FCC REPORT
(UNII)

Applicant:	Aratek Biometrics Co., Ltd.
Address of Applicant:	2F,T2-A Building,ShenZhen Software Park South Area, Hi-Tech Park

Equipment Under Test (EUT)

Product Name:	Automated Election Device
Model No.:	VC33, BD1300
Trade mark:	Aratek
FCC ID:	2AGUJ-VC331
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	12 Jan., 2022
Date of Test:	13 Jan., to 13 Feb., 2022
Date of report issued:	22 Feb., 2022
Test Result:	PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*14 Feb., 2022*	*Original*
01	*22 Feb., 2022*	*add model*

Tested by: Mike.ou ***Date:*** *22 Feb., 2022*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *22 Feb., 2022*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Test Data	Test Result
Antenna requirement	15.203 & 15.407 (a)	See Section 6.1	Pass
AC Power Line Conducted Emission	15.207	See Section 6.2	Pass
Duty Cycle	ANSI C63.10-2013	Appendix A – 5G Wi-Fi	Pass
Conducted Peak Output Power	15.407 (a) (1) (iv)	Appendix A – 5G Wi-Fi	Pass
26dB Occupied Bandwidth	15.407 (a) (12)	Appendix A – 5G Wi-Fi	Pass
6dB Emission Bandwidth	15.407(e)	Appendix A – 5G Wi-Fi	Pass
Power Spectral Density	15.407 (a) (1) (iv)	Appendix A – 5G Wi-Fi	Pass
Band Edge	15.407(b)	See Section 6.6	Pass
Spurious Emission	15.407 (b) & 15.205 & 15.209	See Section 6.7	Pass
Frequency Stability	15.407(g)	Appendix A – 5G Wi-Fi	Pass

Remark:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

Test Method:	*ANSI C63.10-2013* *KDB 789033 D02 General UNII Test Procedures New Rules v02r01*

5 General Information

5.1 Client Information

Applicant:	Aratek Biometrics Co., Ltd.
Address:	2F,T2-A Building,ShenZhen Software Park South Area, Hi-Tech Park
Manufacturer:	Aratek Biometrics Co., Ltd.
Address:	2F,T2-A Building,ShenZhen Software Park South Area, Hi-Tech Park
Factory:	Aratek Biometrics Co., Ltd.
Address:	Block 4, 1st Industrial Park of Nan Gang, 1029# Song Bai Road of Bai Mang, Nan Shan District, Shenzhen 518055, China.

5.2 General Description of E.U.T.

Product Name:	Automated Election Device	
Model No.:	VC33, BD1300	
Operation Frequency:	Band 1: 5150MHz-5250MHz	
Channel numbers:	Band 1:	802.11a/802.11n20: 4 802.11n40: 2 802.11ac: 1
Channel separation:	20MHz:	802.11a/802.11n-HT20/802.11ac-HT20
	40MHz:	802.11n-HT40/802.11ac-HT40
	80MHz:	802.11ac-HT80
Modulation technology (IEEE 802.11a):	BPSK, QPSK, 16-QAM, 64-QAM	
Modulation technology (IEEE 802.11n):	BPSK, QPSK, 16-QAM, 64-QAM	
Modulation technology (IEEE 802.11ac):	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM	
Data speed (IEEE 802.11a):	6Mbps, 9Mbps,12Mbps,18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps	
Data speed (IEEE 802.11n20):	MCS0: 6.5Mbps, MCS1:13Mbps,MCS2:19.5Mbps, MCS3:26Mbps, MCS4:39Mbps, MCS5:52Mbps, MCS6:58.5Mbps, MCS7:65Mbps	
Data speed (IEEE 802.11n40):	MCS0:15Mbps, MCS1:30Mbps, MCS2:45Mbps, MCS3:60Mbps, MCS4:90Mbps, MCS5:120Mbps, MCS6:135Mbps, MCS7:150Mbps	
Data speed (IEEE 802.11ac):	Up to 433.3Mbps	
Antenna Type:	Internal Antenna	
Antenna gain:	1.3dBi	
Power supply:	Rechargeable Li-ion Battery DC11.1V-13Ah	
AC adapter:	Model: AK120WG-2400500W2 Input: AC100-240V, 50/60Hz, 2.0A Output: DC 24.0V, 5.0A	
Remark:	Model No.: VC331, BD1300 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name.	
Test Sample Condition:	The test samples were provided in good working order with no visible defects.	

Operation Frequency each of channel					
Band 1					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	42	5210MHz
40	5200MHz	46	5230MHz		
44	5220MHz				
48	5240MHz				

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Band 1					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest	5180MHz	Lowest	5190MHz	Middle	5210MHz
Middle	5200MHz	Highest	5230MHz		
Highest	5240MHz				

5.3 Test environment and mode, and test samples plans

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate, and found the follow list were the worst case.	

Mode	Data rate
802.11a	6 Mbps
802.11n/ac20	6.5 Mbps
802.11n/ac40	13.5 Mbps
802.11ac80	29.3 Mbps

Remark: *JianYan Testing Group Shenzhen Co., Ltd. is only responsible for the test project data of the above samples, and will keep the above samples for a month.*

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
The EUT has been tested as an independent unit.				

5.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 150KHz) for V-AMN	3.11 dB
Conducted Emission (150kHz ~ 30MHz) for V-AMN	2.62 dB
Conducted Emission (150kHz ~ 30MHz) for AAN	3.54 dB
Radiated Emission (9kHz ~ 30MHz electric field) for 3m SAC	3.13 dB
Radiated Emission (9kHz ~ 30MHz magnetic field) for 3m SAC	3.13 dB
Radiated Emission (30MHz ~ 1GHz) for 3m SAC	4.45 dB
Radiated Emission (1GHz ~ 18GHz) for 3m SAC	5.34 dB
Radiated Emission (18GHz ~ 40GHz) for 3m SAC	5.34 dB

5.6 Additions to, deviations, or exclusions from the method

No

5.7 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.8 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.9 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

5.10 Test Instruments list

Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
3m SAC	ETS	RFD-100	Q1984	04-14-2021	04-13-2024
BiConiLog Antenna	SCHWARZBECK	VULB9163	9163-1246	03-07-2021	03-06-2022
Biconical Antenna	SCHWARZBECK	VUBA 9117	9117#359	06-17-2021	06-17-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	912D-916	03-07-2021	03-06-2022
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1067	04-02-2021	04-01-2022
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1068	04-02-2021	04-01-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-03-2021	03-02-2022
Spectrum analyzer	Keysight	N9010B	MY60240202	10-27-2021	10-26-2022
Low Pre-amplifier	SCHWARZBECK	BBV9743B	00305	03-07-2021	03-06-2022
High Pre-amplifier	SKET	LNPA_0118G-50	MF280208233	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-1G-NN-8M	JYT3M-1	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-18G-NN-8M	JYT3M-2	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-1G-BB-5M	JYT3M-3	03-07-2021	03-06-2022
Cable	Bost	JYT3M-40G-SS-8M	JYT3M-4	04-02-2021	04-01-2022
EMI Test Software	Tonscend	TS+	Version:3.0.0.1		

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI 3	101189	03-03-2021	03-02-2022
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	03-18-2021	03-17-2022
LISN	Rohde & Schwarz	ESH3-Z5	843862/010	06-18-2020	06-17-2022
RF Switch	TOP PRECISION	RSU0301	N/A	03-03-2021	03-02-2022
Cable	Bost	JYTCE-1G-NN-2M	JYTCE-1	03-03-2021	03-02-2022
Cable	Bost	JYTCE-1G-BN-3M	JYTCE-2	03-03-2021	03-02-2022
EMI Test Software	AUDIX	E3	Version: 6.110919b		

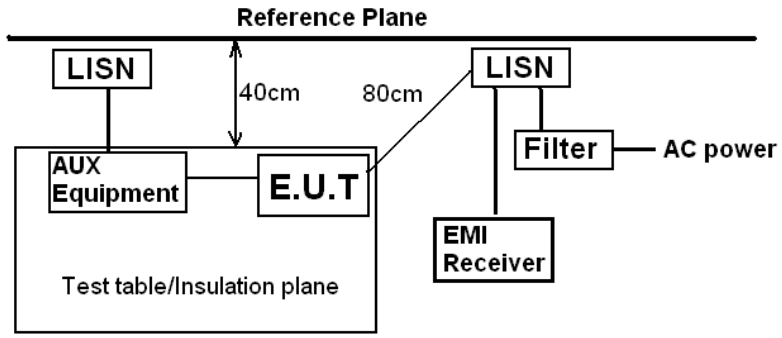
Conducted method:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Spectrum Analyzer	Keysight	N9010B	MY60240202	10-27-2021	10-26-2022
Vector Signal Generator	Keysight	N5182B	MY59101009	10-27-2021	10-26-2022
Analog Signal Generator	Keysight	N5173B	MY59100765	10-27-2021	10-26-2022
Power Detector Box	MWRF-test	MW100-PSB	MW201020JYT	11-19-2021	11-18-2022
Simulated Station	Rohde & Schwarz	CMW270	102335	10-27-2021	10-26-2022
RF Control Box	MWRF-test	MW100-RFCB	MW200927JYT	N/A	N/A
PDU	MWRF-test	XY-G10	N/A	N/A	N/A
DC Power Supply	Keysight	E3642A	MY60296194	11-27-2020	11-26-2023
Temperature Humidity Chamber	Deli	8840	N/A	03-08-2021	03-07-2022
Test Software	MWRF-tes	MTS 8310	Version: 2.0.0.0		

6 Test results and Measurement Data

6.1 Antenna requirement

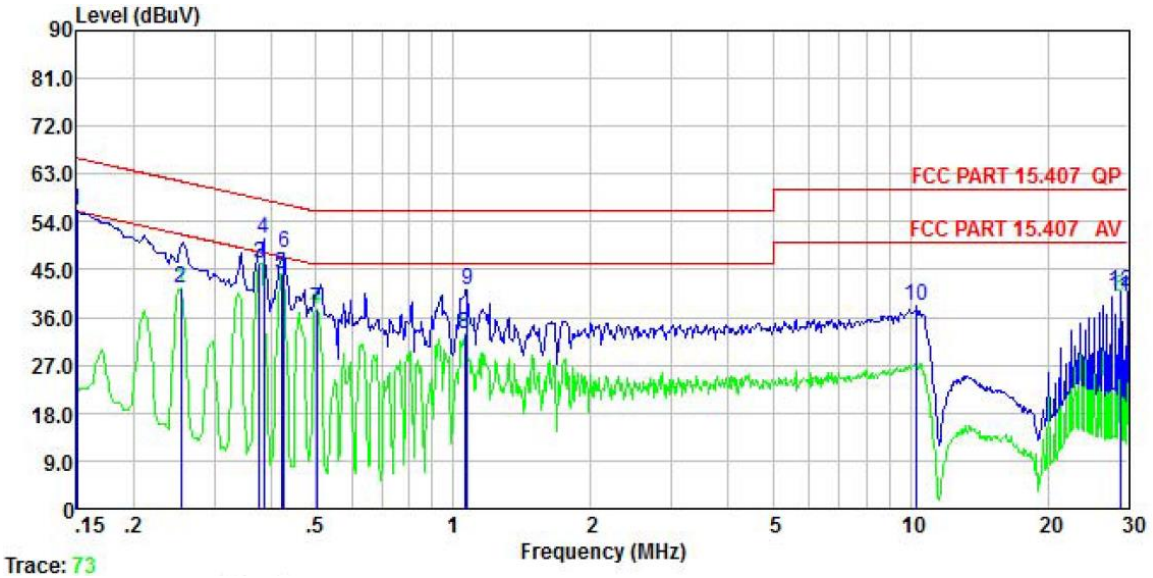
Standard requirement:	FCC Part15 E Section 15.203 /407(a)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.	
E.U.T Antenna:	
The Wi-Fi antenna is an Internal antenna which cannot replace by end-user, the best case gain of the antenna is 1.3 dBi.	

6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	
	0.15-0.5	66 to 56*	0.15-0.5
	0.5-5	56	0.5-5
	5-30	60	5-30
	* Decreases with the logarithm of the frequency.		
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10(latest version) on conducted measurement.		
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*		
Test Instruments:	Refer to section 5.10 for details		
Test mode:	Refer to section 5.3 for details.		
Test results:	Passed		

Measurement Data:

Product name:	Automated Election Device	**Product model:**	VC331
Test by:	Mike	**Test mode:**	5G Wi-Fi Tx mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 19.2℃ Huni: 59%

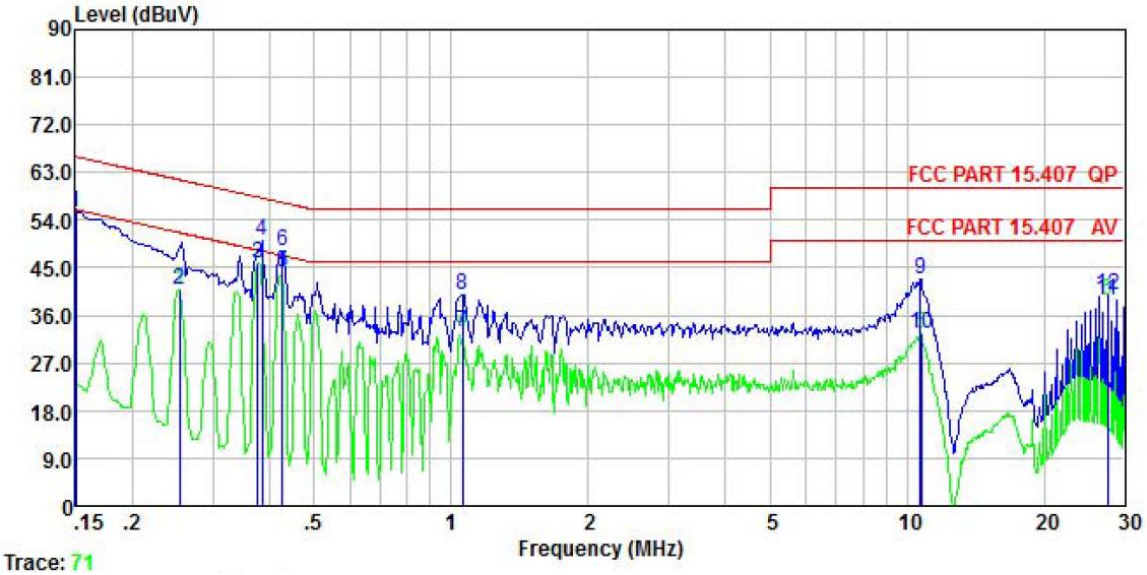


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	56.04	0.04	0.01	56.09	66.00	-9.91	QP
2	0.253	41.44	0.04	0.01	41.49	51.64	-10.15	Average
3	0.377	46.11	0.04	0.03	46.18	48.34	-2.16	Average
4	0.385	50.58	0.04	0.03	50.65	58.17	-7.52	QP
5	0.421	43.98	0.04	0.04	44.06	47.42	-3.36	Average
6	0.426	48.25	0.04	0.03	48.32	57.33	-9.01	QP
7	0.502	37.46	0.04	0.03	37.53	46.00	-8.47	Average
8	1.060	32.75	0.05	0.06	32.86	46.00	-13.14	Average
9	1.071	41.14	0.05	0.07	41.26	56.00	-14.74	QP
10	10.342	37.87	0.21	0.12	38.20	60.00	-21.80	QP
11	28.755	39.41	0.39	0.20	40.00	50.00	-10.00	Average
12	28.755	40.34	0.39	0.20	40.93	60.00	-19.07	QP

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Aux Factor + Cable Loss.*

Product name:	Automated Election Device	Product model:	VC331
Test by:	Mike	Test mode:	5G Wi-Fi Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 19.2℃ Huni: 59%

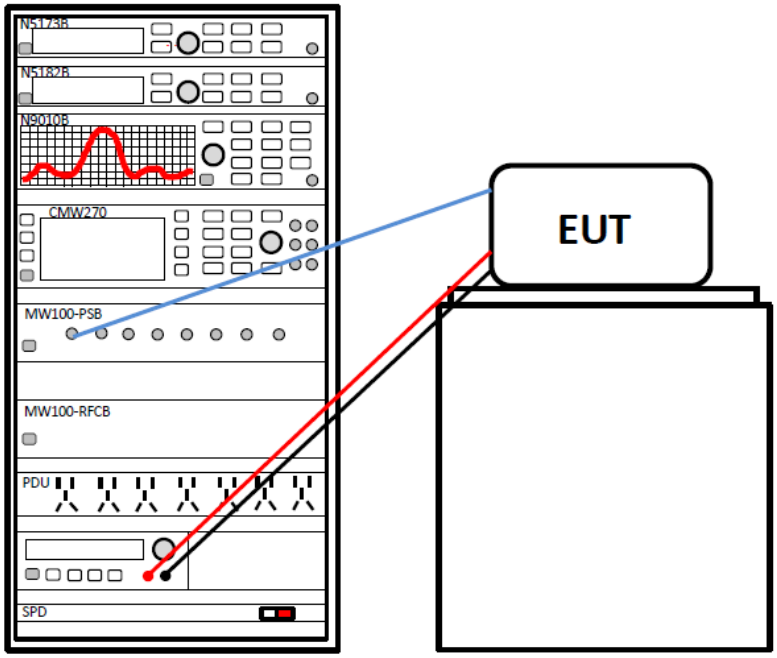


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	55.48	0.05	0.01	55.54	66.00	-10.46	QP
2	0.253	40.95	0.04	0.01	41.00	51.64	-10.64	Average
3	0.377	45.84	0.04	0.03	45.91	48.34	-2.43	Average
4	0.385	49.99	0.04	0.03	50.06	58.17	-8.11	QP
5	0.426	44.16	0.04	0.03	44.23	47.33	-3.10	Average
6	0.426	48.00	0.04	0.03	48.07	57.33	-9.26	QP
7	1.060	32.82	0.05	0.06	32.93	46.00	-13.07	Average
8	1.060	39.83	0.05	0.06	39.94	56.00	-16.06	QP
9	10.676	42.47	0.20	0.12	42.79	60.00	-17.21	QP
10	10.733	32.15	0.20	0.12	32.47	50.00	-17.53	Average
11	27.562	38.17	0.38	0.19	38.74	50.00	-11.26	Average
12	27.562	39.27	0.38	0.19	39.84	60.00	-20.16	QP

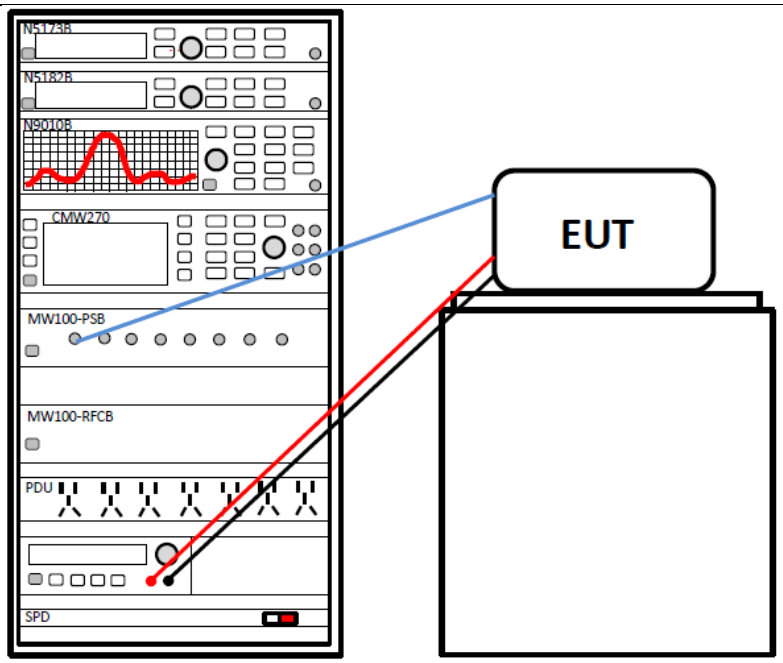
Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Aux Factor + Cable Loss.*

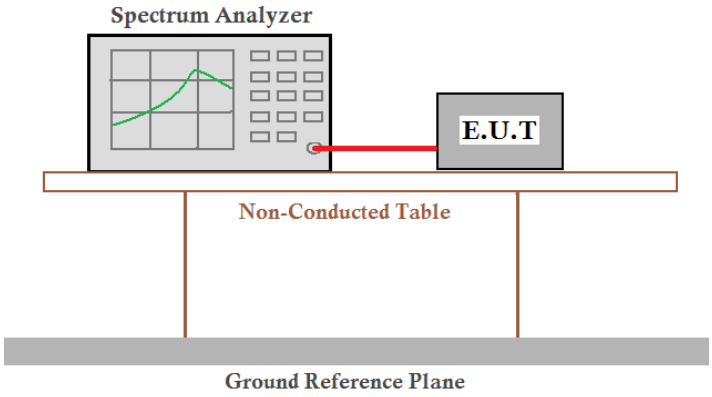
6.3 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv)
Limit:	Band 1: 24dBm
Test setup:	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Measurement Data:	**Refer to Appendix A - 5G WIFI**

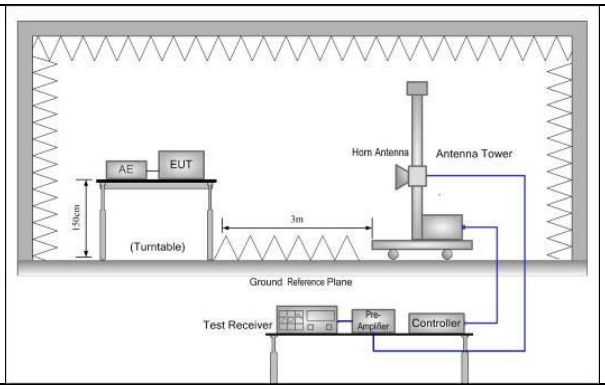
6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407 (a) (12) and Section 15.407 (e)
Limit:	Band 1: N/A (26dB Emission Bandwidth and 99% Occupy Bandwidth)
Test setup:	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Measurement Data:	**Refer to Appendix A - 5G WIFI**

6.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv)
Limit:	Band 1: 11 dBm/MHz
Test setup:	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Measurement Data:	**Refer to Appendix A - 5G WIFI**

6.6 Band Edge

<table>
<tr><td>Test Requirement:</td><td colspan="4">FCC Part 15 E Section 15.407 (b)</td></tr>
<tr><td rowspan="4">Receiver setup:</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td rowspan="4">Limit:</td><td>Band</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td rowspan="2">Band 1</td><td colspan="2">68.20</td><td>Peak Value</td></tr>
<tr><td colspan="2">54.00</td><td>Average Value</td></tr>
<tr><td colspan="4">Remark:
1. Band 1 limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.</td></tr>
<tr><td>Test Procedure:</td><td colspan="4">1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height 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.
4. 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 was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td colspan="4"> 
</td></tr>
<tr><td>Test Instruments:</td><td colspan="4">Refer to section 5.10 for details</td></tr>
<tr><td>Test mode:</td><td colspan="4">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="4">Passed</td></tr>
</table>

Measurement Data (worst case):

Band 1:

Band 1 – 802.11a							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5150.00	35.23	15.49	50.72	68.20	17.48	Horizontal	Peak
5150.00	35.88	15.49	51.37	68.20	16.83	Vertical	Peak
5150.00	28.16	15.49	43.65	54.00	10.35	Horizontal	Average
5150.00	27.90	15.49	43.39	54.00	10.61	Vertical	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5350.00	35.47	16.44	51.91	68.20	16.29	Horizontal	Peak
5350.00	36.12	16.44	52.56	68.20	15.64	Vertical	Peak
5350.00	28.04	16.44	44.48	54.00	9.52	Horizontal	Average
5350.00	27.98	16.44	44.42	54.00	9.58	Vertical	Average

Band 1 – 802.11n(HT20)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5150.00	35.15	15.49	50.64	68.20	17.56	Horizontal	Peak
5150.00	35.76	15.49	51.25	68.20	16.95	Vertical	Peak
5150.00	28.34	15.49	43.83	54.00	10.17	Horizontal	Average
5150.00	27.87	15.49	43.36	54.00	10.64	Vertical	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5350.00	35.51	16.44	51.95	68.20	16.25	Horizontal	Peak
5350.00	35.62	16.44	52.06	68.20	16.14	Vertical	Peak
5350.00	28.45	16.44	44.89	54.00	9.11	Horizontal	Average
5350.00	28.20	16.44	44.64	54.00	9.36	Vertical	Average

Remark:

1. Final Level = Receiver Read level + Factor.

2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

Band 1 – 802.11n(HT40)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5150.00	35.35	15.49	50.84	68.20	17.36	Horizontal	Peak
5150.00	35.88	15.49	51.37	68.20	16.83	Vertical	Peak
5150.00	28.42	15.49	43.91	54.00	10.09	Horizontal	Average
5150.00	28.07	15.49	43.56	54.00	10.44	Vertical	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5350.00	35.48	16.44	51.92	68.20	16.28	Horizontal	Peak
5350.00	35.63	16.44	52.07	68.20	16.13	Vertical	Peak
5350.00	28.39	16.44	44.83	54.00	9.17	Horizontal	Average
5350.00	27.76	16.44	44.20	54.00	9.8	Vertical	Average

Band 1 – 802.11ac(HT20)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5150.00	35.11	15.49	50.60	68.20	17.6	Horizontal	Peak
5150.00	35.56	15.49	51.05	68.20	17.15	Vertical	Peak
5150.00	28.32	15.49	43.81	54.00	10.19	Horizontal	Average
5150.00	27.74	15.49	43.23	54.00	10.77	Vertical	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5350.00	35.46	16.44	51.90	68.20	16.3	Horizontal	Peak
5350.00	35.52	16.44	51.96	68.20	16.24	Vertical	Peak
5350.00	28.47	16.44	44.91	54.00	9.09	Horizontal	Average
5350.00	27.80	16.44	44.24	54.00	9.76	Vertical	Average

Remark:

1. Final Level = Receiver Read level + Factor.

2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

Band 1 – 802.11ac(HT40)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5150.00	34.73	15.49	50.22	68.20	17.98	Horizontal	Peak
5150.00	35.62	15.49	51.11	68.20	17.09	Vertical	Peak
5150.00	28.35	15.49	43.84	54.00	10.16	Horizontal	Average
5150.00	27.71	15.49	43.20	54.00	10.8	Vertical	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5350.00	35.40	16.44	51.84	68.20	16.36	Horizontal	Peak
5350.00	35.99	16.44	52.43	68.20	15.77	Vertical	Peak
5350.00	27.84	16.44	44.28	54.00	9.72	Horizontal	Average
5350.00	27.75	16.44	44.19	54.00	9.81	Vertical	Average

Band 1 – 802.11ac(HT80)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5150.00	34.95	15.49	50.44	68.20	17.76	Horizontal	Peak
5150.00	35.78	15.49	51.27	68.20	16.93	Vertical	Peak
5150.00	28.70	15.49	44.19	54.00	9.81	Horizontal	Average
5150.00	27.94	15.49	43.43	54.00	10.57	Vertical	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Polarity
5350.00	35.41	16.44	51.85	68.20	16.35	Horizontal	Peak
5350.00	35.52	16.44	51.96	68.20	16.24	Vertical	Peak
5350.00	28.39	16.44	44.83	54.00	9.17	Horizontal	Average
5350.00	27.84	16.44	44.28	54.00	9.72	Vertical	Average

Remark:

1. Final Level = Receiver Read level + Factor.

2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

6.7 Spurious Emission

6.7.1 Restricted Band

Test Requirement:	FCC Part15 E Section 15.407(b)
Test Frequency Range:	4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	RMS	1MHz	3MHz	Average Value

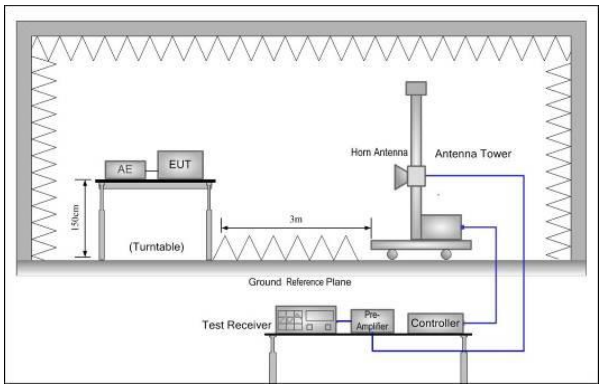
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
Above 1GHz	74.00	Peak Value
	54.00	Average Value

Test Procedure:

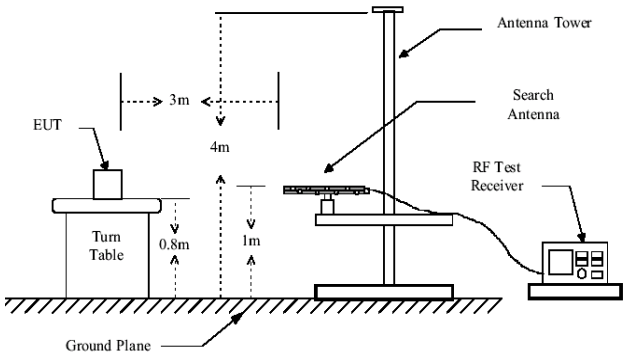
1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height 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.
4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test setup:

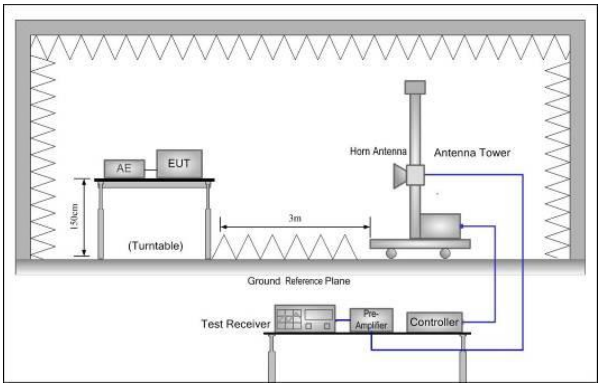


Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed(Refer to section 6.6)

6.7.2 Unwanted Emissions out of the Restricted Bands

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>68.20</td><td>Peak Value</td></tr>
<tr><td>54.00</td><td>Average Value</td></tr>
</table>
Remark:
Above 1GHz limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.
</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height 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.
4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td>Below 1GHz
 

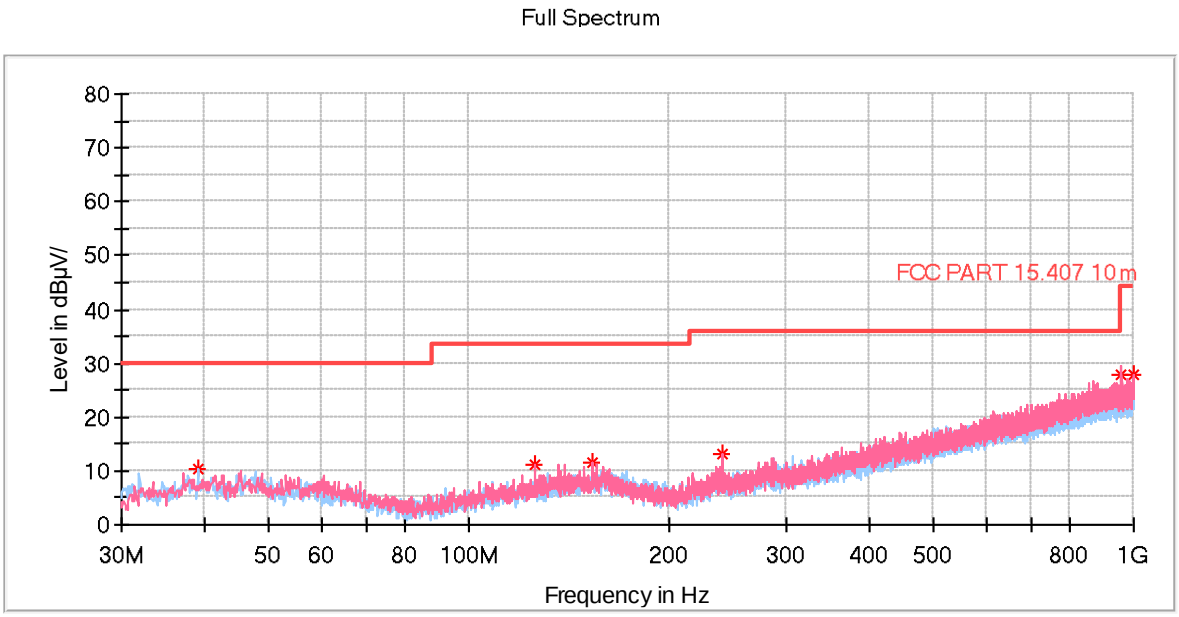
Above 1GHz</td></tr>
</table>

	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case):

Below 1GHz

Product Name:	Automated Election Device	**Product Model:**	VC331
Test By:	Mike	**Test mode:**	5G Wi-Fi Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical &Horizontal
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 20.9℃ Huni: 59%



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.118000	10.35	30.00	19.65	100.0	H	18.0	-15.9
125.351000	11.05	33.50	22.45	100.0	V	351.0	-16.7
153.287000	11.70	33.50	21.80	100.0	V	34.0	-15.5
240.005000	13.13	36.00	22.87	100.0	V	98.0	-15.7
959.357000	27.95	36.00	8.05	100.0	V	172.0	0.0
998.642000	27.92	44.00	16.08	100.0	V	343.0	0.6

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Above 1GHz:
Band 1:

Band 1 – 802.11a							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10360.00	52.37	5.48	57.85	68.20	10.35	Vertical	Peak
10360.00	52.35	5.48	57.83	68.20	10.37	Horizontal	Peak
10360.00	44.43	5.48	49.91	54.00	4.09	Vertical	Average
10360.00	45.08	5.48	50.56	54.00	3.44	Horizontal	Average
Test channel: Middle channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10400.00	52.45	5.31	57.76	68.20	10.44	Vertical	Peak
10400.00	52.31	5.31	57.62	68.20	10.58	Horizontal	Peak
10400.00	44.56	5.31	49.87	54.00	4.13	Vertical	Average
10400.00	45.47	5.31	50.78	54.00	3.22	Horizontal	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10480.00	52.53	5.98	58.51	68.20	9.69	Vertical	Peak
10480.00	52.62	5.98	58.60	68.20	9.60	Horizontal	Peak
10480.00	44.57	5.98	50.55	54.00	3.45	Vertical	Average
10480.00	45.39	5.98	51.37	54.00	2.63	Horizontal	Average
Band 1 – 802.11n(HT20)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10360.00	52.56	5.48	58.04	68.20	10.16	Vertical	Peak
10360.00	52.74	5.48	58.22	68.20	9.98	Horizontal	Peak
10360.00	44.35	5.48	49.83	54.00	4.17	Vertical	Average
10360.00	45.17	5.48	50.65	54.00	3.35	Horizontal	Average
Test channel: Middle channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10400.00	52.22	5.31	57.53	68.20	10.67	Vertical	Peak
10400.00	52.53	5.31	57.84	68.20	10.36	Horizontal	Peak
10400.00	44.38	5.31	49.69	54.00	4.31	Vertical	Average
10400.00	45.12	5.31	50.43	54.00	3.57	Horizontal	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10480.00	52.30	5.98	58.28	68.20	9.92	Vertical	Peak
10480.00	52.38	5.98	58.36	68.20	9.84	Horizontal	Peak
10480.00	44.36	5.98	50.34	54.00	3.66	Vertical	Average
10480.00	45.47	5.98	51.45	54.00	2.55	Horizontal	Average

Remark:
1. *Final Level = Receiver Read level + Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Band 1 – 802.11n(HT40)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10380.00	52.46	5.39	57.85	68.20	10.35	Vertical	Peak
10380.00	52.64	5.39	58.03	68.20	10.17	Horizontal	Peak
10380.00	44.78	5.39	50.17	54.00	3.83	Vertical	Average
10380.00	44.89	5.39	50.28	54.00	3.72	Horizontal	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10460.00	52.63	5.81	58.44	68.20	9.76	Vertical	Peak
10460.00	52.52	5.81	58.33	68.20	9.87	Horizontal	Peak
10460.00	44.67	5.81	50.48	54.00	3.52	Vertical	Average
10460.00	45.41	5.81	51.22	54.00	2.78	Horizontal	Average
Band 1 – 802.11ac(HT20)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10360.00	52.24	5.48	57.72	68.20	10.48	Vertical	Peak
10360.00	52.36	5.48	57.84	68.20	10.36	Horizontal	Peak
10360.00	44.63	5.48	50.11	54.00	3.89	Vertical	Average
10360.00	45.28	5.48	50.76	54.00	3.24	Horizontal	Average
Test channel: Middle channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10400.00	52.15	5.31	57.46	68.20	10.74	Vertical	Peak
10400.00	52.40	5.31	57.71	68.20	10.49	Horizontal	Peak
10400.00	44.71	5.31	50.02	54.00	3.98	Vertical	Average
10400.00	44.82	5.31	50.13	54.00	3.87	Horizontal	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10480.00	52.47	5.98	58.45	68.20	9.75	Vertical	Peak
10480.00	52.69	5.98	58.67	68.20	9.53	Horizontal	Peak
10480.00	44.25	5.98	50.23	54.00	3.77	Vertical	Average
10480.00	45.44	5.98	51.42	54.00	2.58	Horizontal	Average

Remark:

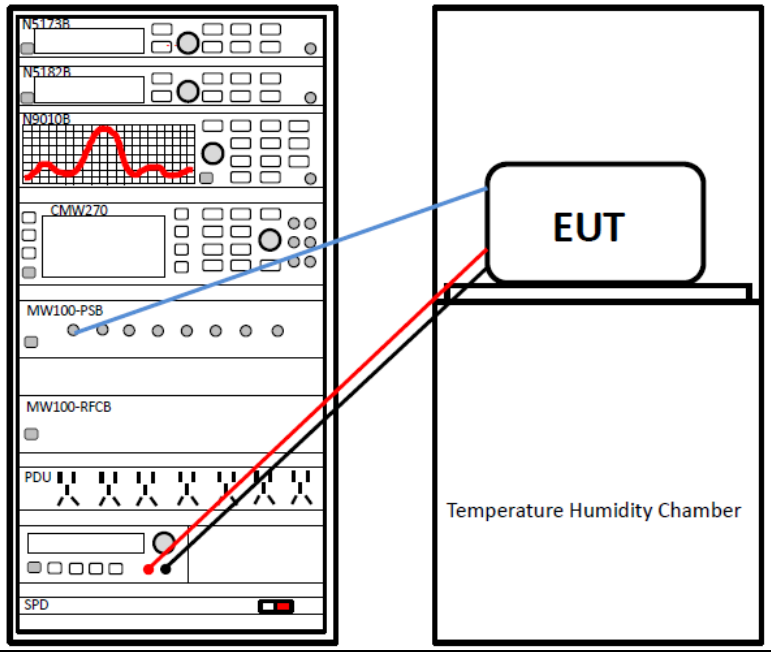
1. Final Level = Receiver Read level + Factor.

2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

Band 1 – 802.11ac(HT40)							
Test channel: Lowest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10380.00	52.46	5.39	57.85	68.20	10.35	Vertical	Peak
10380.00	52.62	5.39	58.01	68.20	10.19	Horizontal	Peak
10380.00	44.33	5.39	49.72	54.00	4.28	Vertical	Average
10380.00	45.29	5.39	50.68	54.00	3.32	Horizontal	Average
Test channel: Highest channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10460.00	52.25	5.81	58.06	68.20	10.14	Vertical	Peak
10460.00	52.71	5.81	58.52	68.20	9.68	Horizontal	Peak
10460.00	44.66	5.81	50.47	54.00	3.53	Vertical	Average
10460.00	44.90	5.81	50.71	54.00	3.29	Horizontal	Average
Band 1 – 802.11ac(HT80)							
Test channel: Middle channel							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin [dB]	Polarization	Trace
10420.00	52.58	5.48	58.06	68.20	10.14	Vertical	Peak
10420.00	52.62	5.48	58.10	68.20	10.10	Horizontal	Peak
10420.00	44.57	5.48	50.05	54.00	3.95	Vertical	Average
10420.00	45.47	5.48	50.95	54.00	3.05	Horizontal	Average

Remark:
1. Final Level = Receiver Read level + Factor.
2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

6.8 Frequency stability

Test Requirement:	FCC Part15 E Section 15.407 (g)
Limit:	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
Test setup:	
Test procedure:	1. The EUT is installed in an environment test chamber with external power source. 2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT. 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement. 4. When temperature is stabled, measure the frequency stability. 5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	**Refer to Appendix A - 5G WIFI**