FCC TEST REPORT (15.407)

REPORT NO.: RF141117E18E-4

MODEL NO.: EX6120

FCC ID: PY315200308

RECEIVED: Nov. 18, 2014

TESTED: Nov. 18 to Dec. 17, 2014

ISSUED: Aug. 17, 2015

APPLICANT: NETGEAR, Inc.

ADDRESS: 350 East Plumeria Drive San Jose, CA 95134

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.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification

Table of Contents

RELEASE CONTROL RECORD 4
1. CERTIFICATION 5
2. SUMMARY OF TEST RESULTS 6
2.1 MEASUREMENT UNCERTAINTY 7
3. GENERAL INFORMATION 8
3.1 GENERAL DESCRIPTION OF EUT (DFS BAND) 8
3.2 DESCRIPTION OF TEST MODES 10
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL 11
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS 13
3.4 DUTY CYCLE OF TEST SIGNAL 14
3.5 DESCRIPTION OF SUPPORT UNITS 15
3.6 CONFIGURATION OF SYSTEM UNDER TEST 16
4. TEST TYPES AND RESULTS 17
4.1 CONDUCTED EMISSION MEASUREMENT 17
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 17
4.1.2 TEST INSTRUMENTS 17
4.1.3 TEST PROCEDURES 18
4.1.4 DEVIATION FROM TEST STANDARD 18
4.1.5 TEST SETUP 18
4.1.6 EUT OPERATING CONDITIONS 19
4.1.7 TEST RESULTS 20
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT 22
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT 22
4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS 23
4.2.3 TEST INSTRUMENTS 24
4.2.4 TEST PROCEDURES 25
4.2.5 DEVIATION FROM TEST STANDARD 25
4.2.6 TEST SETUP 26
4.2.7 EUT OPERATING CONDITION 26
4.2.8 TEST RESULTS 27
4.3 TRANSMIT POWER MEASUREMENT 48
4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT 48
4.3.2 TEST INSTRUMENTS 49
4.3.3 TEST PROCEDURE 49
4.3.4 DEVIATION FROM TEST STANDARD 50
4.3.5 TEST SETUP 50
4.3.6 EUT OPERATING CONDITIONS 50
4.3.7 TEST RESULTS 51
4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT 57

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT.....57
4.4.2 TEST INSTRUMENTS 57
4.4.3 TEST PROCEDURES 58
4.4.4 DEVIATION FROM TEST STANDARD 58
4.4.5 TEST SETUP 58
4.4.6 EUT OPERATING CONDITIONS 58
4.4.7 TEST RESULTS 59
4.5 FREQUENCY STABILITY 61
4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT 61
4.5.2 TEST INSTRUMENTS 61
4.5.3 TEST PROCEDURE 61
4.5.4 DEVIATION FROM TEST STANDARD 62
4.5.5 TEST SETUP 62
4.5.6 EUT OPERATING CONDITION 62
4.5.7 TEST RESULTS 63
5. PHOTOGRAPHS OF THE TEST CONFIGURATION.....64
6. INFORMATION ON THE TESTING LABORATORIES 65
7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....66

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141117E18E-4	Original release	Aug. 17, 2015

1. CERTIFICATION

PRODUCT:	WiFi Range Extender
BRAND NAME:	NETGEAR
MODEL NO.:	EX6120
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	NETGEAR, Inc.
TESTED:	Nov. 18 to Dec. 17, 2014
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	ANSI C63.10-2009

The above equipment (Model: EX6120) 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:** Aug. 17, 2015
(Midoli Peng, Specialist)

Approved by : _____ , **Date:** Aug. 17, 2015
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407 Under New Rule)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -13.49dB at 0.30625MHz
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 5470.00MHz & 5725.00MHz
15.407(a/1/2/3)	Transmit Power	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex (MHF) not a standard connector.

NOTE: 1. This report is prepared for FCC class II permissive change. (Add DFS band: 5250~5350MHz & 5470~5725MHz).

2. The DFS report 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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.43 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT (DFS BAND)

PRODUCT	WiFi Range Extender
MODEL NO.	EX6120
POWER SUPPLY	100-250Vac, 0.14A, 50-60Hz
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 866.7Mbps
OPERATING FREQUENCY	5.26 ~ 5.32GHz, 5.5~5.7GHz
NUMBER OF CHANNEL	15 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 7 for 802.11n (HT40), 802.11ac (VHT40) 3 for 802.11ac (VHT80)
MAXIMUM OUTPUT POWER	802.11a: 230.706mW 802.11ac (VHT20): 223.889mW 802.11ac (VHT40): 249.476mW 802.11ac (VHT80): 154.717mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF141117E18E-1 design is as the following:
   - ◆ Add DFS band <5250~5350MHz & 5470~5725MHz>
2. 2.4GHz and 5GHz technology can transmit at same time.
3. The antennas provided to the EUT, please refer to the following table:

Ant. No.	Brand	Model	Antenna Gain(dBi) <including cable loss>	Frequency range (GHz ~ GHz)	Antenna Type	Connecter Type	Cable Length (mm)
Antenna R	NETGEAR	NA	3.1	2.4~2.4835	Dipole	i-pex (MHF)	35
			3	5.15~5.25			
			3.2	5.25~5.35			
			3.2	5.47~5.725			
			3.3	5.725~5.85			
Antenna L	NETGEAR	NA	3.2	2.4~2.4835	Dipole	i-pex (MHF)	75
			4	5.15~5.25			
			4	5.25~5.35			
			3.9	5.47~5.725			
			3.1	5.725~5.85			

4. The EUT incorporates a MIMO function.

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

Note: 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)

5. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Operated in 5250 ~ 5350MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
58	5290 MHz

Operated in 5470MHz ~ 5725MHz bands:

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channels are provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
106	5530 MHz	122	5610 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	
-	√	√	√	√	-

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

RE ≥ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

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

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	54 to 140	54	OFDM	BPSK	13.5

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	54 to 140	54	OFDM	BPSK	13.5

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6
802.11ac (VHT20)	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6.5
802.11ac (VHT40)	54 to 134	54, 62, 102, 118, 134	OFDM	BPSK	13.5
802.11ac (VHT80)	58 to 122	58, 106, 122	OFDM	BPSK	29.3

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6
802.11ac (VHT20)	52 to 140	52, 60, 64, 100, 120, 140	OFDM	BPSK	6.5
802.11ac (VHT40)	54 to 134	54, 62, 102, 118, 134	OFDM	BPSK	13.5
802.11ac (VHT80)	58 to 122	58, 106, 122	OFDM	BPSK	29.3

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	24deg. C, 71%RH	120Vac, 60Hz	Wythe Lin
RE<1G	25deg. C, 74%RH	120Vac, 60Hz	Gary Cheng
RE≥1G	20deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

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

3.4 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.

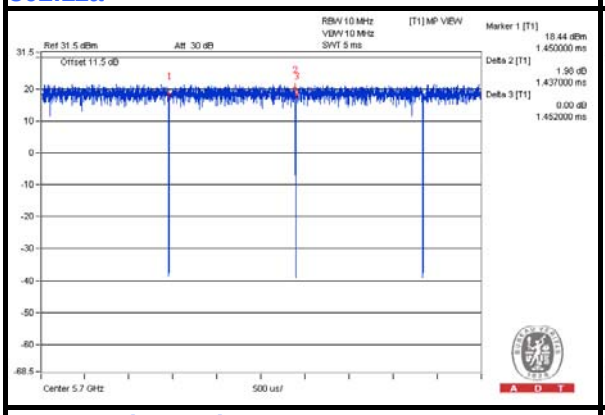
802.11a: Duty cycle = 1.437 ms/1.452 ms = 0.99

802.11ac (VHT20): Duty cycle = 1.345 ms/1.356 ms = 0.992

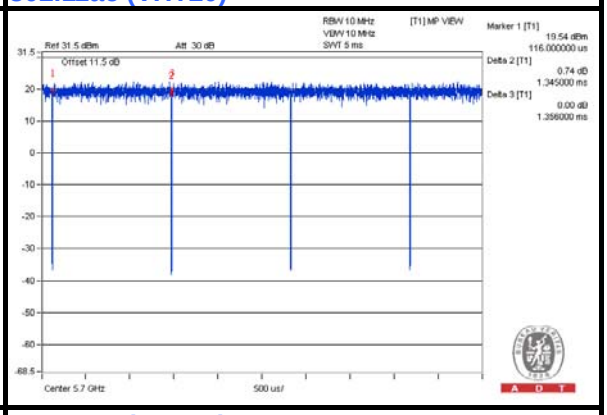
802.11ac (VHT40): Duty cycle = 0.666 ms/0.676 ms = 0.985

802.11ac (VHT80): Duty cycle = 0.335 ms/0.419 ms = 0.8, Duty factor = 10 * log(1/0.8) = 0.97

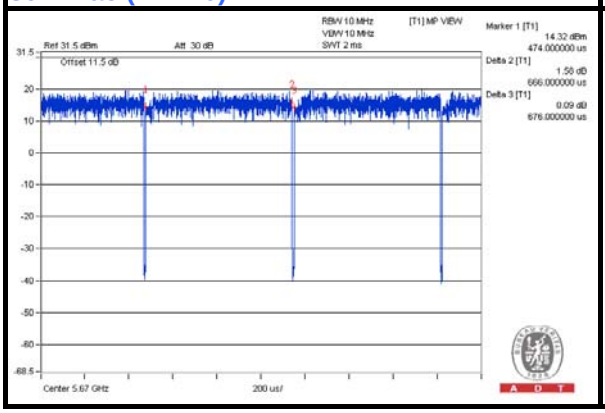
802.11a



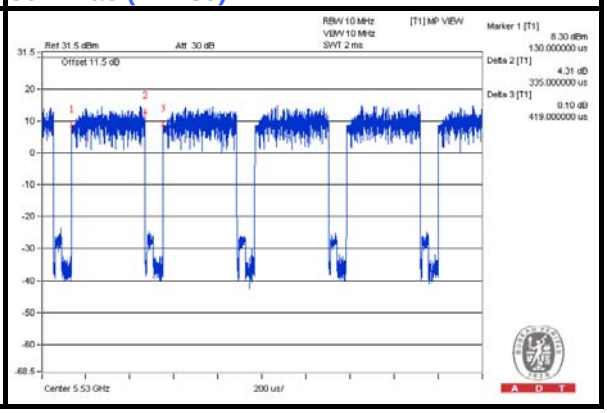
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

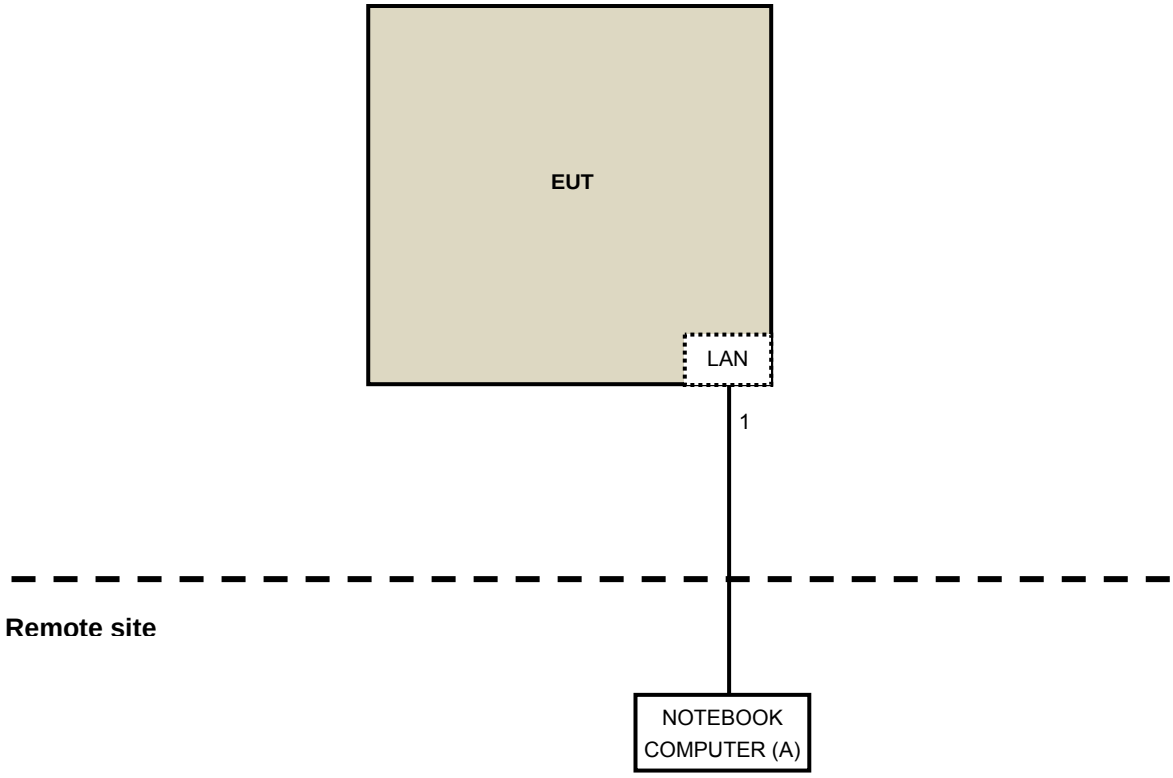
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	PP32LA	HSLB32S	FCC DoC	Provided by Lab

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	RJ45	1	10	No	0	Provided by Lab

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10 , 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Nov. 28, 2014

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

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

d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

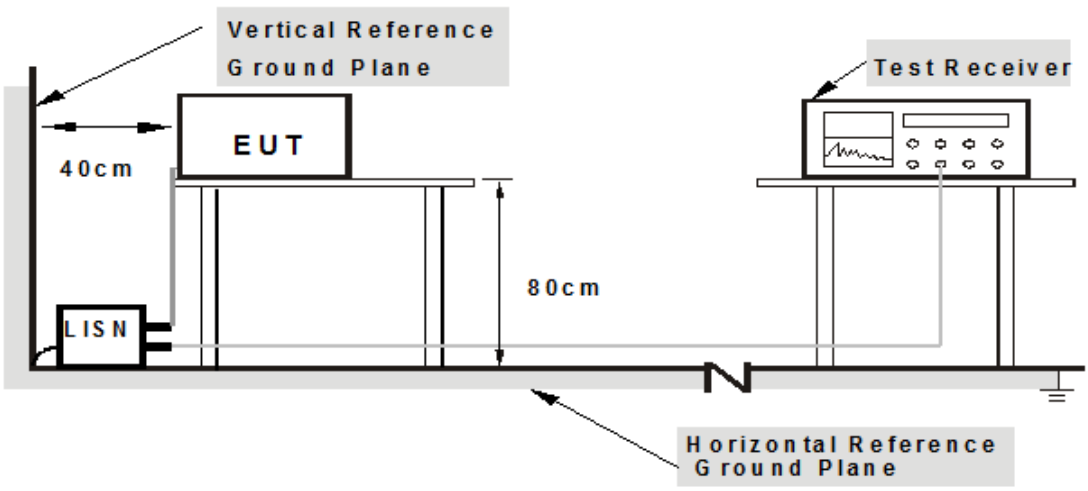
NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit A (Notebook Computer) which is placed in remote site.
2. The communication partner run test program “QATool.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

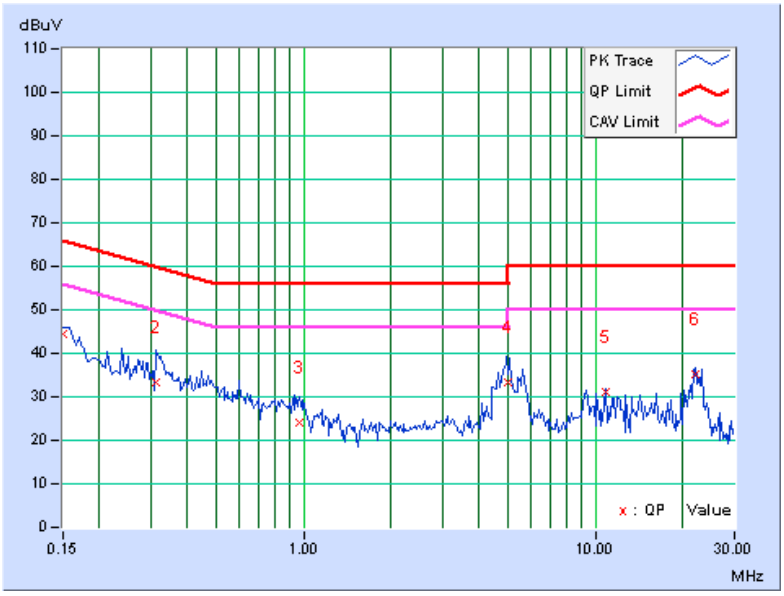
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	44.27	36.19	44.34	36.26	66.00	56.00	-21.66	-19.74
2	0.31406	0.08	33.31	26.71	33.39	26.79	59.86	49.86	-26.47	-23.07
3	0.97422	0.13	24.03	20.23	24.16	20.36	56.00	46.00	-31.84	-25.64
4	5.00000	0.28	33.23	24.95	33.51	25.23	56.00	46.00	-22.49	-20.77
5	10.79297	0.47	30.66	28.57	31.13	29.04	60.00	50.00	-28.87	-20.96
6	21.90625	0.74	34.35	33.17	35.09	33.91	60.00	50.00	-24.91	-16.09

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

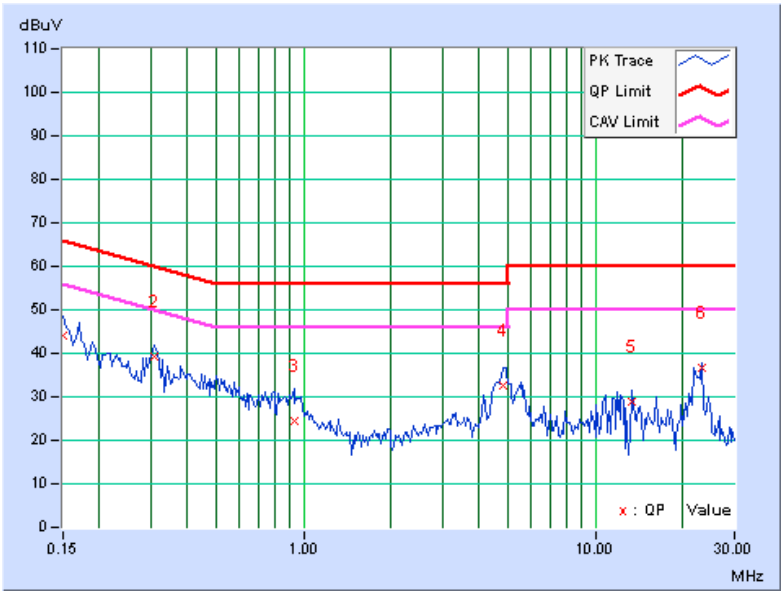


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	43.91	35.46	43.98	35.53	66.00	56.00	-22.02	-20.47
2	**0.30625**	**0.08**	**39.25**	**36.51**	**39.33**	**36.59**	**60.07**	**50.07**	**-20.75**	**-13.49**
3	0.93125	0.13	24.17	19.86	24.30	19.99	56.00	46.00	-31.70	-26.01
4	4.83594	0.29	32.42	24.11	32.71	24.40	56.00	46.00	-23.29	-21.60
5	13.35934	0.56	28.33	24.91	28.89	25.47	60.00	50.00	-31.11	-24.53
6	23.12891	0.81	36.03	33.96	36.84	34.77	60.00	50.00	-23.16	-15.23

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 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 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.

4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures 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).

4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	000022009111 0	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5 The CANADA Site Registration No. is IC 7450H-3.
6 Tested Date: Nov. 18 to Dec. 04, 2014

4.2.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

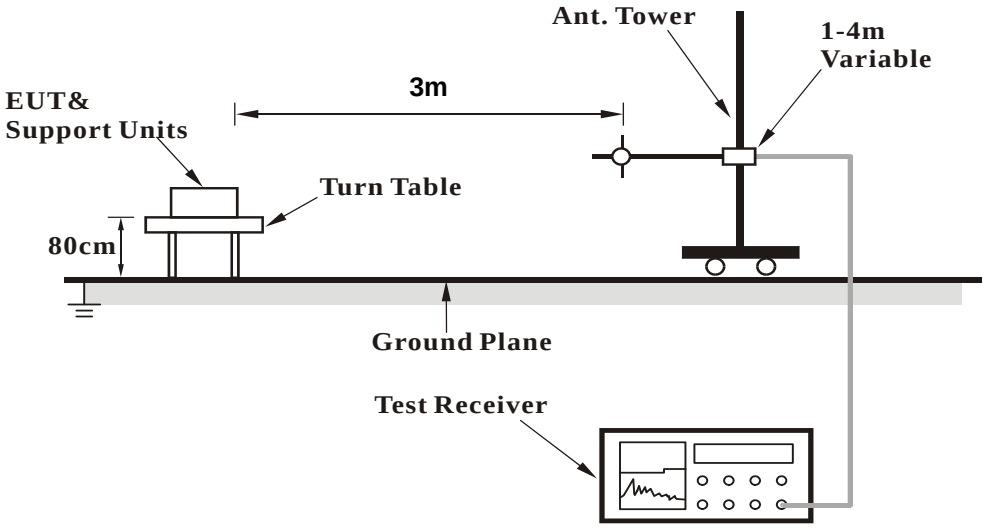
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution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

4.2.5 DEVIATION FROM TEST STANDARD

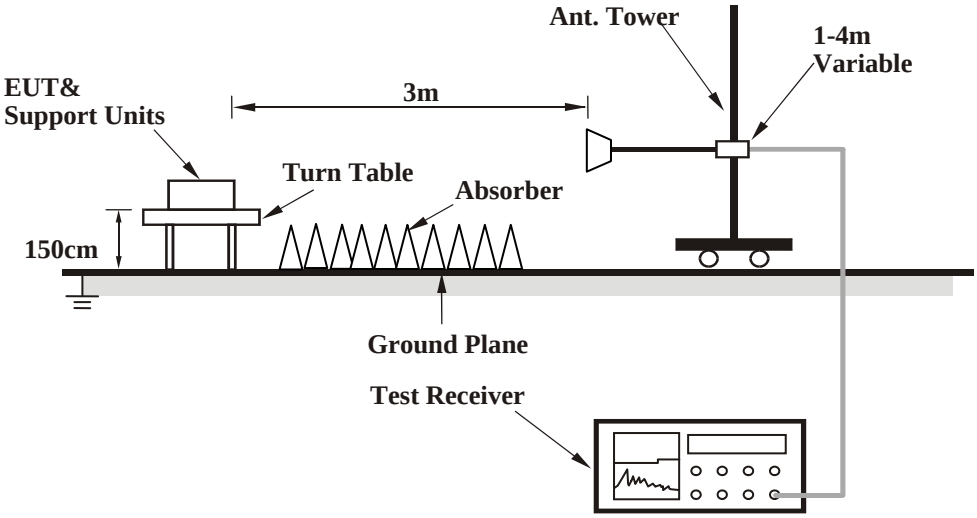
No deviation

4.2.6 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11ac (VHT40)

CHANNEL	TX Channel 54	**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	101.88	28.2 QP	43.5	-15.3	1.50 H	115	45.39	-17.16
2	148.10	30.1 QP	43.5	-13.4	1.50 H	136	43.05	-12.93
3	161.82	27.4 QP	43.5	-16.1	1.50 H	228	40.52	-13.11
4	250.00	30.4 QP	46.0	-15.6	1.00 H	145	44.27	-13.91
5	913.53	37.9 QP	46.0	-8.1	1.00 H	117	37.31	0.55
6	927.01	36.2 QP	46.0	-9.8	1.50 H	239	35.40	0.83
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	34.71	34.8 QP	40.0	-5.2	1.12 V	165	49.15	-14.33
2	51.82	35.4 QP	40.0	-4.6	1.09 V	144	48.82	-13.39
3	58.71	35.1 QP	40.0	-4.9	1.50 V	164	48.79	-13.70
4	106.73	30.2 QP	43.5	-13.3	1.00 V	167	46.61	-16.38
5	912.89	35.2 QP	46.0	-10.8	1.00 V	249	34.68	0.54
6	956.98	35.1 QP	46.0	-10.9	1.48 V	225	33.96	1.17

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

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 52	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	5139.00	62.4 PK	74.0	-11.6	1.09 H	9	58.14	4.26
2	5139.00	52.5 AV	54.0	-1.5	1.09 H	9	48.24	4.26
3	*5260.00	116.1 PK			1.07 H	10	111.71	4.39
4	*5260.00	106.7 AV			1.07 H	10	102.31	4.39
5	#10520.00	54.9 PK	74.0	-19.1	1.00 H	301	44.53	10.37
6	#10520.00	43.1 AV	54.0	-10.9	1.00 H	301	32.73	10.37
7	15780.00	62.7 PK	74.0	-11.3	1.28 H	21	47.98	14.72
8	15780.00	50.2 AV	54.0	-3.8	1.28 H	21	35.48	14.72
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	5139.00	56.3 PK	74.0	-17.7	1.14 V	84	52.04	4.26
2	5139.00	46.1 AV	54.0	-7.9	1.14 V	84	41.84	4.26
3	*5260.00	113.6 PK			1.16 V	83	109.21	4.39
4	*5260.00	104.6 AV			1.16 V	83	100.21	4.39
5	#10520.00	61.1 PK	74.0	-12.9	1.26 V	336	50.73	10.37
6	#10520.00	47.4 AV	54.0	-6.6	1.26 V	336	37.03	10.37
7	15780.00	64.1 PK	74.0	-9.9	1.00 V	360	49.38	14.72
8	15780.00	50.1 AV	54.0	-3.9	1.00 V	360	35.38	14.72

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 60	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	*5300.00	116.5 PK			1.05 H	16	112.14	4.36
2	*5300.00	106.7 AV			1.05 H	16	102.34	4.36
3	5380.80	59.6 PK	74.0	-14.4	1.03 H	14	55.00	4.60
4	5380.80	49.5 AV	54.0	-4.5	1.03 H	14	44.90	4.60
5	10600.00	59.5 PK	74.0	-14.5	1.14 H	313	48.82	10.68
6	10600.00	46.4 AV	54.0	-7.6	1.14 H	313	35.72	10.68
7	15900.00	62.9 PK	74.0	-11.1	1.29 H	191	47.85	15.05
8	15900.00	48.9 AV	54.0	-5.1	1.29 H	191	33.85	15.05

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	*5300.00	113.1 PK			1.14 V	90	108.74	4.36
2	*5300.00	103.7 AV			1.14 V	90	99.34	4.36
3	5380.80	59.8 PK	74.0	-14.2	1.31 V	62	55.20	4.60
4	5380.80	47.9 AV	54.0	-6.1	1.31 V	62	43.30	4.60
5	10600.00	61.0 PK	74.0	-13.0	1.29 V	344	50.32	10.68
6	10600.00	47.5 AV	54.0	-6.5	1.29 V	344	36.82	10.68
7	15900.00	64.3 PK	74.0	-9.7	1.03 V	360	49.25	15.05
8	15900.00	50.7 AV	54.0	-3.3	1.03 V	360	35.65	15.05

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.

CHANNEL	TX Channel 64	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	*5320.00	113.7 PK			1.31 H	55	109.28	4.42
2	*5320.00	104.6 AV			1.31 H	55	100.18	4.42
3	5350.00	66.9 PK	74.0	-7.1	1.31 H	55	62.39	4.51
4	5350.00	53.5 AV	54.0	-0.5	1.31 H	55	48.99	4.51
5	10640.00	54.1 PK	74.0	-19.9	1.02 H	322	43.47	10.63
6	10640.00	42.5 AV	54.0	-11.5	1.02 H	322	31.87	10.63
7	15960.00	62.3 PK	74.0	-11.7	1.25 H	24	47.33	14.97
8	15960.00	49.2 AV	54.0	-4.8	1.25 H	24	34.23	14.97

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	112.4 PK			1.22 V	83	107.98	4.42
2	*5320.00	103.6 AV			1.22 V	83	99.18	4.42
3	5350.00	66.3 PK	74.0	-7.7	1.22 V	83	61.79	4.51
4	5350.00	52.5 AV	54.0	-1.5	1.22 V	83	47.99	4.51
5	10640.00	58.0 PK	74.0	-16.0	1.37 V	16	47.37	10.63
6	10640.00	45.2 AV	54.0	-8.8	1.37 V	16	34.57	10.63
7	15960.00	61.4 PK	74.0	-12.6	1.42 V	70	46.43	14.97
8	15960.00	49.1 AV	54.0	-4.9	1.42 V	70	34.13	14.97

REMARKS:

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

CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK)
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	5419.10	60.1 PK	74.0	-13.9	1.16 H	48	55.46	4.64
2	5419.10	49.8 AV	54.0	-4.2	1.16 H	48	45.16	4.64
3	#5470.00	73.7 PK	74.0	-0.3	1.16 H	48	69.09	4.61
4	#5470.00	51.7 AV	54.0	-2.3	1.16 H	48	47.09	4.61
5	*5500.00	114.8 PK			1.16 H	48	110.21	4.59
6	*5500.00	105.3 AV			1.16 H	48	100.71	4.59
7	11000.00	54.0 PK	74.0	-20.0	1.06 H	308	43.15	10.85
8	11000.00	42.3 AV	54.0	-11.7	1.06 H	308	31.45	10.85
9	#16500.00	62.6 PK	74.0	-11.4	1.30 H	11	45.61	16.99
10	#16500.00	49.2 AV	54.0	-4.8	1.30 H	11	32.21	16.99

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	5419.10	64.6 PK	74.0	-9.4	1.28 V	100	59.96	4.64
2	5419.10	49.3 AV	54.0	-4.7	1.28 V	100	44.66	4.64
3	#5470.00	71.7 PK	74.0	-2.3	1.28 V	100	67.09	4.61
4	#5470.00	49.1 AV	54.0	-4.9	1.28 V	100	44.49	4.61
5	*5500.00	112.6 PK			1.28 V	100	108.01	4.59
6	*5500.00	103.4 AV			1.28 V	100	98.81	4.59
7	11000.00	58.1 PK	74.0	-15.9	1.36 V	23	47.25	10.85
8	11000.00	45.4 AV	54.0	-8.6	1.36 V	23	34.55	10.85
9	#16500.00	61.2 PK	74.0	-12.8	1.40 V	69	44.21	16.99
10	#16500.00	49.1 AV	54.0	-4.9	1.40 V	69	32.11	16.99

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 120	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	*5600.00	117.0 PK			1.42 H	29	112.04	4.96
2	*5600.00	107.1 AV			1.42 H	29	102.14	4.96
3	#5725.00	59.4 PK	74.0	-14.6	1.39 H	33	54.47	4.93
4	#5725.00	49.3 AV	54.0	-4.7	1.39 H	33	44.37	4.93
5	11200.00	55.3 PK	74.0	-18.7	1.01 H	321	44.56	10.74
6	11200.00	43.2 AV	54.0	-10.8	1.01 H	321	32.46	10.74
7	#16800.00	62.8 PK	74.0	-11.2	1.22 H	34	44.58	18.22
8	#16800.00	50.0 AV	54.0	-4.0	1.22 H	34	31.78	18.22

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	*5600.00	115.8 PK			1.33 V	41	110.84	4.96
2	*5600.00	106.0 AV			1.33 V	41	101.04	4.96
3	#5725.00	56.4 PK	74.0	-17.6	1.33 V	41	51.47	4.93
4	#5725.00	46.3 AV	54.0	-7.7	1.33 V	41	41.37	4.93
5	11200.00	60.7 PK	74.0	-13.3	1.31 V	336	49.96	10.74
6	11200.00	47.1 AV	54.0	-6.9	1.31 V	336	36.36	10.74
7	#16800.00	64.8 PK	74.0	-9.2	1.00 V	360	46.58	18.22
8	#16800.00	51.2 AV	54.0	-2.8	1.00 V	360	32.98	18.22

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 140	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	*5700.00	112.8 PK			1.49 H	0	107.89	4.91
2	*5700.00	103.4 AV			1.49 H	0	98.49	4.91
3	#5725.00	71.8 PK	74.0	-2.2	1.49 H	0	66.87	4.93
4	#5725.00	53.4 AV	54.0	-0.6	1.49 H	0	48.47	4.93
5	11400.00	53.9 PK	74.0	-20.1	1.02 H	305	43.27	10.63
6	11400.00	42.4 AV	54.0	-11.6	1.02 H	305	31.77	10.63
7	#17100.00	59.0 PK	74.0	-15.0	1.20 H	26	40.45	18.55
8	#17100.00	45.0 AV	54.0	-9.0	1.20 H	26	26.45	18.55
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	*5700.00	110.4 PK			1.19 V	63	105.49	4.91
2	*5700.00	100.9 AV			1.19 V	63	95.99	4.91
3	#5725.00	65.7 PK	74.0	-8.3	1.19 V	63	60.77	4.93
4	#5725.00	50.2 AV	54.0	-3.8	1.19 V	63	45.27	4.93
5	11400.00	53.9 PK	74.0	-20.1	1.35 V	26	43.27	10.63
6	11400.00	40.9 AV	54.0	-13.1	1.35 V	26	30.27	10.63
7	#17100.00	66.6 PK	74.0	-7.4	1.42 V	100	48.05	18.55
8	#17100.00	43.7 AV	54.0	-10.3	1.42 V	100	25.15	18.55

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.

802.11ac (VHT20)

CHANNEL	TX Channel 52	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	5139.00	62.9 PK	74.0	-11.1	1.14 H	14	58.64	4.26
2	5139.00	52.9 AV	54.0	-1.1	1.14 H	14	48.64	4.26
3	*5260.00	116.2 PK			1.06 H	23	111.81	4.39
4	*5260.00	106.7 AV			1.06 H	23	102.31	4.39
5	#10520.00	55.6 PK	74.0	-18.4	1.00 H	319	45.23	10.37
6	#10520.00	43.7 AV	54.0	-10.3	1.00 H	319	33.33	10.37
7	15780.00	63.1 PK	74.0	-10.9	1.21 H	31	48.38	14.72
8	15780.00	50.5 AV	54.0	-3.5	1.21 H	31	35.78	14.72
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	5139.00	59.1 PK	74.0	-14.9	1.27 V	11	54.84	4.26
2	5139.00	49.0 AV	54.0	-5.0	1.27 V	11	44.74	4.26
3	*5260.00	115.9 PK			1.27 V	11	111.51	4.39
4	*5260.00	105.5 AV			1.27 V	11	101.11	4.39
5	#10520.00	60.3 PK	74.0	-13.7	1.22 V	346	49.93	10.37
6	#10520.00	46.9 AV	54.0	-7.1	1.22 V	346	36.53	10.37
7	15780.00	63.3 PK	74.0	-10.7	1.00 V	360	48.58	14.72
8	15780.00	49.8 AV	54.0	-4.2	1.00 V	360	35.08	14.72

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 60	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	*5300.00	116.9 PK			1.07 H	27	112.54	4.36
2	*5300.00	107.0 AV			1.07 H	27	102.64	4.36
3	5381.00	59.8 PK	74.0	-14.2	1.02 H	0	55.20	4.60
4	5381.00	49.8 AV	54.0	-4.2	1.02 H	0	45.20	4.60
5	10600.00	54.6 PK	74.0	-19.4	1.00 H	286	43.92	10.68
6	10600.00	42.9 AV	54.0	-11.1	1.00 H	286	32.22	10.68
7	15900.00	62.9 PK	74.0	-11.1	1.29 H	42	47.85	15.05
8	15900.00	50.3 AV	54.0	-3.7	1.29 H	42	35.25	15.05

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	*5300.00	115.9 PK			1.23 V	24	111.54	4.36
2	*5300.00	106.2 AV			1.23 V	24	101.84	4.36
3	5381.00	56.3 PK	74.0	-17.7	1.23 V	24	51.70	4.60
4	5381.00	46.5 AV	54.0	-7.5	1.23 V	24	41.90	4.60
5	10600.00	61.3 PK	74.0	-12.7	1.33 V	324	50.62	10.68
6	10600.00	47.6 AV	54.0	-6.4	1.33 V	324	36.92	10.68
7	15900.00	63.8 PK	74.0	-10.2	1.06 V	360	48.75	15.05
8	15900.00	50.4 AV	54.0	-3.6	1.06 V	360	35.35	15.05

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.

CHANNEL	TX Channel 64	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	*5320.00	111.9 PK			1.27 H	38	107.48	4.42
2	*5320.00	102.7 AV			1.27 H	38	98.28	4.42
3	5350.00	71.5 PK	74.0	-2.5	1.30 H	55	66.99	4.51
4	5350.00	53.8 AV	54.0	-0.2	1.30 H	55	49.29	4.51
5	10640.00	54.4 PK	74.0	-19.6	1.04 H	316	43.77	10.63
6	10640.00	42.8 AV	54.0	-11.2	1.04 H	316	32.17	10.63
7	15960.00	62.1 PK	74.0	-11.9	1.20 H	24	47.13	14.97
8	15960.00	49.2 AV	54.0	-4.8	1.20 H	24	34.23	14.97
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	110.2 PK			1.28 V	96	105.78	4.42
2	*5320.00	101.5 AV			1.28 V	96	97.08	4.42
3	5350.00	68.4 PK	74.0	-5.6	1.28 V	96	63.89	4.51
4	5350.00	51.4 AV	54.0	-2.6	1.28 V	96	46.89	4.51
5	10640.00	61.3 PK	74.0	-12.7	1.23 V	320	50.67	10.63
6	10640.00	47.7 AV	54.0	-6.3	1.23 V	320	37.07	10.63
7	15960.00	63.7 PK	74.0	-10.3	1.00 V	360	48.73	14.97
8	15960.00	50.3 AV	54.0	-3.7	1.00 V	360	35.33	14.97

REMARKS:

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

CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK)
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	#5470.00	73.6 PK	74.0	-0.4	1.12 H	12	68.99	4.61
2	#5470.00	52.1 AV	54.0	-1.9	1.12 H	12	47.49	4.61
3	*5500.00	114.2 PK			1.12 H	12	109.61	4.59
4	*5500.00	104.5 AV			1.12 H	12	99.91	4.59
5	11000.00	53.9 PK	74.0	-20.1	1.00 H	324	43.05	10.85
6	11000.00	42.1 AV	54.0	-11.9	1.00 H	324	31.25	10.85
7	#16500.00	62.3 PK	74.0	-11.7	1.34 H	25	45.31	16.99
8	#16500.00	48.8 AV	54.0	-5.2	1.34 H	25	31.81	16.99
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	70.2 PK	74.0	-3.8	1.23 V	111	65.59	4.61
2	#5470.00	48.9 AV	54.0	-5.1	1.23 V	111	44.29	4.61
3	*5500.00	113.0 PK			1.23 V	111	108.41	4.59
4	*5500.00	103.7 AV			1.23 V	111	99.11	4.59
5	11000.00	58.2 PK	74.0	-15.8	1.30 V	27	47.35	10.85
6	11000.00	45.4 AV	54.0	-8.6	1.30 V	27	34.55	10.85
7	#16500.00	60.8 PK	74.0	-13.2	1.35 V	55	43.81	16.99
8	#16500.00	48.6 AV	54.0	-5.4	1.35 V	55	31.61	16.99

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 120	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	*5600.00	117.5 PK			1.41 H	21	112.54	4.96
2	*5600.00	107.5 AV			1.41 H	21	102.54	4.96
3	#5725.00	59.4 PK	74.0	-14.6	1.45 H	48	54.47	4.93
4	#5725.00	49.4 AV	54.0	-4.6	1.45 H	48	44.47	4.93
5	11200.00	55.4 PK	74.0	-18.6	1.00 H	313	44.66	10.74
6	11200.00	43.5 AV	54.0	-10.5	1.00 H	313	32.76	10.74
7	#16800.00	62.8 PK	74.0	-11.2	1.29 H	43	44.58	18.22
8	#16800.00	50.8 AV	54.0	-3.2	1.29 H	43	32.58	18.22
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	*5600.00	116.5 PK			1.20 V	42	111.54	4.96
2	*5600.00	106.4 AV			1.20 V	42	101.44	4.96
3	#5725.00	55.6 PK	74.0	-18.4	1.20 V	42	50.67	4.93
4	#5725.00	45.4 AV	54.0	-8.6	1.20 V	42	40.47	4.93
5	11200.00	60.4 PK	74.0	-13.6	1.27 V	329	49.66	10.74
6	11200.00	47.4 AV	54.0	-6.6	1.27 V	329	36.66	10.74
7	#16800.00	64.0 PK	74.0	-10.0	1.00 V	357	45.78	18.22
8	#16800.00	50.4 AV	54.0	-3.6	1.00 V	357	32.18	18.22

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 140	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	*5700.00	109.9 PK			1.40 H	2	104.99	4.91
2	*5700.00	101.0 AV			1.40 H	2	96.09	4.91
3	#5725.00	70.0 PK	74.0	-4.0	1.40 H	2	65.07	4.93
4	**#5725.00**	**53.9 AV**	**54.0**	**-0.1**	**1.40 H**	**2**	**48.97**	**4.93**
5	11400.00	54.4 PK	74.0	-19.6	1.07 H	310	43.77	10.63
6	11400.00	42.7 AV	54.0	-11.3	1.07 H	310	32.07	10.63
7	#17100.00	59.4 PK	74.0	-14.6	1.15 H	36	40.85	18.55
8	#17100.00	45.4 AV	54.0	-8.6	1.15 H	36	26.85	18.55

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	*5700.00	108.4 PK			1.21 V	39	103.49	4.91
2	*5700.00	100.2 AV			1.21 V	39	95.29	4.91
3	#5725.00	67.5 PK	74.0	-6.5	1.21 V	39	62.57	4.93
4	#5725.00	50.2 AV	54.0	-3.8	1.21 V	39	45.27	4.93
5	11400.00	54.0 PK	74.0	-20.0	1.30 V	12	43.37	10.63
6	11400.00	41.1 AV	54.0	-12.9	1.30 V	12	30.47	10.63
7	#17100.00	66.7 PK	74.0	-7.3	1.41 V	88	48.15	18.55
8	#17100.00	44.1 AV	54.0	-9.9	1.41 V	88	25.55	18.55

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.

802.11ac (VHT40)

CHANNEL	TX Channel 54	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	*5270.00	113.1 PK			1.25 H	41	108.72	4.38
2	*5270.00	103.0 AV			1.25 H	41	98.62	4.38
3	5350.00	73.5 PK	74.0	-0.5	1.23 H	45	68.99	4.51
4	5350.00	53.2 AV	54.0	-0.8	1.23 H	45	48.69	4.51
5	#10540.00	54.5 PK	74.0	-19.5	1.02 H	283	44.05	10.45
6	#10540.00	42.7 AV	54.0	-11.3	1.02 H	283	32.25	10.45
7	15810.00	61.8 PK	74.0	-12.2	1.20 H	34	47.02	14.78
8	15810.00	49.7 AV	54.0	-4.3	1.20 H	34	34.92	14.78
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	*5270.00	112.6 PK			1.15 V	41	108.22	4.38
2	*5270.00	101.2 AV			1.15 V	41	96.82	4.38
3	5350.00	70.6 PK	74.0	-3.4	1.15 V	41	66.09	4.51
4	5350.00	50.2 AV	54.0	-3.8	1.15 V	41	45.69	4.51
5	#10540.00	53.2 PK	74.0	-20.8	1.27 V	1	42.75	10.45
6	#10540.00	40.6 AV	54.0	-13.4	1.27 V	1	30.15	10.45
7	15810.00	59.6 PK	74.0	-14.4	1.43 V	75	44.82	14.78
8	15810.00	48.2 AV	54.0	-5.8	1.43 V	75	33.42	14.78

REMARKS:

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

CHANNEL	TX Channel 62	DETECTOR FUNCTION	Peak (PK)
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	*5310.00	104.6 PK			1.08 H	15	100.21	4.39
2	*5310.00	95.1 AV			1.08 H	15	90.71	4.39
3	5350.00	69.3 PK	74.0	-4.7	1.03 H	50	64.79	4.51
4	5350.00	53.7 AV	54.0	-0.3	1.03 H	50	49.19	4.51
5	10620.00	53.6 PK	74.0	-20.4	1.39 H	19	42.95	10.65
6	10620.00	40.9 AV	54.0	-13.1	1.39 H	19	30.25	10.65
7	15930.00	67.0 PK	74.0	-7.0	1.50 H	60	51.99	15.01
8	15930.00	43.9 AV	54.0	-10.1	1.50 H	60	28.89	15.01

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	103.3 PK			1.13 V	60	98.91	4.39
2	*5310.00	93.6 AV			1.13 V	60	89.21	4.39
3	5350.00	66.2 PK	74.0	-7.8	1.13 V	60	61.69	4.51
4	5350.00	50.2 AV	54.0	-3.8	1.13 V	60	45.69	4.51
5	10620.00	51.8 PK	74.0	-22.2	1.15 V	189	41.15	10.65
6	10620.00	38.6 AV	54.0	-15.4	1.15 V	189	27.95	10.65
7	15930.00	64.5 PK	74.0	-9.5	1.11 V	343	49.49	15.01
8	15930.00	41.0 AV	54.0	-13.0	1.11 V	343	25.99	15.01

REMARKS:

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

CHANNEL	TX Channel 102	DETECTOR FUNCTION	Peak (PK)
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	#5470.00	69.3 PK	74.0	-4.7	1.16 H	17	64.69	4.61
2	#5470.00	53.7 AV	54.0	-0.3	1.16 H	17	49.09	4.61
3	*5510.00	104.2 PK			1.16 H	17	99.57	4.63
4	*5510.00	94.3 AV			1.16 H	17	89.67	4.63
5	11020.00	53.6 PK	74.0	-20.4	1.34 H	18	42.78	10.82
6	11020.00	40.4 AV	54.0	-13.6	1.34 H	18	29.58	10.82
7	#16530.00	66.9 PK	74.0	-7.1	1.51 H	71	49.86	17.04
8	#16530.00	43.8 AV	54.0	-10.2	1.51 H	71	26.76	17.04
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	65.4 PK	74.0	-8.6	1.10 V	42	60.79	4.61
2	#5470.00	50.6 AV	54.0	-3.4	1.10 V	42	45.99	4.61
3	*5510.00	102.0 PK			1.10 V	42	97.37	4.63
4	*5510.00	93.1 AV			1.10 V	42	88.47	4.63
5	11020.00	52.4 PK	74.0	-21.6	1.11 V	202	41.58	10.82
6	11020.00	39.4 AV	54.0	-14.6	1.11 V	202	28.58	10.82
7	#16530.00	64.0 PK	74.0	-10.0	1.12 V	341	46.96	17.04
8	#16530.00	40.6 AV	54.0	-13.4	1.12 V	341	23.56	17.04

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 118	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	5127.00	62.3 PK	74.0	-11.7	1.00 H	19	58.09	4.21
2	5127.00	53.2 AV	54.0	-0.8	1.00 H	19	48.99	4.21
3	#5470.00	68.1 PK	74.0	-5.9	1.02 H	37	63.49	4.61
4	#5470.00	50.7 AV	54.0	-3.3	1.02 H	37	46.09	4.61
5	*5590.00	114.1 PK			1.00 H	37	109.18	4.92
6	*5590.00	103.8 AV			1.00 H	37	98.88	4.92
7	11180.00	54.7 PK	74.0	-19.3	1.00 H	304	43.98	10.72
8	11180.00	42.8 AV	54.0	-11.2	1.00 H	304	32.08	10.72
9	#16770.00	62.7 PK	74.0	-11.3	1.22 H	7	44.66	18.04
10	#16770.00	50.2 AV	54.0	-3.8	1.22 H	7	32.16	18.04

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	5127.00	61.4 PK	74.0	-12.6	1.02 V	90	57.19	4.21
2	5127.00	51.6 AV	54.0	-2.4	1.02 V	90	47.39	4.21
3	#5470.00	59.9 PK	74.0	-14.1	1.07 V	93	55.29	4.61
4	#5470.00	47.7 AV	54.0	-6.3	1.07 V	93	43.09	4.61
5	*5590.00	107.9 PK			1.07 V	93	102.98	4.92
6	*5590.00	98.4 AV			1.07 V	93	93.48	4.92
7	11180.00	59.3 PK	74.0	-14.7	1.38 V	347	48.58	10.72
8	11180.00	46.6 AV	54.0	-7.4	1.38 V	347	35.88	10.72
9	#16770.00	61.5 PK	74.0	-12.5	1.11 V	360	43.46	18.04
10	#16770.00	48.9 AV	54.0	-5.1	1.11 V	360	30.86	18.04

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 134	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	*5670.00	107.2 PK			1.11 H	11	102.27	4.93
2	*5670.00	98.2 AV			1.11 H	11	93.27	4.93
3	#5725.00	73.2 PK	74.0	-0.8	1.11 H	11	68.27	4.93
4	#5725.00	53.4 AV	54.0	-0.6	1.11 H	11	48.47	4.93
5	11340.00	53.4 PK	74.0	-20.6	1.24 H	49	42.64	10.76
6	11340.00	40.7 AV	54.0	-13.3	1.24 H	49	29.94	10.76
7	#17010.00	66.4 PK	74.0	-7.6	1.57 H	91	48.03	18.37
8	#17010.00	43.5 AV	54.0	-10.5	1.57 H	91	25.13	18.37

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	107.2 PK			1.04 V	19	102.27	4.93
2	*5670.00	97.3 AV			1.04 V	19	92.37	4.93
3	#5725.00	70.3 PK	74.0	-3.7	1.04 V	19	65.37	4.93
4	#5725.00	50.4 AV	54.0	-3.6	1.04 V	19	45.47	4.93
5	11340.00	52.3 PK	74.0	-21.7	1.14 V	200	41.54	10.76
6	11340.00	39.3 AV	54.0	-14.7	1.14 V	200	28.54	10.76
7	#17010.00	65.0 PK	74.0	-9.0	1.00 V	351	46.63	18.37
8	#17010.00	41.4 AV	54.0	-12.6	1.00 V	351	23.03	18.37

REMARKS:

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

802.11ac (VHT80)

CHANNEL	TX Channel 58	DETECTOR FUNCTION	Peak (PK)
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	*5290.00	102.3 PK			1.08 H	9	97.93	4.37
2	*5290.00	91.8 AV			1.08 H	9	87.43	4.37
3	5350.00	70.2 PK	74.0	-3.8	1.19 H	11	65.69	4.51
4	5350.00	53.6 AV	54.0	-0.4	1.19 H	11	49.09	4.51
5	#10580.00	49.0 PK	74.0	-25.0	1.13 H	244	38.39	10.61
6	#10580.00	38.4 AV	54.0	-15.6	1.13 H	244	27.79	10.61
7	15870.00	60.0 PK	74.0	-14.0	1.05 H	12	45.04	14.96
8	15870.00	47.4 AV	54.0	-6.6	1.05 H	12	32.44	14.96
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5290.00	99.8 PK			1.42 V	91	95.43	4.37
2	*5290.00	88.3 AV			1.42 V	91	83.93	4.37
3	5350.00	67.2 PK	74.0	-6.8	1.42 V	91	62.69	4.51
4	5350.00	50.4 AV	54.0	-3.6	1.42 V	91	45.89	4.51
5	#10580.00	54.8 PK	74.0	-19.2	1.43 V	11	44.19	10.61
6	#10580.00	42.1 AV	54.0	-11.9	1.43 V	11	31.49	10.61
7	15870.00	58.4 PK	74.0	-15.6	1.19 V	54	43.44	14.96
8	15870.00	46.8 AV	54.0	-7.2	1.19 V	54	31.84	14.96

REMARKS:

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

CHANNEL	TX Channel 106	DETECTOR FUNCTION	Peak (PK)
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	#5470.00	69.5 PK	74.0	-4.5	1.05 H	10	64.89	4.61
2	**#5470.00**	**53.9 AV**	**54.0**	**-0.1**	**1.05 H**	**10**	**49.29**	**4.61**
3	*5530.00	99.8 PK			1.14 H	15	95.10	4.70
4	*5530.00	89.5 AV			1.14 H	15	84.80	4.70
5	11060.00	48.3 PK	74.0	-25.7	1.18 H	234	37.55	10.75
6	11060.00	37.2 AV	54.0	-16.8	1.18 H	234	26.45	10.75
7	#16590.00	59.6 PK	74.0	-14.4	1.05 H	24	42.44	17.16
8	#16590.00	46.5 AV	54.0	-7.5	1.05 H	24	29.34	17.16

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	66.5 PK	74.0	-7.5	1.42 V	90	61.89	4.61
2	#5470.00	50.4 AV	54.0	-3.6	1.42 V	90	45.79	4.61
3	*5530.00	98.4 PK			1.42 V	90	93.70	4.70
4	*5530.00	87.6 AV			1.42 V	90	82.90	4.70
5	11060.00	54.0 PK	74.0	-20.0	1.46 V	7	43.25	10.75
6	11060.00	41.2 AV	54.0	-12.8	1.46 V	7	30.45	10.75
7	#16590.00	58.6 PK	74.0	-15.4	1.19 V	62	41.44	17.16
8	#16590.00	47.0 AV	54.0	-7.0	1.19 V	62	29.84	17.16

REMARKS:

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

CHANNEL	TX Channel 122	DETECTOR FUNCTION	Peak (PK)
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	#5166.00	61.5 PK	68.2	-6.7	1.00 H	19	57.16	4.34
2	*5610.00	107.4 PK			1.11 H	12	102.44	4.96
3	*5610.00	97.1 AV			1.11 H	12	92.14	4.96
4	#5725.00	72.6 PK	74.0	-1.4	1.11 H	12	67.67	4.93
5	#5725.00	53.7 AV	54.0	-0.3	1.11 H	12	48.77	4.93
6	11220.00	48.7 PK	74.0	-25.3	1.12 H	252	37.93	10.77
7	11220.00	38.0 AV	54.0	-16.0	1.12 H	252	27.23	10.77
8	#16830.00	59.4 PK	74.0	-14.6	1.07 H	9	41.13	18.27
9	#16830.00	46.9 AV	54.0	-7.1	1.07 H	9	28.63	18.27

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	#5166.00	60.1 PK	68.2	-8.1	1.34 V	104	55.76	4.34
2	*5610.00	105.9 PK			1.44 V	92	100.94	4.96
3	*5610.00	95.6 AV			1.44 V	92	90.64	4.96
4	#5725.00	70.4 PK	74.0	-3.6	1.44 V	92	65.47	4.93
5	#5725.00	50.6 AV	54.0	-3.4	1.44 V	92	45.67	4.93
6	11220.00	55.2 PK	74.0	-18.8	1.37 V	70	44.43	10.77
7	11220.00	42.5 AV	54.0	-11.5	1.37 V	70	31.73	10.77
8	#16830.00	58.1 PK	74.0	-15.9	1.28 V	70	39.83	18.27
9	#16830.00	46.6 AV	54.0	-7.4	1.28 V	70	28.33	18.27

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.

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 ≦ 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)

Note: Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

4.3.2 TEST INSTRUMENTS

FOR POWER OUTPUT MEASUREMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power Sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 17, 2014

FOR 26dB OCCUPIED BANDWIDTH

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 17, 2014

4.3.3 TEST PROCEDURE

FOR POWER OUTPUT MEASUREMENT

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

FOR 26dB BANDWIDTH

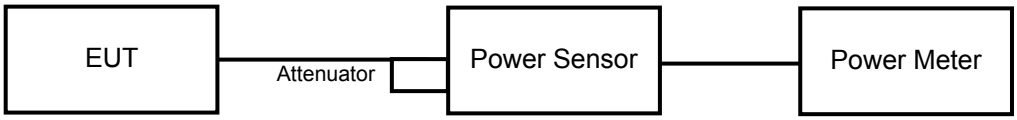
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement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

4.3.4 DEVIATION FROM TEST STANDARD

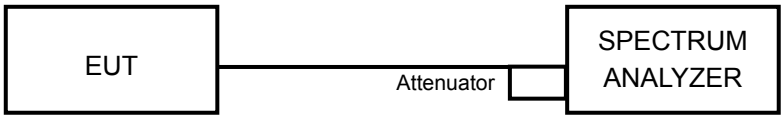
No deviation

4.3.5 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB OCCUPIED BANDWIDTH



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.3.7 TEST RESULTS

POWER OUTPUT:

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
802.11a							
52	5260	20.59	20.61	229.631	23.61	24	PASS
60	5300	20.55	20.59	228.052	23.58	24	PASS
64	5320	19.41	19.51	176.628	22.47	24	PASS
100	5500	19.34	19.28	170.624	22.32	24	PASS
120	5580	20.57	20.67	230.706	23.63	24	PASS
140	5700	17.89	17.92	123.462	20.92	24	PASS
802.11ac (VHT20)							
52	5260	20.39	20.50	221.598	23.46	24	PASS
60	5300	20.51	20.47	223.889	23.50	24	PASS
64	5320	19.02	18.88	157.067	21.96	24	PASS
100	5500	18.96	19.09	159.801	22.04	24	PASS
120	5580	20.38	20.39	218.54	23.40	24	PASS
140	5700	17.32	17.36	108.401	20.35	24	PASS
802.11ac (VHT40)							
54	5270	20.97	20.86	246.925	23.93	24	PASS
62	5310	15.37	15.42	69.269	18.41	24	PASS
102	5510	14.46	14.75	57.779	17.62	24	PASS
118	5590	20.96	20.96	249.476	23.97	24	PASS
134	5670	18.26	17.96	129.505	21.12	24	PASS
802.11ac (VHT80)							
58	5290	14.67	14.51	57.558	17.60	24	PASS
106	5530	14.12	14.22	52.247	17.18	24	PASS
122	5610	18.91	18.86	154.717	21.90	24	PASS

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
802.11a			
52	5260	35.40	37.75
60	5300	35.57	37.18
64	5320	30.22	31.79
100	5500	31.22	33.27
120	5600	39.05	39.29
140	5700	27.91	29.73

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	35.40	26.49 > 24
60	5300	35.57	26.51 > 24
64	5320	30.22	25.8 > 24
100	5500	31.22	25.94 > 24
120	5600	39.05	26.91 > 24
140	5700	27.91	25.45 > 24

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
802.11ac (VHT20)			
52	5260	41.52	42.31
60	5300	43.01	42.93
64	5320	38.08	39.80
100	5500	37.82	37.86
120	5600	43.35	43.29
140	5700	31.39	36.31

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	41.52	27.18 > 24
60	5300	42.93	27.32 > 24
64	5320	38.08	26.8 > 24
100	5500	37.82	26.77 > 24
120	5600	43.29	27.36 > 24
140	5700	31.39	25.96 > 24

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
802.11ac (VHT40)			
54	5270	88.74	88.58
62	5310	41.42	41.22
102	5510	41.37	41.32
118	5590	86.60	88.18
134	5670	70.40	73.24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

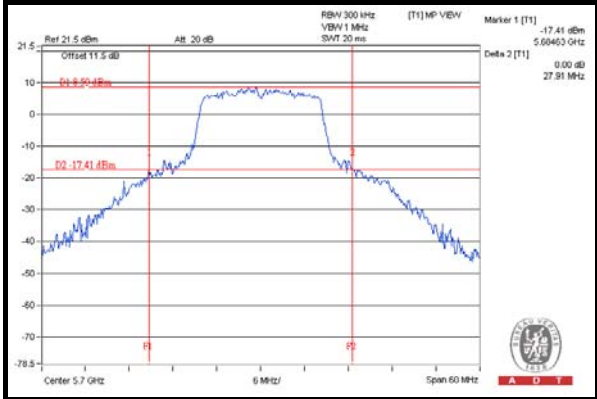
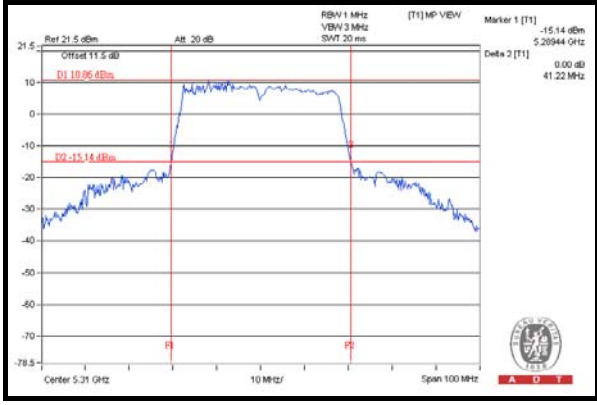
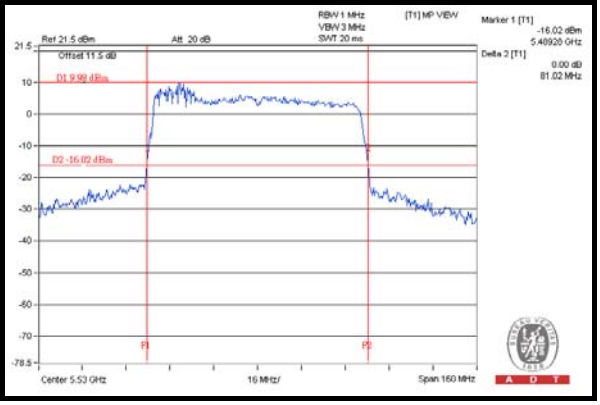
Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	88.58	30.47 > 24
62	5310	41.22	27.15 > 24
102	5510	41.32	27.16 > 24
110	5550	86.60	30.37 > 24
134	5670	70.40	29.47 > 24

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
802.11ac (VHT80)			
58	5290	81.25	81.24
106	5530	81.02	81.15
122	5610	114.11	118.52

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	81.24	30.09 > 24
106	5530	81.02	30.08 > 24
122	5610	114.11	31.57 > 24

SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(0) : CH140	**802.11ac (VHT20) / Chain(0) : CH140**
	
802.11ac (VHT40) / Chain(1) : CH62	**802.11ac (VHT80) / Chain(0) : CH106**
	

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 17, 2014

4.4.3 TEST PROCEDURES

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

Using method SA-1

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

For 802.11ac (VHT80)

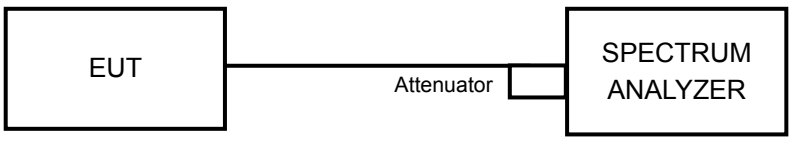
Using method SA-2

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6

4.4.7 TEST RESULTS

802.11a						
CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
52	5260	6.59	6.56	9.59	10.38	PASS
60	5300	6.87	6.76	9.83	10.38	PASS
64	5320	5.35	5.59	8.48	10.38	PASS
100	5500	5.90	5.84	8.88	10.43	PASS
120	5600	7.21	7.21	10.22	10.43	PASS
140	5700	3.76	3.81	6.80	10.43	PASS
802.11ac (VHT20)						
52	5260	6.35	6.17	9.27	10.38	PASS
60	5300	6.51	6.29	9.41	10.38	PASS
64	5320	5.44	5.59	8.53	10.38	PASS
100	5500	5.56	5.51	8.55	10.43	PASS
120	5600	6.79	6.75	9.78	10.43	PASS
140	5700	3.91	3.79	6.86	10.43	PASS
802.11ac (VHT40)						
54	5270	4.13	4.07	7.11	10.38	PASS
62	5310	-1.67	-1.86	1.25	10.38	PASS
102	5510	-2.24	-2.10	0.84	10.43	PASS
118	5590	3.84	4.00	6.93	10.43	PASS
134	5670	1.14	1.23	4.20	10.43	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. **For 5250MHz ~ 5350MHz:** Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.62dBi > 6dBi , so the power density limit shall be reduced to 11-(6.62-6) = 10.38dBm.
For 5470MHz ~ 5725MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.57dBi > 6dBi , so the power density limit shall be reduced to 11-(6.57-6) = 10.43dBm.

802.11ac (VHT80)							
CHANNEL	CHANNEL FREQUENCY (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				
58	5290	-5.73	-5.49	0.97	-1.63	10.38	PASS
106	5530	-5.62	-5.74	0.97	-1.70	10.43	PASS
122	5610	-0.83	-0.69	0.97	3.22	10.43	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. **For 5250MHz ~ 5350MHz:** Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.62dBi > 6dBi , so the power density limit shall be reduced to 11-(6.62-6) = 10.38dBm.
For 5470MHz ~ 5725MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 6.57dBi > 6dBi , so the power density limit shall be reduced to 11-(6.57-6) = 10.43dBm.

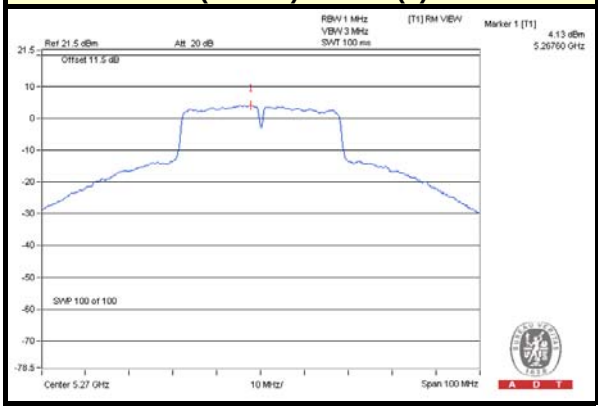
3. Refer to section 3.4 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

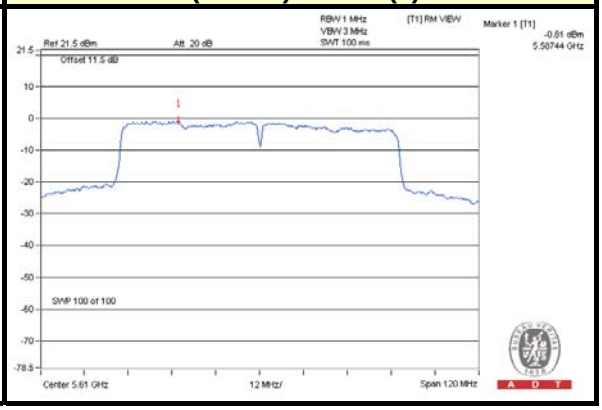
802.11a / Chain(0) : CH120

802.11ac (VHT20) / Chain(0) : CH120

802.11ac (VHT40) / Chain(0) : CH54



802.11ac (VHT80) / Chain(0) : CH122



4.5 FREQUENCY STABILITY

4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-SP-AR	MAA0812-008	Jan. 13, 2014	Jan. 12, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Dec. 17, 2014

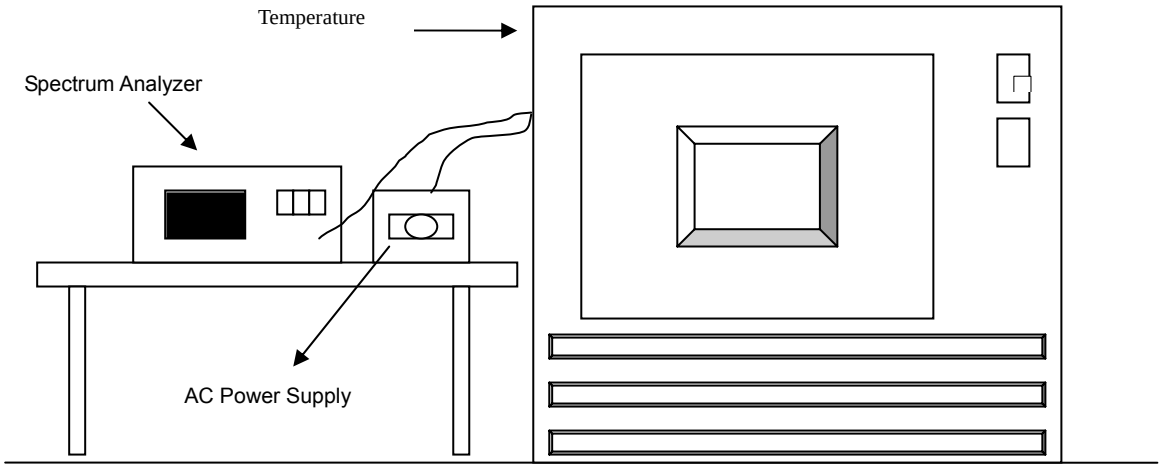
4.5.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. 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.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. 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.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



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: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	120	5320.0234	0.00044	5320.0258	0.00048	5320.0215	0.00040	5320.0243	0.00046
40	120	5320.0131	0.00025	5320.0145	0.00027	5320.0117	0.00022	5320.016	0.00030
30	120	5320.0265	0.00050	5320.0236	0.00044	5320.024	0.00045	5320.0218	0.00041
20	120	5319.989	-0.00021	5319.9905	-0.00018	5319.9907	-0.00017	5319.9889	-0.00021
10	120	5320.0054	0.00010	5320.006	0.00011	5320.0047	0.00009	5320.0057	0.00011
0	120	5320.0002	0.00000	5320.0018	0.00003	5320.0004	0.00001	5319.9998	0.00000
-10	120	5320.0195	0.00037	5320.0199	0.00037	5320.0234	0.00044	5320.0211	0.00040
-20	120	5319.9998	0.00000	5319.9968	-0.00006	5319.9982	-0.00003	5319.9979	-0.00004
-30	120	5320.0199	0.00037	5320.0165	0.00031	5320.0165	0.00031	5320.0192	0.00036

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	138	5319.9894	-0.00020	5319.9901	-0.00019	5319.9898	-0.00019	5319.9885	-0.00022
	120	5319.989	-0.00021	5319.9905	-0.00018	5319.9907	-0.00017	5319.9889	-0.00021
	102	5319.9881	-0.00022	5319.9898	-0.00019	5319.9901	-0.00019	5319.9882	-0.00022

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6. 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: 886-2-26052943

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

Hwa Ya EMC/RF/Safety Lab:
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.

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

--- END ---