

## COMPLIANCE For FCC PART 15 Subpart C

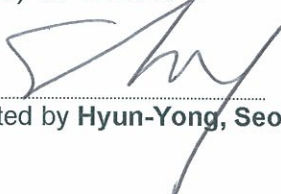
<b>Applicant Name:</b>	<b>Date of Testing</b>
DUALi INC.	May 26, 2015 to June 12, 2015
<b>Address:</b>	<b>Test Site/Location</b>
306, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, South Korea	#23, Gokhyeon-ro 480 Beon-gil, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-853, South Korea
	<b>Test Report No.:</b> BWS-15-RF-0005
	<b>BWS FRN:</b> 0009936881
<b>FCC ID: SWUITOUCHPOPV2</b>	

<b>Model(s):</b>	iTOUCH POP V2
<b>EUT Type:</b>	SMART CARD READER
<b>Frequency Range:</b>	2412-2462 MHz, 2422-2452 MHz
<b>Modulation Type</b>	DSSS(802.11b), OFDM(802.11g/n(20,40M))
<b>FCC Classification:</b>	Digital Transmission System (DTS)
<b>FCC Rule Part(s):</b>	FCC Part 15 Subpart C §15.247

The product was received on May 26, 2015 and testing was completed on June 12, 2015. We, BWS TECH Inc. would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of BWS TECH Inc. the test report shall not be reproduced except in full.

(Date) 06/ 12/2015

  
Tested by Hyun-Yong, Seol

(Date) 06/ 12 /2015

  
Reviewed by Bang-Hyun, Nam

### BWS TECH INC.

#23, Gokhyeon-ro 480 Beon-gil, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do  
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<http://www.bws.co.kr>

## TABLE OF CONTENTS

<b>1. General Information.....</b>	<b>3</b>
<b>2. Description of Test Facility.....</b>	<b>4</b>
<b>3. Test Methodology.....</b>	<b>5</b>
<b>4. Summary of Test Results.....</b>	<b>6</b>
<b>5. Test Data.....</b>	<b>7</b>
<b>5.1 6dB Bandwidth.....</b>	<b>7</b>
<b>5.2 Maximum Peak Conducted Output Power.....</b>	<b>13</b>
<b>5.3 Power Spectral Density.....</b>	<b>15</b>
<b>5.4 Conducted Spurious Emission.....</b>	<b>21</b>
<b>5.5 Radiated Spurious Emission.....</b>	<b>26</b>
<b>5.6 Band Edge Measurement.....</b>	<b>38</b>
<b>5.7 Antenna Application.....</b>	<b>65</b>
<b>5.8 Conducted Emission.....</b>	<b>66</b>

# FCC TEST REPORT

**Scope** – Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)

## 1. General Information

### 1.1 Applicant

- **Company Name** : DUALi INC.
- **Company Address** : 306, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do  
South Korea
- **Phone/Fax** : Tel No. : +82-31-213-0078 Fax No. : +82-31-213-0074

### 1.2 Manufacturer

- **Company Name** : DUALi INC.
- **Company Address** : 306, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do  
South Korea
- **Phone/Fax** : Tel No. : +82-31-213-0078 Fax No. : +82-31-213-0074

### 1.3 EUT Description

- **EUT Type** : SMART CARD READER
- **Model Name** : i TOUCH POP V2
- **S/N** : None.
- **Freq. Range** : 2412-2462 MHz , 2422-2452 MHz
- **Number of Channels** : 11 Channel , 7 Channel
- **Modulation Method** : DSSS(802.11b), OFDM(802.11g/n(20,40M))
- **Power source** : DC 12 V
- **Battery** : N/A
- **Antenna Peak Gain** : 5.52 dBi

### 1.4 Other Information

- **FCC Rule Part(s)** : Part 15 Subpart C §15.247
- **Test Procedure** : ANSI C63.10-2013,  
KDB 558074 D01 DTS Meas Guidance v03r02
- **FCC ID** : SWUITOUCHPOPV2
- **Date of Test** : May 26, 2015 to June 12, 2015
- **Place of Test** : BWS TECH Inc.(FCC Registration Number : 287786)  
#23, Gokhyeon-ro 480 Beon-gil, Mohyeon-myeon,  
Cheoin-gu, Yongin-si, Gyeonggi-do 449-853, South Korea  
TEL: +82 31 333 5997 FAX: +82 31 333 0017

## 2. Description of Test Facility

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### Site Description

<b>Test Lab.</b>	:	 Accredited by Industry Canada, February 27, 2012 The Certificate Registration Number is 4963A-2.
		 Accredited by FCC, September 03, 2013 The Certificate Registration Number is 287786.
		 Accredited by VCCI, July 10, 2012 The Certificate Registration Number is C-4326
		 Accredited by RRA(EMC,RF, SAR), November 27, 2014 The Certificate Registration Number is KR0017
		 Accredited by KOLAS(KS Q ISO/IEC 17025), October 7, 2014 The Certificate Registration Number is KT174
<b>Name of Firm</b>	:	BWS TECH Inc.
<b>Site Location</b>	:	#23, Gokhyeon-ro 480 Beon-gil, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-853, South Korea

### 3. Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

#### 3.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application

#### 3.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

#### 3.3 FCC Part 15.205 Restricted Bands Of Operations

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions.

The provisions in Section 15.35 apply to these measurements.

#### 3.4 Description Of Test Modes

The EUT has been tested under operating condition.

After verification, all tests were carried out with the worst case test modes as shown below.

- DSSS(11Mbps) Channel Low (2412MHz), Mid (2437MHz) and High (2462MHz),
- OFDM(54Mbps,MCS7) Channel Low (2412MHz), Mid (2437MHz) and High (2462MHz).

These were chosen for full testing.

## 4. Summary of Test Results

Digital Transmission System (DTS)			
TEST Description	Standard Section	Requirements	Result
6dB Bandwidth	§15.247(a)(2)	≥500kHz	Pass
Maximum Peak Conducted Output Power	§15.247(b)(3)	≤30dBm	Pass
Power Spectral Density	§15.247(e)	≤8dBm/3kHz	Pass
Conducted Spurious Emission	§15.247(d)	≥20dBc/100kHz	Pass
Radiated Spurious Emission	§15.247(d), §15.209(a), §15.35(b)	§15.209, §15.247(d)	Pass
Band Edges Measurement	§15.247(d)	§15.205(a), §15.209(a)	Pass
Antenna Application	§15.247(b), §15.203	§15.247(b), §15.203	Pass
Conducted Emission	§15.207	§15.207(a)	Pass



## 5. Test Data

### 5.1 6dB Bandwidth

#### 5.1.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)
Spectrum analyzer	N9020A	Agilent	US46220101	15/09/11
RF Cable_2m	Test No.1	Hubersunhner	N/A	16/01/14
AC Power Source	15001ix-CTS	California Instruments	56255/56256/56257	16/01/13

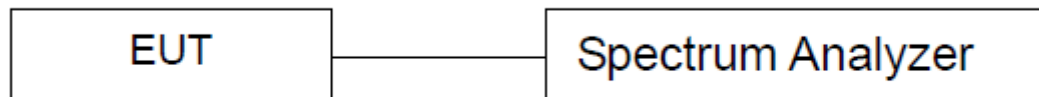
#### 5.1.2 Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

#### 5.1.3 Measurement Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously
4. Set (RBW = 100 kHz, VBW = 300 kHz, Detector = Peak, Trace mode = Max Hold, Sweep = Auto)
5. Measure and record the results in the test report.

#### 5.1.4 Test SET-UP (Block Diagram of Configuration)



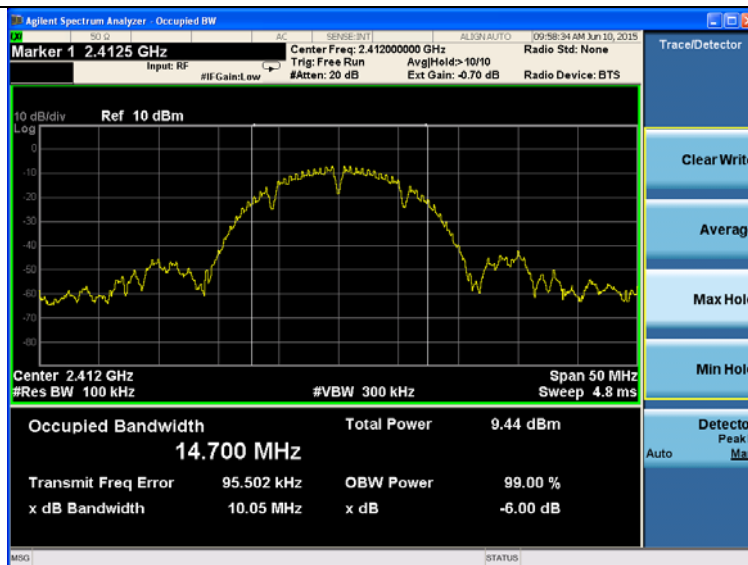
### 5.1.5 Test Result

Modulation	Frequency (MHz)	Test Result (MHz)	Limit (MHz)
<b>802.11b</b>	2412	10.05	≥ 0.5
	2437	10.08	≥ 0.5
	2462	10.07	≥ 0.5
<b>802.11g</b>	2412	16.58	≥ 0.5
	2437	16.58	≥ 0.5
	2462	16.59	≥ 0.5
<b>802.11n(20M)</b>	2412	17.67	≥ 0.5
	2437	17.66	≥ 0.5
	2462	17.65	≥ 0.5
<b>802.11n(40M)</b>	2422	36.06	≥ 0.5
	2437	36.07	≥ 0.5
	2452	36.08	≥ 0.5

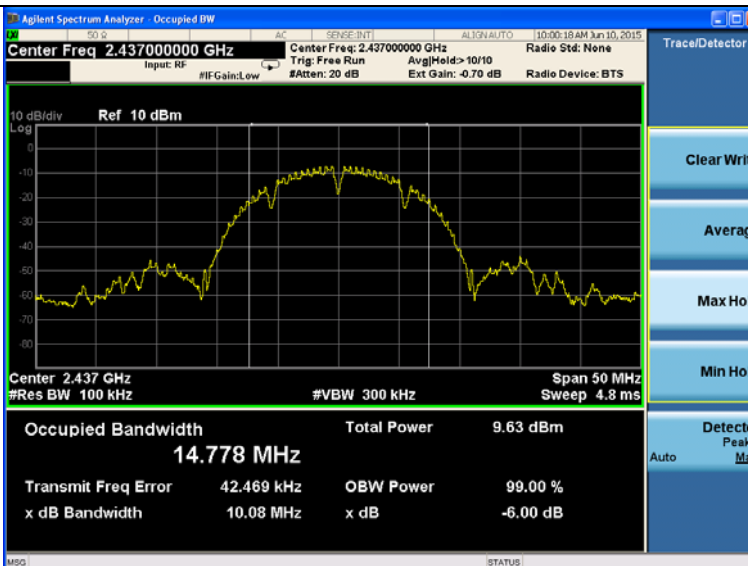


## 6dB Bandwidth - 802.11b

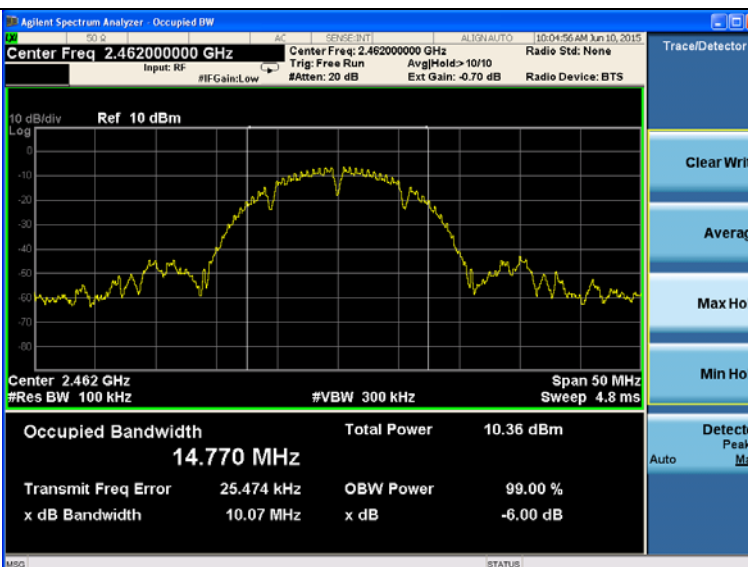
2412MHz



2437MHz

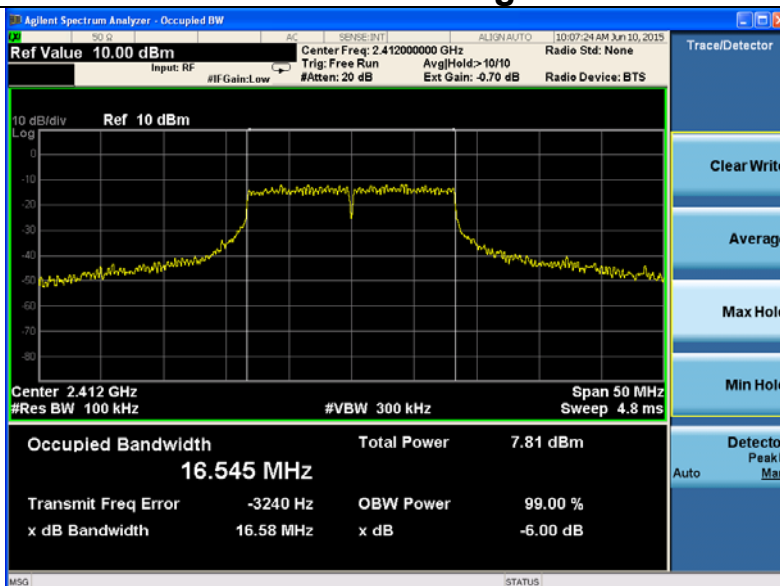


2462MHz

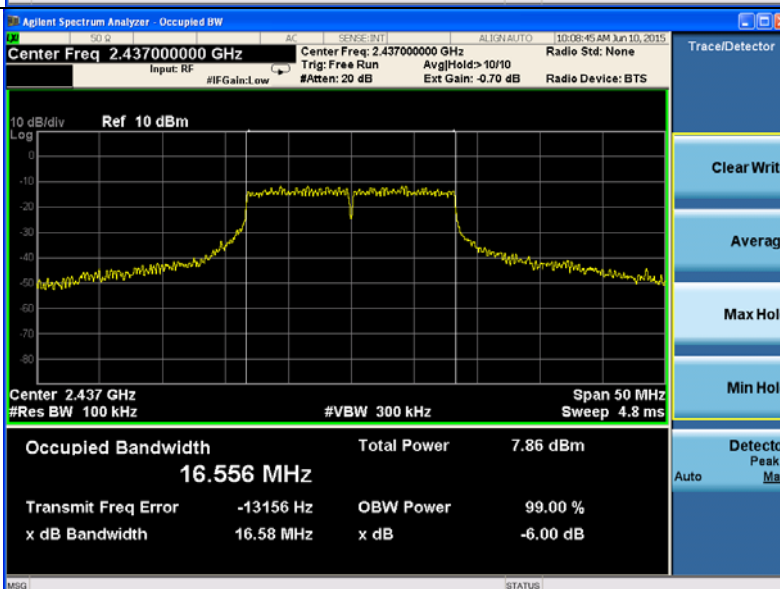


## 6dB Bandwidth - 802.11g

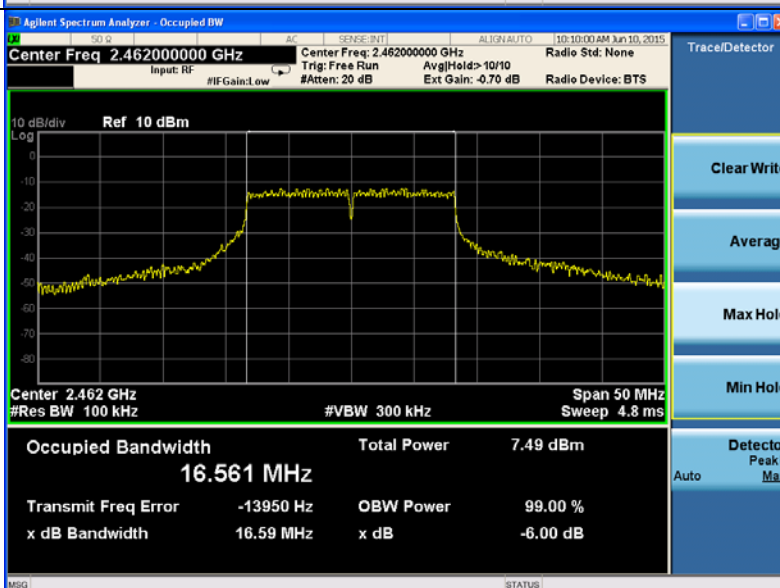
2412MHz



2437MHz

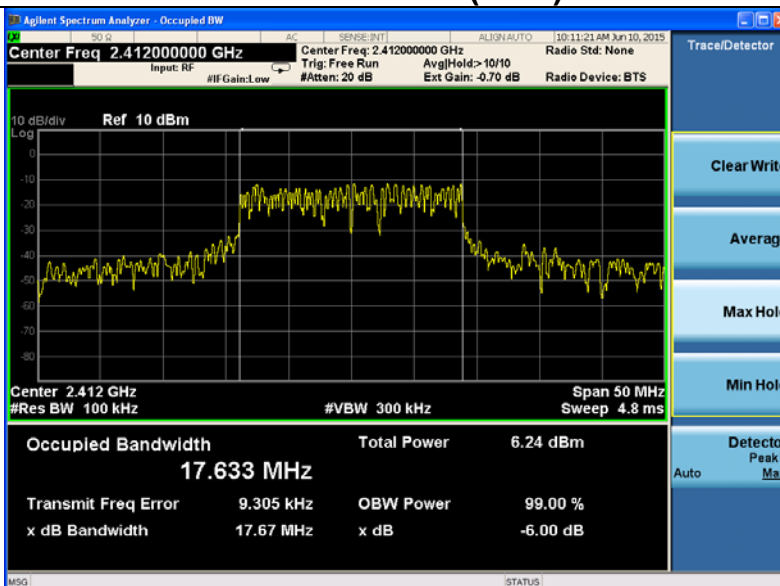


2462MHz

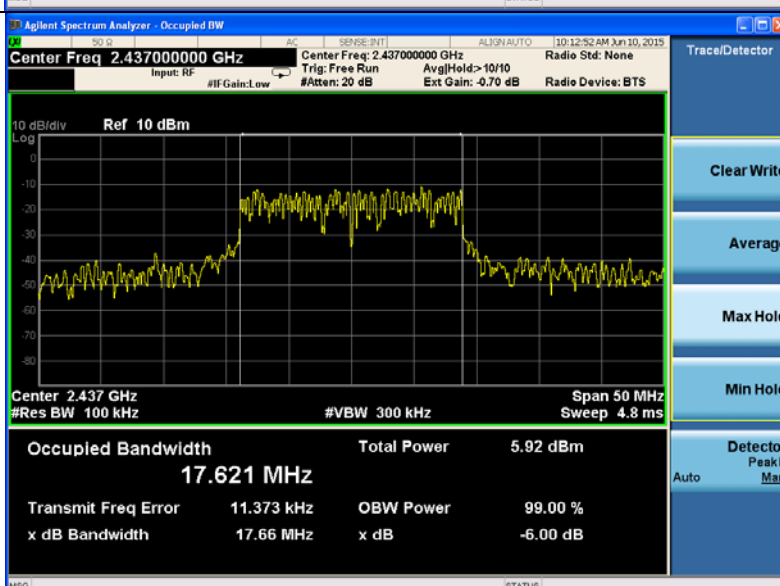


## 6dB Bandwidth - 802.11n(20M)

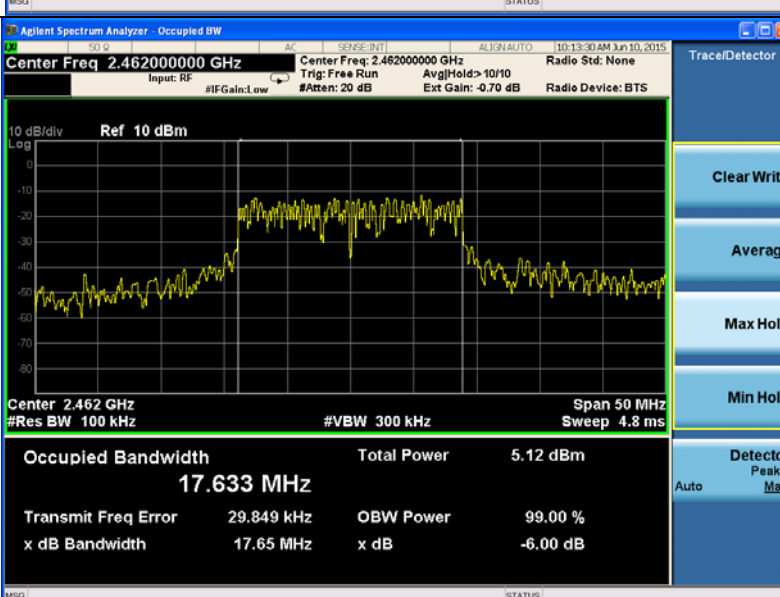
2412MHz



2437MHz

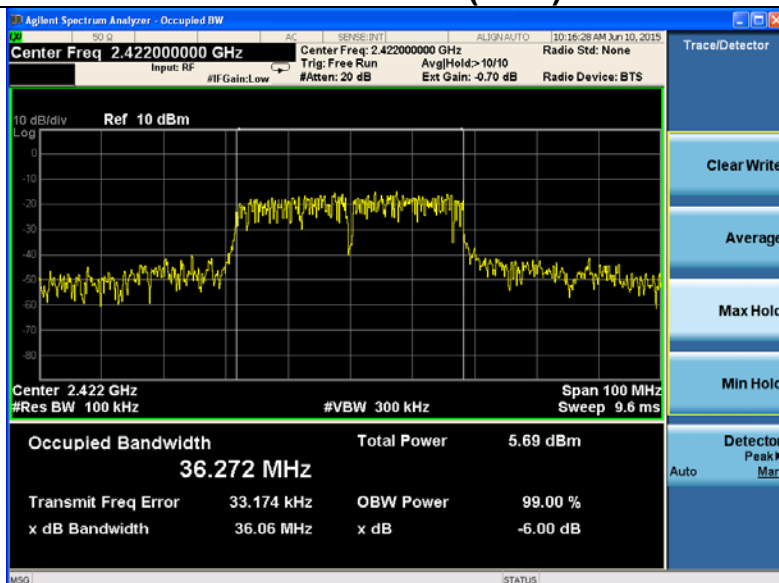


2462MHz

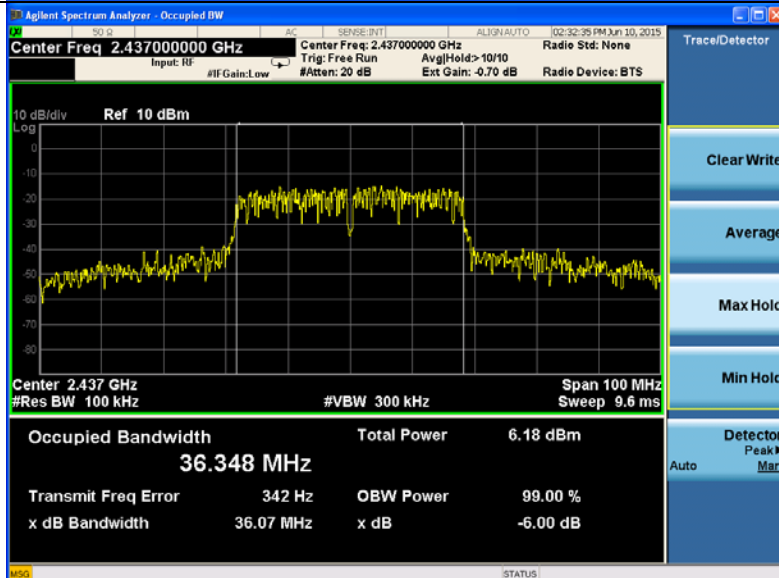


## 6dB Bandwidth - 802.11n(40M)

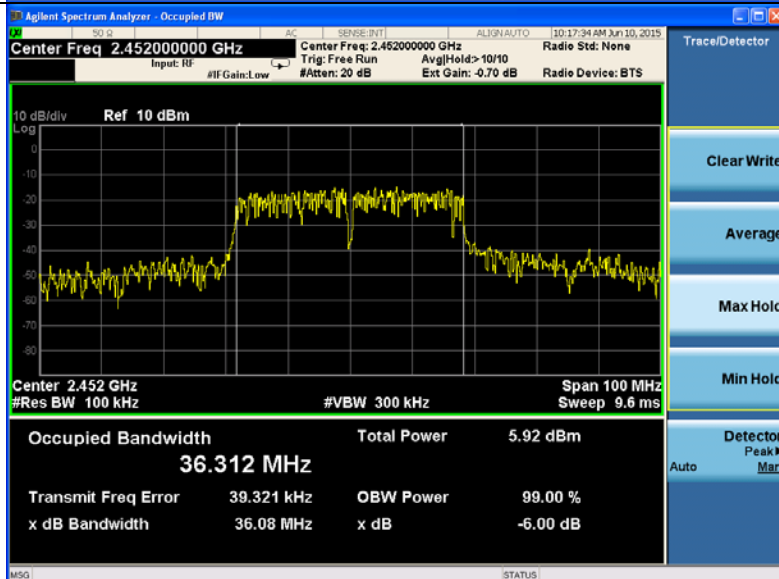
2422MHz



2437MHz



2452MHz



## 5.2 Maximum Peak Conducted Output Power

### 5.2.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)
Power Meter	RPR3006W	D.A.R.E!! Insrtuments	14I00048SNO09	16/04/30
RF Cable_2m	Test No.1	Hubersunhner	N/A	16/01/14
AC Power Source	15001ix-CTS	California Instruments	56255/56256/56257	16/01/13

### 5.2.2 Test Limit

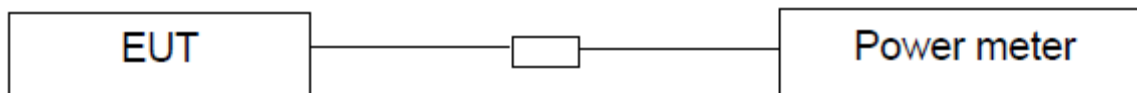
The maximum peak power shall be less than 1 Watt (30dBm).

Note: If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the direction gain of the antenna exceeds 6dBi, In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

### 5.2.3 Measurement Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The RF output of EUT was connected to the power meter by RF cable and attnuator.  
The path loss was compensated to the results for each measurement.
3. Set to the maximum output power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.

### 5.2.4 Test SET-UP (Block Diagram of Configuration)



### 5.2.5 Test Result

Modulation	Frequency (MHz)	Test Result (dBm)	Limit (dBm)
<b>802.11b</b>	2412	3.8	≤ 30
	2437	3.5	≤ 30
	2462	5.2	≤ 30
<b>802.11g</b>	2412	-0.5	≤ 30
	2437	-0.7	≤ 30
	2462	-0.8	≤ 30
<b>802.11n(20M)</b>	2412	1.3	≤ 30
	2437	1.7	≤ 30
	2462	2.9	≤ 30
<b>802.11n(40M)</b>	2422	2.1	≤ 30
	2437	1.7	≤ 30
	2452	1.6	≤ 30

Note: Measurement has been performed with the Power Meter which is compliance with the 9.1.2 of KDB 558074 D01 DTS Meas. Guidance v03r02. (Power Meter Model : RPR 3006W)

## 5.3 Power Spectral Density

### 5.3.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)
Spectrum analyzer	N9020A	Agilent	US46220101	15/09/11
RF Cable_2m	Test No.1	Hubersunhner	N/A	16/01/14
AC Power Source	15001ix-CTS	California Instruments	56255/56256/56257	16/01/13

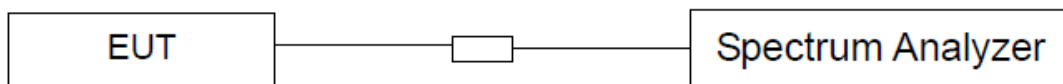
### 5.3.2 Test Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the Antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

### 5.3.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously
4. Set (RBW = 3 kHz, VBW = 10 kHz, Detector = Peak, Span = 1.5 times DTS Channel Bandwidth, Trace mode = Max Hold, Sweep = Auto)
5. Measure and record the results in the test report.

### 5.3.4 Block Diagram of Test Setup



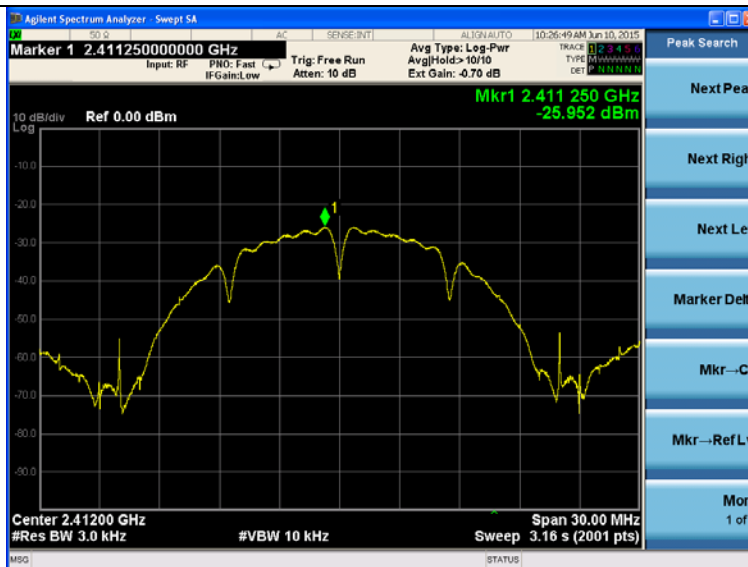


### 5.3.5 Test Result

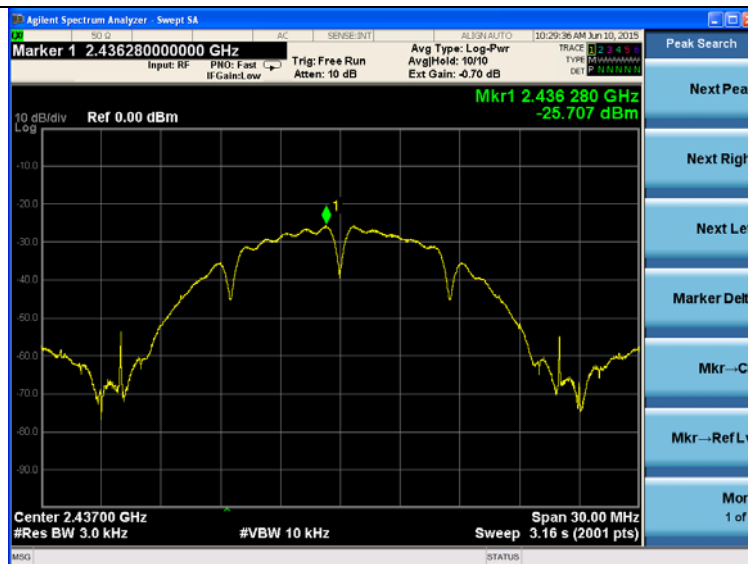
Modulation	Frequency(MHz)	Test Result(dBm)	Limit(dBm/3kHz)
<b>802.11b</b>	2412	-25.952	≤ 8
	2437	-25.707	≤ 8
	2462	-24.559	≤ 8
<b>802.11g</b>	2412	-26.747	≤ 8
	2437	-27.306	≤ 8
	2462	-27.266	≤ 8
<b>802.11n(20M)</b>	2412	-13.009	≤ 8
	2437	-13.122	≤ 8
	2462	-12.270	≤ 8
<b>802.11n(40M)</b>	2422	-15.366	≤ 8
	2437	-15.221	≤ 8
	2452	-15.340	≤ 8

## Power Spectral Density - 802.11b

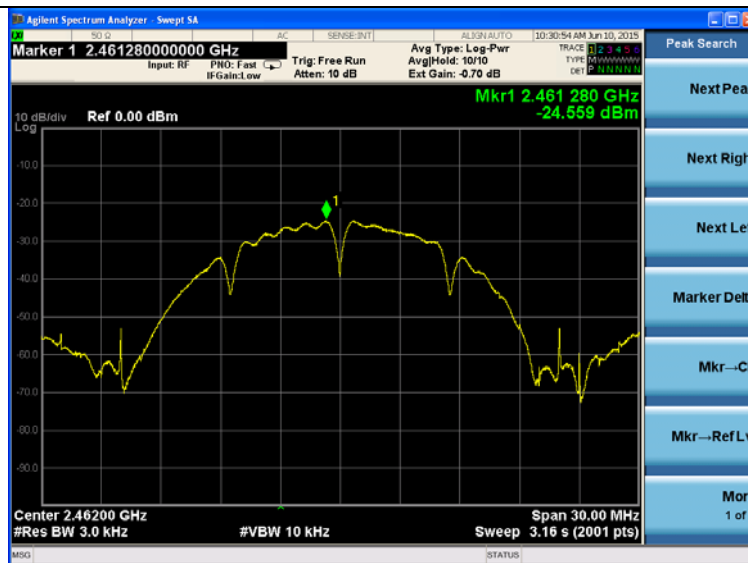
2412MHz



2437MHz

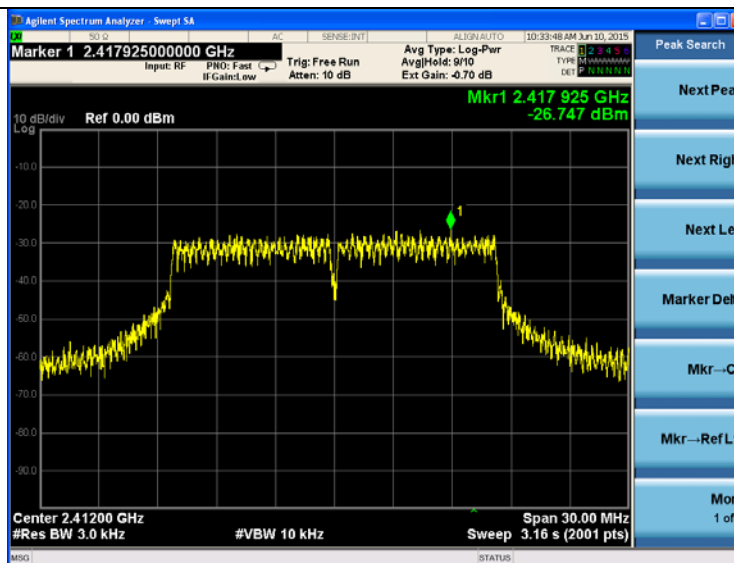


2462MHz

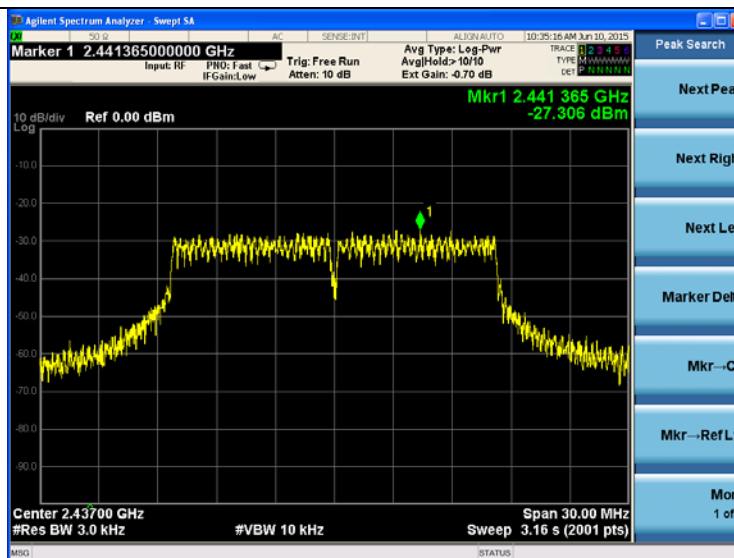


## Power Spectral Density - 802.11g

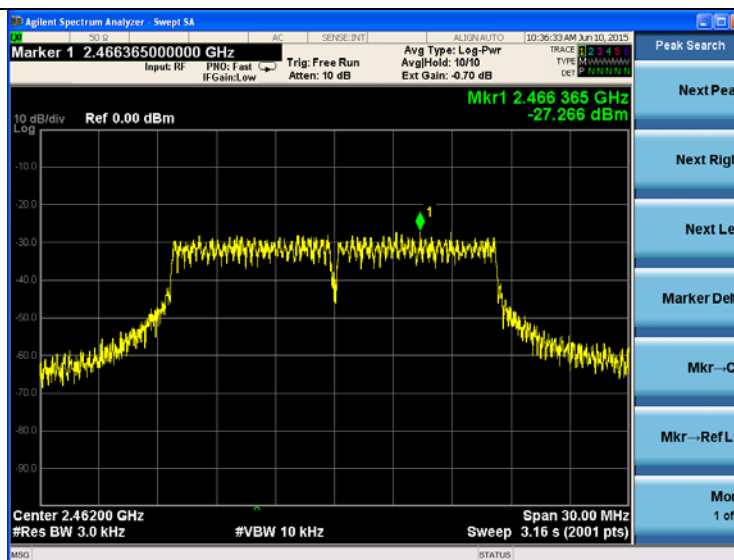
2412MHz



2437MHz

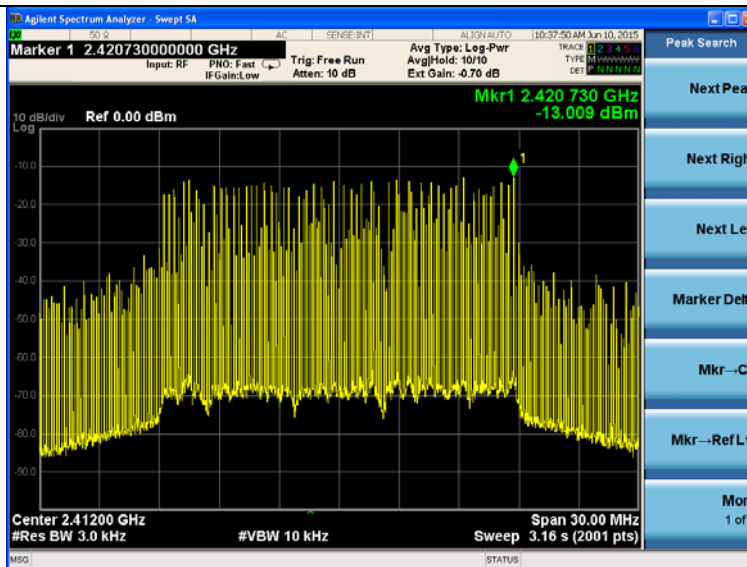


2462MHz

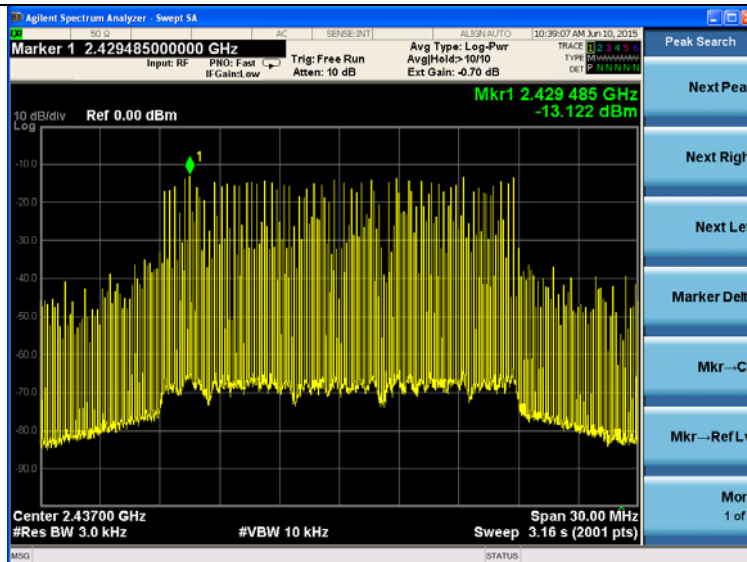


## Power Spectral Density - 802.11n(20M)

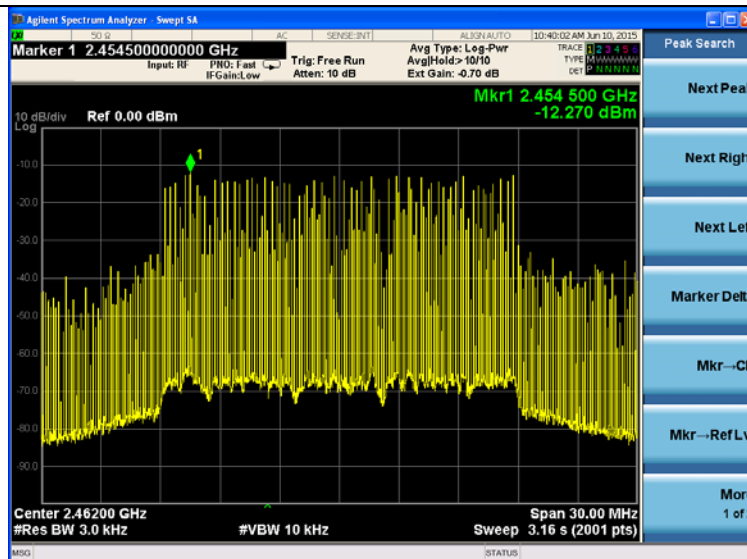
2412MHz



2437MHz

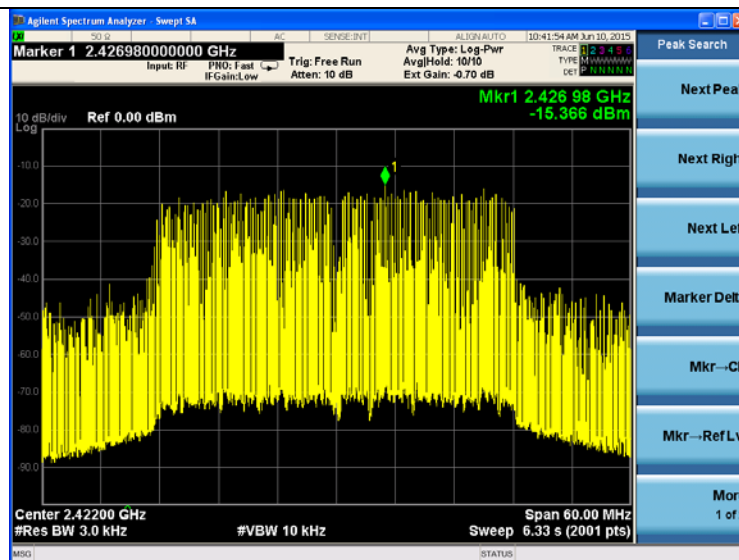


2462MHz

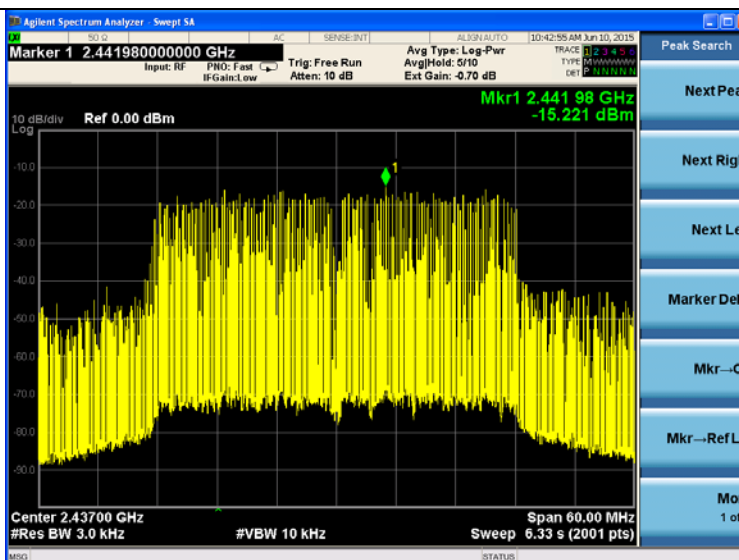


## Power Spectral Density - 802.11n(40M)

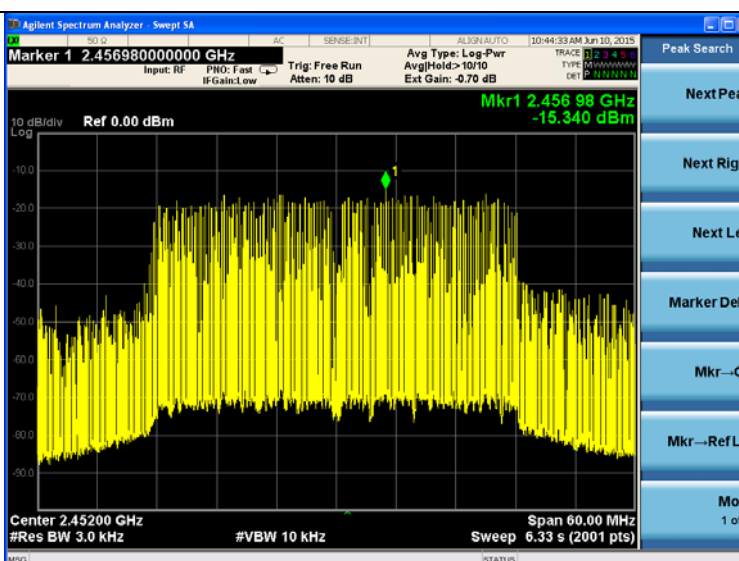
2422MHz



2437MHz



2452MHz



## 5.4 Conducted Spurious Emission

### 5.4.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)
Spectrum analyzer	N9020A	Agilent	US46220101	15/09/11
RF Cable_2m	Test No.1	Hubersunhner	N/A	16/01/14
AC Power Source	15001ix-CTS	California Instruments	56255/56256/56257	16/01/13

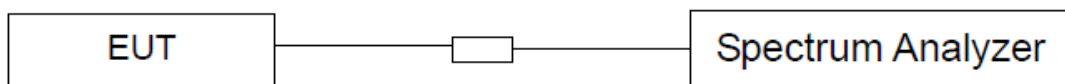
### 5.4.2 Test Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. 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).

### 5.4.3 Test Procedures

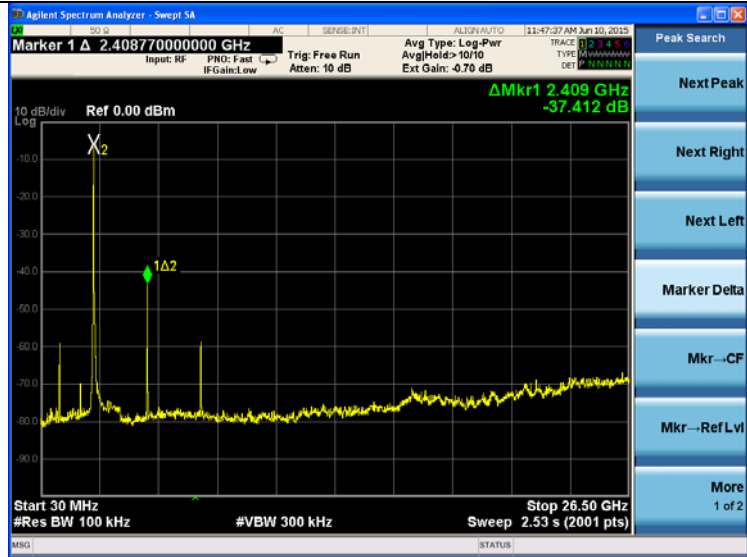
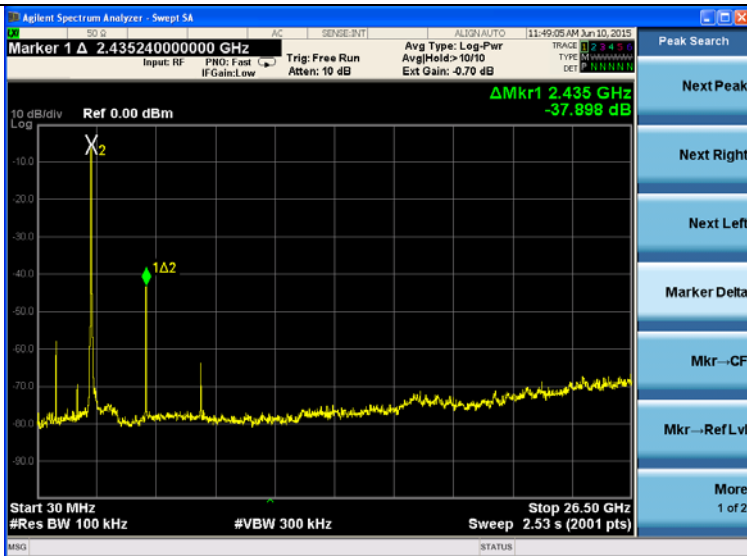
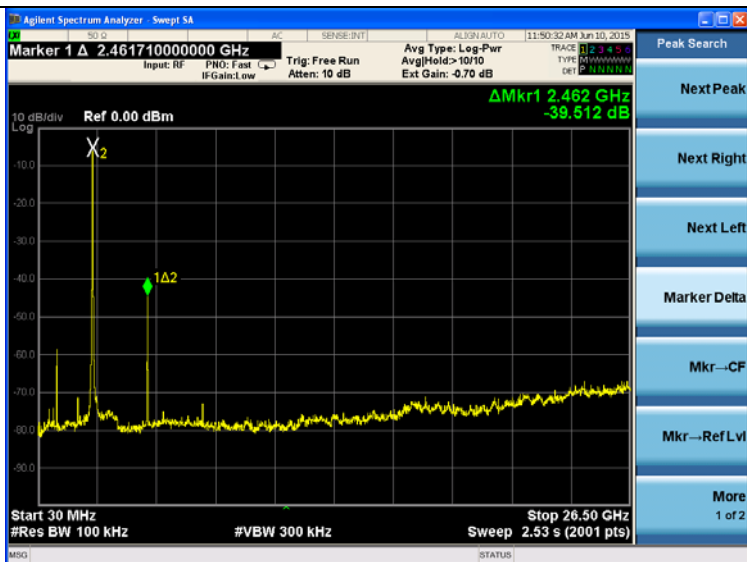
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously
4. Set (RBW = 100 kHz, VBW = 300 kHz, Detector = Peak, Trace mode = Max Hold, Sweep = Auto)
5. Measure and record the results in the test report.

### 5.4.4 Block Diagram of Test setup.



## 5.4.5 Test Result

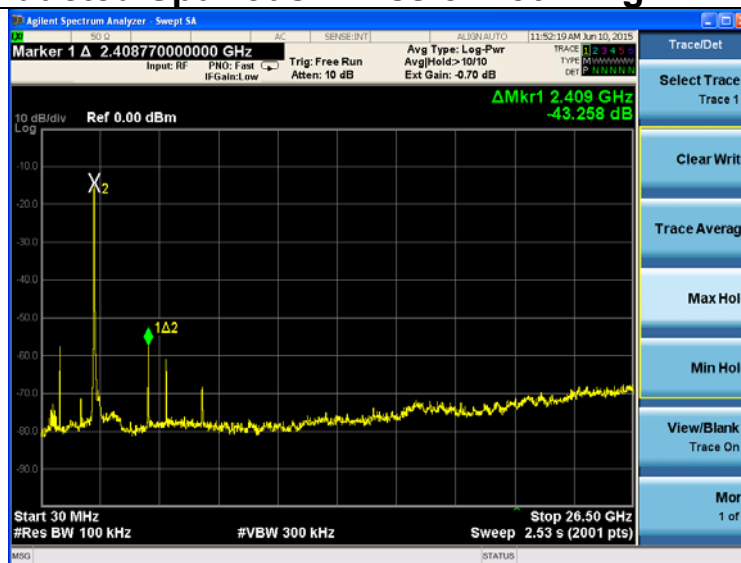
### Conducted Spurious Emission -802.11b

2412MHz	
2437MHz	
2462MHz	

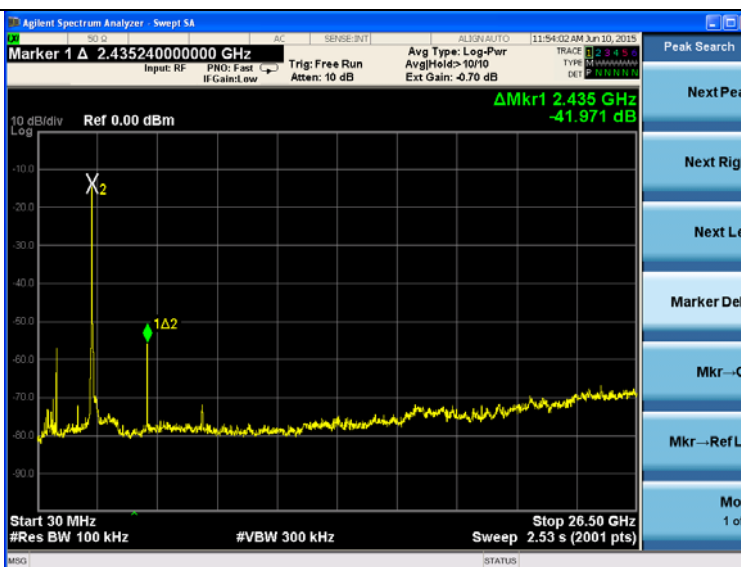


## Conducted Spurious Emission -802.11g

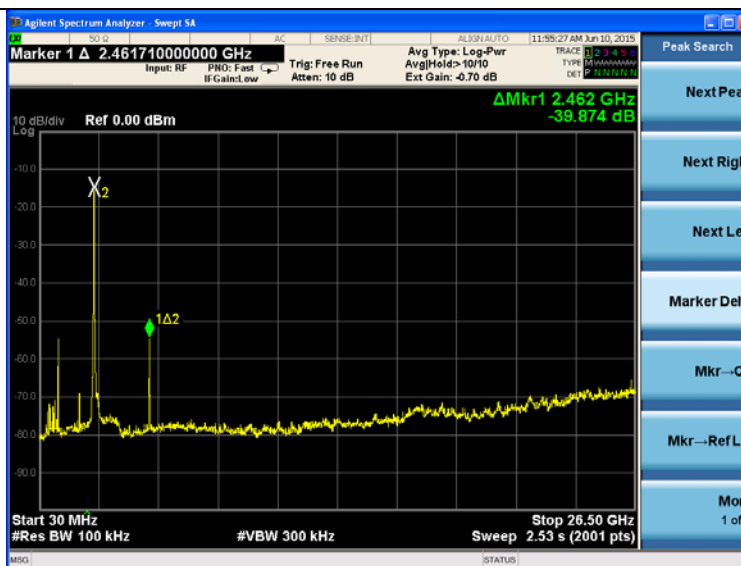
2412MHz



2437MHz

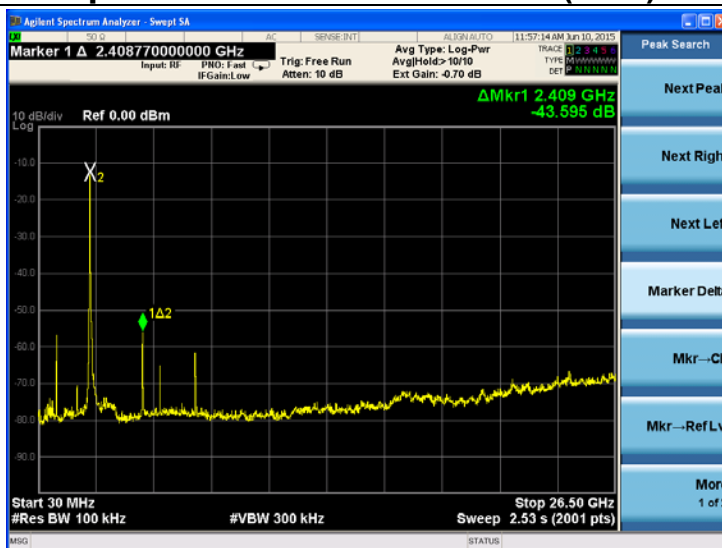


2462MHz

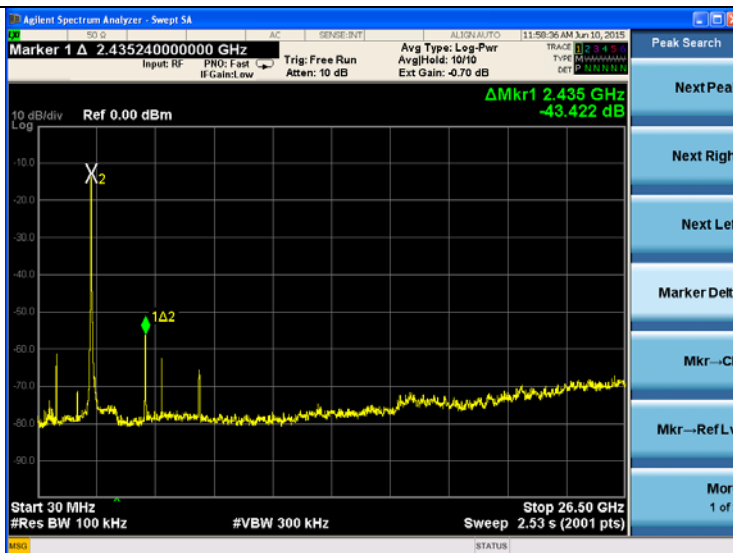


## Conducted Spurious Emission -802.11n(20M)

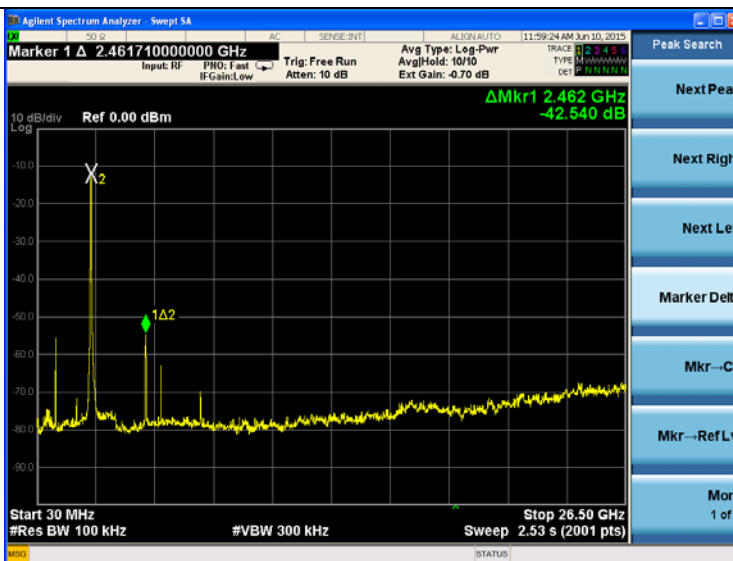
2412MHz






2437MHz



2462MHz



## Conducted Spurious Emission -802.11n(40M)

2422MHz	
2437MHz	
2452MHz	

## 5.5 Radiated Spurious Emission

### 5.5.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)
Spectrum analyzer	FSP13	Rohde & Schwarz	100760	16/02/06
Spectrum analyzer	N9020A	Agilent	US46220101	15/09/11
Bilog Antenna	VULB9160	Schwarzbeck	VULB9160-3122	16/04/02
Antenna Master	JAC-3	DAE IL EMC	N/A	N/A
Antenna Turntable Controller	JAC-2	JAEMC	N/A	N/A
RF Cable_2m	Test No.1	Hubersunhner	N/A	16/01/14
RF Cable_10m	Test No.2	Hubersunhner	N/A	16/01/14
Loop Antenna	HFH2-Z2	Rohde & Schwarz	881056/6	16/01/06
Horn Antenna	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D 234	15/09/15
Horn Antenna	BBHA 9170	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170157	15/11/14
RF Amplifier	PAM-118A	COM-POWER	551019	15/07/21
Antenna Master	N/A	AUDIX	N/A	15/09/17
Antenna Turntable Controller	ACT	AUDIX	N/A	15/09/17
RE Below 1 GHz CHAMBER	N/A	SY Corp.	N/A	N/A
RE Above 1 GHz CHAMBER	N/A	SY Corp.	N/A	15/09/17
AC Power Source	15001ix-CTS	California Instruments	56255/56256/56257	16/01/13

### 5.5.2 Test Limit

Radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/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

### 5.5.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Measurements were performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured was complete.

When spectrum scanned from 0.009 MHz to 30MHz,  
EMI Test Receiver Setting (Attenuation: Auto, RBW: 200 Hz, VBW 1 kHz, Detector: QP, Trace: Max hold).

When spectrum scanned from 30 MHz to 1GHz,  
EMI Test Receiver Setting (Attenuation: Auto, RBW: 120 kHz, VBW 300 kHz, Detector: QP, Trace: Max hold).

When spectrum scanned above 1GHz,  
EMI Test Receiver Setting (Attenuation: Auto, RBW: 1 MHz, VBW 3 MHz, Detector: Peak, Trace: Max hold).

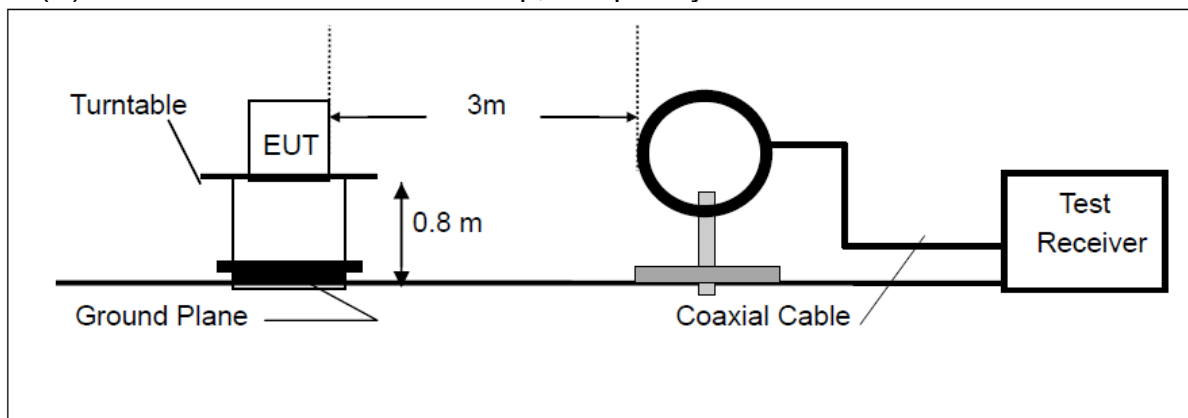
For average measurement:

- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

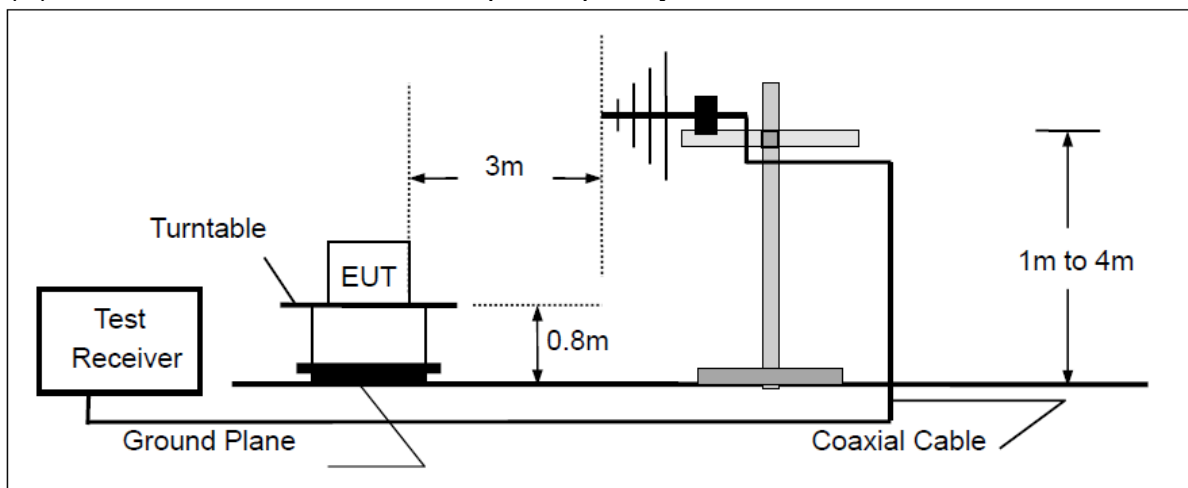
6. Measure and record the results in the test report.

#### 5.5.4 Test SET-UP (Block Diagram of Configuration)

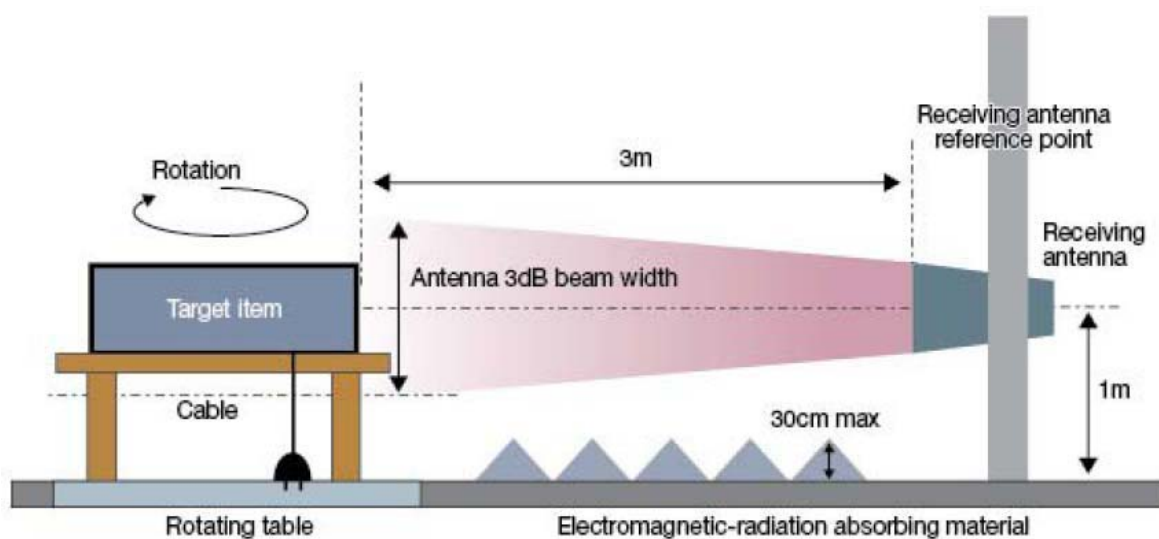
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



## 5.5.5 Test Result

### 5.5.5.1 0.009–30 MHz

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	AMP Gain [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Margin [dB]	Result
-	-	-	-	-	-	-	-	-	Pass

Note: §15.31(o)\_The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.



### 5.5.5.2 30–1000 MHz

#### 802.11b - 2412 MHz(Low)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
94.43	17.87	H	11.16	1.00	43.52	30.03	Q.P
108.27	15.55	H	13.15	1.07	43.52	29.77	Q.P
156.46	14.90	H	13.84	1.29	43.52	30.03	Q.P
336.04	18.07	H	15.55	1.89	46.02	35.51	Q.P
429.52	13.55	V	17.54	2.12	46.02	33.21	Q.P
467.24	17.48	H	18.26	2.22	46.02	37.96	Q.P

#### 802.11b - 2437 MHz(Middle)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
94.43	14.98	H	11.16	1.00	43.52	27.14	Q.P
108.27	14.58	H	13.15	1.07	43.52	28.80	Q.P
148.44	13.73	H	13.98	1.25	43.52	28.96	Q.P
323.32	19.01	H	15.27	1.86	46.02	36.14	Q.P
462.35	17.61	H	18.17	2.21	46.02	37.99	Q.P
625.08	13.81	V	20.73	2.53	46.02	37.07	Q.P

#### 802.11b - 2462 MHz(High)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
49.53	14.46	V	12.37	0.73	40.00	27.56	Q.P
94.43	13.35	H	11.16	1.00	43.52	25.51	Q.P
108.27	15.33	H	13.15	1.07	43.52	29.55	Q.P
323.32	18.74	H	15.27	1.86	46.02	35.87	Q.P
454.31	18.45	H	18.01	2.19	46.02	38.65	Q.P
522.72	15.79	H	19.23	2.33	46.02	37.35	Q.P

**802.11g - 2412 MHz(Low)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
108.27	14.69	H	13.15	1.07	43.52	28.91	Q.P
153.74	12.92	H	13.89	1.27	43.52	28.08	Q.P
236.64	14.03	V	12.99	1.58	46.02	28.60	Q.P
323.32	17.95	H	15.27	1.86	46.02	35.08	Q.P
454.31	17.88	H	18.01	2.19	46.02	38.08	Q.P
830.40	13.58	H	23.66	2.99	46.02	40.23	Q.P

**802.11g - 2437 MHz(Middle)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
60.07	12.45	V	12.01	0.80	40.00	25.26	Q.P
103.08	15.64	H	12.23	1.04	43.52	28.91	Q.P
148.44	15.21	H	13.98	1.25	43.52	30.44	Q.P
236.64	14.13	V	12.99	1.58	46.02	28.70	Q.P
323.32	18.25	H	15.27	1.86	46.02	35.38	Q.P
454.31	18.04	H	18.01	2.19	46.02	38.24	Q.P

**802.11g - 2462 MHz(High)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
103.08	15.48	H	12.23	1.04	43.52	28.75	Q.P
148.44	14.06	H	13.98	1.25	43.52	29.29	Q.P
323.32	18.16	H	15.27	1.86	46.02	35.29	Q.P
454.31	17.49	H	18.01	2.19	46.02	37.69	Q.P
919.29	12.34	V	24.46	3.16	46.02	39.96	Q.P
989.54	13.33	H	25.20	3.30	54.00	41.83	Q.P

**802.11n(20M) - 2412 MHz(Low)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
59.86	13.14	V	12.01	0.80	40.00	25.95	Q.P
103.08	15.29	H	12.23	1.04	43.52	28.56	Q.P
108.27	15.65	H	13.15	1.07	43.52	29.87	Q.P
235.82	14.67	V	12.97	1.58	46.02	29.22	Q.P
323.32	18.16	H	15.27	1.86	46.02	35.29	Q.P
454.31	17.69	H	18.01	2.19	46.02	37.89	Q.P

**802.11n(20M) - 2437 MHz(Middle)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
103.08	13.50	V	12.23	1.04	43.52	26.77	Q.P
108.27	15.70	H	13.15	1.07	43.52	29.92	Q.P
148.44	14.01	H	13.98	1.25	43.52	29.24	Q.P
236.64	14.09	V	12.99	1.58	46.02	28.66	Q.P
323.32	17.81	H	15.27	1.86	46.02	34.94	Q.P
454.31	18.26	H	18.01	2.19	46.02	38.46	Q.P

**802.11n(20M) - 2462 MHz(High)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
103.08	15.74	H	12.23	1.04	43.52	29.01	Q.P
108.27	15.37	H	13.15	1.07	43.52	29.59	Q.P
148.44	13.99	H	13.98	1.25	43.52	29.22	Q.P
237.48	14.67	H	13.00	1.58	46.02	29.25	Q.P
323.32	18.86	H	15.27	1.86	46.02	35.99	Q.P
447.98	18.02	H	17.89	2.17	46.02	38.08	Q.P

**802.11n(40M) - 2422 MHz(Low)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
103.08	16.53	H	12.23	1.04	43.52	29.80	Q.P
108.27	15.76	H	13.15	1.07	43.52	29.98	Q.P
143.83	14.08	H	14.07	1.23	43.52	29.38	Q.P
237.48	16.28	V	13.00	1.58	46.02	30.86	Q.P
323.32	18.27	H	15.27	1.86	46.02	35.40	Q.P
453.31	17.64	H	18.01	2.19	46.02	37.84	Q.P

**802.11n(40M) - 2437 MHz(Middle)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
103.08	16.36	H	12.23	1.04	43.52	29.63	Q.P
108.27	15.66	H	13.15	1.07	43.52	29.88	Q.P
143.83	13.49	H	14.07	1.23	43.52	28.79	Q.P
323.32	18.56	H	15.27	1.86	46.02	35.69	Q.P
454.31	17.66	H	18.01	2.19	46.02	37.86	Q.P
821.71	13.06	V	23.59	2.97	46.02	39.62	Q.P

**802.11n(40M) - 2452 MHz(High)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
103.08	18.60	H	12.23	1.04	43.52	31.87	Q.P
108.27	17.82	H	13.15	1.07	43.52	32.04	Q.P
113.71	16.11	H	14.11	1.10	43.52	31.32	Q.P
232.53	16.44	V	12.90	1.57	46.02	30.91	Q.P
323.32	18.39	H	15.27	1.86	46.02	35.52	Q.P
467.24	17.80	H	18.26	2.22	46.02	38.28	Q.P

### 5.5.5.3 Above 1 GHz

#### 802.11b - 2412 MHz(Low)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	AMP Gain [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1091.91	53.07	H	25.38	3.09	40.29	74.00	41.25	Peak
1200.53	52.76	H	25.46	3.32	40.34	74.00	41.20	Peak
1799.84	51.03	H	25.96	4.12	40.64	74.00	40.47	Peak
1878.92	60.47	H	26.06	4.23	40.69	74.00	50.07	Peak
4824.13	45.01	H	30.76	6.70	41.27	54.00	41.20	Average
4824.13	61.68	H	30.77	6.70	41.26	74.00	57.89	Peak

#### 802.11b - 2437 MHz(Middle)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	AMP Gain [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1057.12	54.32	H	25.40	3.14	40.30	74.00	42.56	Peak
1660.42	58.05	V	25.79	3.92	40.57	74.00	47.19	Peak
1796.62	57.22	H	25.96	4.11	40.64	74.00	46.65	Peak
1916.32	56.43	H	26.10	4.28	40.71	74.00	46.10	Peak
4874.00	49.14	H	30.84	6.75	41.23	54.00	45.50	Average
4874.00	67.37	H	30.84	6.75	41.23	74.00	63.73	Peak

#### 802.11b - 2462 MHz(High)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	AMP Gain [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1059.01	53.69	H	25.40	3.14	40.30	74.00	41.93	Peak
1590.53	50.54	H	25.70	3.82	40.54	74.00	39.52	Peak
1809.54	50.35	H	25.97	4.13	40.65	74.00	39.80	Peak
1954.47	54.26	H	26.14	4.34	40.73	74.00	44.01	Peak
4926.68	38.55	H	30.94	6.80	41.19	54.00	35.10	Average
4926.68	59.48	H	30.94	6.80	41.19	74.00	56.03	Peak

### 802.11g - 2412 MHz(Low)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	AMP Gain [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1057.12	51.81	H	25.40	3.14	40.30	74.00	40.05	Peak
1200.53	52.35	H	25.46	3.32	40.34	74.00	40.79	Peak
1587.68	55.01	H	25.69	3.81	40.54	74.00	43.97	Peak
1799.84	59.27	H	25.96	4.12	40.64	74.00	48.71	Peak
1878.92	60.41	H	26.06	4.23	40.69	74.00	50.01	Peak
4839.20	54.94	H	30.78	6.71	41.26	74.00	51.17	Peak

### 802.11g - 2437 MHz(Middle)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	AMP Gain [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1060.91	51.12	H	25.40	3.15	40.30	74.00	39.37	Peak
1601.97	51.03	H	25.71	3.83	40.55	74.00	40.02	Peak
1806.30	54.46	H	25.97	4.12	40.65	74.00	43.90	Peak
1919.76	52.81	H	26.10	4.29	40.71	74.00	42.49	Peak
4874.00	39.14	H	30.84	6.75	41.23	54.00	35.50	Average
4874.00	57.61	H	30.86	6.76	41.22	74.00	54.01	Peak

### 802.11g - 2462 MHz(High)

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	AMP Gain [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1059.01	53.30	H	25.40	3.14	40.30	74.00	41.54	Peak
1584.84	55.55	H	25.69	3.81	40.54	74.00	44.51	Peak
1799.84	50.05	V	25.96	4.12	40.64	74.00	39.49	Peak
1806.30	51.45	H	25.97	4.12	40.65	74.00	40.89	Peak
4949.52	56.12	H	30.95	6.81	41.18	74.00	52.70	Peak

**802.11n(20M) - 2412 MHz(Low)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1059.01	53.28	H	25.40	3.14	74.00	41.52	Peak
1200.53	50.17	H	25.46	3.32	74.00	38.61	Peak
1590.53	53.72	H	25.70	3.82	74.00	42.70	Peak
1882.29	59.23	H	26.06	4.23	74.00	48.83	Peak
4830.50	41.89	H	30.77	6.70	54.00	38.10	Average
4830.50	59.63	H	30.77	6.70	74.00	55.84	Peak

**802.11n(20M) - 2437 MHz(Middle)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1062.81	62.03	H	25.40	3.15	74.00	50.28	Peak
1200.53	52.95	H	25.46	3.32	74.00	41.39	Peak
1806.30	57.24	H	25.97	4.12	74.00	46.68	Peak
1919.76	61.59	H	26.10	4.29	74.00	51.27	Peak
4874.00	52.84	H	30.84	6.75	54.00	49.20	Average
4874.00	68.33	H	30.84	6.75	74.00	64.69	Peak

**802.11n(20M) - 2462 MHz(High)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1060.91	53.03	H	25.40	3.15	74.00	41.28	Peak
1593.38	48.24	H	25.70	3.82	74.00	37.22	Peak
1793.40	53.79	H	25.96	4.11	74.00	43.22	Peak
1950.97	59.15	H	26.14	4.33	74.00	48.89	Peak
4923.85	50.96	H	30.93	6.80	54.00	47.50	Average
4923.85	62.44	H	30.94	6.80	74.00	58.99	Peak



**802.11n(40M) - 2422 MHz(Low)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1059.01	51.18	H	25.40	3.14	74.00	39.42	Peak
1198.38	52.19	H	25.46	3.32	74.00	40.63	Peak
1799.84	60.37	H	25.96	4.12	74.00	49.81	Peak
1899.23	56.17	H	26.08	4.26	74.00	45.81	Peak
4864.08	49.47	H	30.83	6.74	54.00	45.80	Average
4864.08	61.43	H	30.83	6.74	74.00	57.76	Peak

**802.11n(40M) - 2437 MHz(Middle)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1057.12	52.32	H	25.40	3.14	74.00	40.56	Peak
1593.38	50.08	H	25.70	3.82	74.00	39.06	Peak
1916.32	55.52	H	26.10	4.28	74.00	45.19	Peak
2650.42	52.00	H	27.12	4.81	74.00	42.76	Peak
4862.67	52.78	H	30.82	6.74	54.00	49.10	Average
4862.67	62.02	H	30.83	6.74	74.00	58.35	Peak

**802.11n(40M) - 2452 MHz(High)**

Frequency [MHz]	Reading [dB $\mu$ V]	Polarization [*H/**V]	Ant. Factor [dB]	Cable Loss [dB]	Limit [dB $\mu$ V/m]	Emission Level [dB $\mu$ V/m]	Detector
1057.12	53.30	H	25.40	3.14	74.00	41.54	Peak
1930.11	51.26	H	26.11	4.30	74.00	40.95	Peak
4892.47	46.17	H	30.88	6.76	54.00	42.60	Average
4892.47	57.63	H	30.89	6.77	74.00	54.08	Peak