FCC Test Report (15.407)

Report No.:	RF150921E04-1
FCC ID:	RRKWAPAC14
Test Model:	WAP-AC14
Series Model:	T1023WLAN-PA
Received Date:	Sep. 21, 2015
Test Date:	Sep. 30 to Oct. 05, 2015
Issued Date:	Nov. 18, 2015
Applicant:	Alpha Networks Inc.
Address:	No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (3):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF150921E04-1	Original release.	Nov. 18, 2015

1 Certificate of Conformity

Product:	11ac 4T4R enterprise AP
Brand:	Freescale
Test Model:	WAP-AC14
Series Model:	T1023WLAN-PA
Sample Status:	ENGINEERING SAMPLE
Applicant:	Alpha Networks Inc.
Test Date:	Sep. 30 to Oct. 05, 2015
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 : _____ , **Date:** Nov. 18, 2015

Claire Kuan / Specialist

Approved by : _____ , **Date:** Nov. 18, 2015

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 -10.62dB at 0.19297MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 5725.00MHz
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6dB bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is R-SMA not a standard connector.

NOTE: 1. The EUT was operating in 2.4 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.85GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz and 5.725~5.85GHz. For the 2.4 ~ 2.4835GHz RF parameters was recorded in another test report.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.19 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.43 dB
	6GHz ~ 18GHz	3.49 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	11ac 4T4R enterprise AP
Brand	Freescale
Test Model	WAP-AC14
Series Model	T1023WLAN-PA
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from Power adapter or 48Vdc from POE 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 802.11a: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	**For 15.247:** 2.412 ~ 2.462GHz **For 15.407:** 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**For 2.4GHz:** 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) **For 5GHz:** 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
Output Power	**For 2.4GHz:** 802.11b: 743.05mW 802.11g: 491.526mW 802.11n (HT20): 615.378mW 802.11n (HT40): 90.294mW **For 5GHz:** 802.11a: 857.501mW 802.11ac (VHT20): 797.147mW 802.11ac (VHT40): 577.099mW 802.11ac (VHT80): 60.113mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Power adapter x 1
Data Cable Supplied	NA

Note:

1. The EUT has two model names, which are identical to each other in all aspects except for the following table:

Brand	Model No.	Difference
Freescale	WAP-AC14	For marketing purposes
	T1023WLAN-PA	

From the above models, model: WAP-AC14 was selected as representative model for the test and its data was recorded in this report.

2. 2.4GHz and 5GHz technology can transmit at same time.
3. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.

4. The antennas provided to the EUT, please refer to the following table:

For 2.4GHz									
Transmitter Circuit	Brand	Model	Antenna Gain (dBi) (excluding cable loss)	Frequency range (GHz to GHz)	Cable Loss(dB)	Net Gain (dBi) (Included cable loss)	Antenna Type	Connecter Type	Cable Length (mm)
Chain (0)	NA	5320813170AWG	4.04	2.4-2.4835	1.2	2.84	Dipole	R-SMA	430
Chain (1)		5320813170AWG							
Chain (2)		5320813170AWG							
Chain (3)		5320813170AWG							
For 5GHz									
Transmitter Circuit	Brand	Model	Antenna Gain (dBi) (excluding cable loss)	Frequency range (GHz to GHz)	Cable Loss(dB)	Net Gain (dBi) (Included cable loss)	Antenna Type	Connecter Type	Cable Length (mm)
Chain (0)	NA	5321813181AWG	6.37	5.15-5.85	1.5	4.87	Dipole	R-SMA	130
Chain (1)		5321813181AWG							
Chain (2)		5321813181AWG							
Chain (3)		5321813181AWG							

5. The EUT must be supplied with a power adapter or POE as following table:

Power adapter		
Brand Name	Model No.	Spec.
APD	DA-48T12	Input: 100-240V, 1.4A, 50-60Hz AC output cable: Unshielded, 1.5m Output: 12V, 4A DC output cable: Unshielded, 1.15m
POE (only for test, not for sale)		
Brand Name	Model No.	Spec.
Base-Unit	EBU-101G-T2 LF	DC Input: 48V DC Output: 48V

The POE must be supplied with the following adapter:

POE adapter (only for test, not for sale)		
Brand Name	Model No.	Spec.
UNIFIVE	UEC345-4808	Input: 100-240V, 1A, 50/60Hz Output: 48V, 0.875A DC output cable: Unshielded, 1.8m
The EUT was pre-tested with Power adapter & POE, the worst case was found in Power adapter. Therefore only the test data of the Power adapter was recorded in this report.		

6. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	4TX	4RX
802.11g	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
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)	MCS 0~8, Nss=1	4TX	4RX
	MCS 0~8, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS0~8, Nss=4	4TX	4RX
802.11ac (VHT40)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS0~9, Nss=4	4TX	4RX
802.11ac (VHT80)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, 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)

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	
1	√	√	√	√	Power adapter
2	-	-	√	-	POE adapter

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: "-"means no effect.

Radiated Emission Test (Above 1GHz):

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

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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	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.

Transmit Power Measurment / Peak Power Spectral Density Measurement / 6dB Bandwidth Measurment						
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

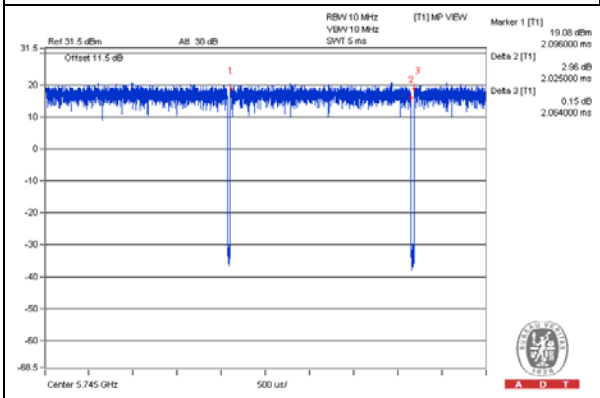
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26deg. C, 67%RH	120Vac, 60Hz	Andy Ho
RE<1G	25deg. C, 70%RH	120Vac, 60Hz	Alex Ku
PLC	28deg. C, 65%RH	120Vac, 60Hz	Eagle Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

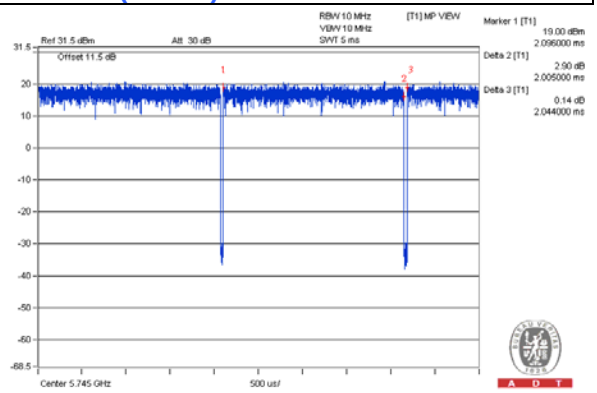
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 2.025 ms/2.064 ms = 0.981
802.11ac (VHT20): Duty cycle = 2.005 ms/2.044 ms = 0.981
802.11ac (VHT40): Duty cycle = 2.416 ms/2.485 ms = 0.972, Duty factor = 10 * log[1/ (2.416/2.485)]= 0.12
802.11ac (VHT80): Duty cycle = 1.135 ms/1.209 ms = 0.939, Duty factor = 10 * log[1/ (1.135/1.209)]= 0.27

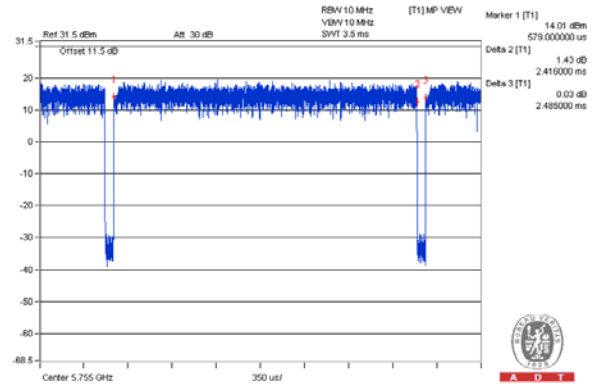
802.11a



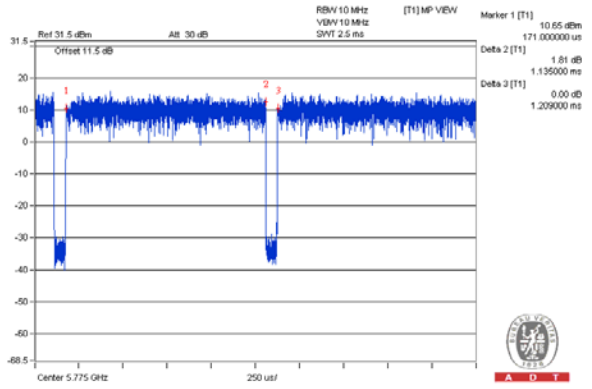
802.11ac (VHT20)



802.11ac (VHT40)



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 COMPUTER	SONY	SVS151A12P	275548477000805	FCC DoC	Provided by Lab
B.	HUB	Linksys	NA	NA	NA	Provided by Lab
C.	IPOD	Apple	MD778TA/A	CC4JG680F4T1	NA	Provided by Lab
D.	POE	Base-Unit	EBU-101G-T2 LF	NA	NA	Supplied by Client

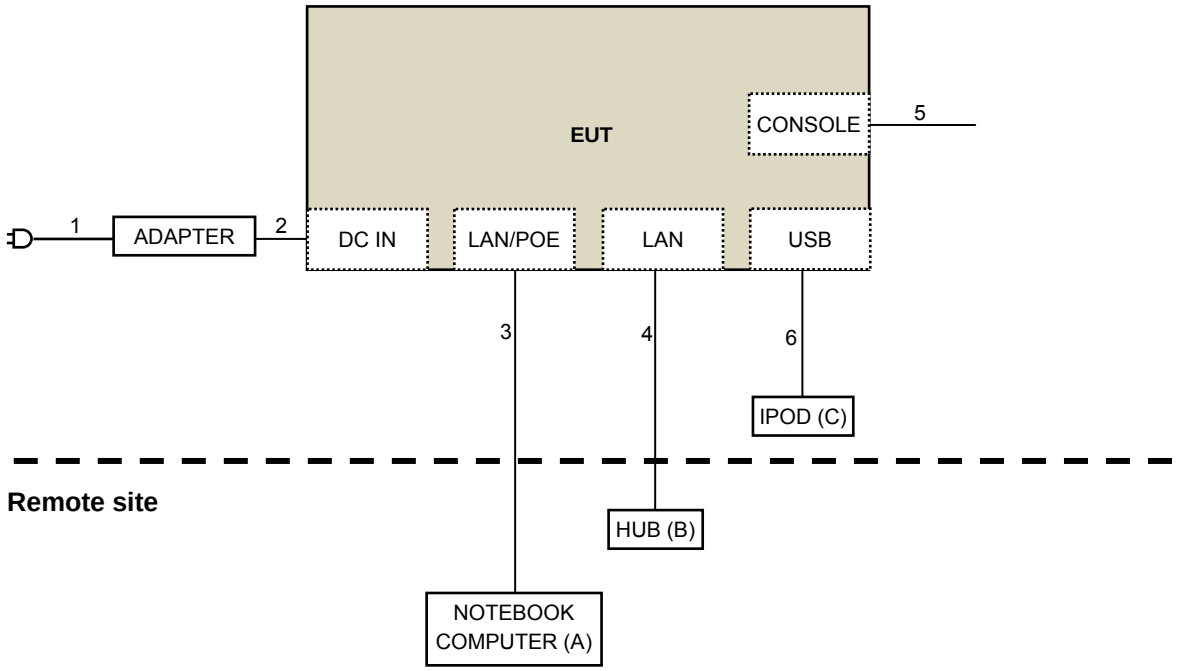
Note:

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

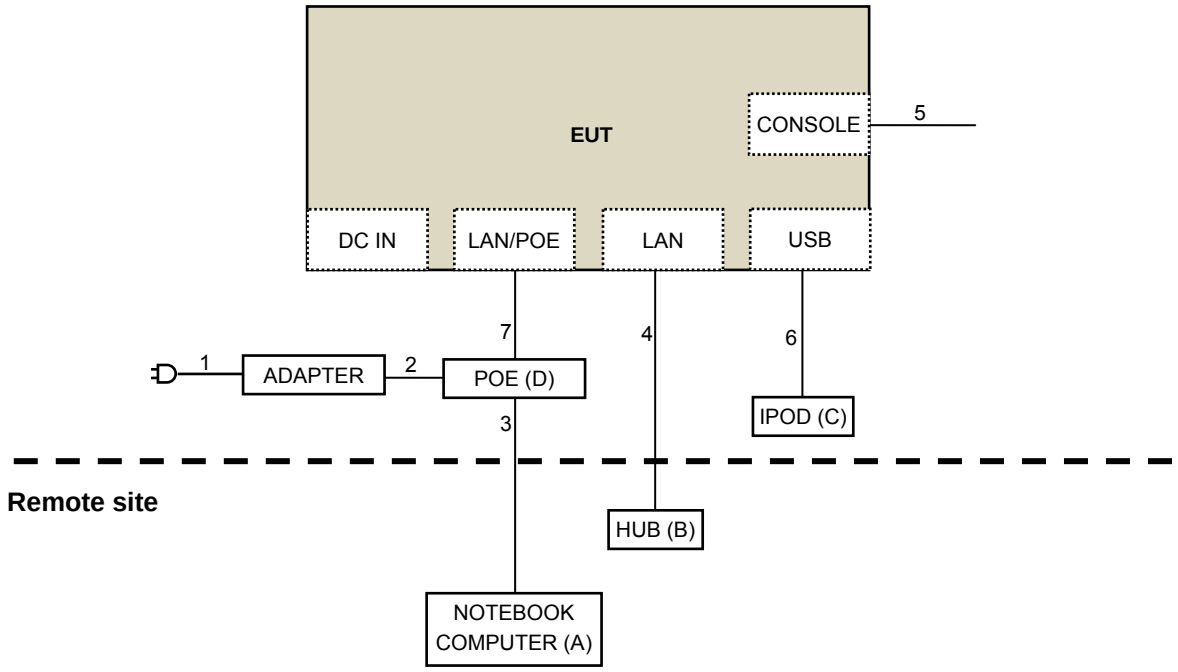
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	AC	1	1.5	No	0	Supplied by Client
2.	DC	1	1.15	No	0	Supplied by Client
3.	RJ45	1	10	No	0	Provided by Lab
4.	RJ45	1	10	No	0	Provided by Lab
5.	RJ45 TO CONSOLE	1	1.8	No	0	Supplied by Client
6.	USB	1	0.1	Yes	0	Provided by Lab
7.	RJ45	1	3	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For adapter Mode:



For POE Mode:



3.5 General Description of Applied Standard

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

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

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 v01	FIELD STRENGTH AT 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
APPLICABLE TO	**EIRP LIMIT**	**EQUIVALENT FIELD STRENGTH AT 3m**
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) [*1] PK:-17 (dBm/MHz) [*2]	PK: 68.2(dBμV/m) [*1] PK:78.2 (dBμV/m) [*2]

NOTE: [*1] beyond 10MHz of the band edge [*2] within 10 MHz of band edge

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

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

4.1.2 Test Instruments

For below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY54450088	July 24, 2015	July 23, 2016
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-06	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Feb. 03, 2015	Feb. 02, 2016
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 test was performed in 966 Chamber No. 4.
3. The FCC Site Registration No. is 292998
4. The CANADA Site Registration No. is 20331-2
5. Tested Date: Oct. 02, 2015

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY54450088	July 24, 2015	July 23, 2016
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 19, 2015	Sep. 18, 2016
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 31, 2015	Mar. 30, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 25, 2016
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Feb. 05, 2015	Feb. 04, 2016
RF Cable	SUCOFLEX 104	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
Spectrum Analyzer R&S	FSP40	100060	May 08, 2015	May 07, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The FCC Site Registration No. is 292998
4. The CANADA Site Registration No. is 20331-2
5. Tested Date: Oct. 02 to 05, 2015

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:

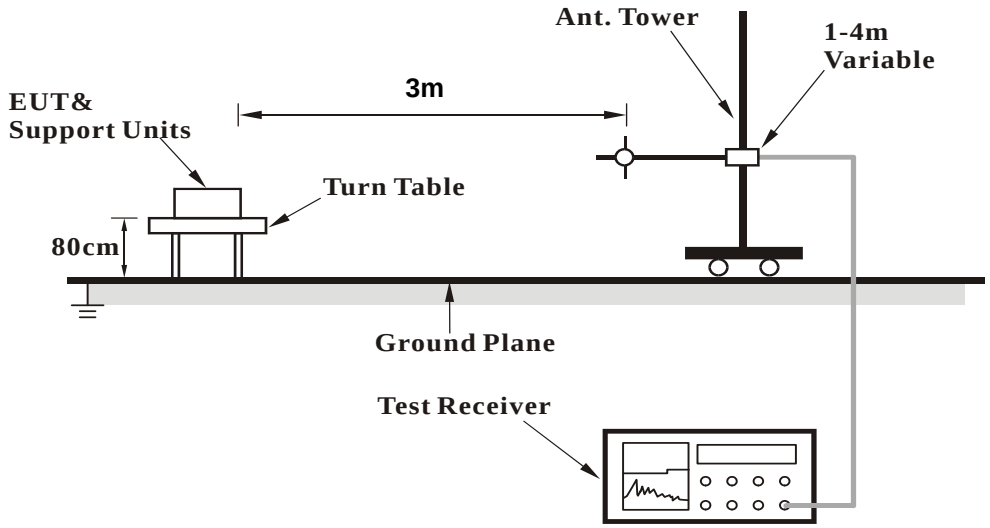
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

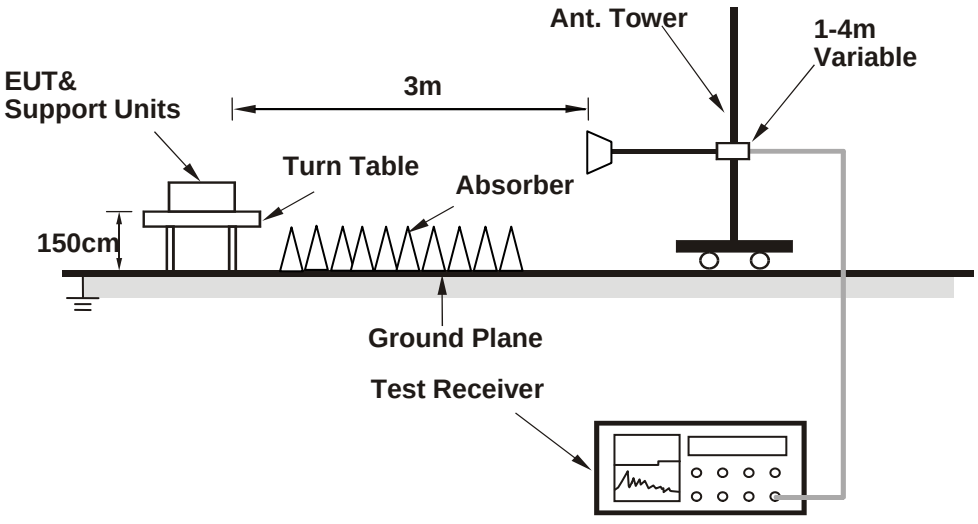
No deviation.

4.1.5 Test 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

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on remote site.
2. Controlling software (QDART.exe[Ver3.0126.0]) 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) 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	49.6 PK	74.0	-24.4	1.42 H	112	48.96	0.64
2	5150.00	40.7 AV	54.0	-13.3	1.42 H	112	40.06	0.64
3	*5180.00	107.6 PK			1.42 H	112	106.87	0.73
4	*5180.00	96.2 AV			1.42 H	112	95.47	0.73
5	#10360.00	51.2 PK	74.0	-22.8	1.78 H	309	40.45	10.75
6	#10360.00	37.4 AV	54.0	-16.6	1.78 H	309	26.65	10.75
7	15540.00	52.5 PK	74.0	-21.5	1.66 H	213	39.35	13.15
8	15540.00	39.0 AV	54.0	-15.0	1.66 H	213	25.85	13.15
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	63.8 PK	74.0	-10.2	1.83 V	97	63.16	0.64
2	5150.00	49.6 AV	54.0	-4.4	1.83 V	97	48.96	0.64
3	*5180.00	121.8 PK			1.83 V	97	121.07	0.73
4	*5180.00	108.1 AV			1.83 V	97	107.37	0.73
5	#10360.00	59.3 PK	74.0	-14.7	1.27 V	51	48.55	10.75
6	#10360.00	45.4 AV	54.0	-8.6	1.27 V	51	34.65	10.75
7	15540.00	52.2 PK	74.0	-21.8	1.57 V	200	39.05	13.15
8	15540.00	38.7 AV	54.0	-15.3	1.57 V	200	25.55	13.15

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) 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	54.1 PK	74.0	-19.9	1.33 H	114	53.46	0.64
2	5150.00	39.7 AV	54.0	-14.3	1.33 H	114	39.06	0.64
3	*5200.00	107.1 PK			1.33 H	114	106.31	0.79
4	*5200.00	96.1 AV			1.33 H	114	95.31	0.79
5	5350.00	53.0 PK	74.0	-21.0	1.33 H	114	51.82	1.18
6	5350.00	39.8 AV	54.0	-14.2	1.33 H	114	38.62	1.18
7	#10400.00	51.2 PK	74.0	-22.8	1.79 H	318	40.10	11.10
8	#10400.00	37.6 AV	54.0	-16.4	1.79 H	318	26.50	11.10
9	15600.00	52.5 PK	74.0	-21.5	1.62 H	211	39.28	13.22
10	15600.00	39.2 AV	54.0	-14.8	1.62 H	211	25.98	13.22
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	63.4 PK	74.0	-10.6	1.50 V	83	62.76	0.64
2	5150.00	44.5 AV	54.0	-9.5	1.50 V	83	43.86	0.64
3	*5200.00	120.1 PK			1.50 V	83	119.31	0.79
4	*5200.00	107.0 AV			1.50 V	83	106.21	0.79
5	5350.00	53.2 PK	74.0	-20.8	1.50 V	83	52.02	1.18
6	5350.00	40.0 AV	54.0	-14.0	1.50 V	83	38.82	1.18
7	#10400.00	59.9 PK	74.0	-14.1	1.21 V	57	48.80	11.10
8	#10400.00	45.7 AV	54.0	-8.3	1.21 V	57	34.60	11.10
9	15600.00	52.6 PK	74.0	-21.4	1.63 V	200	39.38	13.22
10	15600.00	38.9 AV	54.0	-15.1	1.63 V	200	25.68	13.22

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	107.4 PK			1.96 H	103	106.48	0.92
2	*5240.00	97.3 AV			1.96 H	103	96.38	0.92
3	5350.00	53.1 PK	74.0	-20.9	1.96 H	103	51.92	1.18
4	5350.00	40.0 AV	54.0	-14.0	1.96 H	103	38.82	1.18
5	#10480.00	51.3 PK	74.0	-22.7	1.79 H	310	40.36	10.94
6	#10480.00	37.8 AV	54.0	-16.2	1.79 H	310	26.86	10.94
7	15720.00	52.6 PK	74.0	-21.4	1.58 H	197	40.07	12.53
8	15720.00	39.5 AV	54.0	-14.5	1.58 H	197	26.97	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	*5240.00	120.6 PK			1.82 V	73	119.68	0.92
2	*5240.00	107.6 AV			1.82 V	73	106.68	0.92
3	5350.00	54.2 PK	74.0	-19.8	1.82 V	73	53.02	1.18
4	5350.00	40.8 AV	54.0	-13.2	1.82 V	73	39.62	1.18
5	#10480.00	59.8 PK	74.0	-14.2	1.21 V	59	48.86	10.94
6	#10480.00	45.7 AV	54.0	-8.3	1.21 V	59	34.76	10.94
7	15720.00	53.0 PK	74.0	-21.0	1.66 V	213	40.47	12.53
8	15720.00	39.4 AV	54.0	-14.6	1.66 V	213	26.87	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 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	53.1 PK	74.0	-20.9	2.19 H	110	51.43	1.67
2	#5715.00	40.6 AV	54.0	-13.4	2.19 H	110	38.93	1.67
3	#5725.00	65.7 PK	78.2	-12.5	2.19 H	110	64.02	1.68
4	*5745.00	106.3 PK			2.19 H	110	104.59	1.71
5	*5745.00	95.7 AV			2.19 H	110	93.99	1.71
6	11490.00	51.9 PK	74.0	-22.1	1.84 H	301	39.30	12.60
7	11490.00	38.2 AV	54.0	-15.8	1.84 H	301	25.60	12.60
8	#17235.00	52.4 PK	74.0	-21.6	1.64 H	199	34.85	17.55
9	#17235.00	39.4 AV	54.0	-14.6	1.64 H	199	21.85	17.55
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	59.8 PK	74.0	-14.2	2.45 V	80	58.13	1.67
2	#5715.00	46.3 AV	54.0	-7.7	2.45 V	80	44.63	1.67
3	**#5725.00**	**78.0 PK**	**78.2**	**-0.2**	**2.45 V**	**80**	**76.32**	**1.68**
4	*5745.00	119.2 PK			2.45 V	80	117.49	1.71
5	*5745.00	106.5 AV			2.45 V	80	104.79	1.71
6	11490.00	59.6 PK	74.0	-14.4	1.24 V	71	47.00	12.60
7	11490.00	45.7 AV	54.0	-8.3	1.24 V	71	33.10	12.60
8	#17235.00	52.5 PK	74.0	-21.5	1.63 V	209	34.95	17.55
9	#17235.00	39.2 AV	54.0	-14.8	1.63 V	209	21.65	17.55

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) 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	#5715.00	53.8 PK	74.0	-20.2	2.44 H	72	52.13	1.67
2	#5715.00	42.6 AV	54.0	-11.4	2.44 H	72	40.93	1.67
3	#5725.00	53.7 PK	78.2	-24.5	2.44 H	72	52.02	1.68
4	*5785.00	112.6 PK			2.44 H	72	110.84	1.76
5	*5785.00	102.7 AV			2.44 H	72	100.94	1.76
6	#5850.00	56.1 PK	78.2	-22.1	2.44 H	72	54.33	1.77
7	#5860.00	54.1 PK	74.0	-19.9	2.44 H	72	52.33	1.77
8	#5860.00	41.1 AV	54.0	-12.9	2.44 H	72	39.33	1.77
9	11570.00	51.3 PK	74.0	-22.7	1.88 H	287	38.96	12.34
10	11570.00	37.7 AV	54.0	-16.3	1.88 H	287	25.36	12.34
11	#17355.00	52.1 PK	74.0	-21.9	1.63 H	197	33.93	18.17
12	#17355.00	38.9 AV	54.0	-15.1	1.63 H	197	20.73	18.17
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	59.9 PK	74.0	-14.1	2.25 V	85	58.23	1.67
2	#5715.00	44.8 AV	54.0	-9.2	2.25 V	85	43.13	1.67
3	#5725.00	65.2 PK	78.2	-13.0	2.25 V	85	63.52	1.68
4	*5785.00	125.6 PK			2.25 V	85	123.84	1.76
5	*5785.00	112.2 AV			2.25 V	85	110.44	1.76
6	#5850.00	64.0 PK	78.2	-14.2	2.25 V	85	62.23	1.77
7	#5860.00	63.1 PK	74.0	-10.9	2.25 V	85	61.33	1.77
8	#5860.00	45.5 AV	54.0	-8.5	2.25 V	85	43.73	1.77
9	11570.00	55.7 PK	74.0	-18.3	1.43 V	138	43.36	12.34
10	11570.00	42.5 AV	54.0	-11.5	1.43 V	138	30.16	12.34
11	#17355.00	56.8 PK	74.0	-17.2	1.64 V	218	38.63	18.17
12	#17355.00	44.6 AV	54.0	-9.4	1.64 V	218	26.43	18.17

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	107.1 PK			2.30 H	95	105.32	1.78
2	*5825.00	96.3 AV			2.30 H	95	94.52	1.78
3	#5850.00	64.1 PK	78.2	-14.1	2.30 H	95	62.33	1.77
4	#5860.00	54.6 PK	74.0	-19.4	2.30 H	95	52.83	1.77
5	#5860.00	43.3 AV	54.0	-10.7	2.30 H	95	41.53	1.77
6	11650.00	51.2 PK	74.0	-22.8	1.84 H	325	39.04	12.16
7	11650.00	38.0 AV	54.0	-16.0	1.84 H	325	25.84	12.16
8	#17475.00	52.4 PK	74.0	-21.6	1.64 H	193	33.66	18.74
9	#17475.00	39.1 AV	54.0	-14.9	1.64 H	193	20.36	18.74
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	*5825.00	120.9 PK			2.38 V	84	119.12	1.78
2	*5825.00	108.7 AV			2.38 V	84	106.92	1.78
3	#5850.00	74.5 PK	78.2	-3.7	2.38 V	84	72.73	1.77
4	#5860.00	67.2 PK	74.0	-6.8	2.38 V	84	65.43	1.77
5	#5860.00	51.7 AV	54.0	-2.3	2.38 V	84	49.93	1.77
6	11650.00	59.7 PK	74.0	-14.3	1.25 V	45	47.54	12.16
7	11650.00	45.4 AV	54.0	-8.6	1.25 V	45	33.24	12.16
8	#17475.00	53.0 PK	74.0	-21.0	1.61 V	218	34.26	18.74
9	#17475.00	39.3 AV	54.0	-14.7	1.61 V	218	20.56	18.74

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.

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.36 H	127	57.36	0.64
2	5150.00	44.6 AV	54.0	-9.4	1.36 H	127	43.96	0.64
3	*5180.00	109.4 PK			1.36 H	127	108.67	0.73
4	*5180.00	98.3 AV			1.36 H	127	97.57	0.73
5	#10360.00	50.7 PK	74.0	-23.3	1.87 H	330	39.95	10.75
6	#10360.00	37.6 AV	54.0	-16.4	1.87 H	330	26.85	10.75
7	15540.00	52.5 PK	74.0	-21.5	1.62 H	196	39.35	13.15
8	15540.00	39.2 AV	54.0	-14.8	1.62 H	196	26.05	13.15
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	63.1 PK	74.0	-10.9	1.81 V	76	62.46	0.64
2	5150.00	49.1 AV	54.0	-4.9	1.81 V	76	48.46	0.64
3	*5180.00	120.3 PK			1.81 V	76	119.57	0.73
4	*5180.00	108.5 AV			1.81 V	76	107.77	0.73
5	#10360.00	59.7 PK	74.0	-14.3	1.21 V	30	48.95	10.75
6	#10360.00	45.6 AV	54.0	-8.4	1.21 V	30	34.85	10.75
7	15540.00	53.2 PK	74.0	-20.8	1.59 V	214	40.05	13.15
8	15540.00	39.4 AV	54.0	-14.6	1.59 V	214	26.25	13.15

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.6 PK	74.0	-18.4	1.39 H	121	54.96	0.64
2	5150.00	40.2 AV	54.0	-13.8	1.39 H	121	39.56	0.64
3	*5200.00	108.8 PK			1.39 H	121	108.01	0.79
4	*5200.00	97.5 AV			1.39 H	121	96.71	0.79
5	#10400.00	51.0 PK	74.0	-23.0	1.90 H	331	39.90	11.10
6	#10400.00	37.9 AV	54.0	-16.1	1.90 H	331	26.80	11.10
7	15600.00	52.7 PK	74.0	-21.3	1.57 H	182	39.48	13.22
8	15600.00	39.2 AV	54.0	-14.8	1.57 H	182	25.98	13.22
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	1.52 V	79	59.56	0.64
2	5150.00	43.2 AV	54.0	-10.8	1.52 V	79	42.56	0.64
3	*5200.00	120.3 PK			1.52 V	79	119.51	0.79
4	*5200.00	107.8 AV			1.52 V	79	107.01	0.79
5	#10400.00	59.4 PK	74.0	-14.6	1.24 V	31	48.30	11.10
6	#10400.00	45.2 AV	54.0	-8.8	1.24 V	31	34.10	11.10
7	15600.00	53.1 PK	74.0	-20.9	1.56 V	229	39.88	13.22
8	15600.00	39.2 AV	54.0	-14.8	1.56 V	229	25.98	13.22

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.8 PK	74.0	-18.2	1.42 H	131	55.16	0.64
2	5150.00	41.2 AV	54.0	-12.8	1.42 H	131	40.56	0.64
3	*5240.00	108.3 PK			1.42 H	131	107.38	0.92
4	*5240.00	97.1 AV			1.42 H	131	96.18	0.92
5	5350.00	52.6 PK	74.0	-21.4	1.42 H	131	51.42	1.18
6	5350.00	39.9 AV	54.0	-14.1	1.42 H	131	38.72	1.18
7	#10480.00	51.2 PK	74.0	-22.8	1.93 H	336	40.26	10.94
8	#10480.00	38.2 AV	54.0	-15.8	1.93 H	336	27.26	10.94
9	15720.00	53.1 PK	74.0	-20.9	1.59 H	185	40.57	12.53
10	15720.00	39.6 AV	54.0	-14.4	1.59 H	185	27.07	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	56.5 PK	74.0	-17.5	1.87 V	72	55.86	0.64
2	5150.00	42.4 AV	54.0	-11.6	1.87 V	72	41.76	0.64
3	*5240.00	119.1 PK			1.87 V	72	118.18	0.92
4	*5240.00	107.2 AV			1.87 V	72	106.28	0.92
5	5350.00	53.0 PK	74.0	-21.0	1.87 V	72	51.82	1.18
6	5350.00	40.8 AV	54.0	-13.2	1.87 V	72	39.62	1.18
7	#10480.00	59.7 PK	74.0	-14.3	1.28 V	19	48.76	10.94
8	#10480.00	45.6 AV	54.0	-8.4	1.28 V	19	34.66	10.94
9	15720.00	53.0 PK	74.0	-21.0	1.60 V	242	40.47	12.53
10	15720.00	39.0 AV	54.0	-15.0	1.60 V	242	26.47	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 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	56.6 PK	74.0	-17.4	1.47 H	128	54.93	1.67
2	#5715.00	42.5 AV	54.0	-11.5	1.47 H	128	40.83	1.67
3	#5725.00	72.8 PK	78.2	-5.4	1.47 H	128	71.12	1.68
4	*5745.00	108.5 PK			1.47 H	128	106.79	1.71
5	*5745.00	97.2 AV			1.47 H	128	95.49	1.71
6	11490.00	51.7 PK	74.0	-22.3	1.89 H	337	39.10	12.60
7	11490.00	38.6 AV	54.0	-15.4	1.89 H	337	26.00	12.60
8	#17235.00	52.7 PK	74.0	-21.3	1.64 H	188	35.15	17.55
9	#17235.00	39.5 AV	54.0	-14.5	1.64 H	188	21.95	17.55
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	2.22 V	83	60.13	1.67
2	#5715.00	47.1 AV	54.0	-6.9	2.22 V	83	45.43	1.67
3	#5725.00	77.6 PK	78.2	-0.6	2.22 V	83	75.92	1.68
4	*5745.00	118.9 PK			2.22 V	83	117.19	1.71
5	*5745.00	107.2 AV			2.22 V	83	105.49	1.71
6	11490.00	59.8 PK	74.0	-14.2	1.24 V	29	47.20	12.60
7	11490.00	45.6 AV	54.0	-8.4	1.24 V	29	33.00	12.60
8	#17235.00	52.5 PK	74.0	-21.5	1.65 V	238	34.95	17.55
9	#17235.00	38.8 AV	54.0	-15.2	1.65 V	238	21.25	17.55

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) 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	#5715.00	56.3 PK	74.0	-17.7	1.45 H	142	54.63	1.67
2	#5715.00	41.1 AV	54.0	-12.9	1.45 H	142	39.43	1.67
3	#5725.00	63.7 PK	78.2	-14.5	1.45 H	142	62.02	1.68
4	*5785.00	113.7 PK			1.45 H	142	111.94	1.76
5	*5785.00	102.4 AV			1.45 H	142	100.64	1.76
6	#5850.00	60.7 PK	78.2	-17.5	1.45 H	142	58.93	1.77
7	#5860.00	55.2 PK	74.0	-18.8	1.45 H	142	53.43	1.77
8	#5860.00	41.8 AV	54.0	-12.2	1.45 H	142	40.03	1.77
9	11570.00	51.1 PK	74.0	-22.9	1.94 H	329	38.76	12.34
10	11570.00	38.1 AV	54.0	-15.9	1.94 H	329	25.76	12.34
11	#17355.00	52.4 PK	74.0	-21.6	1.62 H	189	34.23	18.17
12	#17355.00	39.0 AV	54.0	-15.0	1.62 H	189	20.83	18.17
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	61.4 PK	74.0	-12.6	2.32 V	82	59.73	1.67
2	#5715.00	45.5 AV	54.0	-8.5	2.32 V	82	43.83	1.67
3	#5725.00	65.9 PK	78.2	-12.3	2.32 V	82	64.22	1.68
4	*5785.00	124.5 PK			2.32 V	82	122.74	1.76
5	*5785.00	112.6 AV			2.32 V	82	110.84	1.76
6	#5850.00	63.0 PK	78.2	-15.2	2.32 V	82	61.23	1.77
7	#5860.00	60.4 PK	74.0	-13.6	2.32 V	82	58.63	1.77
8	#5860.00	45.9 AV	54.0	-8.1	2.32 V	82	44.13	1.77
9	11570.00	59.1 PK	74.0	-14.9	1.24 V	30	46.76	12.34
10	11570.00	45.2 AV	54.0	-8.8	1.24 V	30	32.86	12.34
11	#17355.00	52.9 PK	74.0	-21.1	1.66 V	251	34.73	18.17
12	#17355.00	39.0 AV	54.0	-15.0	1.66 V	251	20.83	18.17

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) 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	*5825.00	108.9 PK			1.41 H	145	107.12	1.78
2	*5825.00	97.7 AV			1.41 H	145	95.92	1.78
3	#5850.00	70.7 PK	78.2	-7.5	1.41 H	145	68.93	1.77
4	#5860.00	58.1 PK	74.0	-15.9	1.41 H	145	56.33	1.77
5	#5860.00	43.7 AV	54.0	-10.3	1.41 H	145	41.93	1.77
6	11650.00	51.4 PK	74.0	-22.6	1.97 H	314	39.24	12.16
7	11650.00	38.1 AV	54.0	-15.9	1.97 H	314	25.94	12.16
8	#17475.00	52.5 PK	74.0	-21.5	1.67 H	205	33.76	18.74
9	#17475.00	38.8 AV	54.0	-15.2	1.67 H	205	20.06	18.74
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	*5825.00	120.1 PK			2.24 V	85	118.32	1.78
2	*5825.00	107.9 AV			2.24 V	85	106.12	1.78
3	#5850.00	77.1 PK	78.2	-1.1	2.24 V	85	75.33	1.77
4	#5860.00	62.3 PK	74.0	-11.7	2.24 V	85	60.53	1.77
5	#5860.00	48.1 AV	54.0	-5.9	2.24 V	85	46.33	1.77
6	11650.00	59.1 PK	74.0	-14.9	1.21 V	33	46.94	12.16
7	11650.00	45.4 AV	54.0	-8.6	1.21 V	33	33.24	12.16
8	#17475.00	53.0 PK	74.0	-21.0	1.70 V	246	34.26	18.74
9	#17475.00	39.4 AV	54.0	-14.6	1.70 V	246	20.66	18.74

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.

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.9 PK	74.0	-10.1	1.40 H	145	63.26	0.64
2	5150.00	48.1 AV	54.0	-5.9	1.40 H	145	47.46	0.64
3	*5190.00	101.6 PK			1.40 H	145	100.85	0.75
4	*5190.00	90.3 AV			1.40 H	145	89.55	0.75
5	#10380.00	50.9 PK	74.0	-23.1	1.92 H	299	39.97	10.93
6	#10380.00	37.7 AV	54.0	-16.3	1.92 H	299	26.77	10.93
7	15570.00	52.4 PK	74.0	-21.6	1.62 H	196	39.21	13.19
8	15570.00	38.6 AV	54.0	-15.4	1.62 H	196	25.41	13.19
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.5 PK	74.0	-5.5	1.68 V	96	67.86	0.64
2	5150.00	53.2 AV	54.0	-0.8	1.68 V	96	52.56	0.64
3	*5190.00	111.8 PK			1.68 V	96	111.05	0.75
4	*5190.00	100.2 AV			1.68 V	96	99.45	0.75
5	#10380.00	59.2 PK	74.0	-14.8	1.22 V	19	48.27	10.93
6	#10380.00	45.5 AV	54.0	-8.5	1.22 V	19	34.57	10.93
7	15570.00	52.8 PK	74.0	-21.2	1.71 V	251	39.61	13.19
8	15570.00	39.0 AV	54.0	-15.0	1.71 V	251	25.81	13.19

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.9 PK	74.0	-10.1	1.35 H	137	63.26	0.64
2	5150.00	46.7 AV	54.0	-7.3	1.35 H	137	46.06	0.64
3	*5230.00	109.2 PK			1.35 H	137	108.30	0.90
4	*5230.00	97.9 AV			1.35 H	137	97.00	0.90
5	5350.00	53.0 PK	74.0	-21.0	1.35 H	137	51.82	1.18
6	5350.00	40.4 AV	54.0	-13.6	1.35 H	137	39.22	1.18
7	#10460.00	50.7 PK	74.0	-23.3	1.87 H	289	39.73	10.97
8	#10460.00	37.3 AV	54.0	-16.7	1.87 H	289	26.33	10.97
9	15690.00	51.8 PK	74.0	-22.2	1.62 H	188	39.16	12.64
10	15690.00	38.1 AV	54.0	-15.9	1.62 H	188	25.46	12.64
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.3 PK	74.0	-5.7	1.99 V	74	67.66	0.64
2	5150.00	50.9 AV	54.0	-3.1	1.99 V	74	50.26	0.64
3	*5230.00	120.3 PK			1.99 V	74	119.40	0.90
4	*5230.00	108.1 AV			1.99 V	74	107.20	0.90
5	5350.00	57.1 PK	74.0	-16.9	1.99 V	74	55.92	1.18
6	5350.00	44.5 AV	54.0	-9.5	1.99 V	74	43.32	1.18
7	#10460.00	59.6 PK	74.0	-14.4	1.16 V	4	48.63	10.97
8	#10460.00	46.0 AV	54.0	-8.0	1.16 V	4	35.03	10.97
9	15690.00	52.5 PK	74.0	-21.5	1.73 V	241	39.86	12.64
10	15690.00	38.7 AV	54.0	-15.3	1.73 V	241	26.06	12.64

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) 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	#5715.00	64.3 PK	74.0	-9.7	1.30 H	144	62.63	1.67
2	#5715.00	47.4 AV	54.0	-6.6	1.30 H	144	45.73	1.67
3	#5725.00	69.8 PK	78.2	-8.4	1.30 H	144	68.12	1.68
4	*5755.00	102.1 PK			1.30 H	144	100.38	1.72
5	*5755.00	90.9 AV			1.30 H	144	89.18	1.72
6	11510.00	50.4 PK	74.0	-23.6	1.87 H	297	37.84	12.56
7	11510.00	37.2 AV	54.0	-16.8	1.87 H	297	24.64	12.56
8	#17265.00	51.5 PK	74.0	-22.5	1.64 H	192	33.86	17.64
9	#17265.00	37.6 AV	54.0	-16.4	1.64 H	192	19.96	17.64
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	68.9 PK	74.0	-5.1	2.28 V	82	67.23	1.67
2	#5715.00	52.0 AV	54.0	-2.0	2.28 V	82	50.33	1.67
3	#5725.00	75.4 PK	78.2	-2.8	2.28 V	82	73.72	1.68
4	*5755.00	113.1 PK			2.28 V	82	111.38	1.72
5	*5755.00	101.2 AV			2.28 V	82	99.48	1.72
6	11510.00	59.8 PK	74.0	-14.2	1.21 V	13	47.24	12.56
7	11510.00	46.0 AV	54.0	-8.0	1.21 V	13	33.44	12.56
8	#17265.00	52.7 PK	74.0	-21.3	1.76 V	246	35.06	17.64
9	#17265.00	38.9 AV	54.0	-15.1	1.76 V	246	21.26	17.64

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) 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	*5795.00	106.7 PK			1.30 H	150	104.93	1.77
2	*5795.00	95.4 AV			1.30 H	150	93.63	1.77
3	#5850.00	68.0 PK	78.2	-10.2	1.30 H	150	66.23	1.77
4	#5860.00	63.2 PK	74.0	-10.8	1.30 H	150	61.43	1.77
5	#5860.00	45.8 AV	54.0	-8.2	1.30 H	150	44.03	1.77
6	11590.00	50.1 PK	74.0	-23.9	1.85 H	284	37.84	12.26
7	11590.00	36.8 AV	54.0	-17.2	1.85 H	284	24.54	12.26
8	#17385.00	51.9 PK	74.0	-22.1	1.59 H	198	33.52	18.38
9	#17385.00	37.7 AV	54.0	-16.3	1.59 H	198	19.32	18.38
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	117.3 PK			2.39 V	87	115.53	1.77
2	*5795.00	105.2 AV			2.39 V	87	103.43	1.77
3	#5850.00	72.6 PK	78.2	-5.6	2.39 V	87	70.83	1.77
4	#5860.00	67.4 PK	74.0	-6.6	2.39 V	87	65.63	1.77
5	#5860.00	50.2 AV	54.0	-3.8	2.39 V	87	48.43	1.77
6	11590.00	59.5 PK	74.0	-14.5	1.21 V	14	47.24	12.26
7	11590.00	45.5 AV	54.0	-8.5	1.21 V	14	33.24	12.26
8	#17385.00	52.9 PK	74.0	-21.1	1.77 V	246	34.52	18.38
9	#17385.00	39.3 AV	54.0	-14.7	1.77 V	246	20.92	18.38

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) 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	64.5 PK	74.0	-9.5	1.29 H	165	63.86	0.64
2	5150.00	47.9 AV	54.0	-6.1	1.29 H	165	47.26	0.64
3	*5210.00	96.8 PK			1.29 H	165	95.97	0.83
4	*5210.00	85.5 AV			1.29 H	165	84.67	0.83
5	5440.00	50.6 PK	74.0	-23.4	1.68 H	154	49.30	1.30
6	5440.00	40.2 AV	54.0	-13.8	1.68 H	154	38.90	1.30
7	#10420.00	49.6 PK	74.0	-24.4	1.84 H	298	38.54	11.06
8	#10420.00	36.4 AV	54.0	-17.6	1.84 H	298	25.34	11.06
9	15630.00	51.5 PK	74.0	-22.5	1.64 H	199	38.47	13.03
10	15630.00	37.4 AV	54.0	-16.6	1.64 H	199	24.37	13.03
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.1 PK	74.0	-4.9	1.84 V	72	68.46	0.64
2	5150.00	52.3 AV	54.0	-1.7	1.84 V	72	51.66	0.64
3	*5210.00	108.4 PK			1.84 V	72	107.57	0.83
4	*5210.00	95.7 AV			1.84 V	72	94.87	0.83
5	5440.00	54.1 PK	74.0	-19.9	1.94 V	74	52.80	1.30
6	5440.00	44.6 AV	54.0	-9.4	1.94 V	74	43.30	1.30
7	#10420.00	59.1 PK	74.0	-14.9	1.17 V	17	48.04	11.06
8	#10420.00	45.4 AV	54.0	-8.6	1.17 V	17	34.34	11.06
9	15630.00	53.1 PK	74.0	-20.9	1.73 V	233	40.07	13.03
10	15630.00	39.5 AV	54.0	-14.5	1.73 V	233	26.47	13.03

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) 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	#5715.00	64.9 PK	74.0	-9.1	1.34 H	153	63.23	1.67
2	#5715.00	47.9 AV	54.0	-6.1	1.34 H	153	46.23	1.67
3	#5725.00	69.2 PK	78.2	-9.0	1.34 H	153	67.52	1.68
4	*5775.00	95.3 PK			1.34 H	153	93.55	1.75
5	*5775.00	84.1 AV			1.34 H	153	82.35	1.75
6	#5850.00	66.3 PK	78.2	-11.9	1.34 H	153	64.53	1.77
7	#5860.00	61.8 PK	74.0	-12.2	1.34 H	153	60.03	1.77
8	#5860.00	46.8 AV	54.0	-7.2	1.34 H	153	45.03	1.77
9	11550.00	50.4 PK	74.0	-23.6	1.82 H	310	37.99	12.41
10	11550.00	36.9 AV	54.0	-17.1	1.82 H	310	24.49	12.41
11	#17325.00	52.0 PK	74.0	-22.0	1.69 H	201	34.07	17.93
12	#17325.00	37.9 AV	54.0	-16.1	1.69 H	201	19.97	17.93
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	69.7 PK	74.0	-4.3	2.20 V	82	68.03	1.67
2	#5715.00	52.5 AV	54.0	-1.5	2.20 V	82	50.83	1.67
3	#5725.00	73.6 PK	78.2	-4.6	2.20 V	82	71.92	1.68
4	*5775.00	106.5 PK			2.20 V	82	104.75	1.75
5	*5775.00	94.3 AV			2.20 V	82	92.55	1.75
6	#5850.00	70.8 PK	78.2	-7.4	2.20 V	82	69.03	1.77
7	#5860.00	66.2 PK	74.0	-7.8	2.20 V	82	64.43	1.77
8	#5860.00	51.3 AV	54.0	-2.7	2.20 V	82	49.53	1.77
9	11550.00	58.7 PK	74.0	-15.3	1.20 V	15	46.29	12.41
10	11550.00	45.0 AV	54.0	-9.0	1.20 V	15	32.59	12.41
11	#17325.00	53.6 PK	74.0	-20.4	1.74 V	246	35.67	17.93
12	#17325.00	39.8 AV	54.0	-14.2	1.74 V	246	21.87	17.93

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:

802.11a

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	82.91	31.2 QP	40.0	-8.8	2.00 H	83	56.78	-25.54
2	359.12	40.8 QP	46.0	-5.2	1.00 H	114	58.69	-17.86
3	625.05	34.9 QP	46.0	-11.1	1.00 H	54	46.17	-11.30
4	653.98	37.3 QP	46.0	-8.7	2.00 H	90	48.31	-11.04
5	750.03	40.6 QP	46.0	-5.4	1.00 H	18	49.78	-9.21
6	775.03	39.3 QP	46.0	-6.7	1.00 H	38	48.20	-8.92
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	219.39	38.2 QP	46.0	-7.8	1.00 V	38	61.60	-23.42
2	265.06	33.8 QP	46.0	-12.3	1.00 V	23	54.27	-20.52
3	360.40	39.3 QP	46.0	-6.7	2.00 V	185	57.16	-17.82
4	658.10	38.1 QP	46.0	-7.9	1.00 V	11	49.14	-11.02
5	750.03	38.9 QP	46.0	-7.1	1.50 V	128	48.08	-9.21
6	775.06	39.7 QP	46.0	-6.3	1.50 V	195	48.63	-8.92

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	100287	Apr. 17, 2015	Apr. 16, 2016
Line-Impedance Stabilization Network (for EUT) R&S	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable	5D-FB	COACAB-001	May 25, 2015	May 24, 2016
50 ohms Terminator	50	3	Oct. 17, 2014	Oct. 16, 2015
50 ohms Terminator	N/A	EMC-04	Oct. 21, 2014	Oct. 20, 2015
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016

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. A.
3. The VCCI Con A Registration No. is C-817.
4. Tested Date: Sep. 30, 2015

4.2.3 Test Procedure

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.

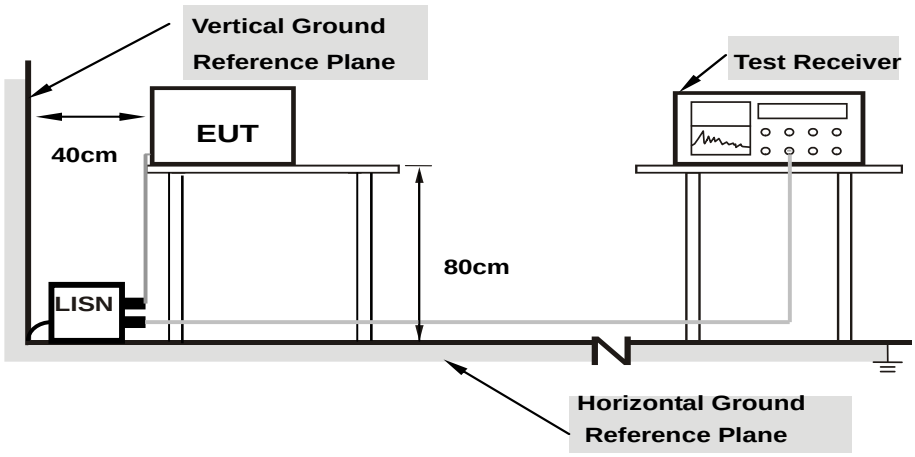
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: 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.

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.

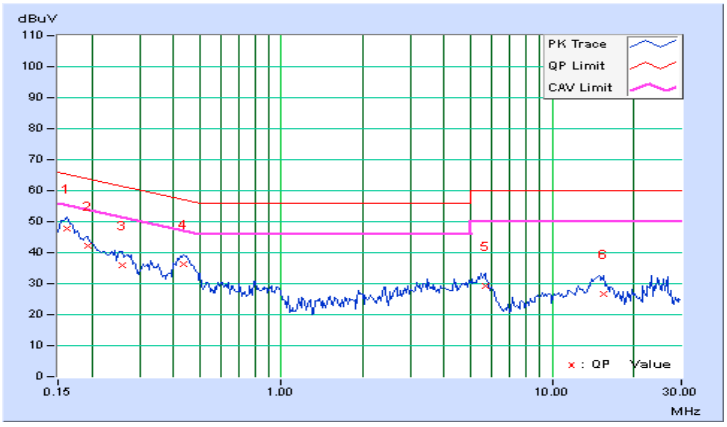
4.2.7 Test Results(Mode 1)

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	0.16172	9.78	37.90	25.12	47.68	34.90	65.38	55.38	-17.70	-20.48
2	0.19297	9.79	32.42	20.38	42.21	30.17	63.91	53.91	-21.70	-23.74
3	0.25938	9.80	26.04	14.46	35.84	24.26	61.45	51.45	-25.61	-27.19
4	0.43516	9.83	26.64	17.20	36.47	27.03	57.15	47.15	-20.68	-20.12
5	5.64844	10.00	19.34	13.24	29.34	23.24	60.00	50.00	-30.66	-26.76
6	15.55078	10.14	16.44	9.64	26.58	19.78	60.00	50.00	-33.42	-30.22

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

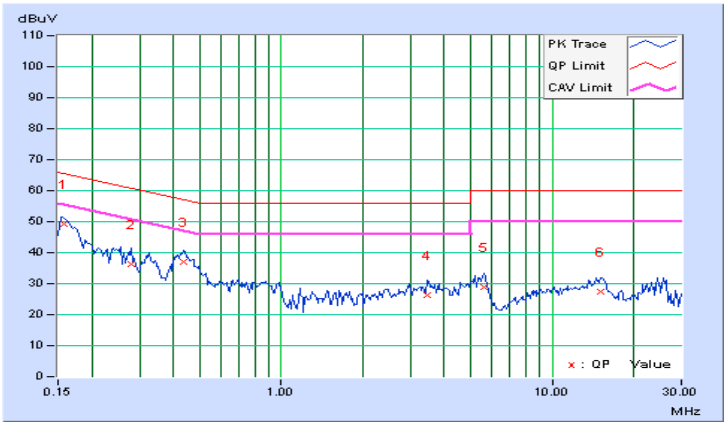


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15781	9.79	39.62	26.96	49.41	36.75	65.58	55.58	-16.17	-18.83
2	0.27891	9.82	26.36	15.12	36.18	24.94	60.85	50.85	-24.67	-25.91
3	0.43516	9.84	27.34	17.86	37.18	27.70	57.15	47.15	-19.97	-19.45
4	3.45703	9.97	16.50	8.80	26.47	18.77	56.00	46.00	-29.53	-27.23
5	5.60156	10.02	19.02	12.84	29.04	22.86	60.00	50.00	-30.96	-27.14
6	15.07031	10.24	17.08	9.56	27.32	19.80	60.00	50.00	-32.68	-30.20

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



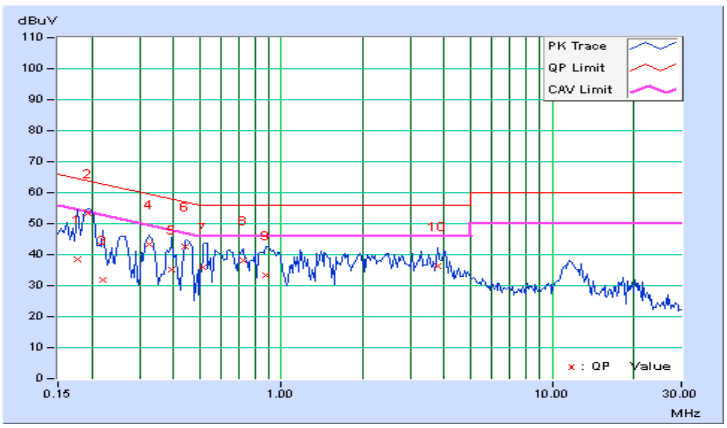
4.2.8 Test Results(Mode 2)

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	0.17734	9.78	28.56	8.42	38.34	18.20	64.61	54.61	-26.27	-36.41
2	**0.19297**	**9.79**	**43.50**	**32.38**	**53.29**	**42.17**	**63.91**	**53.91**	**-10.62**	**-11.74**
3	0.22031	9.79	22.14	0.00	31.93	9.79	62.81	52.81	-30.87	-43.01
4	0.32578	9.82	33.64	27.60	43.46	37.42	59.56	49.56	-16.10	-12.14
5	0.39609	9.83	25.38	13.42	35.21	23.25	57.93	47.93	-22.73	-24.69
6	0.44297	9.83	32.58	20.04	42.41	29.87	57.01	47.01	-14.59	-17.13
7	0.51719	9.84	25.94	13.56	35.78	23.40	56.00	46.00	-20.22	-22.60
8	0.72422	9.86	28.16	17.40	38.02	27.26	56.00	46.00	-17.98	-18.74
9	0.88047	9.88	23.28	6.70	33.16	16.58	56.00	46.00	-22.84	-29.42
10	3.78906	9.97	26.30	17.12	36.27	27.09	56.00	46.00	-19.73	-18.91

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

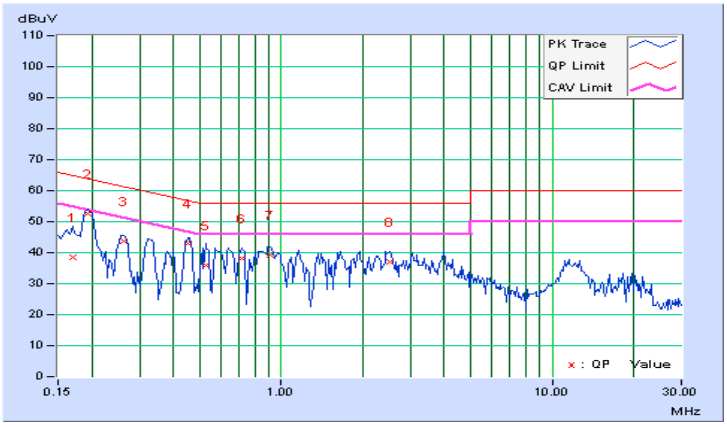


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16953	9.79	28.66	4.04	38.45	13.83	64.98	54.98	-26.53	-41.15
2	0.19297	9.80	42.70	32.04	52.50	41.84	63.91	53.91	-11.41	-12.07
3	0.26328	9.81	33.84	23.92	43.65	33.73	61.33	51.33	-17.67	-17.59
4	0.45469	9.84	32.98	26.06	42.82	35.90	56.79	46.79	-13.96	-10.88
5	0.52500	9.85	26.08	14.20	35.93	24.05	56.00	46.00	-20.07	-21.95
6	0.71250	9.87	28.46	18.64	38.33	28.51	56.00	46.00	-17.67	-17.49
7	0.90781	9.88	29.46	18.76	39.34	28.64	56.00	46.00	-16.66	-17.36
8	2.50391	9.95	27.00	15.08	36.95	25.03	56.00	46.00	-19.05	-20.97

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)

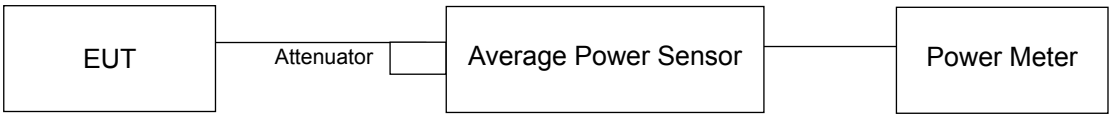
*B is the 26 dB emission bandwidth in megahertz

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



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

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.09	19.53	18.89	18.96	310.311	24.92	30	Pass
40	5200	18.02	19.50	18.88	18.82	305.988	24.86	30	Pass
48	5240	18.35	19.25	18.94	18.71	305.176	24.85	30	Pass
149	5745	16.56	17.49	17.10	17.23	205.526	23.13	30	Pass
157	5785	22.71	24.64	22.82	22.75	857.501	29.33	30	Pass
165	5825	17.25	19.56	18.60	17.15	267.777	24.28	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.85	19.33	18.69	18.76	295.781	24.71	30	Pass
40	5200	17.85	19.29	18.71	18.60	292.618	24.66	30	Pass
48	5240	18.11	19.10	18.58	18.61	290.719	24.63	30	Pass
149	5745	16.27	17.23	16.85	16.95	193.171	22.86	30	Pass
157	5785	22.24	24.16	22.72	22.60	797.147	29.02	30	Pass
165	5825	16.12	18.36	17.37	15.83	202.333	23.06	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	12.72	13.97	13.60	13.45	88.693	19.48	30	Pass
46	5230	21.08	21.98	21.67	21.59	577.099	27.61	30	Pass
151	5755	13.12	14.34	13.72	13.89	95.717	19.81	30	Pass
159	5795	17.26	18.96	18.14	17.56	254.095	24.05	30	Pass

802.11ac (VHT80)

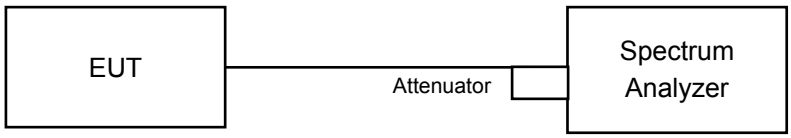
Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	11.09	12.38	11.81	11.70	60.113	17.79	30	Pass
155	5775	10.30	11.94	10.92	10.92	51.064	17.08	30	Pass

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

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
c. Sweep time = auto, trigger set to “free run”.
d. Trace average at least 100 traces in power averaging mode.
e. Record the max value

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

Using method SA-2

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

For U-NII-3 band:

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 ≥ 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 = 10log(500 kHz/300kHz)
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 ≥ 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 = 10log(500 kHz/300kHz)
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)				Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	4.57	5.16	5.62	4.71	11.06	12.11	Pass
40	5200	4.52	5.39	5.30	5.01	11.09	12.11	Pass
48	5240	4.51	5.33	5.09	5.05	11.03	12.11	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 = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 17-(10.89-6) = 12.11dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm)				Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	4.06	4.78	5.18	4.26	10.61	12.11	Pass
40	5200	3.93	4.71	5.12	4.38	10.58	12.11	Pass
48	5240	3.95	4.92	4.51	4.59	10.53	12.11	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 = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 17-(10.89-6) = 12.11dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-4.10	-3.40	-3.50	-3.75	0.12	2.46	12.11	Pass
46	5230	3.82	4.61	5.06	4.75	0.12	10.73	12.11	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 = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 17-(10.89-6) = 12.11dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. EIRP Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-8.95	-8.17	-7.83	-8.70	0.27	-2.10	12.11	Pass

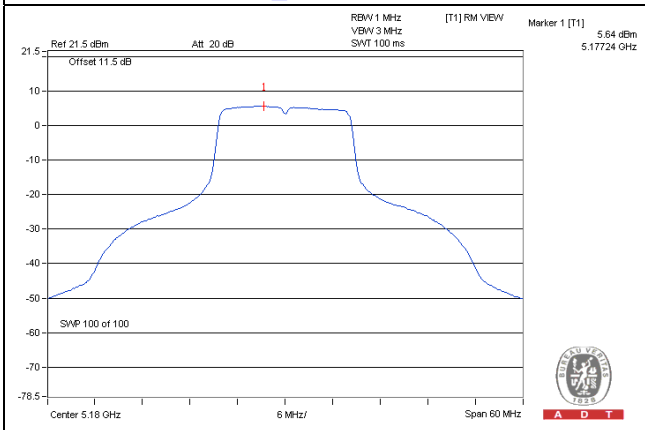
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. Directional gain = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 17-(10.89-6) = 12.11dBm.

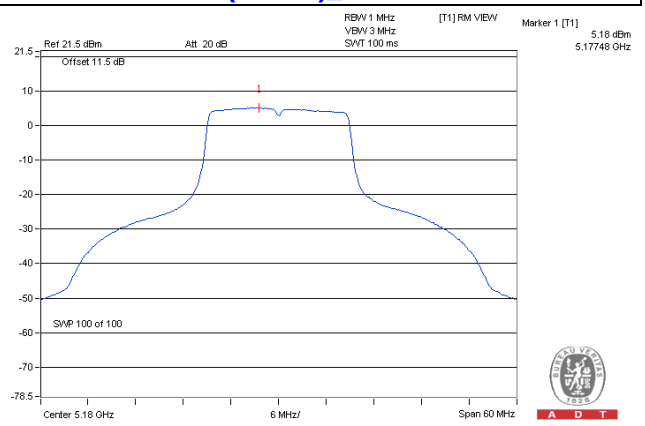
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

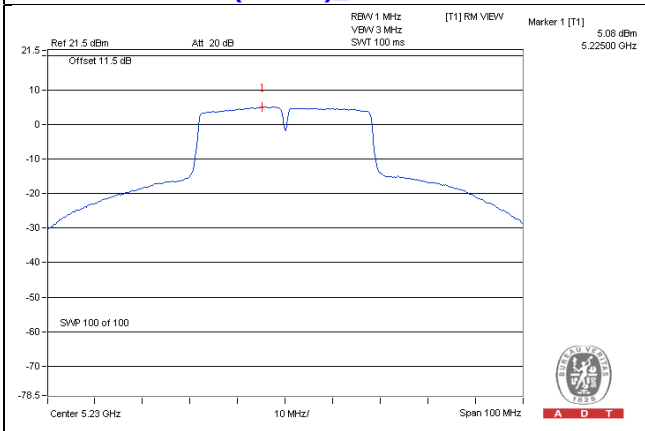
802.11a_Chain 2 / CH36



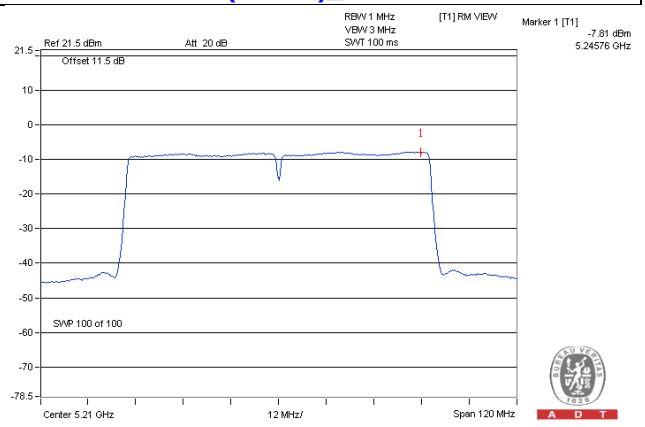
802.11ac (VHT20)_Chain 2 / CH36



802.11ac (VHT40)_Chain 2 / CH46



802.11ac (VHT80)_Chain 2 / 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	-5.10	-2.88	6.02	3.14	25.11	Pass
	157	5785	0.87	3.09	6.02	9.11	25.11	Pass
	165	5825	-3.86	-1.64	6.02	4.38	25.11	Pass
1	149	5745	-3.65	-1.43	6.02	4.59	25.11	Pass
	157	5785	2.59	4.81	6.02	10.83	25.11	Pass
	165	5825	-2.11	0.11	6.02	6.13	25.11	Pass
2	149	5745	-3.74	-1.52	6.02	4.50	25.11	Pass
	157	5785	1.67	3.89	6.02	9.91	25.11	Pass
	165	5825	-2.56	-0.34	6.02	5.68	25.11	Pass
3	149	5745	-4.35	-2.13	6.02	3.89	25.11	Pass
	157	5785	0.86	3.08	6.02	9.10	25.11	Pass
	165	5825	-3.12	-0.90	6.02	5.12	25.11	Pass

Note: 1. Directional gain = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 30-(10.89-6) = 25.11dBm.

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	-5.74	-3.52	6.02	2.50	25.11	Pass
	157	5785	0.46	2.68	6.02	8.70	25.11	Pass
	165	5825	-5.20	-2.98	6.02	3.04	25.11	Pass
1	149	5745	-4.07	-1.85	6.02	4.17	25.11	Pass
	157	5785	2.31	4.53	6.02	10.55	25.11	Pass
	165	5825	-3.87	-1.65	6.02	4.37	25.11	Pass
2	149	5745	-4.35	-2.13	6.02	3.89	25.11	Pass
	157	5785	1.27	3.49	6.02	9.51	25.11	Pass
	165	5825	-4.15	-1.93	6.02	4.09	25.11	Pass
3	149	5745	-4.89	-2.67	6.02	3.35	25.11	Pass
	157	5785	0.40	2.62	6.02	8.64	25.11	Pass
	165	5825	-4.68	-2.46	6.02	3.56	25.11	Pass

Note: 1. Directional gain = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 30-(10.89-6) = 25.11dBm.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-11.91	-9.69	6.02	0.12	-3.55	25.11	Pass
	159	5795	-7.67	-5.45	6.02	0.12	0.69	25.11	Pass
1	151	5755	-10.36	-8.14	6.02	0.12	-2.00	25.11	Pass
	159	5795	-6.00	-3.78	6.02	0.12	2.36	25.11	Pass
2	151	5755	-10.53	-8.31	6.02	0.12	-2.17	25.11	Pass
	159	5795	-6.47	-4.25	6.02	0.12	1.89	25.11	Pass
3	151	5755	-10.97	-8.75	6.02	0.12	-2.61	25.11	Pass
	159	5795	-6.93	-4.71	6.02	0.12	1.43	25.11	Pass

Note: 1. Directional gain = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 30-(10.89-6) = 25.11dBm.

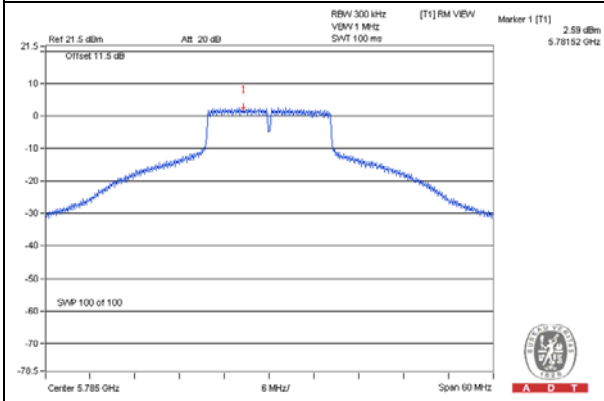
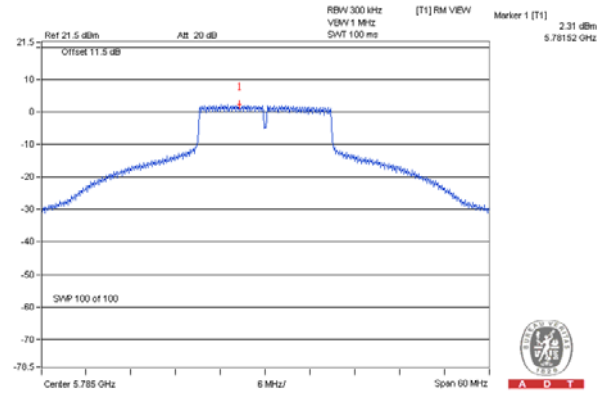
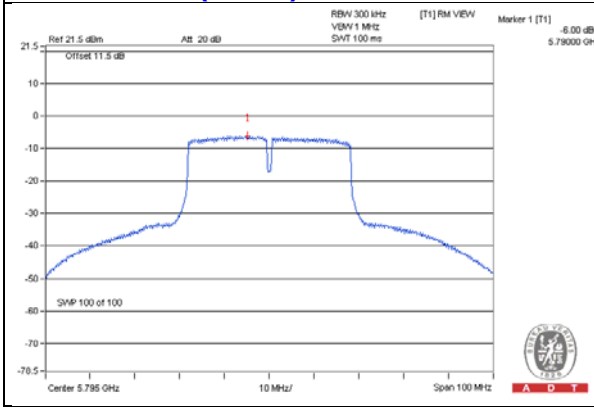
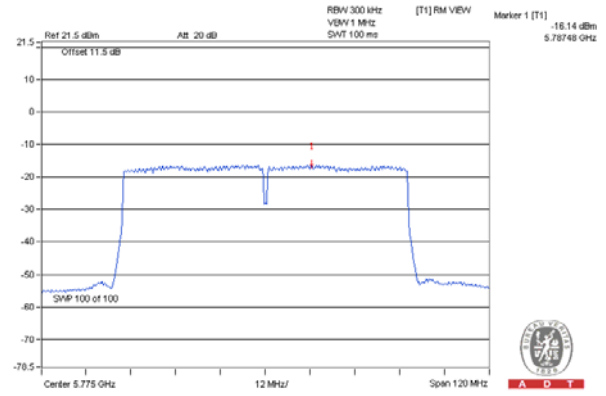
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-17.81	-15.59	6.02	0.27	-9.30	25.11	Pass
1	155	5775	-16.14	-13.92	6.02	0.27	-7.63	25.11	Pass
2	155	5775	-16.60	-14.38	6.02	0.27	-8.09	25.11	Pass
3	155	5775	-17.11	-14.89	6.02	0.27	-8.60	25.11	Pass

Note: 1. Directional gain = 4.87dBi + 10log(4) = 10.89dBi > 6dBi , so the power density limit shall be reduced to 30-(10.89-6) = 25.11dBm.

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

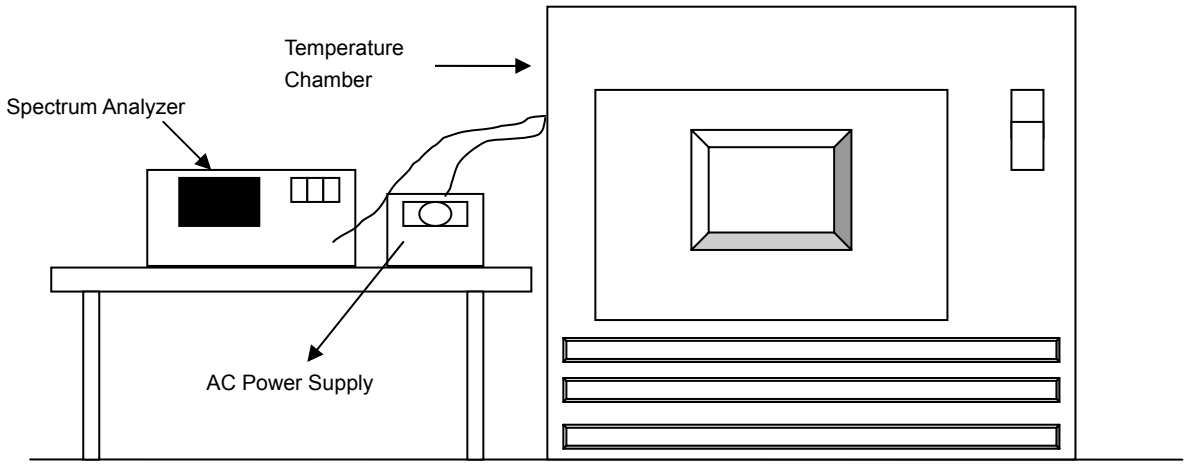
Spectrum Plot of Worst Value	
802.11a – Chain 1: CH 157	**802.11ac (VHT20) – Chain 1: CH 157**
	
802.11ac (VHT40) – Chain 1: CH 159	**802.11ac (VHT80) – Chain 1: CH 155**
	

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

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.
.

4.5.5 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

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5745MHz									
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	5745.0271	0.00047	5745.0257	0.00045	5745.027	0.00047	5745.0237	0.00041
40	120	5745.0005	0.00001	5744.9988	-0.00002	5744.9995	-0.00001	5744.9988	-0.00002
30	120	5745.0206	0.00036	5745.0182	0.00032	5745.0221	0.00038	5745.0207	0.00036
20	120	5744.9884	-0.00020	5744.9895	-0.00018	5744.9855	-0.00025	5744.9906	-0.00016
10	120	5745.0103	0.00018	5745.0116	0.00020	5745.0081	0.00014	5745.0097	0.00017
0	120	5744.9811	-0.00033	5744.976	-0.00042	5744.9776	-0.00039	5744.9787	-0.00037
-10	120	5744.976	-0.00042	5744.9753	-0.00043	5744.971	-0.00050	5744.9755	-0.00043
-20	120	5744.9901	-0.00017	5744.9905	-0.00017	5744.9924	-0.00013	5744.9911	-0.00015
-30	120	5744.9995	-0.00001	5744.9996	-0.00001	5744.9996	-0.00001	5745.0026	0.00005

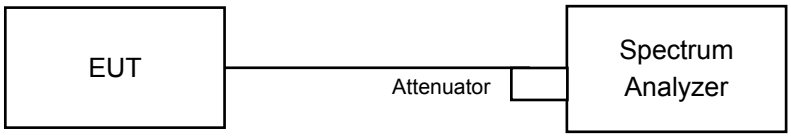
FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5745MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5744.9884	-0.00020	5744.9885	-0.00020	5744.9852	-0.00026	5744.9902	-0.00017
	120	5744.9884	-0.00020	5744.9895	-0.00018	5744.9855	-0.00025	5744.9906	-0.00016
	102	5744.9894	-0.00018	5744.9887	-0.00020	5744.9858	-0.00025	5744.9903	-0.00017

4.6 6dB Bandwidth Measurment

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

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

4.6.5 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	16.30	16.36	15.95	16.08	0.5	Pass
157	5785	16.38	16.37	16.29	16.30	0.5	Pass
165	5825	16.33	16.35	16.03	16.33	0.5	Pass

802.11ac (VHT20)

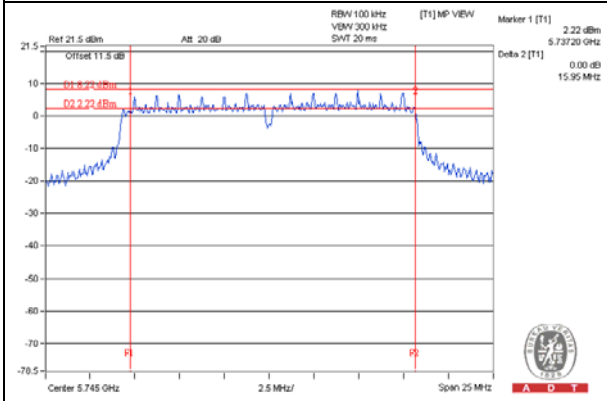
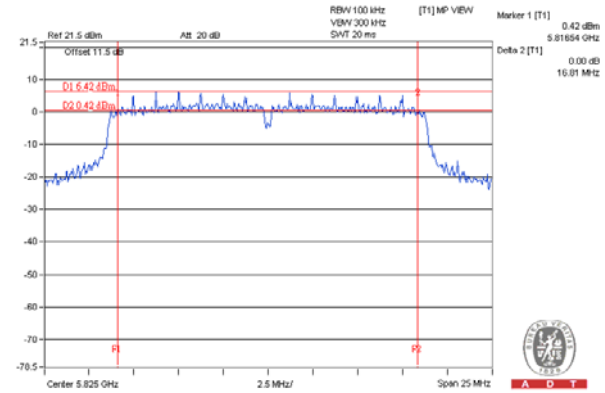
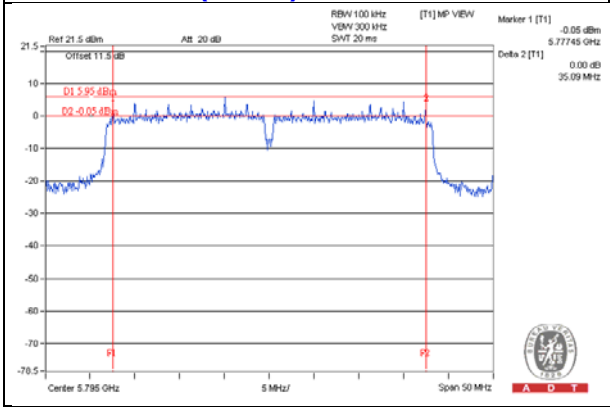
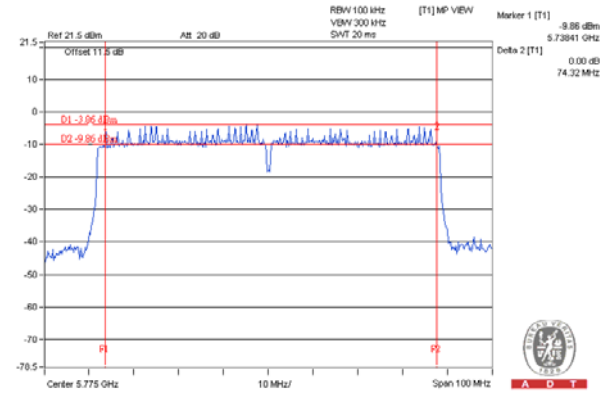
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.21	17.62	17.22	16.98	0.5	Pass
157	5785	17.57	17.61	17.63	17.63	0.5	Pass
165	5825	16.81	17.18	17.56	16.98	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.50	35.87	35.20	35.18	0.5	Pass
159	5795	35.34	36.10	36.39	35.09	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	76.00	74.32	75.58	75.31	0.5	Pass

Spectrum Plot of Worst Value	
802.11a – Chain 2: CH 149	**802.11ac (VHT20) – Chain 0: CH 165**
	
802.11ac (VHT40) – Chain 3: 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:

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

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

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

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

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

--- END ---