FCC TEST REPORT

Product	:	Mobile Phone
Trade mark	:	LeEco
Model/Type reference	:	Le X522
Report Number	:	1611100482RFC-4
Date of Issue	:	Nov. 28, 2016
FCC ID	:	2AFWMLEX522
Test Standards	:	47 CFR Part 15 Subpart E (2015)
Test result	:	PASS

Prepared for:

Lemobile Information Technology (Beijing) Co., Ltd.
WENHUAYING NORTH (No.1, LINKONG 2nd St.), GAOLIYING, SHUNYI DISTRICT, BEIJING, CHINA

Prepared by:

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Reviewed by: Jim Long — Jim Long, RF Senior Supervisor

Approved by: Billy Li — Billy Li, Technical Director

Date: Nov. 28, 2016

UnionTrust Laboratories * Certified *

Version

Version No.	Date	Description
V1.0	Nov. 28, 2016	Original

Content

1 General Information

1.1 Client Information

Applicant:	Lemobile Information Technology (Beijing) Co., Ltd.
Address of Applicant:	WENHUAYING NORTH (No.1, LINKONG 2nd St.), GAOLIYING, SHUNYI DISTRICT, BEIJING, CHINA
Manufacturer:	Lemobile Information Technology (Beijing) Co., Ltd.
Address of Manufacturer:	WENHUAYING NORTH (No.1, LINKONG 2nd St.), GAOLIYING, SHUNYI DISTRICT, BEIJING, CHINA

1.2 General Description of EUT

Product Name:	Mobile Phone	
Model No.(EUT):	Le X522	
Add Mode No.:	N/A	
Trade Mark:	LeEco	
EUT Supports Radios application:	GSM850/900/1800/1900 WCDMA Band I/II/IV/V/VIII LTE FDD Band 1/2/3/4/5/7/8/12/17 Wlan 2.4GHz: 802.11b/g/n(HT20)/n(HT40) Wlan 5180~5825MHz: 802.11a/g/n(HT20)/n(HT40)/ac(VHT20)/ac(VHT40) /ac(VHT80) Bluetooth V3.0+EDR&Bluetooth V4.1 BLE GPS	
Power Supply:	Adapter 1	Model: EQ-24BUS Brand: Dongyang Input: 100-240V~50/60Hz, 0.8A; Output: 12V ⎓ 2A or 3.6-8V ⎓ 3A
	Adapter 2	Model: EQ-24BUS Brand: Kunxing Input: 100-240V~50/60Hz, 0.8A; Output: 12V ⎓ 2A or 3.6-8V ⎓ 3A
	Battery	Model: LTF21A Brand: SCUD Rated voltage: 3.83Vdc Battery capacity: 3000mAh(Li-on Rechargeable)
USB Micro-B Plug cable:	100cm(Shielded w/o core)	
Earphone:	100cm(Unshielded w/o core)	
Sample Received Date:	Nov. 07, 2016	
Sample tested Date:	Nov. 17, 2016 to Nov. 26, 2016	

1.3 Product Specification subjective to this standard

Type of Modulation:	IEEE for 802.11a:OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40): OFDM (64QAM, 16QAM,QPSK,BPSK) IEEE for 802.11ac:OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)
Operating Frequency / Channel Number:	5150MHz to 5250MHz: 4 for IEEE 802.11a/n(HT20)/ac(VHT20) 2 for IEEE 802.11n(HT40)/ac(VHT40) 1 for IEEE 802.11ac(VHT80)

	5250MHz to 5350MHz: 4 for IEEE 802.11a/n(HT20)/ac(VHT20) 2 for IEEE 802.11n(HT40)/ac(VHT40) 1 for IEEE 802.11ac(VHT80) 5470MHz to 5725MHz: 11 for IEEE 802.11a/n(HT20)/ac(VHT20) 5 for IEEE 802.11n(HT40)/ac(VHT40) 2 for IEEE 802.11ac(VHT80) 5725MHz to 5850MHz 5 for IEEE 802.11a/n(HT20)/ac(VHT20) 2 for IEEE 802.11n(HT40)/ac(VHT40) 1 for IEEE 802.11ac(VHT80)
Transmit Data Rate:	IEEE 802.11a:6M/ 9M/ 12M/ 18M/ 24M/ 36M/ 48M/ 54M bps IEEE 802.11n: up to MCS7 IEEE 802.11ac: up to V9
Sample Type:	Portable Device
Test Software of EUT:	Provided by the manufacturer
Antenna Type	LDS antenna
Antenna Gain:	-2.5 dBi gain (5150MHz to 5250MHz) -2.7 dBi gain (5250MHz to 5350MHz) -3.1 dBi gain (5470MHz to 5725MHz) -3 dBi gain (5725MHz to 5850MHz)
Normal Test voltage:	3.83Vdc
Extreme Test voltage:	3.6~4.4Vdc (declared by the manufacturer)

Operation Frequency each of channel

For 802.11a/n(HT20)/ac(VHT20) Operation in the 5150MHz ~5250 MHz band							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz

For 802.11a/n(HT20)/ac(VHT20) Operation in the 5250MHz ~5350 MHz band							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
52	5260MHz	56	5280MHz	60	5300MHz	64	5320MHz

For 802.11a/n(HT20)/ac(VHT20) Operation in the 5470MHz ~5725 MHz band							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
100	5500MHz	112	5560MHz	124	5620MHz	136	5680MHz
104	5520MHz	116	5580MHz	128	5640MHz	140	5700MHz
108	5540MHz	120	5600MHz	132	5660MHz	N/A	N/A

For 802.11a/n(HT20)/ac(VHT20) Operation in the 5725MHz ~5850 MHz band					
Channel	Frequency	Channel	Frequency	Channel	Frequency

149	5745MHz	153	5765MHz	157	5785MHz
161	5805MHz	165	5825MHz	N/A	N/A

For 802.11n(HT40)/ac(VHT40) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

For 802.11n(HT40)/ac(VHT40) Operation in the 5150MHz ~5350 MHz band			
Channel	Frequency	Channel	Frequency
54	5270MHz	62	5310MHz

For 802.11n(HT40)/ac(VHT40) Operation in the 5470MHz ~5725 MHz band					
Channel	Frequency	Channel	Frequency	Channel	Frequency
102	5510MHz	118	5590MHz	134	5670MHz
110	5550MHz	126	5630MHz	N/A	N/A

For 802.11n(HT40)/ac(VHT40) Operation in the 5725MHz ~5850 MHz band			
Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

For 802.11ac(VHT80) Operation in the 5150MHz ~5250 MHz band	
Channel	Frequency
42	5210MHz

For 802.11ac(VHT80) Operation in the 5250MHz ~5350 MHz band	
Channel	Frequency
58	5290MHz

For 802.11ac(VHT80) Operation in the 5470MHz ~5725 MHz band			
Channel	Frequency	Channel	Frequency
106	5530MHz	122	5610MHz

For 802.11ac(VHT80) Operation in the 5725MHz ~5850 MHz band	
Channel	Frequency
155	5775MHz

1.4 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
Notebook	Lenovo	E450	SL10G10780	UnionTrust

2) Cable

Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by
1	N/A	N/A	N/A	N/A

1.5 Test Location

All tests were performed at:

Compliance Certification Services (Shenzhen) Inc.

No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town, Baoan Distr, Shenzhen, Guangdong, China.

Tel: 86 0755 28055000 Fax: 86 0755 29055221

Tested by: Darry Wu

1.6 Test Facility

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

Compliance Certification Services (Shenzhen) Inc. has been accepted by the FCC, the FCC Registration Number is **441872**.

1.7 Deviation from Standards

None.

1.8 Abnormalities from Standard Conditions

None.

1.9 Other Information Requested by the Customer

None.

1.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	±6.3 x 10^{-8}
2	RF power, conducted	±0.52 dB
3	Spurious emissions, radiated (Below 1GHz)	±5.3 dB
	Spurious emissions, radiated (Above 1GHz)	±5.1 dB
4	Conduction emission (9KHz~150KHz)	±3.8 dB
	Conduction emission (150KHz~30MHz)	±3.4 dB
5	Temperature	±0.64 °C
6	Humidity	±2.8 %
7	Supply voltages	±0.49 %

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
Maximum conducted output power	47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v01r03 Section E.3.a(Method PM)	N/A[1]
Peak Power Spectral Density	47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v01r03 Section F	N/A[1]
6 dB bandwidth	47 CFR Part 15 Subpart E Section 15.407 (e)	KDB 789033 D02 v01r03 Section C.2	N/A[1]
26 dB emission bandwidth	47 CFR Part 15 Subpart E Section 15.407 (a)(2)(5)	KDB 789033 D02 v01r03 Section C.1	N/A[1]
Frequency stability	47 CFR Part 15 Subpart E Section 15.407 (g)	ANSI C63.10-2013	N/A[1]
Radiated Emissions and Band Edge Measurement	47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6)	KDB 789033 D02 v01r03 Section G.3, G.4, G.5, and G.6	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart E Section 15.407 (b)(6)	ANSI C63.10-2013	N/A[1]

Remark:

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

Volt: In this whole report Volt means Voltage.

Temp: In this whole report Temp means Temperature.

Humid: In this whole report Humid means humidity.

Press: In this whole report Press means Pressure.

N/A: In this whole report not application

1. The EUT this time and previous all the mobile phone are identical in appearance, circuitry and electrical, mechanical and physical construction, trade mark and model number, the only differences are the GPS/BT/WLAN antenna and WLAN power [Note1]. After assessment, this differences does not affect the test results, so the test data from the original report with report No. RF160315C17-3.

   Note1: These differences please refer to “declaration of hardware differences in tested devices”.

3 Equipment List

3m (Semi-Anechoic Chamber)					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Due date (mm-dd-yyyy)**	**Cal. Interval**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	02-20-2017	1 Year
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Bilog Antenna	SCHAFFNER	CBL6143	5063	02-21-2017	1 Year
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02-20-2017	1 Year
Loop Antenna	COM-POWER	AL-130	121044	02-20-2017	1 Year
High Noise Amplifier	Agilent	8449B	3008A01838	02-21-2017	1 Year
Horn Antenna	Schwarzbeck	BBHA9120	D286	02-21-2017	1 Year
Temp. / Humidity Meter	Anymetre	JR913	N/A	02-21-2017	N.C.R
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAO	LZ-RF / CCS-SZ-3A2			

4 Test Requirement

4.1 Test setup

4.1.1 For Radiated Emissions test setup

Radiated Emissions setup:

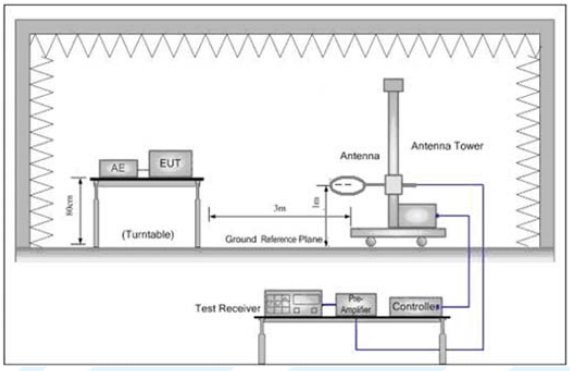


Figure 1. Below 30MHz

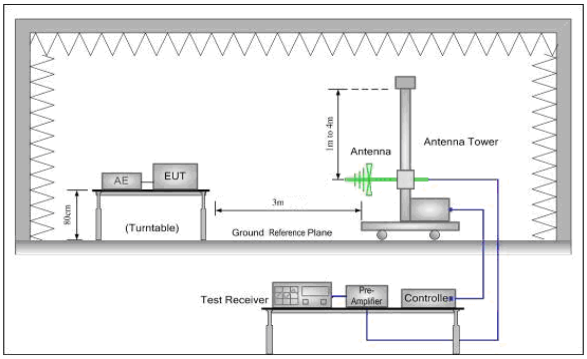


Figure 2. 30MHz to 1GHz

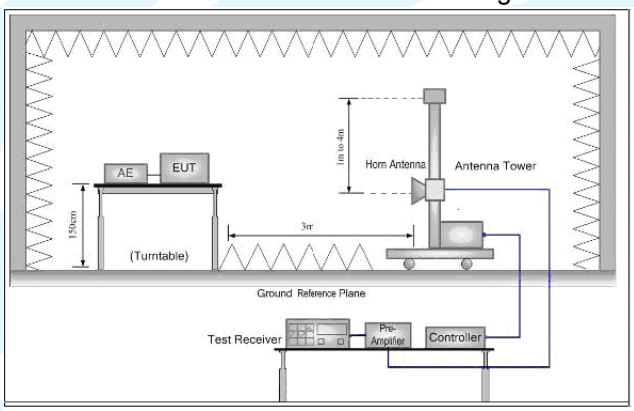


Figure 3. Above 1GHz

4.2 Test Environment

Operating Environment:	
Temperature:	24.6 °C
Humidity:	54 % RH
Atmospheric Pressure:	100.25 Kpa

4.3 System Test Configuration

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.83Vdc rechargeable Li-on battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a

closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency Band(GHz)	Mode	Worst-case Orientation
5150MHz to 5250MHz	1TX SISO	Y-Portrait
5250MHz to 5350MHz		Y-Portrait
5470MHz to 5725MHz		Y-Portrait
5725MHz to 5850MHz		Y-Portrait

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.4 Test Condition

4.4.1 Test channel

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11a/ ac(VHT20)	5150MHz ~5250 MHz	Channel 36	Channel 44	Channel 48
		5180MHz	5220MHz	5240MHz
	5250MHz ~5350 MHz	Channel 52	Channel 60	Channel 64
		5260MHz	5300MHz	5320MHz
	5470MHz ~5725 MHz	Channel 100	Channel116	Channel140
		5500MHz	5580MHz	5700MHz
	5725MHz ~5850 MHz	Channel149	Channel157	Channel165
		5745MHz	5785MHz	5825MHz
802.11ac(VHT40)	5150MHz ~5250 MHz	Channel 38	N/A	Channel 46
		5190MHz	N/A	5230MHz
	5250MHz ~5350 MHz	Channel54	N/A	Channel62
		5270MHz	N/A	5310MHz
	5470MHz ~5725 MHz	Channel 102	Channel110	Channel 134
		5510MHz	5590MHz	5670MHz
	5725MHz ~5850 MHz	Channel 151	N/A	Channel 159
		5755MHz	N/A	5795MHz
802.11ac(VHT80)	5150MHz ~5250 MHz	N/A	Channel 42	N/A
		N/A	5210MHz	N/A
	5250MHz ~5350 MHz	N/A	Channel 58	N/A
		N/A	5290MHz	N/A
	5470MHz ~5725 MHz	Channel 106	N/A	Channel 122
		5530MHz	N/A	5610MHz

	5725MHz ~5850 MHz	N/A	Channel 155	N/A
		N/A	5775MHz	N/A

Remark:
1. The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for HT20 / HT40, therefore investigated worst case to representative mode in test report.
2. Transmitting mode:
Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

4.4.2 Test mode

According the original report with report No. RF160315C17-3, the worst-case rates see table below:

Mode	Worst-case data rates
802.11a	6 Mbps
802.11ac(VHT20)	MCS 0
802.11ac(VHT40)	MCS 0
802.11ac(VHT80)	V0

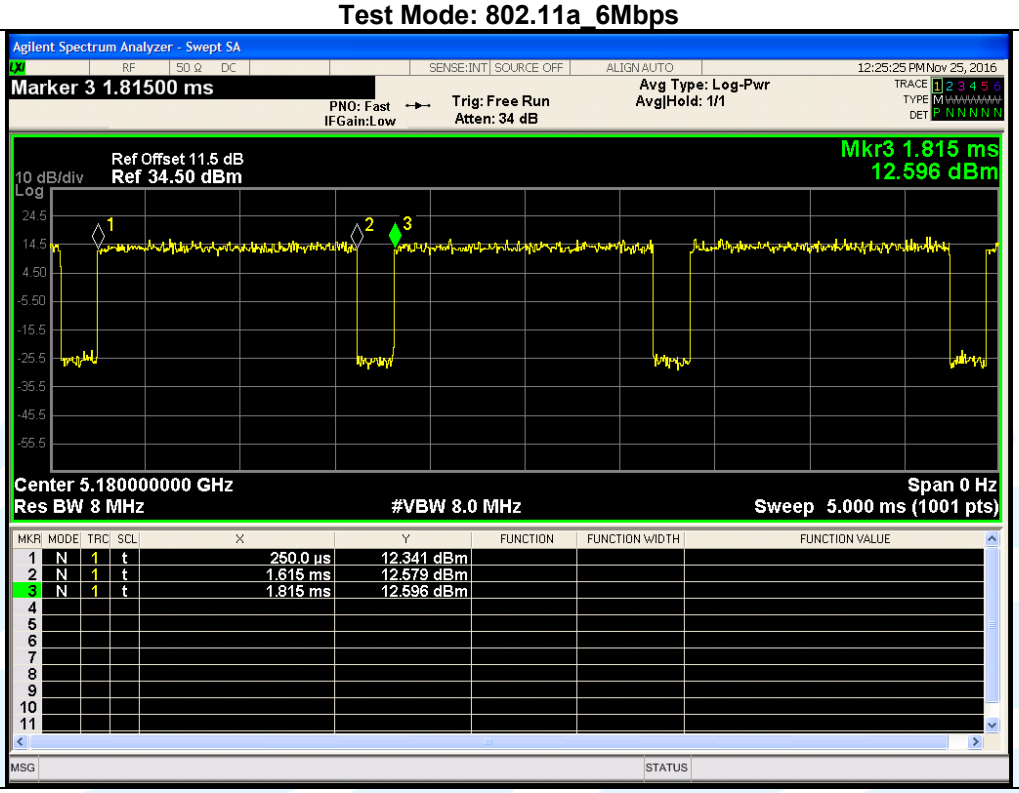
4.4.3 Duty Cycle

Mode	Data rates (Mbps)	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)
802.11a	6 Mbps	1.365	1.565	0.8722	87.2204	0.5938	0.7326
802.11ac(VHT20)	MCS 0	0.975	1.175	0.8298	82.9787	0.8103	1.0256
802.11ac(VHT40)	MCS 0	0.489	0.689	0.7097	70.9724	1.4891	2.0450
802.11ac(VHT80)	V0	0.246	0.449	0.5479	54.7884	2.6131	4.0650

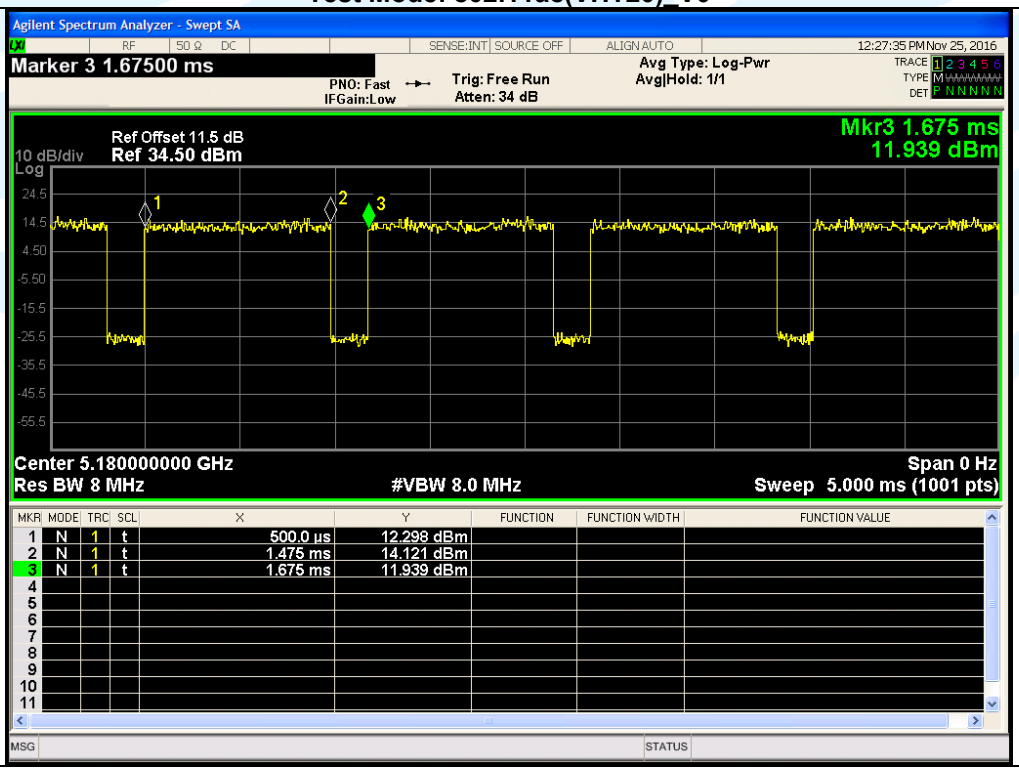
Remark:
1) Duty cycle= On Time/ Period
2) Duty Cycle factor = 10 * log(1/ Duty cycle)

The test plot as follows:

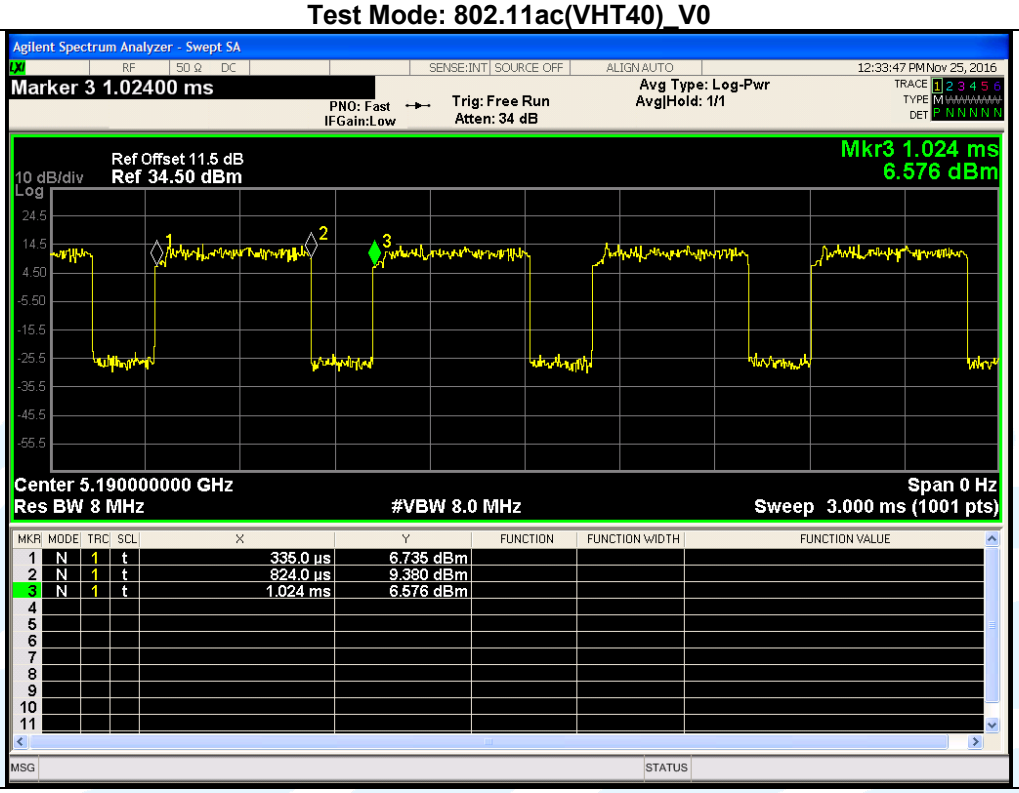
Test Mode: 802.11a_6Mbps



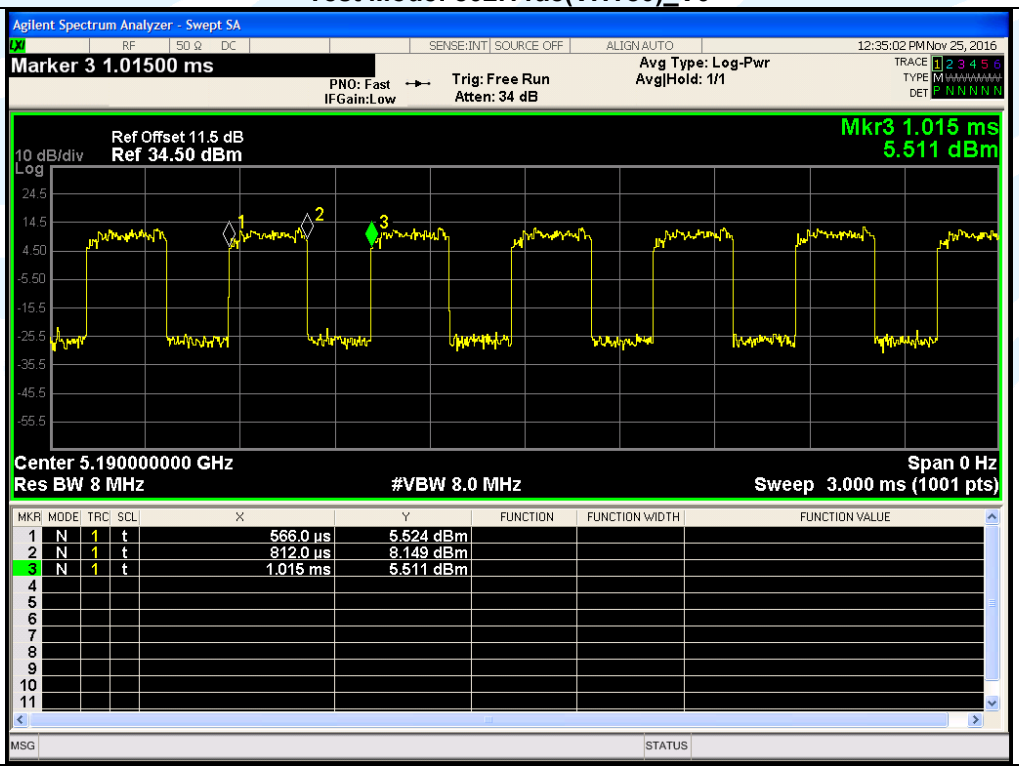
Test Mode: 802.11ac(VHT20)_V0



Test Mode: 802.11ac(VHT40)_V0



Test Mode: 802.11ac(VHT80)_V0



5 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15E (2014)	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
3	789033 D02 General U-NII Test Procedures New Rules v01r03	Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) device part 15 subpart E

5.1 Antenna Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.407(a)(1) (2) requirement:

The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:	
Both antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna is -2.5dBi.	

5.2 Radiated Emissions and Band Edge Measurement

Test Requirement: 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6)

Test Method: KDB 789033 D02 v01r03 Section G.3, G.4, G.5, and G.6

Limit:

1. Limits of Radiated Emission and Bandedge Measurement

Radiated emissions that fall in the restricted bands must comply with the general emissions limits in 15.209(a) as below table. Other emissions shall be at least 20 dB below the highest level of the desired power.

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Remark:

a) The lower limit shall apply at the transition frequencies.

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

2. Limits of Unwanted Emission Out of the Restricted Bands

Applicable To	Limit	
789033 D02 General U-NII Test Procedures New Rules v01r03	Field Strength at 3 m	
	PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(1)(2)(3)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
15.407(b)(4)	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 5 MHz 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.	

Test Procedure:

a) The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f) The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Remark:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency

above 1 GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) or ≥ 1/T(duty cycle is < 98%) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

Test Setup: Refer to section 4.1.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

Radiated Emission Test Data (9 KHz ~ 30MHz):

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Radiated Emission Test Data (Below 1 GHz Worst Case):

Mode		Tx_802.11a_Channel 44				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	53.8818	16.72	40.00	-23.28	Peak	Horizontal
2	192.4186	15.26	43.50	-28.24	Peak	Horizontal
3	900.1474	29.14	46.00	-16.86	Peak	Horizontal
4	48.5016	15.71	40.00	-24.29	Peak	Vertical
5	185.7882	15.41	43.50	-28.09	Peak	Vertical
6	851.0353	31.04	46.00	-14.96	Peak	Vertical

Mode		Tx_802.11ac(VHT20)_Channel 64				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	53.8818	16.72	40.00	-23.28	Peak	Horizontal
2	214.5143	17.39	43.50	-26.11	Peak	Horizontal
3	903.3094	30.61	46.00	-15.39	Peak	Horizontal
4	52.2079	16.65	40.00	-23.35	Peak	Vertical
5	203.5228	16.41	43.50	-27.09	Peak	Vertical
6	851.0353	31.97	46.00	-14.03	Peak	Vertical

Mode		Tx_802.11a_Channel 100				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	47.8260	16.19	40.00	-23.81	Peak	Horizontal
2	204.2377	15.66	43.50	-27.84	Peak	Horizontal
3	890.7278	29.57	46.00	-16.43	Peak	Horizontal
4	50.5860	15.97	40.00	-24.03	Peak	Vertical
5	190.4050	15.33	43.50	-28.17	Peak	Vertical
6	851.0353	30.41	46.00	-15.59	Peak	Vertical

Mode		Tx_802.11a_Channel 149				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	48.8429	15.83	40.00	-24.17	Peak	Horizontal
2	210.0482	16.82	43.50	-26.68	Peak	Horizontal
3	887.6099	31.74	46.00	-14.26	Peak	Horizontal
4	47.6586	16.05	40.00	-23.95	Peak	Vertical
5	203.5228	16.84	43.50	-26.66	Peak	Vertical
6	807.4291	31.65	46.00	-14.35	Peak	Vertical

Radiated Emission Test Data (Above 1GHz Worst Case):

Mode		Tx_802.11a_Channel 44				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	10440.0000	51.29	74	-22.71	Peak	Horizontal
2	10440.0000	38.43	54	-15.57	Average	Horizontal
3	15660.0000	53.81	74	-20.19	Peak	Horizontal
4	15660.0000	39.99	54	-14.01	Average	Horizontal
5	10440.0000	50.16	74	-23.84	Peak	Vertical
6	10440.0000	36.82	54	-17.18	Average	Vertical
7	15660.0000	51.98	74	-22.02	Peak	Vertical
8	15660.0000	39.18	54	-14.82	Average	Vertical

Mode		Tx_802.11ac(VHT20)_Channel 64				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	10640.0000	51.66	74	-22.34	Peak	Horizontal
2	10640.0000	37.76	54	-16.24	Average	Horizontal
3	15960.0000	55.3	74	-18.7	Peak	Horizontal
4	15960.0000	42.18	54	-11.82	Average	Horizontal
5	10640.0000	50.31	74	-23.69	Peak	Vertical
6	10640.0000	36.64	54	-17.36	Average	Vertical
7	15960.0000	53.78	74	-20.22	Peak	Vertical
8	15960.0000	41.1	54	-12.9	Average	Vertical

Mode		Tx_802.11a_Channel 100				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	11000.0000	51.58	74	-22.42	Peak	Horizontal
2	11000.0000	37.94	54	-16.06	Average	Horizontal
3	16500.0000	55.4	74	-18.6	Peak	Horizontal
4	16500.0000	42.6	54	-11.4	Average	Horizontal
5	11000.0000	50.67	74	-23.33	Peak	Vertical
6	11000.0000	36.74	54	-17.26	Average	Vertical
7	16500.0000	54.01	74	-19.99	Peak	Vertical
8	16500.0000	41.4	54	-12.6	Average	Vertical

Mode		Tx_802.11a_Channel 149				
.No.	Frequency (MHz)	Result (dBuV)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Polar.
1	11490.0000	52.11	74	-21.89	Peak	Horizontal
2	11490.0000	37.8	54	-16.2	Average	Horizontal
3	17235.0000	54.3	74	-19.7	Peak	Horizontal
4	17235.0000	41.78	54	-12.22	Average	Horizontal
5	11490.0000	50.48	74	-23.52	Peak	Vertical
6	11490.0000	36.4	54	-17.6	Average	Vertical
7	17235.0000	52.42	74	-21.58	Peak	Vertical
8	17235.0000	40.67	54	-13.33	Average	Vertical

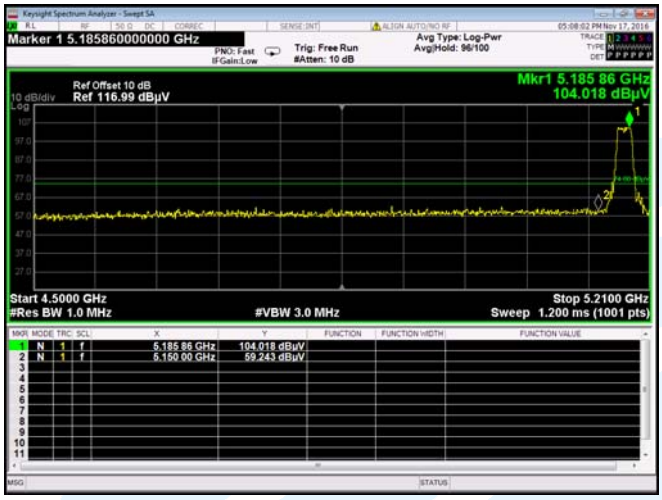
Note:

1) Scan from 9 kHz to 25 GHz, the disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

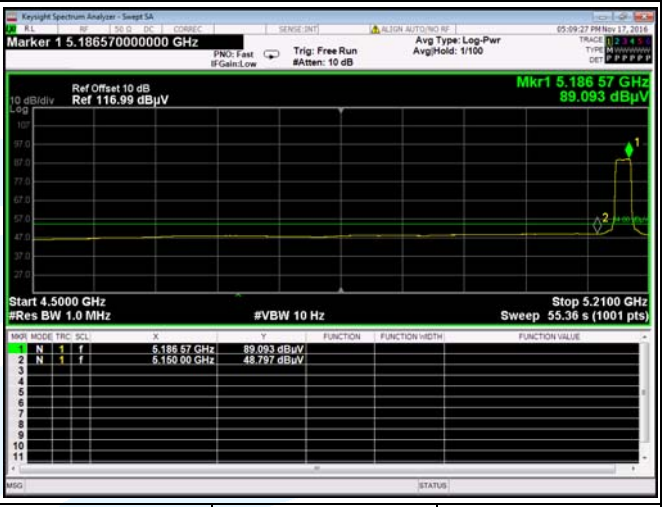
Band Edge Measurements (Radiated) Worst Case

Frequency (MHz)	Tx_802.11a_ Channel 36	Ant. Polar.	Horizontal

Detector: Peak



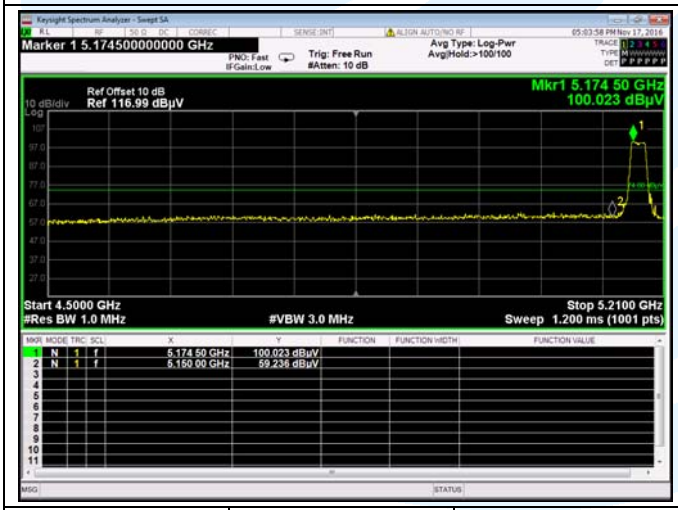
Detector: AV



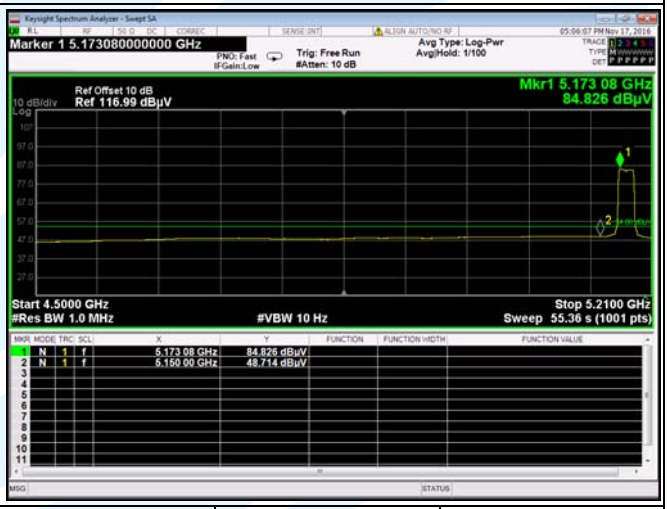
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	59.243	74	48.797	54	Pass

Frequency (MHz)	Tx_802.11a_ Channel 36	Ant. Polar.	Vertical

Detector: Peak



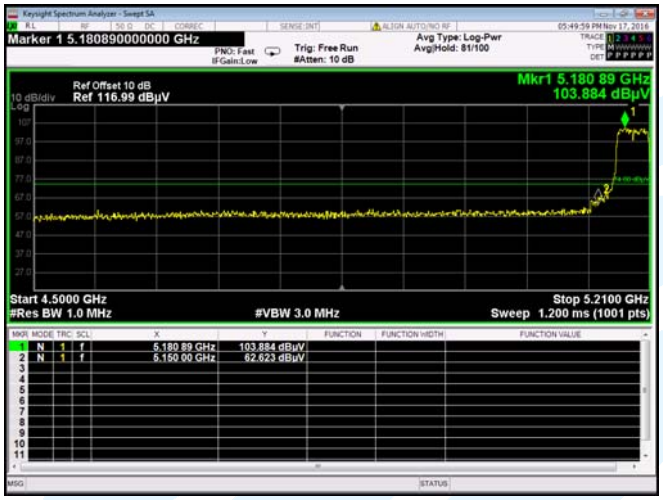
Detector: AV



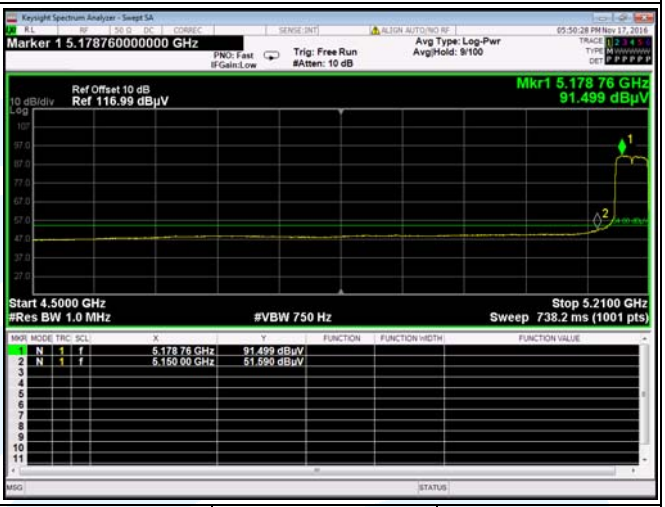
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	59.236	74	48.714	54	Pass

Frequency (MHz)	Tx_802.11ac(VHT40)_ Channel 38	Ant. Polar.	Horizontal

Detector: Peak



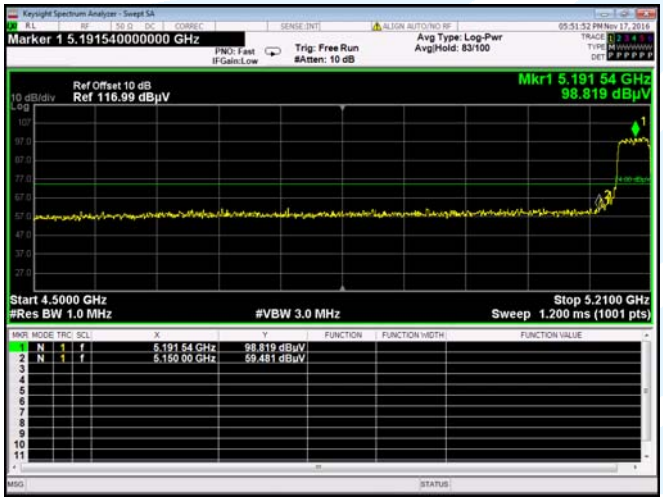
Detector: AV



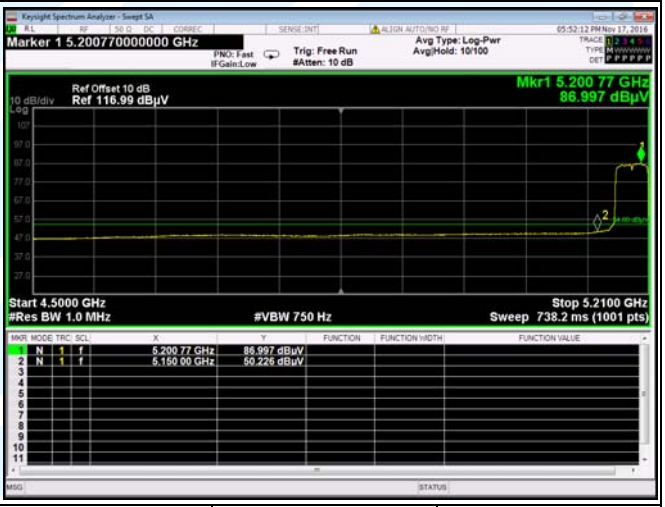
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	62.623	74	51.590	54	Pass

Frequency (MHz)	Tx_802.11ac(VHT40)_ Channel 38	Ant. Polar.	Vertical

Detector: Peak



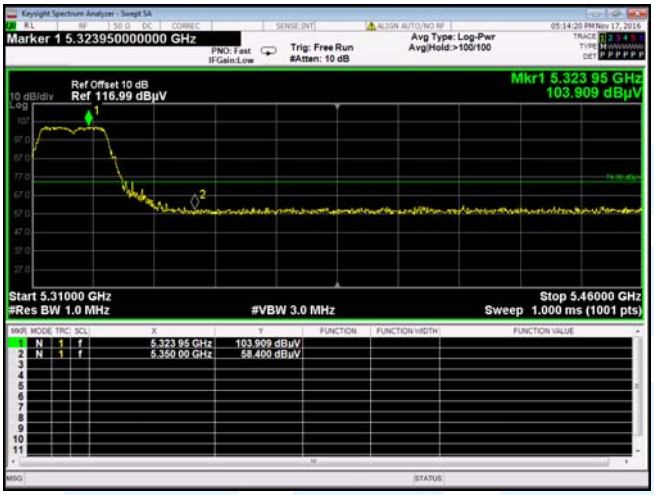
Detector: AV



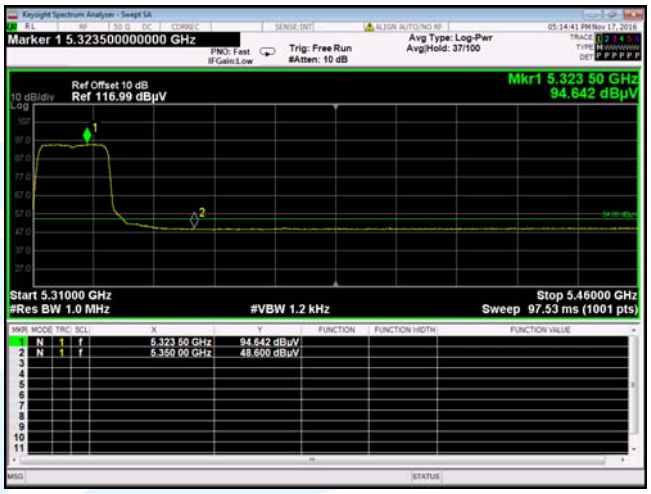
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	59.481	74	50.226	54	Pass

Frequency (MHz)	Tx_802.11a_ Channel 64	Ant. Polar.	Horizontal

Detector: Peak



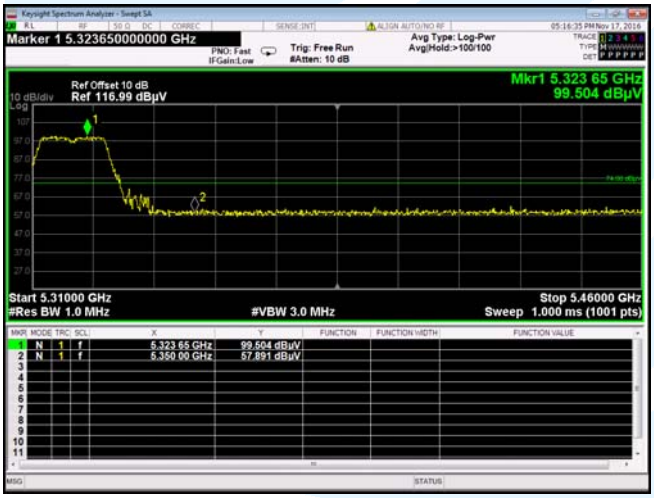
Detector: AV



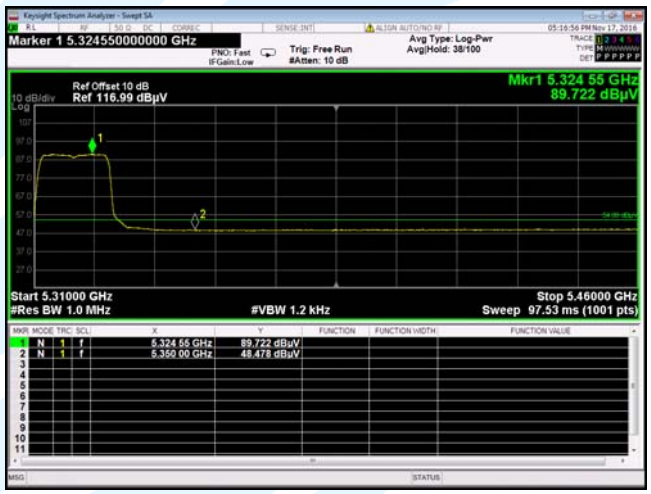
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	58.400	74	48.600	54	Pass

Frequency (MHz)	Tx_802.11a_ Channel 64	Ant. Polar.	Vertical

Detector: Peak



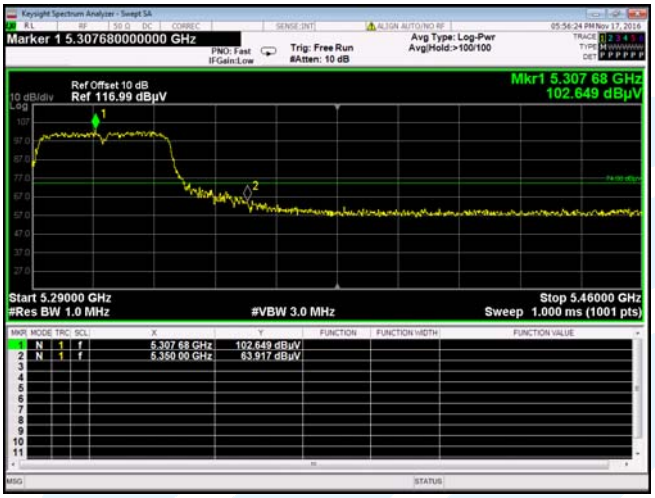
Detector: AV



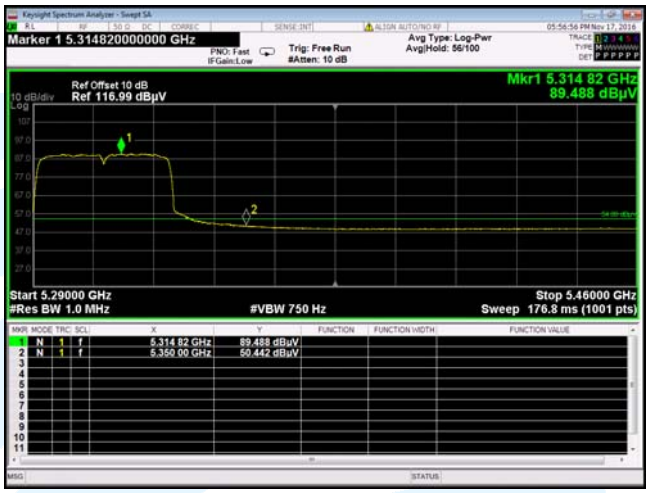
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	57.891	74	48.478	54	Pass

Frequency (MHz)	Tx_802.11ac(VHT40)_ Channel 62	Ant. Polar.	Horizontal

Detector: Peak



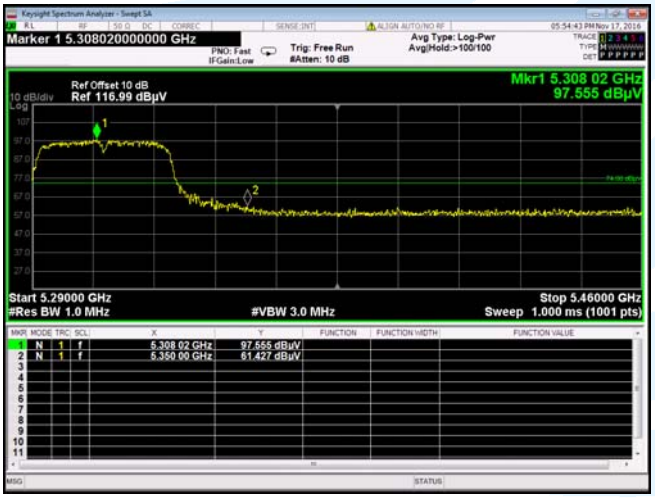
Detector: AV



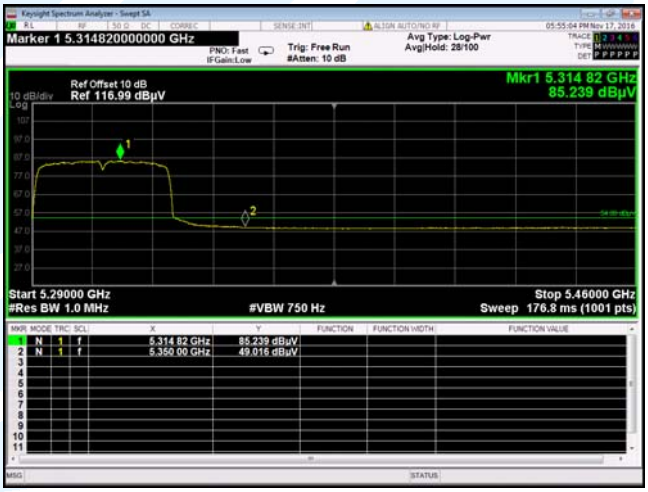
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	63.917	74	50.442	54	Pass

Frequency (MHz)	Tx_802.11ac(VHT40)_ Channel 62	Ant. Polar.	Vertical

Detector: Peak

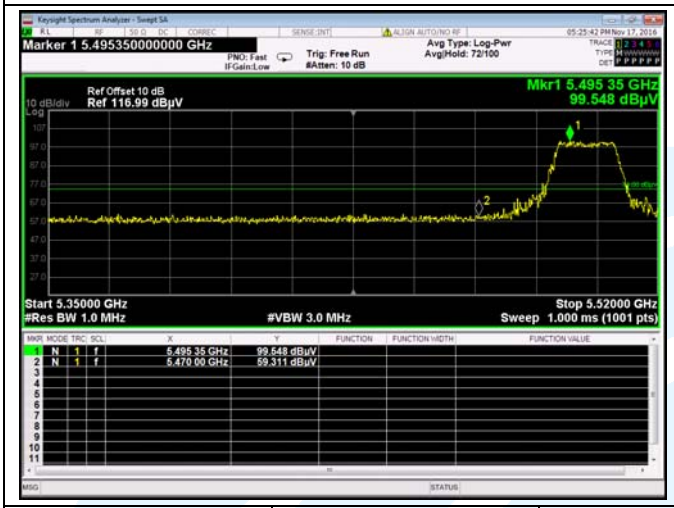


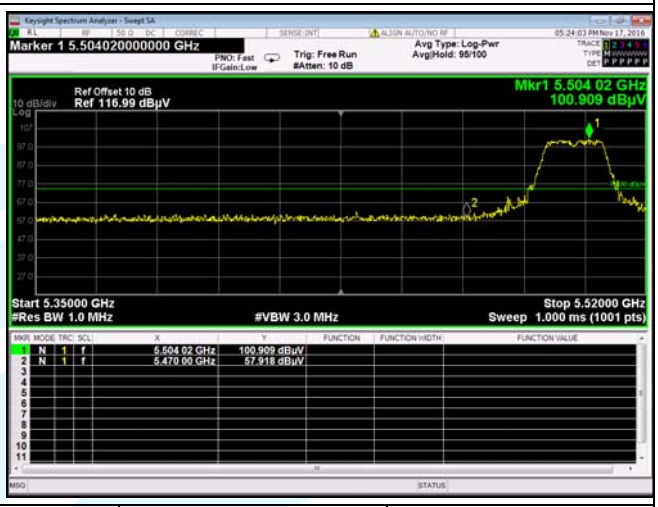
Detector: AV



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	61.427	74	49.016	54	Pass

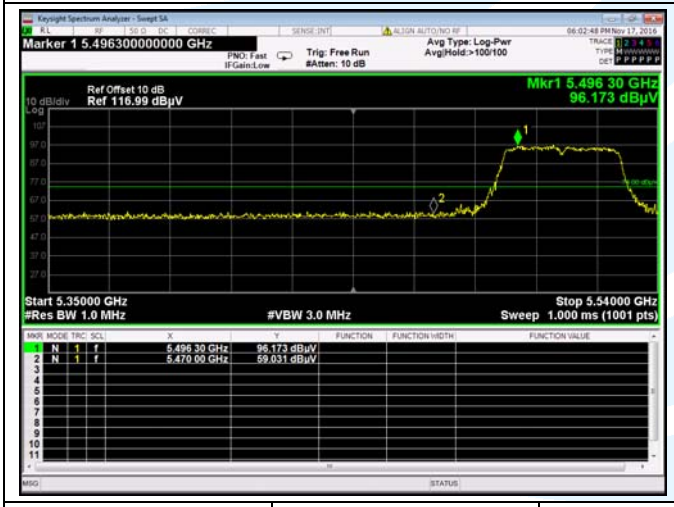
Frequency (MHz)	Tx_802.11a_ Channel 100	Detector	Peak
Horizontal		Vertical	

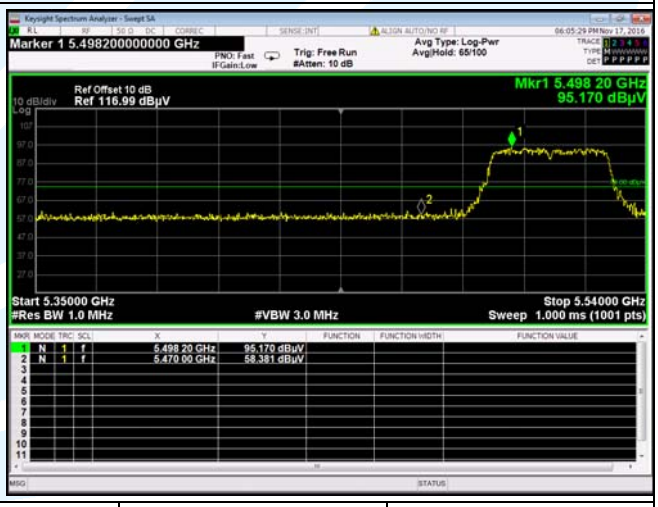




Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Ant. Polar.	Conclusion
5470.00	59.311	68.2	Horizontal	Pass
5470.00	57.918	68.2	Vertical	Pass

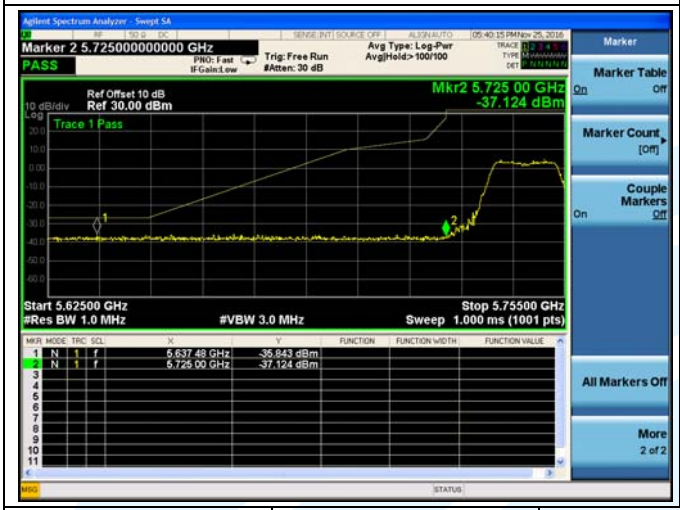
Frequency (MHz)	Tx_802.11ac(VHT40)_ Channel 102	Detector	Peak
Horizontal		Vertical	

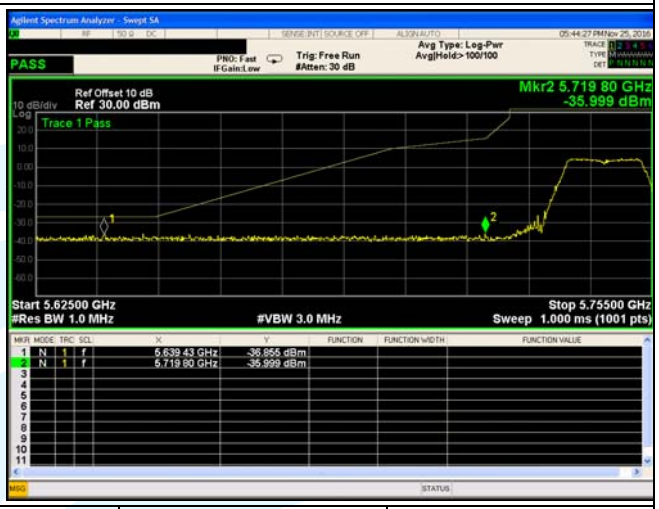




Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Ant. Polar.	Conclusion
5470.00	59.031	68.2	Horizontal	Pass
5470.00	58.381	68.2	Vertical	Pass

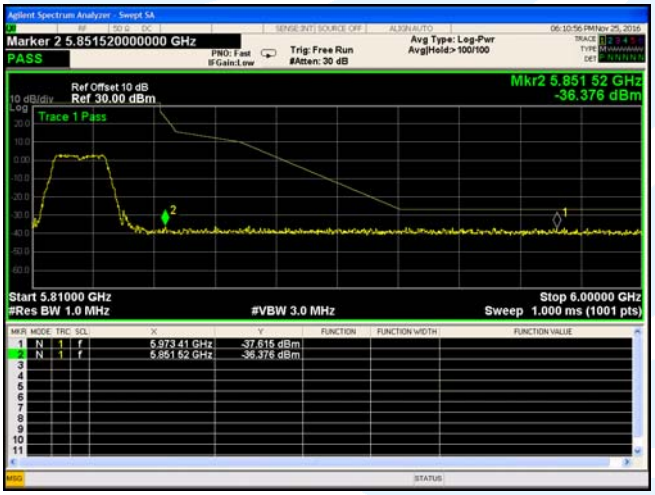
Frequency (MHz)	Tx_802.11a_ Channel 149	Detector	Peak
Horizontal		Vertical	

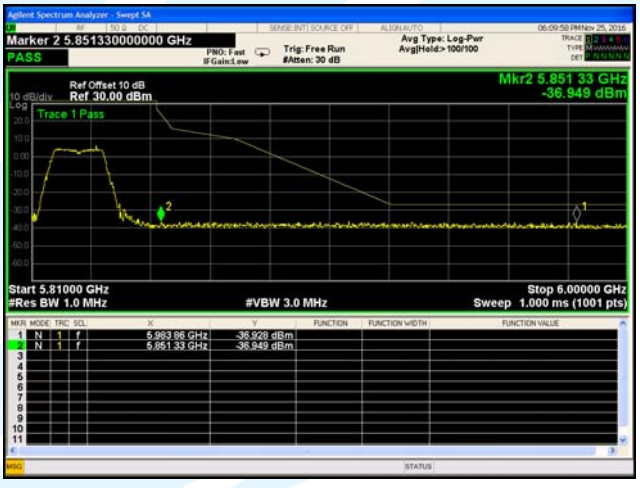




Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Ant. Polar.	Conclusion
5637.48	-35.843	-27	Horizontal	Pass
5639.43	-36.855	-27	Vertical	Pass

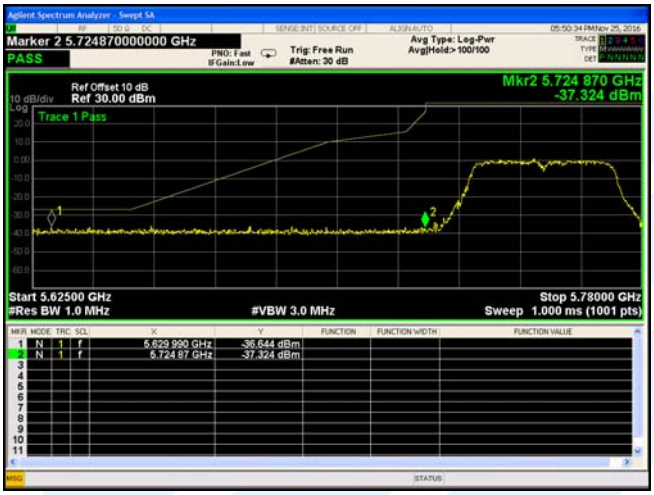
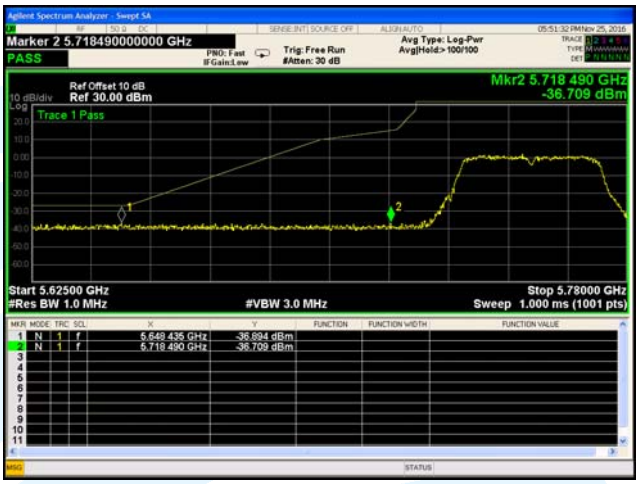
Frequency (MHz)	Tx_802.11a_ Channel 165	Detector	Peak
Horizontal		Vertical	





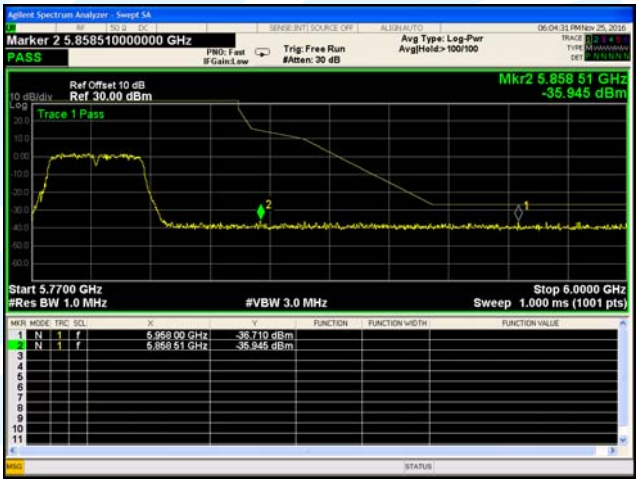
Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Ant. Polar.	Conclusion
5973.41	-37.615	-27	Horizontal	Pass
5983.86	-36.928	-27	Vertical	Pass

Frequency (MHz)	Tx_802.11ac(VHT40)_ Channel 151	Detector	Peak

Horizontal	Vertical
	

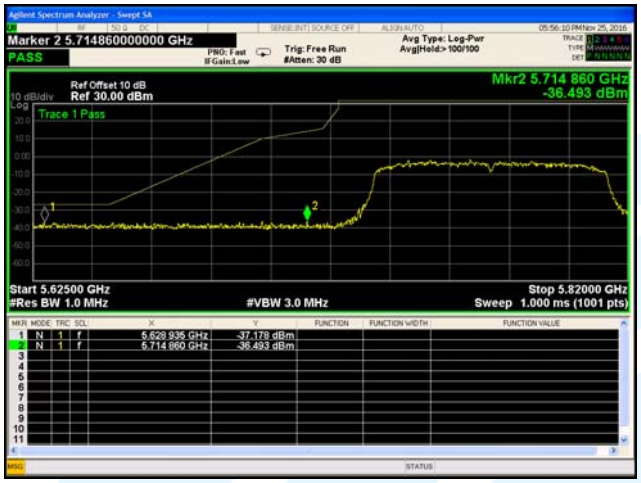
Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Ant. Polar.	Conclusion
5629.990	-36.644	-27	Horizontal	Pass
5648.435	-36.894	-27	Vertical	Pass

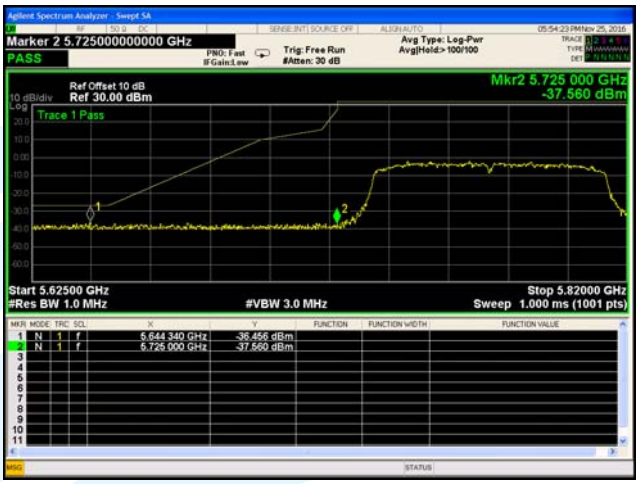
Frequency (MHz)	Tx_802.11ac(VHT40)_ Channel 159	Detector	Peak

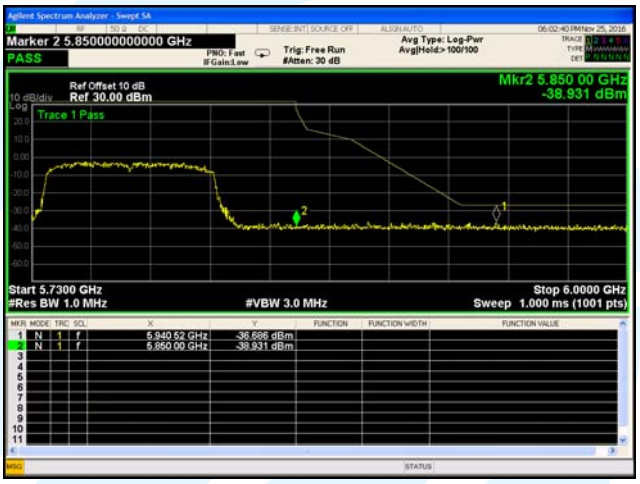
Horizontal	Vertical
	

Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Ant. Polar.	Conclusion
5929.71	-36.944	-27	Horizontal	Pass
5958.00	-36.710	-27	Vertical	Pass

Frequency (MHz)	Tx_802.11ac(VHT80)_ Channel 155	Detector	Peak
Horizontal		Vertical	







Frequency (MHz)	Peak level (dBm)	Peak Limit (dBm)	Ant. Polar.	Conclusion
5628.935	-37.178	-27	Horizontal	Pass
5950.51	-37.207	-27	Horizontal	Pass
5644.340	-36.456	-27	Vertical	Pass
5940.52	-36.686	-27	Vertical	Pass

5.3 Conducted Emissions

Test Requirement: 47 CFR Part 15C Section 15.207

Test Method: ANSI C63.10

Test Frequency Range: 150KHz to 30MHz

Limit:

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

* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

NOTE : The lower limit is applicable at the transition frequency

Test Procedure: Test frequency range :150KHz-30MHz

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) 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 on conducted measurement.

Test Setup: Refer to section 4.1.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Test plot as follows:

Live Line:

Neutral Line:

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.:

Radiated emission Test Setup-1(9kHz ~ 30MHz)

Radiated emission Test Setup-2 (30MHz ~ 1GHz)

Radiated spurious emission Test Setup-3(Above 1GHz)

Conducted Emissions

APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Refer to Report No.SZEMxxxxxxxx01 for EUT external and internal photos.

*** End of Report ***