



FCC TEST REPORT

**Test report
On Behalf of
Clear Touch Solutions, Inc.
For
Document Camera**

Model No.: DC110, DC100, DC200, DC400

FCC ID: 2ARWS-DC1NX

**Prepared for : Clear Touch Solutions, Inc.
561 Keystone Avenue, Suite 821, Reno, NV 89503 USA**

**Prepared By : Shenzhen HUAK Testing Technology Co., Ltd.
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street,
Bao'an District, Shenzhen City, China**

**Date of Test: Sep. 14, 2020 -- Sep. 24, 2020
Date of Report: Sep. 24, 2020
Report Number: HK2009222672-E**



TEST RESULT CERTIFICATION

Applicant's name: Clear Touch Solutions, Inc.

Address: 561 Keystone Avenue, Suite 821, Reno, NV 89503 USA

Manufacture's Name: SHENZHEN SHINYLOAM ELECTRONICS CO.,LTD

Address: 2nd Building, Phase 1, Lianchuang Technical Zone, Bulan Road, Longgang, Shenzhen, Guangdong, China

Product description

Trade Mark: ClearTouch

Product name: Document Camera

Model and/or type reference : DC110, DC100, DC200, DC400

Standards: FCC Rules and Regulations Part 15 Subpart C Section 15.407

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Date of Test:

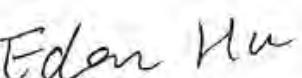
Date (s) of performance of tests: Sep. 14, 2020 -- Sep. 24, 2020

Date of Issue: Nov. 27, 2020

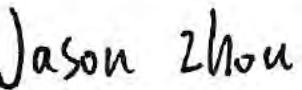
Test Result: Pass

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)



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1. Test Result Summary

1.1. TEST PROCEDURES AND RESULTS

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Maximum Conducted Output Power	§15.407(a)	PASS
6dB Emission Bandwidth	§15.407(e)	PASS
Power Spectral Density	§15.407(a)	PASS
Band edge	§15.407(b)	PASS
Radiated Emission	§15.407(a)	PASS
Frequency Stability	§15.407(g)	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

1.2. TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China



1.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^\circ\text{C}$
7	Humidity	$\pm 1.0\%$



2. EUT Description

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Document Camera			
Model Name	DC110			
Serial No.	DC100, DC200, DC400			
Model Difference	All model's the function, software and electric circuit are the same, only model named different. Test sample model: DC110			
Trade Mark	ClearTouch			
FCC ID	2ARWS-DC1NX			
Hardware Version:	V1.6.2			
Software Version:	V1.0			
Frequency Range :	Band	Mode	Operation frequency	Channels
	BAND III	IEEE802.11 a HT20 IEEE802.11 ac HT20 IEEE802.11 ac HT40	5745-5825 MHz 5745-5825 MHz 5755-5795 MHz	5 5 2
Antenna Type	Internal antenna			
Antenna Gain	Antenna: 2dBi			
Power Source	DC 5.0V from adapter/pc or DC3.7V from battery			

Note: This report only shows 5.8G (band3) test data
the product can not transmit 802.11ac(80MHz) mode

2.2. Operation Frequency each of channel

802.11a / 802.11ac (20MHz) Frequency / Channel Operations Band 3

CH.	Frequency (MHz)
149	5745
...	...
157	5785
...	...
165	5825

802.11n / 802.11ac (40MHz BW) Frequency / Channel Operations Band 3

CH.	Frequency (MHz)
151	5755
159	5795

Worst Case Configuration: ANT1 transmitting mode

Description	5 GHz Emission
Antenna	ANT1
Channel	149
Operating Frequency (MHz)	5745
Data Rate (Mbps)	MCS0

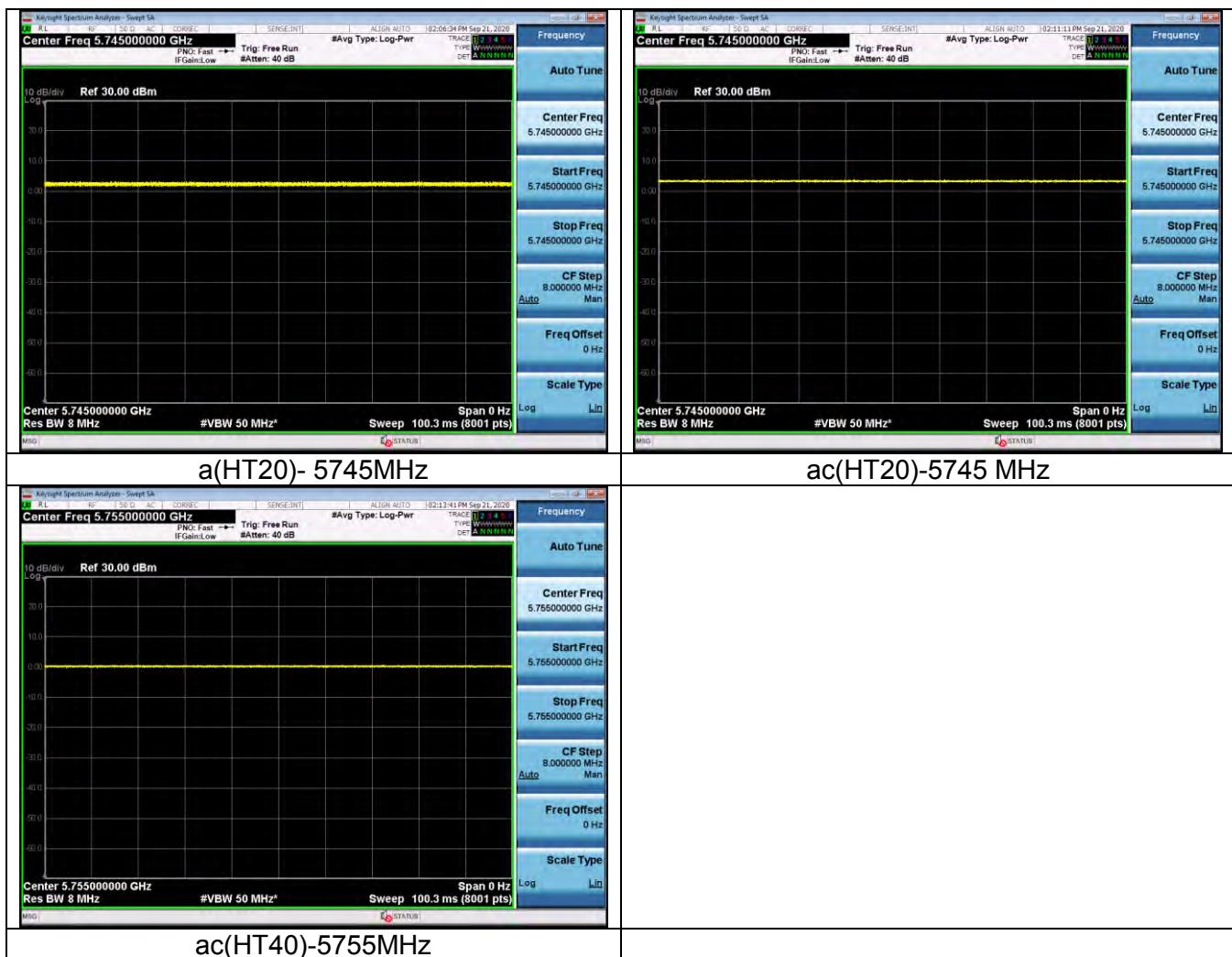


2.3. Duty Cycles

5GHz NII operation is possible in 20MHz, and 40MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of ANSI C63.10-2013 and KDB 789033 D02 v02r01. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Duty Cycles(%)

Mode/Band	ANT1
a(HT20)	100
ac(HT20)	100
ac(HT40)	100



2.4. EUT CONFIGURATION

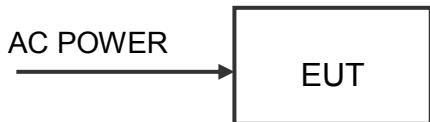
The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

The EUT is operated in the engineering mode to fix the Tx frequency for the purposes of measurement. According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.



2.5. DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing:



Operation of EUT during Radiation and Above1GHz Radiation testing:



2.6. 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.

Equipment	Model No.	Manufacture	Remark	Certificate
AC-DC adapter	Model:FJ-SW1260502500UN INPUT:100-240 50/60Hz 0.4A Max OUTPUT:5V 2500mA	SHENZHEN FUJIA APPLIANCE CO.,LTD	Provide by lab	SDOC

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

3. Test Results and Measurement Data

3.1. Conducted Emission

3.1.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	<p><i>Remark:</i> <i>E.U.T: Equipment Under Test</i> <i>LISN: Line Impedance Stabilization Network</i> <i>Test table height=0.8m</i></p>														
Test Mode:	Tx Mode														
Test Procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This 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: 2013 on conducted measurement. 														
Test Result:	PASS														



3.1.2. Test Instruments

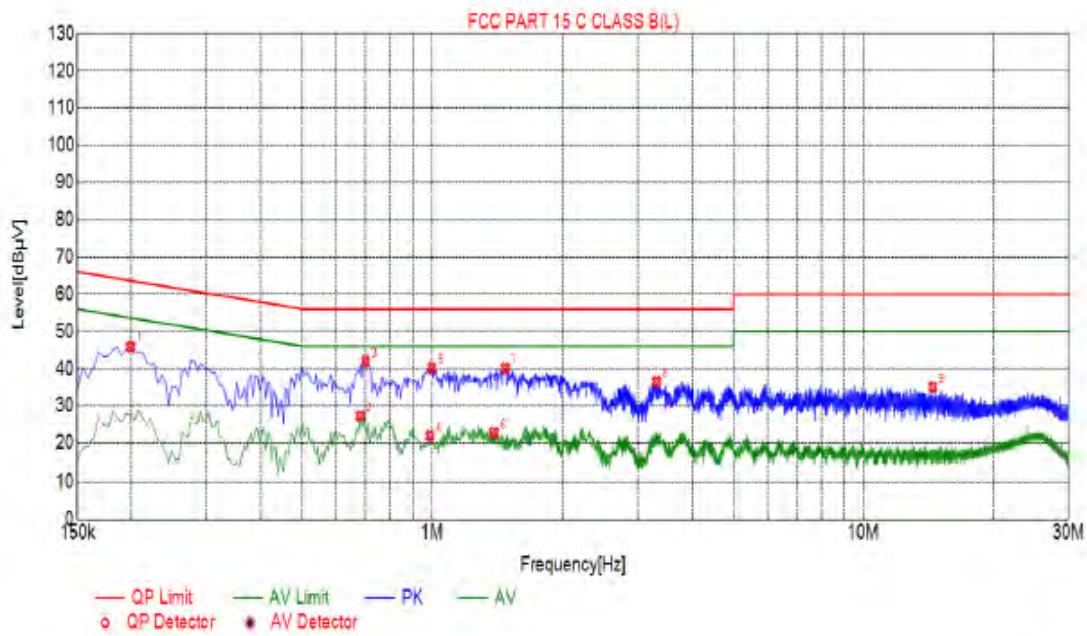
Conducted Emission Shielding Room Test Site (843)					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	R&S	ESCI 7	HKE-010	Dec. 26, 2019	Dec. 25, 2020
LISN	R&S	ENV216	HKE-002	Dec. 26, 2019	Dec. 25, 2020
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Dec. 26, 2019	Dec. 25, 2020
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

3.1.3. Test data

All the test modes completed for test. only the worst result of AC120V/60Hz(802.11a at 5745MHz) was reported as below:

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)

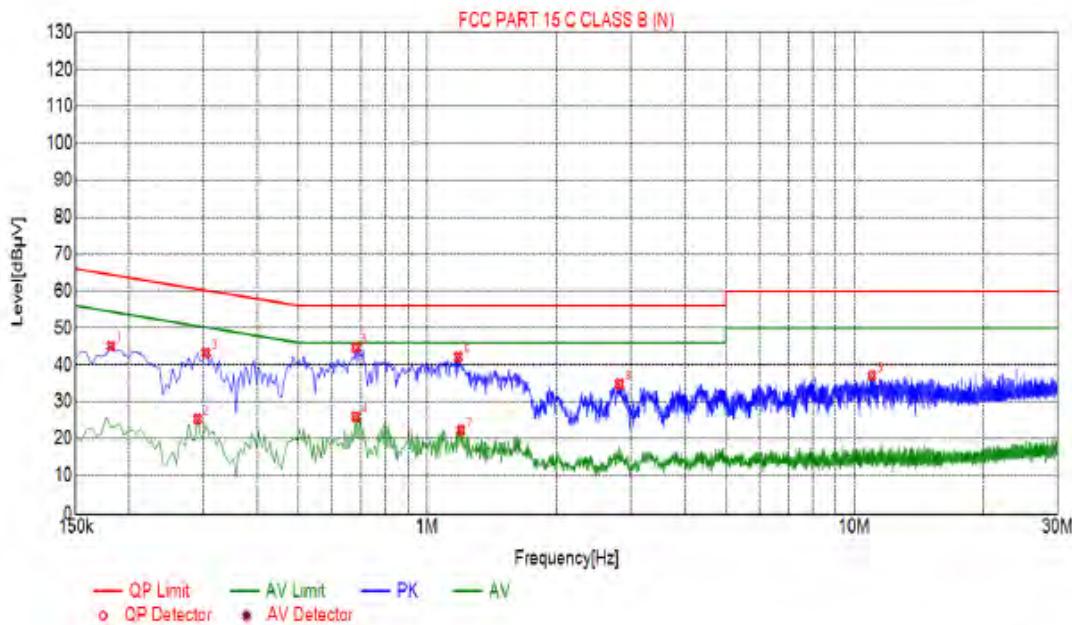


Suspected List

NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.1995	45.88	20.03	63.63	17.75	25.85	PK	L
2	0.6810	27.31	20.05	46.00	18.69	7.26	AV	L
3	0.6990	41.98	20.05	56.00	14.02	21.93	PK	L
4	0.9870	21.97	20.06	46.00	24.03	1.91	AV	L
5	0.9960	40.19	20.06	56.00	15.81	20.13	PK	L
6	1.3920	22.83	20.11	46.00	23.17	2.72	AV	L
7	1.4775	40.16	20.10	56.00	15.84	20.06	PK	L
8	3.3135	36.50	20.24	56.00	19.50	16.26	PK	L
9	14.5095	35.06	19.95	60.00	24.94	15.11	PK	L



Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Suspected List

NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.1815	45.07	20.06	64.42	19.35	25.01	PK	N
2	0.2895	25.30	20.03	50.54	25.24	5.27	AV	N
3	0.3030	43.25	20.04	60.16	16.91	23.21	PK	N
4	0.6810	25.98	20.05	46.00	20.02	5.93	AV	N
5	0.6810	44.66	20.05	56.00	11.34	24.61	PK	N
6	1.1805	42.08	20.09	56.00	13.92	21.99	PK	N
7	1.1985	22.30	20.09	46.00	23.70	2.21	AV	N
8	2.8185	34.79	20.21	56.00	21.21	14.58	PK	N
9	10.9950	37.03	20.01	60.00	22.97	17.02	PK	N



3.2. Maximum Conducted Output Power

3.2.1. Test Specification



3.2.2. Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 26, 2019	Dec. 25, 2020
Power meter	Agilent	E4419B	HKE-085	Dec. 26, 2019	Dec. 25, 2020
Power Sensor	Agilent	E9300A	HKE-086	Dec. 26, 2019	Dec. 25, 2020
RF cable	Times	1-40G	HKE-034	Dec. 26, 2019	Dec. 25, 2020
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 26, 2019	Dec. 25, 2020

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

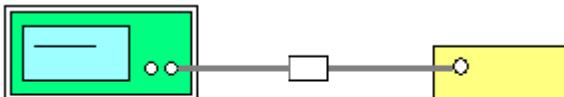
Test Data

BAND	802.11 Mode	Channel No.	Frequency [MHz]	Conducted Power [dBm]	Limit [dBm]
BAND 3	a (20MHz)	149	5745	7.101	30.00
		157	5785	7.024	30.00
		165	5825	6.937	30.00
	ac (20MHz)	149	5745	8.575	30.00
		157	5785	7.617	30.00
		165	5825	8.672	30.00
	ac(40MHz)	151	5755	8.257	30.00
		159	5795	8.036	30.00



3.3. -6dB Bandwidth

3.3.1. Test Specification

Test Requirement:	47 CFR Part 15C Section 15.407 (a)& Part 2 J Section 2.1049
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	In the 5.725 – 5.850GHz band, the 6dB bandwidth must be ≥ 500 kHz.
Test Setup:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth RBW = 1% EBW, $VBW \geq 3RBW$, In order to make an accurate measurement. 4. Measure and record the results in the test report.
Test Result:	N/A

3.3.2. Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 26, 2019	Dec. 25, 2020
RF cable	Times	1-40G	HKE-034	Dec. 26, 2019	Dec. 25, 2020
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 26, 2019	Dec. 25, 2020

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

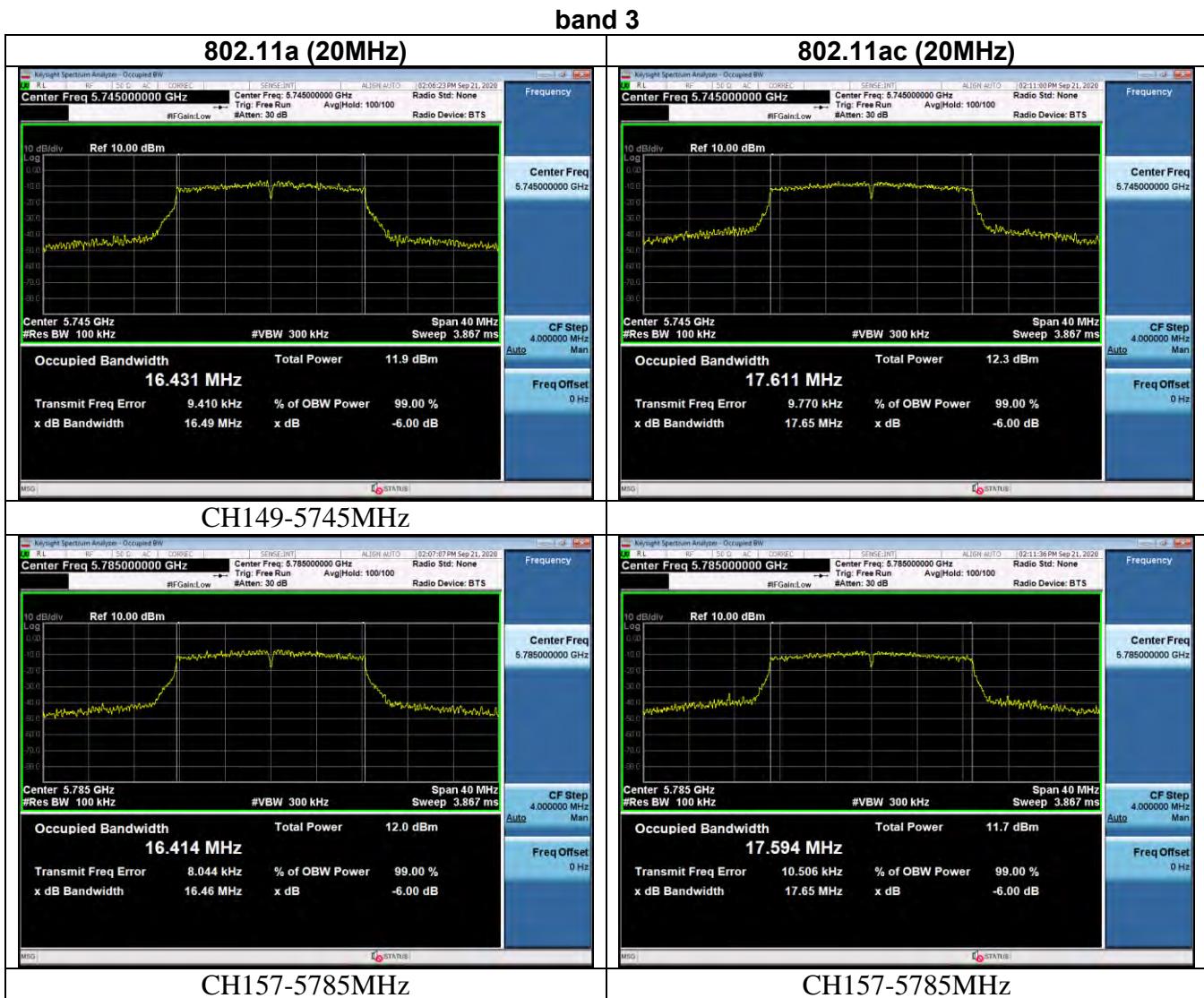


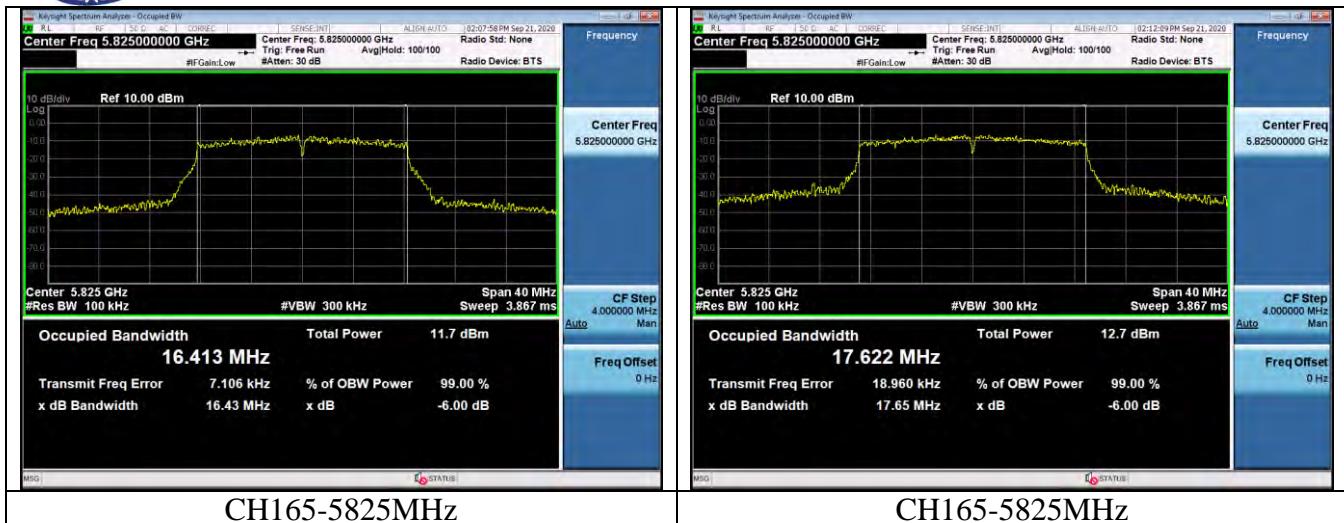
Test Result

Report No.: HK2009222672-E

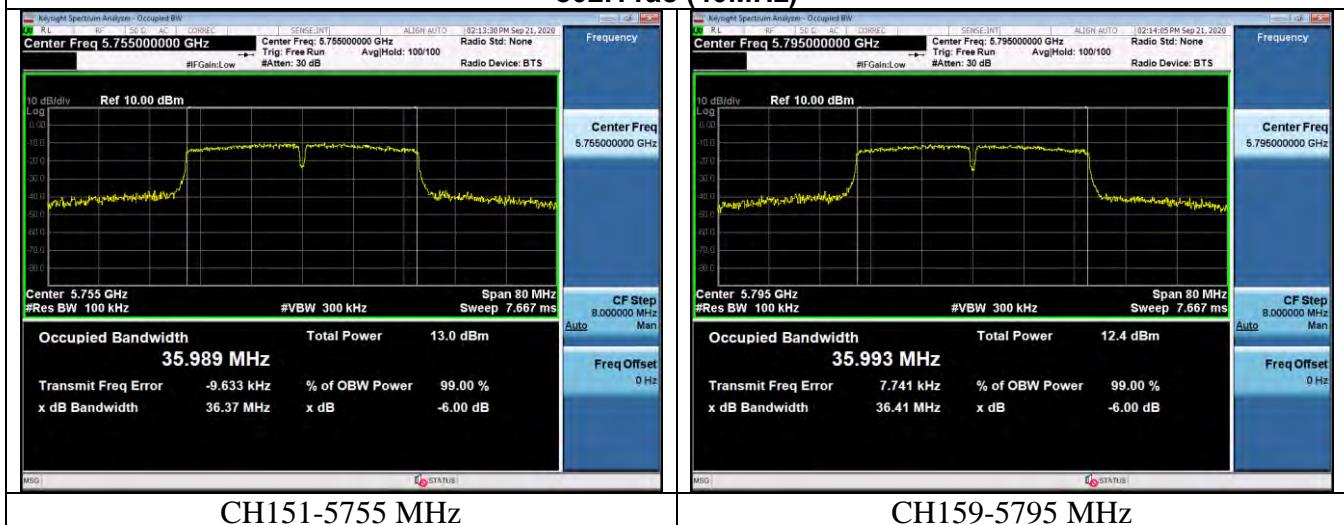
BAND	802.11 Mode	Channel No.	Frequency [MHz]	-6db Bandwidth [MHz]
BAND 3	a (20MHz)	149	5745	16.49
		157	5785	16.46
		165	5825	16.43
	ac (20MHz)	149	5745	17.65
		157	5785	17.65
		165	5825	17.65
	ac(40MHz)	151	5755	36.37
		159	5795	36.41
Limit			≥ 500 kHz	
Result			PASS	

Test plots as follows:





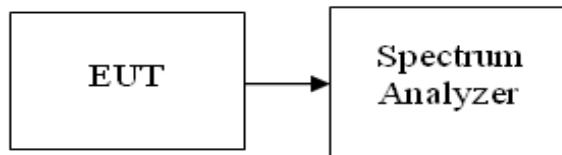
802.11ac (40MHz)



99% EMISSION BANDWIDTHA

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

TEST CONFIGURATION



TEST PROCEDURE

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot \text{RBW}$
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

TEST RESULTS

BAND	802.11 Mode	Channel No.	Frequency [MHz]	99%dB Bandwidth [MHz]
BAND 3	a (20MHz)	149	5745	16.741
		157	5785	16.686
		165	5825	16.713
	ac (20MHz)	149	5745	17.773
		157	5785	17.731
		165	5825	17.793
	ac(40MHz)	151	5755	36.141
		159	5795	36.183

Test plots as follows:





band 3

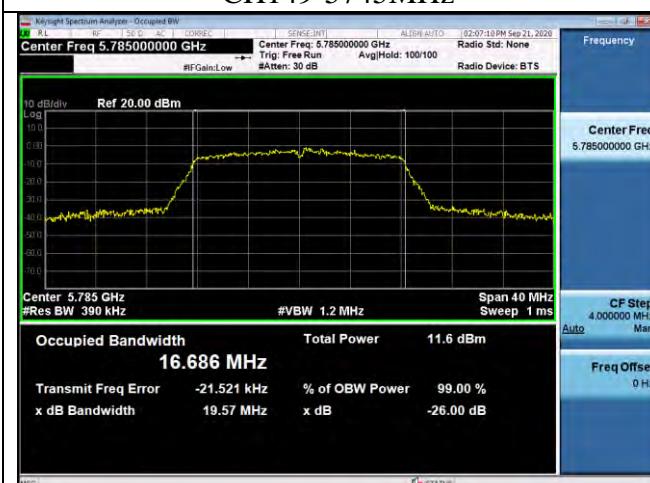
802.11a (20MHz)



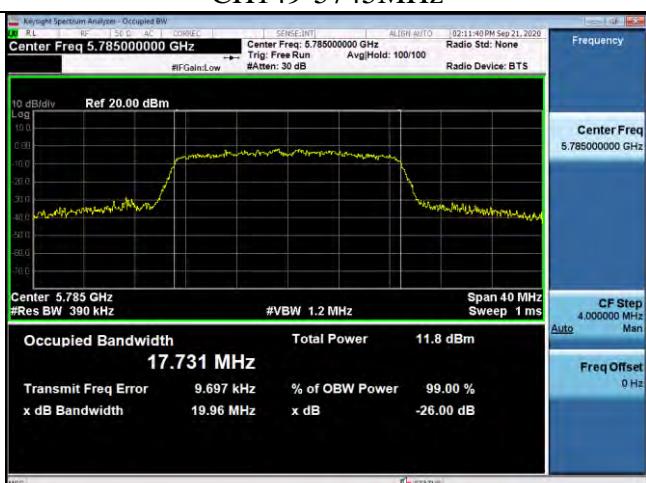
802.11ac (20MHz)



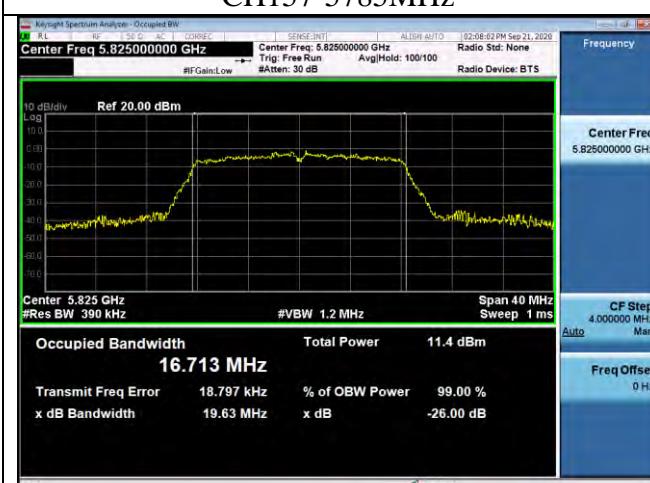
CH149-5745MHz



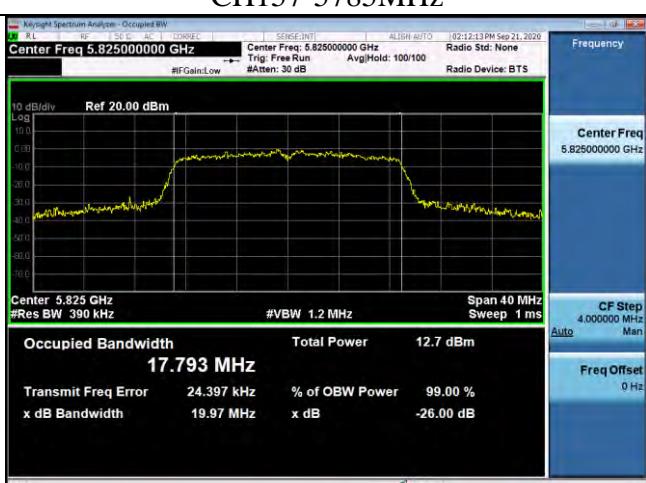
CH149-5745MHz



CH157-5785MHz

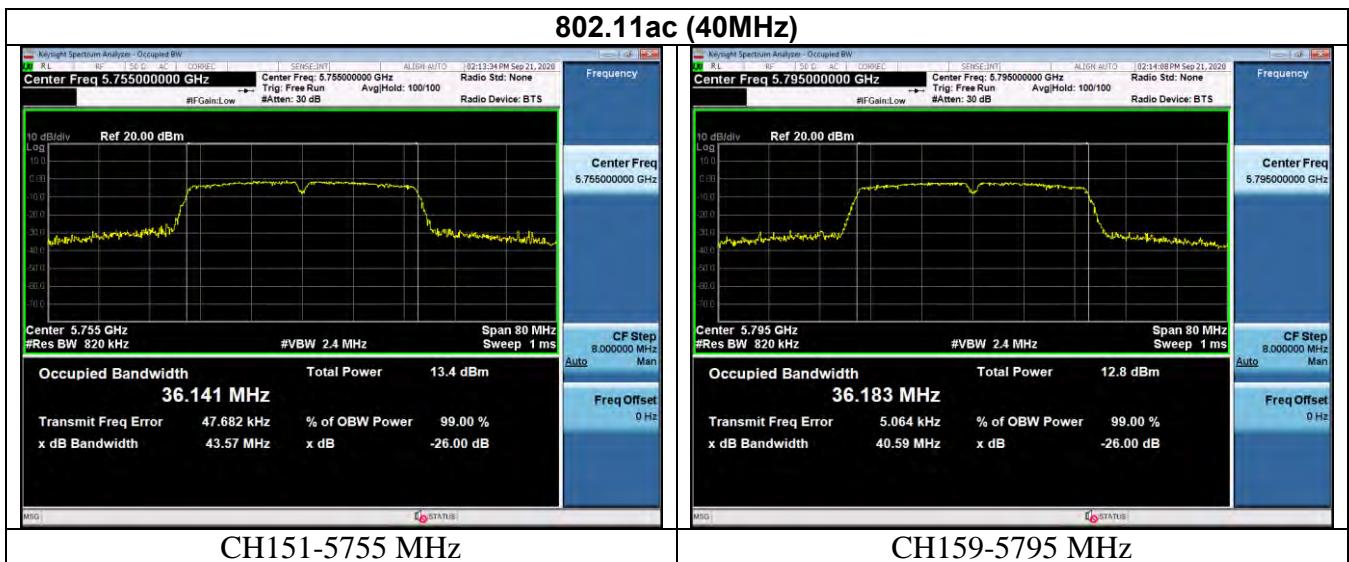


CH157-5785MHz



CH165-5825MHz

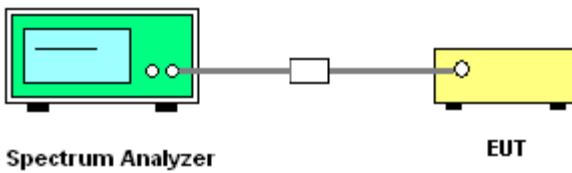
CH165-5825MHz





3.4. Power Spectral Density

3.4.1. Test Specification

Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
Limit:	$\leq 11.00 \text{dBm/MHz}$ for Band I 5150MHz-5250MHz $\leq 30.00 \text{dBm/500KHz}$ for Band IV 5725MHz-5850MHz The e.i.r,p spectral density for Band I 5150MHz – 5250 MHz should not exceed 10dBm/MHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none">1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.1. Set RBW = 510 kHz/1 MHz, VBW $\geq 3 \times \text{RBW}$, Sweep time = Auto, Detector = RMS.2. Allow the sweeps to continue until the trace stabilizes.3. Use the peak marker function to determine the maximum amplitude level.4. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.
Test Result:	PASS

3.4.2. Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 26, 2019	Dec. 25, 2020
RF cable	Times	1-40G	HKE-034	Dec. 26, 2019	Dec. 25, 2020
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 26, 2019	Dec. 25, 2020

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

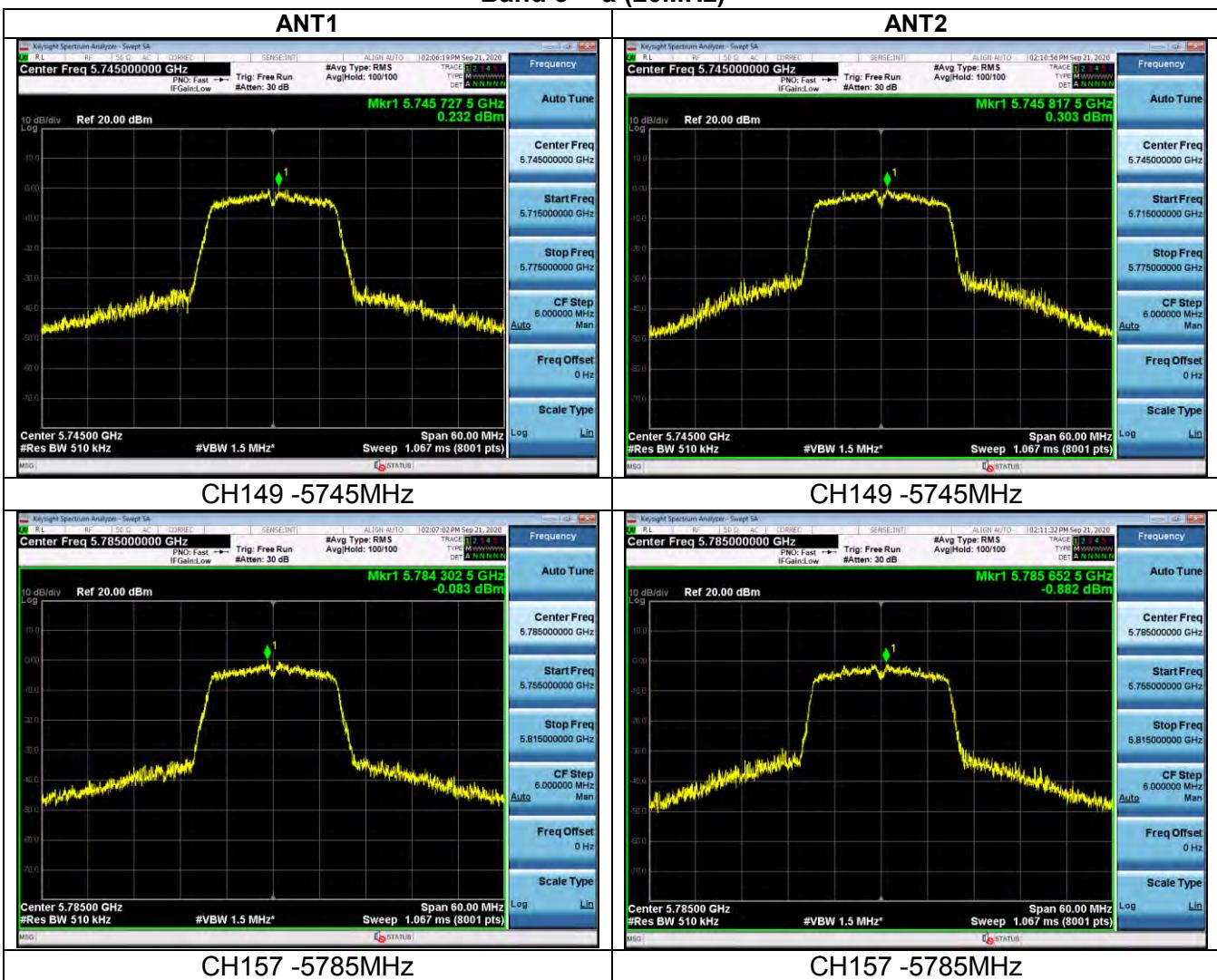


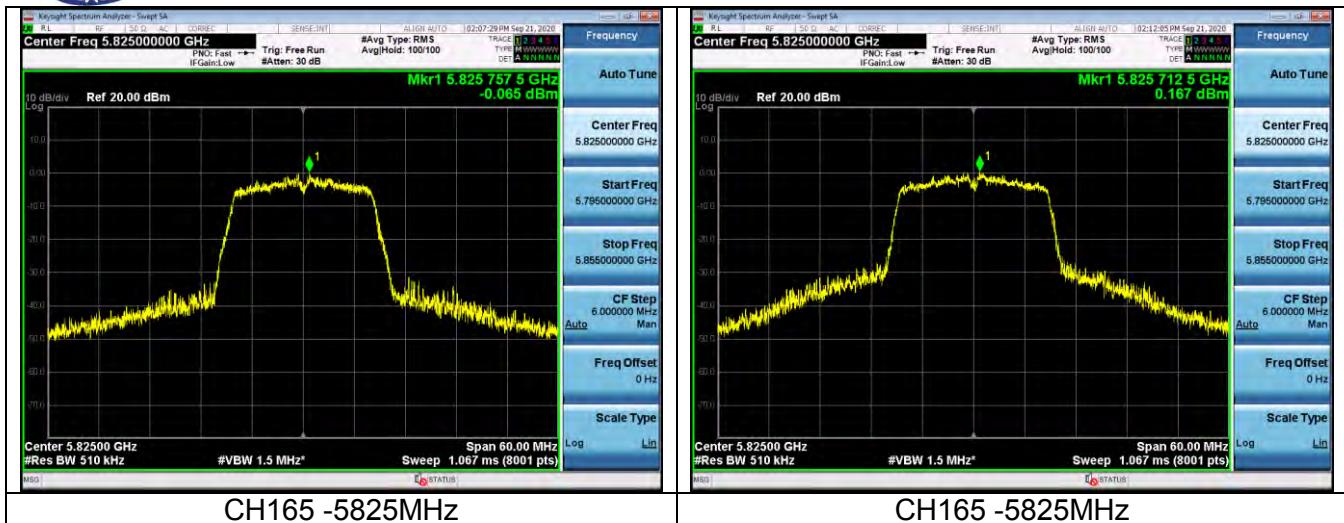
3.4.3. Test results

BAND	802.11 Mode	Channel No.	Frequency [MHz]	Measured PSD [dBm/510KHz]	Covert PSD [dBm/500KHz]	Limit [dBm/500KHz]
BAND 3	a(20MHz)	149	5745	0.232	0.146	30
		157	5785	-0.083	-0.169	30
		165	5825	-0.065	-0.151	30
	ac(20MHz)	149	5745	0.303	0.217	30
		157	5785	-0.882	-0.968	30
		165	5825	0.167	0.081	30
	ac(40MHz)	151	5755	-3.342	-3.428	30
		159	5795	-3.661	-3.747	30

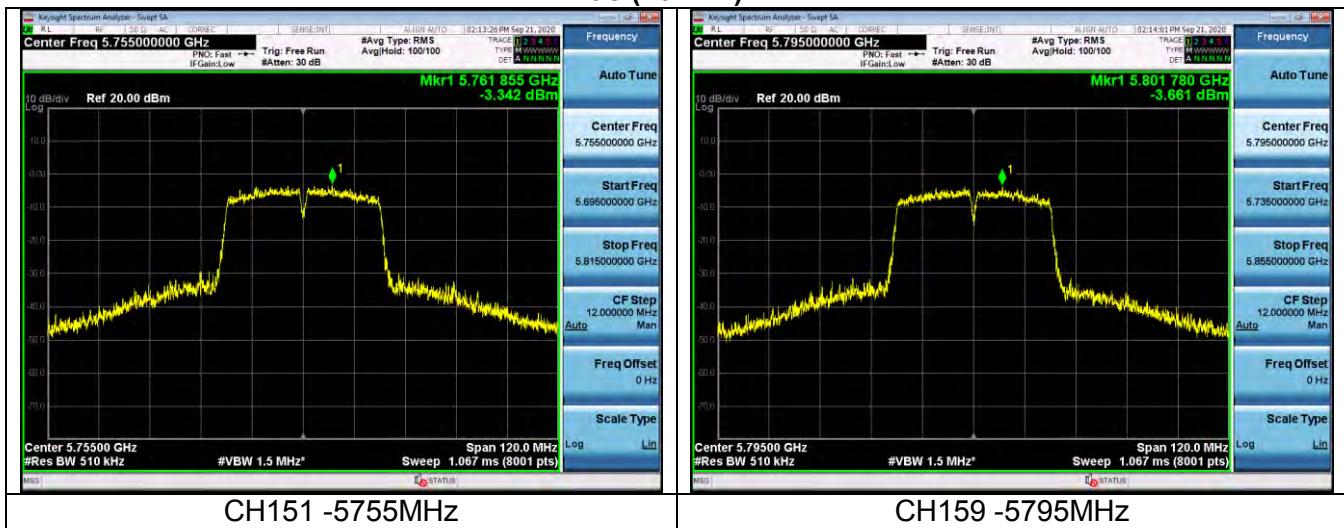
Note: Covert PSD [dBm/510KHz] = PSD[dBm/510KHz]+10*log(500/510)
 $10*\log(500/510) = -0.086$

Band 3 -- a (20MHz)





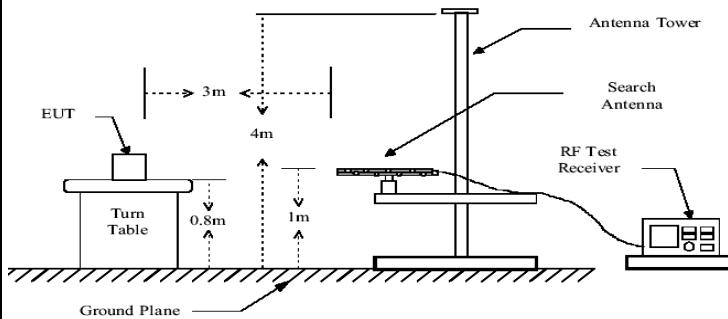
ac (40MHz)



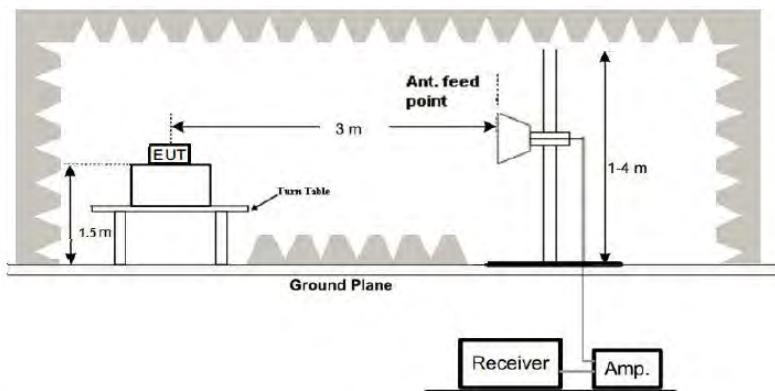
3.5. Spurious Emission

3.5.1. Test Specification

Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
Test Method:	KDB 789033 D02 v02r01				
Frequency Range:	9kHz to 40GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation mode:	Transmitting mode with modulation				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	<p>All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</p> <p>Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,</p>				
	Frequency	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	30	30		
	30-88	100	3		
	88-216	150	3		
	216-960	200	3		
	Above 960	500	3		
	Frequency	Limit (dBuV/m @3m)	Detector		
	Above 1G	74.0	Peak		
		54.0	Average		
Test setup:	<p>For radiated emissions below 30MHz</p> <p>Distance = 3m</p> <p>Turn table</p> <p>Ground Plane</p> <p>30MHz to 1GHz</p>				



Above 1GHz



Test Procedure:

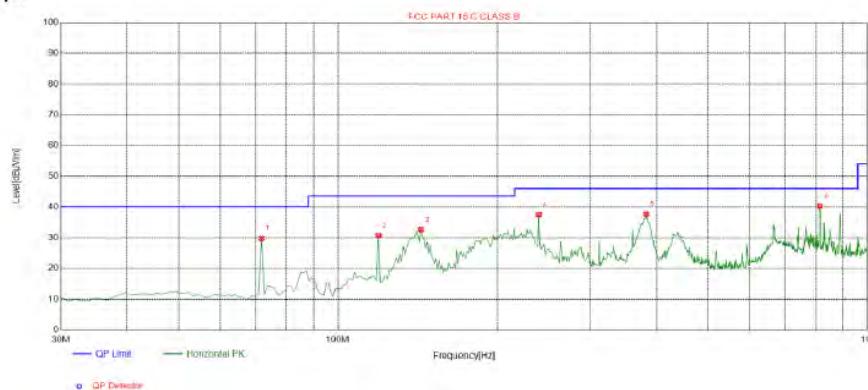
1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height 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 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 results: PASS

3.6.2 Test Data

Radiated emission 30MHz – 1Ghz:

Test Graph



Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	71.7518	-17.99	47.74	29.75	40.00	10.25	100	304	Horizontal
2	119.3293	-16.99	47.72	30.73	43.50	12.77	100	133	Horizontal
3	143.6036	-19.09	51.74	32.65	43.50	10.85	100	346	Horizontal
4	239.7297	-13.87	51.43	37.56	46.00	8.44	100	108	Horizontal
5	382.4625	-10.78	48.51	37.73	46.00	8.27	100	12	Horizontal
6	814.5445	-2.84	43.16	40.32	46.00	5.68	100	82	Horizontal

Remark:

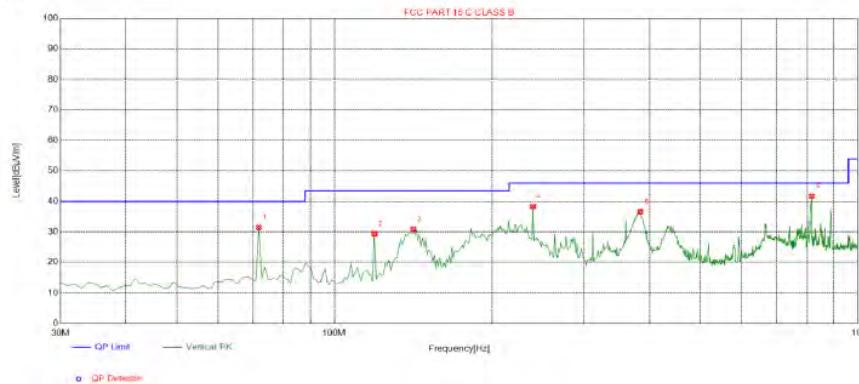
Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading + Factor;

Margin = Limit – Level;



Test Graph



Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	71.7518	-17.99	49.45	31.46	40.00	8.54	100	310	Vertical
2	119.3293	-16.99	46.37	29.38	43.50	14.12	100	162	Vertical
3	141.6617	-19.14	49.96	30.82	43.50	12.68	100	284	Vertical
4	239.7297	-13.87	52.11	38.24	46.00	7.76	100	95	Vertical
5	384.4044	-10.75	47.29	36.54	46.00	9.46	100	348	Vertical
6	817.4575	-2.77	44.43	41.66	46.00	4.34	100	56	Vertical

Remark:

Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading + Factor;

Margin = Limit – Level;

**Above 1GHz**

Note: only show the worst test results –band3-802.11 ac20 mode: low/mid/high channel

LOW CH 149 (802.11ac20 Mode with 5.8G)/5745

Horizontal:

Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
3370	60.79	-4.59	56.20	68.2	-12.00	PK
11075	48.95	4.21	53.16	74	-20.84	PK
11075	28.32	4.21	32.53	54	-21.47	AV

Vertical:

Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
3370	62.19	-4.59	57.60	68.2	-10.60	PK
11075	47.36	4.21	51.57	74	-22.43	PK
11075	31.97	4.21	36.18	54	-17.82	AV



MID CH157 (802.11 ac20 Mode with 5.8G)/5785

Horizontal:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
3280	63.22	-4.59	58.63	68.2	-9.57	PK
11044	51.87	4.21	56.08	74	-17.92	PK
11044	30.06	4.21	34.27	54	-19.73	AV

Vertical:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
3280	61.64	-4.59	57.05	68.2	-11.15	PK
11044	49.68	4.21	53.89	74	-20.11	PK
11044	30.37	4.21	34.58	54	-19.42	AV

HIGH CH 165 (802.11 ac20 Mode with 5.8G)/5825

Horizontal:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
3327	58.72	-4.59	54.13	68.2	-14.07	PK
11070	51.59	4.21	55.80	74	-18.20	PK
11070	28.25	4.21	32.46	54	-21.54	AV

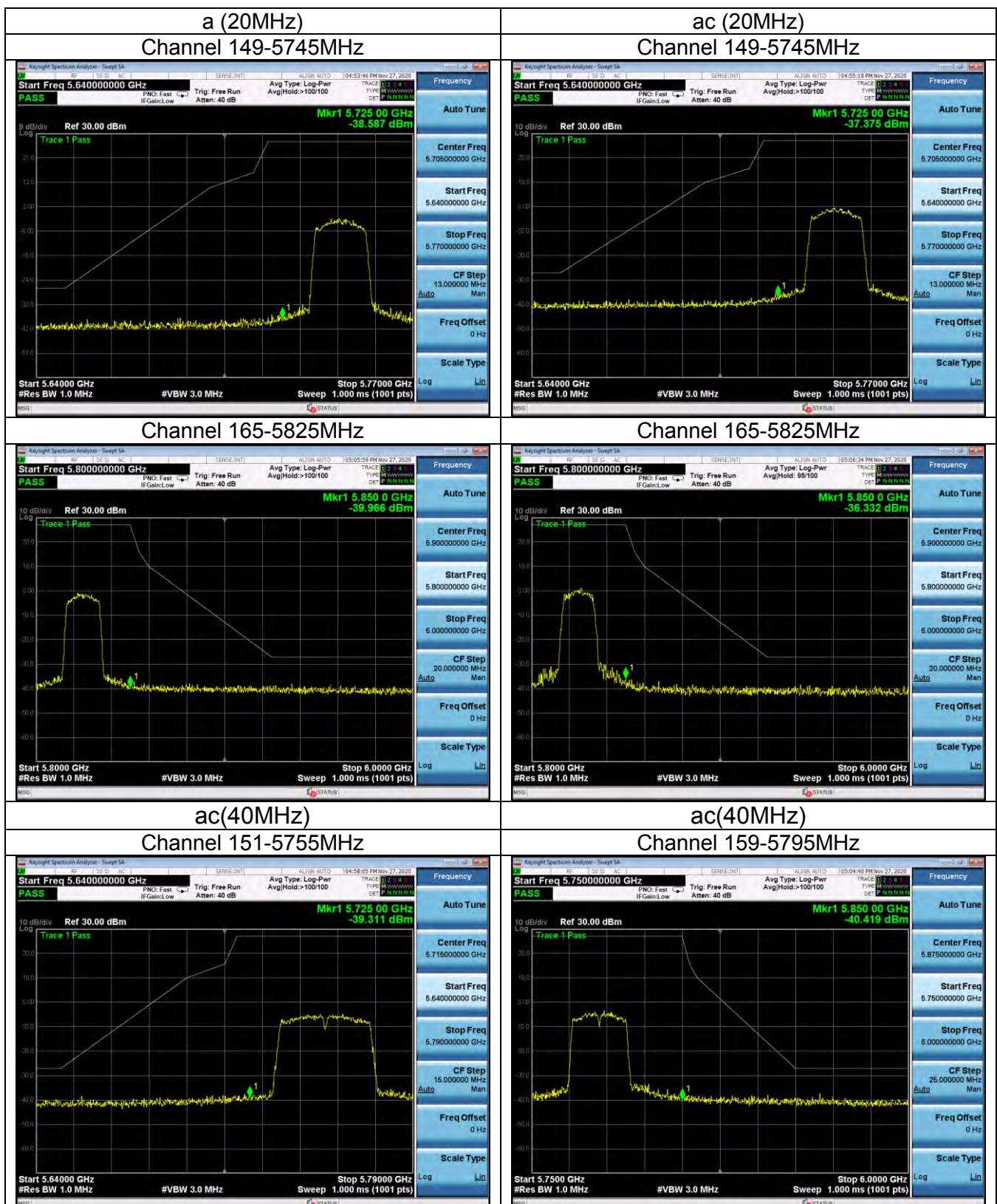
Vertical:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
3327	58.95	-4.59	54.36	68.2	-13.84	PK
11070	52.03	4.21	56.24	74	-17.76	PK
11070	30.07	4.21	34.28	54	-19.72	AV

NOTE: The other emissions are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.



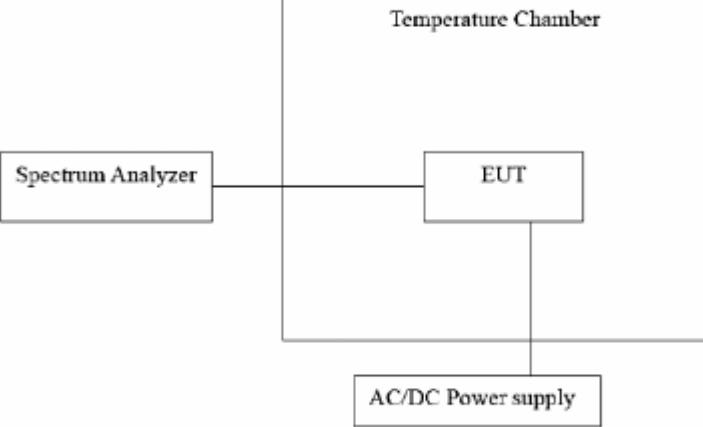
band edge:





3.6. Frequency Stability Measurement

3.6.1. Test Specification

Test Requirement:	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
Test Method:	ANSI C63.10: 2013
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Test Setup:	
Test Procedure:	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test Result:	PASS
Remark:	N/A

**3.6.2. Test Result as follows:**

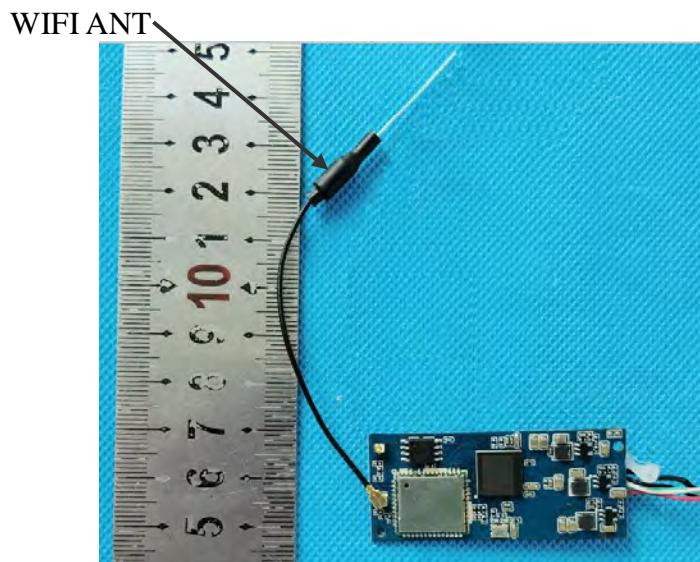
Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
U-NII 3 5.8G	3.7V	5745.023	23	5824.974	-26
	4.26 V	5744.975	-25	5824.976	-24
	3.15 V	5744.978	-22	5824.979	-21

Mode	Temperature (°C)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
U-NII 3 5.8G	-30	5744.976	-24	5824.973	-27
	-20	5744.975	-25	5824.972	-28
	-10	5744.974	-26	5824.976	-24
	0	5744.978	-22	5824.974	-26
	10	5745.021	21	5824.972	-28
	20	5744.973	-27	5824.974	-26
	30	5744.970	-30	5824.977	-23
	40	5744.972	-28	5824.978	-22
	50	5744.979	-21	5824.977	-23

3.7. ANTENNA REQUIREMENT

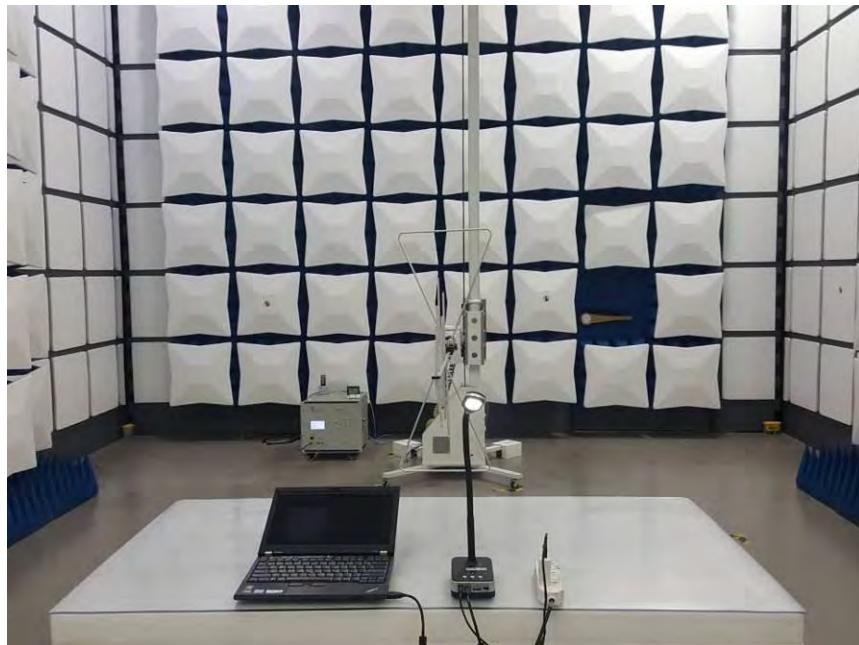
an intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by there responsible party can be used with the device. The use of a permanently attached or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section”

- * the antenna of this EUT is a unique(internal antenna for WiFi).
- * the EUT complies with the requirement of 15.203.

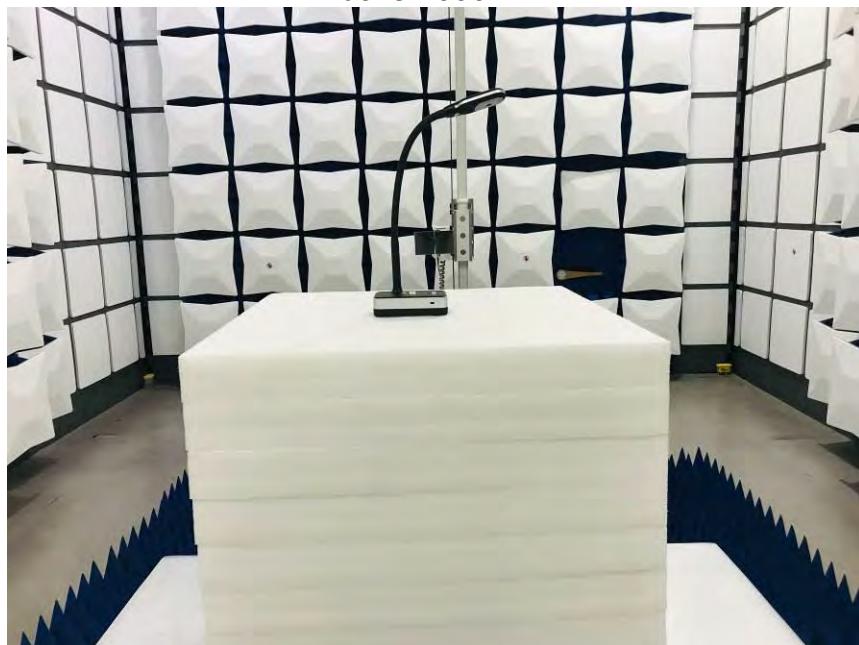


4. Photographs of Test Setup

Radiation Emission below 1000MHz



Above 1000MHz



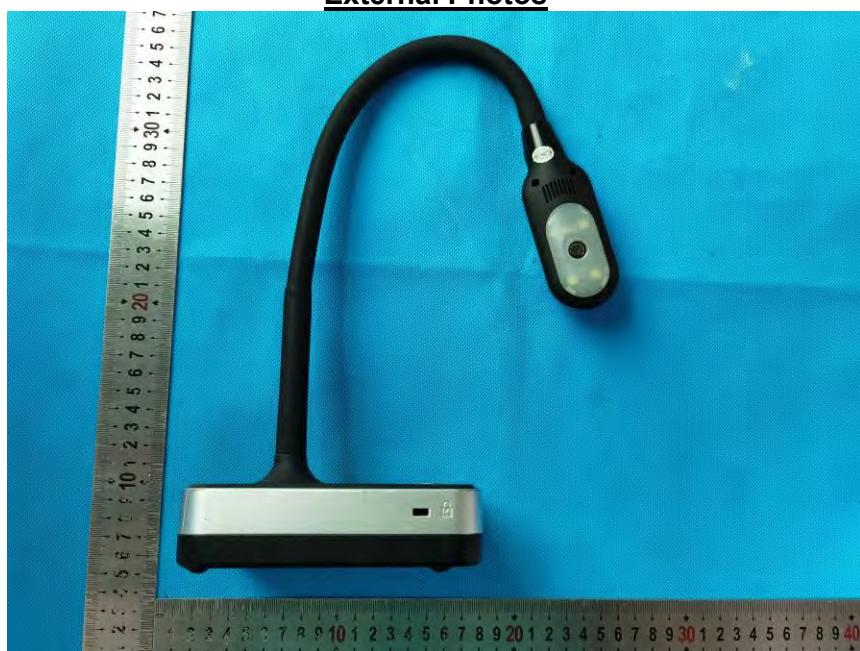


Conducted emission



5. PHOTOS OF THE EUT

External Photos





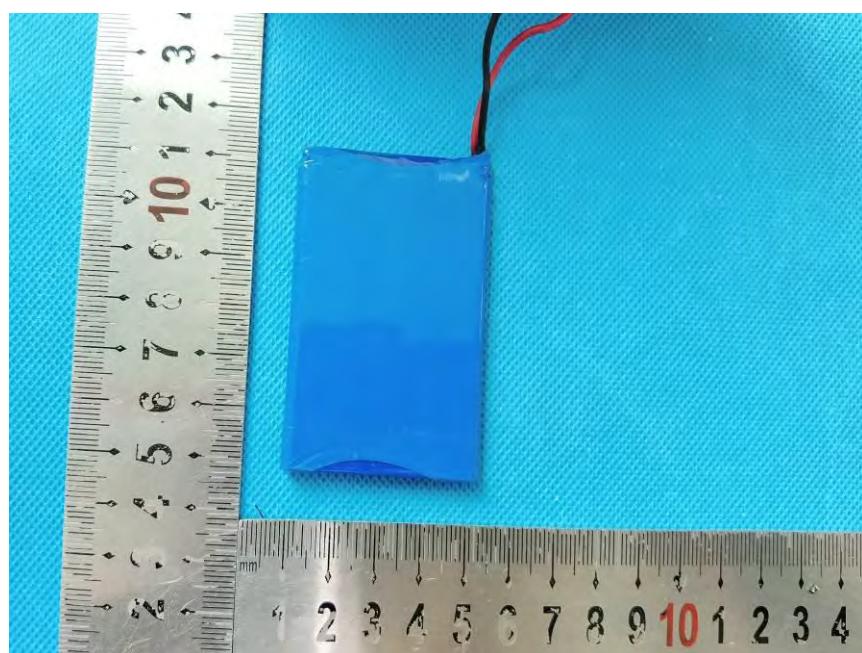
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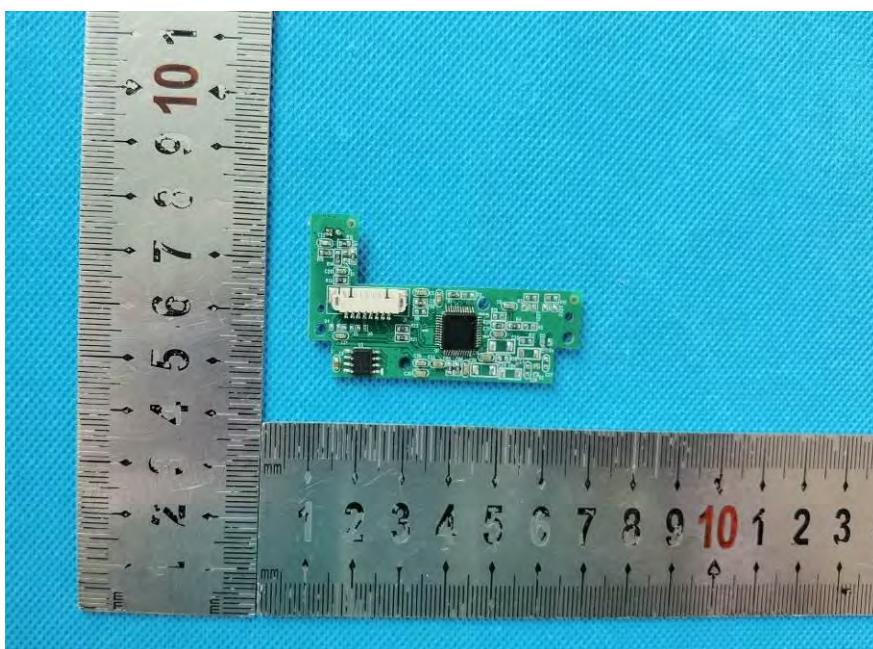
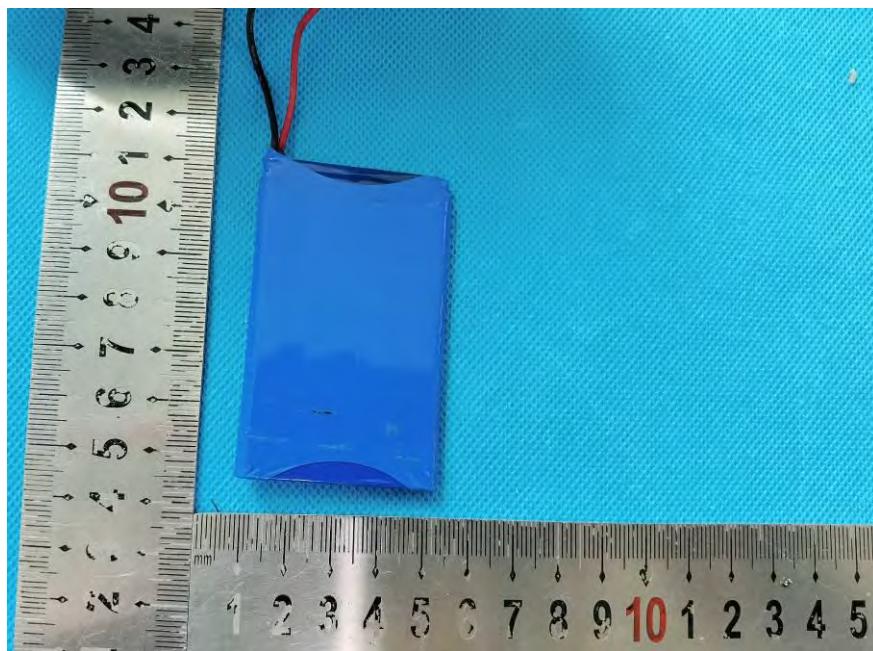


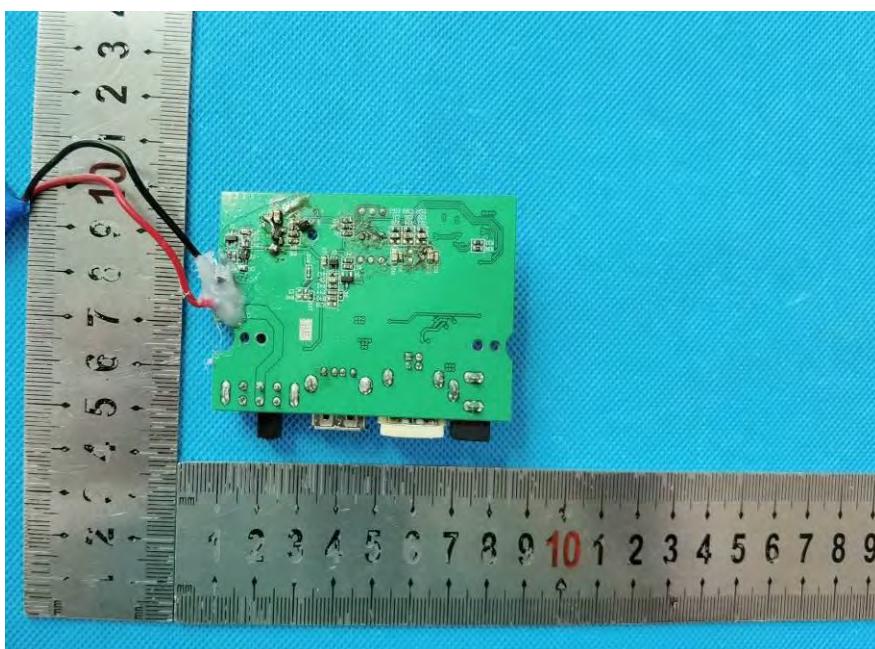
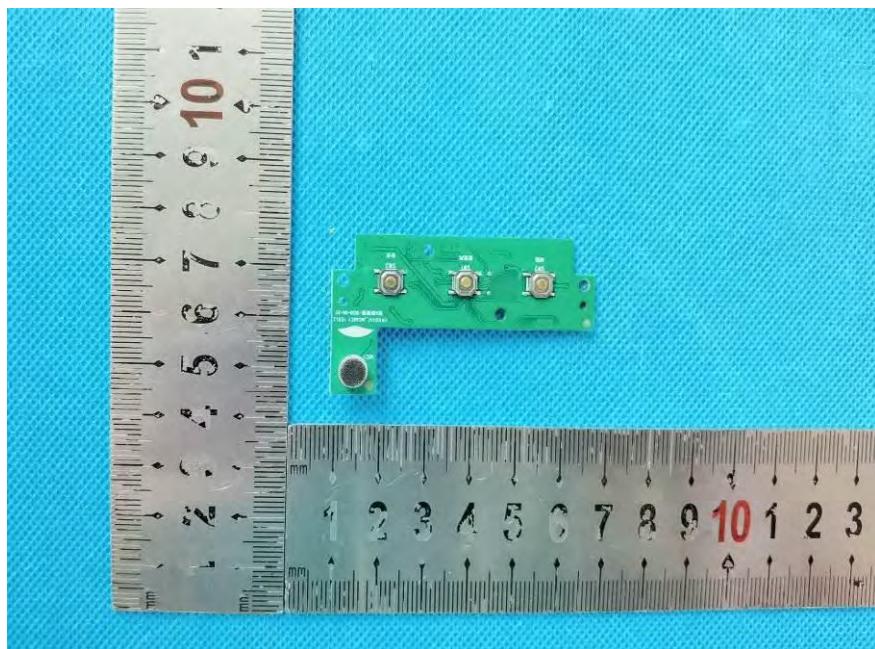


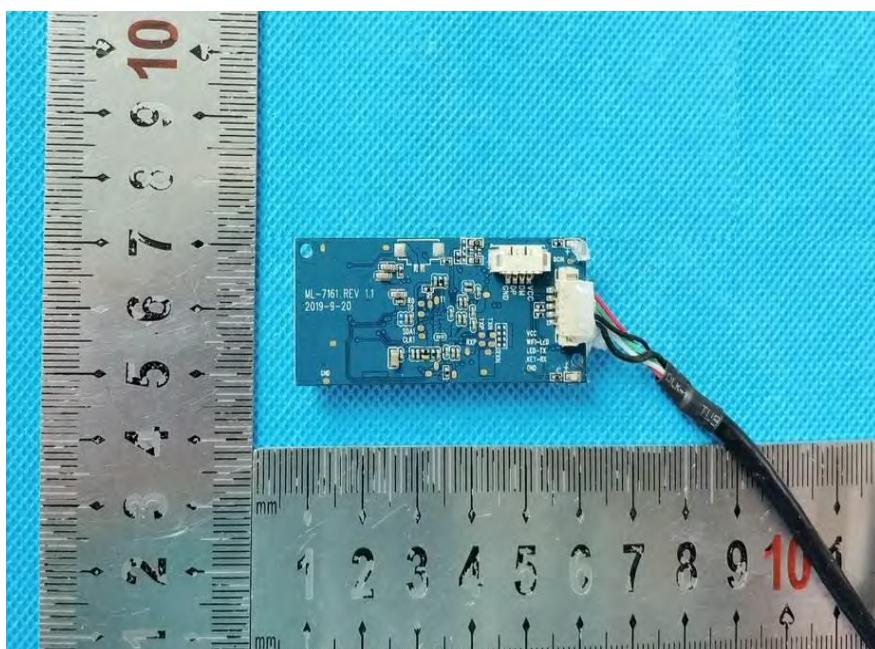
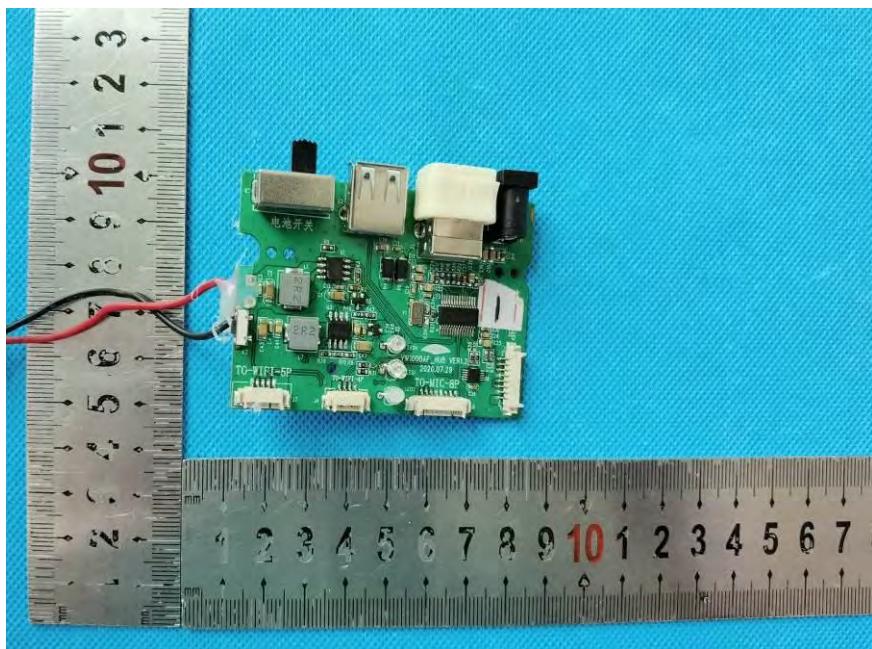


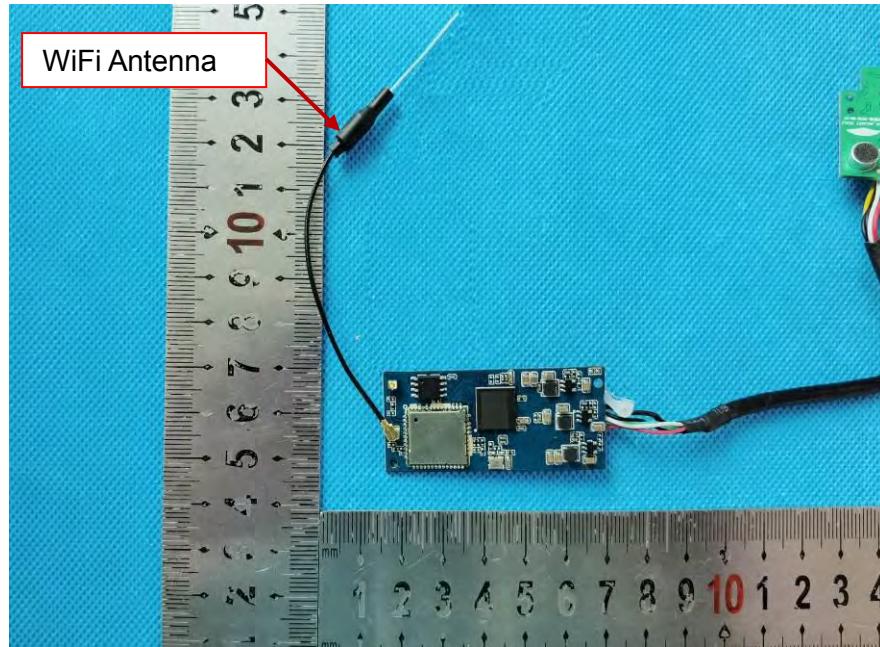
Internal Photos











*****END OF REPORT*****