

FCC Test Report

Report No.: AGC05414191102FE05

FCC ID : 2A1FX-A2
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : DDPai
BRAND NAME : ddpai
MODEL NAME : A2
APPLICANT : DDPai Technology Co., Ltd
DATE OF ISSUE : Dec. 31, 2019
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	/	Dec. 31, 2019	Valid	Initial Release



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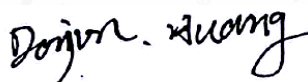
1. VERIFICATION OF CONFORMITY

Applicant	DDPAI Technology Co., Ltd
Address	Floor 12, Yihua finance building, Nanshan software industry park, Xuefu Rd, Nanshan district, Shenzhen, China
Manufacturer	DDPAI Technology Co., Ltd
Address	Floor 12, Yihua finance building, Nanshan software industry park, Xuefu Rd, Nanshan district, Shenzhen, China
Factory	DDPai vision equipment Co.,Ltd
Address	Building A, Futai Industrial Park, Qingfeng south Road, Keyuancheng, Tangxia Town, Dongguan city, Guangdong province, China
Product Designation	DDPai
Brand Name	ddpai
Test Model	A2
Date of test	Dec. 12, 2019 to Dec. 30, 2019
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



Donjon Huang
(Project Engineer)

Dec. 30, 2019

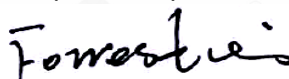
Reviewed By



Max Zhang
(Reviewer)

Dec. 31, 2019

Approved By



Forrest Lei
(Authorized Officer)

Dec. 31, 2019

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as “DDPa”. 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 802.11b:16.53dBm; IEEE 802.11g:13.52dBm; IEEE 802.11n(20):13.27dBm; IEEE 802.11n(40):12.63dBm
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
Number of channels	11 channels for 802.11b/g/n20 7 channels for 802.11n40
Hardware Version	V1.0
Software Version	V1.0
Antenna Designation	Integral Antenna
Antenna Gain	2.3dBi
Power Supply	DC 12V 0.5A

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)	
					20MHz	40MHz	20MHz	40MHz	800nsGI	800nsGI
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: **2AJFX-A2** 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 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)	

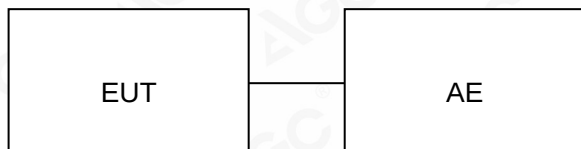
Note:

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 SecureCRT_x86_7.0.4.537_PortableSoft which can set the EUT into the individual test modes

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure :



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	DDPai	A2	2AJFX-A2	EUT
2	USB Cable	N/A	3.0m, Unshielded	AE
3	TF	SanDisk	C10 A1	AE
4	car battery	N/A	DC 12V 0.5A	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	AC Power Line Conduction Emission	N/A

Note: The DDPai used in the car

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 RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.12, 2019	Jun. 11, 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec.11, 2020
Power sensor	Aglient	U2021XA	MY54110007	Sep. 09, 2019	Sep. 08, 2020
2.4GHz Fliter	EM Electronics	2400-2500	N/A	Feb. 27, 2019	Feb. 26, 2020
Attenuator	Warriors	W13	11324	Sep. 09, 2019	Sep. 08, 2020
Horn antenna	ETS-LINDGREN	3117	00154520	Oct. 26, 2019	Oct. 25, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2018	Jun. 13, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 14, 2020
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	FARA	EZ EMC (Ver. RA-03A)	N/A	N/A	N/A

7. OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

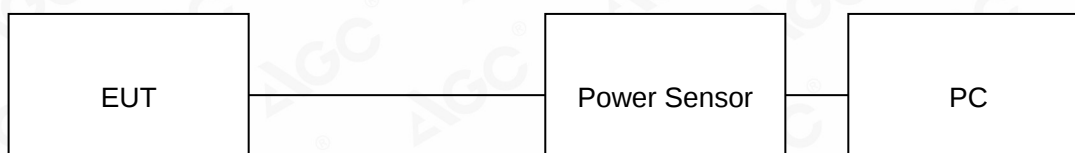
For average power test:

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	16.34	30	Pass
2.437	16.18	30	Pass
2.462	16.53	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	13.52	30	Pass
2.437	12.59	30	Pass
2.462	12.37	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	13.27	30	Pass
2.437	12.84	30	Pass
2.462	12.75	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	12.63	30	Pass
2.437	12.18	30	Pass
2.452	12.24	30	Pass



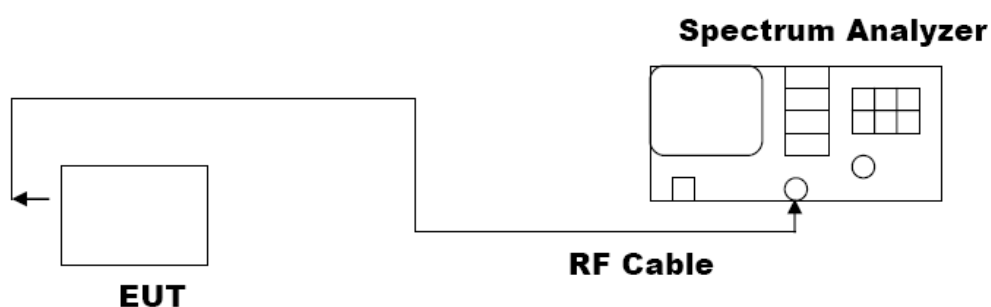
8. 6 DB BANDWIDTH

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	9.064	PASS
	Middle Channel	9.087	PASS
	High Channel	9.061	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	16.53	PASS
	Middle Channel	16.54	PASS
	High Channel	16.54	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	17.80	PASS
	Middle Channel	17.79	PASS
	High Channel	17.77	PASS

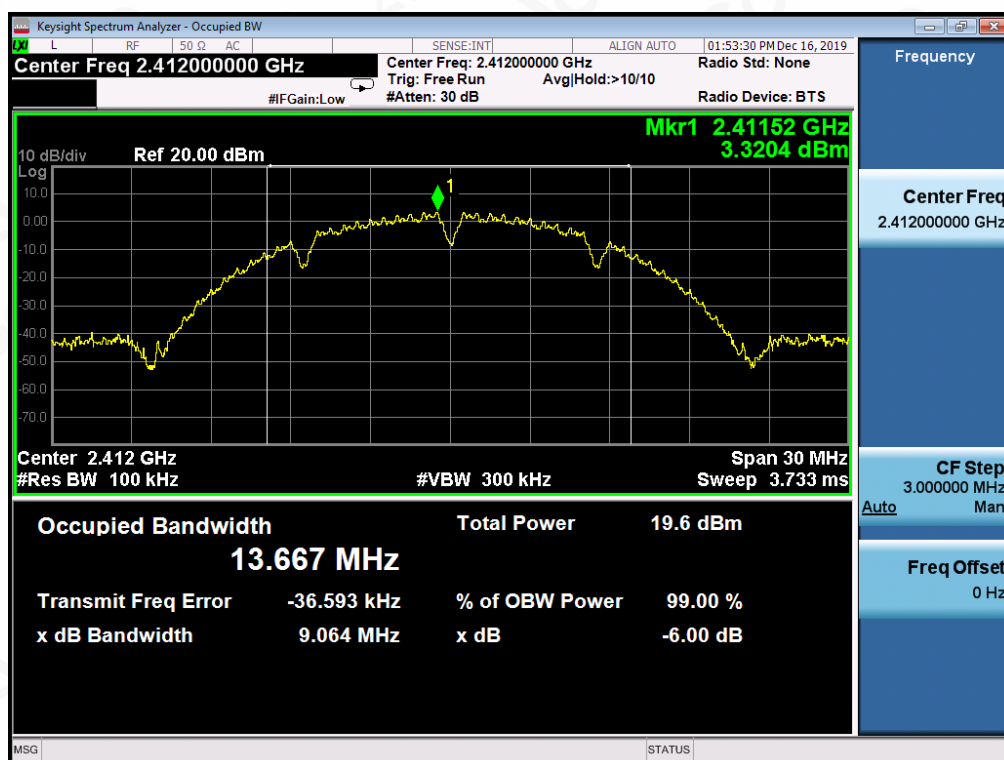
TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11n 40 with data rate 135

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	36.45	PASS
	Middle Channel	36.45	PASS
	High Channel	36.44	PASS

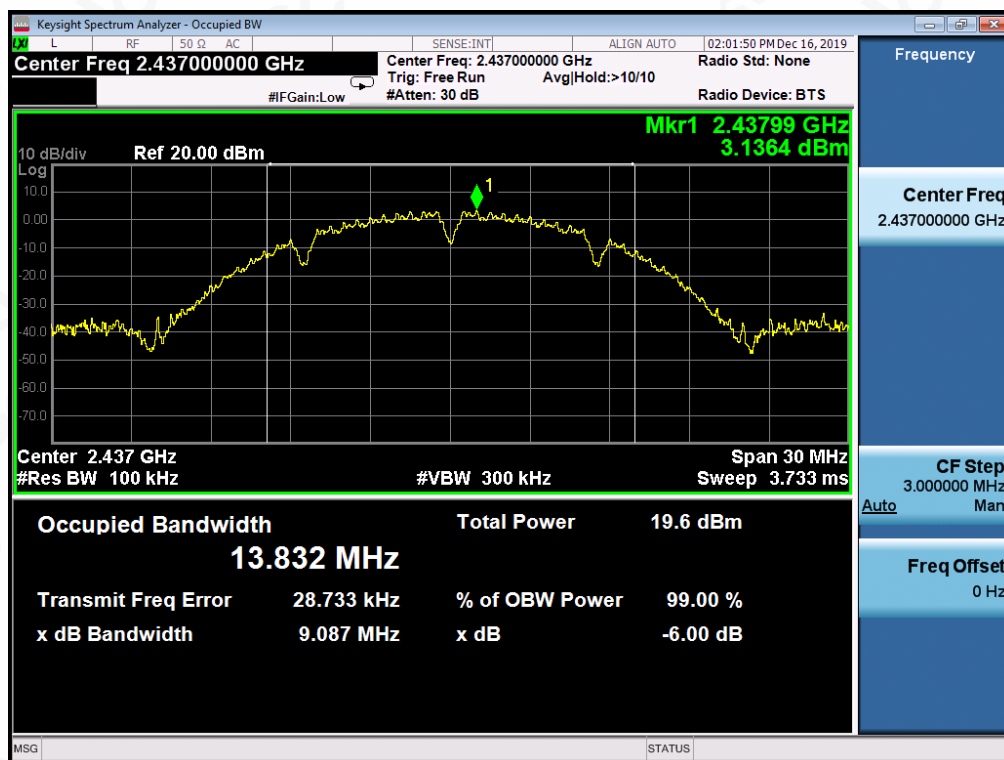


802.11b TEST RESULT

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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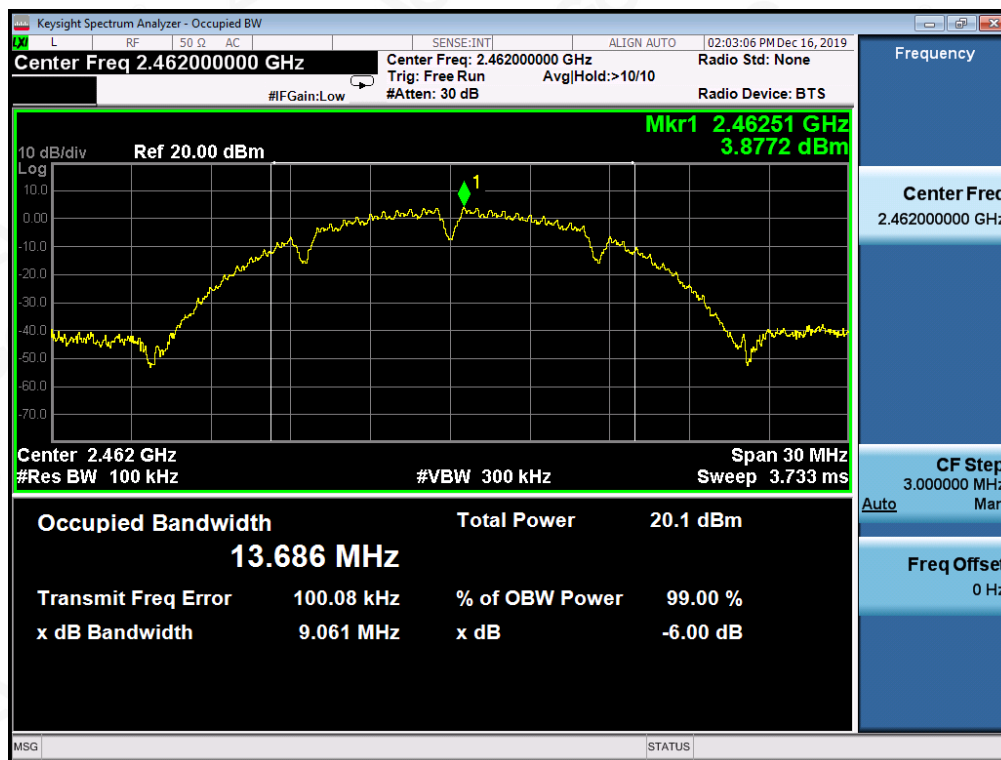
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

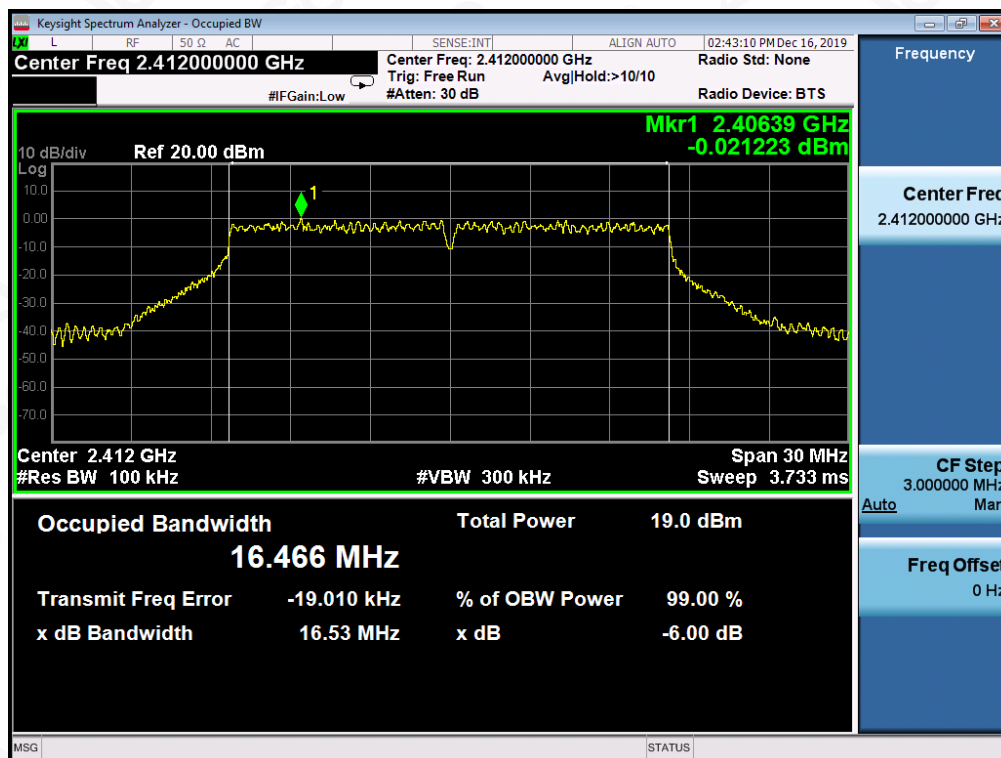
Service Hotline: 400 089 2118

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

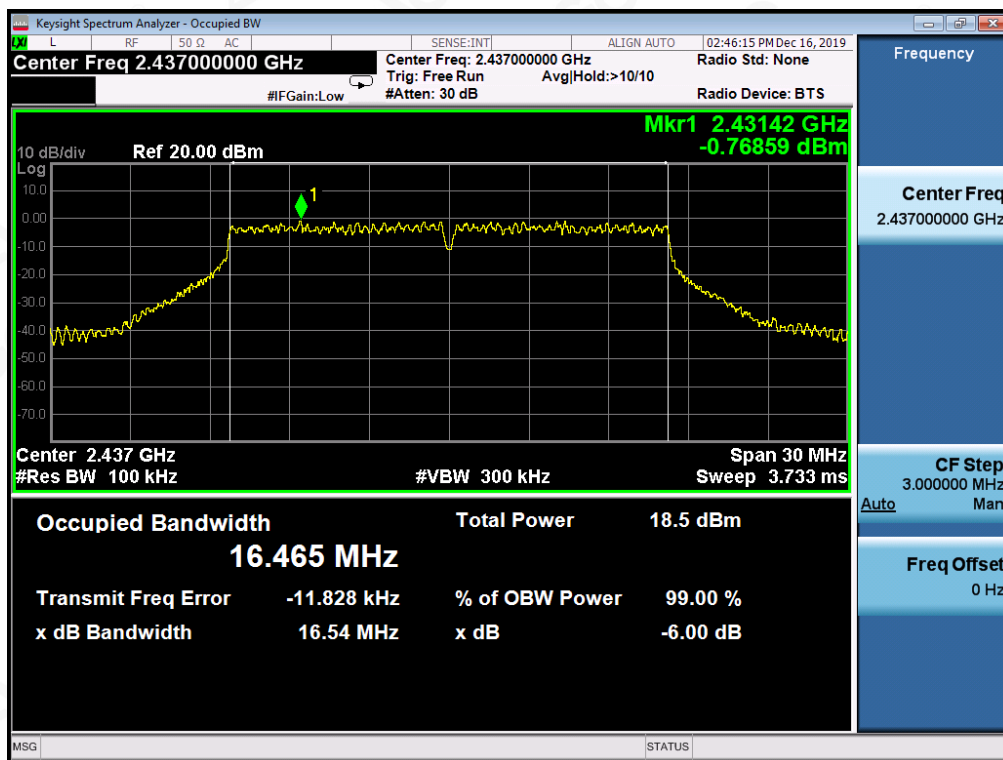


802.11g TEST RESULT

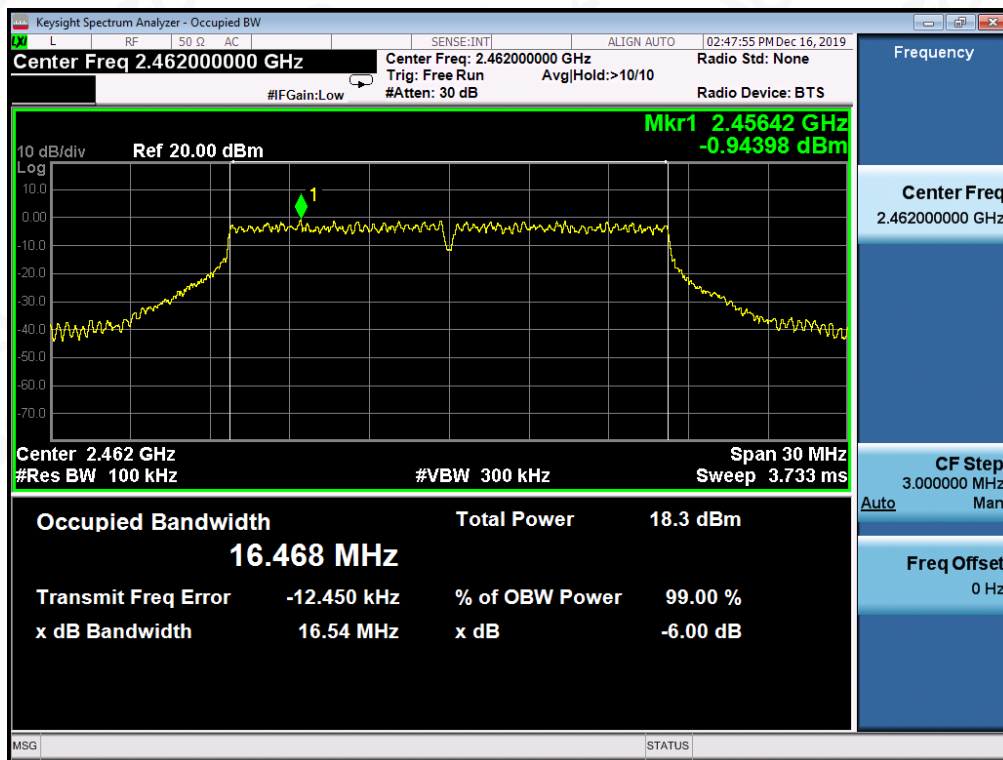
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

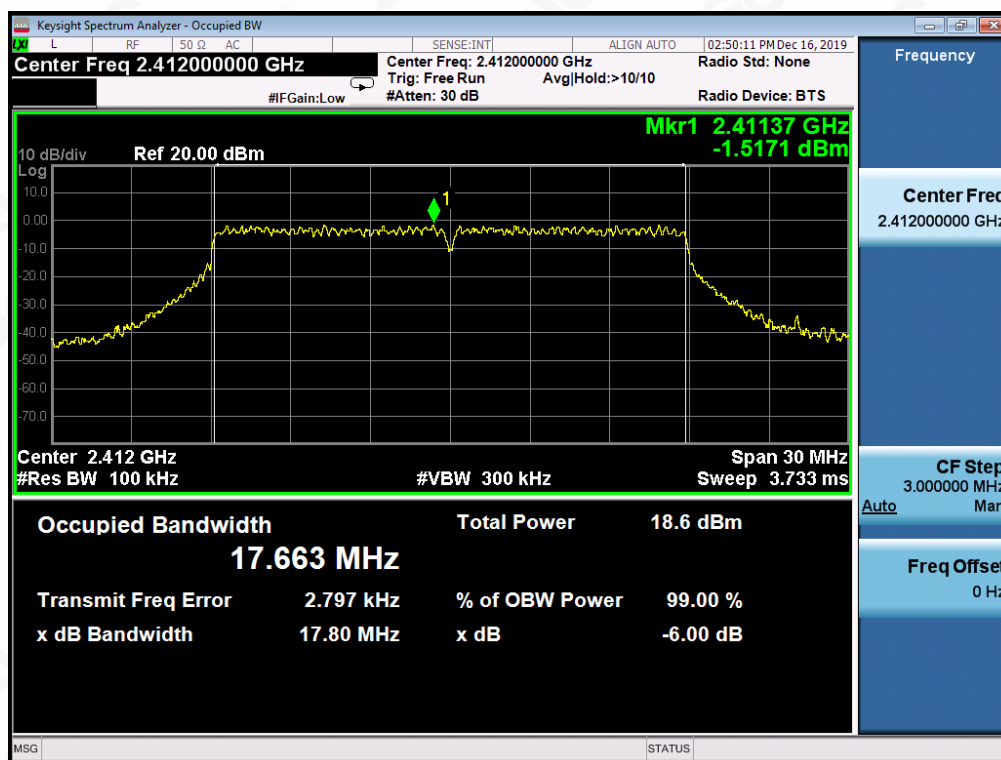


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

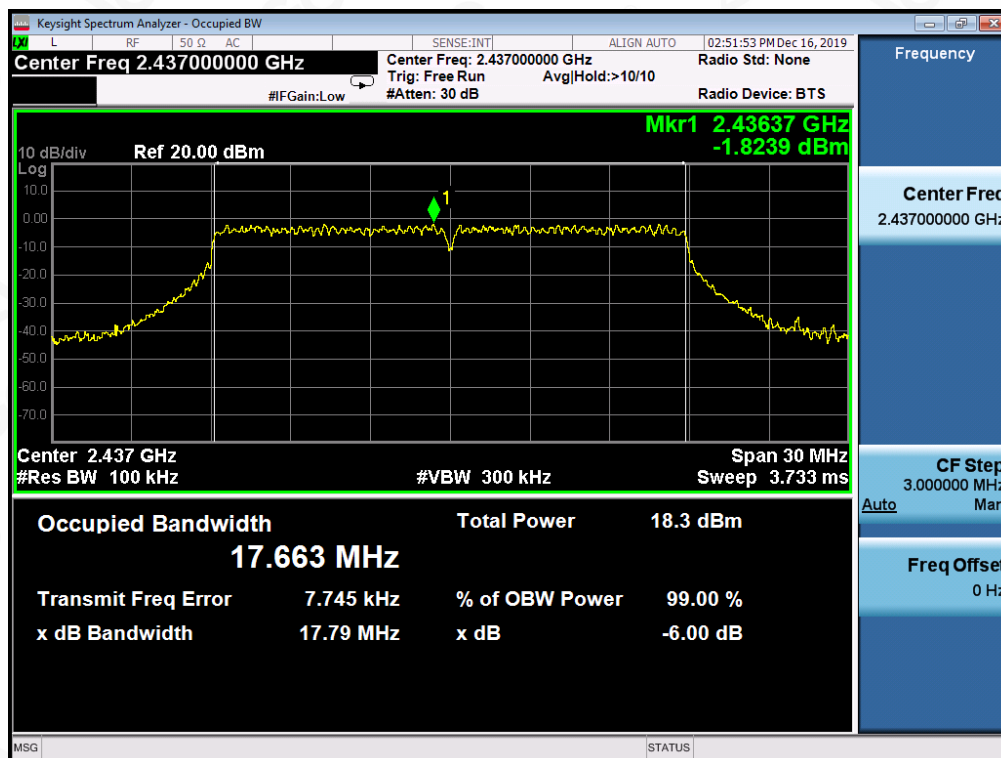


802.11n (20) TEST RESULT

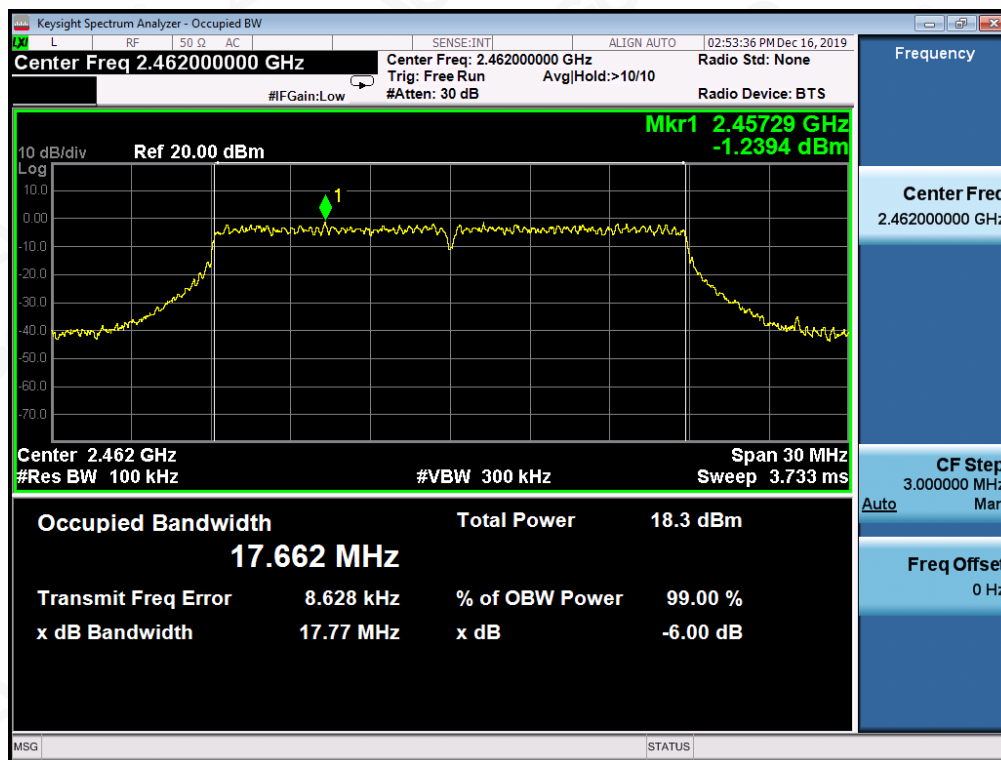
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

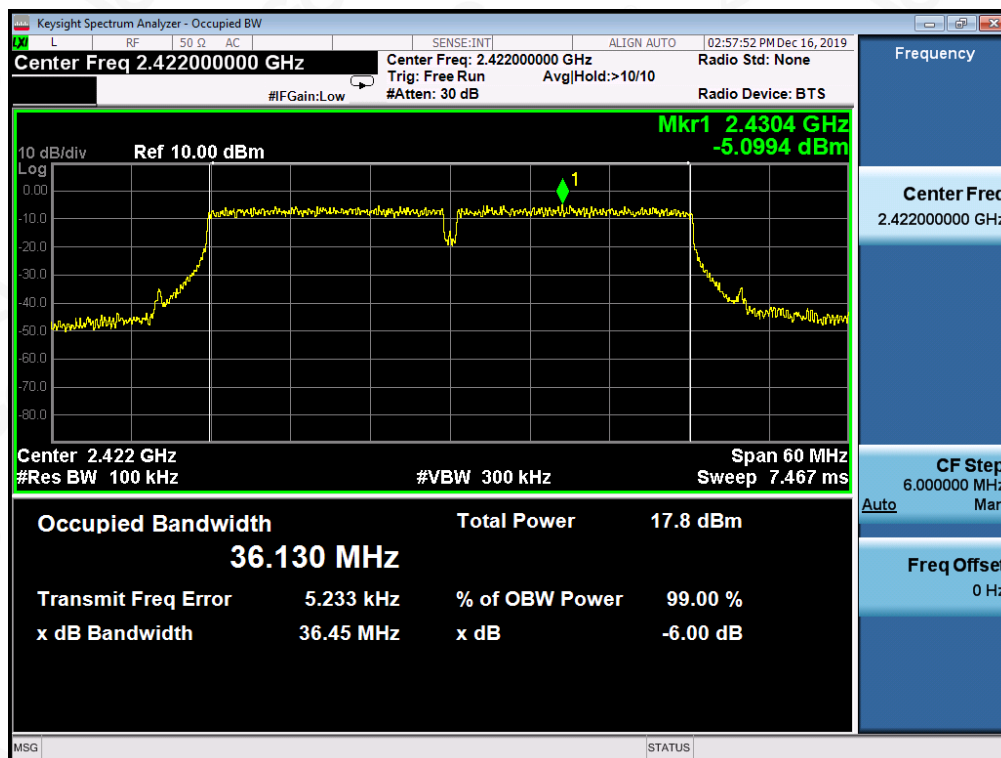


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



802.11n (40) TEST RESULT

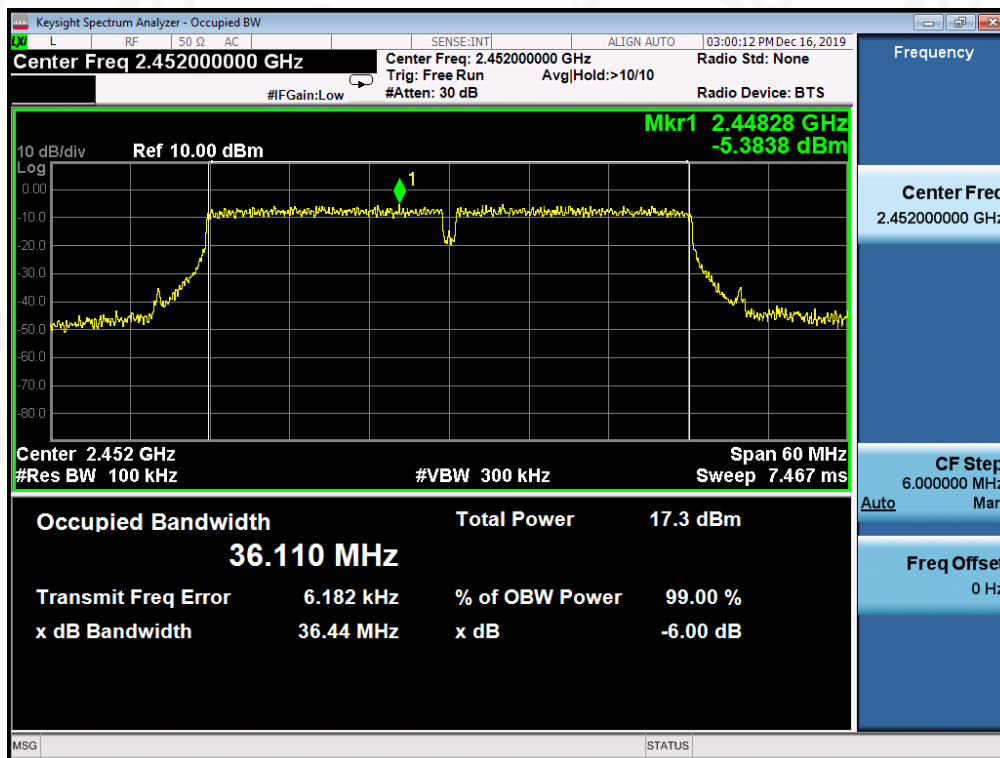
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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.

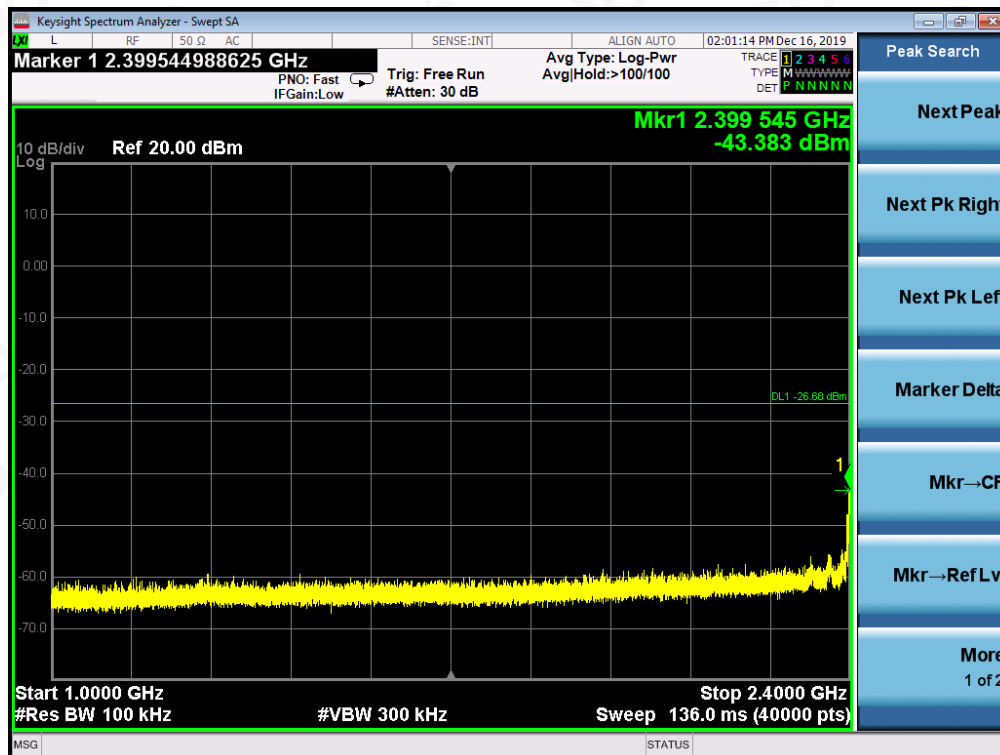
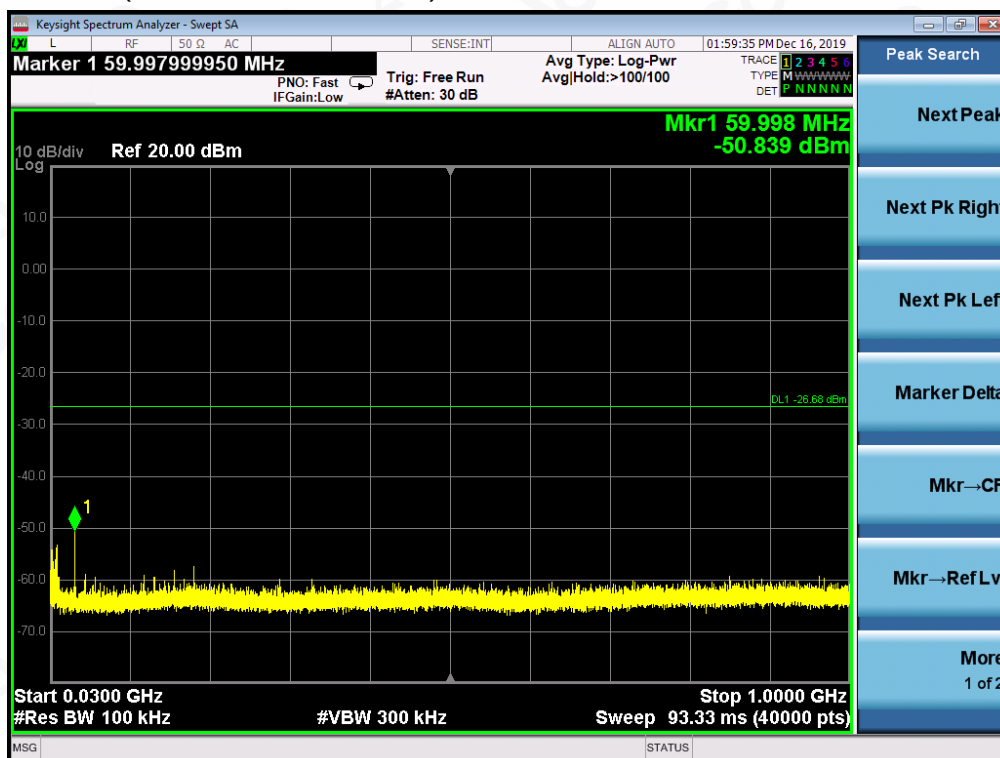
9.3. MEASUREMENT EQUIPMENT USED

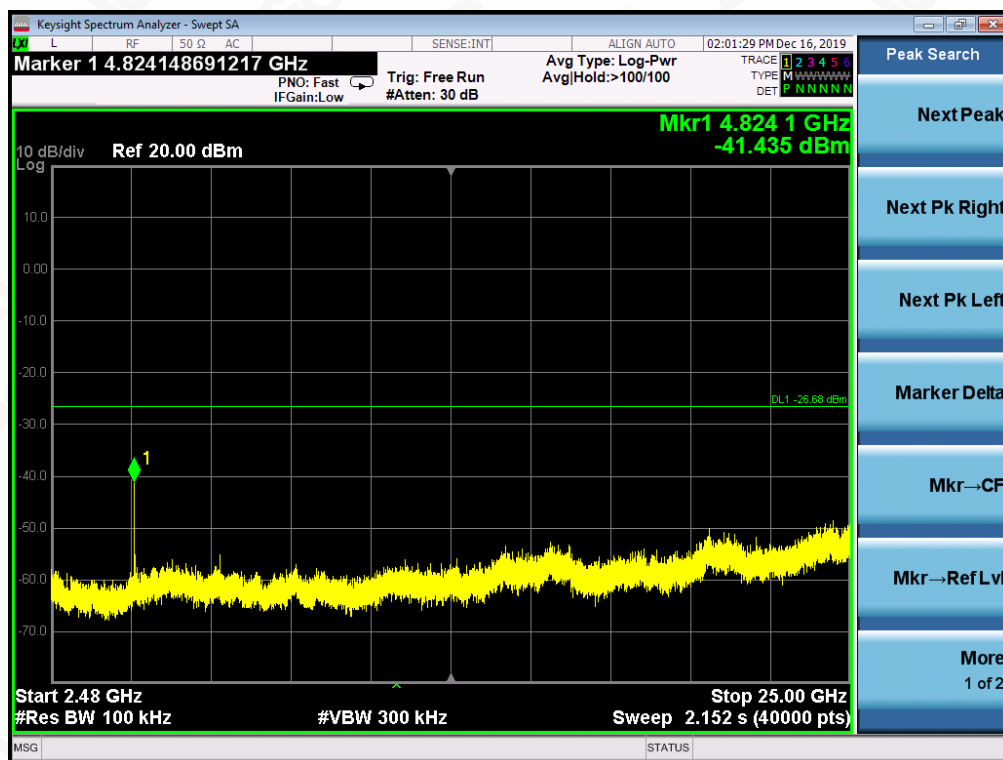
The same as described in section 6.

9.4. LIMITS AND MEASUREMENT RESULT

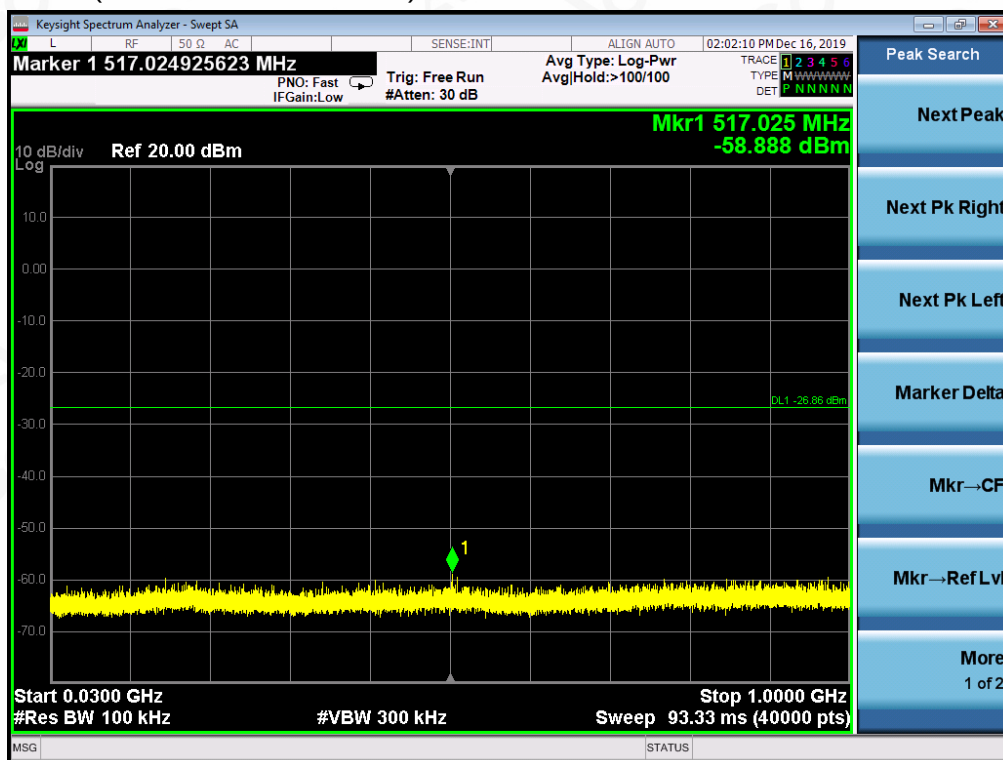
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 30 dB below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

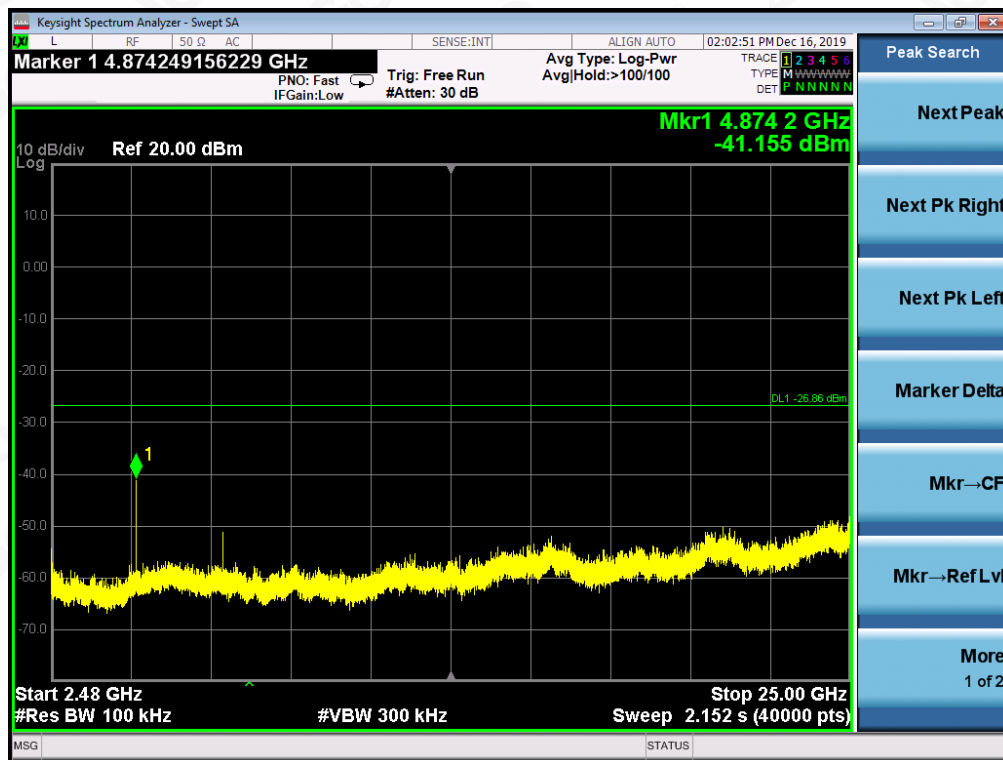
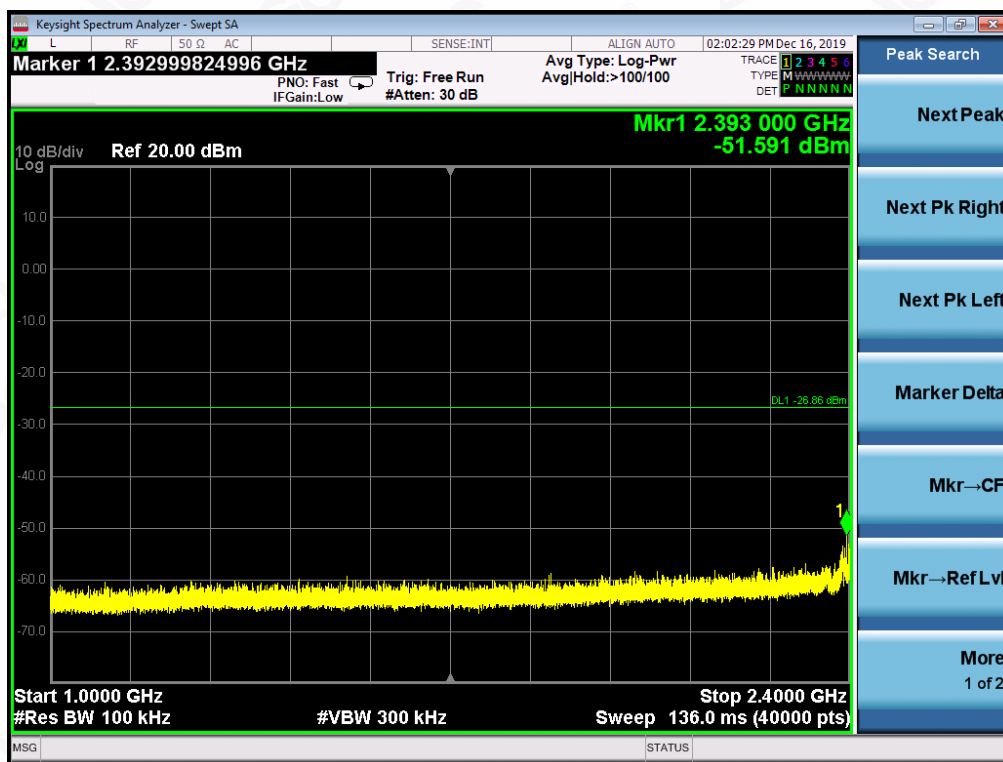
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE
OF (802.11b with data rate 1) FOR MODULATION IN LOW CHANNEL



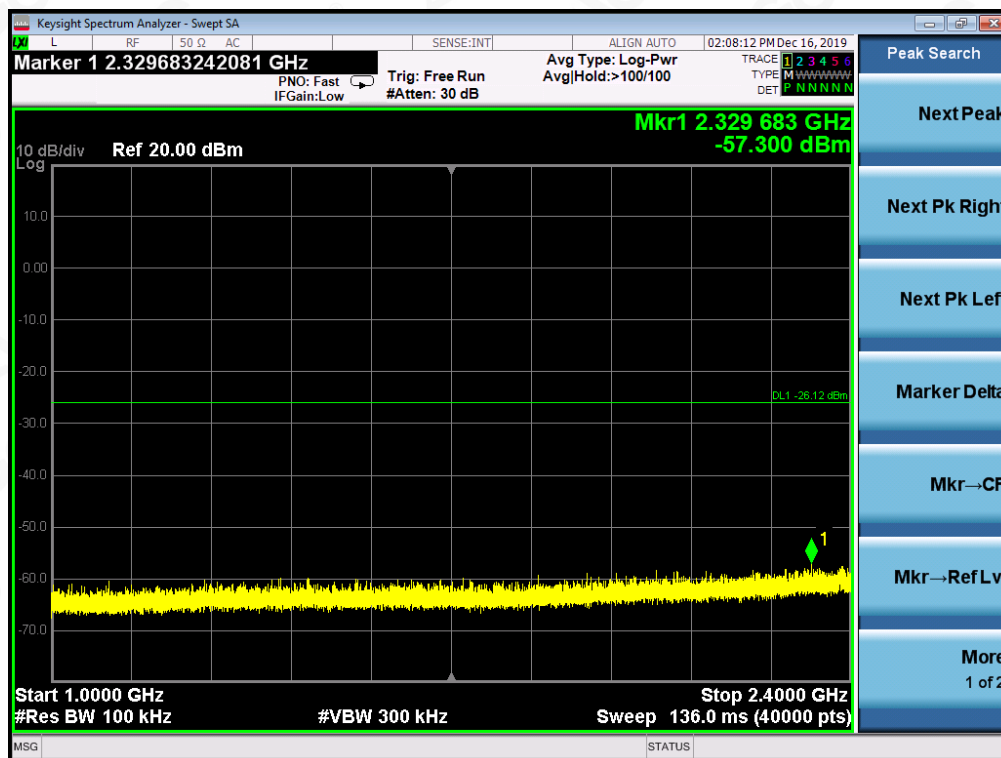
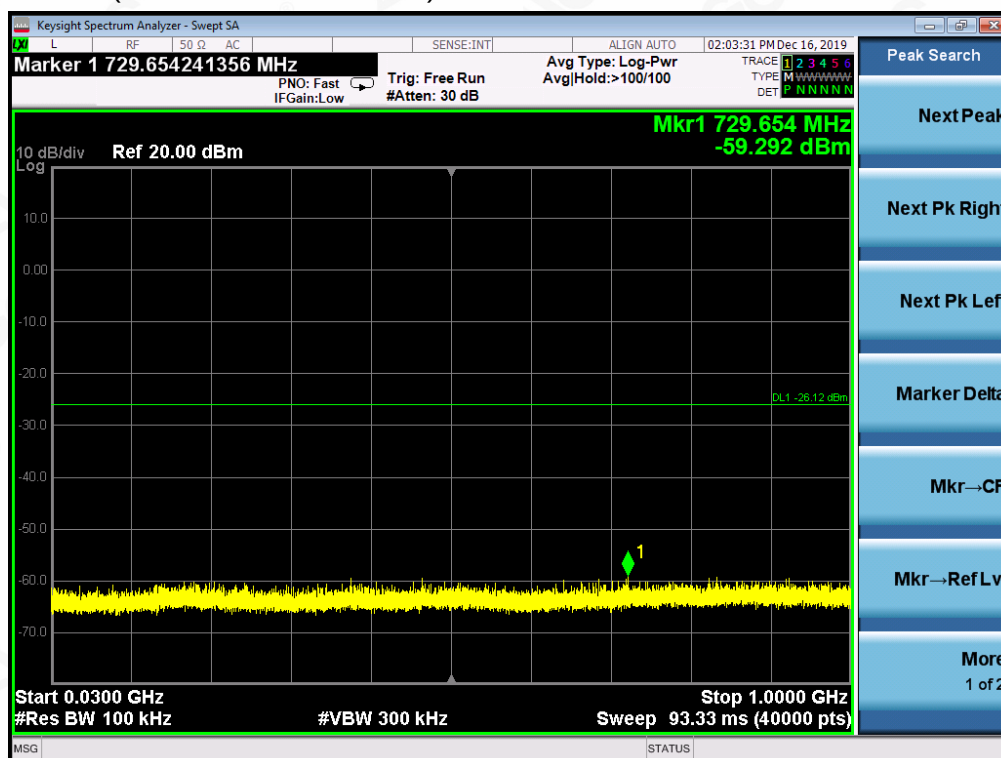


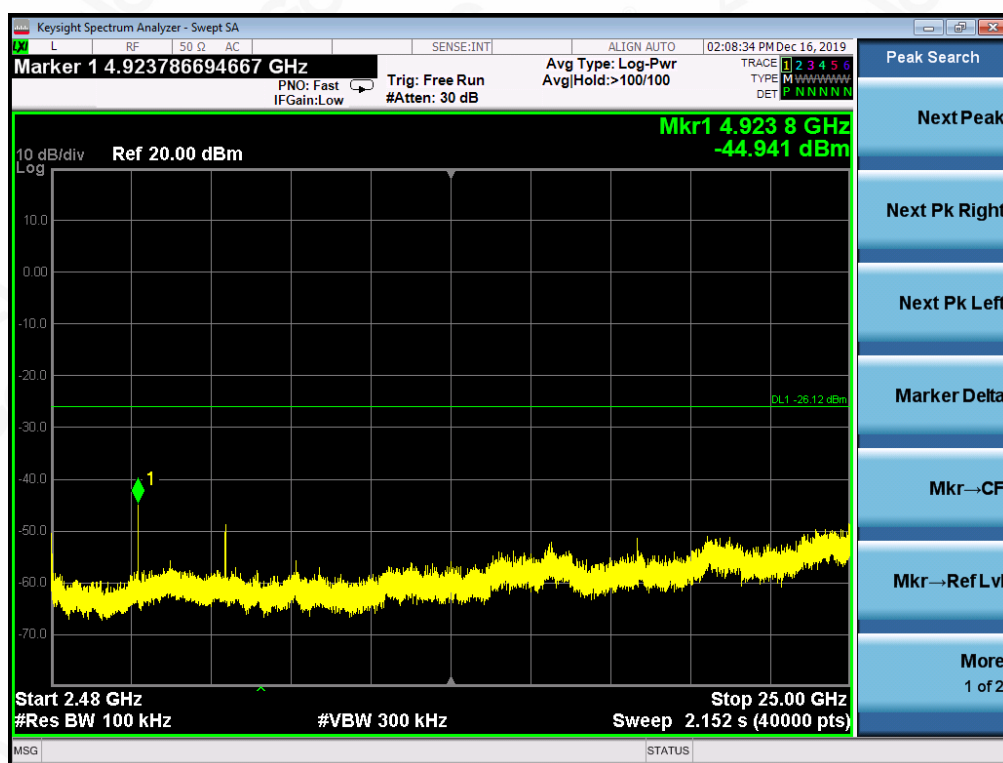
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF(802.11b with data rate 1) FOR MODULATION IN MIDDLE CHANNEL



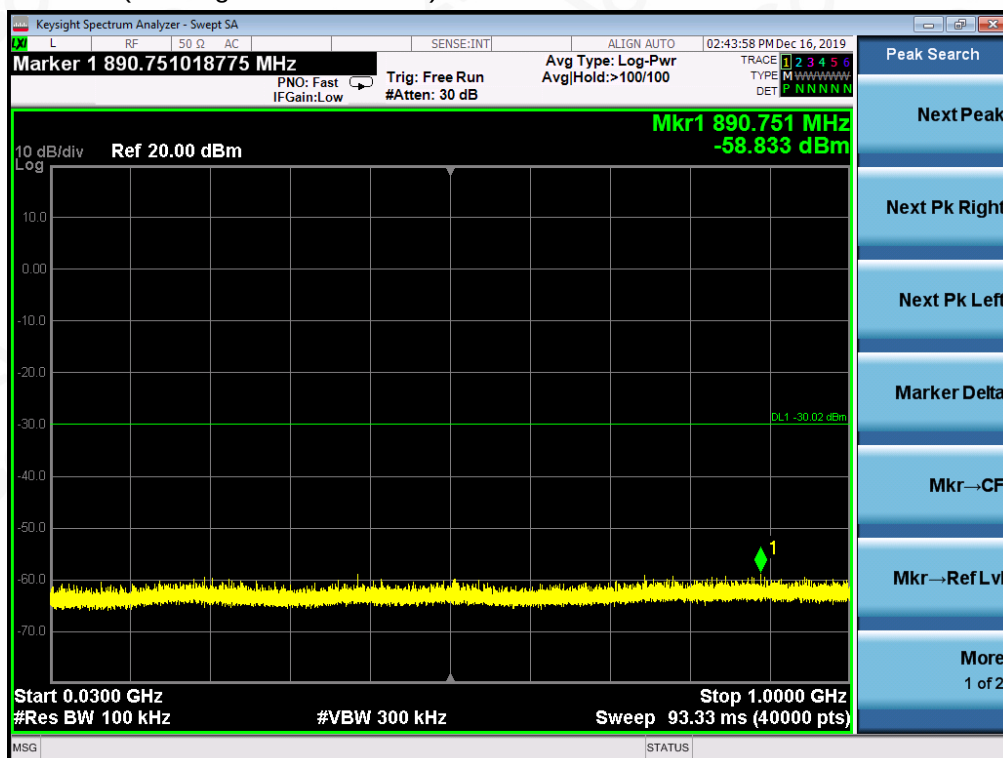


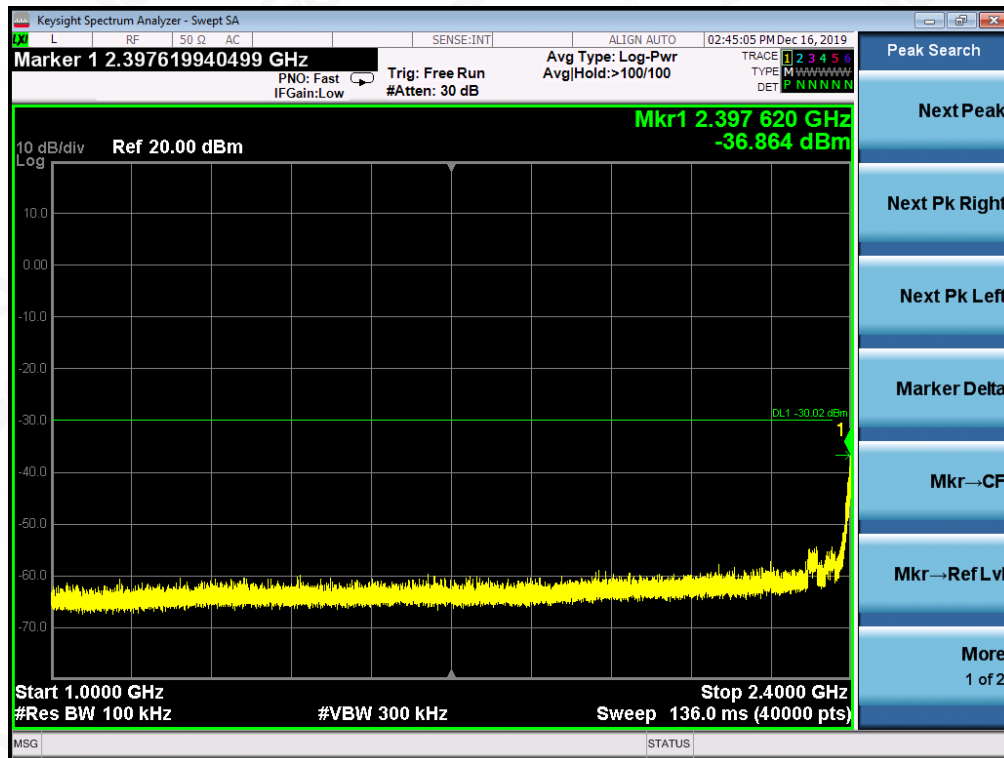
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF(802.11b with data rate 1) FOR MODULATION IN HIGH CHANNEL



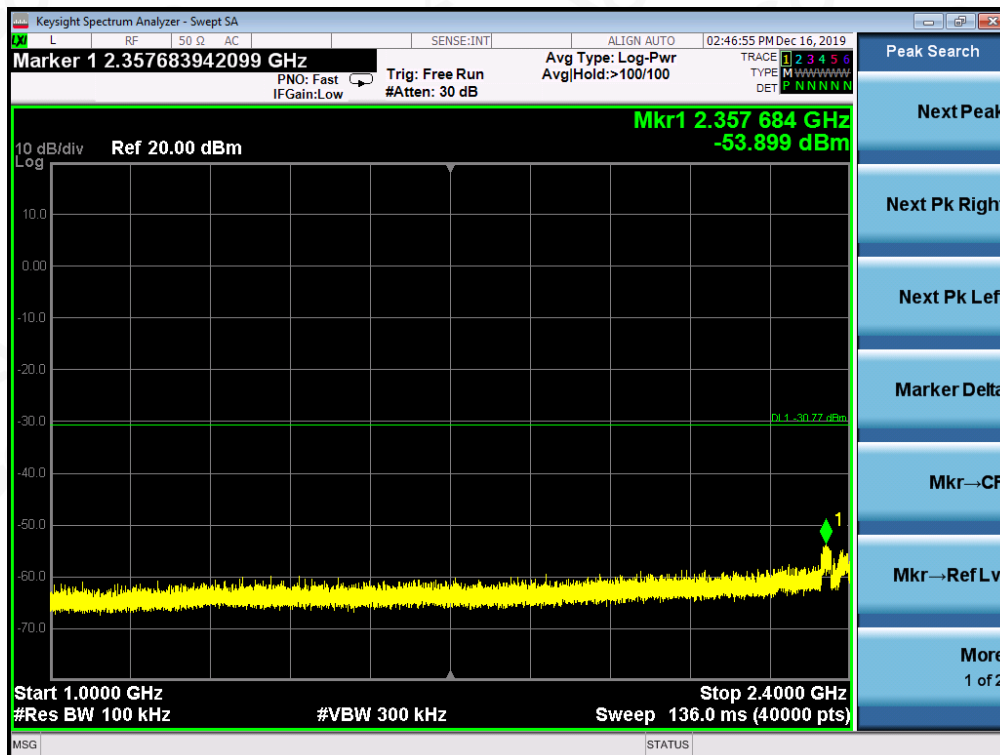
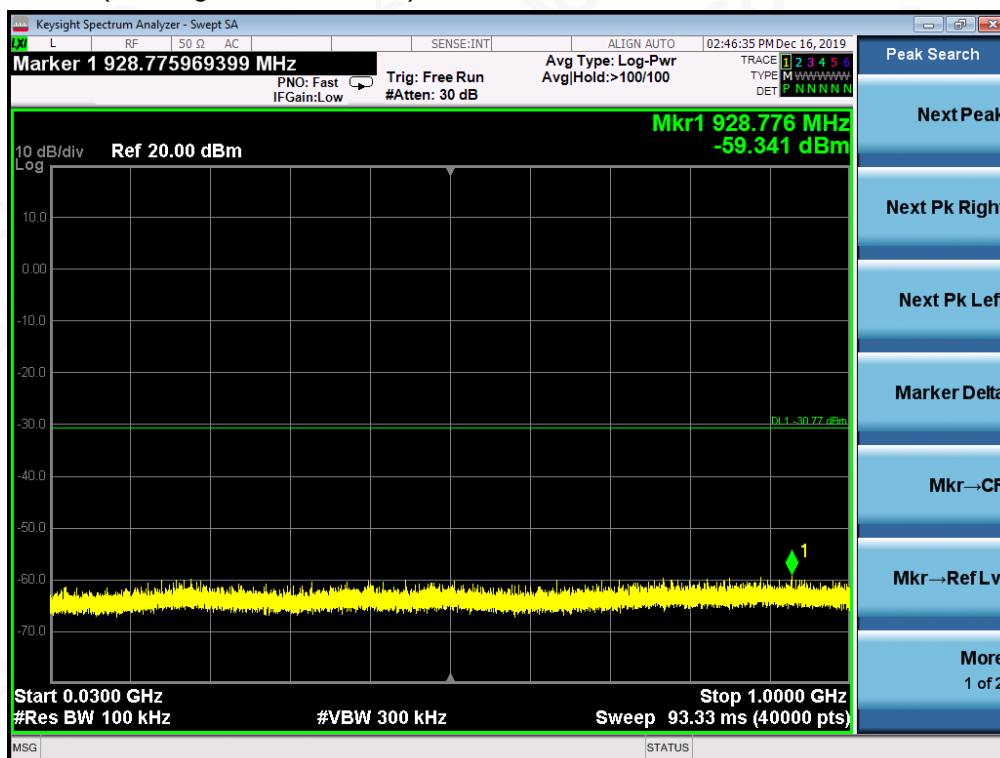


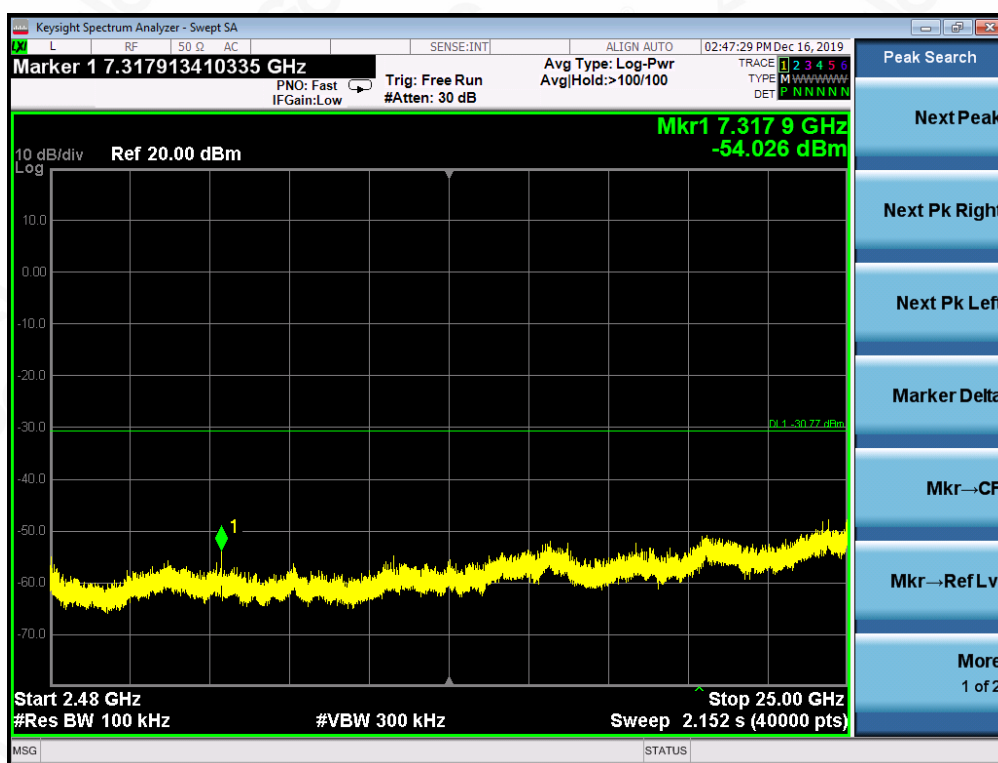
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF (802.11g with data rate 6) FOR MODULATION IN LOW CHANNEL



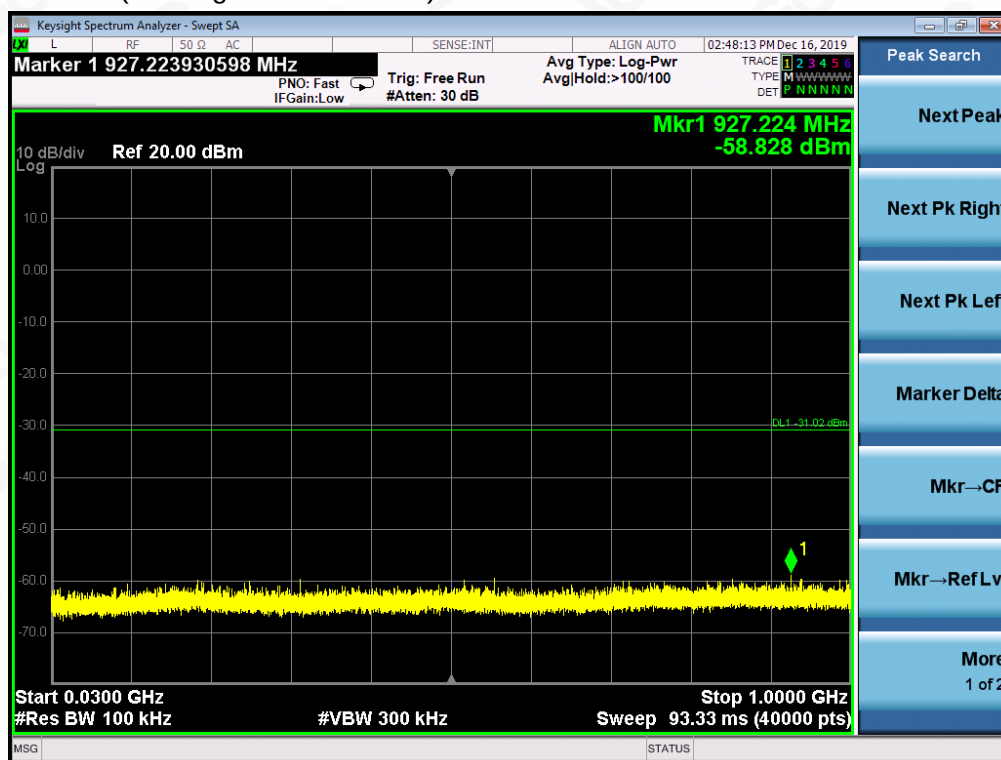


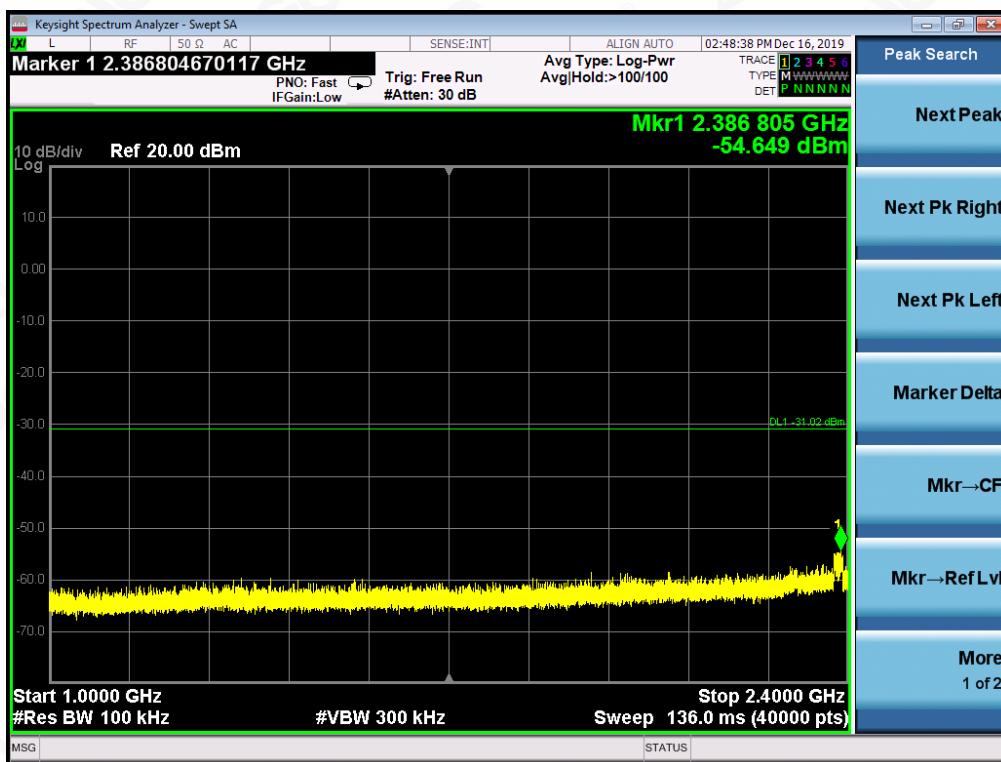
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF (802.11g with data rate 6) FOR MODULATION IN MIDDLE CHANNEL



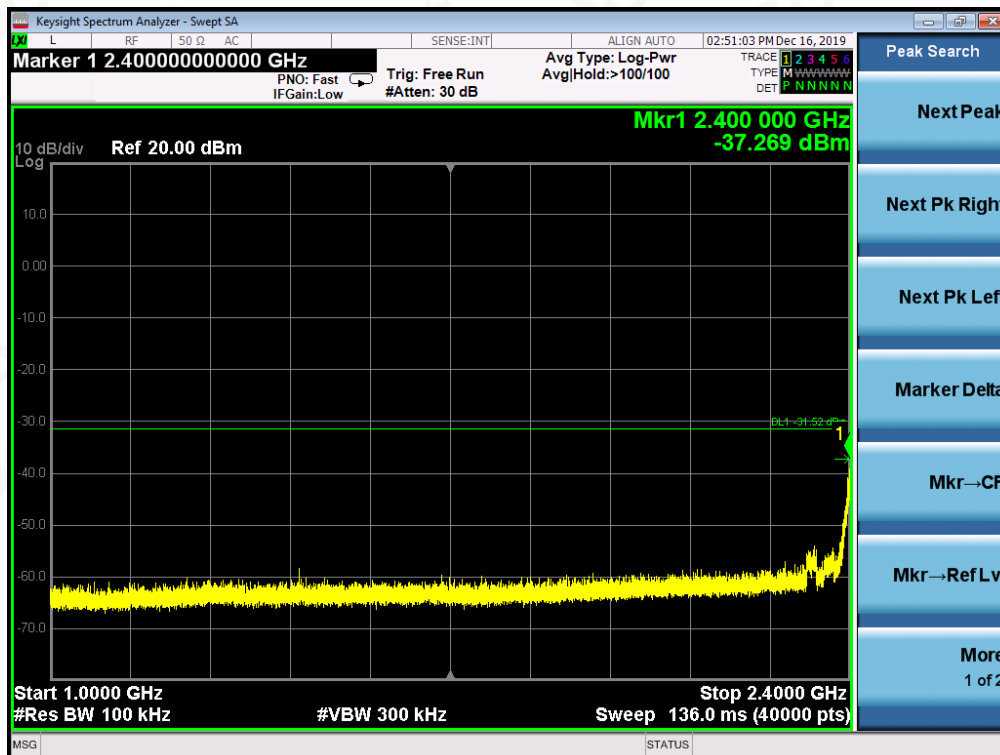
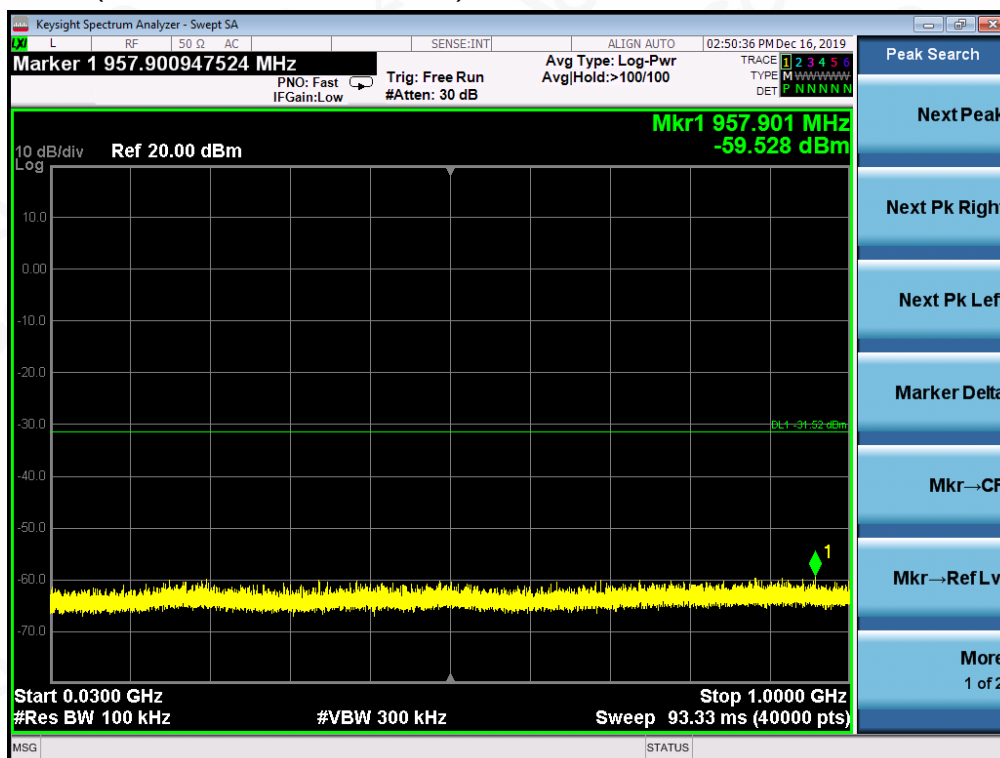


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF (802.11g with data rate 6) FOR MODULATION IN HIGH CHANNEL





TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE
OF (802.11n20 with data rate 6.5) FOR MODULATION IN LOW CHANNEL



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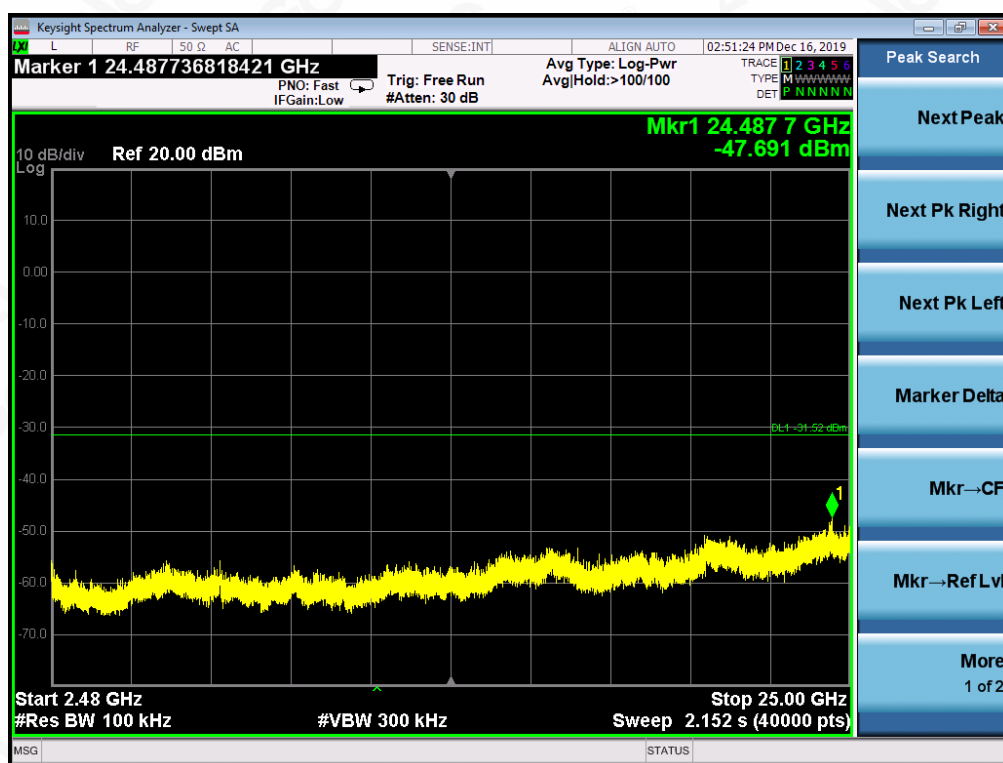
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Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

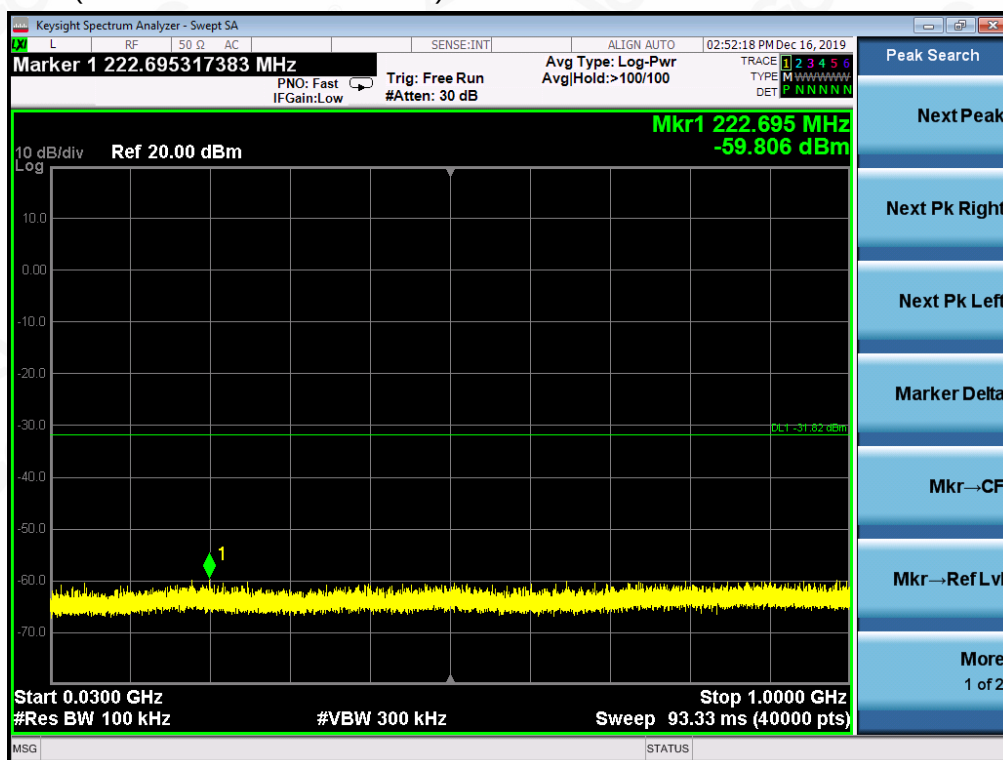
Tel: +86-755 2523 4088

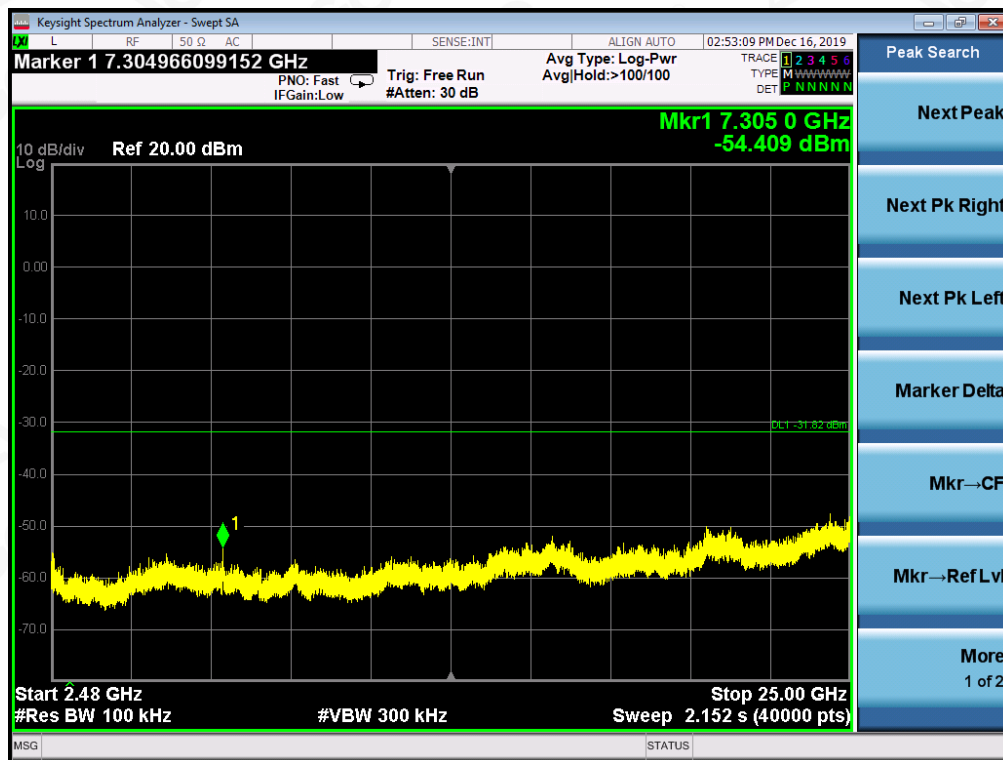
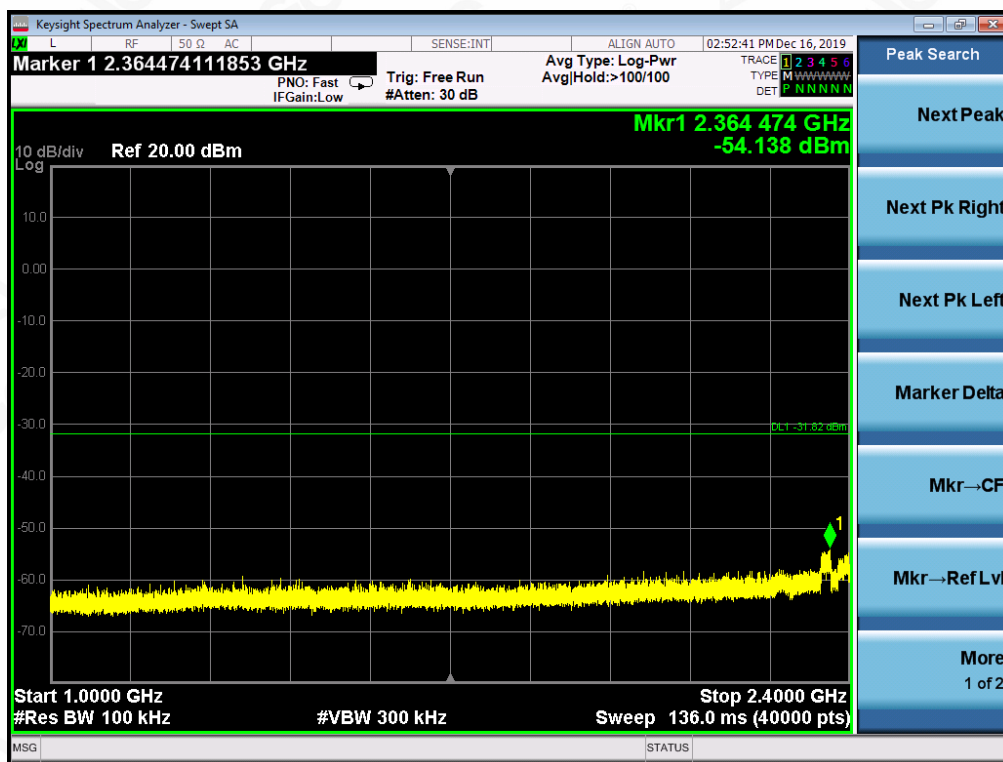
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

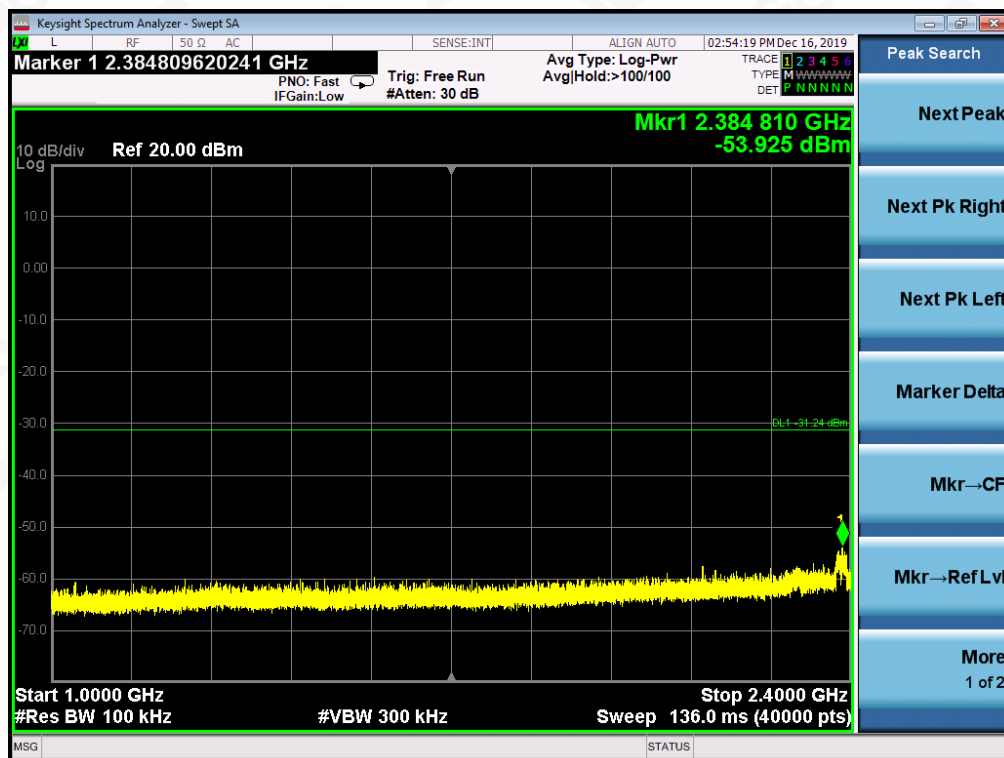
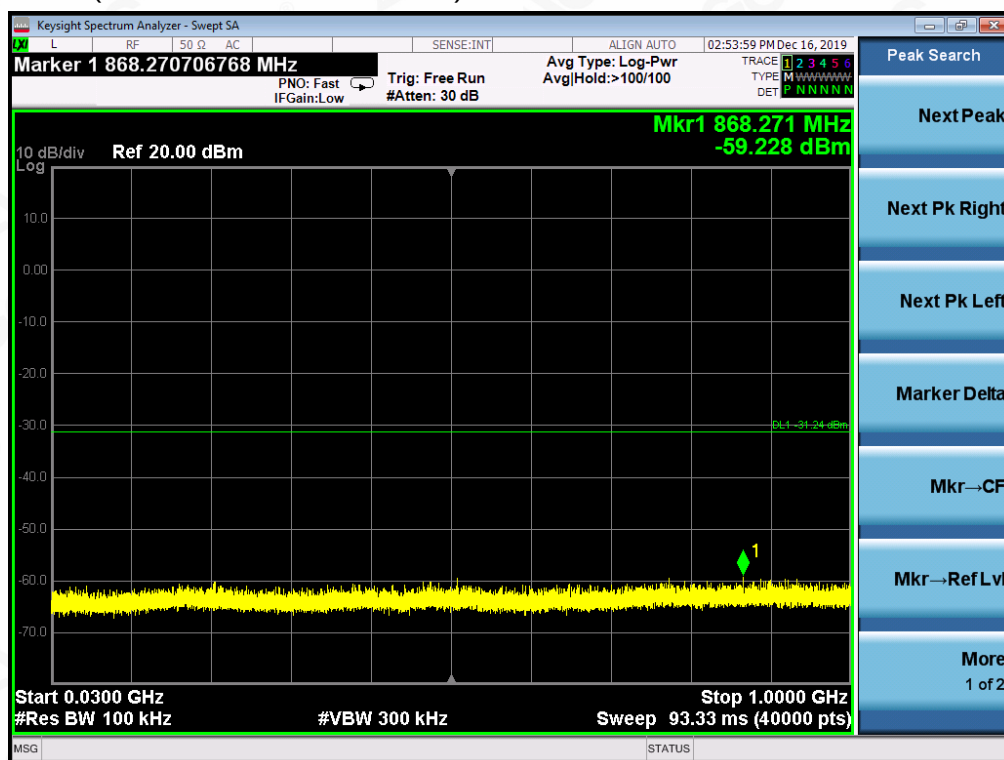


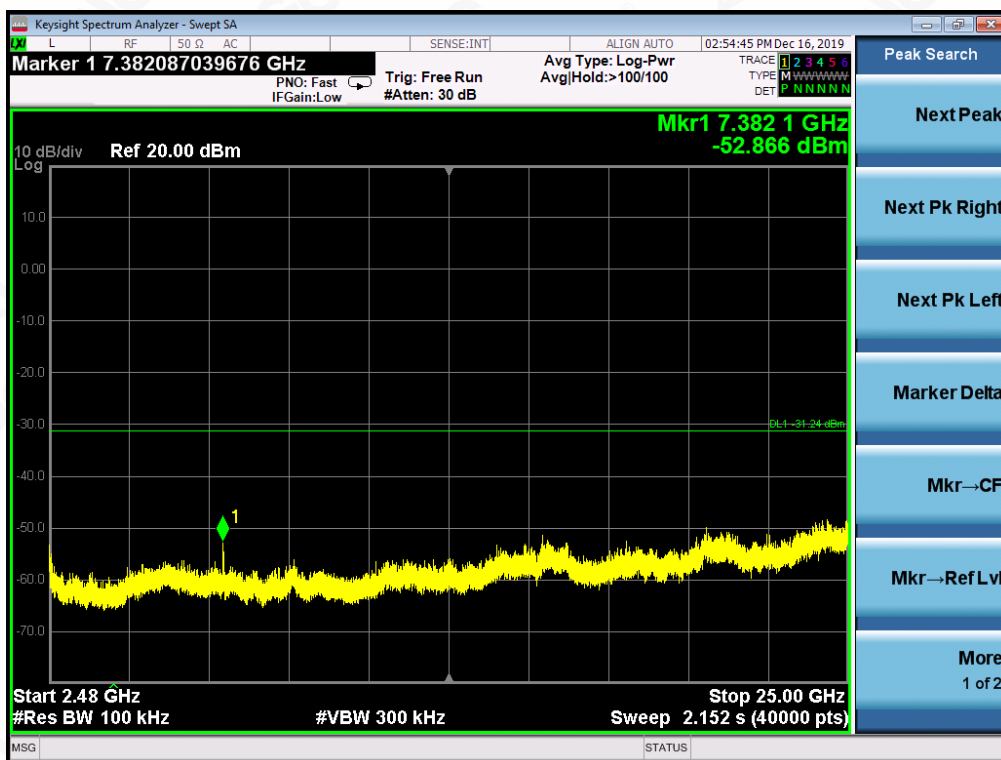
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF (802.11n20 with data rate 6.5) FOR MODULATION IN MIDDLE CHANNEL



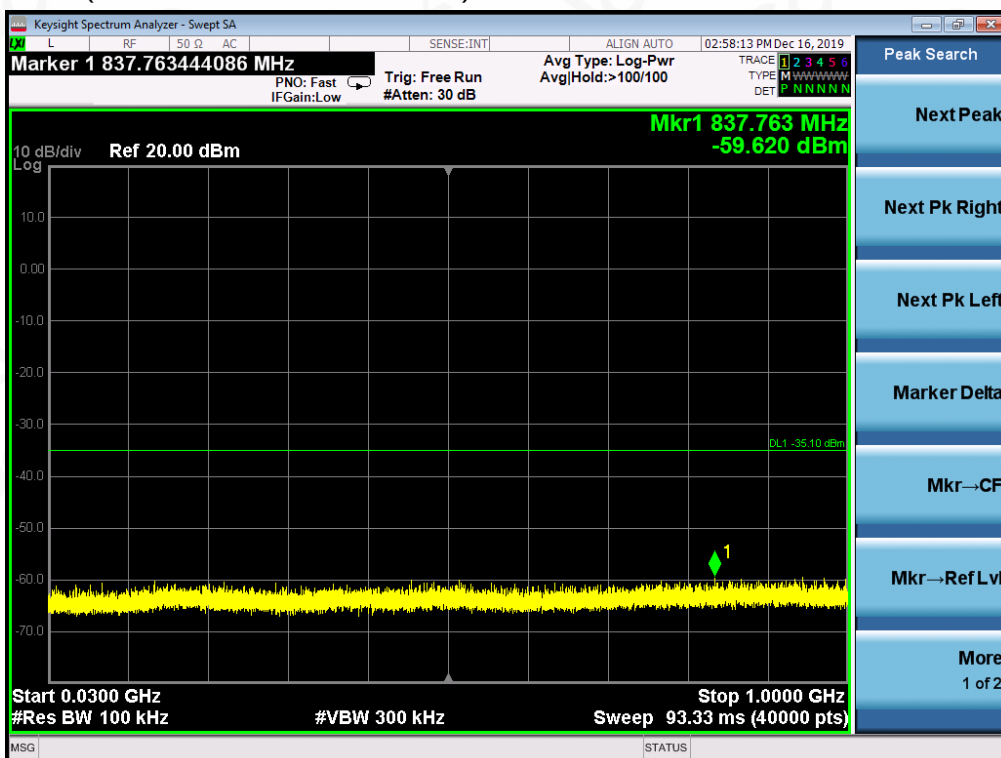


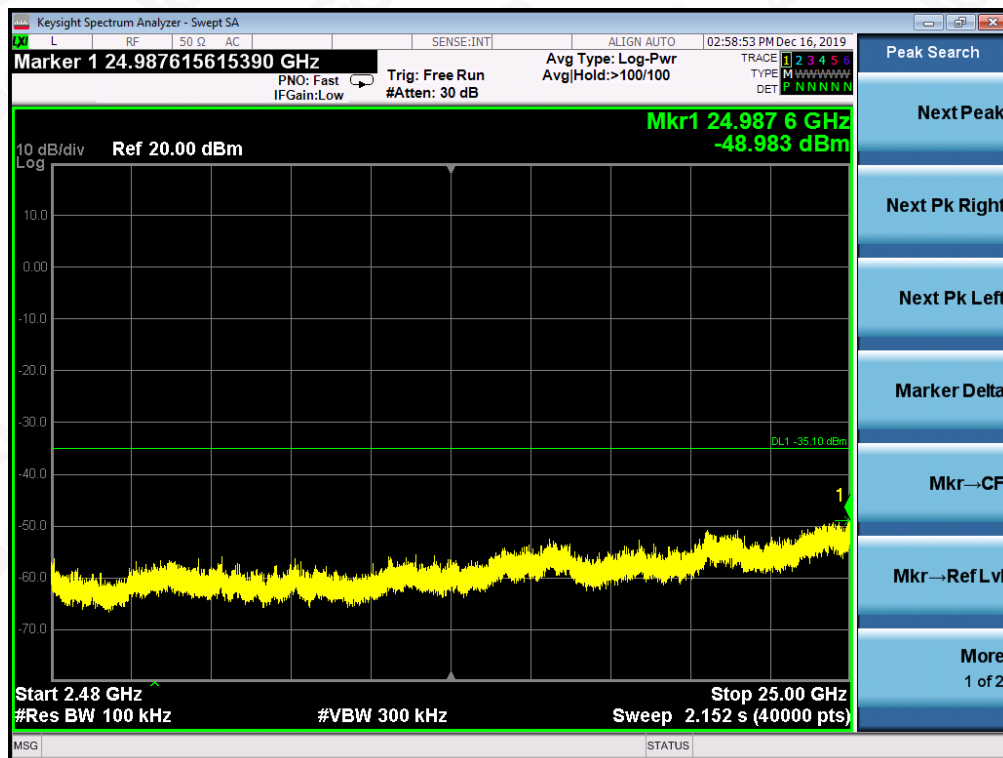
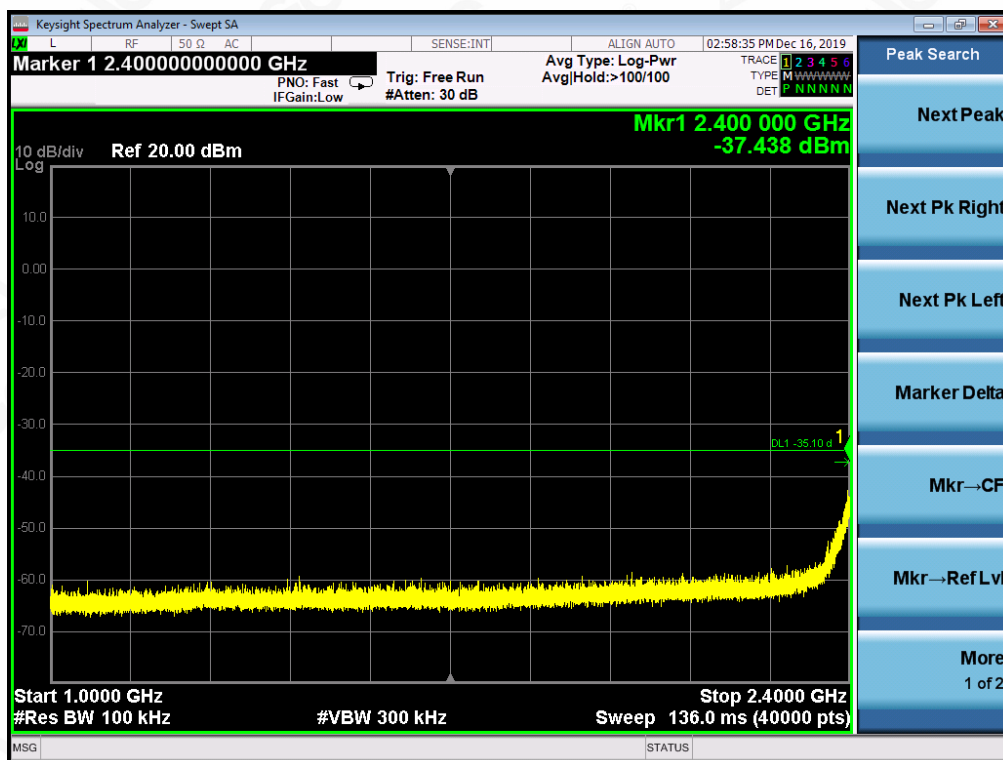
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF (802.11n20 with data rate 6.5) FOR MODULATION IN HIGH CHANNEL





TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF (802.11n40 with data rate 13.5) FOR MODULATION IN LOW CHANNEL





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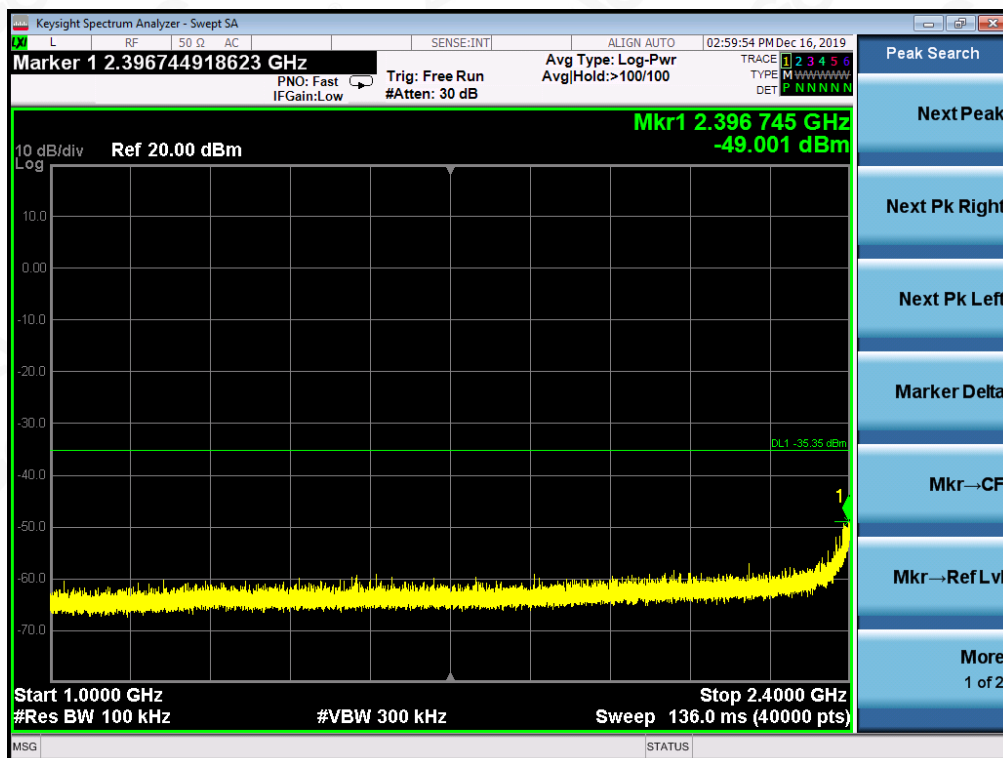
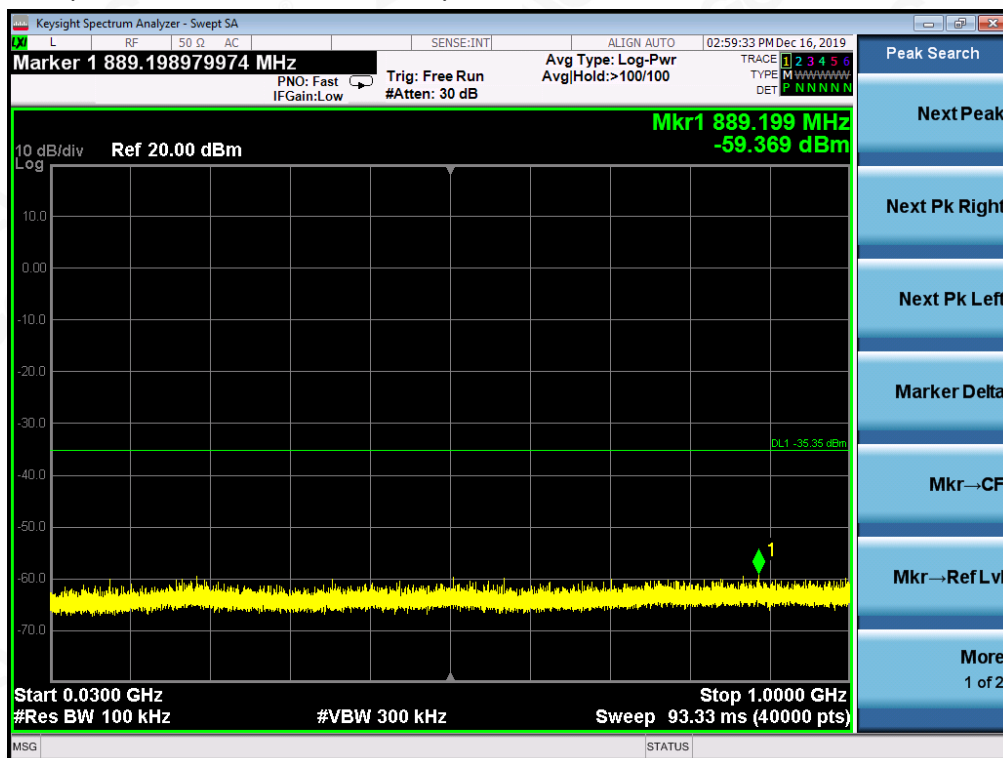
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Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

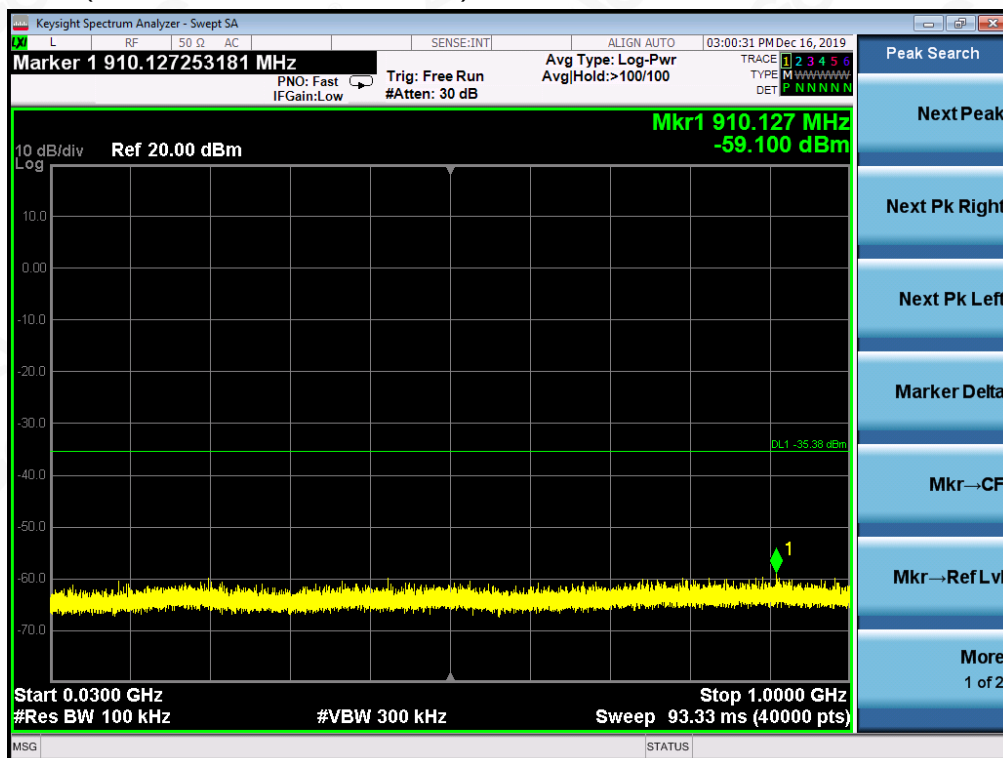
Service Hotline: 400 089 2118

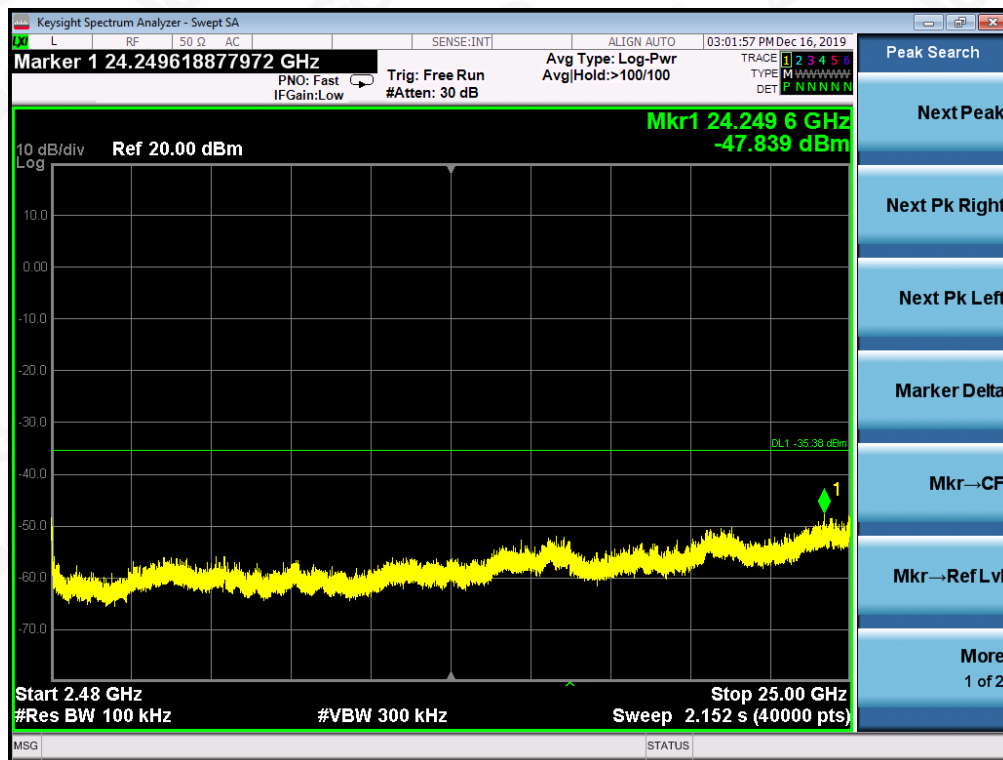
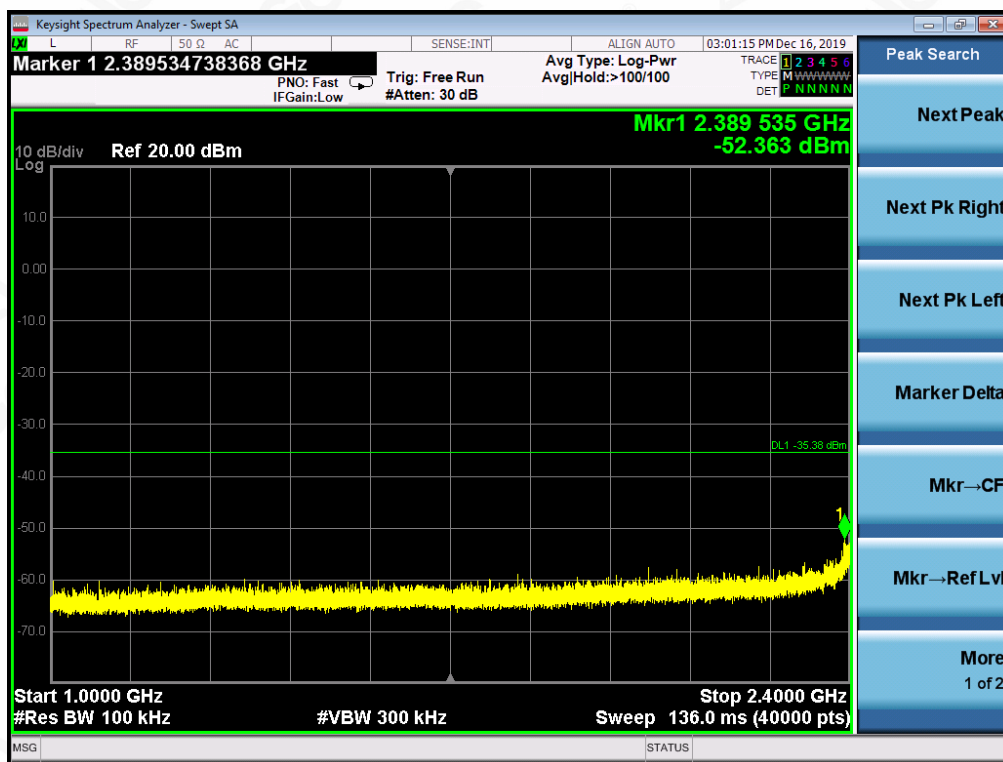
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF (802.11n40 with data rate 13.5) FOR MODULATION IN MIDDLE CHANNEL





TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE
OF (802.11n40 with data rate 13.5) 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	-0.876	8	Pass
Middle Channel	-0.676	8	Pass
High Channel	-1.330	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	-6.549	8	Pass
Middle Channel	-6.799	8	Pass
High Channel	-6.946	8	Pass

TEST ITEM	POWER SPECTRAL DENSITY
TEST MODE	802.11n 20 with data rate 6.5

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-8.933	8	Pass
Middle Channel	-10.277	8	Pass
High Channel	-9.500	8	Pass

TEST ITEM	POWER SPECTRAL DENSITY
TEST MODE	802.11n 40 with data rate 13.5

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-8.766	8	Pass
Middle Channel	-9.124	8	Pass
High Channel	-8.666	8	Pass



802.11b TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



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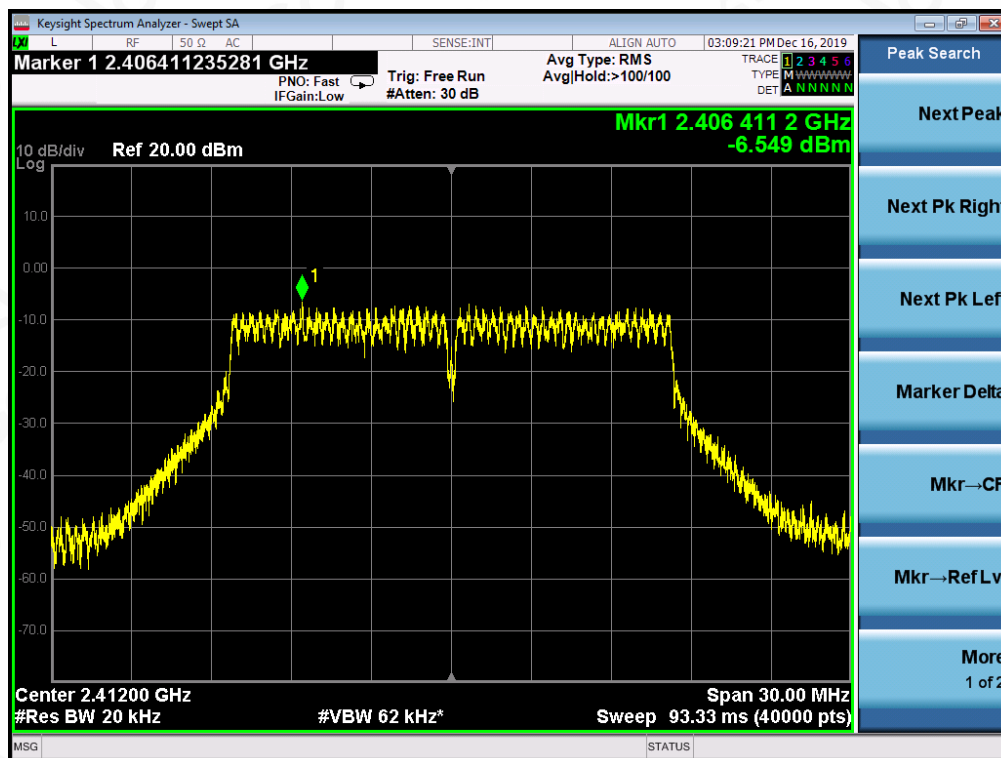
Service Hotline: 400 089 2118

TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



802.11g TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



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E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

Keysight Spectrum Analyzer - Swept SA

Marker 1 2.431411985300 GHz

PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB

Avg Type: RMS Avg/Hold: >100/100

03:10:19 PM Dec 16, 2019

TRACE 1 2 3 4 5 6
TYPE M N N N N N
DET A N N N N N

Peak Search

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

Mkr→Chr

Mkr→Ref Lvl

More

1 of 2

10 dB/div Log

Ref 20.00 dBm

Mkr1 2.431 412 0 GHz
-6.799 dBm

Center 2.43700 GHz

#Res BW 20 kHz

#VBW 62 kHz*

Span 30.00 MHz

Sweep 93.33 ms (40000 pts)

MSG STATUS

Keysight Spectrum Analyzer - Swept SA

Marker 1 2.456410485262 GHz

PNO: Fast IFGain: Low Trig: Free Run Avg Type: RMS Avg/Hold: >100/100

03:10:43 PM Dec 16, 2019

Peak Search

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

Mkr → CR

Mkr → Ref Lv

More

1 of 2

10 dB/div Log Ref 20.00 dBm

Mkr1 2.456 410 5 GHz -6.946 dBm

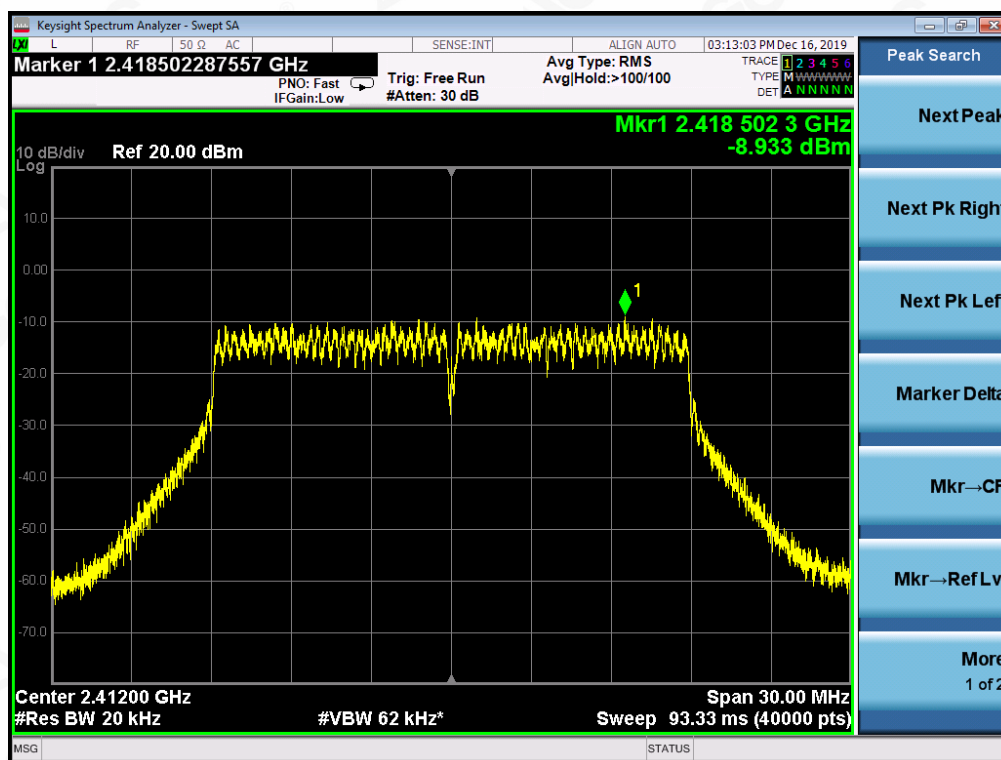
Center 2.46200 GHz #Res BW 20 kHz #VBW 62 kHz* Span 30.00 MHz Sweep 93.33 ms (40000 pts)

The image shows a Keysight Spectrum Analyzer interface. The main display area shows a spectrum plot with a yellow signal. A peak marker is placed at 2.456410485262 GHz, indicating a power level of -6.946 dBm. The plot has a vertical scale of 10 dB/div and a logarithmic frequency axis. The reference level is set to 20.00 dBm. The center frequency is 2.46200 GHz, the resolution bandwidth (Res BW) is 20 kHz, the video bandwidth (VBW) is 62 kHz, and the span is 30.00 MHz. The sweep time is 93.33 ms, covering 40,000 points. The interface includes various control buttons on the right side, such as 'Peak Search', 'Next Peak', 'Next Pk Right', 'Next Pk Left', 'Marker Delta', 'Mkr → CR', 'Mkr → Ref Lv', and 'More'. The top status bar shows the time as 03:10:43 PM on Dec 16, 2019, and the alignment is set to AUTO. The trigger is set to Free Run, and the average type is RMS. The average hold is set to >100/100. The PNO is set to Fast, and the IF gain is set to Low. The marker is labeled 'Marker 1'.

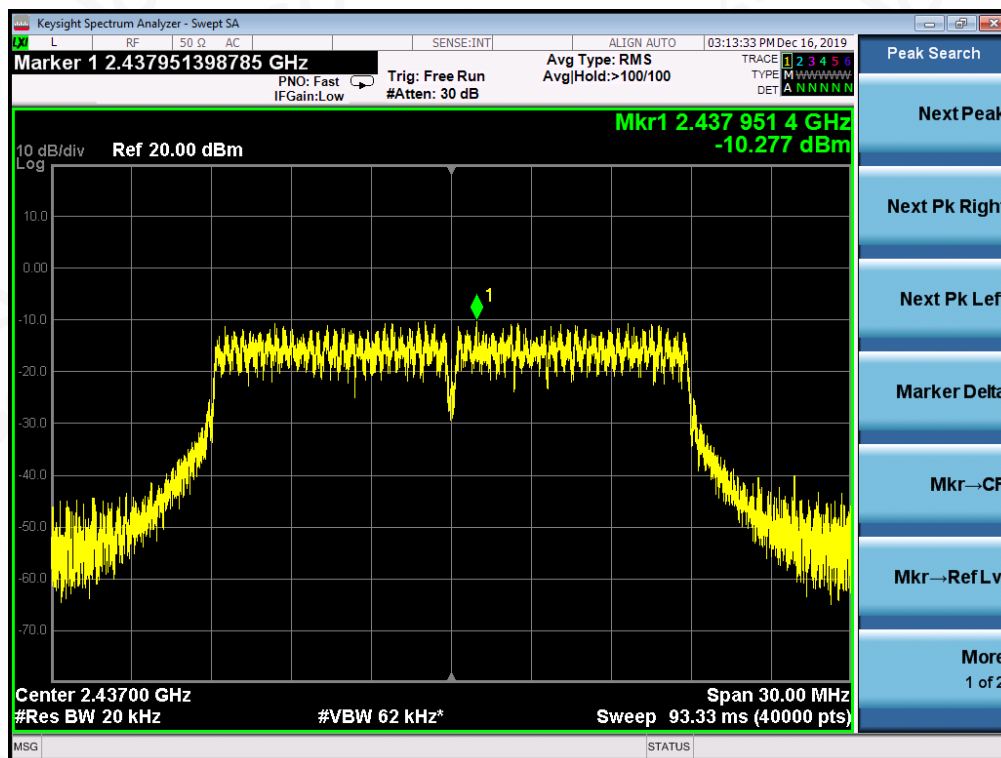


802.11n 20 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



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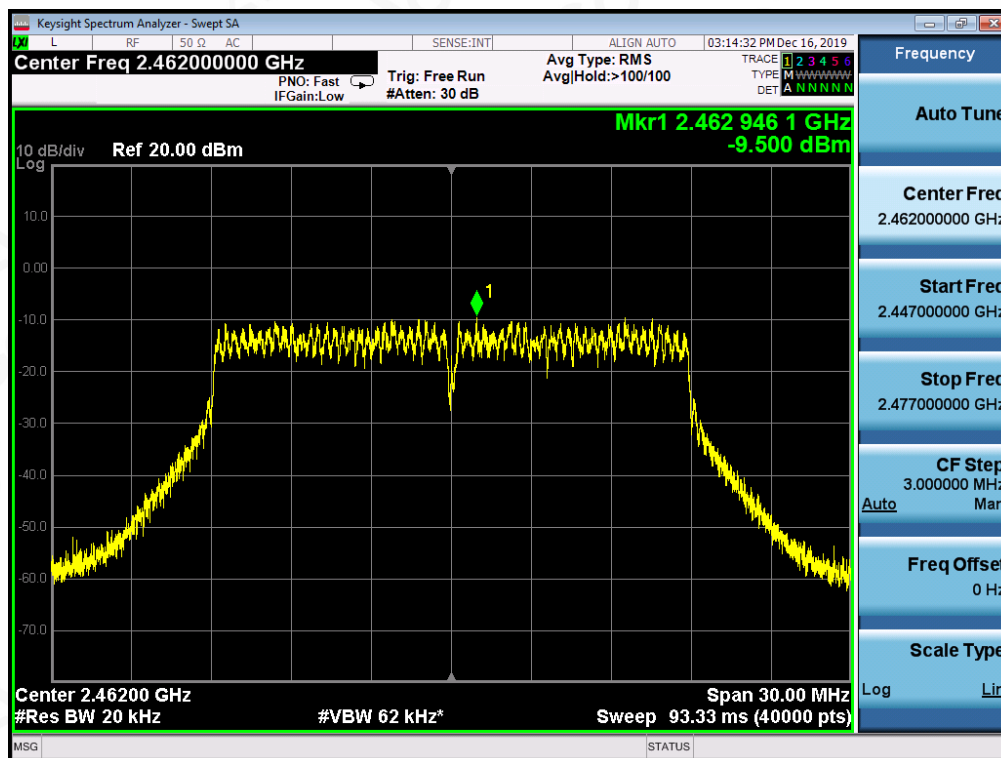
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Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

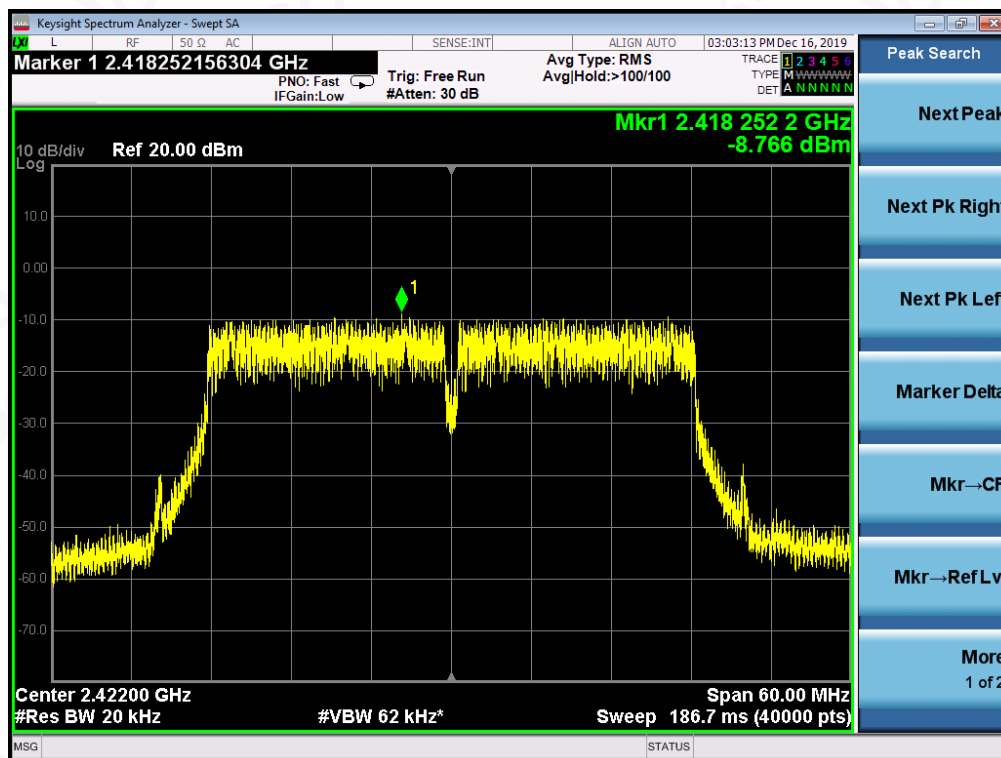
Service Hotline: 400 089 2118

TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

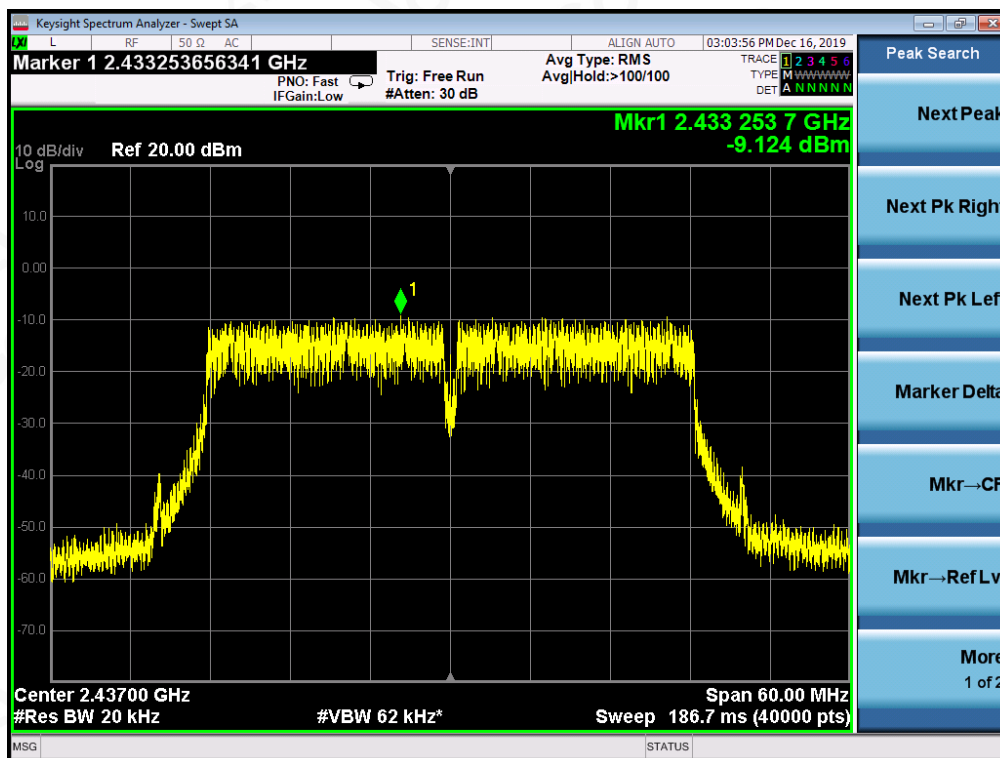


802.11n 40 TEST RESULT

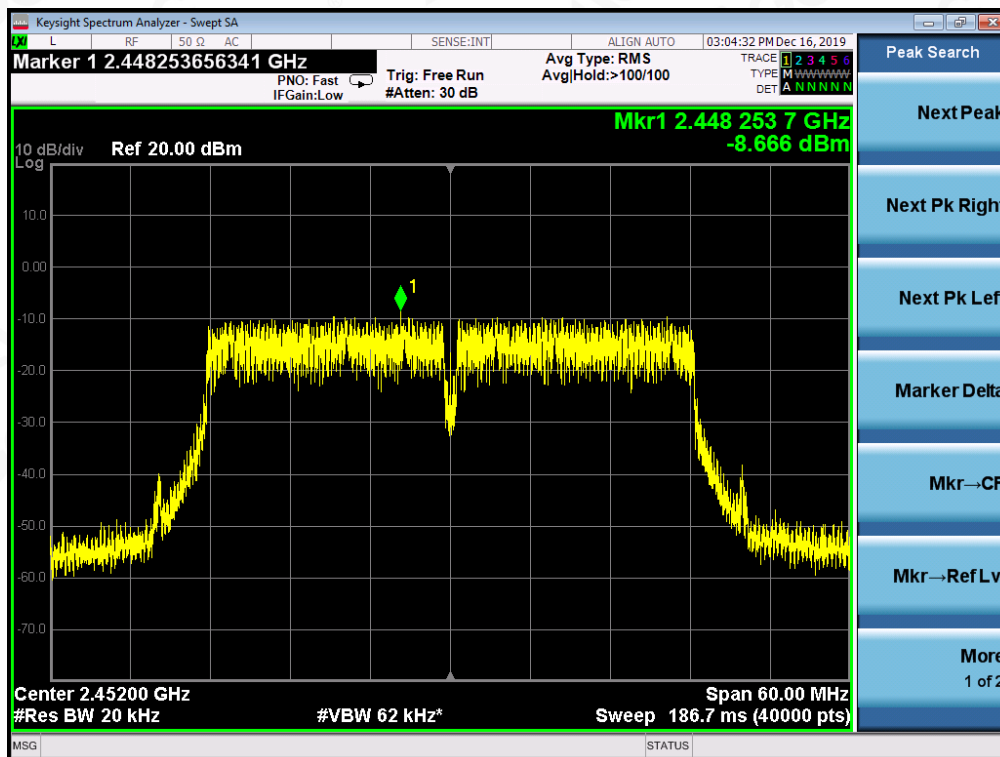
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



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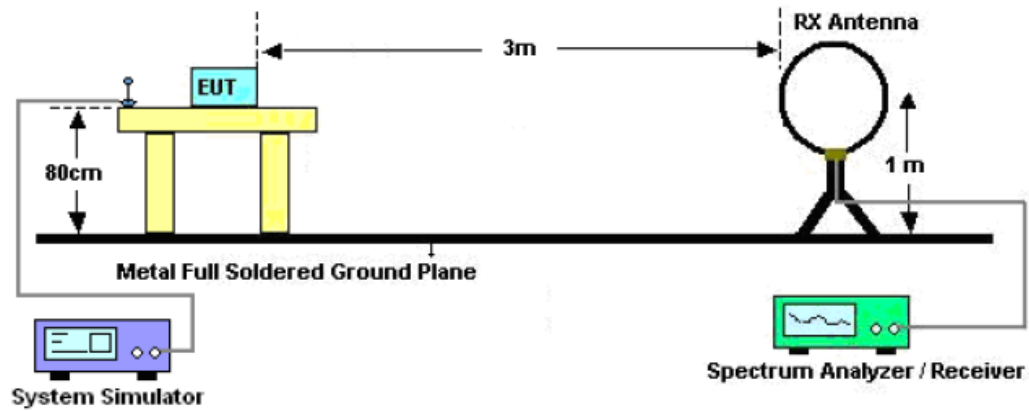
11. RADIATED EMISSION

11.1. MEASUREMENT PROCEDURE

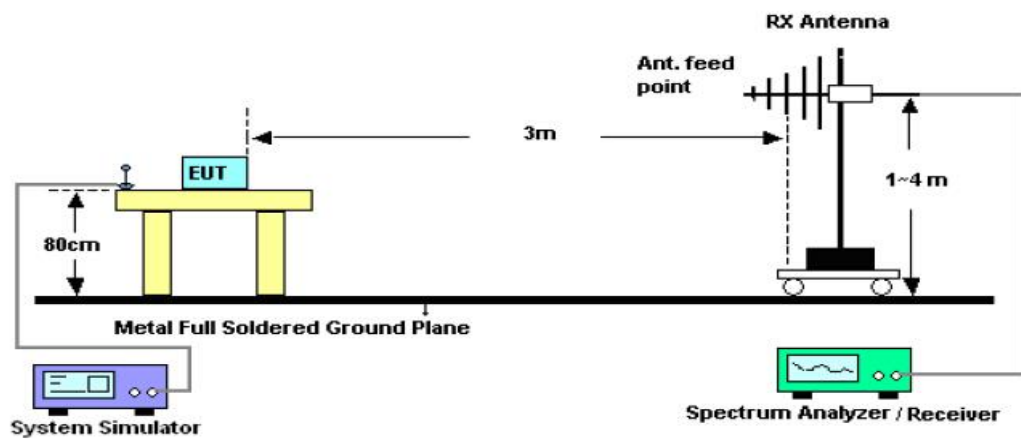
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated 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 3MHz 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

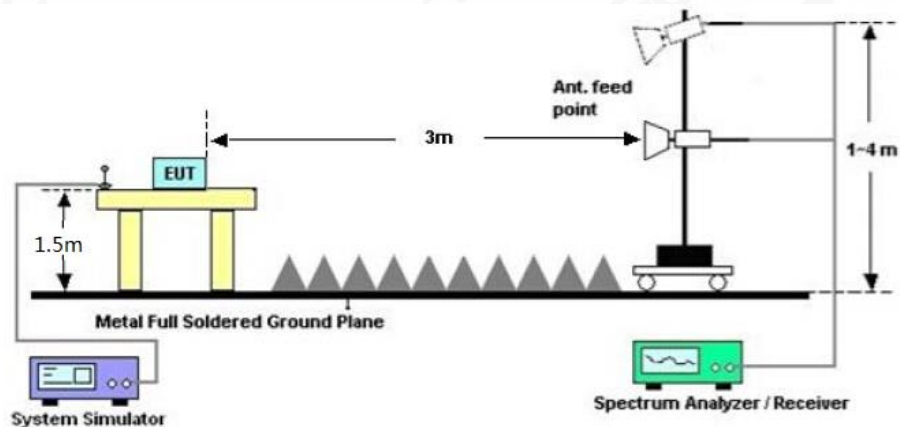
Radiated Emission Test-Setup Frequency Below 30MHz



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

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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.

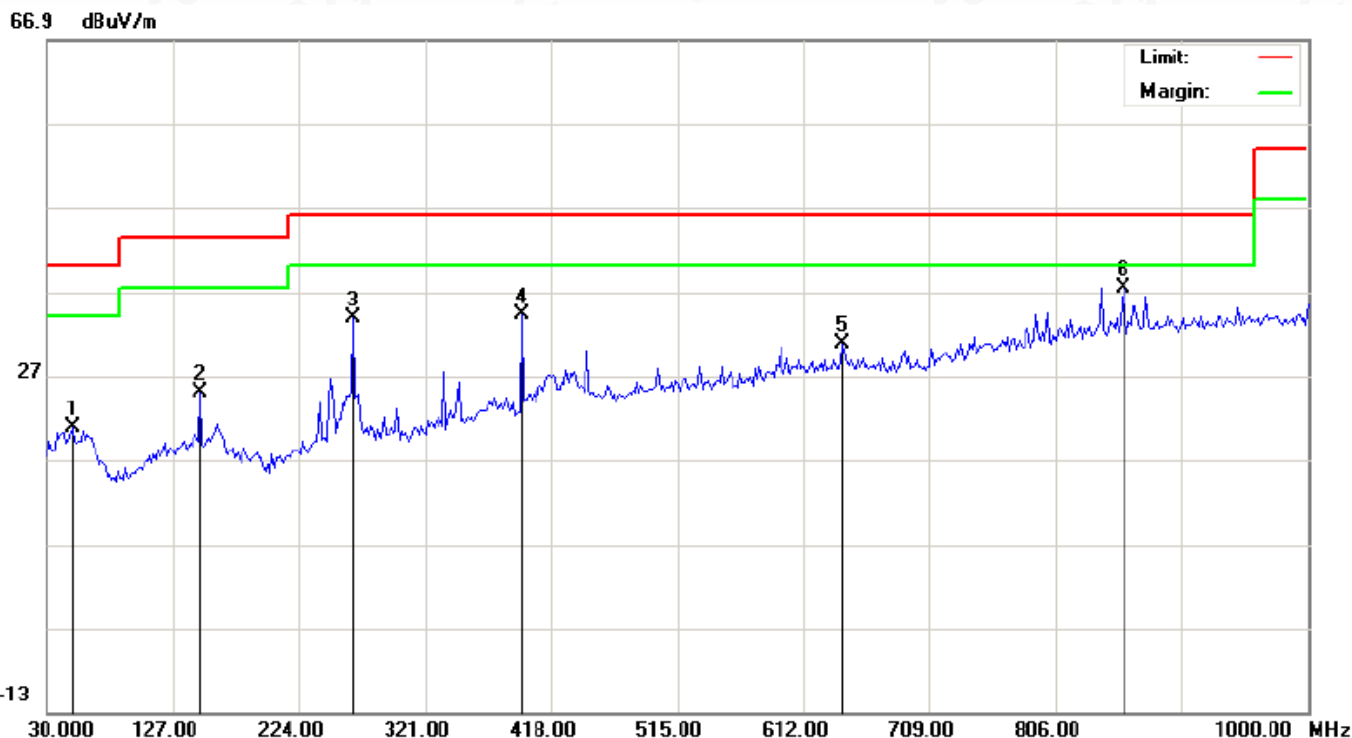
11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION BELOW 1GHZ

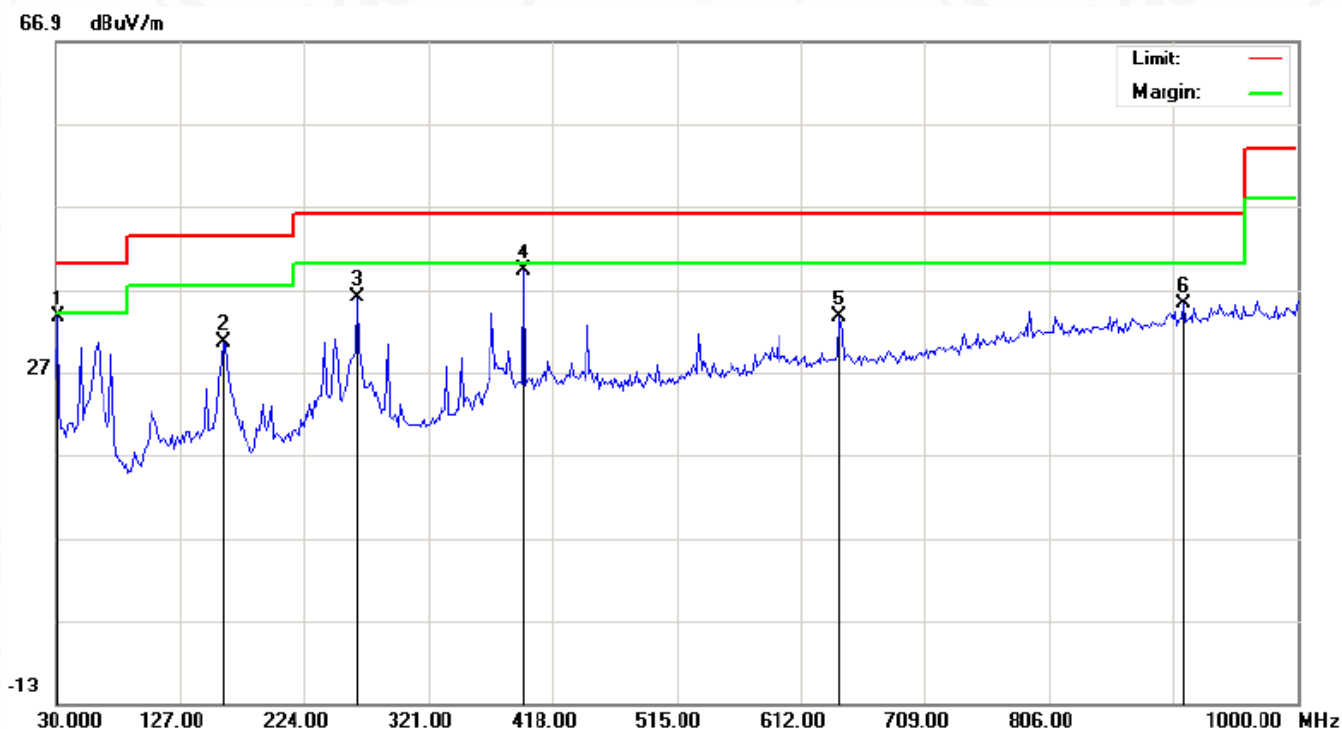
EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Horizontal



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		49.4000	1.00	19.75	20.75	40.00	-19.25	peak			
2		148.0167	5.85	19.21	25.06	43.50	-18.44	peak			
3		266.0333	15.07	18.80	33.87	46.00	-12.13	peak			
4		395.3667	11.48	22.82	34.30	46.00	-11.70	peak			
5		642.7167	3.37	27.46	30.83	46.00	-15.17	peak			
6	*	857.7333	6.19	31.15	37.34	46.00	-8.66	peak			

RESULT: PASS

EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Vertical



No.	Mk	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	31.6167	15.38	18.22	33.60	40.00	-6.40	peak			
2		160.9500	11.43	19.09	30.52	43.50	-12.98	peak			
3		266.0333	17.26	18.80	36.06	46.00	-9.94	peak			
4		395.3667	16.40	22.82	39.22	46.00	-6.78	peak			
5		642.7167	6.09	27.46	33.55	46.00	-12.45	peak			
6		911.0833	3.31	31.80	35.11	46.00	-10.89	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

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

3. All test modes had been pre-tested. The 802.11b at low channel is the worst case and recorded in the report.

RADIATED EMISSION ABOVE 1GHZ

EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.064	51.56	3.72	55.28	74	-18.72	peak
4824.093	41.35	3.72	45.07	54	-8.93	AVG
7236.102	47.18	8.15	55.33	74	-18.67	peak
7236.106	37.54	8.15	45.69	54	-8.31	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.073	51.17	3.72	54.89	74	-19.11	peak
4824.11	40.63	3.72	44.35	54	-9.65	AVG
7236.071	47.24	8.15	55.39	74	-18.61	peak
7236.055	37.58	8.15	45.73	54	-8.27	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.063	53.26	3.75	57.01	74	-16.99	peak
4874.045	42.44	3.75	46.19	54	-7.81	AVG
7311.096	49.05	8.16	57.21	74	-16.79	peak
7311.109	38.11	8.16	46.27	54	-7.73	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.062	52.63	3.75	56.38	74	-17.62	peak
4874.022	42.54	3.75	46.29	54	-7.71	AVG
7311.026	49.08	8.16	57.24	74	-16.76	peak
7311.053	38.62	8.16	46.78	54	-7.22	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.063	52.23	3.81	56.04	74	-17.96	peak
4924.04	42.36	3.81	46.17	54	-7.83	AVG
7386.119	48.78	8.19	56.97	74	-17.03	peak
7386.061	38.27	8.19	46.46	54	-7.54	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	DDPai	Model Name	A2
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.023	51.44	3.81	55.25	74	-18.75	peak
4924.051	41.63	3.81	45.44	54	-8.56	AVG
7386.062	48.72	8.19	56.91	74	-17.09	peak
7386.093	38.15	8.19	46.34	54	-7.66	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RESULT: PASS

Note: Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.
Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.
The “Factor” value can be calculated automatically by software of measurement system.
All test modes had been pre-tested. The 802.11b mode is the worst case and recorded in the report.