

FCC RADIO TEST REPORT

Applicant..... : Soulaca INC

Address..... : 36 S 18TH AVE STE A, BRIGHTON, CO, US, 80601

Manufacturer..... : SHINEWORLD INNOVATIONS LIMITED

Address..... : #1502, BUILDING A4, R&D CENTER, SONGSHAN LAKE INTELLIGENT VALLEY, LIAOBU, DONGGUAN, GUANGDONG, 523425, CHINA

Factory..... : SHINEWORLD INNOVATIONS LIMITED

Address..... : #1502, BUILDING A4, R&D CENTER, SONGSHAN LAKE INTELLIGENT VALLEY, LIAOBU, DONGGUAN, GUANGDONG, 523425, CHINA

Product Name..... : BATHROOM LED TV

Brand Name..... : Soulaca

Model No. : SS215U22, SS270U22, SS320U22, M106, M156, M19, M22, M27, M32, M42, M55 (For model difference refer to section 2.1)

FCC ID..... : 2A72C-SLC1

Measurement Standard.... : 47 CFR FCC PART 15 Subpart E (section 407)

Receipt Date of Samples.... : May 24, 2022

Date of Tested..... : May 24, 2022 to June 24, 2022

Date of Report..... : July 22, 2022

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced except in full.



Prepared by

Rose Hu / Project Engineer



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Revision History

Report Number	Description	Issued Date
NTC2205371FV00	Initial Issue	2022-07-22

1. Summary of Test Result

FCC Rules	Description of Test	Result	Remarks
§15.207 (a)	AC Power Conducted Emission	PASS	---
§15.407(a)	Max. Conducted Output Power	PASS	---
§15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	PASS	---
§15.407(e)	6dB Bandwidth	PASS	---
§15.407(a)	Power Spectral Density	PASS	---
§15.407(b) §15.205	Radiated Emissions	PASS	---
§15.407(b)	Band Edge Emissions	PASS	---
§15.407(g)	Frequency Stability	PASS	---
§15.203	Antenna Requirement	PASS	---
§15.407(h)	Dynamic Frequency Selection	N/A	---

2. General Description of EUT

Product Information	
Product name:	BATHROOM LED TV
Main Model Name:	M22
Additional Model Name:	SS215U22, SS270U22, SS320U22, M106, M156, M19, M27, M32, M42, M55
Model Difference:	These models have the same circuit schematic, construction, PCB Layout and critical components. Their difference is model number only due to trading purpose.
S/N:	2205-2247
Brand Name	Soulaca
Hardware version:	V01
Software version:	V01
Rating:	AC 100-230V 50/60Hz
Classification:	Class B
Typical arrangement:	Table-top
I/O Port:	HDMI IN port*3, USB port*2, Tuner port*2, AV port*1, Earphone port*1, RJ45 port*1
Accessories Information	
Adapter:	N/A
Cable:	AC Port: 1.55m unshielded.
Other:	IR Remote control
Additional Information	
Note:	According to the model difference, all tests were performed on model M22.
Remark:	All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual.

Technical Specification	
Frequency Range:	5180-5240MHz, 5745-5825MHz
Modulation Technology:	DSSS, OFDM
Modulation Type:	BPSK, QPSK for 802.11a 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for 802.11n/ac
Number of Channel:	U-NII-1 4 Channel for 802.11a/n(HT20) 2 Channel for 802.11n(HT40)/ac(VHT40) 1 Channel for 802.11ac(VHT80) U-NII-3: 5 Channel for 802.11a/n(HT20) 2 Channel for 802.11n(HT40)/ac(VHT40) 1 Channel for 802.11ac(VHT80)
Antenna Type:	Integral antenna *2
Antenna Gain:	2.0dBi
Beamforming gain:	Not support

Channel List					
U-NII-1 Band 5180~5240MHz					
IEEE 802.11a/n(HT20)/ac(VHT20)		IEEE 802.11n(HT40)/ac(VHT40)		IEEE 802.11 ac (VHT80)	
Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz
36	5180	38	5190	42	5210
40	5200	46	5230	-	-
44	5220	-	-	-	-
48	5240	-	-	-	-

U-NII-3 Band 5745~5825MHz					
IEEE 802.11a/n(HT20)/ac(VHT20)		IEEE 802.11n(HT40)/ac(VHT40)		IEEE 802.11 ac (VHT80)	
Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz
149	5745	151	5755	155	5775
153	5765	159	5795	-	-
157	5785	-	-		
161	5805	-	-		
165	5825	-	-		

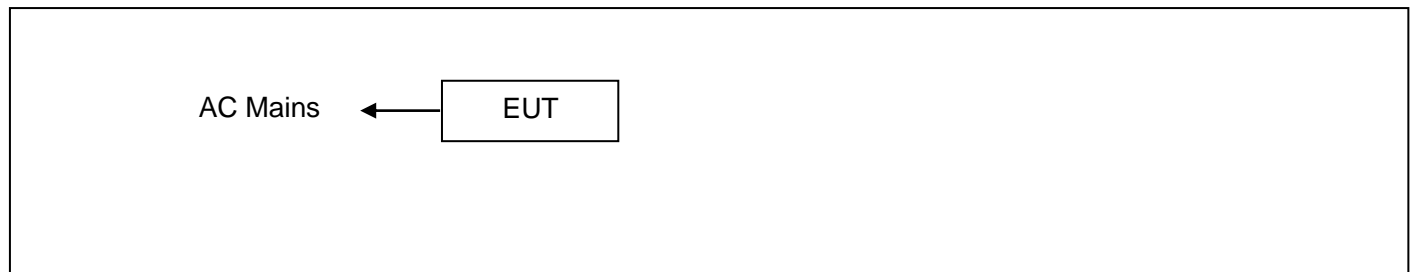
3. Test Channels and Modes Detail

No.	Mode	Channel	Frequency (MHz)	Specification	Remark
1	TX	36	5180	IEEE 802.11a/n(HT20)/ac(HT20)	SISO, MIMO
		40	5200	IEEE 802.11a/n(HT20)/ac(HT20)	SISO, MIMO
		48	5240	IEEE 802.11a/n(HT20) /ac(HT20)	SISO, MIMO
		149	5745	IEEE 802.11a/n(HT20) /ac(HT20)	SISO, MIMO
		157	5785	IEEE 802.11a/n(HT20) /ac(HT20)	SISO, MIMO
		165	5825	IEEE 802.11a/n(HT20) /ac(HT20)	SISO, MIMO
		38	5190	IEEE 802.11n(HT40) /ac(VHT40)	SISO, MIMO
		46	5230	IEEE 802.11n(HT40) /ac(VHT40)	SISO, MIMO
		151	5755	IEEE 802.11n(HT40) /ac(VHT40)	SISO, MIMO
		159	5795	IEEE 802.11n(HT40) /ac(VHT40)	SISO, MIMO
		42	5210	IEEE 802.11ac(VHT80)	SISO, MIMO
		155	5775	IEEE 802.11ac(VHT80))	SISO, MIMO
2.	Normal Mode	---	---	---	

Note:

1. TX mode means that the EUT was programmed to be in continuously transmitting mode.
2. 802.11a only support SISO mode, and 802.11n/ac supports both SISO and MIMO modes.

4. Configuration of EUT



5. Modification of EUT

No modifications are made to the EUT during all test items.

6. Description of Support Device

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

No.	Equipment	Brand	M/N	S/N	Cable Specification	Remarks
1.	Laptop	DELL	VOSTR 03400	H3K2X A01	Power Cord: 1.8m Unshielded, with core	Provided by the Lab
2.	Adapter	DELL	HA45N M140	N/A	AC Line: 1.13m unshielded DC Line: 1.15m unshielded with a core	I/P: AC 100-240V 50-60Hz, 1.3A O/P: DC 19.5V 2.31A 45W Provided by the Lab
3.	Test fixture	---	---	---	---	Provided by the manufacturer

Software	Power Setting				
RPLBTAP P	---	Ant_1		Ant_2	
		U-NII-1	U-NII-3	U-NII-1	U-NII-3
	IEEE 802.11a	80,80	80,80	80,80	80,80
	IEEE 802.11n(HT20)	75,75	75,75	75,75	75,75
	IEEE 802.11ac(VHT20)	75,75	75,75	75,75	75,75
	IEEE 802.11n(HT40)	75,75	75,75	75,75	75,75
	IEEE 802.11ac(VHT40)	75,75	75,75	75,75	75,75
	IEEE 802.11ac(VHT80)	75,75	75,75	75,75	75,75

7. Test Facility and Location

Test Site	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)
Accreditations and Authorizations	:	<p>The Laboratory has been assessed and proved to be in compliance with CNAS/CL01</p> <p>Listed by CNAS, August 13, 2018</p> <p>The Certificate Registration Number is L5795.</p> <p>The Certificate is valid until August 13, 2024</p> <p>The Laboratory has been assessed and proved to be in compliance with ISO17025</p> <p>Listed by A2LA, November 01, 2017</p> <p>The Certificate Registration Number is 4429.01</p> <p>Listed by FCC, November 06, 2017</p> <p>Test Firm Registration Number is 907417</p> <p>Listed by Industry Canada, June 08, 2017</p> <p>The Certificate Registration Number is 46405-9743A</p>
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

8. Applicable Standards and References

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

Test Standards:

47 CFR Part 15, Subpart E, 15.407

ANSI C63.10-2013

References Test Guidance:

KDB 789033 D02 v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

10. Test Conditions

No.	Test Item	Test Mode	Test Voltage	Tested by	Remarks
1.	AC Power Conducted Emission	2	AC 120V/60Hz	Sean	See note 1
2.	Max. Conducted Output Power	1	AC 120V/60Hz	Sean	See note 1
3.	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	1	AC 120V/60Hz	Sean	See note 1
4.	6dB Bandwidth	1	AC 120V/60Hz	Sean	See note 1
5.	Power Spectral Density	1	AC 120V/60Hz	Sean	See note 1
6.	Radiated Emissions	1, 2	AC 120V/60Hz	Sean	See note 1,3
7.	Band Edge Emissions	1	AC 120V/60Hz	Sean	See note 1
8.	Frequency Stability	1	AC 120V/60Hz	Sean	See note 1
9.	Antenna Requirement	---	---	---	See note 1

Note:

1. The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35℃, 30~70%, 86~106kPa.

11. Measurement Uncertainty

No.	Test Item	Frequency	Uncertainty	Remarks
1.	Conducted Emission	150KHz ~ 30MHz	±2.52 dB	---
2.	Radiated Emission Test	9KHz ~ 30MHz	±2.60 dB	---
		30MHz ~ 1GHz	±5.04 dB	---
		1GHz ~ 18GHz	±5.23 dB	---
		18GHz ~ 40GHz	±5.14 dB	---
3.	RF Conducted Test	10Hz ~ 40GHz	±1.06 dB	---
4.	Occupied Channel Bandwidth	---	±1.42 x10 ⁻⁴ % MHz	---

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The measurement uncertainty levels above are estimated and calculated according to CISPR 16-4-2.
3. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

12. Sample Calculations

Conducted Emission						
Freq. (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
0.1500	50.00	10.60	60.60	66.00	-5.40	QP
<p>Where,</p> <p>Freq. = Emission frequency in MHz</p> <p>Reading Level = Spectrum Analyzer/Receiver Reading</p> <p>Corrector Factor = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation</p> <p>Measurement = Reading + Corrector Factor</p> <p>Limit = Limit stated in standard</p> <p>Margin = Measurement - Limit</p> <p>Detector = Reading for Quasi-Peak / Average / Peak</p>						

Radiated Spurious Emissions and Restricted Bands						
Freq. (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
110.5100	41.32	-7.62	33.70	43.50	-9.80	QP
<p>Where,</p> <p>Freq. = Emission frequency in MHz</p> <p>Reading Level = Spectrum Analyzer/Receiver Reading</p> <p>Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier</p> <p>Measurement = Reading + Corrector Factor</p> <p>Limit = Limit stated in standard</p> <p>Over = Margin, which calculated by Measurement - Limit</p> <p>Detector = Reading for Quasi-Peak / Average / Peak</p>						

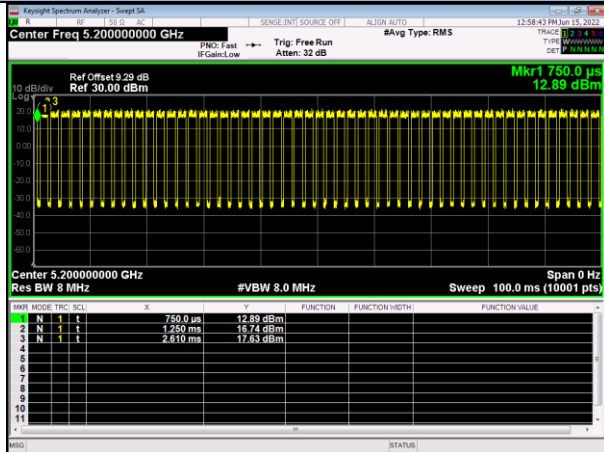
Note: For all conducted test items, the spectrum analyzer offset or transducer is derived from RF cable loss and attenuator factor. The offset or transducer is equal to the RF cable loss plus attenuator factor.

13. Duty cycle

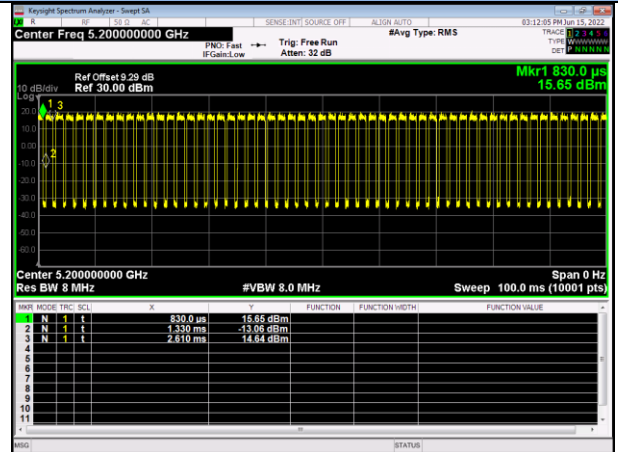
Operation Band (MHz)	Mode	Ton (ms)	Ton+off (ms)	Duty Cycle (%)	1/T minimum VBW (kHz)	Duty Cycle Factor (dB)
U-NII-1	802.11a	1.36	1.86	73.12	0.74	1.36
	802.11n(HT20)	1.27	1.77	71.75	0.79	1.44
	802.11n(HT40)	0.63	1.14	55.26	1.59	2.58
	802.11ac(VHT20)	0.32	0.82	39.02	3.12	4.09
	802.11ac(VHT40)	1.28	1.78	71.91	0.78	1.43
	802.11ac(VHT80)	0.64	1.14	56.14	1.56	2.51
U-NII-3	802.11a	1.36	1.87	72.73	0.74	1.38
	802.11n(HT20)	1.28	1.78	71.91	0.78	1.43
	802.11n(HT40)	0.64	1.14	56.14	1.56	2.51
	802.11ac(VHT20)	0.32	0.82	39.02	3.13	4.09
	802.11ac(VHT40)	1.27	1.77	71.75	0.79	1.44
	802.11ac(VHT80)	0.64	1.14	56.14	1.56	2.51
Remark: Duty Cycle= (Ton/ Ton+off)*100% Duty Cycle factor=10*log(1/ Duty cycle)						

U-NII-1 Band

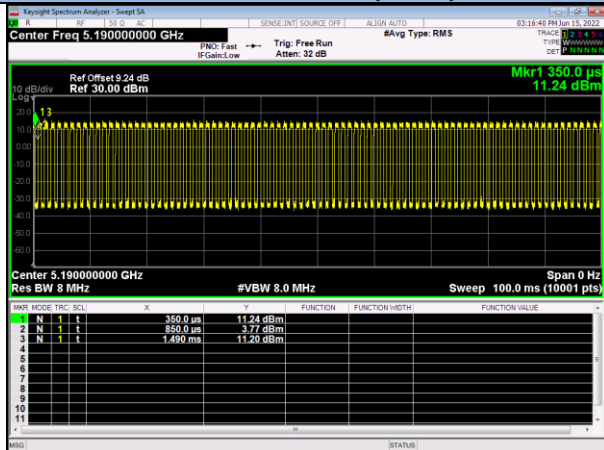
IEEE 802.11a



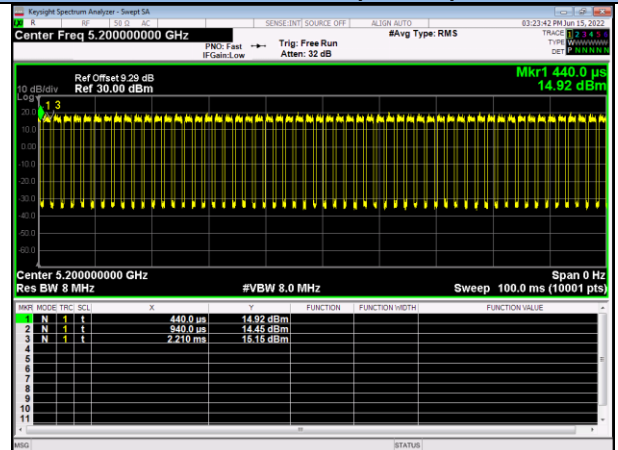
IEEE 802.11n(HT20)



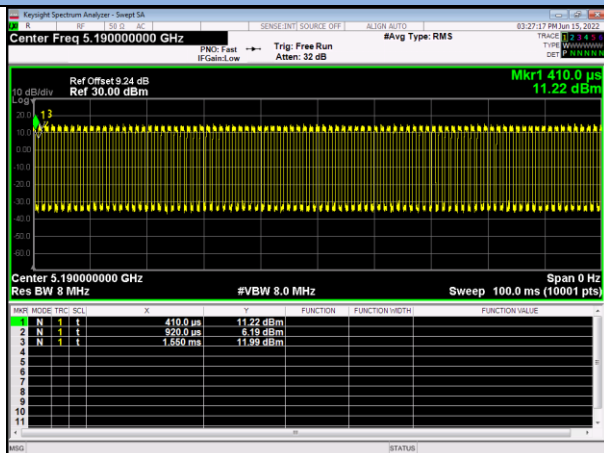
802.11n(HT40)



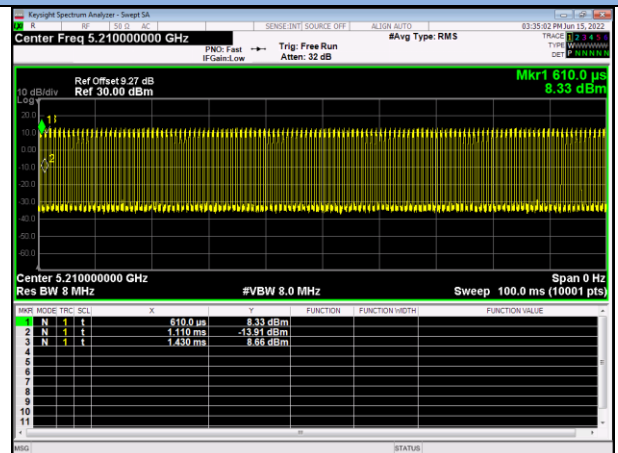
IEEE 802.11ac(VHT20)



IEEE 802.11ac(VHT40)

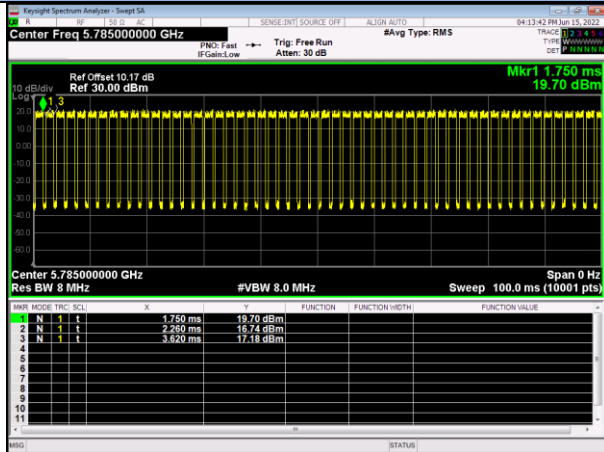


IEEE 802.11ac(VHT80)

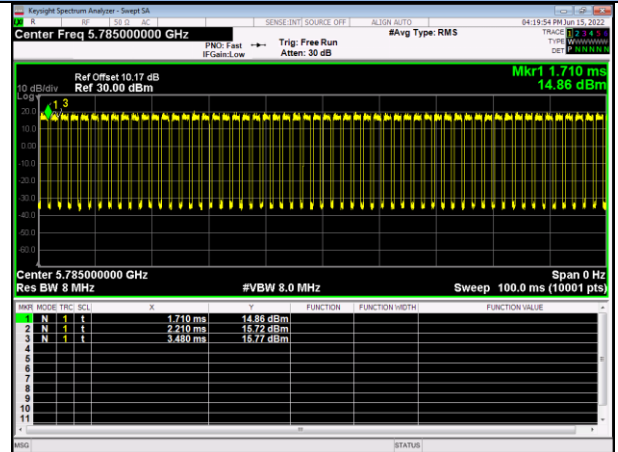


U-NII-3 Band

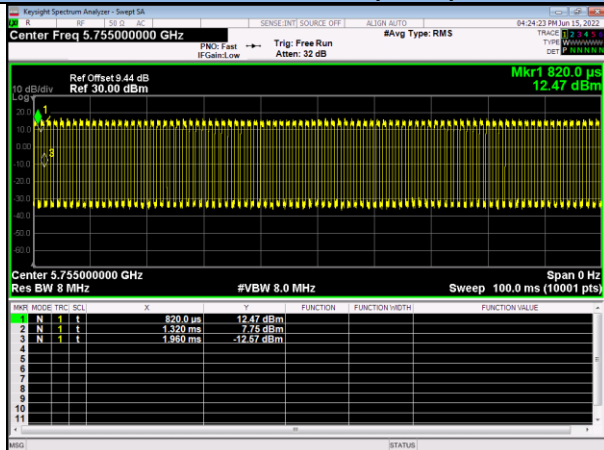
IEEE 802.11a



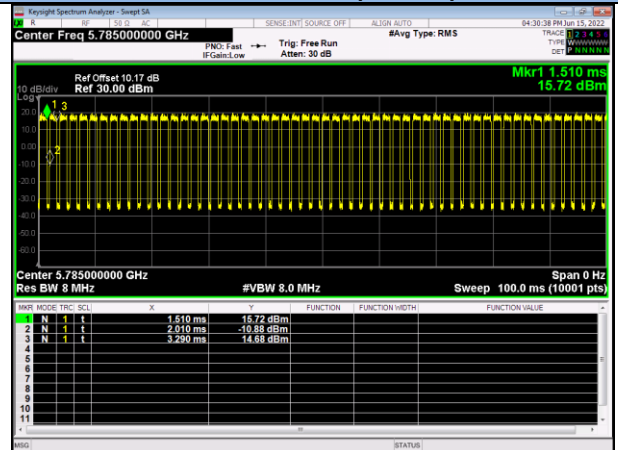
IEEE 802.11n(HT20)



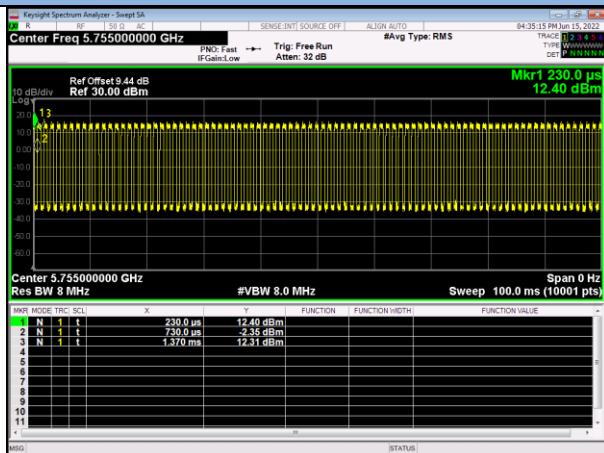
802.11n(HT40)



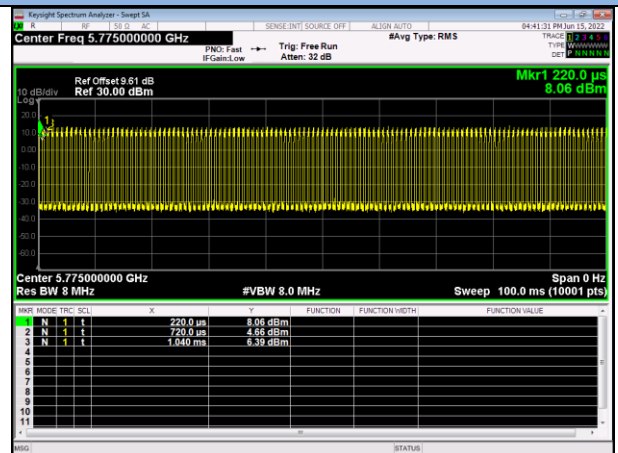
IEEE 802.11ac(VHT20)



IEEE 802.11ac(VHT40)



IEEE 802.11ac(VHT80)



14. Test Items and Results

14.1 Conducted Emissions Measurement

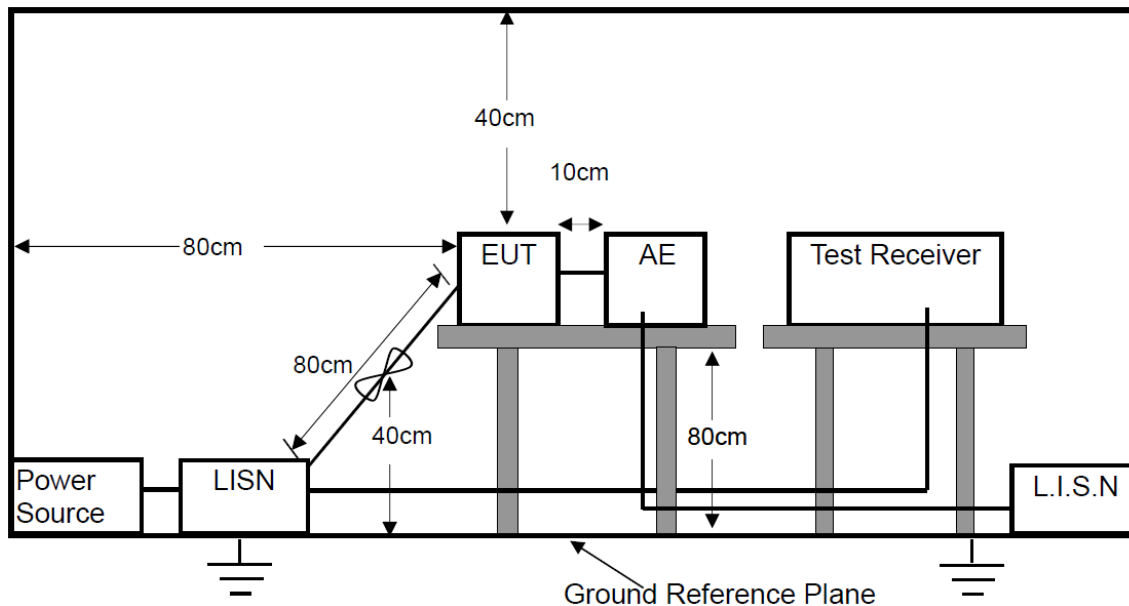
LIMITS

According to the requirements of FCC PART 15.207, the limits are as follows:

Frequency (MHz)	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

- Note:
1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.
 2. The lower limit shall apply at the transition frequencies.
 3. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. All I/O cables and support devices were positioned as per ANSI C63.10.
- c. Connect mains power port of the EUT to a line impedance stabilization network (LISN).
- d. Connect all support devices to the other LISN and AAN, if needed.
- e. Scan the frequency range from 150KHz to 30MHz at both sides of AC line for maximum conducted interference checking and record the test data.

TEST RESULTS

PASS

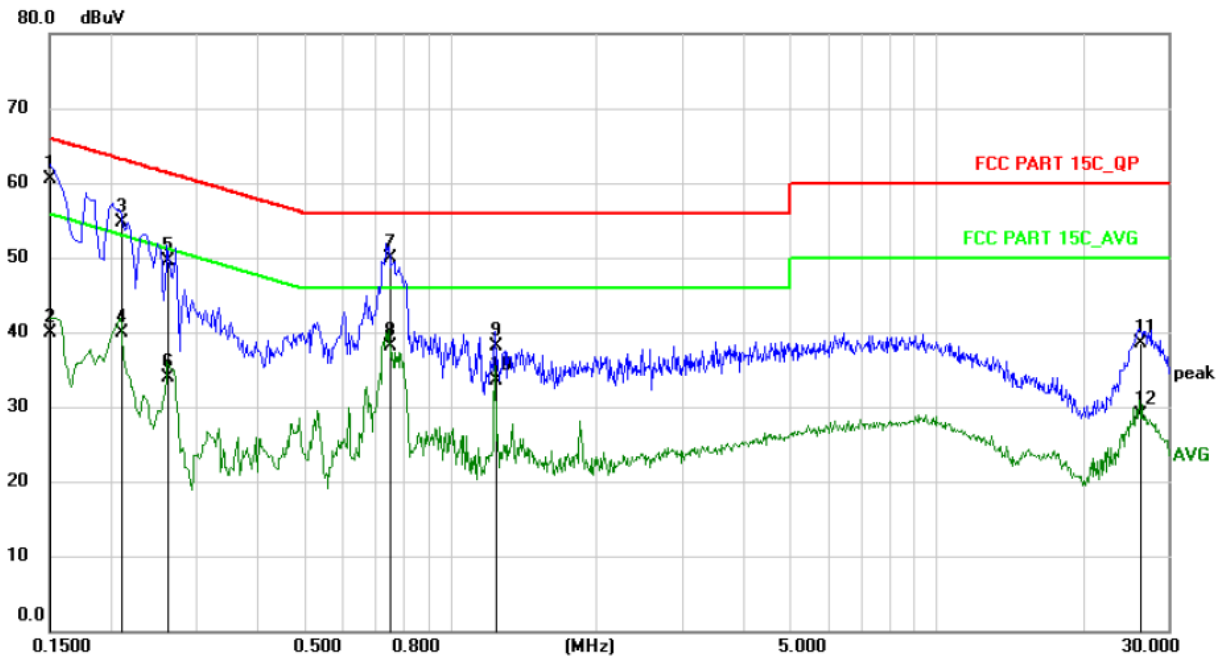
Please refer to the following pages.

M/N: M22	Testing Voltage: AC 120V/60Hz
Phase: L1	Detector: QP & AVG
Test Mode: 2	

Conducted Emission Measurement

Date: 2022/5/31

Time: 16:25:48



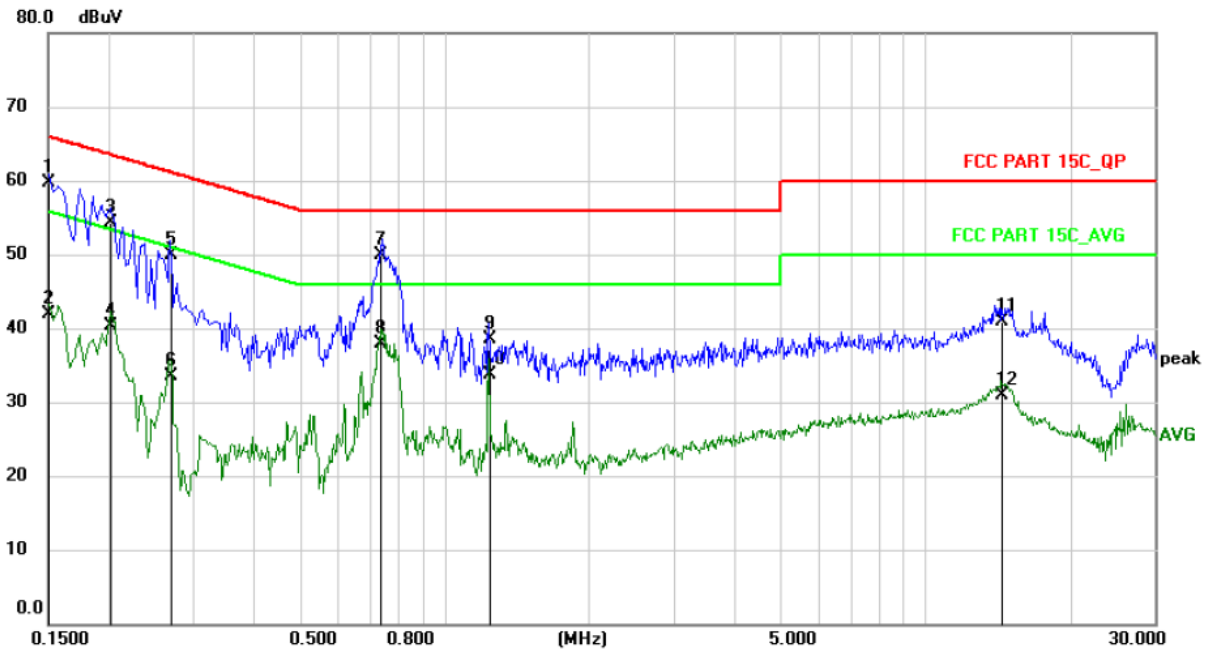
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1500	50.00	10.60	60.60	66.00	-5.40	QP	
2	0.1500	29.30	10.60	39.90	56.00	-16.10	AVG	
3	0.2100	44.10	10.60	54.70	63.21	-8.51	QP	
4	0.2100	29.30	10.60	39.90	53.21	-13.31	AVG	
5	0.2620	39.00	10.60	49.60	61.37	-11.77	QP	
6	0.2620	23.40	10.60	34.00	51.37	-17.37	AVG	
7	0.7500	39.24	10.66	49.90	56.00	-6.10	QP	
8	0.7500	27.54	10.66	38.20	46.00	-7.80	AVG	
9	1.2380	27.40	10.70	38.10	56.00	-17.90	QP	
10	1.2380	22.80	10.70	33.50	46.00	-12.50	AVG	
11	26.1900	27.71	10.79	38.50	60.00	-21.50	QP	
12	26.1900	18.11	10.79	28.90	50.00	-21.10	AVG	

M/N: M22	Testing Voltage: AC 120V/60Hz
Phase: N	Detector: QP & AVG
Test Mode: 2	

Conducted Emission Measurement

Date: 2022/5/31

Time: 16:30:24



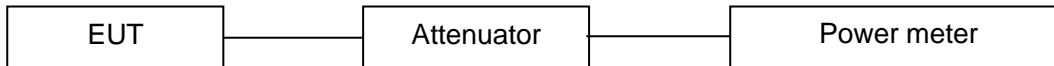
No. Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
	MHz	Level	Factor	ment			Detector	Comment
		dBuV	dB	dBuV	dBuV	dB		
1	0.1500	49.20	10.60	59.80	66.00	-6.20	QP	
2	0.1500	31.30	10.60	41.90	56.00	-14.10	AVG	
3	0.2020	43.70	10.60	54.30	63.53	-9.23	QP	
4	0.2020	29.70	10.60	40.30	53.53	-13.23	AVG	
5	0.2700	39.30	10.60	49.90	61.12	-11.22	QP	
6	0.2700	23.00	10.60	33.60	51.12	-17.52	AVG	
7 *	0.7380	39.34	10.66	50.00	56.00	-6.00	QP	
8	0.7380	27.24	10.66	37.90	46.00	-8.10	AVG	
9	1.2380	27.90	10.70	38.60	56.00	-17.40	QP	
10	1.2380	23.10	10.70	33.80	46.00	-12.20	AVG	
11	14.4300	30.25	10.75	41.00	60.00	-19.00	QP	
12	14.4300	20.15	10.75	30.90	50.00	-19.10	AVG	

14.2 Maximum Conducted Output Power Measurement

LIMITS

Operation Band	EUT category	Limit
<input checked="" type="checkbox"/> 5180~5240MHz	<input type="checkbox"/> Outdoor Access Point	1 Watt (30dBm) (Max. e.i.r.p \leq 125mW(21dBm) at any elevation angle above 30 degrees as measured from the horizon)
	<input type="checkbox"/> Fixed point-to-point Access Point	1 Watt (30dBm)
	<input type="checkbox"/> Indoor Access Point	1 Watt (30dBm)
	<input checked="" type="checkbox"/> Mobile and Portable client device	250mW (24dBm)
<input type="checkbox"/> 5260~5320MHz	-	250mW (24dBm)
<input type="checkbox"/> 5500~5700MHz	-	250mW (24dBm)
<input checked="" type="checkbox"/> 5745~5825MHz	-	1 Watt (30dBm)

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 v02r01 for compliance testing of Unlicensed National Information Infrastructure (U-NII) Device -section (E) Maximum conducted output power.
3. Measurement using a power meter (PM) =b Method PM-G (Measurement using a gated RF average power meter).

TEST RESULTS

PASS

Please refer to the following table.

U-NII-1						
Frequency MHz	Data Rate Mbps		Average Output Power dBm			Limit dBm
IEEE 802.11a Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5180	6		12.509			24
Channel: 5200	6		12.978			24
Channel: 5240	6		12.523			24
IEEE 802.11n(HT20)Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5180	SISO	MIMO	ANT_1 (SISO)	ANT_2 (SISO)	Ant_1+ANT_2 (MIMO)	24
	MCS 0	MCS 8	11.603	11.729	14.677	
Channel: 5200	MCS 0	MCS 8	11.747	11.644	14.706	24
Channel: 5240	MCS 0	MCS 8	11.189	11.495	14.355	24
IEEE 802.11n(HT40) Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5190	MCS 0	MCS 8	9.876	10.248	13.076	24
Channel: 5230	MCS 0	MCS 8	8.633	10.360	12.592	24
IEEE 802.11ac (VHT20) Mode (OFDM7.42, Antenna Gain=2.0dBi)						
Channel: 5180	MCS 0	MCS 8	10.84	11.731	14.319	24
Channel: 5200	MCS 0	MCS 8	11.121	11.533	14.342	24
Channel: 5240	MCS 0	MCS 8	10.72	11.530	14.154	24
IEEE 802.11ac (VHT40) Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5190	MCS 0	MCS 8	9.662	10.712	13.229	24
Channel: 5230	MCS 0	MCS 8	9.011	10.164	12.636	24
IEEE 802.11ac (VHT80) Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5210	MCS 0	MCS 8	7.855	8.735	11.328	24
Note: 1. As for IEEE 802.11a mode, both of antennas have considered during pre-test, but only the worst case (ANT_1) was recorded. 2. As for IEEE 802.11n/ac mode, EUT working in both SISO and MIMO modes. Directional Gain for MIMO. 3. Directional Gain = 2dBi + 10log(2) = 5.01 dBi<6 dBi, Therefore the limit doesn't change. 4. The duty cycle factor has considered during the test.						

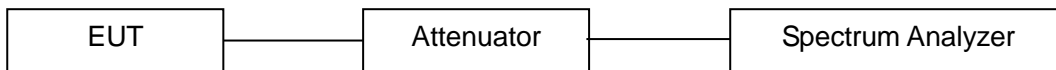
U-NII-3						
Frequency MHz	Data Rate Mbps		Average Output Power dBm			Limit dBm
IEEE 802.11a Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5745	6		12.326			30
Channel: 5785	6		14.482			30
Channel: 5825	6		12.247			30
IEEE 802.11n(HT20)Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5745	SISO	MIMO	ANT_1 (SISO)	ANT_2 (SISO)	Ant_1+ANT_2 (MIMO)	30
	MCS 0	MCS 8	11.356	11.482	14.430	
Channel: 5785	MCS 0	MCS 8	11.844	11.938	14.902	30
Channel: 5825	MCS 0	MCS 8	11.044	11.913	14.510	30
IEEE 802.11n(HT40) Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5755	MCS 0	MCS 8	11.204	10.858	14.045	30
Channel: 5795	MCS 0	MCS 8	10.446	9.187	12.872	30
IEEE 802.11ac (VHT20) Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5745	MCS 0	MCS 8	11.617	11.731	14.685	30
Channel: 5785	MCS 0	MCS 8	12.003	12.049	15.036	30
Channel: 5825	MCS 0	MCS 8	11.161	11.942	14.579	30
IEEE 802.11ac (VHT40) Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5755	MCS 0	MCS 8	10.225	10.652	13.454	30
Channel: 5795	MCS 0	MCS 8	11.490	10.734	14.139	30
IEEE 802.11ac (VHT80) Mode (OFDM, Antenna Gain=2.0dBi)						
Channel: 5775	MCS 0	MCS 8	9.264	9.289	12.287	30
Note: 1. As for IEEE 802.11a mode, both of antennas have considered during pre-test, but only the worst case (ANT_1) was recorded. 2. As for IEEE 802.11n/ac mode, EUT working in both SISO and MIMO modes. Directional Gain for MIMO. 3. Directional Gain = 2.0dBi + 10log(2) = 5.01 dBi<6 dBi, Therefore the limit doesn't change. 4. The duty cycle factor has considered during the test.						

14.3 6dB Bandwidth Measurement

LIMITS

The minimum 6dB bandwidth shall be at least 500 kHz

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to ANSI C63.10 clause 11.8.1:

- a. Set the RBW = 100KHz.
- b. Set the VBW $\geq 3 \times$ RBW
- c. Set the Detector = peak.
- d. Set the Sweep time = auto couple.
- e. Set the Trace mode = max hold.
- f. Allow trace to fully stabilize.
- g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST RESULTS

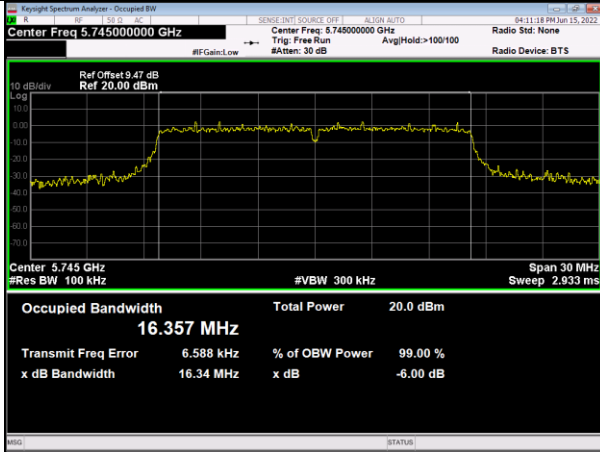
PASS

Please refer to the following tables.

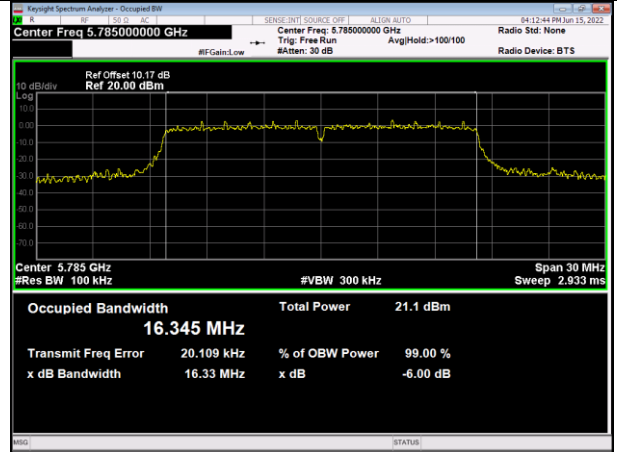
U-NII-3 Band			
Frequency MHz	Data Rate Mbps	6dB Bandwidth MHz	Limit
IEEE 802.11a Mode (OFDM)			
Channel: 5745	6	16.34	>500KHz
Channel: 5785	6	16.33	>500KHz
Channel: 5825	6	16.31	>500KHz
IEEE 802.11n(HT20) Mode (OFDM)			
Channel: 5745	MCS0	17.59	>500KHz
Channel: 5785	MCS0	17.32	>500KHz
Channel: 5825	MCS0	17.32	>500KHz
IEEE 802.11n(HT40) Mode (OFDM)			
Channel: 5755	MCS0	35.19	>500KHz
Channel: 5795	MCS0	35.18	>500KHz
IEEE 802.11ac (VHT20) Mode (OFDM)			
Channel: 5745	MCS0	17.57	>500KHz
Channel: 5785	MCS0	17.30	>500KHz
Channel: 5825	MCS0	17.11	>500KHz
IEEE 802.11ac (VHT40) Mode (OFDM)			
Channel: 5755	MCS0	35.12	>500KHz
Channel: 5795	MCS0	35.19	>500KHz
IEEE 802.11ac (VHT80) Mode (OFDM)			
Channel: 5775	MCS0	75.09	>500KHz
Note: Both of antennas have considered during pre-test, but only the worst case (ANT_1) was recorded.			

U-NII-3

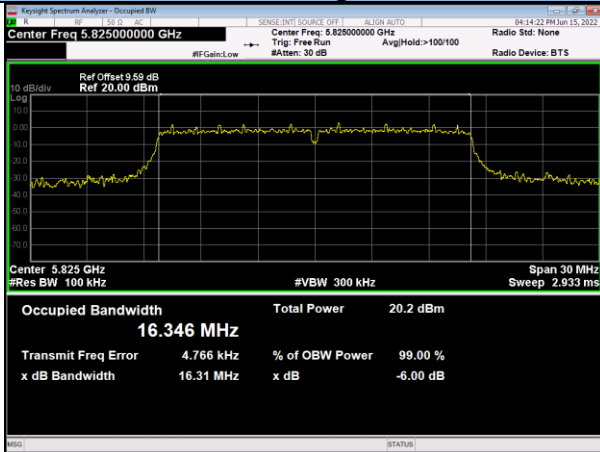
IEEE 802.11a Low Channel



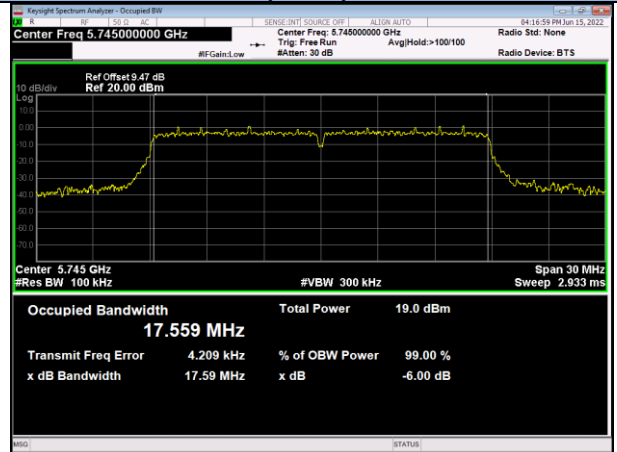
IEEE 802.11a Middle Channel



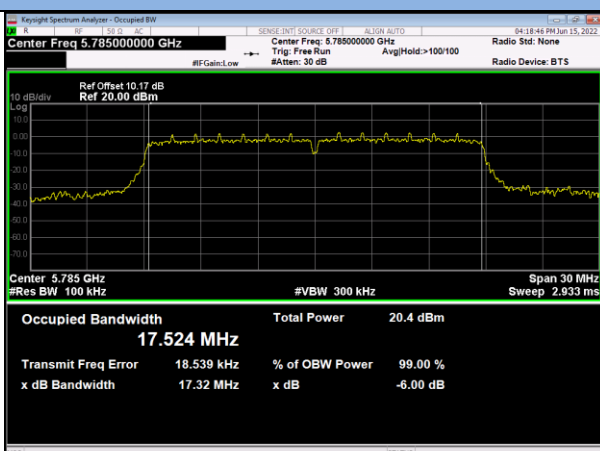
IEEE 802.11a High Channel



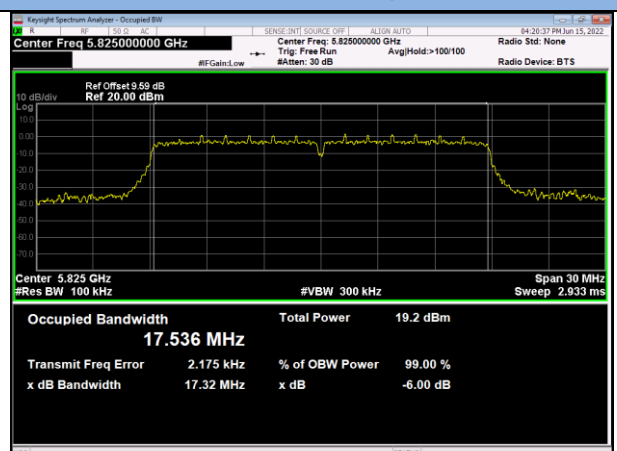
IEEE 802.11n(HT20) Low Channel



IEEE 802.11n(HT20) Middle Channel

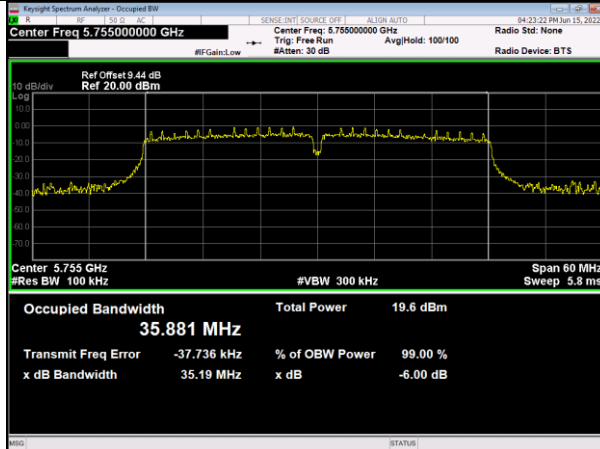


IEEE 802.11n(HT20) High Channel

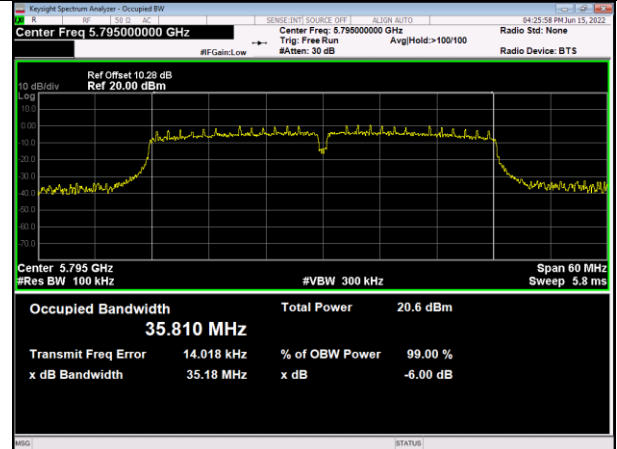


U-NII-3

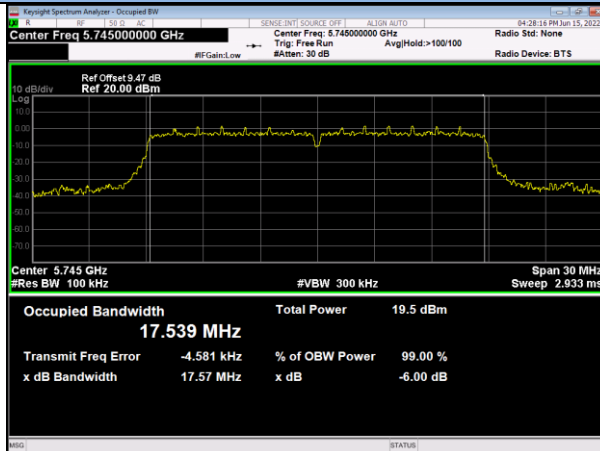
IEEE 802.11n(HT40) Low Channel



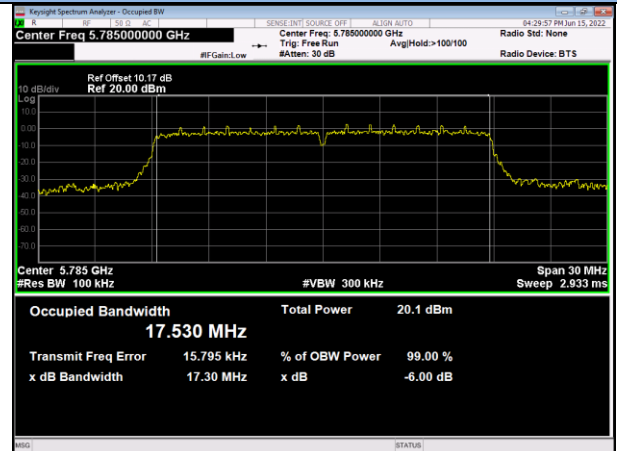
IEEE 802.11n(HT40) High Channel



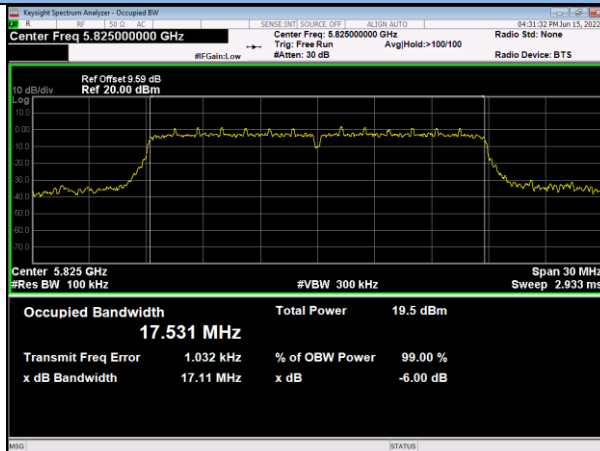
IEEE 802.11ac(VHT20) Low Channel



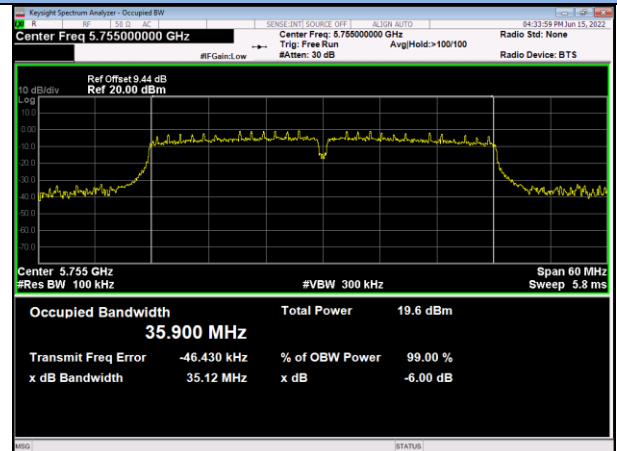
IEEE 802.11ac(VHT20) Middle Channel



IEEE 802.11ac(VHT20) High Channel



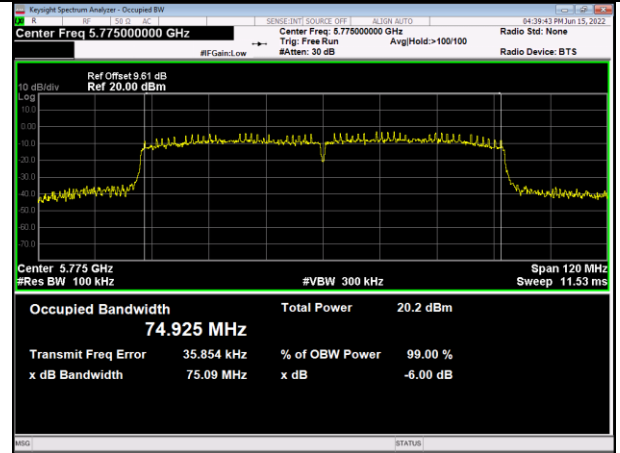
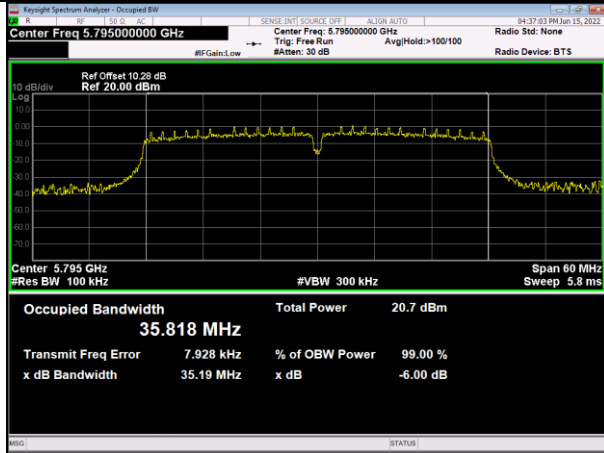
IEEE 802.11ac(VHT40) Low Channel



U-NII-3

IEEE 802.11ac(VHT40) High Channel

IEEE 802.11ac(VHT80)

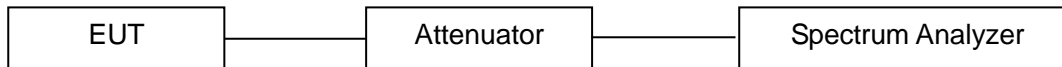


14.4 26dB Bandwidth & 99% Occupied Bandwidth

LIMITS

No restriction limits.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

The antenna port of the EUT was connected to the input of a spectrum analyzer.

Analyzer was set as below according to FCC KDB789033(v02r01):

- a. For 26dB bandwidth, Set the RBW = Approximately 1% of the emission bandwidth
 - b. Set the VBW > RBW
 - c. Detector = peak.
 - d. Sweep time = auto couple.
 - e. Trace mode = max hold.
 - f. Allow trace to fully stabilize.
 - g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.
-
1. For 99% occupied bandwidth, Set the RBW = 1% to 5% of the OBW
 2. Set the VBW $\geq 3 \times$ RBW
 3. Detector = peak.
 4. Span = 1.5 times to 5.0 times the OBW
 5. Sweep time = auto couple.
 6. Trace mode = max hold. Allow trace to fully stabilize.
 7. Use the 99% power bandwidth function of the spectrum analyzer measure the occupied bandwidth.

TEST RESULTS

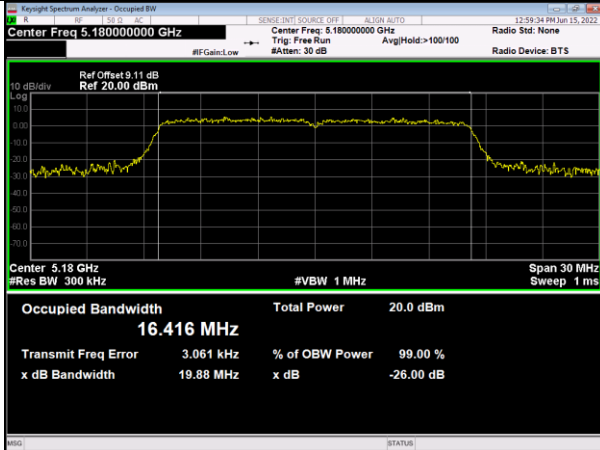
PASS

Please refer to the following table.

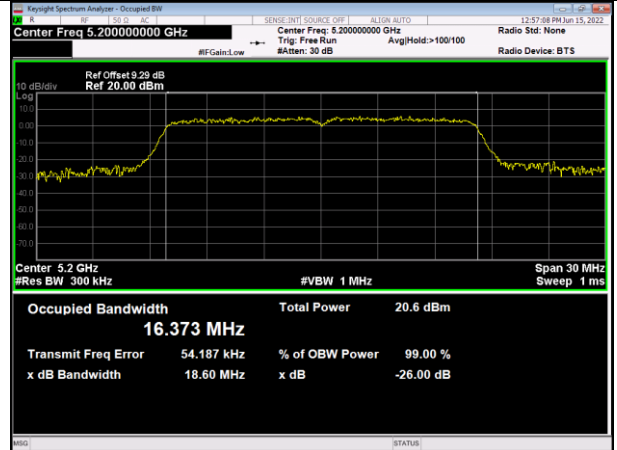
U-NII-1 Band			
Frequency MHz	Data Rate Mbps	26dB Bandwidth MHz	99% Occupied Bandwidth MHz
IEEE 802.11a Mode (OFDM)			
Channel: 5180	6	19.88	---
Channel: 5200	6	18.60	---
Channel: 5240	6	23.33	---
IEEE 802.11n(HT20) Mode (OFDM)			
Channel: 5180	MCS0	19.65	---
Channel: 5200	MCS0	19.44	---
Channel: 5240	MCS0	19.53	---
IEEE 802.11n(HT40) Mode (OFDM)			
Channel: 5190	MCS0	41.28	---
Channel: 5230	MCS0	41.26	---
IEEE 802.11ac (VHT20) Mode (OFDM)			
Channel: 5180	MCS0	19.69	---
Channel: 5200	MCS0	19.48	---
Channel: 5240	MCS0	19.55	---
IEEE 802.11ac (VHT40) Mode (OFDM)			
Channel: 5190	MCS0	41.31	---
Channel: 5230	MCS0	41.04	---
IEEE 802.11ac (VHT80) Mode (OFDM)			
Channel: 5210	MCS0	85.61	---
Note: Both of antennas have considered during pre-test, but only the worst case (ANT_1) was recorded.			

U-NII-1 Band 26dB Bandwidth

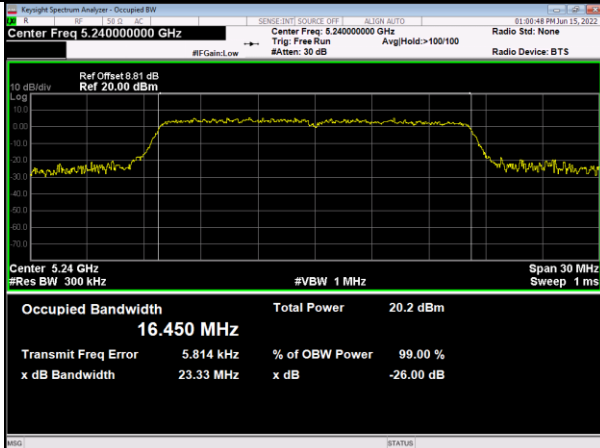
IEEE 802.11a Low Channel



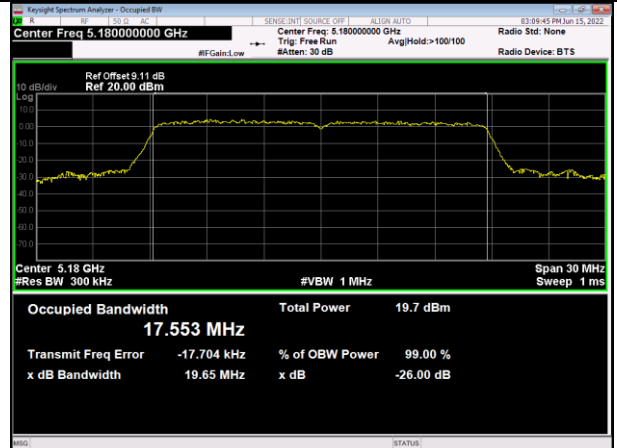
IEEE 802.11a Middle Channel



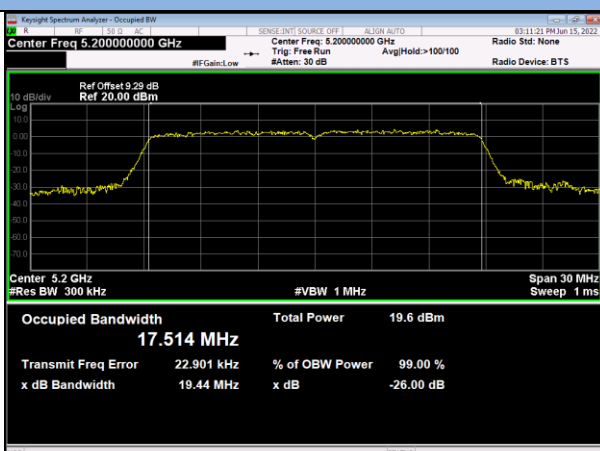
IEEE 802.11a High Channel



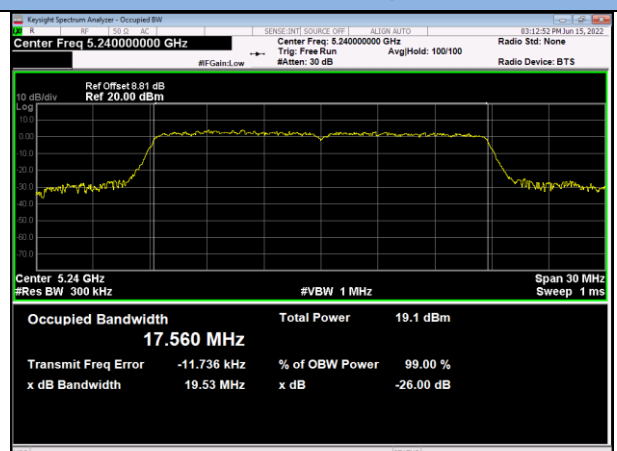
IEEE 802.11n(HT20) Low Channel



IEEE 802.11n(HT20) Middle Channel

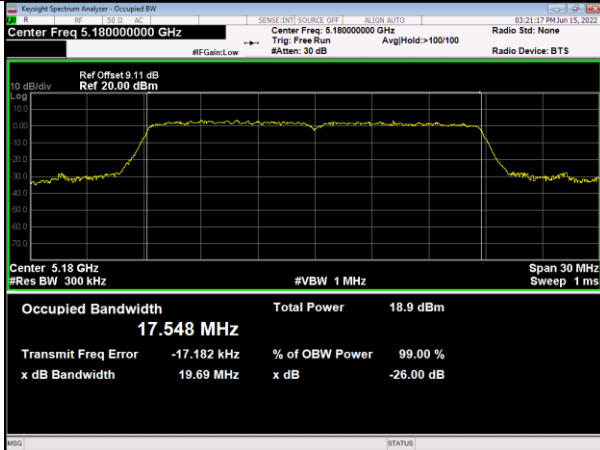


IEEE 802.11n(HT20) High Channel

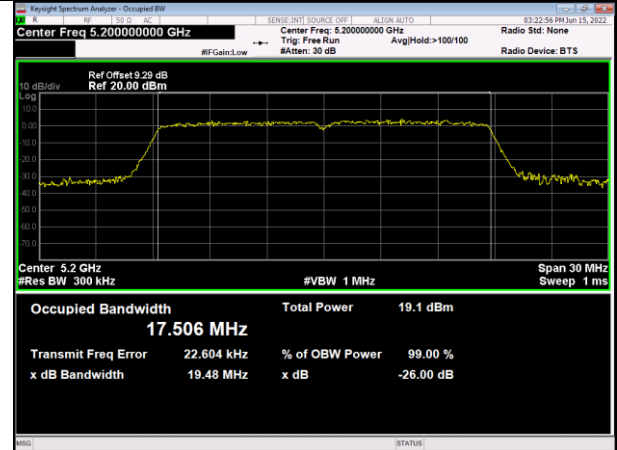


U-NII-1 Band 26dB Bandwidth

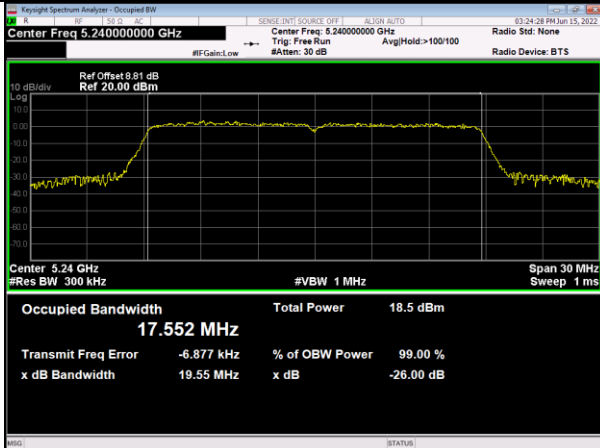
IEEE 802.11ac(VHT20) Low Channel



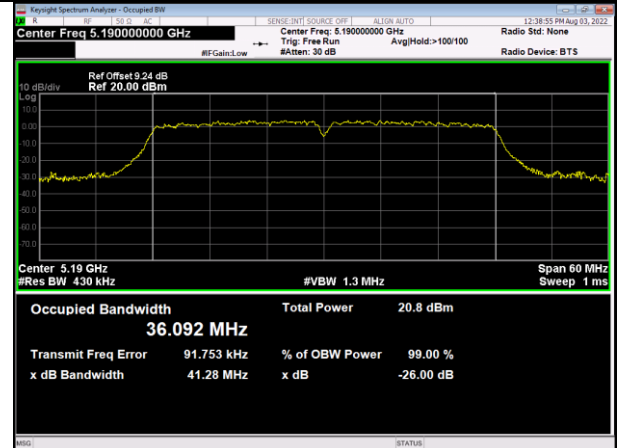
IEEE 802.11ac(VHT20) Middle Channel



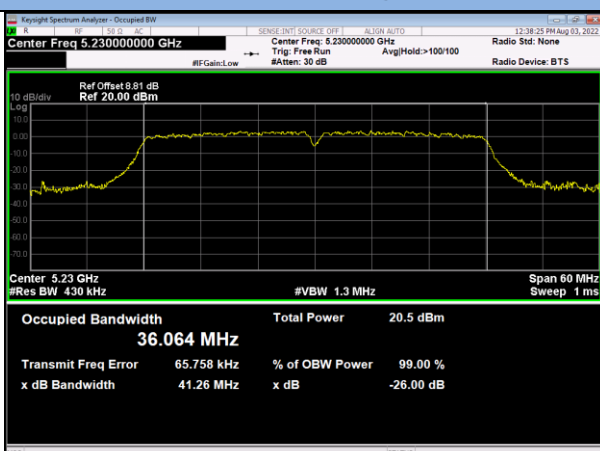
IEEE 802.11ac(VHT20) High Channel



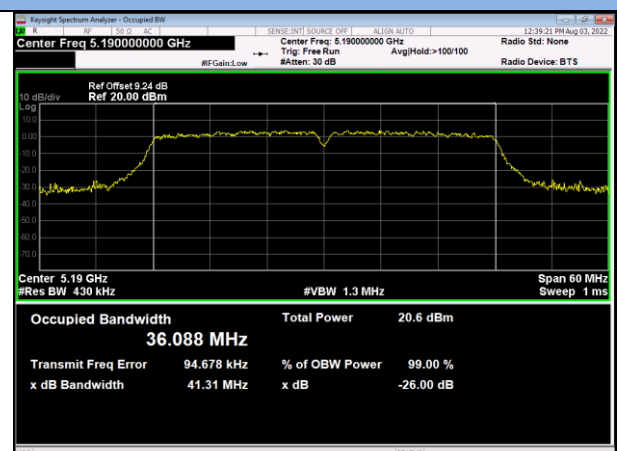
IEEE 802.11n(HT40) Low Channel



IEEE 802.11n(HT40) High Channel

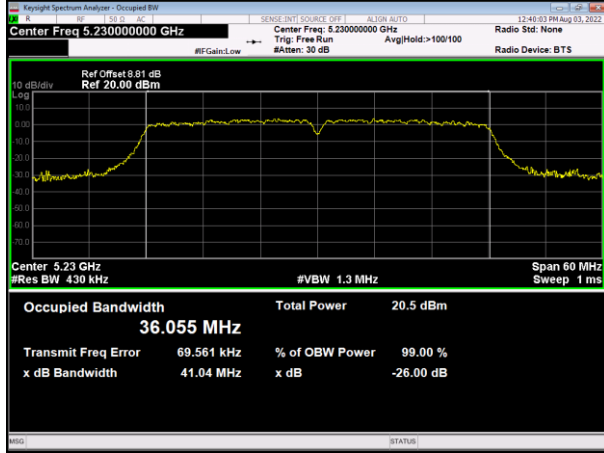


IEEE 802.11ac(VHT40) Low Channel

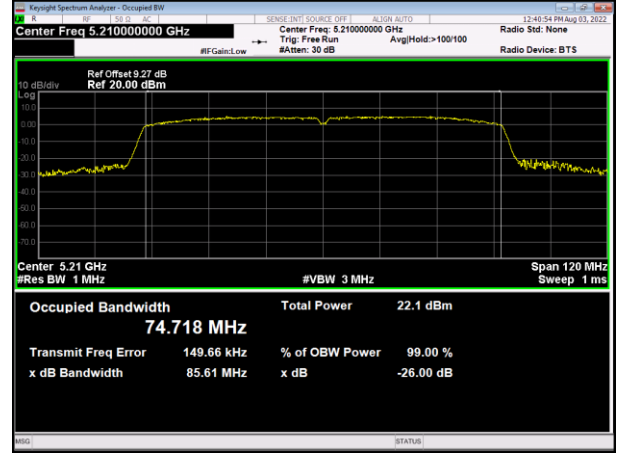


U-NII-1 Band 26dB Bandwidth

IEEE 802.11ac(VHT40) High Channel



IEEE 802.11ac(VHT80)

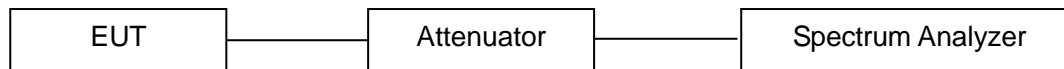


14.5 Power Spectral Density

LIMITS

Operation Band		Limit
<input checked="" type="checkbox"/> 5180~5240MHz	<input type="checkbox"/> Outdoor access point	17 dBm/MHz
	<input type="checkbox"/> Indoor access point	17 dBm/MHz
	<input type="checkbox"/> Fixed point-to-point access points	17 dBm/MHz
	<input checked="" type="checkbox"/> Client devices	11 dBm/MHz
<input type="checkbox"/> 5260~5320MHz	-	11 dBm/MHz
<input type="checkbox"/> 5500~5700MHz	-	11 dBm/MHz
<input checked="" type="checkbox"/> 5745~5825MHz	-	30 dBm/500kHz

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

The antenna port of the EUT was connected to the input of a spectrum analyzer.

Analyzer was set as below according to FCC KDB789033 (v02r01):

- Set analyzer center frequency to center frequency
- Set the RBW to: 1MHz
- Set the VBW to: 3MHz
- Detector = RMS
- Sweep time = auto couple
- Trace Average = 100 times
- If measured bandwidth of Maximum PSD is specified in 500kHz, add $10\log(500\text{kHz}/\text{RBW})$ to the measured result, whereas RBW (<500kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement. Allow trace to fully stabilize.