

# FCC Test Report

Report No.: AGC02031180502TE05

**FCC ID** : 2AG94-C-8087  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : WIFI Module  
**BRAND NAME** : C-CHIP  
**MODEL NAME** : C-8087  
**CLIENT** : Shenzhenshi Xinzhongxin Technology Co., Ltd  
**DATE OF ISSUE** : Jun. 01, 2018  
**STANDARD(S)** : FCC Part 15.247  
**TEST PROCEDURE(S)**  
**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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**REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jun. 01, 2018	Valid	Initial Release

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**TABLE OF CONTENTS**

**1. VERIFICATION OF CONFORMITY ..... 5**

**2. GENERAL INFORMATION ..... 6**

2.1. PRODUCT DESCRIPTION ..... 6

2.2. TABLE OF CARRIER FREQUENCIES ..... 6

2.3. IEEE 802.11N MODULATION SCHEME ..... 7

2.4. RELATED SUBMITTAL(S) / GRANT (S) ..... 7

2.5. TEST METHODOLOGY ..... 7

2.6. SPECIAL ACCESSORIES ..... 7

2.7. EQUIPMENT MODIFICATIONS..... 7

**3. MEASUREMENT UNCERTAINTY ..... 8**

**4. DESCRIPTION OF TEST MODES ..... 9**

**5. SYSTEM TEST CONFIGURATION ..... 10**

5.1. CONFIGURATION OF EUT SYSTEM..... 10

5.2. EQUIPMENT USED IN EUT SYSTEM..... 10

5.3. SUMMARY OF TEST RESULTS ..... 10

**6. TEST FACILITY ..... 11**

**7. OUTPUT POWER ..... 12**

7.1. MEASUREMENT PROCEDURE ..... 12

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) ..... 12

7.3. LIMITS AND MEASUREMENT RESULT ..... 13

**8. 6 DB BANDWIDTH ..... 15**

8.1. MEASUREMENT PROCEDURE ..... 15

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) ..... 15

8.3. LIMITS AND MEASUREMENT RESULTS ..... 16

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<b>9. CONDUCTED SPURIOUS EMISSION.....</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.....	24
<b>10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY .....</b>	<b>43</b>
10.1 MEASUREMENT PROCEDURE .....	43
10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	43
10.3 MEASUREMENT EQUIPMENT USED .....	43
10.4 LIMITS AND MEASUREMENT RESULT.....	43
<b>11. RADIATED EMISSION .....</b>	<b>51</b>
11.1. MEASUREMENT PROCEDURE.....	51
11.2. TEST SETUP.....	52
11.3. LIMITS AND MEASUREMENT RESULT .....	53
11.4. TEST RESULT.....	53
<b>12. BAND EDGE EMISSION .....</b>	<b>59</b>
12.1. MEASUREMENT PROCEDURE .....	59
12.2. TEST SET-UP .....	59
12.3. TEST RESULT.....	60
<b>13. FCC LINE CONDUCTED EMISSION TEST .....</b>	<b>76</b>
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST .....	76
13.2. BLOCK DIAGRAM OF TEST SETUP.....	76
13.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST .....	77
13.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST.....	78
<b>APPENDIX A: PHOTOGRAPHS OF TEST SETUP .....</b>	<b>80</b>
<b>APPENDIX B: PHOTOGRAPHS OF EUT .....</b>	<b>82</b>

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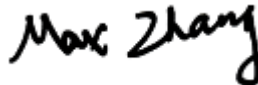
**1. VERIFICATION OF CONFORMITY**

<b>Applicant</b>	Shenzhenshi Xinzhongxin Technology Co., Ltd
<b>Address</b>	Block A3, Dong Huan Industrial Zone, Nanpu Road, Shajin Street, Baoan District, Shenzhen, China
<b>Manufacturer</b>	Shenzhenshi Xinzhongxin Technology Co., Ltd
<b>Address</b>	Block A3, Dong Huan Industrial Zone, Nanpu Road, Shajin Street, Baoan District, Shenzhen, China
<b>Product Designation</b>	WIFI Module
<b>Brand Name</b>	C-CHIP
<b>Test Model</b>	C-8087
<b>Date of test</b>	May 25, 2018 to Jun. 01, 2018
<b>Deviation</b>	None
<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 radiated emission limits of FCC Rules Part 15.247.


Tested By



Max Zhang(Zhang Yi)

Jun. 01, 2018

Reviewed By



Bart Xie(Xie Xiaobin)

Jun. 01, 2018

Approved By



Forrest Lei(Lei Yonggang)  
 Authorized Officer

Jun. 01, 2018

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## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as "WIFI Module". It is designed by way of utilizing the DSSS and OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Operation Frequency</b>	2.412 GHz~2.462GHz
<b>Output Power(Average)</b>	IEEE 802.11b:16.81dBm; IEEE 802.11g:13.78dBm; IEEE 802.11n(20):13.42dBm; IEEE 802.11n(40):9.61dBm
<b>Modulation</b>	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
<b>Number of channels</b>	11
<b>Hardware Version</b>	V1.2
<b>Software Version</b>	V1.2
<b>Antenna Designation</b>	PCB antenna
<b>Antenna Gain</b>	0dBi
<b>Power Supply</b>	DC 3.3V

### 2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	1	2412 MHZ
	2	2417 MHZ
	3	2422 MHZ
	4	2427 MHZ
	5	2432 MHZ
	6	2437 MHZ
	7	2442 MHZ
	8	2447 MHZ
	9	2452 MHZ
	10	2457 MHZ
	11	2462 MHZ

Note: For 20MHZ bandwidth system use Channel 1 to Channel 11, For 40MHZ bandwidth system use Channel 3 to Channel 9

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### 2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPS	NCBPS		NDBPS		Data rate(Mbps)	
									800nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPS	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	Guard interval

### 2.4. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AG94-C-8087** filing to comply with the FCC Part 15 requirements.

### 2.5. 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.

### 2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

### 2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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### 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,  $U_c = \pm 3.2$  dB
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 3.9$  dB
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 4.8$  dB

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#### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal operating
Note: Transmit by 802.11b with Data rate (1/2/5.5/11) Transmit by 802.11g with Data rate (6/9/12/18/24/36/48/54) Transmit by 802.11n (20MHz) with Data rate (6.5/13/19.5/26/39/52/58.5/65) Transmit by 802.11n (40MHz) with Data rate (13.5/27/40.5/54/81/108/121.5/135)	

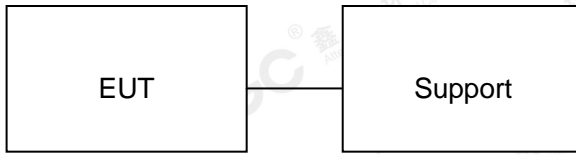
**Note:**

1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency 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. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

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## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM



### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	WIFI Module	C-8087	2AG94-C-8087	EUT
2	PC Adapter	ADC6501TM	N/A	Support
3	PC	161301-01	N/A	Support

### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Output Power	Compliant
§15.247	6 dB Bandwidth	Compliant
§15.247	Conducted Spurious Emission	Compliant
§15.247	Maximum Conducted Output Power SPECTRAL Density	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.207	Line Conduction Emission	Compliant

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**6. TEST FACILITY**

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012
<b>NVLAP LAB CODE</b>	600153-0
<b>Designation Number</b>	CN5028
<b>FCC Test Firm Registration Number</b>	682566
<b>Description</b>	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0

**TEST EQUIPMENT OF CONDUCTED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.20, 2017	Jun.19, 2018
LISN	R&S	ESH2-Z5	100086	Aug.21, 2017	Aug.20, 2018

**TEST EQUIPMENT OF RADIATED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Power sensor	Aglient	U2021XA	MY54110007	Sep.21, 2017	Sep.20, 2018
2.4GHz Fliter	Micro-tronics	087	N/A	Jun. 20, 2017	Jun. 19, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Active loop antenna (9K-30MHz)	A.H.	SAS-562B	N/A	Mar.01, 2018	Feb.28, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May.18, 2017	May.17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018

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## 7. OUTPUT POWER

### 7.1. MEASUREMENT PROCEDURE

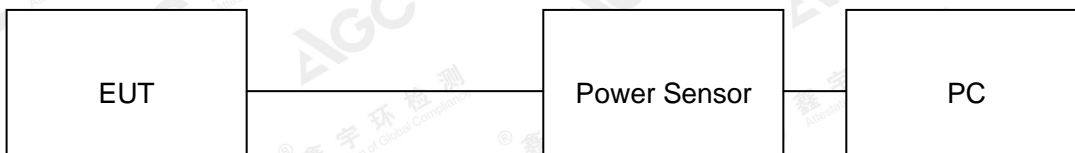
For average power test:

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 ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.

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

#### AVERAGE POWER SETUP



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**7.3. LIMITS AND MEASUREMENT RESULT**

<b>TEST ITEM</b>	OUTPUT POWER
<b>TEST MODE</b>	802.11b with data rate 1

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	16.54	30	Pass
2.437	16.72	30	Pass
2.462	16.81	30	Pass

<b>TEST ITEM</b>	OUTPUT POWER
<b>TEST MODE</b>	802.11g with data rate 6

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	13.45	30	Pass
2.437	13.52	30	Pass
2.462	13.78	30	Pass

<b>TEST ITEM</b>	OUTPUT POWER
<b>TEST MODE</b>	802.11n 20 with data rate 6.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	13.16	30	Pass
2.437	13.25	30	Pass
2.462	13.42	30	Pass

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<b>TEST ITEM</b>	OUTPUT POWER
<b>TEST MODE</b>	802.11n 40 with data rate 13.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.422	9.12	30	Pass
2.437	9.28	30	Pass
2.452	9.61	30	Pass

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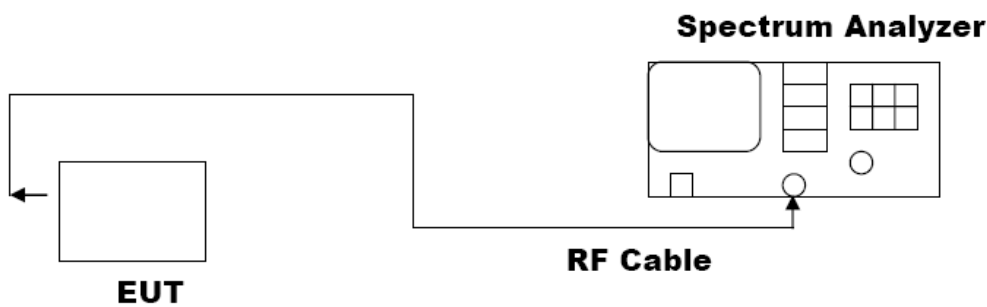
## 8. 6 DB BANDWIDTH

### 8.1. 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 Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW $\geq$ 3 $\times$ RBW.
4. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.

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



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**8.3. LIMITS AND MEASUREMENT RESULTS**

<b>TEST ITEM</b>	6DB BANDWIDTH
<b>TEST MODE</b>	802.11b with data rate 11

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	10.06	PASS
	Middle Channel	10.06	PASS
	High Channel	10.05	PASS

<b>TEST ITEM</b>	6DB BANDWIDTH
<b>TEST MODE</b>	802.11g with data rate 54

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	16.38	PASS
	Middle Channel	16.38	PASS
	High Channel	16.38	PASS

<b>TEST ITEM</b>	6DB BANDWIDTH
<b>TEST MODE</b>	802.11n 20 with data rate 65

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	17.58	PASS
	Middle Channel	17.58	PASS
	High Channel	17.57	PASS

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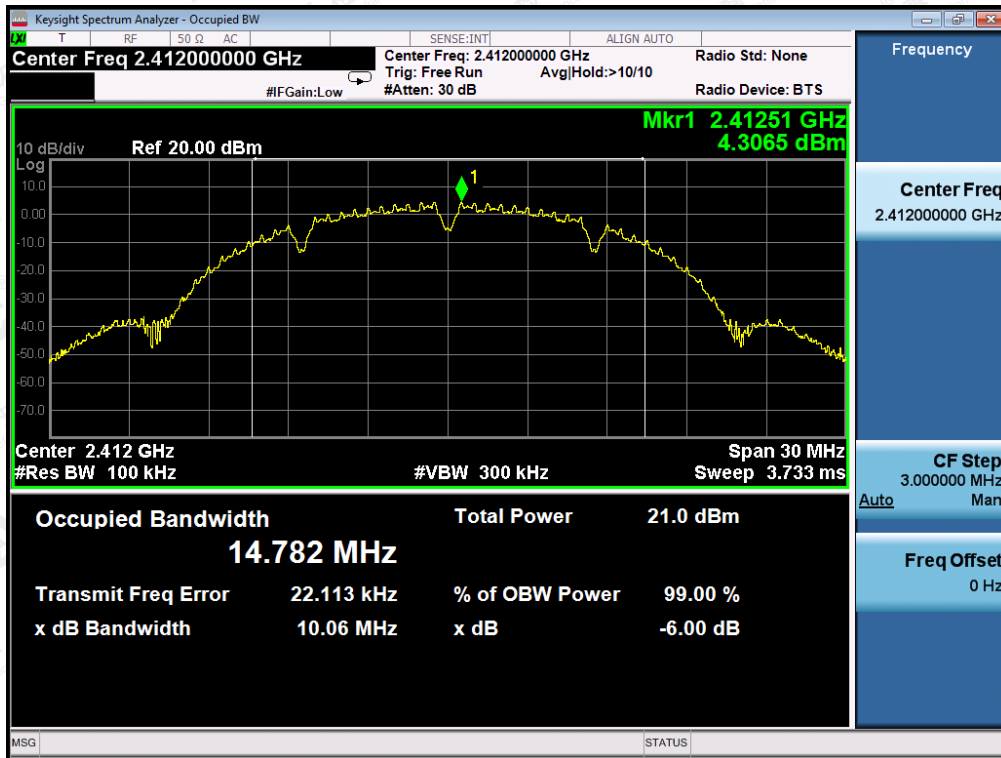
<b>TEST ITEM</b>	6DB BANDWIDTH
<b>TEST MODE</b>	802.11n 40 with data rate 135

<b>LIMITS AND MEASUREMENT RESULT</b>			
<b>Applicable Limits</b>	<b>Applicable Limits</b>		
	<b>Test Data (MHz)</b>		<b>Criteria</b>
>500KHZ	Low Channel	35.41	PASS
	Middle Channel	35.40	PASS
	High Channel	35.39	PASS

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**802.11b TEST RESULT**  
**TEST PLOT OF BANDWIDTH FOR LOW CHANNEL**

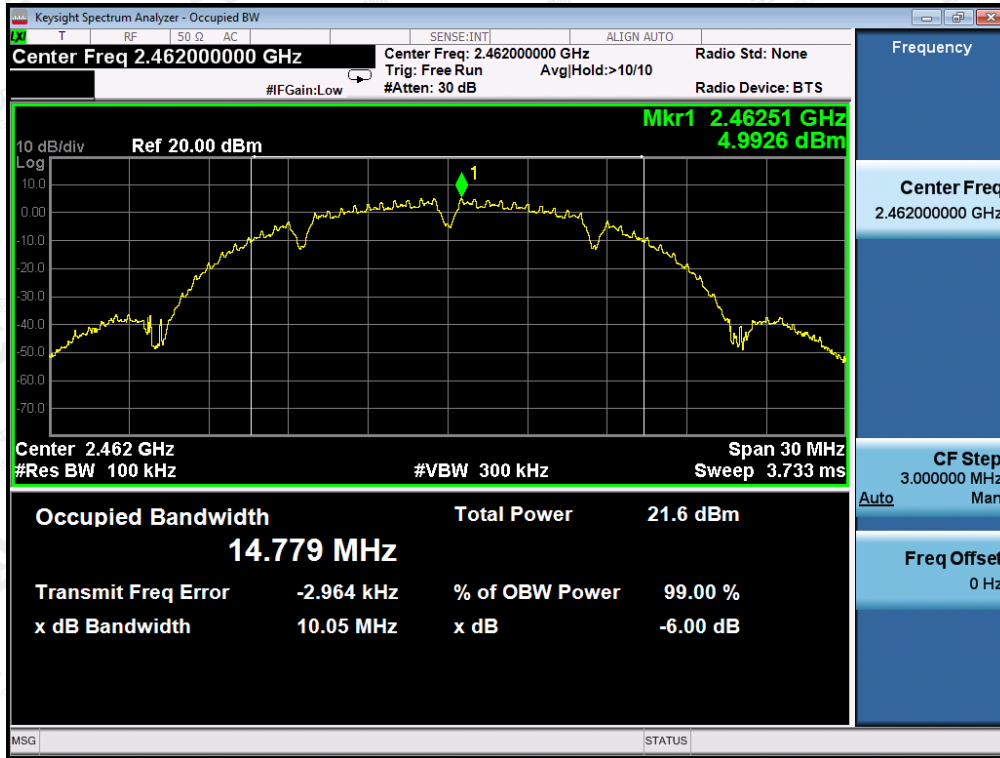


**TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL**



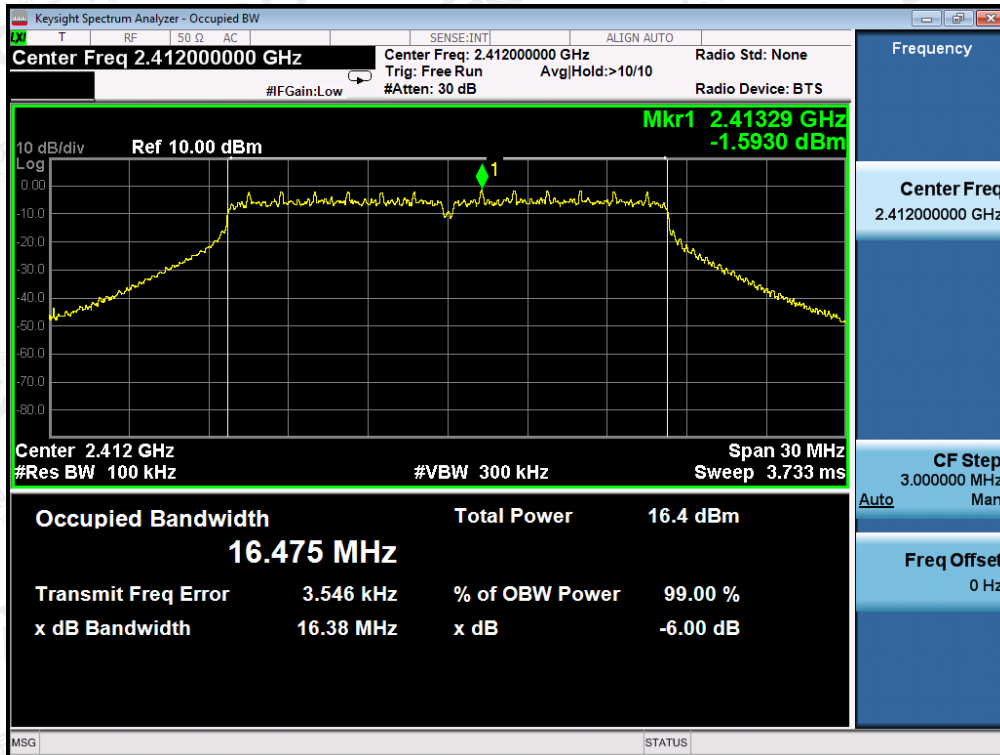
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TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



802.11g TEST RESULT

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

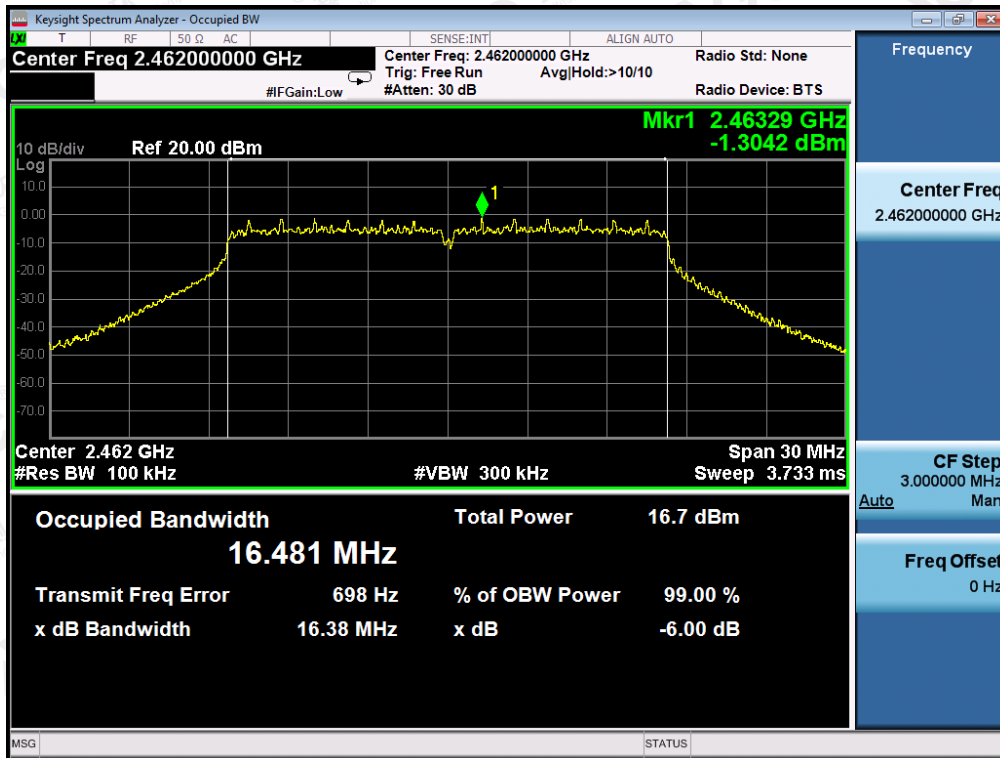


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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



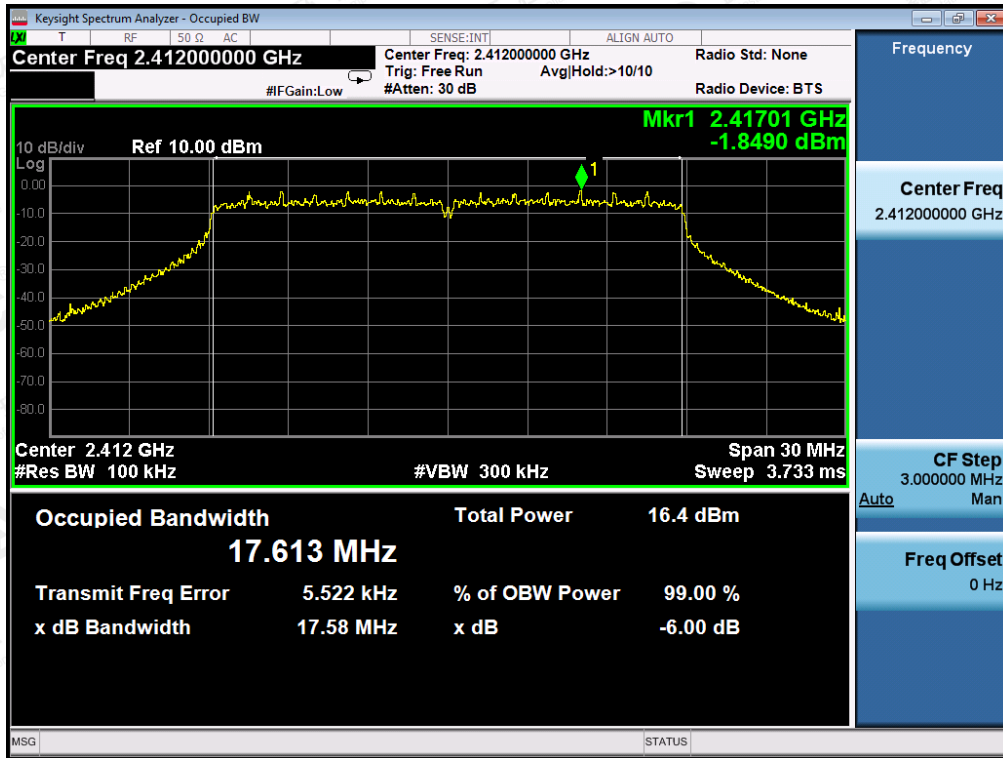
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



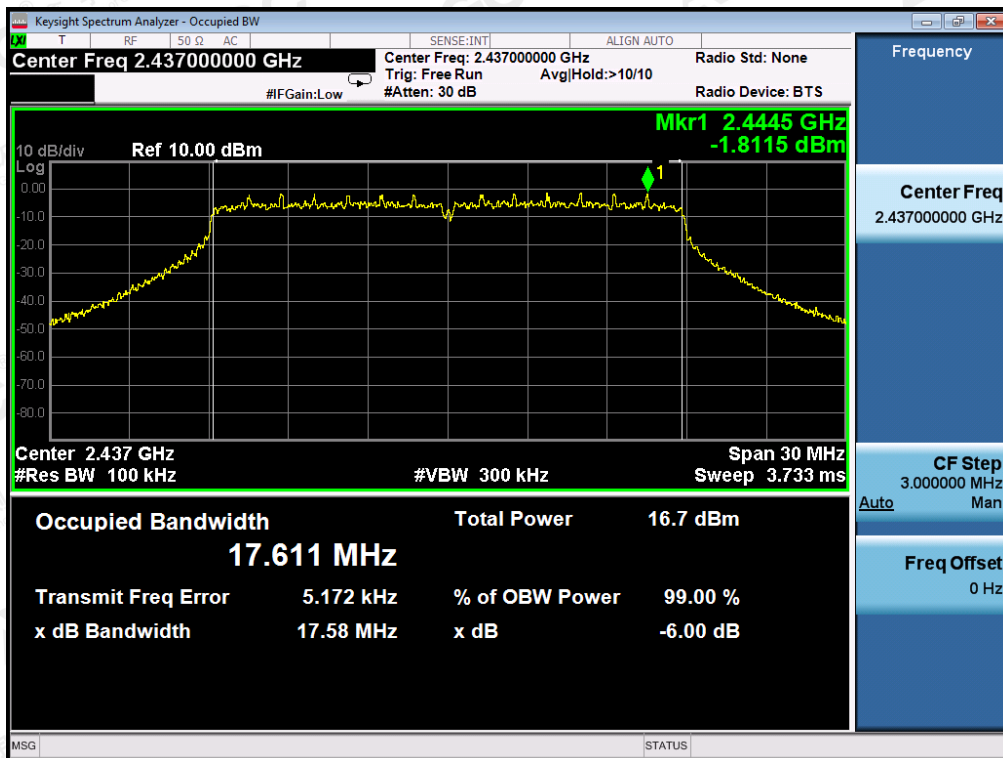
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**802.11n (20) TEST RESULT**  
**TEST PLOT OF BANDWIDTH FOR LOW CHANNEL**

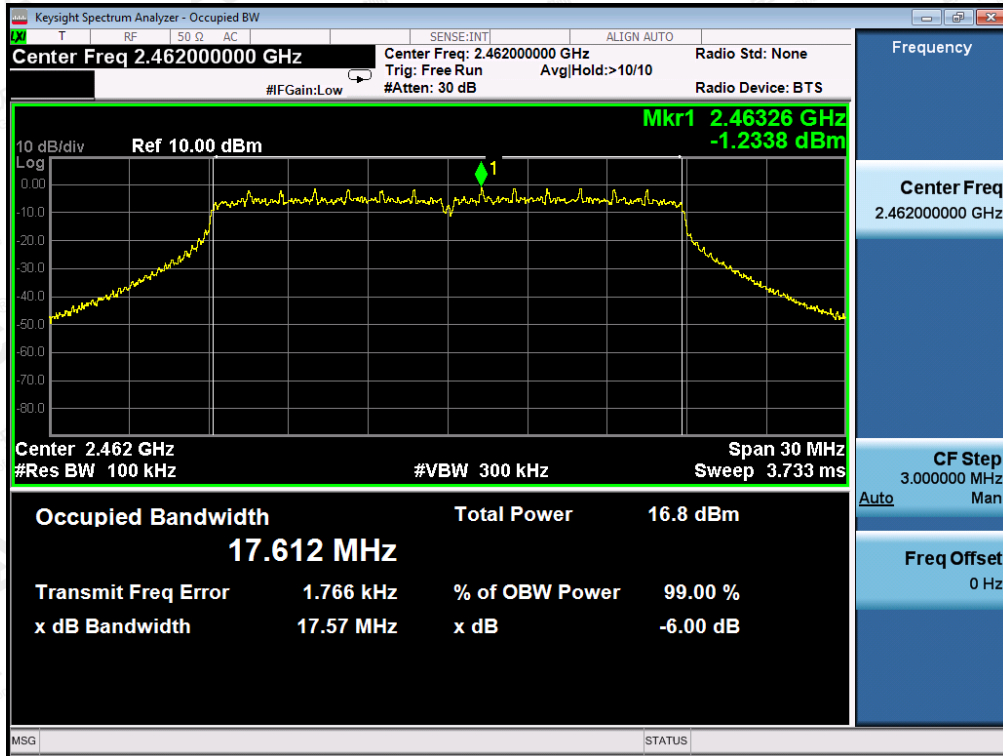


**TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL**



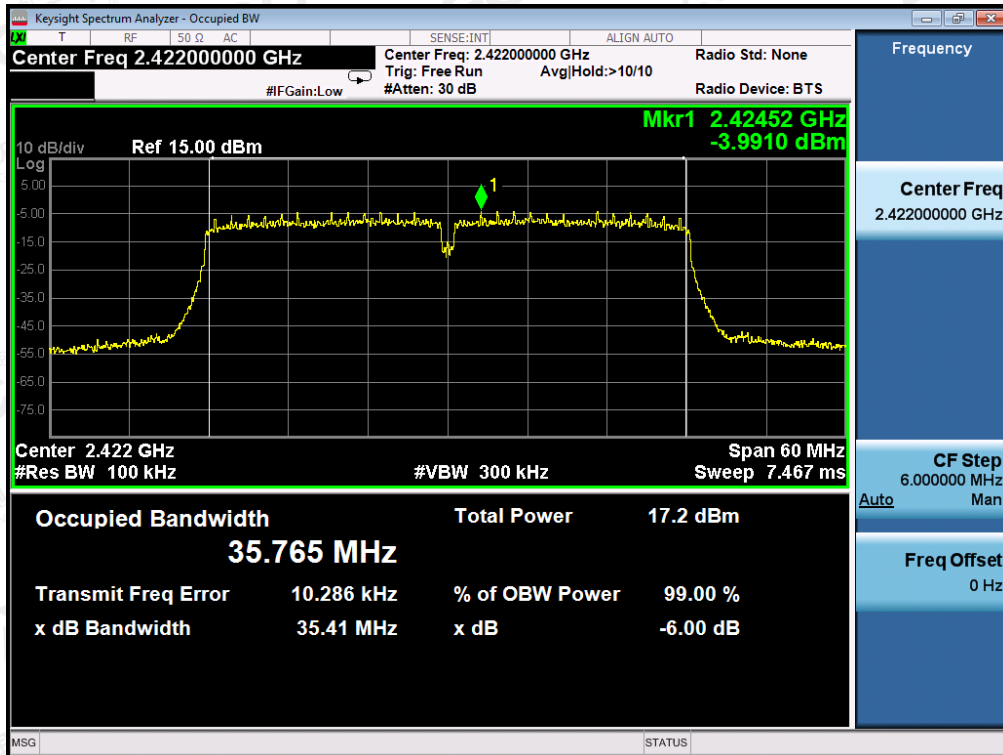
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TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



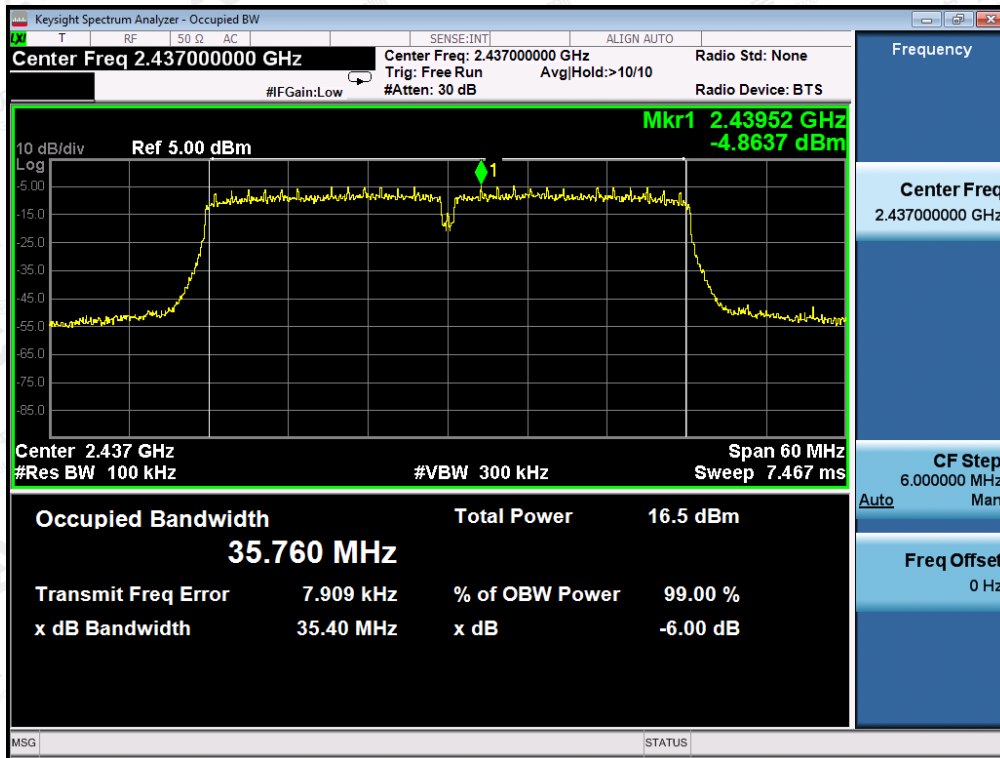
802.11n (40) TEST RESULT

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

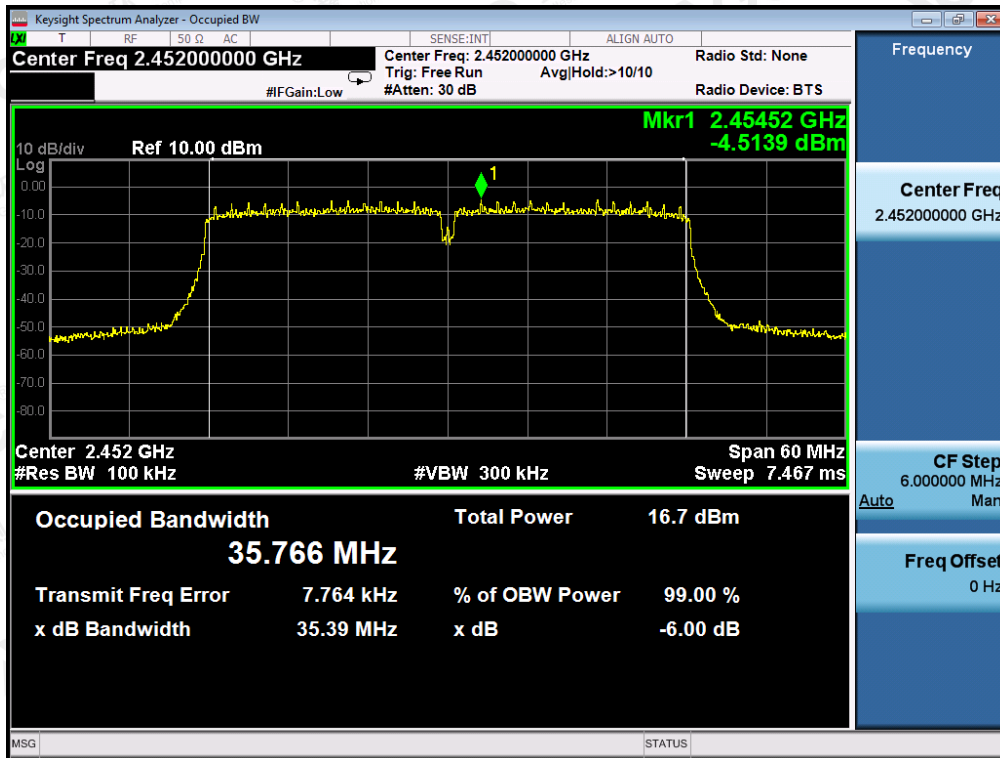


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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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## 9. CONDUCTED SPURIOUS EMISSION

### 9.1. 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 ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements. Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW > RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW > RBW) are conform to the requirement.

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

The same as described in section 8.2.

### 9.3. MEASUREMENT EQUIPMENT USED

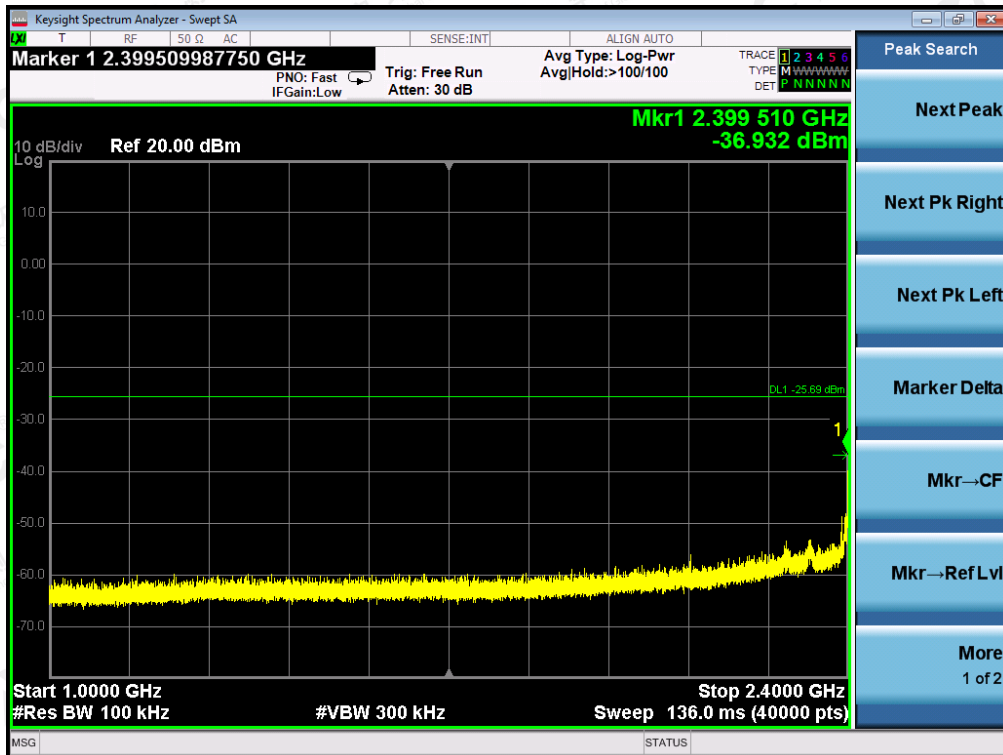
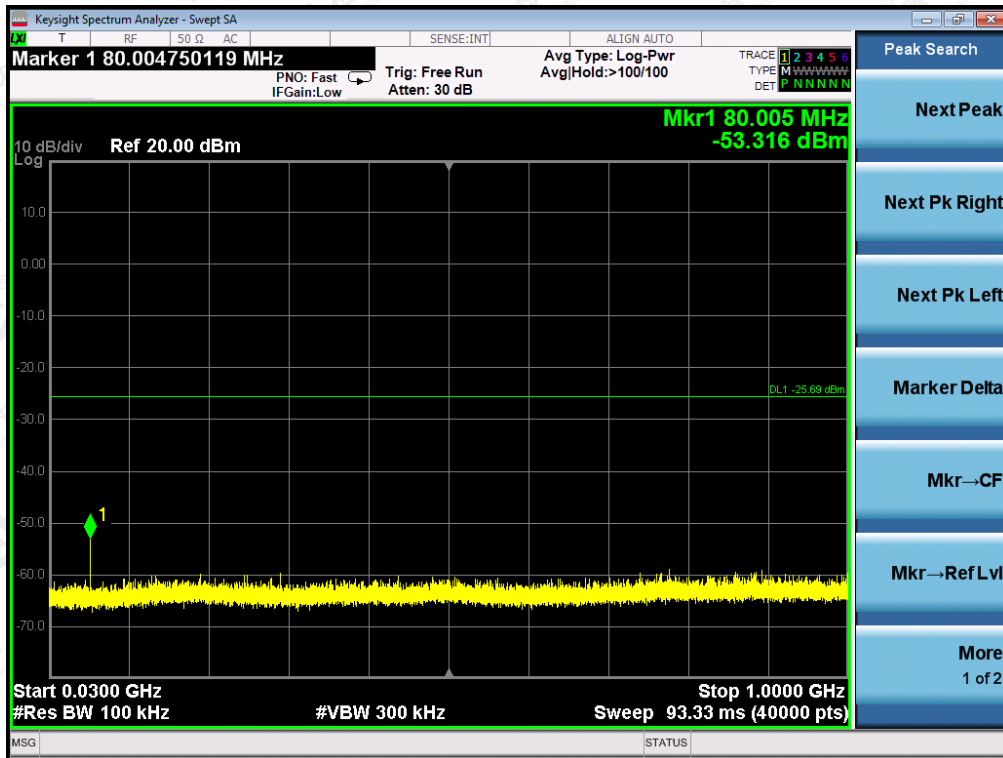
The same as described in section 6.

### 9.4. LIMITS AND MEASUREMENT RESULT

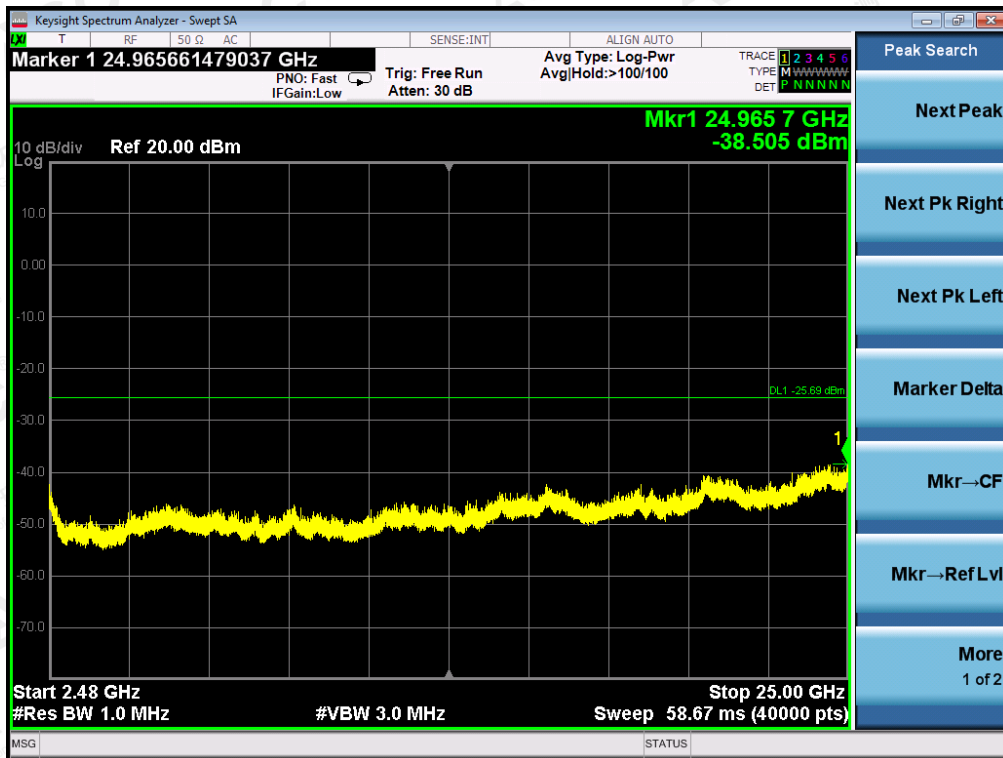
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 30 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a)	At least -30dBc than the limit Specified on the BOTTOM Channel	PASS
	At least -30dBc than the limit Specified on the TOP Channel	PASS

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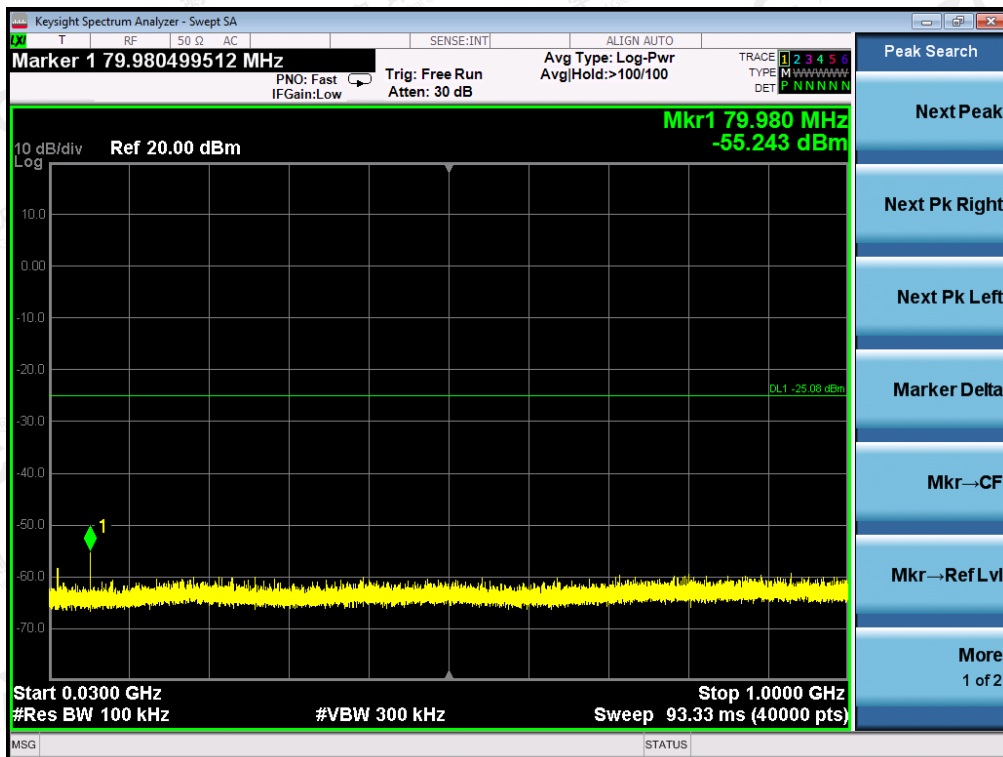
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11b FOR MODULATION IN LOW CHANNEL



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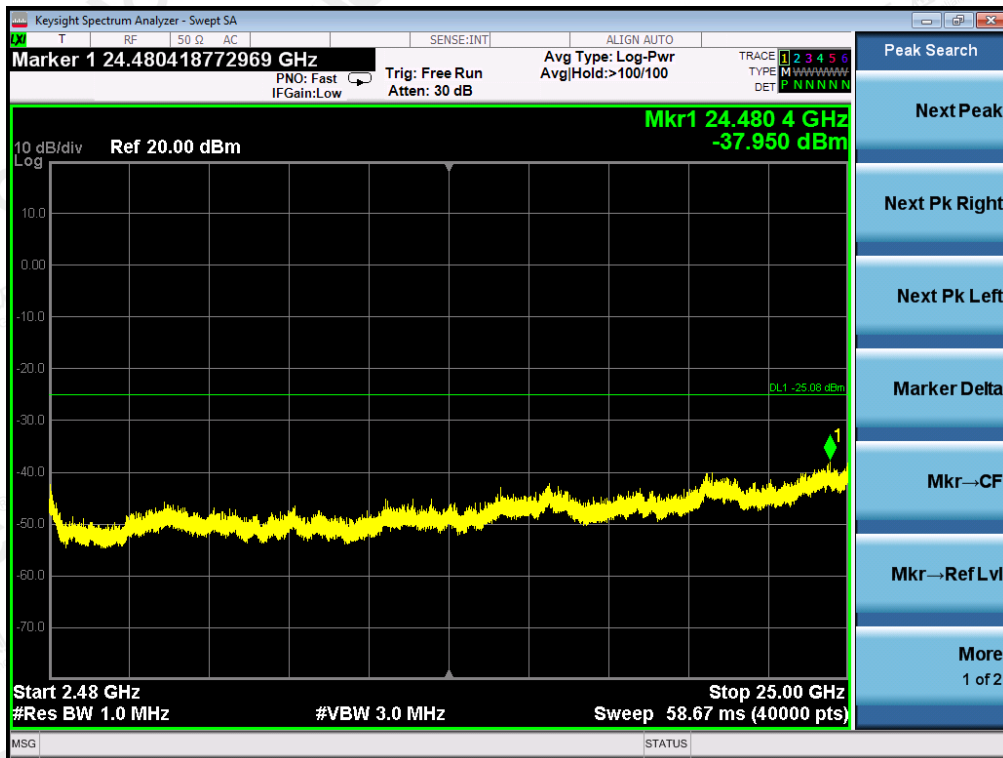
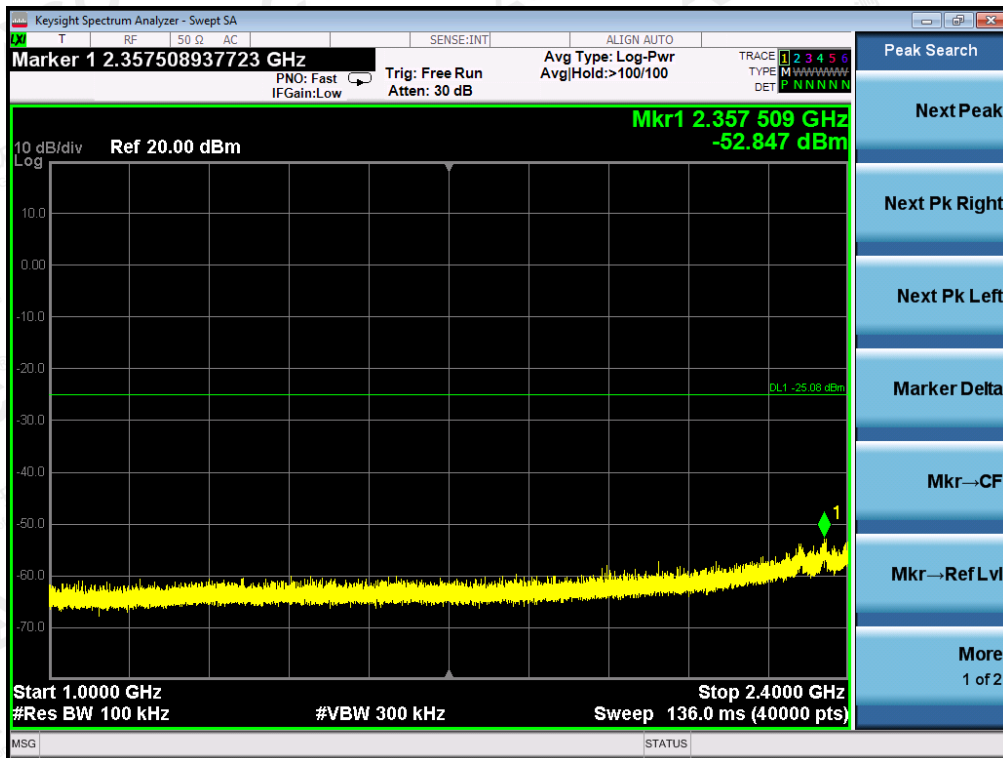


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11b FOR MODULATION IN MIDDLE CHANNEL



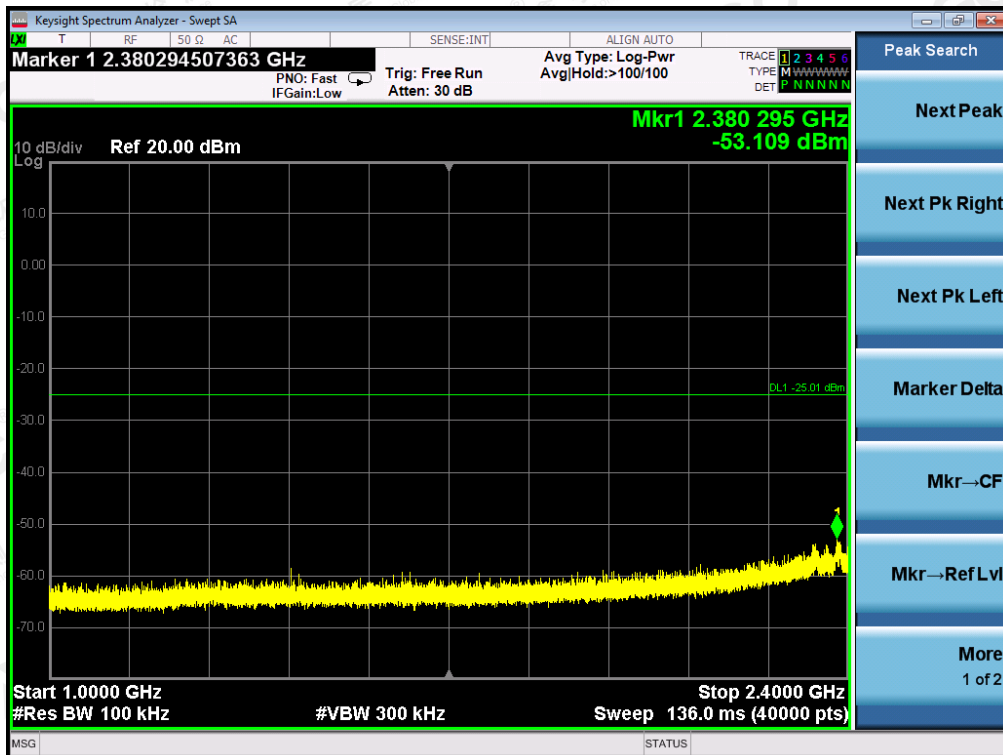
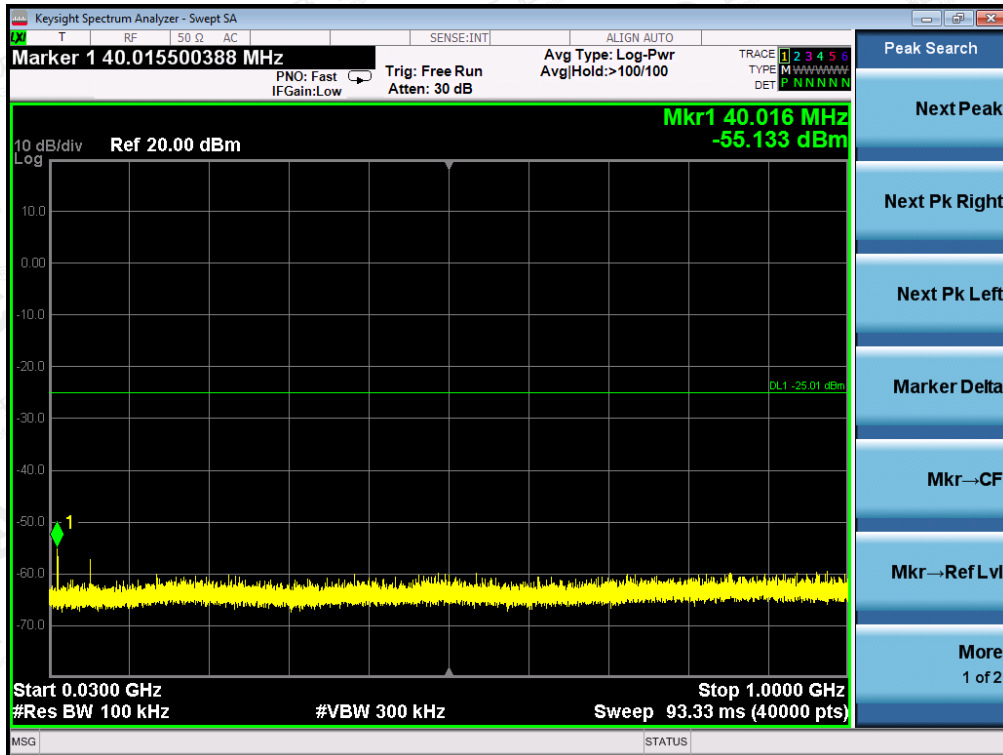
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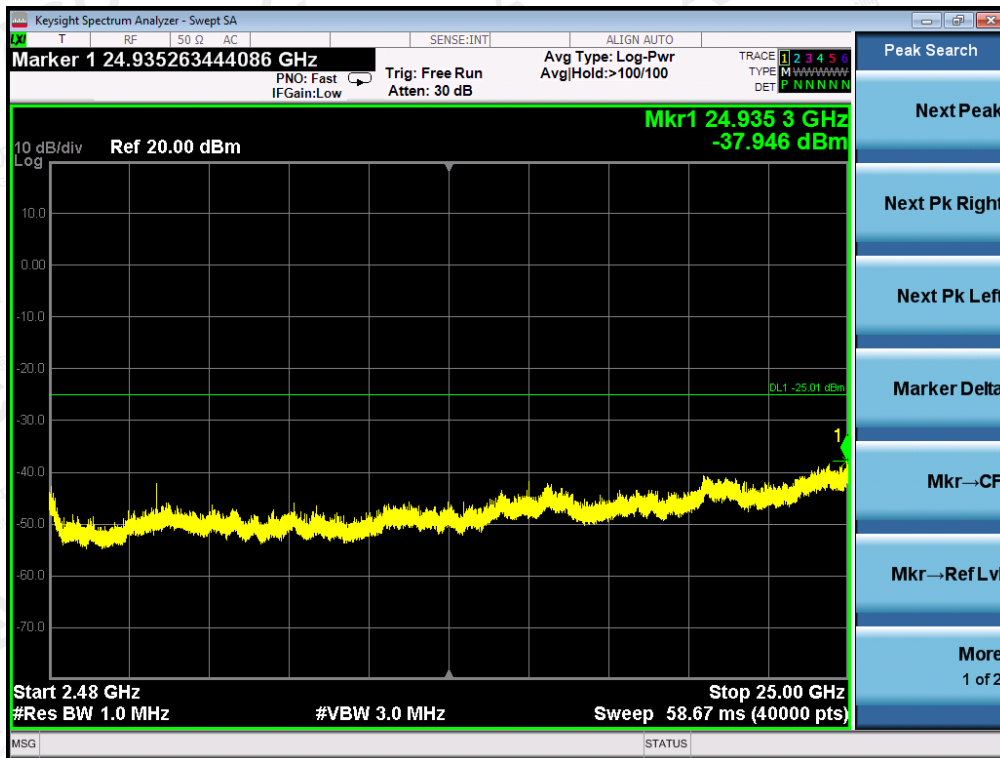


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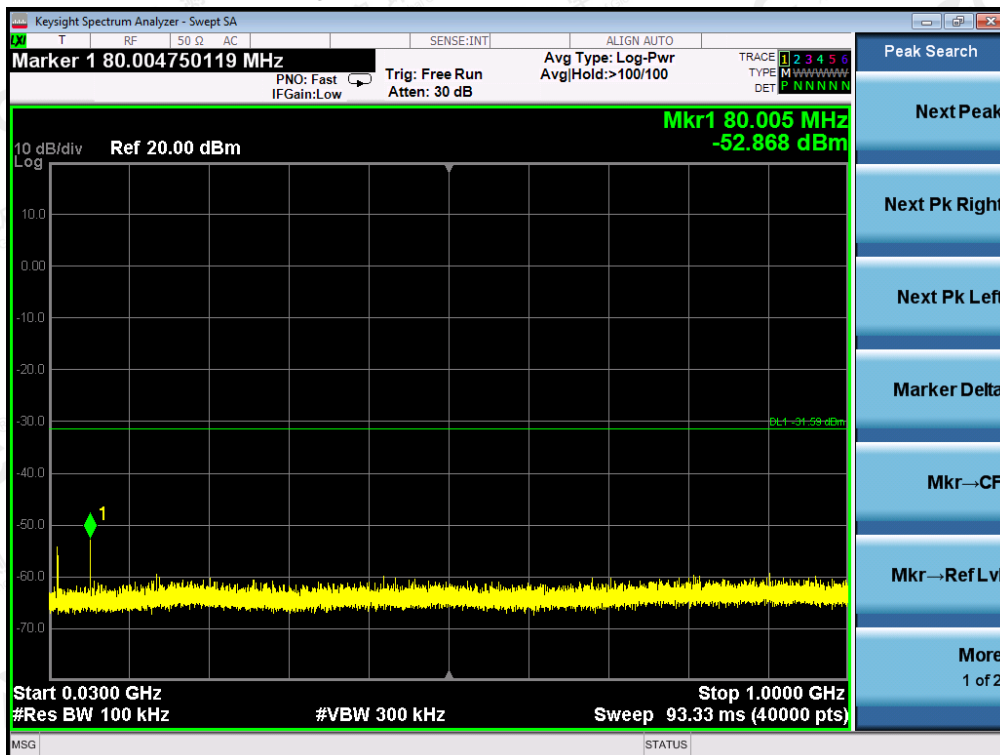
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11b FOR MODULATION IN HIGH CHANNEL



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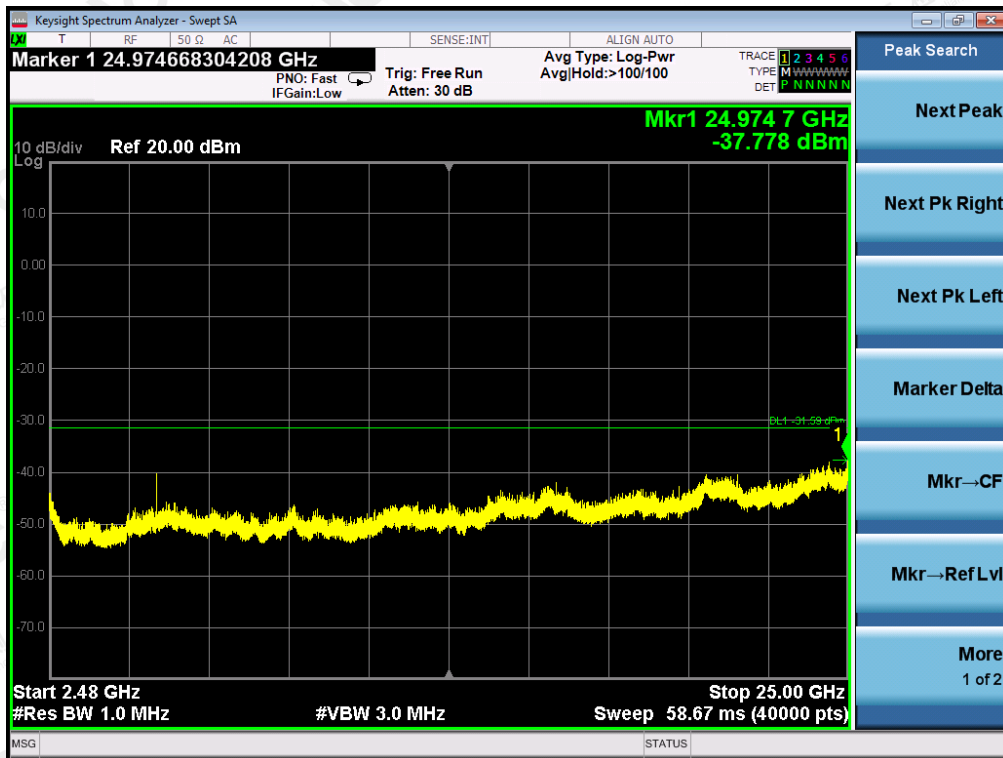
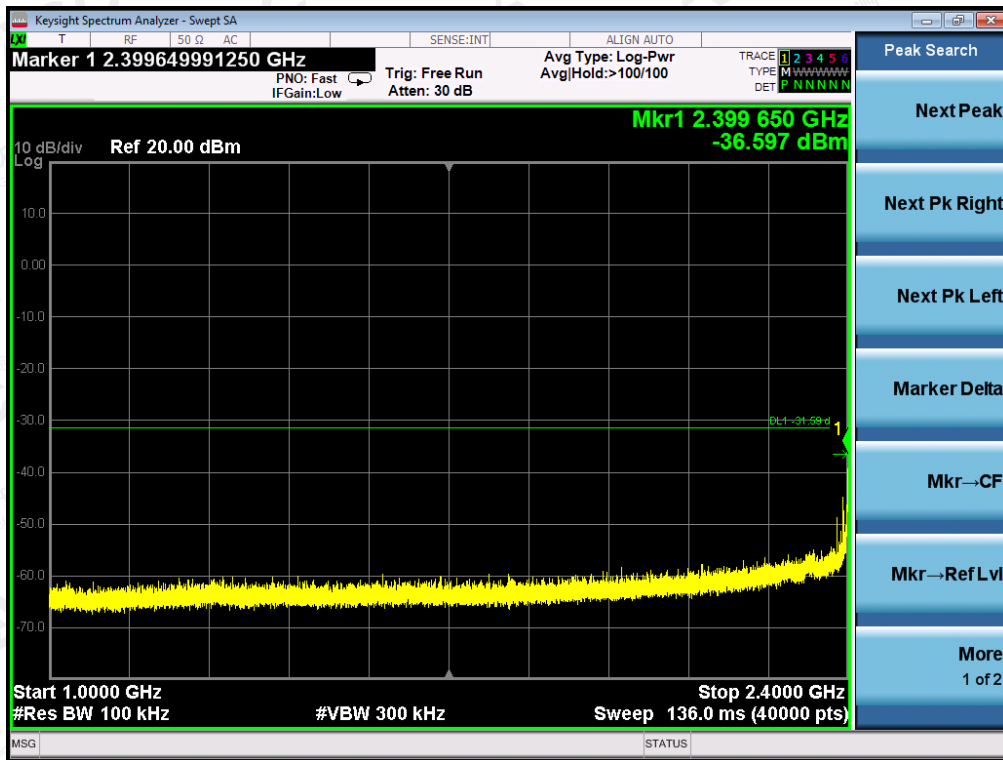


TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 802.11g FOR MODULATION IN LOW CHANNEL



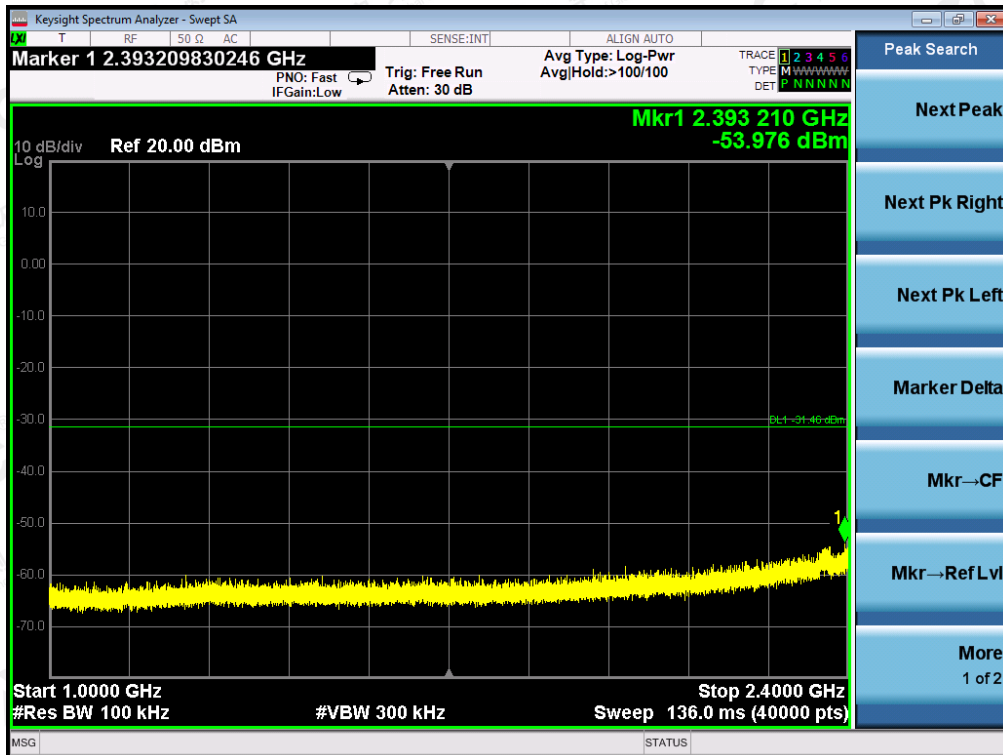
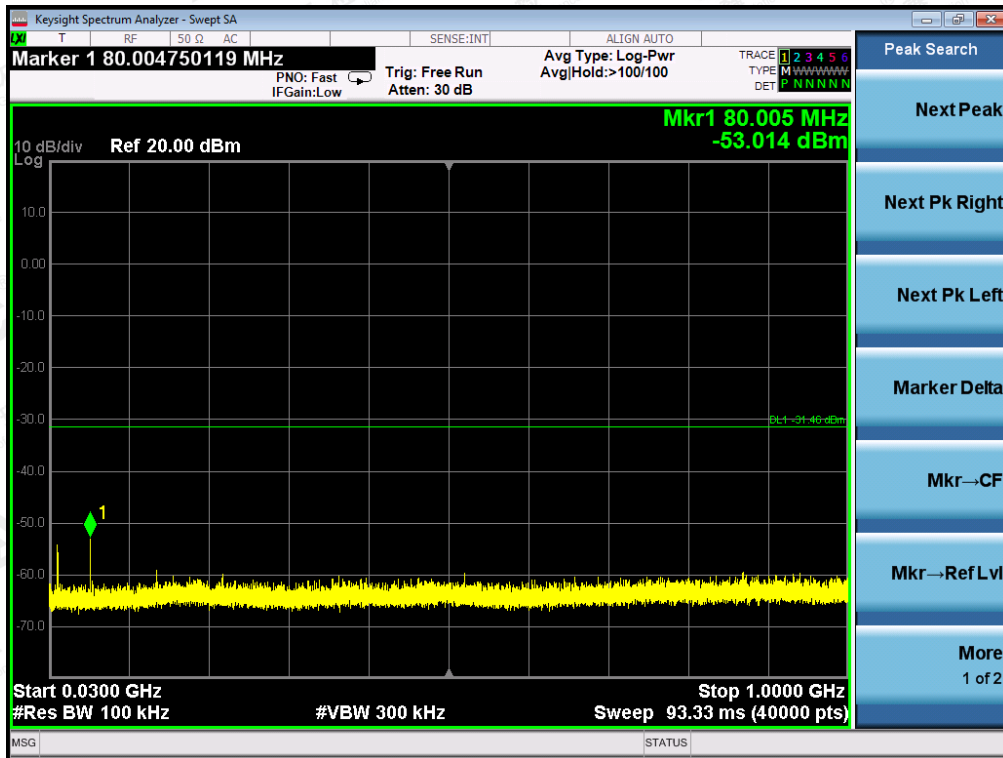
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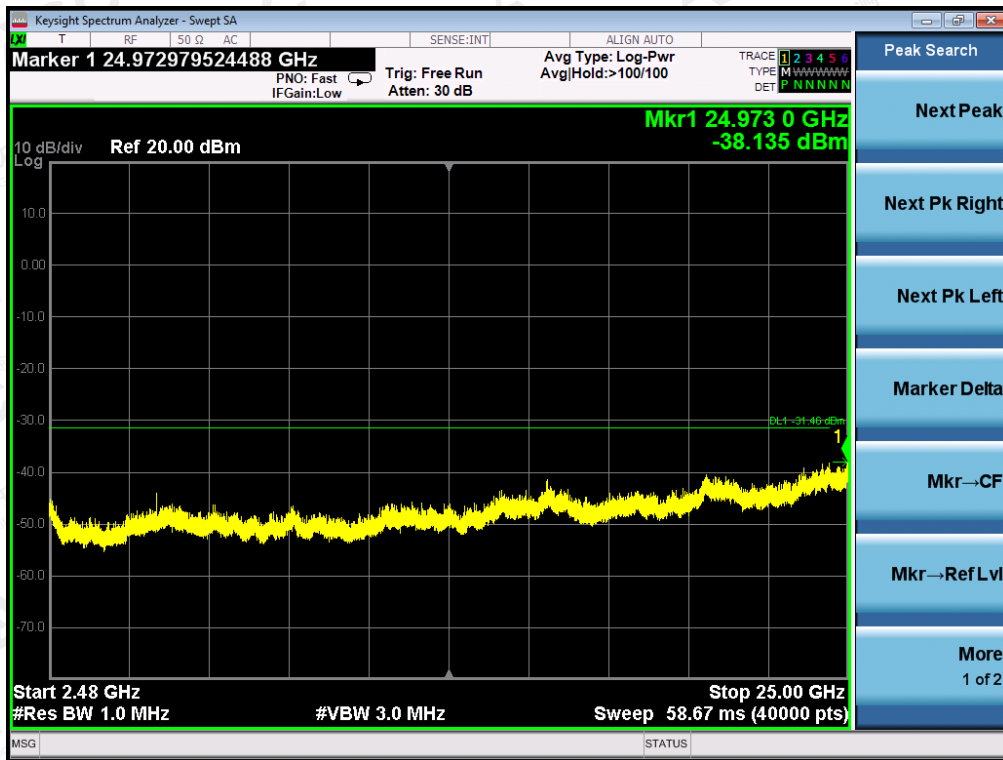


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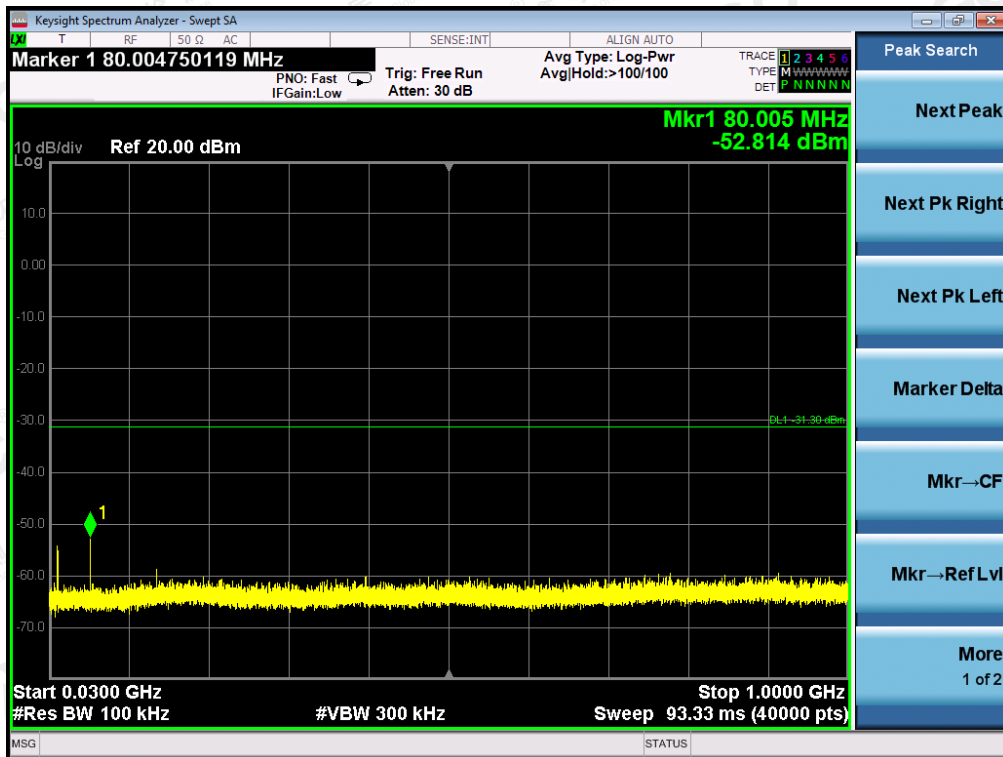
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11g FOR MODULATION IN MIDDLE CHANNEL



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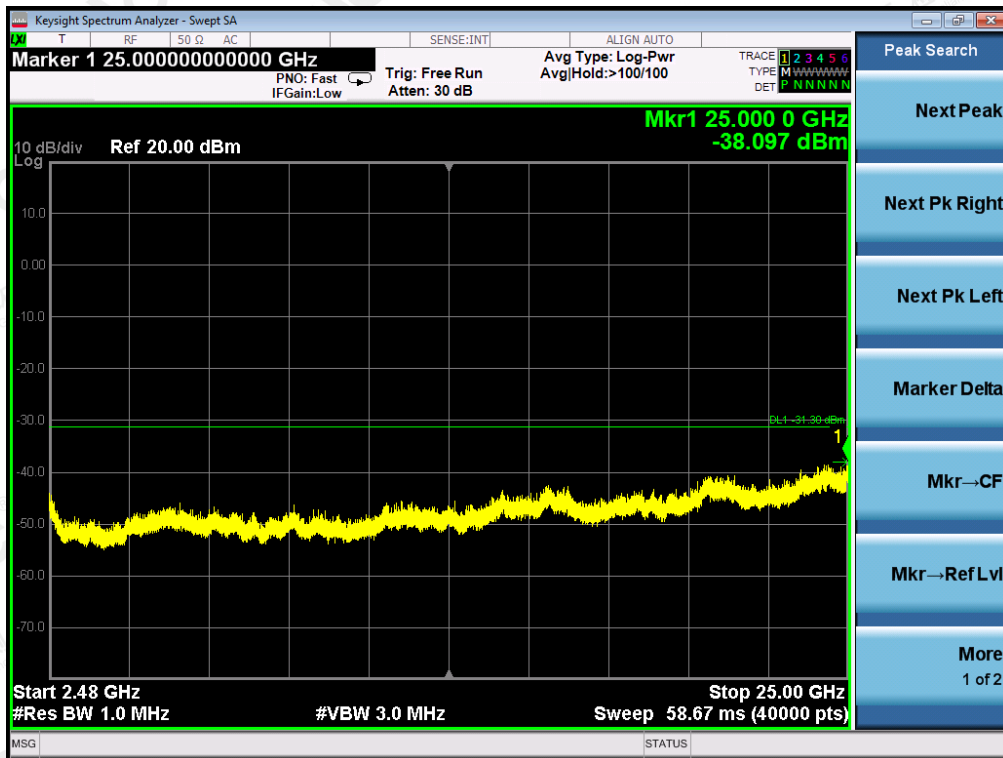
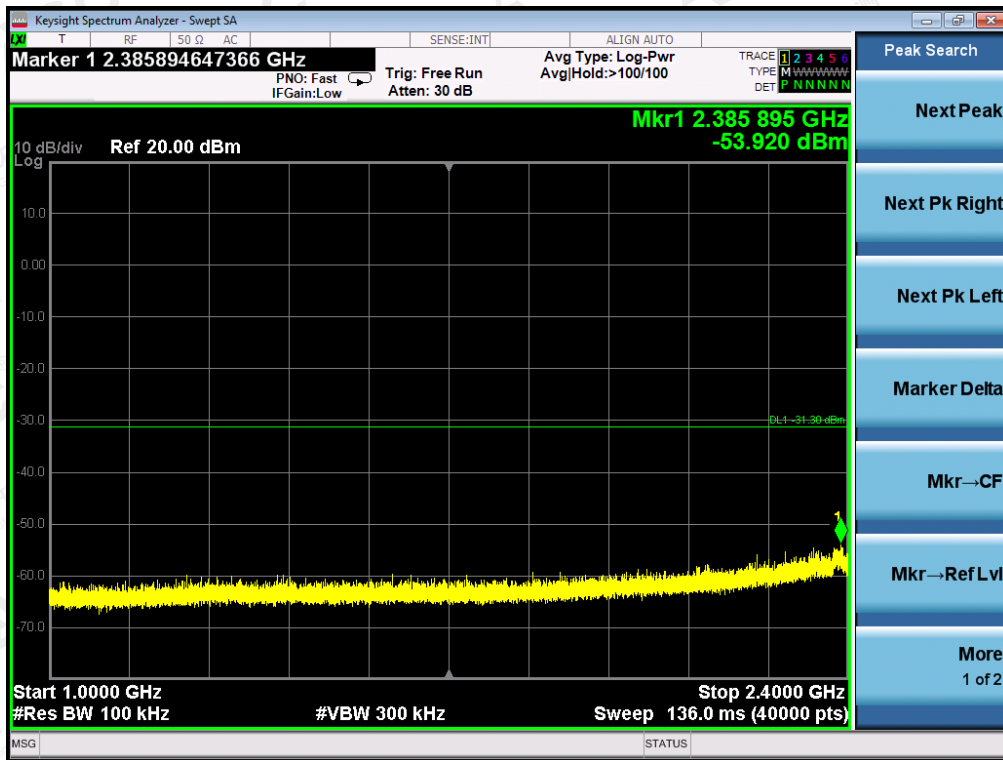


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11g FOR MODULATION IN HIGH CHANNEL



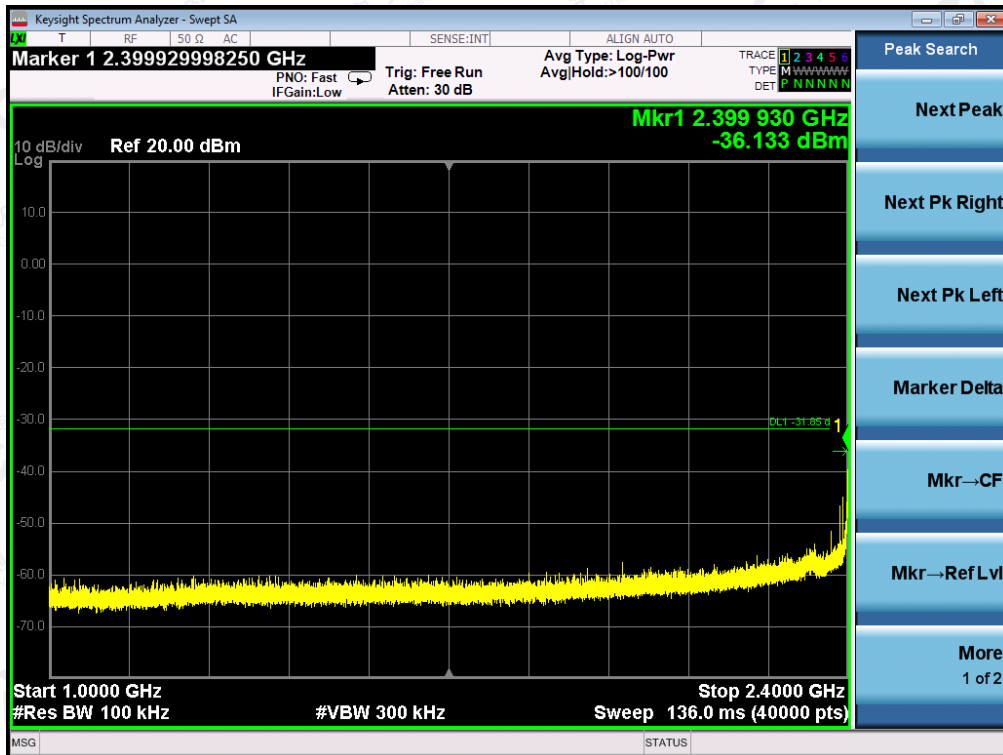
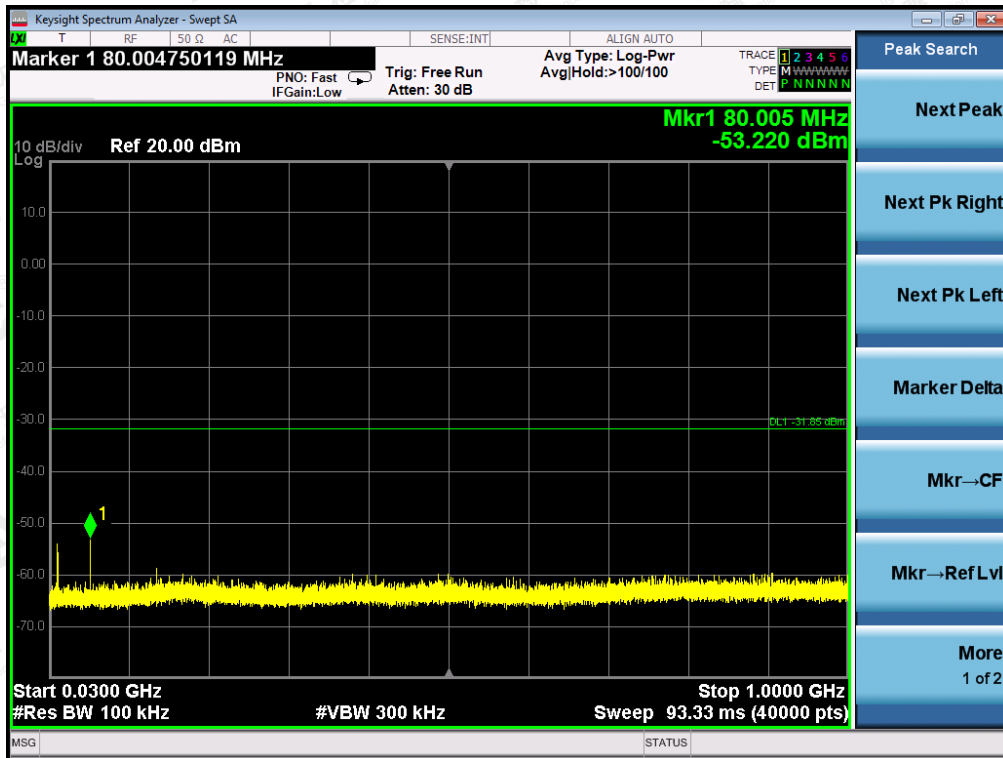
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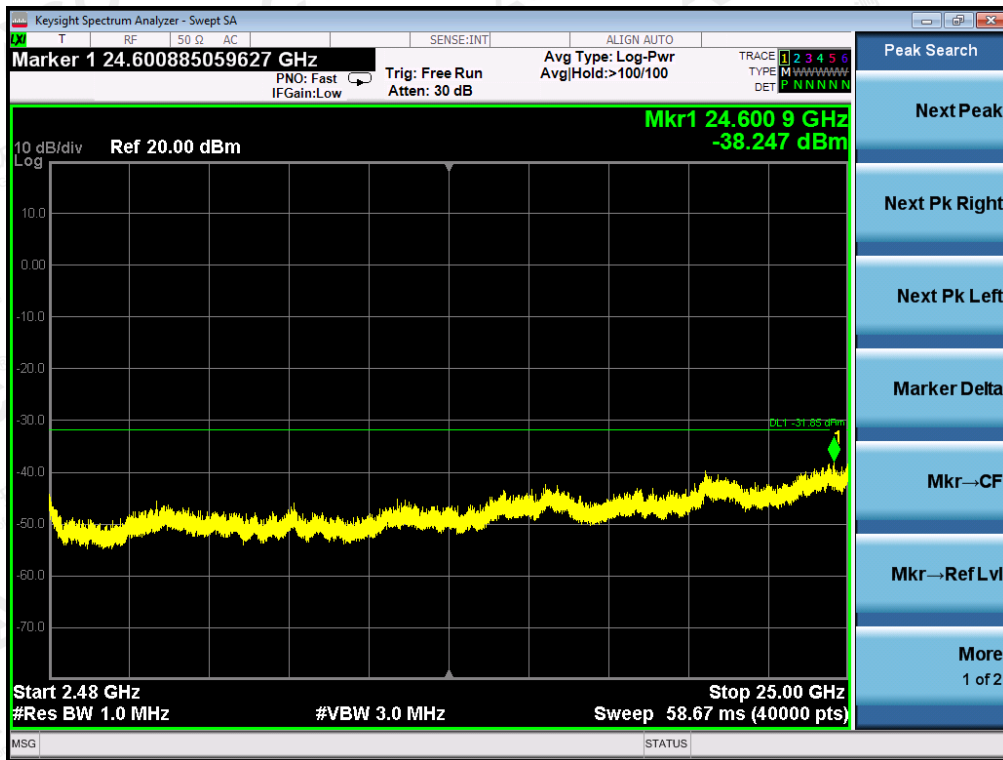


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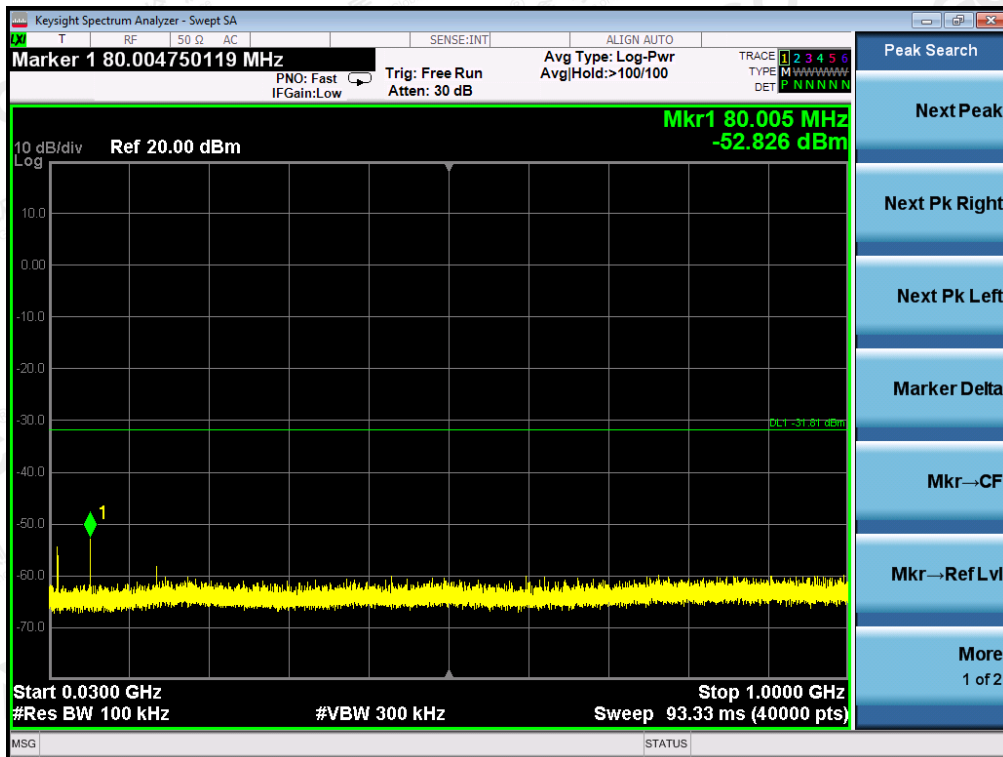
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11n20 FOR MODULATION IN LOW CHANNEL



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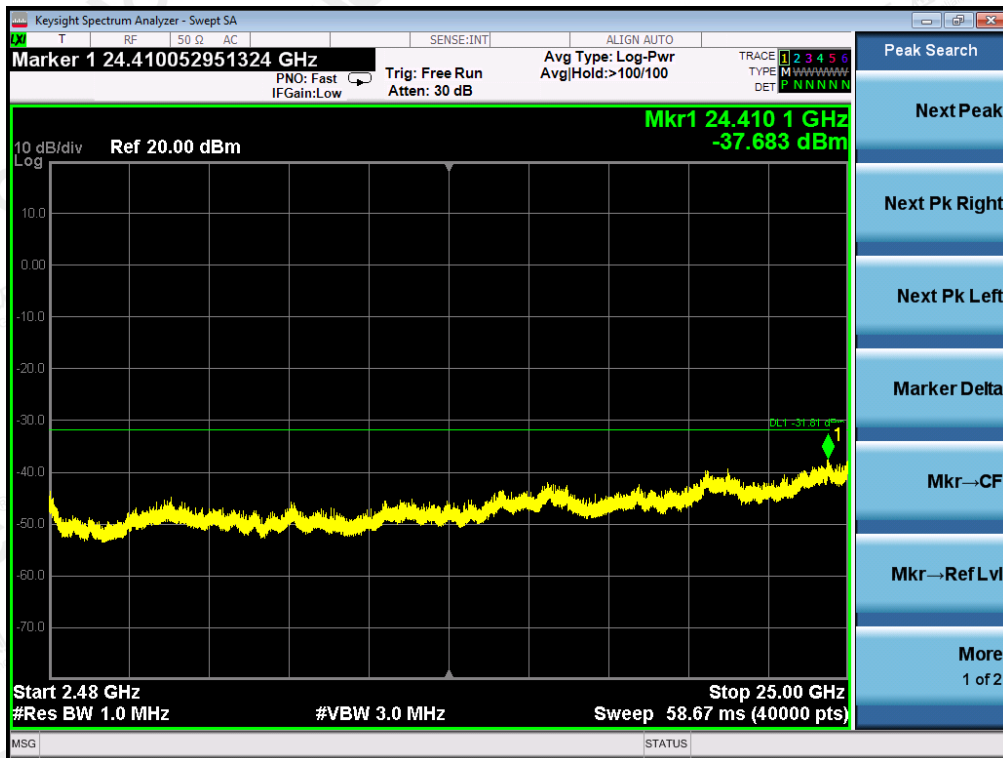
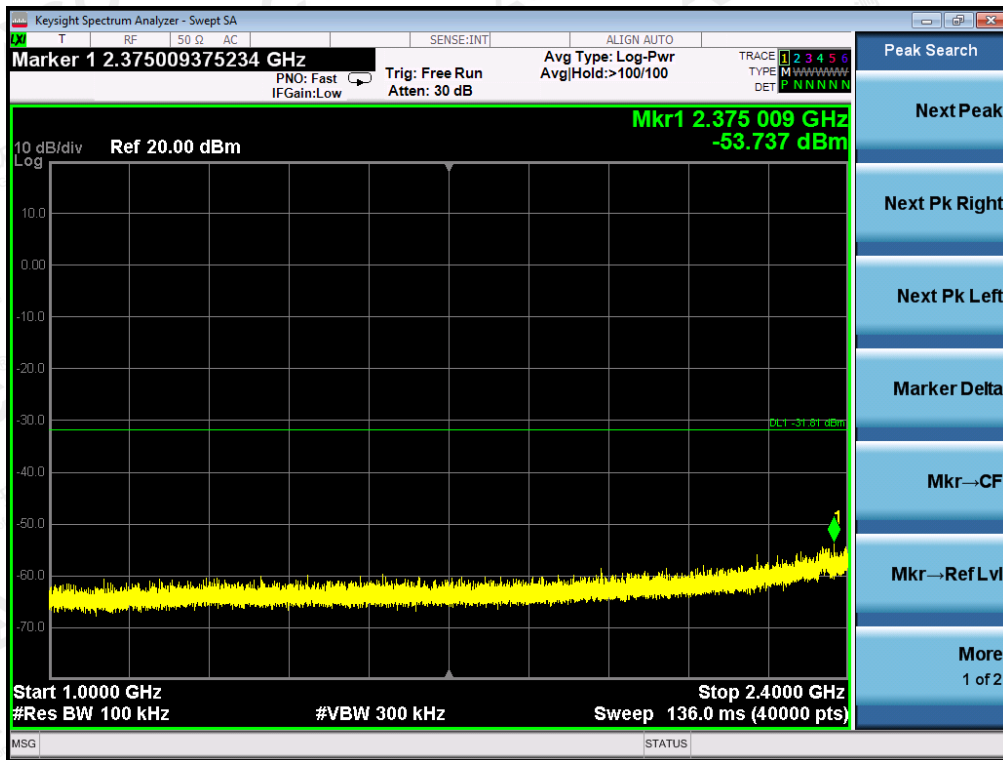


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n20 FOR MODULATION IN MIDDLE CHANNEL



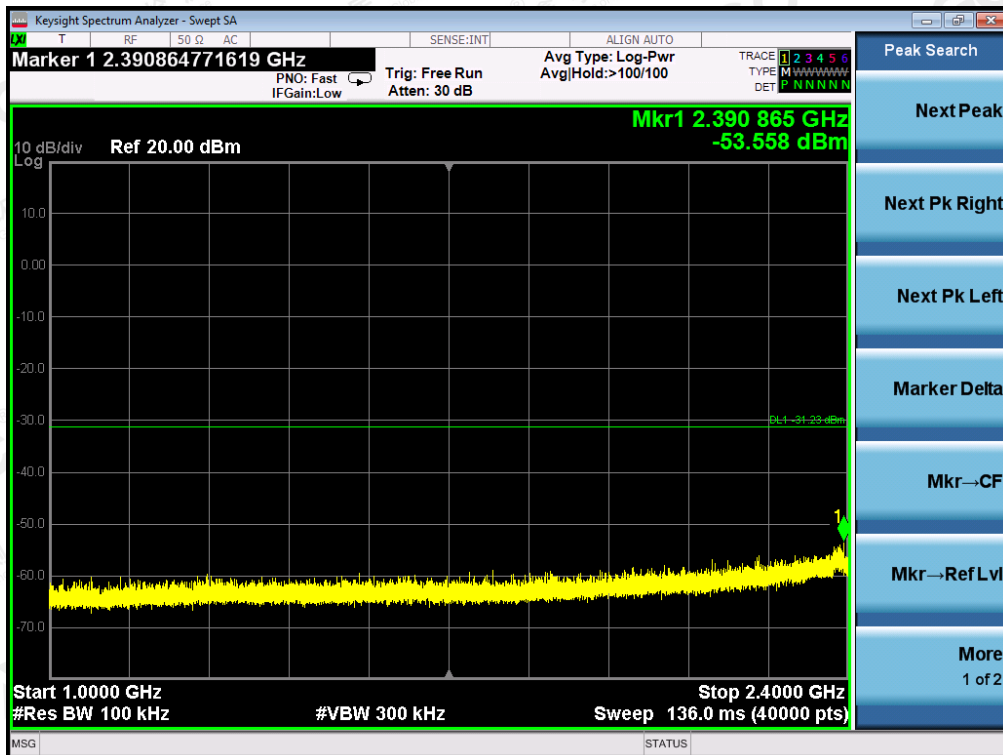
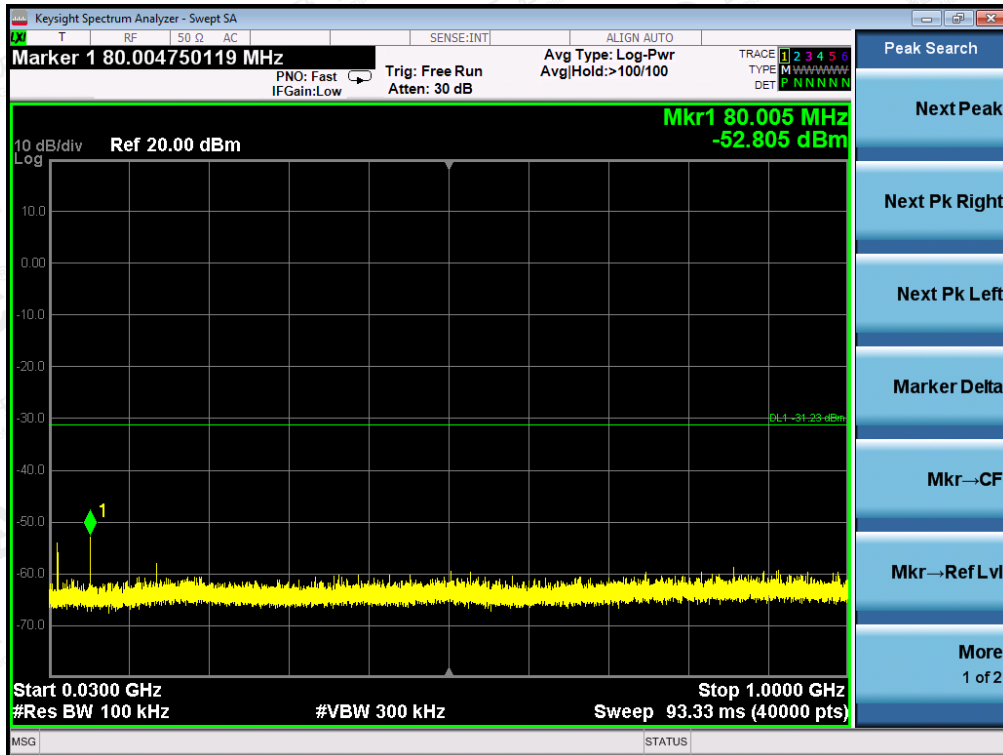
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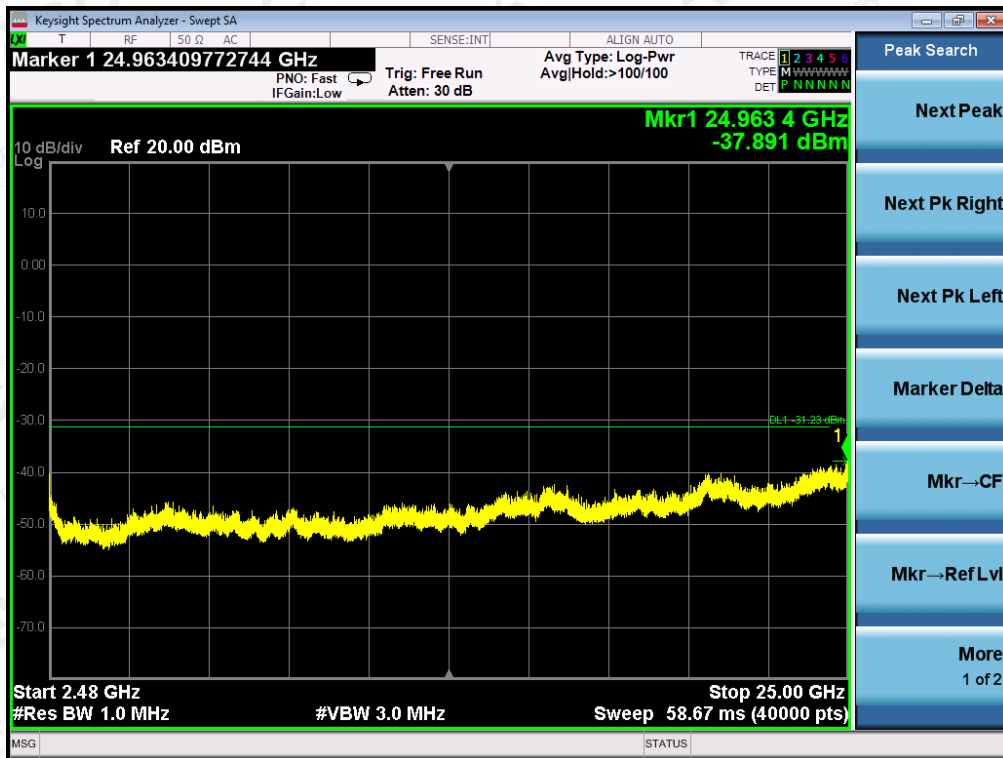


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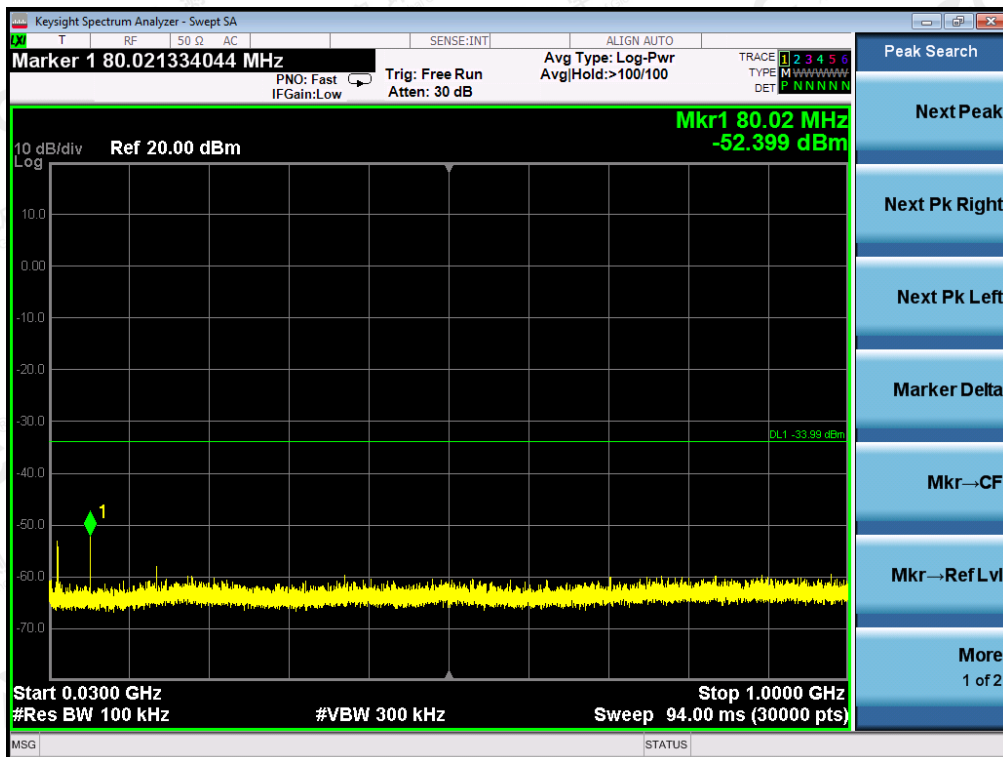
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n20 FOR MODULATION IN HIGH CHANNEL



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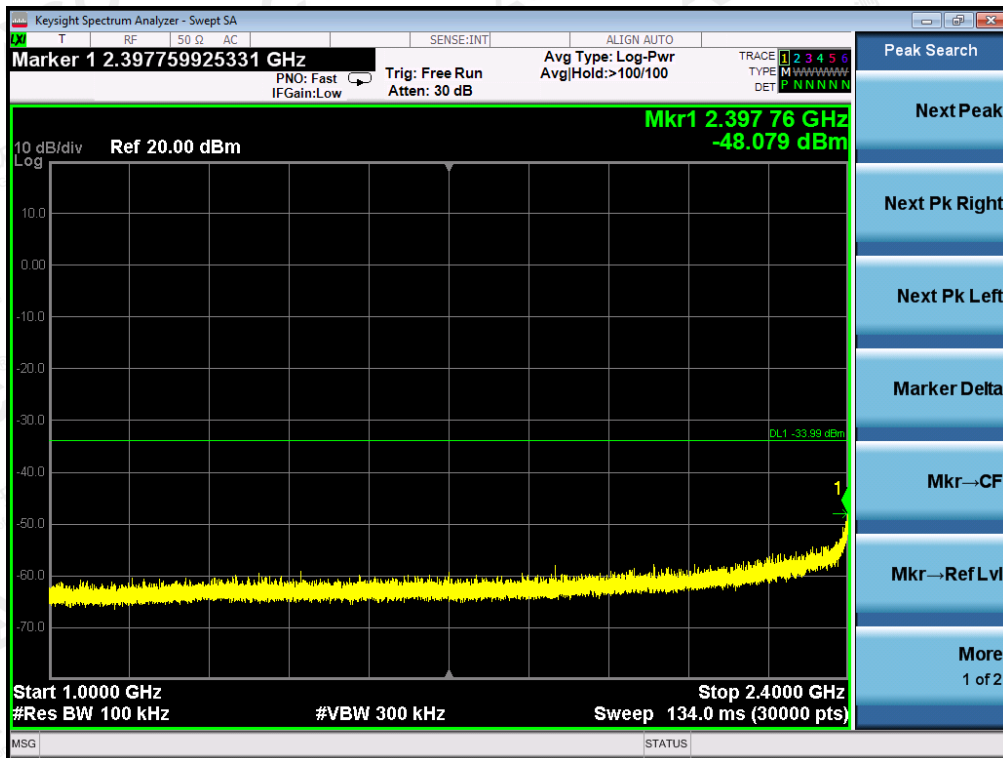


TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 802.11n40 FOR MODULATION IN LOW CHANNEL



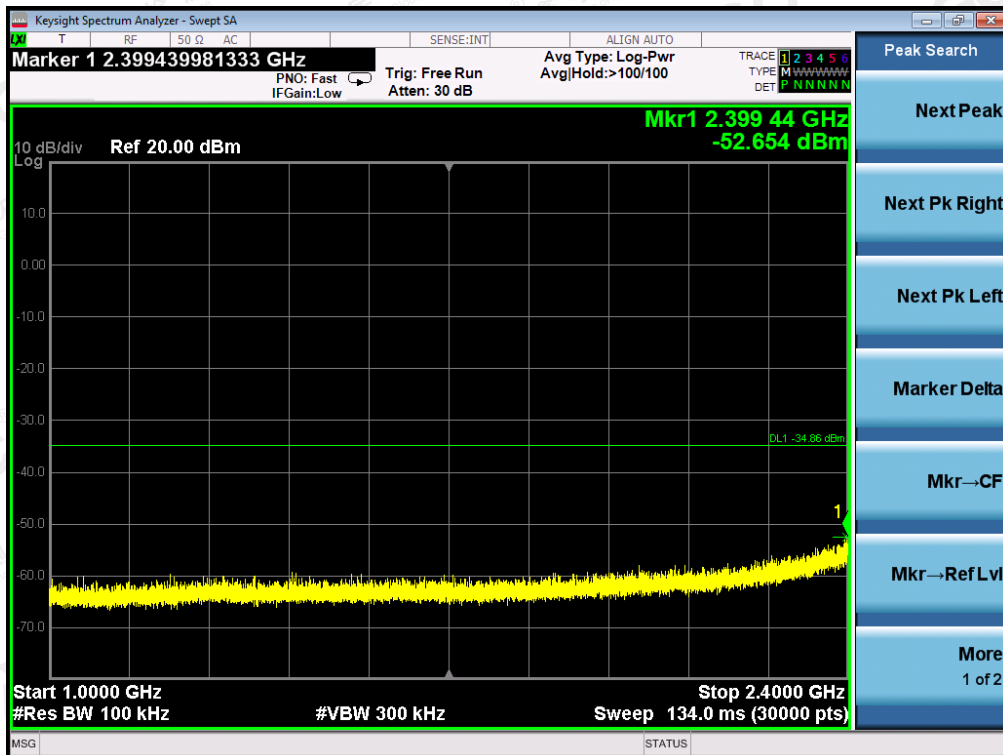
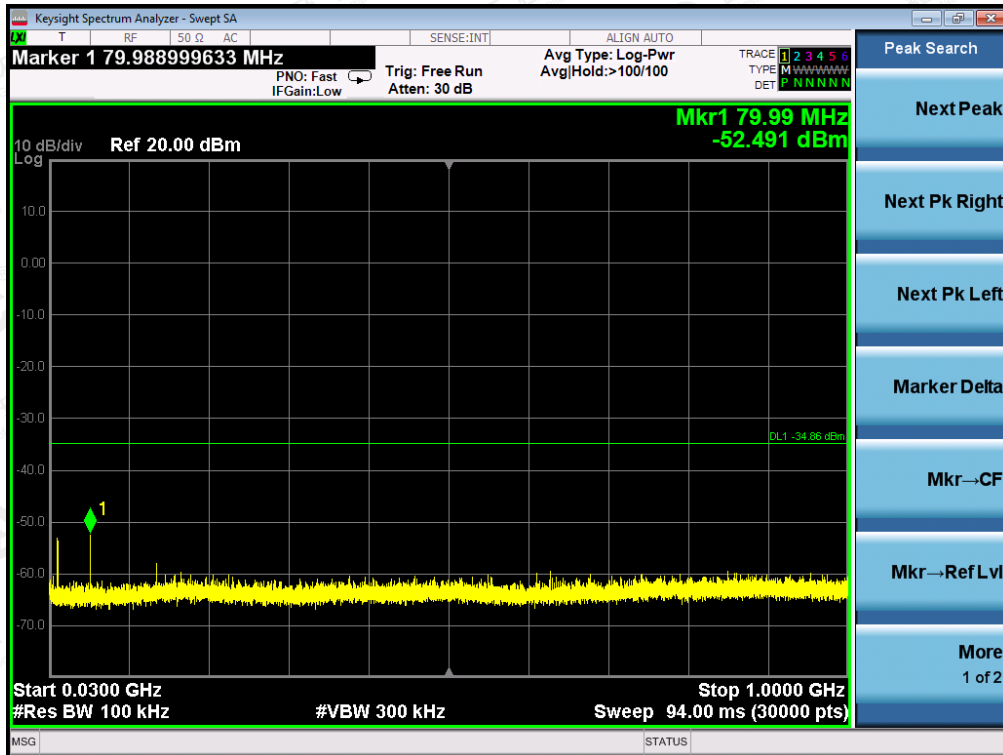
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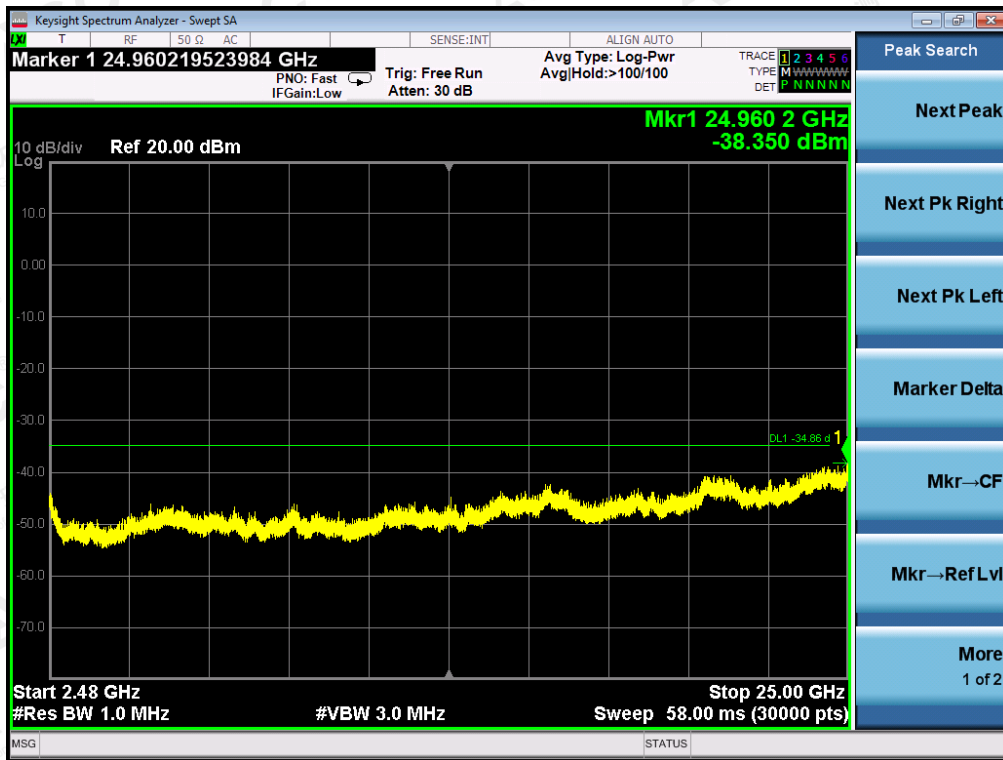


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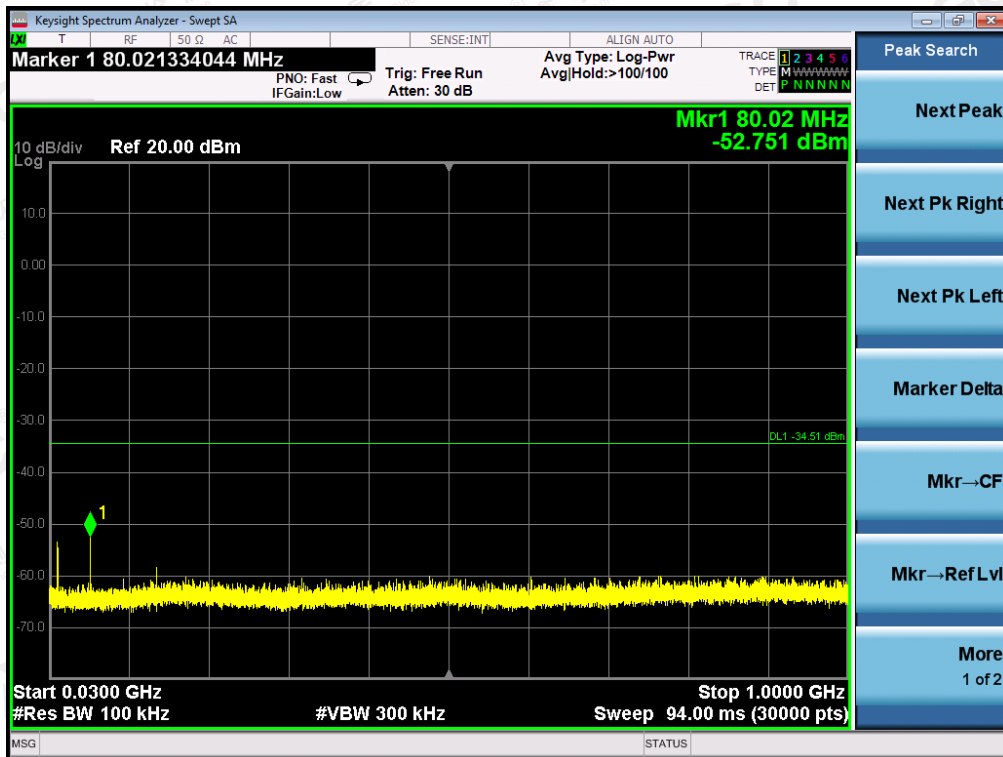
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n40 FOR MODULATION IN MIDDLE CHANNEL



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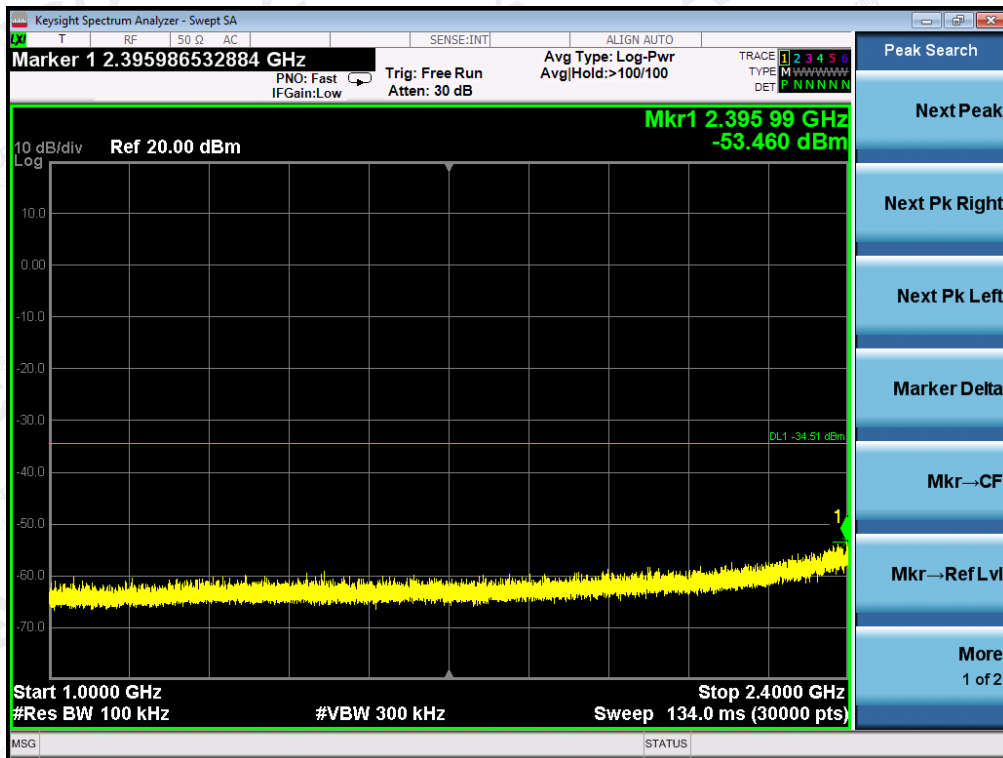


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n40 FOR MODULATION IN HIGH CHANNEL



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## 10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

### 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 method of AVGPSD-1 in the ANSI C63.10 (2013) item 11.10 was used in this testing.

### 10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 8.2.

### 10.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.

### 10.4 LIMITS AND MEASUREMENT RESULT

<b>TEST ITEM</b>	POWER SPECTRAL DENSITY
<b>TEST MODE</b>	802.11b with data rate 1

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	0.667	8	Pass
Middle Channel	1.250	8	Pass
High Channel	0.044	8	Pass

<b>TEST ITEM</b>	POWER SPECTRAL DENSITY
<b>TEST MODE</b>	802.11g with data rate 6

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-6.770	8	Pass
Middle Channel	-6.740	8	Pass
High Channel	-6.525	8	Pass

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<b>TEST ITEM</b>	POWER SPECTRAL DENSITY
<b>TEST MODE</b>	802.11n 20 with data rate 6.5

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-5.454	8	Pass
Middle Channel	-7.117	8	Pass
High Channel	-7.221	8	Pass

<b>TEST ITEM</b>	POWER SPECTRAL DENSITY
<b>TEST MODE</b>	802.11n 40 with data rate 13.5

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-9.911	8	Pass
Middle Channel	-9.590	8	Pass
High Channel	-9.709	8	Pass

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**802.11b TEST RESULT**  
**TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL**



**TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL**



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