
FCC Test Report

Report No.: AGC04138200502FE05

FCC ID : 2AAXO-ISM1080

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : WIFI ENABLED PEDESTAL KARAOKE SYSTEM

BRAND NAME : N/A

MODEL NAME : iSM1080, ERP-iSM1080XX (X is reserved for future color change, it can be 0-9, A-Z or NA)

APPLICANT : The Singing Machine Company Inc.

DATE OF ISSUE : Jul. 03, 2020

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	/	Jul. 03, 2020	Valid	Initial Release

TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY	5
2. GENERAL INFORMATION.....	6
2.1. PRODUCT DESCRIPTION	6
2.2. TABLE OF CARRIER FREQUENCYS	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.....	11
6. TEST FACILITY	12
7. OUTPUT POWER.....	13
7.1. MEASUREMENT PROCEDURE	13
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	13
7.3. LIMITS AND MEASUREMENT RESULT	14
8. 6 DB BANDWIDTH.....	16
8.1. MEASUREMENT PROCEDURE.....	16
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	16
8.3. LIMITS AND MEASUREMENT RESULTS	17
9. CONDUCTED SPURIOUS EMISSION	25
9.1. MEASUREMENT PROCEDURE	25
9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	25
9.3. MEASUREMENT EQUIPMENT USED JN	25
9.4. LIMITS AND MEASUREMENT RESULT	25
10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY	44

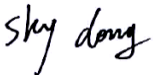
10.1 MEASUREMENT PROCEDURE	44
10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	44
10.3 MEASUREMENT EQUIPMENT USED	44
10.4 LIMITS AND MEASUREMENT RESULT	44
11. RADIATED EMISSION.....	52
11.1. MEASUREMENT PROCEDURE	52
11.2. TEST SETUP	53
11.3. LIMITS AND MEASUREMENT RESULT	54
11.4. TEST RESULT	54
12. BAND EDGE EMISSION	60
12.1. MEASUREMENT PROCEDURE	60
12.2. TEST SET-UP.....	60
12.3. TEST RESULT	61
13. FCC LINE CONDUCTED EMISSION TEST	77
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST	77
13.2. BLOCK DIAGRAM OF TEST SETUP	77
13.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST	78
13.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST	79
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	81
APPENDIX B: PHOTOGRAPHS OF EUT	83

1. VERIFICATION OF CONFORMITY

Applicant	The Singing Machine Company Inc.
Address	6301 NW 5th Way, Suite 2900 Fort Lauderdale, FL, 33309, U.S.A.
manufacturer	The Singing Machine Company Inc.
Address	6301 NW 5th Way, Suite 2900 Fort Lauderdale, FL, 33309, U.S.A.
Factory	ZHUHAI FULLWING ELECTRONIC CO.,LTD ZHONGSHAN BRANCH
Address	4/F & 5/F, No 10, Xingye Road, Xinxu, San Xiang, Zhongshan, Guangdong, China
Product Designation	WIFI ENABLED PEDESTAL KARAOKE SYSTEM
Brand Name	N/A
Test Model	iSM1080
Series Model	ERP-iSM1080XX (X is reserved for future color change, it can be 0-9, A-Z or NA)
Difference Description	All the same except for the model name.
Date of test	Jun. 19, 2020 to Jul. 03, 2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	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.

Prepared By		
	Sky Dong (Project Engineer)	Jul. 03, 2020
Reviewed By		
	Max Zhang (Reviewer)	Jul. 03, 2020
Approved By		
	Forrest Lei (Authorized Officer)	Jul. 03, 2020

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as “WIFI ENABLED PEDESTAL KARAOKE SYSTEM”. 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

Operation Frequency	2.412 GHz~2.462GHz
Output Power(Average)	IEEE 802.11b11.41dBm; IEEE 802.11g:10.45dBm; IEEE 802.11n(20):9.43dBm; IEEE 802.11n(40):8.96dBm
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
Number of channels	11
Hardware Version	1.0
Software Version	1.0
Antenna Designation	Integral antenna
Antenna Gain	2dBi
Power Supply	DC 16.1V by adapter

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

2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPSC	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
NBPSC	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: 2AAXO-ISM1080** filing to comply with the FCC Part 15 requirements.

2.5. TEST METHODOLOGY

KDB 558074 D01 15.247 Meas Guidance v05: Guidance for compliance measurements on Digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules
ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

2.7. 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, $U_c = \pm 3.2$ 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

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)	

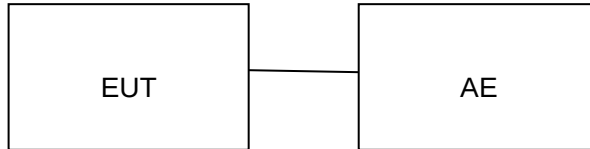
Note:

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. The test software is the FCCAssist 2.4 which can set the EUT into the individual test modes.

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure :



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	WIFI ENABLED PEDESTAL KARAOKE SYSTEM	iSM1080	2AAXO-ISM1080	EUT
2	Smart phone	V8	N/A	AE
3	AUX line	2265	N/A	AE
4	Adapter	K65A16130U	Input:100-240V, 50/60Hz, 1.5A Output:16.1V, 3.5A	AE
5	Microphone 1	N/A	N/A	AE
6	Microphone 1	N/A	N/A	AE
7	loudspeaker box	N/A	N/A	AE
8	loudspeaker box	N/A	N/A	AE
9	HDMI cable	HDMI14000	N/A	AE
10	TV	KD-65A8F	N/A	AE
11	U disk	DataTraveler SE9 16G	N/A	AE

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

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	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. 10, 2019	Sep. 09, 2020
2.4GHz Fliter	Micro-tronics	087	N/A	Feb. 26, 2020	Feb. 25, 2021
Attenuator	Weinachel Corp	58-30-33	N/A	Sep. 09, 2019	Sep. 08, 2020
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.21, 2019	Sep. 20, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2018	Jun. 13, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 17, 2019	May. 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 16, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 20, 2019	Sep. 19, 2021
Test software	FARA	EZ EMC (Ver.RA-03A)	N/A	N/A	N/A

7. OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

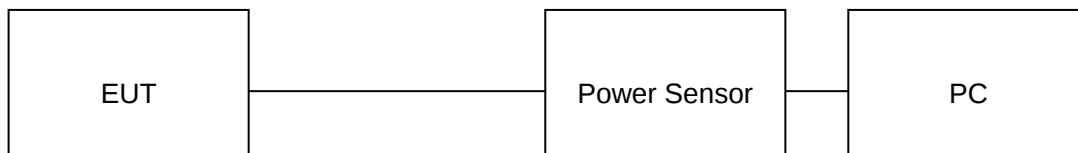
For average power test:

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



7.3. LIMITS AND MEASUREMENT RESULT

TEST ITEM	OUTPUT POWER
TEST MODE	802.11b with data rate 1

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	11.06	30	Pass
2.437	11.41	30	Pass
2.462	11.37	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11g with data rate 6

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	9.87	30	Pass
2.437	10.45	30	Pass
2.462	10.25	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11n 20 with data rate 6.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	9.09	30	Pass
2.437	9.43	30	Pass
2.462	9.06	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11n 40 with data rate 13.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.422	8.96	30	Pass
2.437	8.83	30	Pass
2.452	8.65	30	Pass

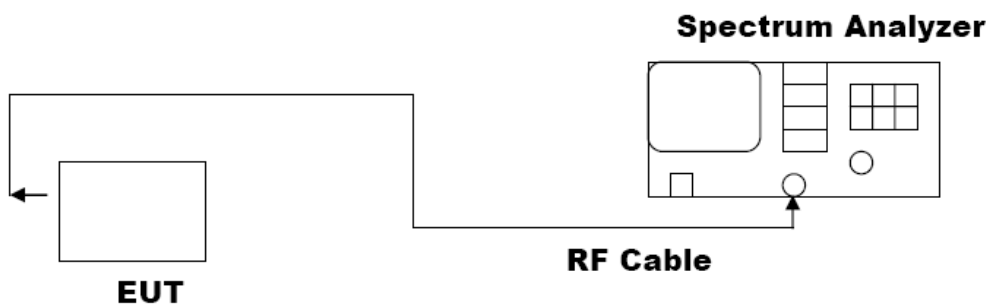
8. 6 DB BANDWIDTH

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)



8.3. LIMITS AND MEASUREMENT RESULTS

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

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	9.04	PASS
	Middle Channel	9.02	PASS
	High Channel	9.02	PASS

TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11g with data rate 54

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	16.36	PASS
	Middle Channel	16.39	PASS
	High Channel	16.43	PASS

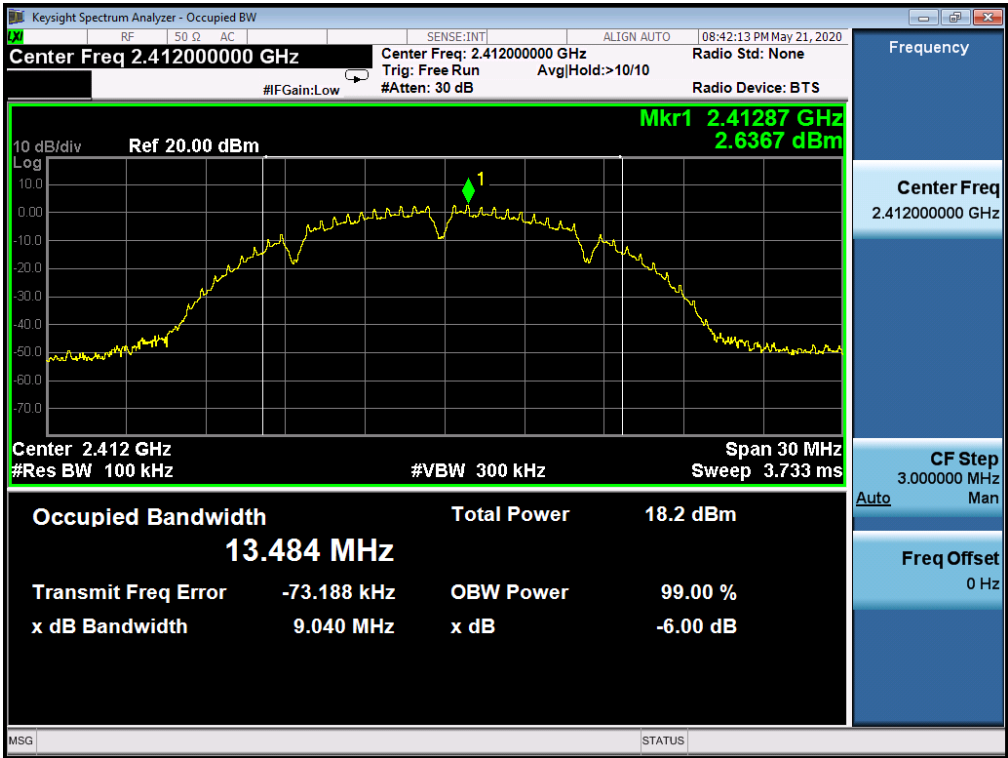
TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11n 20 with data rate 65

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	17.58	PASS
	Middle Channel	17.59	PASS
	High Channel	17.58	PASS

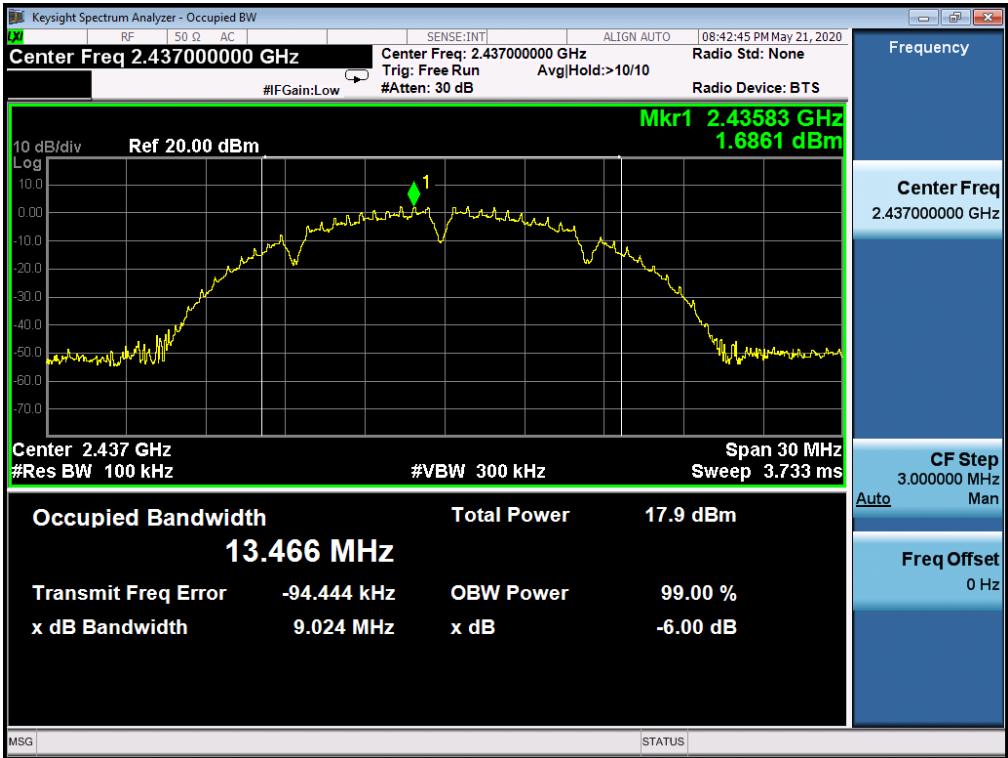
TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11n 40 with data rate 135

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	35.81	PASS
	Middle Channel	36.06	PASS
	High Channel	35.52	PASS

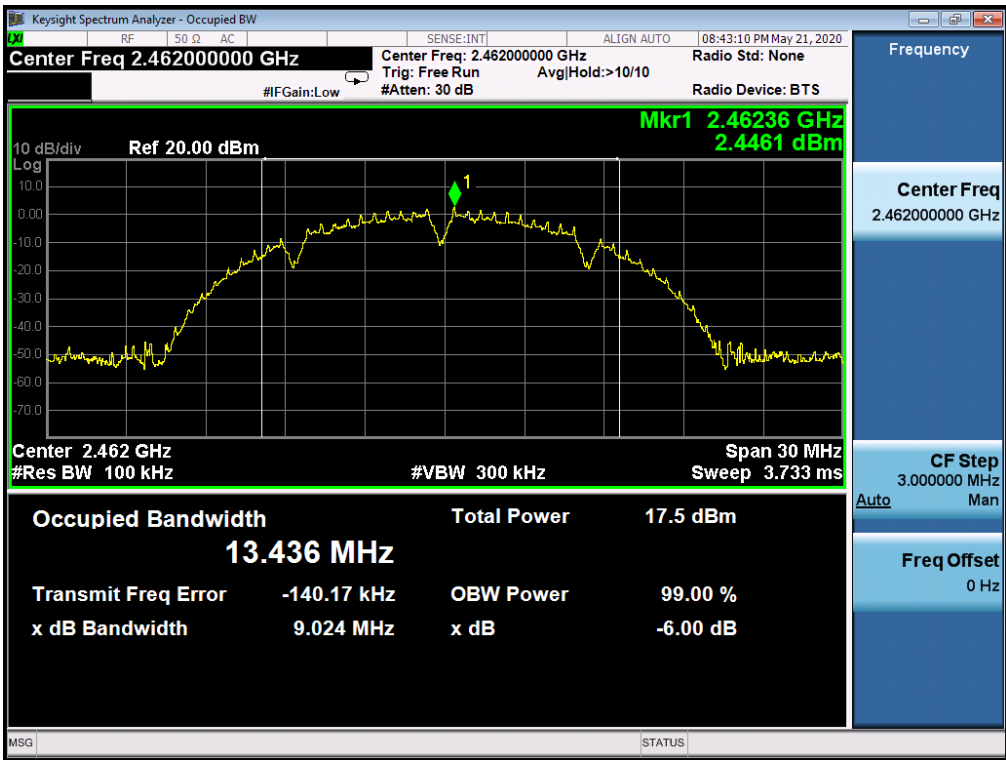
802.11b TEST RESULT
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

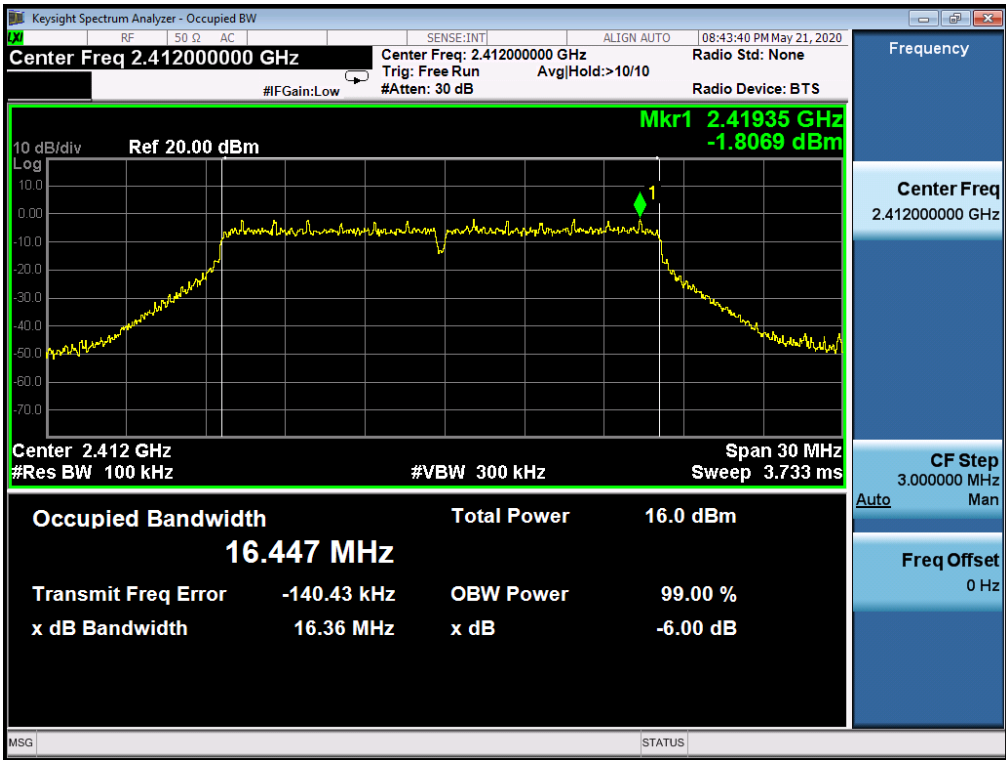


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

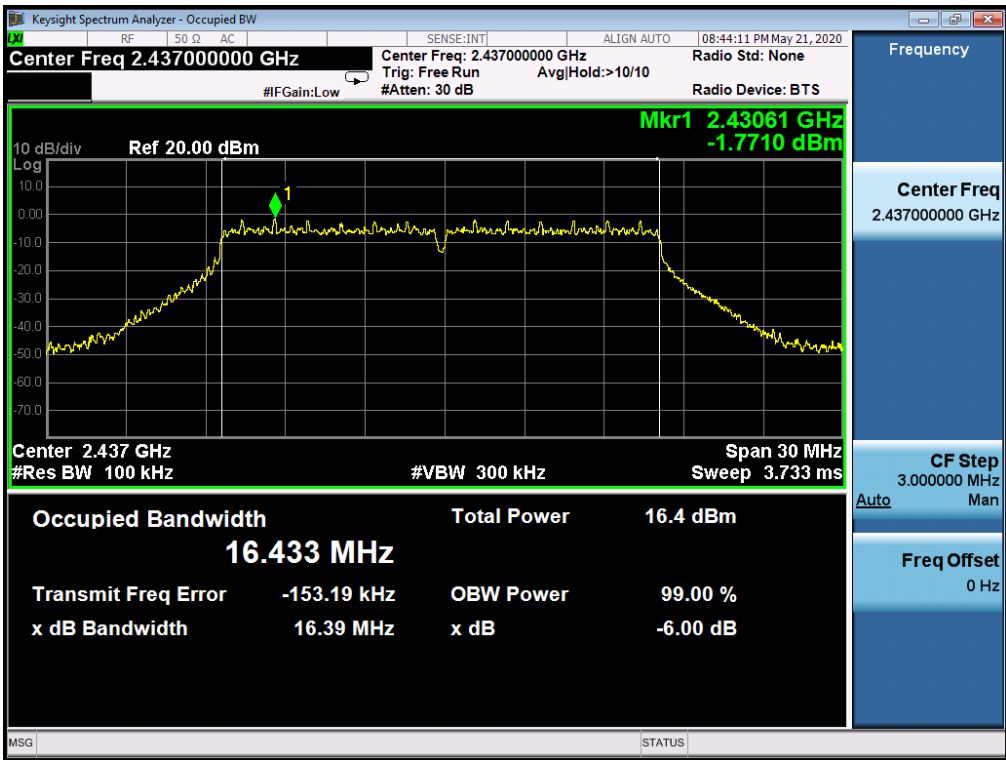


802.11g TEST RESULT

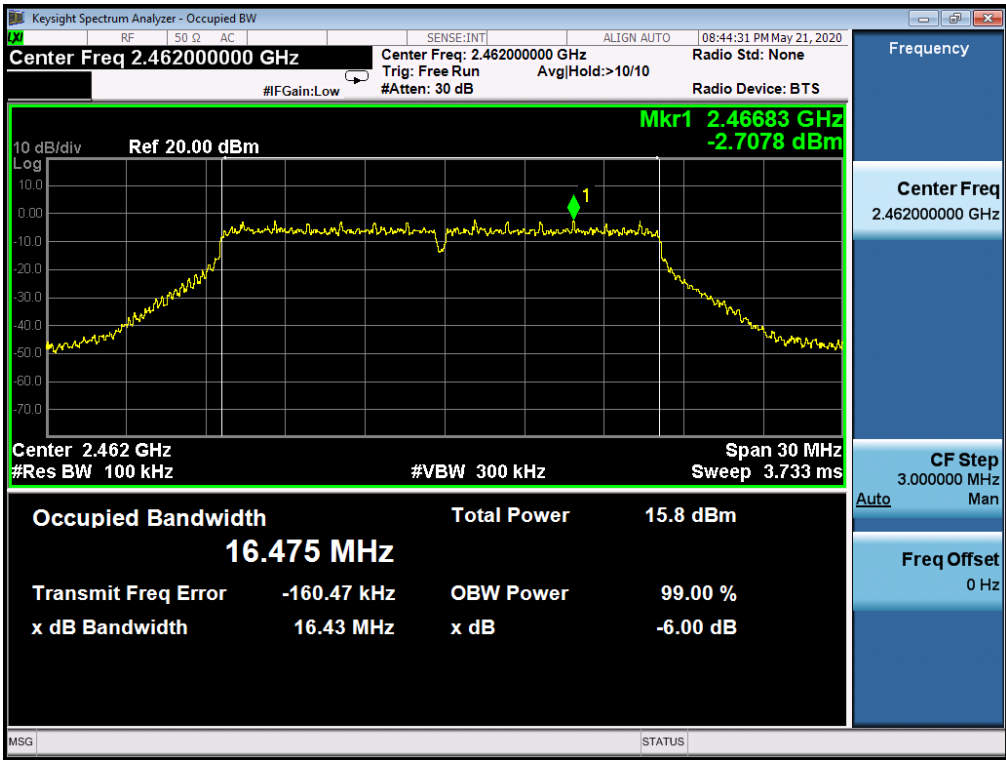
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



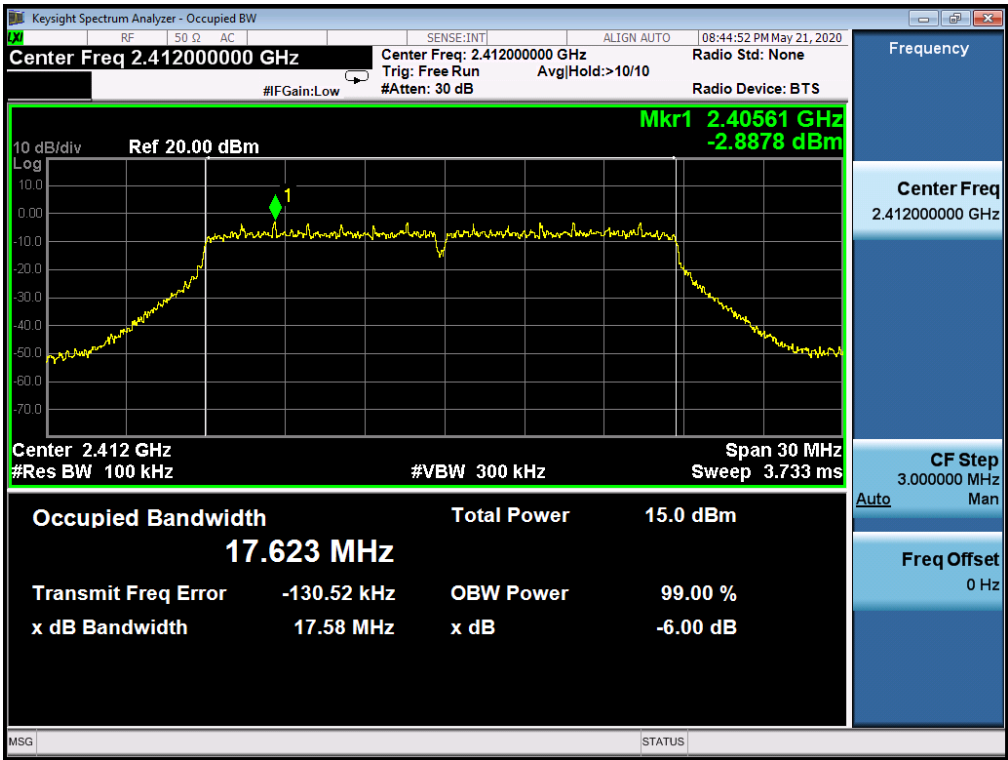
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



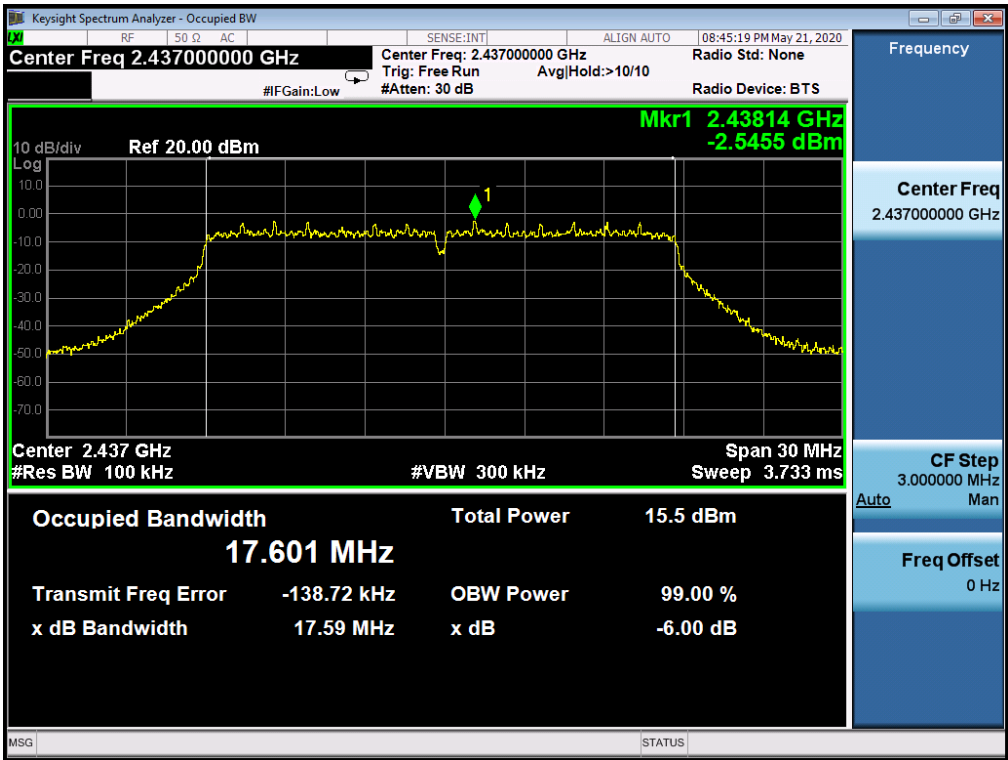
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



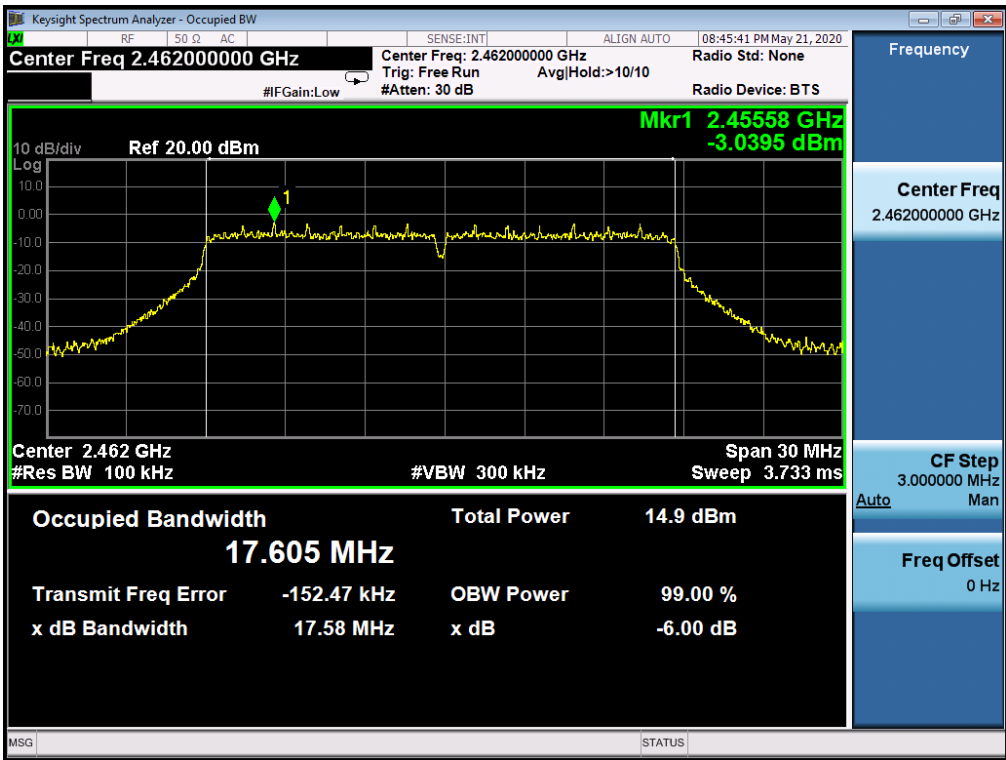
802.11n (20) TEST RESULT
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

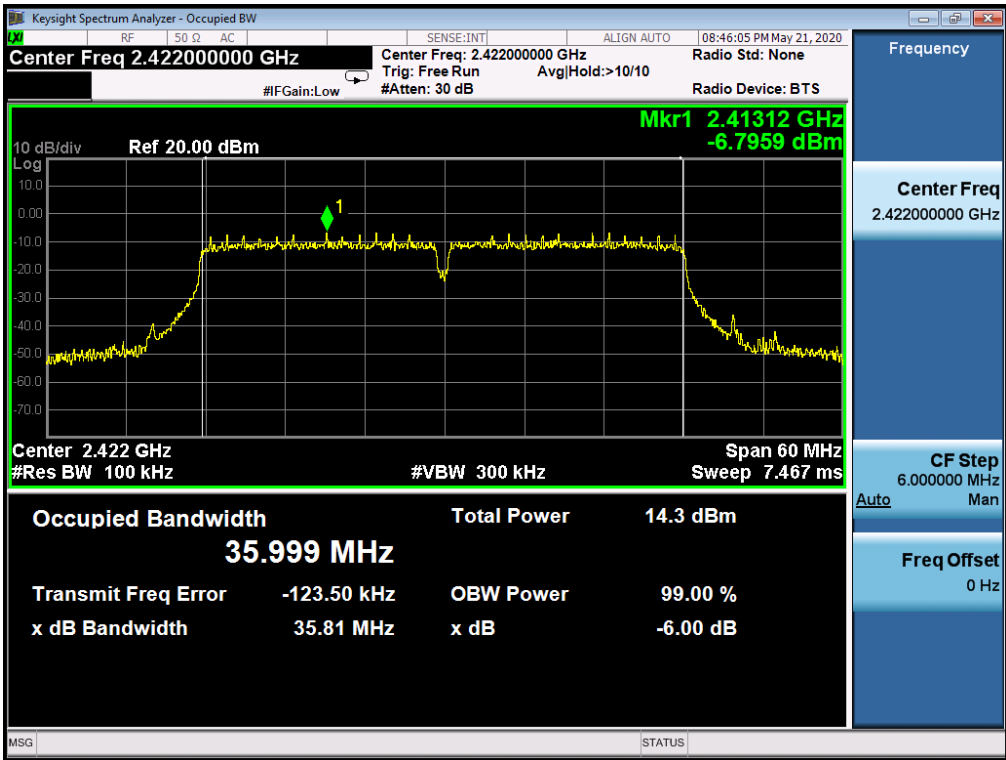


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



802.11n (40) TEST RESULT

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



Keysight Spectrum Analyzer - Occupied BW

Center Freq 2.437000000 GHz

Center Freq: 2.437000000 GHz
Trig: Free Run
Avg/Hold: >10/10

Radio Device: BTS

#IFGain: Low

Frequency

Center Freq
2.437000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

10 dB/div
Log
Ref 20.00 dBm

Mkr1 2.42812 GHz
-6.8938 dBm

Center 2.437 GHz
#Res BW 100 kHz

#VBW 300 kHz

Span 60 MHz
Sweep 7.467 ms

Occupied Bandwidth	Total Power
35.986 MHz	14.4 dBm

Transmit Freq Error	OBW Power
-175.01 kHz	99.00 %
x dB Bandwidth	x dB
36.06 MHz	-6.00 dB

MSG

STATUS

Keysight Spectrum Analyzer - Occupied BW

RF 50 Ω AC SENSE:INT ALIGN AUTO 08:47:23 PM May 21, 2020

Center Freq 2.452000000 GHz Center Freq: 2.452000000 GHz Trig: Free Run Avg/Hold: >10/10 Radio Device: BTS
#FGain:Low #Atten: 30 dB

Frequency

Center Freq 2.452000000 GHz

10 dB/div Ref 20.00 dBm

Log

Mkr1 2.44312 GHz
-6.7731 dBm

Center 2.452 GHz Span 60 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 7.467 ms

Occupied Bandwidth	Total Power
36.032 MHz	14.1 dBm

Transmit Freq Error	OBW Power
-163.59 kHz	99.00 %

x dB Bandwidth	x dB
35.52 MHz	-6.00 dB

Auto

Freq Offset 0 Hz

MSG STATUS

The figure is a screenshot of a Keysight Spectrum Analyzer displaying an Occupied Bandwidth (OBW) measurement. The main display area shows a frequency spectrum plot with a yellow trace. The x-axis represents frequency, and the y-axis represents power in dBm. A green marker labeled 'Mkr1' is positioned at 2.44312 GHz with a power level of -6.7731 dBm. The plot shows a signal with a bandwidth of approximately 36 MHz. The top of the screen displays various settings: Center Freq 2.452000000 GHz, Span 60 MHz, Res BW 100 kHz, VBW 300 kHz, and Sweep 7.467 ms. The bottom of the screen shows a summary table with Occupied Bandwidth (36.032 MHz), Total Power (14.1 dBm), Transmit Freq Error (-163.59 kHz), OBW Power (99.00 %), x dB Bandwidth (35.52 MHz), and x dB (-6.00 dB). The right side of the screen features a blue sidebar with additional information, including Frequency, Center Freq (2.452000000 GHz), CF Step (6.000000 MHz), and Freq Offset (0 Hz).

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.

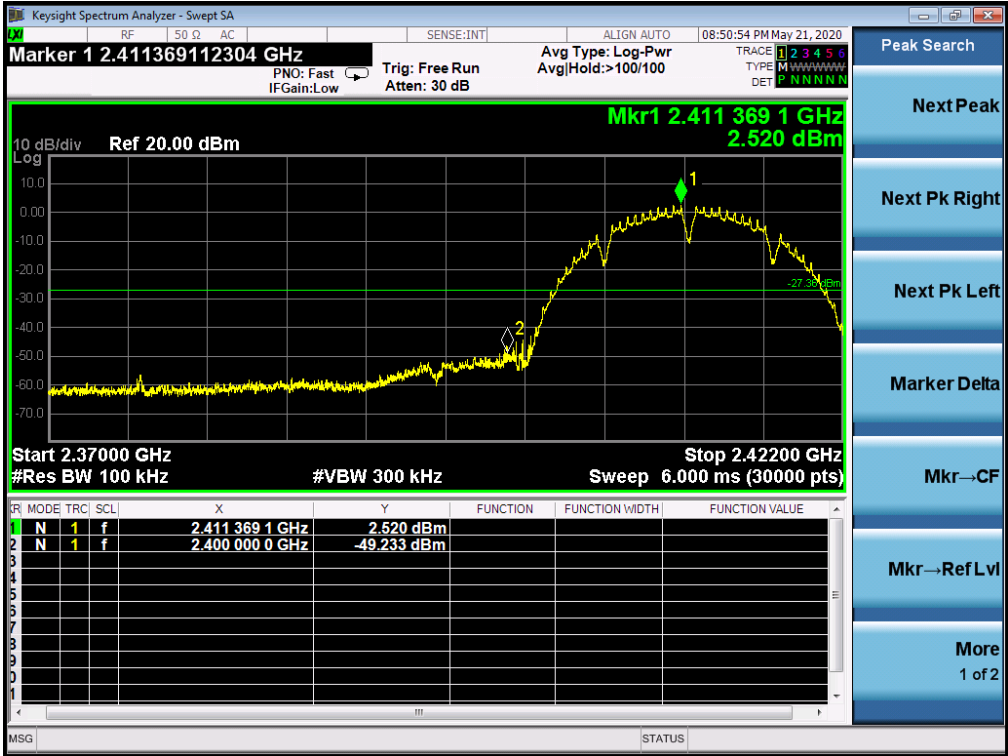
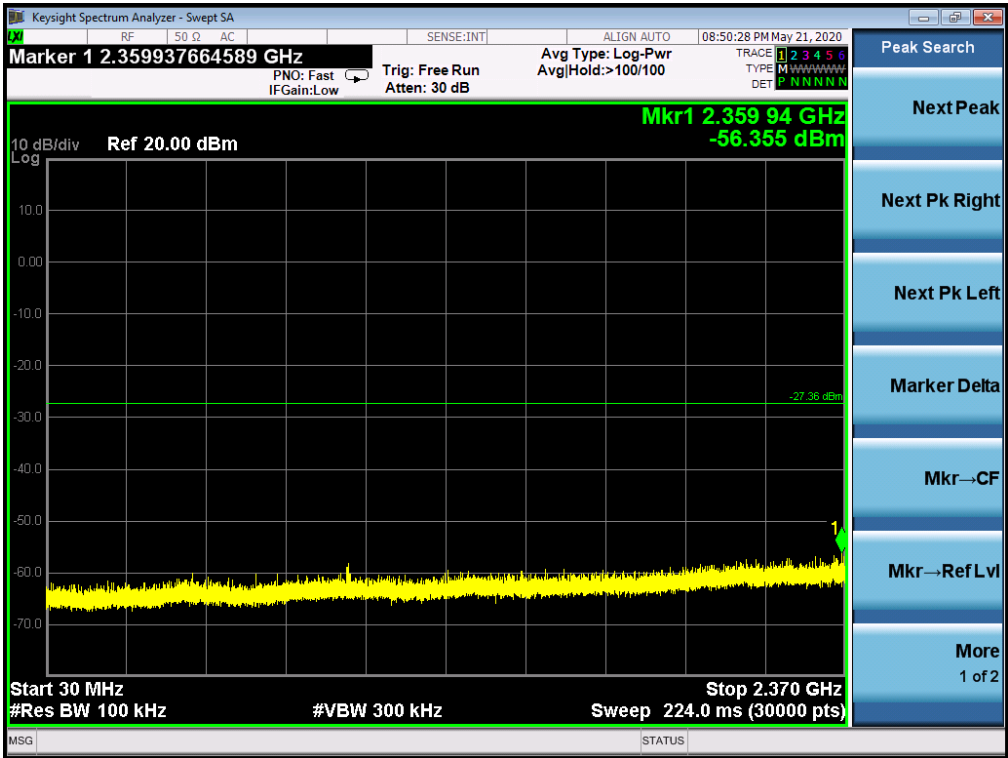
9.3. MEASUREMENT EQUIPMENT USED

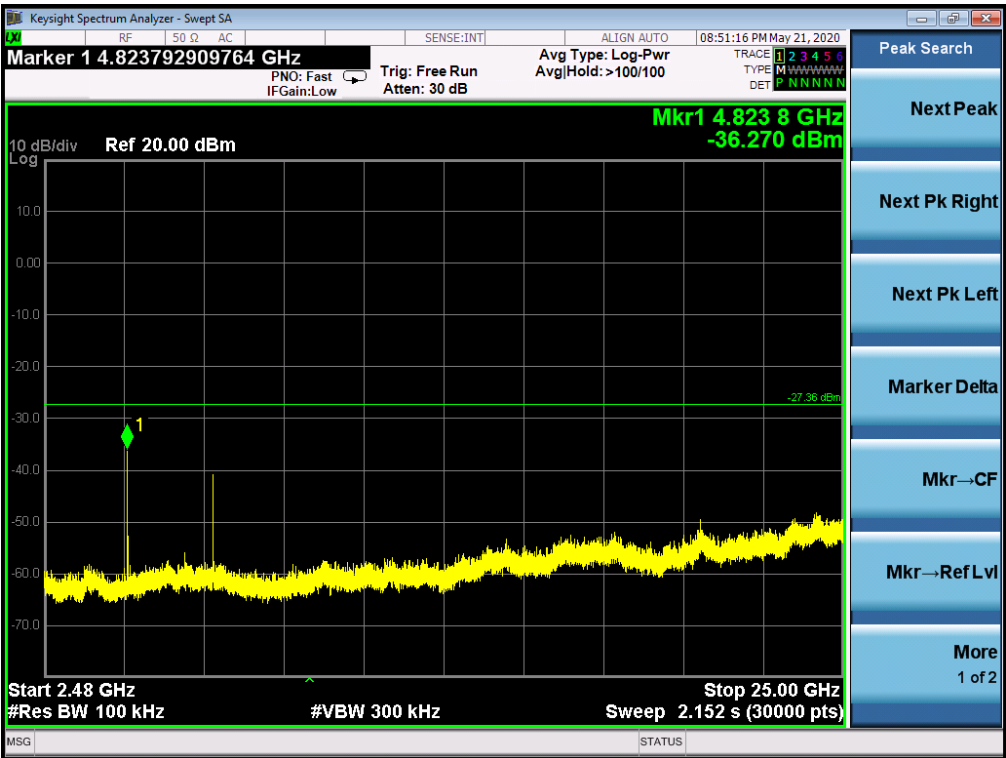
The same as described in section 6.

9.4. LIMITS AND MEASUREMENT RESULT

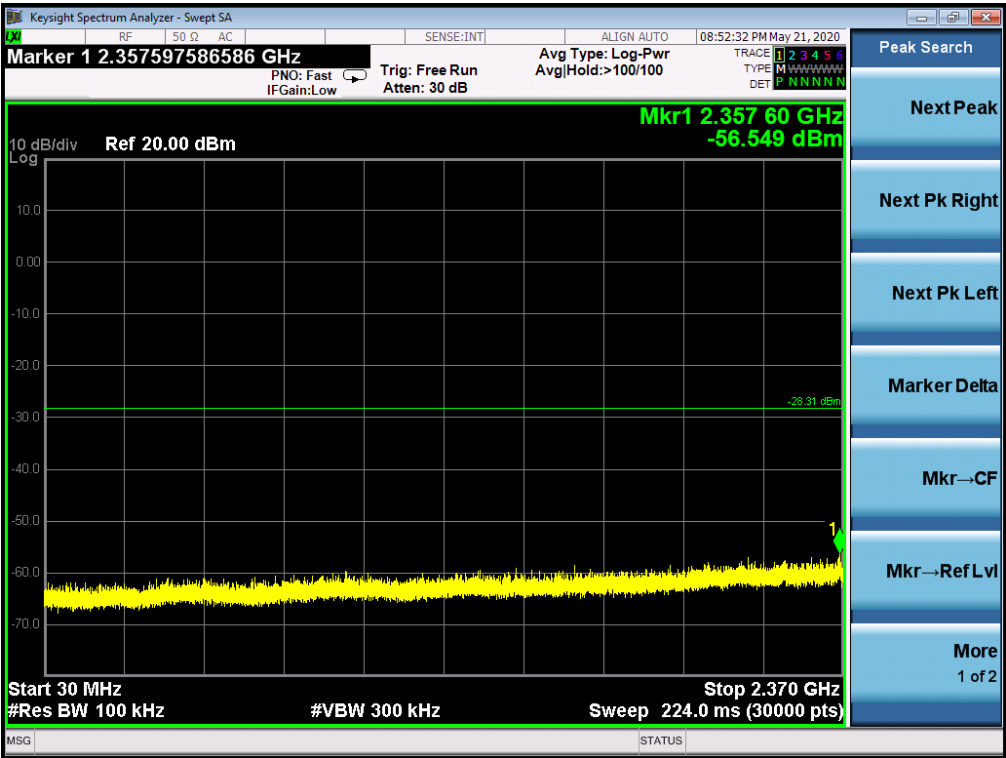
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 30 dB below 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

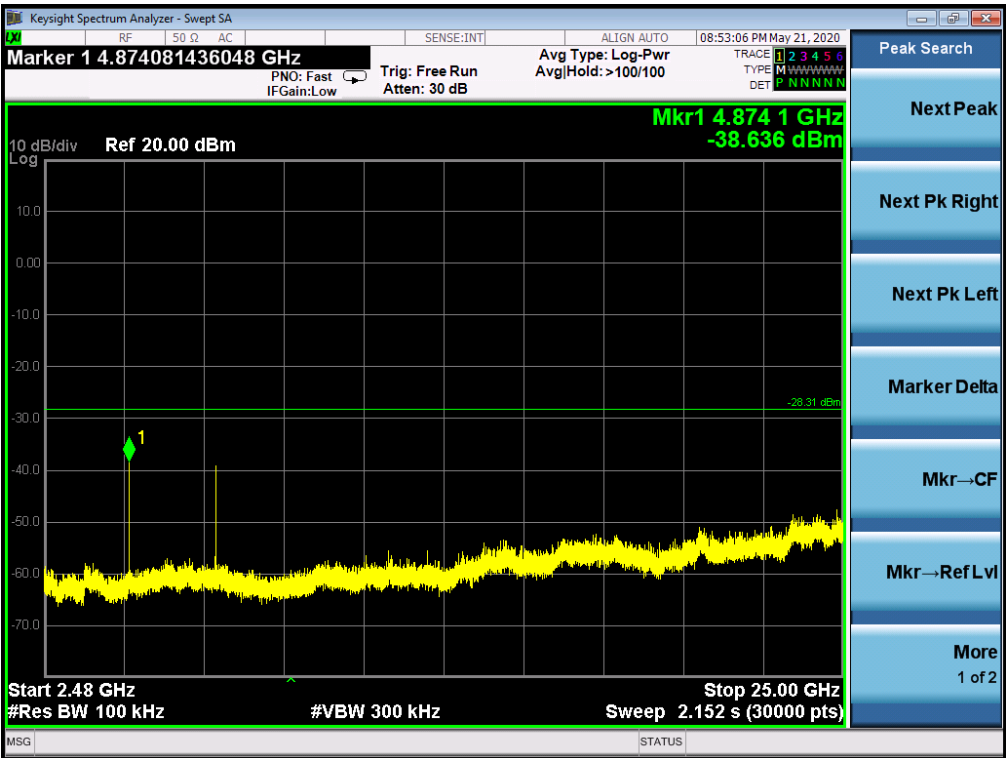
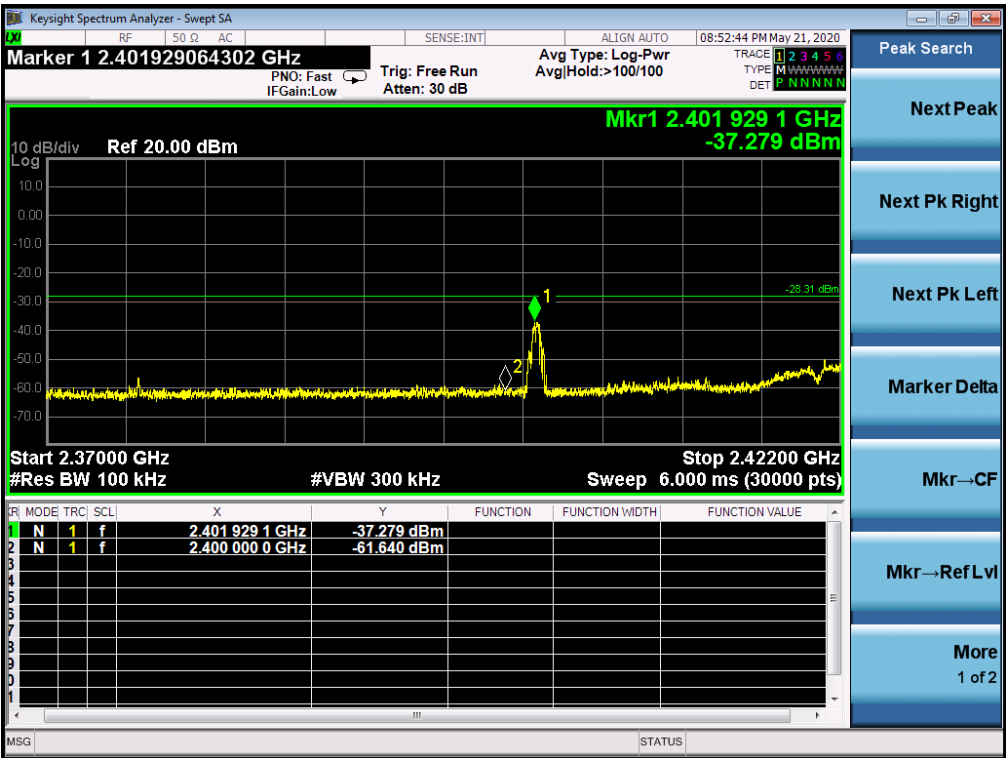
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE
OF 802.11b FOR MODULATION IN LOW CHANNEL



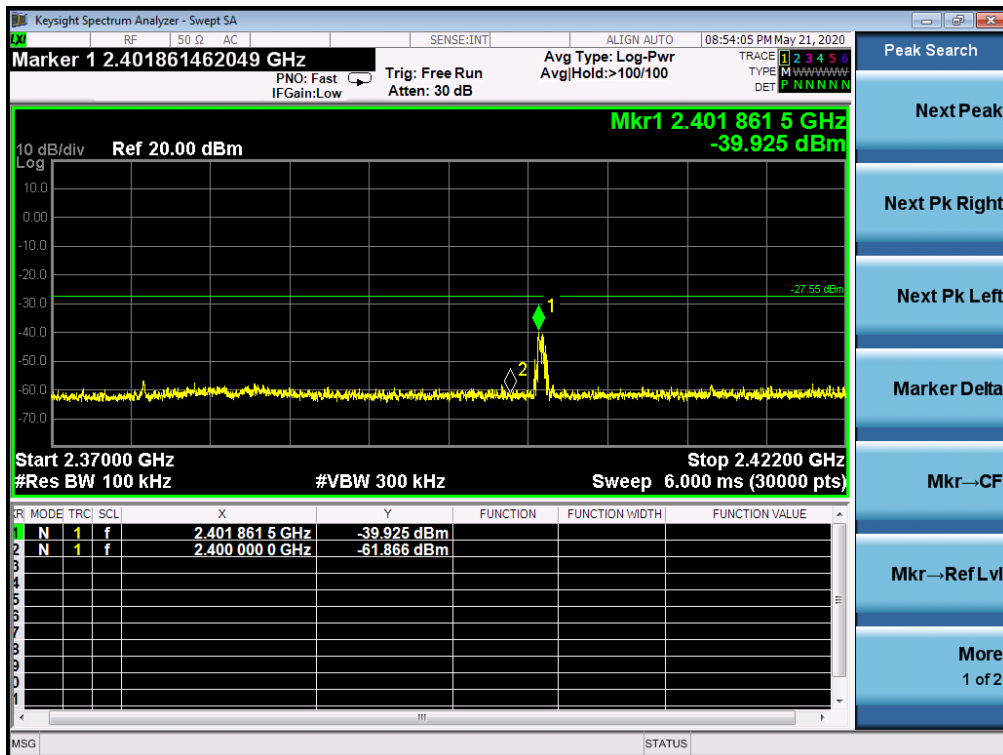
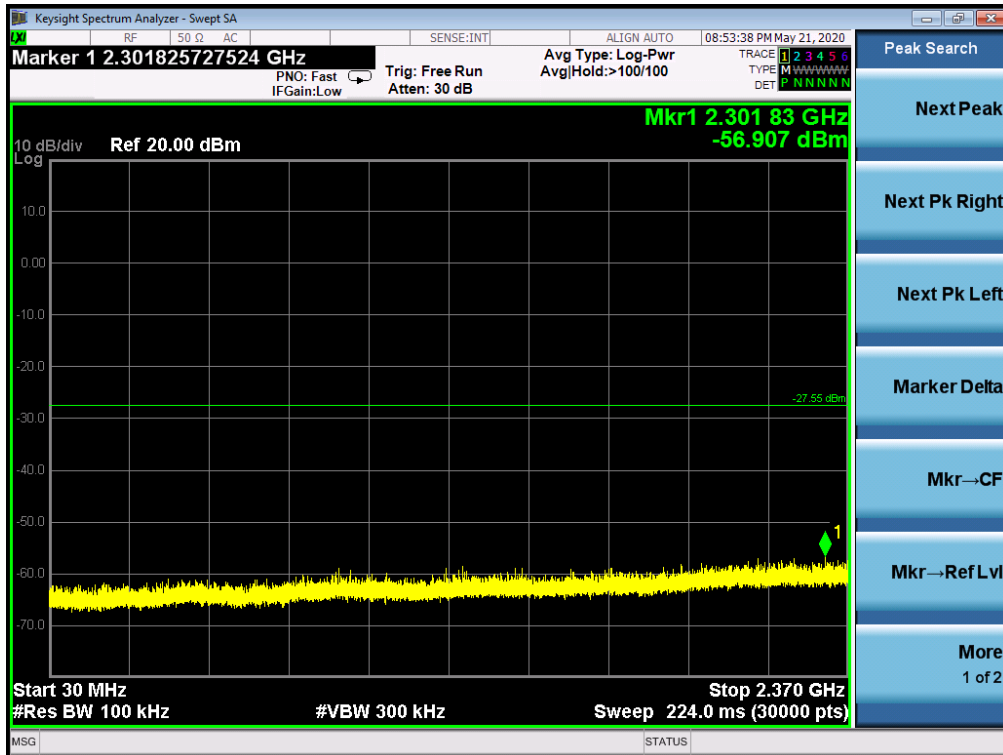


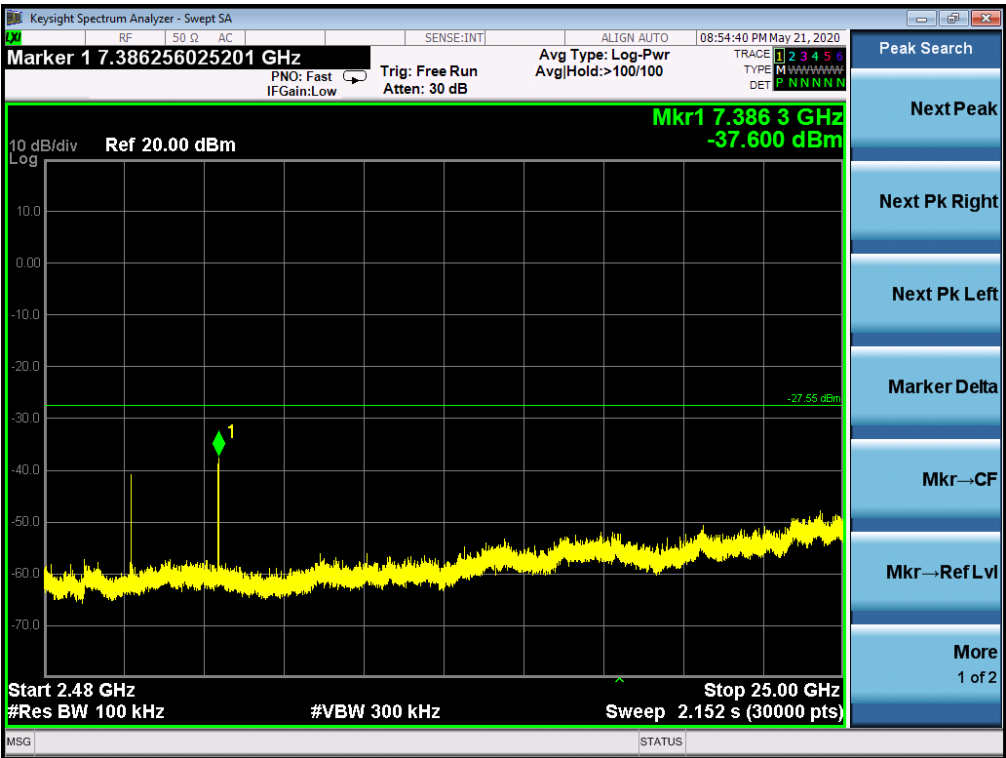
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF 802.11b FOR MODULATION IN MIDDLE CHANNEL



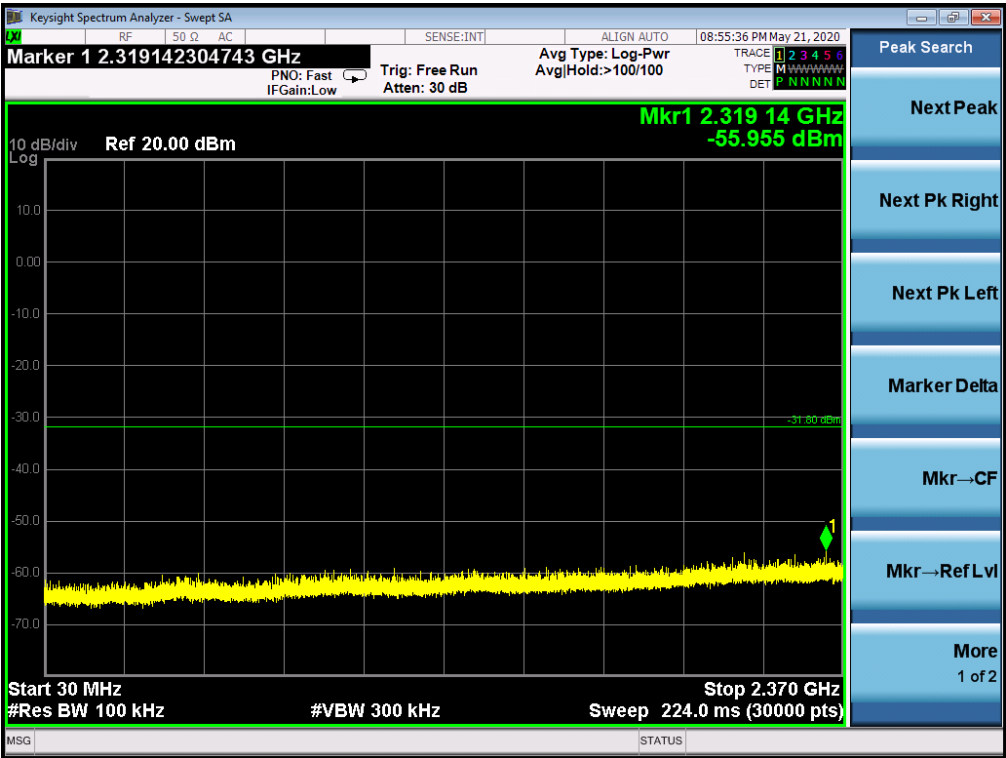


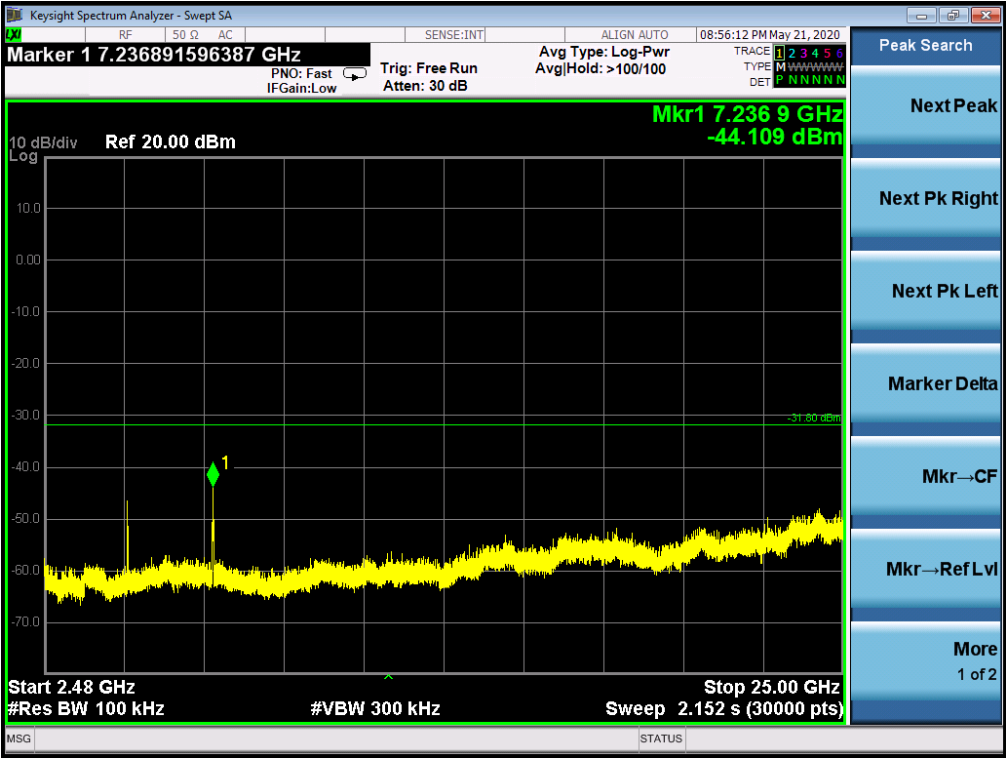
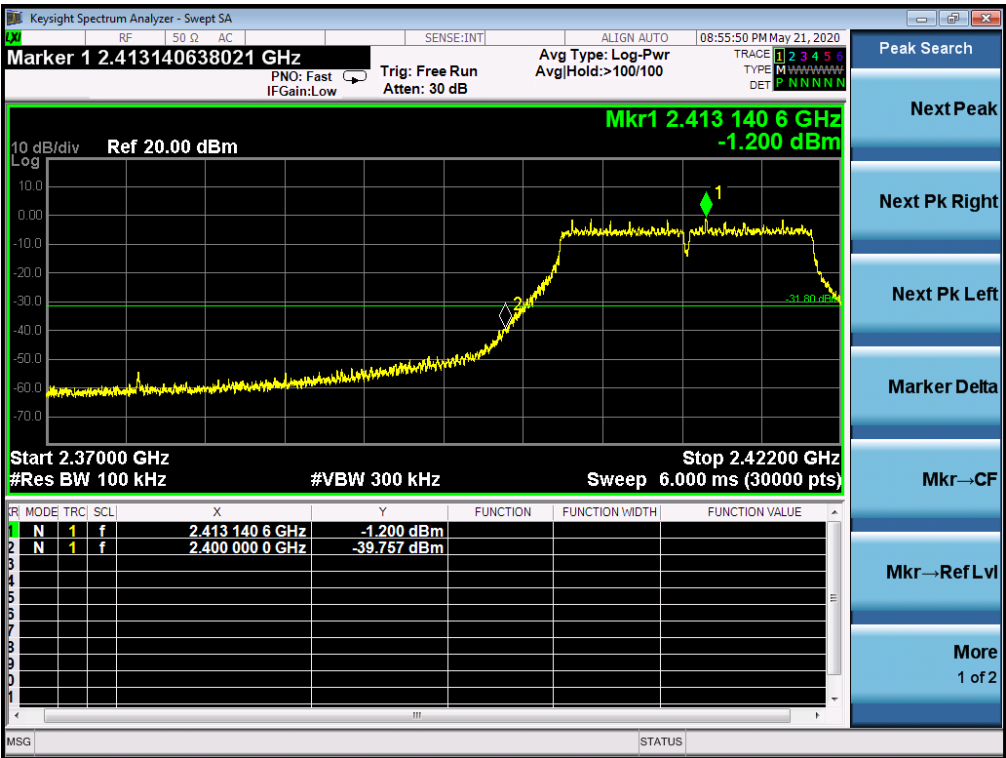
OF 802.11b FOR MODULATION IN HIGH CHANNEL

[illegible]



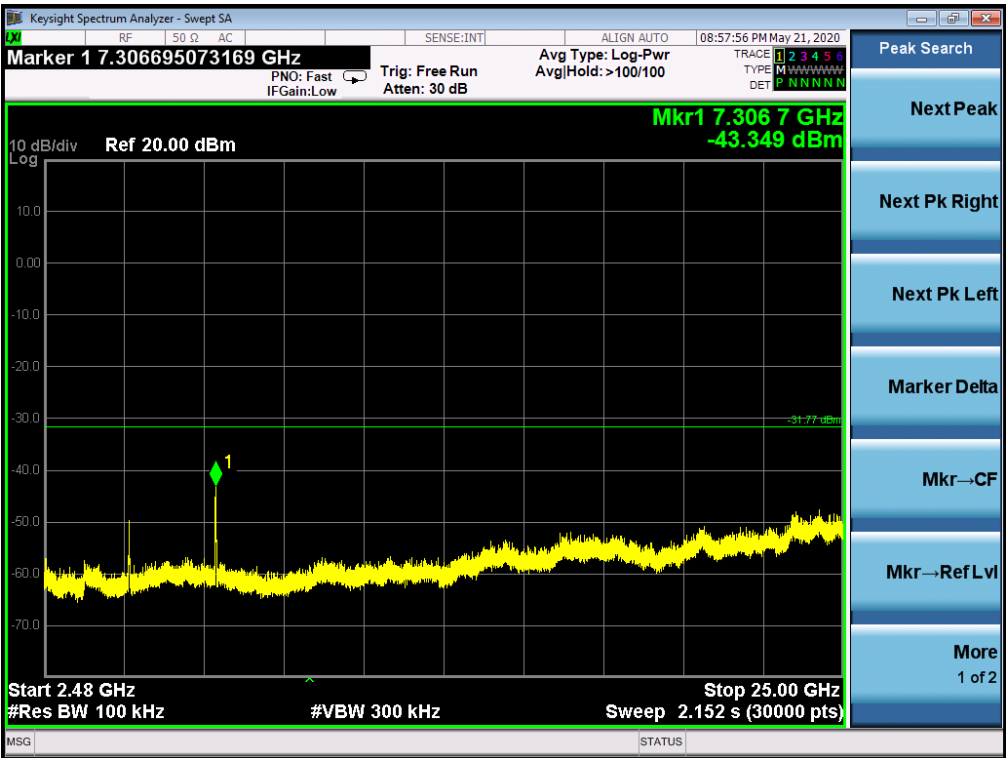
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE
OF 802.11g FOR MODULATION IN LOW CHANNEL





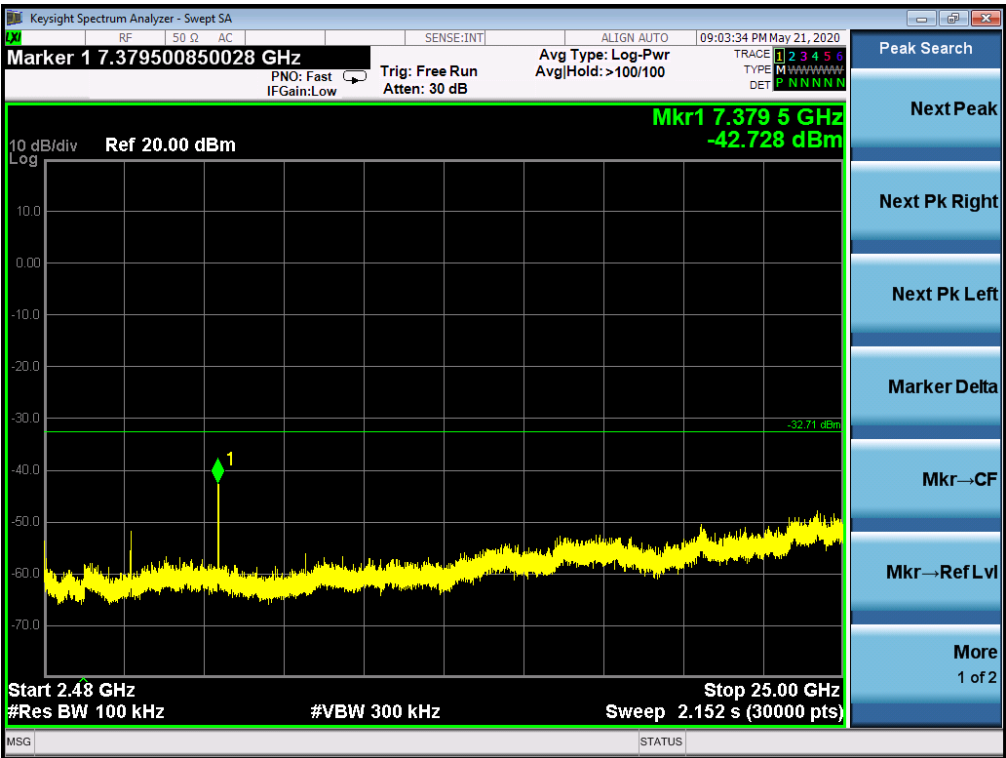
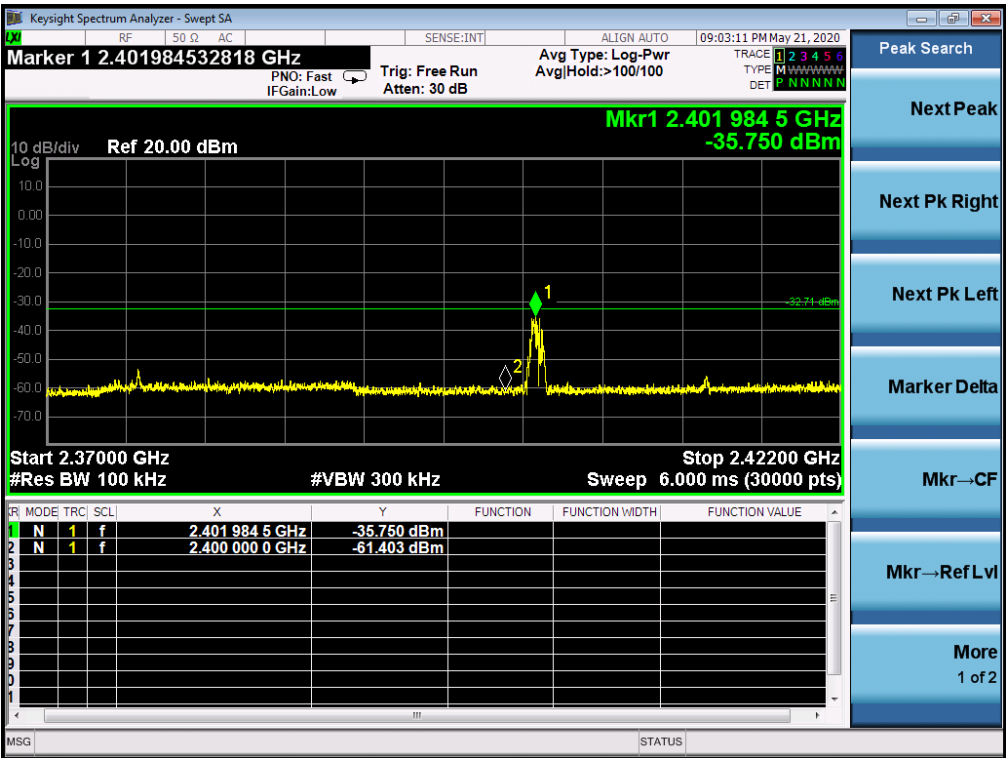
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF 802.11g FOR MODULATION IN MIDDLE CHANNEL



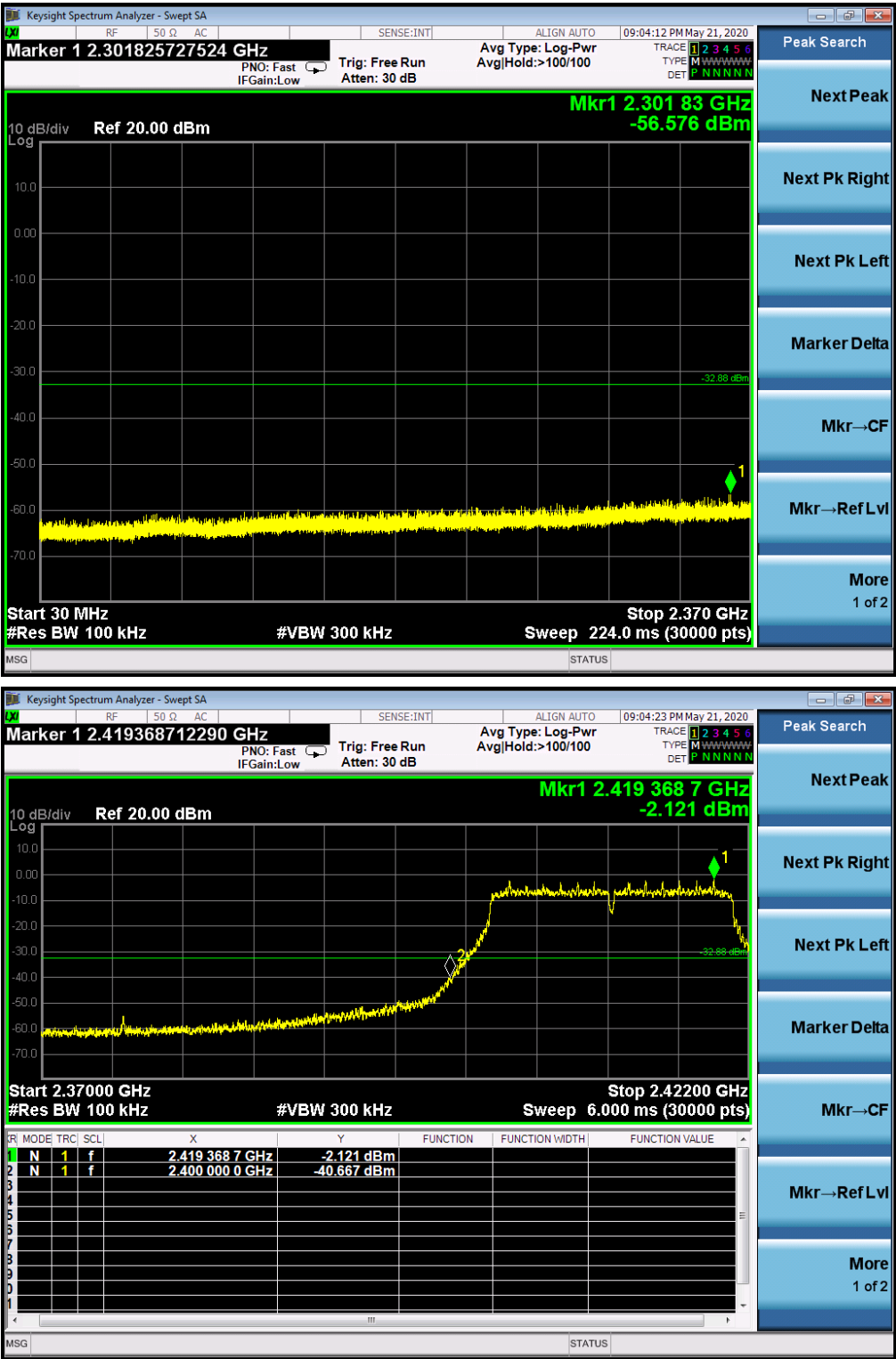


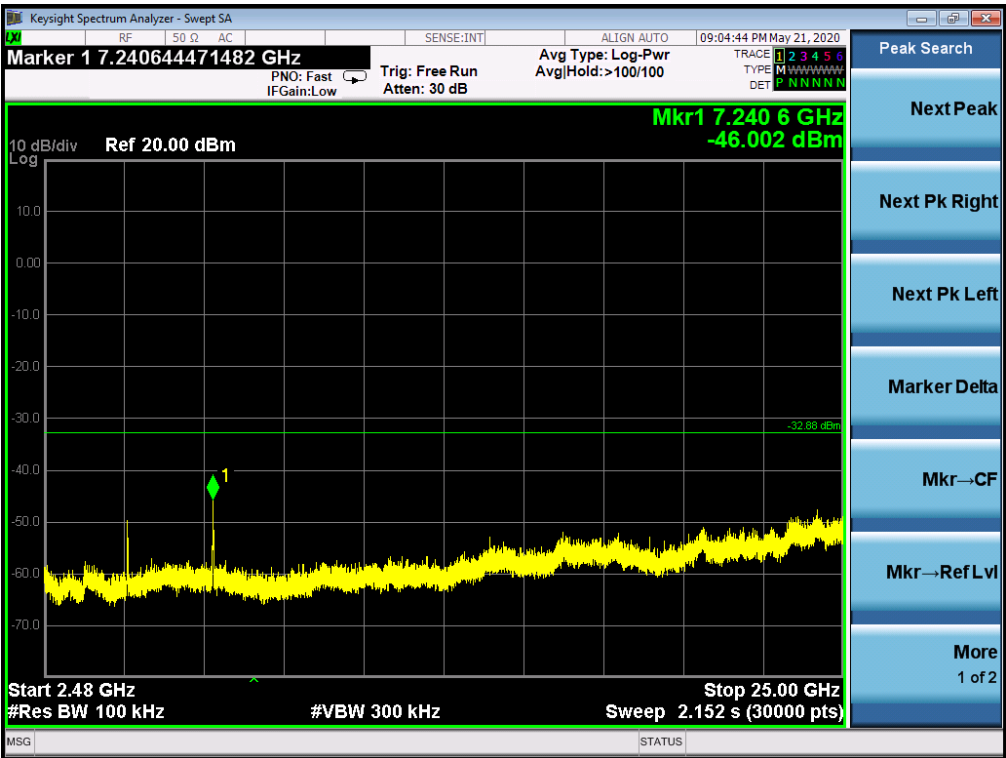
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF 802.11g FOR MODULATION IN HIGH CHANNEL



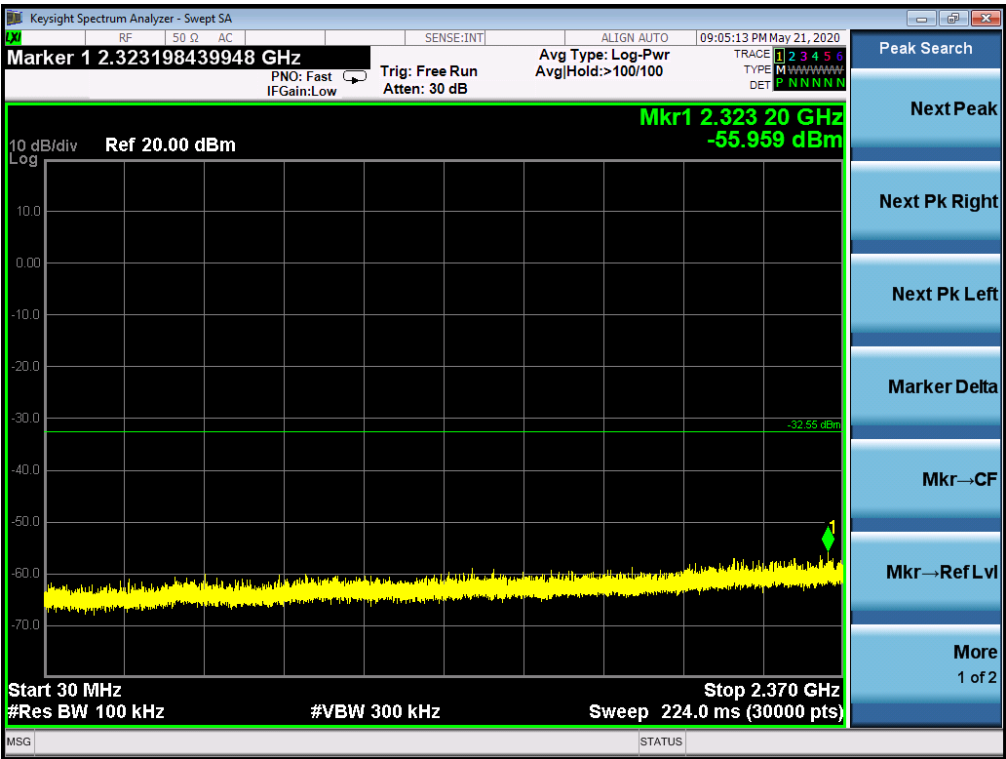


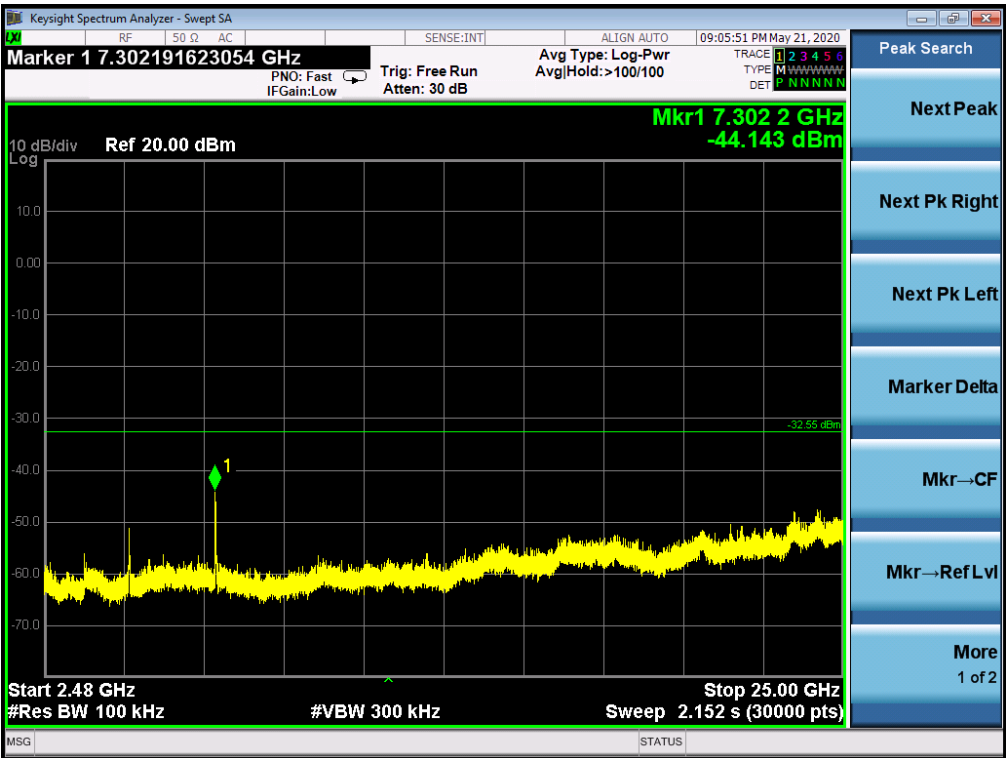
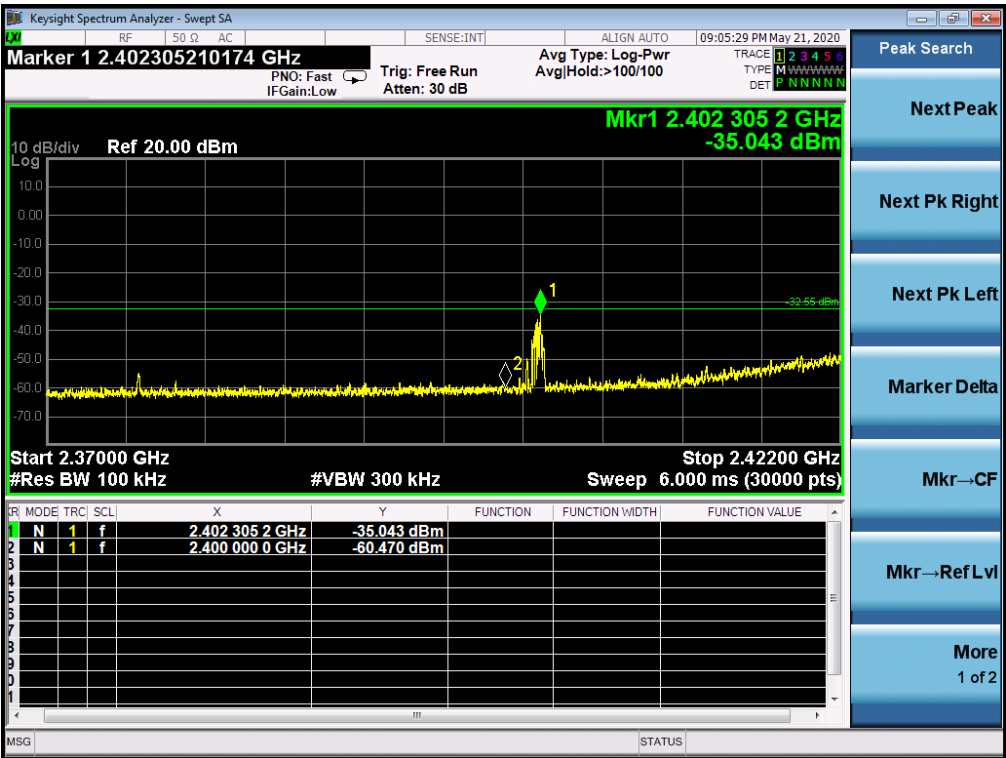
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE
OF 802.11n20 FOR MODULATION IN LOW CHANNEL



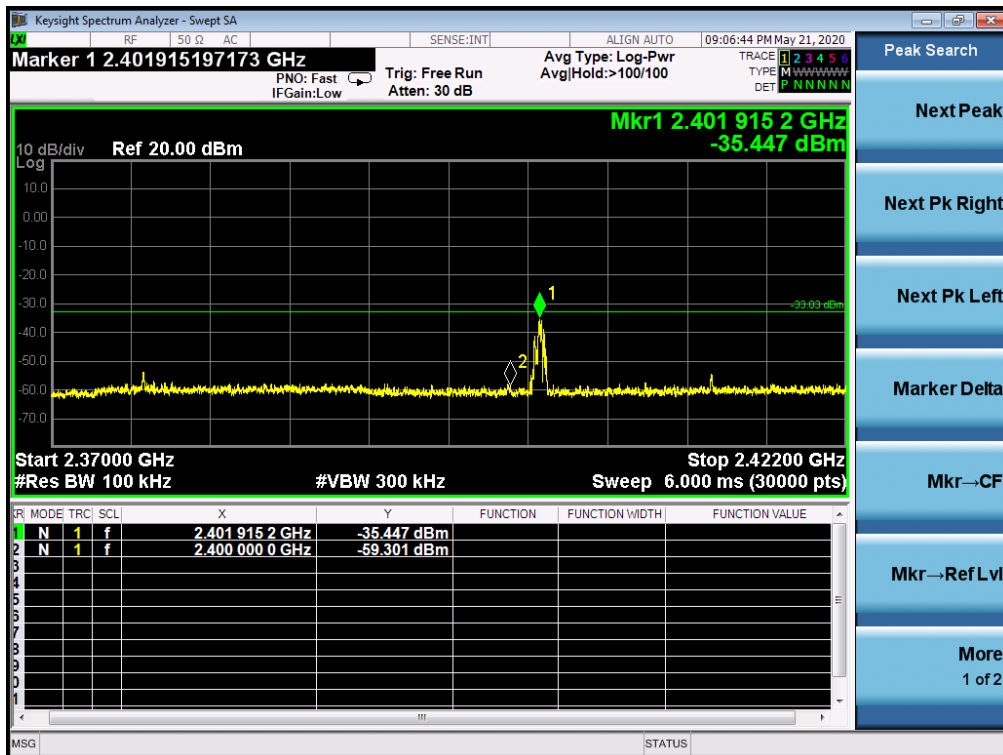
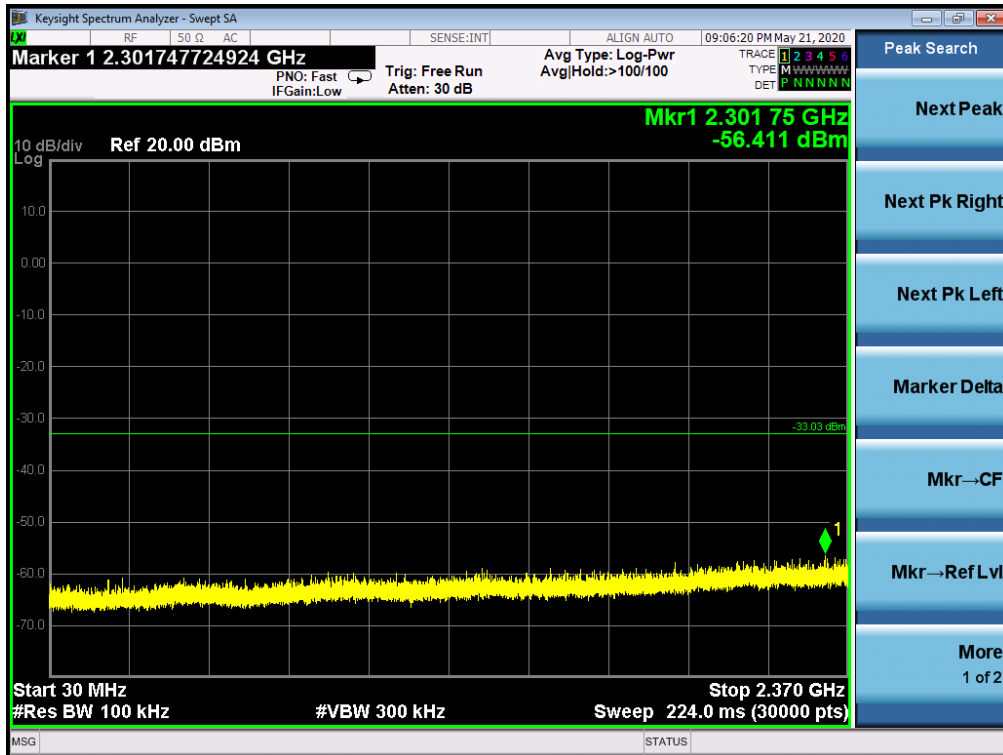


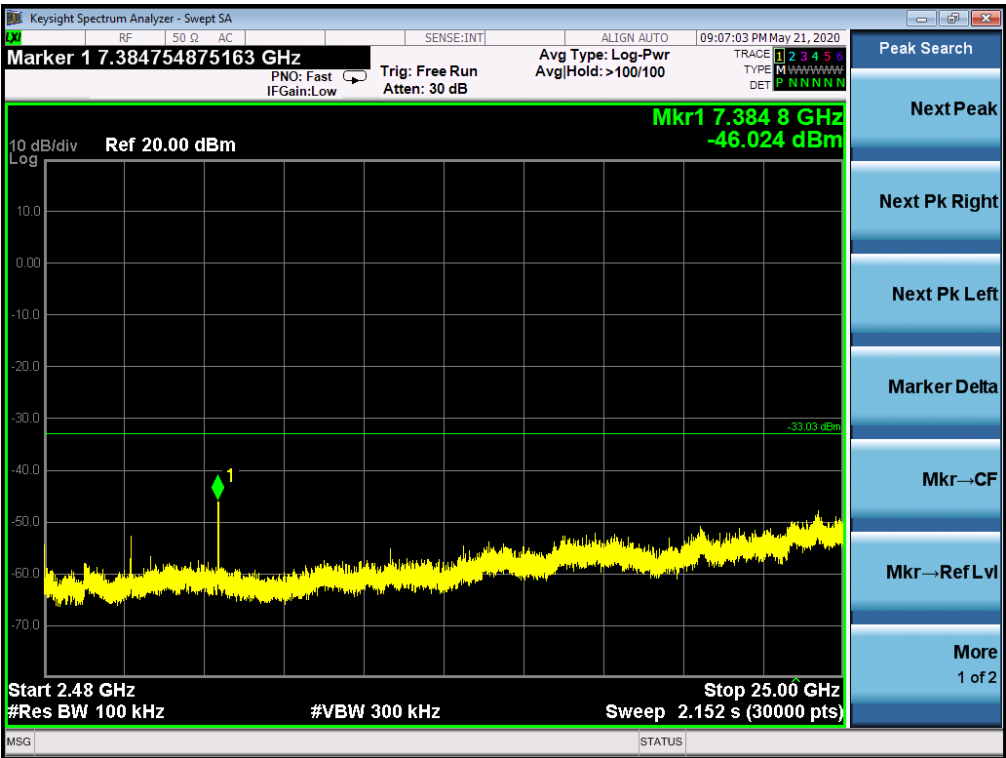
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF 802.11n20 FOR MODULATION IN MIDDLE CHANNEL



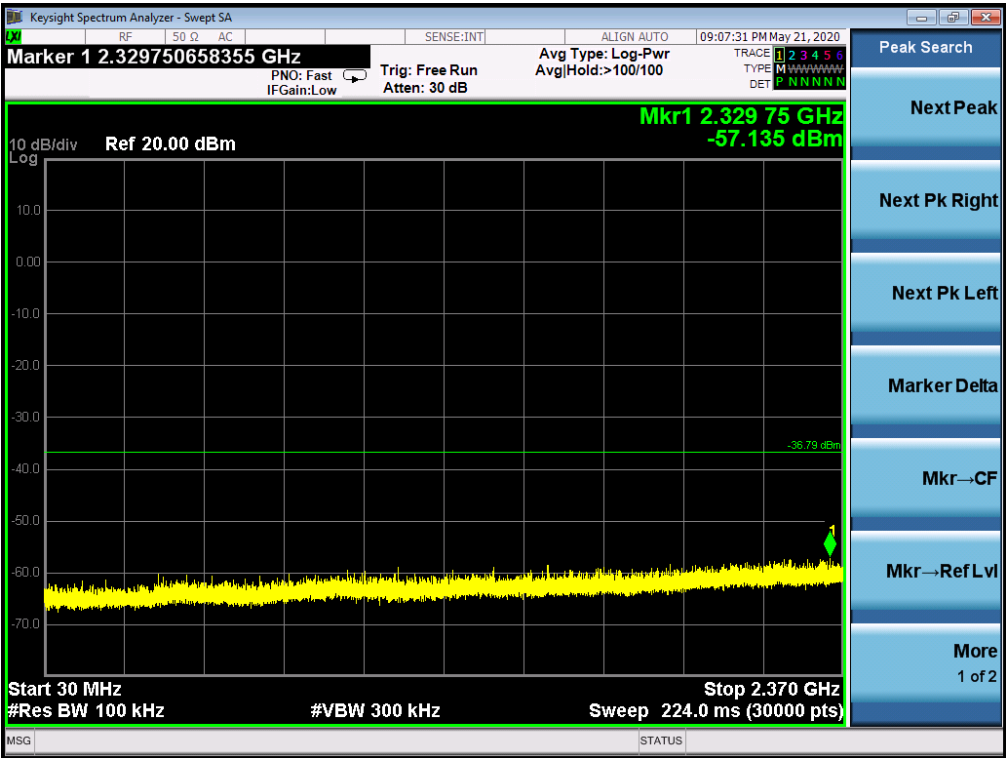


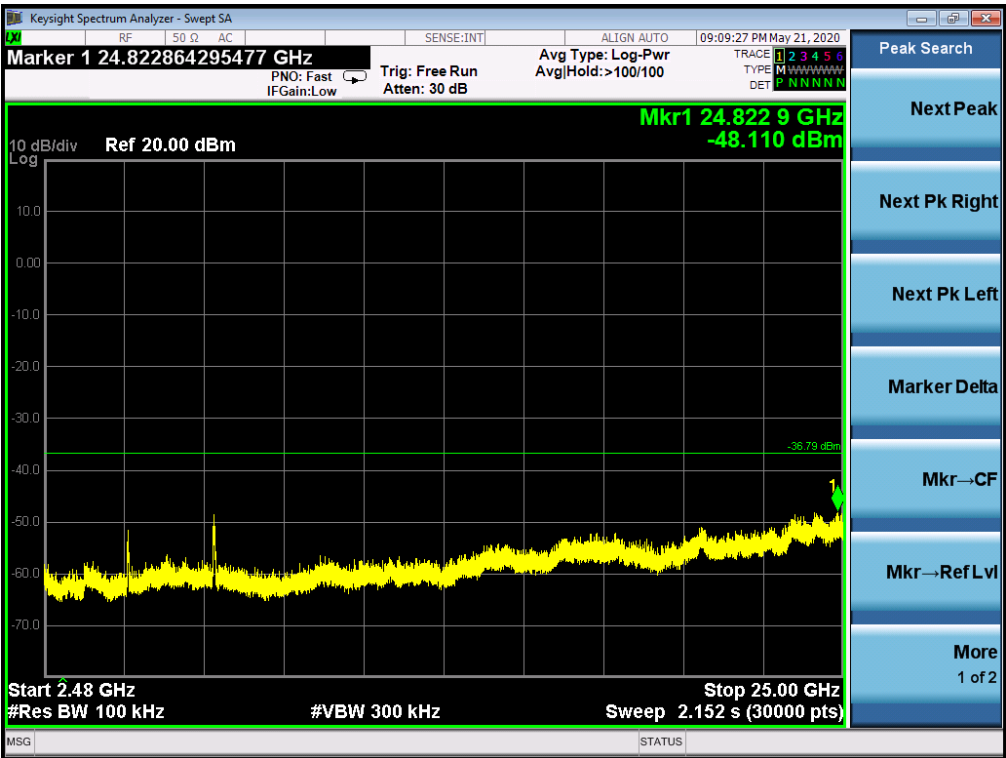
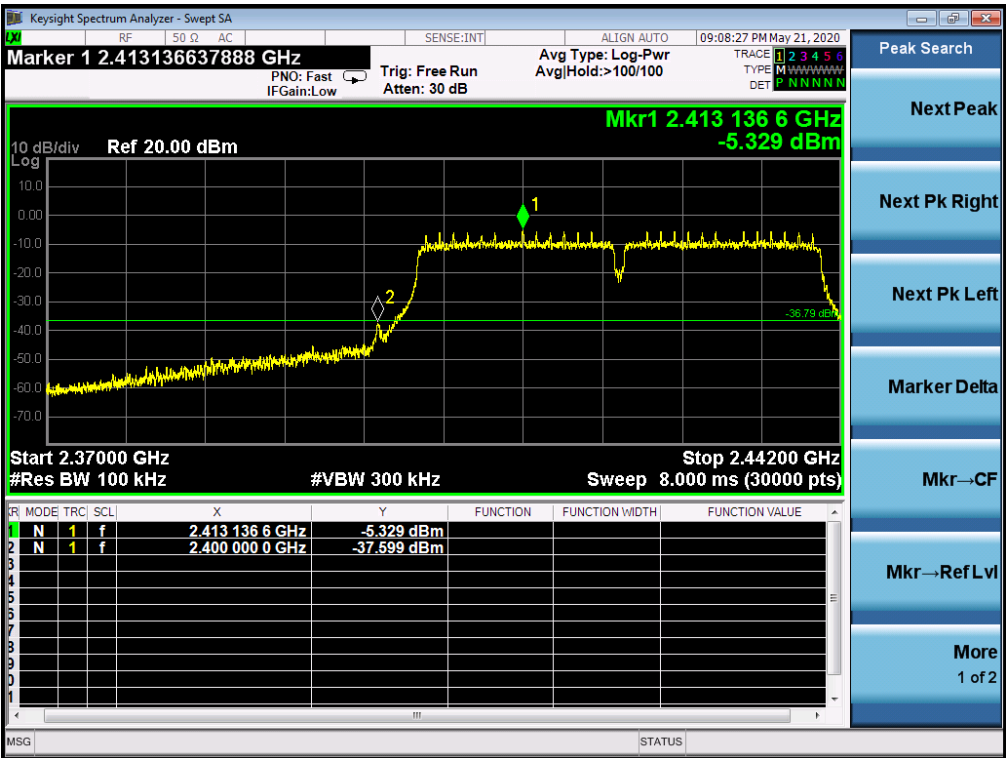
OF 802.11n20 FOR MODULATION IN HIGH CHANNEL

[illegible]

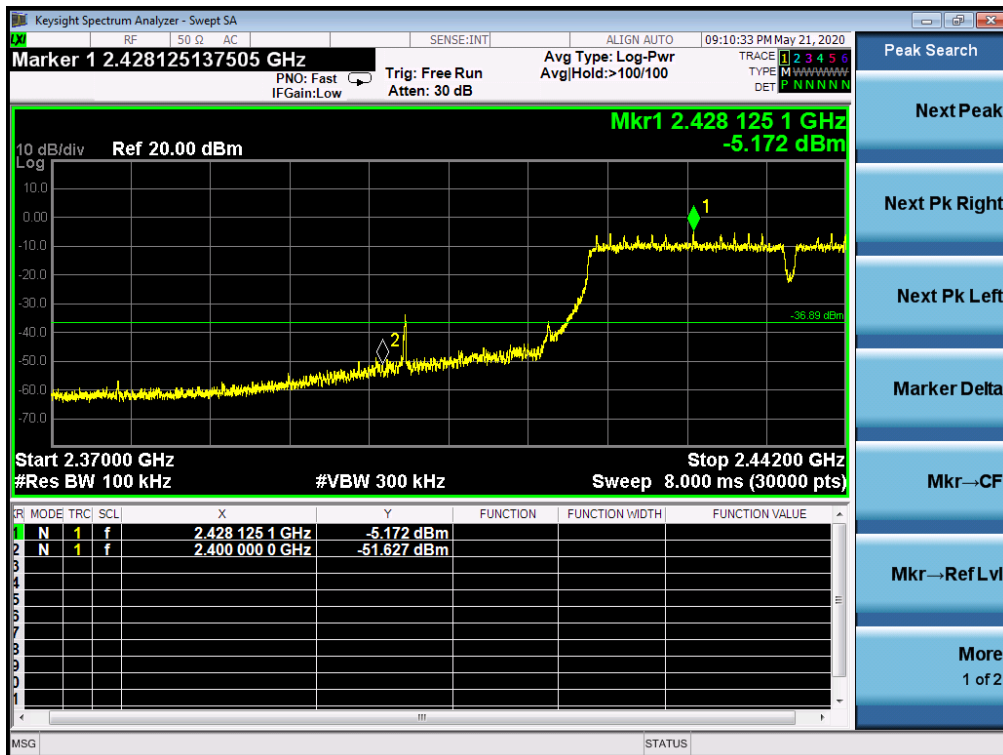
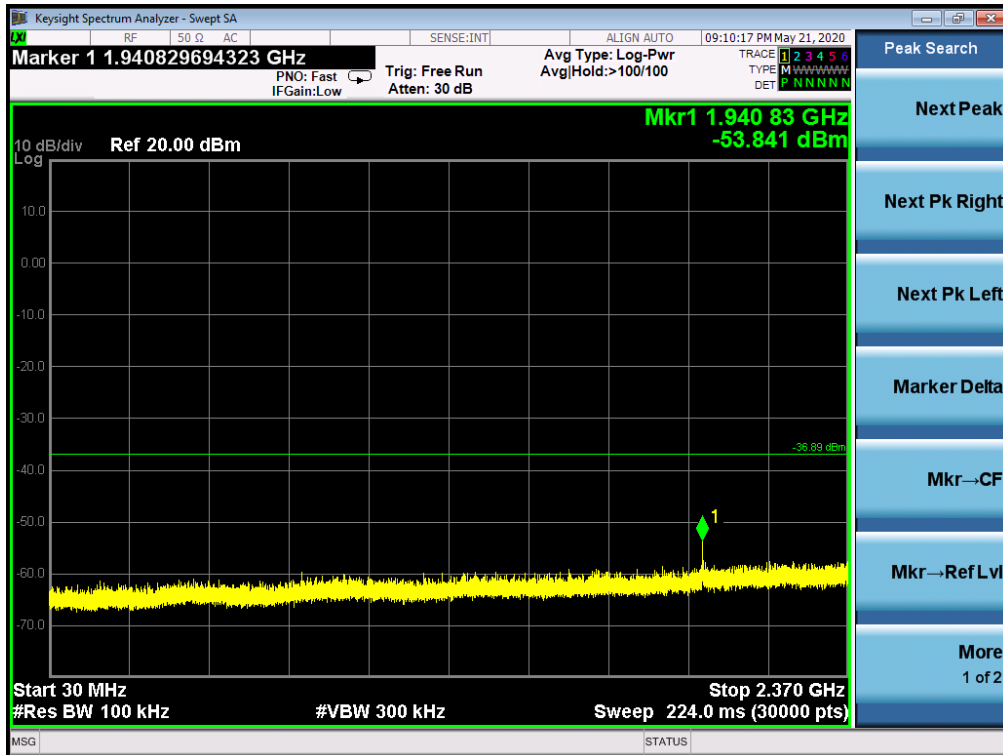


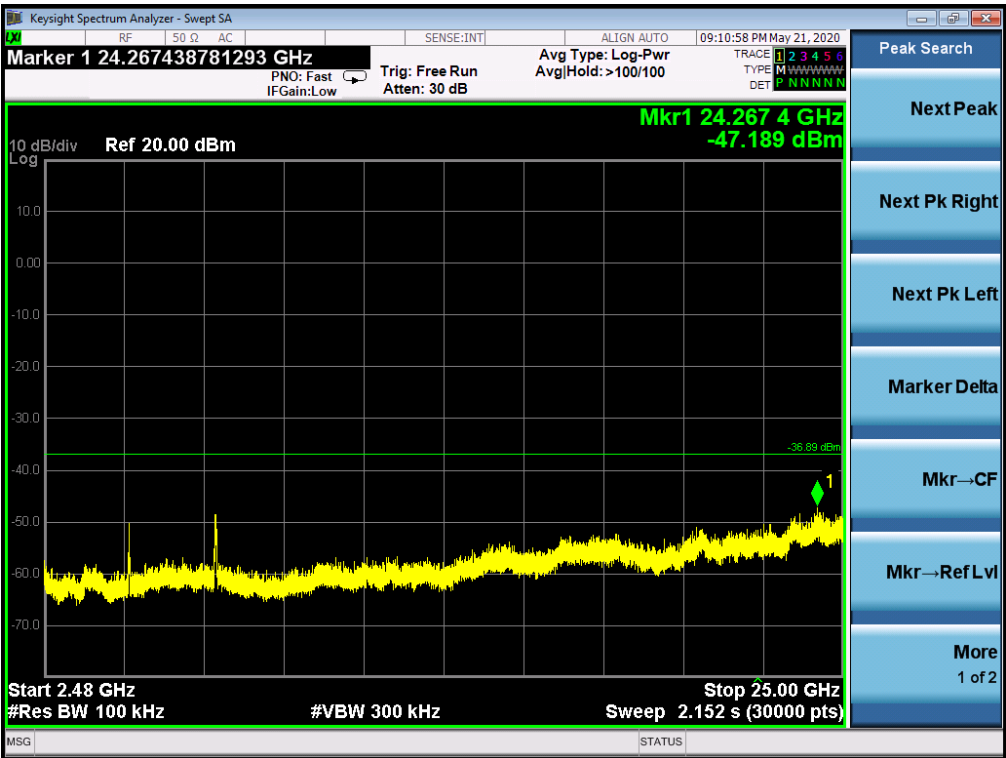
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE
OF 802.11n40 FOR MODULATION IN LOW CHANNEL



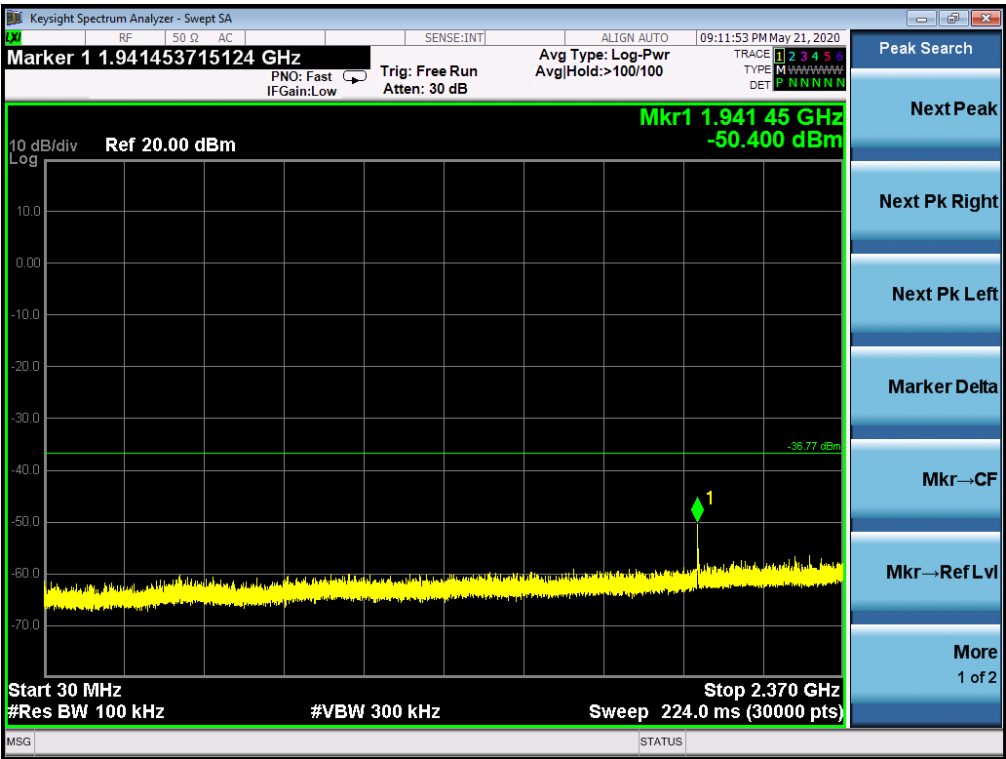


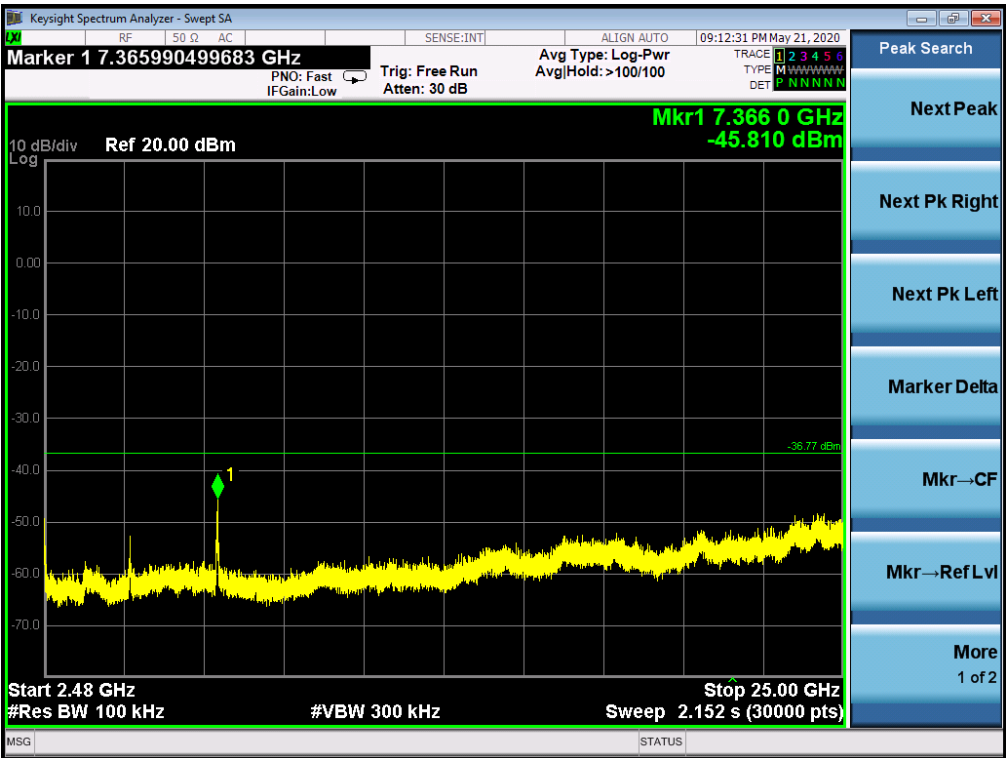
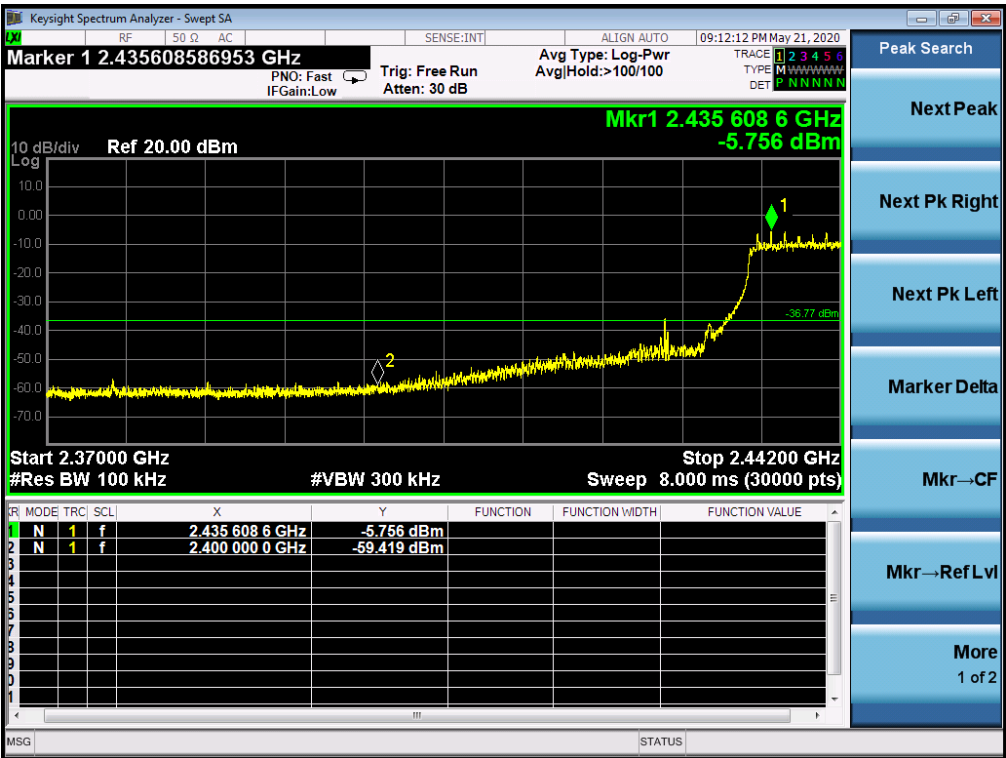
OF 802.11n40 FOR MODULATION IN MIDDLE CHANNEL

[illegible]



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





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

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

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-2.228	8	Pass
Middle Channel	-2.437	8	Pass
High Channel	-3.089	8	Pass

TEST ITEM	POWER SPECTRAL DENSITY
TEST MODE	802.11g with data rate 6

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-6.604	8	Pass
Middle Channel	-6.629	8	Pass
High Channel	-6.853	8	Pass