



# FCC PART 15C TEST REPORT No. 2012WLN0371

for

**TCT Mobile Limited**

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

**Model Name: ONE TOUCH 991S**

**With**

**FCC ID: RAD256**

**IC: 9238A-0011**

**Hardware Version: PIO02**

**Software Version: vF1J\_AWS**

**Issued Date: 2012-06-08**



**No. DGA-PL-114/01-02**

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**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.

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## 1. TEST LABORATORY

### 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: 008610623046332500  
Fax: 008610623046332504

### 1.2. Testing Environment

Normal Temperature: 15-30℃  
Extreme Temperature: -10/+55℃  
Relative Humidity: 30-60%  
Air Pressure 990hPa-1040hPa

Note: The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

### 1.3. Project data

Testing Start Date: 2012-02-29  
Testing End Date: 2012-06-01

### 1.4. Signature



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**Sun Zhenyu**

**(Prepared this test report)**



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**Gao Hong**

**(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, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China. 201203  
City: Shanghai  
Postal Code: 518057  
Country: China  
Contact Gong Zhizhou  
Email zhizhou.gong@jrdcom.com  
Telephone: 0086-21-6146089  
Fax: 0086-21-61460602

### **2.2. Manufacturer Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China. 201203  
City: Shanghai  
Postal Code: 518057  
Country: China  
Contact Gong Zhizhou  
Email zhizhou.gong@jrdcom.com  
Telephone: 0086-21-6146089  
Fax: 0086-21-61460602

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

#### 3.1. About EUT

Description	HSUPA/HSDPA/UMTS triband / GSM quadband mobile phone
Model Name	ONE TOUCH 991S
FCC ID	RAD256
IC	9238A-0011
With WLAN Function	Yes
Frequency Range	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	23.07dBm(OFDM)
Power Supply	3.7V DC by Battery

Note: Photographs of EUT are shown in ANNEX C of this test report.

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

EUT ID*	IMEI	HW Version	SW Version
EUT1	013112000020691	PIO02	vF1J_AWS
EUT2	013112000020592	PIO02	vF1J_AWS

\*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	Battery	CAB32A0000C2	/
AE2	Battery	CAB32A0000C1	/
AE3	Travel Adapter	CBA3002AG0C1	/
AE4	Travel Adapter	CBA3001AG0C1	/
AE5	Travel Adapter	CBA3001AG0C2	/
AE6	Travel Adapter	CBA3000AG0C1	/

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

#### 3.4. General Description

Equipment Under Test (EUT) is a model of HSUPA/HSDPA/UMTS triband / GSM quadband mobile phone with integrated antenna. It consists of normal options: Battery and Charger.

Manual and specifications of the EUT were provided to fulfil the test.

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;	Oct,
FCC Part15	15.209 Radiated emission limits, general requirements;	2009
	15.247 Operation within the bands 902-928MHz,	Edition
	2400-2483.5 MHz, and 5725-5850 MHz.	
ANSI C63.10	American National Standard for Testing Unlicensed Wireless Devices	2009
	RSS-210 Spectrum Management and	
RSS-210	Telecommunications Radio Standards Specification - Low-power Licence-exempt Radiocommunication	Issue 8 Dec 2010
	Devices (All Frequency Bands): Category I Equipment Spectrum Management and Telecommunications - Radio Standards Specification	
RSS-Gen	General Requirements and Information for the Certification of Radiocommunication Equipment	Issue3 Dec 2010



## 5. LABORATORY ENVIRONMENT

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

**Semi-anechoic chamber** (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 M ohm
Ground system resistance	< 0.5
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

**Shielding Room2** (7.30 meters×4.00 meters×3.80 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

## 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 Output Power	15.247 (a)	A8.4	<b>P</b>
Peak Power Spectral Density	15.247 (d)	A8.2, A8.3	<b>P</b>
Occupied 6dB Bandwidth	15.247 (d)	A8.2	<b>P</b>
Band Edges Compliance	15.247 (b)	A8.5	<b>P</b>
Transmitter Spurious Emission - Conducted	15.247	A8.5	<b>P</b>
Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	A8.5	<b>P</b>
20dB Bandwidth	15.247 (d)	A8.5	<b>/</b>
AC Powerline Conducted Emission	15.107, 15.207	A8.5, 7.2.2	<b>P</b>

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

The measurement is made according to ANSI C63.10.

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/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.

Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage
V min	Low Voltage
V max	High Voltage
H nom	Norm Humidity
A nom	Norm Air Pressure

For this report, all the test cases listed above are tested under Normal Temperature and Normal Voltage which is using a new battery, and also under norm humidity, the specific conditions as following:

Temperature	T nom	26°C
Voltage	V nom	3.7(By battery)
Humidity	H nom	44%

Air Pressure	A nom	1010hPa
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## **7. TEST EQUIPMENTS UTILIZED**

### **Conducted test system**

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2012-07-19
2	Spectrum Analyzer	MS2687B	6200819812	Anritsu	2012-09-22
3	Test Receiver	ESS	847151/015	Rohde & Schwarz	2012-10-30
4	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2012-08-12

### **Radiated emission test system**

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Test Receiver	ESI40	831564/002	Rohde & Schwarz	2012-08-11
2	BiLog Antenna	3142B	9908-1403	EMCO	2013-03-15
3	Dual-Ridge Waveguide Horn Antenna	3115	9906-5827	EMCO	2012-12-25
4	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2012-06-30

### **Anechoic chamber**

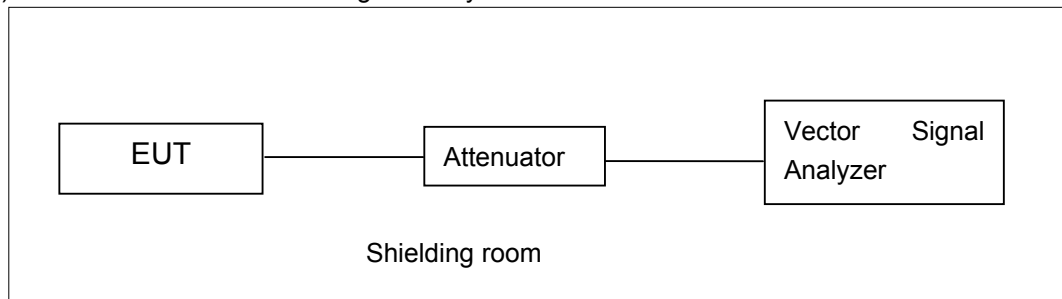
Anechoic chamber by Frankonia German.

## ANNEX A: MEASUREMENT RESULTS

### A.1. Measurement Method

#### A.1.1. Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values. Vector Signal Analyzer

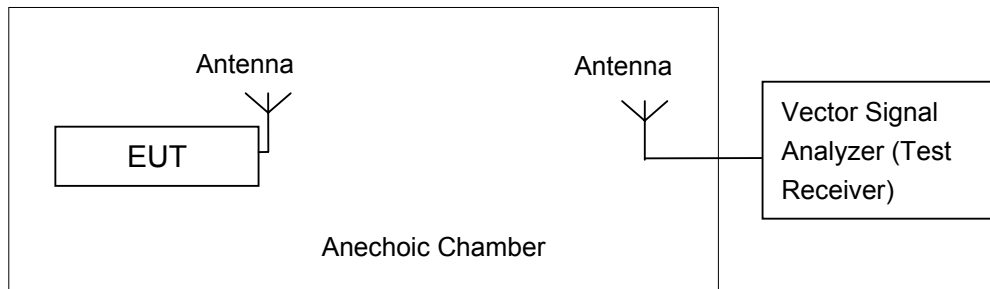


#### A.1.2. Radiated Emission Measurements

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

## A.2. Maximum Output Power

### Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.247(b) A8.4	< 30

The measurement is made according to ANSI C63.10, and power output option 1 (RBW=20MHz) in ANSI C63.10 is used for the test. EUT is operating in continuous transmitting mode

### Measurement Uncertainty:

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

### A.2.1. Maximum Peak Output Power

#### Measurement Results:

#### 802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	18.64	/	/
	2	18.92	/	/
	5.5	19.29	/	/
	11	20.92	20.34	20.80
802.11g	6	21.80	/	/
	9	21.85	/	/
	12	21.57	/	/
	18	21.28	/	/
	24	21.88	/	/
	36	21.91	/	/
	48	22.05	/	/
	54	22.11	22.45	23.07

The data rate 11Mbps and 54Mbps are selected as worse condition, and the following cases are performed with this condition.

#### 802.11n mode

Mode	Data Rate (MCS Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz BW)	MCS0	21.59	/	/
	MCS1	21.67	/	/
	MCS2	21.72	/	/
	MCS3	21.89	/	/
	MCS4	21.99	/	/
	MCS5	22.13	/	/

	MCS6	22.14	/	/
	MCS7	22.16	22.43	22.67
802.11n (40MHz)	MCS0	/	/	/
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

The data rate index of MCS7 is selected as worse condition, and the following cases are performed with this condition.

**Conclusion: PASS**

### A.3. Peak Power Spectral Density

**Measurement Limit:**

Standard	Limit
FCC CRF Part 15.247(d) A8.2, A8.3	< 8 dBm/3 kHz

The measurement is made according to ANSI C63.10

**Measurement Uncertainty:**

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

**Measurement Results:**

#### 802.11b/g mode

Mode	Channel	Power Spectral Density ( 8 dBm/3 kHz )		Conclusion
		Fig.	Value	
802.11b	1	Fig.1	-6.01	P
	6	Fig.2	-6.33	P
	11	Fig.3	-6.46	P
802.11g	1	Fig.4	-10.35	P
	6	Fig.5	-10.07	P
	11	Fig.6	-9.48	P

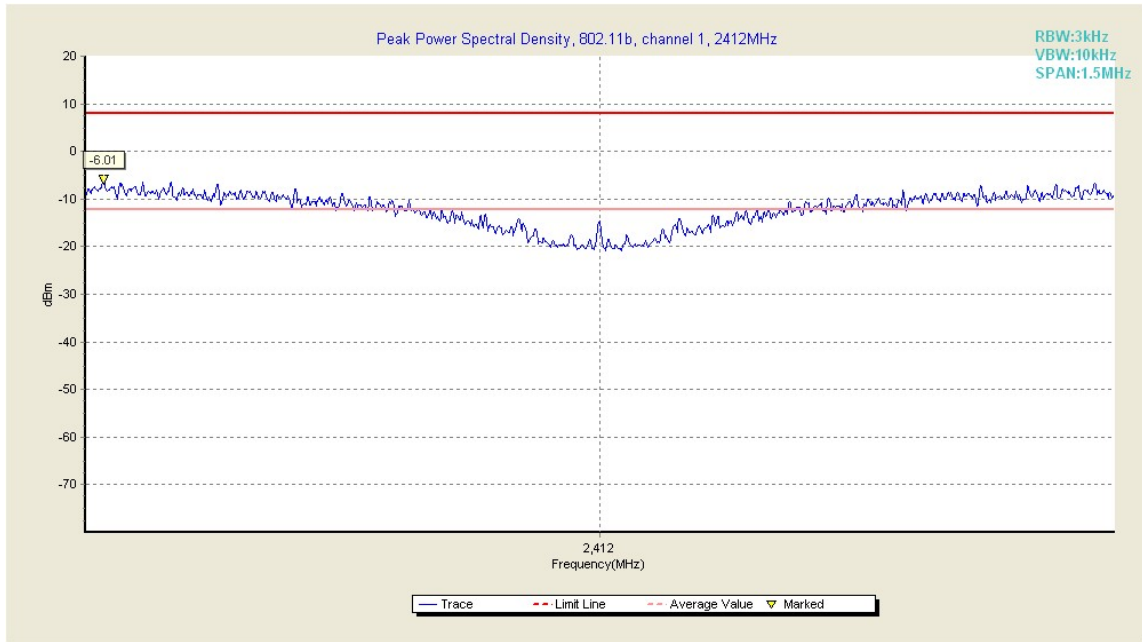
#### 802.11n mode

Mode	Channel	Power Spectral Density ( dBm/3 kHz )		Conclusion
		Fig.	Value	
802.11n (20MHz)	1	Fig.7	-10.66	P
	6	Fig.8	-9.97	P
	11	Fig.9	-9.80	P
802.11n (40MHz)	/	/	/	/
	/	/	/	/

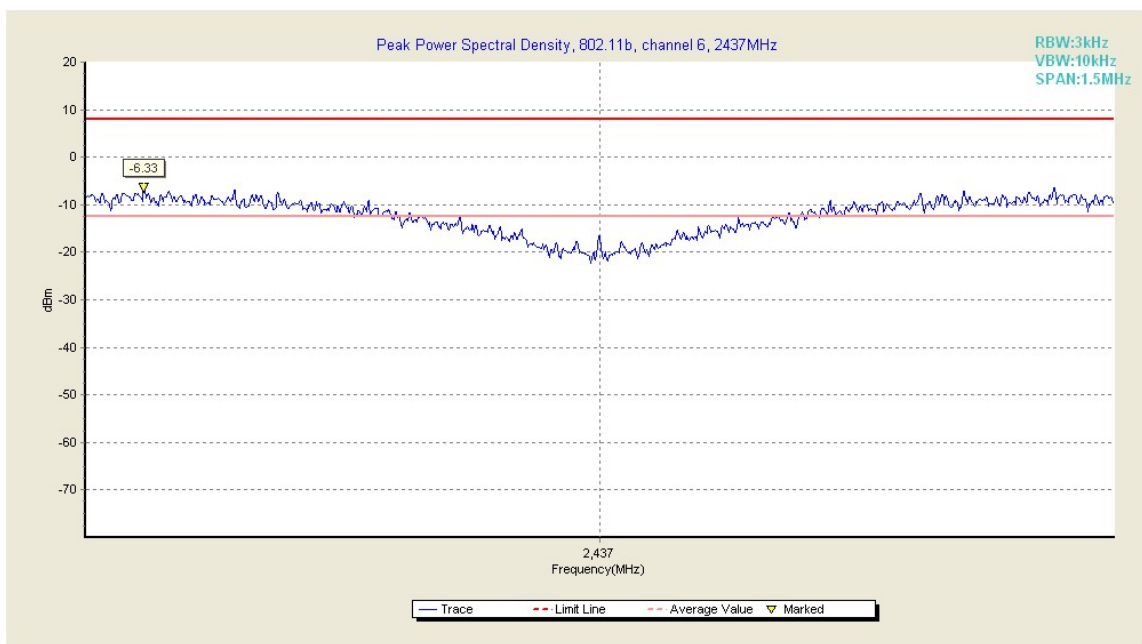
	/	/	/
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**Conclusion: PASS**

**Test graphs as below:**



**Fig. 1 Power Spectral Density (802.11b, Ch 1)**



**Fig. 2 Power Spectral Density (802.11b, Ch 6)**

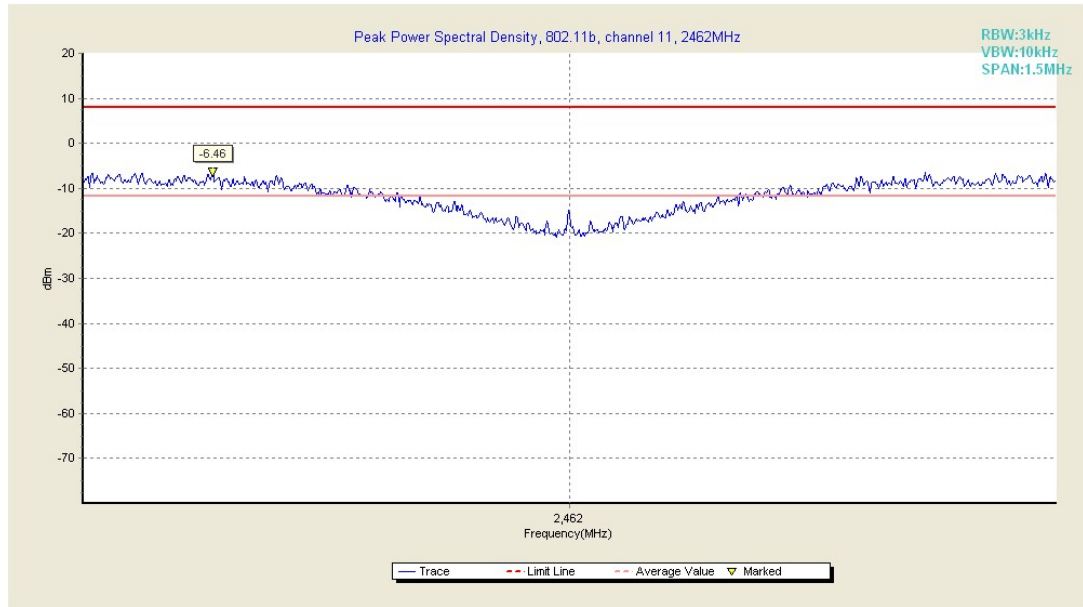


Fig. 3 Power Spectral Density (802.11b, Ch 11)

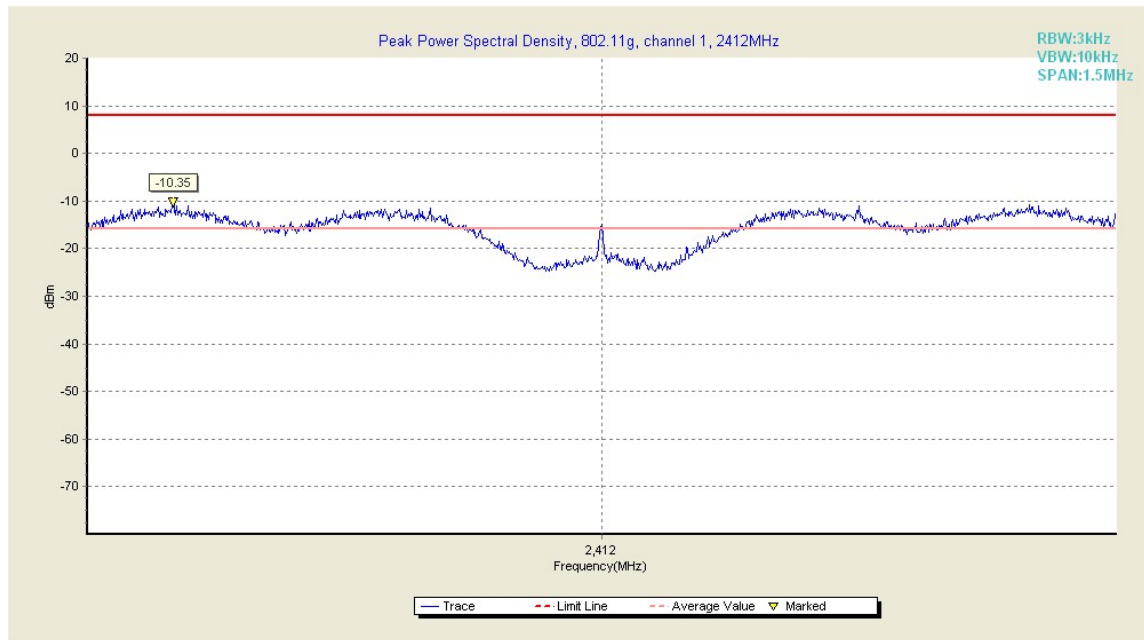


Fig. 4 Power Spectral Density (802.11g, Ch 1)



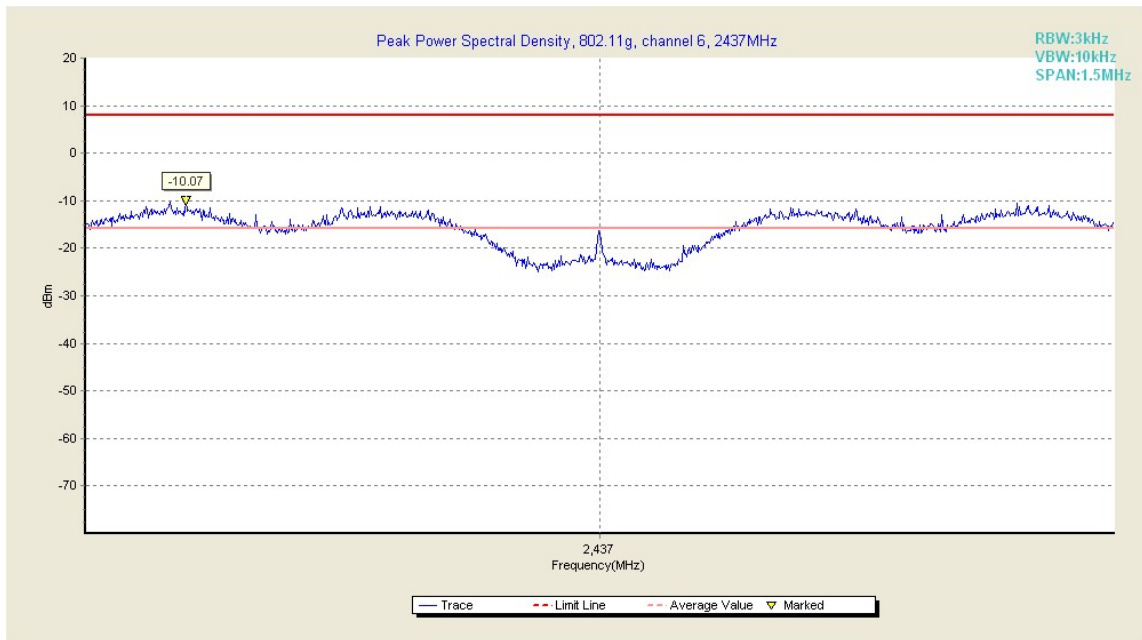


Fig. 5 Power Spectral Density (802.11g, Ch 6)

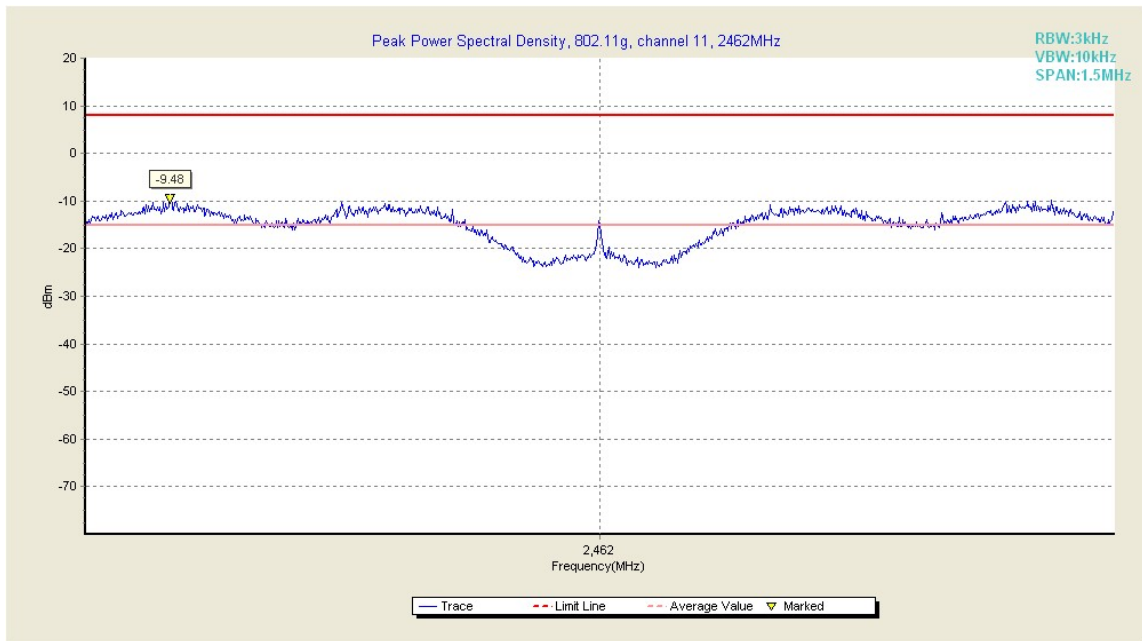


Fig. 6 Power Spectral Density (802.11g, Ch 11)

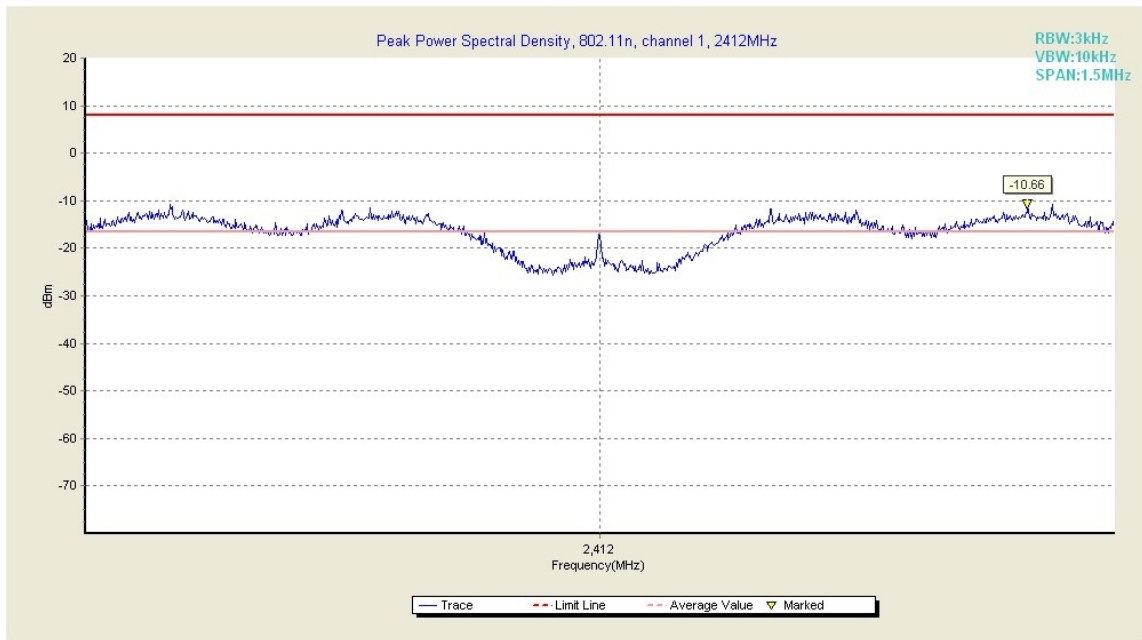


Fig. 7 Power Spectral Density (802.11n-20MHz, Ch 1)

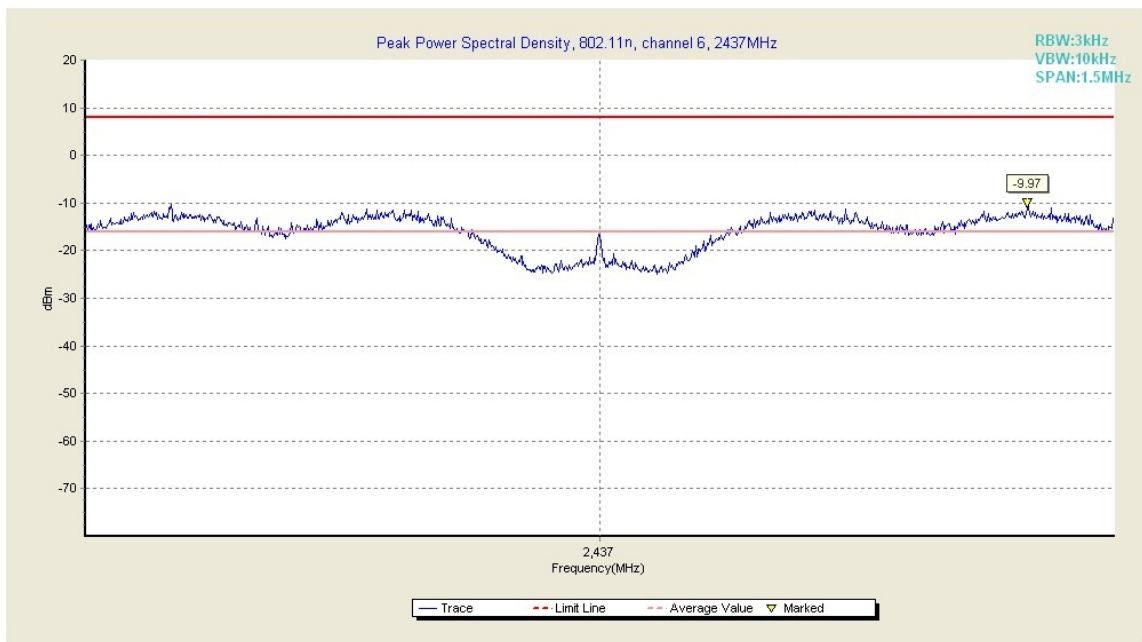


Fig. 8 Power Spectral Density (802.11n-20MHz, Ch 6)

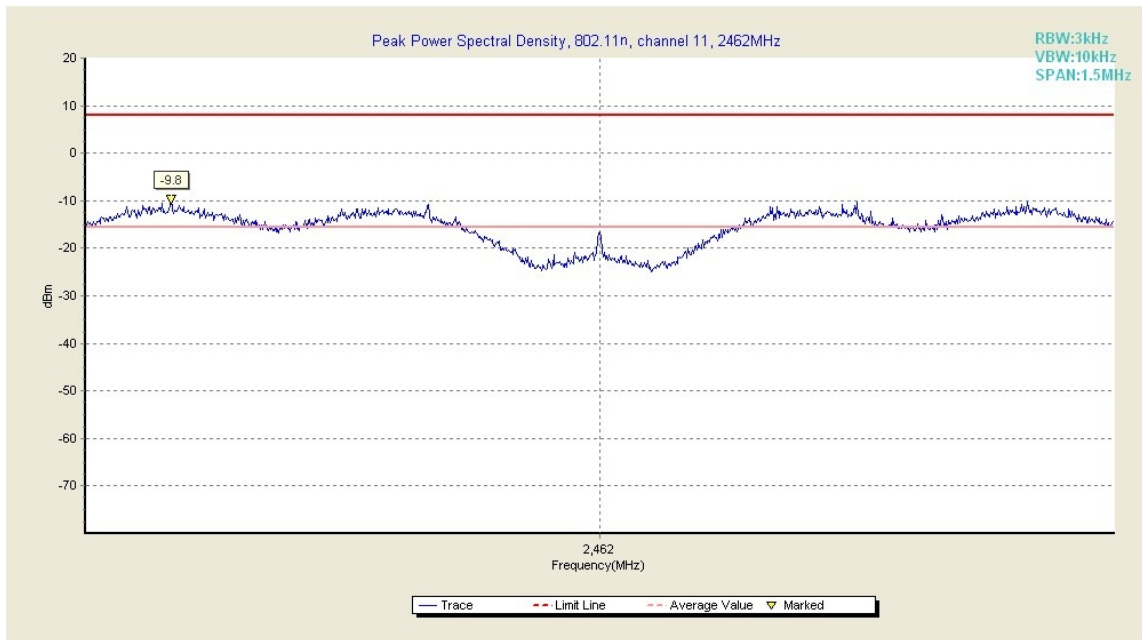


Fig. 9 Power Spectral Density (802.11n-20MHz, Ch 11)

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

**Measurement Limit:**

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a) A8.2	≥ 500

The measurement is made according to ANSI C63.10

**Measurement Uncertainty:**

Measurement Uncertainty	60.80Hz
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**Measurement Result:**

**802.11b/g mode**

Mode	Channel	Occupied 6dB Bandwidth ( kHz)		conclusion
802.11b	1	Fig.10	9100	P
	6	Fig.11	9100	P
	11	Fig.12	9100	P
802.11g	1	Fig.13	16550	P
	6	Fig.14	16500	P
	11	Fig.15	16450	P

**802.11n mode**

Mode	Channel	Occupied 6dB Bandwidth ( kHz)		conclusion
802.11n (20MHz)	1	Fig.16	17700	P
	6	Fig.17	17800	P
	11	Fig.18	17750	P
802.11n (40MHz)	/	/	/	/
	/	/	/	/
	/	/	/	/

**Conclusion: PASS**

**Test graphs as below:**

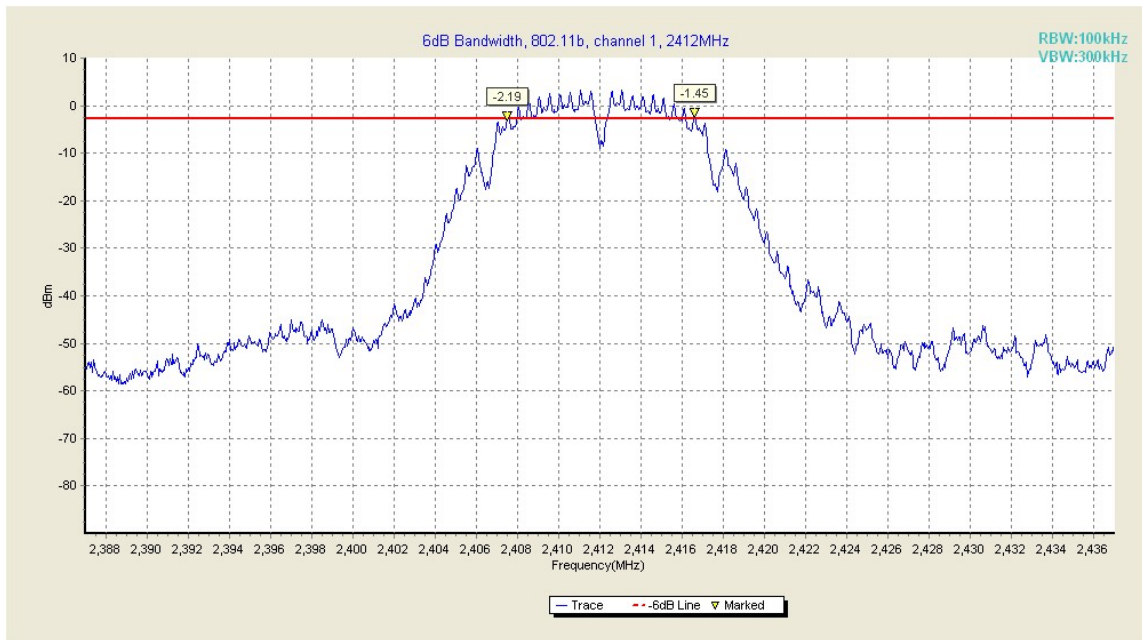


Fig. 10 Occupied 6dB Bandwidth (802.11b, Ch 1)

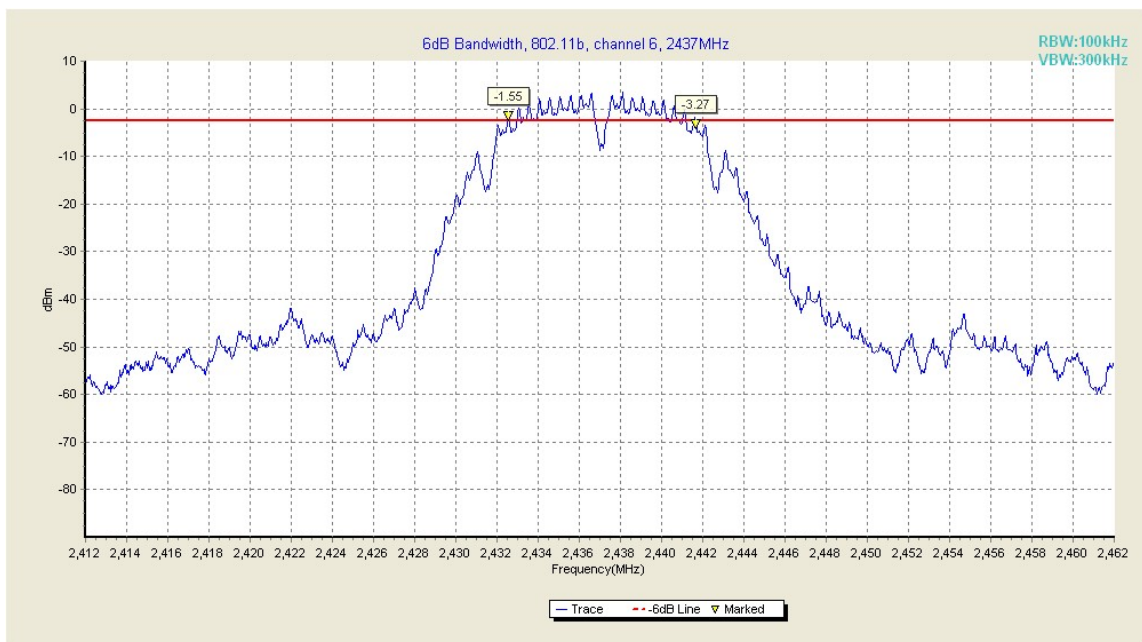


Fig. 11 Occupied 6dB Bandwidth (802.11b, Ch 6)

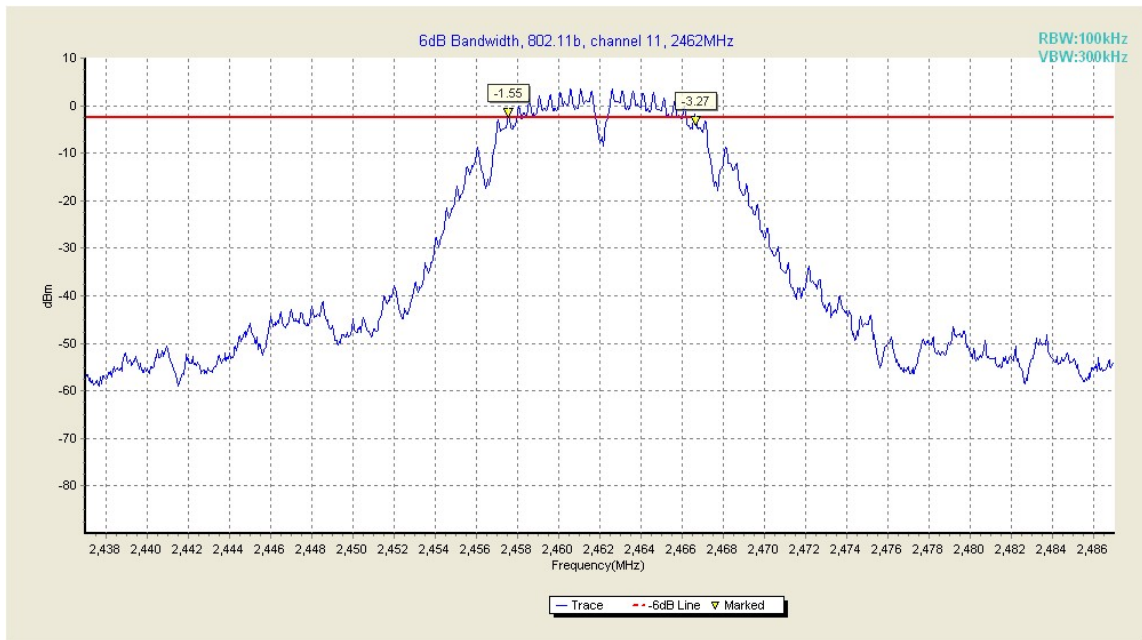


Fig. 12 Occupied 6dB Bandwidth (802.11b, Ch 11)

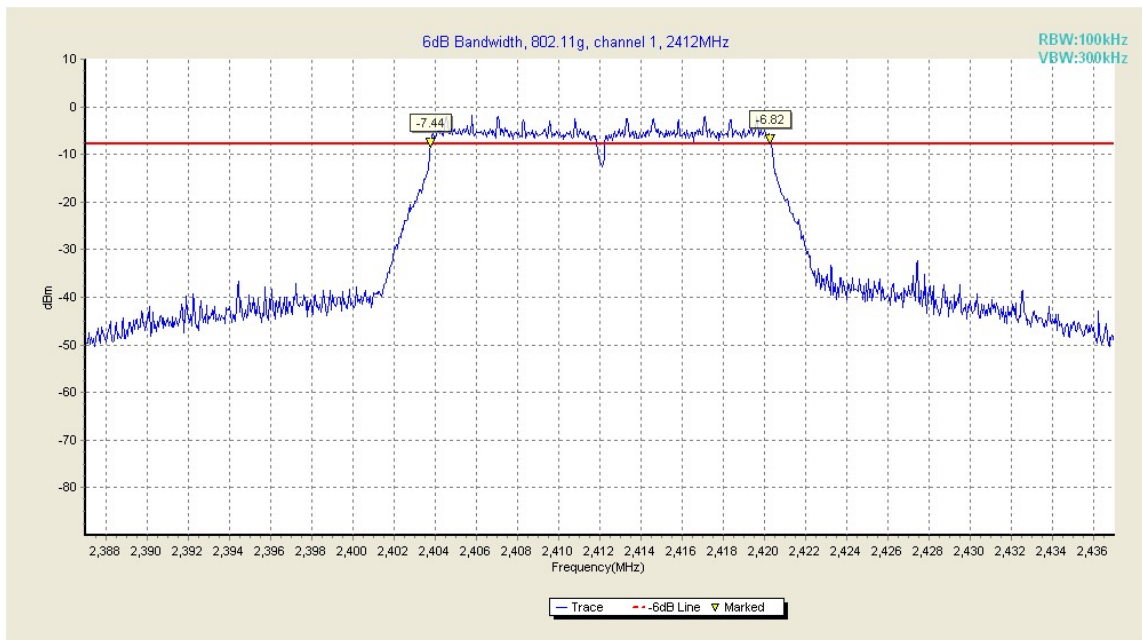


Fig. 13 Occupied 6dB Bandwidth (802.11g, Ch 1)

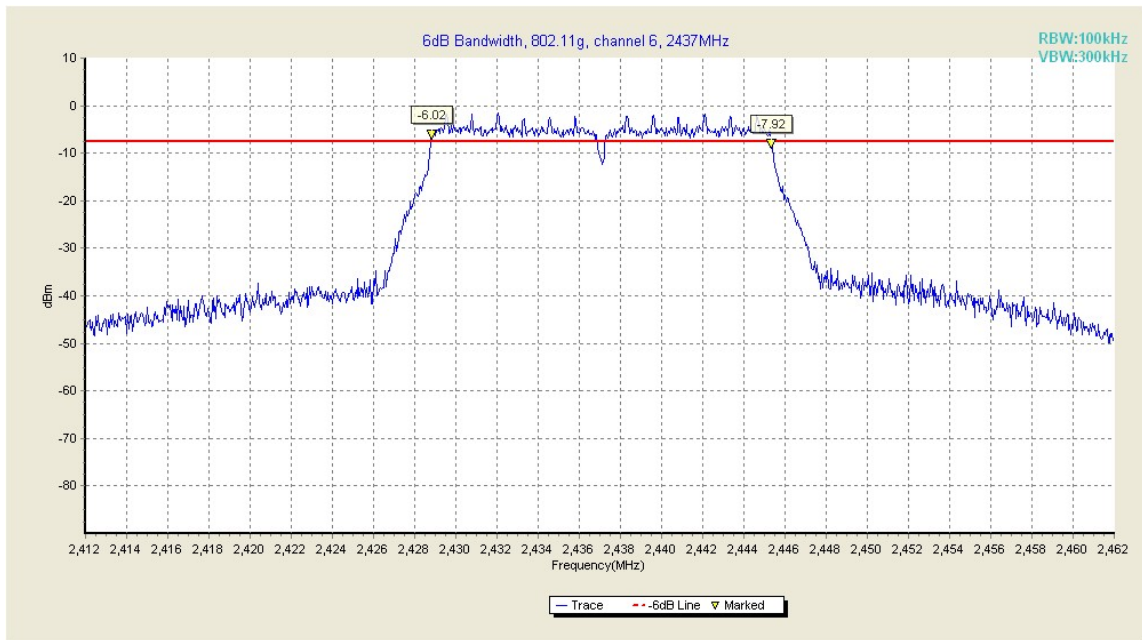


Fig. 14 Occupied 6dB Bandwidth (802.11g, Ch 6)

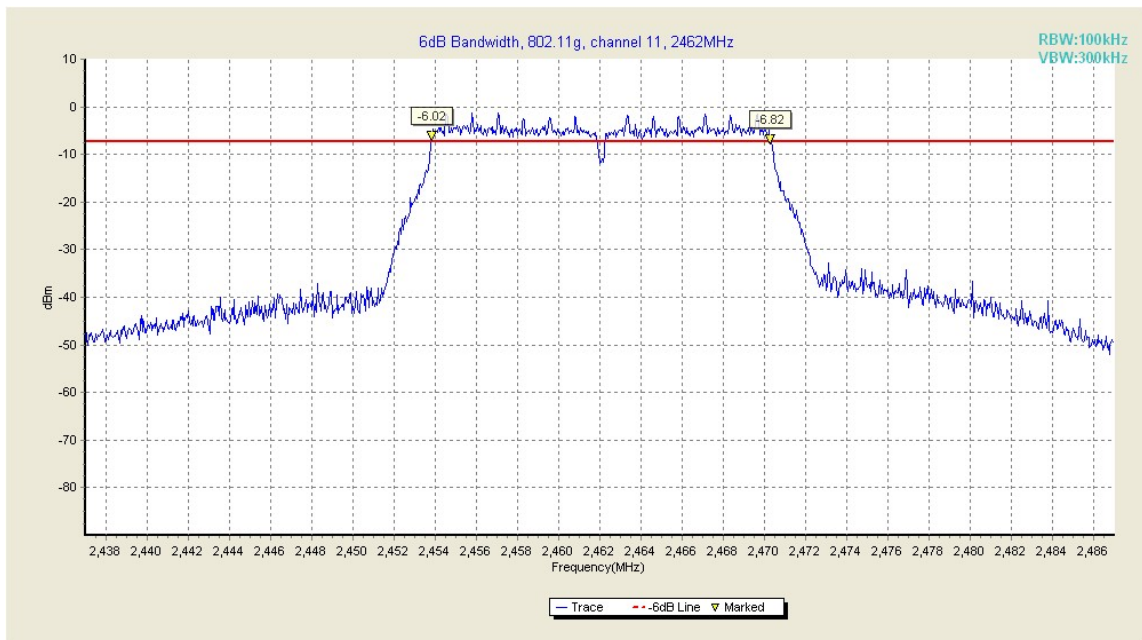


Fig. 15 Occupied 6dB Bandwidth (802.11g, Ch 11)

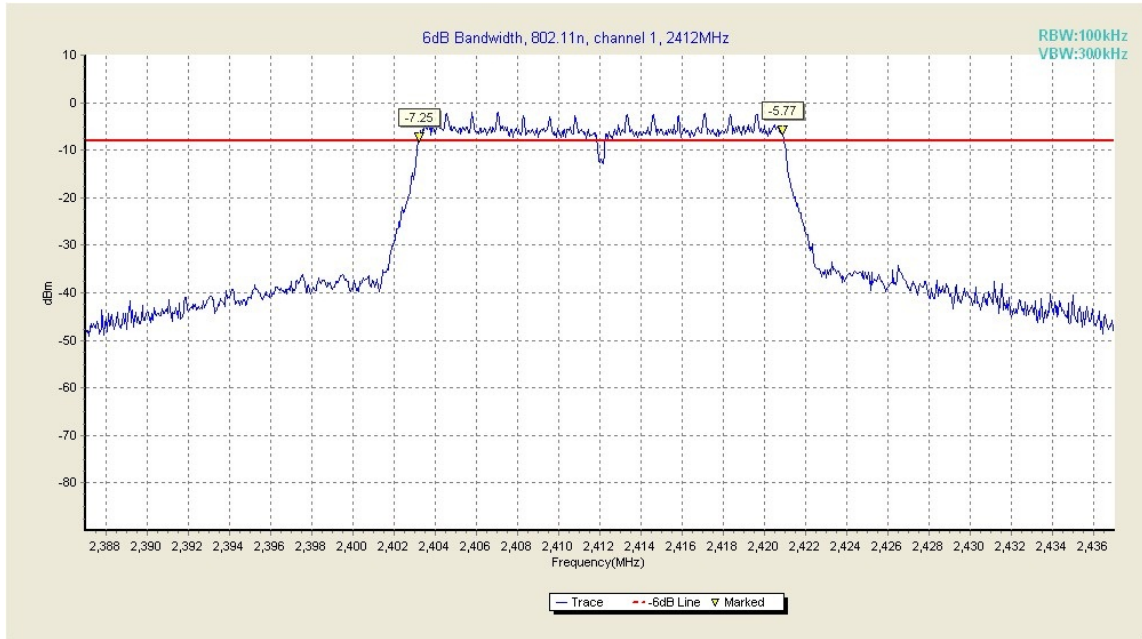


Fig. 16 Occupied 6dB Bandwidth (802.11 n-20MHz, Ch 1)

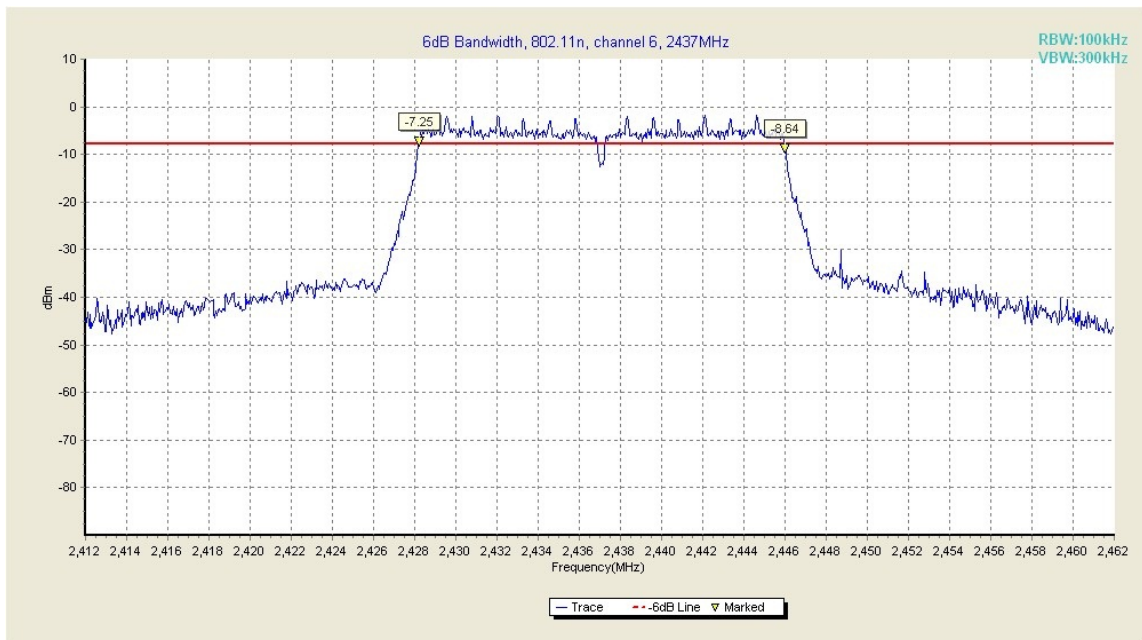


Fig. 17 Occupied 6dB Bandwidth (802.11 n-20MHz, Ch 6)



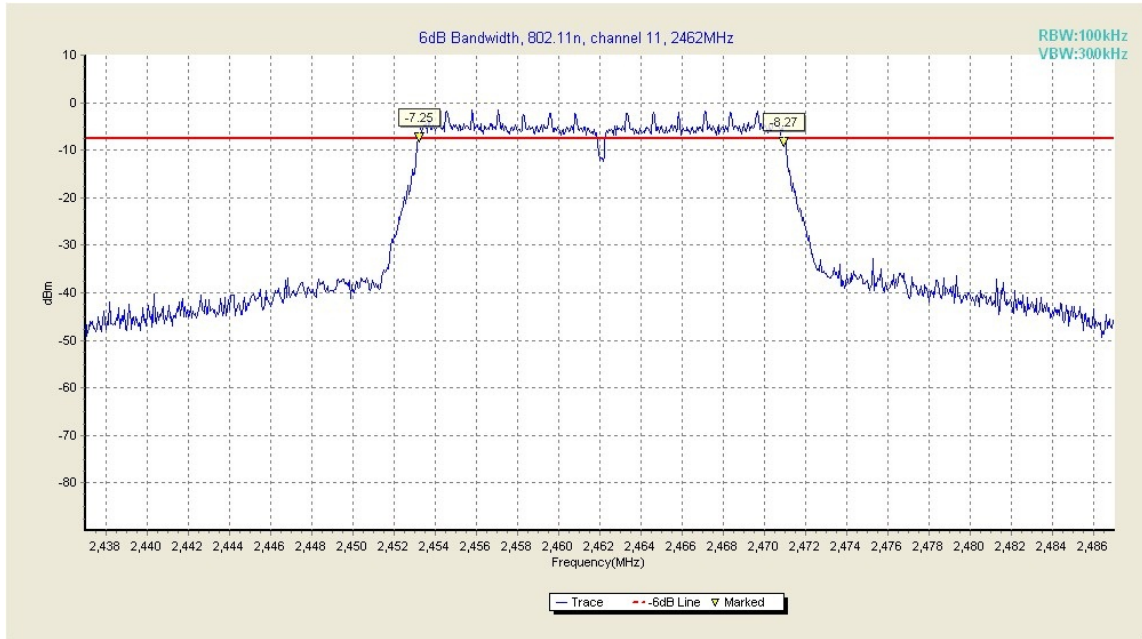


Fig. 18 Occupied 6dB Bandwidth (802.11n-20MHz, Ch 11)

### A.5. Band Edges Compliance

**Measurement Limit:**

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d) A8.5	> 20

The measurement is made according to ANSI C63.10

**Measurement Uncertainty:**

Measurement Uncertainty	0.75dB
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**Measurement Result:**

**802.11b/g mode**

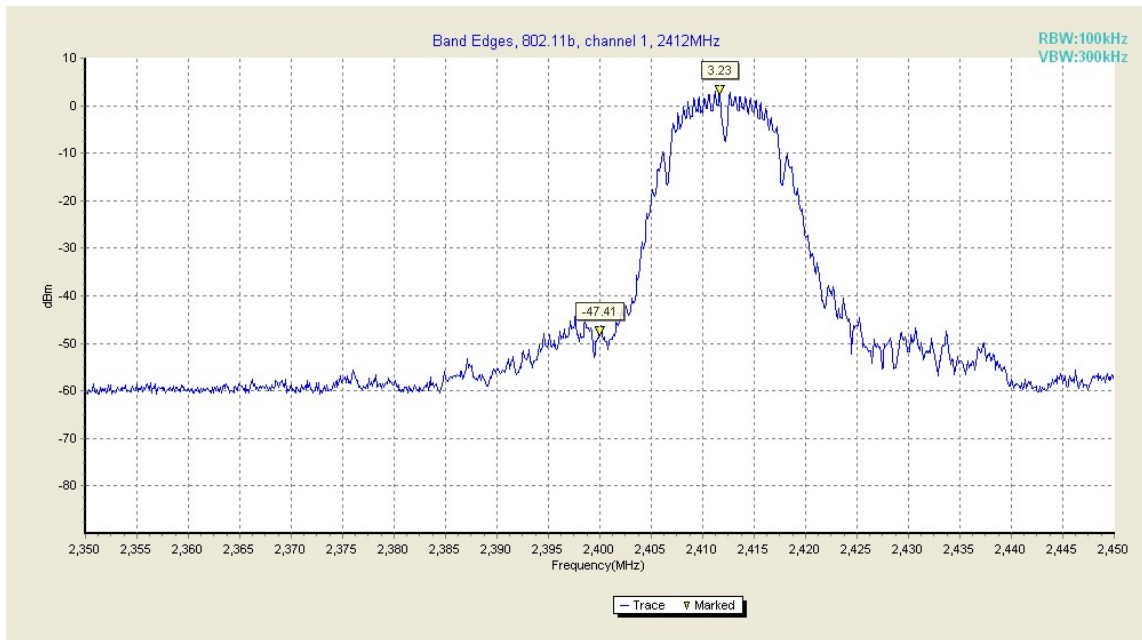
Mode	Channel	Test Results	Conclusion
802.11b	1	Fig.19	P
	11	Fig.20	P
802.11g	1	Fig.21	P
	11	Fig.22	P

**802.11n mode**

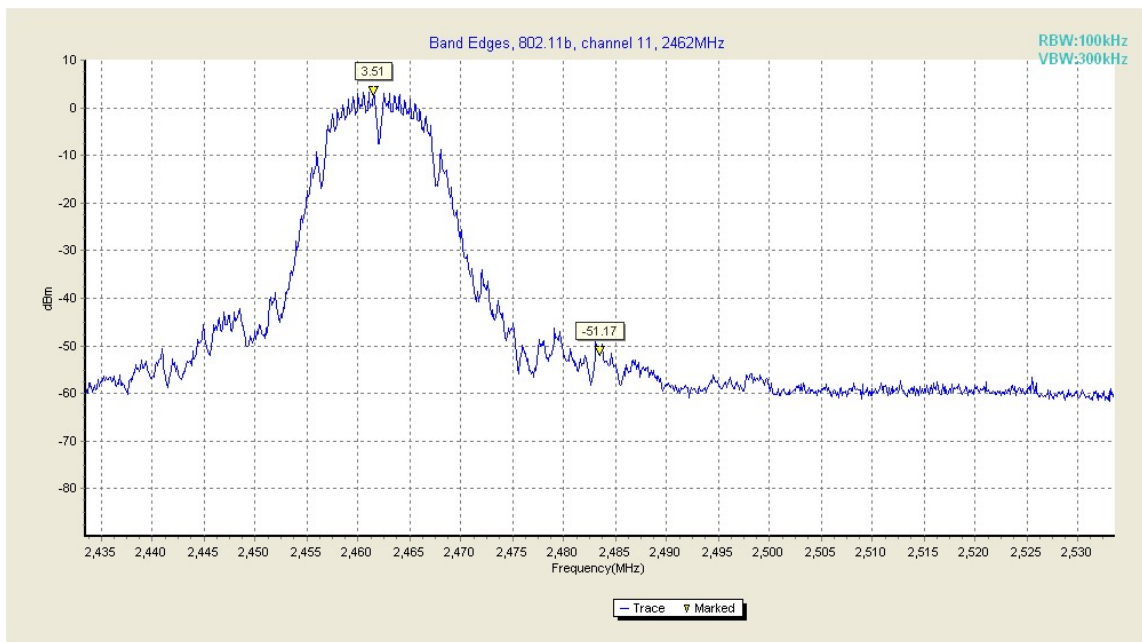
Mode	Channel	Test Results	Conclusion
802.11n (20MHz)	1	Fig.23	P
	11	Fig.24	P
802.11n (40MHz)	/	/	/
	/	/	/

**Conclusion: PASS**

**Test graphs as below:**



**Fig. 19 Band Edges (802.11b, Ch 1)**



**Fig. 20 Band Edges (802.11b, Ch 11)**

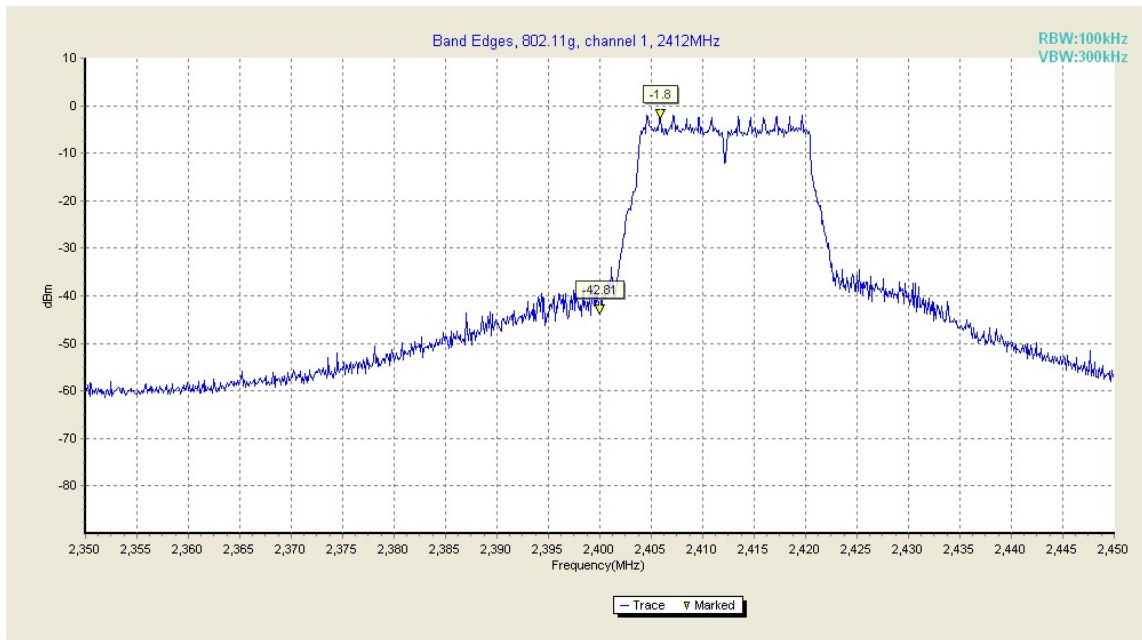


Fig. 21 Band Edges (802.11g, Ch 1)

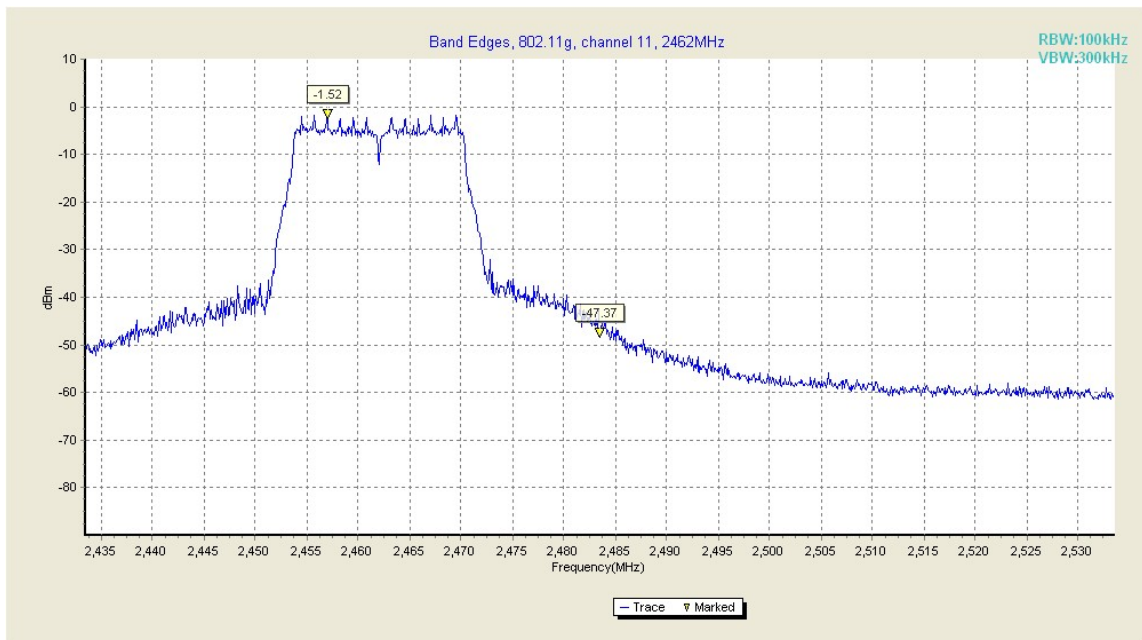


Fig. 22 Band Edges (802.11g, Ch 11)

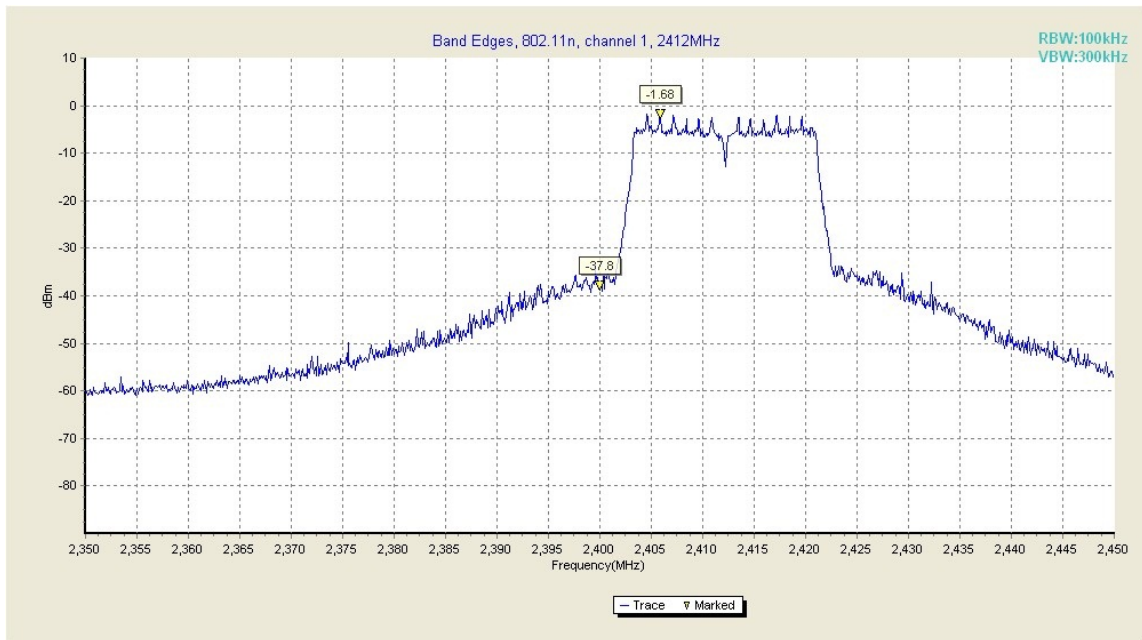


Fig. 23 Band Edges (802.11 n-20MHz, Ch 1)

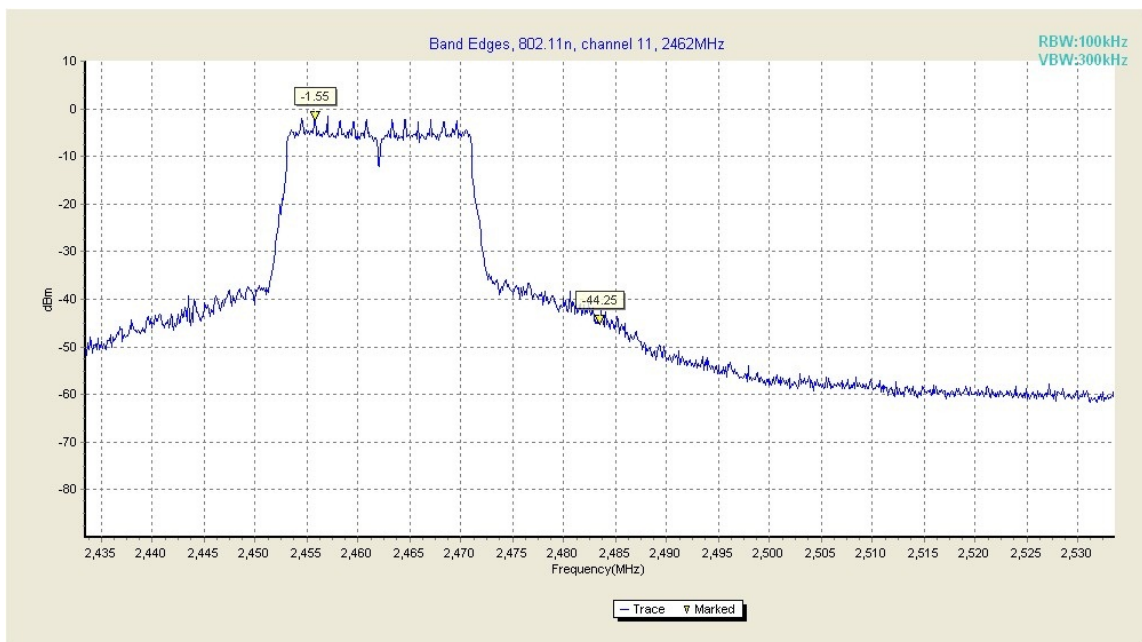


Fig. 24 Band Edges (802.11 n-20MHz, Ch 11)

## A.6. Transmitter Spurious Emission

### A.6.1 Transmitter Spurious Emission - Conducted

#### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d) A8.5	20dB below peak output power in 100 kHz bandwidth

The measurement is made according to ANSI C63.10

#### Measurement Uncertainty:

Frequency Range	Uncertainty
$30\text{MHz} \leq f \leq 2\text{GHz}$	0.63
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	0.82
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.55
$8\text{GHz} \leq f \leq 20\text{GHz}$	1.86
$20\text{GHz} \leq f \leq 22\text{GHz}$	1.90
$22\text{GHz} \leq f \leq 26\text{GHz}$	2.20

#### Measurement Results:

##### 802.11b/g mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412 GHz	Fig.25	P
		30 MHz-26 GHz	Fig.26	P
	6	2.437 GHz	Fig.27	P
		30 MHz-26 GHz	Fig.28	P
	11	2.462 GHz	Fig.29	P
		30 MHz-26 GHz	Fig.30	P
802.11g	1	2.412 GHz	Fig.31	P
		30 MHz-26 GHz	Fig.32	P
	6	2.437 GHz	Fig.33	P
		30 MHz-26 GHz	Fig.34	P
	11	2.462 GHz	Fig.35	P
		30 MHz-26 GHz	Fig.36	P

##### 802.11n mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n (20MHz)	1	2.412 GHz	Fig.37	P
		30 MHz-26 GHz	Fig.38	P
	6	2.437 GHz	Fig.39	P
		30 MHz-26 GHz	Fig.40	P
	11	2.462 GHz	Fig.41	P