

---

# FCC Test Report

---

Report No.: AGC00742200401FE06

**FCC ID** : 2ALP3X2  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : Smart phone  
**BRAND NAME** : kodak  
**MODEL NAME** : X2  
**APPLICANT** : Industria Fuegina de Relojeria Electronica S.A.  
**DATE OF ISSUE** : Jun. 18, 2020  
**STANDARD(S)** : FCC Part 15.407  
**TEST PROCEDURE(S)** : KDB 789033 D02 v02r01  
**REPORT VERSION** : V1.0

Attestation of *Global Compliance (Shenzhen) Co., Ltd*

**CAUTION:**

This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context.



**REPORT REVISE RECORD**

<b>Report Version</b>	<b>Revise Time</b>	<b>Issued Date</b>	<b>Valid Version</b>	<b>Notes</b>
V1.0	/	Jun. 18, 2020	Valid	Initial Release

## TABLE OF CONTENTS

<b>1. VERIFICATION OF CONFORMITY .....</b>	<b>5</b>
<b>2. GENERAL INFORMATION.....</b>	<b>6</b>
2.1. PRODUCT DESCRIPTION.....	6
2.2. TABLE OF CARRIER FREQUENCYS .....	6
2.3. RELATED SUBMITTAL(S) / GRANT (S) .....	7
2.4. TEST METHODOLOGY .....	7
2.5. SPECIAL ACCESSORIES .....	7
2.6. EQUIPMENT MODIFICATIONS .....	7
<b>3. MEASUREMENT UNCERTAINTY .....</b>	<b>8</b>
<b>4. DESCRIPTION OF TEST MODES.....</b>	<b>9</b>
<b>5. SYSTEM TEST CONFIGURATION .....</b>	<b>10</b>
5.1. CONFIGURATION OF EUT SYSTEM.....	10
5.2. EQUIPMENT USED IN EUT SYSTEM.....	10
5.3. SUMMARY OF TEST RESULTS.....	10
<b>6. TEST FACILITY .....</b>	<b>11</b>
<b>7. MAXIMUM CONDUCTED OUTPUT POWER.....</b>	<b>12</b>
7.1. MEASUREMENT PROCEDURE .....	12
7.2. TEST SET-UP.....	12
7.3. LIMITS AND MEASUREMENT RESULT.....	13
<b>8. EMISSION BANDWIDTH.....</b>	<b>15</b>
8.1. MEASUREMENT PROCEDURE .....	15
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	15
8.3. LIMITS AND MEASUREMENT RESULTS .....	16
<b>9. MAXIMUM CONDUCTED OUTPUT PEAK POWER SPECTRAL DENSITY .....</b>	<b>24</b>
9.1 MEASUREMENT PROCEDURE .....	24
9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	24
9.3 MEASUREMENT EQUIPMENT USED .....	24
9.4 LIMITS AND MEASUREMENT RESULT.....	25
<b>10. CONDUCTED SPURIOUS EMISSION .....</b>	<b>33</b>
10.1. MEASUREMENT PROCEDURE .....	33


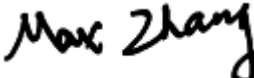

10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	33
10.3. MEASUREMENT EQUIPMENT USED .....	33
10.4. LIMITS AND MEASUREMENT RESULT.....	33
<b>11. RADIATED EMISSION.....</b>	<b>44</b>
11.1. MEASUREMENT PROCEDURE .....	44
11.2. TEST SETUP .....	45
11.3. LIMITS AND MEASUREMENT RESULT .....	46
11.4. TEST RESULT .....	46
<b>12. BAND EDGE EMISSION .....</b>	<b>51</b>
12.1. MEASUREMENT PROCEDURE .....	51
12.2. TEST SET-UP.....	51
12.3. TEST RESULT.....	52
<b>13. FREQUENCY STABILITY.....</b>	<b>58</b>
13.1. MEASUREMENT PROCEDURE .....	58
13.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	58
13.3. MEASUREMENT RESULTS.....	59
<b>14. FCC LINE CONDUCTED EMISSION TEST .....</b>	<b>62</b>
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST.....	62
14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST.....	62
14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST .....	63
14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST.....	63
14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST.....	64
<b>APPENDIX A: PHOTOGRAPHS OF TEST SETUP .....</b>	<b>66</b>

### 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	INDUSTRIA FUEGUINA DE RELOJERIA ELECTRONICA SA
<b>Address</b>	SARMIENTO 2920,9420, RIO GRANDE, Argentina
<b>Manufacturer</b>	Luzhou Maisui Smart Technology Co., Ltd.
<b>Address</b>	No.19, Section 5, Jiugu Avenue, Luzhou high-tech Zone, Sichuan Province,China
<b>Factory 1</b>	Industria Fuegina de Relojeria Electronica S.A.
<b>Address</b>	Sarmiento 2920, CP 9420), Rio Grande, Tierra del Fuego, Argentina
<b>Product Designation</b>	Smart phone
<b>Brand Name</b>	kodak
<b>Test Model</b>	X2
<b>Date of test</b>	May 22, 2020~Jun. 18, 2020
<b>Deviation</b>	No any deviation from the test method
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass
<b>Report Template</b>	AGCRT-US-BGN/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Prepared By	 <hr/> Calvin Liu (Project Engineer)	Jun. 18, 2020
Reviewed By	 <hr/> Max Zhang (Reviewer)	Jun. 18, 2020
Approved By	 <hr/> Forrest Lei Authorized Officer	Jun. 18, 2020

## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as “Smart phone”. It is designed by way of utilizing the OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Operation Frequency</b>	5150 MHz~5250MHz
<b>Output Power</b>	IEEE 802.11a20:10.26dBm IEEE 802.11n(20):10.09dBm; IEEE802.11n(40):9.78dBm IEEE802.11ac(20):9.28dBm IEEE802.11ac(40):9.23dBm EEE802.11ac(80):8.79dBm
<b>Modulation</b>	BPSK, QPSK, 16QAM, 64QAM, 128QAM, 256QAM,OFDM
<b>Number of channels</b>	7
<b>Hardware Version</b>	V1.0
<b>Software Version</b>	TE9572_KODAK_62_Q0_V0.1.6.1_S200507
<b>Antenna Gain</b>	0.70dBi
<b>Power Supply</b>	DC 3.8V by Built-in Li-ion Battery

### 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
5150 GHz~5250GHz	36	5180 MHz
	38	5190 MHz
	40	5200 MHz
	42	5210 MHz
	44	5220 MHz
	46	5230 MHz
	48	5240 MHz

Note: For 20MHZ bandwidth system use Channel 36,40,44,48; For 40MHZ bandwidth system use Channel 38,46; For 80MHZ bandwidth system use Channel 42

### **2.3. RELATED SUBMITTAL(S) / GRANT (S)**

This submittal(s) (test report) is intended for **FCC ID: 2ALP3X2** filing to comply with the FCC Part 15 requirements.

### **2.4. TEST METHODOLOGY**

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013).

Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.407 rules KDB 789033 D02

### **2.5. SPECIAL ACCESSORIES**

Refer to section 5.2.

### **2.6. EQUIPMENT MODIFICATIONS**

Not available for this EUT intended for grant.

### **3. MEASUREMENT UNCERTAINTY**

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission,  $U_c = \pm 3.1$  dB
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 4.0$  dB
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 5.4$  dB



#### 4. DESCRIPTION OF TEST MODES

Mode	Available channel	Tested channel	Modulation	Date rate(Mbps)
802.11a/n20/ac20	36,40,44,48	36,38,48	OFDM	6/6.5
802.11n40/ac40	38,46	38,46	OFDM	13.5
802.11ac80	42	42	OFDM	13.5

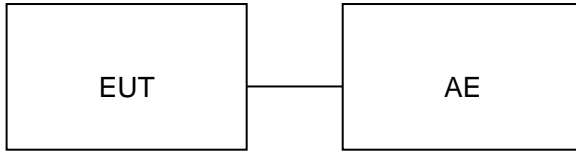
**Note:**

1. The EUT has been set to operate continuously on tested channel individually, and the EUT is operating at its maximum duty cycle or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
3. The test software is the RtkTestAPP-v2.0.0\_20170425 which can set the EUT into the individual test modes.

## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Configure 1:



### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Smart phone	X2	2ALP3X2	EUT
2	Adapter	FJ-SW266B50502000A	Input: AC 100-240V, 50/60Hz, 0.4A Output: DC 5V, 2000mA	AE
3	Battery	L63464	DC3.8V 3900mAh	AE
4	USB Cable	N/A	N/A	AE
5	Earphone	N/A	N/A	AE

### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.407	Emission Bandwidth	Compliant
§15.407	Maximum conducted output power	Compliant
§15.407	Conducted Spurious Emission	Compliant
§15.407	Maximum Conducted Output Power Density	Compliant
§15.209	Radiated Emission	Compliant
§15.407	Band Edges	Compliant
§15.207	Line Conduction Emission	Compliant

**6. TEST FACILITY**

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Designation Number</b>	CN1259
<b>FCC Test Firm Registration Number</b>	975832
<b>A2LA Cert. No.</b>	5054.02
<b>Description</b>	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

**TEST EQUIPMENT OF CONDUCTED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2022
LISN	R&S	ESH2-Z5	100086	Aug. 26, 2019	Aug. 25, 2020
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A

**TEST EQUIPMENT OF RADIATED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2022
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
Power sensor	Aglient	U2021XA	MY54110007	Sep. 09, 2019	Sep. 08, 2021
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 09, 2019	Sep. 08, 2021
preamplifier	ChengYi	EMC184045SE	980508	Sep. 21, 2017	Sep. 20, 2020
Active loop antenna (9K-30MHz)	A.H.	SAS-562B	XGIMI	Jun. 14, 2018	Jun. 13, 2020
Active loop antenna (9K-30MHz)	A.H.	SAS-562B	XGIMI	Jun. 12, 2020	Jun. 11, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May. 16, 2021
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Oct. 15, 2019	Oct. 16, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

## 7. MAXIMUM CONDUCTED OUTPUT POWER

### 7.1. MEASUREMENT PROCEDURE

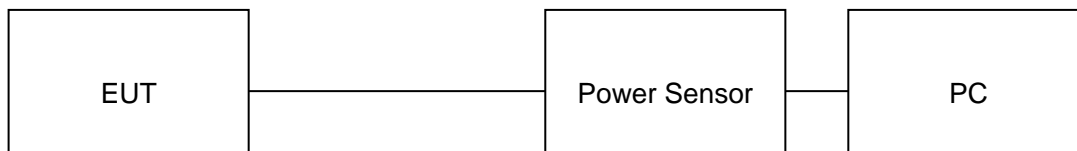
For average power test:

1. Connect EUT RF output port to power sensor through an RF attenuator.
2. Connect the power sensor to the PC.
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power from the software.

**Note :** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 7.2. TEST SET-UP

#### AVERAGE POWER SETUP



**7.3. LIMITS AND MEASUREMENT RESULT**

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Average Power (dBm)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5180	9.95	30	Pass
5200	10.26	30	Pass
5240	9.72	30	Pass

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Average Power (dBm)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5180	10.09	30	Pass
5200	10.09	30	Pass
5240	9.77	30	Pass

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11AC20 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Average Power (dBm)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5180	9.75	30	Pass
5200	9.78	30	Pass
5240	8.87	30	Pass

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11N40 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Average Power (dBm)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5190	9.28	30	Pass
5230	8.99	30	Pass

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11 AC40 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Average Power (dBm)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5190	9.23	30	Pass
5230	9.03	30	Pass

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11 AC80 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Average Power (dBm)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5210	8.79	30	Pass

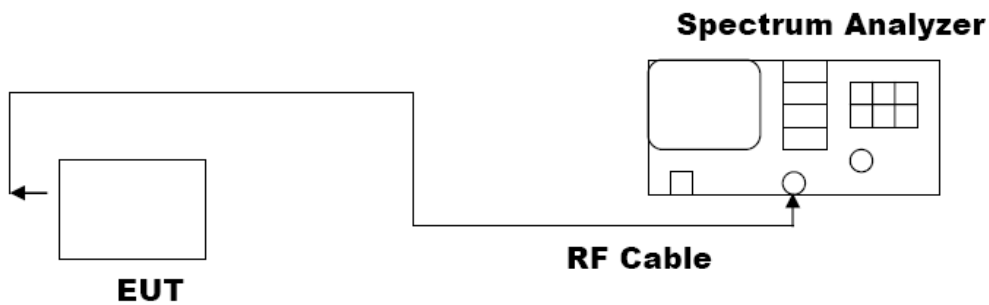
## 8. EMISSION BANDWIDTH

### 8.1. MEASUREMENT PROCEDURE

- a) Set RBW = approximately 1% of the emission bandwidth.
  - b) Set the VBW > RBW.
  - c) Detector = Peak.
  - d) Trace mode = max hold.
  - e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission.
- Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

**Note:** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



**8.3. LIMITS AND MEASUREMENT RESULTS**

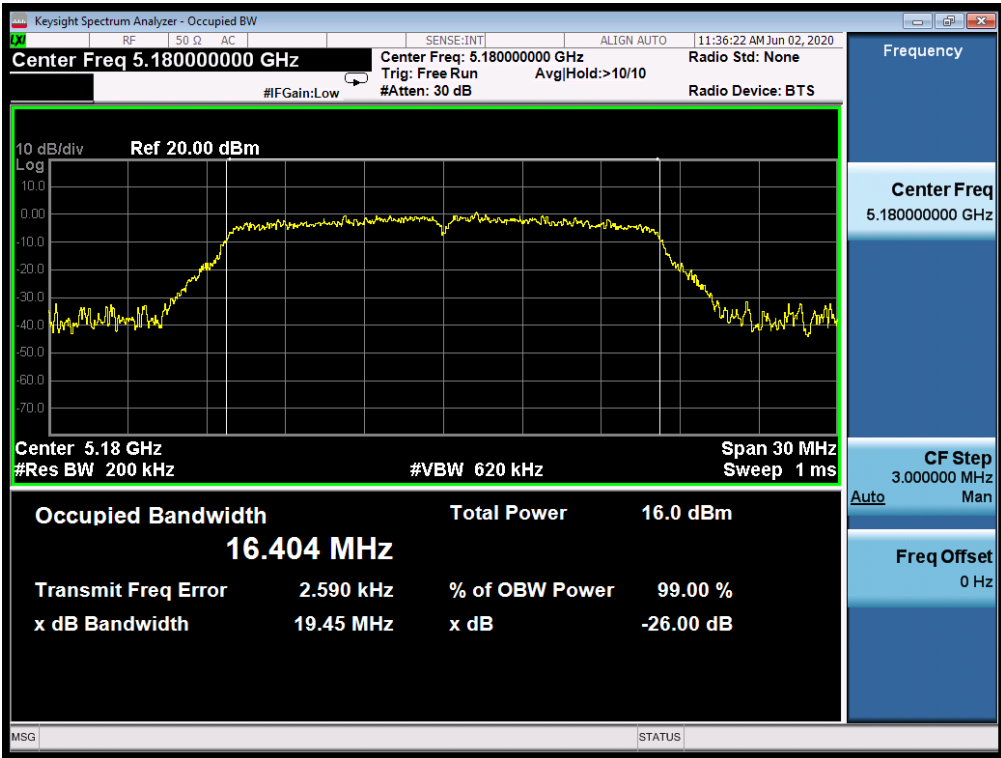
<b>LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION</b>			
<b>Applicable Limits</b>	<b>Applicable Limits</b>		
	<b>Test Data (MHz)</b>		<b>Criteria</b>
Within the Band	5180MHz	19.45	PASS
	5200MHz	19.84	PASS
	5240MHz	19.64	PASS

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION</b>			
<b>Applicable Limits</b>	<b>Applicable Limits</b>		
	<b>Test Data (MHz)</b>		<b>Criteria</b>
Within the Band	5180MHz	20.03	PASS
	5200MHz	20.01	PASS
	5240MHz	20.14	PASS
	5190MHz	40.17	PASS
	5230MHz	40.14	PASS

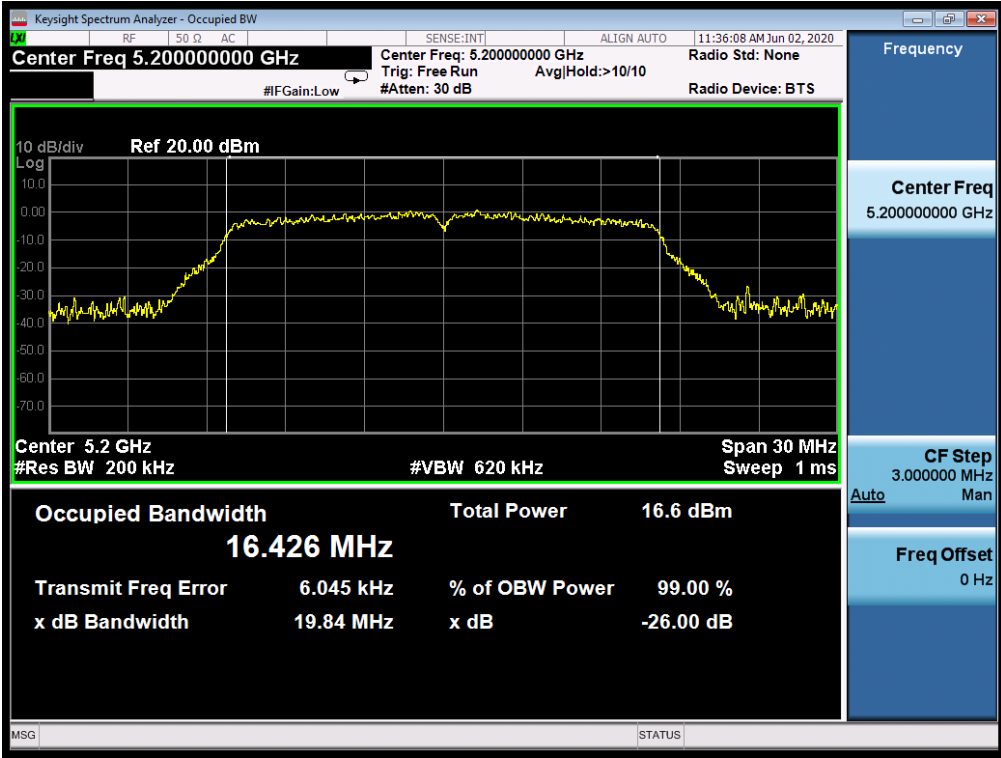
<b>LIMITS AND MEASUREMENT RESULT FOR 802.11AC80 MODULATION</b>			
<b>Applicable Limits</b>	<b>Applicable Limits</b>		
	<b>Test Data (MHz)</b>		<b>Criteria</b>
Within the Band	5180MHz	20.08	PASS
	5200MHz	19.77	PASS
	5240MHz	20.01	PASS
	5190MHz	39.77	PASS
	5230MHz	39.99	PASS
	5210MHz	80.22	PASS



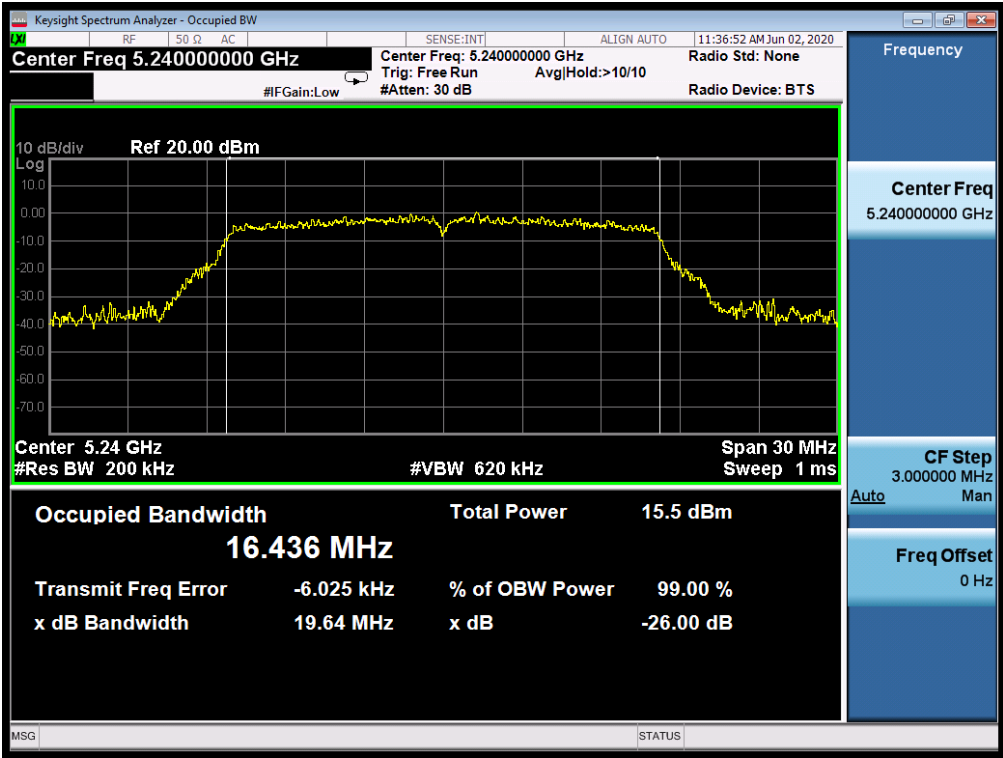
**802.11a20 TEST RESULT**  
**TEST PLOT OF BANDWIDTH FOR 5180MHz**



**TEST PLOT OF BANDWIDTH FOR 5200MHz**

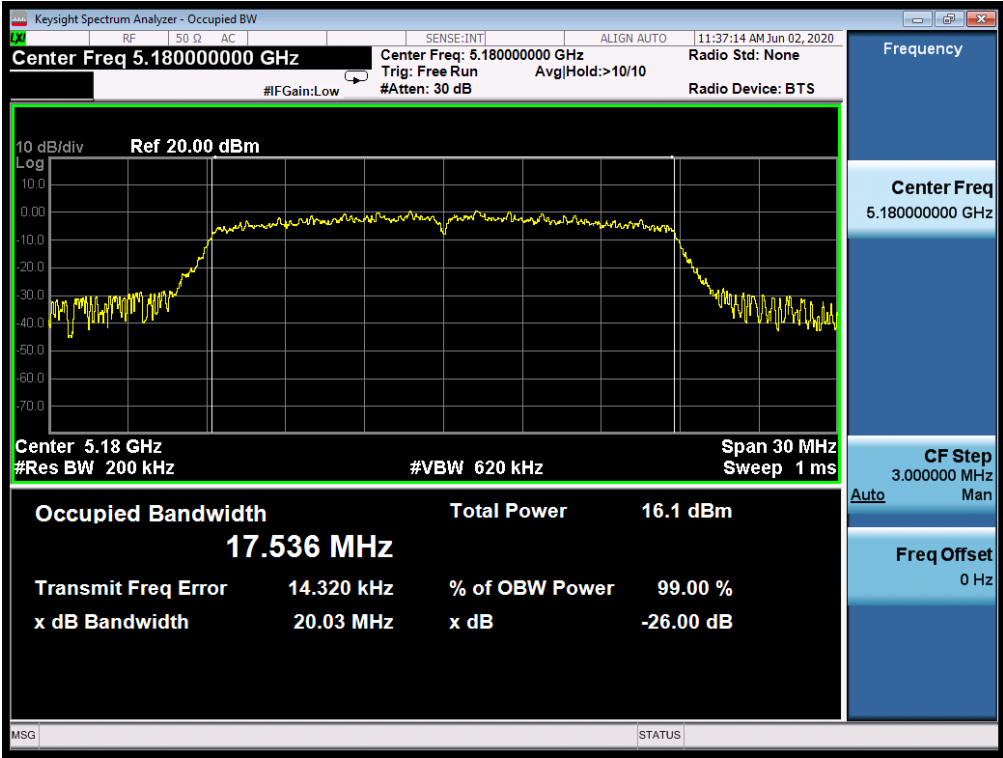


TEST PLOT OF BANDWIDTH FOR 5240MHz

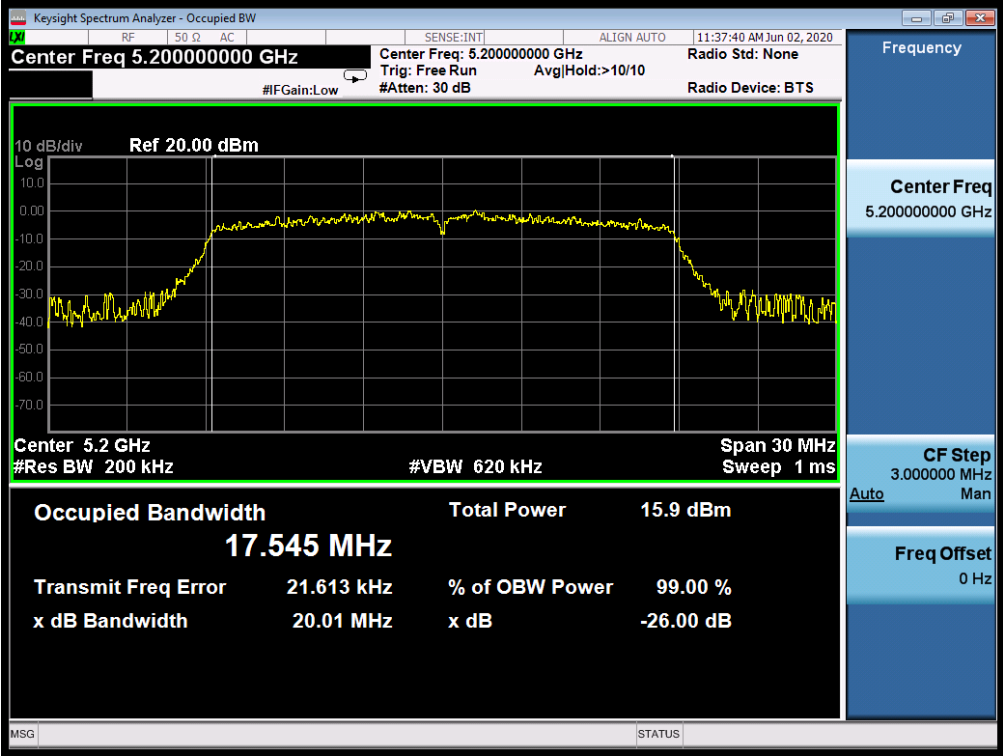


802.11n20 TEST RESULT

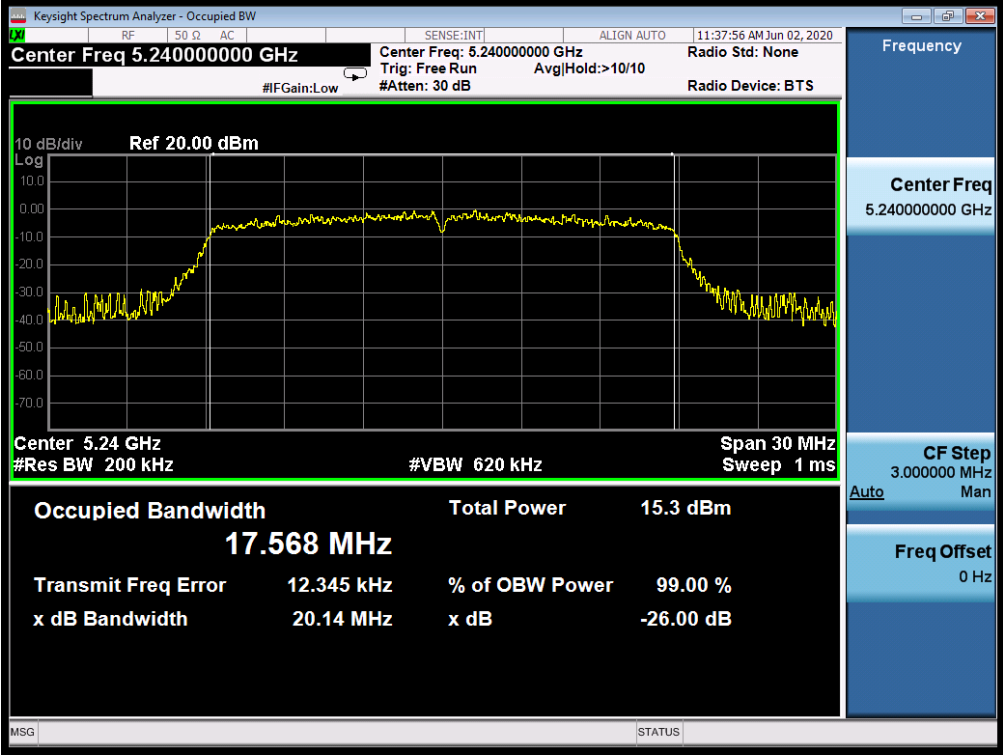
TEST PLOT OF BANDWIDTH FOR 5180MHz



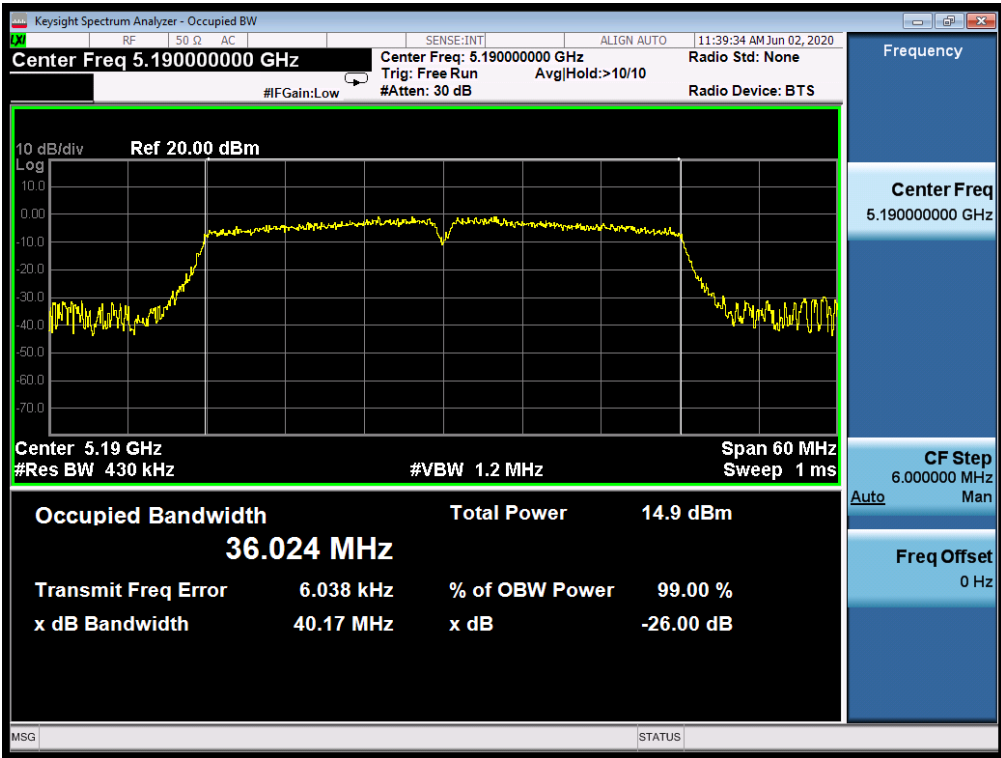
TEST PLOT OF BANDWIDTH FOR 5200MHz



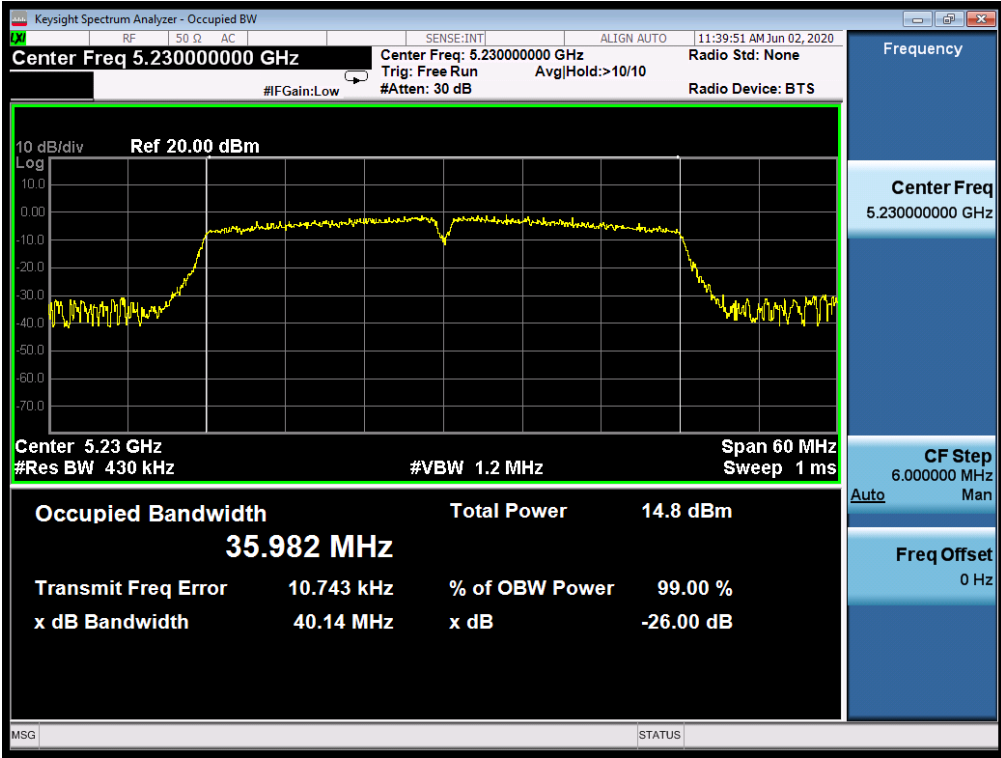
TEST PLOT OF BANDWIDTH FOR 5240MHz



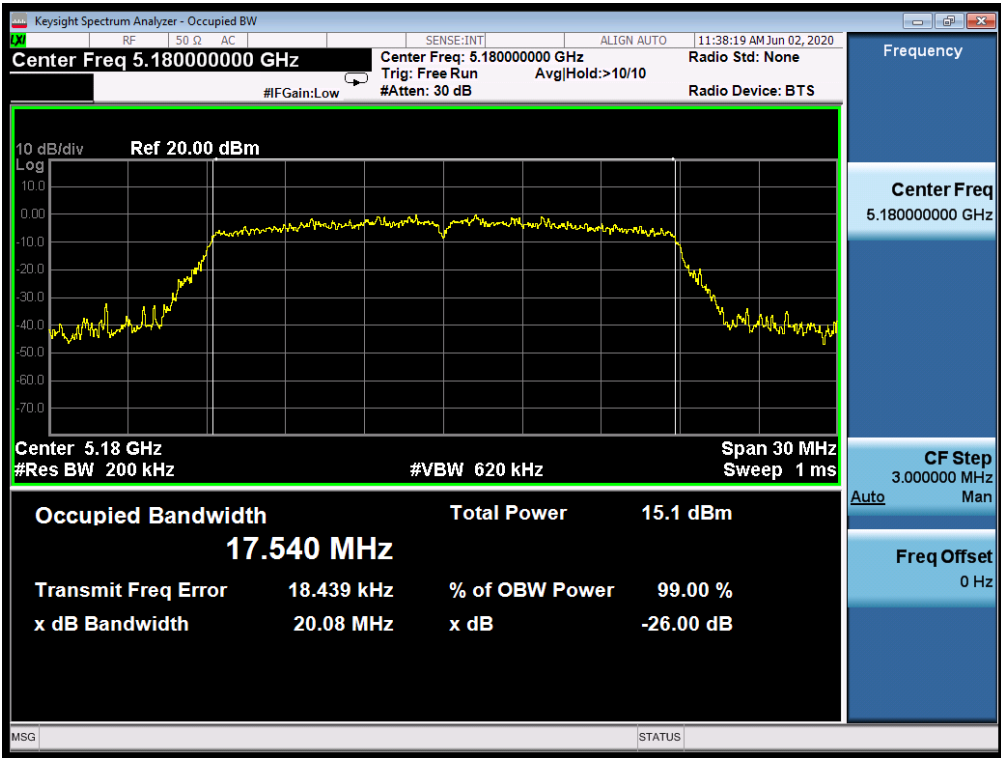
**802.11n40 TEST RESULT**  
**TEST PLOT OF BANDWIDTH FOR 5190MHz**



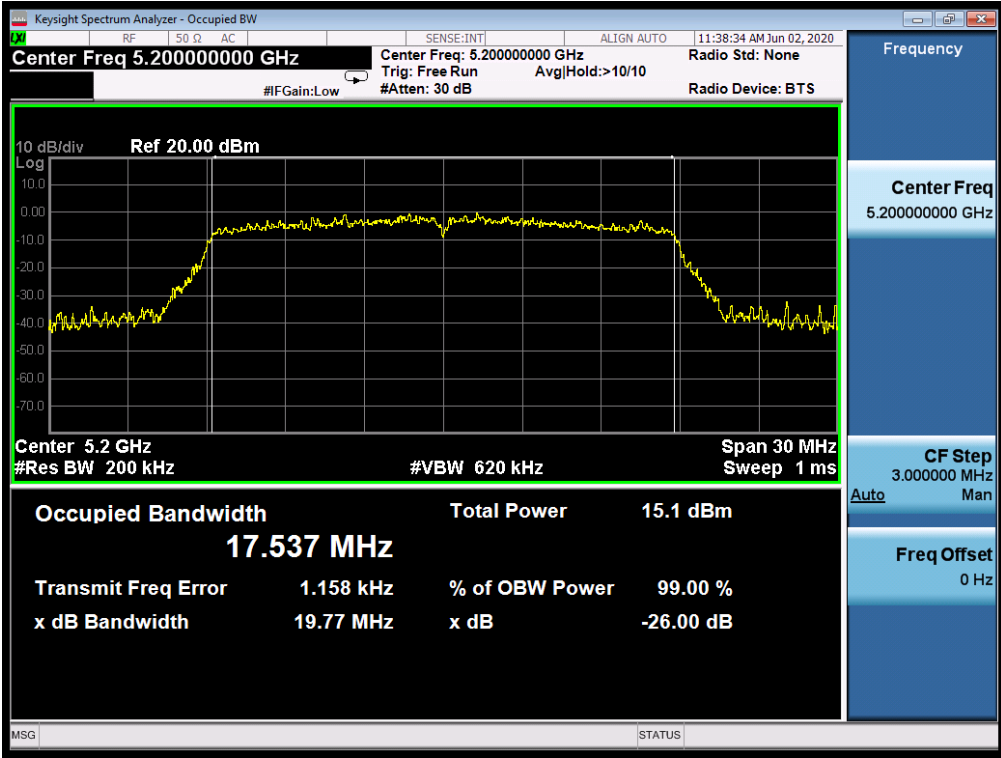
**TEST PLOT OF BANDWIDTH FOR 5230MHz**



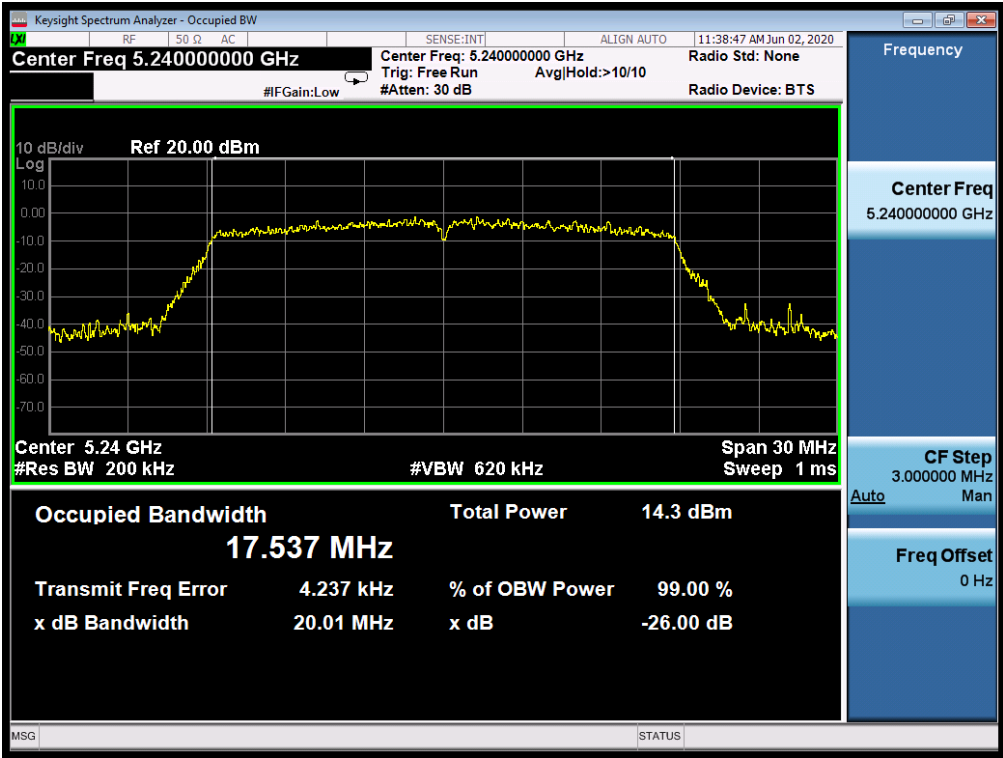
**802.11ac20 TEST RESULT**  
**TEST PLOT OF BANDWIDTH FOR 5180MHz**



**TEST PLOT OF BANDWIDTH FOR 5200MHz**

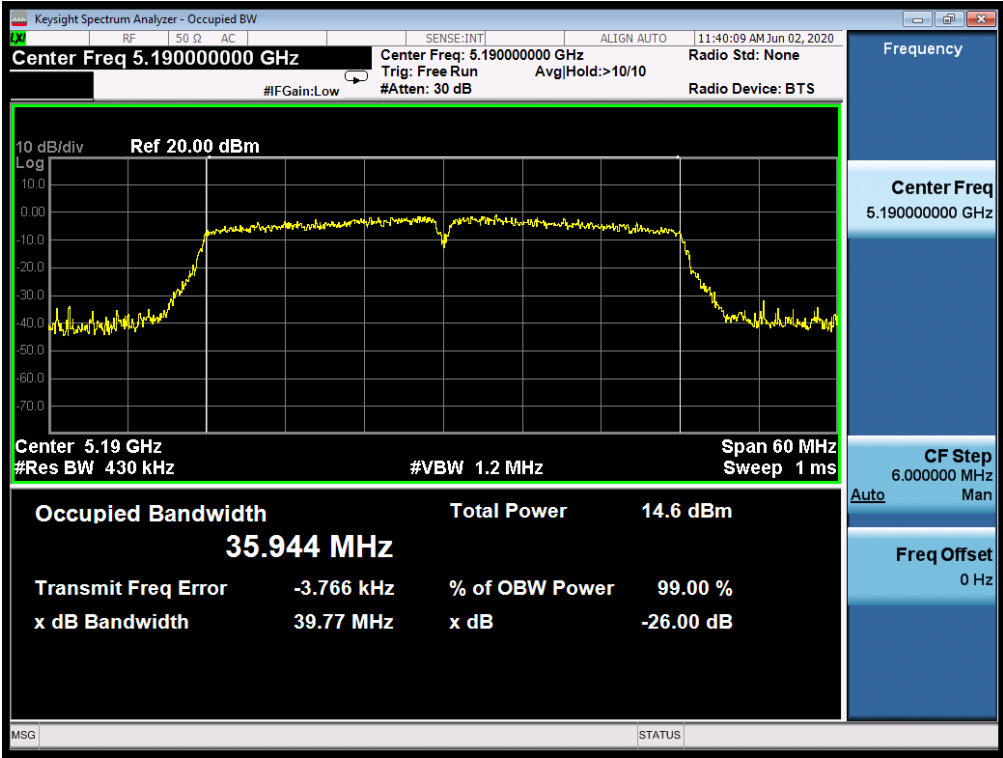


TEST PLOT OF BANDWIDTH FOR 5240MHz

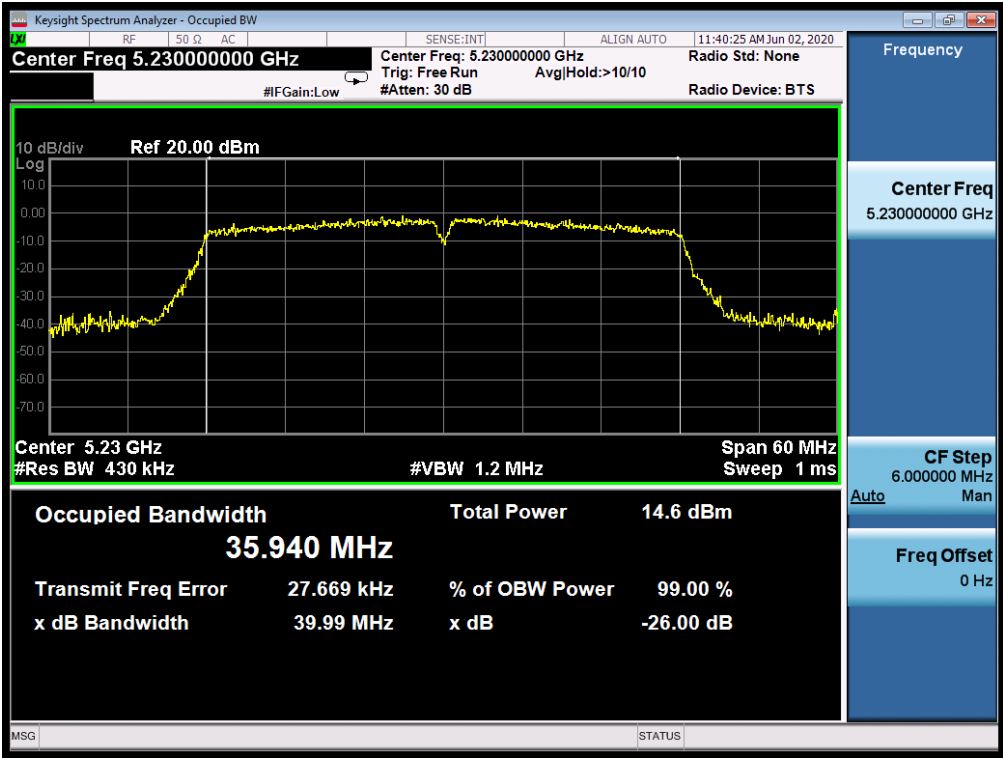


802.11ac40 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5190MHz

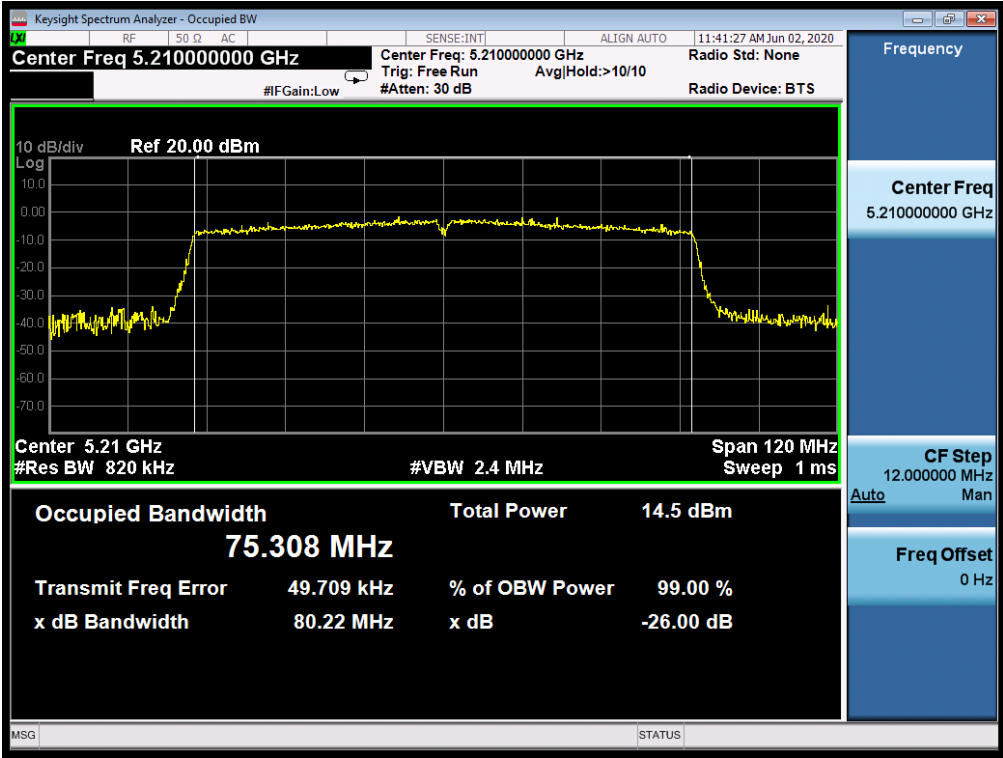


TEST PLOT OF BANDWIDTH FOR 5230MHz



802.11ac80 TEST RESULT

TEST PLOT OF BANDWIDTH FOR 5210MHz



## **9. MAXIMUM CONDUCTED OUTPUT PEAK POWER SPECTRAL DENSITY**

### **9.1 MEASUREMENT PROCEDURE**

Refer to KDB 789033 section F

### **9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)**

Refer To Section 8.2.

### **9.3 MEASUREMENT EQUIPMENT USED**

Refer To Section 6.



**9.4 LIMITS AND MEASUREMENT RESULT**

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Power density (dBm/MHz)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5180	7.528	17	Pass
5200	7.642	17	Pass
5240	7.208	17	Pass

<b>LIMITS AND MEASUREMENT RESULT FOR 802.11 N20/40 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Power density (dBm/MHz)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5180	6.989	17	Pass
5200	6.993	17	Pass
5240	7.108	17	Pass
5190	4.427	17	Pass
5230	4.301	17	Pass

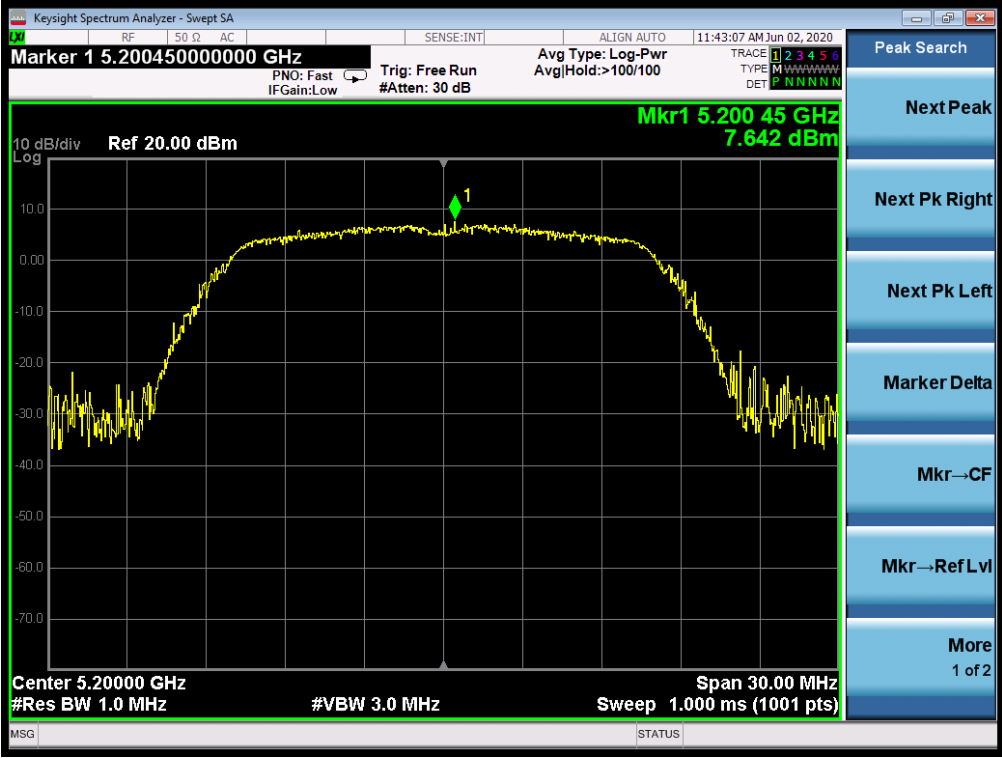
<b>LIMITS AND MEASUREMENT RESULT FOR 802.11AC20/40/80 MODULATION</b>			
<b>Frequency (MHz)</b>	<b>Power density (dBm/MHz)</b>	<b>Applicable Limits (dBm)</b>	<b>Pass or Fail</b>
5180	6.788	17	Pass
5200	6.849	17	Pass
5240	6.658	17	Pass
5190	4.166	17	Pass
5230	4.177	17	Pass
5210	1.613	17	Pass

### 802.11a20 TEST RESULT

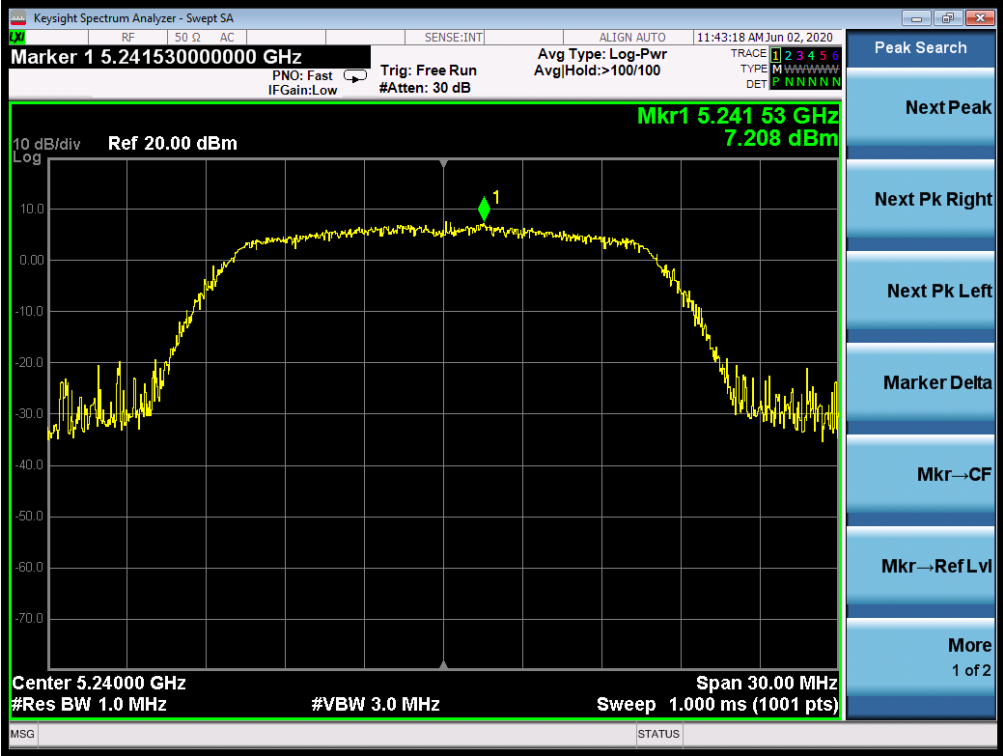
#### TEST PLOT OF SPECTRAL DENSITY FOR 5180MHz



#### TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz



802.11n20 TEST RESULT

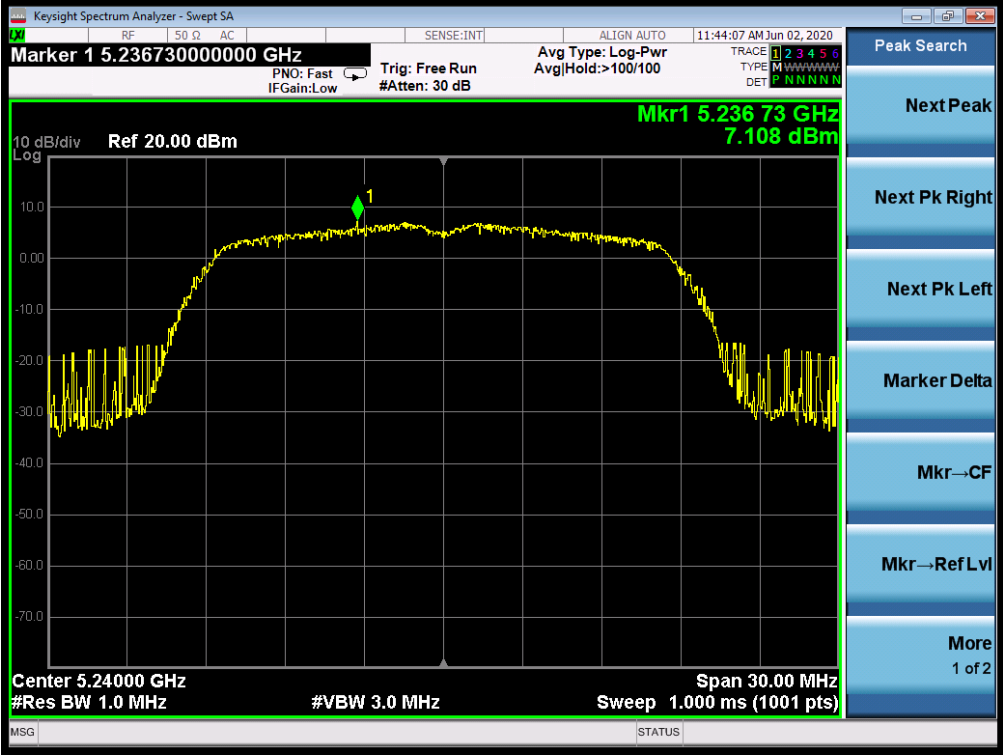
TEST PLOT OF SPECTRAL DENSITY FOR 5180MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz

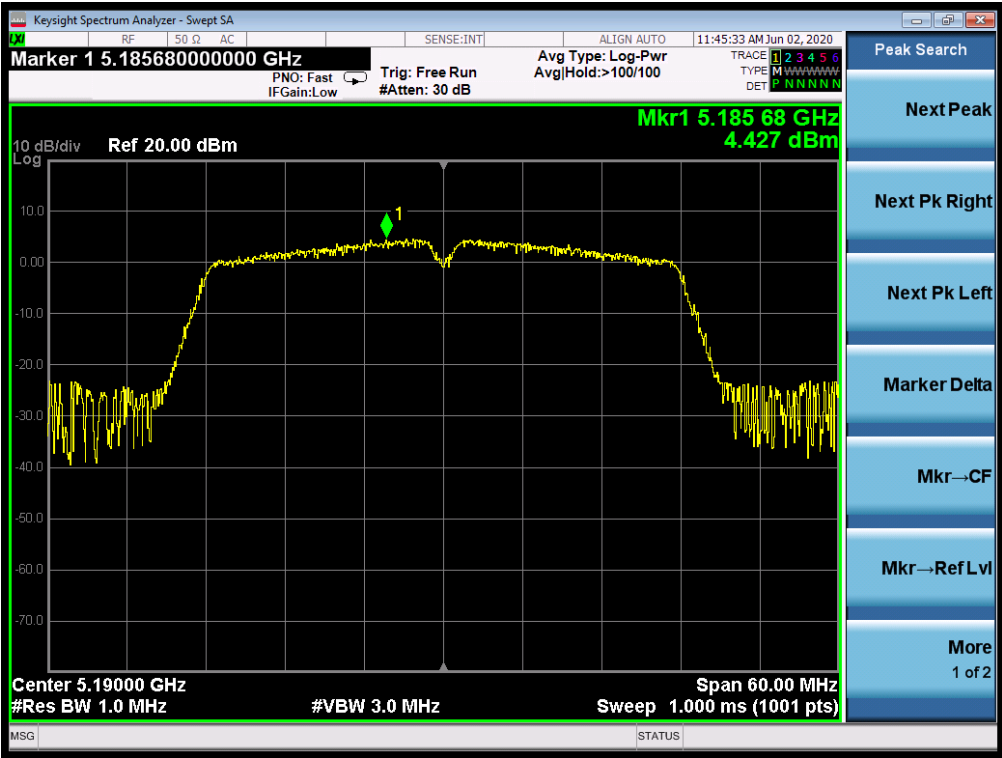


TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz

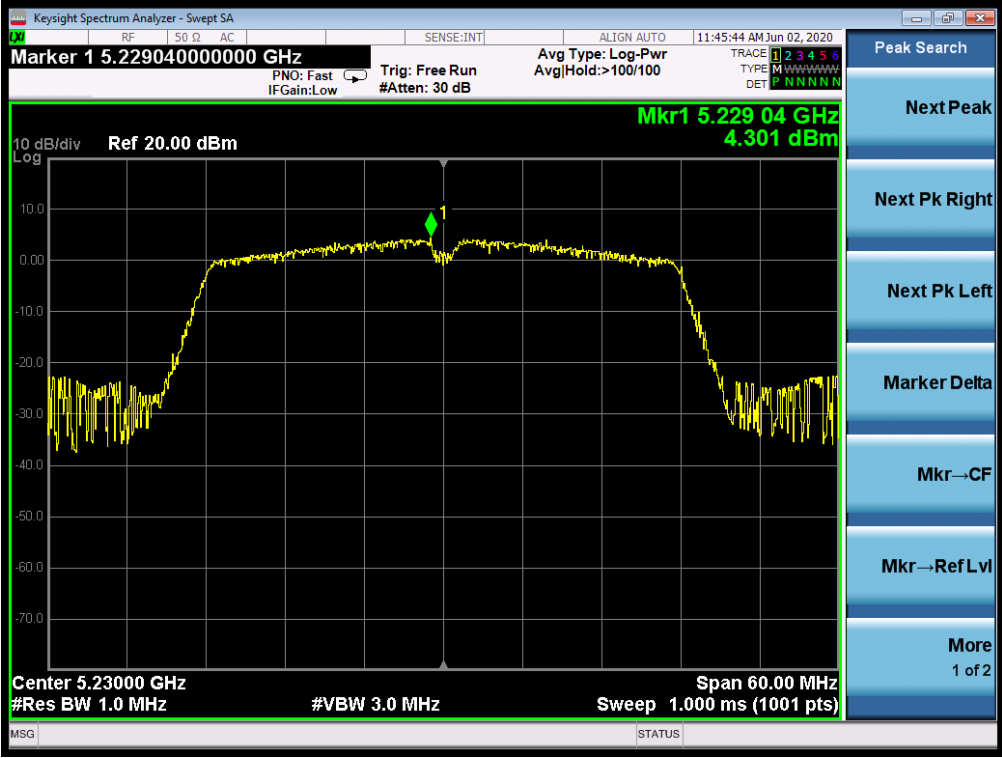


### 802.11n40 TEST RESULT

#### TEST PLOT OF SPECTRAL DENSITY FOR 5190MHz



#### TEST PLOT OF SPECTRAL DENSITY FOR 5230MHz



### 802.11ac20 TEST RESULT

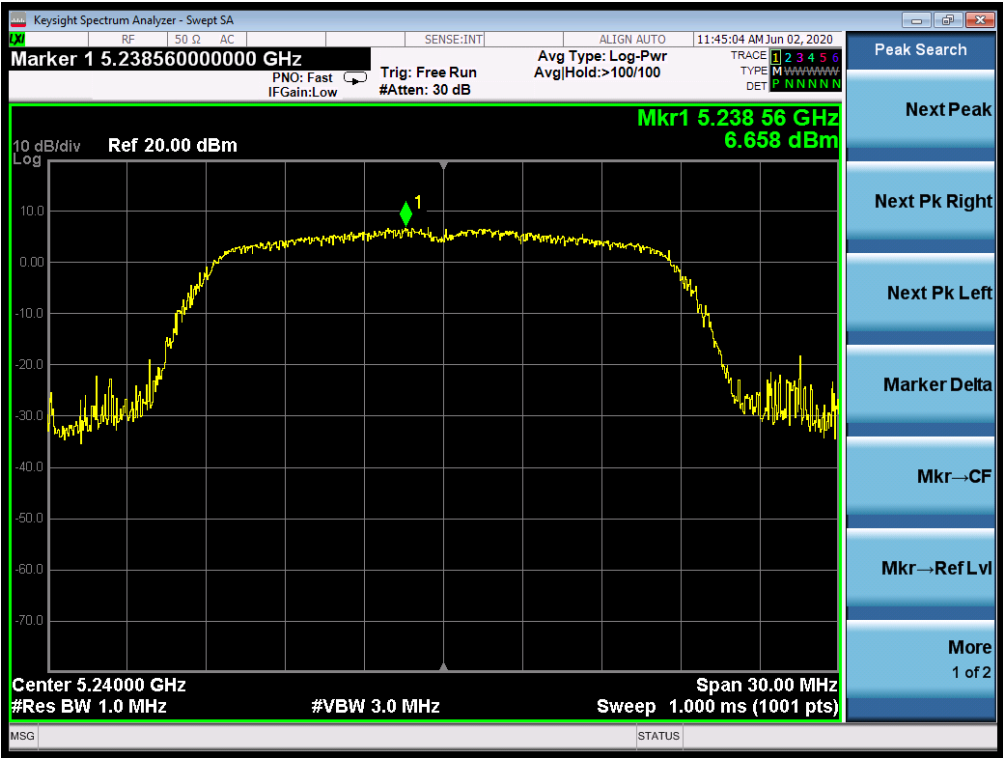
#### TEST PLOT OF SPECTRAL DENSITY FOR 5180MHz



#### TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz

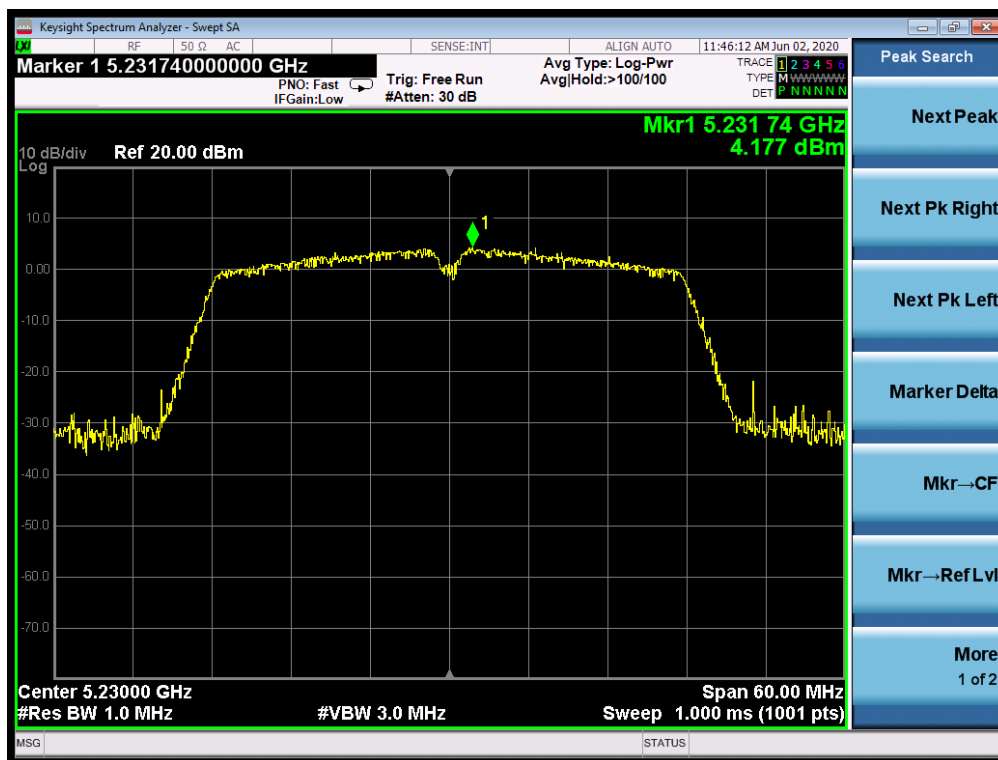


802.11ac40 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR 5190MHz



### TEST PLOT OF SPECTRAL DENSITY FOR 5230MHz



### 802.11ac80 TEST RESULT

### TEST PLOT OF SPECTRAL DENSITY FOR 5210MHz





**10. CONDUCTED SPURIOUS EMISSION**

**10.1. MEASUREMENT PROCEDURE**

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

**10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)**

The same as described in section 8.2.

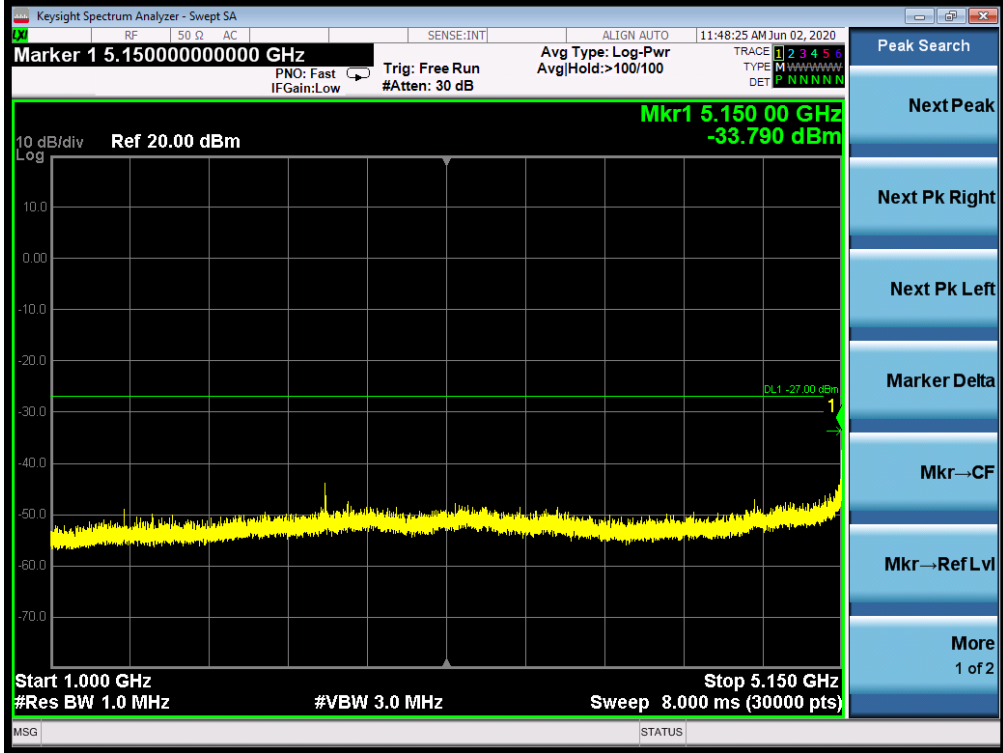
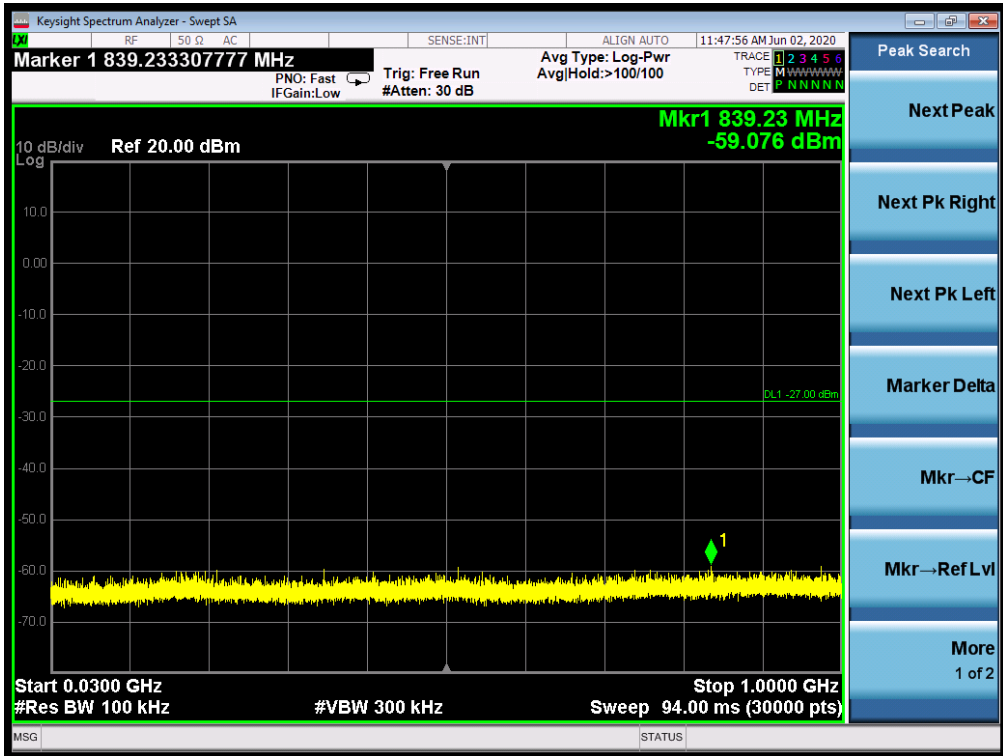
**10.3. MEASUREMENT EQUIPMENT USED**

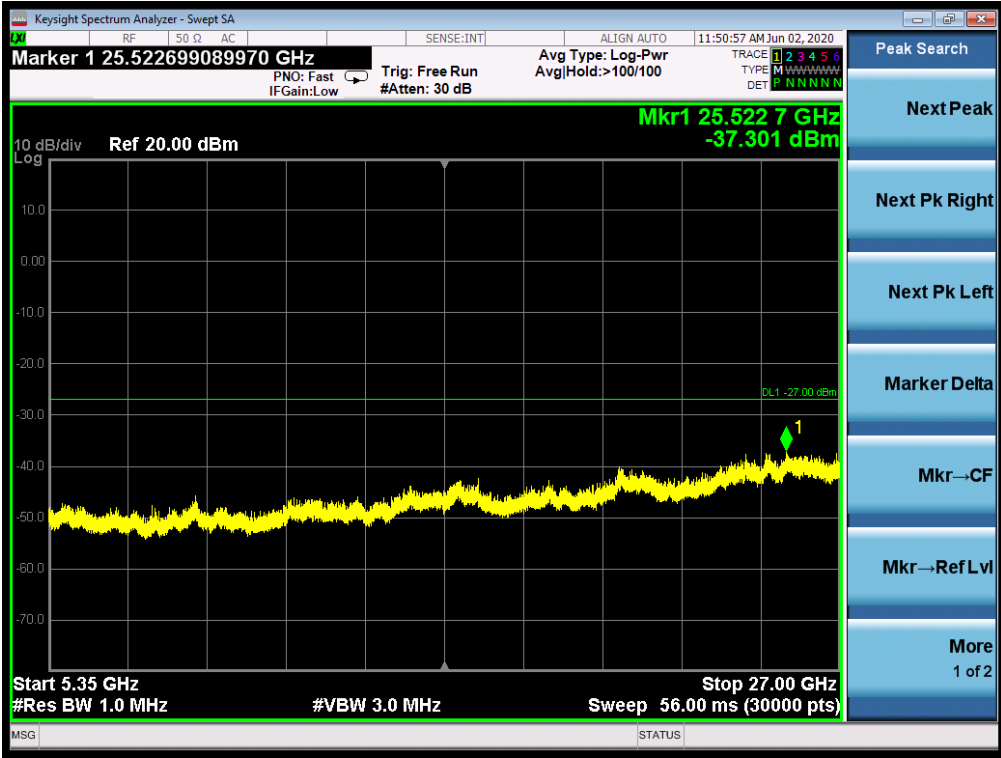
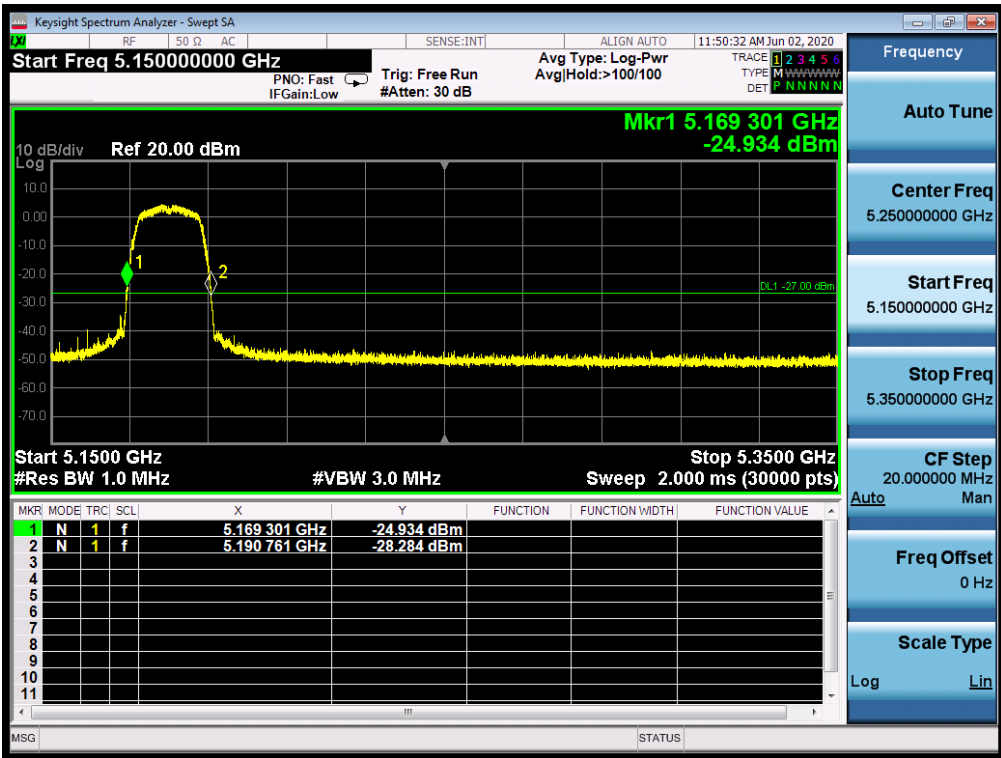
The same as described in section 6.

**10.4. LIMITS AND MEASUREMENT RESULT**

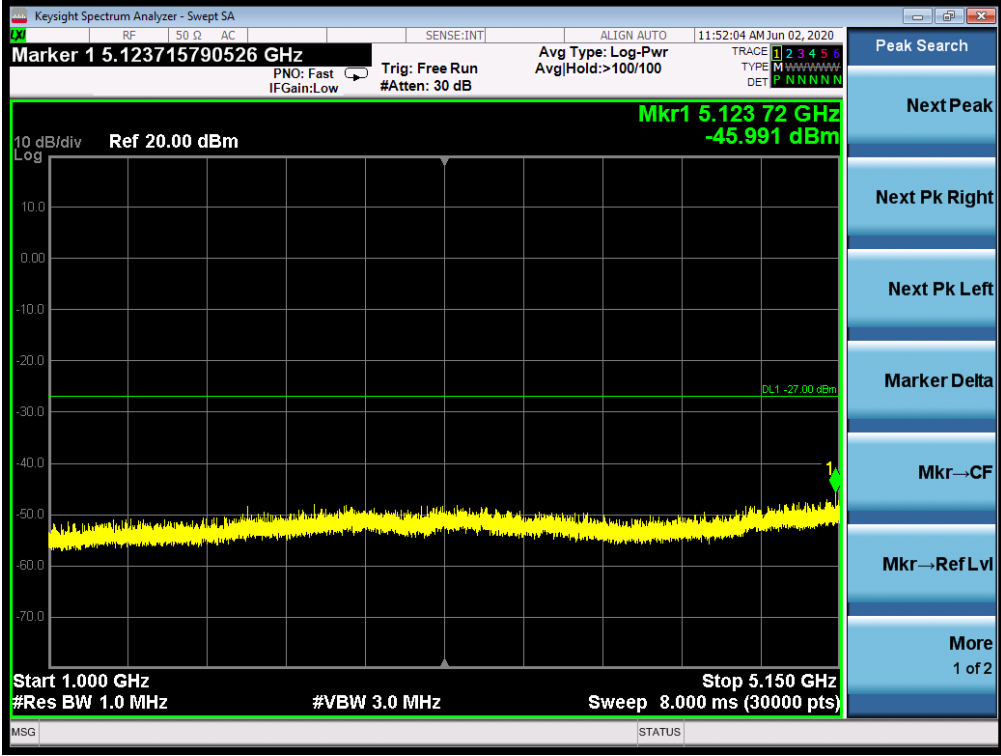
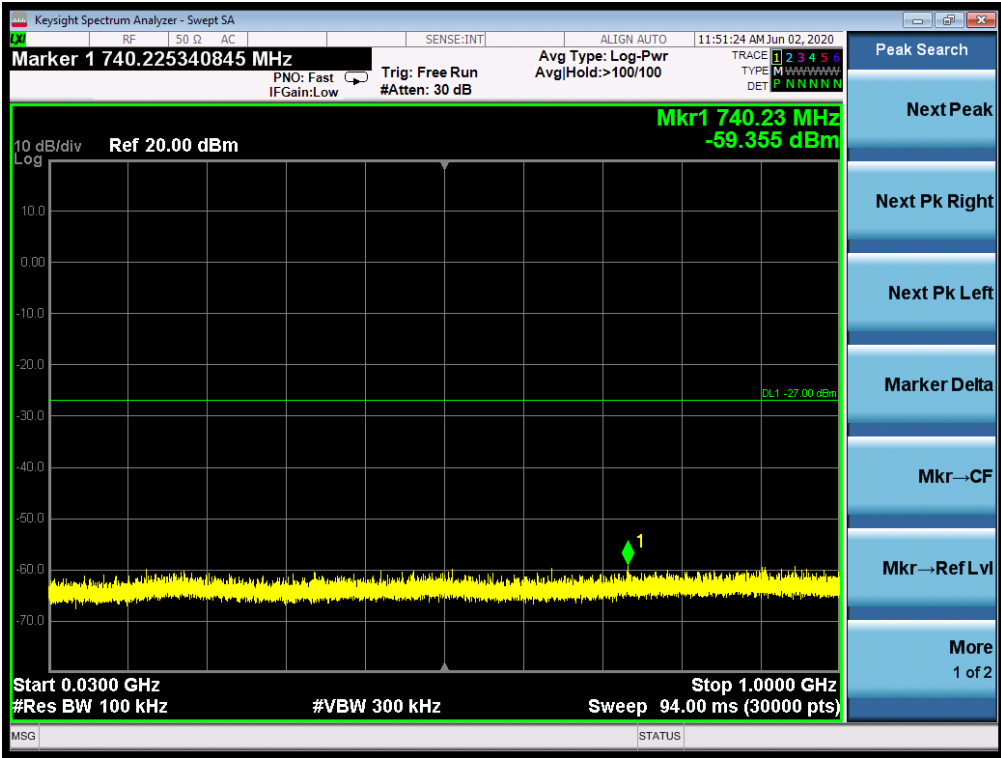
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test channel	Criteria
-27dBm/MHz	5150MHz-5250MHz	PASS

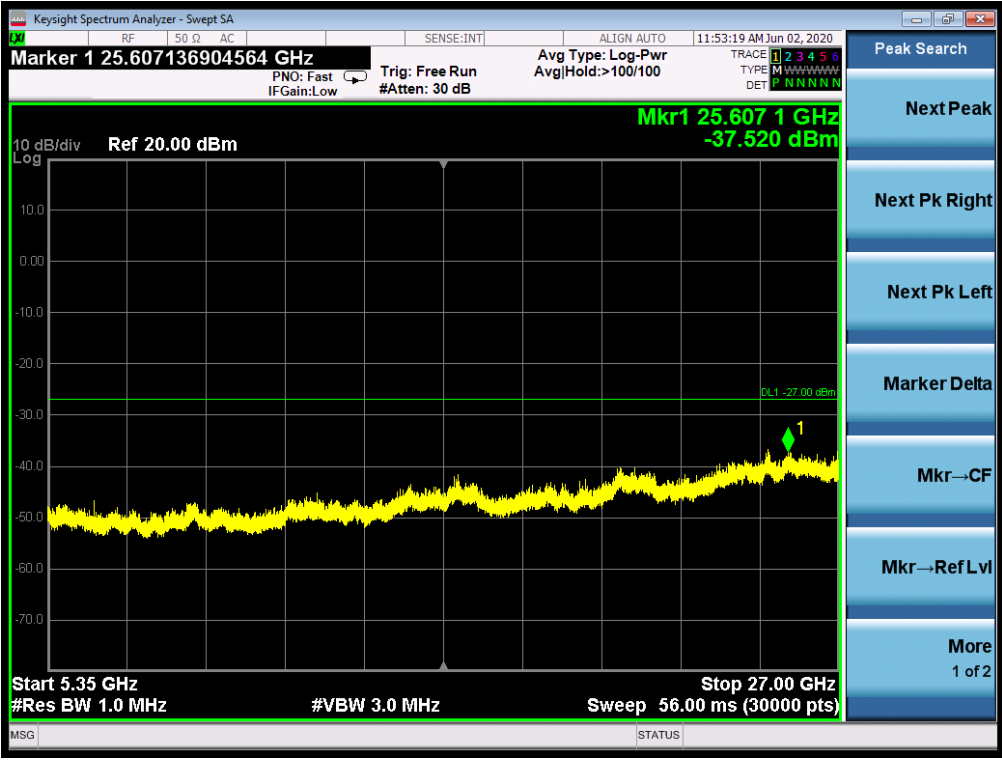
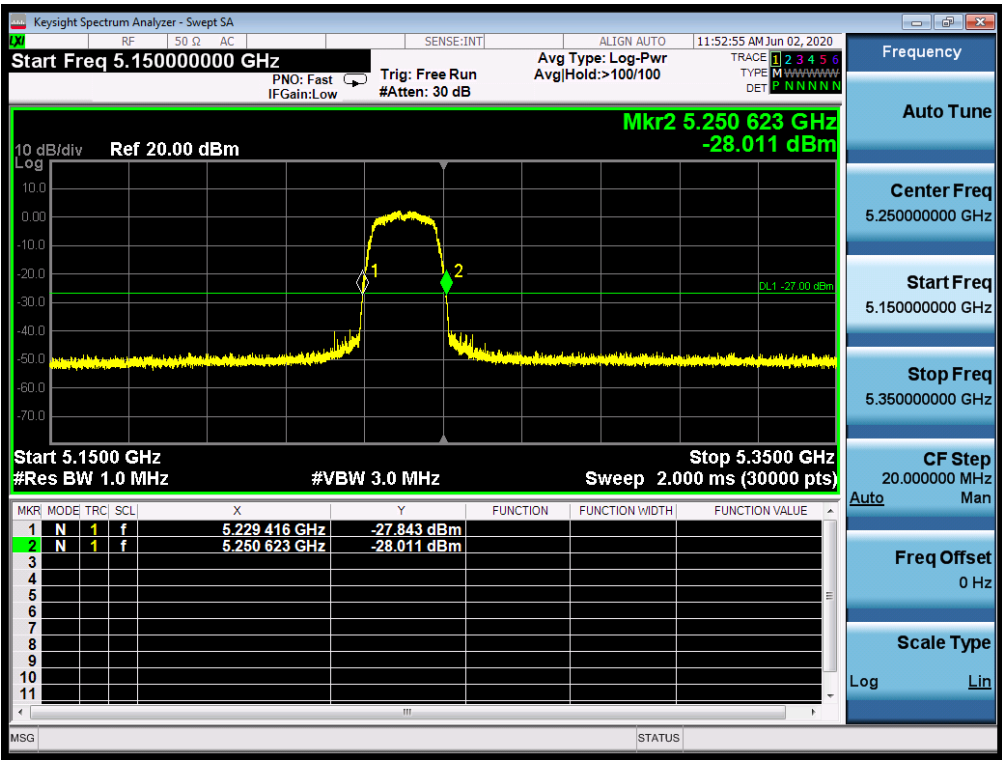
**FOR 802.11A20 MODULATION**  
**TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5180MHZ**





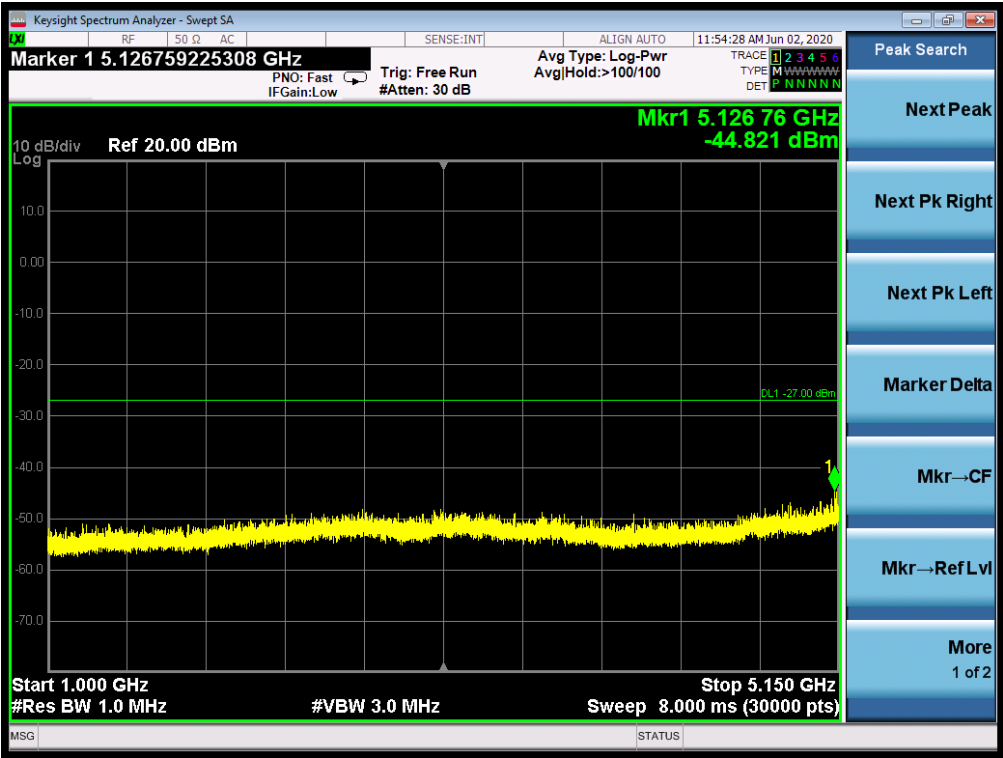
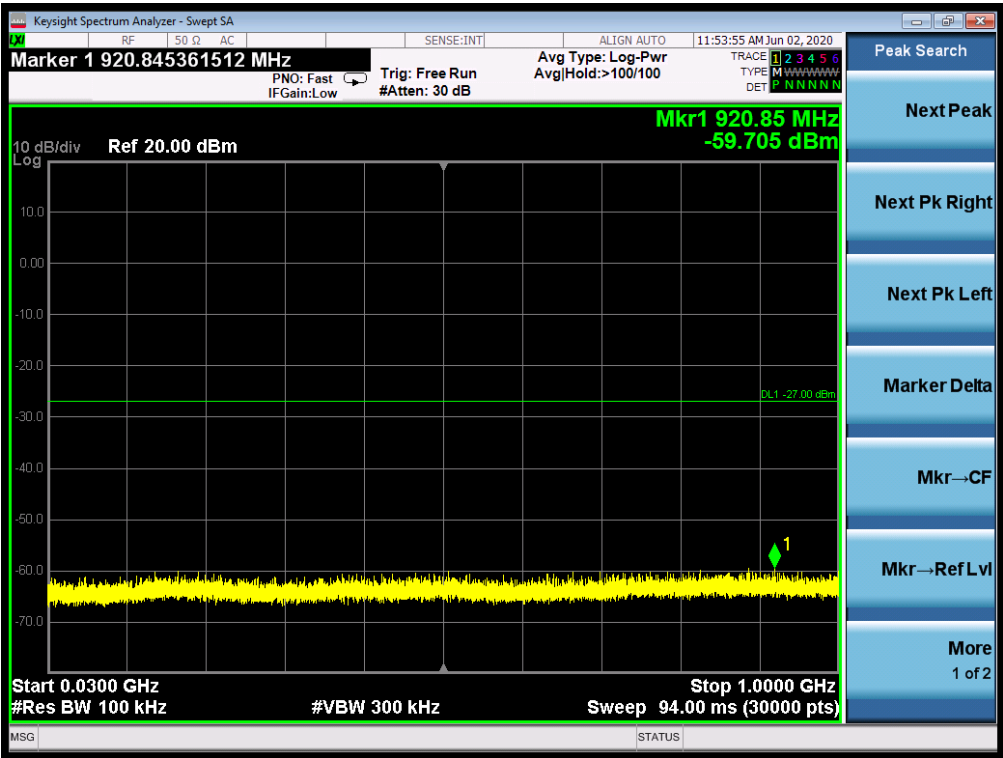
TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5240MHz

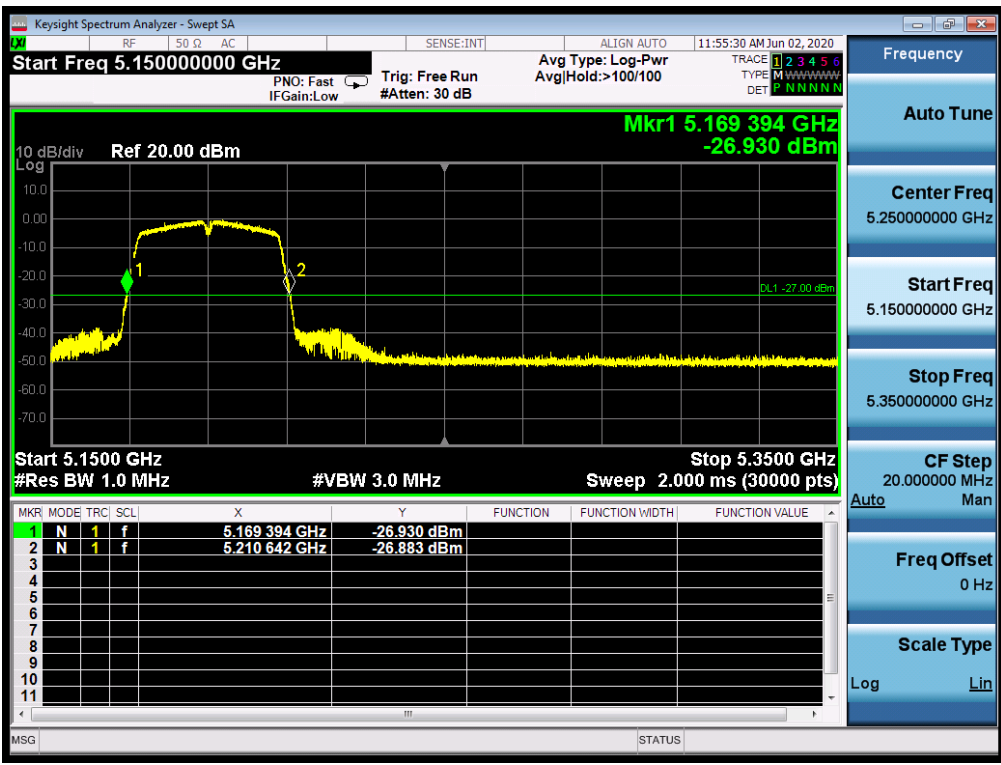




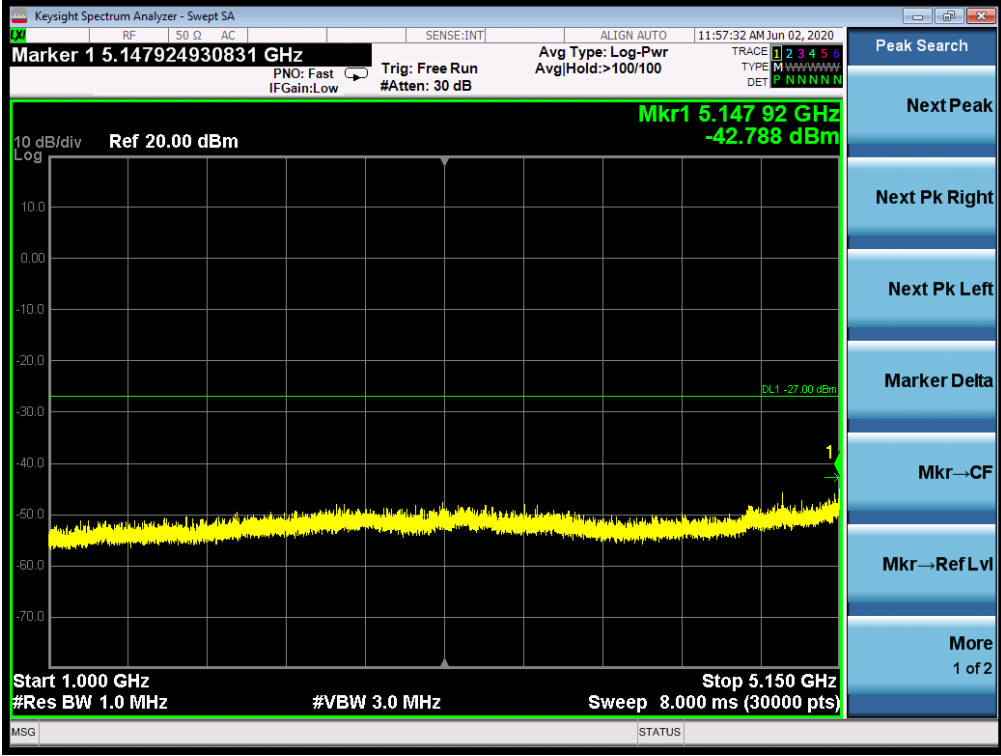
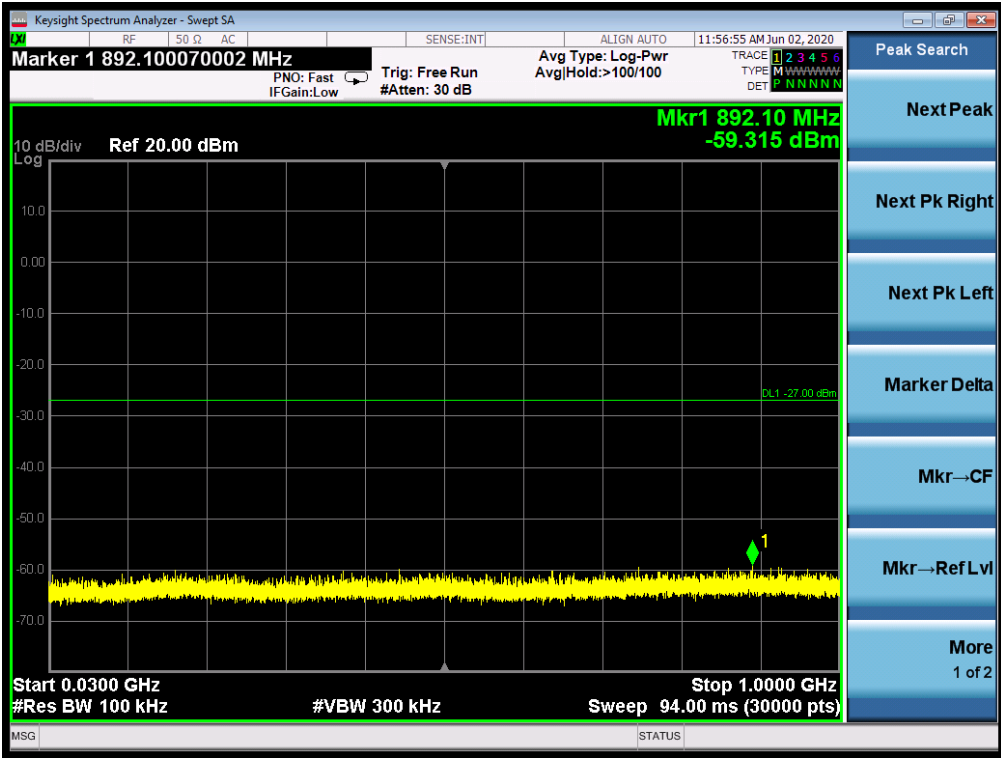
FOR 802.11N40 MODULATION

TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5190MHz

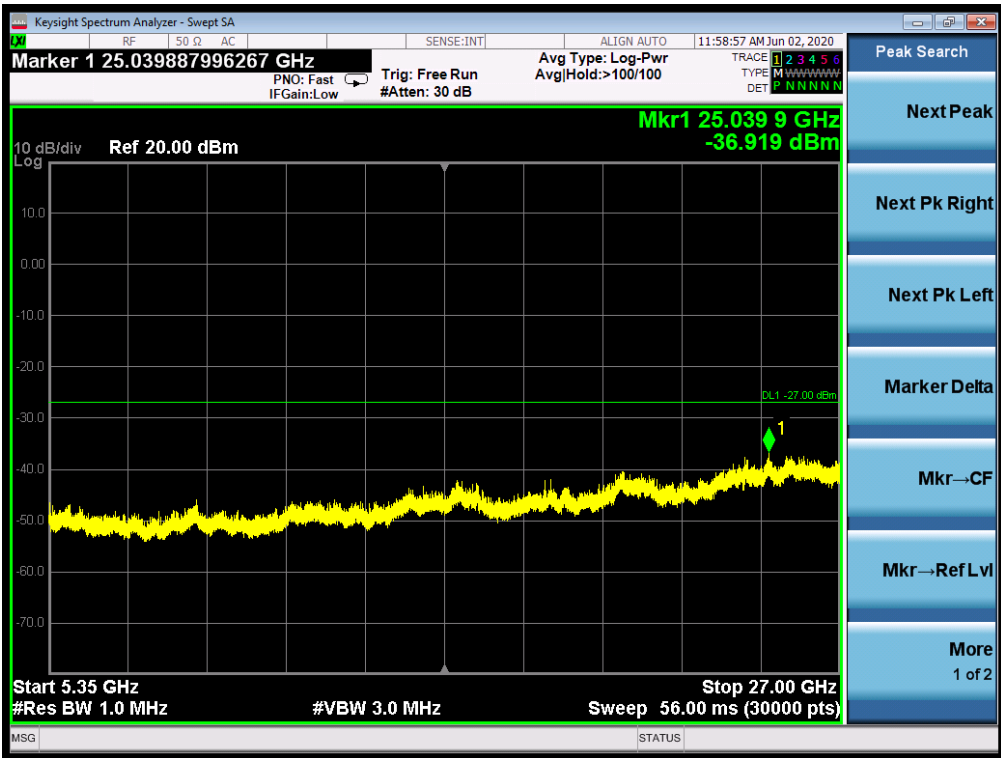
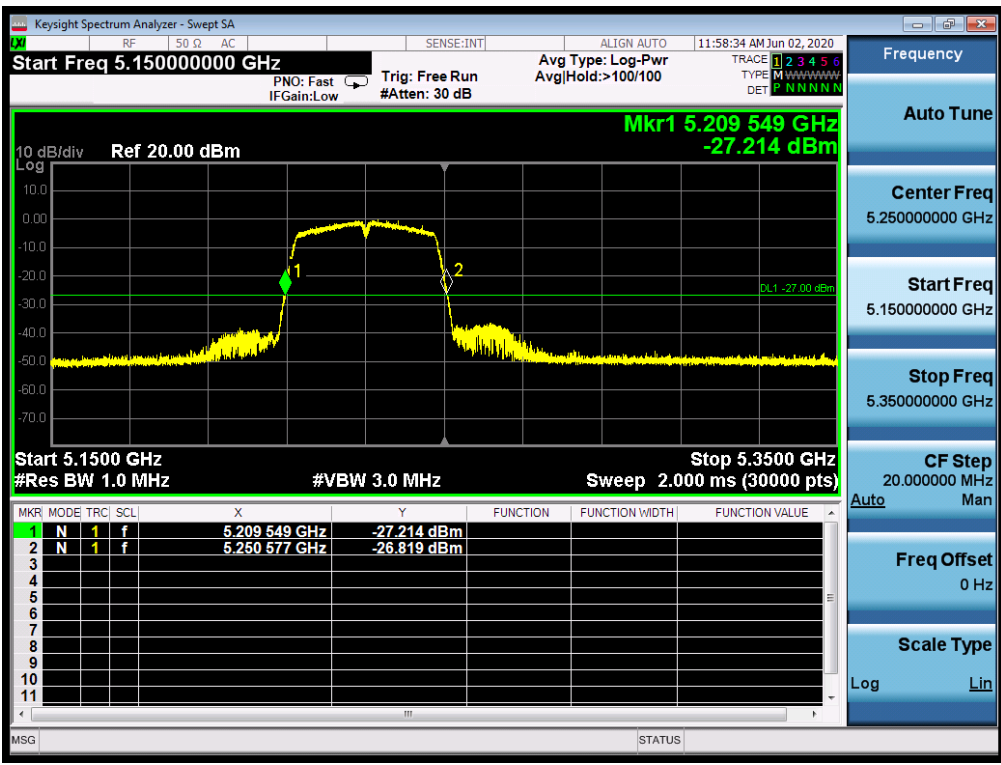




TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5230MHz

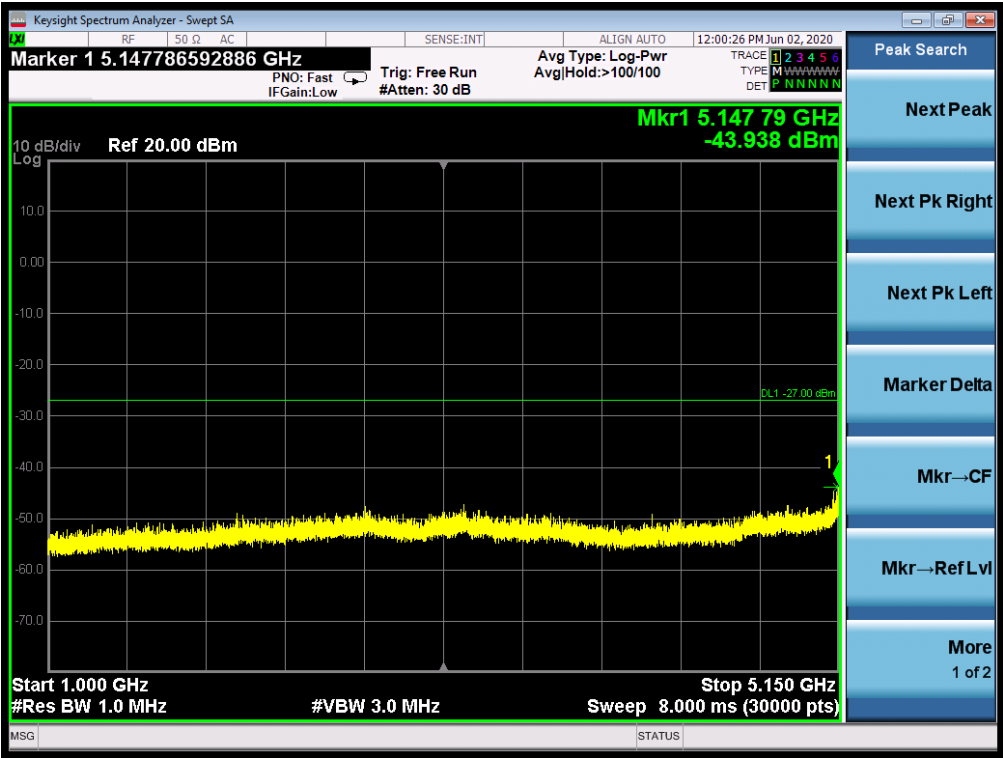
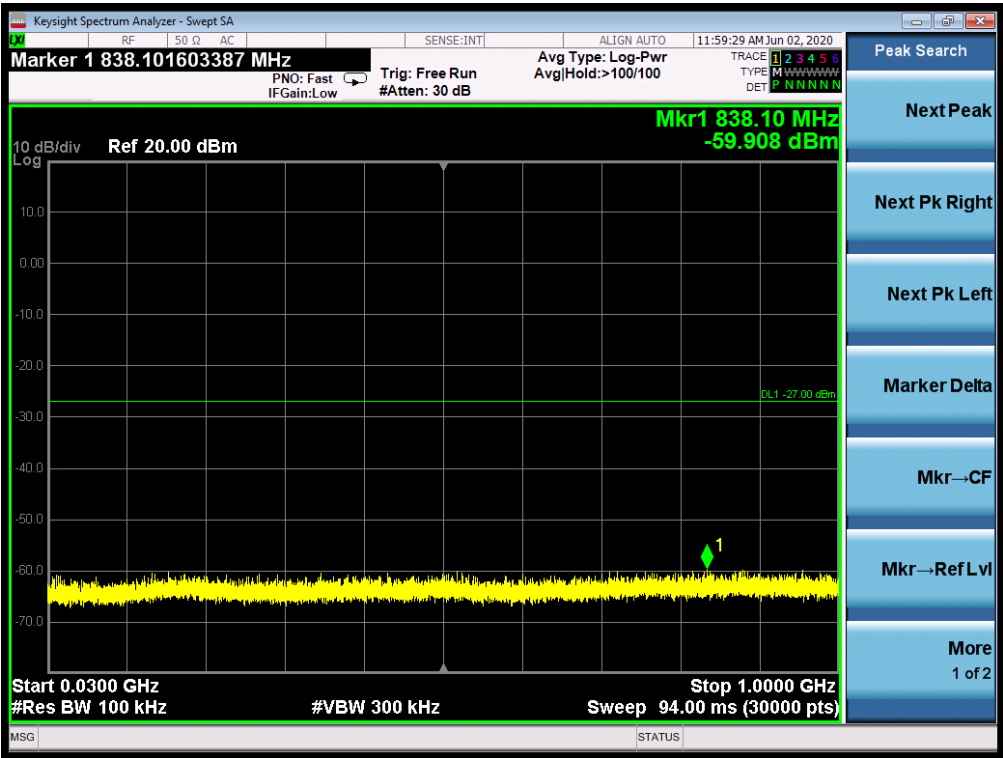


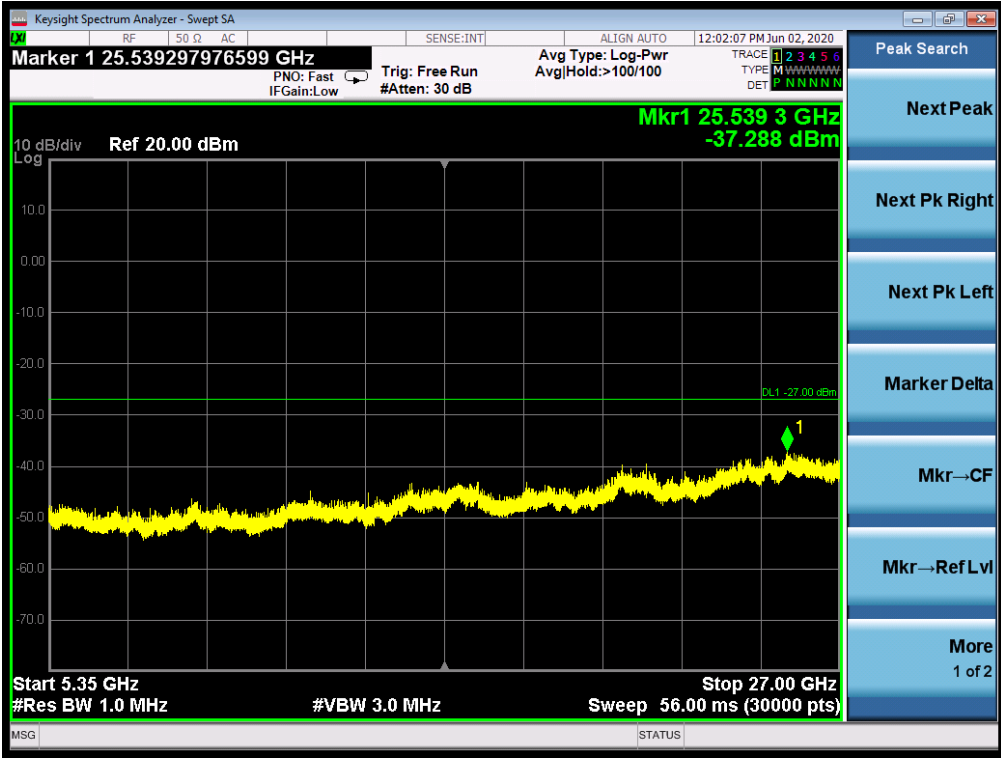
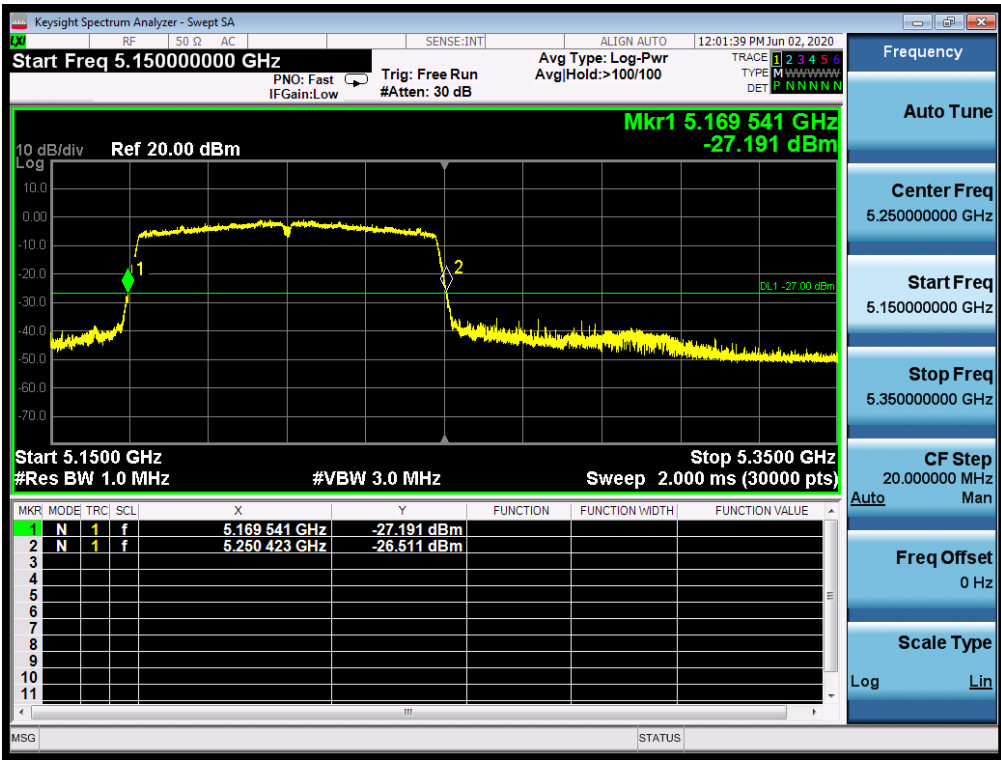




FOR 802.11AC80 MODULATION

TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5210MHz





Note: All the 20MHz bandwidth modulation had been tested, the 802.11a20 was the worst case and record in his test report. All the 40MHz bandwidth modulation had been tested, the 802.11N40 was the worst case and record in his test report. All the 80MHz bandwidth modulation had been tested, the 802.11ac80 was the worst case and record in his test report.

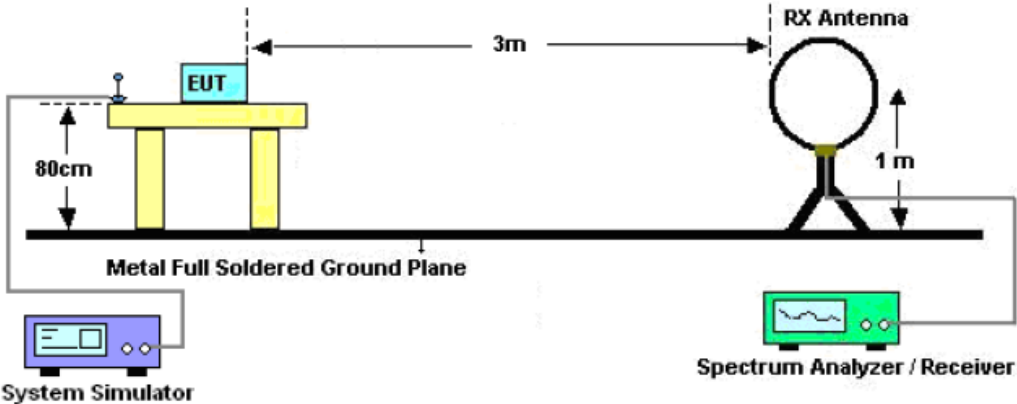
## 11. RADIATED EMISSION

### 11.1. MEASUREMENT PROCEDURE

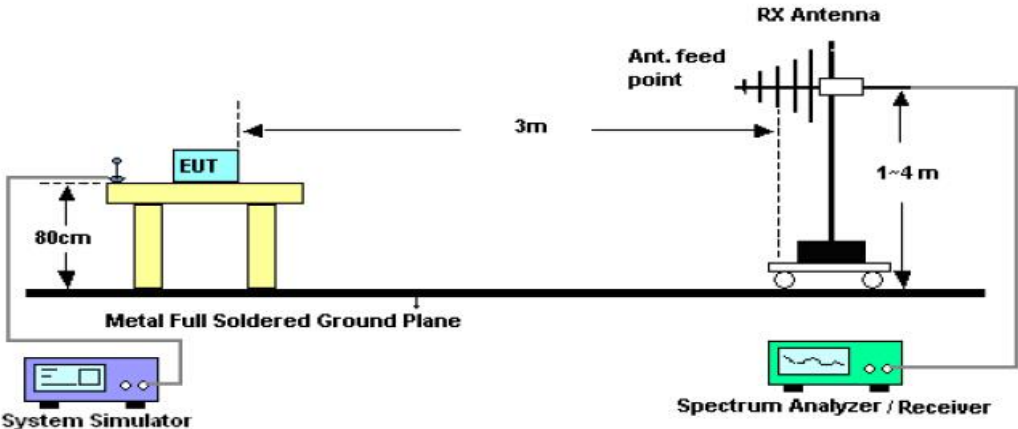
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3M VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

11.2. TEST SETUP

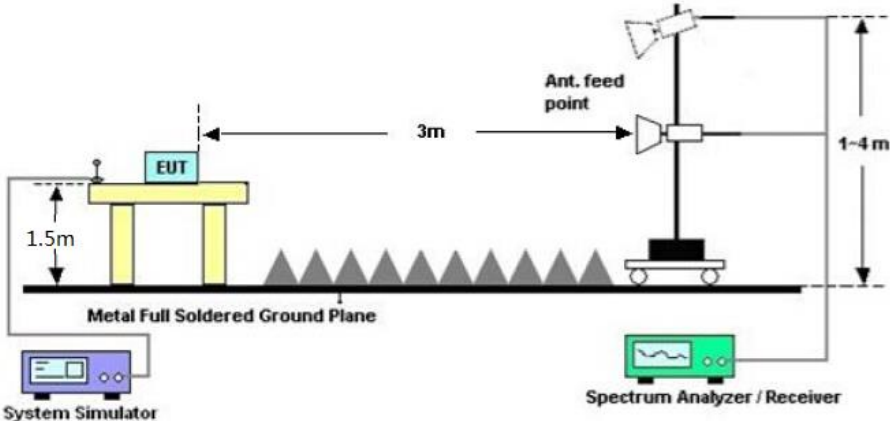
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



### 11.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

<b>Frequencies (MHz)</b>	<b>Field Strength (micorvolts/meter)</b>	<b>Measurement Distance (meters)</b>
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,  
the test records reported below are the worst result compared to other modes.

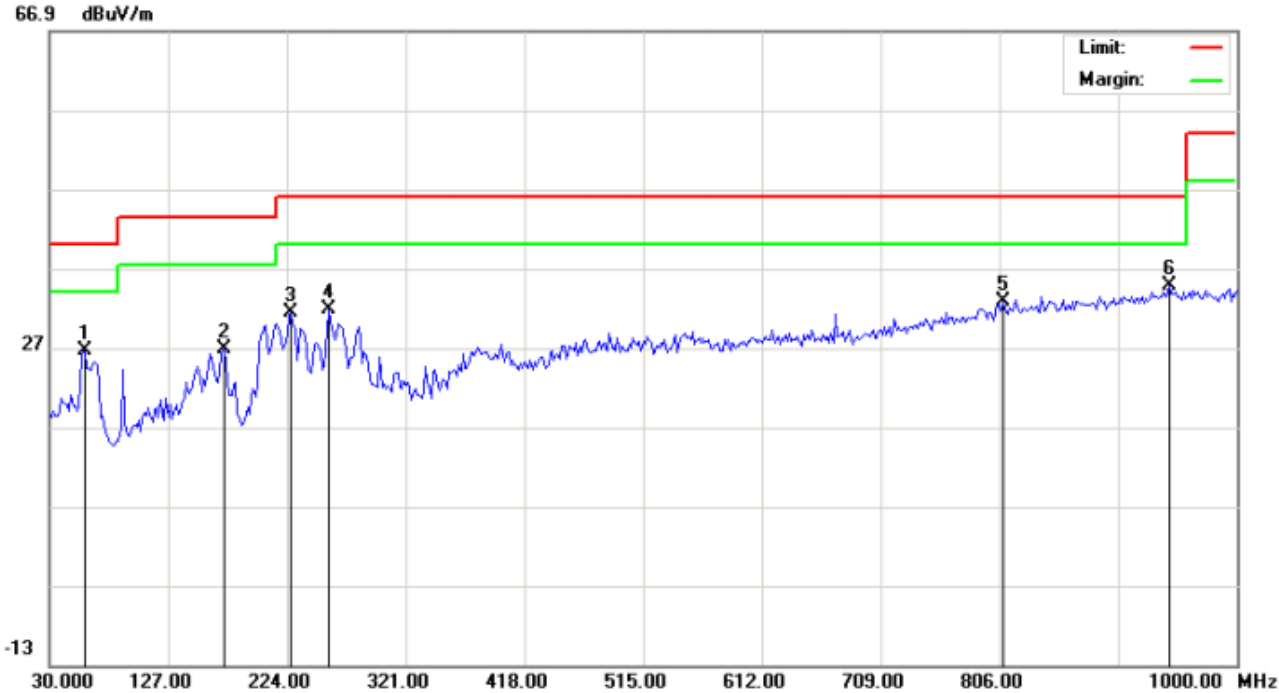
### 11.4. TEST RESULT

#### **RADIATED EMISSION BELOW 30MHZ**

No emission found between lowest internal used/generated frequencies to 30MHz.

**RADIATED EMISSION BELOW 1GHZ**

<b>EUT</b>	Smart phone	<b>Model Name</b>	X2
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	53%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11a20 5180MHz	<b>Antenna</b>	Horizontal



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		59.1000	7.74	18.95	26.69	40.00	-13.31	peak			
2		172.2667	8.78	17.93	26.71	43.50	-16.79	peak			
3		227.2333	13.62	17.75	31.37	46.00	-14.63	peak			
4		257.9500	13.41	18.35	31.76	46.00	-14.24	peak			
5		809.2333	2.29	30.53	32.82	46.00	-13.18	peak			
6	*	945.0333	2.65	32.09	34.74	46.00	-11.26	peak			

**RESULT: PASS**

EUT	Smart phone	Model Name	X2
Temperature	25°C	Relative Humidity	53%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	57.4833	17.26	19.09	36.35	40.00	-3.65	peak			
2		165.8000	11.45	18.59	30.04	43.50	-13.46	peak			
3		259.5667	13.93	18.32	32.25	46.00	-13.75	peak			
4		451.9500	9.18	24.02	33.20	46.00	-12.80	peak			
5		602.3000	4.46	26.98	31.44	46.00	-14.56	peak			
6		949.8833	2.51	32.13	34.64	46.00	-11.36	peak			

**RESULT: PASS**

**Note:** All test channels had been tested. The 802.11a20 at 5180MHz is the worst case and recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The "Factor" value can be calculated automatically by software of measurement system.



**RADIATED EMISSION ABOVE 1GHZ**

<b>EUT</b>	Smart phone	<b>Model Name</b>	X2
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	53%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11a20 5180MHz	<b>Antenna</b>	Horizontal/Vertical

**RADIATED EMISSION ABOVE 1GHZ–Horizontal**

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
10360.042	43.55	9.14	52.69	74.00	-21.31	peak
10360.042	38.27	9.14	47.41	54.00	-6.59	AVG
15540.063	41.85	10.22	52.07	74.00	-21.93	peak
15540.063	37.44	10.22	47.66	54.00	-6.34	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**RADIATED EMISSION ABOVE 1GHZ–Vertical**

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
10360.042	45.42	9.14	54.56	74.00	-19.44	peak
10360.042	38.42	9.14	47.56	54.00	-6.44	AVG
15540.063	40.66	10.22	50.88	74.00	-23.12	peak
15540.063	35.27	10.22	45.49	54.00	-8.51	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

<b>EUT</b>	Smart phone	<b>Model Name</b>	X2
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	53%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11a20 5240MHz	<b>Antenna</b>	Horizontal/Vertical

## RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	44.79	9.27	54.06	74.00	-19.94	peak
10480.042	35.24	9.27	44.51	54.00	-9.49	AVG
15720.063	42.88	10.38	53.26	74.00	-20.74	peak
15720.063	36.21	10.38	46.59	54.00	-7.41	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	46.11	9.27	55.38	74.00	-18.62	peak
10480.042	37.15	9.27	46.42	54.00	-7.58	AVG
15720.063	45.39	10.38	55.77	74.00	-18.23	peak
15720.063	35.28	10.38	45.66	54.00	-8.34	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**Note:** All the case had been tested. The 802.11a modulation is the worst case and recorded in the test report. Other frequencies radiation emission from 1GHz to 40GHz at least have 20dB margin and not recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

## 12. BAND EDGE EMISSION

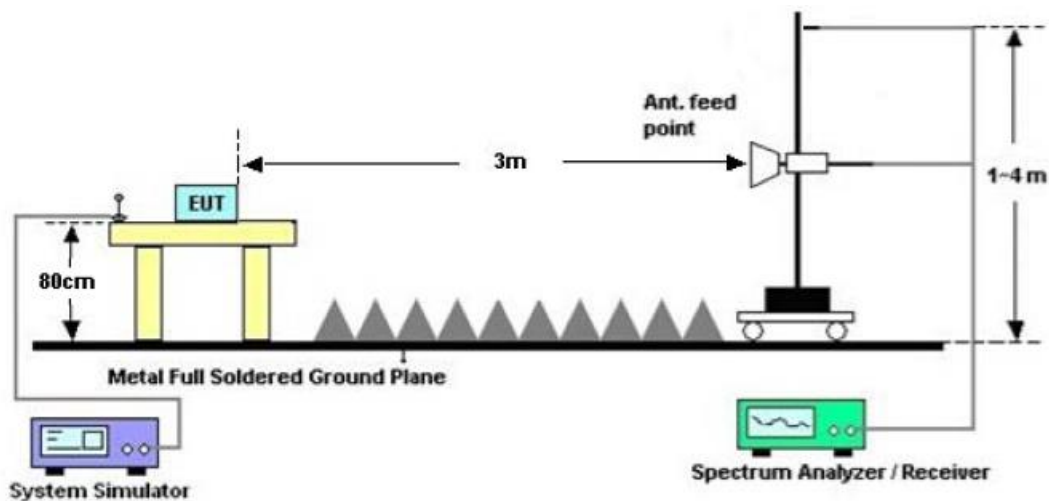
### 12.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:  
(a) PEAK: RBW=1MHz, VBW=3MHz / Sweep=AUTO  
(b) AVERAGE: RBW=1MHz ; VBW=1/on time(1KHz) / Sweep=AUTO
3. Other procedures refer to clause 11.2.

#### Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB( $\mu$ V) to represent the Amplitude. Use the F dB( $\mu$ V/m) to represent the Field Strength. So A=F.
3. Only the data of band edge emission at the restricted band 4.5GHz-5.15GHz record in the report. Other restricted band 5.35GHz-5.46GHz and 7.25GHz-7.77GHz were considered as ambient noise. No recording in the test report.

### 12.2. TEST SET-UP



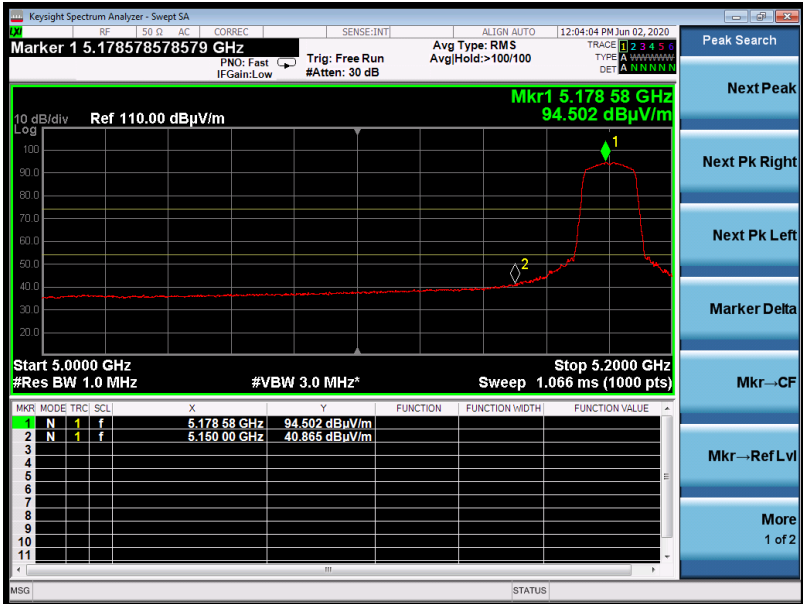
12.3. TEST RESULT

EUT	Smart phone	Model Name	X2
Temperature	25°C	Relative Humidity	53%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Horizontal

PK Value



AV Value



EUT	Smart phone	Model Name	X2
Temperature	25°C	Relative Humidity	53%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Vertical

PK Value

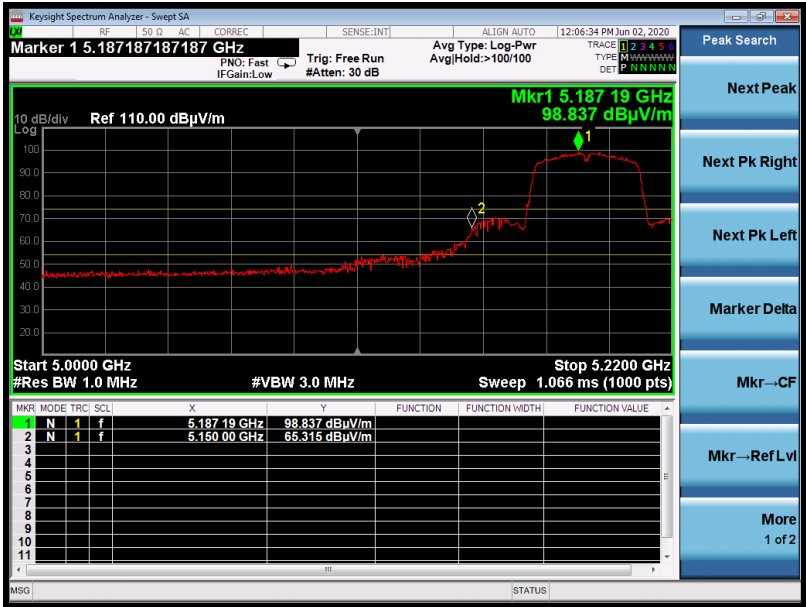


AV Value



EUT	Smart phone	Model Name	X2
Temperature	25°C	Relative Humidity	53%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n40 5190MHz	Antenna	Horizontal

PK Value

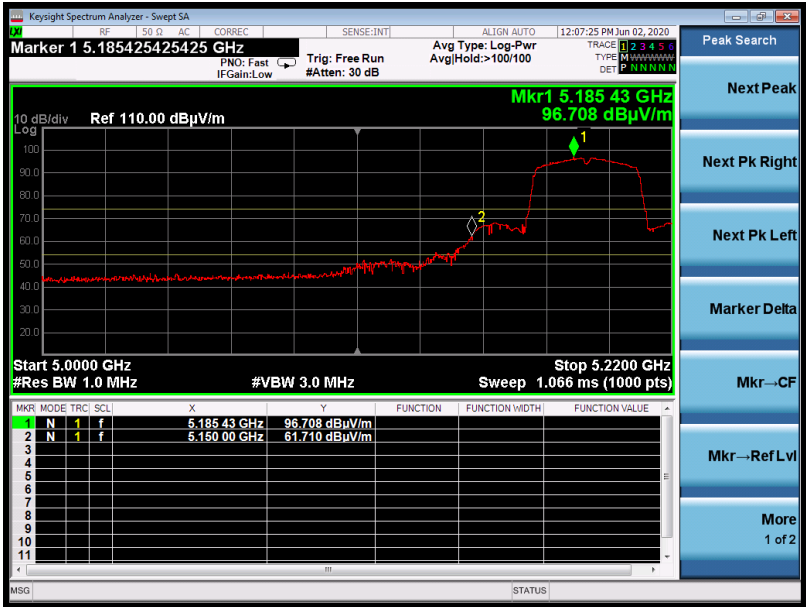


AV Value



EUT	Smart phone	Model Name	X2
Temperature	25°C	Relative Humidity	53%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n40 5190MHz	Antenna	Vertical

PK Value

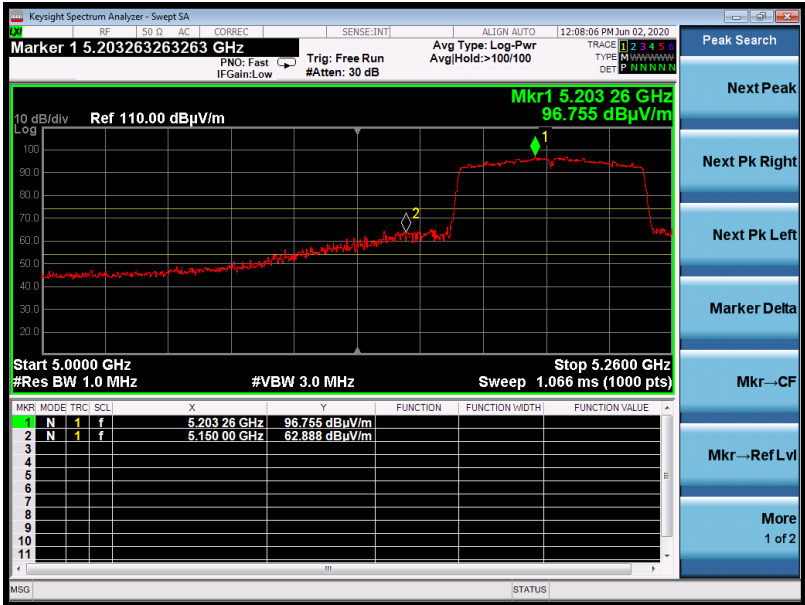


AV Value

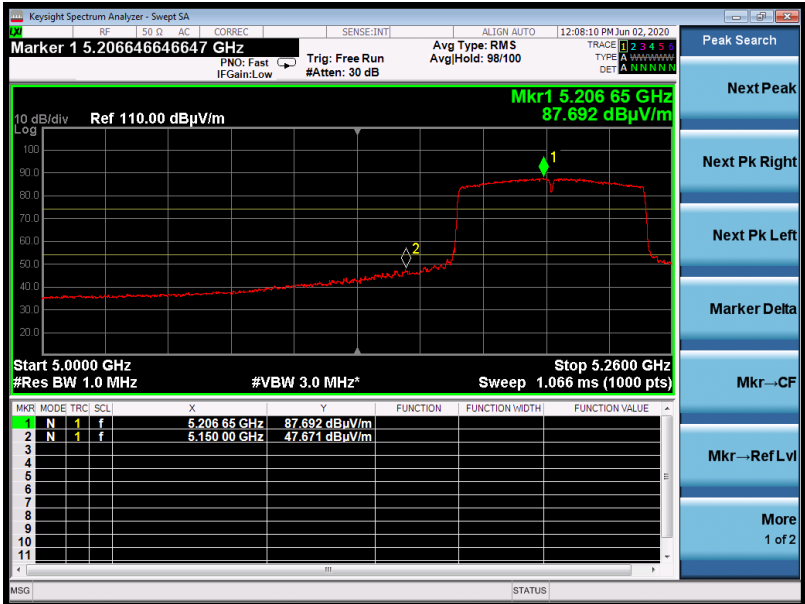


EUT	Smart phone	Model Name	X2
Temperature	25°C	Relative Humidity	53%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11ac80 5210MHz	Antenna	Horizontal

PK Value



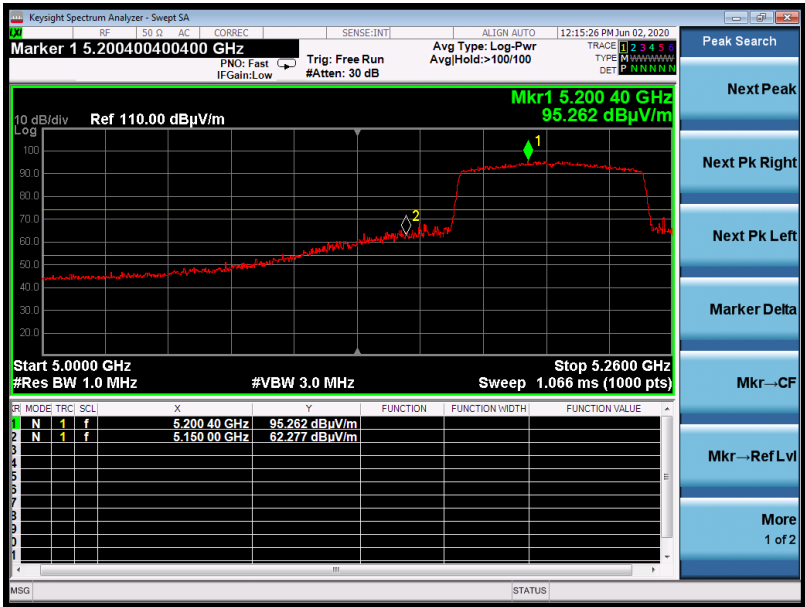
AV Value





EUT	Smart phone	Model Name	X2
Temperature	25°C	Relative Humidity	53%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11ac80 5210MHz	Antenna	Vertical

PK Value



AV Value



RESULT: PASS

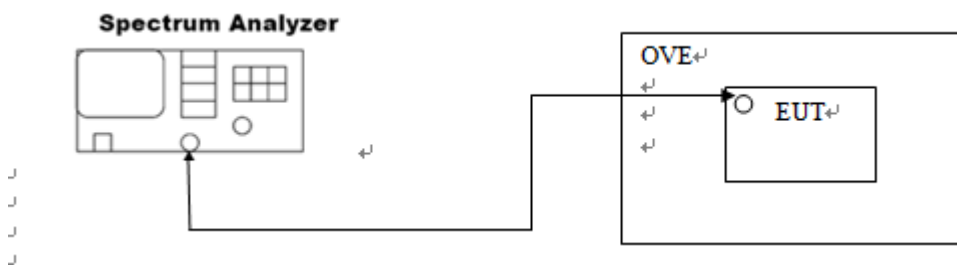
Note: All the 20MHz bandwidth modulation had been tested, the 802.11a20 was the worst case and record in his test report. All the 40MHz bandwidth modulation had been tested, the 802.11N40 was the worst case and record in his test report.

### 13. FREQUENCY STABILITY

#### 13.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the operation frequency.
3. Set SPA Centre Frequency = Operation Frequency. SPAN=enough to measure the emission is maintained within the band
4. Set SPA Trace 1 Max hold, then View.
5. Extreme temperature rule is -10°C~60°C.

#### 13.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



**13.3. MEASUREMENT RESULTS**

Test Mode	Temperature	Measurement Frequency (MHz)	Result	Conclusion
802.11a	- 10°C	5180	within the band	PASS
	0°C	5180	within the band	PASS
	10°C	5180	within the band	PASS
	20°C	5180	within the band	PASS
	30°C	5180	within the band	PASS
	40°C	5180	within the band	PASS
	50°C	5180	within the band	PASS
	60°C	5180	within the band	PASS
	- 10°C	5240	within the band	PASS
	0°C	5240	within the band	PASS
	10°C	5240	within the band	PASS
	20°C	5240	within the band	PASS
	30°C	5240	within the band	PASS
	40°C	5240	within the band	PASS
	50°C	5240	within the band	PASS
	60°C	5240	within the band	PASS

Test Mode	Temperature	Measurement Frequency (MHz)	Result	Conclusion
802.11n20	- 10°C	5180	within the band	PASS
	0°C	5180	within the band	PASS
	10°C	5180	within the band	PASS
	20°C	5180	within the band	PASS
	30°C	5180	within the band	PASS
	40°C	5180	within the band	PASS
	50°C	5180	within the band	PASS
	60°C	5180	within the band	PASS
	- 10°C	5240	within the band	PASS
	0°C	5240	within the band	PASS
	10°C	5240	within the band	PASS
	20°C	5240	within the band	PASS
	30°C	5240	within the band	PASS
	40°C	5240	within the band	PASS
	50°C	5240	within the band	PASS
	60°C	5240	within the band	PASS

Test Mode	Temperature	Measurement Frequency (MHz)	Result	Conclusion
802.11ac20	- 10°C	5180	within the band	PASS
	0°C	5180	within the band	PASS
	10°C	5180	within the band	PASS
	20°C	5180	within the band	PASS
	30°C	5180	within the band	PASS
	40°C	5180	within the band	PASS
	50°C	5180	within the band	PASS
	60°C	5180	within the band	PASS
	- 10°C	5240	within the band	PASS
	0°C	5240	within the band	PASS
	10°C	5240	within the band	PASS
	20°C	5240	within the band	PASS
	30°C	5240	within the band	PASS
	40°C	5240	within the band	PASS
	50°C	5240	within the band	PASS
	60°C	5240	within the band	PASS

Test Mode	Temperature	Measurement Frequency (MHz)	Result	Conclusion
802.11n40	- 10°C	5190	within the band	PASS
	0°C	5190	within the band	PASS
	10°C	5190	within the band	PASS
	20°C	5190	within the band	PASS
	30°C	5190	within the band	PASS
	40°C	5190	within the band	PASS
	50°C	5190	within the band	PASS
	60°C	5190	within the band	PASS
	- 10°C	5230	within the band	PASS
	0°C	5230	within the band	PASS
	10°C	5230	within the band	PASS
	20°C	5230	within the band	PASS
	30°C	5230	within the band	PASS
	40°C	5230	within the band	PASS
	50°C	5230	within the band	PASS
	60°C	5230	within the band	PASS

Test Mode	Temperature	Measurement Frequency (MHz)	Result	Conclusion
802.11ac40	- 10°C	5190	within the band	PASS
	0°C	5190	within the band	PASS
	10°C	5190	within the band	PASS
	20°C	5190	within the band	PASS
	30°C	5190	within the band	PASS
	40°C	5190	within the band	PASS
	50°C	5190	within the band	PASS
	60°C	5190	within the band	PASS
	- 10°C	5230	within the band	PASS
	0°C	5230	within the band	PASS
	10°C	5230	within the band	PASS
	20°C	5230	within the band	PASS
	30°C	5230	within the band	PASS
	40°C	5230	within the band	PASS
	50°C	5230	within the band	PASS
	60°C	5230	within the band	PASS

Test Mode	Temperature	Measurement Frequency (MHz)	Result	Conclusion
802.11ac80	- 10°C	5210	within the band	PASS
	0°C	5210	within the band	PASS
	10°C	5210	within the band	PASS
	20°C	5210	within the band	PASS
	30°C	5210	within the band	PASS
	40°C	5210	within the band	PASS
	50°C	5210	within the band	PASS
	60°C	5210	within the band	PASS

**14. FCC LINE CONDUCTED EMISSION TEST**

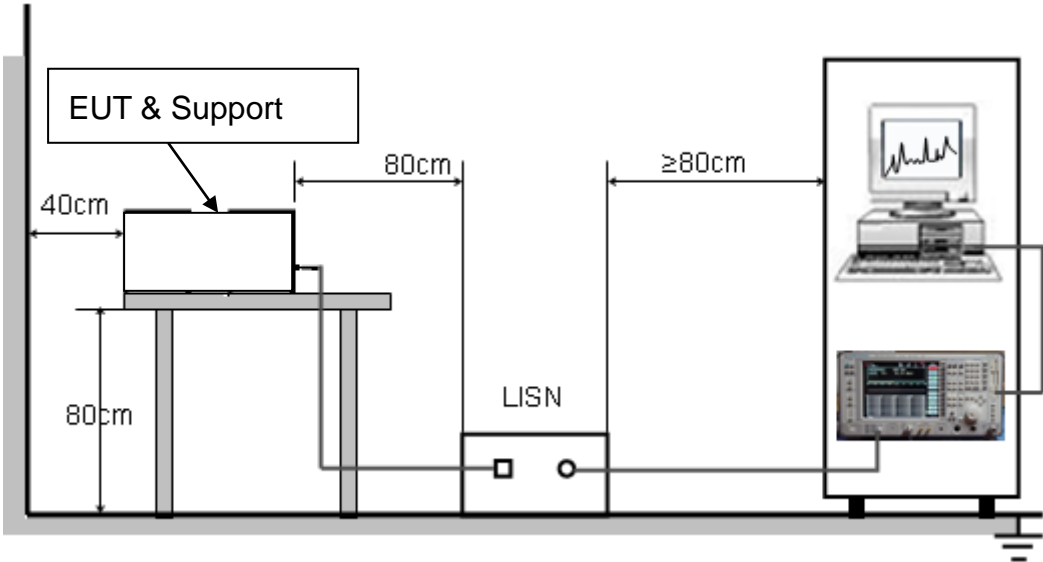
**14.1. LIMITS OF LINE CONDUCTED EMISSION TEST**

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

**14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST**



### 14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hz power by a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

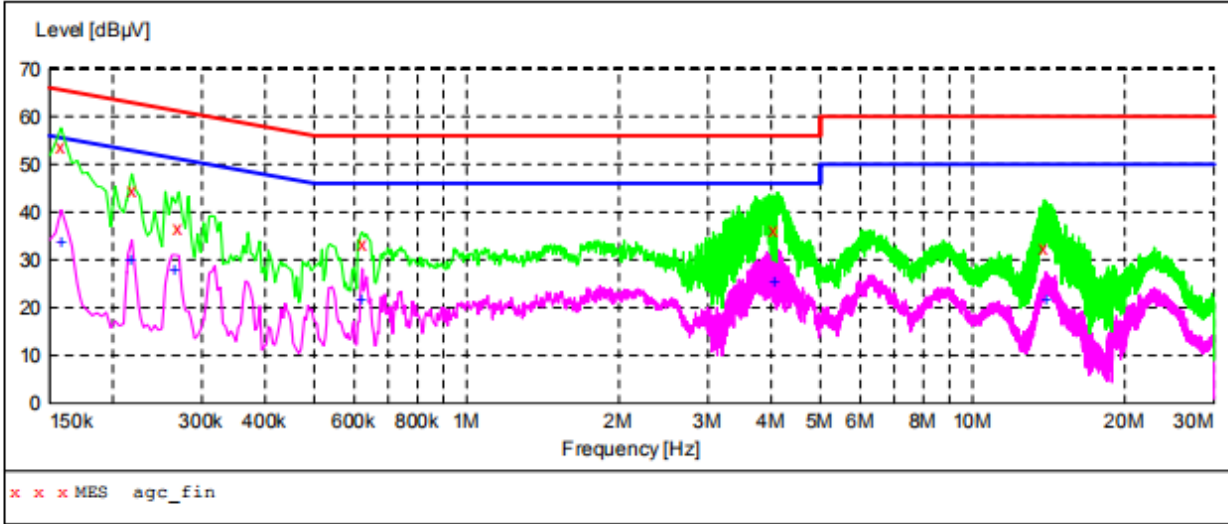
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



**MEASUREMENT RESULT: "agc\_fin"**

2020/4/29 2:20

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	53.80	11.3	66	11.8	QP	L1	FLO
0.218000	44.40	11.3	63	18.5	QP	L1	FLO
0.270000	36.70	11.3	61	24.4	QP	L1	FLO
0.622000	33.40	11.3	56	22.6	QP	L1	FLO
4.066000	36.20	11.4	56	19.8	QP	L1	FLO
13.874000	32.40	11.9	60	27.6	QP	L1	FLO

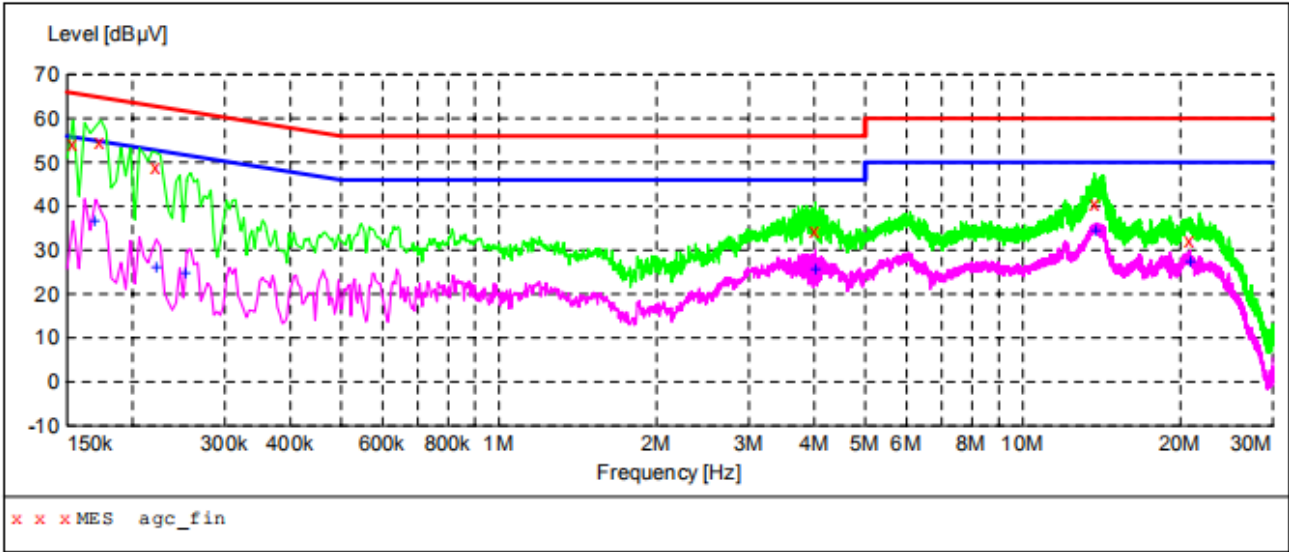
**MEASUREMENT RESULT: "agc\_fin2"**

2020/4/29 2:20

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	33.80	11.3	56	21.8	AV	L1	FLO
0.218000	29.80	11.3	53	23.1	AV	L1	FLO
0.266000	28.00	11.3	51	23.2	AV	L1	FLO
0.622000	21.80	11.3	46	24.2	AV	L1	FLO
4.058000	25.50	11.4	46	20.5	AV	L1	FLO
13.970000	21.60	11.9	50	28.4	AV	L1	FLO



LINE CONDUCTED EMISSION TEST-N



**MEASUREMENT RESULT: "agc\_fin"**

2020/4/29 2:15

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154000	54.00	11.3	66	11.8	QP	N	FLO
0.174000	54.70	11.3	65	10.1	QP	N	FLO
0.222000	48.80	11.3	63	13.9	QP	N	FLO
4.018000	34.30	11.4	56	21.7	QP	N	FLO
13.694000	40.50	11.9	60	19.5	QP	N	FLO
20.850000	32.30	12.3	60	27.7	QP	N	FLO

**MEASUREMENT RESULT: "agc\_fin2"**

2020/4/29 2:16

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.170000	36.40	11.3	55	18.6	AV	N	FLO
0.222000	26.10	11.3	53	26.6	AV	N	FLO
0.254000	24.70	11.3	52	26.9	AV	N	FLO
4.018000	25.60	11.4	46	20.4	AV	N	FLO
13.774000	34.20	11.9	50	15.8	AV	N	FLO
20.870000	27.50	12.3	50	22.5	AV	N	FLO

**RESULT: PASS**

**APPENDIX A: PHOTOGRAPHS OF TEST SETUP**  
FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ



----END OF REPORT----