

# FCC Test Report

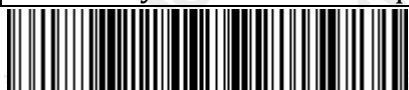
Report No.: AGC00008190410FE05

**FCC ID** : TW5T5200HCA  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : 1080P WiFi Smart Home Monitoring System  
**BRAND NAME** : N/A  
**MODEL NAME** : T5200HCA  
**CLIENT** : Shenzhen Gospell Smarthome Electronic Co., Ltd.  
**DATE OF ISSUE** : Jun. 06, 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	/	Jun. 06, 2019	Valid	Initial Release

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## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	Shenzhen Gospell Smarthome Electronic Co., Ltd.
<b>Address</b>	East of 01st-04th Floor, Block A, No.1 Industrial park, Fenghuang Gang, South of No.1 Baotian Road, Xixiang Street, Bao'an District, Shenzhen City, Guangdong Province 518126, P.R.China
<b>manufacturer</b>	Shenzhen Gospell Smarthome Electronic Co., Ltd.
<b>Address</b>	East of 01st-04th Floor, Block A, No.1 Industrial park, Fenghuang Gang, South of No.1 Baotian Road, Xixiang Street, Bao'an District, Shenzhen City, Guangdong Province 518126, P.R.China
<b>Factory</b>	Shenzhen Gospell Smarthome Electronic Co., Ltd.
<b>Address</b>	East of 01st-04th Floor, Block A, No.1 Industrial park, Fenghuang Gang, South of No.1 Baotian Road, Xixiang Street, Bao'an District, Shenzhen City, Guangdong Province 518126, P.R.China
<b>Product Designation</b>	1080P WiFi Smart Home Monitoring System
<b>Brand Name</b>	N/A
<b>Test Model</b>	T5200HCA
<b>Date of test</b>	May. 28, 2019 to Jun. 06, 2019
<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

*Draven Li*

Draven Li(Li Ming Liang)

Jun. 06, 2019

Reviewed By

*Max Zhang*

Max Zhang(Zhang Yi)

Jun. 06, 2019

Approved By

*Forrest Lei*

Forrest Lei(Lei Yonggang)

Authorized Officer

Jun. 06, 2019

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## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as "1080P WiFi Smart Home Monitoring 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

<b>Operation Frequency</b>	2.412 GHz~2.462GHz
<b>Output Power(Average)</b>	IEEE 802.11b:9.77dBm; IEEE 802.11g:8.61dBm; IEEE 802.11n(20):8.45dBm
<b>Modulation</b>	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
<b>Number of channels</b>	11
<b>Hardware Version</b>	T5200_M03
<b>Software Version</b>	E_900.GT4027ZJ.018.129
<b>Antenna Designation</b>	Internal antenna
<b>Antenna Gain</b>	2.0dBi
<b>Power Supply</b>	DC 5V by adapter or DC 3.6V by battery

### 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

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### 2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate(Mbps)	
					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: TW5T5200HCA** 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.

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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)	

#### Note:

- 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%
- 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.
- The test software is the CC3100\_CC3200\_RadioTool-1.2 which can set the EUT into the individual test modes.

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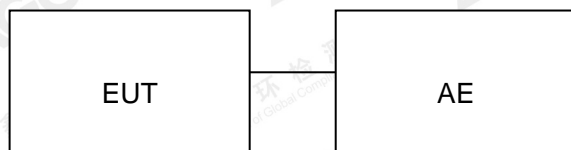
## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure :



Conducted Emission Configure :



### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	1080P WiFi Smart Home Monitoring System	T5200HCA	TW5T5200HCA	EUT
2	Adapter	PS10E050K2000UU	100-240V, 50-60HZ, 0.35A 5V, 2A	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

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## 6. TEST FACILITY

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

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun. 12, 2018	Jun. 11, 2019
LISN	R&S	ESH2-Z5	100086	Aug. 28, 2018	Aug. 27, 2019

### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2018	Jun. 11, 2019
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 20, 2018	Dec. 19, 2019
Power sensor	Aglient	U2021XA	MY54110007	Sep. 20, 2018	Sep. 19, 2019
2.4GHz Fliter	Micro-tronics	087	N/A	Jun. 12, 2018	Jun. 11, 2019
Attenuator	Weinachel Corp	58-30-33	N/A	Jun. 12, 2018	Jun. 11, 2019
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2017	Sep. 20, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2018	Jun. 13, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26, 2018	May. 25, 2020
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 25, 2018	Oct. 24, 2019
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 28, 2017	Sep. 27, 2019

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## 7. OUTPUT POWER

### 7.1. MEASUREMENT PROCEDURE

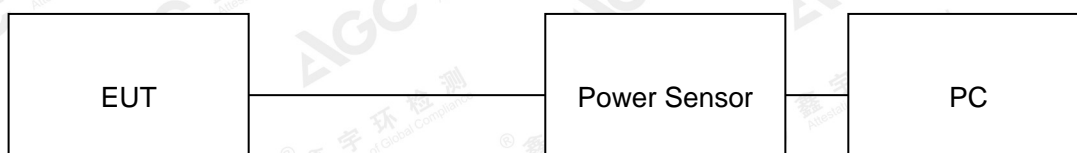
For average power test:

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	9.65	30	Pass
2.437	<b>9.77</b>	30	Pass
2.462	9.51	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	8.24	30	Pass
2.437	<b>8.61</b>	30	Pass
2.462	8.57	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	8.31	30	Pass
2.437	<b>8.45</b>	30	Pass
2.462	7.99	30	Pass

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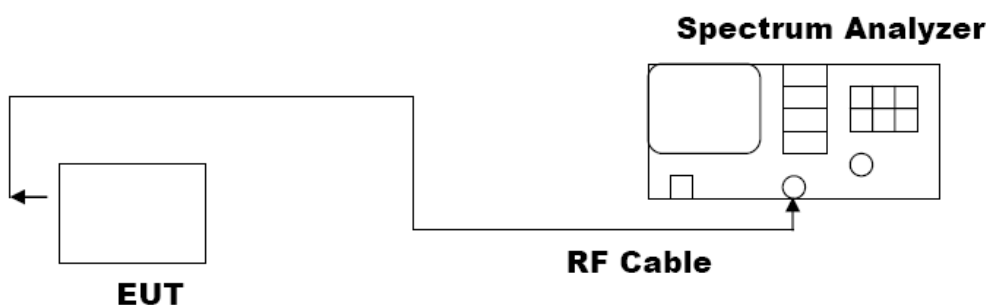
## 8. 6 DB BANDWIDTH

### 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

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	9.543	PASS
	Middle Channel	9.550	PASS
	High Channel	9.164	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	15.09	PASS
	Middle Channel	15.10	PASS
	High Channel	15.11	PASS

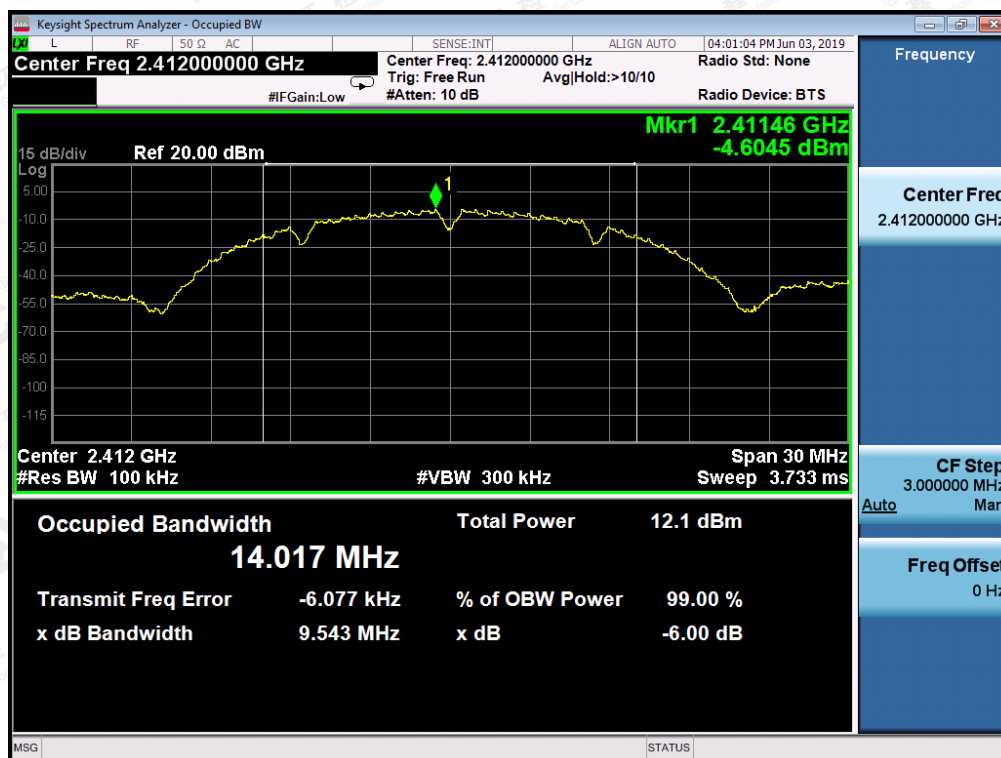
TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11n 20 with data rate 65

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	15.11	PASS
	Middle Channel	15.10	PASS
	High Channel	15.10	PASS

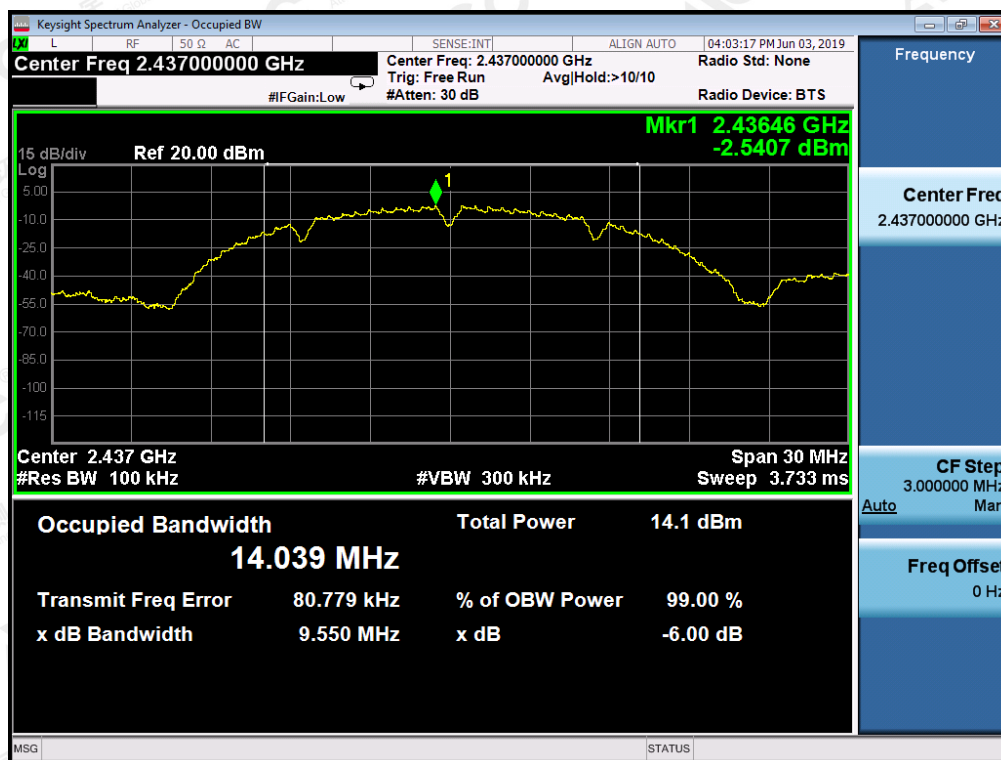
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### 802.11b TEST RESULT

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

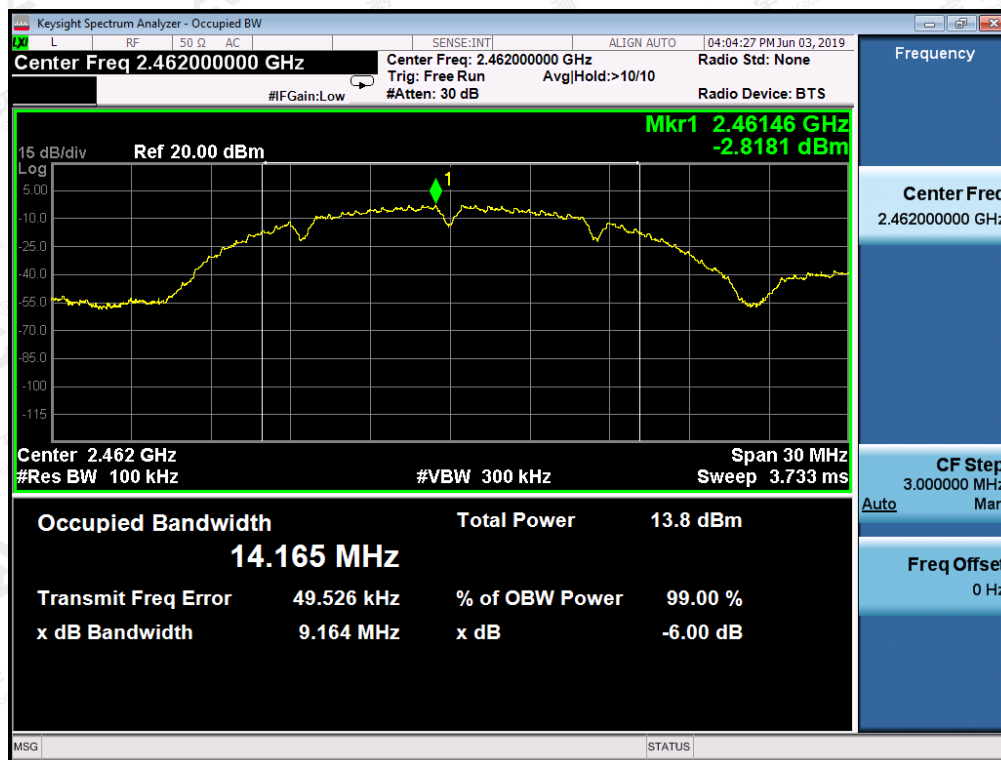


#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



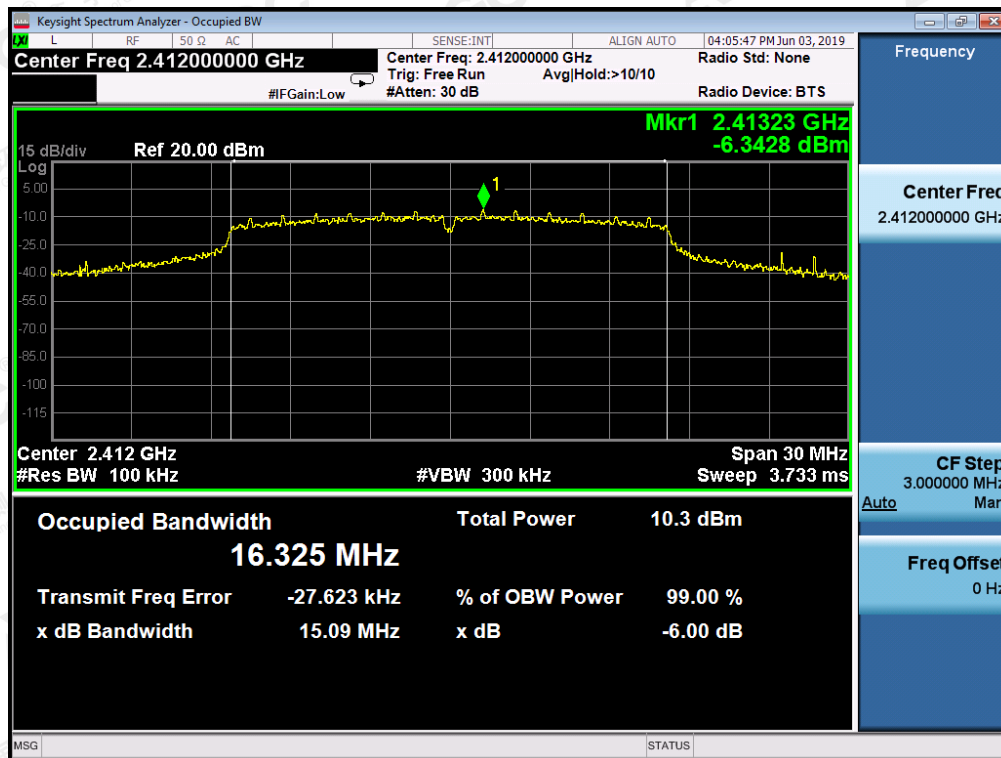
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### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



### 802.11g TEST RESULT

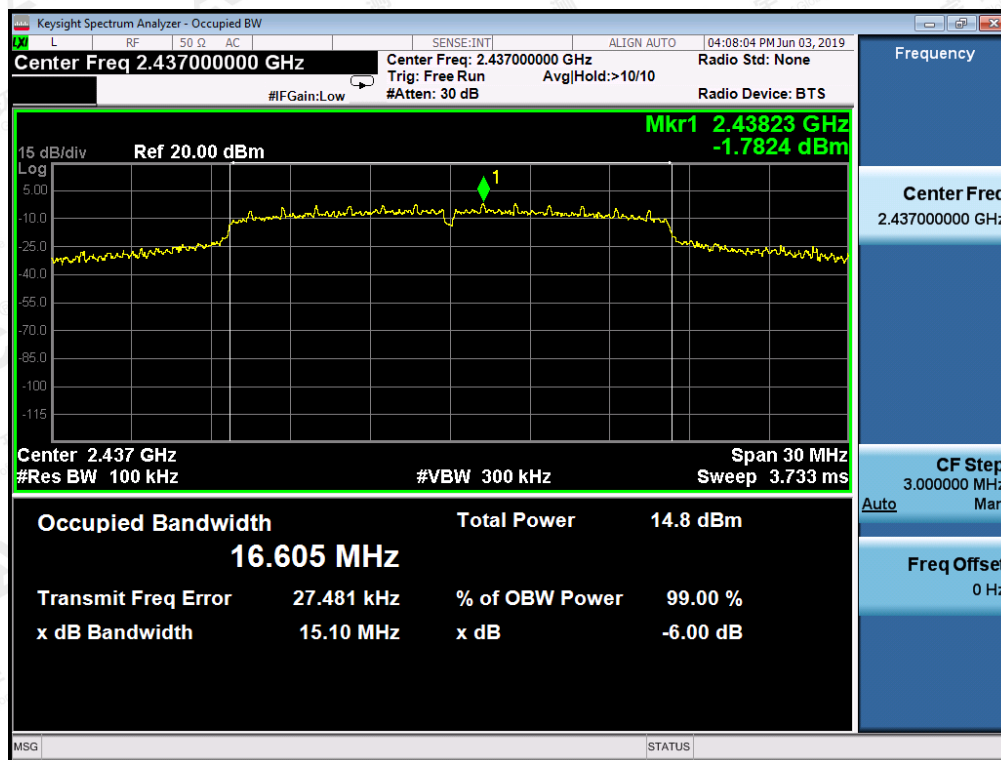
### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



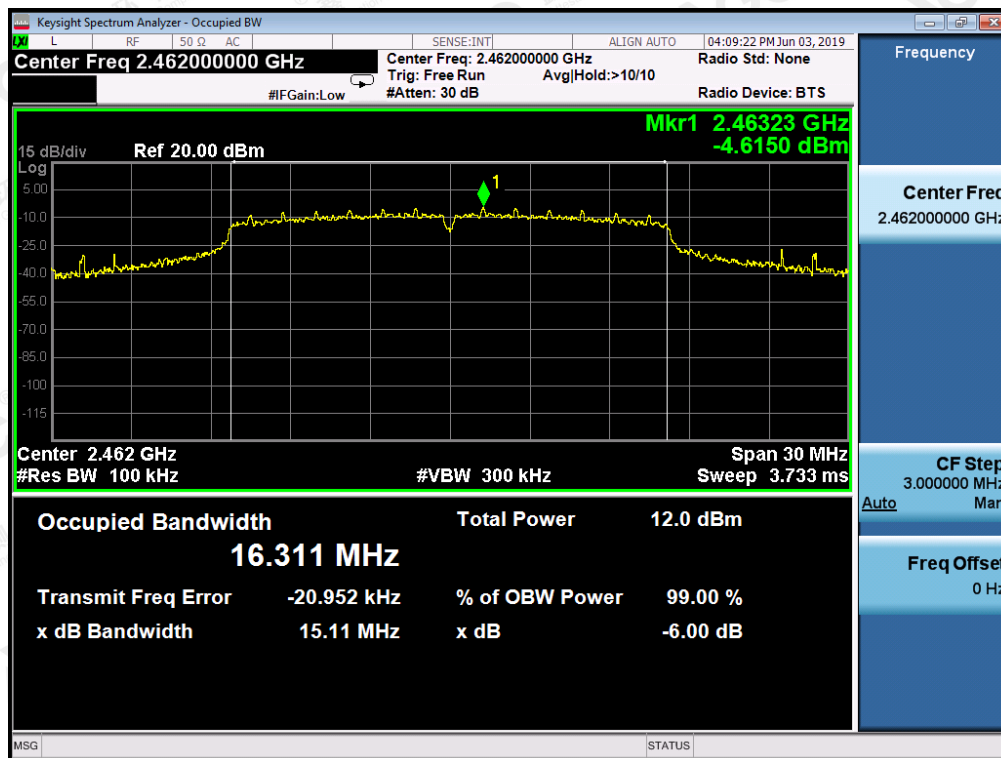
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### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



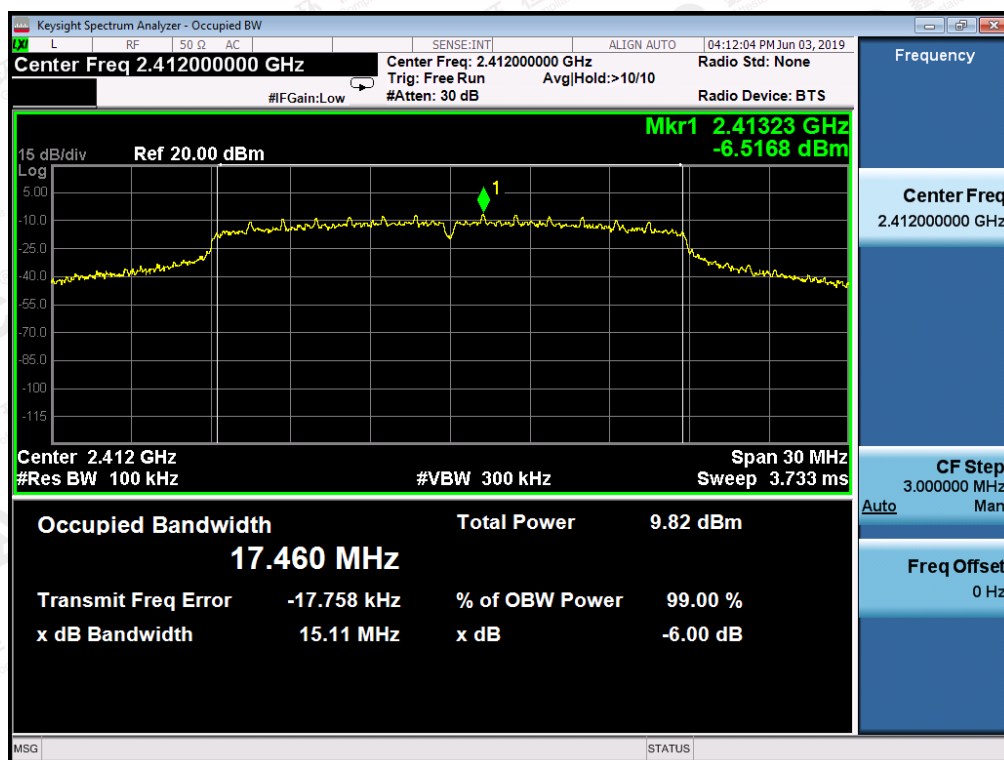
### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



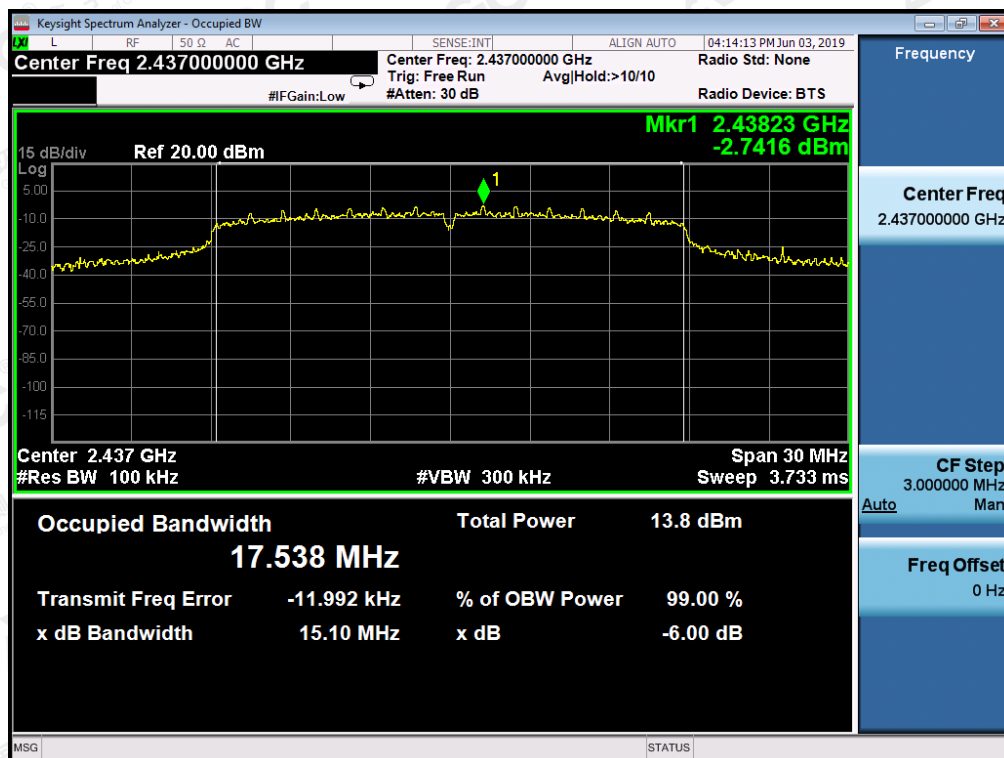
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## 802.11n (20) TEST RESULT

### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

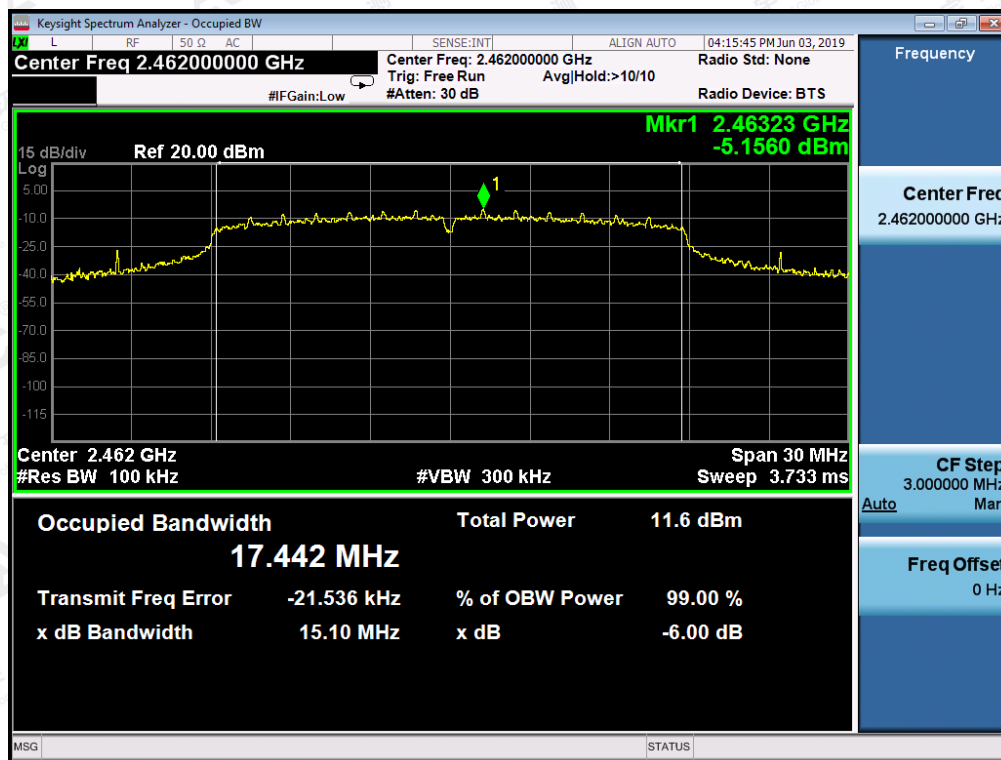


### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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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

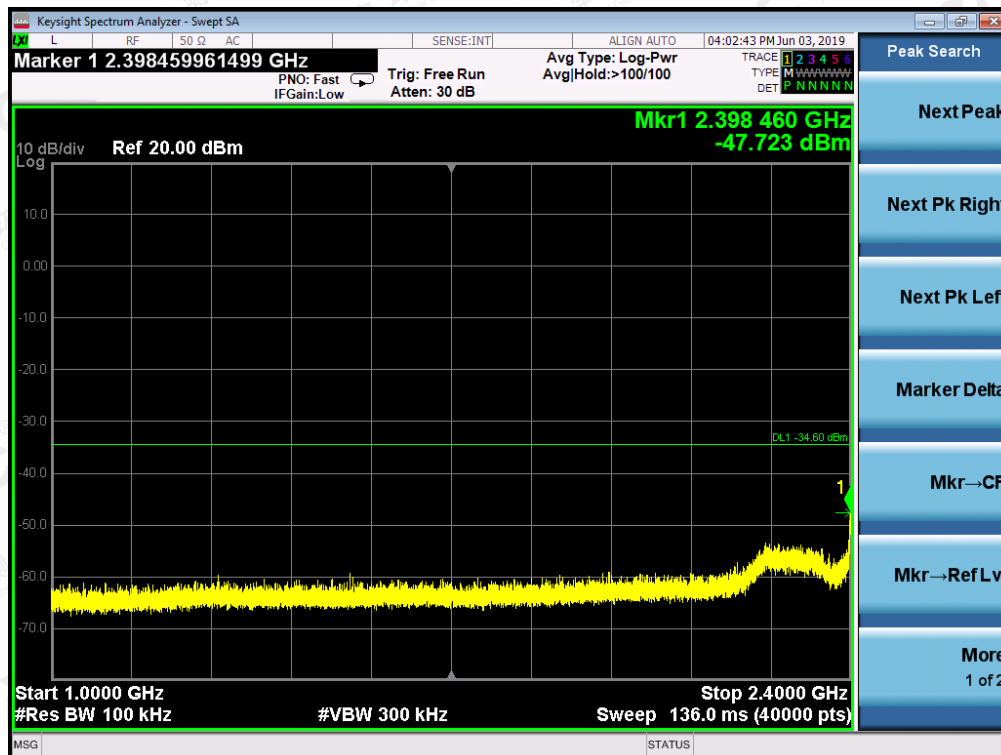
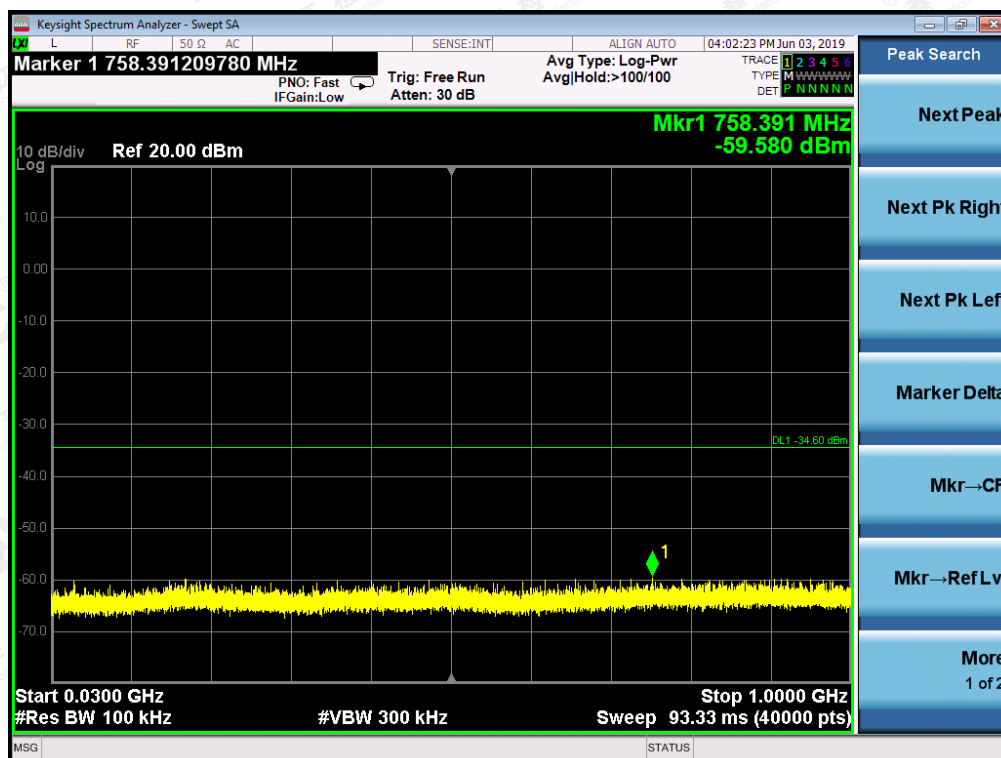
The same as described in section 6.

### 9.4. LIMITS AND MEASUREMENT RESULT

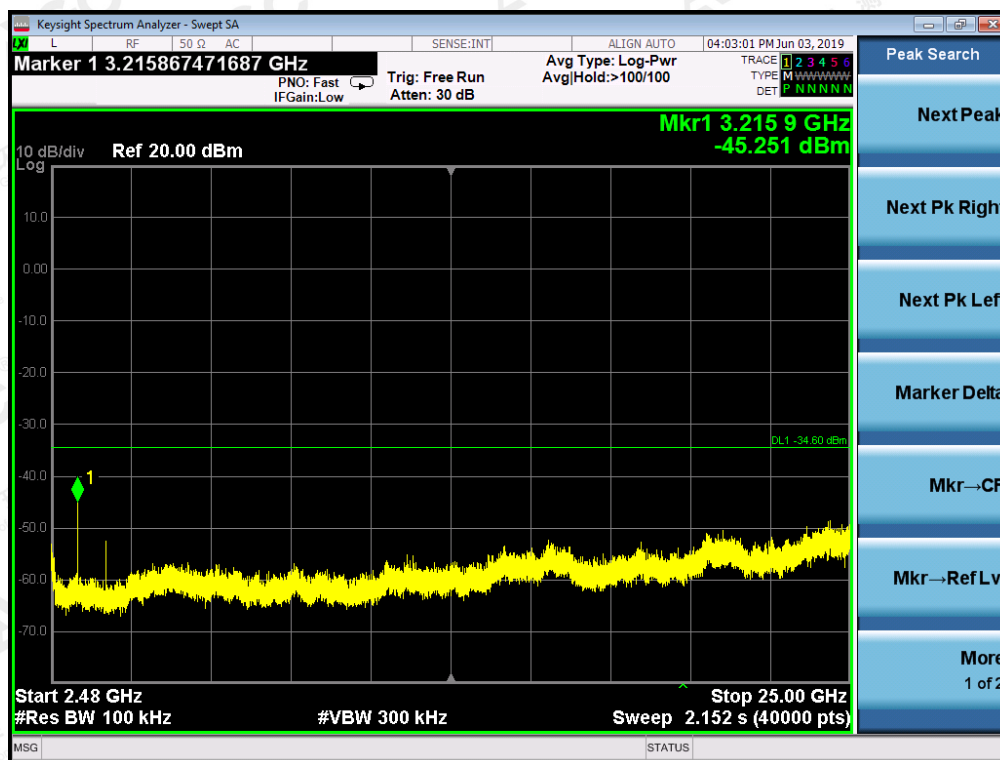
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 30 dB below 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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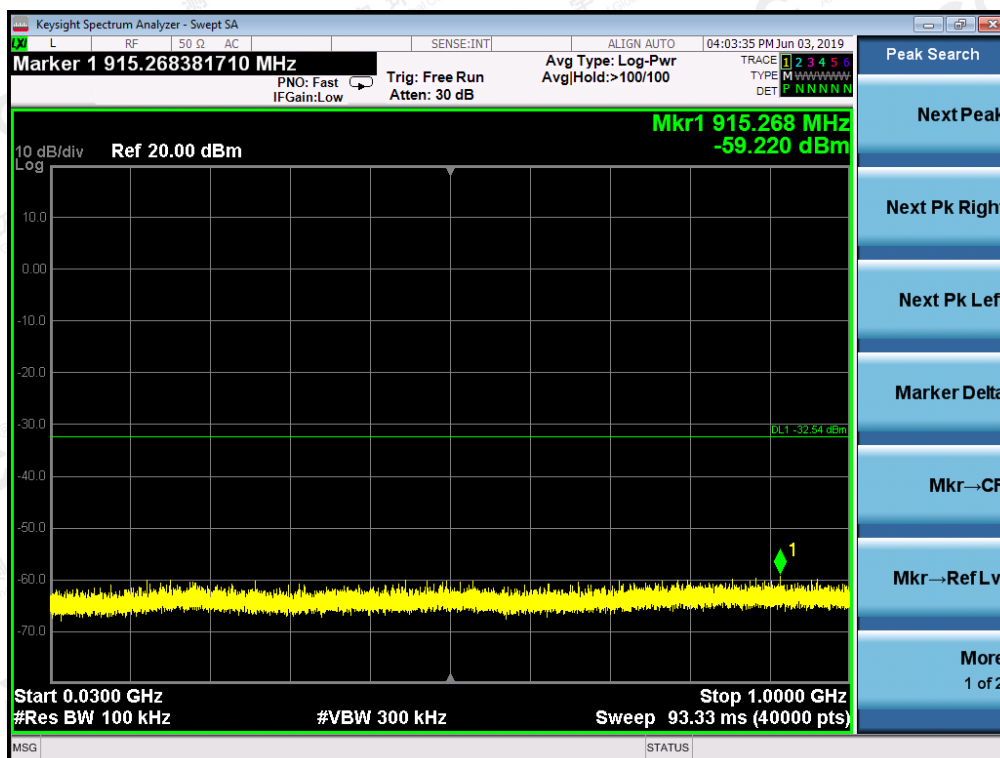
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11b FOR MODULATION IN LOW CHANNEL



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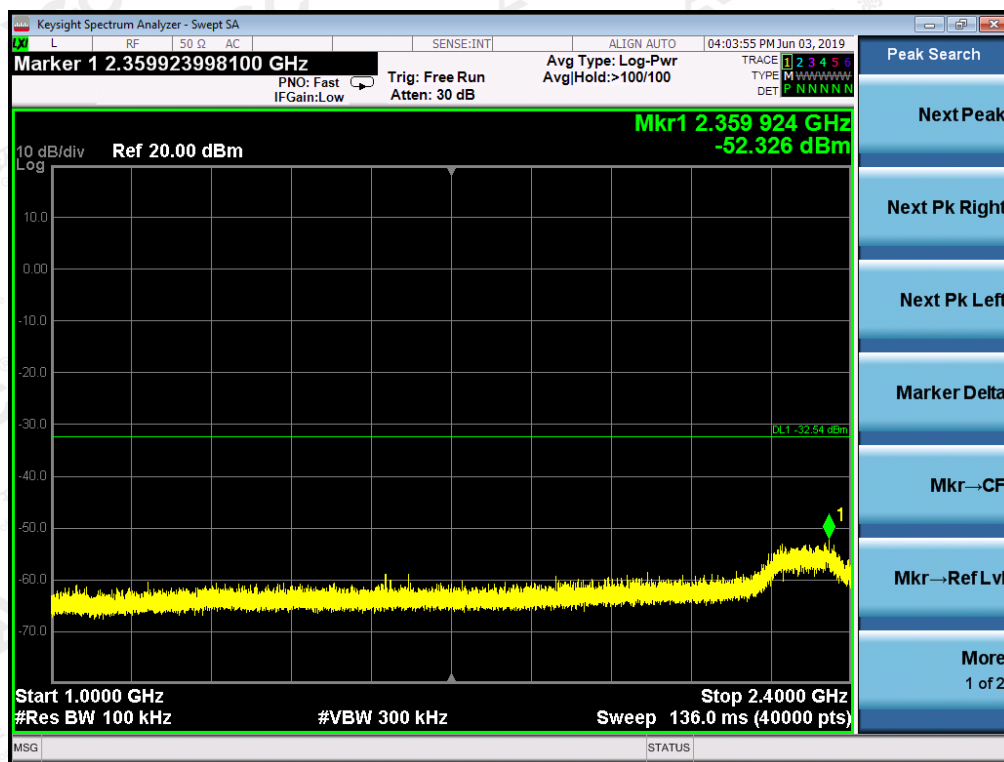


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11b FOR MODULATION IN MIDDLE CHANNEL



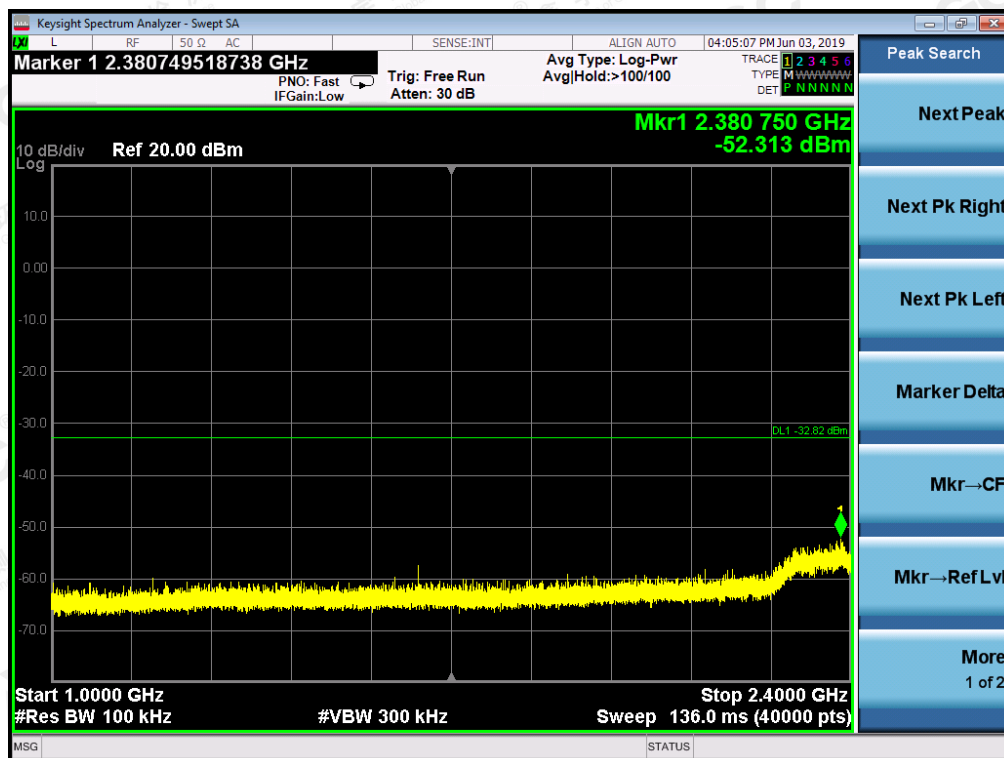
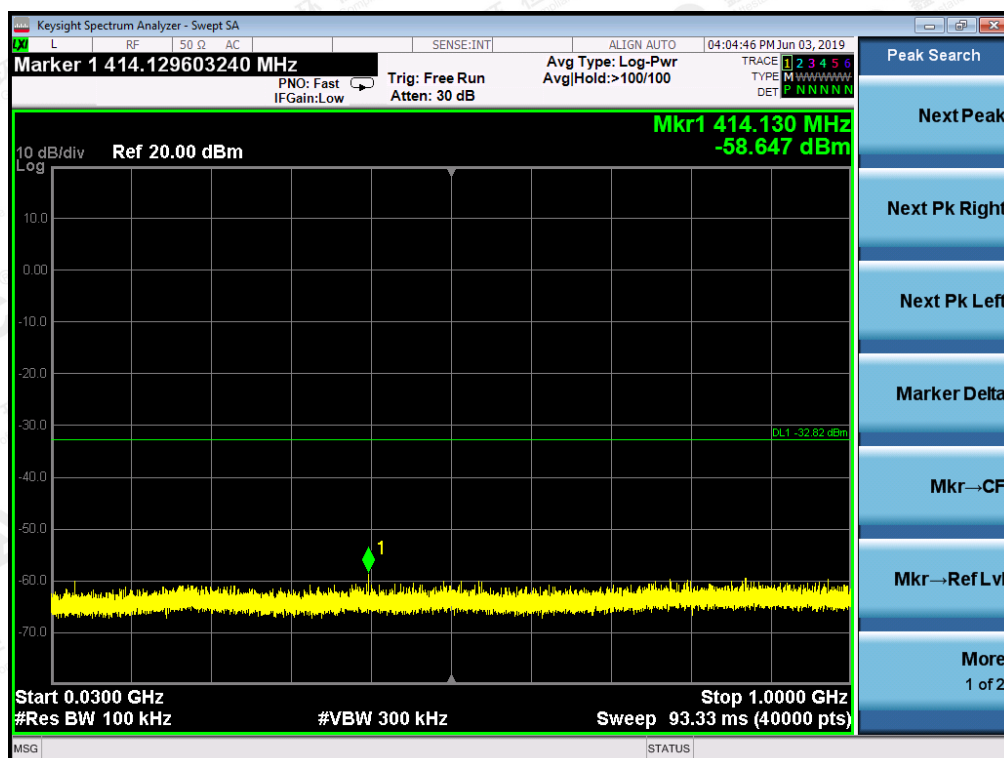
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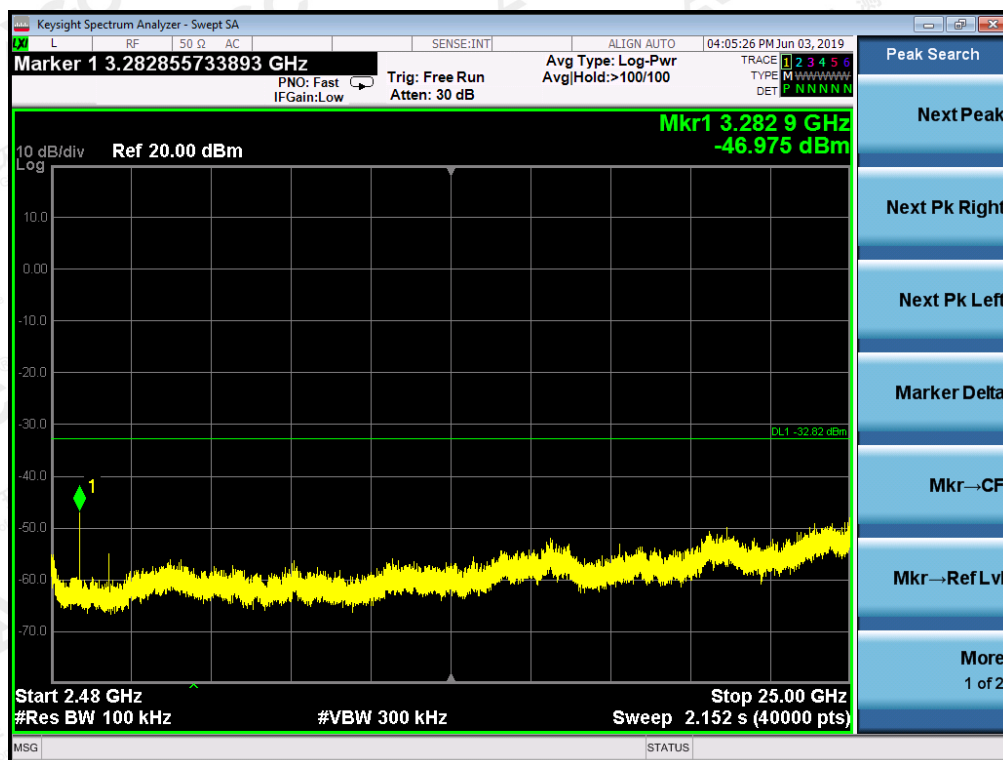


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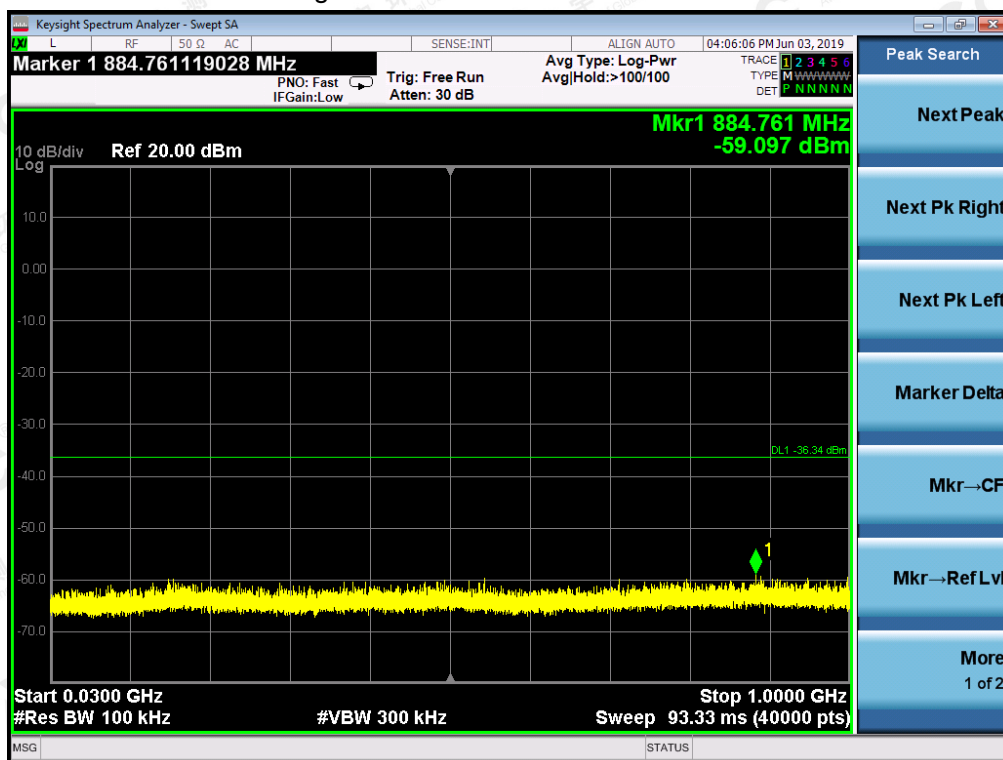
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11b FOR MODULATION IN HIGH CHANNEL



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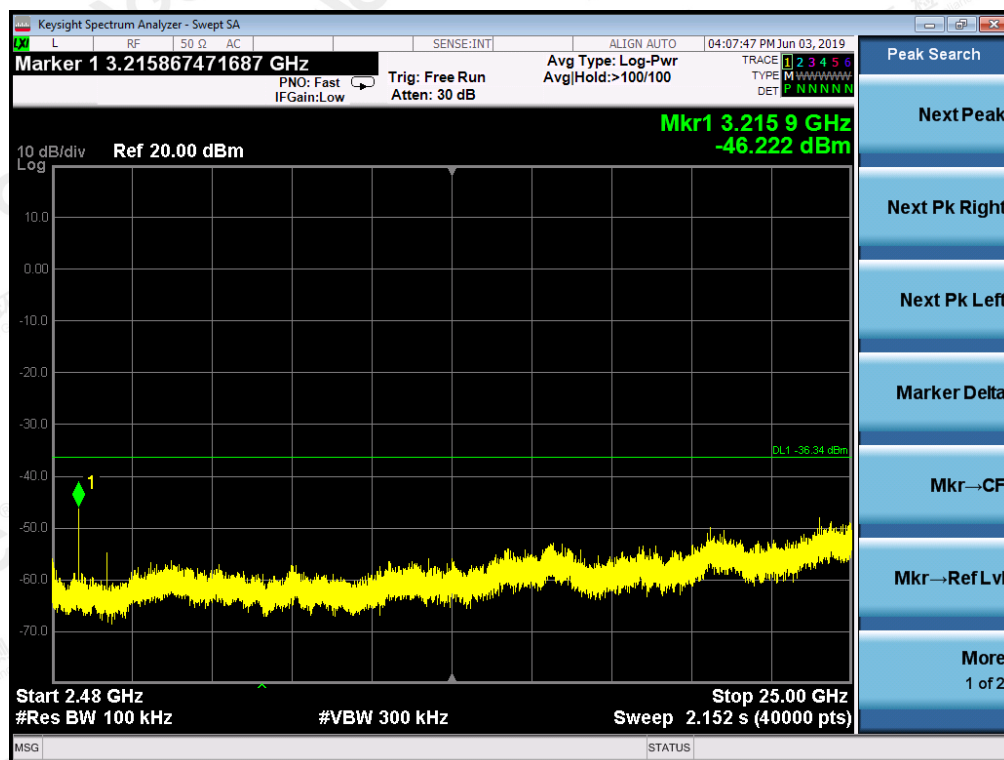
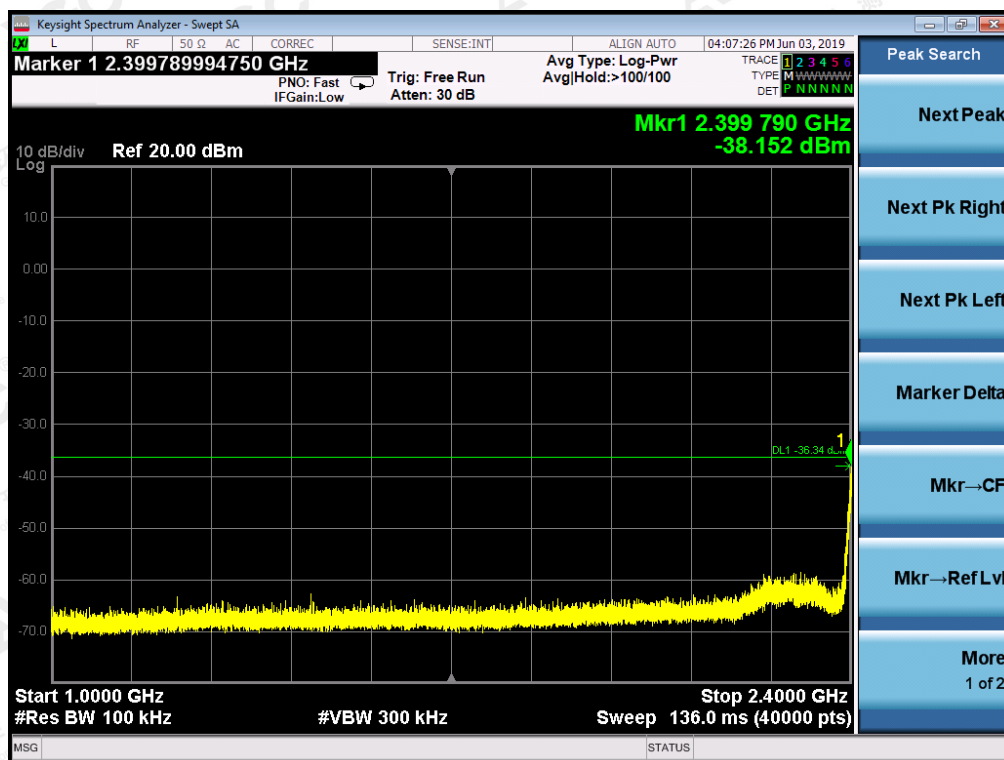


TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11g FOR MODULATION IN LOW CHANNEL



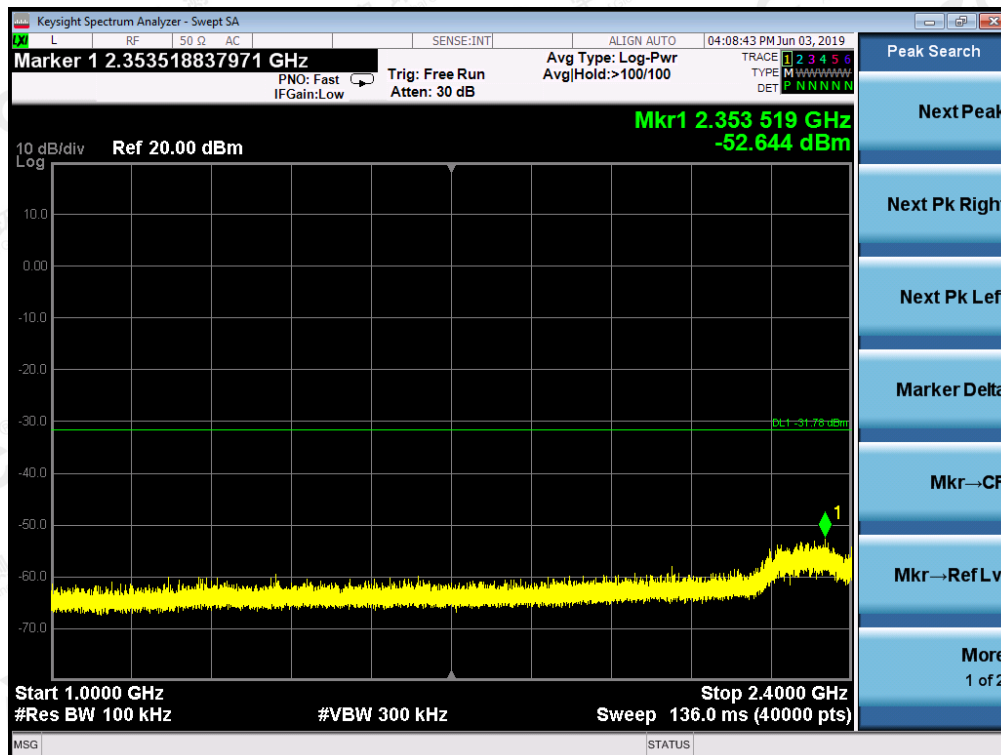
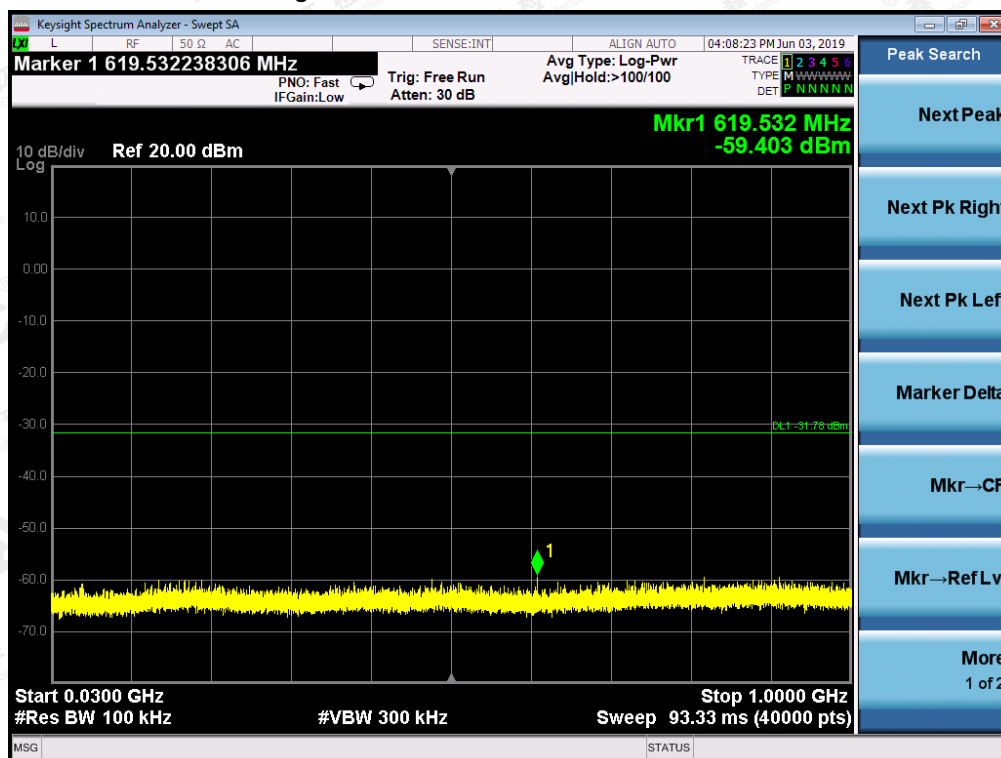
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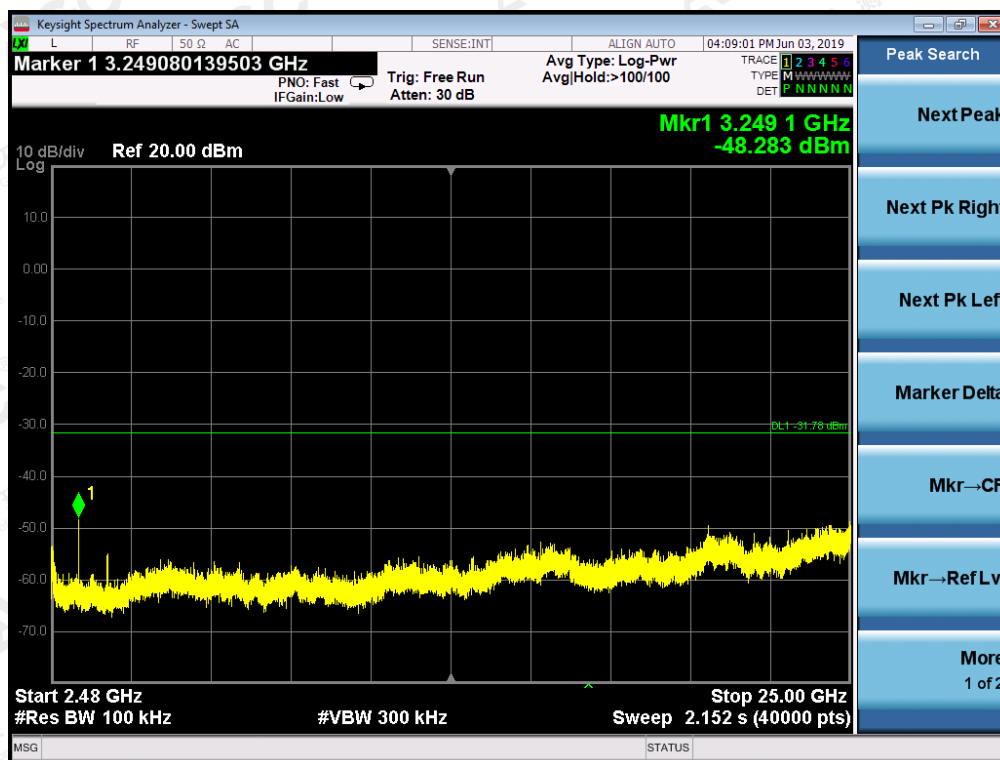


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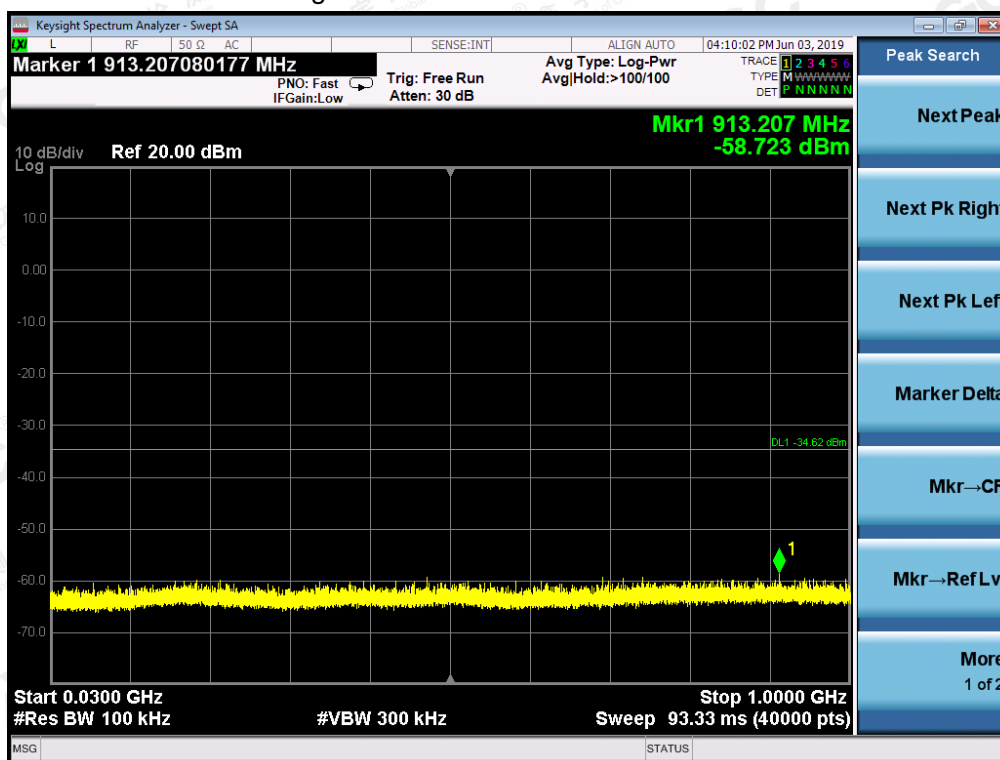
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11g FOR MODULATION IN MIDDLE CHANNEL



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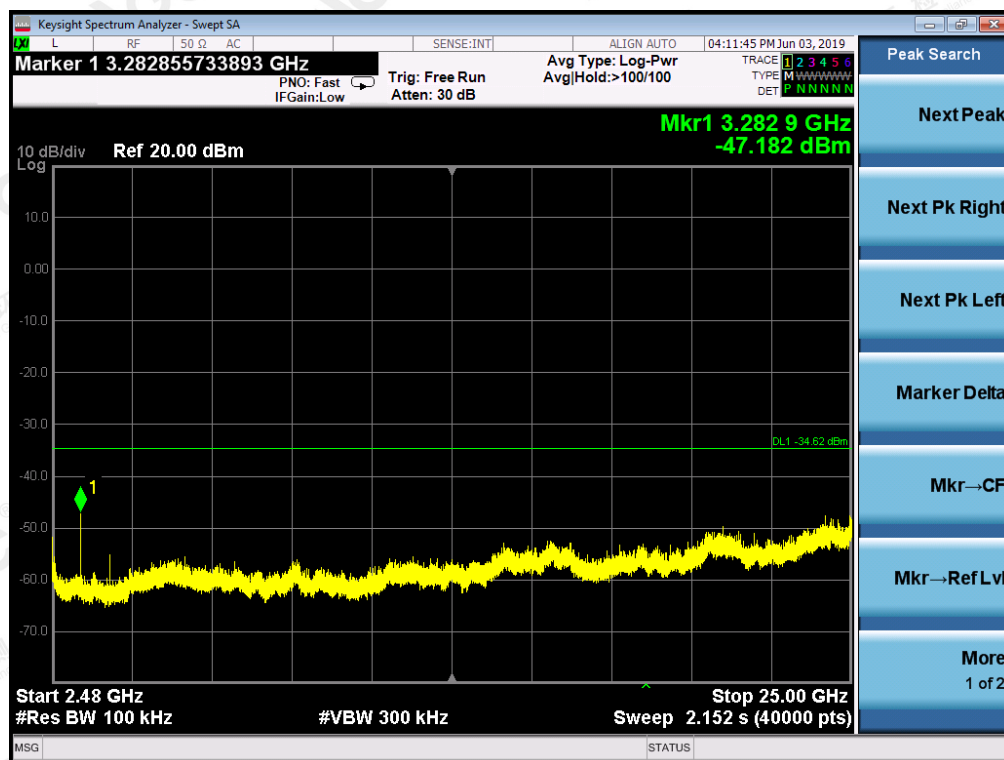
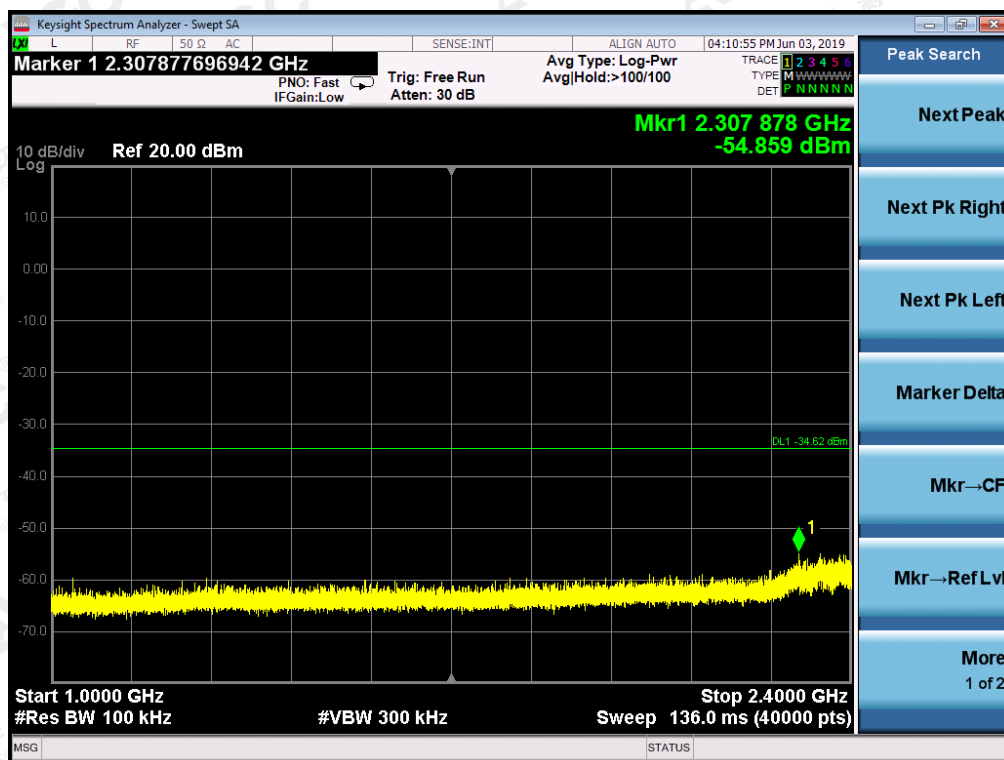


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11g FOR MODULATION IN HIGH CHANNEL



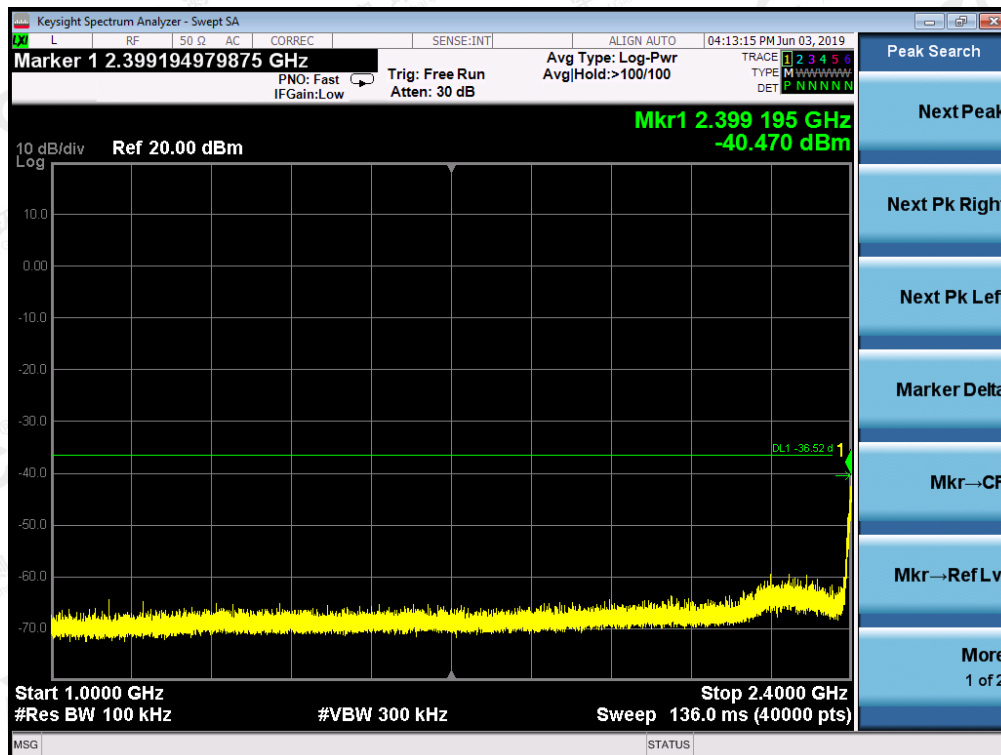
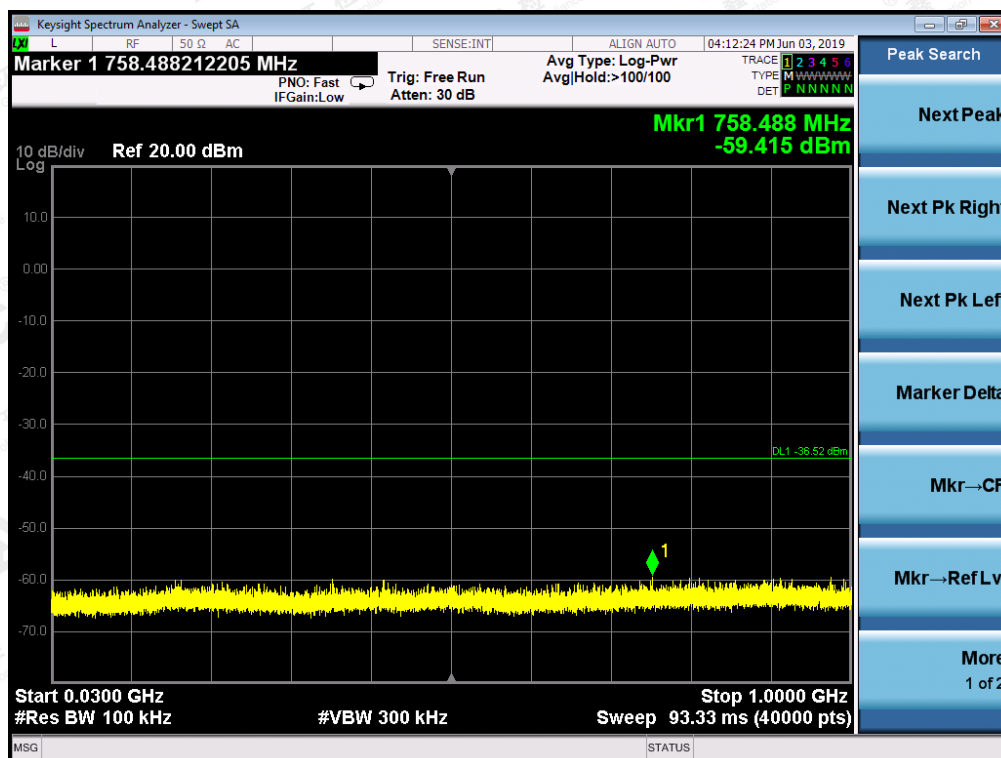
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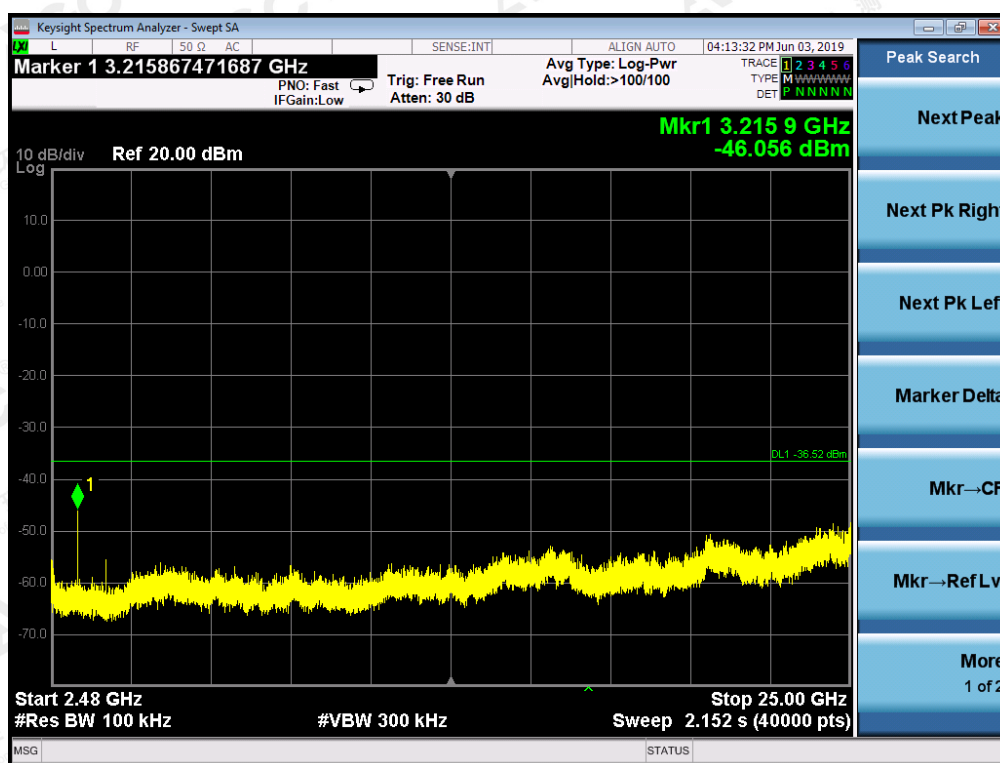


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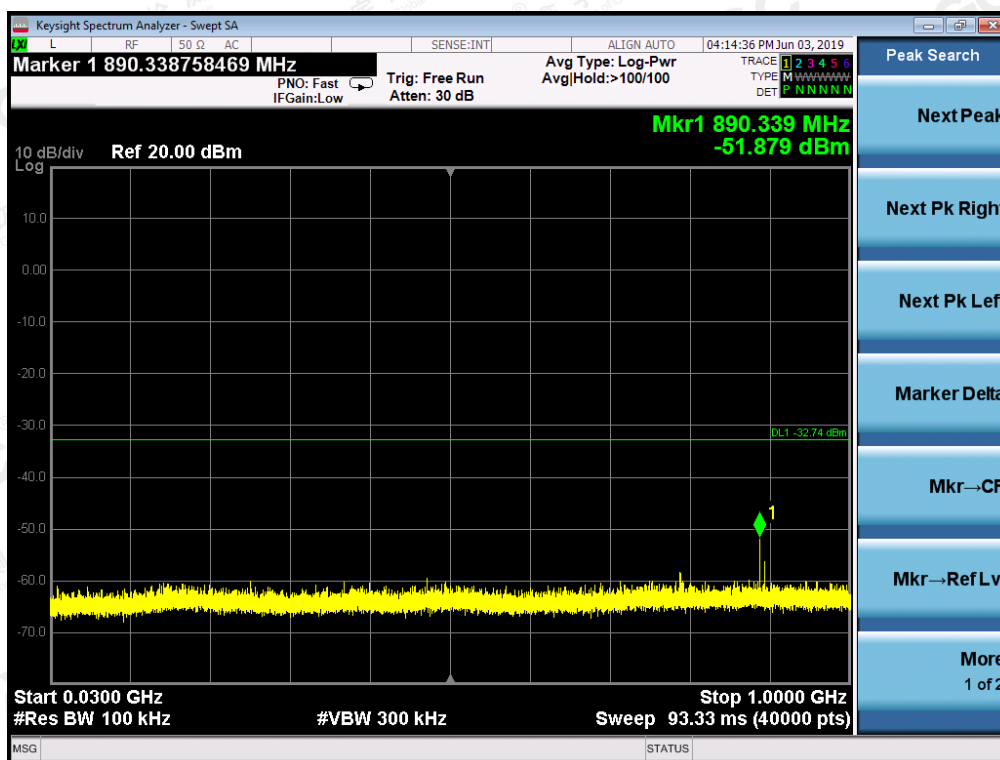
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11n20 FOR MODULATION IN LOW CHANNEL



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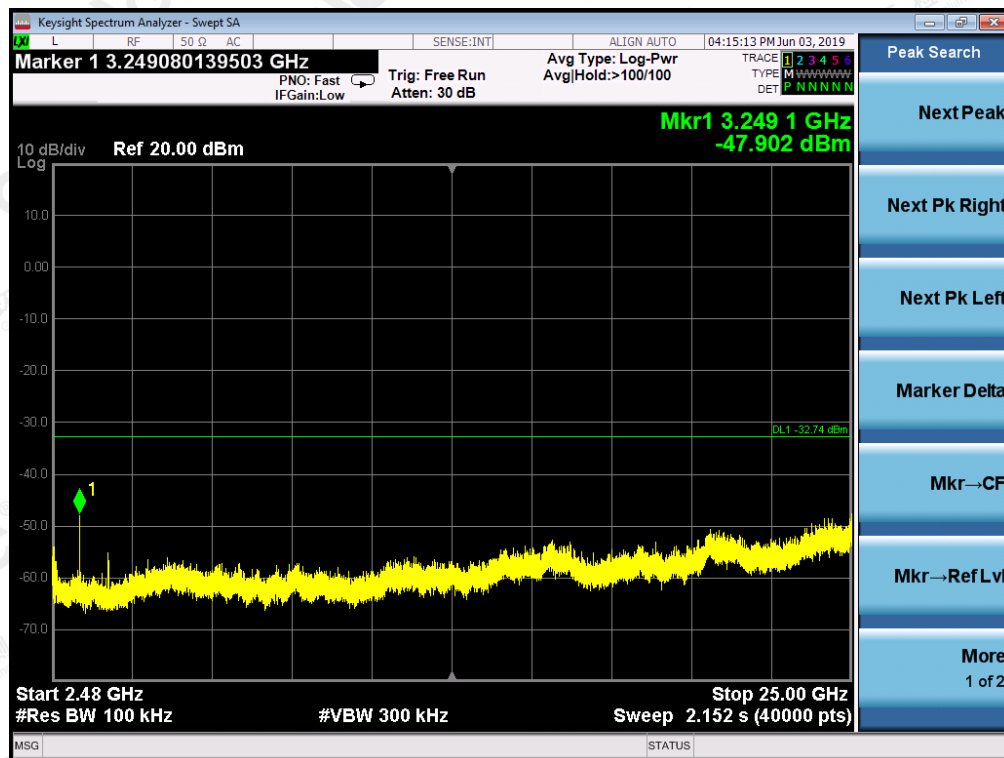
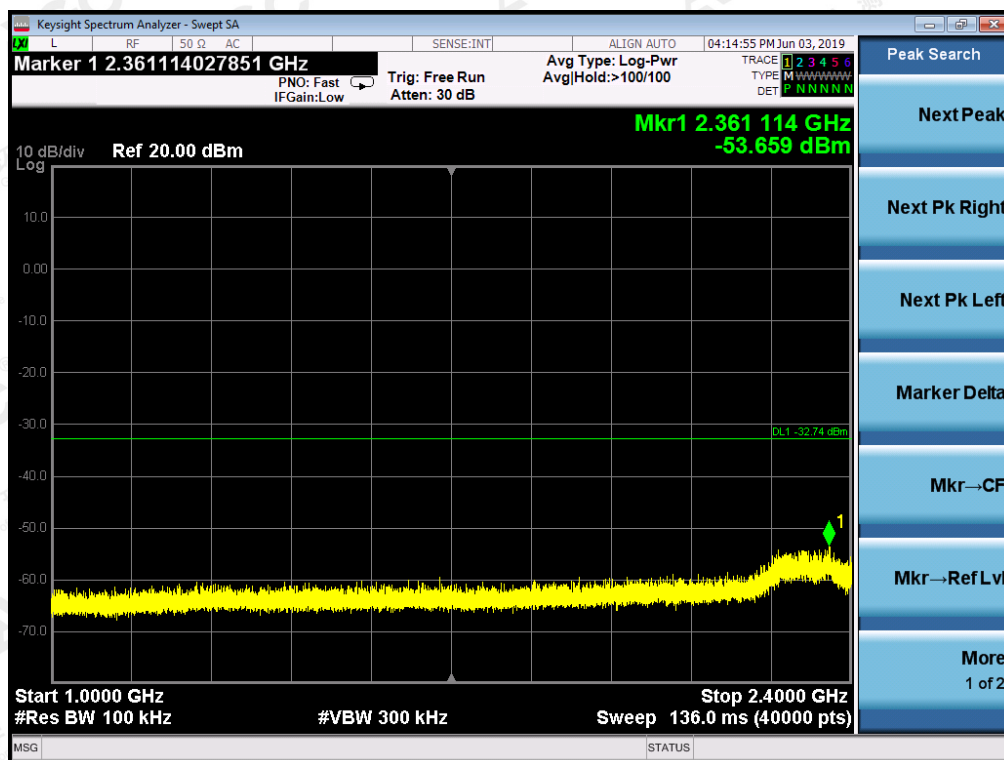


TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n20 FOR MODULATION IN MIDDLE CHANNEL



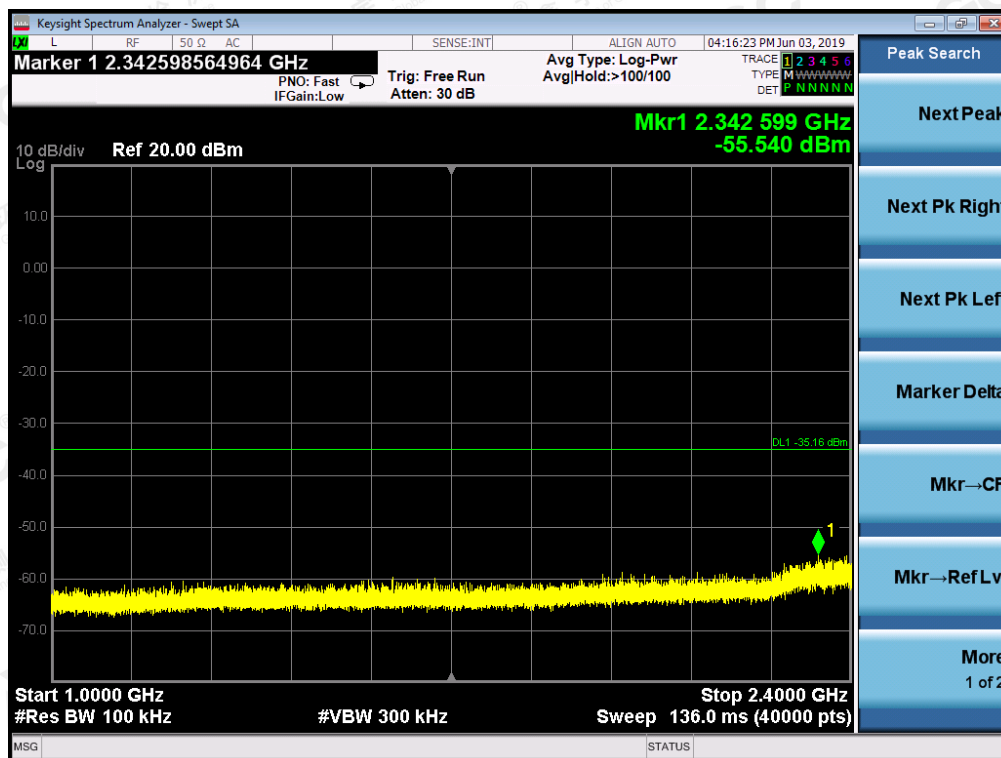
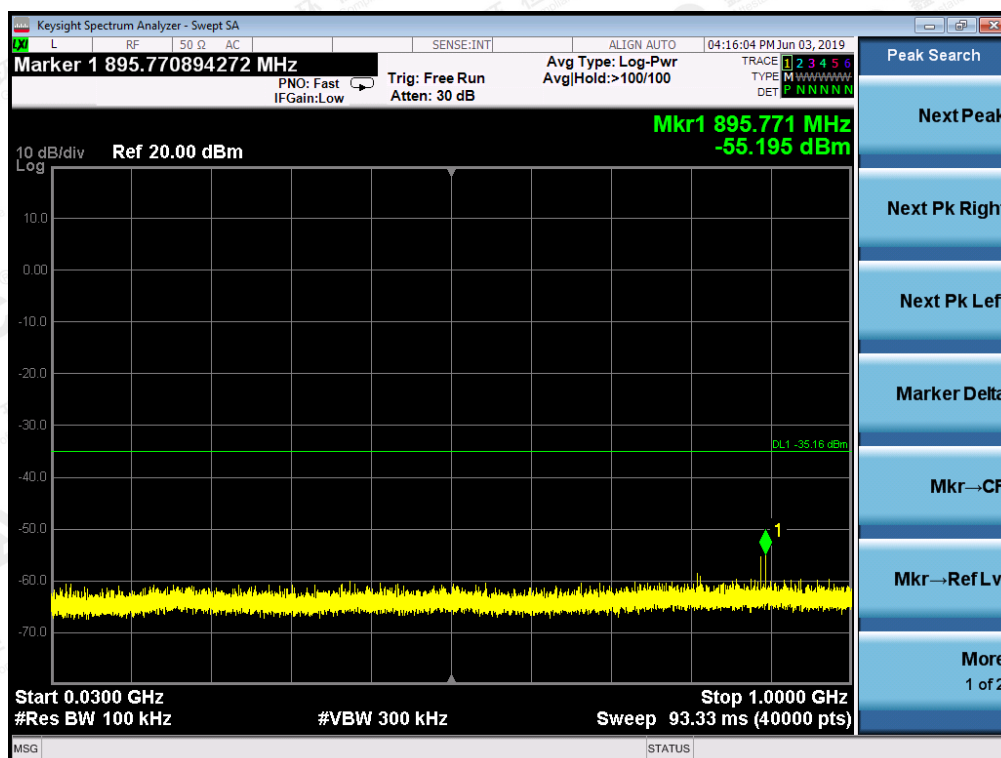
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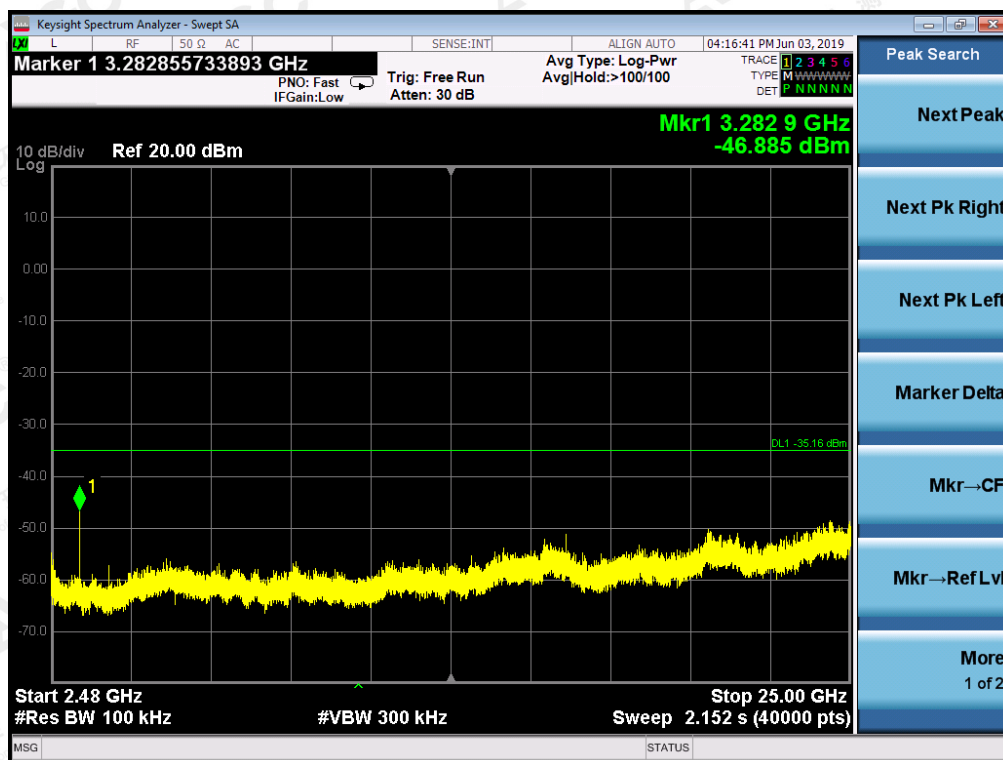


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TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n20 FOR MODULATION IN HIGH CHANNEL



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## 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 AVGPS-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	-9.412	8	Pass
Middle Channel	-7.381	8	Pass
High Channel	-7.700	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	-12.103	8	Pass
Middle Channel	-6.992	8	Pass
High Channel	-10.507	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	-11.847	8	Pass
Middle Channel	-9.078	8	Pass
High Channel	-11.047	8	Pass

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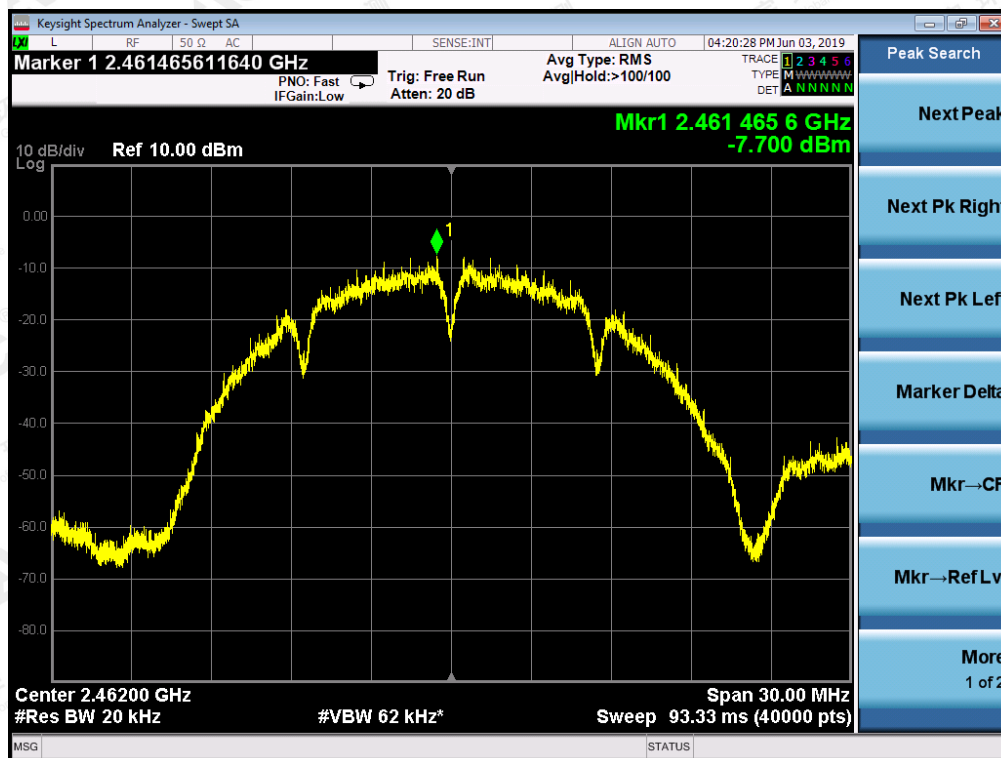
### TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



Tel: +86-755 2908 1955    Fax: +86-755 2600 8484    E-mail: [agc@agc-cert.com](mailto:agc@agc-cert.com)    400 089 2118  
Add: 2/F., Building 2, No. 1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Baoan District, Shenzhen, Guangdong China

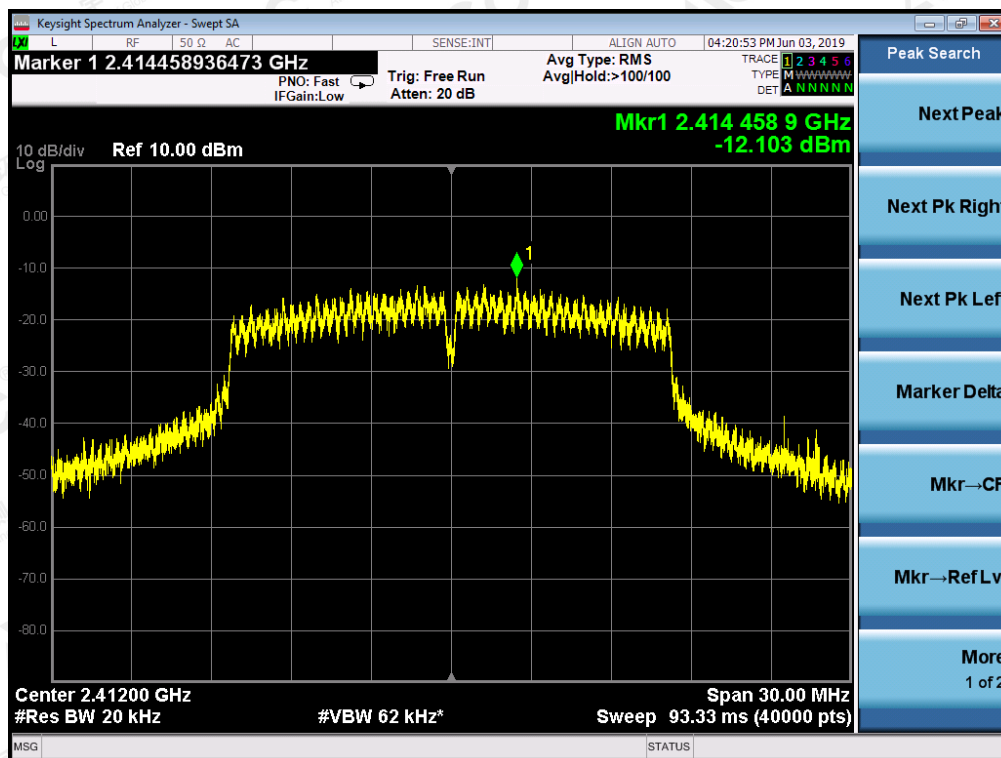


### TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



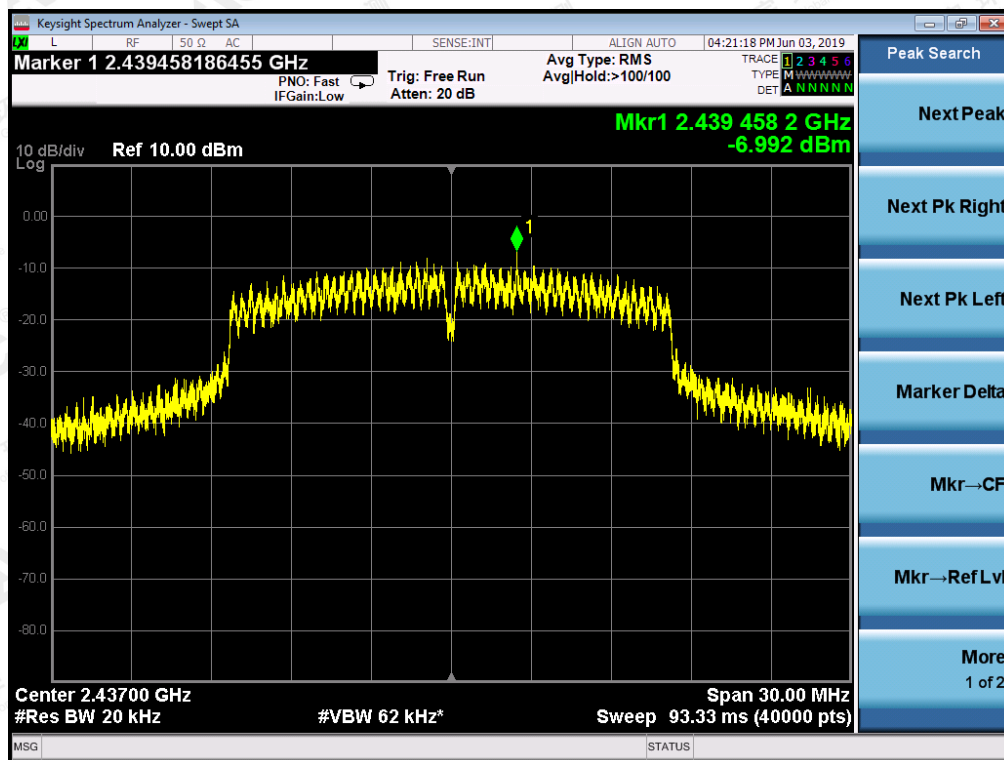
### 802.11g TEST RESULT

### TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL

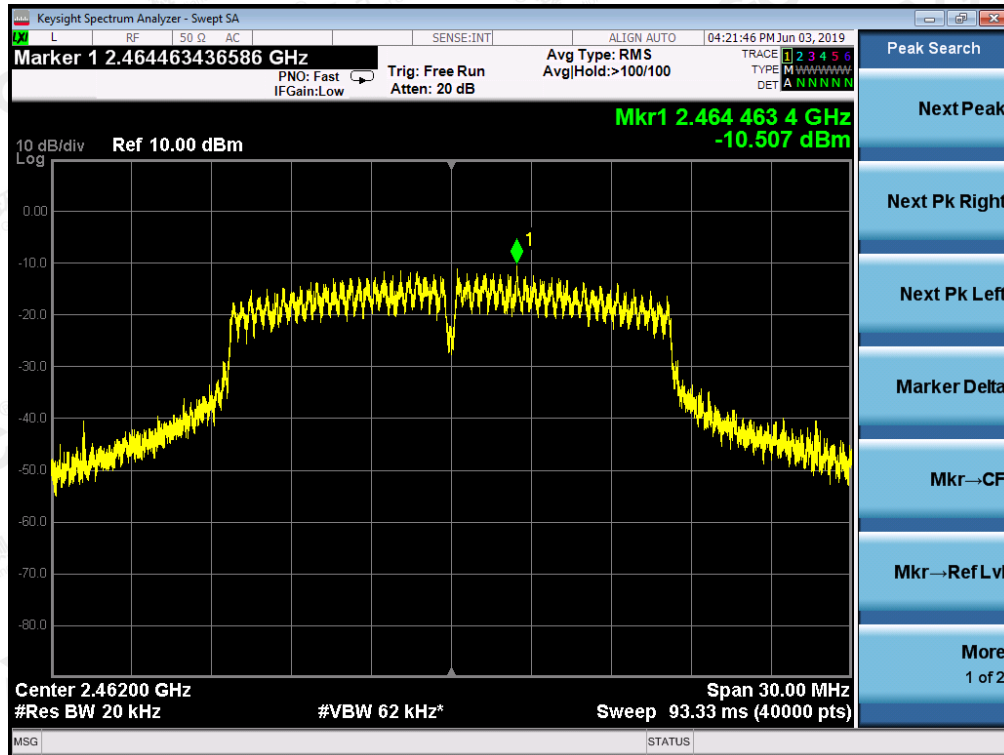


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### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

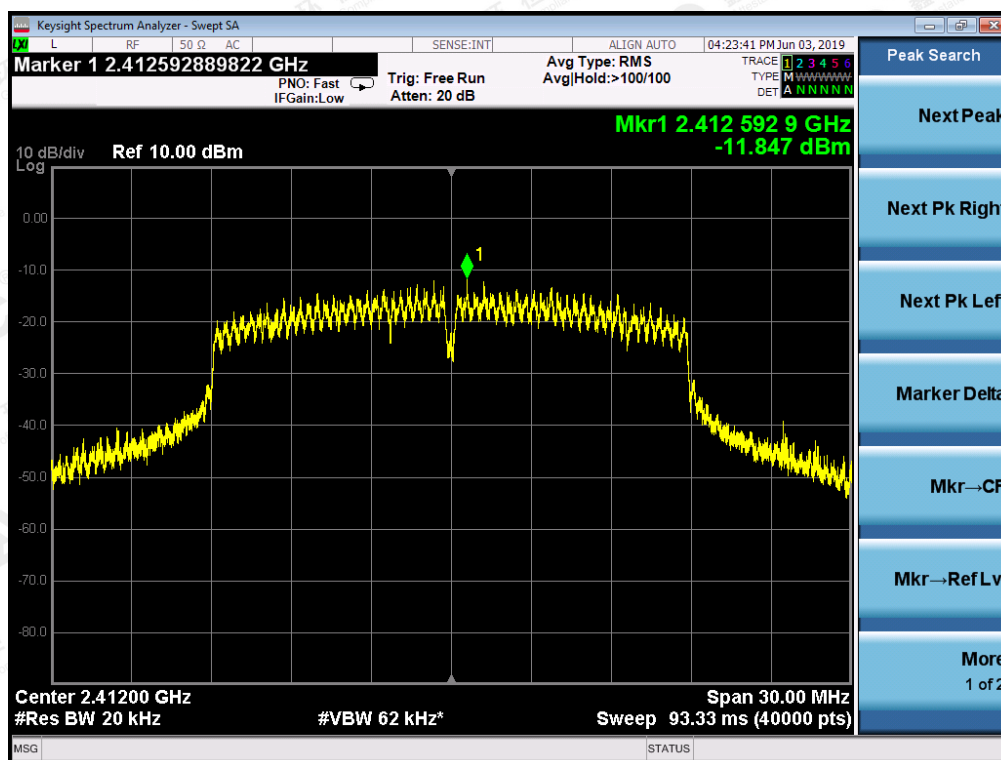


### TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

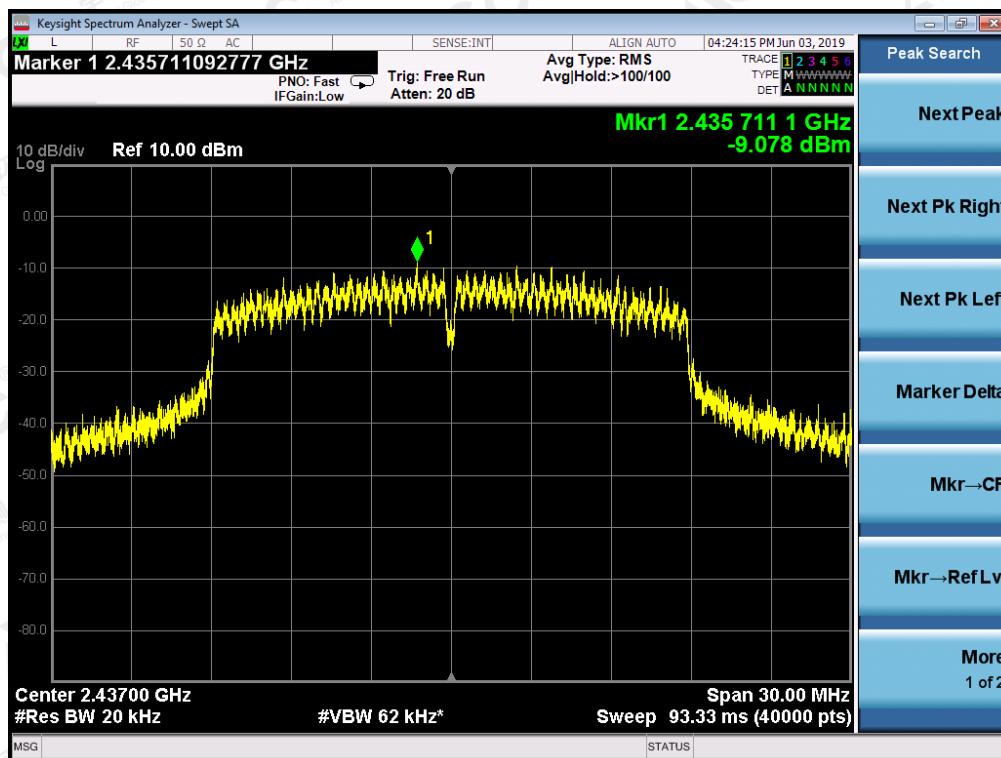


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### TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



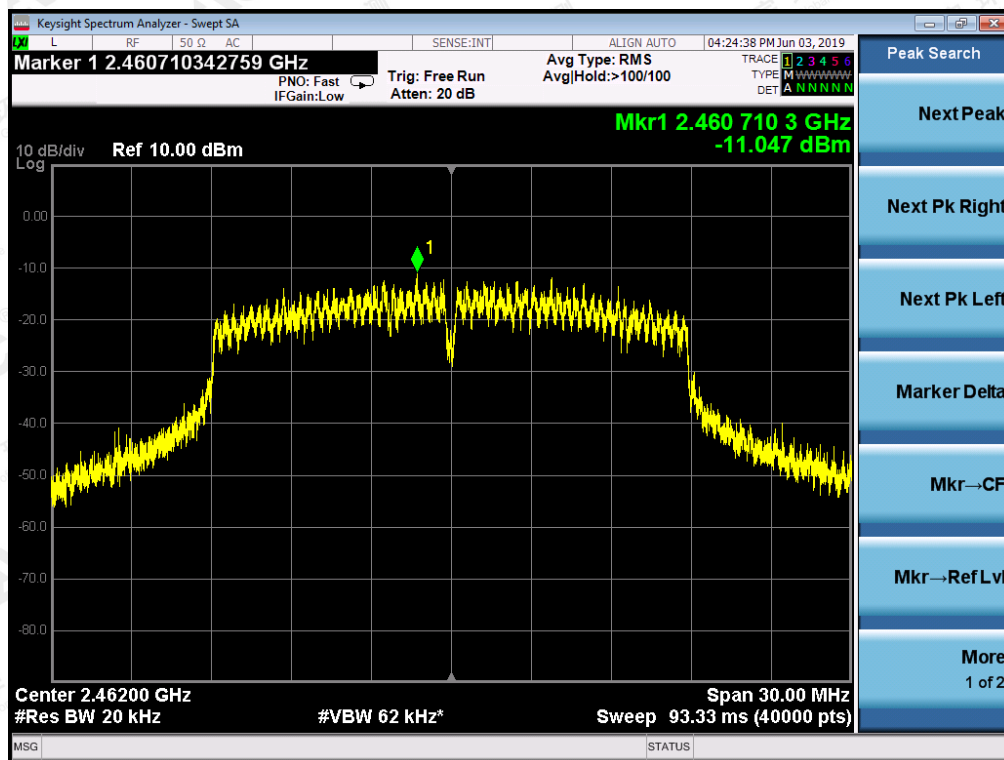
### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



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### 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.

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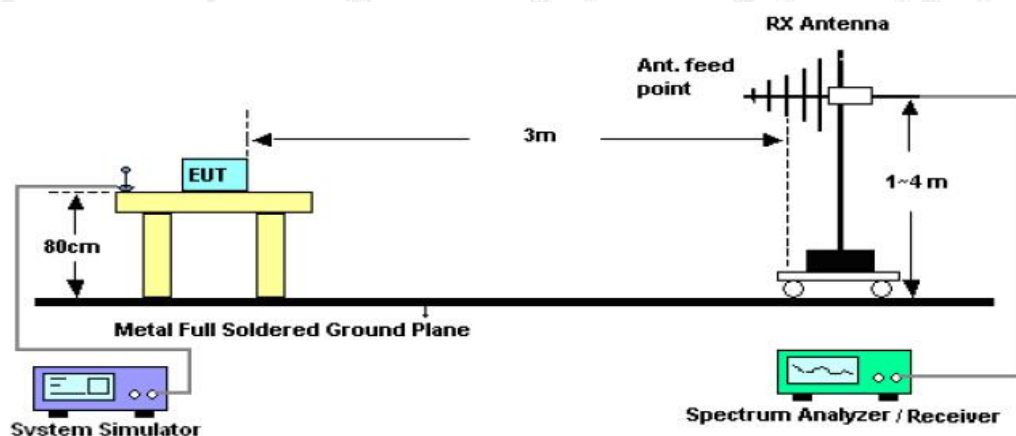


## 11.2. TEST SETUP

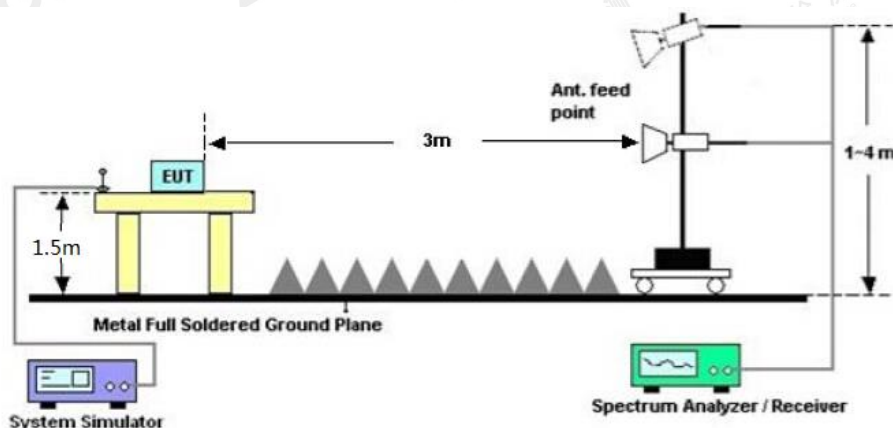
### Radiated Emission Test-Setup Frequency Below 30MHz



### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



### RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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### 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

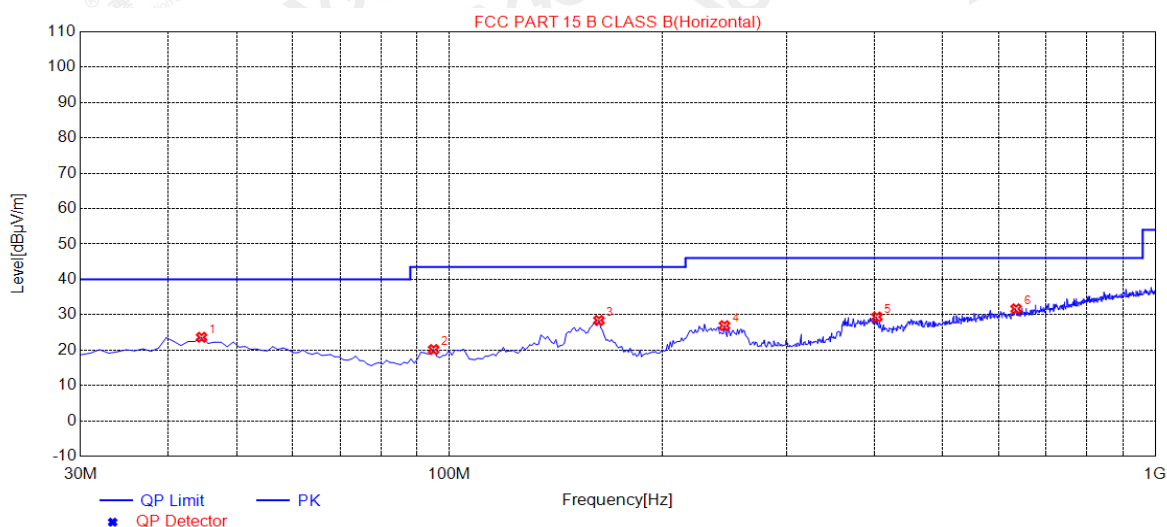
#### RADIATED EMISSION BELOW 30MHZ

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

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### RADIATED EMISSION BELOW 1GHZ

<b>EUT</b>	1080P WiFi Smart Home Monitoring System	<b>Model Name</b>	T5200HCA
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2412MHZ	<b>Antenna</b>	Horizontal

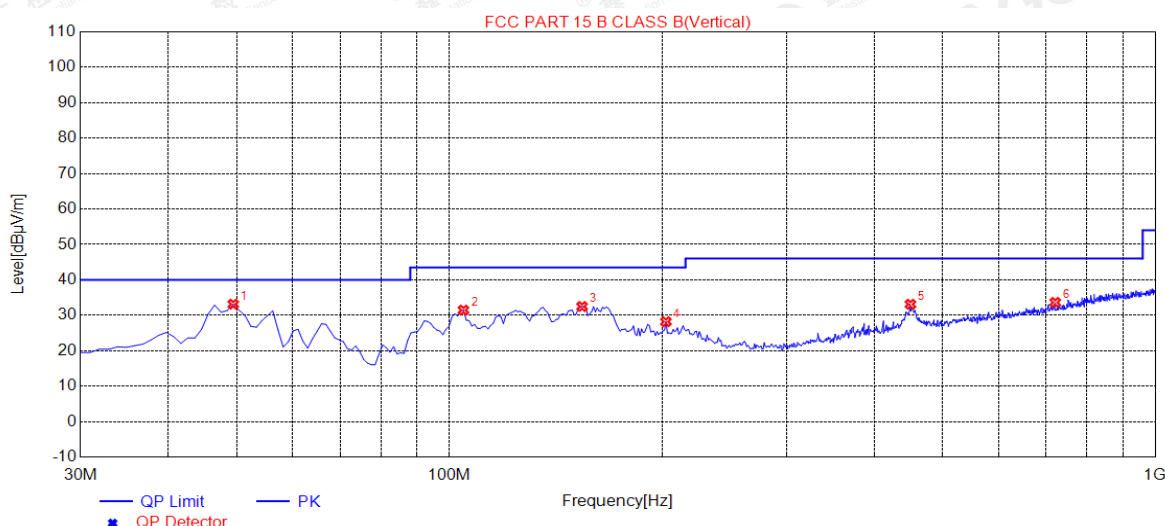


NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.5500	23.63	14.82	40.00	16.37	150	251	Horizontal
2	94.9900	20.15	10.82	43.50	23.35	200	106	Horizontal
3	162.8900	28.40	14.65	43.50	15.10	150	265	Horizontal
4	245.3400	26.90	14.76	46.00	19.10	150	161	Horizontal
5	403.4500	29.37	19.90	46.00	16.63	100	272	Horizontal
6	635.2800	31.67	24.90	46.00	14.33	100	0	Horizontal

**RESULT: PASS**

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EUT	1080P WiFi Smart Home Monitoring System	Model Name	T5200HCA
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	49.4000	33.14	14.69	40.00	6.86	100	164	Vertical
2	104.6900	31.46	11.86	43.50	12.04	100	143	Vertical
3	154.1600	32.49	14.92	43.50	11.01	100	313	Vertical
4	202.6600	28.20	12.23	43.50	15.30	100	5	Vertical
5	450.0100	33.12	20.99	46.00	12.88	100	7	Vertical
6	721.6100	33.64	26.50	46.00	12.36	200	2	Vertical

## 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.

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**RADIATED EMISSION ABOVE 1GHZ**

<b>EUT</b>	1080P WiFi Smart Home Monitoring System	<b>Model Name</b>	T5200HCA
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2412MHZ	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.091	44.63	3.72	48.35	74	-25.65	peak
4824.045	38.41	3.72	42.13	54	-11.87	AVG
7236.039	42.32	8.15	50.47	74	-23.53	peak
7236.059	36.74	8.15	44.89	54	-9.11	AVG

Remark:

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

<b>EUT</b>	1080P WiFi Smart Home Monitoring System	<b>Model Name</b>	T5200HCA
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2412MHZ	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.040	43.74	3.72	47.46	74	-26.54	peak
4824.048	39.15	3.72	42.87	54	-11.13	AVG
7236.090	42.19	8.15	50.34	74	-23.66	peak
7236.103	37.52	8.15	45.67	54	-8.33	AVG

Remark:

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

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<b>EUT</b>	1080P WiFi Smart Home Monitoring System	<b>Model Name</b>	T5200HCA
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2437MHZ	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.038	47.44	3.75	51.19	74	-22.81	peak
4874.098	43.35	3.75	47.1	54	-6.9	AVG
7311.051	41.23	8.16	49.39	74	-24.61	peak
7311.078	37.26	8.16	45.42	54	-8.58	AVG

Remark:

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

<b>EUT</b>	1080P WiFi Smart Home Monitoring System	<b>Model Name</b>	T5200HCA
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2437MHZ	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.029	46.32	3.75	50.07	74	-23.93	peak
4874.021	40.29	3.75	44.04	54	-9.96	AVG
7311.079	42.28	8.16	50.44	74	-23.56	peak
7311.059	39.64	8.16	47.8	54	-6.2	AVG

Remark:

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

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<b>EUT</b>	1080P WiFi Smart Home Monitoring System	<b>Model Name</b>	T5200HCA
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2462MHZ	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.098	43.35	3.81	47.16	74	-26.84	peak
4924.081	40.15	3.81	43.96	54	-10.04	AVG
7386.051	40.83	8.19	49.02	74	-24.98	peak
7386.040	36.82	8.19	45.01	54	-8.99	AVG

Remark:

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

<b>EUT</b>	1080P WiFi Smart Home Monitoring System	<b>Model Name</b>	T5200HCA
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2462MHZ	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.068	44.51	3.81	48.32	74	-25.68	peak
4924.044	39.91	3.81	43.72	54	-10.28	AVG
7386.079	38.41	8.19	46.6	74	-27.4	peak
7386.094	37.56	8.19	45.75	54	-8.25	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.

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## 12. BAND EDGE EMISSION

### 12.1. MEASUREMENT PROCEDURE

Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

### 12.2. TEST SET-UP

same as 11.2

#### Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.

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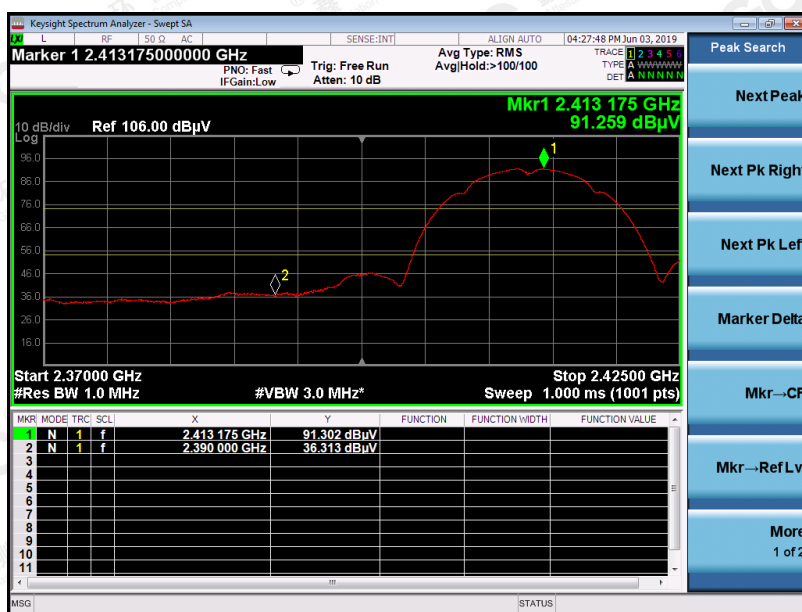
### 12.3. TEST RESULT

EUT	1080P WiFi Smart Home Monitoring System	Model Name	T5200HCA
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Horizontal

PK



AV



### RESULT: PASS

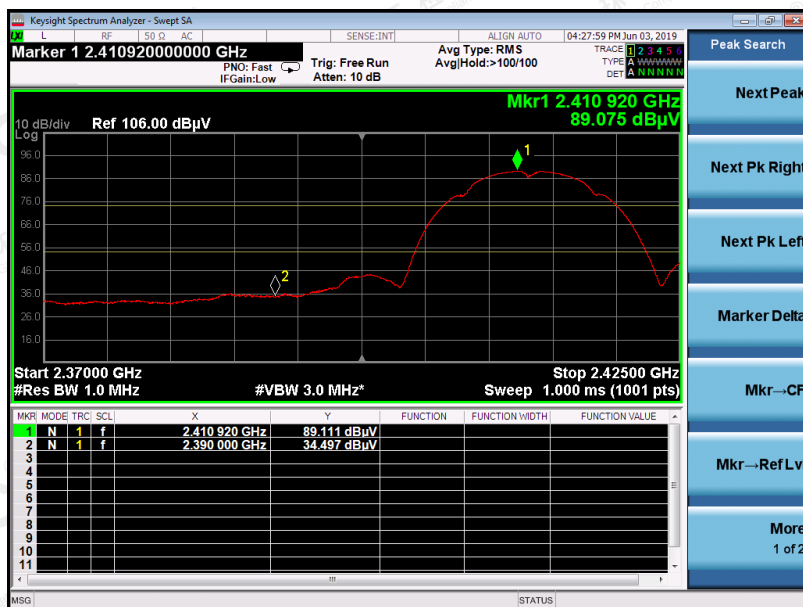
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EUT	1080P WiFi Smart Home Monitoring System	Model Name	T5200HCA
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Vertical

PK



AV



**RESULT: PASS**

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EUT	1080P WiFi Smart Home Monitoring System	Model Name	T5200HCA
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Horizontal

PK



AV



**RESULT: PASS**

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EUT	1080P WiFi Smart Home Monitoring System	Model Name	T5200HCA
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Vertical

PK



AV



**RESULT: PASS**

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EUT	1080P WiFi Smart Home Monitoring System	Model Name	T5200HCA
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Horizontal

PK



AV



**RESULT: PASS**

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