

## FCC Test Report

**Report No.:** RF151005E12A-1

**FCC ID:** MCQ-50M1899

**Test Model:** 50001899-03

**Series Model:** 50001899-XX (X=0~9)

**Received Date:** Dec. 10, 2015

**Test Date:** Dec. 10, 2015 to Jan. 12, 2016

**Issued Date:** June 13, 2016

**Applicant:** Digi International Inc.

**Address:** 11001 Bren Road East, Minnetonka, MN 55343

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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### Report Issue History Record of EUT (50001899-03)

Issue No.	Description	Date Issued
RF151005E12-1	Original release.	May 16, 2016
RF151005E12A-1	Add DFS band (5250-5350MHz & 5470-5725)	June 13, 2016

### Release Control Record


Issue No.	Description	Date Issued
RF151005E12A-1	Original release.	June 13, 2016



# 1 Certificate of Conformity

**Product:** TransPort LR54  
**Brand:** Digi International  
**Test Model:** 50001899-03  
**Series Model:** 50001899-XX (X=0~9)  
**Sample Status:** ENGINEERING SAMPLE  
**Applicant:** Digi International Inc.  
**Test Date:** Dec. 10, 2015 to Jan. 12, 2016  
**Standard:** 47 CFR FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**  \_\_\_\_\_ , **Date:** June 13, 2016  
Claire Kuan / Specialist

**Approved by :**  \_\_\_\_\_ , **Date:** June 13, 2016  
May Chen / Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -8.50dB at 0.50940MHz.
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 5350.00MHz.
15.407(b)(1/2/3/4/6)	Conducted Emissions	PASS	Meet the requirement of limit.
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.
-	Occupied Bandwidth Measurement	PASS	Meet the requirement.
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:** This report is prepared for FCC Class II permissive change. (Add DFS band <5250~5350MHz & 5470~5725MHz>).

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.31 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.40 dB
	6GHz ~ 18GHz	3.73 dB
	18GHz ~ 40GHz	4.11 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (DFS Band)

Product	TransPort LR54
Brand	Digi International
Test Model	50001899-03
Series Model	50001899-XX (X=0~9)
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5.26 ~ 5.32GHz, 5.5 ~ 5.70GHz
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)
Output Power	<b>CDD Mode:</b> <b>5.26 ~ 5.32GHz:</b> 802.11a: 175.388mW 802.11ac (VHT20): 102.222mW 802.11ac (VHT40): 181.148mW 802.11ac (VHT80): 64.914mW <b>5.5 ~ 5.7GHz:</b> 802.11a: 177.011mW 802.11ac (VHT20): 102.336mW 802.11ac (VHT40): 177.857mW 802.11ac (VHT80): 172.099mW <b>Beamforming Mode:</b> <b>5.26 ~ 5.32GHz:</b> 802.11ac (VHT20): 102.222mW 802.11ac (VHT40): 100.816mW 802.11ac (VHT80): 64.914mW <b>5.5 ~ 5.7GHz:</b> 802.11ac (VHT20): 102.336mW 802.11ac (VHT40): 101.063mW 802.11ac (VHT80): 97.503mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

- This report is prepared for FCC Class II permissive change. This report is used in conjunction with report No: RF151005E12-1 and adds the following additional information:
  - ◆ Add DFS band <5250~5350MHz & 5470~5725MHz>
- According to above condition, all test items need to be performed. And all data were verified to meet the requirements.

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

Brand Name	Model No.	Description
Digi International	50001899-03	For marketing requirement
	50001899-XX (X=0~9)	

From the above models, model: 50001899-03 was selected as representative model for the test and its data was recorded in this report.

4. There are WLAN(2.4GHz/5GHz), WWAN(3G) and LTE(4G) technology used for the EUT.

5. The emission of the simultaneous operation (WLAN, WWAN(3G) and LTE(4G)) has been evaluated and no non-compliance was found.

6. The EUT could be supplied with a power adapter as the following table:

Brand	Model No.	Spec.
MASS POWER	NBS30D120200M2	AC I/P: 100-240V, 50/60Hz, 0.8A AC input cable (Unshielded, 1.4m) DC O/P: 12V, 2A DC output cable (Unshielded, 1.5m)

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

<b>WLAN Antenna Spec.</b>				
Transmitter Circuit	Antenna Type	Antenna Connector	Gain(dBi) including cable loss	Frequency (MHz to MHz)
Chain (0)	Dipole	R-SMA	4.6	2400~2483.5
			6.3	5150~5850
Chain (1)	Dipole	R-SMA	5	2400~2483.5
			7.4	5150~5850
<b>WWAN Antenna Spec.</b>				
Transmitter Circuit	Antenna Type	Antenna Connector	Gain(dBi) including cable loss	Frequency (MHz to MHz)
Chain (0)	Dipole	SMA	4.18	1850 to 1915
			2.59	824 to 849
			5.12	1710 to 1785
			3.33	816 to 824
			2.22	777 to 787
			1.97	699 to 716
			2.97	2300 to 2325
			4.11	2496 to 2690
Chain (1)	Dipole	SMA	3.6	1850 to 1915
			2.47	824 to 849
			5.14	1710 to 1785
			3.2	816 to 824
			1.6	777 to 787
			1.6	699 to 716
			4.27	2300 to 2325
			3.56	2496 to 2690

8. This device can support different category application which switched by access point mode and client mode by software.



9. The EUT incorporates a MIMO function with beamforming.

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

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.  
 2. All of modulation mode support beamforming function except 2.4GHz & 802.11a modulation mode.

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

### 3.2 Description of Test Modes

#### FOR 5260 ~ 5320MHz

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

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

2 channels are provided for 802.11n (40MHz), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

#### FOR 5500 ~ 5700MHz

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

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

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

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

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency
106	5530MHz
122	5610 MHz

### 3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

**NOTE:** The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane**.

#### **Radiated Emission Test (Above 1GHz):**

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
<b>CDD MODE</b>						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11ac (VHT20)	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 122	106, 122	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.

<b>CDD MODE</b>						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	5260-5320	54 to 62	54	OFDM	BPSK	13.5
	5500-5700	102 to 134				

**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.

<b>CDD MODE</b>						
<b>MODE</b>	<b>FREQ. BAND (MHz)</b>	<b>AVAILABLE CHANNEL</b>	<b>TESTED CHANNEL</b>	<b>MODULATION TECHNOLOGY</b>	<b>MODULATION TYPE</b>	<b>DATA RATE (Mbps)</b>
802.11ac (VHT40)	5260-5320	54 to 62	54	OFDM	BPSK	13.5
	5500-5700	102 to 134				

**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.

<b>MODE</b>	<b>FREQ. BAND (MHz)</b>	<b>AVAILABLE CHANNEL</b>	<b>TESTED CHANNEL</b>	<b>MODULATION TECHNOLOGY</b>	<b>MODULATION TYPE</b>	<b>DATA RATE (Mbps)</b>
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
<b>CDD MODE</b>						
<b>MODE</b>	<b>FREQ. BAND (MHz)</b>	<b>AVAILABLE CHANNEL</b>	<b>TESTED CHANNEL</b>	<b>MODULATION TECHNOLOGY</b>	<b>MODULATION TYPE</b>	<b>DATA RATE (Mbps)</b>
802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11ac (VHT20)	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 122	106, 122	OFDM	BPSK	29.3
<b>Beamforming MODE</b>						
<b>MODE</b>	<b>FREQ. BAND (MHz)</b>	<b>AVAILABLE CHANNEL</b>	<b>TESTED CHANNEL</b>	<b>MODULATION TECHNOLOGY</b>	<b>MODULATION TYPE</b>	<b>DATA RATE (Mbps)</b>
802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11ac (VHT20)	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 122	106, 122	OFDM	BPSK	29.3



**Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	23deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
PLC	25deg. C, 54%RH	120Vac, 60Hz	Jason Huang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

### 3.3 Duty Cycle of Test Signal

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

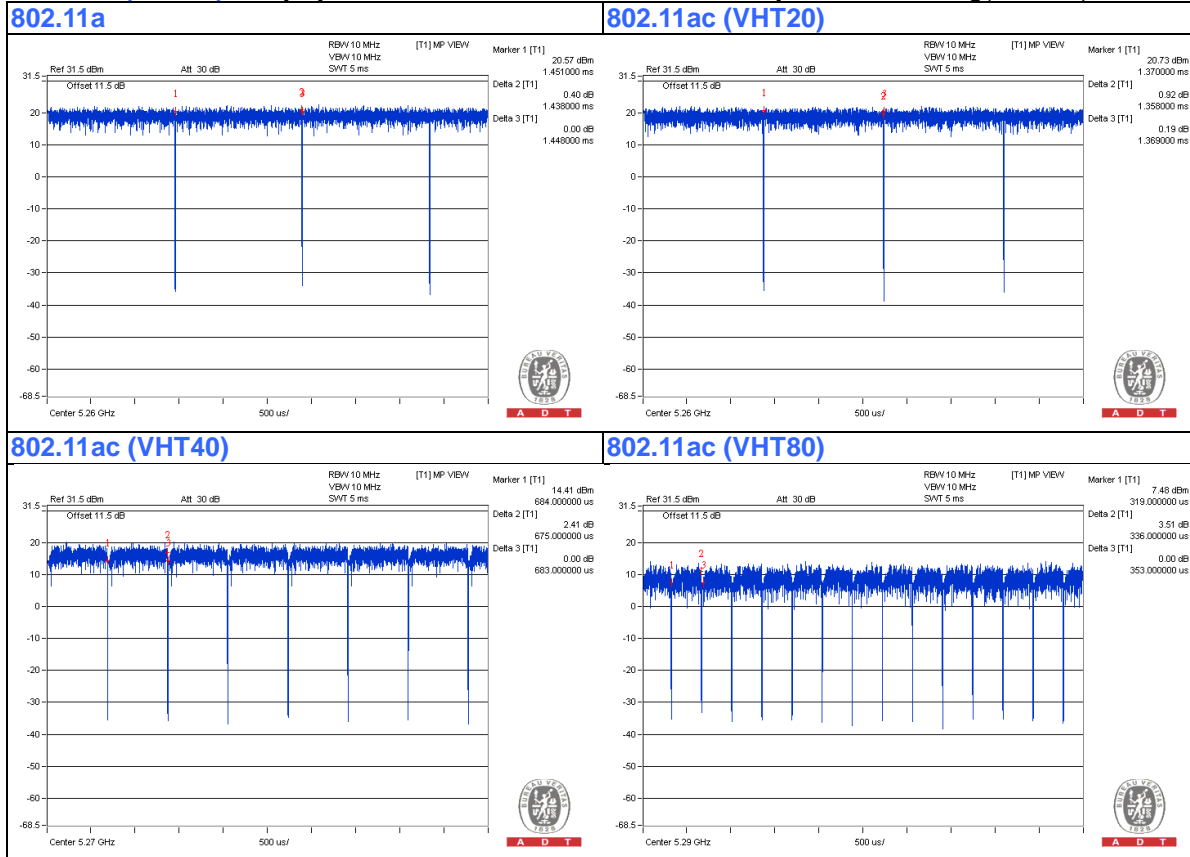
If duty cycle of test signal is  $< 98\%$ , duty factor shall be considered.

**802.11a:** Duty cycle =  $1.438 \text{ ms} / 1.448 \text{ ms} = 0.993$

**802.11ac (VHT20):** Duty cycle =  $1.358 \text{ ms} / 1.369 \text{ ms} = 0.992$

**802.11ac (VHT40):** Duty cycle =  $0.675 \text{ ms} / 0.683 \text{ ms} = 0.988$

**802.11ac (VHT80):** Duty cycle =  $0.336 \text{ ms} / 0.353 \text{ ms} = 0.952$ , Duty factor =  $10 * \log(1/0.952) = 0.21$



### 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.

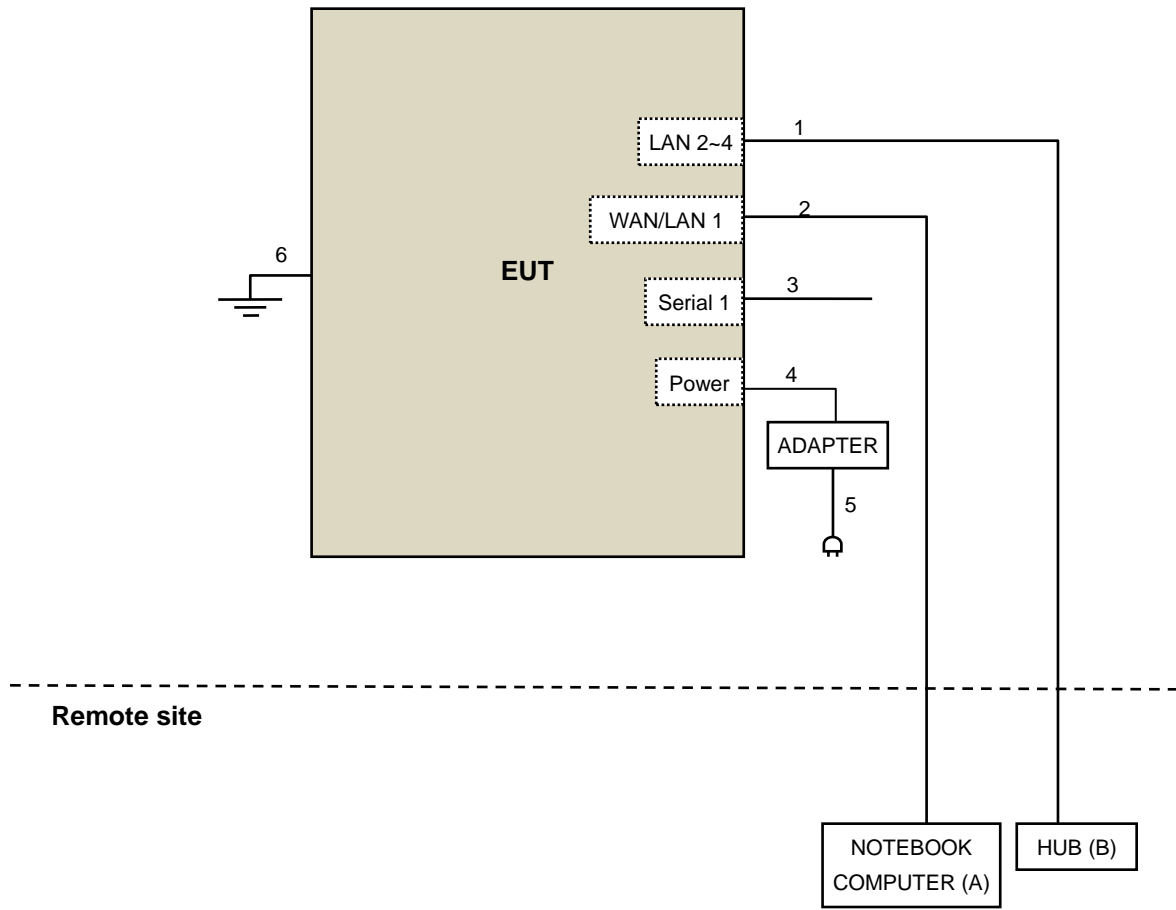
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

**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	3	10	No	0	Provided by Lab
2	RJ45	1	10	No	0	Provided by Lab
3	CONSOLE	1	1.8	No	0	Provided by Lab
4	AC	1	1.4	No	0	Supplied by Client
5	DC	1	1.5	No	0	Supplied by Client
6	GROUND	1	3	No	0	Provided by Lab

### 3.4.1 Configuration of System under Test





### 3.5 General Description of Applied Standard

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

**FCC Part 15, Subpart E (15.407)**

**KDB 789033 D02 General UNII Test Procedure New Rules v01r01**

**KDB 662911 D01 Multiple Transmitter Output v02r01**

**ANSI C63.10-2013**

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

#### NOTE:

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

#### LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:-17 (dBm/MHz) <sup>*2</sup>	PK: 68.2(dBuV/m) <sup>*1</sup> PK:78.2 (dBuV/m) <sup>*2</sup>

**NOTE:** <sup>\*1</sup> beyond 10MHz of the band edge <sup>\*2</sup> within 10 MHz of band edge

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

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

#### 4.1.2 Test Instruments

##### Below 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 12, 2015	Aug. 11, 2016
Pre-Amplifier <sup>(*)</sup> EMCI	EMC001340	980142	Jan. 13, 2014	Jan. 12, 2016
Loop Antenna <sup>(*)</sup> Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2015	Jan. 17, 2016
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-07	May 08, 2015	May 07, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	138	Feb. 03, 2015	Feb. 02, 2016
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 03, 2015	Apr. 02, 2016
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

##### Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. \*The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. 3.
5. The FCC Site Registration No. is 147459
6. The CANADA Site Registration No. is 20331-1
7. Tested Date: Jan. 11, 2016

**Above 1GHz test**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 12, 2015	Aug. 11, 2016
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Feb. 05, 2015	Feb. 04, 2016
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 06, 2015	Apr. 05, 2016
RF Cable	EMC104-SM- SM-2000 EMC104-SM- SM-5000 EMC104-SM- SM-5000	150317 150321 150322	Mar. 31, 2015	Mar. 30, 2016
Spectrum Analyzer Keysight	N9030A	MY54490520	July 26, 2015	July 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 102	36432/2 36441/2	Jan. 17, 2015	Jan. 16, 2016
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. 3.
3. The FCC Site Registration No. is 147459
4. The CANADA Site Registration No. is 20331-1
5. Tested Date: Dec. 30, 2015 to Jan. 06, 2016

#### 4.1.3 Test Procedure

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

#### Note:

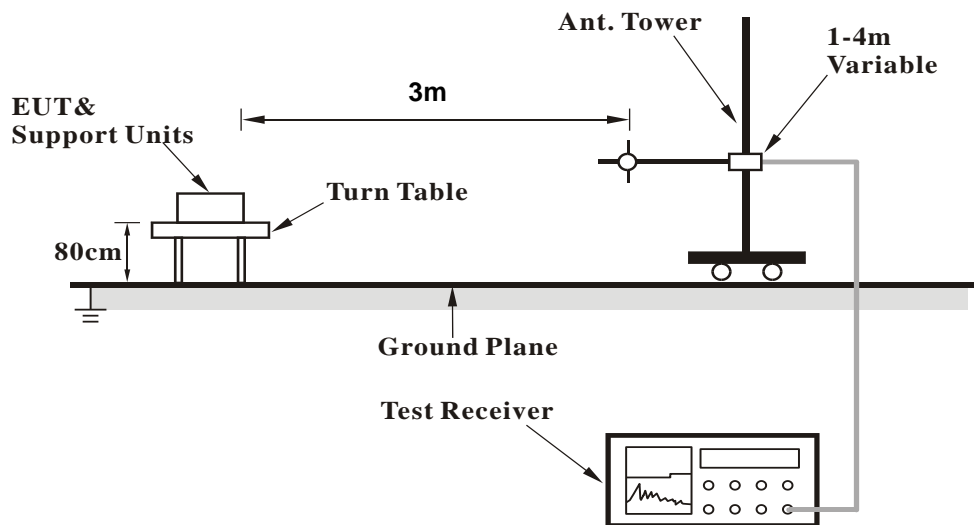
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.1.4 Deviation from Test Standard

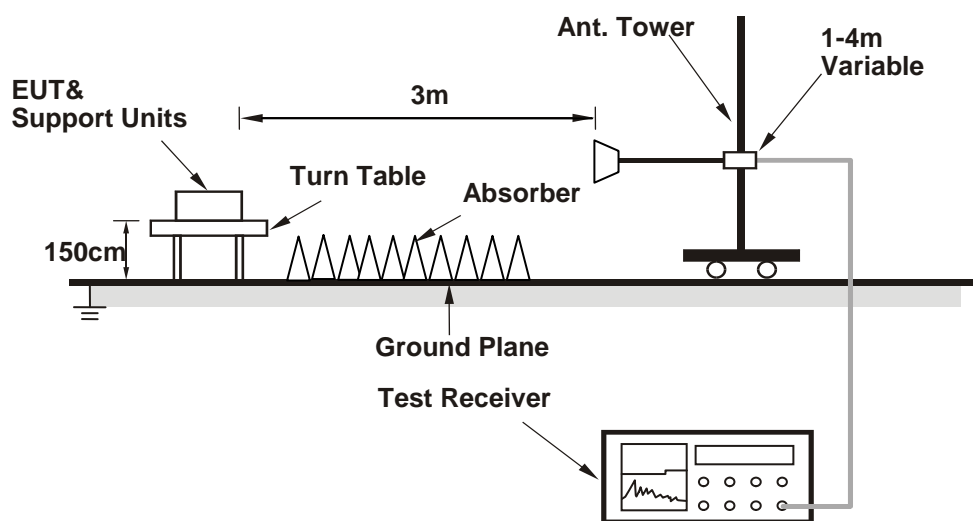
No deviation.

#### 4.1.5 Test Setup

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



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

#### 4.1.6 EUT Operating Condition

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on remote site.
2. Controlling software (MT76xxE\_AP.exe\_V1.0.3.4) has been activated to set the EUT on specific status.

**4.1.7 Test Results**
**Above 1GHz Data**
**802.11a**

<b>CHANNEL</b>	TX Channel 52	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
<b>NO.</b>	<b>FREQ. (MHz)</b>	<b>EMISSION LEVEL (dBuV/m)</b>	<b>LIMIT (dBuV/m)</b>	<b>MARGIN (dB)</b>	<b>ANTENNA HEIGHT (m)</b>	<b>TABLE ANGLE (Degree)</b>	<b>RAW VALUE (dBuV)</b>	<b>CORRECTION FACTOR (dB/m)</b>
1	*5260.00	104.6 PK			2.77 H	308	95.97	8.63
2	*5260.00	97.2 AV			2.77 H	308	88.57	8.63
3	5350.00	51.9 PK	74.0	-22.1	2.77 H	308	43.10	8.80
4	5350.00	40.7 AV	54.0	-13.3	2.77 H	308	31.90	8.80
5	#10520.00	47.9 PK	74.0	-26.1	1.15 H	165	33.44	14.46
6	#10520.00	36.5 AV	54.0	-17.5	1.15 H	165	22.04	14.46
7	15780.00	55.9 PK	74.0	-18.1	2.02 H	204	36.68	19.22
8	15780.00	44.0 AV	54.0	-10.0	2.02 H	204	24.78	19.22

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
<b>NO.</b>	<b>FREQ. (MHz)</b>	<b>EMISSION LEVEL (dBuV/m)</b>	<b>LIMIT (dBuV/m)</b>	<b>MARGIN (dB)</b>	<b>ANTENNA HEIGHT (m)</b>	<b>TABLE ANGLE (Degree)</b>	<b>RAW VALUE (dBuV)</b>	<b>CORRECTION FACTOR (dB/m)</b>
1	*5260.00	117.5 PK			1.87 V	90	108.87	8.63
2	*5260.00	108.0 AV			1.87 V	90	99.37	8.63
3	5350.00	57.7 PK	74.0	-16.3	1.87 V	90	48.90	8.80
4	5350.00	45.2 AV	54.0	-8.8	1.87 V	90	36.40	8.80
5	#10520.00	48.3 PK	74.0	-25.7	1.18 V	151	33.84	14.46
6	#10520.00	36.5 AV	54.0	-17.5	1.18 V	151	22.04	14.46
7	15780.00	59.1 PK	74.0	-14.9	1.84 V	89	39.88	19.22
8	15780.00	48.1 AV	54.0	-5.9	1.84 V	89	28.88	19.22

**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.

<b>CHANNEL</b>	TX Channel 60	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	104.6 PK			2.74 H	308	95.91	8.69
2	*5300.00	97.1 AV			2.74 H	308	88.41	8.69
3	5350.00	52.0 PK	74.0	-22.0	2.74 H	308	43.20	8.80
4	5350.00	40.6 AV	54.0	-13.4	2.74 H	308	31.80	8.80
5	10600.00	48.3 PK	74.0	-25.7	1.22 H	174	33.76	14.54
6	10600.00	36.4 AV	54.0	-17.6	1.22 H	174	21.86	14.54
7	15900.00	56.5 PK	74.0	-17.5	2.09 H	209	37.11	19.39
8	15900.00	44.1 AV	54.0	-9.9	2.09 H	209	24.71	19.39

**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	117.8 PK			1.87 V	83	109.11	8.69
2	*5300.00	107.5 AV			1.87 V	83	98.81	8.69
3	5350.00	70.1 PK	74.0	-3.9	1.87 V	83	61.30	8.80
<b>4</b>	<b>5350.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.87 V</b>	<b>83</b>	<b>45.10</b>	<b>8.80</b>
5	10600.00	48.3 PK	74.0	-25.7	1.25 V	151	33.76	14.54
6	10600.00	36.9 AV	54.0	-17.1	1.25 V	151	22.36	14.54
7	15900.00	59.3 PK	74.0	-14.7	1.91 V	93	39.91	19.39
8	15900.00	48.4 AV	54.0	-5.6	1.91 V	93	29.01	19.39

**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.





<b>CHANNEL</b>	TX Channel 64	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	105.0 PK			2.74 H	320	96.27	8.73
2	*5320.00	97.2 AV			2.74 H	320	88.47	8.73
3	5350.00	52.5 PK	74.0	-21.5	2.74 H	320	43.70	8.80
4	5350.00	41.0 AV	54.0	-13.0	2.74 H	320	32.20	8.80
5	10640.00	48.4 PK	74.0	-25.6	1.15 H	150	33.82	14.58
6	10640.00	36.8 AV	54.0	-17.2	1.15 H	150	22.22	14.58
7	15960.00	56.2 PK	74.0	-17.8	2.06 H	215	36.85	19.35
8	15960.00	44.0 AV	54.0	-10.0	2.06 H	215	24.65	19.35

**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	114.6 PK			1.86 V	91	105.87	8.73
2	*5320.00	105.3 AV			1.86 V	91	96.57	8.73
3	5350.00	65.5 PK	74.0	-8.5	1.86 V	91	56.70	8.80
4	5350.00	53.1 AV	54.0	-0.9	1.86 V	91	44.30	8.80
5	10640.00	48.2 PK	74.0	-25.8	1.25 V	171	33.62	14.58
6	10640.00	36.5 AV	54.0	-17.5	1.25 V	171	21.92	14.58
7	15960.00	60.3 PK	74.0	-13.7	1.82 V	85	40.95	19.35
8	15960.00	49.0 AV	54.0	-5.0	1.82 V	85	29.65	19.35

**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.

<b>CHANNEL</b>	TX Channel 100	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	5460.00	52.4 PK	74.0	-21.6	2.73 H	284	43.26	9.14
2	5460.00	41.4 AV	54.0	-12.6	2.73 H	284	32.26	9.14
3	#5470.00	53.8 PK	74.0	-20.2	3.21 H	74	44.62	9.18
4	#5470.00	43.3 AV	54.0	-10.7	3.21 H	74	34.12	9.18
5	*5500.00	106.2 PK			2.73 H	284	96.91	9.29
6	*5500.00	98.3 AV			2.73 H	284	89.01	9.29
7	11000.00	48.3 PK	74.0	-25.7	1.17 H	165	33.03	15.27
8	11000.00	36.7 AV	54.0	-17.3	1.17 H	165	21.43	15.27
9	#16500.00	56.4 PK	74.0	-17.6	2.11 H	199	35.53	20.87
10	#16500.00	44.5 AV	54.0	-9.5	2.11 H	199	23.63	20.87

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	60.6 PK	74.0	-13.4	2.22 V	84	51.46	9.14
2	5460.00	45.8 AV	54.0	-8.2	2.22 V	84	36.66	9.14
3	#5470.00	67.5 PK	74.0	-6.5	2.22 V	84	58.32	9.18
4	#5470.00	53.4 AV	54.0	-0.6	2.22 V	84	44.22	9.18
5	*5500.00	114.0 PK			2.22 V	84	104.71	9.29
6	*5500.00	104.5 AV			2.22 V	84	95.21	9.29
7	11000.00	48.3 PK	74.0	-25.7	1.21 V	149	33.03	15.27
8	11000.00	37.1 AV	54.0	-16.9	1.21 V	149	21.83	15.27
9	#16500.00	59.3 PK	74.0	-14.7	1.90 V	72	38.43	20.87
10	#16500.00	48.1 AV	54.0	-5.9	1.90 V	72	27.23	20.87

**REMARKS:**

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



<b>CHANNEL</b>	TX Channel 116	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	52.5 PK	74.0	-21.5	2.68 H	275	43.32	9.18
2	#5470.00	41.1 AV	54.0	-12.9	2.68 H	275	31.92	9.18
3	*5580.00	106.7 PK			2.68 H	275	97.35	9.35
4	*5580.00	98.6 AV			2.68 H	275	89.25	9.35
5	11160.00	48.1 PK	74.0	-25.9	1.24 H	153	32.86	15.24
6	11160.00	36.6 AV	54.0	-17.4	1.24 H	153	21.36	15.24
7	#16740.00	56.5 PK	74.0	-17.5	2.10 H	208	34.73	21.77
8	#16740.00	44.2 AV	54.0	-9.8	2.10 H	208	22.43	21.77

**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	54.4 PK	74.0	-19.6	2.16 V	85	45.22	9.18
2	#5470.00	40.9 AV	54.0	-13.1	2.16 V	85	31.72	9.18
3	*5580.00	117.3 PK			2.16 V	85	107.95	9.35
4	*5580.00	106.9 AV			2.16 V	85	97.55	9.35
5	11160.00	47.8 PK	74.0	-26.2	1.24 V	158	32.56	15.24
6	11160.00	36.4 AV	54.0	-17.6	1.24 V	158	21.16	15.24
7	#16740.00	59.7 PK	74.0	-14.3	1.84 V	71	37.93	21.77
8	#16740.00	48.8 AV	54.0	-5.2	1.84 V	71	27.03	21.77

**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.



<b>CHANNEL</b>	TX Channel 140	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	102.1 PK			2.82 H	286	92.46	9.64
2	*5700.00	94.9 AV			2.82 H	286	85.26	9.64
3	#5725.00	61.6 PK	74.0	-12.4	2.82 H	286	51.90	9.70
4	#5725.00	46.5 AV	54.0	-7.5	2.82 H	286	36.80	9.70
5	11400.00	48.0 PK	74.0	-26.0	1.18 H	155	32.65	15.35
6	11400.00	36.7 AV	54.0	-17.3	1.18 H	155	21.35	15.35
7	#17100.00	56.6 PK	74.0	-17.4	2.10 H	211	32.80	23.80
8	#17100.00	44.6 AV	54.0	-9.4	2.10 H	211	20.80	23.80

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	112.1 PK			2.13 V	113	102.46	9.64
2	*5700.00	102.4 AV			2.13 V	113	92.76	9.64
3	#5725.00	73.1 PK	74.0	-0.9	2.13 V	113	63.40	9.70
4	#5725.00	53.5 AV	54.0	-0.5	2.13 V	113	43.80	9.70
5	11400.00	47.9 PK	74.0	-26.1	1.19 V	173	32.55	15.35
6	11400.00	36.5 AV	54.0	-17.5	1.19 V	173	21.15	15.35
7	#17100.00	60.1 PK	74.0	-13.9	1.84 V	74	36.30	23.80
8	#17100.00	48.8 AV	54.0	-5.2	1.84 V	74	25.00	23.80

**REMARKS:**

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

**802.11ac (VHT20)**

<b>CHANNEL</b>	TX Channel 52	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.7 PK	74.0	-21.3	2.73 H	228	44.37	8.33
2	5150.00	39.1 AV	54.0	-14.9	2.73 H	228	30.77	8.33
3	*5260.00	106.7 PK			2.73 H	228	98.07	8.63
4	*5260.00	98.1 AV			2.73 H	228	89.47	8.63
5	5350.00	52.9 PK	74.0	-21.1	2.73 H	228	44.10	8.80
6	5350.00	40.0 AV	54.0	-14.0	2.73 H	228	31.20	8.80
7	#10520.00	45.9 PK	74.0	-28.1	1.72 H	359	31.44	14.46
8	#10520.00	35.5 AV	54.0	-18.5	1.72 H	359	21.04	14.46
9	15780.00	52.3 PK	74.0	-21.7	1.30 H	293	33.08	19.22
10	15780.00	41.5 AV	54.0	-12.5	1.30 H	293	22.28	19.22

**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	53.2 PK	74.0	-20.8	1.86 V	275	44.87	8.33
2	5150.00	39.7 AV	54.0	-14.3	1.86 V	275	31.37	8.33
3	*5260.00	117.3 PK			1.86 V	275	108.67	8.63
4	*5260.00	108.6 AV			1.86 V	275	99.97	8.63
5	5350.00	54.1 PK	74.0	-19.9	1.86 V	275	45.30	8.80
6	5350.00	40.9 AV	54.0	-13.1	1.86 V	275	32.10	8.80
7	#10520.00	45.7 PK	74.0	-28.3	1.33 V	290	31.24	14.46
8	#10520.00	35.5 AV	54.0	-18.5	1.33 V	290	21.04	14.46
9	15780.00	51.4 PK	74.0	-22.6	1.72 V	360	32.18	19.22
10	15780.00	40.7 AV	54.0	-13.3	1.72 V	360	21.48	19.22

**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.

<b>CHANNEL</b>	TX Channel 60	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.8 PK	74.0	-21.2	2.78 H	238	44.47	8.33
2	5150.00	38.8 AV	54.0	-15.2	2.78 H	238	30.47	8.33
3	*5300.00	107.9 PK			2.78 H	238	99.21	8.69
4	*5300.00	99.2 AV			2.78 H	238	90.51	8.69
5	5350.00	52.1 PK	74.0	-21.9	2.78 H	238	43.30	8.80
6	5350.00	40.8 AV	54.0	-13.2	2.78 H	238	32.00	8.80
7	10600.00	46.2 PK	74.0	-27.8	1.72 H	360	31.66	14.54
8	10600.00	35.6 AV	54.0	-18.4	1.72 H	360	21.06	14.54
9	15900.00	52.0 PK	74.0	-22.0	1.31 H	280	32.61	19.39
10	15900.00	41.4 AV	54.0	-12.6	1.31 H	280	22.01	19.39

**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	53.1 PK	74.0	-20.9	1.75 V	275	44.77	8.33
2	5150.00	39.2 AV	54.0	-14.8	1.75 V	275	30.87	8.33
3	*5300.00	116.5 PK			1.75 V	275	107.81	8.69
4	*5300.00	107.5 AV			1.75 V	275	98.81	8.69
5	5350.00	73.1 PK	74.0	-0.9	1.75 V	275	64.30	8.80
<b>6</b>	<b>5350.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.75 V</b>	<b>275</b>	<b>45.10</b>	<b>8.80</b>
7	10600.00	45.5 PK	74.0	-28.5	1.31 V	280	30.96	14.54
8	10600.00	35.1 AV	54.0	-18.9	1.31 V	280	20.56	14.54
9	15900.00	51.9 PK	74.0	-22.1	1.72 V	360	32.51	19.39
10	15900.00	41.1 AV	54.0	-12.9	1.72 V	360	21.71	19.39

**REMARKS:**

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



<b>CHANNEL</b>	TX Channel 64	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	91.8 PK			2.75 H	248	83.07	8.73
2	*5320.00	83.6 AV			2.75 H	248	74.87	8.73
3	5350.00	51.9 PK	74.0	-22.1	2.75 H	248	43.10	8.80
4	5350.00	40.7 AV	54.0	-13.3	2.75 H	248	31.90	8.80
5	10640.00	46.6 PK	74.0	-27.4	1.72 H	355	32.02	14.58
6	10640.00	35.9 AV	54.0	-18.1	1.72 H	355	21.32	14.58
7	15960.00	51.5 PK	74.0	-22.5	1.27 H	287	32.15	19.35
8	15960.00	41.0 AV	54.0	-13.0	1.27 H	287	21.65	19.35

**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	110.4 PK			1.75 V	217	101.67	8.73
2	*5320.00	101.9 AV			1.75 V	217	93.17	8.73
3	5350.00	70.8 PK	74.0	-3.2	1.75 V	217	62.00	8.80
4	5350.00	53.5 AV	54.0	-0.5	1.75 V	217	44.70	8.80
5	10640.00	45.1 PK	74.0	-28.9	1.28 V	274	30.52	14.58
6	10640.00	34.9 AV	54.0	-19.1	1.28 V	274	20.32	14.58
7	15960.00	51.8 PK	74.0	-22.2	1.75 V	360	32.45	19.35
8	15960.00	40.8 AV	54.0	-13.2	1.75 V	360	21.45	19.35

**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.

<b>CHANNEL</b>	TX Channel 100	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	52.3 PK	74.0	-21.7	2.76 H	242	43.12	9.18
2	#5470.00	41.3 AV	54.0	-12.7	2.76 H	242	32.12	9.18
3	*5500.00	93.2 PK			2.76 H	242	83.91	9.29
4	*5500.00	81.9 AV			2.76 H	242	72.61	9.29
5	11000.00	46.0 PK	74.0	-28.0	1.71 H	360	30.73	15.27
6	11000.00	35.5 AV	54.0	-18.5	1.71 H	360	20.23	15.27
7	#16500.00	51.6 PK	74.0	-22.4	1.31 H	275	30.73	20.87
8	#16500.00	41.1 AV	54.0	-12.9	1.31 H	275	20.23	20.87

**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	71.9 PK	74.0	-2.1	1.95 V	254	62.72	9.18
2	#5470.00	52.6 AV	54.0	-1.4	1.95 V	254	43.42	9.18
3	*5500.00	111.8 PK			1.95 V	254	102.51	9.29
4	*5500.00	100.2 AV			1.95 V	254	90.91	9.29
5	11000.00	46.0 PK	74.0	-28.0	1.35 V	282	30.73	15.27
6	11000.00	35.5 AV	54.0	-18.5	1.35 V	282	20.23	15.27
7	#16500.00	51.5 PK	74.0	-22.5	1.67 V	360	30.63	20.87
8	#16500.00	40.7 AV	54.0	-13.3	1.67 V	360	19.83	20.87

**REMARKS:**

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





<b>CHANNEL</b>	TX Channel 116	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	52.8 PK	74.0	-21.2	2.73 H	231	43.62	9.18
2	#5470.00	41.5 AV	54.0	-12.5	2.73 H	231	32.32	9.18
3	*5580.00	97.2 PK			2.74 H	231	87.85	9.35
4	*5580.00	96.0 AV			2.74 H	231	86.65	9.35
5	11160.00	46.6 PK	74.0	-27.4	1.76 H	360	31.36	15.24
6	11160.00	35.9 AV	54.0	-18.1	1.76 H	360	20.66	15.24
7	#16740.00	52.3 PK	74.0	-21.7	1.26 H	285	30.53	21.77
8	#16740.00	41.6 AV	54.0	-12.4	1.26 H	285	19.83	21.77

**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	69.1 PK	74.0	-4.9	2.17 V	71	59.92	9.18
2	#5470.00	46.3 AV	54.0	-7.7	2.17 V	71	37.12	9.18
3	*5580.00	115.2 PK			1.88 V	257	105.85	9.35
4	*5580.00	104.0 AV			1.88 V	257	94.65	9.35
5	11160.00	46.0 PK	74.0	-28.0	1.27 V	270	30.76	15.24
6	11160.00	35.5 AV	54.0	-18.5	1.27 V	270	20.26	15.24
7	#16740.00	51.4 PK	74.0	-22.6	1.69 V	360	29.63	21.77
8	#16740.00	40.7 AV	54.0	-13.3	1.69 V	360	18.93	21.77

**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.

<b>CHANNEL</b>	TX Channel 140	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	92.8 PK			2.70 H	239	83.16	9.64
2	*5700.00	82.6 AV			2.70 H	239	72.96	9.64
3	#5725.00	52.6 PK	74.0	-21.4	2.70 H	239	42.90	9.70
4	#5725.00	41.6 AV	54.0	-12.4	2.70 H	239	31.90	9.70
5	11400.00	46.5 PK	74.0	-27.5	1.73 H	360	31.15	15.35
6	11400.00	35.9 AV	54.0	-18.1	1.73 H	360	20.55	15.35
7	#17100.00	52.7 PK	74.0	-21.3	1.37 H	273	28.90	23.80
8	#17100.00	41.8 AV	54.0	-12.2	1.37 H	273	18.00	23.80

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	111.4 PK			2.11 V	269	101.76	9.64
2	*5700.00	100.9 AV			2.11 V	269	91.26	9.64
3	#5725.00	70.9 PK	74.0	-3.1	2.11 V	269	61.20	9.70
4	#5725.00	52.1 AV	54.0	-1.9	2.11 V	269	42.40	9.70
5	11400.00	45.2 PK	74.0	-28.8	1.29 V	270	29.85	15.35
6	11400.00	34.8 AV	54.0	-19.2	1.29 V	270	19.45	15.35
7	#17100.00	52.1 PK	74.0	-21.9	1.73 V	360	28.30	23.80
8	#17100.00	41.1 AV	54.0	-12.9	1.73 V	360	17.30	23.80

**REMARKS:**

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



802.11ac (VHT40)

<b>CHANNEL</b>	TX Channel 54	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	4806.35	51.9 PK	74.0	-22.1	2.03 H	28	44.88	7.02
2	4806.35	40.3 AV	54.0	-13.7	2.03 H	28	33.28	7.02
3	*5270.00	95.5 PK			2.03 H	28	86.86	8.64
4	*5270.00	84.4 AV			2.03 H	28	75.76	8.64
5	5350.00	52.4 PK	74.0	-21.6	2.03 H	28	43.60	8.80
6	5350.00	40.8 AV	54.0	-13.2	2.03 H	28	32.00	8.80
7	#10540.00	46.4 PK	74.0	-27.6	1.71 H	360	31.93	14.47
8	#10540.00	35.6 AV	54.0	-18.4	1.71 H	360	21.13	14.47
9	15810.00	51.8 PK	74.0	-22.2	1.34 H	264	32.50	19.30
10	15810.00	41.1 AV	54.0	-12.9	1.34 H	264	21.80	19.30

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	4806.35	58.5 PK	74.0	-15.5	1.32 V	278	51.48	7.02
2	4806.35	48.4 AV	54.0	-5.6	1.32 V	278	41.38	7.02
3	*5270.00	114.1 PK			1.96 V	274	105.46	8.64
4	*5270.00	102.7 AV			1.96 V	274	94.06	8.64
5	5350.00	70.9 PK	74.0	-3.1	1.96 V	274	62.10	8.80
6	5350.00	53.5 AV	54.0	-0.5	1.96 V	274	44.70	8.80
7	#10540.00	45.5 PK	74.0	-28.5	1.33 V	280	31.03	14.47
8	#10540.00	35.2 AV	54.0	-18.8	1.33 V	280	20.73	14.47
9	15810.00	51.9 PK	74.0	-22.1	1.72 V	360	32.60	19.30
10	15810.00	41.3 AV	54.0	-12.7	1.72 V	360	22.00	19.30

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.

<b>CHANNEL</b>	TX Channel 62	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	87.5 PK			2.02 H	45	78.78	8.72
2	*5310.00	77.4 AV			2.02 H	45	68.68	8.72
3	5350.00	52.5 PK	74.0	-21.5	2.02 H	45	43.70	8.80
4	5350.00	40.7 AV	54.0	-13.3	2.02 H	45	31.90	8.80
5	10620.00	46.9 PK	74.0	-27.1	1.69 H	360	32.33	14.57
6	10620.00	36.0 AV	54.0	-18.0	1.69 H	360	21.43	14.57
7	15930.00	51.9 PK	74.0	-22.1	1.34 H	285	32.53	19.37
8	15930.00	41.4 AV	54.0	-12.6	1.34 H	285	22.03	19.37

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	106.1 PK			1.91 V	256	97.38	8.72
2	*5310.00	95.7 AV			1.91 V	256	86.98	8.72
3	5350.00	69.4 PK	74.0	-4.6	1.91 V	256	60.60	8.80
4	5350.00	53.7 AV	54.0	-0.3	1.91 V	256	44.90	8.80
5	10620.00	45.7 PK	74.0	-28.3	1.31 V	291	31.13	14.57
6	10620.00	35.1 AV	54.0	-18.9	1.31 V	291	20.53	14.57
7	15930.00	51.4 PK	74.0	-22.6	1.66 V	355	32.03	19.37
8	15930.00	40.7 AV	54.0	-13.3	1.66 V	355	21.33	19.37

**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.



<b>CHANNEL</b>	TX Channel 102	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	53.8 PK	74.0	-20.2	1.98 H	32	44.62	9.18
2	#5470.00	40.8 AV	54.0	-13.2	1.98 H	32	31.62	9.18
3	*5510.00	85.0 PK			1.98 H	32	75.71	9.29
4	*5510.00	75.5 AV			1.98 H	32	66.21	9.29
5	11020.00	46.5 PK	74.0	-27.5	1.69 H	360	31.23	15.27
6	11020.00	36.1 AV	54.0	-17.9	1.69 H	360	20.83	15.27
7	#16530.00	52.4 PK	74.0	-21.6	1.36 H	269	31.33	21.07
8	#16530.00	41.7 AV	54.0	-12.3	1.36 H	269	20.63	21.07

**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	71.1 PK	74.0	-2.9	1.99 V	255	61.92	9.18
2	#5470.00	53.6 AV	54.0	-0.4	1.99 V	255	44.42	9.18
3	*5510.00	103.6 PK			1.99 V	255	94.31	9.29
4	*5510.00	93.8 AV			1.99 V	255	84.51	9.29
5	11020.00	45.8 PK	74.0	-28.2	1.34 V	274	30.53	15.27
6	11020.00	35.3 AV	54.0	-18.7	1.34 V	274	20.03	15.27
7	#16530.00	51.9 PK	74.0	-22.1	1.70 V	360	30.83	21.07
8	#16530.00	41.2 AV	54.0	-12.8	1.70 V	360	20.13	21.07

**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.



<b>CHANNEL</b>	TX Channel 110	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	53.9 PK	74.0	-20.1	1.97 H	36	44.72	9.18
2	#5470.00	41.2 AV	54.0	-12.8	1.97 H	36	32.02	9.18
3	*5550.00	92.2 PK			1.97 H	36	82.87	9.33
4	*5550.00	81.6 AV			1.97 H	36	72.27	9.33
5	11100.00	46.5 PK	74.0	-27.5	1.68 H	360	31.25	15.25
6	11100.00	35.8 AV	54.0	-18.2	1.68 H	360	20.55	15.25
7	#16650.00	52.2 PK	74.0	-21.8	1.30 H	290	30.62	21.58
8	#16650.00	41.5 AV	54.0	-12.5	1.30 H	290	19.92	21.58

**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	73.6 PK	74.0	-0.4	2.02 V	267	64.42	9.18
2	#5470.00	49.6 AV	54.0	-4.4	2.02 V	267	40.42	9.18
3	*5550.00	110.8 PK			2.02 V	267	101.47	9.33
4	*5550.00	99.9 AV			2.02 V	267	90.57	9.33
5	11100.00	45.8 PK	74.0	-28.2	1.30 V	269	30.55	15.25
6	11100.00	35.6 AV	54.0	-18.4	1.30 V	269	20.35	15.25
7	#16650.00	51.2 PK	74.0	-22.8	1.75 V	360	29.62	21.58
8	#16650.00	40.7 AV	54.0	-13.3	1.75 V	360	19.12	21.58

**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.

<b>CHANNEL</b>	TX Channel 134	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	89.7 PK			1.99 H	48	80.15	9.55
2	*5670.00	79.9 AV			1.99 H	48	70.35	9.55
3	#5725.00	51.8 PK	74.0	-22.2	1.99 H	48	42.10	9.70
4	#5725.00	40.9 AV	54.0	-13.1	1.99 H	48	31.20	9.70
5	11340.00	46.1 PK	74.0	-27.9	1.67 H	351	30.86	15.24
6	11340.00	35.4 AV	54.0	-18.6	1.67 H	351	20.16	15.24
7	#17010.00	51.5 PK	74.0	-22.5	1.27 H	282	28.28	23.22
8	#17010.00	41.1 AV	54.0	-12.9	1.27 H	282	17.88	23.22

**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	*5670.00	108.3 PK			2.16 V	101	98.75	9.55
2	*5670.00	98.2 AV			2.16 V	101	88.65	9.55
3	#5725.00	71.3 PK	74.0	-2.7	2.16 V	101	61.60	9.70
4	#5725.00	53.7 AV	54.0	-0.3	2.16 V	101	44.00	9.70
5	11340.00	45.6 PK	74.0	-28.4	1.30 V	288	30.36	15.24
6	11340.00	35.3 AV	54.0	-18.7	1.30 V	288	20.06	15.24
7	#17010.00	52.4 PK	74.0	-21.6	1.69 V	351	29.18	23.22
8	#17010.00	41.6 AV	54.0	-12.4	1.69 V	351	18.38	23.22

**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.

**802.11ac (VHT80)**

<b>CHANNEL</b>	TX Channel 58	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 40GHz		Average (AV)

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
<b>NO.</b>	<b>FREQ. (MHz)</b>	<b>EMISSION LEVEL (dBuV/m)</b>	<b>LIMIT (dBuV/m)</b>	<b>MARGIN (dB)</b>	<b>ANTENNA HEIGHT (m)</b>	<b>TABLE ANGLE (Degree)</b>	<b>RAW VALUE (dBuV)</b>	<b>CORRECTION FACTOR (dB/m)</b>
1	4844.85	51.9 PK	74.0	-22.1	1.98 H	59	44.75	7.15
2	4844.85	42.3 AV	54.0	-11.7	1.98 H	59	35.15	7.15
3	*5290.00	86.7 PK			1.98 H	59	78.02	8.68
4	*5290.00	75.3 AV			1.98 H	59	66.62	8.68
5	5358.47	54.6 PK	74.0	-19.4	1.98 H	59	45.77	8.83
6	5358.47	42.6 AV	54.0	-11.4	1.98 H	59	33.77	8.83
7	#10580.00	45.8 PK	74.0	-28.2	1.67 H	360	31.28	14.52
8	#10580.00	35.4 AV	54.0	-18.6	1.67 H	360	20.88	14.52
9	15870.00	52.5 PK	74.0	-21.5	1.28 H	294	33.15	19.35
10	15870.00	41.7 AV	54.0	-12.3	1.28 H	294	22.35	19.35

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
<b>NO.</b>	<b>FREQ. (MHz)</b>	<b>EMISSION LEVEL (dBuV/m)</b>	<b>LIMIT (dBuV/m)</b>	<b>MARGIN (dB)</b>	<b>ANTENNA HEIGHT (m)</b>	<b>TABLE ANGLE (Degree)</b>	<b>RAW VALUE (dBuV)</b>	<b>CORRECTION FACTOR (dB/m)</b>
1	4844.85	60.4 PK	74.0	-13.6	1.85 V	271	53.25	7.15
2	4844.85	48.2 AV	54.0	-5.8	1.85 V	271	41.05	7.15
3	*5290.00	105.3 PK			1.96 V	58	96.62	8.68
4	*5290.00	93.7 AV			1.96 V	58	85.02	8.68
5	5358.47	72.3 PK	74.0	-1.7	1.96 V	58	63.47	8.83
6	5358.47	52.9 AV	54.0	-1.1	1.96 V	58	44.07	8.83
7	#10580.00	45.1 PK	74.0	-28.9	1.32 V	295	30.58	14.52
8	#10580.00	34.9 AV	54.0	-19.1	1.32 V	295	20.38	14.52
9	15870.00	52.1 PK	74.0	-21.9	1.75 V	360	32.75	19.35
10	15870.00	41.1 AV	54.0	-12.9	1.75 V	360	21.75	19.35

**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.



<b>CHANNEL</b>	TX Channel 106	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	51.9 PK	74.0	-22.1	1.92 H	51	42.72	9.18
2	#5470.00	41.8 AV	54.0	-12.2	1.92 H	51	32.62	9.18
3	*5530.00	83.8 PK			1.92 H	51	74.49	9.31
4	*5530.00	72.8 AV			1.92 H	51	63.49	9.31
5	#5725.00	52.0 PK	74.0	-22.0	1.92 H	51	42.30	9.70
6	#5725.00	42.3 AV	54.0	-11.7	1.92 H	51	32.60	9.70
7	11060.00	45.9 PK	74.0	-28.1	1.76 H	360	30.64	15.26
8	11060.00	35.2 AV	54.0	-18.8	1.76 H	360	19.94	15.26
9	#16590.00	51.9 PK	74.0	-22.1	1.29 H	279	30.46	21.44
10	#16590.00	41.5 AV	54.0	-12.5	1.29 H	279	20.06	21.44

**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	70.6 PK	74.0	-3.4	1.98 V	75	61.42	9.18
2	#5470.00	53.4 AV	54.0	-0.6	1.98 V	75	44.22	9.18
3	*5530.00	102.4 PK			1.98 V	75	93.09	9.31
4	*5530.00	91.2 AV			1.98 V	75	81.89	9.31
5	#5725.00	53.4 PK	74.0	-20.6	1.98 V	75	43.70	9.70
6	#5725.00	43.2 AV	54.0	-10.8	1.98 V	75	33.50	9.70
7	11060.00	45.4 PK	74.0	-28.6	1.26 V	276	30.14	15.26
8	11060.00	35.2 AV	54.0	-18.8	1.26 V	276	19.94	15.26
9	#16590.00	51.6 PK	74.0	-22.4	1.72 V	360	30.16	21.44
10	#16590.00	41.0 AV	54.0	-13.0	1.72 V	360	19.56	21.44

**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.

<b>CHANNEL</b>	TX Channel 122	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	5094.60	51.7 PK	74.0	-22.3	1.91 H	62	43.60	8.10
2	5094.60	42.0 AV	54.0	-12.0	1.91 H	62	33.90	8.10
3	#5165.40	51.6 PK	74.0	-22.4	1.91 H	62	43.21	8.39
4	#5165.40	42.0 AV	54.0	-12.0	1.91 H	62	33.61	8.39
5	*5610.00	89.1 PK			1.91 H	62	79.71	9.39
6	*5610.00	78.6 AV			1.91 H	62	69.21	9.39
7	#5725.00	51.9 PK	74.0	-22.1	1.91 H	62	42.20	9.70
8	#5725.00	42.1 AV	54.0	-11.9	1.91 H	62	32.40	9.70
9	11220.00	45.8 PK	74.0	-28.2	1.69 H	360	30.58	15.22
10	11220.00	35.3 AV	54.0	-18.7	1.69 H	360	20.08	15.22
11	#16830.00	51.8 PK	74.0	-22.2	1.36 H	292	29.69	22.11
12	#16830.00	41.4 AV	54.0	-12.6	1.36 H	292	19.29	22.11

**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	5094.60	57.3 PK	74.0	-16.7	2.03 V	290	49.20	8.10
2	5094.60	47.0 AV	54.0	-7.0	2.03 V	290	38.90	8.10
3	#5165.40	62.5 PK	74.0	-11.5	2.03 V	290	54.11	8.39
4	#5165.40	51.8 AV	54.0	-2.2	2.03 V	290	43.41	8.39
5	*5610.00	107.7 PK			2.02 V	72	98.31	9.39
6	*5610.00	97.0 AV			2.02 V	72	87.61	9.39
7	#5725.00	70.3 PK	74.0	-3.7	2.02 V	72	60.60	9.70
8	#5725.00	53.4 AV	54.0	-0.6	2.02 V	72	43.70	9.70
9	11220.00	46.2 PK	74.0	-27.8	1.32 V	281	30.98	15.22
10	11220.00	35.6 AV	54.0	-18.4	1.32 V	281	20.38	15.22
11	#16830.00	52.0 PK	74.0	-22.0	1.70 V	360	29.89	22.11
12	#16830.00	40.9 AV	54.0	-13.1	1.70 V	360	18.79	22.11

**REMARKS:**

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

**Below 1GHz Data**
**802.11ac (VHT40)**

<b>CHANNEL</b>	TX Channel 54	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	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	37.18	36.9 QP	40.0	-3.2	1.00 H	347	52.94	-16.09
2	47.68	35.2 QP	40.0	-4.8	1.00 H	279	50.45	-15.26
3	106.14	33.5 QP	43.5	-10.0	1.50 H	268	51.95	-18.48
4	153.31	31.6 QP	43.5	-11.9	2.00 H	70	46.62	-15.00
5	290.91	29.8 QP	46.0	-16.2	1.00 H	300	44.26	-14.50
6	500.01	28.6 QP	46.0	-17.4	2.00 H	53	37.90	-9.28

**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	84.71	33.0 QP	40.0	-7.0	1.50 V	196	53.77	-20.81
2	106.63	28.0 QP	43.5	-15.5	1.00 V	199	46.40	-18.43
3	204.16	24.8 QP	43.5	-18.7	1.50 V	0	43.17	-18.33
4	291.00	24.3 QP	46.0	-21.7	2.00 V	360	38.79	-14.50
5	460.95	24.2 QP	46.0	-21.8	1.50 V	0	34.10	-9.91
6	499.99	24.7 QP	46.0	-21.3	1.00 V	69	34.02	-9.28

**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	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 01, 2015	Aug. 31, 2016
Line-Impedance Stabilization Network (for Peripheral ) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Jan. 12, 2015

#### 4.2.3 Test Procedure

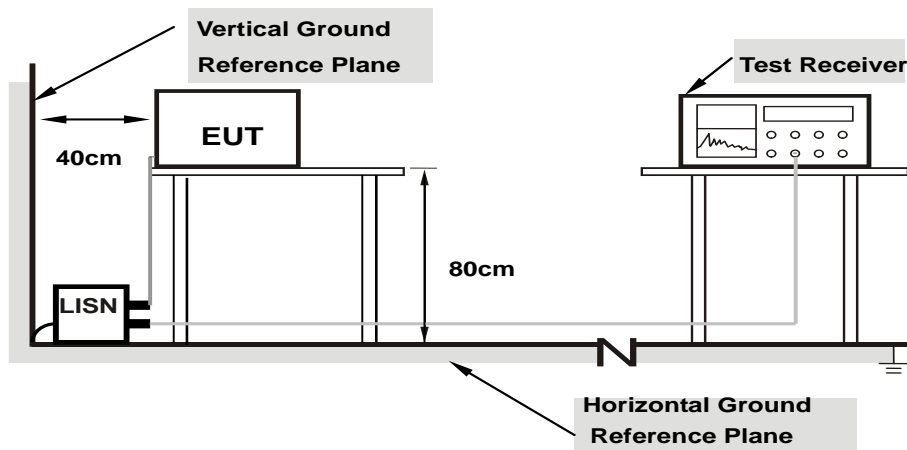
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

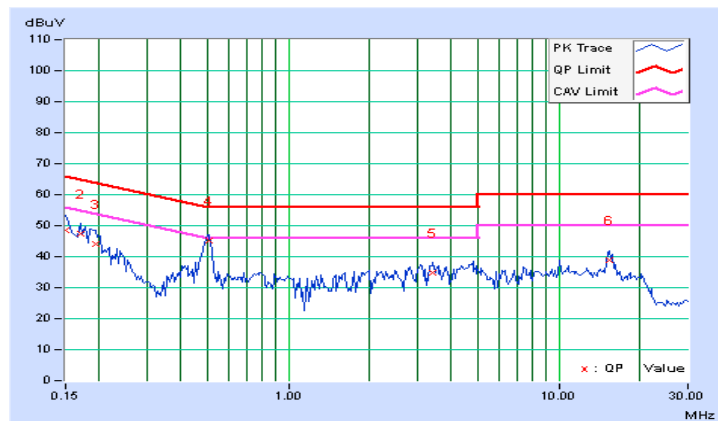
#### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.15000	10.26	38.41	23.69	48.67	33.95	66.00	56.00	-17.33	-22.05
2	0.16952	10.24	37.26	25.46	47.50	35.70	64.98	54.98	-17.48	-19.28
3	0.19299	10.23	33.72	23.58	43.95	33.81	63.91	53.91	-19.96	-20.10
<b>4</b>	<b>0.50940</b>	<b>10.23</b>	<b>34.88</b>	<b>27.27</b>	<b>45.11</b>	<b>37.50</b>	<b>56.00</b>	<b>46.00</b>	<b>-10.89</b>	<b>-8.50</b>
5	3.43361	10.33	24.67	15.49	35.00	25.82	56.00	46.00	-21.00	-20.18
6	15.44532	10.78	28.25	22.39	39.03	33.17	60.00	50.00	-20.97	-16.83

#### 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

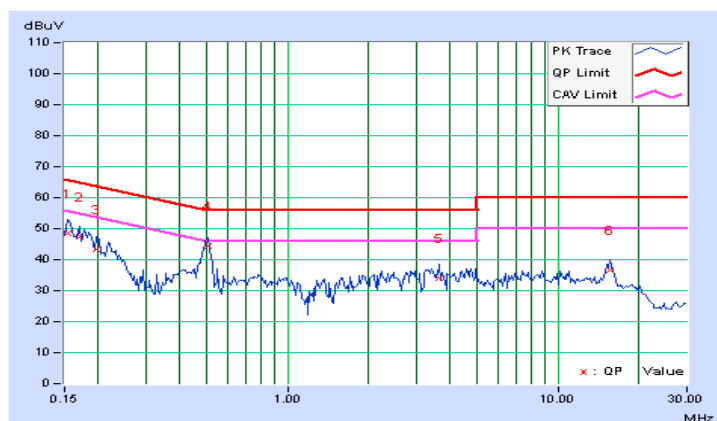


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15390	10.24	38.18	24.12	48.42	34.36	65.79	55.79	-17.37	-21.43
2	0.16955	10.22	37.26	24.84	47.48	35.06	64.98	54.98	-17.50	-19.92
3	0.19689	10.20	33.14	22.86	43.34	33.06	63.74	53.74	-20.40	-20.68
4	0.50937	10.21	34.23	26.57	44.44	36.78	56.00	46.00	-11.56	-9.22
5	3.65233	10.36	23.89	15.32	34.25	25.68	56.00	46.00	-21.75	-20.32
6	15.56639	10.81	25.69	19.96	36.50	30.77	60.00	50.00	-23.50	-19.23

**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



### 4.3 Transmit Power Measurement

#### 4.3.1 Limits of Transmit Power Measurement

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

\*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 D01 Multiple Transmitter Output v02r01 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  $\geq 40$  MHz for any  $N_{ANT}$ ;

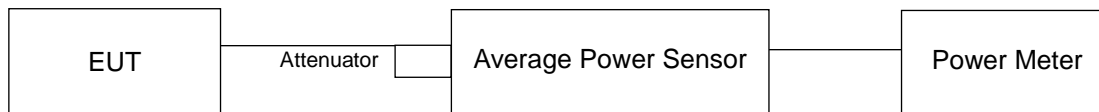
Array Gain =  $5 \log(N_{ANT}/N_{SS})$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $N_{ANT} \geq 5$ .

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

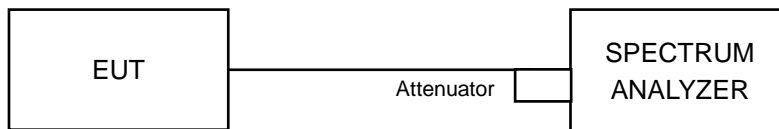


#### 4.3.2 Test Setup

##### FOR POWER OUTPUT MEASUREMENT



##### FOR OCCUPIED BANDWIDTH



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

##### FOR AVERAGE POWER MEASUREMENT

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 and set the detector to AVERAGE. Duty factor is not added to measured value.

##### FOR 26dB OCCUPIED BANDWIDTH

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

#### 4.3.5 Deviation 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 POWER OUTPUT

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
52	5260	170.608	22.32	22.60	Pass
60	5300	175.388	22.44	22.60	Pass
64	5320	69.984	18.45	22.60	Pass
100	5500	79.983	19.03	22.60	Pass
116	5580	177.011	22.48	22.60	Pass
140	5700	52	17.16	22.60	Pass

**Note:** Directional gain = 7.4dBi > 6dBi , so the power limit shall be reduced to "Determined Conducted Limit-(7.4-6)"

##### 26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
52	5260	43.93
60	5300	44.31
64	5320	32.74
100	5500	29.31
116	5580	46.62
140	5700	30.71

**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	43.93	27.42 > 24
60	5300	44.31	27.46 > 24
64	5320	32.74	26.15 > 24
100	5500	29.31	25.67 > 24
116	5580	46.62	27.68 > 24
140	5700	30.71	25.87 > 24



**CDD Mode**

**802.11ac (VHT20)  
POWER OUTPUT**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	17.11	17.05	102.103	20.09	22.60	Pass
60	5300	17.05	17.12	102.222	20.10	22.60	Pass
64	5320	17.09	17.06	101.984	20.09	22.60	Pass
100	5500	17.10	17.08	102.336	20.10	22.60	Pass
116	5580	17.06	17.05	101.515	20.07	22.60	Pass
140	5700	17.11	17.01	101.638	20.07	22.60	Pass

**Note:** Directional gain = 7.4dBi > 6dBi , so the power limit shall be reduced to “Determined Conducted Limit-(7.4-6)”

**26dB OCCUPIED BANDWIDTH**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.62	21.35
60	5300	21.54	23.88
64	5320	21.38	25.00
100	5500	25.76	27.82
116	5580	21.34	20.94
140	5700	32.86	25.09

**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	21.35	24.29 > 24
60	5300	21.54	24.33 > 24
64	5320	21.38	24.30 > 24
100	5500	25.76	25.10 > 24
116	5580	20.94	24.20 > 24
140	5700	25.09	24.99 > 24

**802.11ac (VHT40)**
**POWER OUTPUT**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
54	5270	19.55	19.59	181.148	22.58	22.60	Pass
62	5310	15.92	15.73	76.495	18.84	22.60	Pass
102	5510	15.82	15.38	72.708	18.62	22.60	Pass
110	5550	19.43	19.55	177.857	22.50	22.60	Pass
134	5670	19.37	19.48	175.213	22.44	22.60	Pass

**Note:** Directional gain = 7.4dBi > 6dBi , so the power limit shall be reduced to "Determined Conducted Limit-(7.4-6)"

**26dB OCCUPIED BANDWIDTH**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	69.22	76.27
62	5310	41.65	42.82
102	5510	41.61	41.72
110	5550	72.93	59.69
134	5670	83.95	79.38

**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	69.22	29.40 > 24
62	5310	41.65	27.19 > 24
102	5510	41.61	27.19 > 24
110	5550	59.69	28.75 > 24
134	5670	79.38	29.99 > 24

**802.11ac (VHT80)**
**POWER OUTPUT**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
58	5290	15.37	14.84	64.914	18.12	22.60	Pass
106	5530	13.68	13.27	44.567	16.49	22.60	Pass
122	5610	19.72	18.94	172.099	22.36	22.60	Pass

**Note:** Directional gain = 7.4dBi > 6dBi , so the power limit shall be reduced to "Determined Conducted Limit-(7.4-6)"

**26dB OCCUPIED BANDWIDTH**

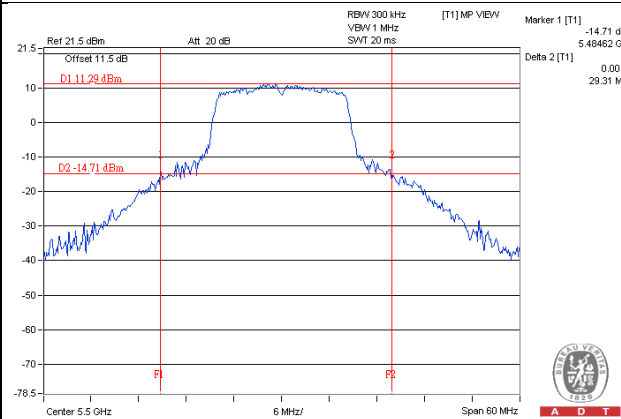
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	81.78	81.91
106	5530	81.96	81.80
122	5610	125.16	132.28

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

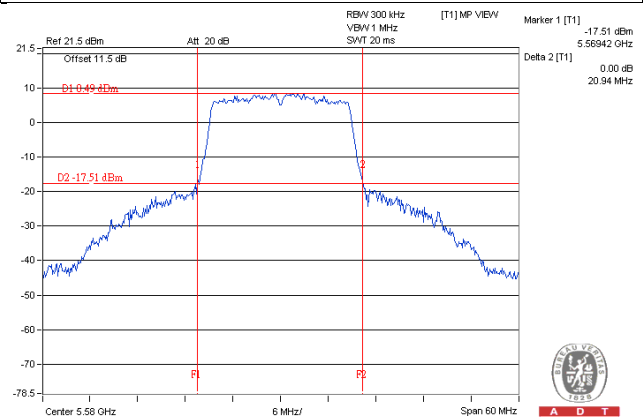
Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	81.78	30.12 > 24
106	5530	81.80	30.12 > 24
122	5610	125.16	31.97 > 24

Spectrum Plot of Worst Value

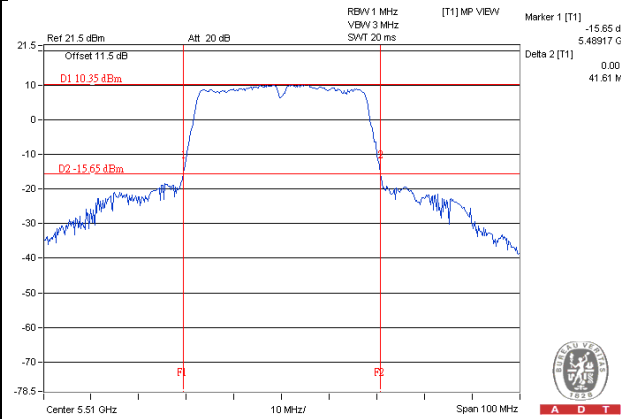
802.11a / CH100



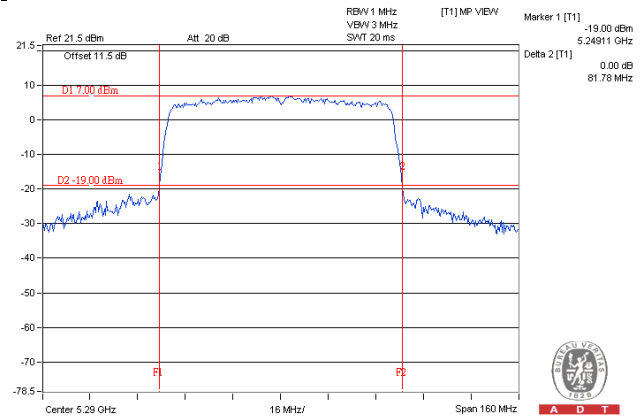
802.11ac (VHT20) / Chain 1\_CH116



802.11ac (VHT40) / Chain 0\_CH102



802.11ac (VHT80) / Chain 0\_CH58



**Beamforming Mode**  
**802.11ac (VHT20)**  
**POWER OUTPUT**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	17.11	17.05	102.103	20.09	20.12	Pass
60	5300	17.05	17.12	102.222	20.10	20.12	Pass
64	5320	17.09	17.06	101.984	20.09	20.12	Pass
100	5500	17.10	17.08	102.336	20.10	20.12	Pass
116	5580	17.06	17.05	101.515	20.07	20.12	Pass
140	5700	17.11	17.01	101.638	20.07	20.12	Pass

**Note:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 9.88\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to "Determined Conducted Limit-(9.88-6)"

**26dB OCCUPIED BANDWIDTH**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.62	21.35
60	5300	21.54	23.88
64	5320	21.38	25.00
100	5500	25.76	27.82
116	5580	21.34	20.94
140	5700	32.86	25.09

**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	21.35	24.29 > 24
60	5300	21.54	24.33 > 24
64	5320	21.38	24.30 > 24
100	5500	25.76	25.10 > 24
116	5580	20.94	24.20 > 24
140	5700	25.09	24.99 > 24

**802.11ac (VHT40)**
**POWER OUTPUT**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
54	5270	17.04	17.01	100.816	20.04	20.12	Pass
62	5310	15.92	15.73	76.495	18.84	20.12	Pass
102	5510	15.82	15.38	72.708	18.62	20.12	Pass
110	5550	16.96	17.11	101.063	20.05	20.12	Pass
134	5670	16.93	17.06	100.133	20.01	20.12	Pass

**Note:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 9.88\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to "Determined Conducted Limit-(9.88-6)"

**26dB OCCUPIED BANDWIDTH**

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	69.22	76.27
62	5310	41.65	42.82
102	5510	41.61	41.72
110	5550	72.93	59.69
134	5670	83.95	79.38

**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	69.22	29.40 > 24
62	5310	41.65	27.19 > 24
102	5510	41.61	27.19 > 24
110	5550	59.69	28.75 > 24
134	5670	79.38	29.99 > 24



**802.11ac (VHT80)**

**POWER OUTPUT**

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
58	5290	15.37	14.84	64.914	18.12	20.12	Pass
106	5530	13.68	13.27	44.567	16.49	20.12	Pass
122	5610	17.36	16.34	97.503	19.89	20.12	Pass

**Note:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 9.88\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to “Determined Conducted Limit-(9.88-6)”

**26dB OCCUPIED BANDWIDTH**

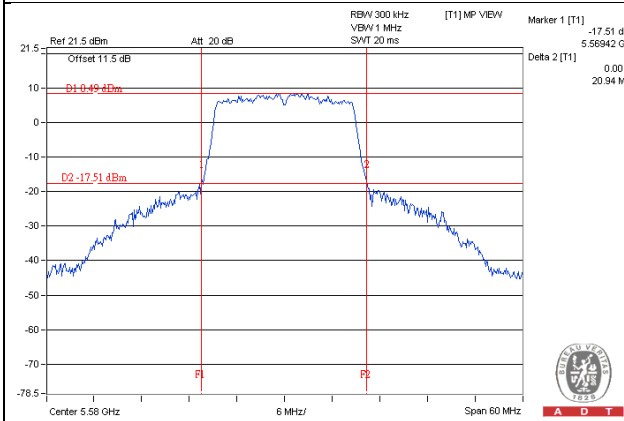
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	81.78	81.91
106	5530	81.96	81.80
122	5610	125.16	132.28

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

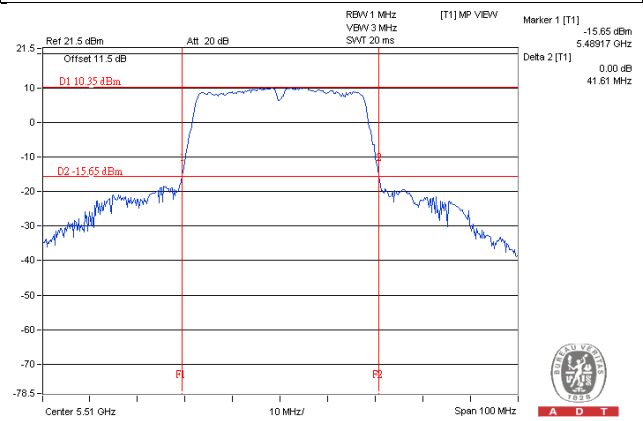
Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	81.78	30.12 > 24
106	5530	81.80	30.12 > 24
122	5610	125.16	31.97 > 24

Spectrum Plot of Worst Value

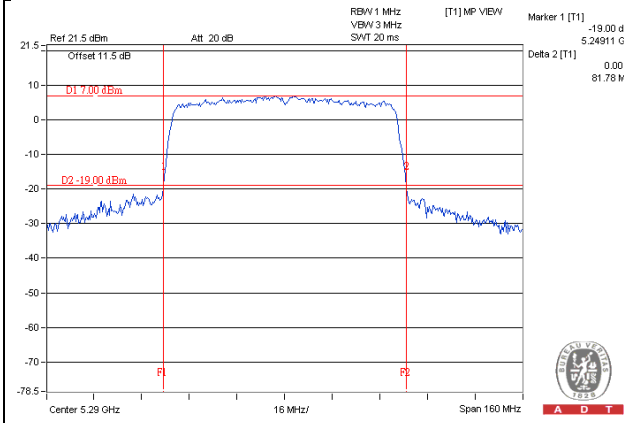
802.11ac (VHT20) / Chain 1\_CH116



802.11ac (VHT40) / Chain 0\_CH102



802.11ac (VHT80) / Chain 0\_CH58



## 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 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  $\geq$  3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to "free run".
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value

#### 802.11ac (VHT80)

Using method SA-2

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

### 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

##### 802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
52	5260	9.49	9.60	Pass
60	5300	9.53	9.60	Pass
64	5320	7.63	9.60	Pass
100	5500	6.69	9.60	Pass
116	5580	9.55	9.60	Pass
140	5700	5.87	9.60	Pass

**NOTE:** Directional gain = 7.4 > 6dBi, so the power density limit shall be reduced to 11-(7.40-6) = 9.60dBm.

##### CDD Mode

##### 802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
52	5260	3.76	3.96	6.87	7.12	Pass
60	5300	3.80	4.26	7.05	7.12	Pass
64	5320	3.84	4.23	7.05	7.12	Pass
100	5500	3.71	4.39	7.07	7.12	Pass
116	5580	3.83	3.95	6.90	7.12	Pass
140	5700	4.41	3.40	6.94	7.12	Pass

**NOTE:** 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$  = 9.88dBi > 6dBi , so the power density limit shall be reduced to 11-(9.88-6) = 7.12dBm.

2. 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.

**802.11ac (VHT40)**

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
54	5270	2.62	3.72	6.21	7.12	Pass
62	5310	0.08	0.42	3.26	7.12	Pass
102	5510	-0.31	0.19	2.96	7.12	Pass
110	5550	3.94	2.80	6.42	7.12	Pass
134	5670	3.71	3.95	6.84	7.12	Pass

**NOTE:** 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 9.88\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (9.88 - 6) = 7.12\text{dBm}$ .

2. 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.

**802.11ac (VHT80)**

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
58	5290	-3.75	-3.70	0.21	-0.50	7.12	Pass
106	5530	-4.90	-4.52	0.21	-1.48	7.12	Pass
122	5610	0.66	-0.09	0.21	3.53	7.12	Pass

**NOTE:** 1. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 9.88\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (9.88 - 6) = 7.12\text{dBm}$ .

2. 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.

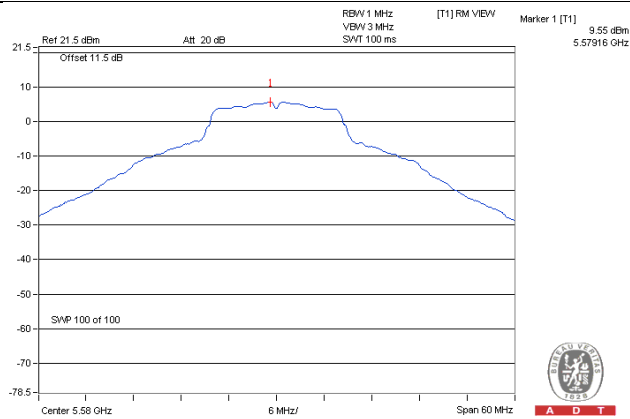
3. Refer to section 3.3 for duty cycle spectrum plot.



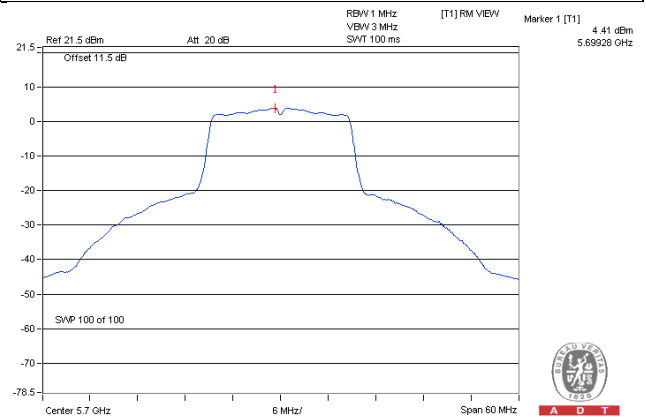
A D T

### Spectrum Plot of Worst Value

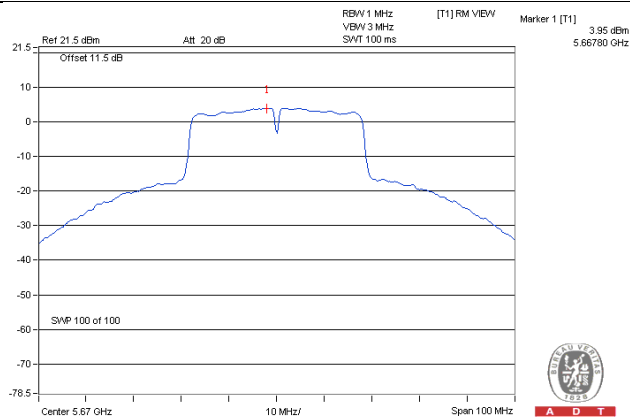
#### 802.11a / CH116



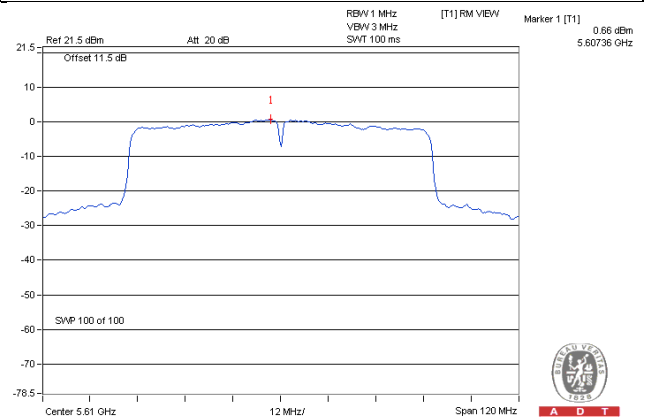
#### 802.11ac (VHT20) / Chain 0\_CH140



#### 802.11ac (VHT40) / Chain 1\_CH134



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

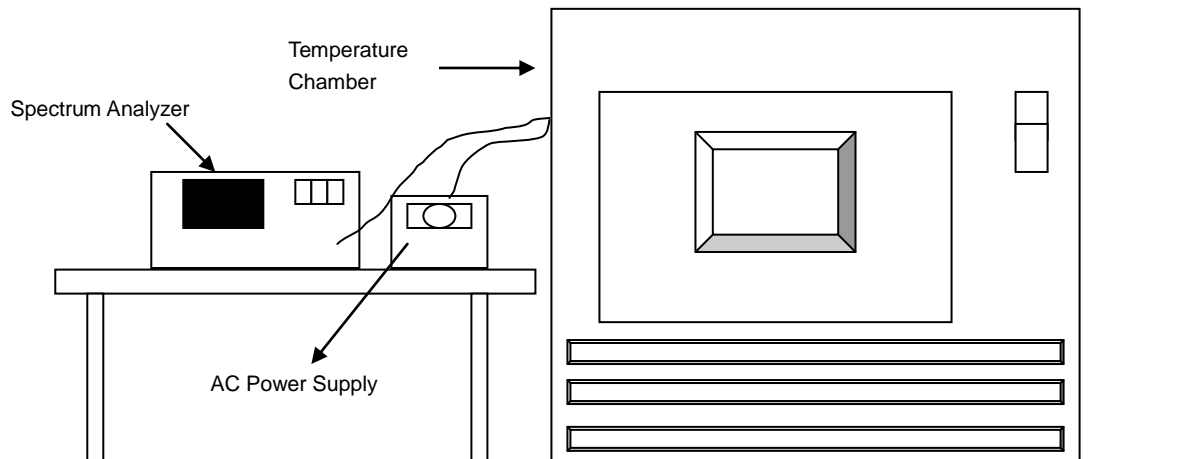


## 4.5 Frequency Stability Measurement

### 4.5.1 Limits of Frequency Stability Measurement

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

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedure

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

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Condition

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



**4.5.7 Test Results**

<b>FREQUENCY STABILITY VERSUS TEMP.</b>									
<b>OPERATING FREQUENCY: 5260MHz</b>									
<b>TEMP. (°C)</b>	<b>POWER SUPPLY (Vac)</b>	<b>0 MINUTE</b>		<b>2 MINUTE</b>		<b>5 MINUTE</b>		<b>10 MINUTE</b>	
		<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>
50	120	5259.9961	-0.00007	5259.9994	-0.00001	5259.9958	-0.00008	5259.9961	-0.00007
40	120	5259.9783	-0.00041	5259.9766	-0.00044	5259.9773	-0.00043	5259.9773	-0.00043
30	120	5259.9823	-0.00034	5259.9832	-0.00032	5259.9839	-0.00031	5259.9832	-0.00032
20	120	5260.0026	0.00005	5259.9983	-0.00003	5260.0024	0.00005	5260.003	0.00006
10	120	5260.0194	0.00037	5260.02	0.00038	5260.0223	0.00042	5260.0227	0.00043
0	120	5259.9923	-0.00015	5259.9953	-0.00009	5259.9944	-0.00011	5259.993	-0.00013
-10	120	5260.0142	0.00027	5260.0147	0.00028	5260.0136	0.00026	5260.0116	0.00022
-20	120	5259.9742	-0.00049	5259.972	-0.00053	5259.9734	-0.00051	5259.9768	-0.00044
-30	120	5259.9924	-0.00014	5259.9916	-0.00016	5259.9928	-0.00014	5259.9916	-0.00016

<b>FREQUENCY STABILITY VERSUS VOLTAGE</b>									
<b>OPERATING FREQUENCY: 5260MHz</b>									
<b>TEMP. (°C)</b>	<b>POWER SUPPLY (Vac)</b>	<b>0 MINUTE</b>		<b>2 MINUTE</b>		<b>5 MINUTE</b>		<b>10 MINUTE</b>	
		<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>
20	138	5260.0022	0.00004	5259.9973	-0.00005	5260.0019	0.00004	5260.004	0.00008
	120	5260.0026	0.00005	5259.9983	-0.00003	5260.0024	0.00005	5260.003	0.00006
	102	5260.0035	0.00007	5259.9977	-0.00004	5260.0025	0.00005	5260.0034	0.00006

## 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.

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

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