



FCC Test Report

TESTING
Test Report
On Behalf of
Circus World Displays Limited

4K60Hz Box to Box Audio & Video wireless sender

Model No.: TBB85TX, TBB85XTX

FCC ID: SMH-TBB85TX

**Prepared For: Circus World Displays Limited
4080 Montrose Rd, Niagara Falls, L2H 1J9, Canada**

Prepared By: Shenzhen HUAK Testing Technology Co., Ltd.
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: Dec. 26, 2024 ~ Feb. 18, 2025
Date of Report: Feb. 18, 2025
Report Number: HK2412268084-2E

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Test Result Certification

Applicant's Name: Circus World Displays Limited

Address: 4080 Montrose Rd, Niagara Falls, L2H 1J9, Canada

Manufacturer's Name: Circus World Displays Limited

Address: 4080 Montrose Rd, Niagara Falls, L2H 1J9, Canada

Product Description

Trade Mark: Nyrius

Product Name: 4K60Hz Box to Box Audio & Video wireless sender

Model and/or Type Reference : TBB85TX, TBB85XTX

Standards: FCC Rules and Regulations Part 15 Subpart E Section 15.407
ANSI C63.10: 2020

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Date of Test:

Date (s) of Performance of Tests: **Dec. 26, 2024 ~ Feb. 18, 2025**

Date of Issue: **Feb. 18, 2025**

Test Result: **Pass**

Testing Engineer



Len Liao

Technical Manager



Sliver Wan

Authorized Signatory



Jason Zhou

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** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Feb. 18, 2025	Jason Zhou
	HUAK TESTING		



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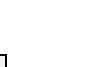
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1.3 Measurement Uncertainty

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	$\pm 0.37\text{dB}$
2	RF Power, Conducted	$\pm 3.35\text{dB}$
3	Spurious Emissions, Conducted	$\pm 2.20\text{dB}$
4	All Emissions, Radiated(<1G)	$\pm 3.90\text{dB}$
5	All Emissions, Radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^\circ\text{C}$
7	Humidity	$\pm 1.0\%$

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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:

2.2 Operation Frequency Each of Channel

802.11a/802.11n(HT20) 802.11ac(HT20)		802.11n(HT40)/ 802.11ac(HT40)		802.11ac(HT80)	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

2.3 Operation of EUT during Testing

Band IV (5725 - 5850 MHz)		
For 802.11a/n (HT20)/ac(HT20)		
Channel Number	Channel	Frequency (MHz)
149	Low	5745
157	Mid	5785
165	High	5825

For 802.11n (HT40)/ac(HT40)		
Channel Number	Channel	Frequency (MHz)
151	Low	5755
159	High	5795

For 802.11ac(HT80)		
Channel Number	Channel	Frequency (MHz)
155	/	5775

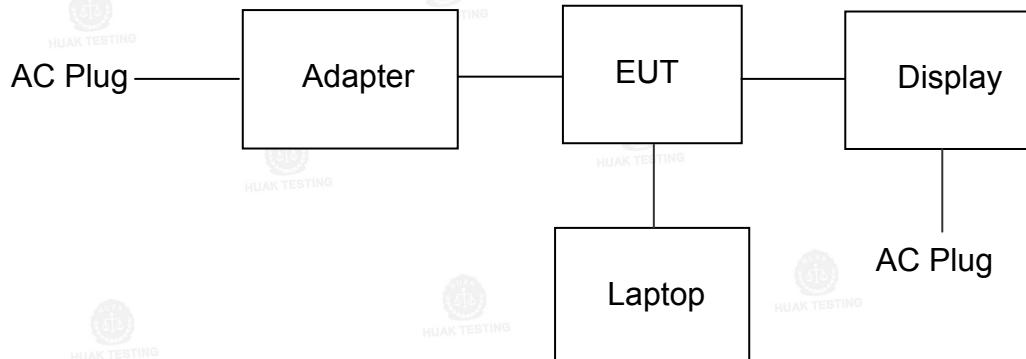
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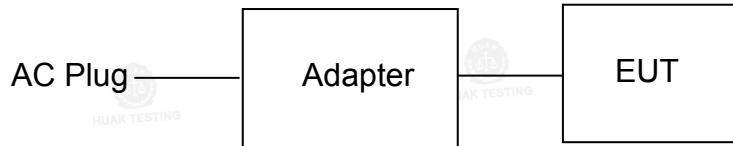
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

2.4 Description of Test Setup

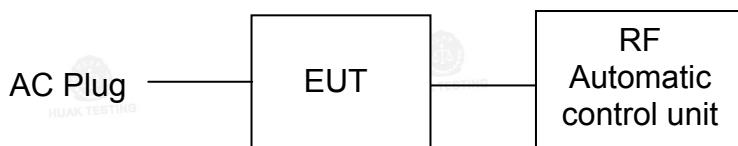
Operation of EUT during AC Conducted and Radiation below 1GHz testing:



Operation of EUT during Radiation Above 1GHz testing



Operation of EUT during RF Conducted testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.

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3. General Information

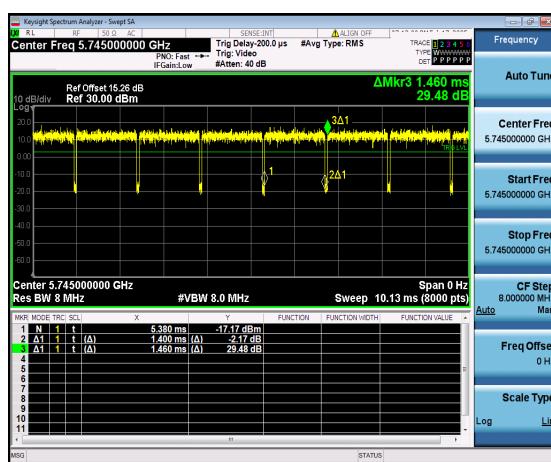
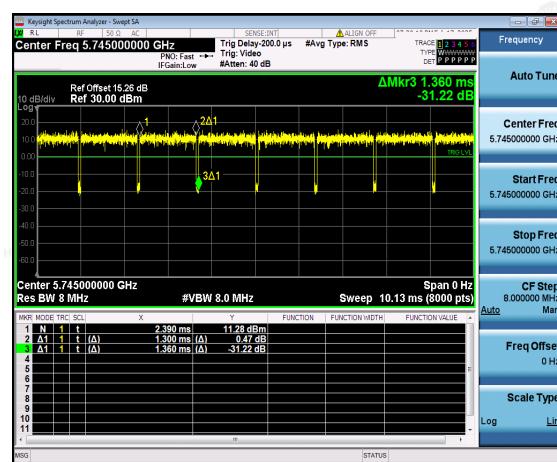
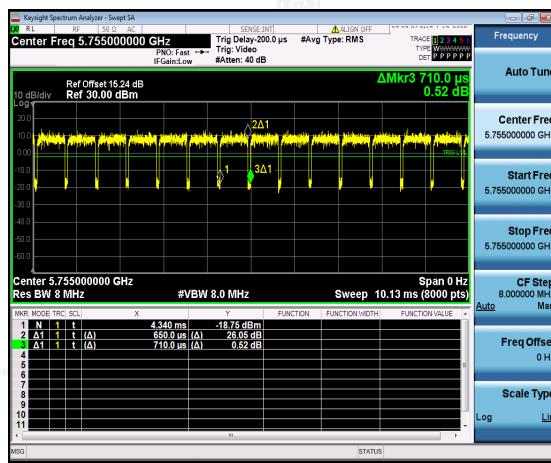
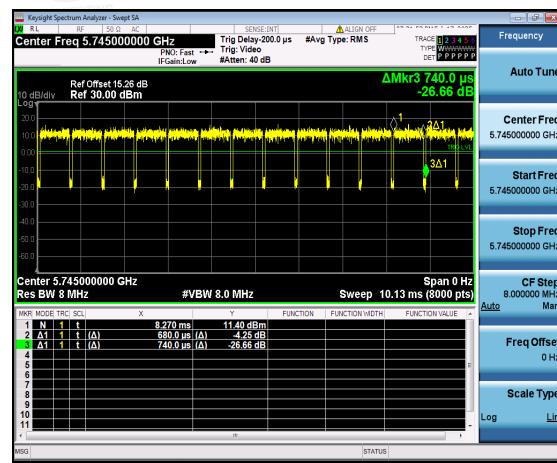
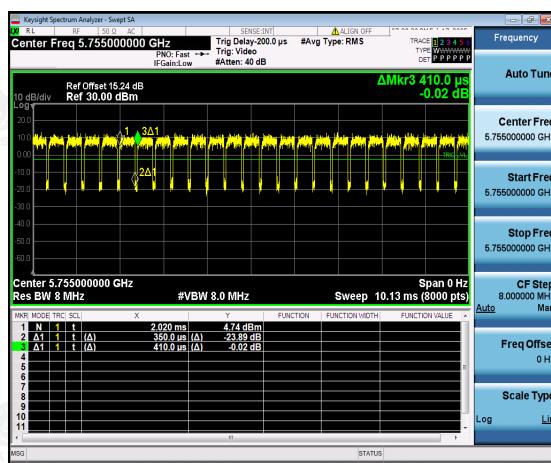
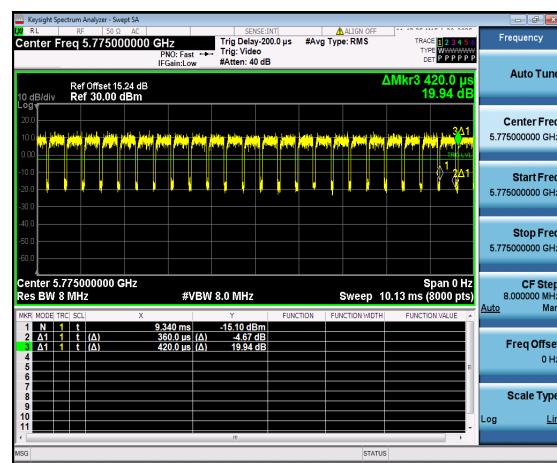
3.1 Test Environment and Modes

Operating Environment:																
Temperature:	25.0 °C	HUAK TESTING														
Humidity:	56 % RH	HUAK TESTING														
Atmospheric Pressure:	1010 mbar	HUAK TESTING														
Test Mode:																
Engineering Mode:	Keep the EUT in continuous transmitting by select channel and modulations															
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 in lowest channel, and found the follow list which it was worst case.																
Mode	Data rate															
802.11a	6 Mbps															
802.11n(HT20)	MCS0															
802.11n(HT40)	MCS0															
802.11ac(HT20)/ac(HT40)/ac(HT80)	MCS0															
Final Test Mode:																
Operation mode:	Keep the EUT in continuous transmitting with modulation															
Mode Test Duty Cycle																
ANT.1:	<table border="1"> <thead> <tr> <th>Mode</th><th>Duty Cycle</th></tr> </thead> <tbody> <tr> <td>802.11a</td><td>0.959</td></tr> <tr> <td>802.11n(HT20)</td><td>0.956</td></tr> <tr> <td>802.11n(HT40)</td><td>0.915</td></tr> <tr> <td>802.11ac(HT20)</td><td>0.919</td></tr> <tr> <td>802.11ac(HT40)</td><td>0.854</td></tr> <tr> <td>802.11ac(HT80)</td><td>0.857</td></tr> </tbody> </table>		Mode	Duty Cycle	802.11a	0.959	802.11n(HT20)	0.956	802.11n(HT40)	0.915	802.11ac(HT20)	0.919	802.11ac(HT40)	0.854	802.11ac(HT80)	0.857
Mode	Duty Cycle															
802.11a	0.959															
802.11n(HT20)	0.956															
802.11n(HT40)	0.915															
802.11ac(HT20)	0.919															
802.11ac(HT40)	0.854															
802.11ac(HT80)	0.857															

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Test plots as follows:

802.11a**802.11n(HT20)****802.11n(HT40)****802.11ac(HT20)****802.11ac(HT40)****802.11ac(HT80)**

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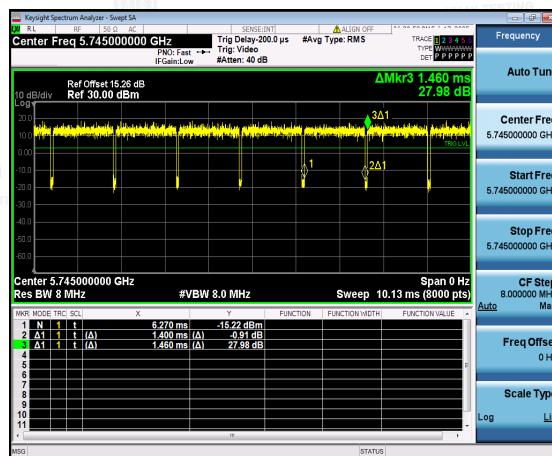


ANT.2:

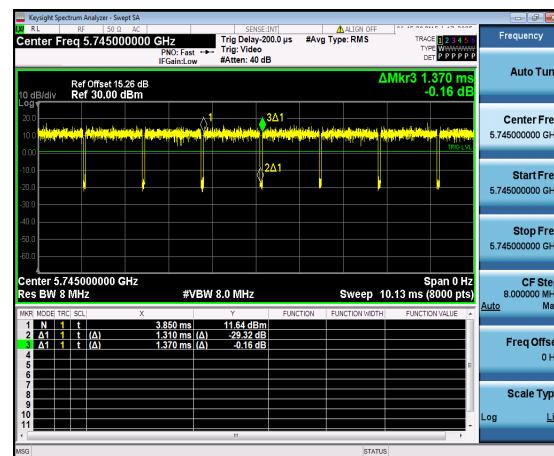
Mode	Duty Cycle
802.11a	0.959
802.11n(HT20)	0.956
802.11n(HT40)	0.915
802.11ac(HT20)	0.920
802.11ac(HT40)	0.857
802.11ac(HT80)	0.854

Test plots as follows:

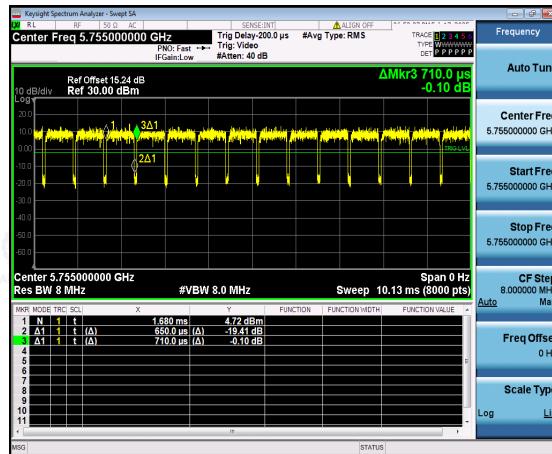
802.11a



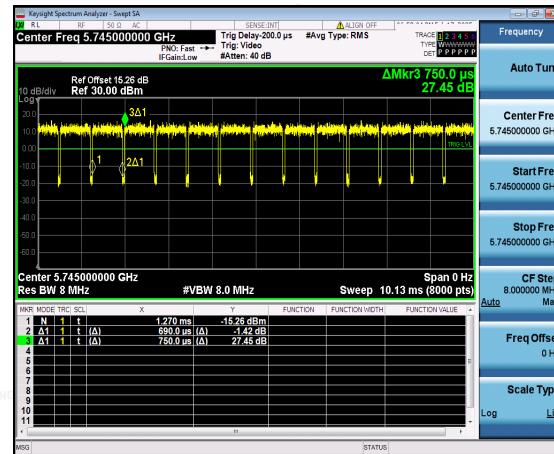
802.11n(HT20)



802.11n(HT40)



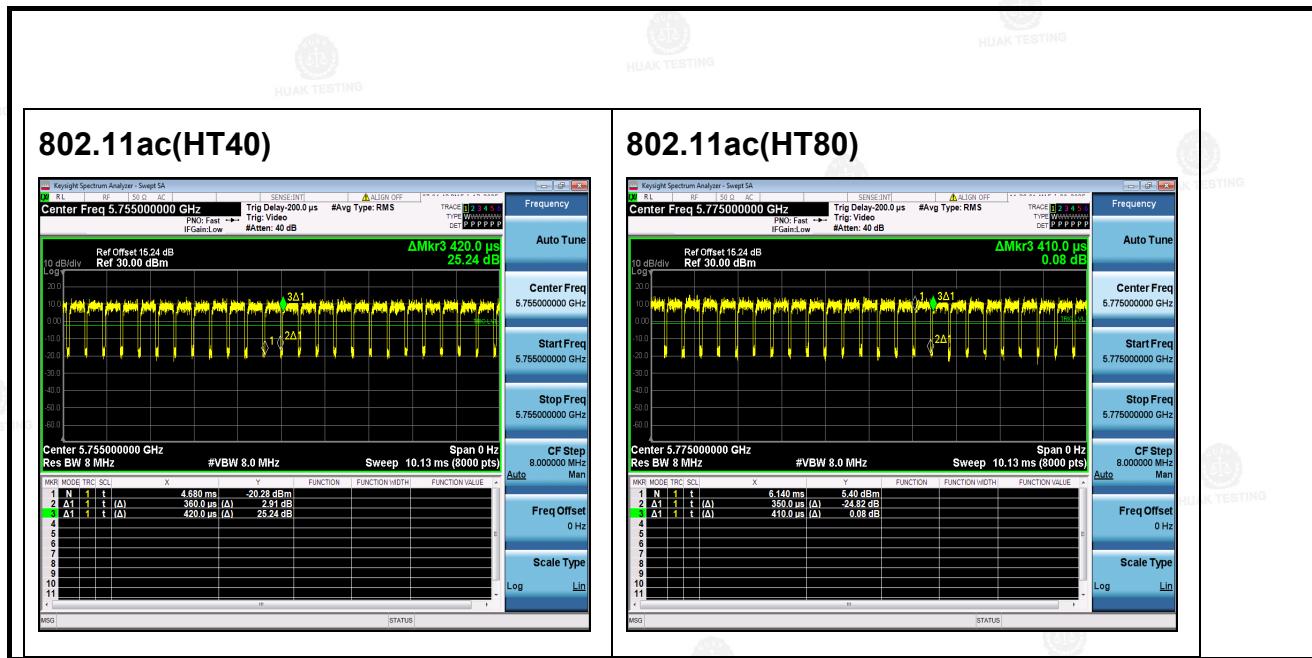
802.11ac(HT20)



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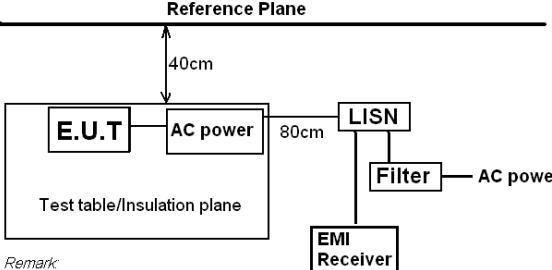
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4. Test Results and Measurement Data

4.1 AC Conducted Emission

4.1.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10: 2020														
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>Reference Plane</p> <p>40cm</p> <p>Test table/Insulation plane</p> <p>E.U.T — AC power — LISN — Filter — AC power</p> <p>EMI Receiver</p> <p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</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: 2020 on conducted measurement. 														
Test Result:	Pass														

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4.1.2 Test Instruments

Conducted Emission Shielding Room Test Site (843)					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	R&S	ESR	HKE-005	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-002	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-059	Feb. 20, 2024	Feb. 19, 2025
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Feb. 20, 2024	Feb. 19, 2025
EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	N/A	N/A
10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 20, 2024	Feb. 19, 2025

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

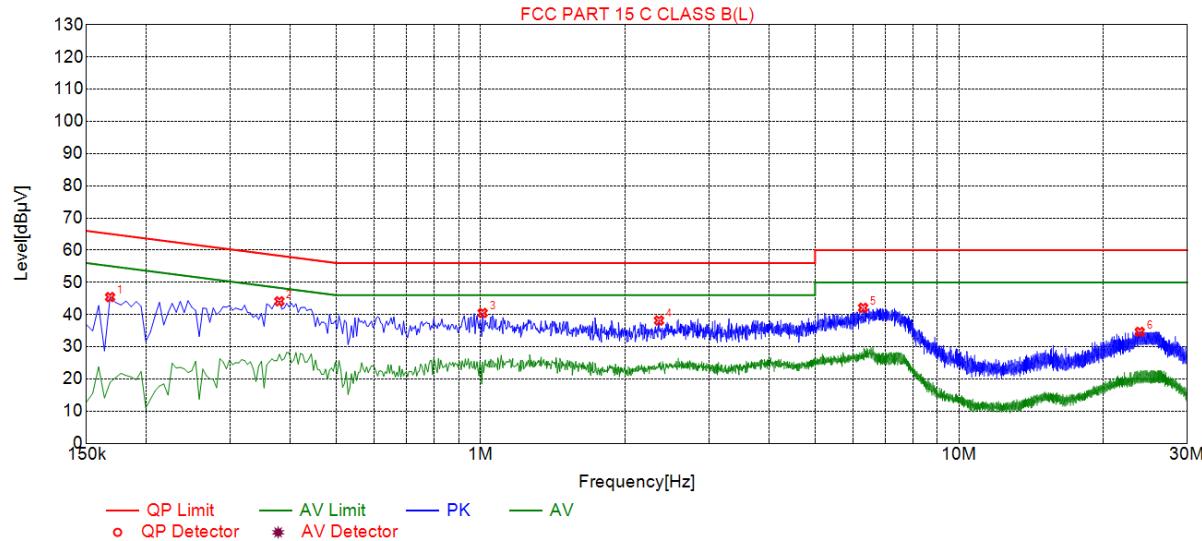


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4.1.3 Test Data

Test Specification: Line



Suspected List

NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.1680	45.44	19.81	65.06	19.62	25.63	PK	L
2	0.3795	44.11	19.85	58.29	14.18	24.26	PK	L
3	1.0095	40.50	19.87	56.00	15.50	20.63	PK	L
4	2.3595	38.16	20.00	56.00	17.84	18.16	PK	L
5	6.3015	42.10	20.08	60.00	17.90	22.02	PK	L
6	23.8605	34.63	20.09	60.00	25.37	14.54	PK	L

Remark: Margin = Limit – Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor

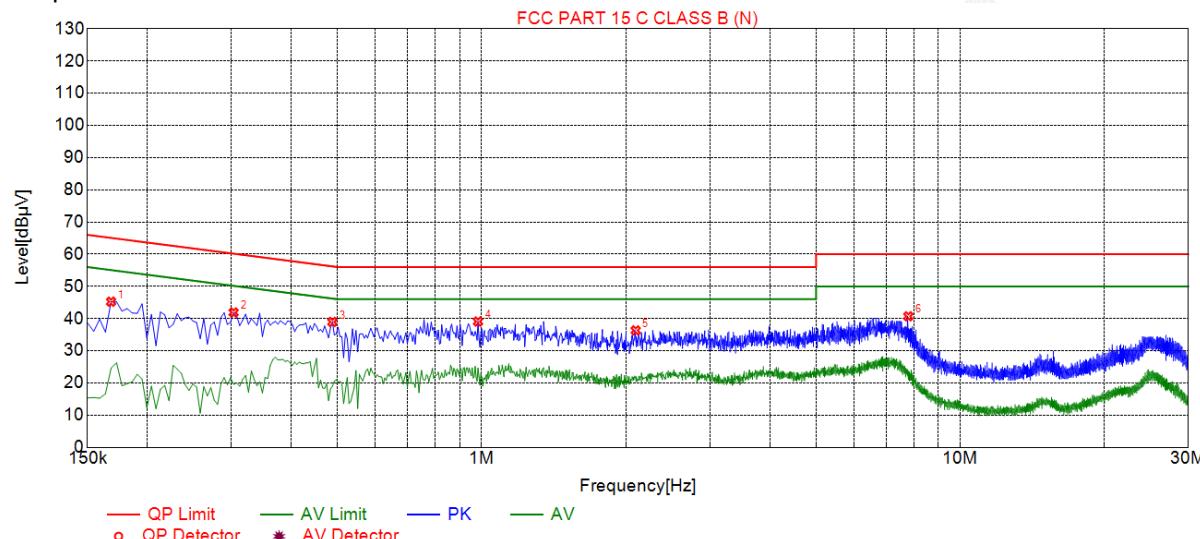
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Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.1680	45.25	19.71	65.06	19.81	25.54	PK	N
2	0.3030	41.89	19.74	60.16	18.27	22.15	PK	N
3	0.4875	38.95	19.73	56.21	17.26	19.22	PK	N
4	0.9825	39.08	19.74	56.00	16.92	19.34	PK	N
5	2.0985	36.33	19.85	56.00	19.67	16.48	PK	N
6	7.7955	40.71	19.94	60.00	19.29	20.77	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

4.2 Maximum Conducted Output Power

4.2.1 Test Specification

4.2.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
Spectrum analyzer	Agilent	N9020A	HKE-117	Feb. 20, 2024	Feb. 19, 2025
Power meter	Agilent	E4419B	HKE-085	Feb. 20, 2024	Feb. 19, 2025
Power Sensor	Agilent	E9300A	HKE-086	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	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).

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4.2.3 Test Data

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Report No.: HK2412268084-2E

Configuration Band IV (5725 - 5850 MHz)

Mode	Test channel	Maximum Conducted Output Power (dBm)		Limit (dBm)	Result
		Antenna port 1	Antenna port 2		
802.11a	CH149	8.77	9.63	30	PASS
802.11a	CH157	9.08	10.02	30	PASS
802.11a	CH165	9.32	9.54	30	PASS
802.11n(HT20)	CH149	7.58	8.34	30	PASS
802.11n(HT20)	CH157	8.03	8.40	30	PASS
802.11n(HT20)	CH165	8.27	8.63	30	PASS
802.11n(HT40)	CH151	8.21	8.68	30	PASS
802.11n(HT40)	CH159	8.82	9.15	30	PASS
802.11ac(HT20)	CH149	7.72	8.32	30	PASS
802.11ac(HT20)	CH157	8.09	8.65	30	PASS
802.11ac(HT20)	CH165	8.54	8.86	30	PASS
802.11ac(HT40)	CH151	8.47	8.98	30	PASS
802.11ac(HT40)	CH159	9.01	9.41	30	PASS
802.11ac(HT80)	CH155	9.54	10.26	30	PASS

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Configuration Band IV (5725 - 5850 MHz)

Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Maximum Conducted Output Power (dBm)			Limit (dBm)	Result
		Antenna port 1	Antenna port 2	MIMO		
802.11n(HT20)	CH149	7.58	8.34	10.99	30	PASS
802.11n(HT20)	CH157	8.03	8.40	11.23	30	PASS
802.11n(HT20)	CH165	8.27	8.63	11.46	30	PASS
802.11n(HT40)	CH151	8.21	8.68	11.46	30	PASS
802.11n(HT40)	CH159	8.82	9.15	12.00	30	PASS
802.11ac(HT20)	CH149	7.72	8.32	11.04	30	PASS
802.11ac(HT20)	CH157	8.09	8.65	11.39	30	PASS
802.11ac(HT20)	CH165	8.54	8.86	11.71	30	PASS
802.11ac(HT40)	CH151	8.47	8.98	11.74	30	PASS
802.11ac(HT40)	CH159	9.01	9.41	12.22	30	PASS
802.11ac(HT80)	CH155	9.54	10.26	12.93	30	PASS

4.3 6dB Emission Bandwidth

4.3.1 Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C
Limit:	>500kHz
Test Setup:	 <p>The diagram illustrates the test setup. A green rectangular box labeled "Spectrum Analyzer" is connected to a yellow rectangular box labeled "EUT" (Equipment Under Test) via a horizontal line. The connection point on the analyzer is marked with two small circles, and the connection point on the EUT is also marked with a small circle.</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 C2. Set to the maximum power setting and enable the EUT transmit continuously.3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.4. Measure and record the results in the test report.
Test Result:	PASS

4.3.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
Spectrum analyzer	Agilent	N9020A	HKE-117	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	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).

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4.3.3 Test Data

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ANT. 1**Band IV (5725 - 5850 MHz)**

Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	CH149	5745	15.120	0.5	PASS
802.11a	CH157	5785	15.080	0.5	PASS
802.11a	CH165	5825	15.120	0.5	PASS
802.11n(HT20)	CH149	5745	15.120	0.5	PASS
802.11n(HT20)	CH157	5785	15.160	0.5	PASS
802.11n(HT20)	CH165	5825	15.120	0.5	PASS
802.11n(HT40)	CH151	5755	35.040	0.5	PASS
802.11n(HT40)	CH159	5795	35.040	0.5	PASS
802.11ac(HT20)	CH149	5745	15.120	0.5	PASS
802.11ac(HT20)	CH157	5785	15.120	0.5	PASS
802.11ac(HT20)	CH165	5825	15.720	0.5	PASS
802.11ac(HT40)	CH151	5755	35.040	0.5	PASS
802.11ac(HT40)	CH159	5795	35.120	0.5	PASS
802.11ac(HT80)	CH155	5775	75.200	0.5	PASS

Test plots as follows:

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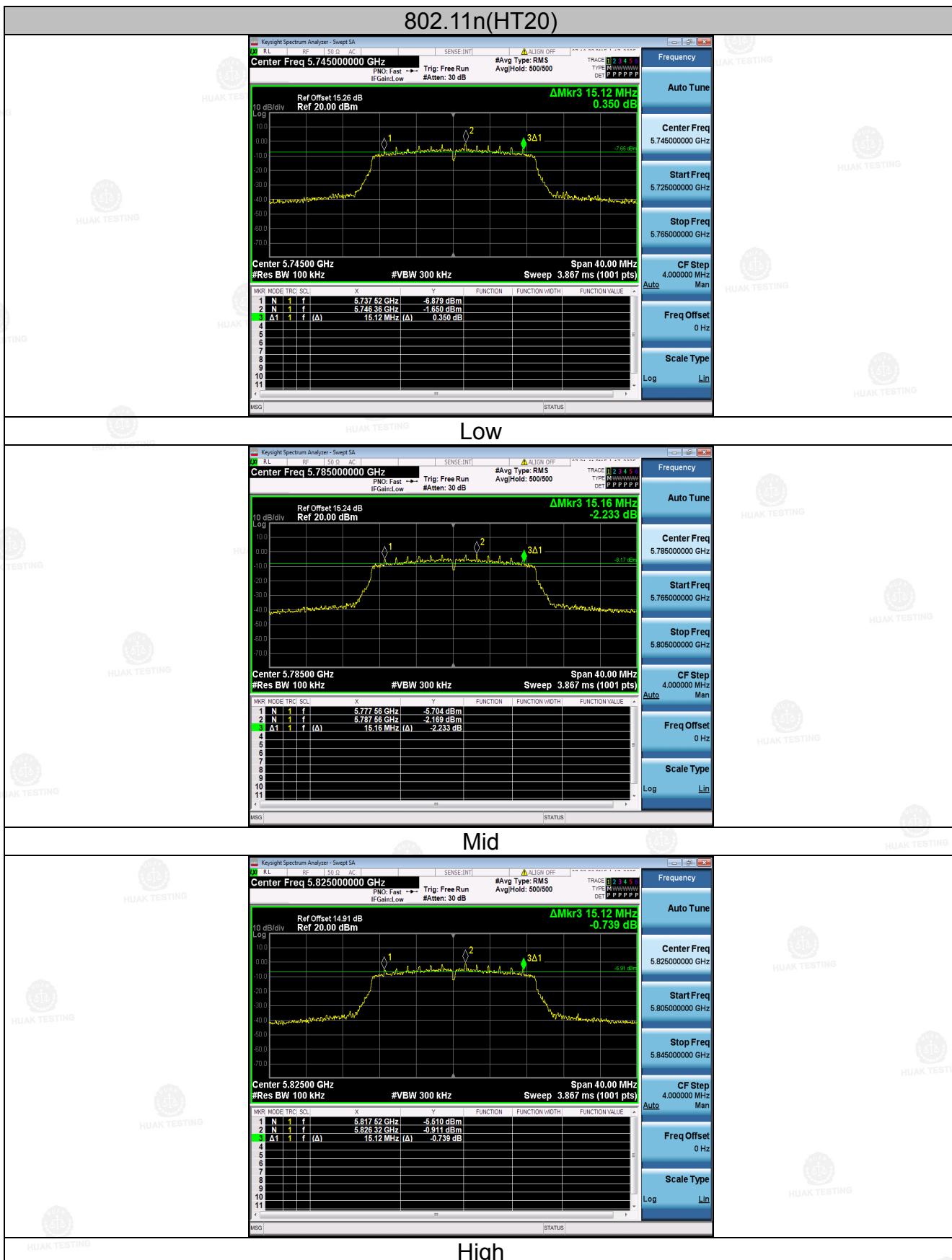
Band IV (5725 – 5850MHz)



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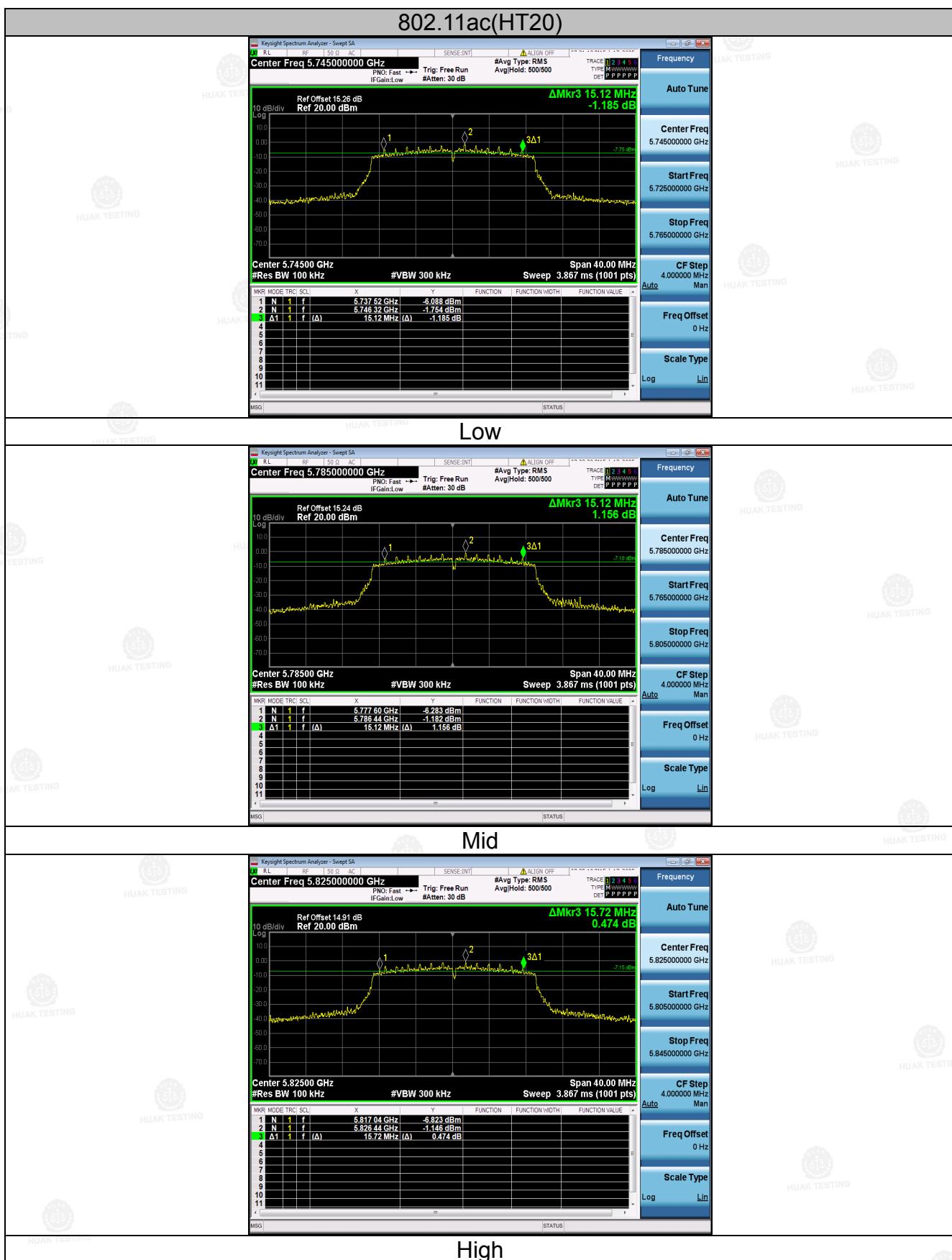
802.11n(HT20)



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ANT. 2

Band IV (5725 - 5850MHz)

Band IV (5725 - 5850MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	CH149	5745	15.120	0.5	PASS
802.11a	CH157	5785	15.120	0.5	PASS
802.11a	CH165	5825	15.080	0.5	PASS
802.11n(HT20)	CH151	5745	15.080	0.5	PASS
802.11n(HT20)	CH159	5785	15.120	0.5	PASS
802.11n(HT20)	CH149	5825	15.080	0.5	PASS
802.11n(HT40)	CH157	5755	35.120	0.5	PASS
802.11n(HT40)	CH165	5795	35.120	0.5	PASS
802.11ac(HT20)	CH151	5745	15.120	0.5	PASS
802.11ac(HT20)	CH159	5785	15.120	0.5	PASS
802.11ac(HT20)	CH155	5825	15.080	0.5	PASS
802.11ac(HT40)	CH149	5755	35.120	0.5	PASS
802.11ac(HT40)	CH157	5795	35.120	0.5	PASS
802.11ac(HT80)	CH165	5775	75.200	0.5	PASS

Test plots as follows:



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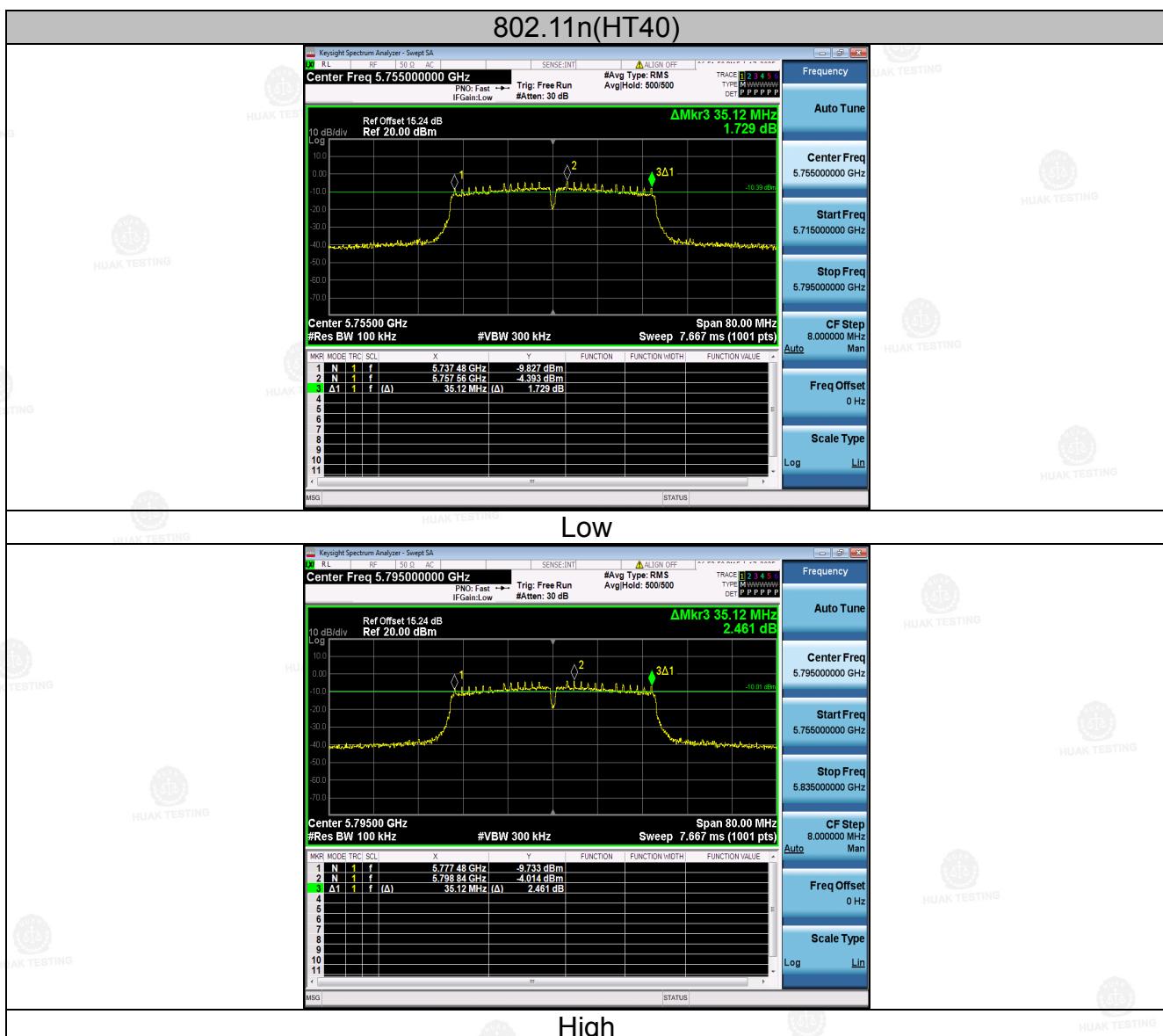
802.11n(HT20)



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4.4 26dB Bandwidth and 99% Occupied Bandwidth

4.4.1 Test Specification

Test Requirement:	47 CFR Part 15C Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	No restriction limits
Test Setup:	 <p>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

4.4.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
Spectrum analyzer	Agilent	N9020A	HKE-117	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	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).

4.4.3 Test Result

N/A

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