
7	#10380.00	59.3 PK	74.0	-14.7	2.53 H	235	48.41	10.89
8	#10380.00	45.4 AV	54.0	-8.6	2.53 H	235	34.51	10.89
9	15570.00	53.6 PK	74.0	-20.4	1.40 H	243	40.88	12.72
10	15570.00	41.0 AV	54.0	-13.0	1.40 H	243	28.28	12.72
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.0 PK	74.0	-4.0	2.27 V	272	69.41	0.59
2	5150.00	53.1 AV	54.0	-0.9	2.27 V	272	52.51	0.59
3	*5190.00	113.1 PK			2.27 V	272	112.39	0.71
4	*5190.00	102.6 AV			2.27 V	272	101.89	0.71
5	5350.00	58.1 PK	74.0	-15.9	2.27 V	272	56.94	1.16
6	5350.00	45.8 AV	54.0	-8.2	2.27 V	272	44.64	1.16
7	#10380.00	62.5 PK	74.0	-11.5	1.91 V	271	51.61	10.89
8	#10380.00	49.2 AV	54.0	-4.8	1.91 V	271	38.31	10.89
9	15570.00	57.1 PK	74.0	-16.9	1.40 V	268	44.38	12.72
10	15570.00	44.9 AV	54.0	-9.1	1.40 V	268	32.18	12.72

REMARKS:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.3 PK	74.0	-14.7	2.93 H	229	58.71	0.59
2	5150.00	47.2 AV	54.0	-6.8	2.93 H	229	46.61	0.59
3	*5230.00	113.1 PK			2.93 H	229	112.24	0.86
4	*5230.00	102.1 AV			2.93 H	229	101.24	0.86
5	5350.00	53.1 PK	74.0	-20.9	2.93 H	229	51.94	1.16
6	5350.00	40.7 AV	54.0	-13.3	2.93 H	229	39.54	1.16
7	#10460.00	59.0 PK	74.0	-15.0	2.57 H	236	48.13	10.87
8	#10460.00	45.3 AV	54.0	-8.7	2.57 H	236	34.43	10.87
9	15690.00	53.5 PK	74.0	-20.5	1.35 H	256	41.40	12.10
10	15690.00	41.1 AV	54.0	-12.9	1.35 H	256	29.00	12.10

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.2 PK	74.0	-8.8	2.29 V	273	64.61	0.59
2	5150.00	52.4 AV	54.0	-1.6	2.29 V	273	51.81	0.59
3	*5230.00	118.1 PK			2.29 V	273	117.24	0.86
4	*5230.00	107.6 AV			2.29 V	273	106.74	0.86
5	5350.00	58.3 PK	74.0	-15.7	2.29 V	273	57.14	1.16
6	5350.00	45.9 AV	54.0	-8.1	2.29 V	273	44.74	1.16
7	#10460.00	62.8 PK	74.0	-11.2	1.92 V	277	51.93	10.87
8	#10460.00	49.3 AV	54.0	-4.7	1.92 V	277	38.43	10.87
9	15690.00	57.3 PK	74.0	-16.7	1.43 V	257	45.20	12.10
10	15690.00	45.1 AV	54.0	-8.9	1.43 V	257	33.00	12.10

REMARKS:

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

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	67.6 PK	74.0	-6.4	2.89 H	239	65.90	1.70
2	#5715.00	50.7 AV	54.0	-3.3	2.89 H	239	49.00	1.70
3	#5725.00	63.5 PK	78.2	-14.7	2.89 H	239	61.79	1.71
4	*5755.00	107.1 PK			2.89 H	239	105.34	1.76
5	*5755.00	96.3 AV			2.89 H	239	94.54	1.76
6	11510.00	58.8 PK	74.0	-15.2	2.58 H	238	46.42	12.38
7	11510.00	45.2 AV	54.0	-8.8	2.58 H	238	32.82	12.38
8	#17265.00	53.1 PK	74.0	-20.9	1.41 H	245	36.30	16.80
9	#17265.00	40.9 AV	54.0	-13.1	1.41 H	245	24.10	16.80

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	#5715.00	69.2 PK	74.0	-4.8	2.14 V	271	67.50	1.70
2	#5715.00	53.4 AV	54.0	-0.6	2.14 V	271	51.70	1.70
3	#5725.00	69.5 PK	78.2	-8.7	2.14 V	271	67.79	1.71
4	*5755.00	112.1 PK			2.14 V	271	110.34	1.76
5	*5755.00	101.8 AV			2.14 V	271	100.04	1.76
6	11510.00	62.8 PK	74.0	-11.2	1.92 V	272	50.42	12.38
7	11510.00	49.1 AV	54.0	-4.9	1.92 V	272	36.72	12.38
8	#17265.00	57.3 PK	74.0	-16.7	1.39 V	245	40.50	16.80
9	#17265.00	44.9 AV	54.0	-9.1	1.39 V	245	28.10	16.80

REMARKS:

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

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	113.7 PK			2.85 H	245	111.88	1.82
2	*5795.00	102.5 AV			2.85 H	245	100.68	1.82
3	#5850.00	64.6 PK	78.2	-13.6	2.85 H	245	62.78	1.82
4	#5860.00	55.6 PK	74.0	-18.4	2.85 H	245	53.78	1.82
5	#5860.00	48.6 AV	54.0	-5.4	2.85 H	245	46.78	1.82
6	11590.00	59.1 PK	74.0	-14.9	2.59 H	232	46.99	12.11
7	11590.00	45.4 AV	54.0	-8.6	2.59 H	232	33.29	12.11
8	#17385.00	53.2 PK	74.0	-20.8	1.39 H	250	35.74	17.46
9	#17385.00	40.9 AV	54.0	-13.1	1.39 H	250	23.44	17.46

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	*5795.00	118.7 PK			2.69 V	273	116.88	1.82
2	*5795.00	108.0 AV			2.69 V	273	106.18	1.82
3	#5850.00	77.9 PK	78.2	-0.3	2.69 V	273	76.08	1.82
4	#5860.00	67.9 PK	74.0	-6.1	2.69 V	273	66.08	1.82
5	#5860.00	51.7 AV	54.0	-2.3	2.69 V	273	49.88	1.82
6	11590.00	62.8 PK	74.0	-11.2	1.96 V	271	50.69	12.11
7	11590.00	49.5 AV	54.0	-4.5	1.96 V	271	37.39	12.11
8	#17385.00	67.7 PK	74.0	-6.3	1.45 V	259	50.24	17.46
9	#17385.00	50.4 AV	54.0	-3.6	1.45 V	259	32.94	17.46

REMARKS:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.6 PK	74.0	-13.4	2.85 H	239	60.01	0.59
2	5150.00	49.6 AV	54.0	-4.4	2.85 H	239	49.01	0.59
3	*5210.00	103.3 PK			2.85 H	239	102.51	0.79
4	*5210.00	91.1 AV			2.85 H	239	90.31	0.79
5	5350.00	51.2 PK	74.0	-22.8	2.85 H	239	50.04	1.16
6	5350.00	39.4 AV	54.0	-14.6	2.85 H	239	38.24	1.16
7	#10420.00	58.6 PK	74.0	-15.4	2.64 H	243	47.61	10.99
8	#10420.00	45.0 AV	54.0	-9.0	2.64 H	243	34.01	10.99
9	15630.00	53.9 PK	74.0	-20.1	1.41 H	254	41.37	12.53
10	15630.00	41.4 AV	54.0	-12.6	1.41 H	254	28.87	12.53
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.3 PK	74.0	-3.7	2.25 V	269	69.71	0.59
2	5150.00	53.9 AV	54.0	-0.1	2.25 V	269	53.31	0.59
3	*5210.00	108.3 PK			2.25 V	269	107.51	0.79
4	*5210.00	96.6 AV			2.25 V	269	95.81	0.79
5	5350.00	55.2 PK	74.0	-18.8	2.25 V	269	54.04	1.16
6	5350.00	41.8 AV	54.0	-12.2	2.25 V	269	40.64	1.16
7	#10420.00	63.5 PK	74.0	-10.5	1.89 V	275	52.51	10.99
8	#10420.00	49.5 AV	54.0	-4.5	1.89 V	275	38.51	10.99
9	15630.00	57.2 PK	74.0	-16.8	1.43 V	260	44.67	12.53
10	15630.00	45.1 AV	54.0	-8.9	1.43 V	260	32.57	12.53

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	63.7 PK	74.0	-10.3	2.88 H	239	62.00	1.70
2	#5715.00	49.5 AV	54.0	-4.5	2.88 H	239	47.80	1.70
3	#5725.00	67.4 PK	78.2	-10.8	2.88 H	239	65.69	1.71
4	*5775.00	104.9 PK			2.88 H	239	103.11	1.79
5	*5775.00	92.6 AV			2.88 H	239	90.81	1.79
6	#5850.00	65.8 PK	78.2	-12.4	2.88 H	239	63.98	1.82
7	#5860.00	55.6 PK	74.0	-18.4	2.88 H	239	53.78	1.82
8	#5860.00	47.9 AV	54.0	-6.1	2.88 H	239	46.08	1.82
9	11550.00	58.3 PK	74.0	-15.7	2.66 H	233	46.06	12.24
10	11550.00	45.0 AV	54.0	-9.0	2.66 H	233	32.76	12.24
11	#17325.00	54.1 PK	74.0	-19.9	1.41 H	250	37.05	17.05
12	#17325.00	41.7 AV	54.0	-12.3	1.41 H	250	24.65	17.05

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	#5715.00	73.9 PK	74.0	-0.1	2.13 V	268	72.20	1.70
2	#5715.00	53.7 AV	54.0	-0.3	2.13 V	268	52.00	1.70
3	#5725.00	73.8 PK	78.2	-4.4	2.13 V	268	72.09	1.71
4	*5775.00	109.9 PK			2.13 V	268	108.11	1.79
5	*5775.00	98.1 AV			2.13 V	268	96.31	1.79
6	#5850.00	72.1 PK	78.2	-6.1	2.13 V	268	70.28	1.82
7	#5860.00	70.9 PK	74.0	-3.1	2.13 V	268	69.08	1.82
8	#5860.00	52.1 AV	54.0	-1.9	2.13 V	268	50.28	1.82
9	11550.00	64.0 PK	74.0	-10.0	1.90 V	289	51.76	12.24
10	11550.00	49.7 AV	54.0	-4.3	1.90 V	289	37.46	12.24
11	#17325.00	56.9 PK	74.0	-17.1	1.43 V	255	39.85	17.05
12	#17325.00	44.7 AV	54.0	-9.3	1.43 V	255	27.65	17.05

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 Data :

802.11ac (VHT40)

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below1GHz		

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	32.67	33.8 QP	40.0	-6.2	1.00 H	23	43.67	-9.85
2	108.81	29.9 QP	43.5	-13.6	2.50 H	82	41.51	-11.60
3	375.00	33.2 QP	46.0	-12.8	1.00 H	313	39.16	-5.98
4	800.01	36.8 QP	46.0	-9.2	1.50 H	135	34.37	2.41
5	874.99	36.1 QP	46.0	-9.9	2.00 H	299	32.71	3.38
6	1000.00	36.1 QP	54.0	-17.9	2.00 H	298	31.30	4.83
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	38.03	35.8 QP	40.0	-4.2	1.00 V	360	45.12	-9.28
2	60.22	34.3 QP	40.0	-5.7	1.00 V	333	43.36	-9.10
3	375.00	36.1 QP	46.0	-9.9	1.50 V	222	42.09	-5.98
4	800.01	37.1 QP	46.0	-8.9	1.00 V	352	34.68	2.41
5	874.99	36.6 QP	46.0	-9.4	1.00 V	108	33.26	3.38
6	1000.00	37.9 QP	54.0	-16.1	1.00 V	288	33.08	4.83

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct 23, 2015	Oct. 22, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 01, 2015	Aug. 31, 2016
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 08, 2016	Mar. 07, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-002	Sep. 14, 2015	Sep. 13, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
50 ohms Terminator	E1-011315	13	Dec. 11 2015	Dec. 10 2016
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
- 3 The VCCI Con C Registration No. is C-3611.
- 4 Tested Date: Mar. 29, 2016

4.2.3 Test Procedure

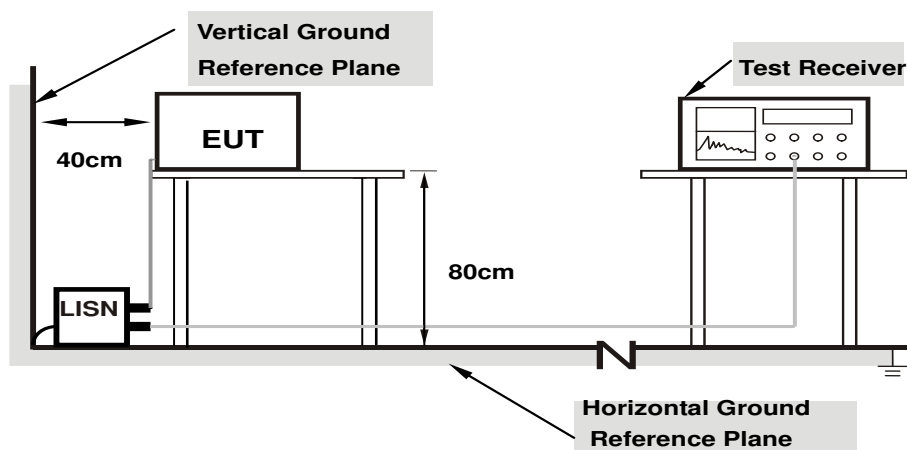
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

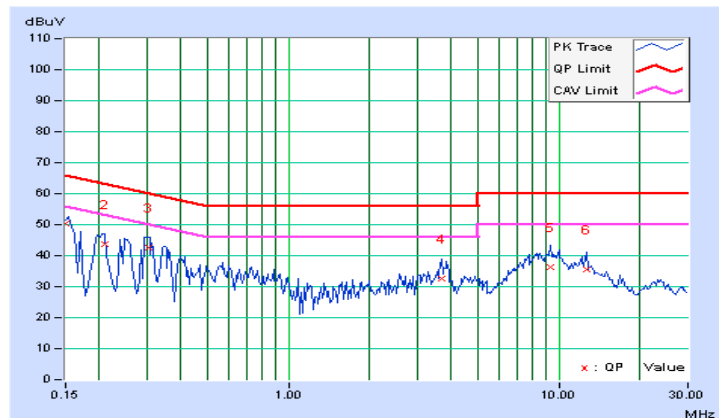
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.44	39.81	29.78	50.25	40.22	66.00	56.00	-15.75	-15.78
2	0.20859	10.40	33.13	22.76	43.53	33.16	63.26	53.26	-19.73	-20.10
3	0.30234	10.42	32.04	21.89	42.46	32.31	60.18	50.18	-17.72	-17.87
4	3.69922	10.60	22.05	15.62	32.65	26.22	56.00	46.00	-23.35	-19.78
5	9.33984	10.89	25.59	19.45	36.48	30.34	60.00	50.00	-23.52	-19.66
6	12.69531	11.10	24.55	18.20	35.65	29.30	60.00	50.00	-24.35	-20.70

Remarks:

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

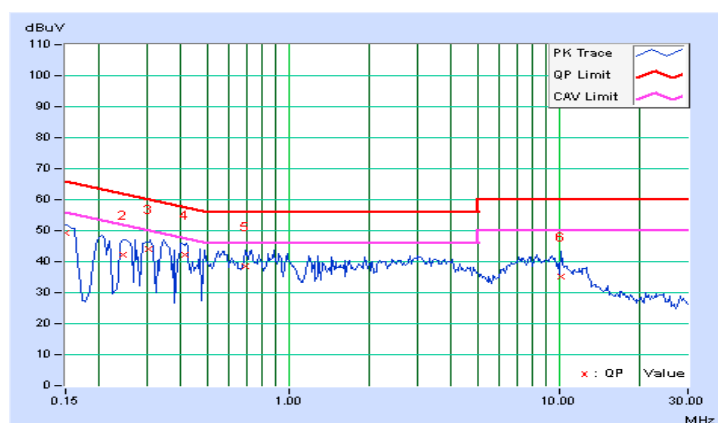


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.44	38.76	28.95	49.20	39.39	66.00	56.00	-16.80	-16.61
2	0.24375	10.46	31.90	23.27	42.36	33.73	61.97	51.97	-19.61	-18.24
3	0.30234	10.47	33.44	30.23	43.91	40.70	60.18	50.18	-16.27	-9.48
4	0.41172	10.48	31.75	27.21	42.23	37.69	57.61	47.61	-15.38	-9.92
5	0.69688	10.46	28.24	21.95	38.70	32.41	56.00	46.00	-17.30	-13.59
6	10.24609	10.96	24.24	18.94	35.20	29.90	60.00	50.00	-24.80	-20.10

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

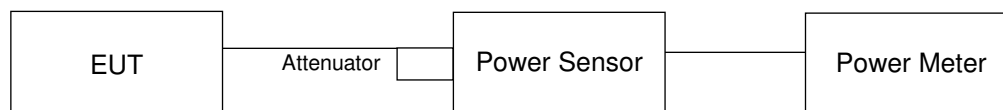
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.84	18.46	19.09	19.21	311.17	24.93	30	Pass
40	5200	18.55	18.63	18.97	19.55	313.603	24.96	30	Pass
48	5240	18.62	18.70	18.99	19.33	311.863	24.94	30	Pass
149	5745	15.26	15.03	15.59	15.48	136.958	21.37	30	Pass
157	5785	20.48	19.96	21.08	20.82	459.783	26.63	30	Pass
165	5825	17.26	16.86	17.76	17.55	218.329	23.39	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.67	18.47	18.83	19.48	309.028	24.90	30	Pass
40	5200	18.67	18.63	19.13	19.29	313.331	24.96	30	Pass
48	5240	18.22	18.13	19.52	19.62	312.545	24.95	30	Pass
149	5745	16.19	15.75	16.88	16.81	175.901	22.45	30	Pass
157	5785	20.67	20.06	21.15	20.91	471.699	26.74	30	Pass
165	5825	19.04	18.86	19.27	19.59	332.6	25.22	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	15.46	14.45	15.43	15.75	135.515	21.32	30	Pass
46	5230	22.11	21.32	22.05	22.11	620.954	27.93	30	Pass
151	5755	14.66	14.43	14.85	15.06	119.587	20.78	30	Pass
159	5795	20.31	19.61	20.34	20.56	420.716	26.24	30	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.17	13.65	14.70	14.79	108.938	20.37	30	Pass
155	5775	15.36	14.78	15.36	15.38	133.287	21.25	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.67	18.47	18.83	19.48	309.028	24.90	26.10	Pass
40	5200	18.67	18.63	19.13	19.29	313.331	24.96	26.10	Pass
48	5240	18.22	18.13	19.52	19.62	312.545	24.95	26.10	Pass
149	5745	16.19	15.75	16.88	16.81	175.901	22.45	26.10	Pass
157	5785	17.72	17.74	18.59	18.58	262.973	24.20	26.10	Pass
165	5825	17.93	18.07	19.27	19.59	301.727	24.80	26.10	Pass

Note: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.90 - 6) = 26.10\text{dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	15.46	14.45	15.43	15.75	135.515	21.32	26.10	Pass
46	5230	18.19	17.86	18.34	19.05	275.598	24.40	26.10	Pass
151	5755	14.66	14.43	14.85	15.06	119.587	20.78	26.10	Pass
159	5795	18.32	18.21	18.51	18.82	281.308	24.49	26.10	Pass

Note: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.90 - 6) = 26.10\text{dBm}$.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.17	13.65	14.70	14.79	108.938	20.37	26.10	Pass
155	5775	15.36	14.78	15.36	15.38	133.287	21.25	26.10	Pass

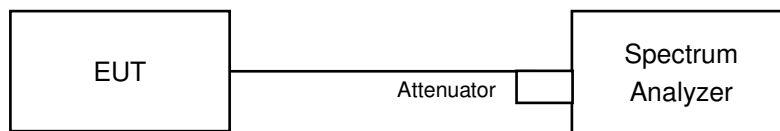
Note: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.90 - 6) = 26.10\text{dBm}$.

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Mobile and Portable client device	11dBm/ MHz
U-NII-2A	---		11dBm/ MHz
U-NII-2C	---		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

For U-NII-1 band:

For 802.11a, 802.11ac (VHT20):

Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW $\geq$ 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

For 802.11ac (VHT40), 802.11ac (VHT80):

Using method SA-2

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW $\geq$ 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)

For U-NII-3 band:

For 802.11a, 802.11ac (VHT20):

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
5. Sweep time = auto, trigger set to "free run".
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value

For 802.11ac (VHT40), 802.11ac (VHT80):

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
5. Sweep time = auto, trigger set to "free run".
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	3.82	4.14	3.84	3.94	9.96	13.10	Pass
40	5200	3.47	4.28	3.24	4.28	9.86	13.10	Pass
48	5240	5.22	3.16	4.76	5.23	10.69	13.10	Pass

- Note:** 1. Method a) 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 = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $17-(9.90-6) = 13.10\text{dBm}$.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	3.53	4.56	3.90	4.24	10.09	13.10	Pass
40	5200	4.02	4.45	3.82	4.83	10.32	13.10	Pass
48	5240	4.69	4.57	4.56	5.04	10.74	13.10	Pass

- Note:** 1. Method a) 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 = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $17-(9.90-6) = 13.10\text{dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-1.73	-1.20	-2.32	-1.16	0.14	4.59	13.10	Pass
46	5230	4.75	5.23	4.71	5.23	0.14	11.15	13.10	Pass

- Note:** 1. Method a) 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 = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $17-(9.90-6) = 13.10\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

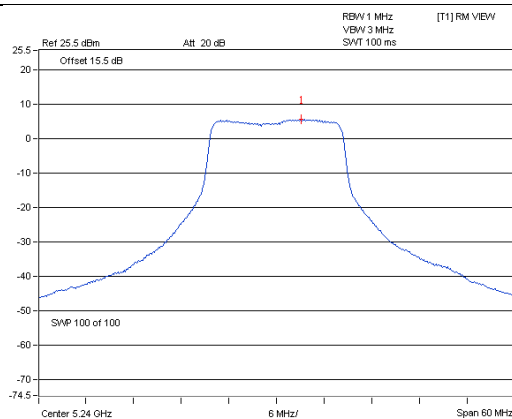
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-4.74	-6.46	-5.65	-4.63	0.18	0.89	13.10	Pass

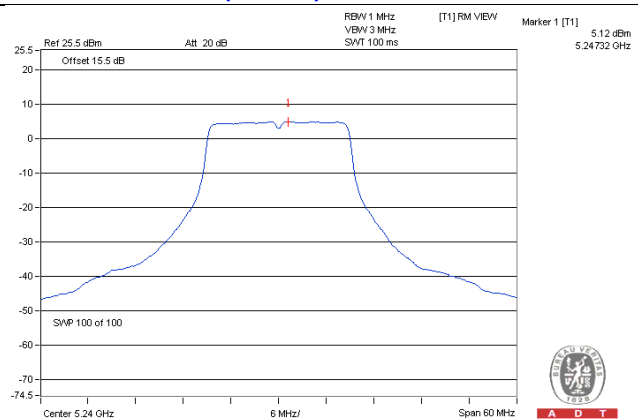
- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $17 - (9.90 - 6) = 13.10\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

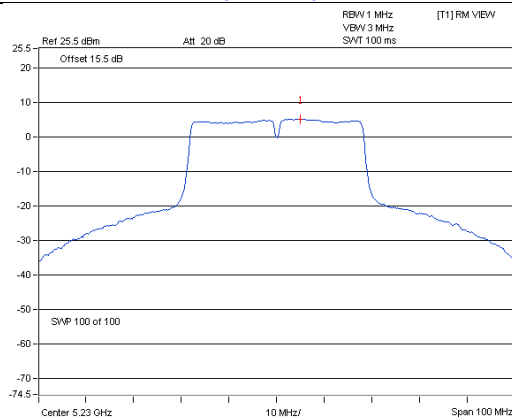
802.11a / Chain 3 : CH48



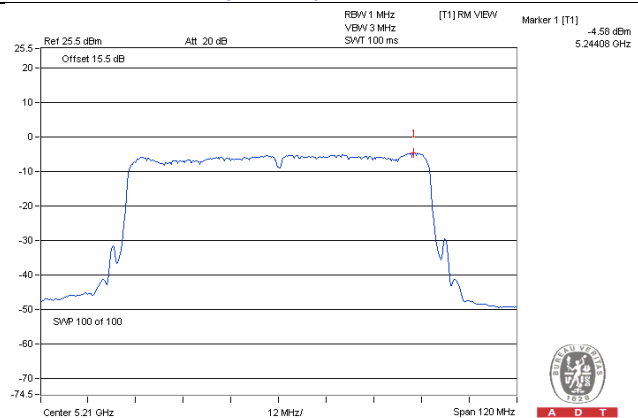
802.11ac (VHT20) / Chain 3 : CH48



802.11ac (VHT40) / Chain 3 : CH46



802.11ac (VHT80) / Chain 3 : CH42



For U-NII-3: 802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-5.95	-3.73	6.02	2.29	26.10	Pass
	157	5785	0.27	2.49	6.02	8.51	26.10	Pass
	165	5825	-3.75	-1.53	6.02	4.49	26.10	Pass
1	149	5745	-4.37	-2.15	6.02	3.87	26.10	Pass
	157	5785	0.38	2.60	6.02	8.62	26.10	Pass
	165	5825	-2.07	0.15	6.02	6.17	26.10	Pass
2	149	5745	-6.03	-3.81	6.02	2.21	26.10	Pass
	157	5785	-1.00	1.22	6.02	7.24	26.10	Pass
	165	5825	-3.84	-1.62	6.02	4.40	26.10	Pass
3	149	5745	-6.20	-3.98	6.02	2.04	26.10	Pass
	157	5785	-0.54	1.68	6.02	7.70	26.10	Pass
	165	5825	-3.86	-1.64	6.02	4.38	26.10	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30-(9.90-6) = 26.10\text{dBm}$.

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-3.54	-1.32	6.02	4.70	26.10	Pass
	157	5785	2.16	4.38	6.02	10.40	26.10	Pass
	165	5825	-0.39	1.83	6.02	7.85	26.10	Pass
1	149	5745	-3.20	-0.98	6.02	5.04	26.10	Pass
	157	5785	0.77	2.99	6.02	9.01	26.10	Pass
	165	5825	-0.36	1.86	6.02	7.88	26.10	Pass
2	149	5745	-5.00	-2.78	6.02	3.24	26.10	Pass
	157	5785	-1.12	1.10	6.02	7.12	26.10	Pass
	165	5825	-1.90	0.32	6.02	6.34	26.10	Pass
3	149	5745	-4.74	-2.52	6.02	3.50	26.10	Pass
	157	5785	-0.31	1.91	6.02	7.93	26.10	Pass
	165	5825	-2.24	-0.02	6.02	6.00	26.10	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30-(9.90-6) = 26.10\text{dBm}$.

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	151	5755	-6.00	-3.78	6.02	0.14	2.38	26.10	Pass
	159	5795	-0.35	1.87	6.02	0.14	8.03	26.10	Pass
1	151	5755	-9.12	-6.90	6.02	0.14	-0.74	26.10	Pass
	159	5795	-3.59	-1.37	6.02	0.14	4.79	26.10	Pass
2	151	5755	-10.31	-8.09	6.02	0.14	-1.93	26.10	Pass
	159	5795	-4.68	-2.46	6.02	0.14	3.70	26.10	Pass
3	151	5755	-10.25	-8.03	6.02	0.14	-1.87	26.10	Pass
	159	5795	-4.56	-2.34	6.02	0.14	3.82	26.10	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.90 - 6) = 26.10\text{dBm}$.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	155	5775	-8.07	-5.85	6.02	0.18	0.35	26.10	Pass
1	155	5775	-11.74	-9.52	6.02	0.18	-3.32	26.10	Pass
2	155	5775	-12.42	-10.20	6.02	0.18	-4.00	26.10	Pass
3	155	5775	-12.49	-10.27	6.02	0.18	-4.07	26.10	Pass

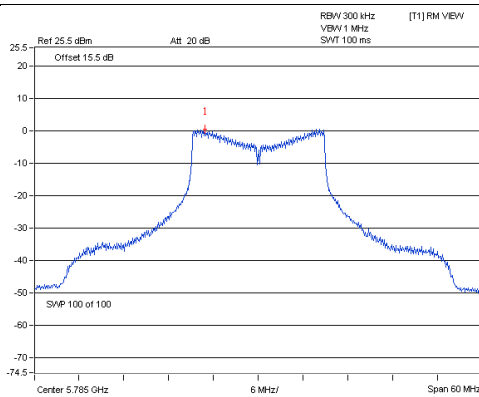
Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 9.90\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.90 - 6) = 26.10\text{dBm}$.

2. Refer to section 3.3 for duty cycle spectrum plot.

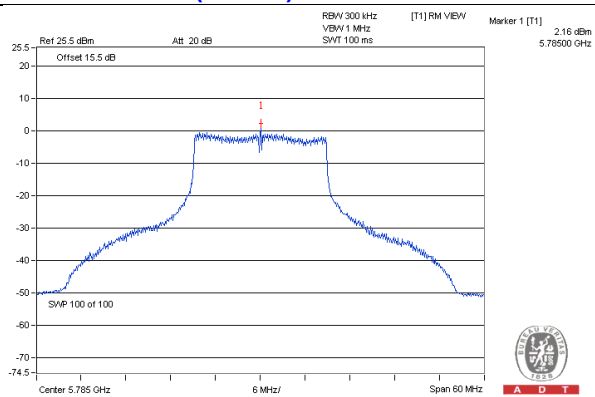
Spectrum Plot of Worst Value

802.11a / Chain 1: CH 157

802.11ac (VHT20) / Chain 0: CH 157



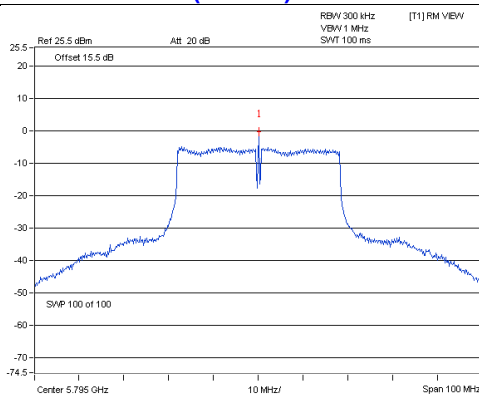
A D T



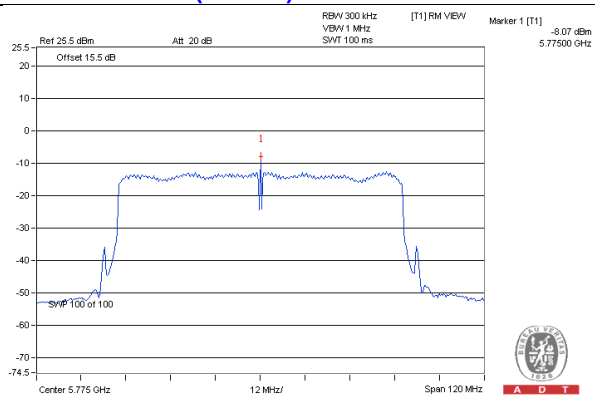
A D T

802.11ac (VHT40) / Chain 0: CH 159

802.11ac (VHT80) / Chain 0: CH 155



A D T



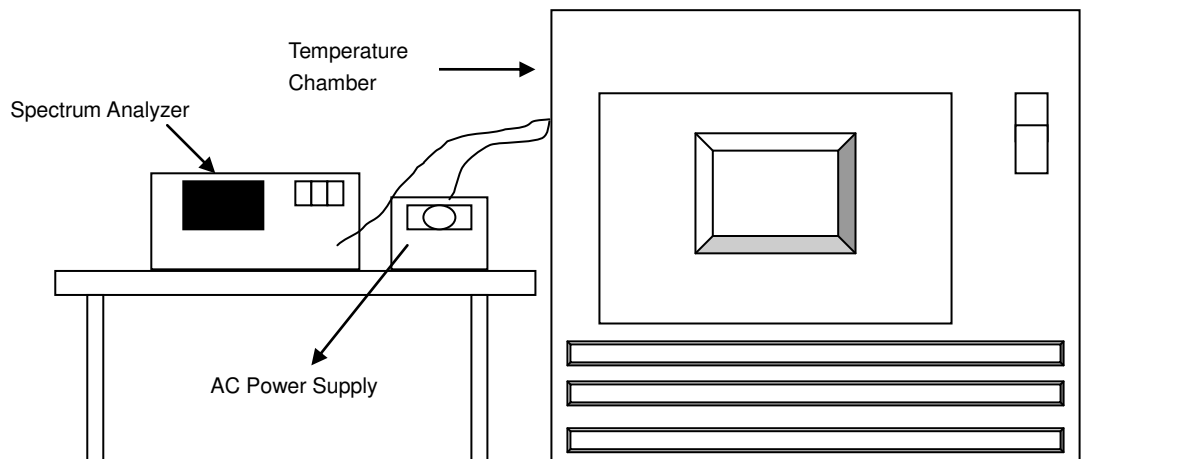
A D T

4.5 Frequency Stability Measurement

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5180.0081	Pass	5180.0093	Pass	5180.0076	Pass	5180.0058	Pass
40	120	5179.9817	Pass	5179.9816	Pass	5179.9859	Pass	5179.9812	Pass
30	120	5179.9916	Pass	5179.9914	Pass	5179.9906	Pass	5179.9924	Pass
20	120	5179.9893	Pass	5179.989	Pass	5179.9896	Pass	5179.991	Pass
10	120	5180.0033	Pass	5180.0011	Pass	5180.0021	Pass	5180.0043	Pass
0	120	5179.9957	Pass	5179.9936	Pass	5179.9958	Pass	5179.9962	Pass
-10	120	5180.0064	Pass	5180.0088	Pass	5180.0078	Pass	5180.0087	Pass
-20	120	5180.0137	Pass	5180.0146	Pass	5180.015	Pass	5180.0116	Pass
-30	120	5180.0226	Pass	5180.021	Pass	5180.0251	Pass	5180.0233	Pass

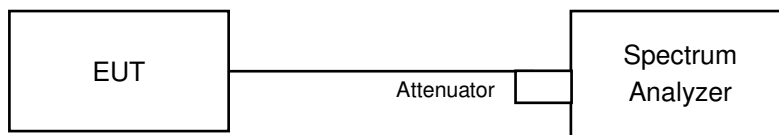
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9888	Pass	5179.9896	Pass	5179.9897	Pass	5179.9917	Pass
	120	5179.9893	Pass	5179.989	Pass	5179.9896	Pass	5179.991	Pass
	102	5179.9884	Pass	5179.9895	Pass	5179.9888	Pass	5179.9905	Pass

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.44	17.77	17.68	17.67	0.5	PASS
157	5785	16.40	17.71	17.66	17.67	0.5	PASS
165	5825	16.43	17.68	17.68	17.66	0.5	PASS

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.67	17.70	17.68	17.67	0.5	PASS
157	5785	17.67	17.68	17.68	17.69	0.5	PASS
165	5825	17.65	17.68	17.69	17.66	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.50	35.26	36.48	36.45	0.5	PASS
159	5795	36.46	35.15	36.45	36.46	0.5	PASS

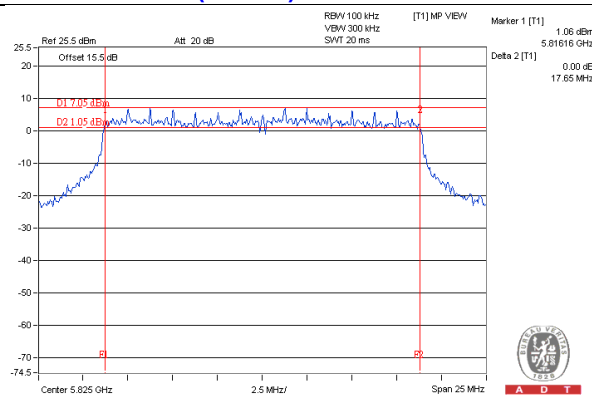
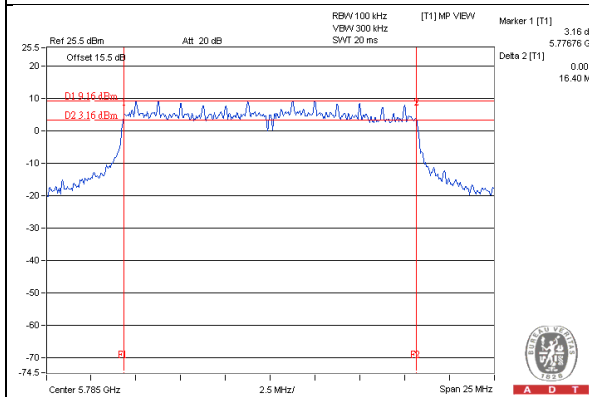
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.44	74.20	75.42	75.41	0.5	PASS

Spectrum Plot of Worst Value

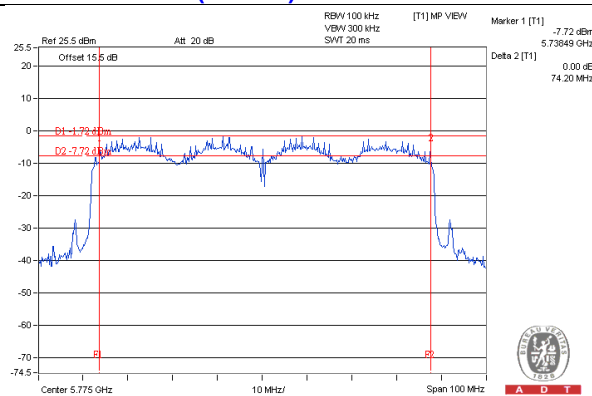
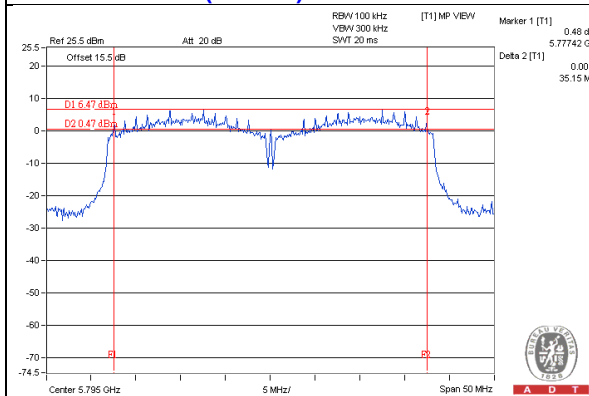
802.11a / Chain 0: CH 157

802.11ac (VHT20) / Chain 0: CH 165



802.11ac (VHT40) / Chain 1: CH 159

802.11ac (VHT80) / Chain 1: CH 155



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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