



**FCC PART 15C  
TEST REPORT  
No. 2013WLN0818**

**for**

**TCT Mobile Limited**

**HSUPA/HSDPA/UMTS dualband / GSM quadband mobile phone**

**Model name:Tigris 3G**

**Marketing name: ALCATEL TRIBE 3075A**

**With**

**FCC ID: RAD417**

**Hardware Version: PIO**

**Software Version: A18**

**Issued Date: 2013-12-19**



**Note:**The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

**Test Laboratory:**

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## 1. TEST LATORATORY

### 1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT  
Address: No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China  
Postal Code: 100191  
Telephone: +86-10-62304633-2561  
Fax: +86-10-62304633-2504

### 1.2. Project data

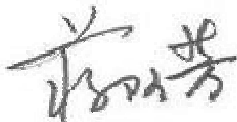
Testing Start Date: 2013-11-08  
Testing End Date: 2013-11-25

### 1.3. Signature



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Xu Zhongfei  
(Prepared this test report)



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Jiang Afang  
(Reviewed this test report)



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Xiao Li  
Deputy Director of the laboratory  
(Approved this test report)

## **2. CLIENT INFORMATION**

### **2.1. Applicant Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China. 201203  
City: Shanghai  
Postal Code: /  
Country: China  
Contact Person: Gong Zhizhou  
Telephone: 0086-21-6146089  
Fax: 0086-21-61460602

### **2.2. Manufacturer Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China. 201203  
City: Shanghai  
Postal Code: /  
Country: China  
Contact Person: Gong Zhizhou  
Telephone: 0086-21-6146089  
Fax: 0086-21-61460602

### 3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY

#### EQUIPMENT(AE)

##### 3.1. About EUT

Description	GSM 850/900/1800/1900 quad bands, GPRS, EDGE, UMTS FDD bands 2/5, HSDPA, HSUPA, WLAN ( 802.11 b/g/n) mobile phone
Model name	Tigris 3G
Marketing name	ALCATEL TRIBE 3075A
FCC ID	RAD417
WLAN Frequency Range	ISM Band: 2400MHz~2483.5MHz
Type of modulation	DSSS/CCK/OFDM
Number of Channels	11
Antenna	Internal
MAX Conducted Power	21.55dBm(OFDM)
Power Supply	3.8V DC by Battery

Note: Photographs of EUT are shown in ANNEX C of this test report. Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

##### 3.2. Internal Identification of EUT used during the test

EUT ID*	S/N	IMEI	HW Version	SW Version
EUT1	/	013830000001524	PIO	A18
EUT2	/	013830000004700	PIO	A18

\*EUT ID: is used to identify the test sample in the lab internally.

##### 3.3. Internal Identification of AE used during the test

AE ID*	Description	Type	SN
AE1	Travel Charger	CBA3007AG0C1	/
AE2	Battery	CAB3120000C1	/
AE3	USB Cable	CDA3122002C1	/

\*AE ID: is used to identify the test sample in the lab internally.

##### 3.4. General Description

The Equipment Under Test (EUT) is a model of HSUPA/HSDPA/UMTS dualband / GSM quadband mobile phone with integrated antenna and inbuilt battery.

The EUT supports GSM 850/900/1800/1900 quad bands, GPRS, EDGE, UMTS FDD bands 2/5, HSDPA, HSUPA, WLAN ( 802.11 b/g/n).

It has functions of MP3/Camera.

Samples undergoing test were selected by the client.



#### **4. REFERENCE DOCUMENTS**

##### **4.1. Documents supplied by applicant**

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

##### **4.2. Reference Documents for testing**

The following documents listed in this section are referred for testing.

	FCC CFR 47, Part 15, Subpart C:	
	15.205 Restricted bands of operation;	
FCC Part15	15.209 Radiated emission limits, general requirements;	Oct,
	15.247 Operation within the bands 902–928MHz,	2012
	2400–2483.5 MHz, and 5725–5850 MHz.	
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009

#### **5. LABORATORY ENVIRONMENT**

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

## 6. SUMMARY OF TEST RESULTS

### 6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	<b>P</b>
Peak Power Spectral Density	15.247 (e)	/	<b>P</b>
Occupied 6dB Bandwidth	15.247 (a)	/	<b>P</b>
Band Edges Compliance	15.247 (d)	/	<b>P</b>
Transmitter Spurious Emission - Conducted	15.247 (d)	/	<b>P</b>
Transmitter Spurious Emission - Radiated	15.247, 15.209	/	<b>P</b>
AC Powerline Conducted Emission	15.107, 15.207	/	<b>P</b>

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by TMC
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

### 6.2. Statements

TMC has evaluated the test cases requested by the client/matrix manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

### 6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	3.8V
Humidity	44%

## 7. TEST EQUIPMENTS UTILIZED

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2013-07-08	2014-07-07
2	Test Receiver	ESS	847151/015	Rohde & Schwarz	2013-10-20	2014-10-30
3	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2013-4-15	2014-08-12
4	Shielding Room	S81	/	ETS-Lindgren	/	/

### Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	2013-10-20	2014-10-30
2	BiLog Antenna	VULB9163	9163-514	Schwarzbeck	2011-11-11	2014-11-10
3	Dual-Ridge Waveguide Horn Antenna	3117	00119024	ETS-Lindgren	2011-2-2	2014-2-1
4	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2011-7-1	2014-06-30
5	Loop antenna	HFH2-Z2	829324/007	Rohde & Schwarz	2011-12-21	2014-12-20
6	Semi-anechoic chamber	/	CT000332-1074	Frankonia German	/	/

## ANNEX A: MEASUREMENT RESULTS

### A.1. Measurement Method

#### A.1.1. Conducted Measurements

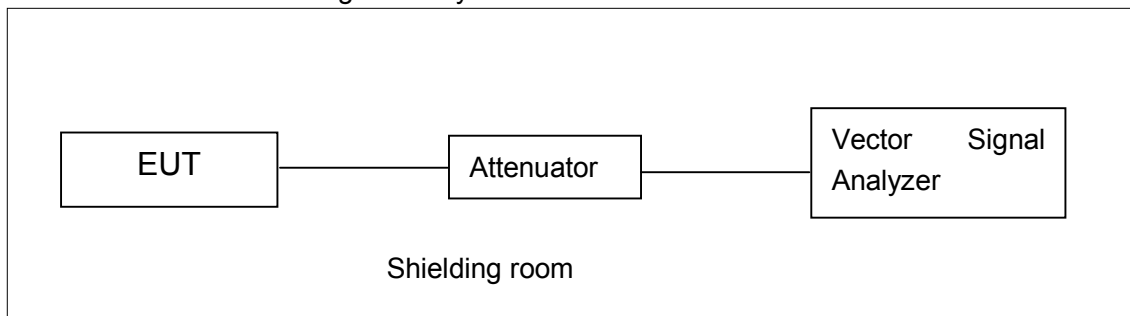
Connect the EUT to the test system as follow shows.

Set the EUT to the required work mode.

Set the EUT to the required channel.

Set the Vector Signal Analyzer and start measurement.

Record the values. Vector Signal Analyzer

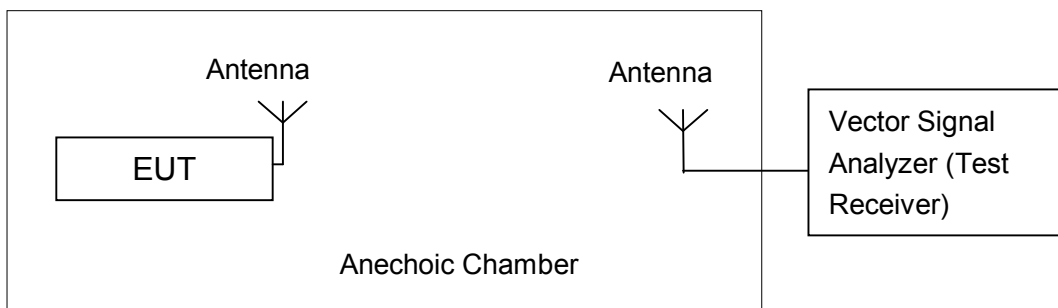


#### A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

## A.2. Maximum Peak Output Power

### Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

The measurement is made according to ANSI C63.10.

### Measurement Uncertainty:

Measurement Uncertainty	0.75dB
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### A.2.1. Maximum Peak Output Power-conducted

#### Measurement Results:

#### 802.11b mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	18.08	/	/
	2	18.37	/	/
	5.5	19.64	/	/
	11	20.93	20.97	21.47

The data rate 11Mbps is selected as worse condition, and the following cases are performed with this condition.

#### 802.11g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11g	6	21.18	/	/
	9	21.22	/	/
	12	20.96	/	/
	18	20.72	/	/
	24	21.28	20.91	21.55
	36	21.02	/	/
	48	21.04	/	/
	54	21.09	/	/

The data rate 6Mbps is selected as worse condition, and the following cases are performed with this condition.

**802.11n mode**

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	MCS0	19.21	/	/
	MCS1	19.05	/	/
	MCS2	18.78	/	/
	MCS3	19.22	19.09	19.31
	MCS4	19.06	/	/
	MCS5	19.08	/	/
	MCS6	19.04	/	/
	MCS7	19.07	/	/

The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

**Conclusion: PASS**

**A.2.2. Maximum Average Output Power-conducted**

**802.11b/g mode**

Mode	Test Result (dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	17.34	17.43	17.59
802.11g	13.11	13.13	13.49

**802.11n-HT20 mode**

Mode	Test Result (dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	10.11	10.01	10.34

**Conclusion: Pass**

**Measurement Uncertainty:**

Measurement Uncertainty	0.75dB
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### A.3. Peak Power Spectral Density

**Measurement Limit:**

Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

The measurement is made according to ANSI C63.10 Clause 6.11.2.4 is used for peak power spectral density measurement.

**Measurement Uncertainty:**

Measurement Uncertainty	0.75dB
-------------------------	--------

Note: Configuration information to be tested as follows:

Modulation type and data rate:

802.11b	802.11g	802.11n
11Mbps(CCK)	24Mbps(OFDM)	MCS3(OFDM)

**Measurement Results:**

Mode	Channel	Power Spectral Density ( dBm/3 kHz )	Conclusion
802.11b	1	-8.19	P
	6	-9.05	P
	11	-9.02	P
802.11g	1	-13.60	P
	6	-12.68	P
	11	-14.06	P
802.11n	1	-16.76	P
	6	-15.84	P
	11	-14.34	P

**Conclusion: PASS**

#### A.4. Occupied 6dB Bandwidth

##### Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

The measurement is made according to ANSI C63.10 Clause 6.9.1 is used for Occupied 6dB Bandwidth measurement.

##### Measurement Uncertainty:

Measurement Uncertainty	60.80Hz
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Note: Configuration information to be tested as follows:

Modulation type and data rate:

802.11b	802.11g	802.11n
11Mbps(CCK)	24Mbps(OFDM)	MCS3(OFDM)

##### Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth ( kHz)		conclusion
		Fig.	Value	
802.11b	1	Fig.1	9800.00	P
	6	Fig.2	9450.00	P
	11	Fig.3	9550.00	P
802.11g	1	Fig.4	16500.00	P
	6	Fig.5	16450.00	P
	11	Fig.6	16450.00	P
802.11n	1	Fig.7	17700.00	P
	6	Fig.8	17700.00	P
	11	Fig.9	17700.00	P

**Conclusion: PASS**

Test graphs as below:



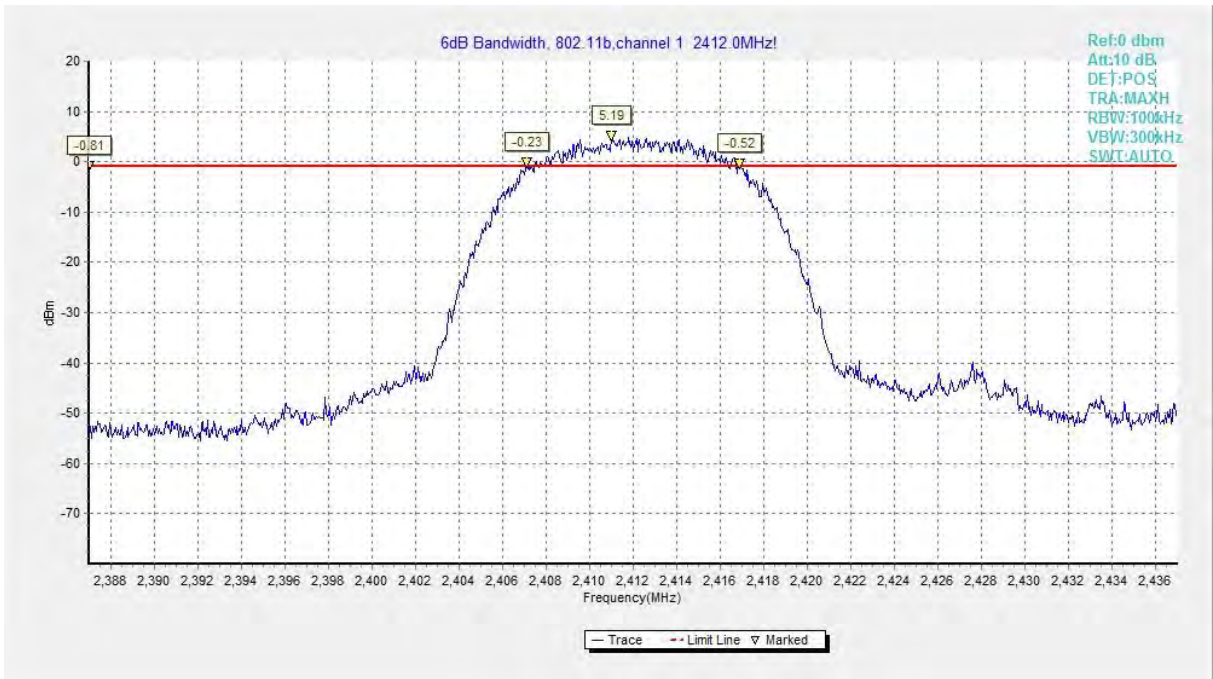


Fig. 1 Occupied 6dB Bandwidth (802.11b, Ch 1)

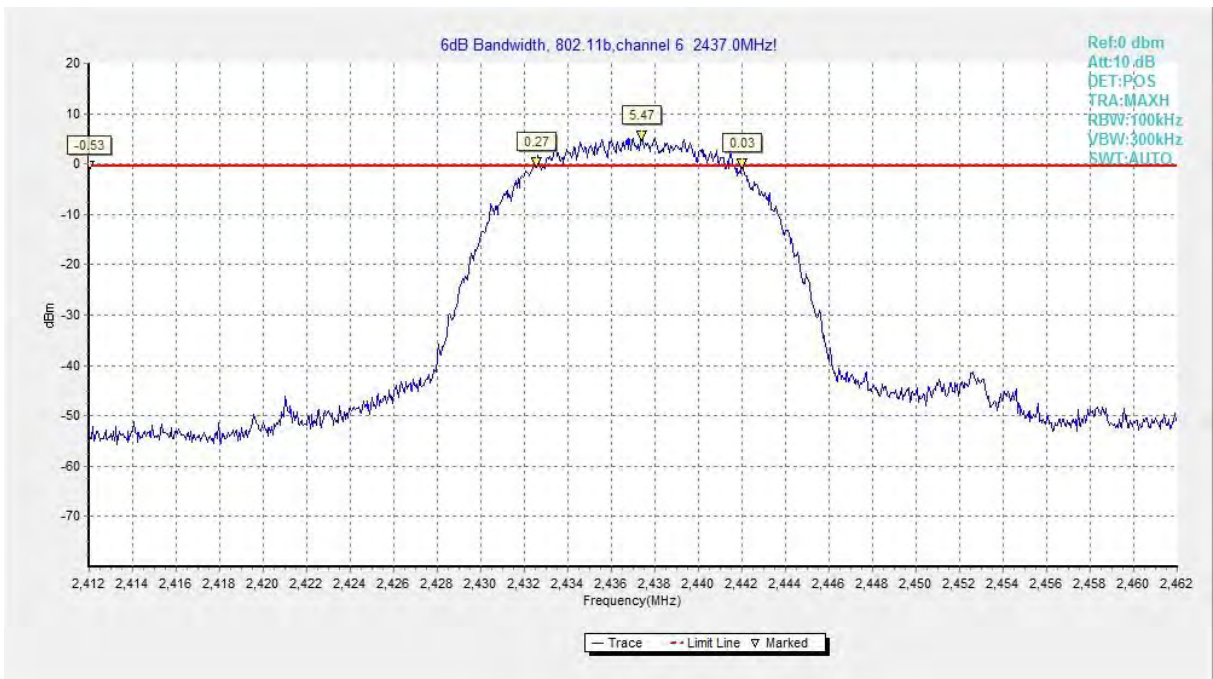


Fig. 2 Occupied 6dB Bandwidth (802.11b, Ch 6)

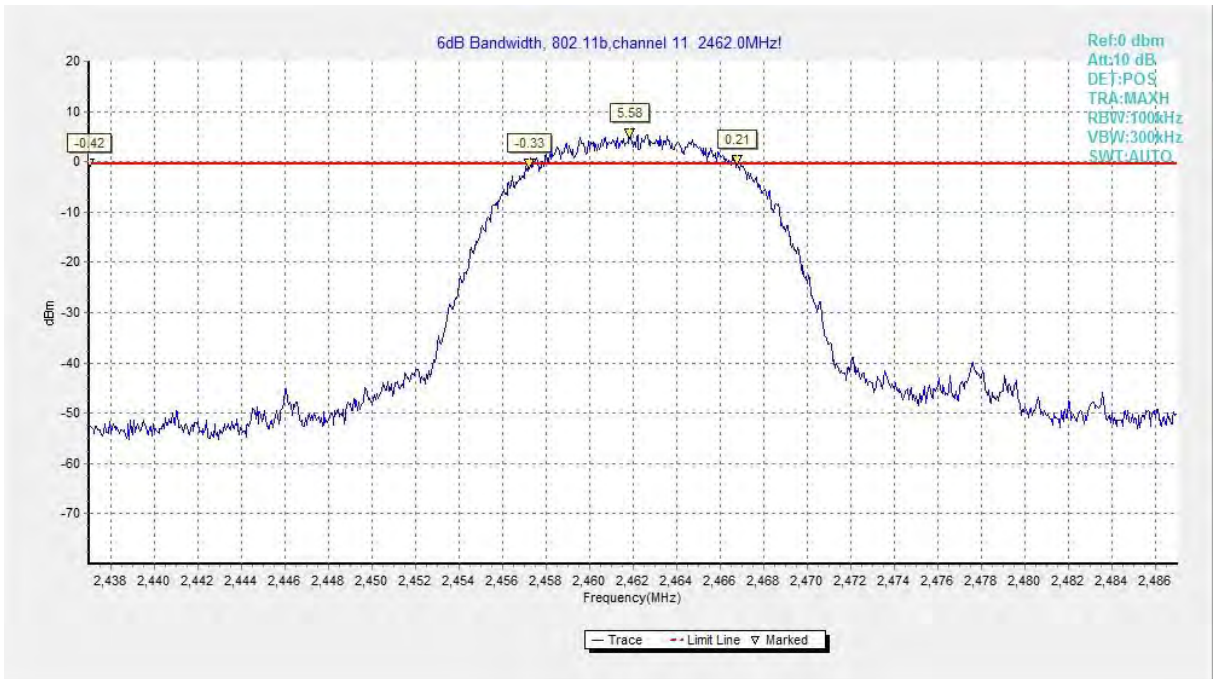


Fig. 3 Occupied 6dB Bandwidth (802.11b, Ch 11)

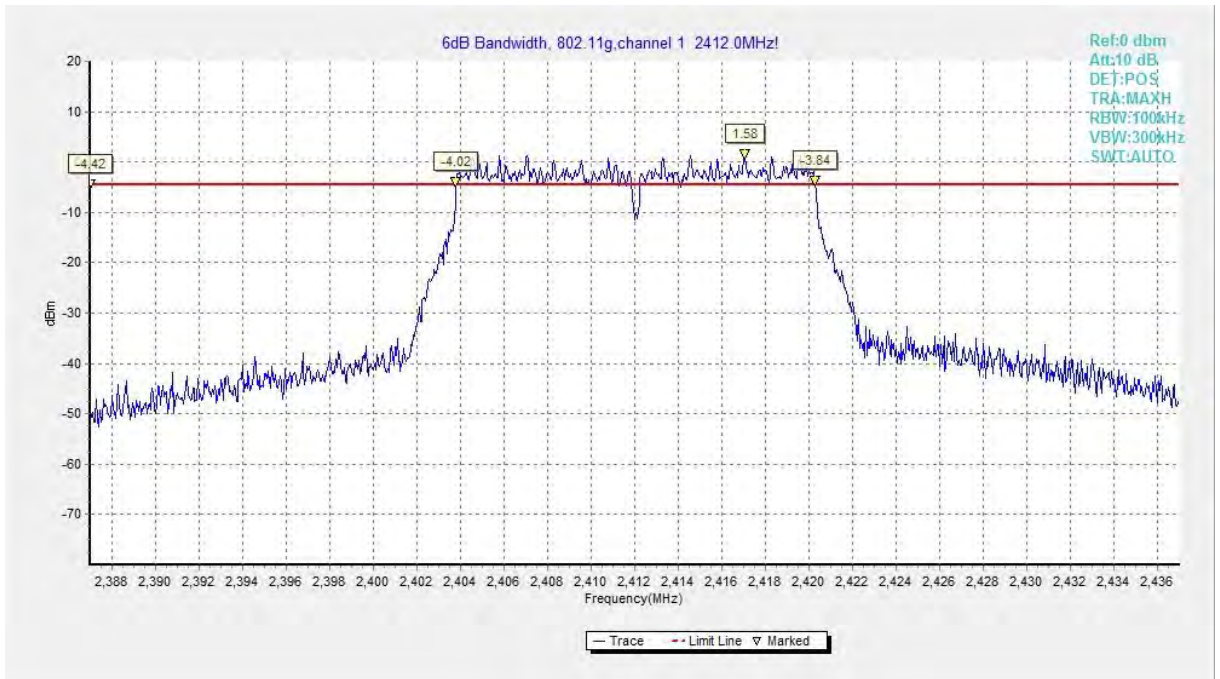


Fig. 4 Occupied 6dB Bandwidth (802.11g, Ch 1)



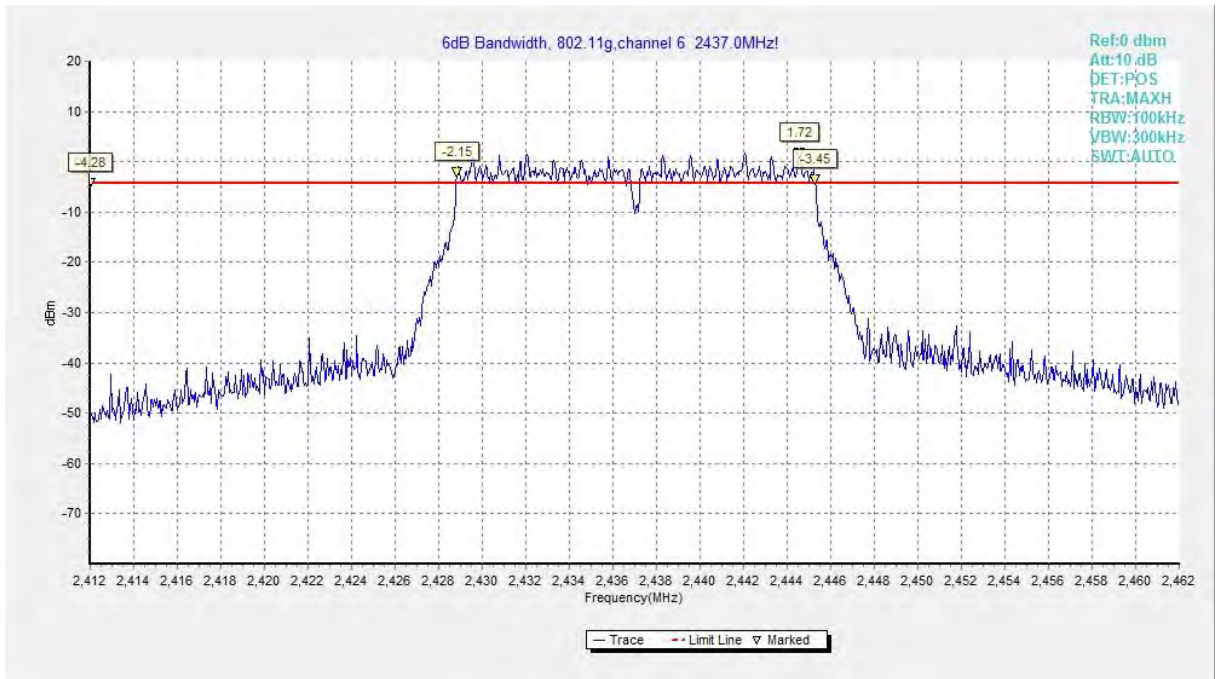


Fig. 5 Occupied 6dB Bandwidth (802.11g, Ch 6)

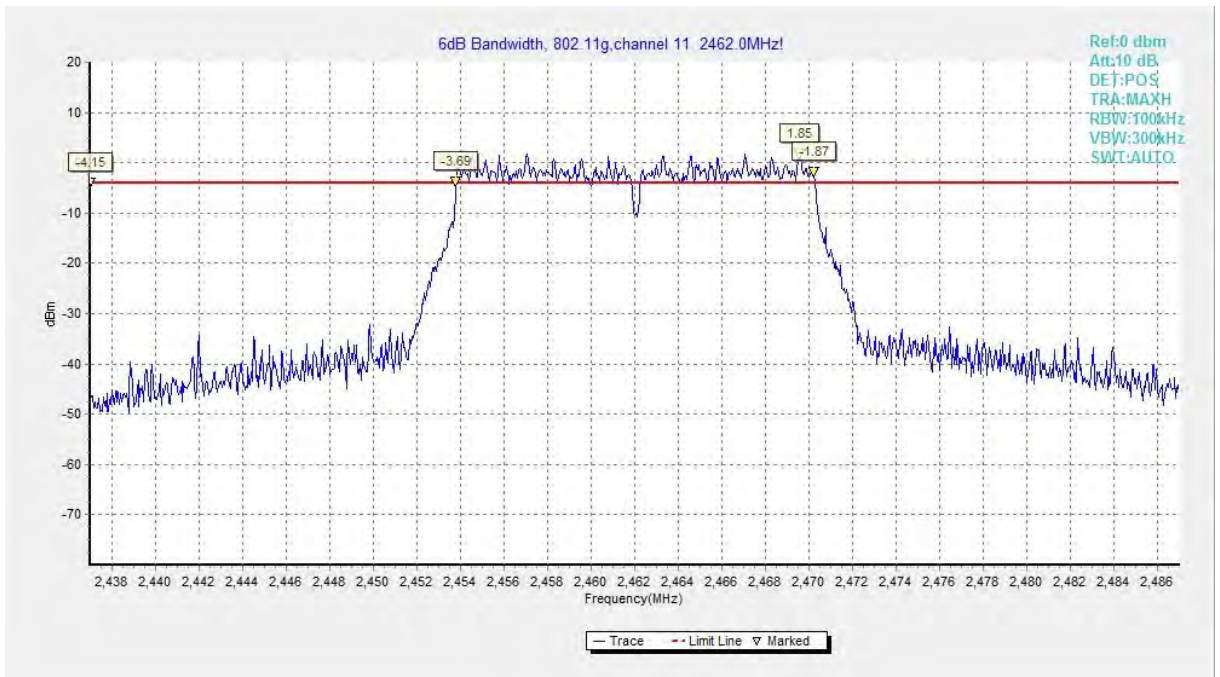


Fig. 6 Occupied 6dB Bandwidth (802.11g, Ch 11)

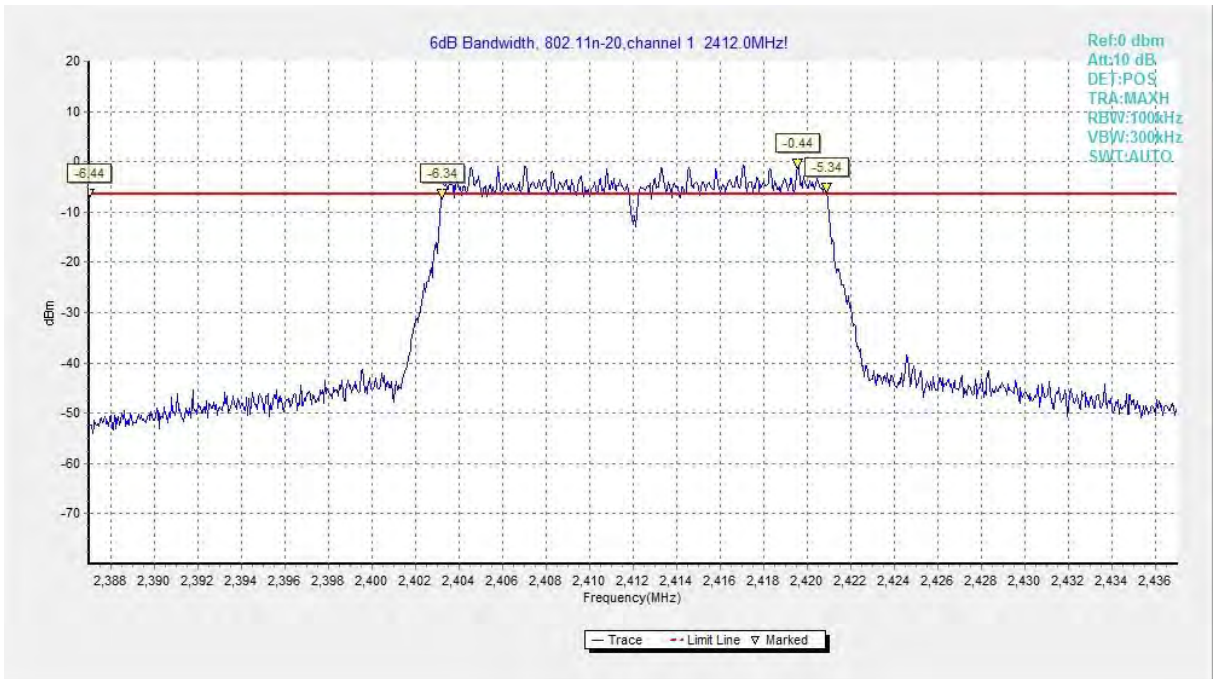


Fig. 7 Occupied 6dB Bandwidth (802.11n-HT20, Ch 1)

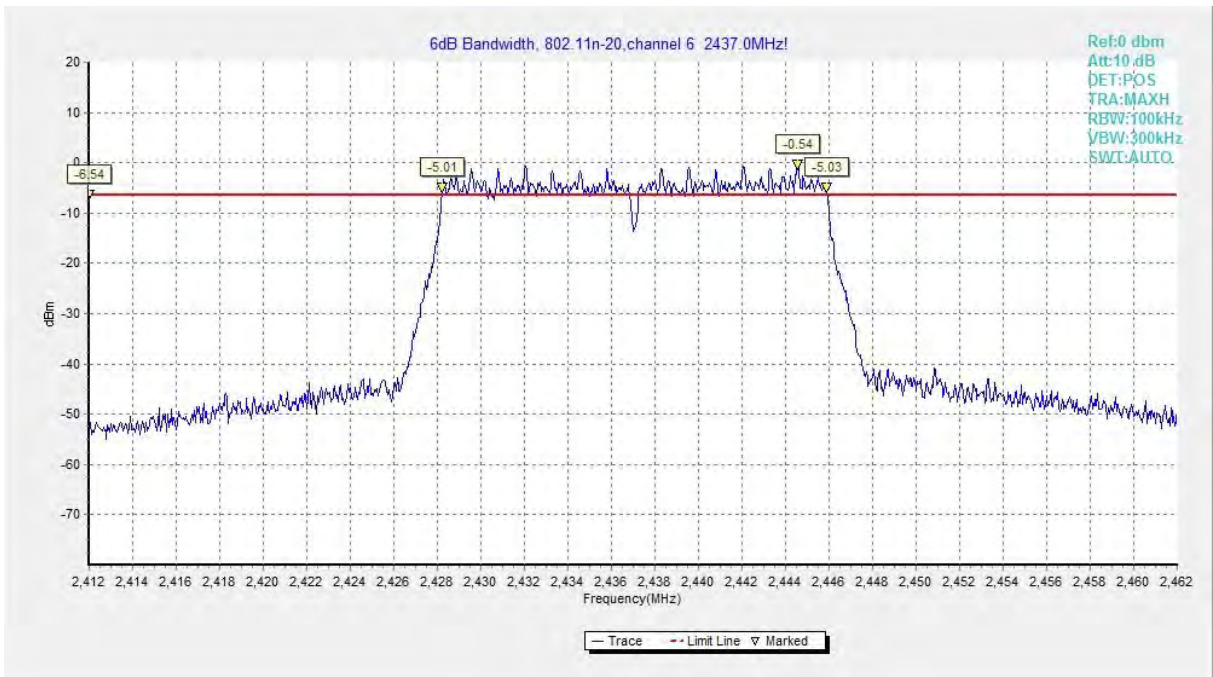
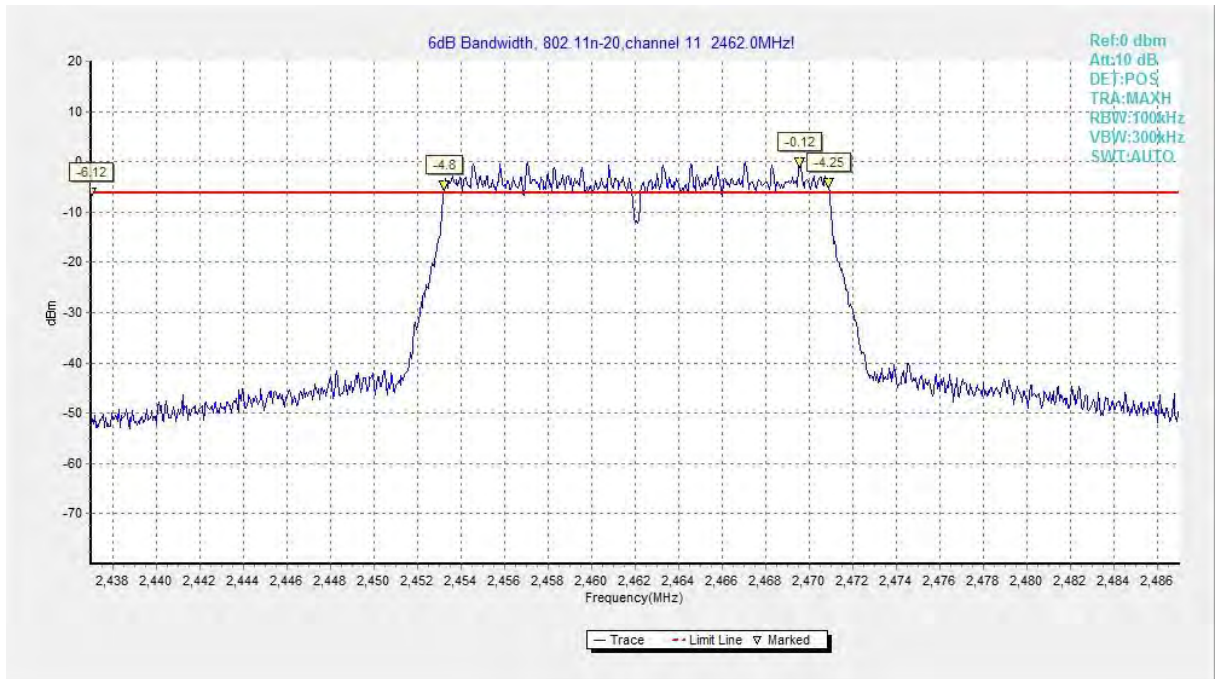


Fig. 8 Occupied 6dB Bandwidth (802.11n-HT20, Ch 6)



**Fig. 9 Occupied 6dB Bandwidth (802.11n-HT20, Ch 11)**

### A.5. Band Edges Compliance

**Measurement Limit:**

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

The measurement is made according to ANSI C63.10 Clause 6.9.2 is used for Band Edges Compliance measurement.

**Measurement Uncertainty:**

Measurement Uncertainty	0.75dB
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Note: Configuration information to be tested as follows:

Modulation type and data rate:

802.11b	802.11g	802.11n
11Mbps(CCK)	24Mbps(OFDM)	MCS3(OFDM)

**Measurement Result:**

Mode	Channel	Test Results	Conclusion
802.11b	1	Fig.10	P
	11	Fig.11	P
802.11g	1	Fig.12	P
	11	Fig.13	P
802.11n	1	Fig.14	P
	11	Fig.15	P

**Conclusion: PASS**

Test graphs as below:



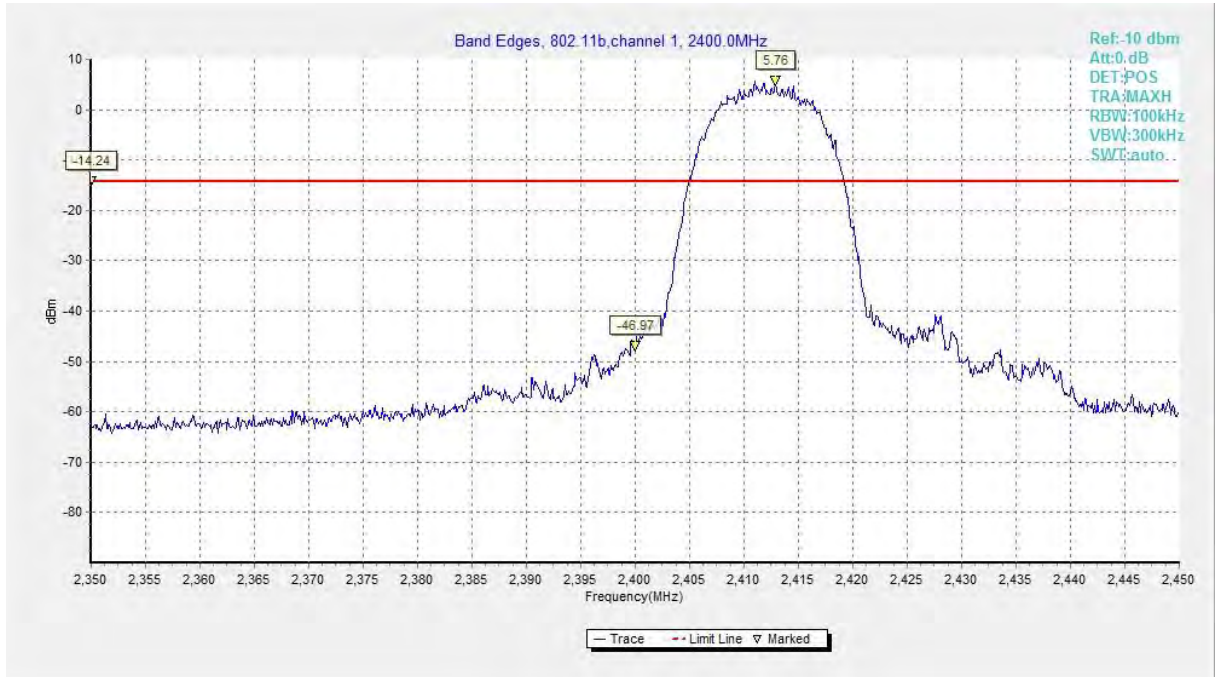


Fig. 10 Band Edges (802.11b, Ch 1)



Fig. 11 Band Edges (802.11b, Ch 11)

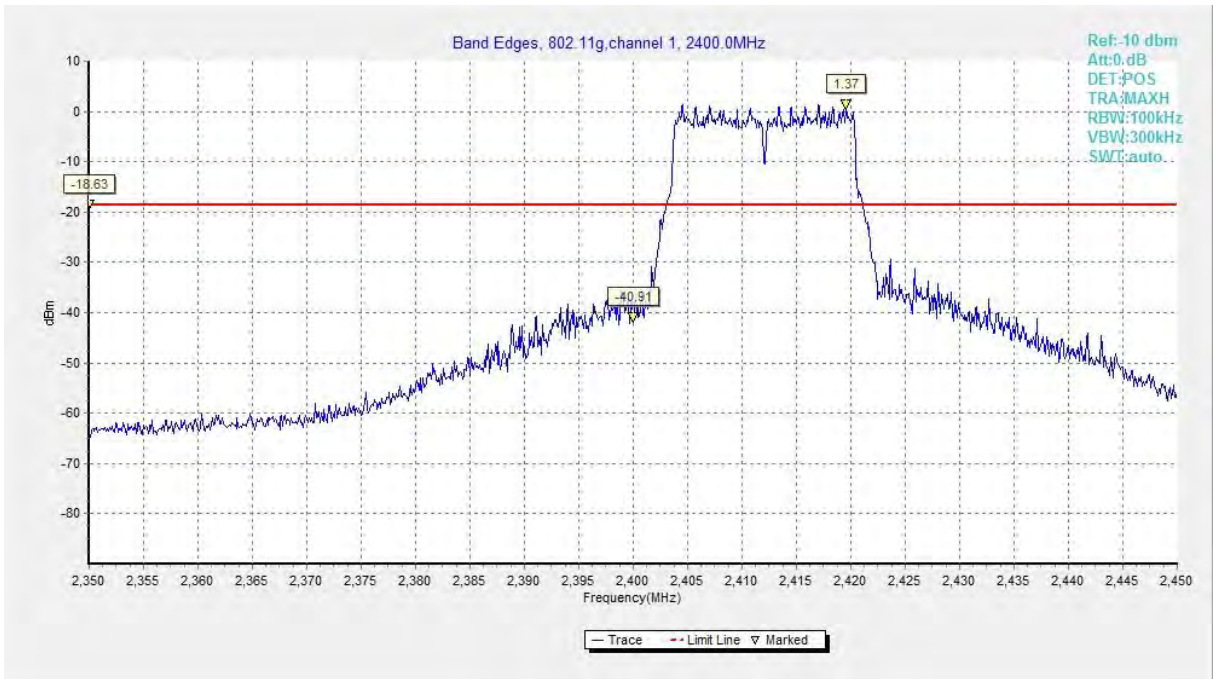


Fig. 12 Band Edges (802.11g, Ch 1)

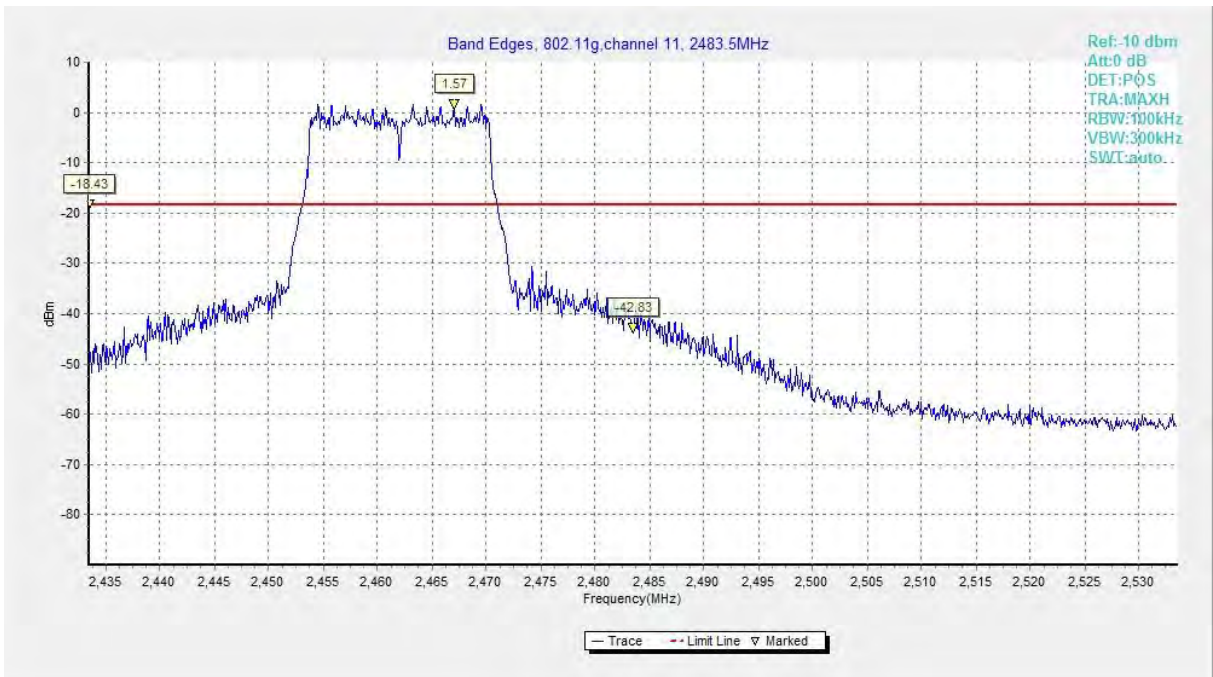


Fig. 13 Band Edges (802.11g, Ch 11)





Fig. 14 Band Edges (802.11n-HT20, Ch 1)

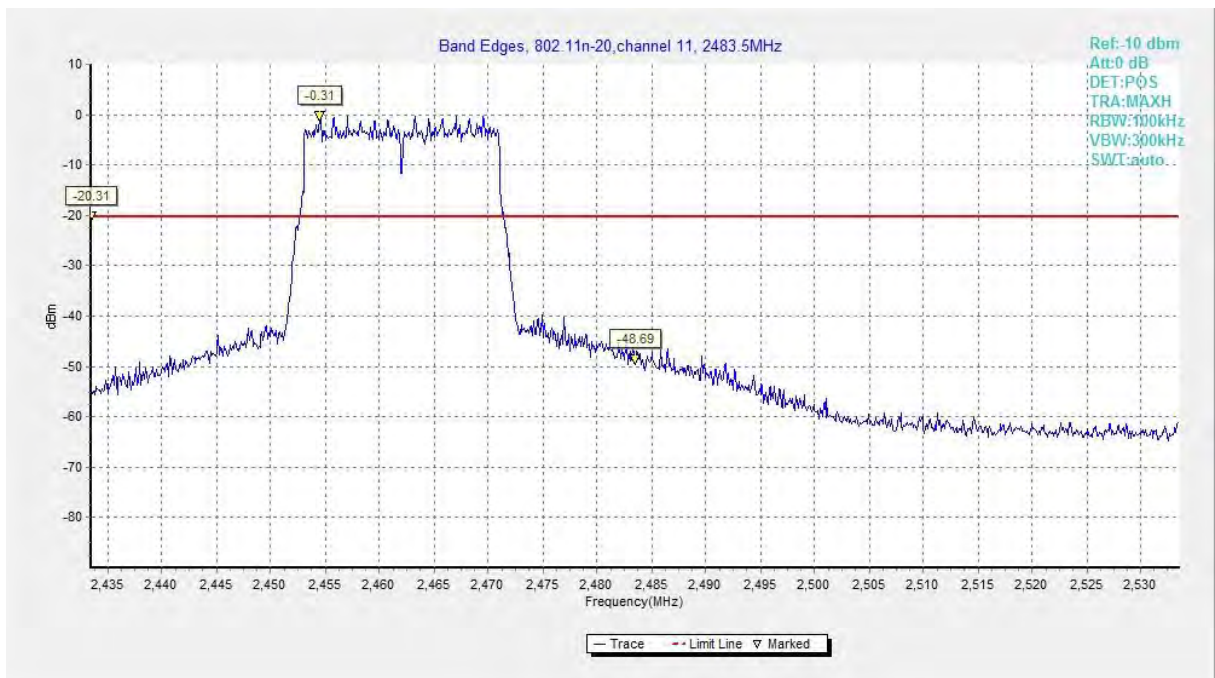


Fig. 15 Band Edges (802.11n-HT20, Ch 11)

## A.6. Transmitter Spurious Emission

### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

The measurement is made according to ANSI C63.10.

In addition, radiated 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) (see § 15.205(c)).

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

### Measurement Uncertainty:

Frequency Range	Uncertainty
30MHz ≤ f ≤ 2GHz	0.63 dB
2GHz ≤ f ≤ 3.6GHz	0.82 dB
3.6GHz ≤ f ≤ 8GHz	1.55 dB
8GHz ≤ f ≤ 20GHz	1.86 dB
20GHz ≤ f ≤ 22GHz	1.90 dB
22GHz ≤ f ≤ 26GHz	2.20 dB

Note: Configuration information to be tested as follows:

Modulation type and data rate:

802.11b	802.11g	802.11n
11Mbps(CCK)	24Mbps(OFDM)	MCS34(OFDM)

### A.6.1 Transmitter Spurious Emission - Conducted

#### Measurement Results:

802.11b mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412 GHz	Fig.16	P
		30 MHz ~ 1 GHz	Fig.17	P
		1 GHz ~ 2.5 GHz	Fig.18	P
		2.5 GHz ~ 7.5 GHz	Fig.19	P
		7.5 GHz ~ 10 GHz	Fig.20	P
		10 GHz ~ 15 GHz	Fig.21	P
		15 GHz ~ 20 GHz	Fig.22	P
		20 GHz ~ 26 GHz	Fig.23	P
	6	2.437 GHz	Fig.24	P
		30 MHz ~ 1 GHz	Fig.25	P
		1 GHz ~ 2.5 GHz	Fig.26	P
		2.5 GHz ~ 7.5 GHz	Fig.27	P
		7.5 GHz ~ 10 GHz	Fig.28	P
		10 GHz ~ 15 GHz	Fig.29	P
		15 GHz ~ 20 GHz	Fig.30	P
		20 GHz ~ 26 GHz	Fig.31	P
	11	2.462 GHz	Fig.32	P
		30 MHz ~ 1 GHz	Fig.33	P
		1 GHz ~ 2.5 GHz	Fig.34	P
		2.5 GHz ~ 7.5 GHz	Fig.35	P
		7.5 GHz ~ 10 GHz	Fig.36	P
		10 GHz ~ 15 GHz	Fig.37	P
		15 GHz ~ 20 GHz	Fig.38	P
		20 GHz ~ 26 GHz	Fig.39	P

802.11g mode

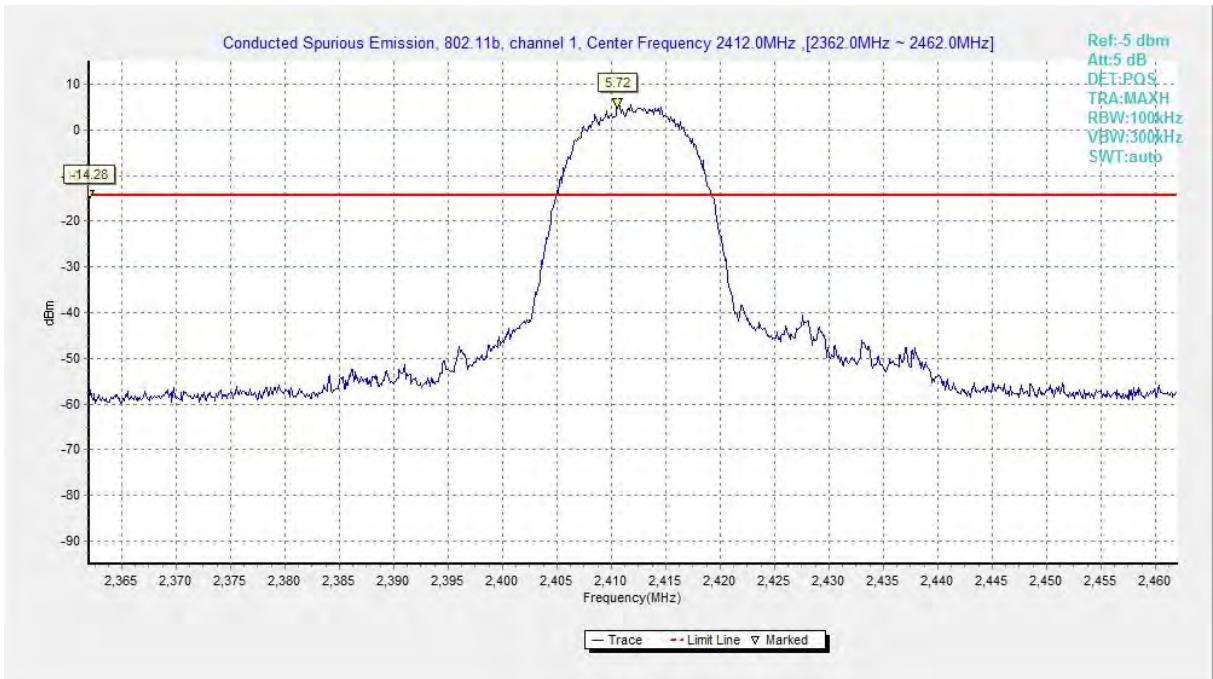
MODE	Channel	Frequency Range	Test Results	Conclusion
802.11g	1	2.412 GHz	Fig.40	P
		30 MHz ~ 1 GHz	Fig.41	P
		1 GHz ~ 2.5 GHz	Fig.42	P
		2.5 GHz ~ 7.5 GHz	Fig.43	P
		7.5 GHz ~ 10 GHz	Fig.44	P
		10 GHz ~ 15 GHz	Fig.45	P
		15 GHz ~ 20 GHz	Fig.46	P
		20 GHz ~ 26 GHz	Fig.47	P
	6	2.437 GHz	Fig.48	P
		30 MHz ~ 1 GHz	Fig.49	P
		1 GHz ~ 2.5 GHz	Fig.50	P
		2.5 GHz ~ 7.5 GHz	Fig.51	P
		7.5 GHz ~ 10 GHz	Fig.52	P
		10 GHz ~ 15 GHz	Fig.53	P
		15 GHz ~ 20 GHz	Fig.54	P
		20 GHz ~ 26 GHz	Fig.55	P
	11	2.462 GHz	Fig.56	P
		30 MHz ~ 1 GHz	Fig.57	P
		1 GHz ~ 2.5 GHz	Fig.58	P
		2.5 GHz ~ 7.5 GHz	Fig.59	P
		7.5 GHz ~ 10 GHz	Fig.60	P
		10 GHz ~ 15 GHz	Fig.61	P
		15 GHz ~ 20 GHz	Fig.62	P
		20 GHz ~ 26 GHz	Fig.63	P

802.11n-HT20 mode

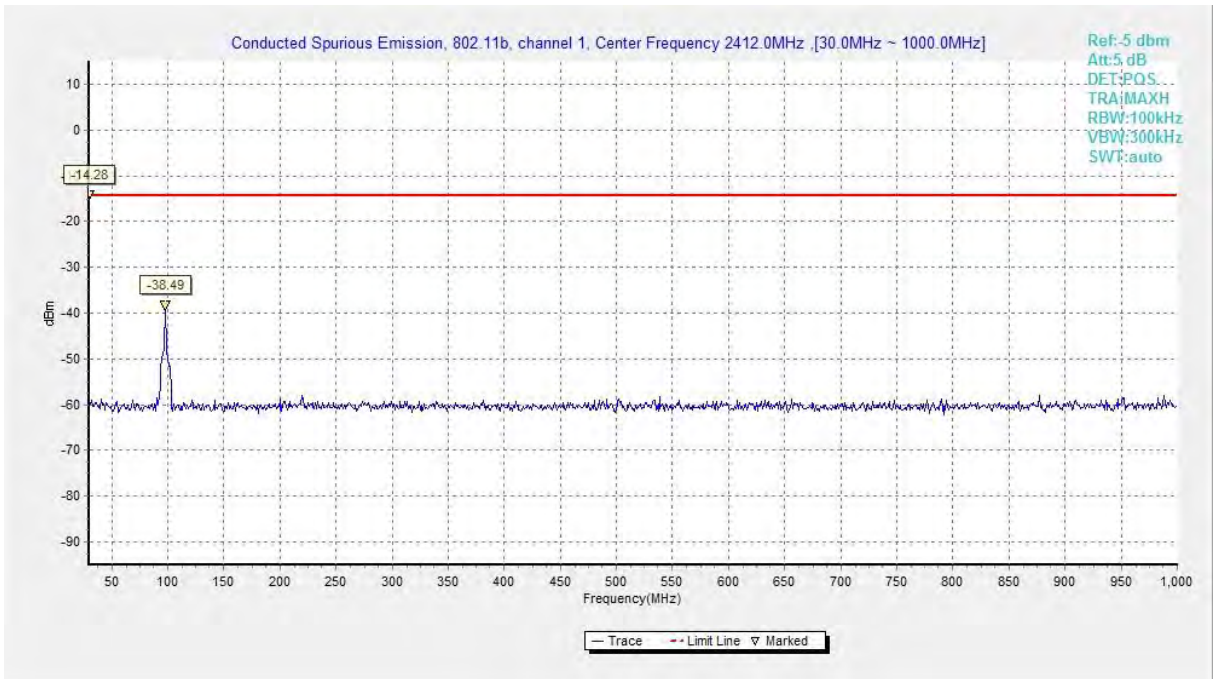
MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n (20MHz)	1	2.412 GHz	Fig.64	P
		30 MHz ~ 1 GHz	Fig.65	P
		1 GHz ~ 2.5 GHz	Fig.66	P
		2.5 GHz ~ 7.5 GHz	Fig.67	P
		7.5 GHz ~ 10 GHz	Fig.68	P
		10 GHz ~ 15 GHz	Fig.69	P
		15 GHz ~ 20 GHz	Fig.70	P
		20 GHz ~ 26 GHz	Fig.71	P
	6	2.437 GHz	Fig.72	P
		30 MHz ~ 1 GHz	Fig.73	P
		1 GHz ~ 2.5 GHz	Fig.74	P
		2.5 GHz ~ 7.5 GHz	Fig.75	P
		7.5 GHz ~ 10 GHz	Fig.76	P
		10 GHz ~ 15 GHz	Fig.77	P
		15 GHz ~ 20 GHz	Fig.78	P
		20 GHz ~ 26 GHz	Fig.79	P
	11	2.462 GHz	Fig.80	P
		30 MHz ~ 1 GHz	Fig.81	P
		1 GHz ~ 2.5 GHz	Fig.82	P
		2.5 GHz ~ 7.5 GHz	Fig.83	P
		7.5 GHz ~ 10 GHz	Fig.84	P
		10 GHz ~ 15 GHz	Fig.85	P
		15 GHz ~ 20 GHz	Fig.86	P
		20 GHz ~ 26 GHz	Fig.87	P

**Conclusion: PASS**

**Test graphs as below:**

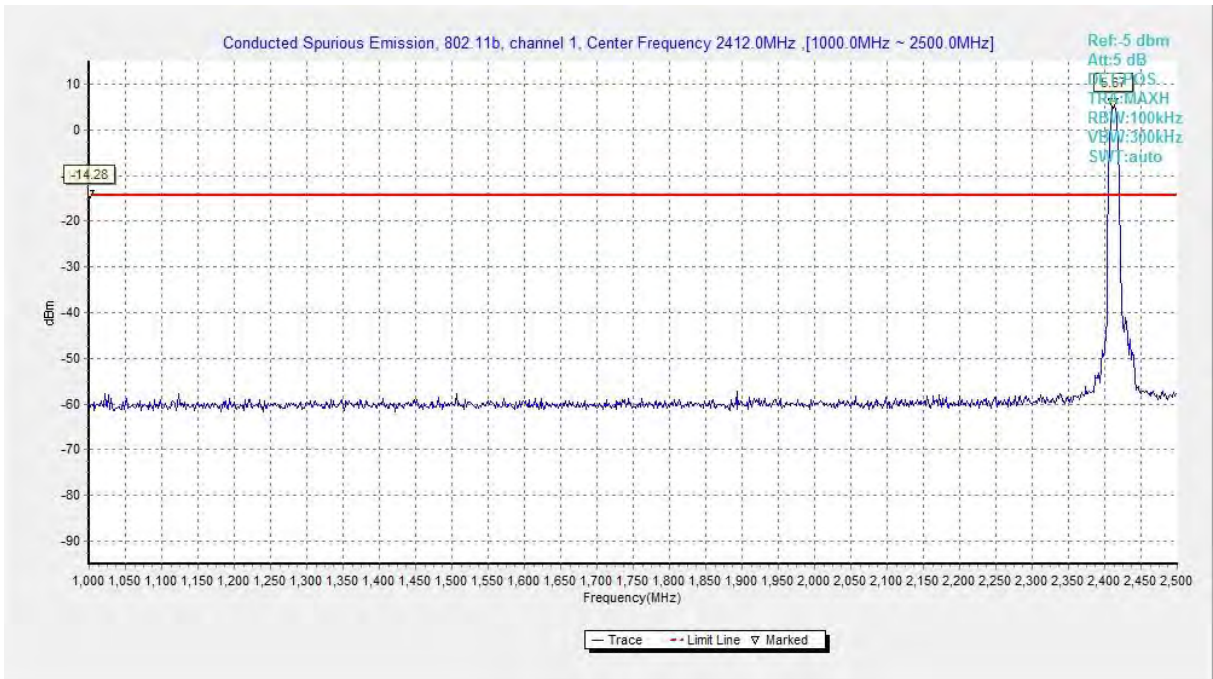


**Fig. 16 Conducted Spurious Emission (802.11b, Ch1, Center Frequency)**

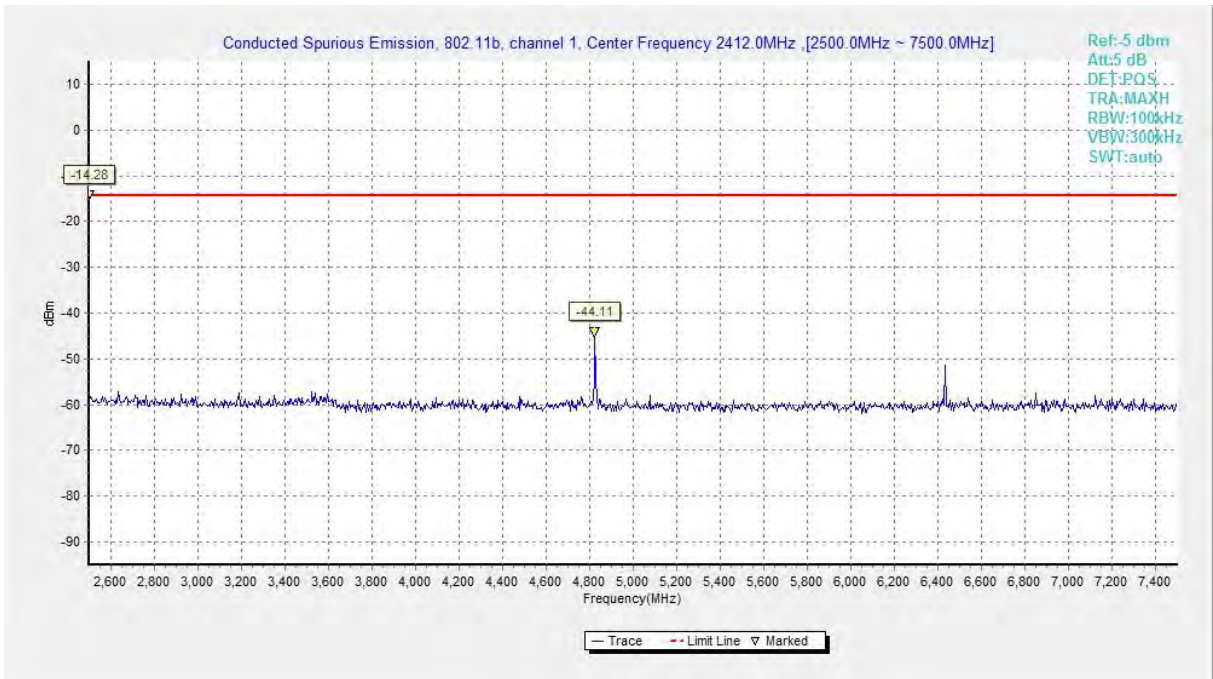


**Fig. 17 Conducted Spurious Emission (802.11b, Ch1, 30 MHz-1 GHz)**

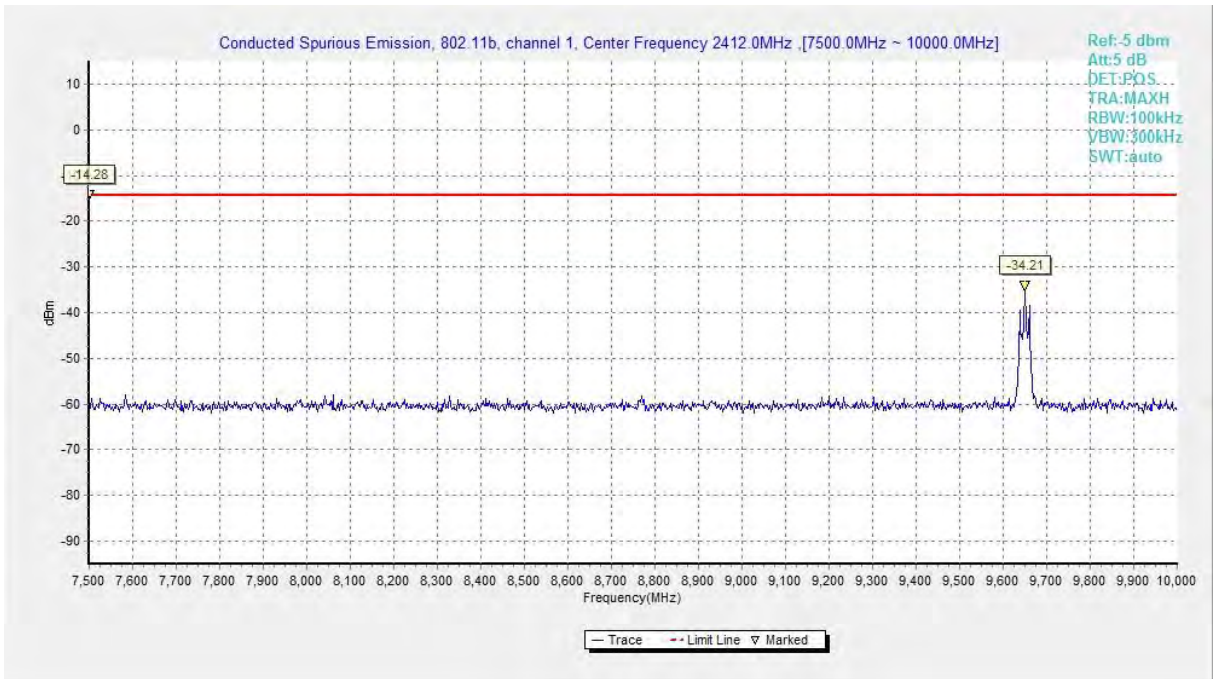




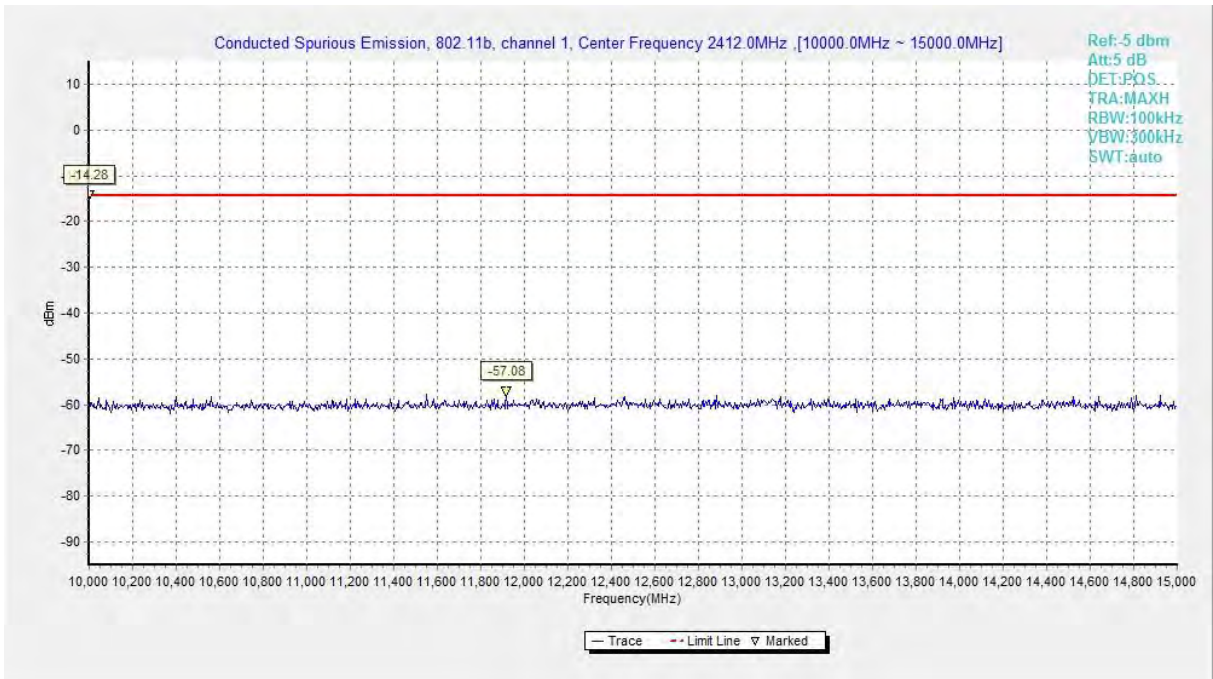
**Fig. 18 Conducted Spurious Emission (802.11b, Ch1, 1 GHz-2.5 GHz)**



**Fig. 19 Conducted Spurious Emission (802.11b, Ch1, 2.5 GHz-7.5 GHz)**

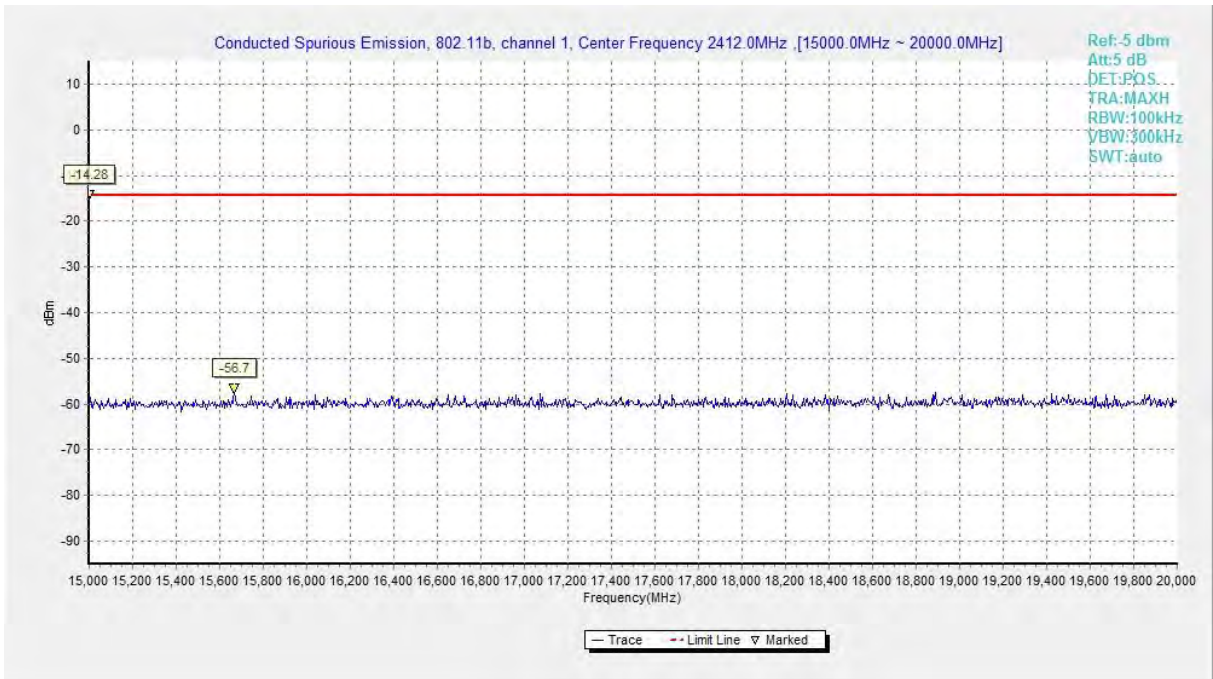


**Fig. 20 Conducted Spurious Emission (802.11b, Ch1, 7.5 GHz-10 GHz)**

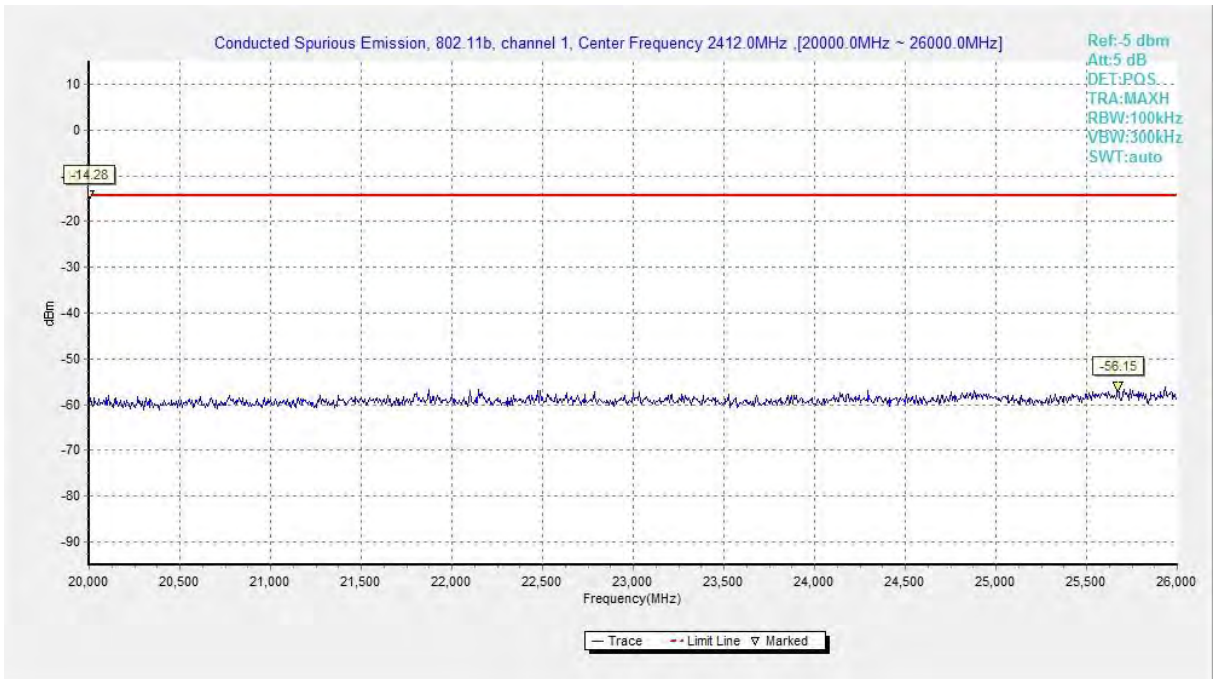


**Fig. 21 Conducted Spurious Emission (802.11b, Ch1, 10 GHz-15 GHz)**

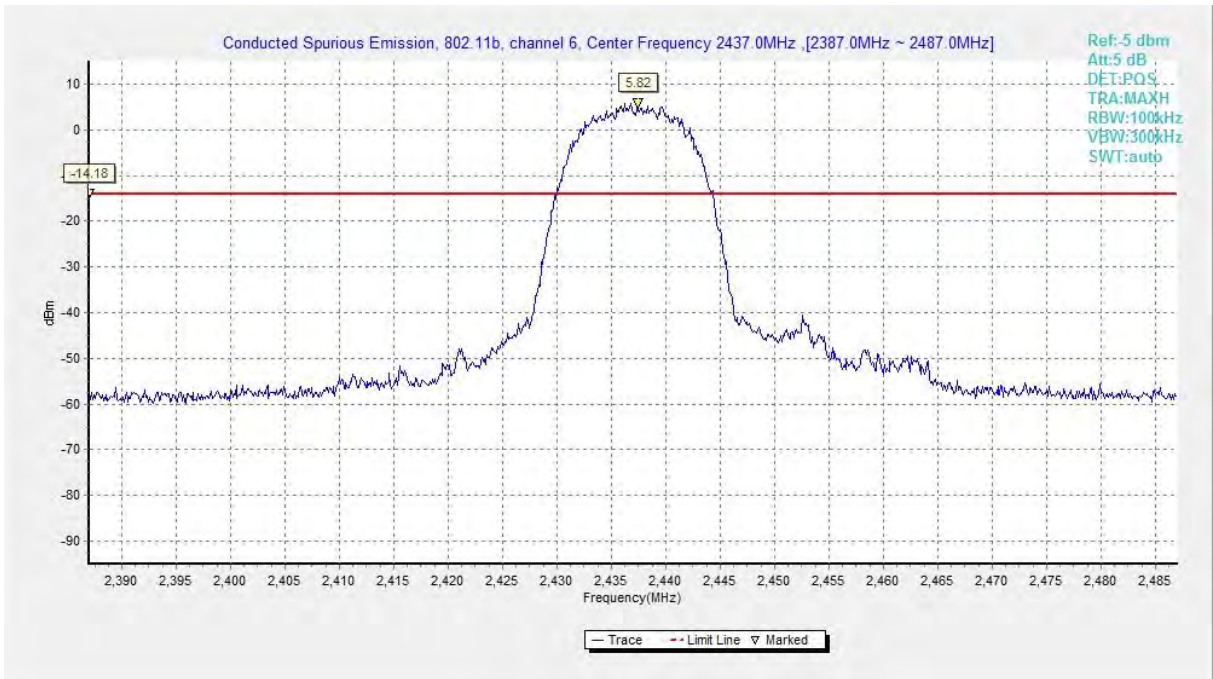




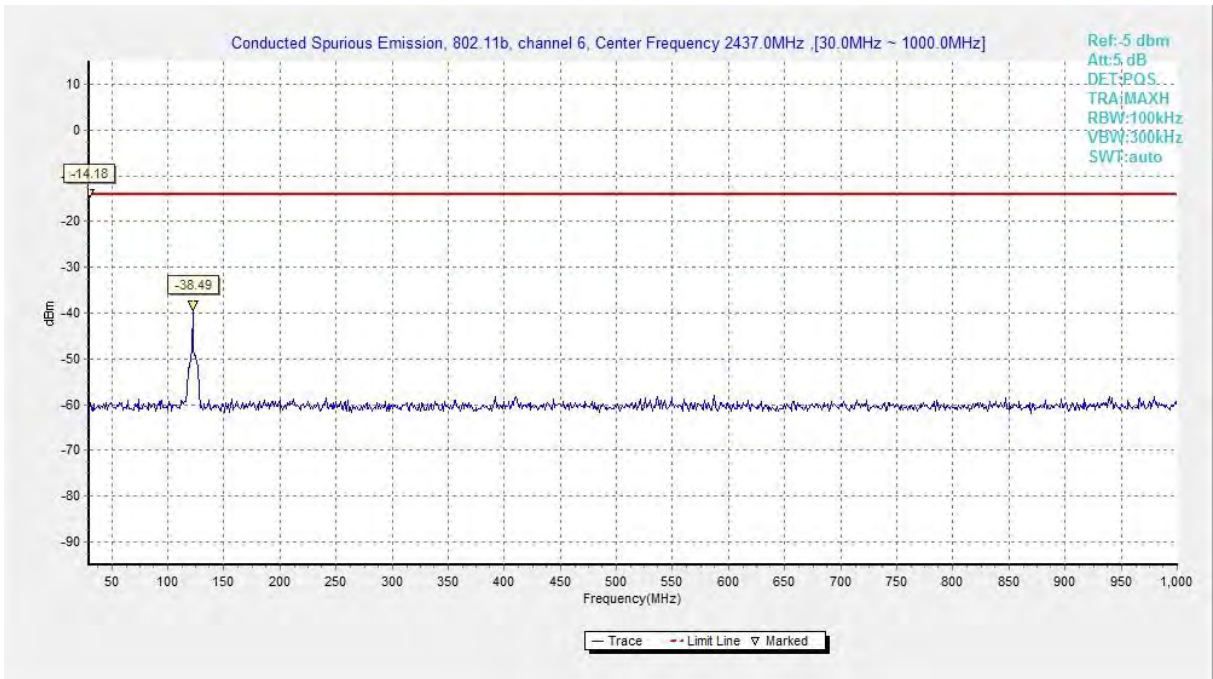
**Fig. 22 Conducted Spurious Emission (802.11b, Ch1, 15 GHz-20 GHz)**



**Fig. 23 Conducted Spurious Emission (802.11b, Ch1, 20 GHz-26 GHz)**

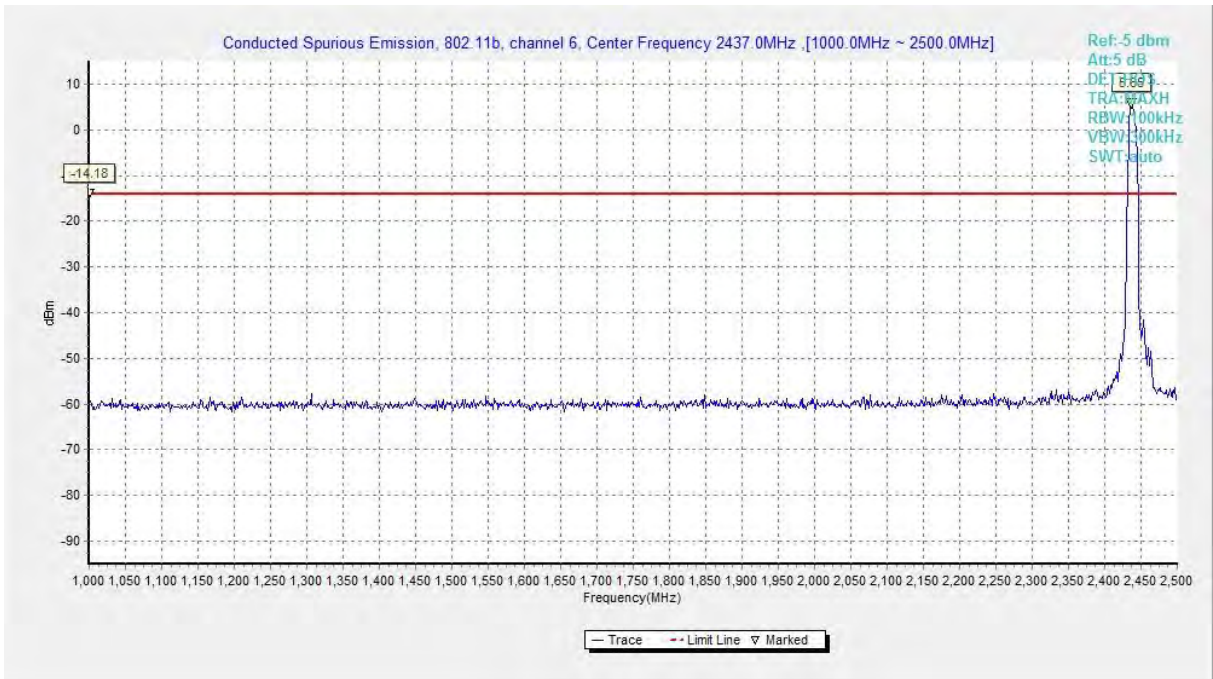


**Fig. 24 Conducted Spurious Emission (802.11b, Ch6, Center Frequency)**

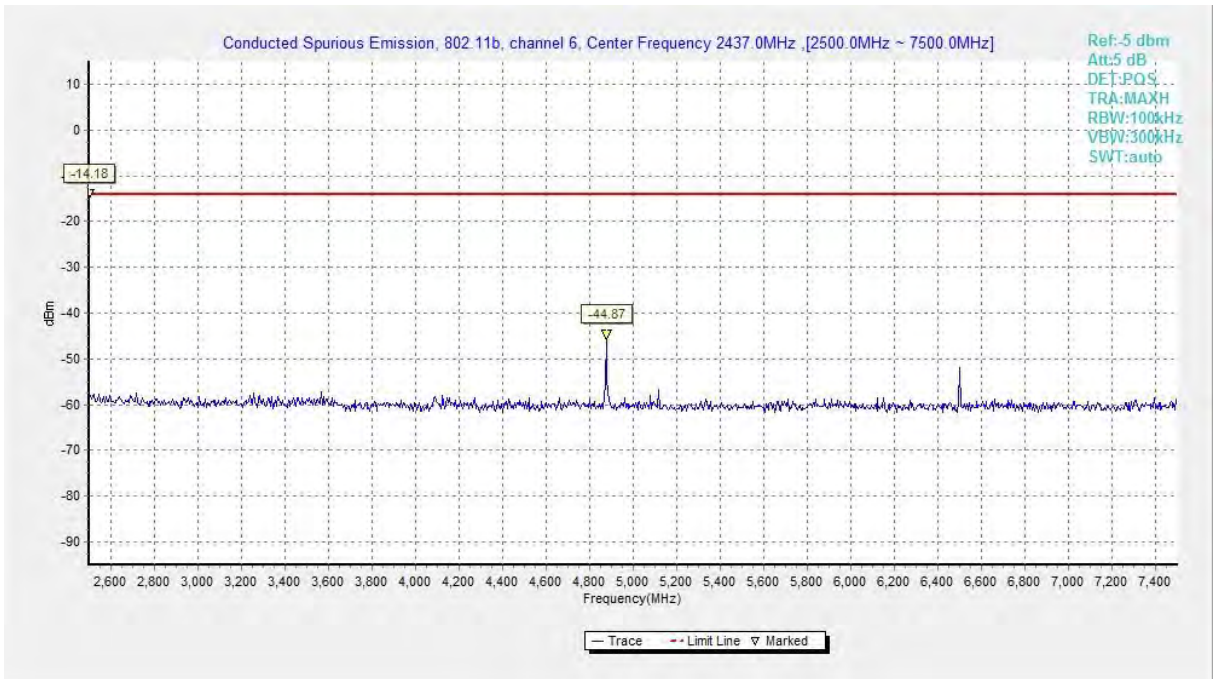


**Fig. 25 Conducted Spurious Emission (802.11b, Ch6, 30 MHz-1 GHz)**





**Fig. 26 Conducted Spurious Emission (802.11b, Ch6, 1 GHz-2.5 GHz)**



**Fig. 27 Conducted Spurious Emission (802.11b, Ch6, 2.5 GHz-7.5 GHz)**

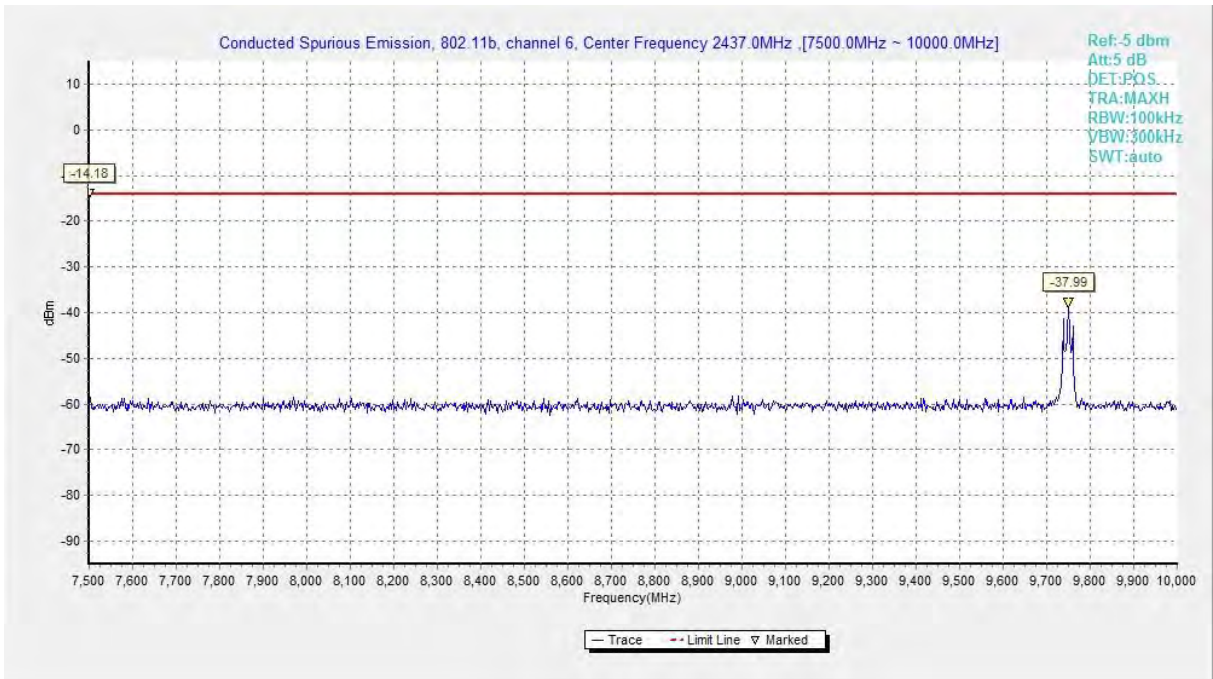


Fig. 28 Conducted Spurious Emission (802.11b, Ch6, 7.5 GHz-10 GHz)

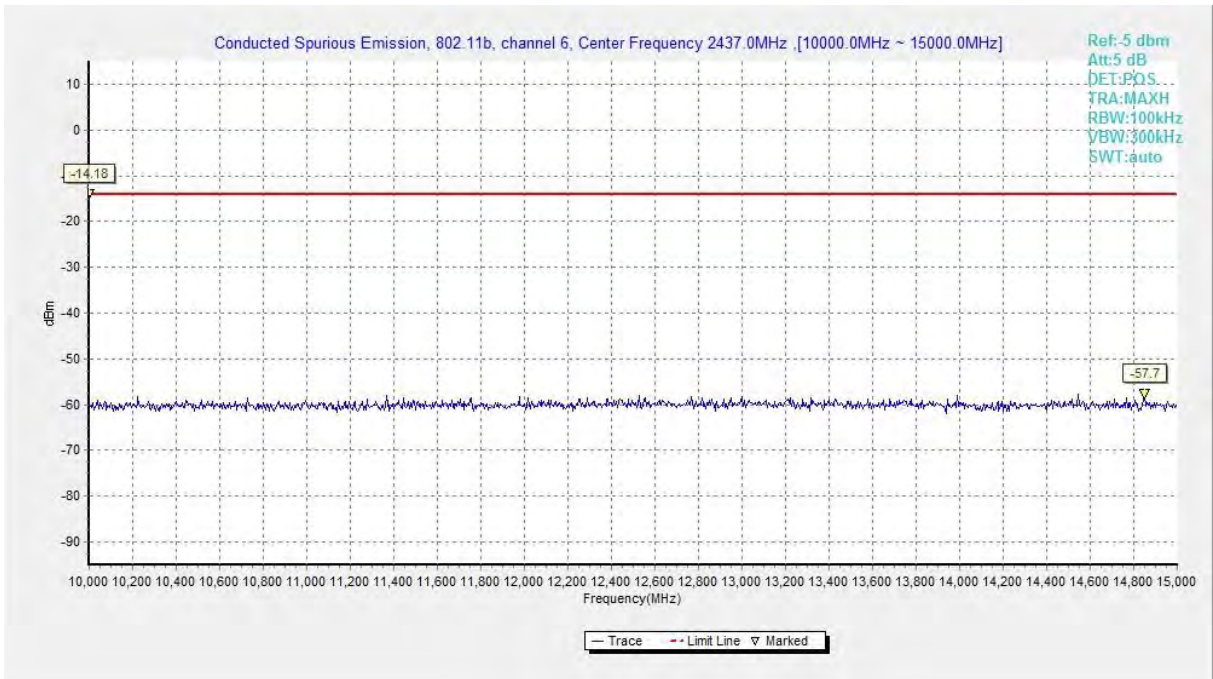
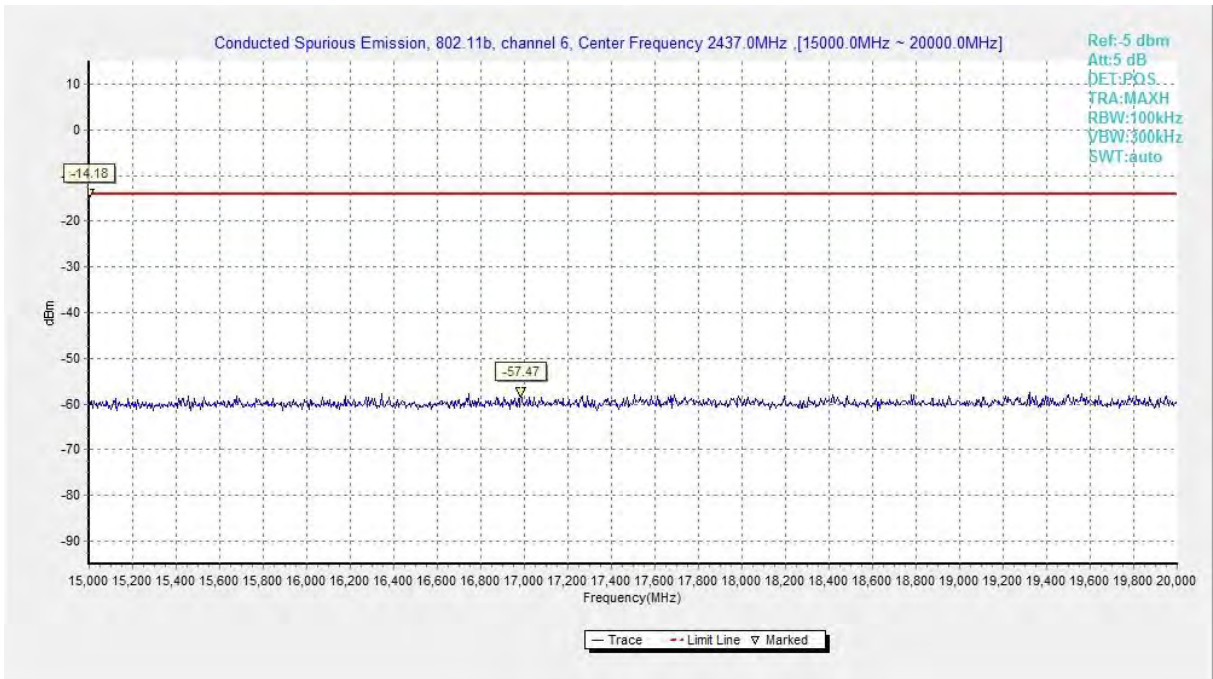
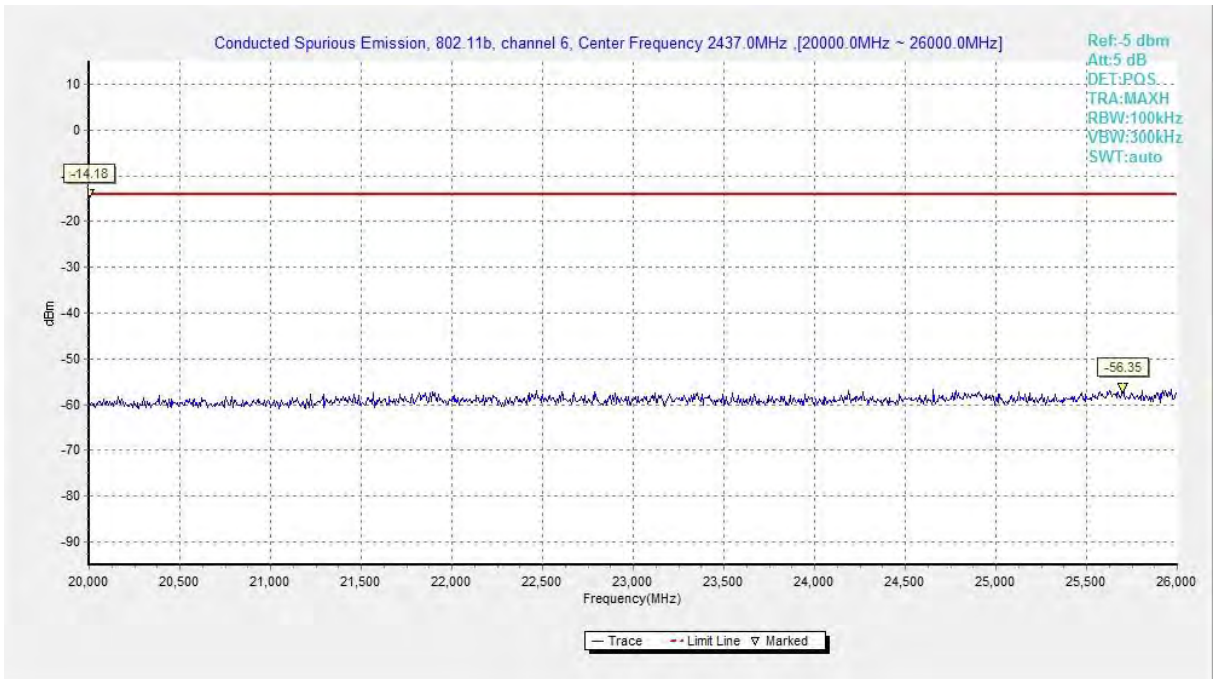


Fig. 29 Conducted Spurious Emission (802.11b, Ch6, 10 GHz-15 GHz)

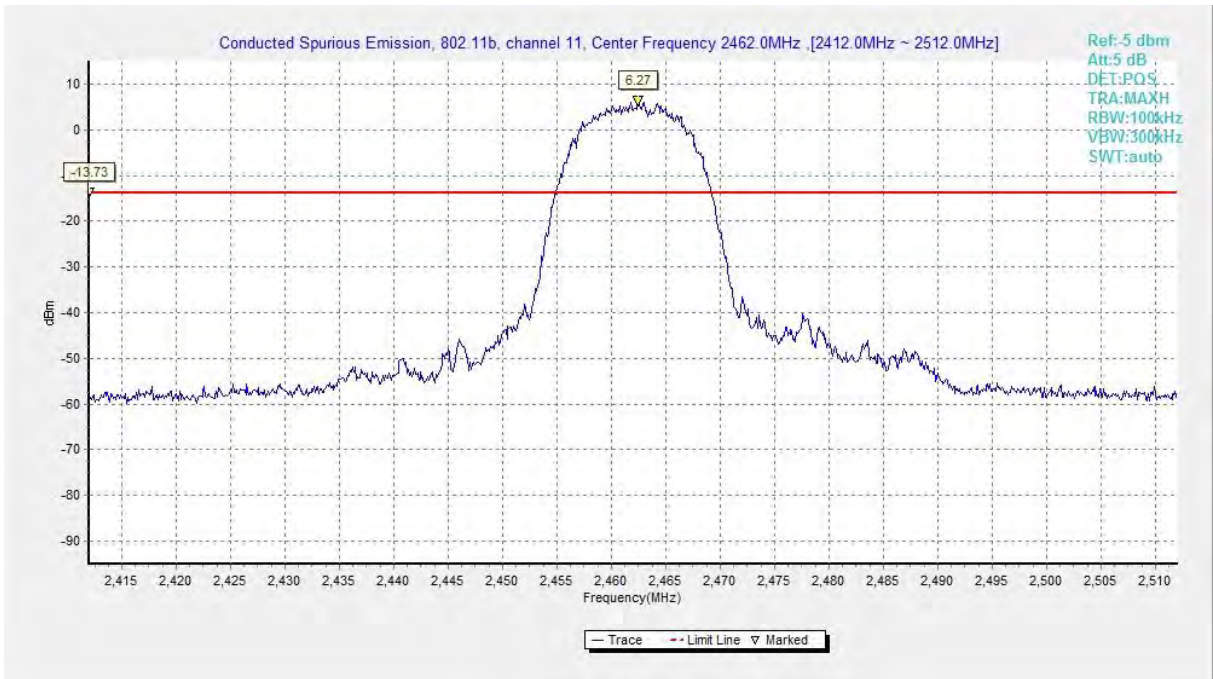




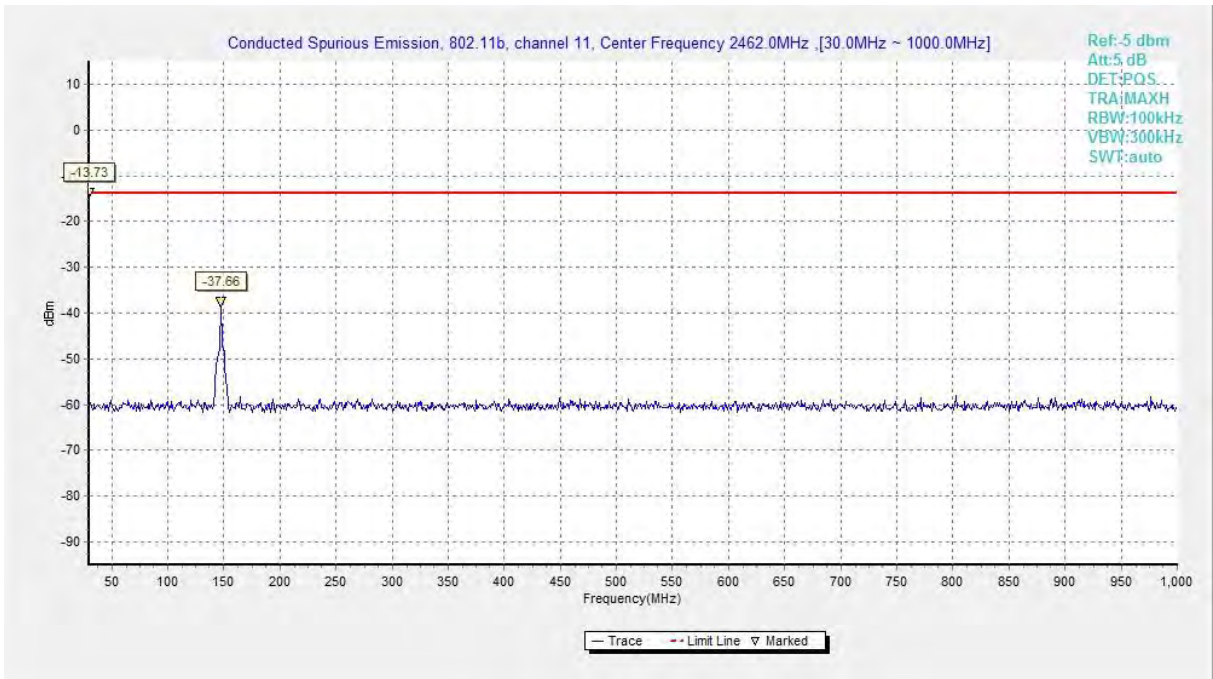
**Fig. 30 Conducted Spurious Emission (802.11b, Ch6, 15 GHz-20 GHz)**



**Fig. 31 Conducted Spurious Emission (802.11b, Ch6, 20 GHz-26 GHz)**

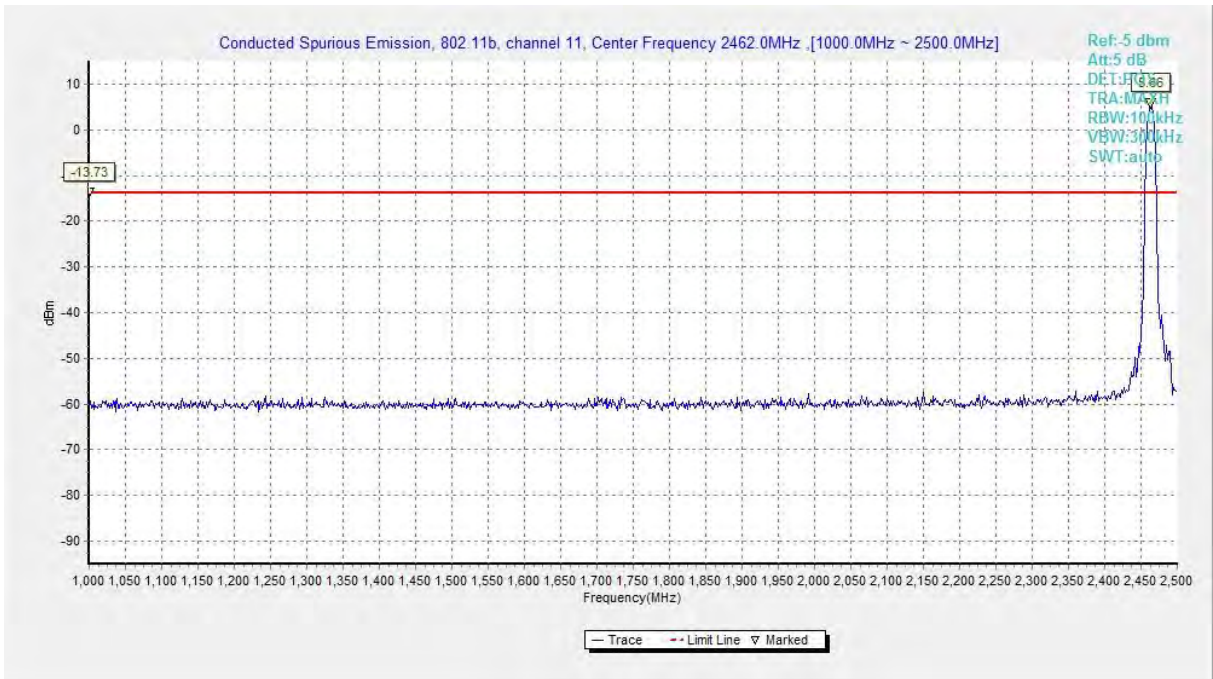


**Fig. 32 Conducted Spurious Emission (802.11b, Ch11, Center Frequency)**

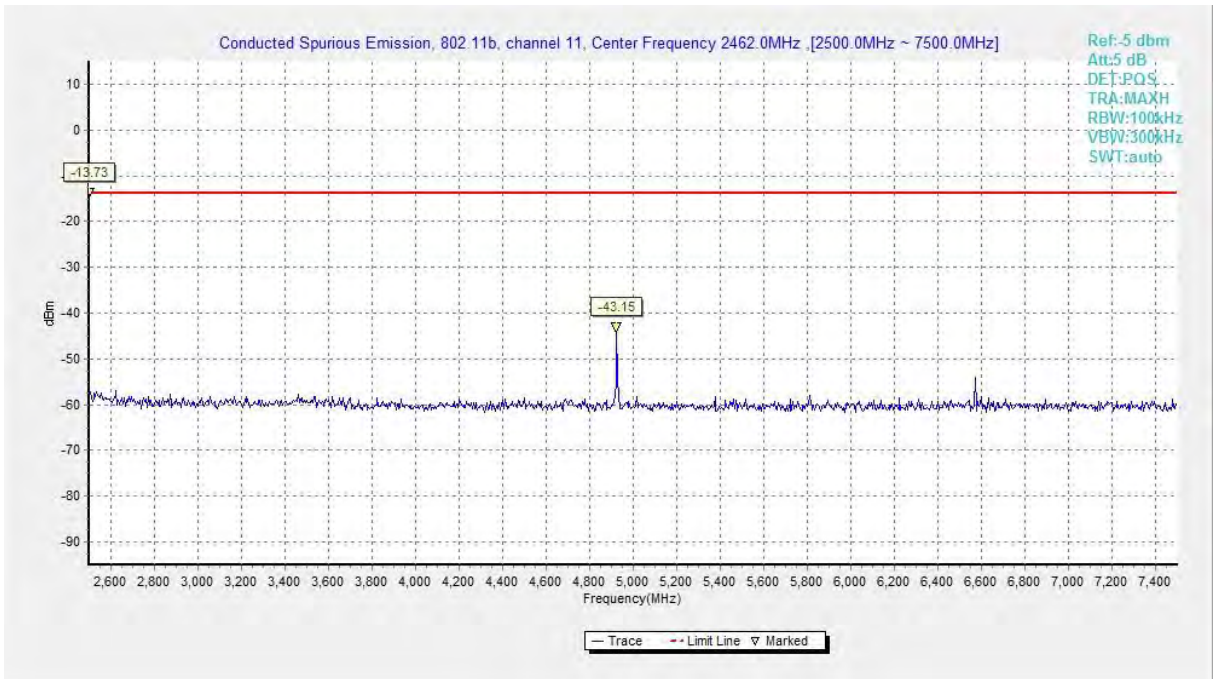


**Fig. 33 Conducted Spurious Emission (802.11b, Ch11, 30 MHz-1 GHz)**

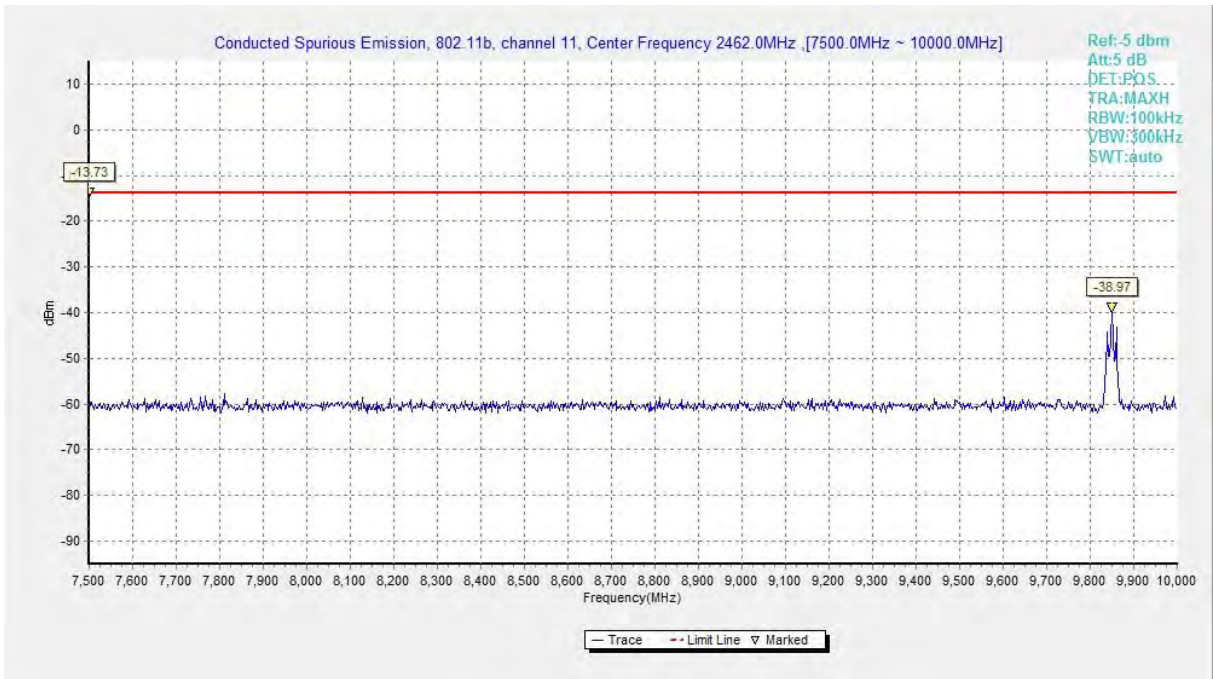




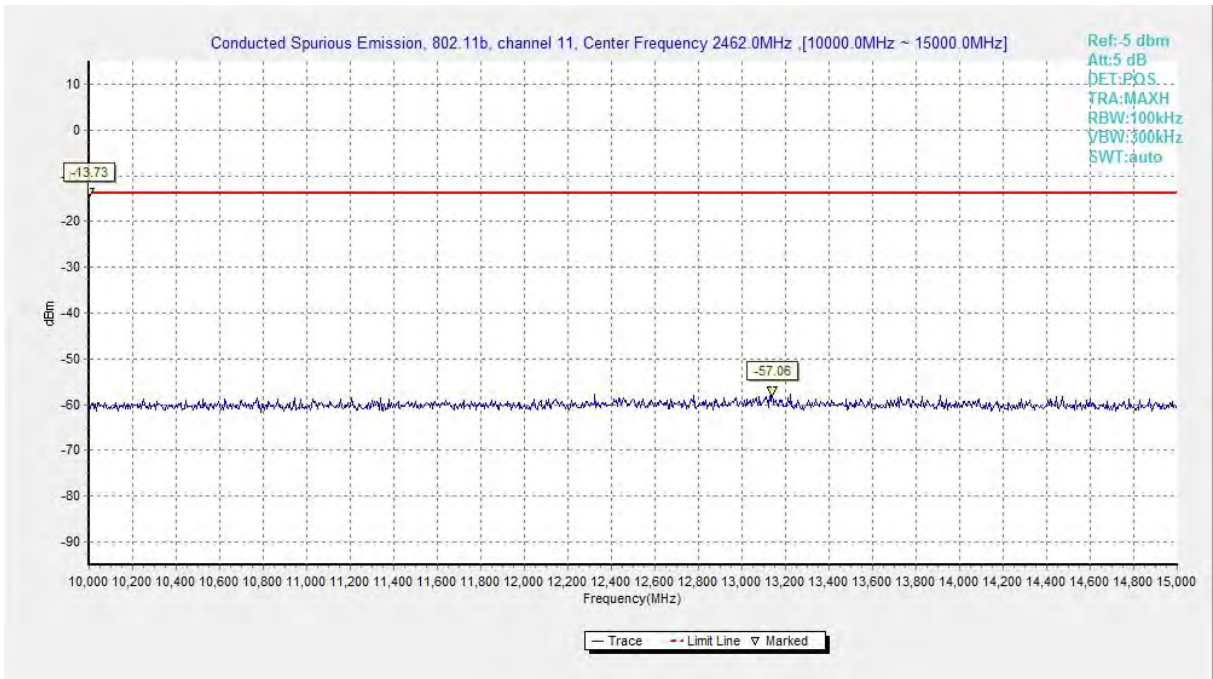
**Fig. 34 Conducted Spurious Emission (802.11b, Ch11, 1 GHz-2.5 GHz)**



**Fig. 35 Conducted Spurious Emission (802.11b, Ch11, 2.5 GHz-7.5 GHz)**

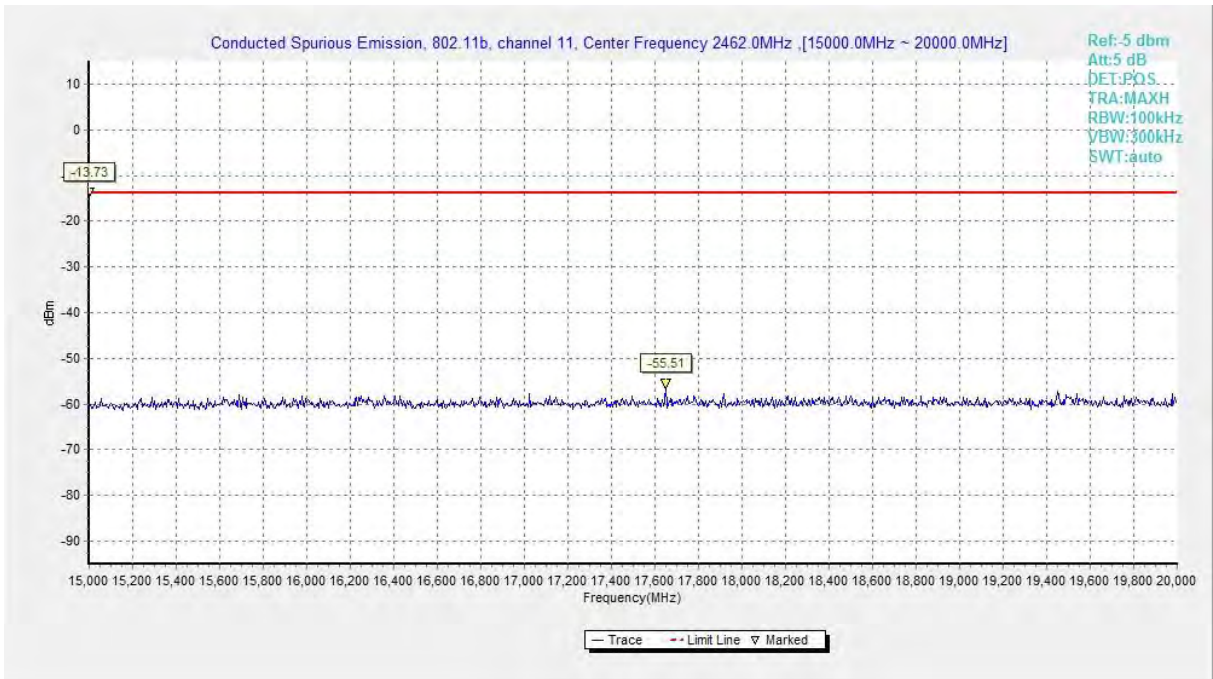


**Fig. 36 Conducted Spurious Emission (802.11b, Ch11, 7.5 GHz-10 GHz)**

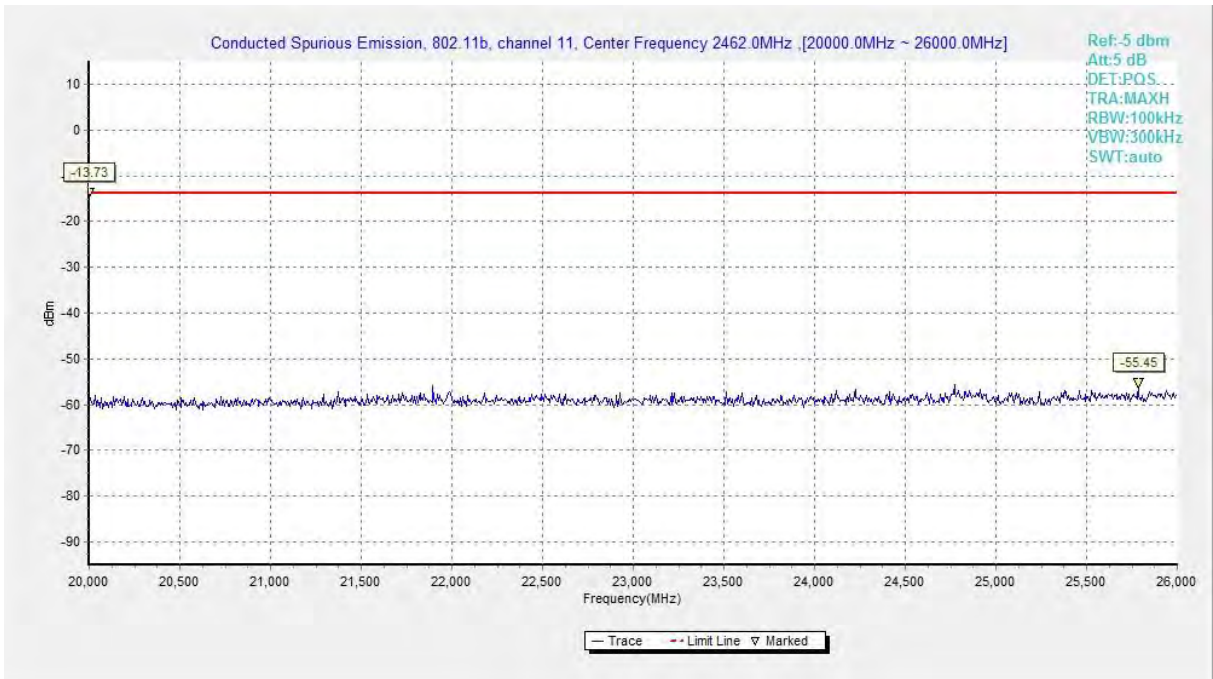


**Fig. 37 Conducted Spurious Emission (802.11b, Ch11, 10 GHz-15 GHz)**





**Fig. 38 Conducted Spurious Emission (802.11b, Ch11, 15 GHz-20 GHz)**



**Fig. 39 Conducted Spurious Emission (802.11b, Ch11, 20 GHz-26 GHz)**

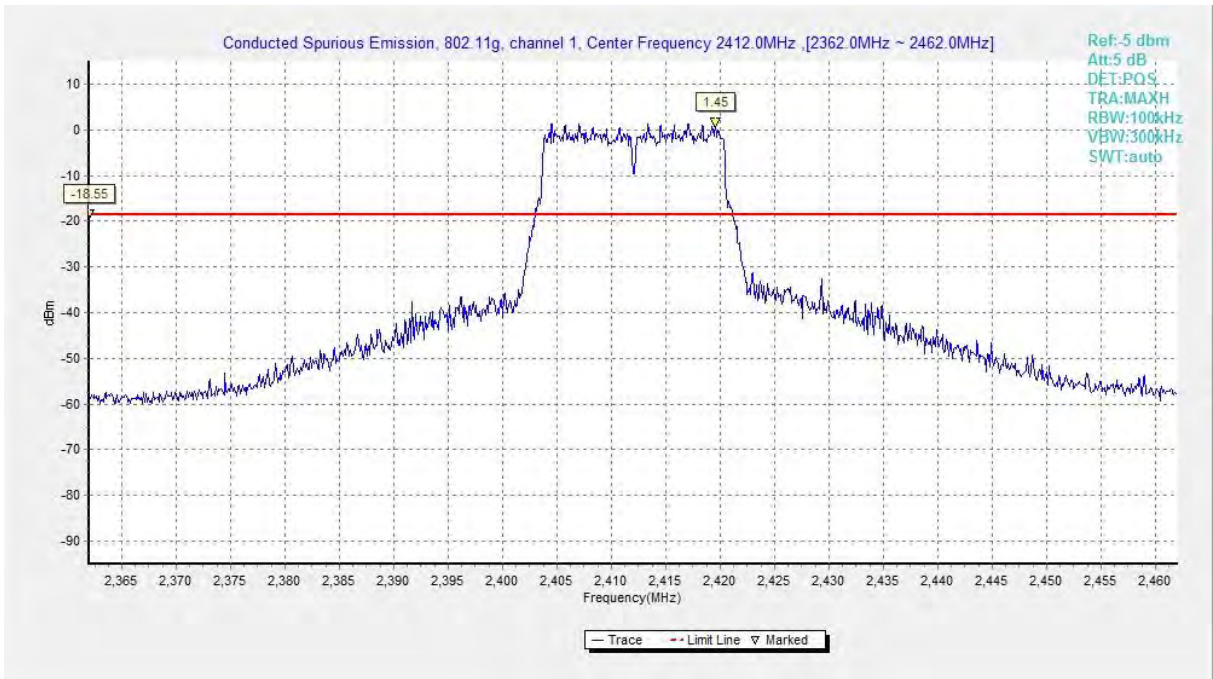


Fig. 40 Conducted Spurious Emission (802.11g, Ch1, Center Frequency)

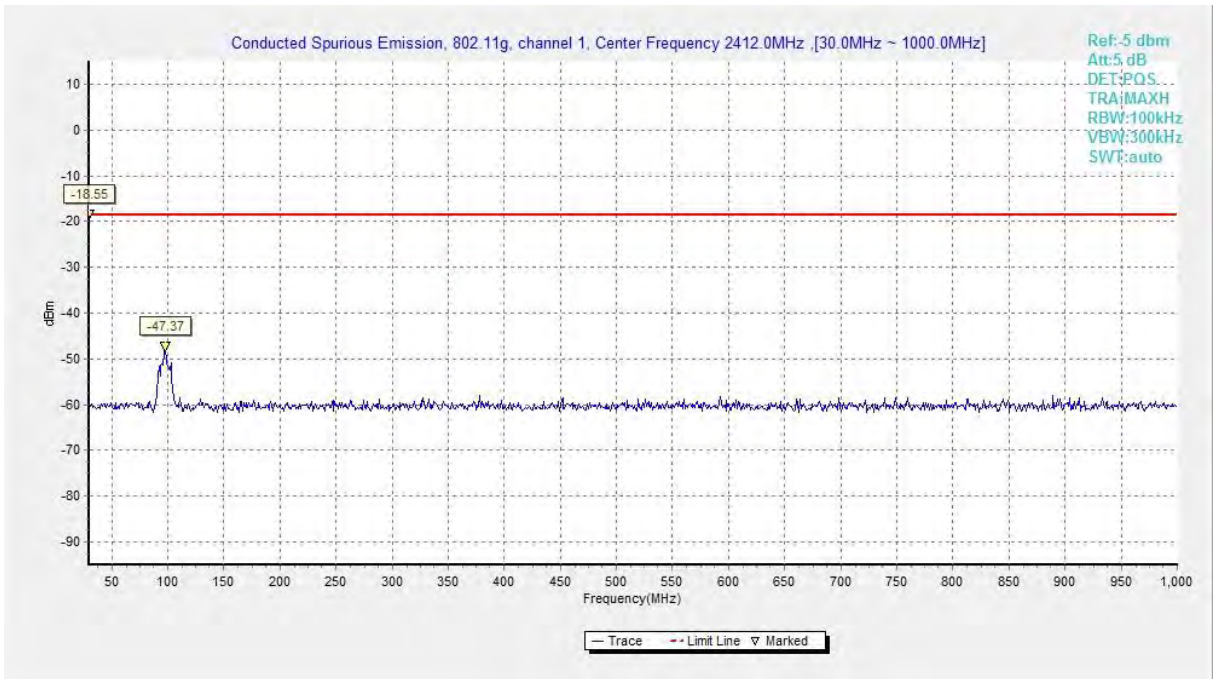
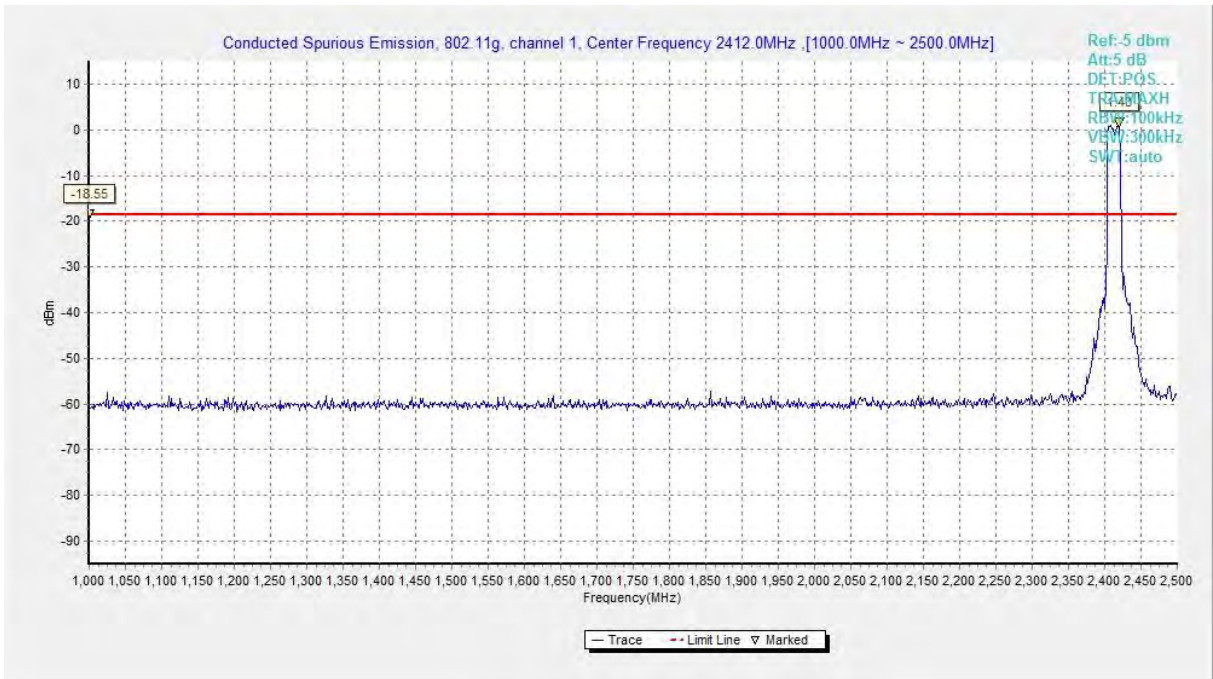
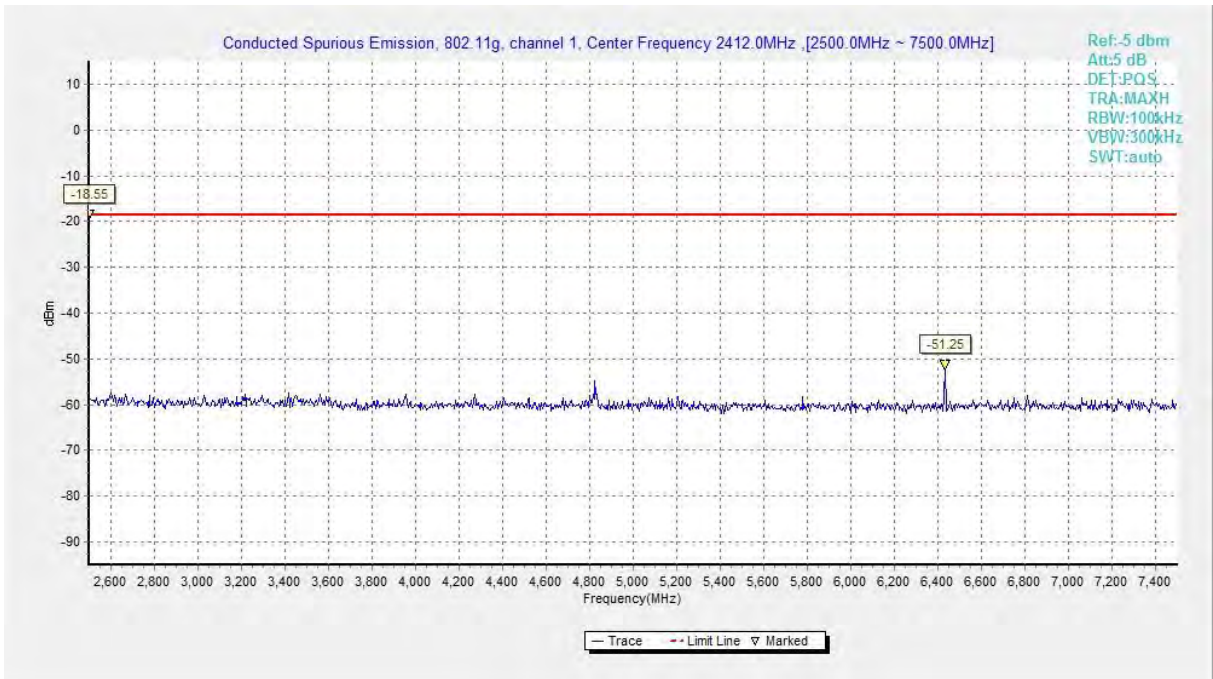


Fig. 41 Conducted Spurious Emission (802.11g, Ch1, 30 MHz-1 GHz)





**Fig. 42 Conducted Spurious Emission (802.11g, Ch1, 1 GHz-2.5 GHz)**



**Fig. 43 Conducted Spurious Emission (802.11g, Ch1, 2.5 GHz-7.5 GHz)**

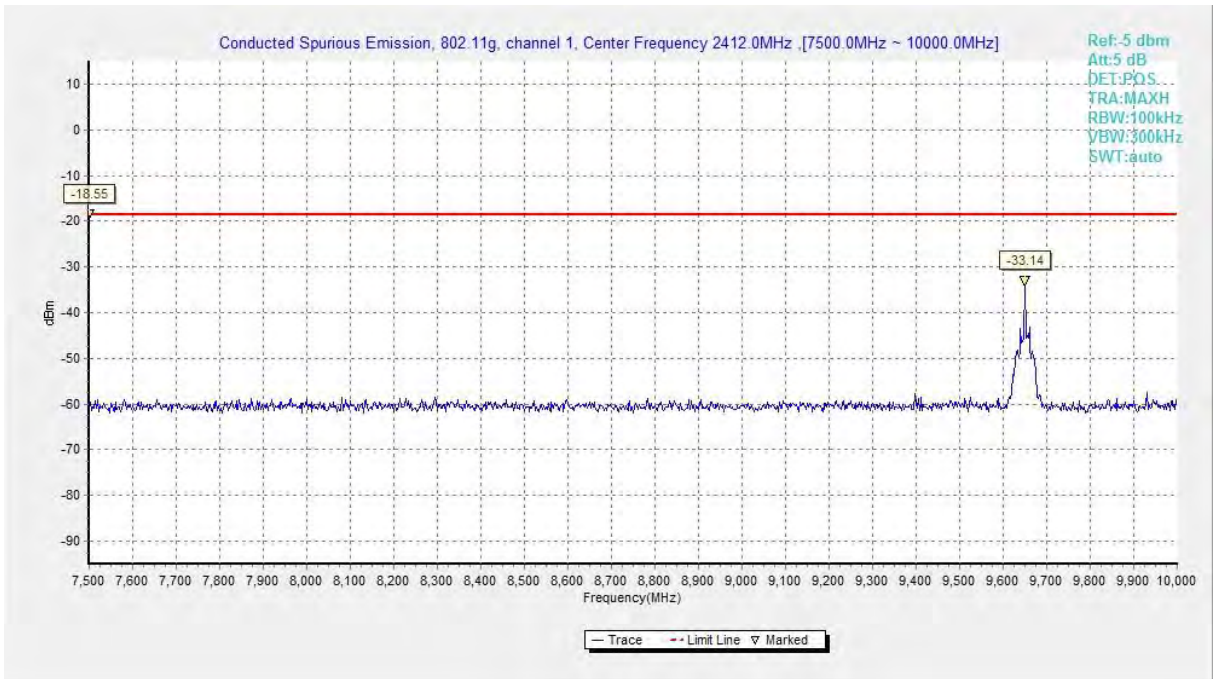


Fig. 44 Conducted Spurious Emission (802.11g, Ch1, 7.5 GHz-10 GHz)

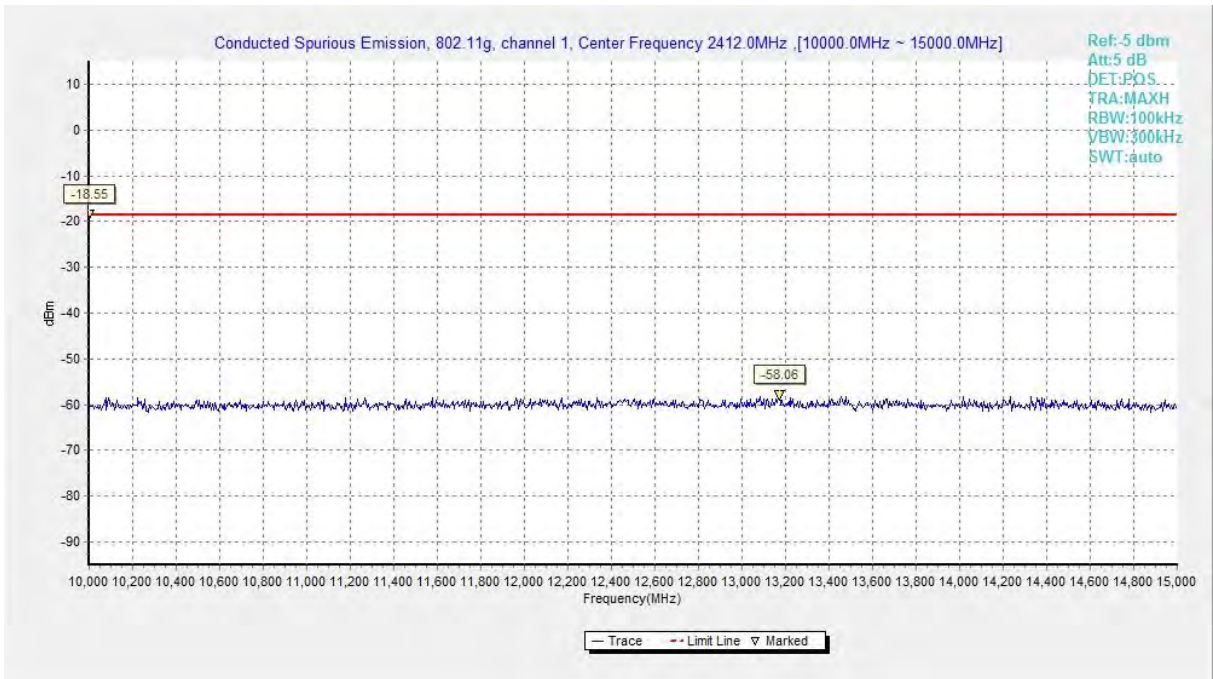
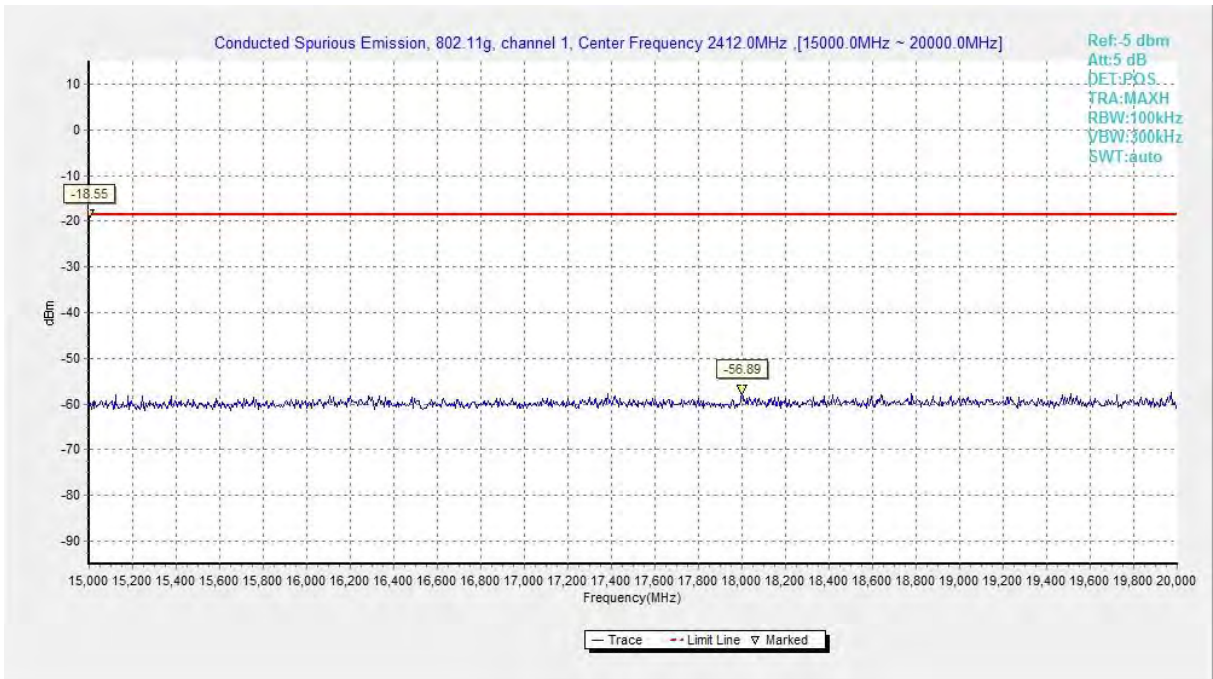
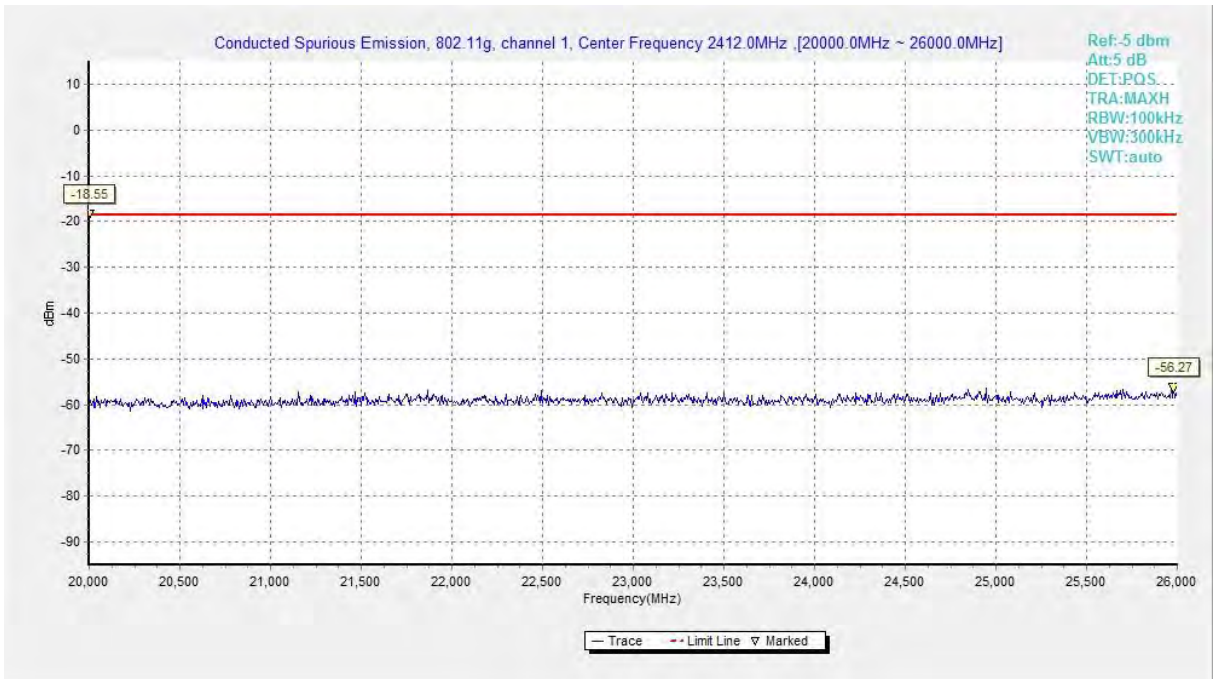


Fig. 45 Conducted Spurious Emission (802.11g, Ch1, 10 GHz-15 GHz)





**Fig. 46 Conducted Spurious Emission (802.11g, Ch1, 15 GHz-20 GHz)**



**Fig. 47 Conducted Spurious Emission (802.11g, Ch1, 20 GHz-26 GHz)**



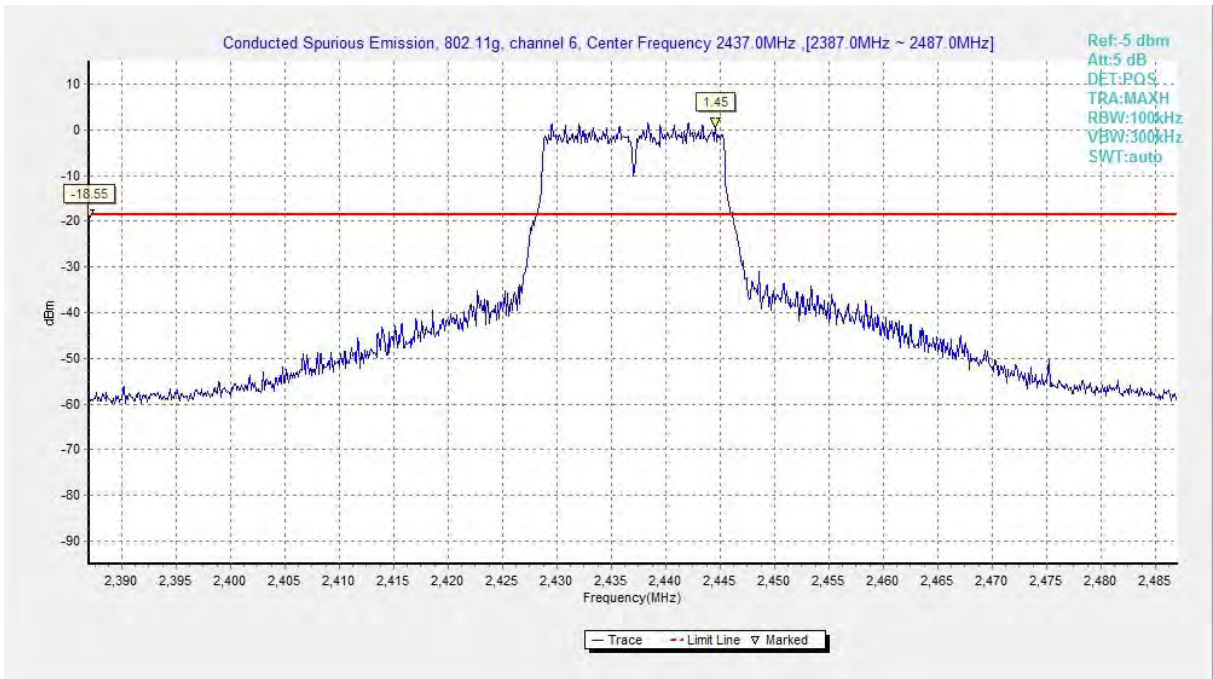


Fig. 48 Conducted Spurious Emission (802.11g, Ch6, Center Frequency)

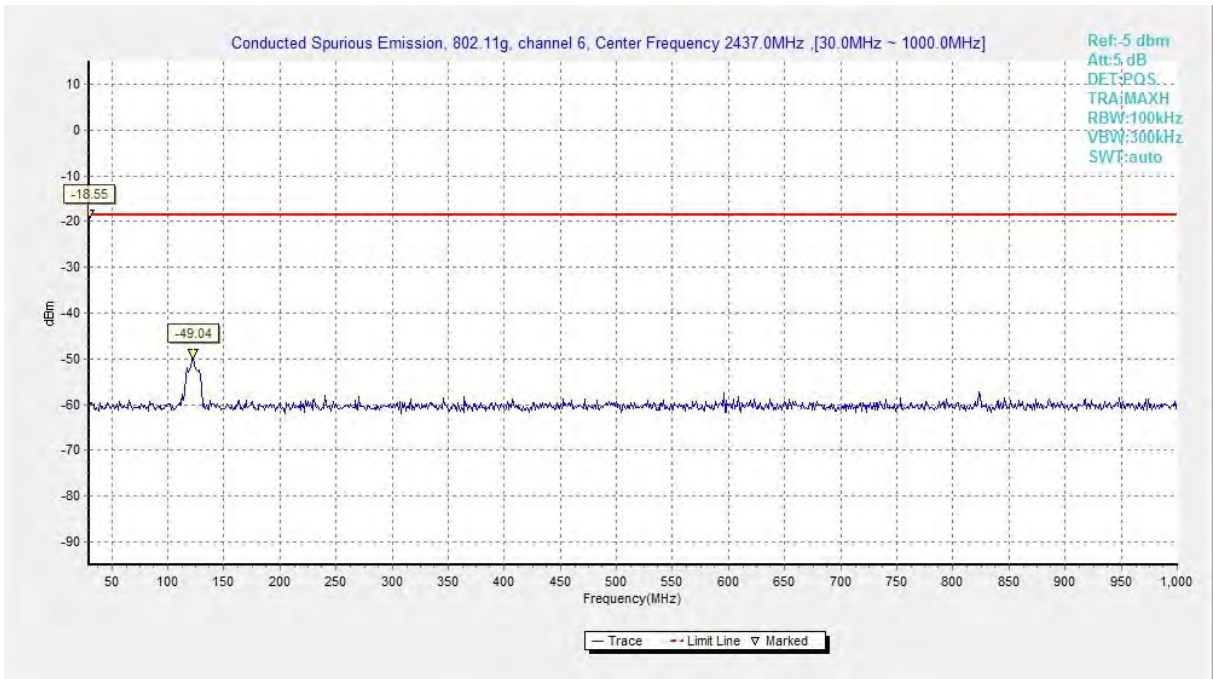
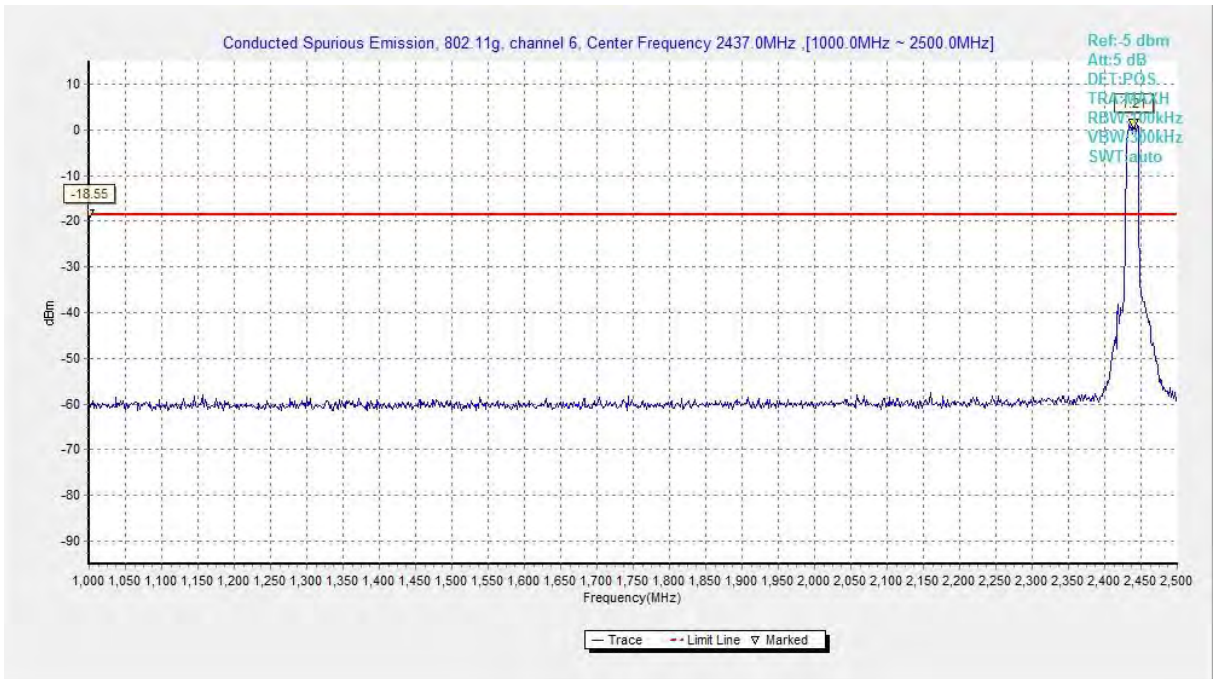
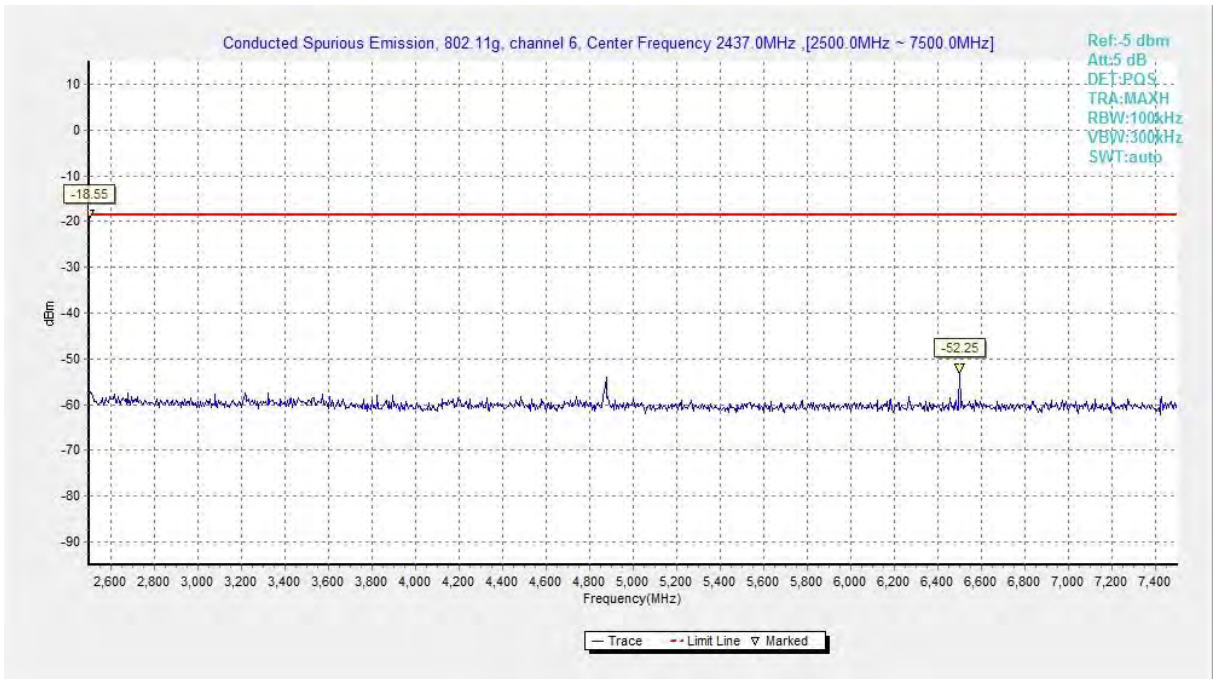


Fig. 49 Conducted Spurious Emission (802.11g, Ch6, 30 MHz-1 GHz)



**Fig. 50 Conducted Spurious Emission (802.11g, Ch6, 1 GHz-2.5 GHz)**



**Fig. 51 Conducted Spurious Emission (802.11g, Ch6, 2.5 GHz-7.5 GHz)**



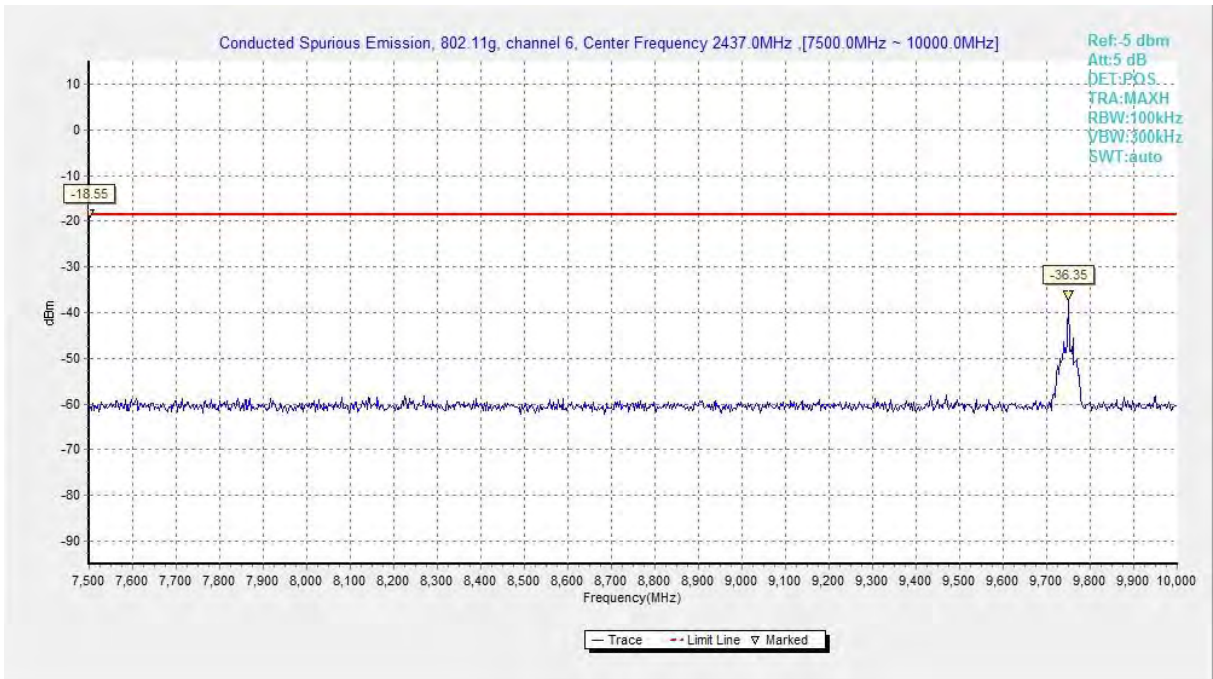


Fig. 52 Conducted Spurious Emission (802.11g, Ch6, 7.5 GHz-10 GHz)

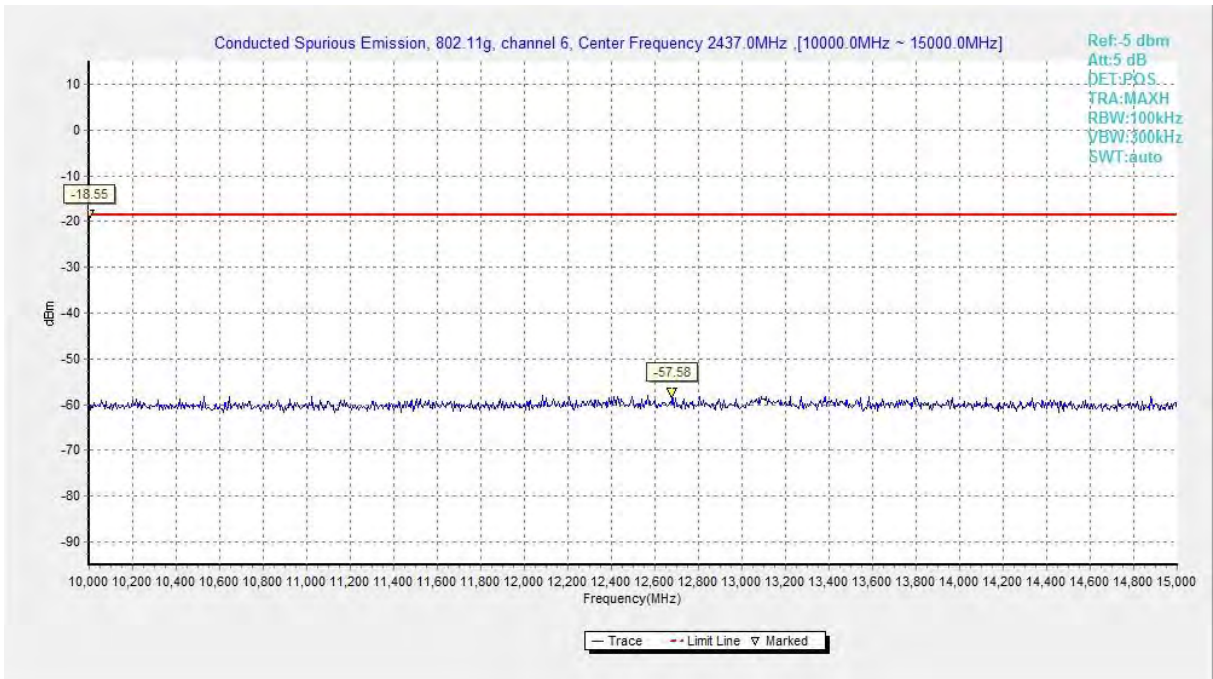
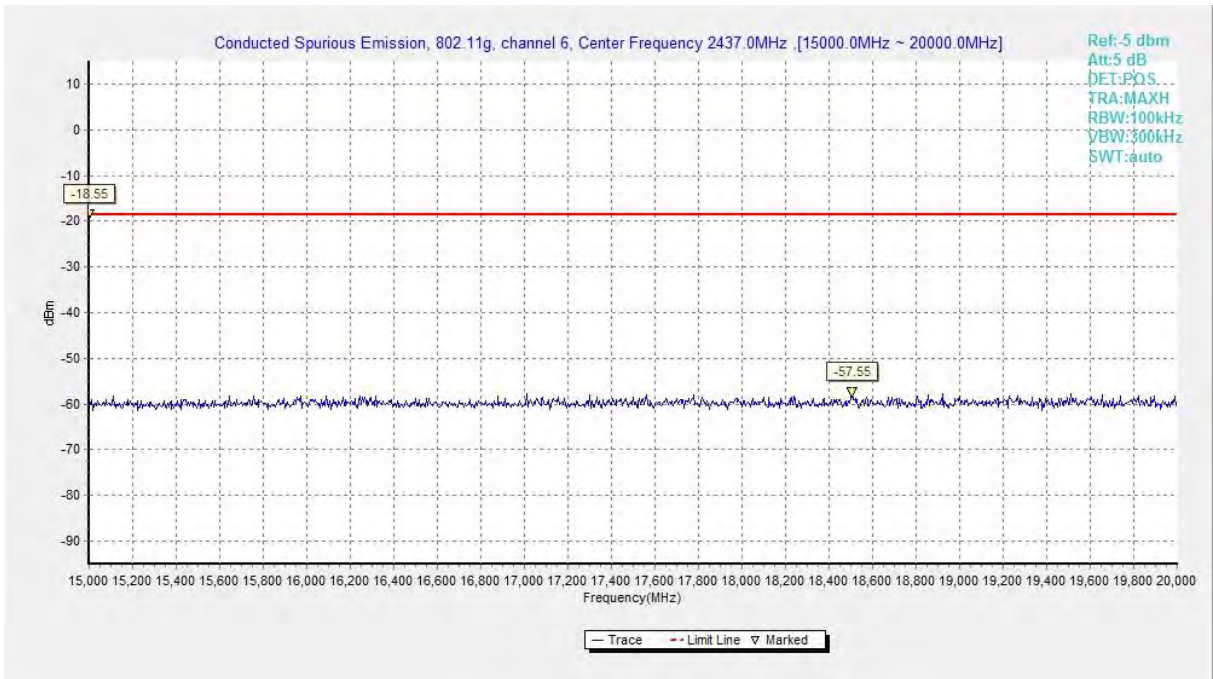
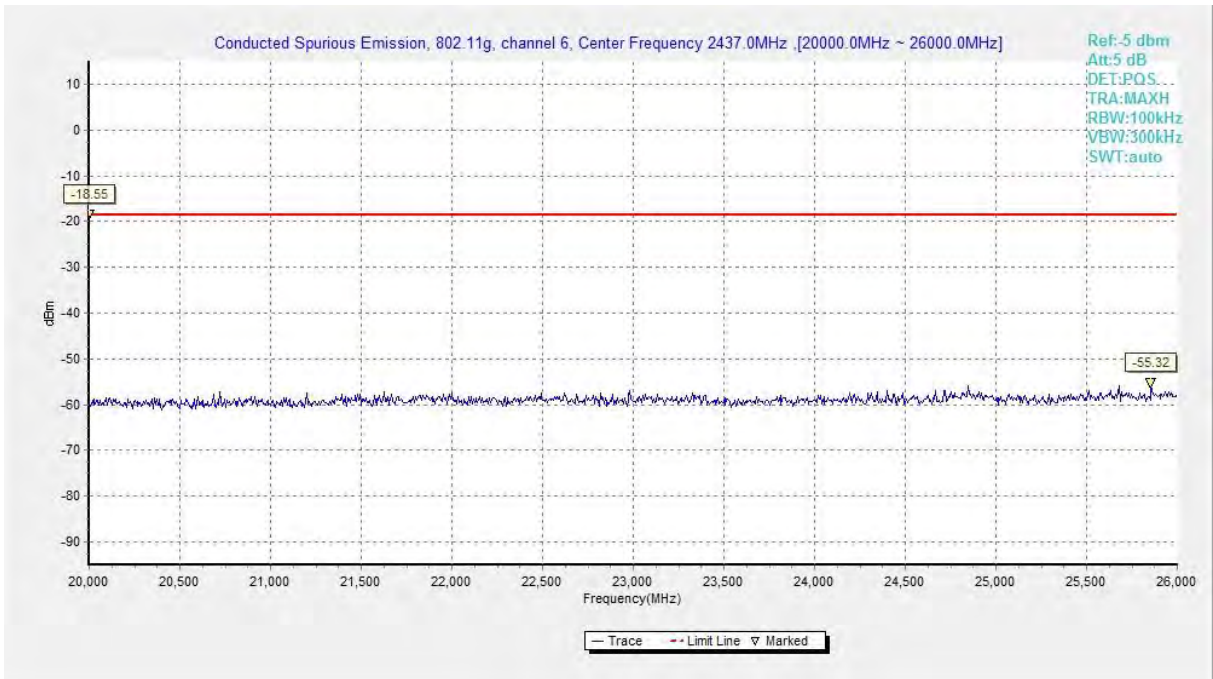


Fig. 53 Conducted Spurious Emission (802.11g, Ch6, 10 GHz-15 GHz)



**Fig. 54 Conducted Spurious Emission (802.11g, Ch6, 15 GHz-20 GHz)**



**Fig. 55 Conducted Spurious Emission (802.11g, Ch6, 20 GHz-26 GHz)**



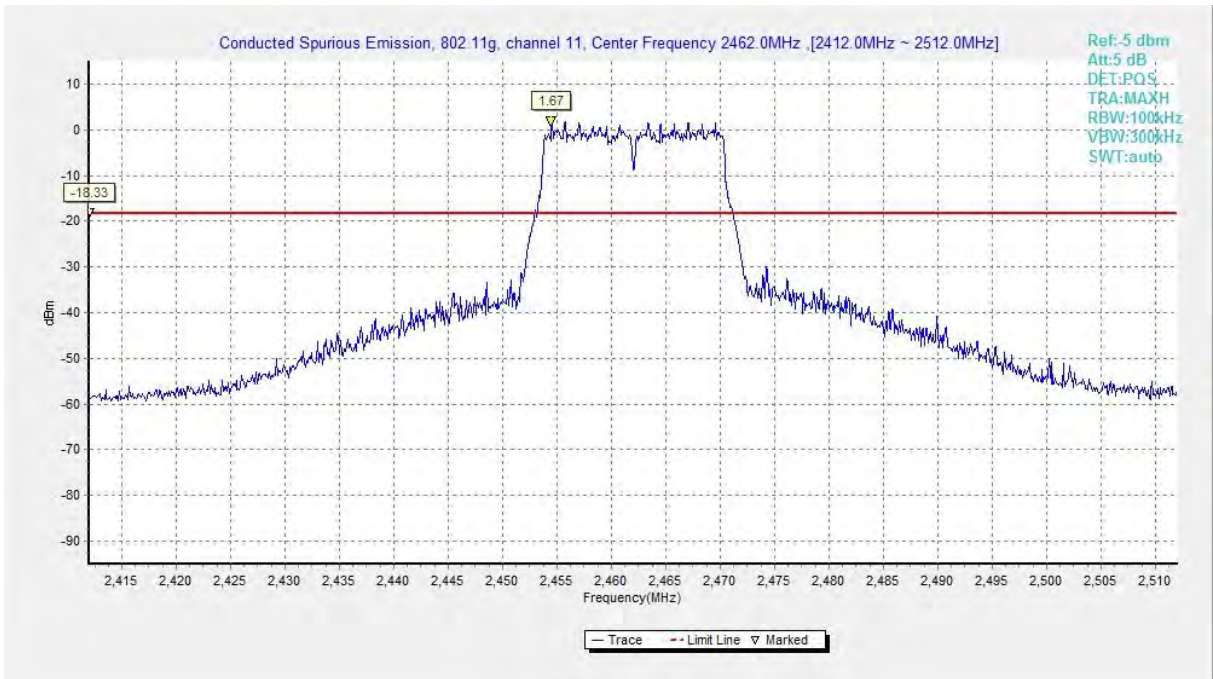


Fig. 56 Conducted Spurious Emission (802.11g, Ch11, Center Frequency)

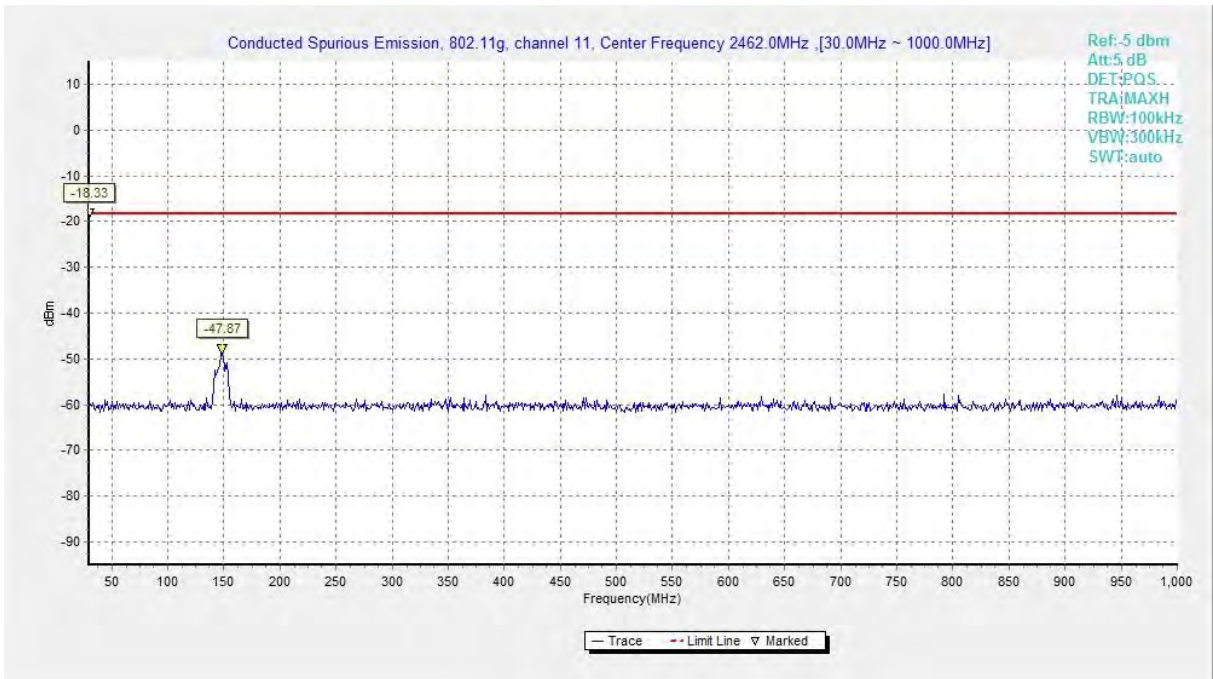
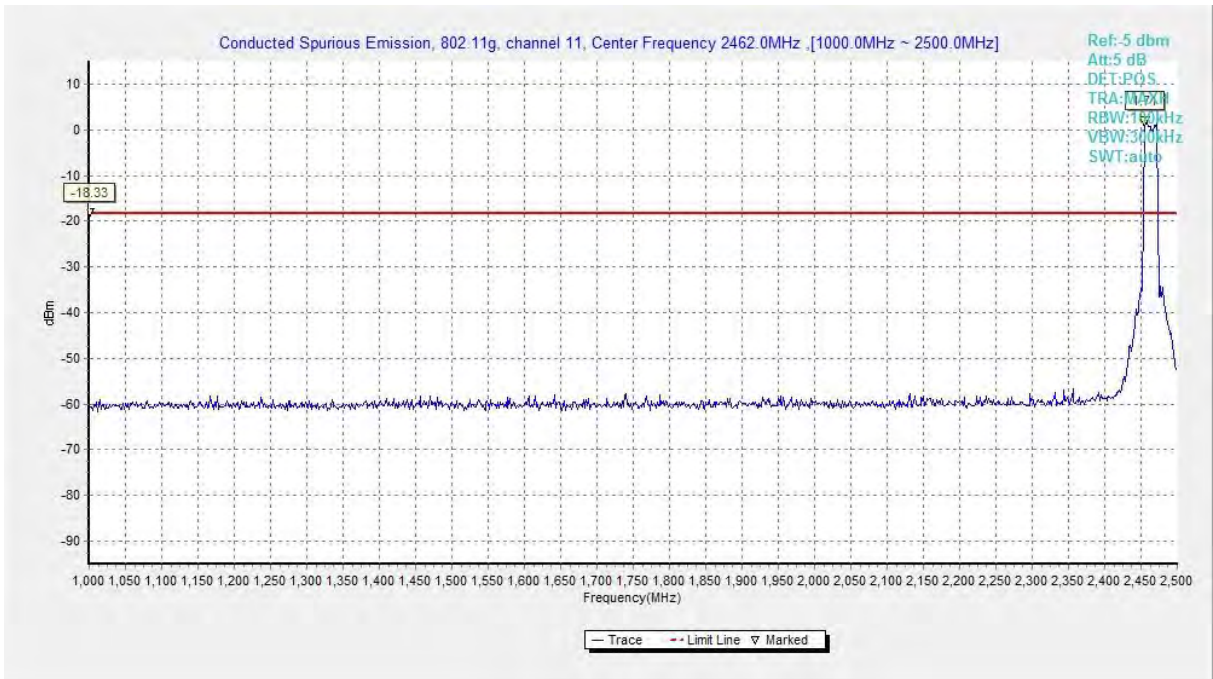
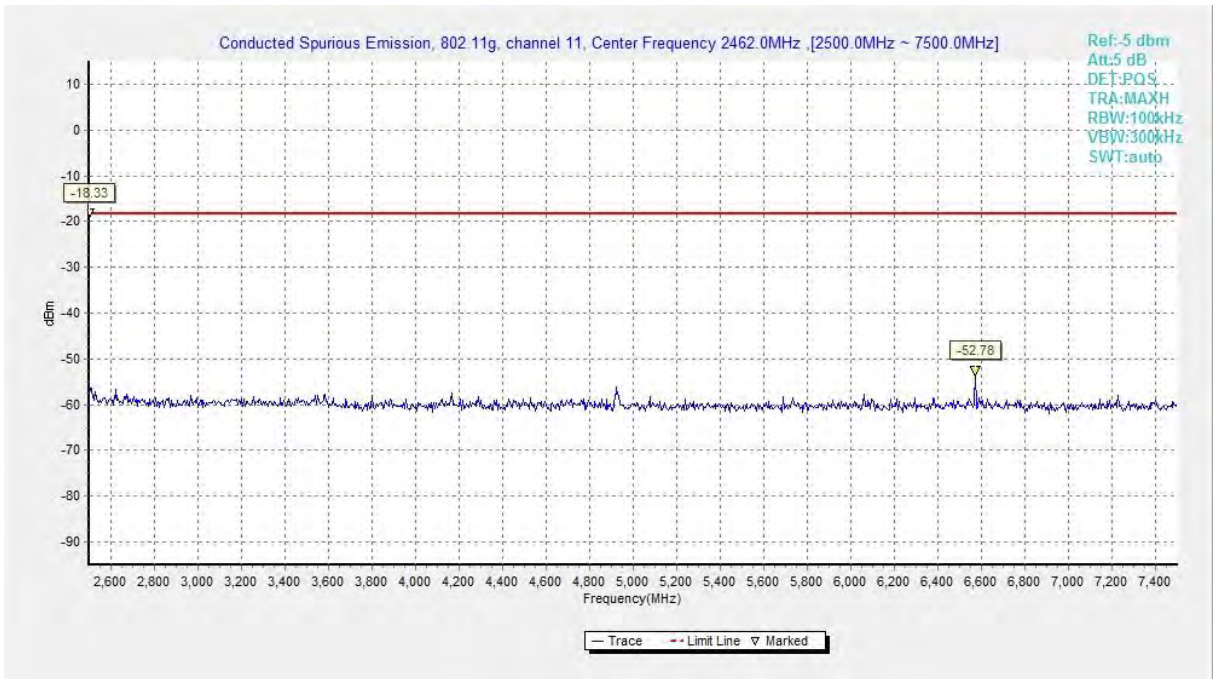


Fig. 57 Conducted Spurious Emission (802.11g, Ch11, 30 MHz-1 GHz)

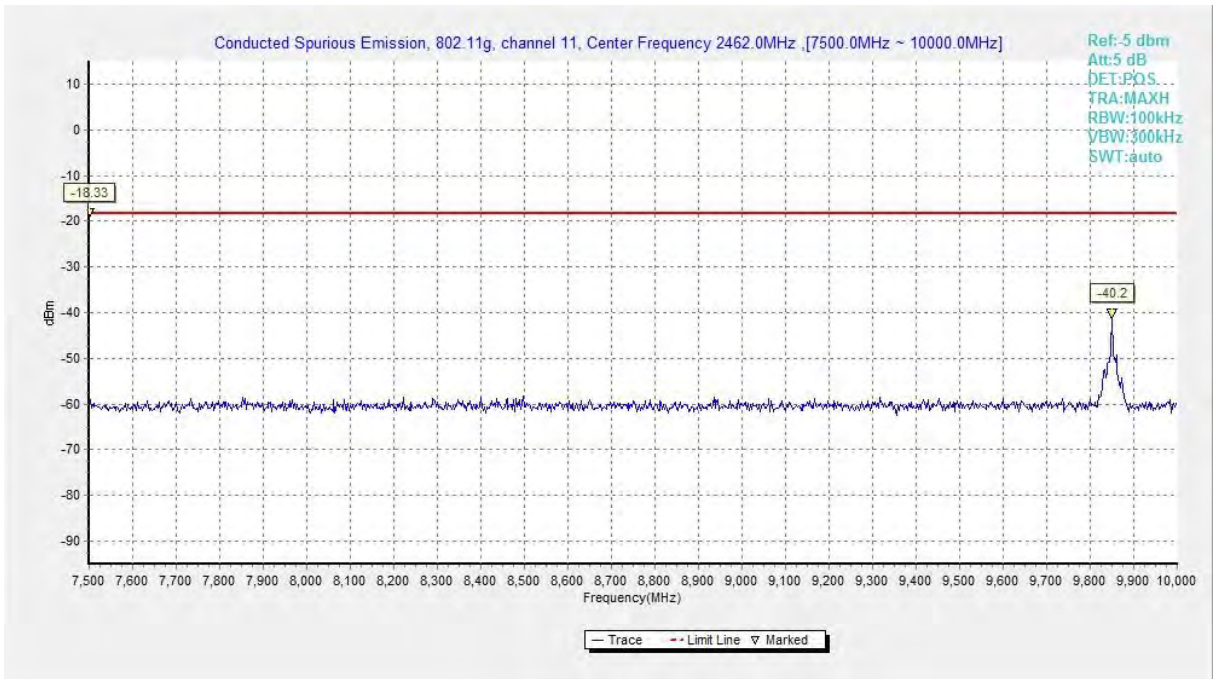


**Fig. 58 Conducted Spurious Emission (802.11g, Ch11, 1 GHz-2.5 GHz)**

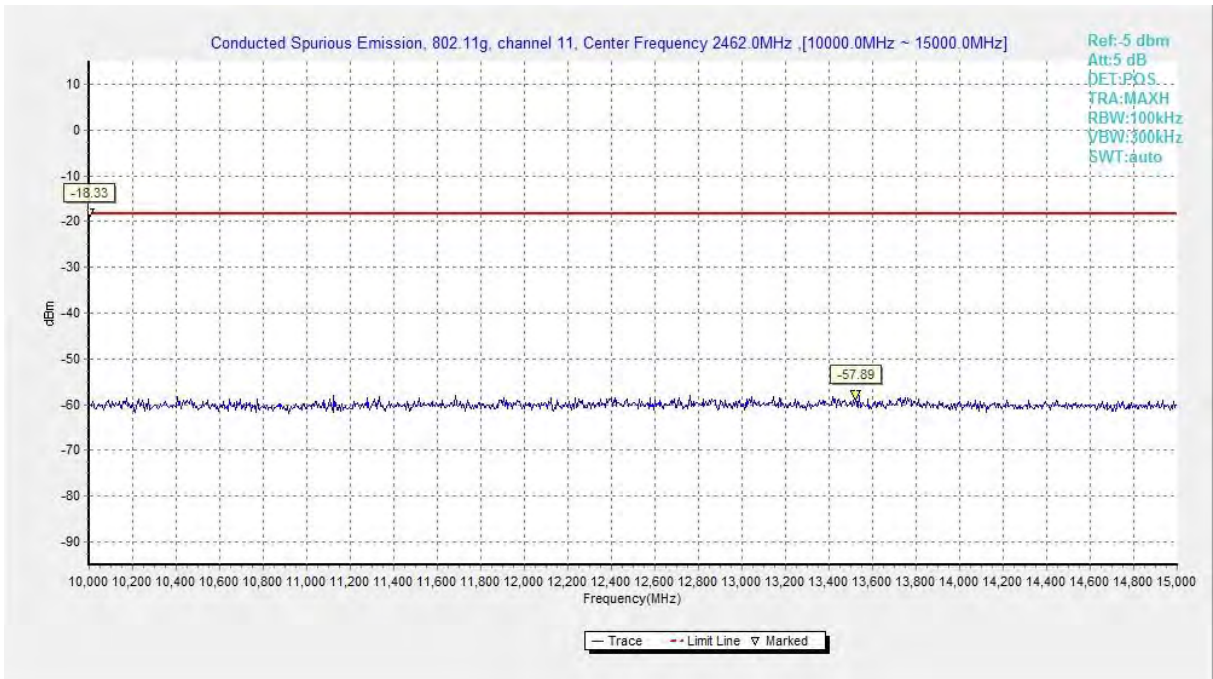


**Fig. 59 Conducted Spurious Emission (802.11g, Ch11, 2.5 GHz-7.5 GHz)**

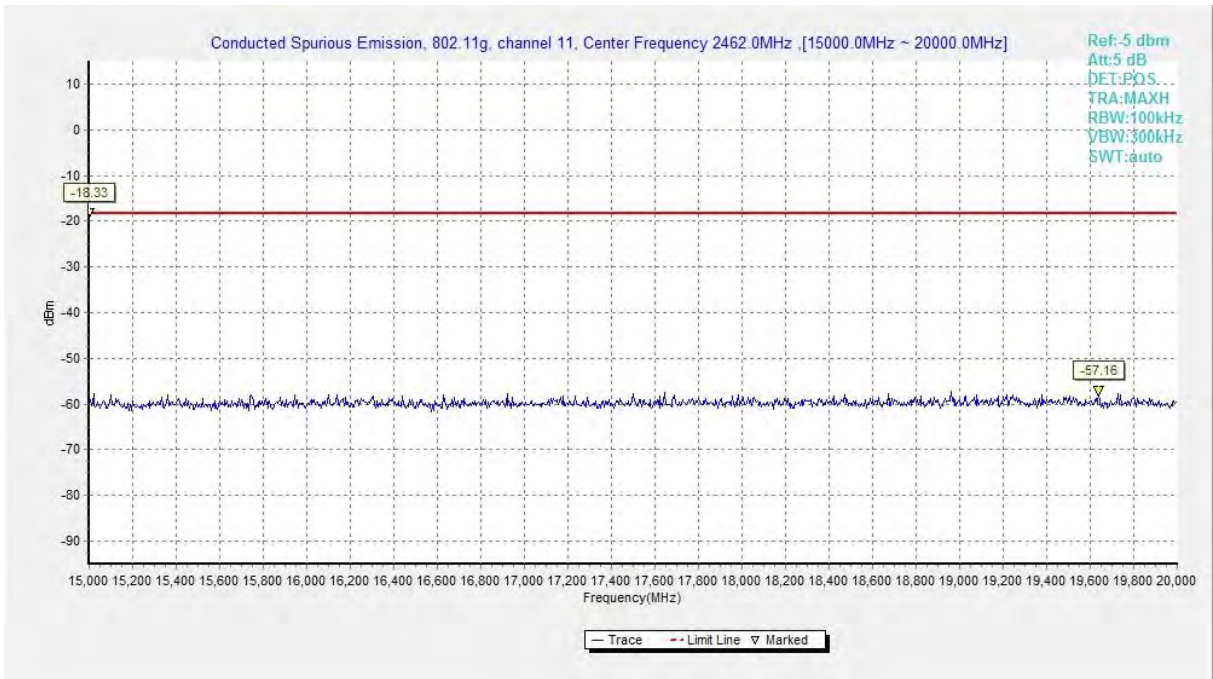




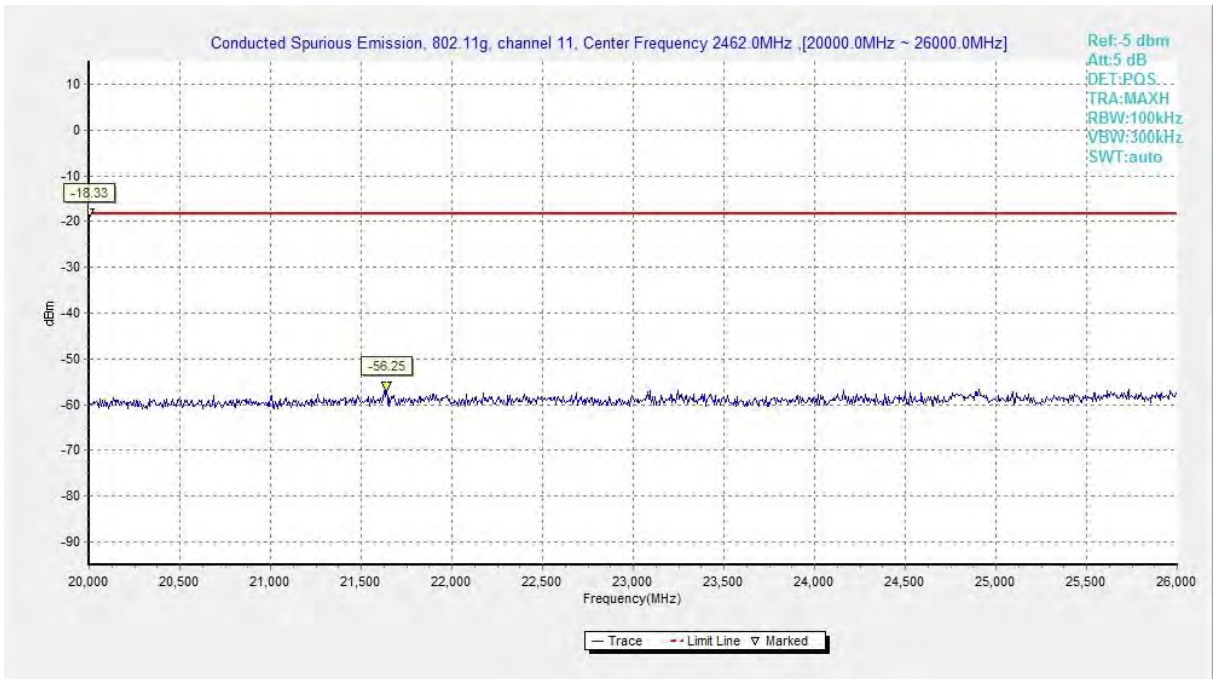
**Fig. 60 Conducted Spurious Emission (802.11g, Ch11, 7.5 GHz-10 GHz)**



**Fig. 61 Conducted Spurious Emission (802.11g, Ch11, 10 GHz-15 GHz)**

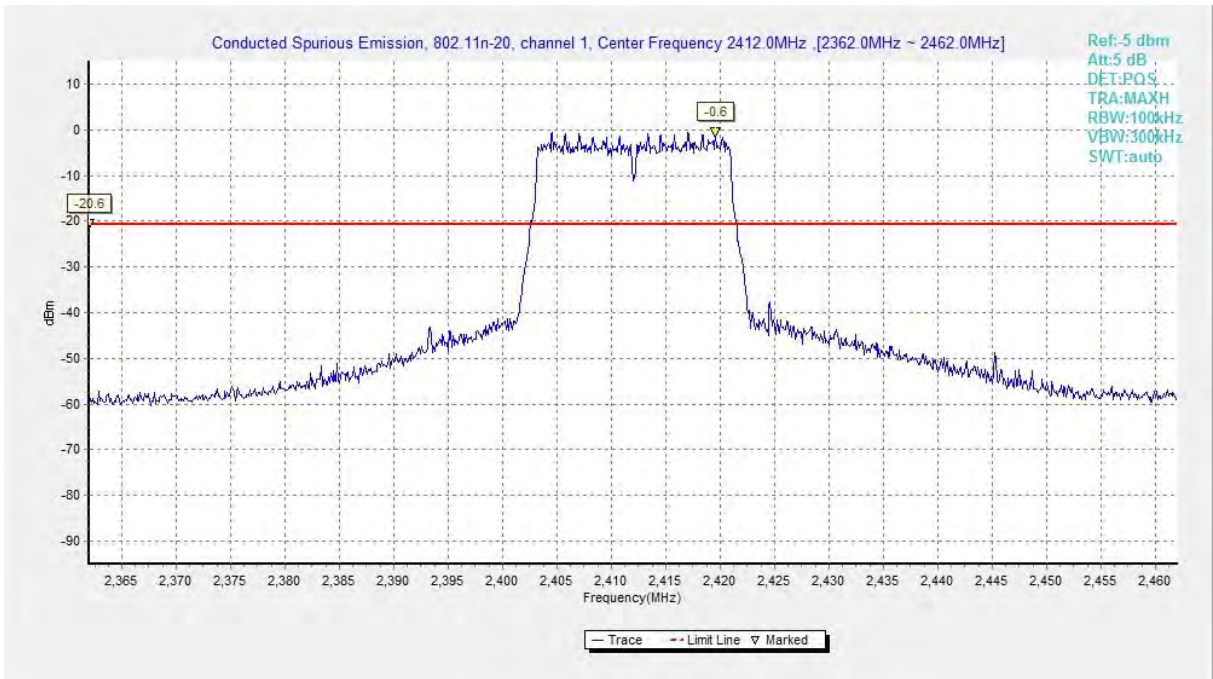


**Fig. 62 Conducted Spurious Emission (802.11g, Ch11, 15 GHz-20 GHz)**

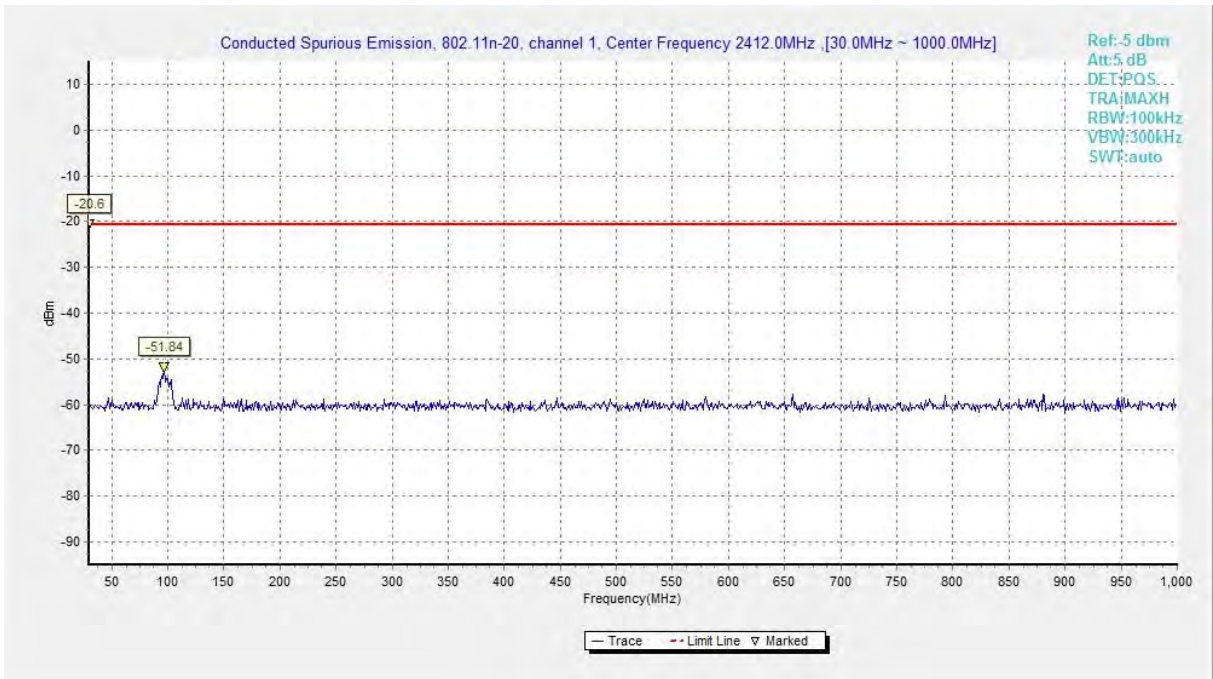


**Fig. 63 Conducted Spurious Emission (802.11g, Ch11, 20 GHz-26 GHz)**

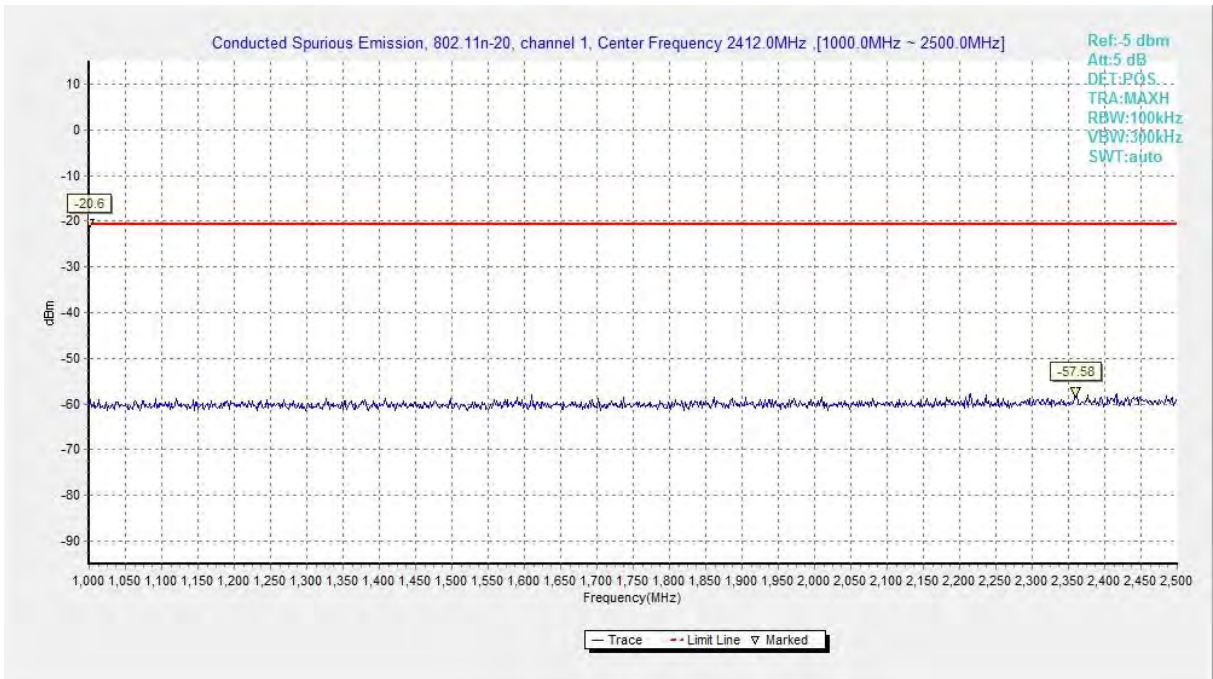




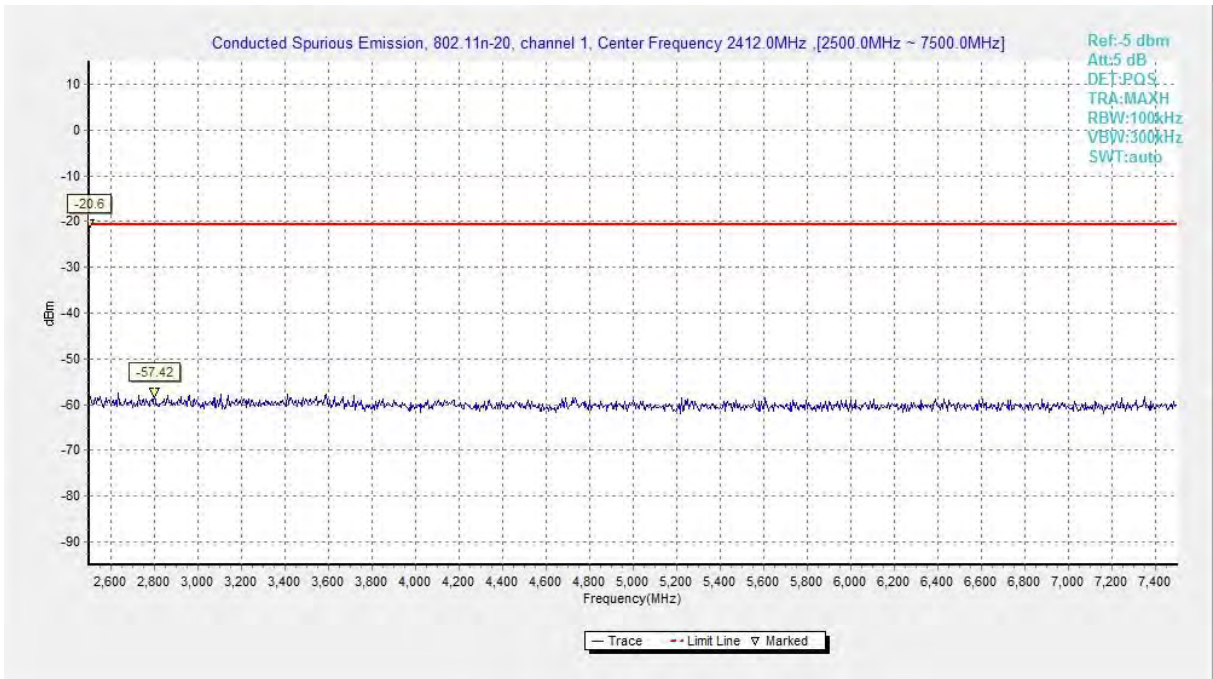
**Fig. 64 Conducted Spurious Emission (802.11n-HT20, Ch1, Center Frequency)**



**Fig. 65 Conducted Spurious Emission (802.11n-HT20, Ch1, 30 MHz-1 GHz)**

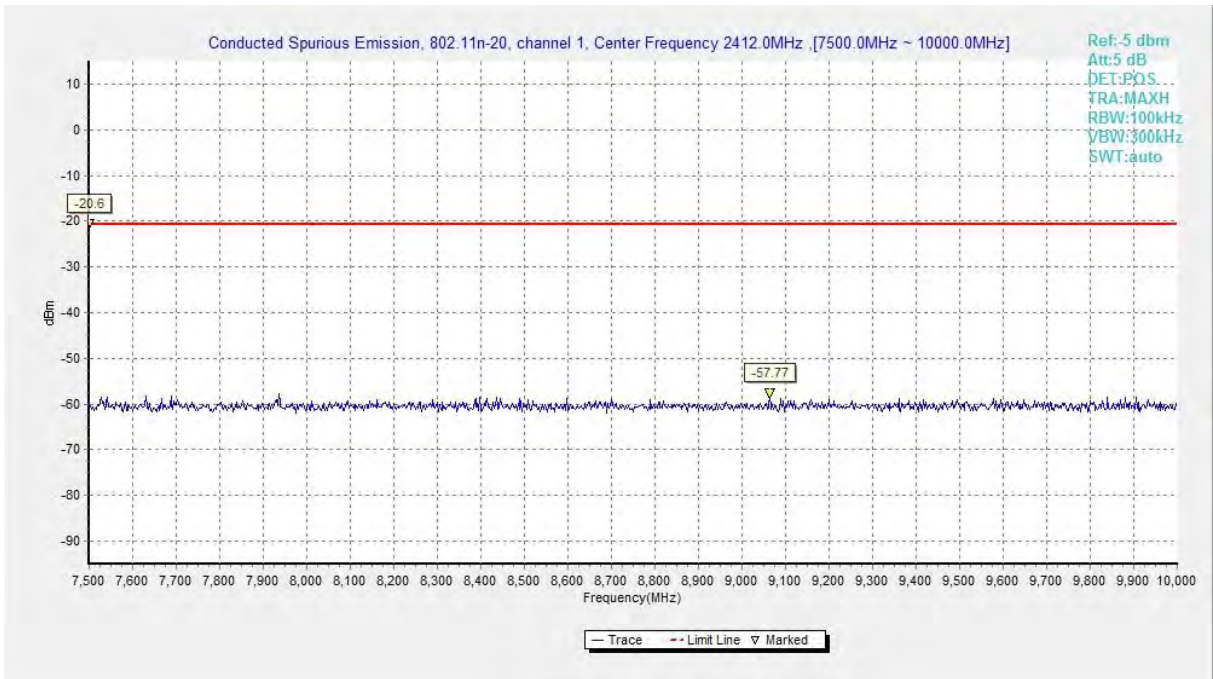


**Fig. 66 Conducted Spurious Emission (802.11n-HT20, Ch1, 1 GHz-2.5 GHz)**

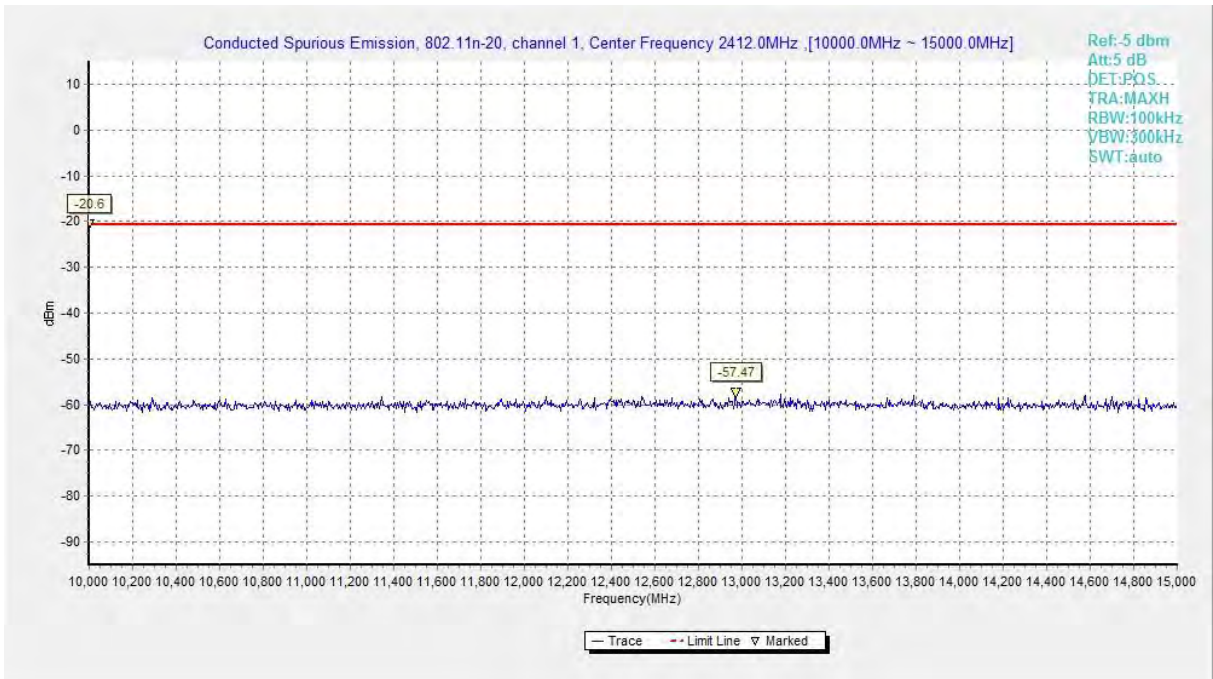


**Fig. 67 Conducted Spurious Emission (802.11n-HT20, Ch1, 2.5 GHz-7.5 GHz)**

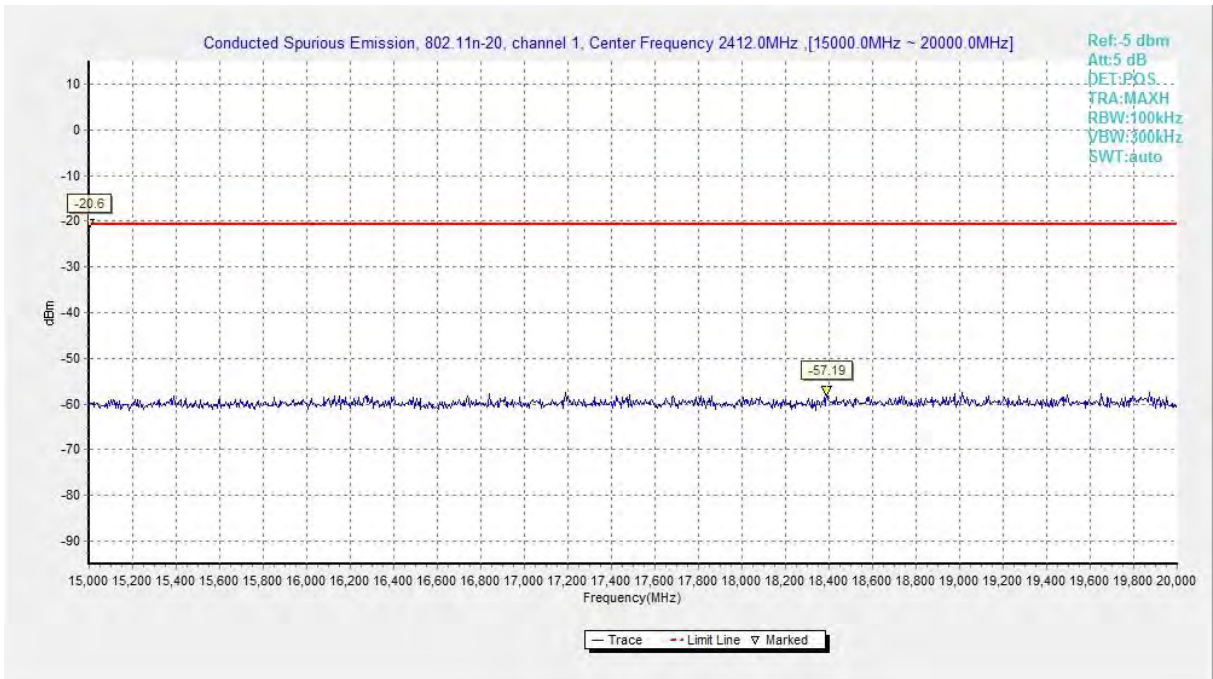




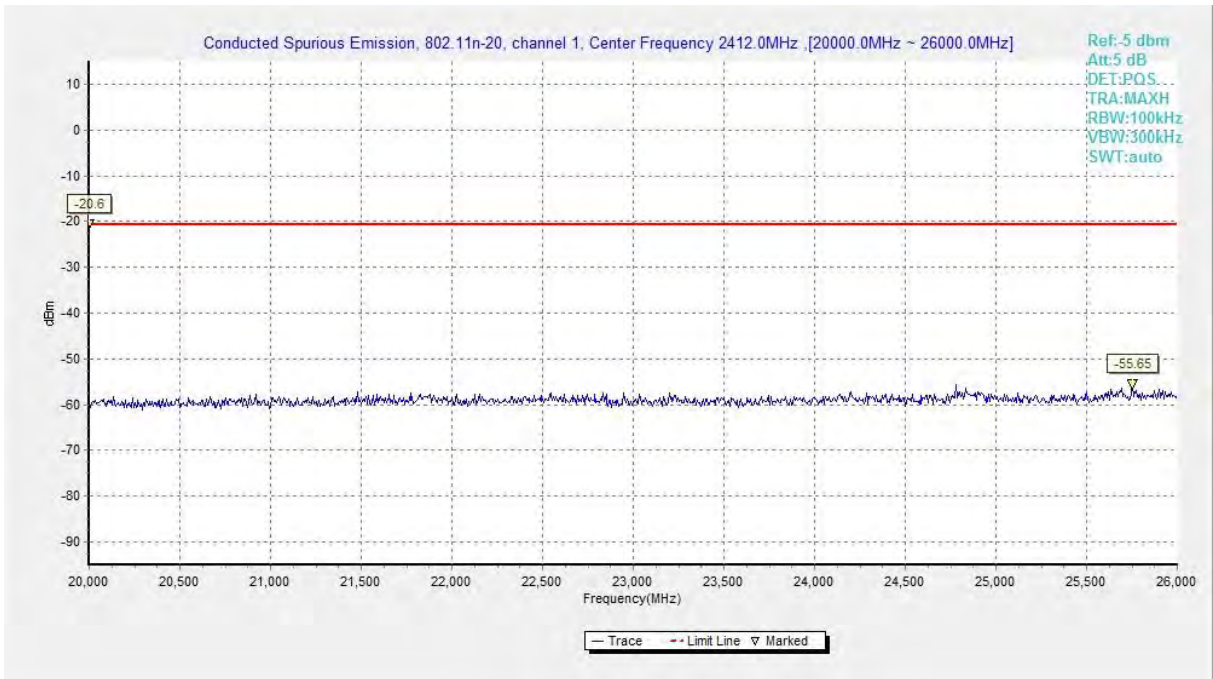
**Fig. 68 Conducted Spurious Emission (802.11n-HT20, Ch1, 7.5 GHz-10 GHz)**



**Fig. 69 Conducted Spurious Emission (802.11n-HT20, Ch1, 10 GHz-15 GHz)**

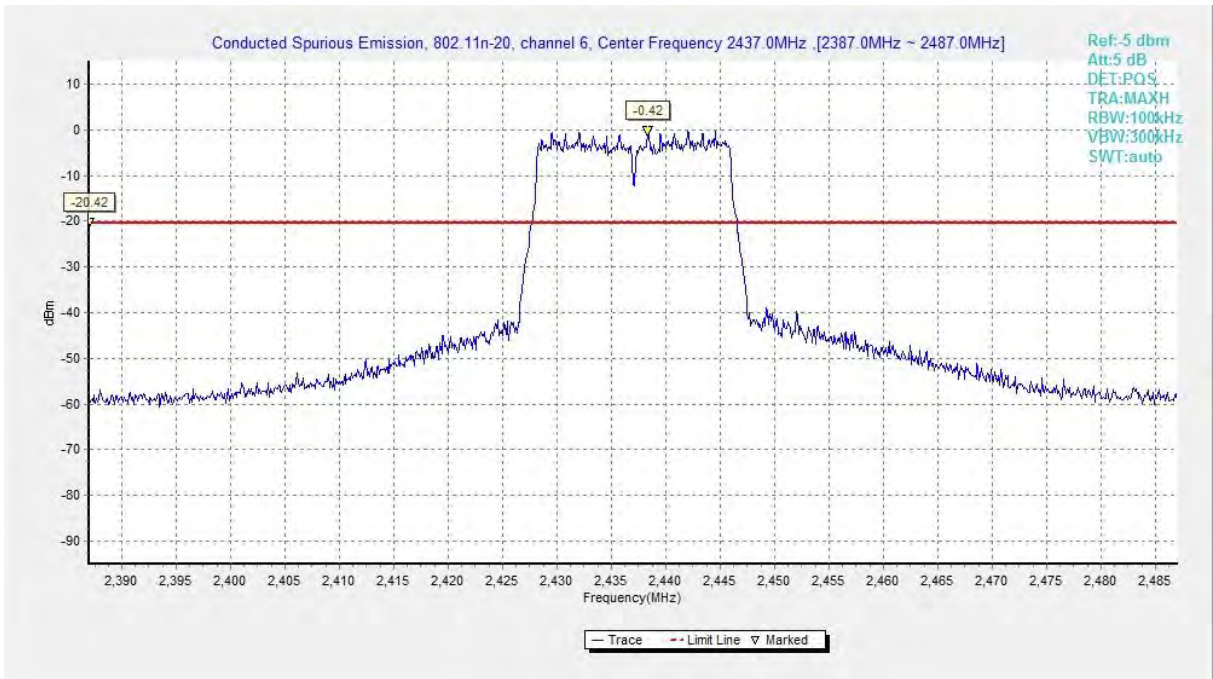


**Fig. 70 Conducted Spurious Emission (802.11n-HT20, Ch1, 15 GHz-20 GHz)**

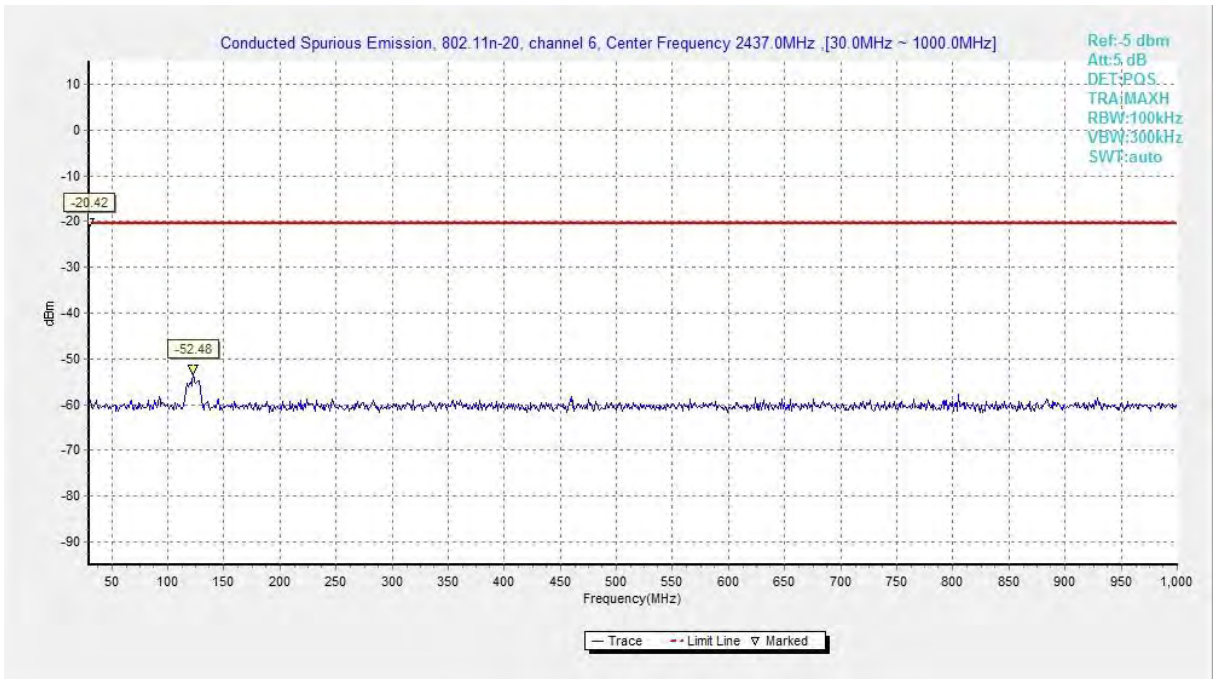


**Fig. 71 Conducted Spurious Emission (802.11n-HT20, Ch1, 20 GHz-26 GHz)**

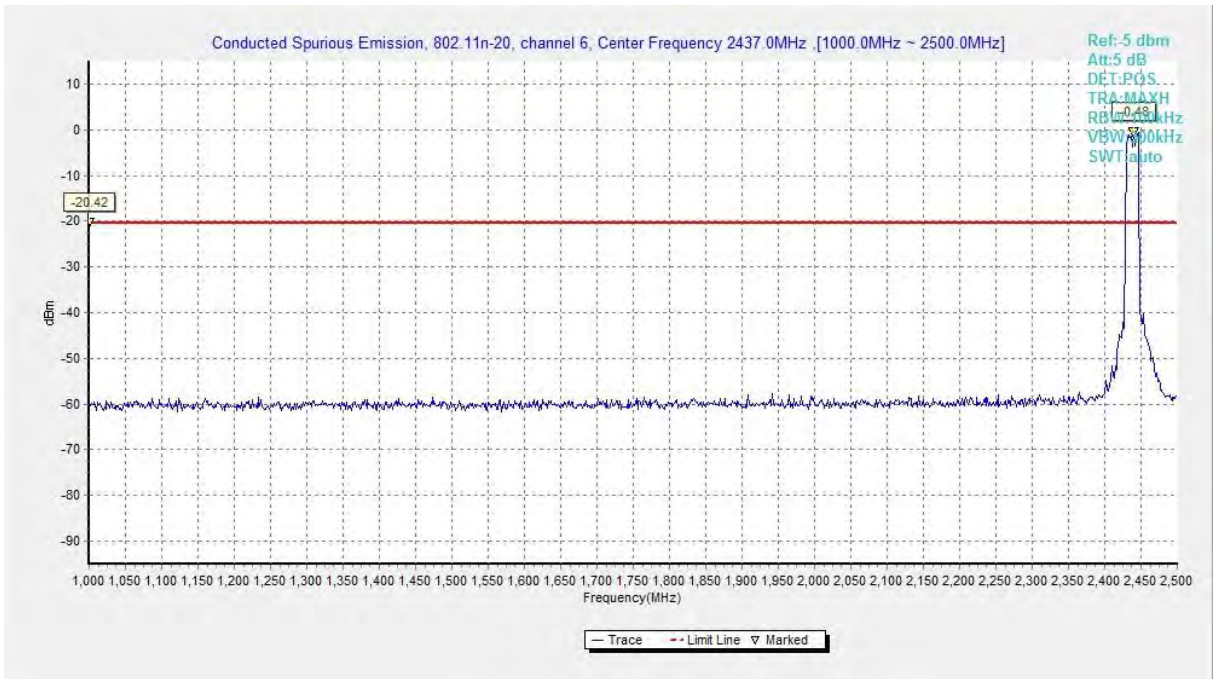




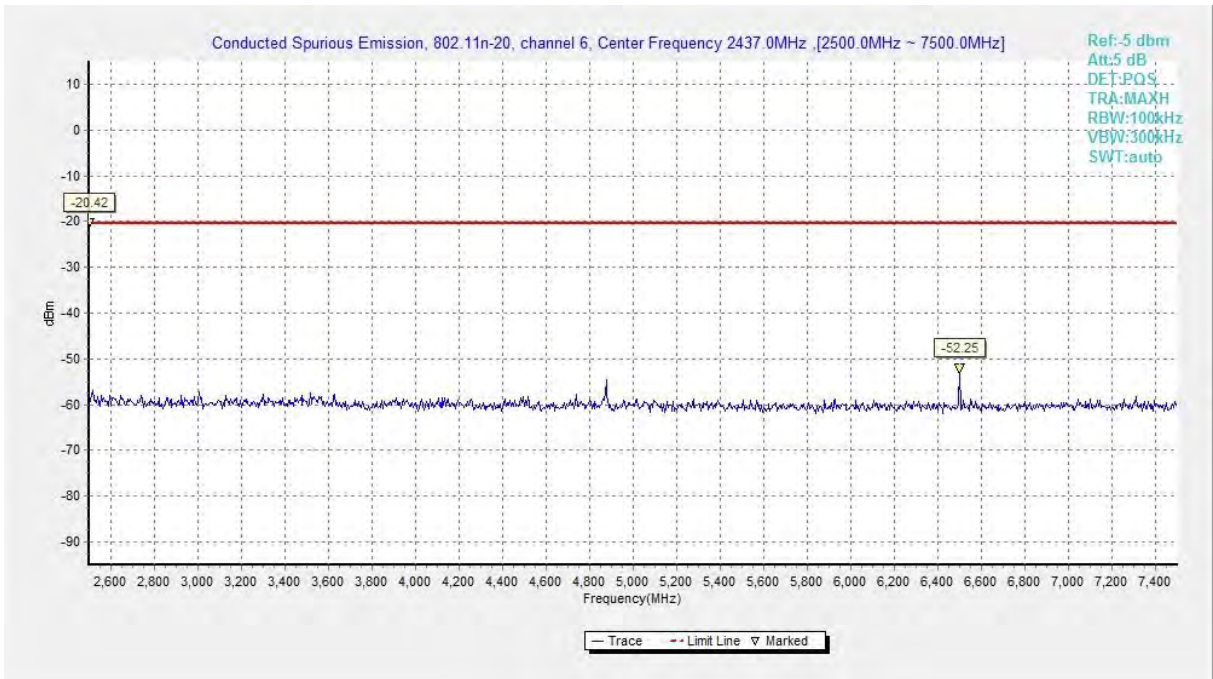
**Fig. 72 Conducted Spurious Emission (802.11n-HT20, Ch6, Center Frequency)**



**Fig. 73 Conducted Spurious Emission (802.11n-HT20, Ch6, 30 MHz-1 GHz)**

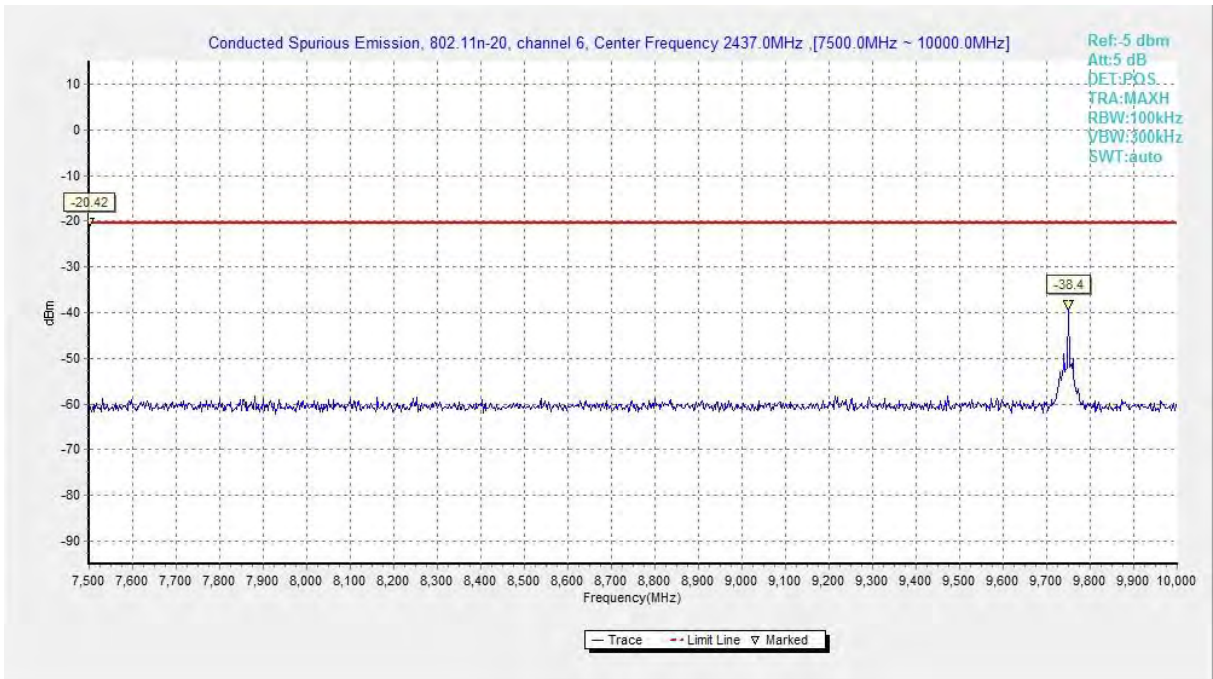


**Fig. 74 Conducted Spurious Emission (802.11n-HT20, Ch6, 1 GHz-2.5 GHz)**

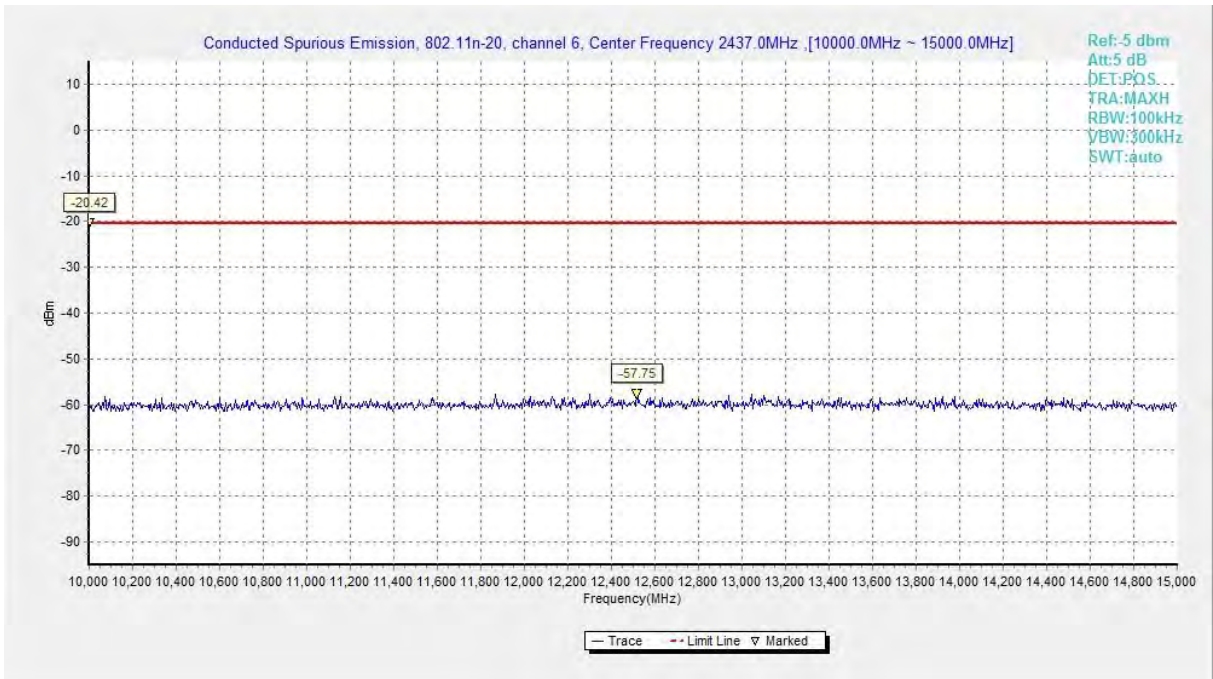


**Fig. 75 Conducted Spurious Emission (802.11n-HT20, Ch6, 2.5 GHz-7.5 GHz)**

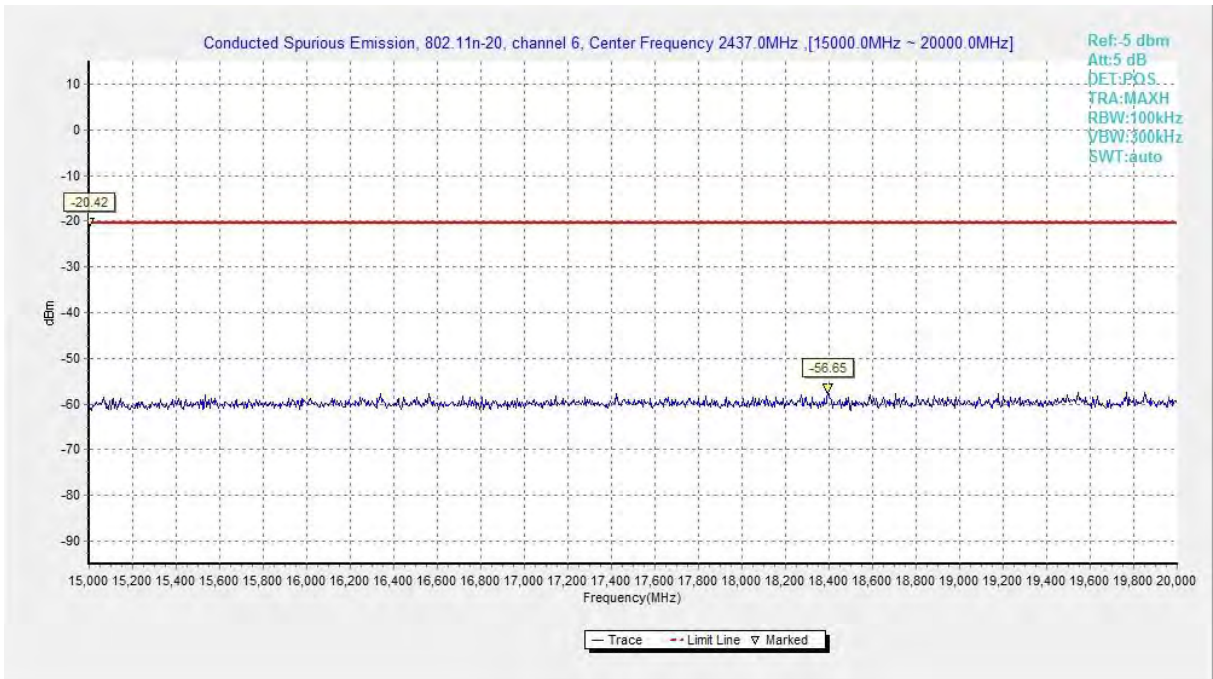




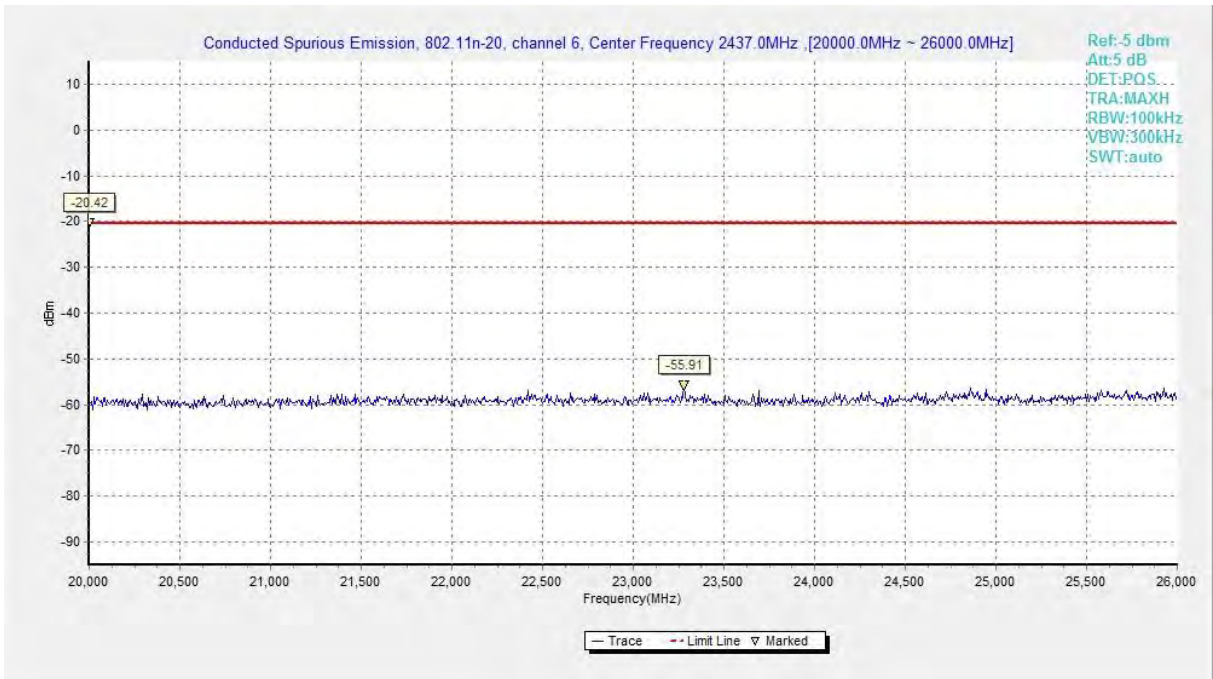
**Fig. 76 Conducted Spurious Emission (802.11n-HT20, Ch6, 7.5 GHz-10 GHz)**



**Fig. 77 Conducted Spurious Emission (802.11n-HT20, Ch6, 10 GHz-15 GHz)**



**Fig. 78 Conducted Spurious Emission (802.11n-HT20, Ch6, 15 GHz-20 GHz)**



**Fig. 79 Conducted Spurious Emission (802.11n-HT20, Ch6, 20 GHz-26 GHz)**



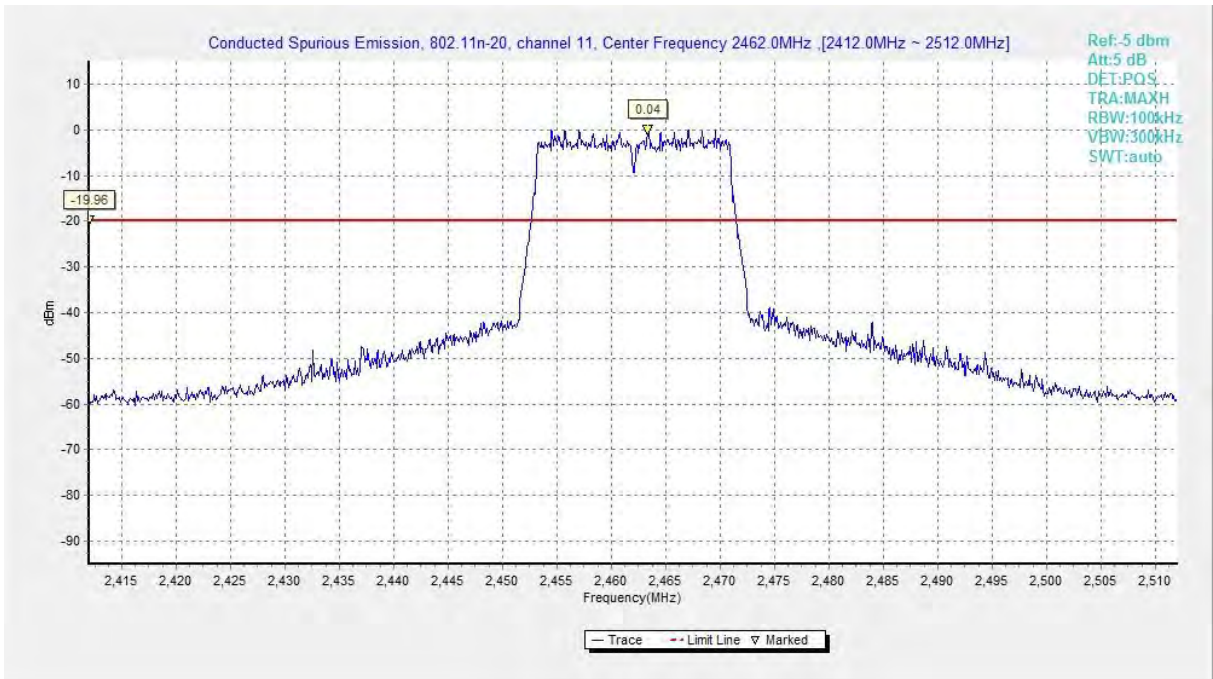


Fig. 80 Conducted Spurious Emission (802.11n-HT20, Ch11, Center Frequency)

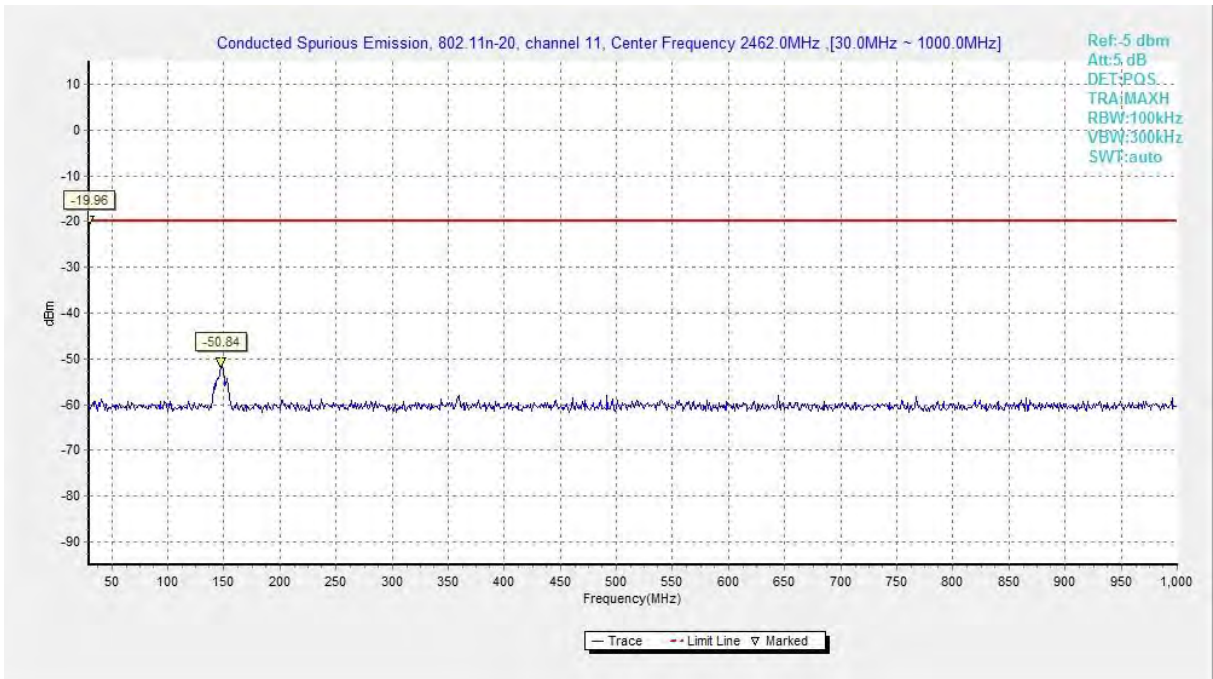
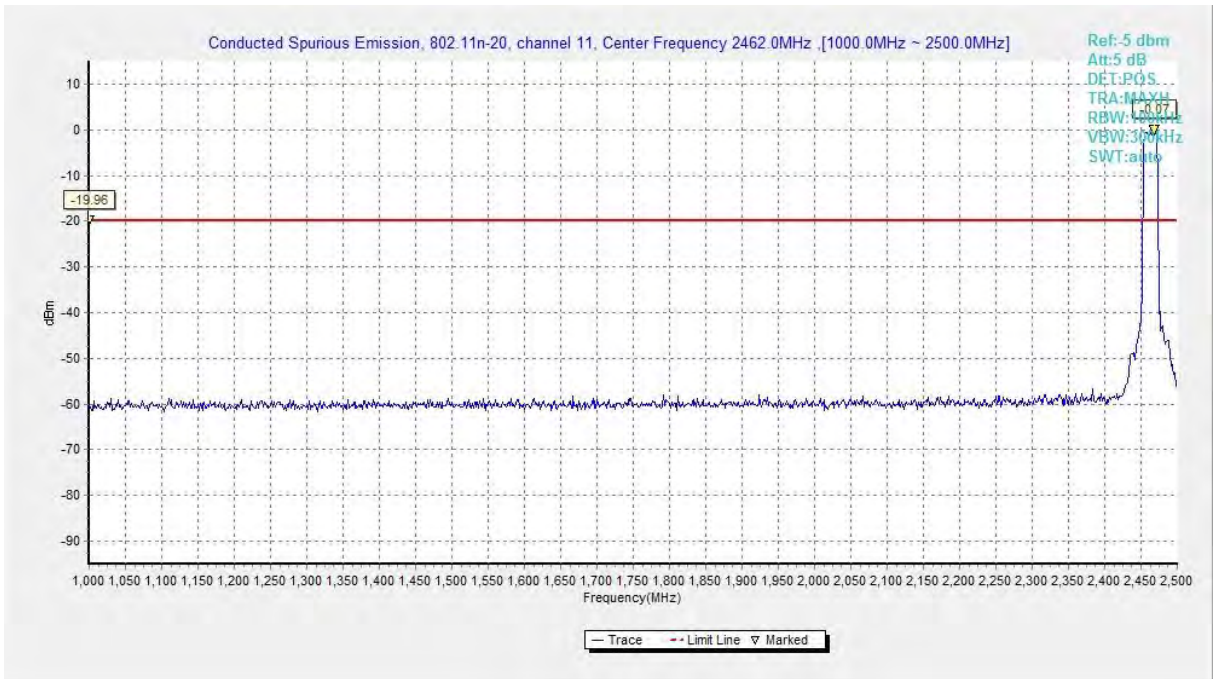
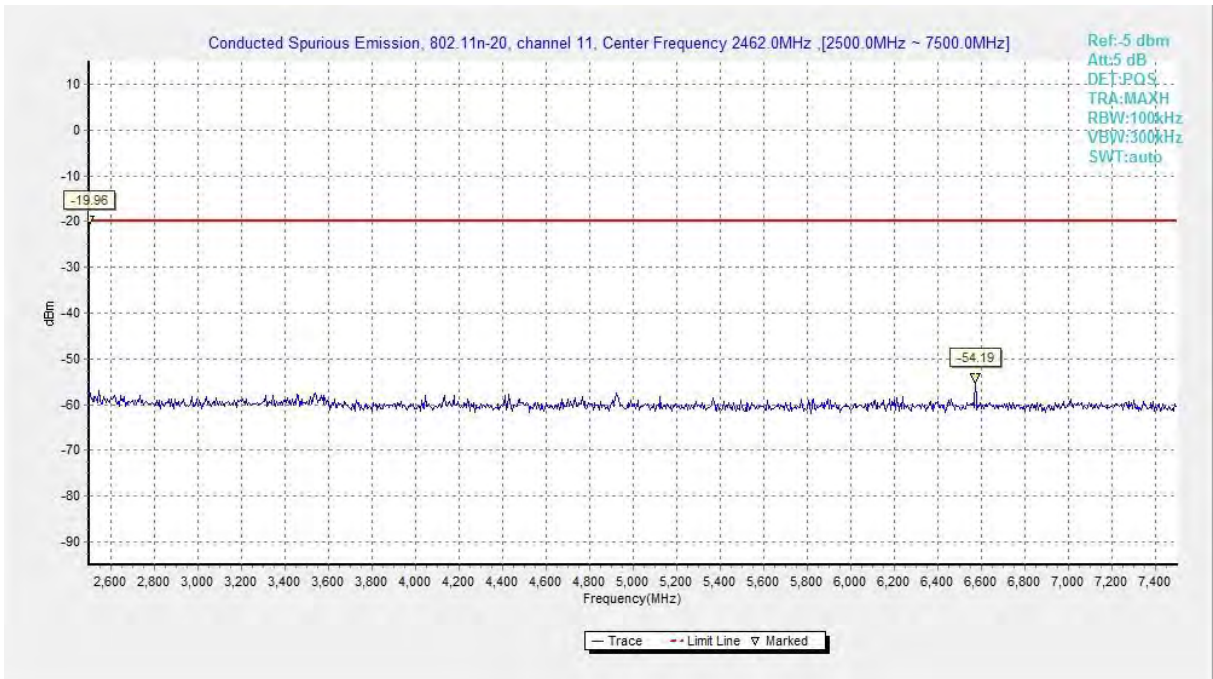


Fig. 81 Conducted Spurious Emission (802.11n-HT20, Ch11, 30 MHz-1 GHz)

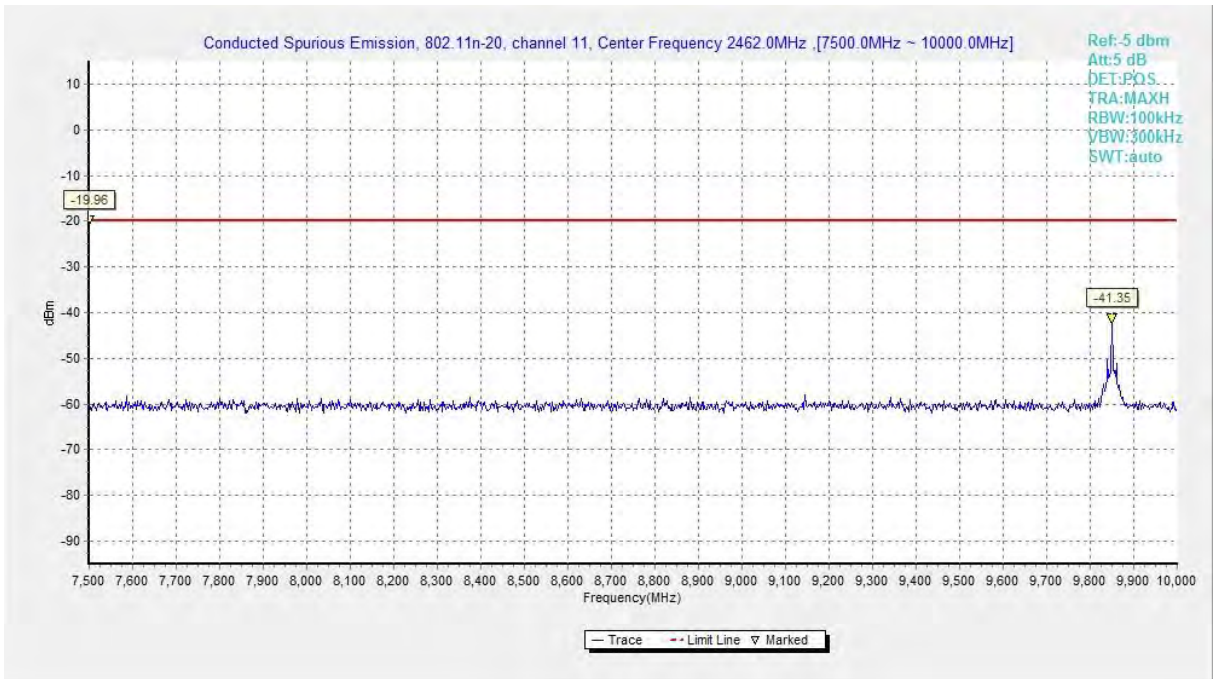


**Fig. 82 Conducted Spurious Emission (802.11n-HT20, Ch11, 1 GHz-2.5 GHz)**

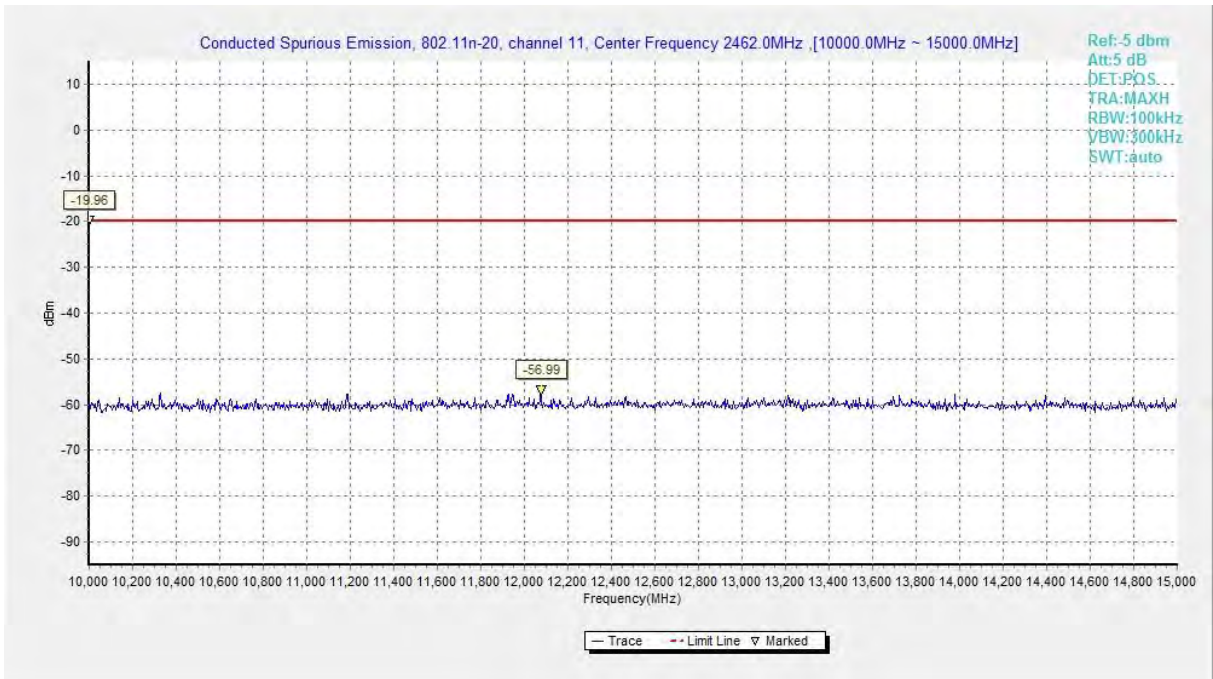


**Fig. 83 Conducted Spurious Emission (802.11n-HT20, Ch11, 2.5 GHz-7.5 GHz)**

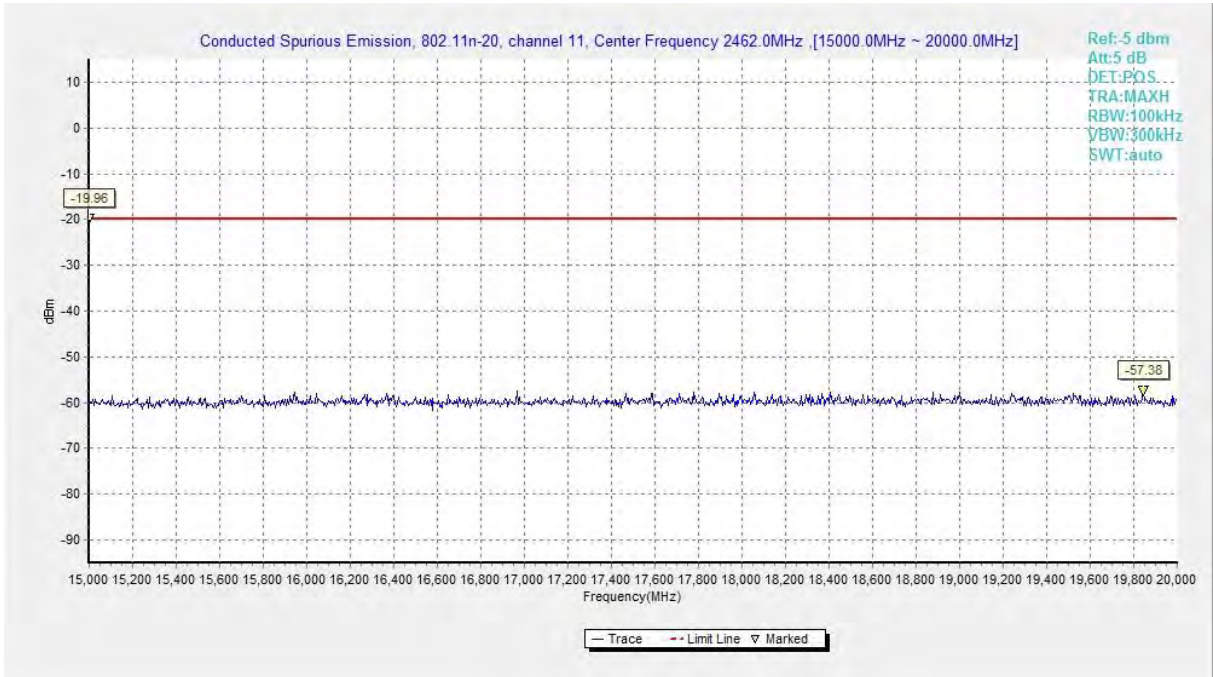




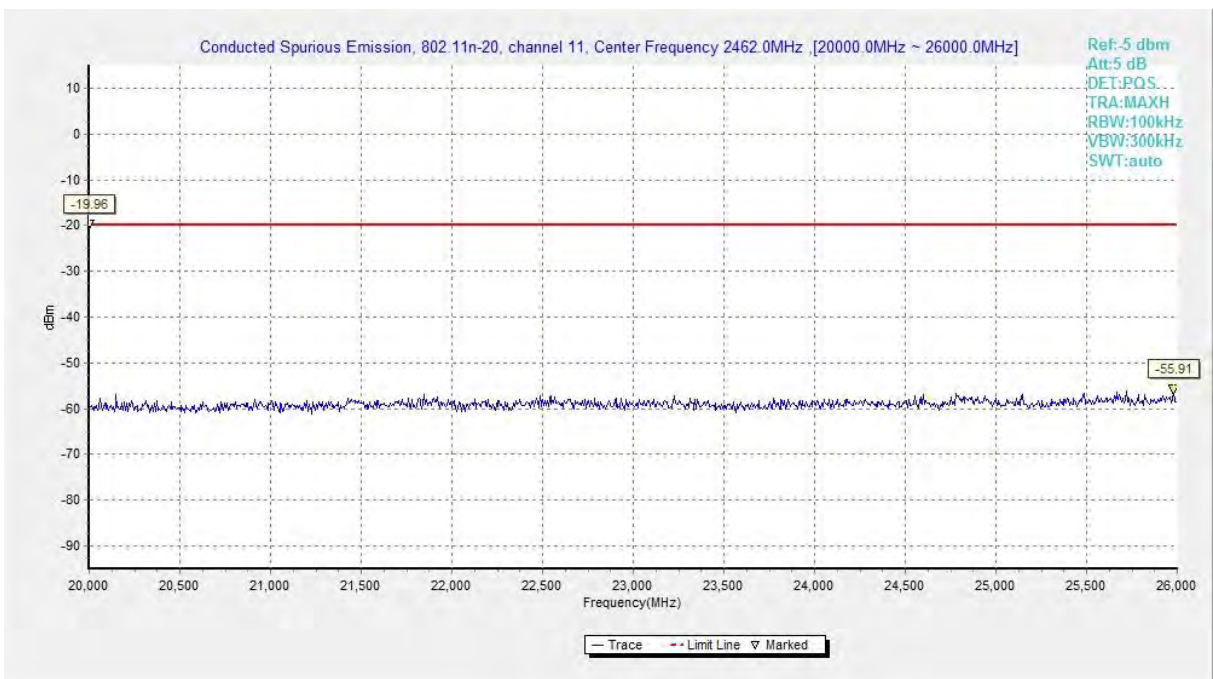
**Fig. 84 Conducted Spurious Emission (802.11n-HT20, Ch11, 7.5 GHz-10 GHz)**



**Fig. 85 Conducted Spurious Emission (802.11n-HT20, Ch11, 10 GHz-15 GHz)**



**Fig. 86 Conducted Spurious Emission (802.11n-HT20, Ch11, 15 GHz-20 GHz)**



**Fig. 87 Conducted Spurious Emission (802.11n-HT20, Ch11, 20 GHz-26 GHz)**



### A.6.2 Transmitter Spurious Emission - Radiated

Limit in restricted band:

#### Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion	
802.11b	Power	2.38GHz ~2.45GHz	Fig.88	P	
	1	9 kHz ~30 MHz	Fig.89	P	
		30 MHz ~1 GHz	Fig.90	P	
		1 GHz ~ 3 GHz	Fig.91	P	
		3 GHz ~ 18 GHz	Fig.92	P	
	6	9 kHz ~30 MHz	Fig.93	P	
		30 MHz ~1 GHz	Fig.94	P	
		1 GHz ~ 3 GHz	Fig.95	P	
		3 GHz ~ 18 GHz	Fig.96	P	
	Power	2.45GHz ~2.5GHz	Fig.97	P	
	11	9 kHz ~30 MHz	Fig.98	P	
		30 MHz ~1 GHz	Fig.99	P	
		1 GHz ~ 3 GHz	Fig.100	P	
		3 GHz ~ 18 GHz	Fig.101	P	
	802.11g	Power	2.38GHz ~2.45GHz	Fig.102	P
		1	9 kHz ~30 MHz	Fig.103	P
30 MHz ~1 GHz			Fig.104	P	
1 GHz ~ 3 GHz			Fig.105	P	
3 GHz ~ 18 GHz			Fig.106	P	
6		9 kHz ~30 MHz	Fig.107	P	
		30 MHz ~1 GHz	Fig.108	P	
		1 GHz ~ 3 GHz	Fig.109	P	
		3 GHz ~ 18 GHz	Fig.110	P	
Power		2.45GHz~2.5GHz	Fig.111	P	
		9 kHz ~30 MHz	Fig.112	P	
11		30 MHz ~1 GHz	Fig.113	P	
		1 GHz ~ 3 GHz	Fig.114	P	
		3 GHz ~ 18 GHz	Fig.115	P	
802.11n- HT20		Power	2.38GHz ~2.45GHz	Fig.116	P
		1	9 kHz ~30 MHz	Fig.117	P
	30 MHz ~1 GHz		Fig.118	P	
	1 GHz ~ 3 GHz		Fig.119	P	
	3 GHz ~ 18 GHz		Fig.120	P	
	6	9 kHz ~30 MHz	Fig.121	P	
		30 MHz ~1 GHz	Fig.122	P	
		1 GHz ~ 3 GHz	Fig.123	P	
		3 GHz ~ 18 GHz	Fig.124	P	
	Power	2.45GHz~2.5GHz	Fig.125	P	

	11	9 kHz ~30 MHz	Fig.126	P
		30 MHz ~1 GHz	Fig.127	P
		1 GHz ~ 3 GHz	Fig.128	P
		3 GHz ~ 18 GHz	Fig.129	P
/	All channels	18 GHz~ 26.5 GHz	Fig.130	P

**Conclusion: PASS**

**Note:**

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

$P_{Mea}$  is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$$\text{Result} = P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$$

These recorded emissions around 21GHz are highest noise floor levels since no higher spurious emission is detected.

**802.11b**

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	$P_{Mea}$ (dBuV/m)	Polarization
19281.375	45.9	-44.7	45.1	45.482	HORIZONTAL
18239.594	46.0	-44.2	44.5	45.658	HORIZONTAL
21403.719	46.2	-44.4	45.7	44.942	VERTICAL
21180.063	46.3	-44.5	45.7	45.122	VERTICAL
20771.000	46.5	-44.3	45.4	45.372	VERTICAL
18840.969	46.6	-43.5	44.9	45.195	HORIZONTAL

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	$P_{Mea}$ (dBuV/m)	Polarization
18185.938	46.0	-44.0	44.5	45.493	VERTICAL
18415.438	45.8	-44.6	44.5	45.912	HORIZONTAL
19411.000	45.7	-43.7	45.1	44.254	VERTICAL
19180.969	45.6	-45.1	45.1	45.618	VERTICAL
21408.500	45.6	-44.4	45.7	44.342	HORIZONTAL
18389.406	45.6	-43.7	44.5	44.824	VERTICAL

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P <sub>Mea</sub> (dBuV/m)	Polarization
18837.250	48.1	-43.5	44.9	46.695	HORIZONTAL
19300.500	46.5	-43.4	45.1	44.792	HORIZONTAL
18250.219	46.1	-43.0	44.5	44.566	VERTICAL
18829.281	45.9	-43.5	44.9	44.495	VERTICAL
19294.125	45.8	-44.7	45.1	45.382	VERTICAL
18736.313	45.7	-43.8	44.9	44.554	VERTICAL

**802.11g**

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P <sub>Mea</sub> (dBuV/m)	Polarization
18736.313	46.1	-43.8	44.9	44.954	VERTICAL
19284.563	45.9	-44.7	45.1	45.482	HORIZONTAL
19390.281	45.9	-44.2	45.1	45.029	HORIZONTAL
21521.125	45.9	-44.9	46.0	44.812	HORIZONTAL
20059.656	45.8	-44.9	45.5	45.226	VERTICAL
18855.313	45.8	-43.4	44.9	44.342	HORIZONTAL

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P <sub>Mea</sub> (dBuV/m)	Polarization
19256.938	46.9	-44.7	45.1	46.482	HORIZONTAL
18252.344	46.8	-43.0	44.5	45.266	HORIZONTAL
18244.906	46.7	-44.2	44.5	46.358	VERTICAL
18827.156	46.3	-43.5	44.9	44.895	HORIZONTAL
17926.875	46.2	-17.7	45.6	18.300	VERTICAL
18771.375	46.1	-43.4	44.9	44.629	HORIZONTAL

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P <sub>Mea</sub> (dBuV/m)	Polarization
20415.063	46.9	-45.0	45.5	46.396	VERTICAL
19292.000	46.8	-44.7	45.1	46.382	HORIZONTAL
18325.125	46.3	-44.1	44.5	45.880	VERTICAL
21999.781	46.3	-44.2	46.0	44.502	HORIZONTAL
19293.594	46.2	-44.7	45.1	45.782	VERTICAL
18244.375	46.2	-44.2	44.5	45.858	HORIZONTAL



**802.11n-HT20**

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P <sub>Mea</sub> (dBuV/m)	Polarization
18253.406	46.6	-43.0	44.5	45.066	VERTICAL
24898.813	46.1	-43.8	45.8	44.116	HORIZONTAL
25957.063	46.0	-43.7	46.0	43.708	VERTICAL
18839.906	45.8	-43.5	44.9	44.395	VERTICAL
19265.438	45.6	-44.7	45.1	45.182	VERTICAL
17777.813	45.5	-18.5	45.6	18.400	HORIZONTAL

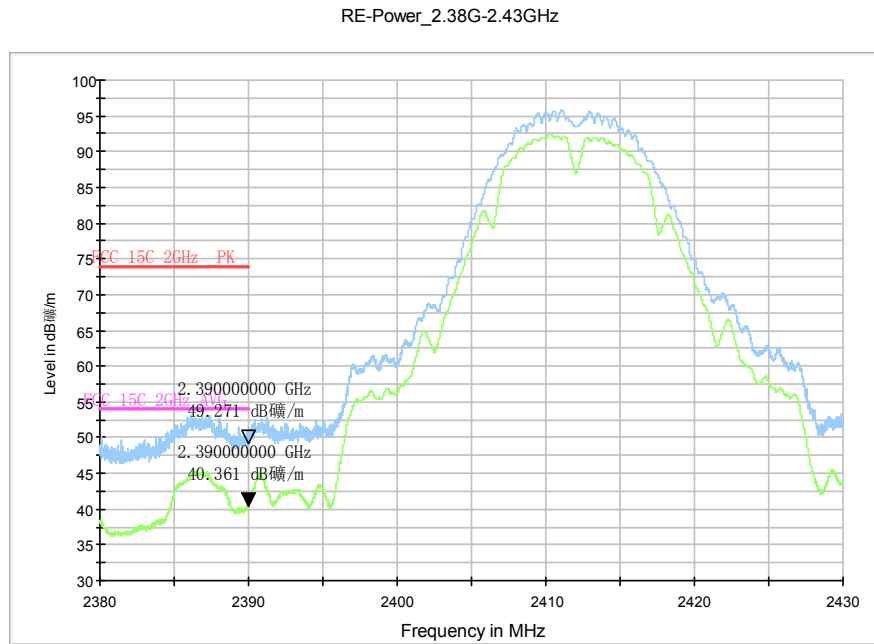
Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P <sub>Mea</sub> (dBuV/m)	Polarization
19893.906	46.4	-44.5	45.4	45.527	VERTICAL
17920.313	46.1	-17.7	45.6	18.200	HORIZONTAL
19289.875	46.1	-44.7	45.1	45.682	HORIZONTAL
17729.063	45.9	-18.9	45.6	19.200	HORIZONTAL
21717.688	45.7	-44.5	46.0	44.183	VERTICAL
19233.031	45.7	-44.1	45.1	44.689	VERTICAL

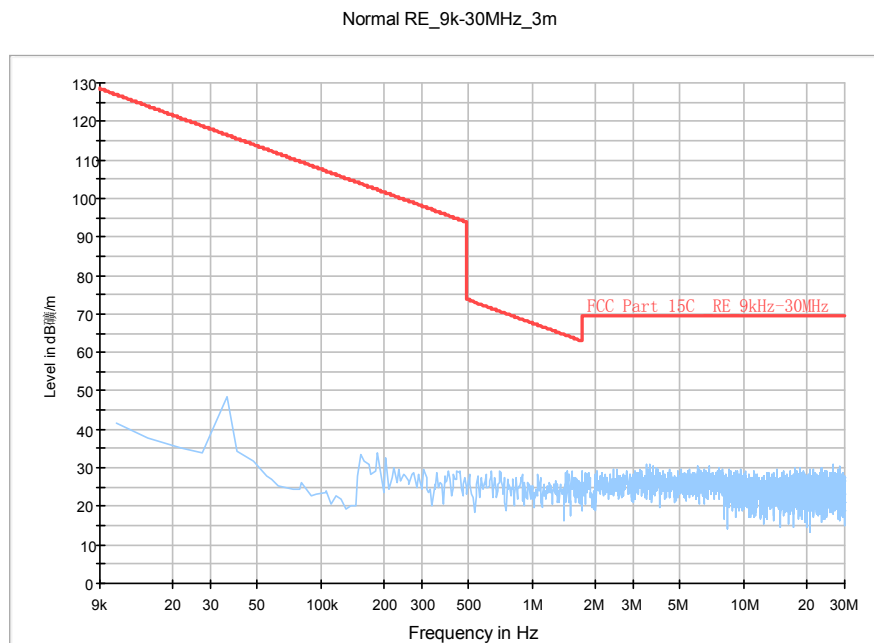
Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P <sub>Mea</sub> (dBuV/m)	Polarization
19347.250	47.2	-43.4	45.1	45.492	VERTICAL
19845.563	46.8	-43.7	45.4	45.121	HORIZONTAL
18865.406	46.8	-43.4	44.9	45.342	HORIZONTAL
19308.469	46.3	-43.4	45.1	44.592	HORIZONTAL
19252.156	45.7	-44.7	45.1	45.282	HORIZONTAL
18834.063	45.7	-43.5	44.9	44.295	HORIZONTAL

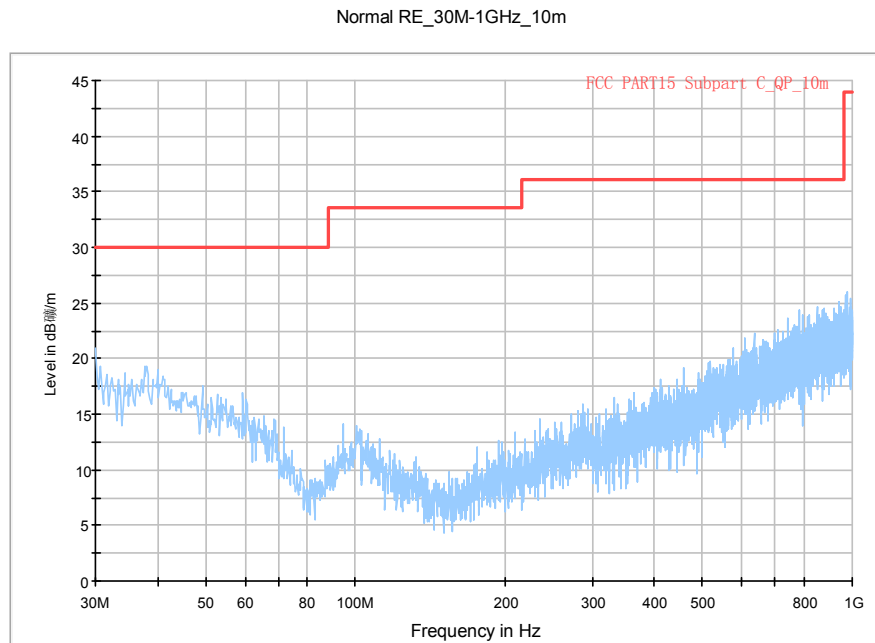
**Test graphs as below:**



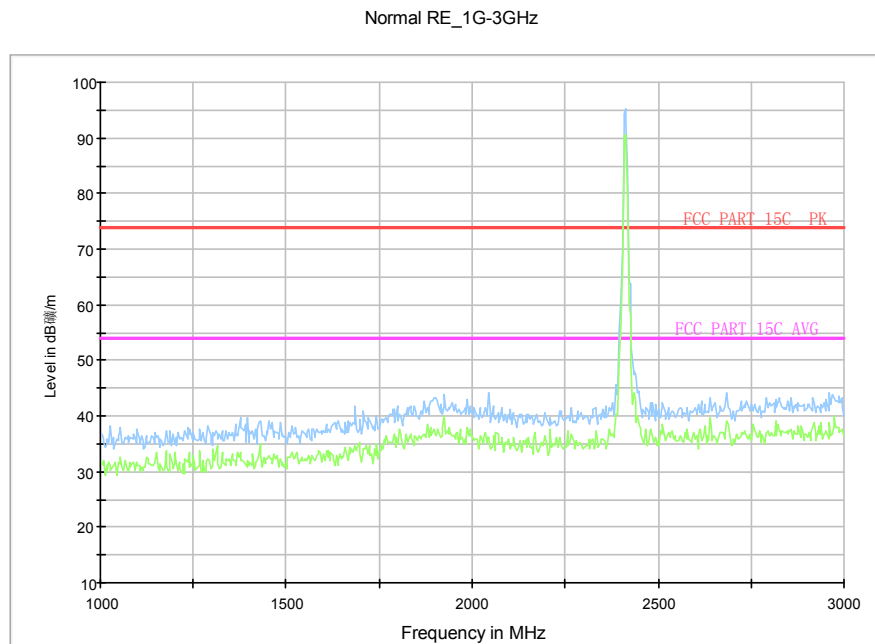
**Fig. 88 Radiated Spurious Emission (Power): 802.11b, ch1, 2.38 GHz - 2.45GHz**



**Fig. 89 Radiated Spurious Emission (802.11b, Ch1, 9 kHz ~30 MHz)**

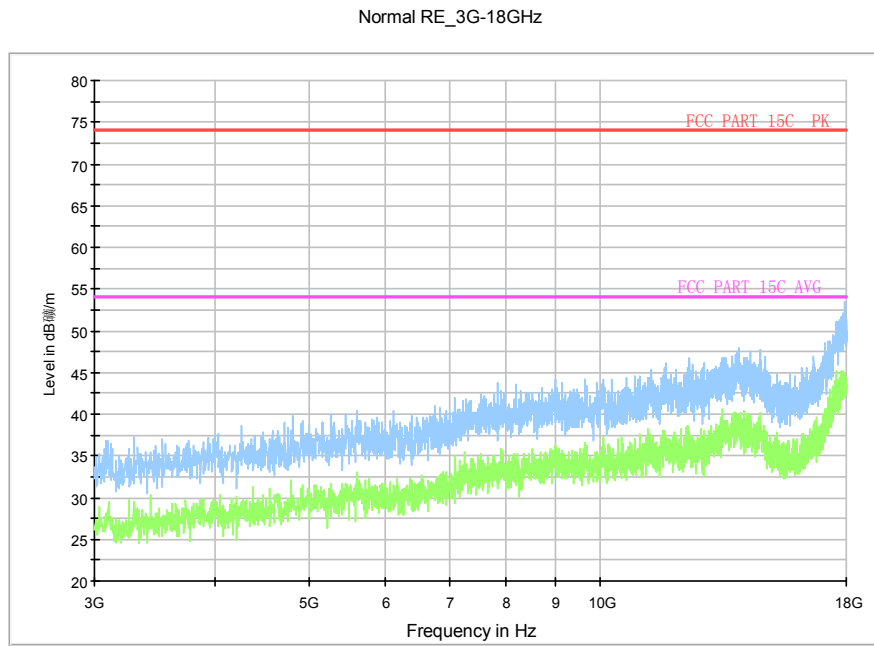


**Fig. 90 Radiated Spurious Emission (802.11b, Ch1, 30 MHz-1 GHz)**

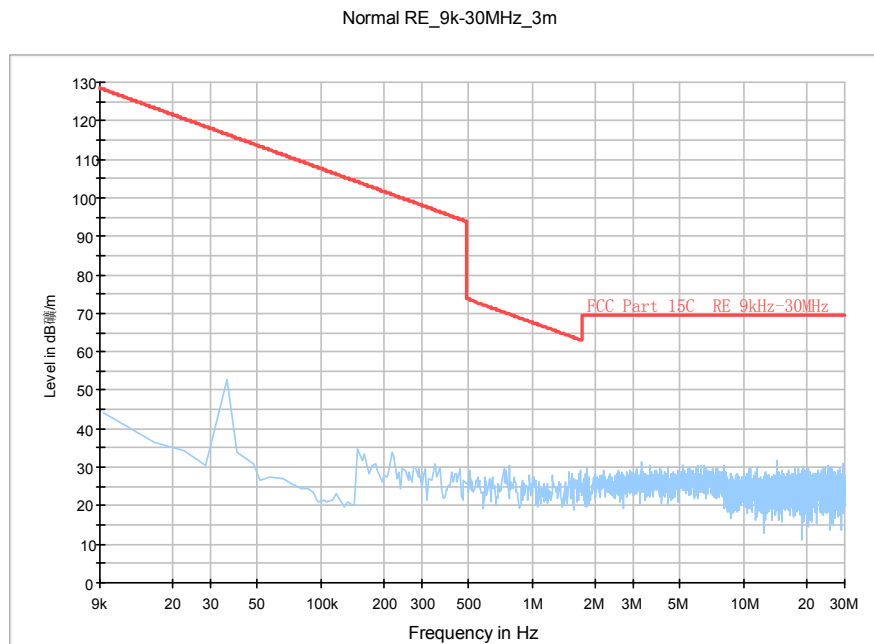


**Fig. 91 Radiated Spurious Emission (802.11b, Ch1, 1 GHz-3 GHz)**

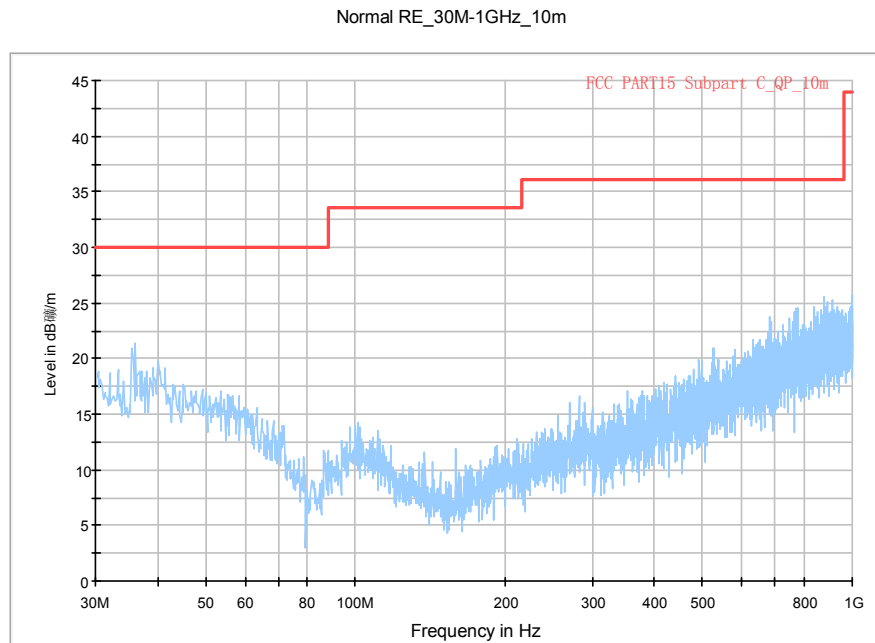




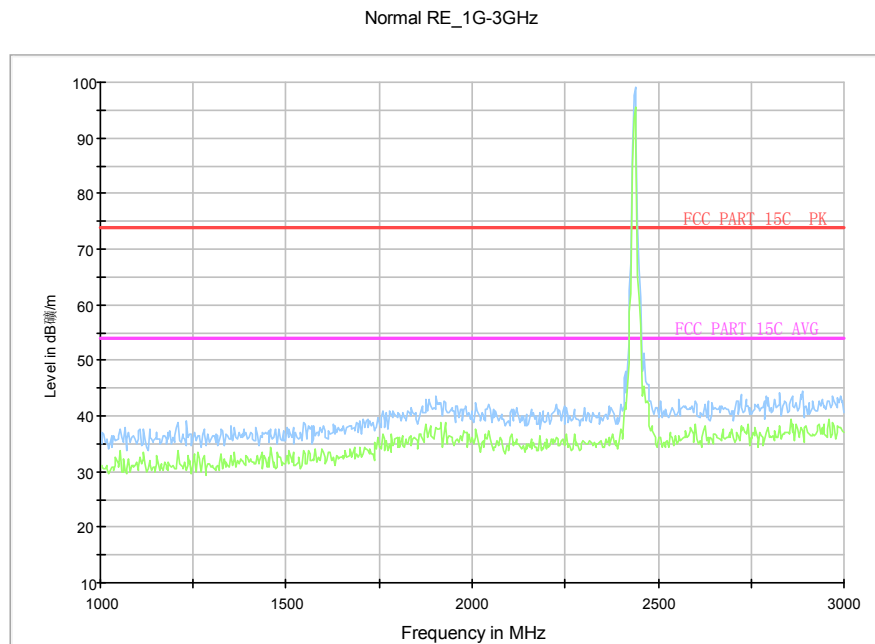
**Fig. 92 Radiated Spurious Emission (802.11b, Ch1, 3 GHz-18 GHz)**



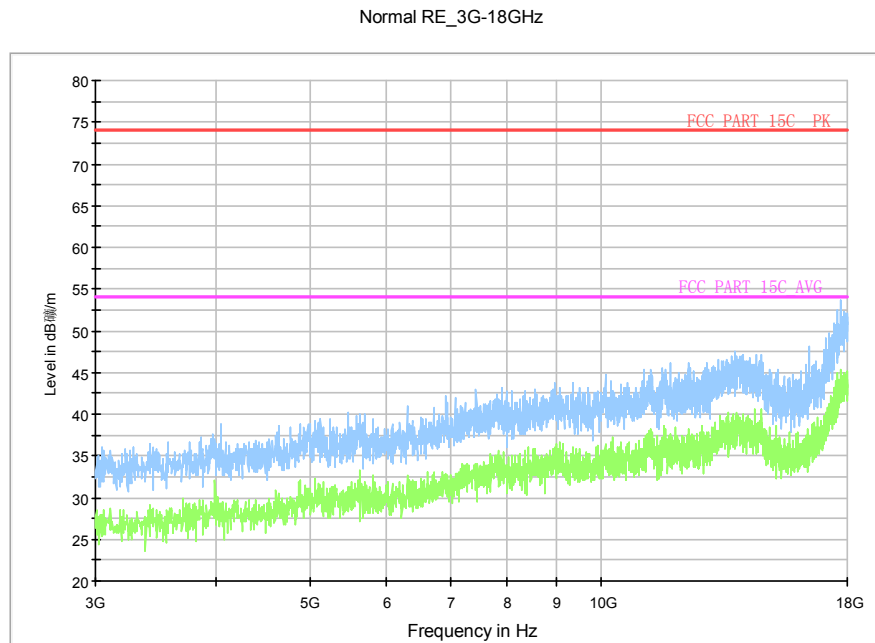
**Fig. 93 Radiated Spurious Emission (802.11b, Ch6, 9 kHz ~30 MHz)**



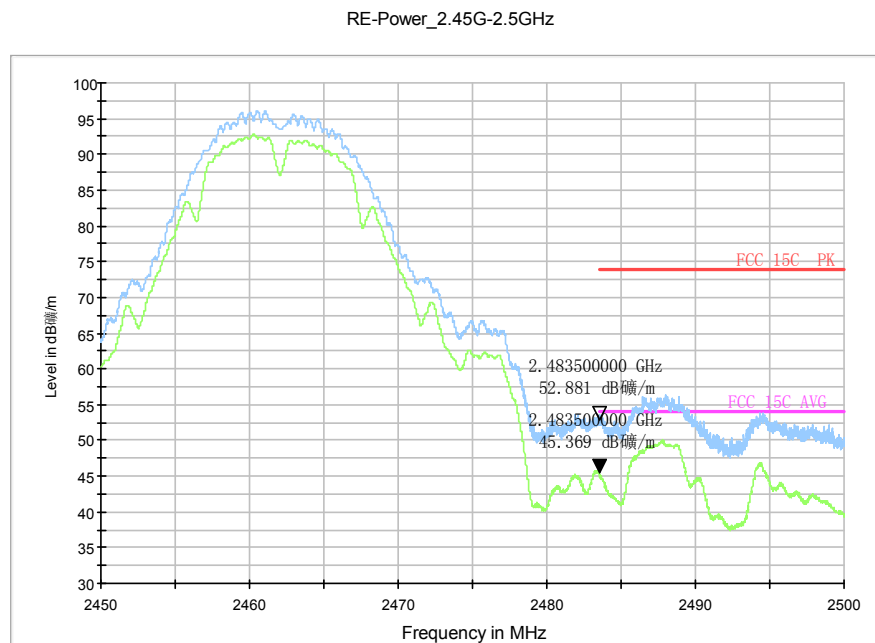
**Fig. 94 Radiated Spurious Emission (802.11b, Ch6, 30 MHz-1 GHz)**



**Fig. 95 Radiated Spurious Emission (802.11b, Ch6, 1 GHz-3 GHz)**

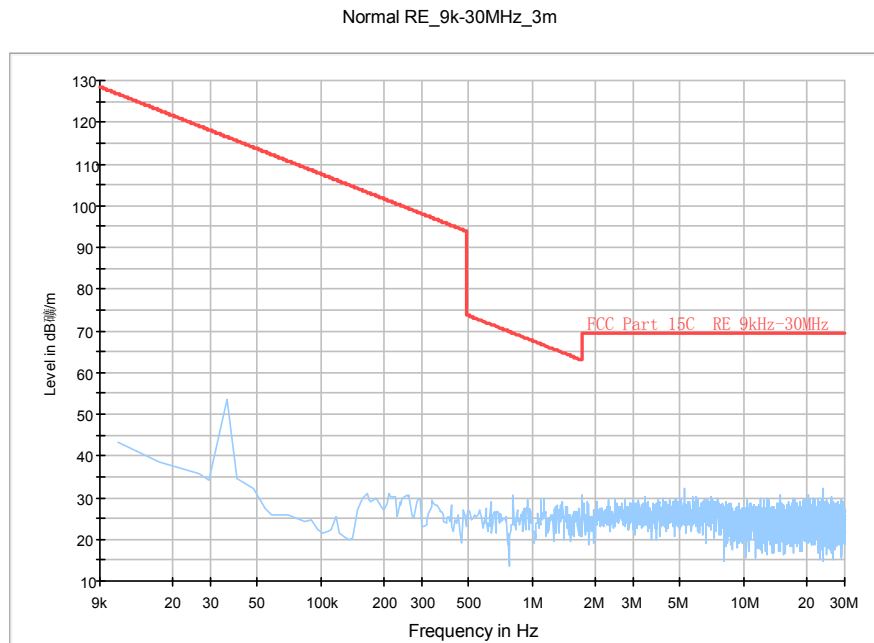


**Fig. 96 Radiated Spurious Emission (802.11b, Ch6, 3 GHz-18 GHz)**

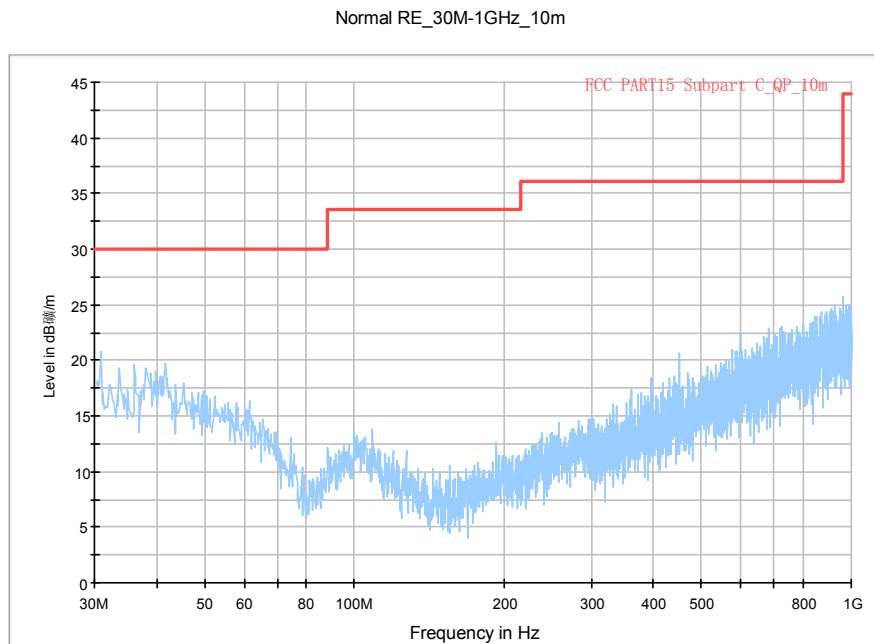


**Fig. 97 Radiated Spurious Emission (Power): 802.11b, ch11, 2.45 GHz - 2.5GHz**

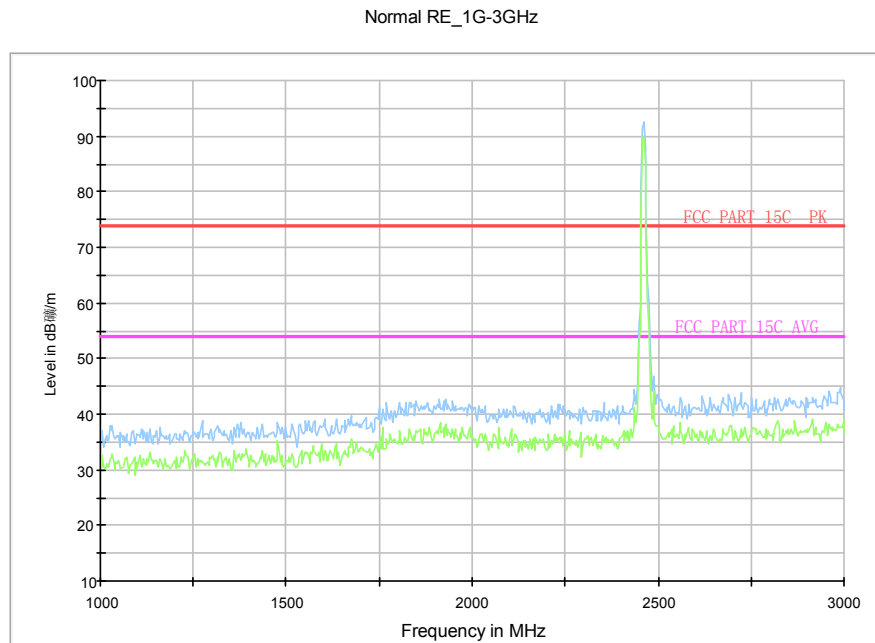




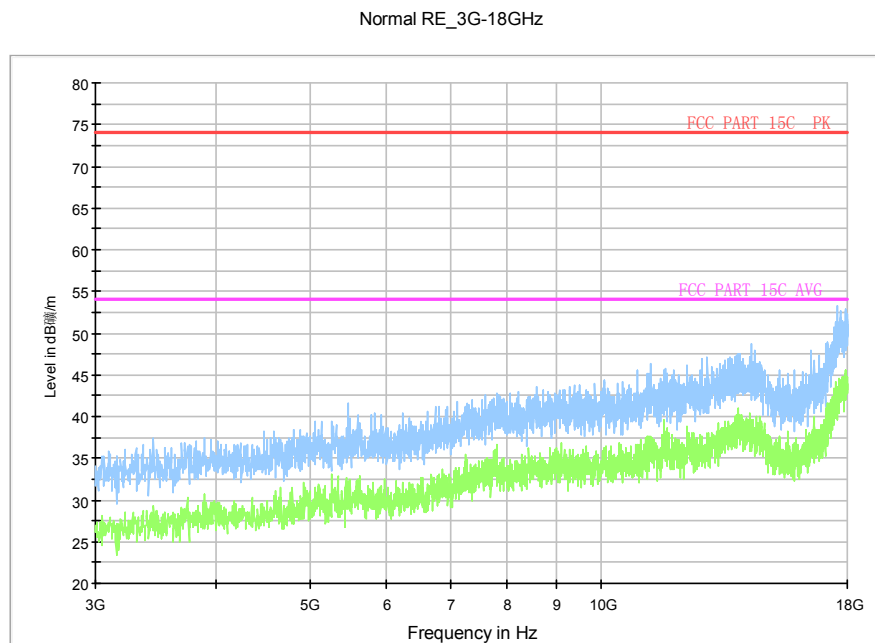
**Fig. 98 Radiated Spurious Emission (802.11b, Ch11, 9 kHz ~30 MHz)**



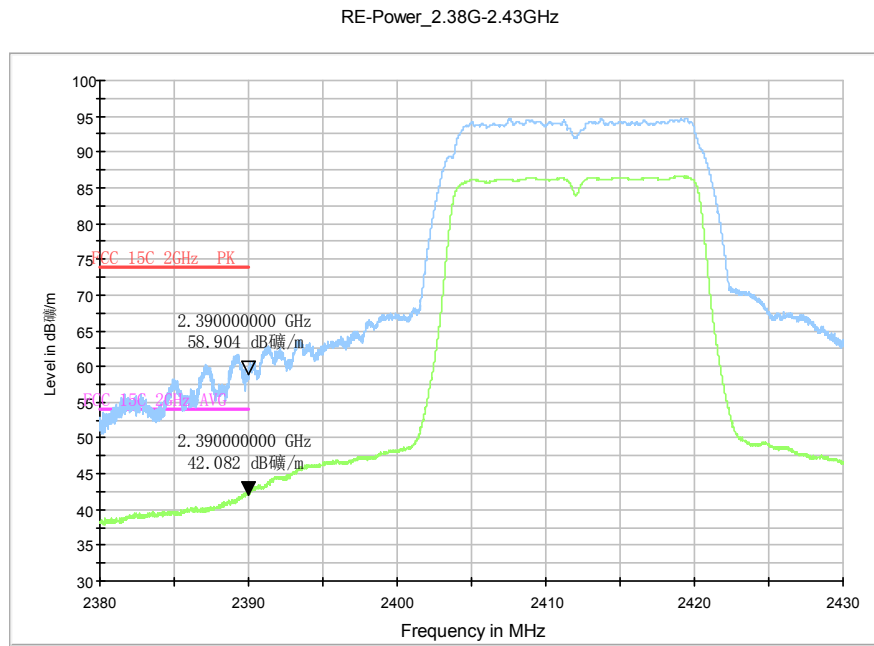
**Fig. 99 Radiated Spurious Emission (802.11b, Ch11, 30 MHz-1 GHz)**



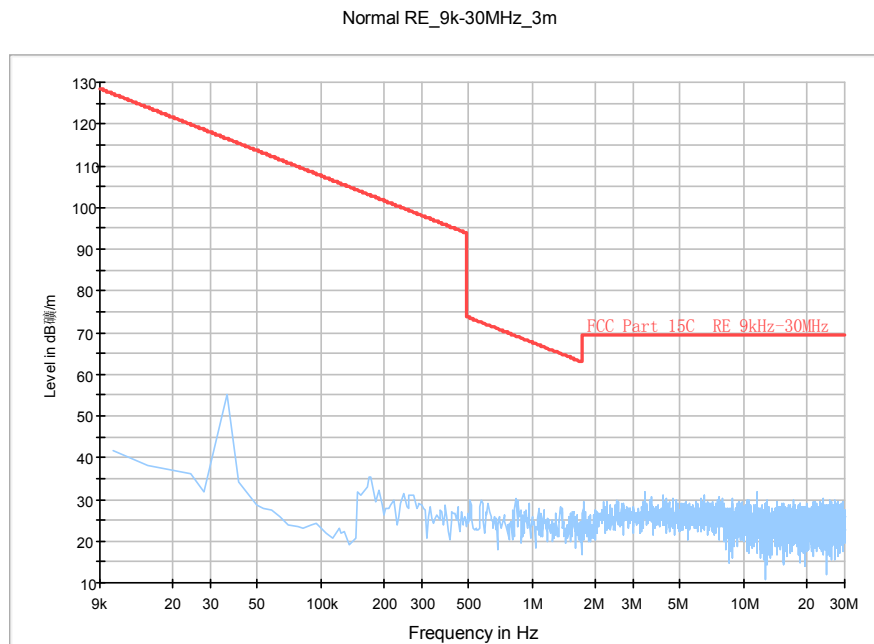
**Fig. 100 Radiated Spurious Emission (802.11b, Ch11, 1 GHz-3 GHz)**



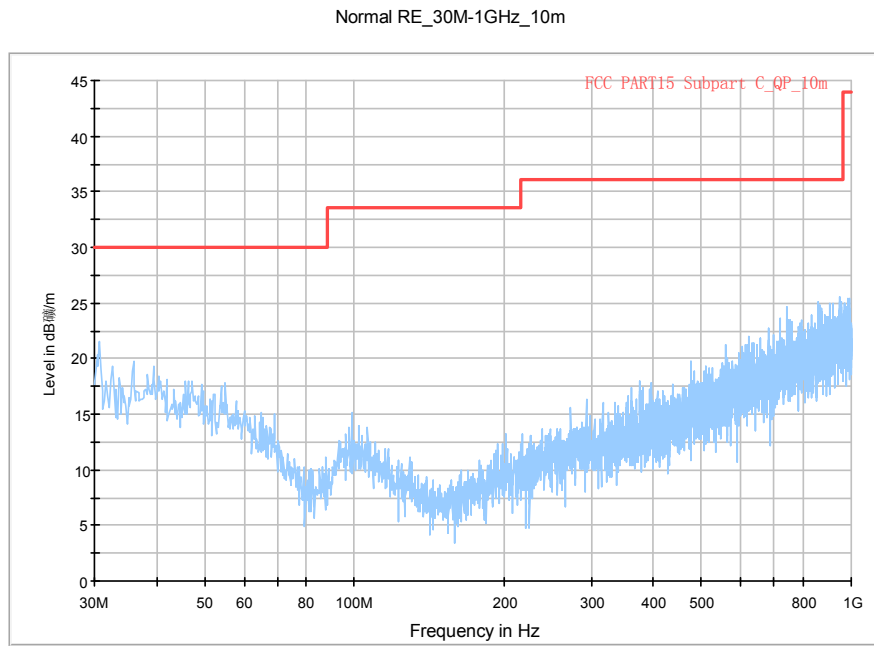
**Fig. 101 Radiated Spurious Emission (802.11b, Ch11, 3 GHz-18 GHz)**



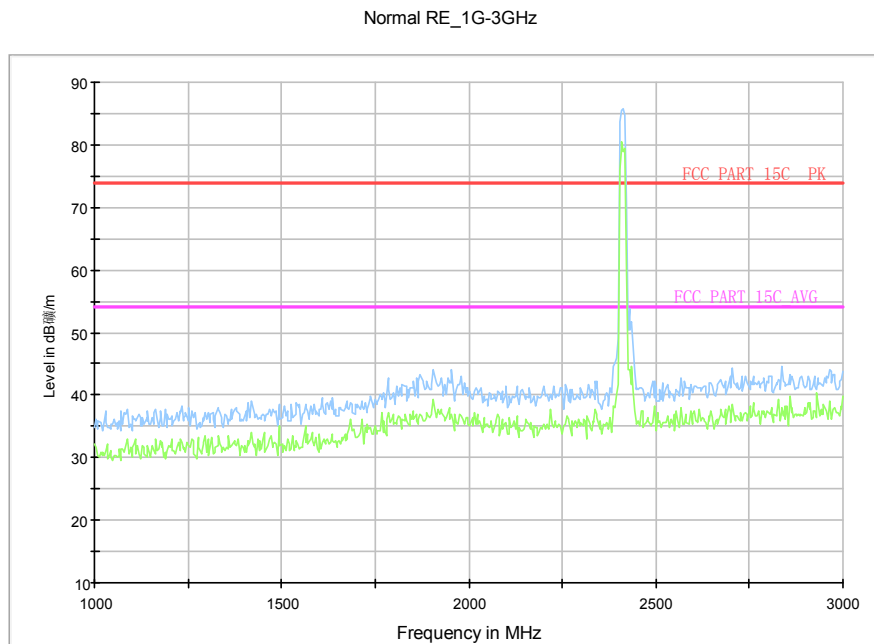
**Fig. 102 Radiated Spurious Emission (Power): 802.11g, ch1, 2.38 GHz - 2.45GHz**



**Fig. 103 Radiated Spurious Emission (802.11g, Ch1, 9 kHz ~30 MHz)**

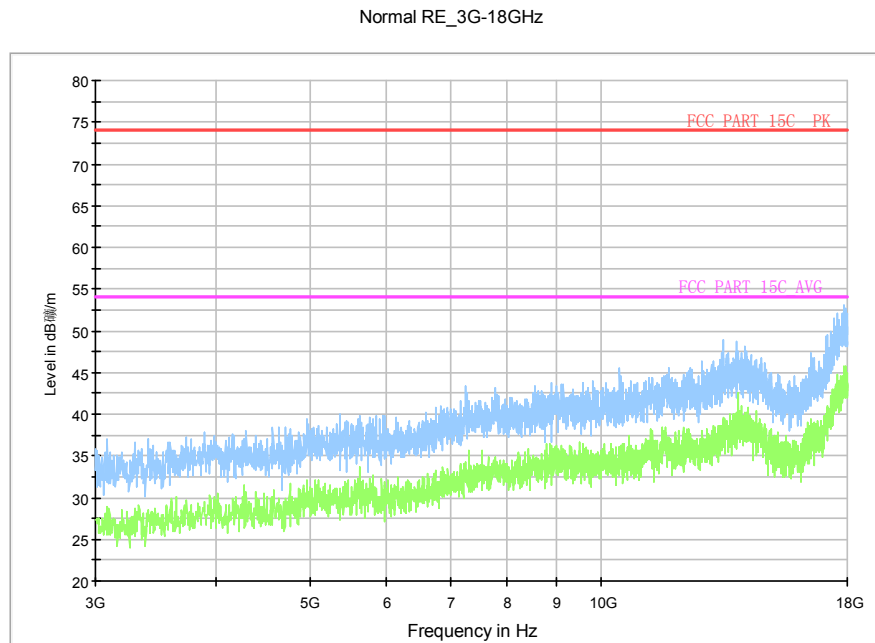


**Fig. 104 Radiated Spurious Emission (802.11g, Ch1, 30 MHz-1 GHz)**

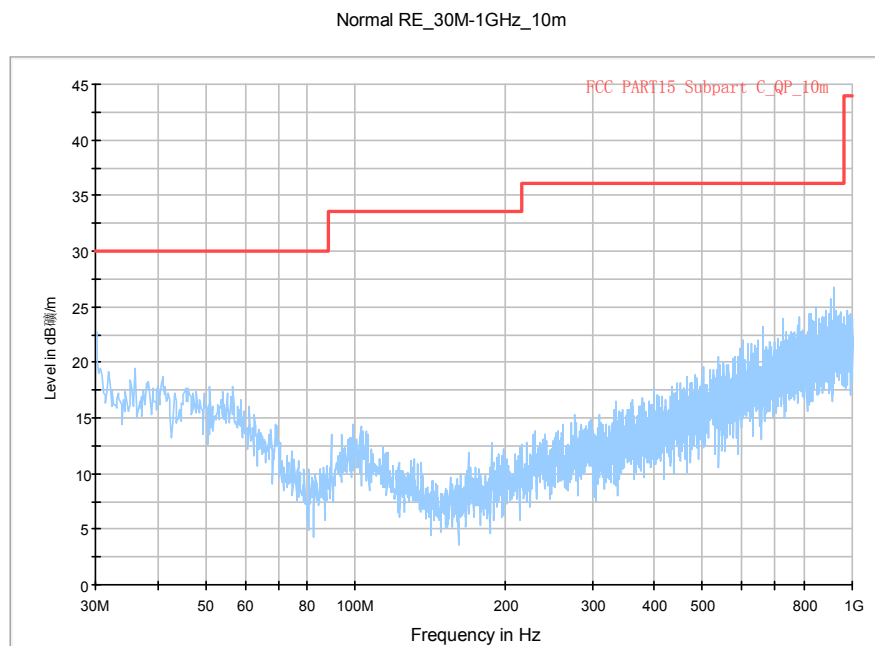


**Fig. 105 Radiated Spurious Emission (802.11g, Ch1, 1 GHz-3 GHz)**

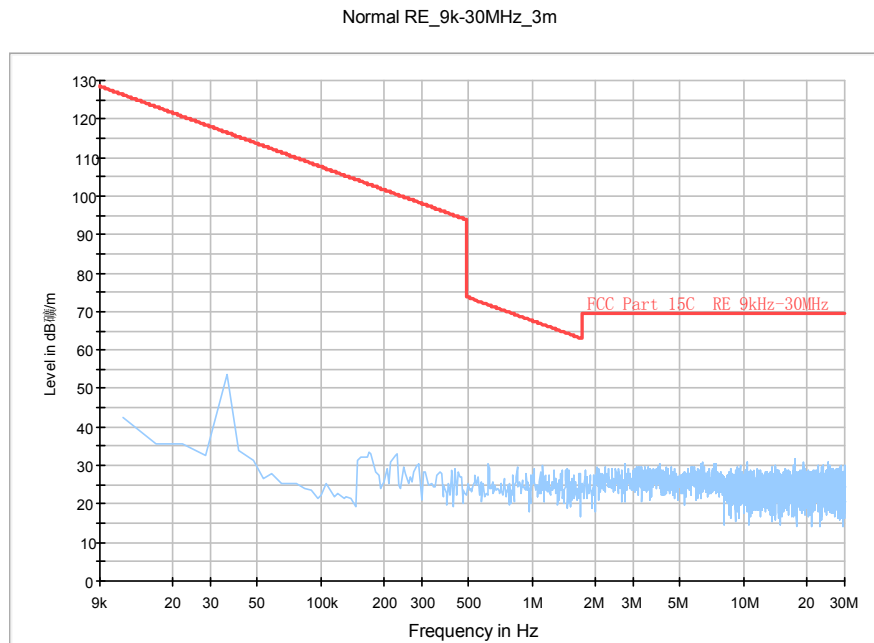




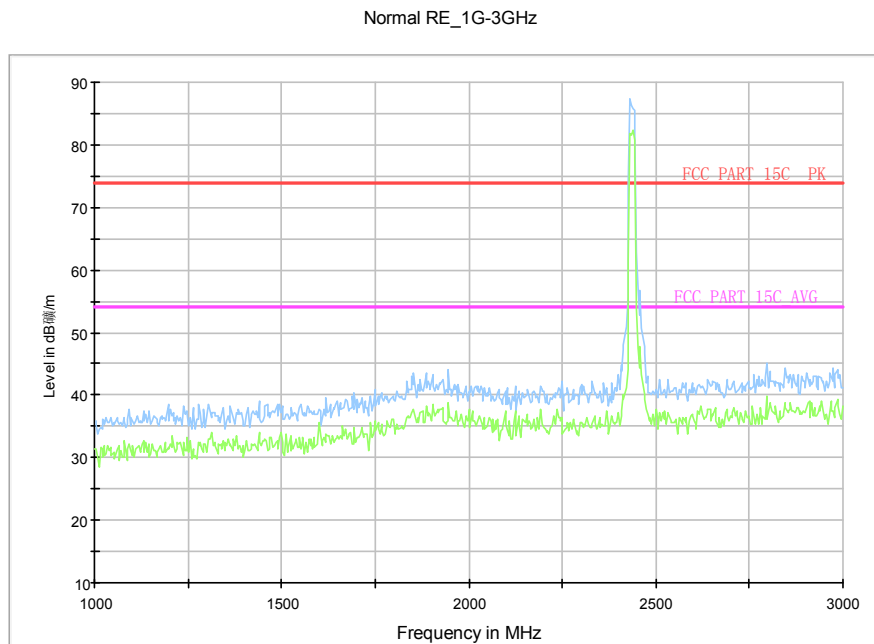
**Fig. 106 Radiated Spurious Emission (802.11g, Ch1, 3 GHz-18 GHz)**



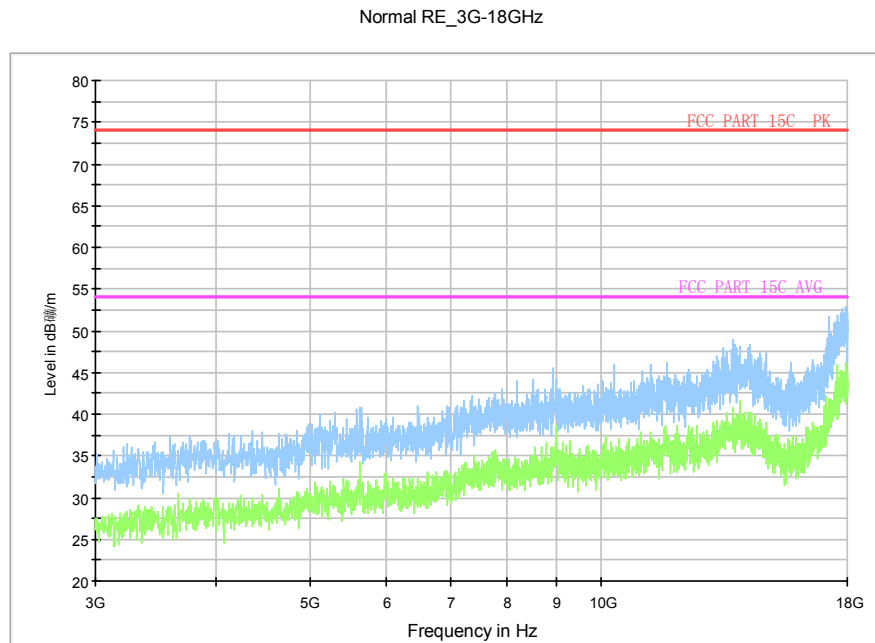
**Fig. 107 Radiated Spurious Emission (802.11g, Ch6, 30 MHz-1 GHz)**



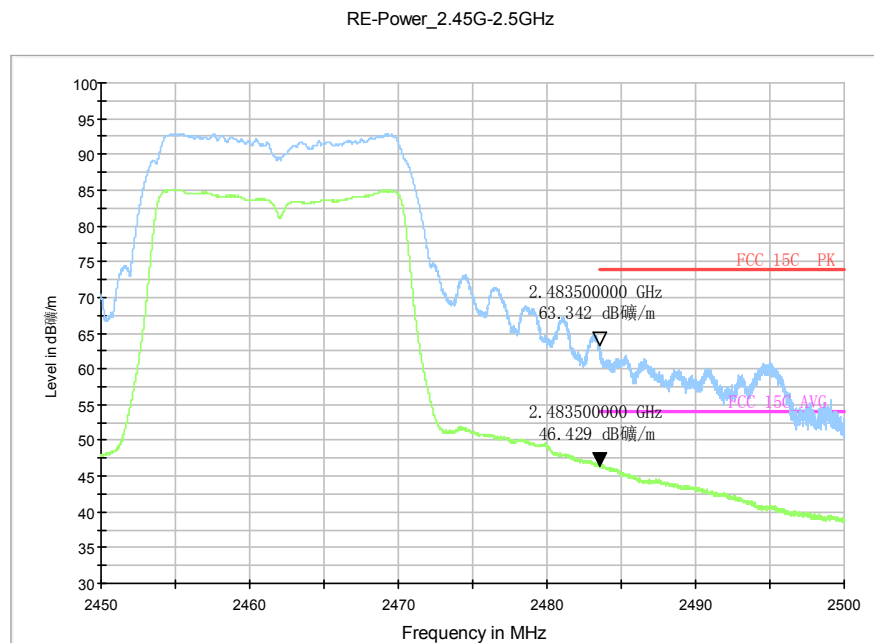
**Fig. 108 Radiated Spurious Emission (802.11g, Ch6, 9 kHz ~30 MHz)**



**Fig. 109 Radiated Spurious Emission (802.11g, Ch6, 1 GHz-3 GHz)**



**Fig. 110 Radiated Spurious Emission (802.11g, Ch6, 3 GHz-18 GHz)**



**Fig. 111 Radiated Spurious Emission (Power): 802.11g, ch11, 2.45 GHz - 2.5GHz**

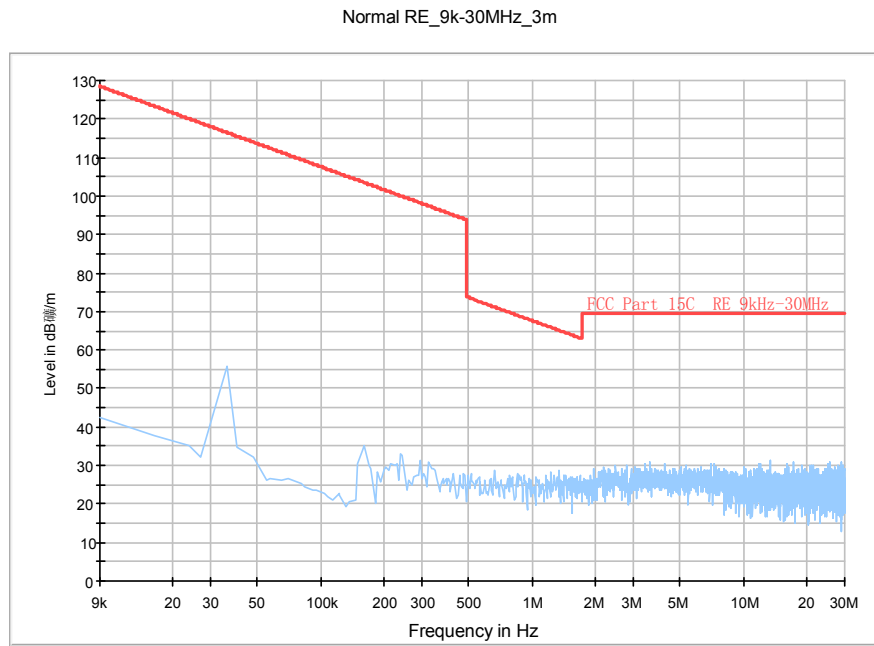


Fig. 112 Radiated Spurious Emission (802.11g, Ch11, 9 kHz ~30 MHz)

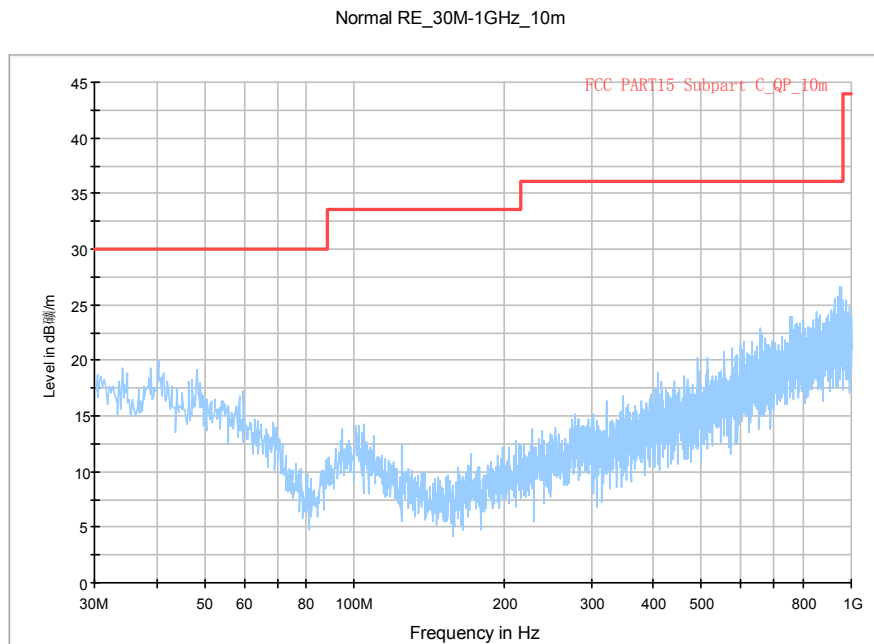
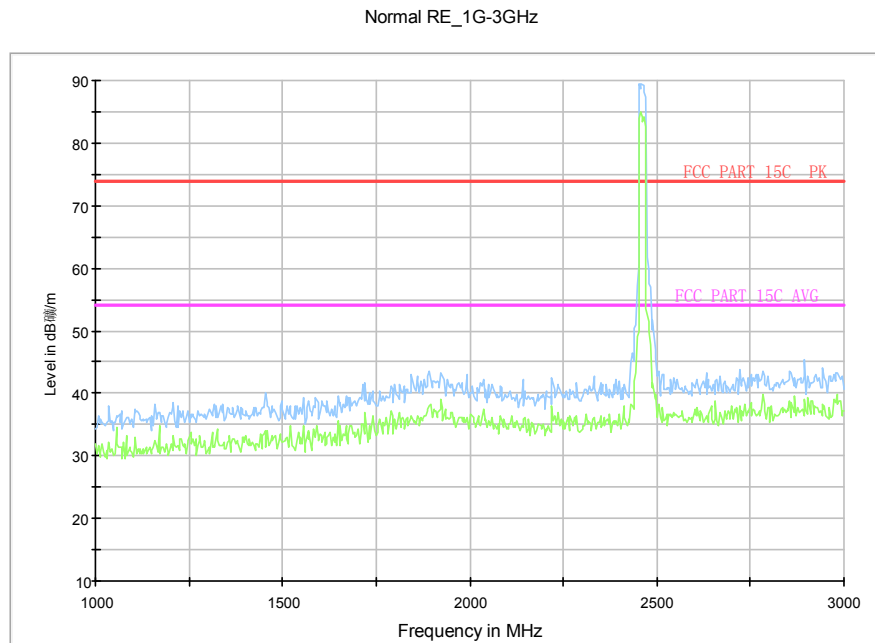
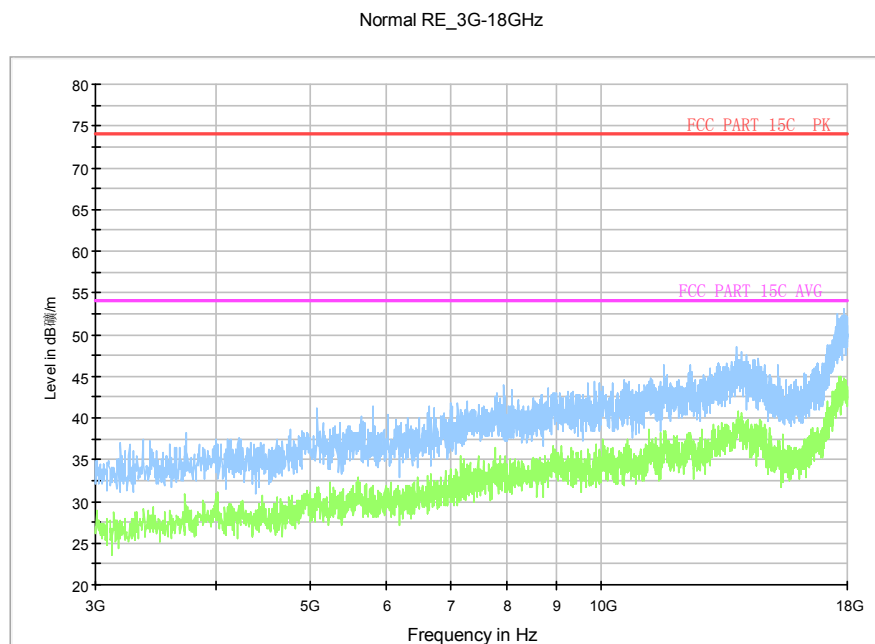


Fig. 113 Radiated Spurious Emission (802.11g, Ch11, 30 MHz-1 GHz)

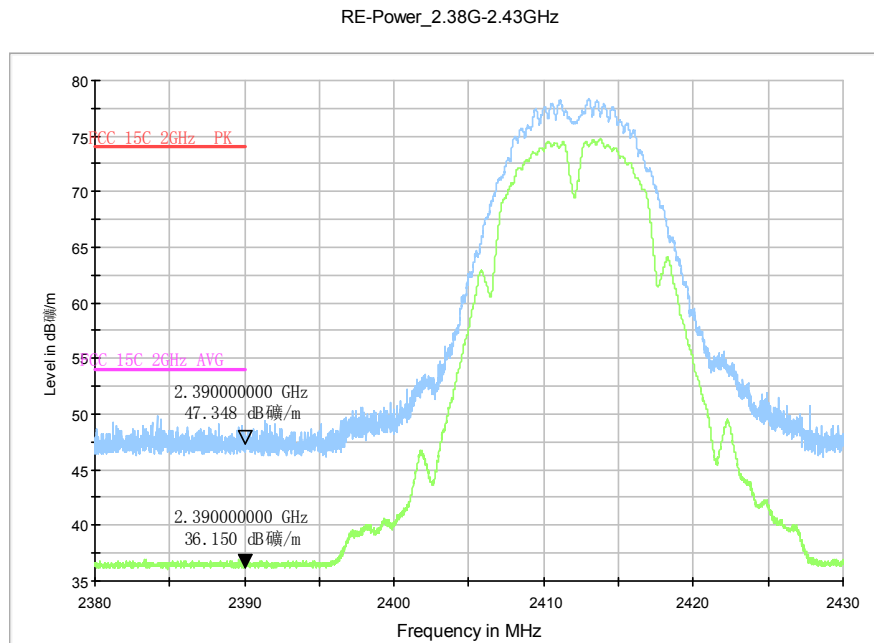




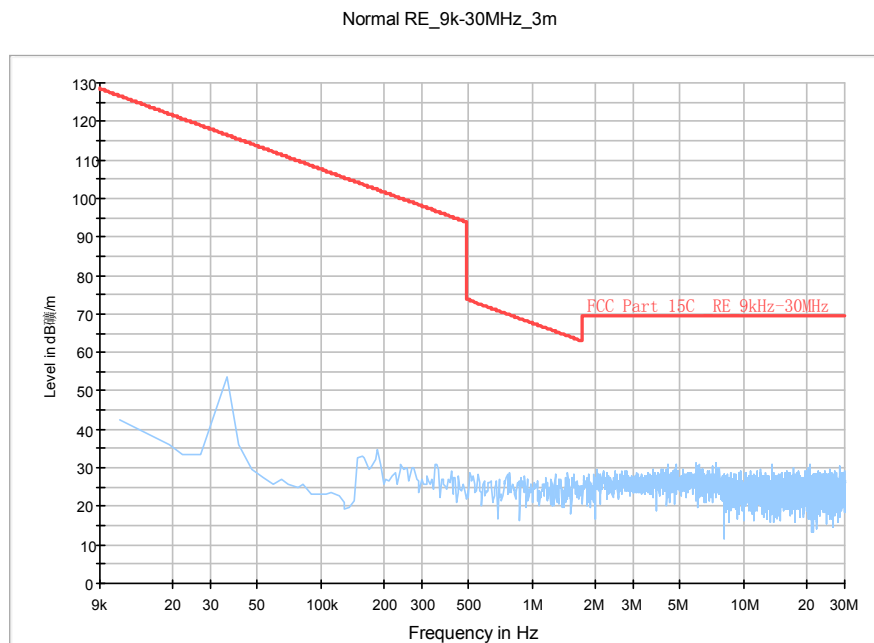
**Fig. 114 Radiated Spurious Emission (802.11g, Ch11, 1 GHz-3 GHz)**



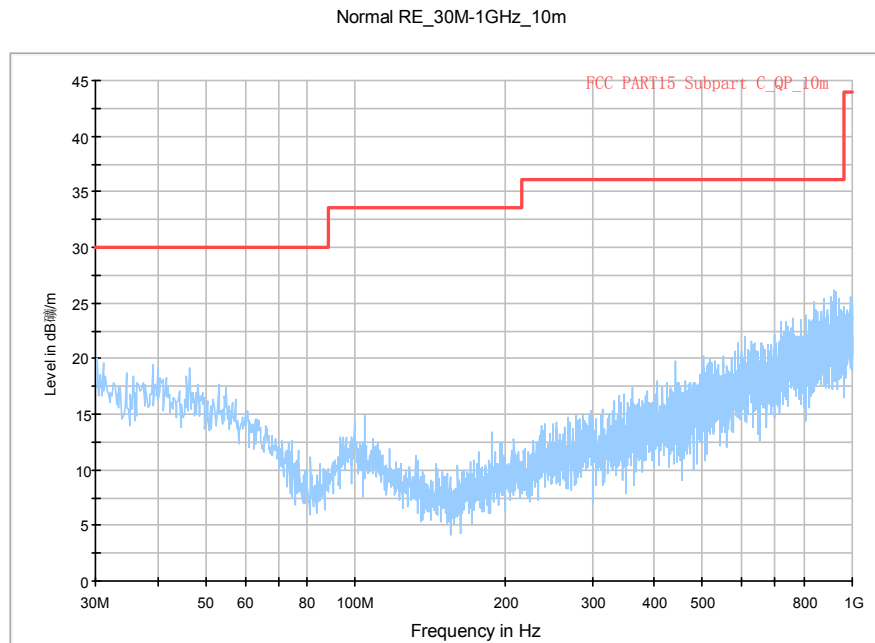
**Fig. 115 Radiated Spurious Emission (802.11g, Ch11, 3 GHz-18 GHz)**



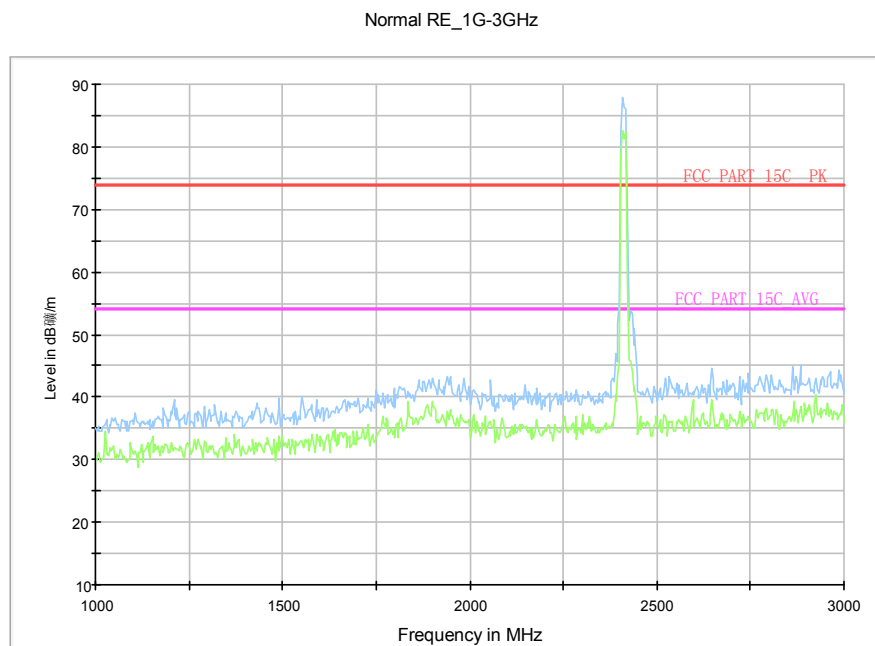
**Fig. 116 Radiated Spurious Emission (Power): 802.11n-HT20, ch1, 2.38 GHz - 2.45GHz**



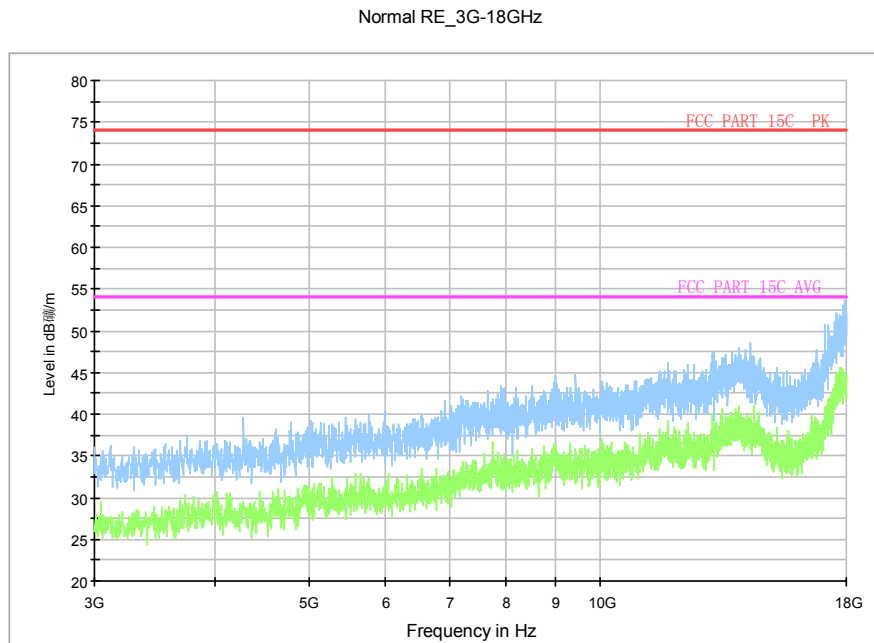
**Fig. 117 Radiated Spurious Emission (802.11n-HT20, Ch1, 9 kHz ~30 MHz)**



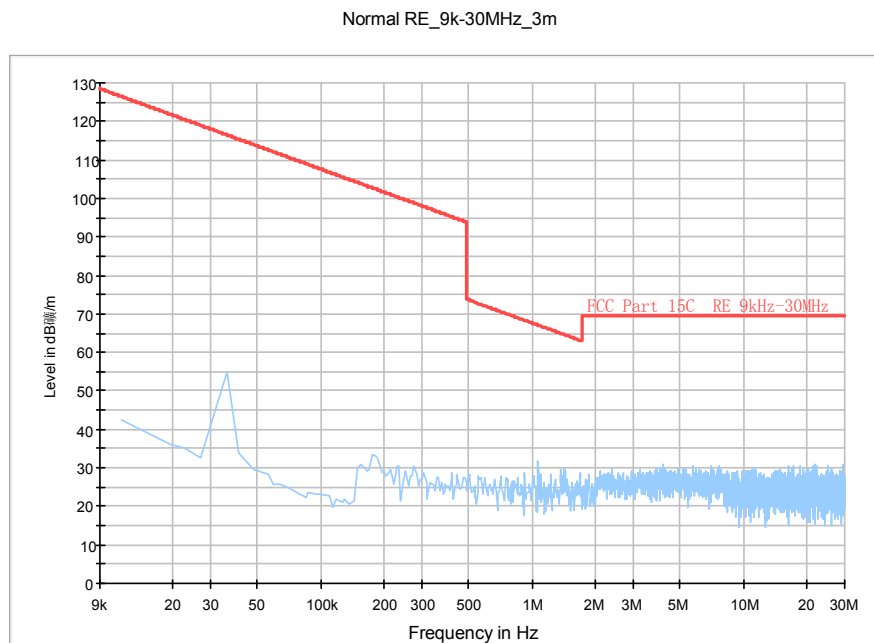
**Fig. 118 Radiated Spurious Emission (802.11n-HT20, Ch1, 30 MHz-1 GHz)**



**Fig. 119 Radiated Spurious Emission (802.11n-HT20, Ch1, 1 GHz-3 GHz)**

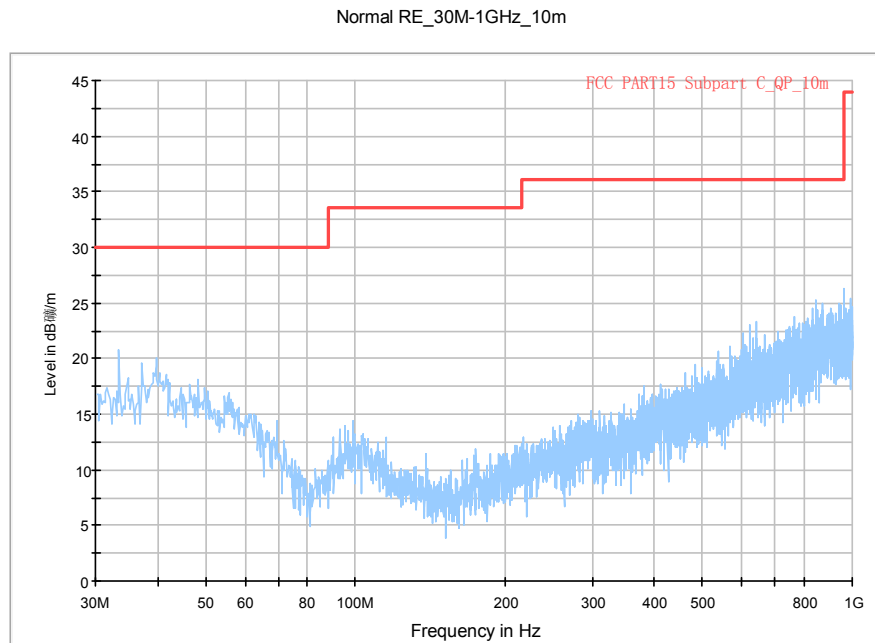


**Fig. 120 Radiated Spurious Emission (802.11n-HT20, Ch1, 3 GHz-18 GHz)**

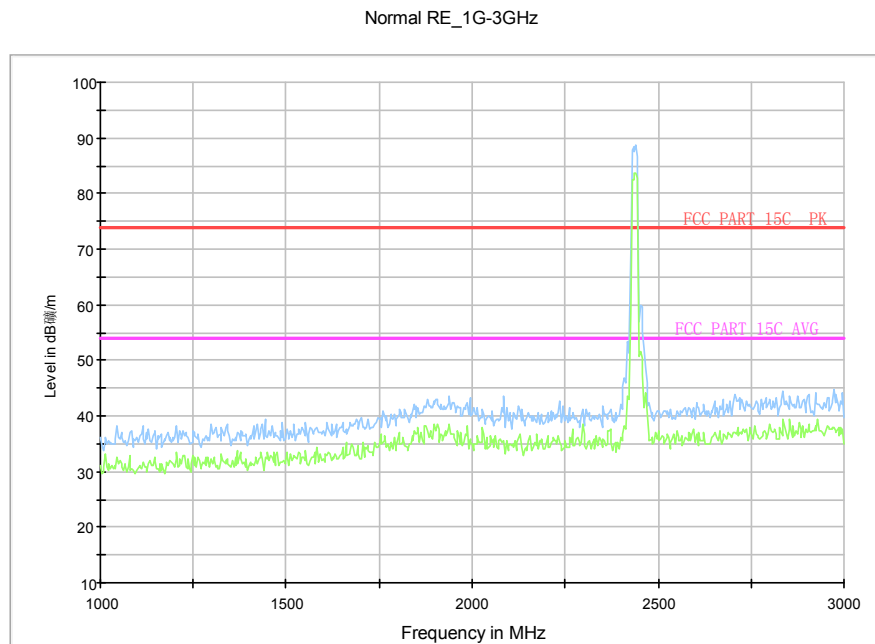


**Fig. 121 Radiated Spurious Emission (802.11n-HT20, Ch6, 9 kHz ~30 MHz)**

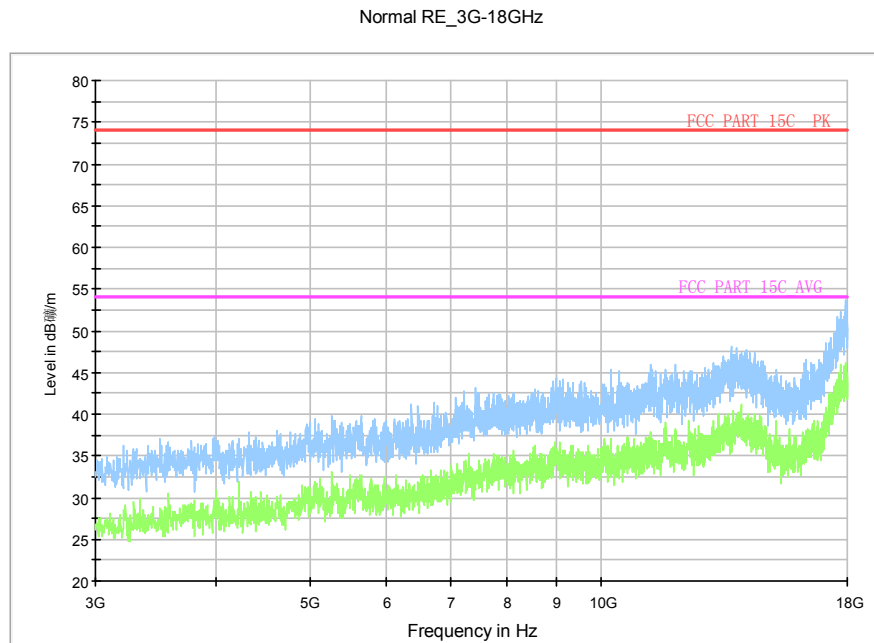




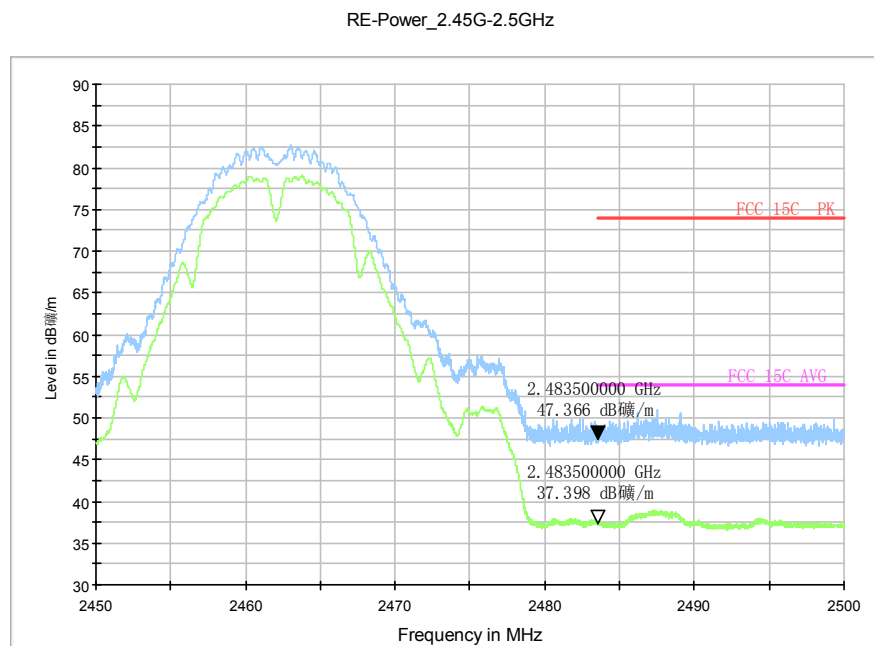
**Fig. 122 Radiated Spurious Emission (802.11n-HT20, Ch6, 30 MHz-1 GHz)**



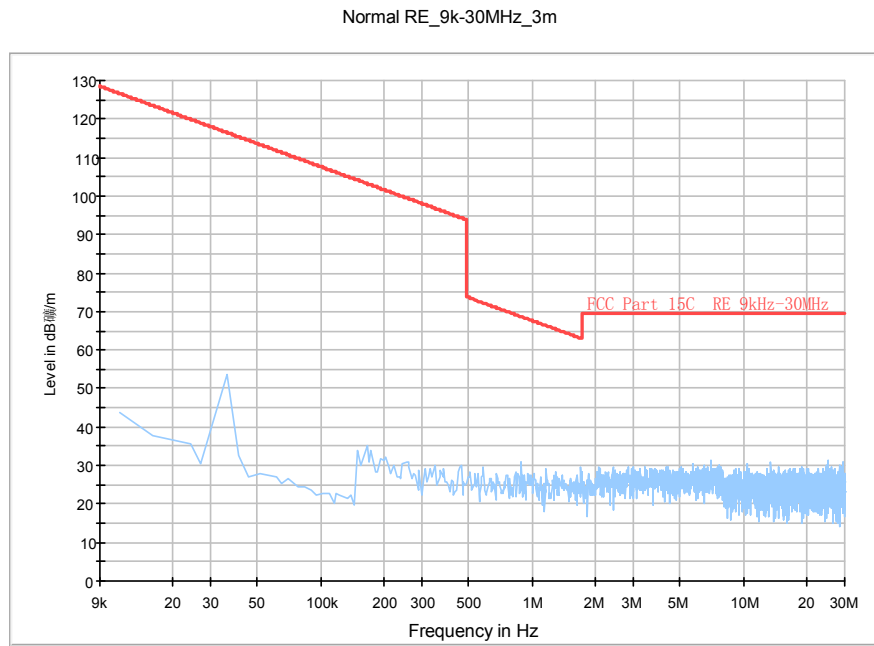
**Fig. 123 Radiated Spurious Emission (802.11n-HT20, Ch6, 1 GHz-3 GHz)**



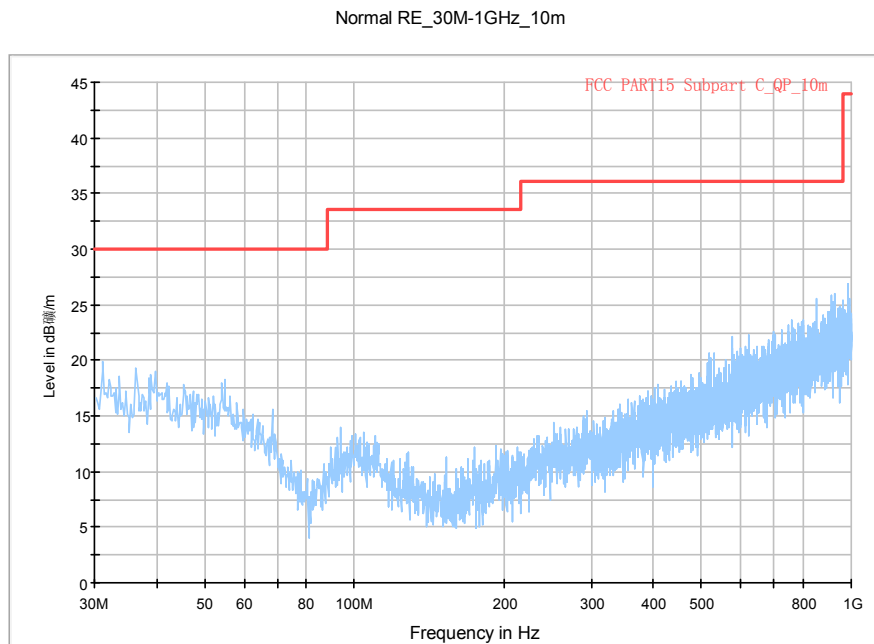
**Fig. 124 Radiated Spurious Emission (802.11n-HT20, Ch6, 3 GHz-18 GHz)**



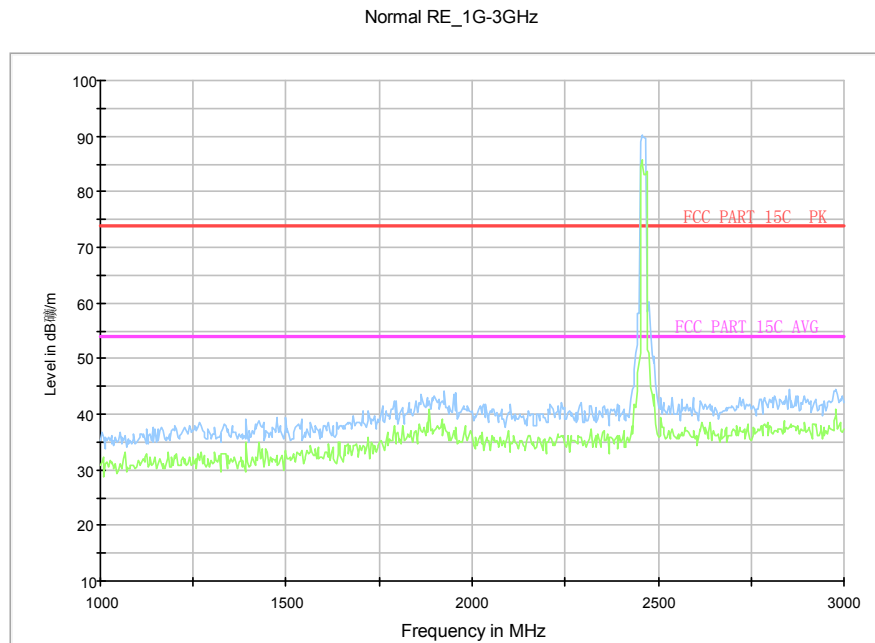
**Fig. 125 Radiated Spurious Emission (Power): 802.11n-HT20, ch11, 2.45 GHz - 2.5GHz**



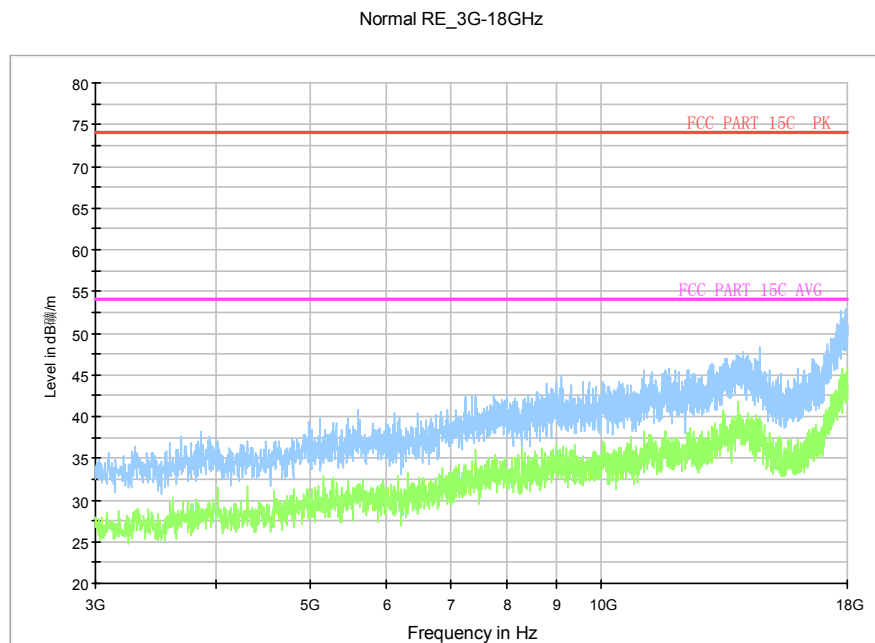
**Fig. 126 Radiated Spurious Emission (802.11n-HT20, Ch11, 9 kHz ~30 MHz)**



**Fig. 127 Radiated Spurious Emission (802.11n-HT20, Ch11, 30 MHz-1 GHz)**



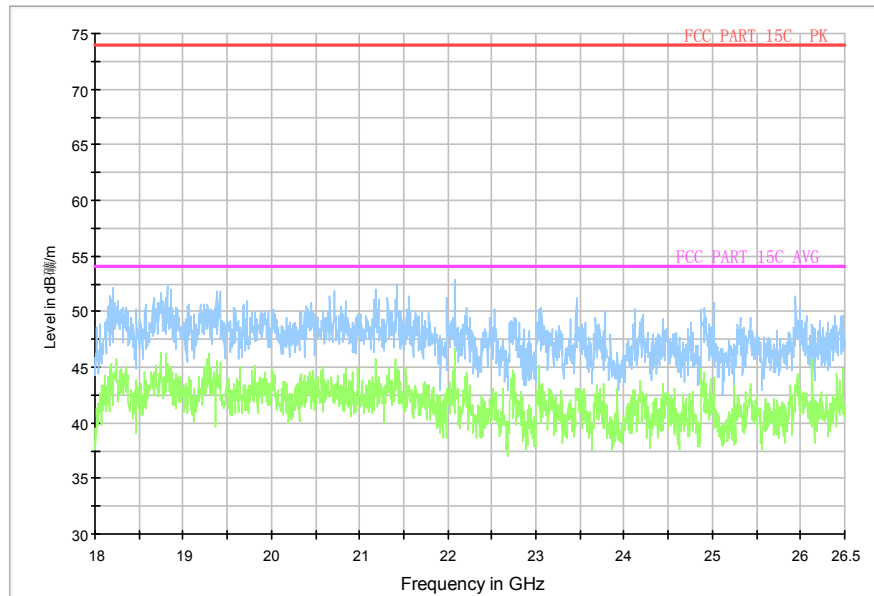
**Fig. 128 Radiated Spurious Emission (802.11n-HT20, Ch11, 1 GHz-3 GHz)**



**Fig. 129 Radiated Spurious Emission (802.11n-HT20, Ch11, 3 GHz-18 GHz)**



Normal RE\_18G-26.5GHz



**Fig. 130 Radiated emission: 18 GHz – 26.5 GHz**

### A.7. AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)	Conclusion
		With charger	
		802.11b	
0.15 to 0.5	66 to 56	Fig.131	P
0.5 to 5	56		
5 to 30	60		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Conclusion: PASS

Test graphs as below:

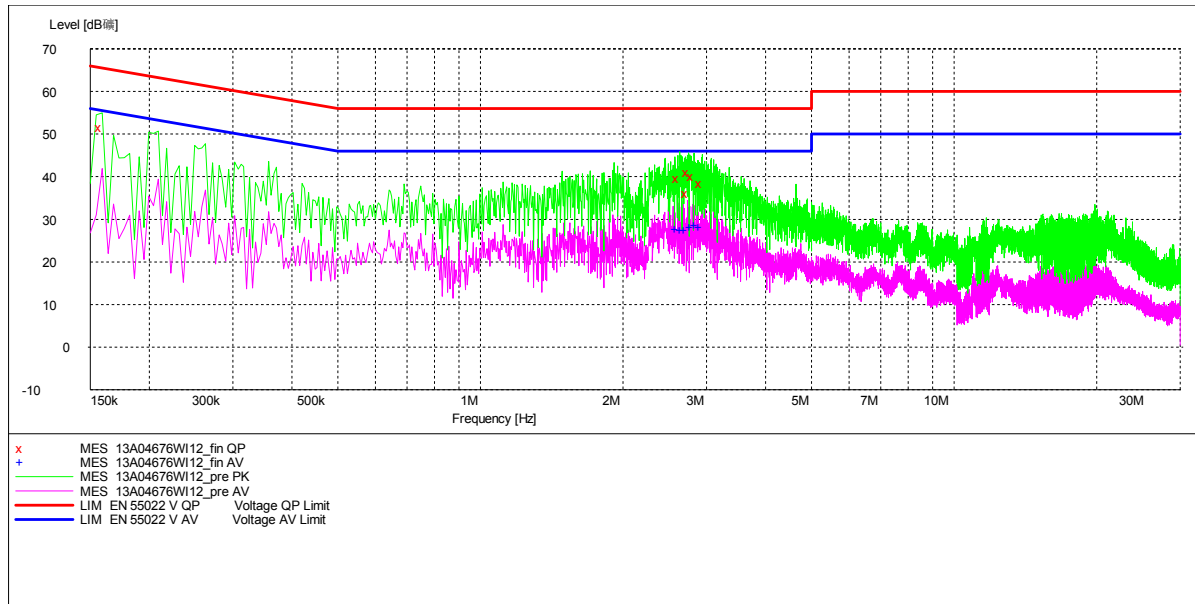


Fig. 131 AC Powerline Conducted Emission-802.11b

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Measurement Result 1:

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	51.70	GND	L1	9.8	13.9	66
2.634500	39.70	GND	L1	9.7	16.3	56
2.751500	36.30	GND	N	9.7	19.7	56
2.765000	41.10	GND	L1	9.7	14.9	56
2.823500	40.30	GND	L1	9.7	15.7	56
2.940500	38.60	GND	L1	9.7	17.4	56

Measurement Result 2:

Frequency (MHz)	CAverage (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.607500	27.80	GND	L1	9.7	18.2	46
2.679500	27.50	GND	L1	9.7	18.5	46
2.738000	27.50	GND	L1	9.7	18.5	46
2.810000	28.30	GND	L1	9.7	17.7	46
2.868500	28.70	GND	L1	9.7	17.3	46
2.927000	28.30	GND	L1	9.7	17.7	46

\*\*\* END OF REPORT BODY \*\*\*