

# Test Report

**FCC ID: 2AMPJ-TM141WT**

Date of issue: Jul. 17, 2017

Report Number:	MTi170628E170
Sample Description:	Laptop
Model(s):	TM141WT720C, W1731A, W1641, W1637, W1840A, W1549, W1645A, W1645C, W1639, W1635
Applicant:	TMAX Digital Inc.
Address:	4401 Eucalyptus Ave., Sulte 120 Chino, CA91710
Date of Test:	Jun. 20, 2017 – Jun. 26, 2017

Shenzhen Microtest Co., Ltd.  
<http://www.mtitest.com>



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TEST RESULT CERTIFICATION	
<b>Applicant's name</b> .....	<b>TMAX Digital Inc.</b>
<b>Address</b> .....	4401 Eucalyptus Ave., Sulte 120 Chino, CA91710
<b>Manufacture's Name</b> .....	<b>TMAX Digital Inc.</b>
<b>Address</b> .....	4401 Eucalyptus Ave., Sulte 120 Chino, CA91710
<b>Product description</b>	
<b>Product name</b> .....	Laptop
<b>Trademark:</b>	<b>Nuvision, TMAX</b>
<b>Model and/or type reference</b> :	TM141WT720C
<b>Serial Model</b> .....	W1731A, W1641, W1637, W1840A, W1549, W1645A, W1645C, W1639, W1635
<b>Standards</b> .....	FCC Part15.247
<b>Test procedure</b> .....	ANSI C63.4-2014

*This device described above has been tested by Shenzhen Toby Technology Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.*

Tested by:



Ace Chai

Jul. 17, 2017

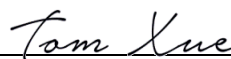
Reviewed by:



Smith Chen

Jul. 17, 2017

Approved by:



Tom Xue

Jul. 17, 2017

Table of Contents	Page
<b>1 . SUMMARY OF TEST RESULTS</b>	<b>5</b>
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
<b>2 . GENERAL INFORMATION</b>	<b>7</b>
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	9
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	11
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	12
<b>3 . EMC EMISSION TEST</b>	<b>13</b>
3.1 CONDUCTED EMISSION MEASUREMENT	13
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
3.1.2 TEST PROCEDURE	14
3.1.3 DEVIATION FROM TEST STANDARD	14
3.1.4 TEST SETUP	14
3.1.5 EUT OPERATING CONDITIONS	14
3.1.6 TEST RESULTS	15
3.2 RADIATED EMISSION MEASUREMENT	17
3.2.1 RADIATED EMISSION LIMITS	17
3.2.2 TEST PROCEDURE	17
3.2.3 DEVIATION FROM TEST STANDARD	18
3.2.4 TEST SETUP	19
3.2.5 EUT OPERATING CONDITIONS	20
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	21
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	22
3.2.8 TEST RESULTS (1G-25GHZ)	23
<b>4 . POWER SPECTRAL DENSITY TEST</b>	<b>30</b>
4.1 APPLIED PROCEDURES / LIMIT	30
4.1.1 TEST PROCEDURE	30
4.1.2 DEVIATION FROM STANDARD	30
4.1.3 TEST SETUP	30
4.1.4 EUT OPERATION CONDITIONS	30
4.1.5 TEST RESULTS	31
<b>5 . BANDWIDTH TEST</b>	<b>44</b>
5.1 APPLIED PROCEDURES / LIMIT	44

<b>Table of Contents</b>	<b>Page</b>
5.1.1 TEST PROCEDURE	44
5.1.2 DEVIATION FROM STANDARD	44
5.1.3 TEST SETUP	44
5.1.4 EUT OPERATION CONDITIONS	44
5.1.5 TEST RESULTS	45
<b>6 . PEAK OUTPUT POWER TEST</b>	<b>53</b>
6.1 APPLIED PROCEDURES / LIMIT	53
6.1.1 TEST PROCEDURE	53
6.1.2 DEVIATION FROM STANDARD	53
6.1.3 TEST SETUP	53
6.1.4 EUT OPERATION CONDITIONS	53
6.1.5 TEST RESULTS	54
<b>7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE</b>	<b>55</b>
7.1 DEVIATION FROM STANDARD	55
7.2 TEST SETUP	55
7.3 EUT OPERATION CONDITIONS	55
7.4 TEST RESULTS	56
<b>8 . ANTENNA REQUIREMENT</b>	<b>61</b>
8.1 STANDARD REQUIREMENT	61
8.2 EUT ANTENNA	61

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

### NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

## 1.1 TEST FACILITY

Shenzhen Toby Technology Co., Ltd.

Add.: 10/F.,A Block, Jiada R&D Bldg.,No.5 Songpingshan, Road, Science& Technology Park,  
Shenzhen, 518057

FCC Registration No.:811562

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Laptop	
Trade Name	<b>Nuvision, TMAX</b>	
Model Name	TM141WT720C	
Serial Model	W1731A, W1641, W1637, W1840A, W1549, W1645A, W1645C, W1639, W1635	
Model Difference	Only Differ in model name	
Product Description	The EUT is a Laptop	
	Operation Frequency:	802.11b/g/n20:2412~2462 MHz 802.11n40:2422~2452 MHz
	Modulation Type:	11n: BPSK, QPSK, 16QAM, 64QAM with OFDM 11g: BPSK, QPSK, 16QAM, 64QAM, OFDM 11b: DQPSK, DBPSK, DSSS, CCK
	Bit Rate of Transmitter	802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n:65/52/6.5Mbps
	Number Of Channel	802.11b/g/n20:11CH 802.11n40:7 CH
	Antenna Designation:	Please see Note 3.
	Output Power(Conducted):	802.11b: 18.85 dBm (Max.)
	Antenna Gain (dBi)	0dbi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Channel List	Please refer to the Note 2.	
Adapter	Model: PS30D120K2000UD AC Power Input: 100-240V~50/60Hz 0.8A Output: 12.0VDC, 2.0V	
Battery	DC 8.7V by rechargeable Li-polymer battery	
Connecting I/O Port(s)	Please refer to the User's Manual	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List for 802.11b/g/n(20)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

Channel List for 802.11n(40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
/	/	04	2427	07	2442	/	/
/	/	05	2432	08	2447	/	/
03	2422	06	2437	09	2452		

3.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	Integrated antenna	/	0	Wifi Antenna



## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n CH1/ CH6/ CH11
Mode 4	802.11n CH3/ CH6/ CH9
Mode 5	Link Mode

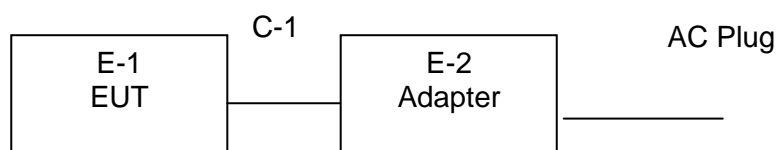
For Conducted Emission	
Final Test Mode	Description
Mode 4	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n CH1/ CH6/ CH11
Mode 4	802.11n CH3/ CH6/ CH9

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

### 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



## 2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Laptop	Nuvision, TMAX	TM141WT720C	N/A	EUT
E-2	Adapter	N/A	PS30D120K2000UD	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.0m	
C-2	NO	NO	0.8m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

For RF conducted test:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Signal Analyzer	Agilent	N9010A	MY48030494	2017/11/4
4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063513	2017/11/4
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54080019	2017/11/4
vector Signal Generator	Agilent	E4438C	US44271917	2017/11/4
vector Signal Generator	Agilent	E4438C	MY49070163	2017/11/4
Dc Power Supply	GW	GPR-6030D	/	2017/11/4
Temperature & Humidity Chamber	GIANT FORCE	GTH-056P	GF-94454-1	2017/11/4
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	120909	2017/11/4

For Radiated test:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Broadband TRILOG Antenna	Schwarabeck	VULB9163	9163-872	2017/11/14
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1145	2017/11/14
Amplifier	HP	8447D	3113A06150	2017/11/4
Amplifier	Agilent	8449B	3008A02400	2018/7/4
Test Receiver	Schwarabeck	ESPI	100314	2017/11/4
Spectrum analyzer	Agilent	E4407B	MY41441082	2017/11/4
Signal Generator	R&S	SMT 06	832080/007	2017/11/4

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

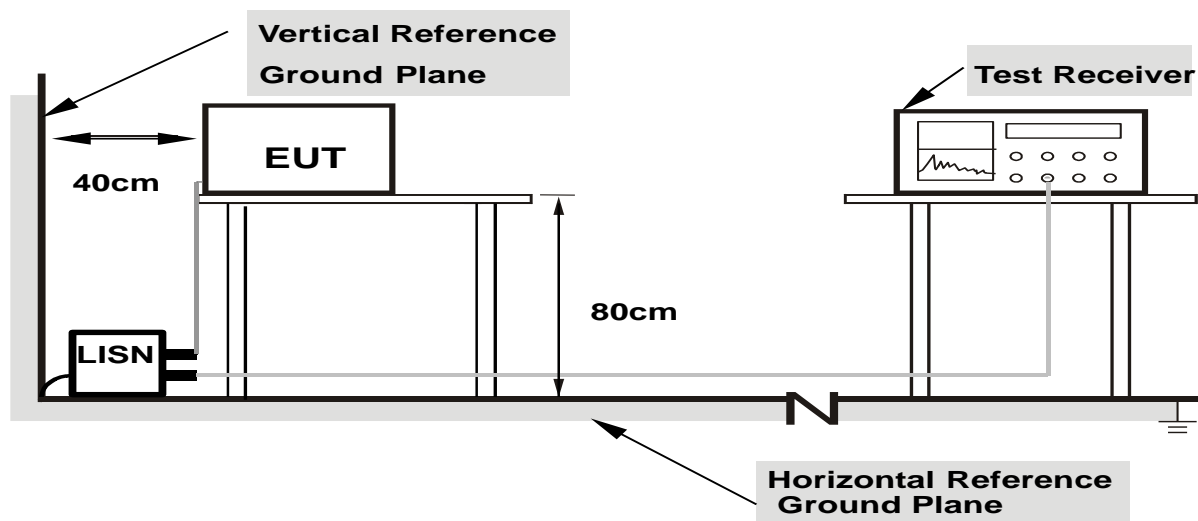
### 3.1.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.4 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

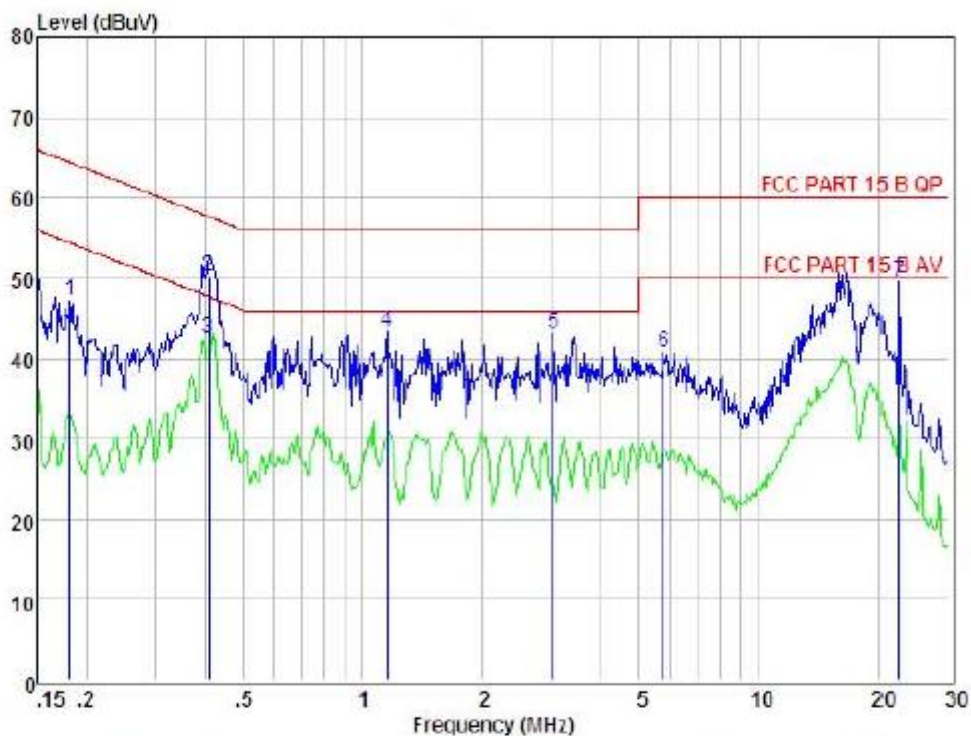
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

### 3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data. All transmitter chains has been tested, and only worst data was listed in this report.

### 3.1.6 TEST RESULTS

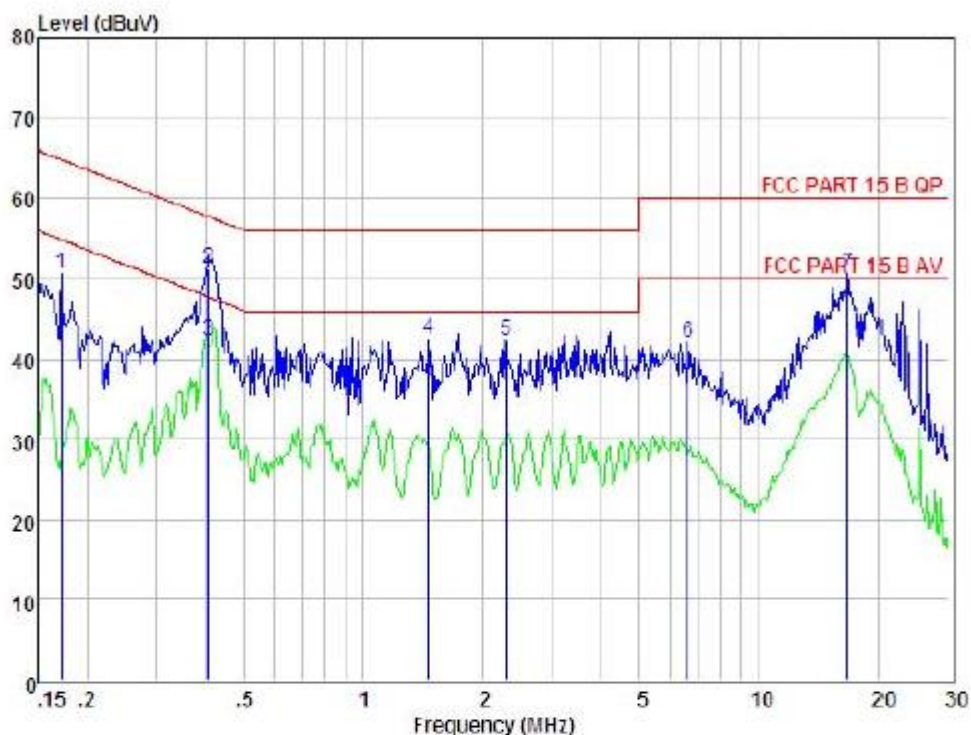
EUT :	Laptop	Model Name. :	TM141WT720C
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 12Vfrom adapter AC 120V/60Hz	Test Mode :	Mode 5



Condition		: FCC PART 15 B QP			POL: LINE		Temp: 25°C	Hum: 51 %	
Item	Freq MHz	Read Level dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.162	37.44	0.03	-9.52	0.10	47.09	64.42	-17.33	Peak
2	0.408	40.50	0.03	-9.57	0.10	50.20	57.68	-7.48	QP
3	0.408	32.70	0.03	-9.57	0.10	42.40	47.68	-5.28	Average
4	1.153	33.62	0.04	-9.65	0.10	43.41	56.00	-12.59	Peak
5	3.041	33.02	0.07	-9.80	0.12	43.01	56.00	-12.99	Peak
6	5.774	30.64	0.11	-9.96	0.14	40.85	60.00	-19.15	Peak
7	22.535	36.93	0.41	-9.81	0.41	49.56	60.00	-10.44	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss

EUT :	Laptop	Model Name. :	TM141WT720C
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 12Vfrom adapter AC 120V/60Hz	Test Mode :	Mode 5



Condition : FCC PART 15 B QP			POL: NEUTRAL		Temp: 25°C		Hum: 51 %		
Item	Freq MHz	Read Level dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.172	41.05	0.03	-9.82	0.10	50.70	64.86	-14.16	Peak
2	0.406	41.50	0.03	-9.87	0.10	51.20	57.73	-6.53	QP
3	0.406	32.50	0.03	-9.87	0.10	42.20	47.73	-5.53	Average
4	1.464	32.65	0.03	-9.68	0.10	42.48	56.00	-13.52	Peak
5	2.309	32.35	0.06	-9.74	0.11	42.26	56.00	-13.74	Peak
6	6.627	31.75	0.12	-9.97	0.15	41.99	60.00	-18.01	Peak
7	16.839	40.31	0.27	-9.83	0.29	50.70	60.00	-9.30	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss



## 3.2 RADIATED EMISSION MEASUREMENT

### 3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

### 3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

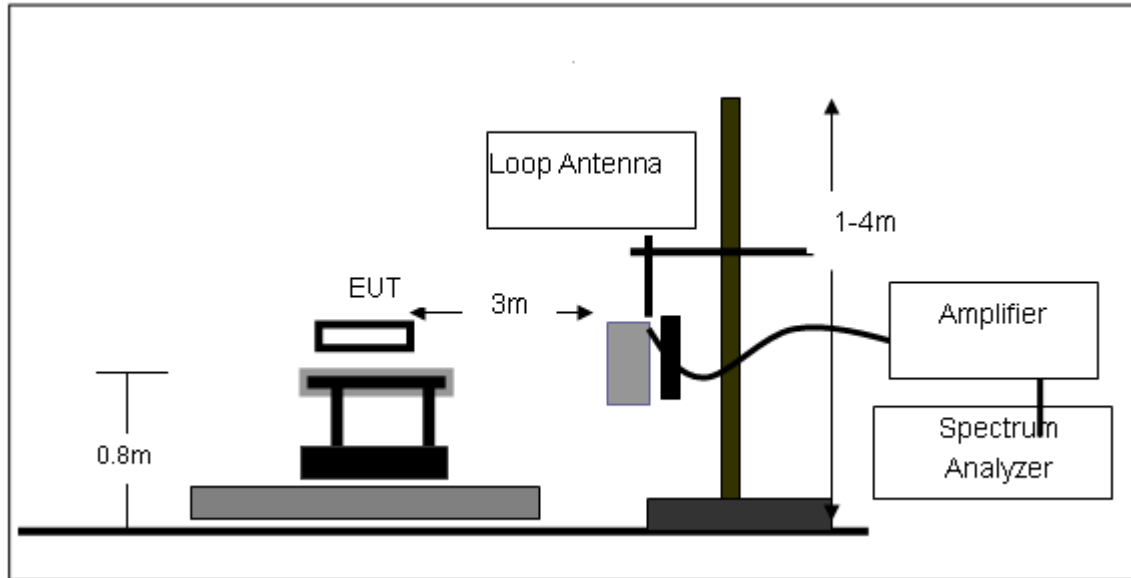
Both horizontal and vertical antenna polarities were tested  
and performed pretest to three orthogonal axis. The worst case emissions were reported

### **3.2.3 DEVIATION FROM TEST STANDARD**

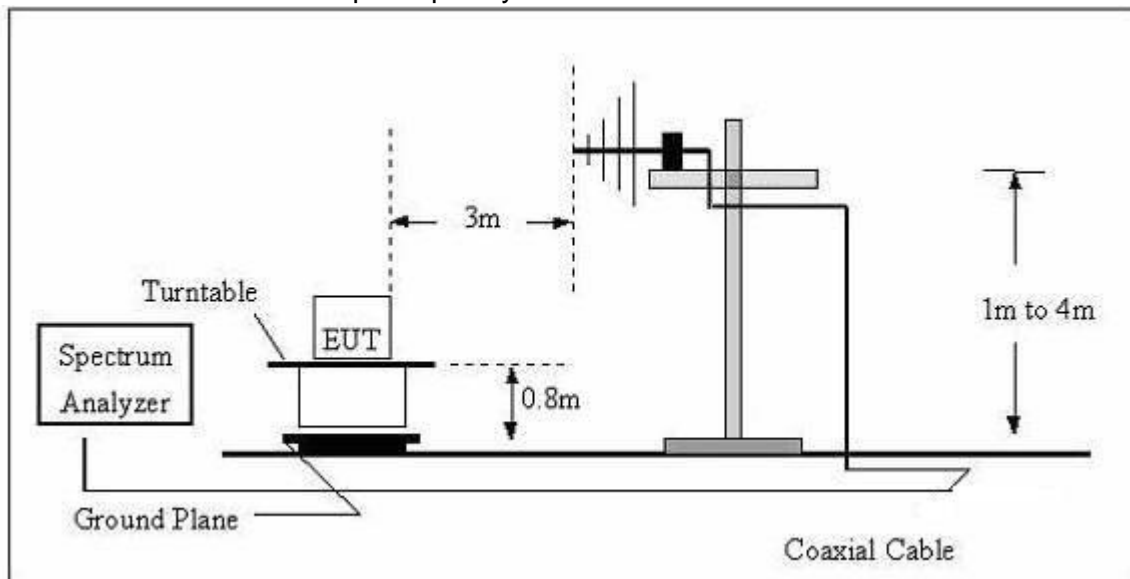
No deviation

### 3.2.4 TEST SETUP

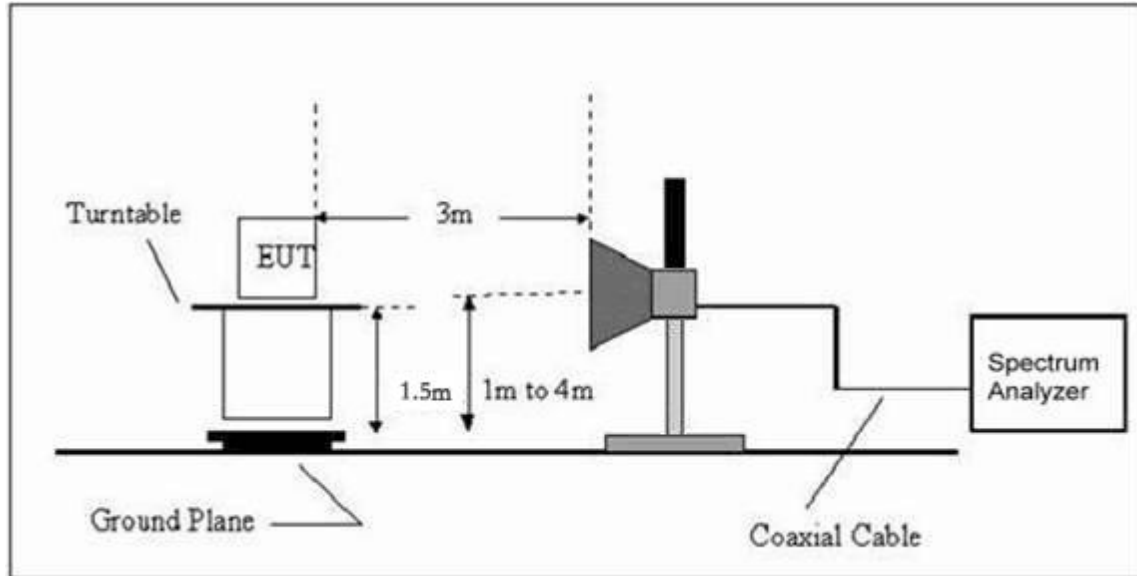
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



### 3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.  
All transmitter chains has been tested, and only worst data was listed in this report.

### 3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	Laptop	Model Name. :	TM141WT720C
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 12Vfrom adapter AC 120V/60Hz
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

#### NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance/test distance})(\text{dB})$ ;

Limit line = specific limits(dBuv) + distance extrapolation factor.

### 3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 12Vfrom adapter
Test Mode :	TX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	119.4360	16.28	12.08	28.36	43.5	15.14	QP
V	128.1129	16.24	12.2	28.44	43.5	15.06	QP
V	170.7926	20.64	10.35	30.99	43.5	12.51	QP
V	341.9786	12.42	16.19	28.61	46	17.39	QP
V	468.8761	17.54	19.69	37.23	46	8.77	QP
V	935.5462	9.42	29.42	38.84	46	7.16	QP
H	170.7923	27.66	10.35	38.01	43.5	5.49	QP
H	341.9786	25.22	16.19	41.41	46	4.59	QP
H	468.8761	21.17	19.69	40.86	46	5.14	QP
H	726.8052	14.85	26	40.85	46	5.15	QP
H	813.1114	16.39	26.35	42.74	46	3.26	QP
H	854.0247	12.56	27.51	40.07	46	5.93	QP

**Remark:**

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level- Limit

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

Factor added by measurement software automatically

### 3.2.8 TEST RESULTS (1G-25GHZ)

#### 802.11b ant1

Normal Voltage

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
<b>Low Channel (2412 MHz)</b>							
Vertical	2491.777	60.32	-11.65	48.67	74	25.33	Pk
Horizontal	2498.247	57.22	-12.73	44.49	74	29.51	Pk
Vertical	4824.184	57.32	-3.6	53.72	74	20.28	Pk
Horizontal	4824.184	57.32	-9.23	48.09	74	25.91	Pk
Vertical	1485.838	61.02	-17.1	43.92	74	30.08	Pk
Vertical	1636.784	60.71	-16.06	44.65	74	29.35	Pk
Vertical	2095.928	59.52	-11.88	47.64	74	26.36	Pk
Horizontal	1074.301	61.25	-19.69	41.56	74	32.44	Pk
Horizontal	1483.178	60.24	-17.09	43.15	74	30.85	Pk
Horizontal	1895.832	57.26	-14.25	43.01	74	30.99	Pk
<b>Mid Channel (2437 MHz)</b>							
Vertical	2474.777	57.01	-11.65	45.36	74	28.64	Pk
Horizontal	2474.144	57.7	-9.37	48.33	74	25.67	Pk
Vertical	4874.425	57.08	-6.15	50.93	74	23.07	Pk
Horizontal	4874.979	57.08	-6.83	50.25	74	23.75	Pk
Vertical	1433.535	64.07	-17.12	46.95	74	27.05	Pk
Vertical	1636.784	61.4	-16.06	45.34	74	28.66	Pk
Vertical	2284.166	55.14	-12.83	42.31	74	31.69	Pk
Horizontal	1280.515	60.8	-17.82	42.98	74	31.02	Pk
Horizontal	1636.784	59.63	-16.06	43.57	74	30.43	Pk
Horizontal	1892.438	59.75	-14.28	45.47	74	28.53	Pk
<b>High Channel (2462 MHz)</b>							
Vertical	2453.883	57.7	-12.91	44.79	74	29.21	Pk
Horizontal	2453.839	57.7	-11.59	46.11	74	27.89	Pk
Vertical	4926.325	54.21	-9.22	44.99	74	29.01	Pk
Horizontal	4926.683	54.21	-3.64	50.57	74	23.43	Pk
Vertical	1187.688	58.73	-18.27	40.46	74	33.54	Pk
Vertical	1636.784	57.54	-16.06	41.48	74	32.52	Pk
Vertical	2084.693	55.13	-11.99	43.14	74	30.86	Pk
Horizontal	1534.540	57.79	-16.94	40.85	74	33.15	Pk
Horizontal	1786.985	57.5	-15.04	42.46	74	31.54	Pk
Horizontal	1892.438	57.38	-14.28	43.1	74	30.9	Pk

**802.11g ant1**

Normal Voltage

Normal Voltage							
Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2412							
V	4824.428	52.48	-3.53	48.95	74	25.05	Pk
V	4824.428	32.57	-3.53	29.04	54	24.96	AV
H	4824.529	54.39	-3.54	50.85	74	23.15	Pk
H	4824.529	32.66	-3.54	29.12	54	24.88	AV
operation frequency:2437							
V	4873.548	52.67	-3.64	49.03	74	24.97	Pk
V	4873.548	34.4	-3.64	30.76	54	23.24	AV
H	4875.279	53.87	-3.64	50.23	74	23.77	Pk
H	4875.279	33.42	-3.64	29.78	54	24.22	AV
operation frequency:2462							
V	4924.358	54.89	-3.75	51.14	74	22.86	pk
V	4924.358	34.56	-3.75	30.81	54	23.19	AV
H	4924.591	51.07	-3.74	47.33	74	26.67	pk
H	4924.591	34.71	-3.74	30.97	54	23.03	pk
Remark:							
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit							



**802.11b ant2**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (2412 MHz)							
Vertical	2491.777	59.7	-11.65	48.05	74	25.95	Pk
Horizontal	2498.247	56.6	-12.73	43.87	74	30.13	Pk
Vertical	4824.184	56.7	-3.6	53.1	74	20.9	Pk
Horizontal	4824.184	56.7	-9.23	47.47	74	26.53	Pk
Vertical	1485.838	60.4	-17.1	43.3	74	30.7	Pk
Vertical	1636.784	60.09	-16.06	44.03	74	29.97	Pk
Vertical	2095.928	58.9	-11.88	47.02	74	26.98	Pk
Horizontal	1074.301	60.63	-19.69	40.94	74	33.06	Pk
Horizontal	1483.178	59.62	-17.09	42.53	74	31.47	Pk
Horizontal	1895.832	56.64	-14.25	42.39	74	31.61	Pk
Mid Channel (2437 MHz)							
Vertical	2474.777	56.32	-11.65	44.67	74	29.33	Pk
Horizontal	2474.144	57.01	-9.37	47.64	74	26.36	Pk
Vertical	4874.425	56.39	-6.15	50.24	74	23.76	Pk
Horizontal	4874.979	56.39	-6.83	49.56	74	24.44	Pk
Vertical	1433.535	63.38	-17.12	46.26	74	27.74	Pk
Vertical	1636.784	60.71	-16.06	44.65	74	29.35	Pk
Vertical	2284.166	54.45	-12.83	41.62	74	32.38	Pk
Horizontal	1280.515	60.11	-17.82	42.29	74	31.71	Pk
Horizontal	1636.784	58.94	-16.06	42.88	74	31.12	Pk
Horizontal	1892.438	59.06	-14.28	44.78	74	29.22	Pk
High Channel (2462 MHz)							
Vertical	2453.883	56.98	-12.91	44.07	74	29.93	Pk
Horizontal	2453.839	56.98	-11.59	45.39	74	28.61	Pk
Vertical	4926.325	53.49	-9.22	44.27	74	29.73	Pk
Horizontal	4926.683	53.49	-3.64	49.85	74	24.15	Pk
Vertical	1187.688	58.01	-18.27	39.74	74	34.26	Pk
Vertical	1636.784	56.82	-16.06	40.76	74	33.24	Pk
Vertical	2084.693	54.41	-11.99	42.42	74	31.58	Pk
Horizontal	1534.540	57.07	-16.94	40.13	74	33.87	Pk
Horizontal	1786.985	56.78	-15.04	41.74	74	32.26	Pk
Horizontal	1892.438	56.66	-14.28	42.38	74	31.62	Pk

**802.11g ant2**

Normal Voltage

Normal Voltage							
Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2412							
V	4824.428	52.34	-3.53	48.81	74	25.19	Pk
V	4824.428	32.43	-3.53	28.9	54	25.1	AV
H	4824.529	54.25	-3.54	50.71	74	23.29	Pk
H	4824.529	32.52	-3.54	28.98	54	25.02	AV
operation frequency:2437							
V	4873.548	52.53	-3.64	48.89	74	25.11	Pk
V	4873.548	34.26	-3.64	30.62	54	23.38	AV
H	4875.279	53.73	-3.64	50.09	74	23.91	Pk
H	4875.279	33.28	-3.64	29.64	54	24.36	AV
operation frequency:2462							
V	4924.358	54.75	-3.75	51	74	23	pk
V	4924.358	34.35	-3.75	30.6	54	23.4	AV
H	4924.591	50.93	-3.74	47.19	74	26.81	pk
H	4924.591	34.57	-3.74	30.83	54	23.17	pk
Remark:							
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit							

**802.11n(20)**

Normal Voltage

Normal Voltage							
Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2412							
V	4824.428	51.58	-3.53	48.05	74	25.95	Pk
H	4824.529	54.63	-3.54	51.09	74	22.91	Pk
operation frequency:2437							
V	4873.548	51.98	-3.53	48.45	74	25.55	Pk
H	4875.279	54.27	-3.54	50.73	74	23.27	Pk
operation frequency:2462							
V	4924.358	53.04	-3.75	49.29	74	24.71	pk
H	4924.591	51.9	-3.74	48.16	74	25.84	pk
Remark:							
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit							

Note:The PK value is less than the AV value, AV value is not required  
Factor added by measurement software automatically.

**802.11n(40)**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2422							
V	4844.537	51.18	-3.56	47.62	74	26.38	Pk
H	4824.614	52.52	-3.56	48.96	74	25.04	Pk
operation frequency:2437							
V	4873.548	51.31	-3.64	47.67	74	26.33	Pk
H	4875.279	54.09	-3.64	50.45	74	23.55	Pk
operation frequency:2452							
V	4904.158	52.38	-3.71	48.67	74	25.33	pk
H	4904.476	51.52	-3.71	47.81	74	26.19	pk
Remark:							
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit							

Note:The PK value is less than the AV value, AV value is not required  
Factor added by measurement software automatically.

**BAND EDGE(Radiated)**

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
<b>802.11b</b>							
2390	56.34	-13.06	43.28	74	30.72	peak	Vertical
2390	56.79	-13.06	43.73	74	30.27	peak	Horizontal
2483.5	57.43	-12.78	44.65	74	29.35	peak	Vertical
2483.5	57.69	-12.78	44.91	74	29.09	peak	Horizontal
<b>802.11g</b>							
2390	57.28	-13.06	44.22	74	29.78	peak	Vertical
2390	57.59	-13.06	44.53	74	29.47	peak	Horizontal
2483.5	57.31	-12.78	44.53	74	29.47	peak	Vertical
2483.5	55.74	-12.78	42.96	74	31.04	peak	Horizontal
<b>802.11n20</b>							
2390	56.34	-13.06	43.28	74	30.72	peak	Vertical
2390	56.79	-13.06	43.73	74	30.27	peak	Horizontal
2483.5	57.43	-12.78	44.65	74	29.35	peak	Vertical
2483.5	57.69	-12.78	44.91	74	29.09	peak	Horizontal
<b>802.11n40</b>							
2390	58.17	-13.06	45.11	74	28.89	peak	Vertical
2390	58.63	-13.06	45.57	74	28.43	peak	Horizontal
2483.5	57.85	-12.78	45.07	74	28.93	peak	Vertical
2483.5	56.21	-12.78	43.43	74	30.57	peak	Horizontal

NOTE1: The PK value is less than the AV value, AV value is not required.

Note 2: For 802.11b and 802.11g mode, all transmitter chains has been tested, and only worst data was listed in this report.

## 4. POWER SPECTRAL DENSITY TEST

### 4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

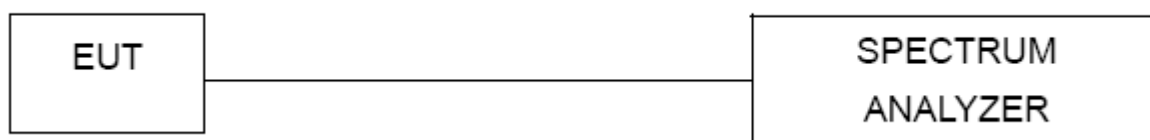
#### 4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW  $\geq 3$  kHz.
4. Set the VBW  $\geq 3 \times$  RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### 4.1.2 DEVIATION FROM STANDARD

No deviation.

#### 4.1.3 TEST SETUP



#### 4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

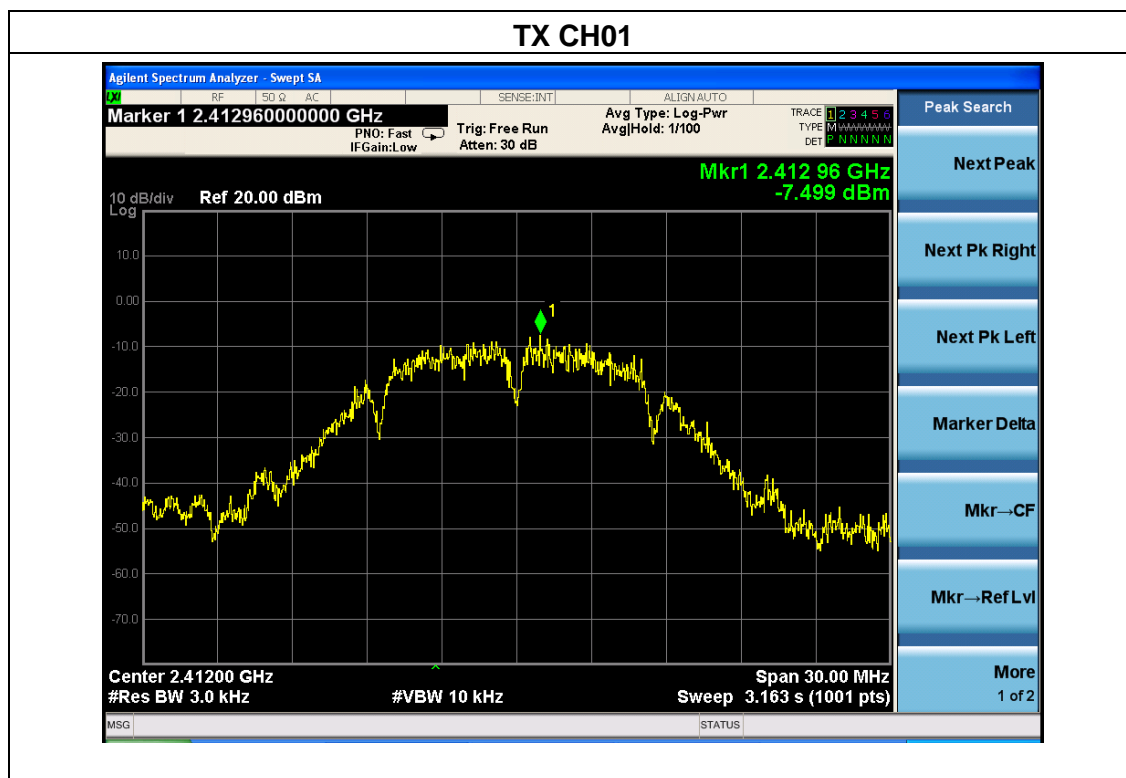
#### 4.1.5 TEST RESULTS

EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 12Vfrom adapter

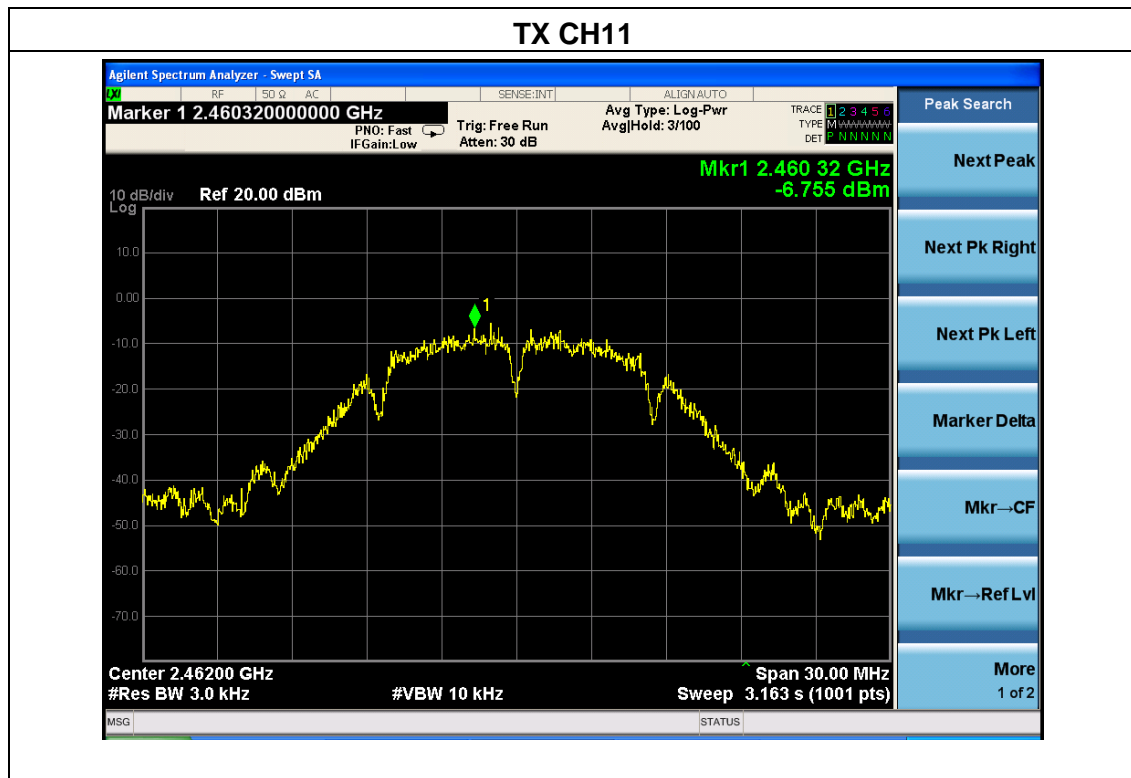
Mode	Frequency (MHz)	Ant Port	PK Output power(dBm)		Limit (dBm)	Result
IEEE 802.11 b	CH1: 2412	1	-7.499	-7.499	8	PASS
		2	-6.257	-6.257		
	CH6: 2437	1	-7.759	-7.759	8	PASS
		2	-7.260	-7.260		
	CH11: 2462	1	-6.755	-6.755	8	PASS
		2	-5.533	-5.533		
IEEE 802.11 g	CH1: 2412	1	-13.246	-13.246	8	PASS
		2	-13.472	-13.472		
	CH6: 2437	1	-10.312	-10.312	8	PASS
		2	-11.923	-11.923		
	CH11: 2462	1	-11.379	-11.379	8	PASS
		2	-10.888	-10.888		
IEEE 802.11 n/HT20 with 2.4G	CH1: 2412	1	-6.996	-6.03	8	PASS
		2	-13.035			
	CH6: 2437	1	-11.796	-9.05	8	PASS
		2	-12.337			
	CH11: 2462	1	-12.135	-8.77	8	PASS
		2	-11.451			
IEEE 802.11 n/HT40 with 2.4G	CH1: 2422	1	-18.785	-15.68	8	PASS
		2	-18.620			
	CH4: 2437	1	-15.726	-12.98	8	PASS
		2	-16.275			
	CH7: 2452	1	-18.298	-14.82	8	PASS
		2	-17.409			
Conclusion: PASS						

Ant1

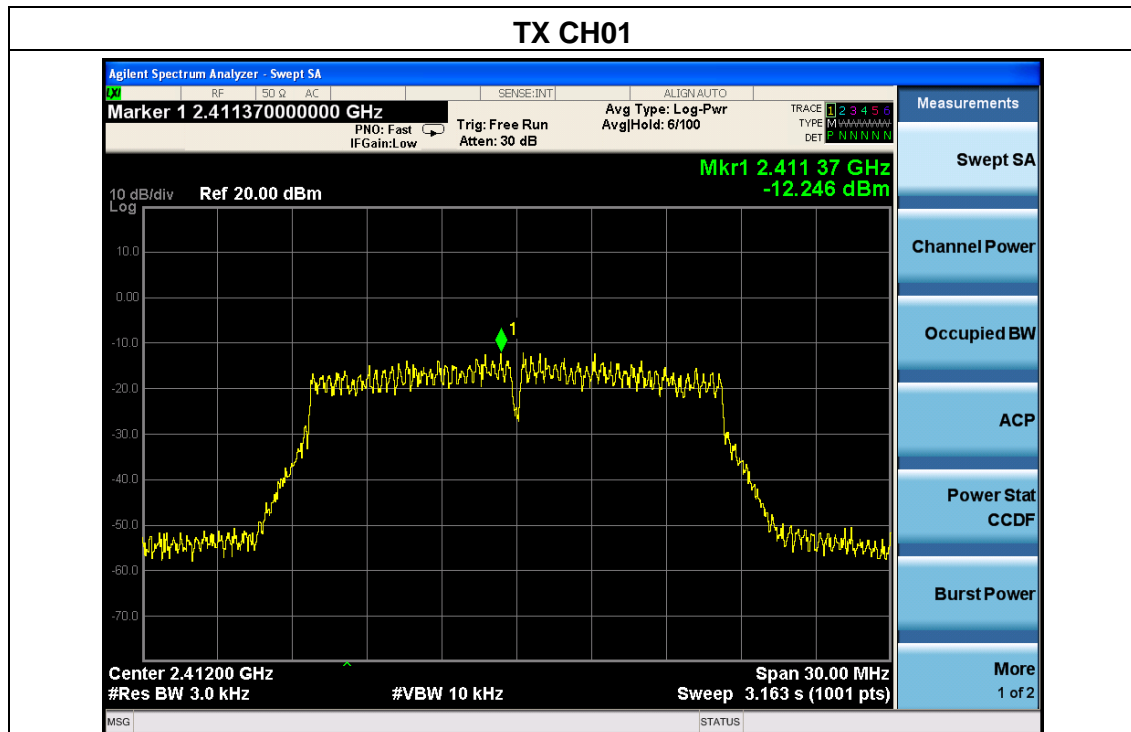
802.11b

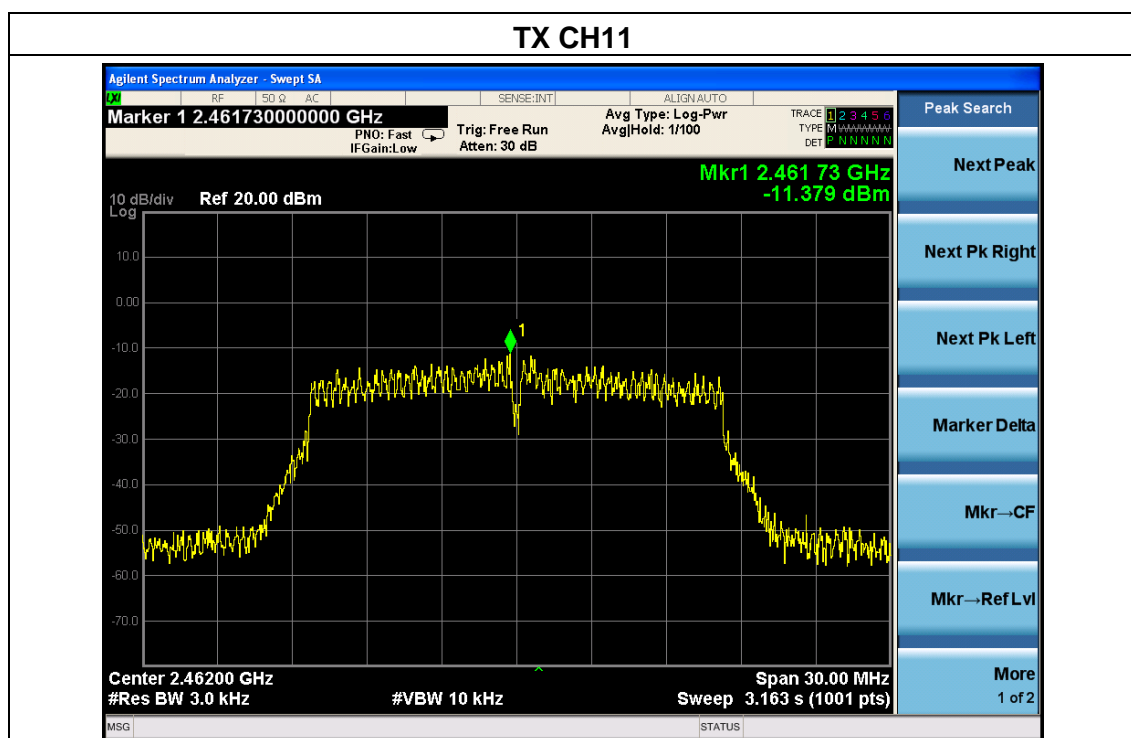
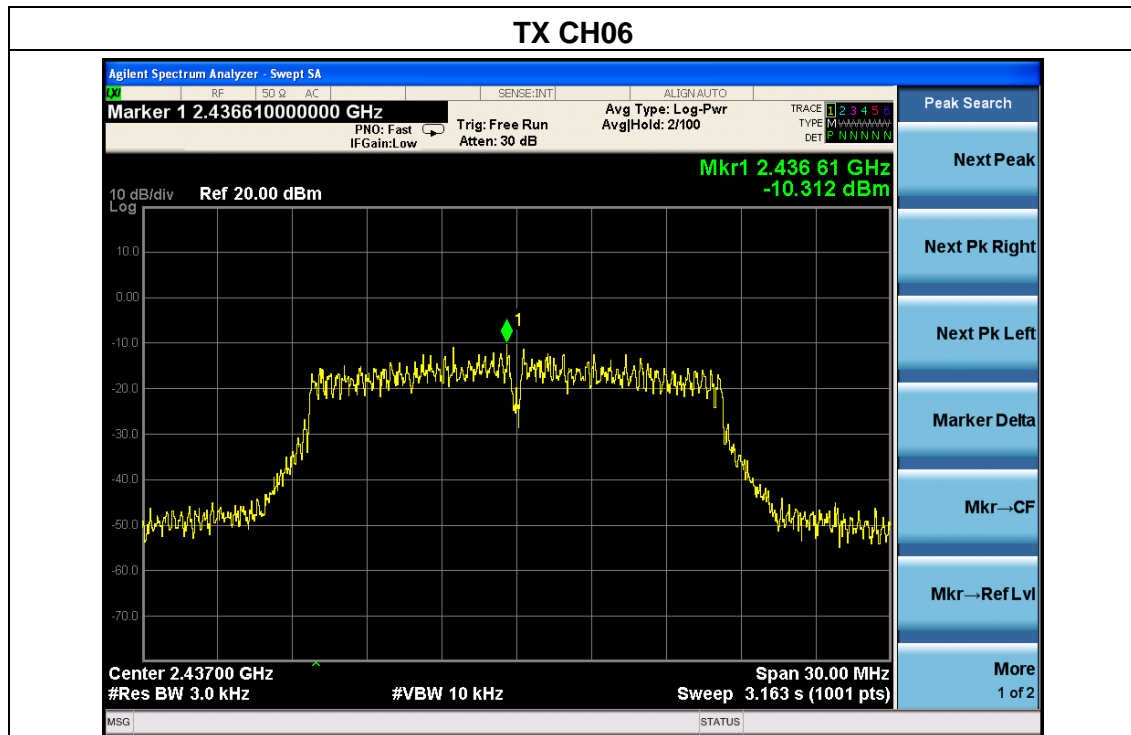




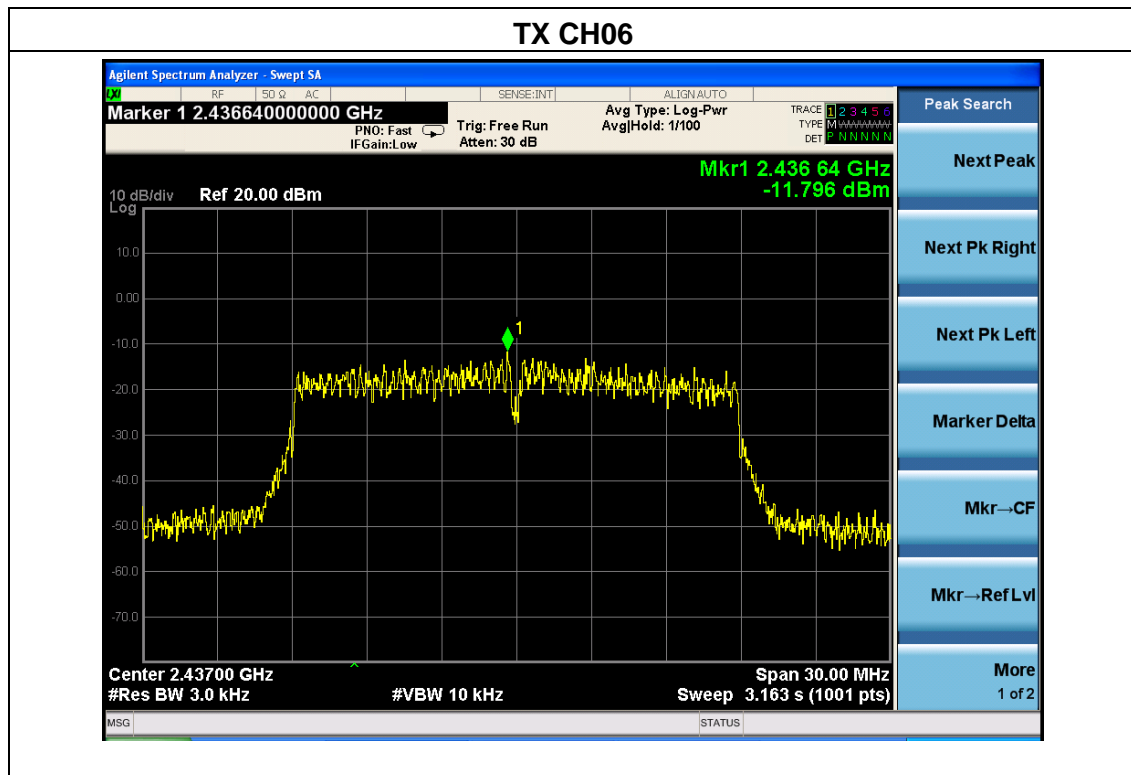
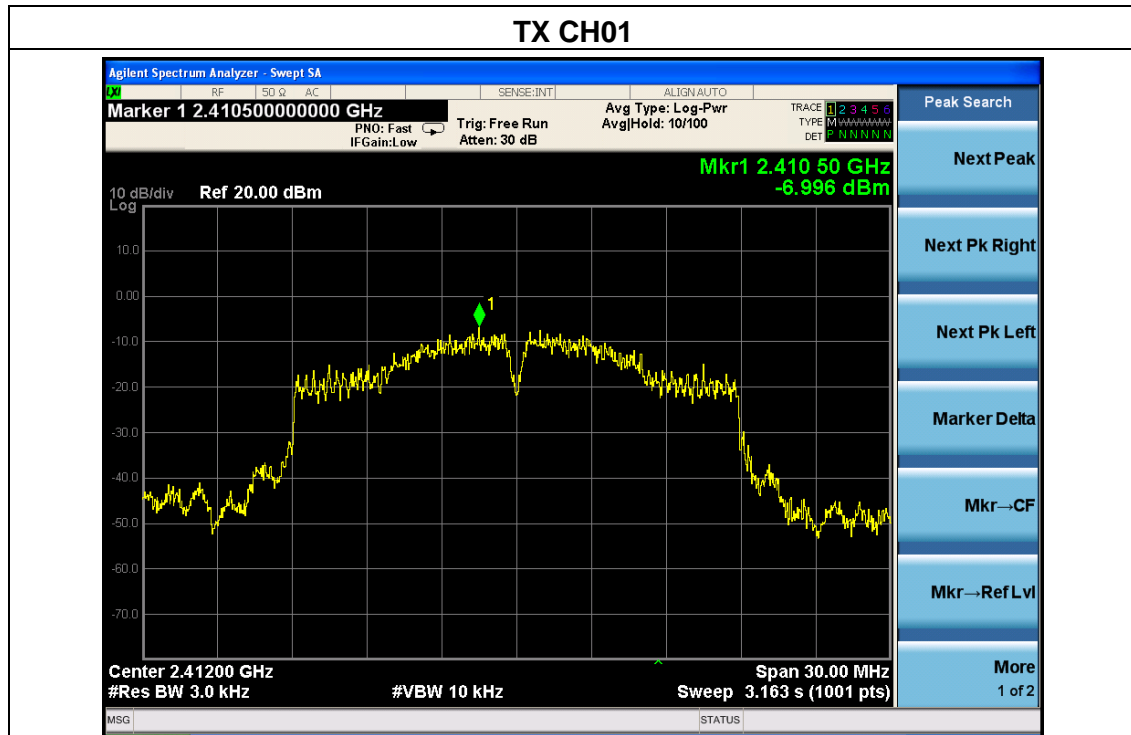


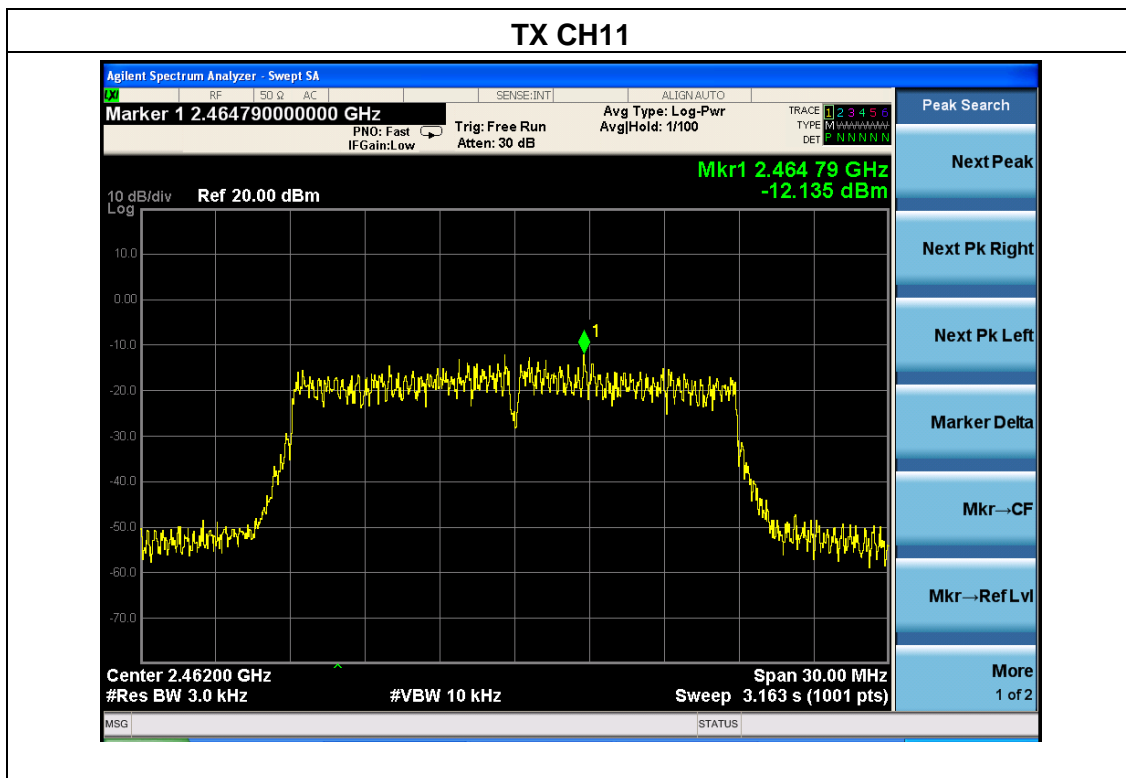
802.11g



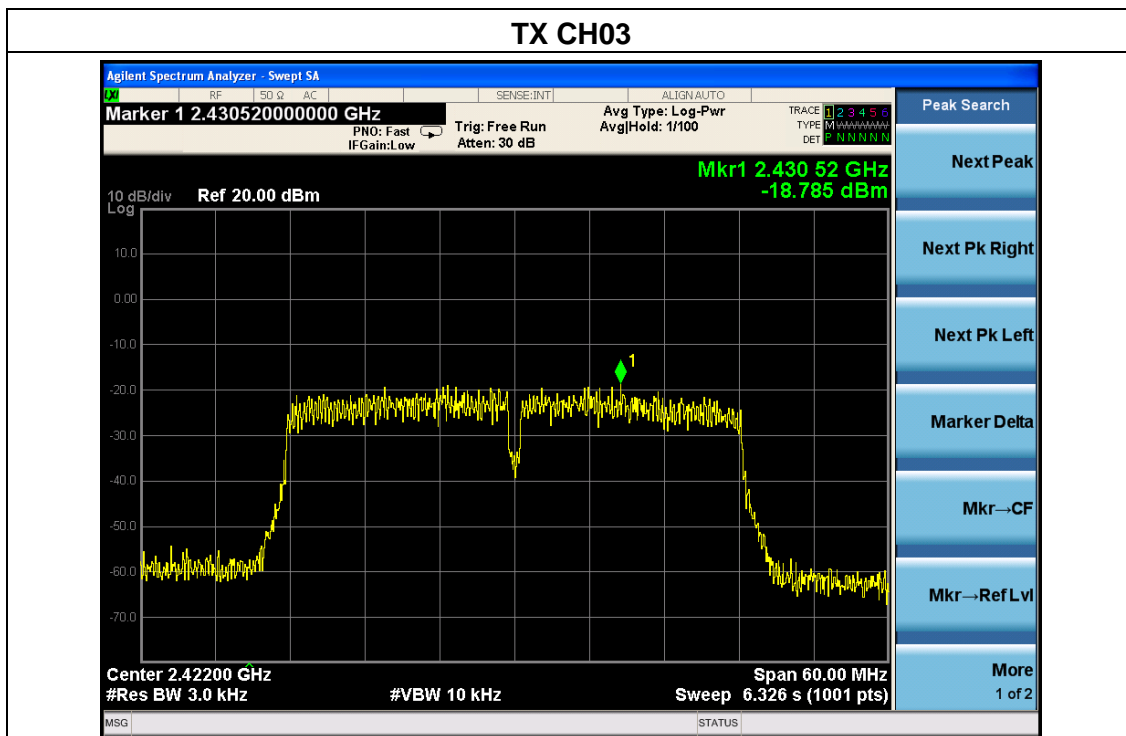


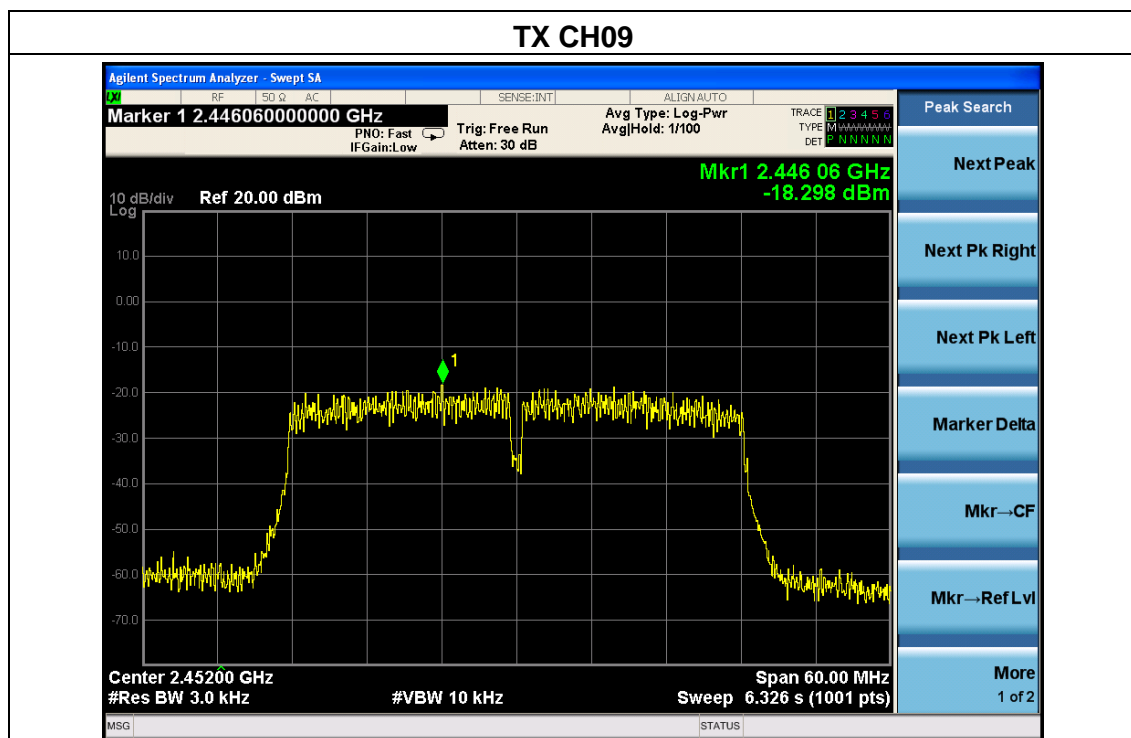
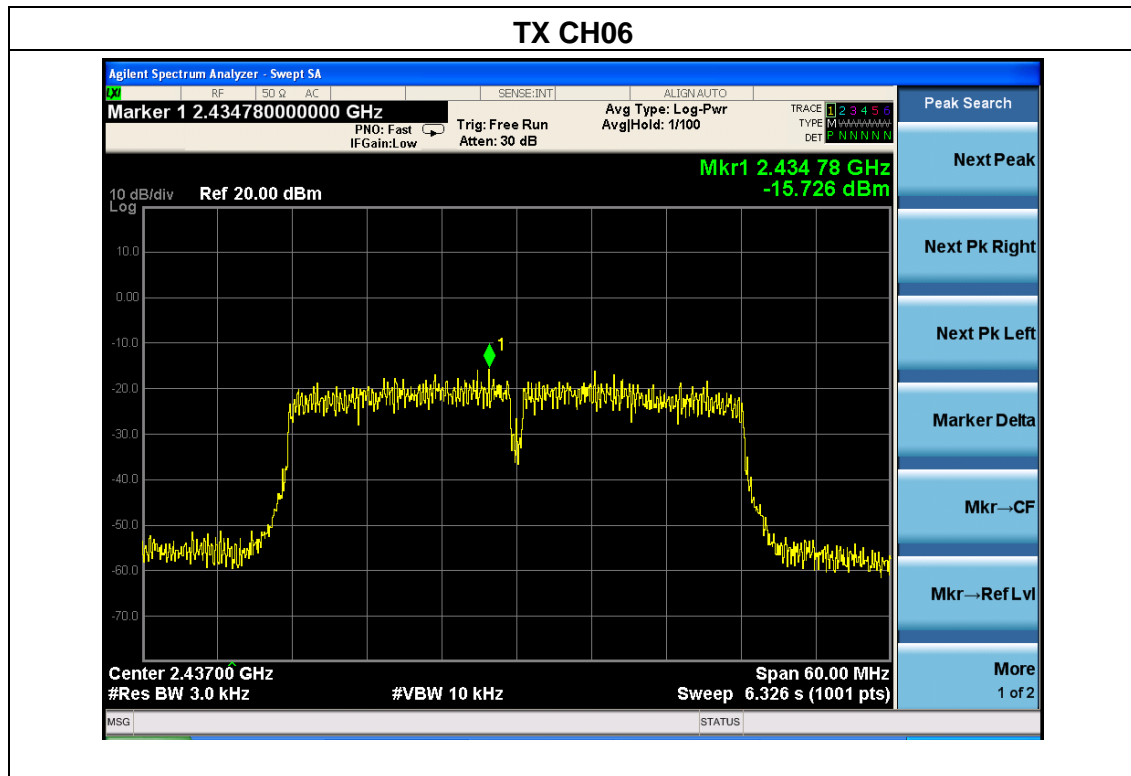
802.11n20





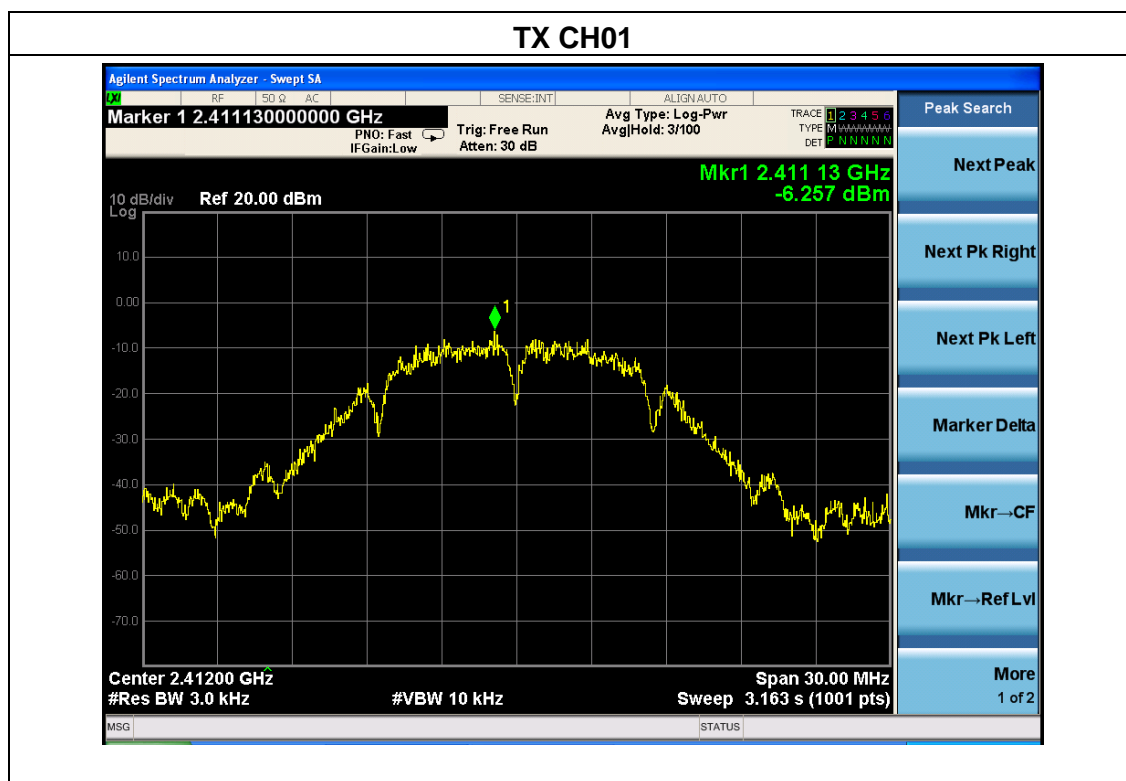
802.11n40

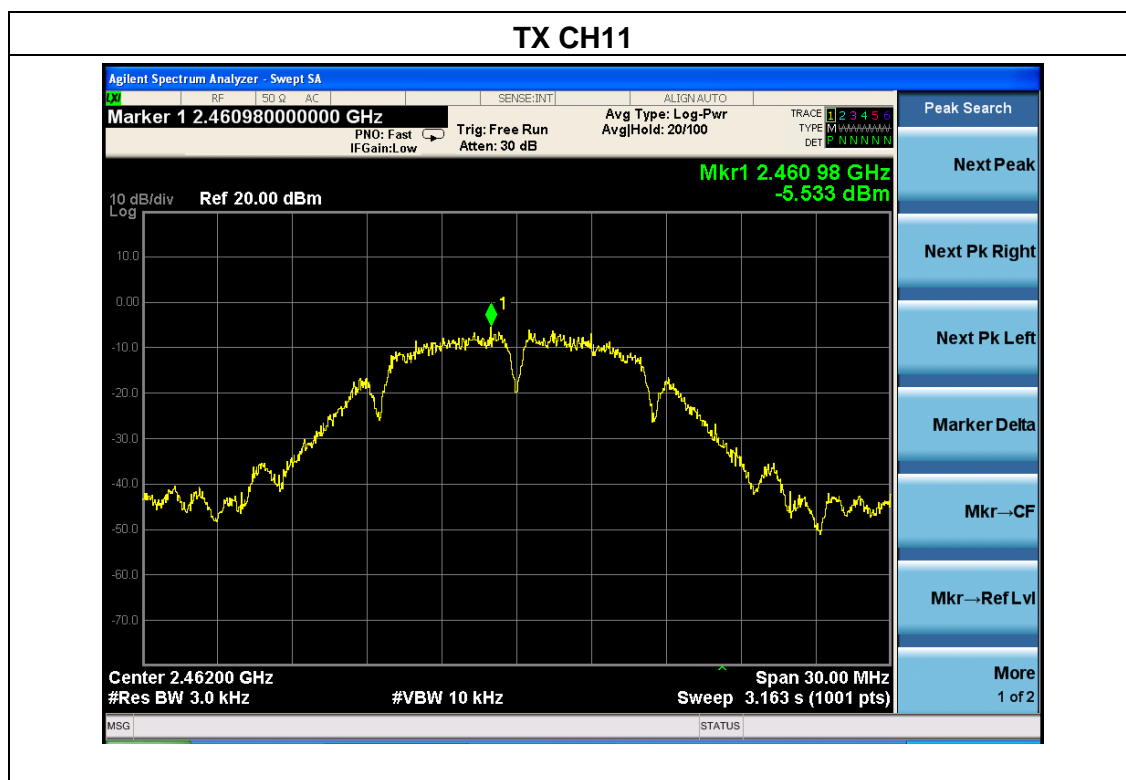




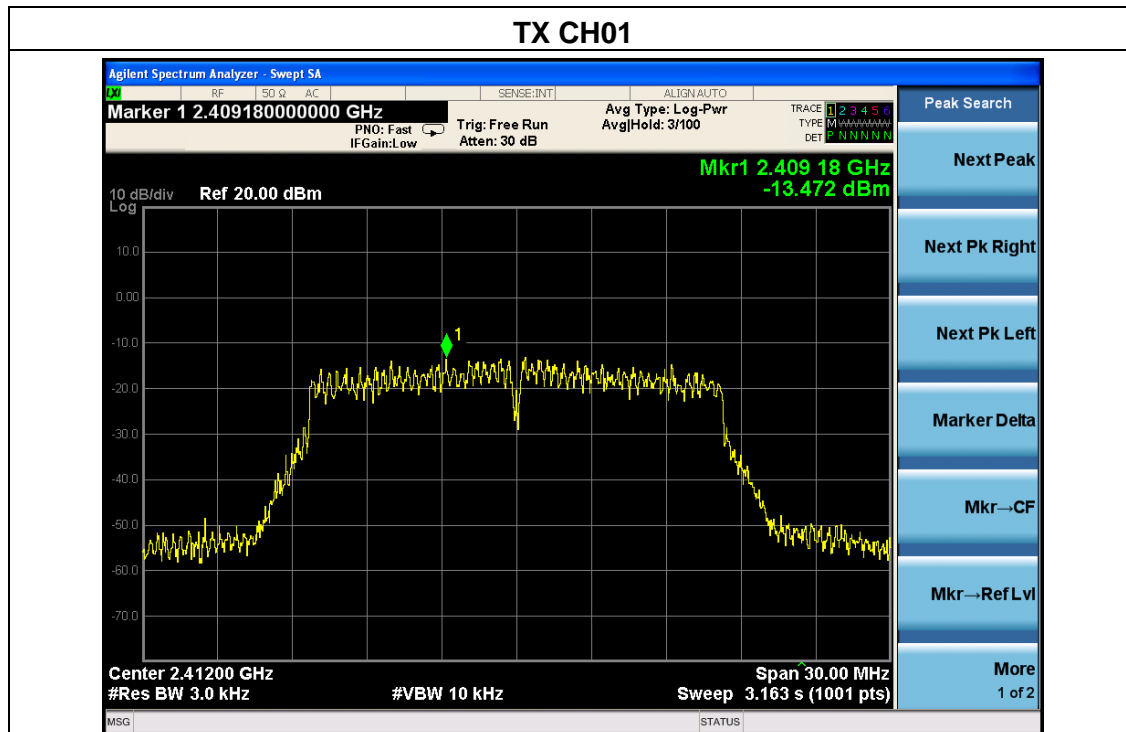
Ant1

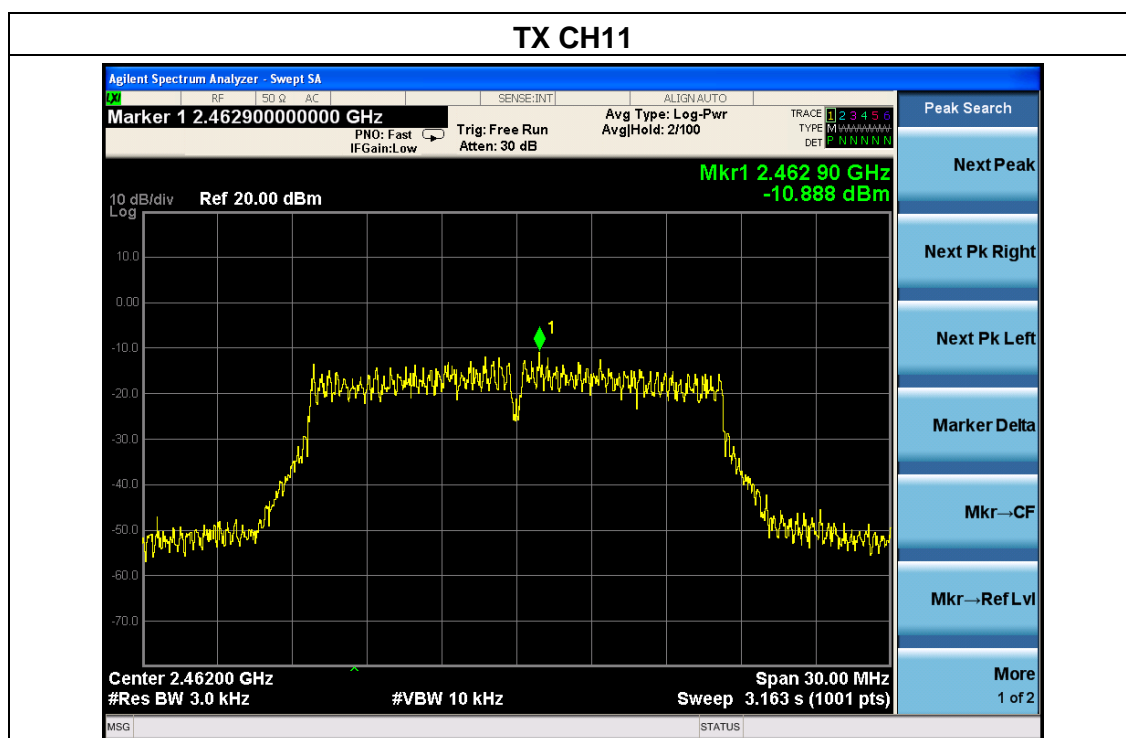
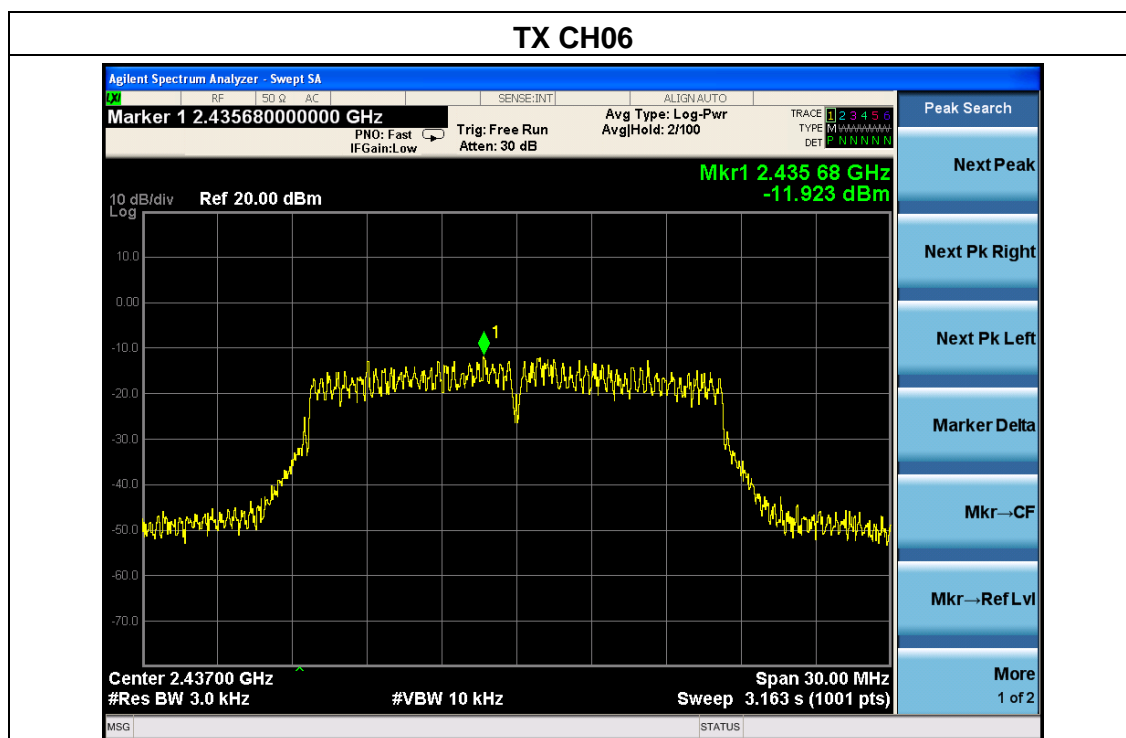
802.11b





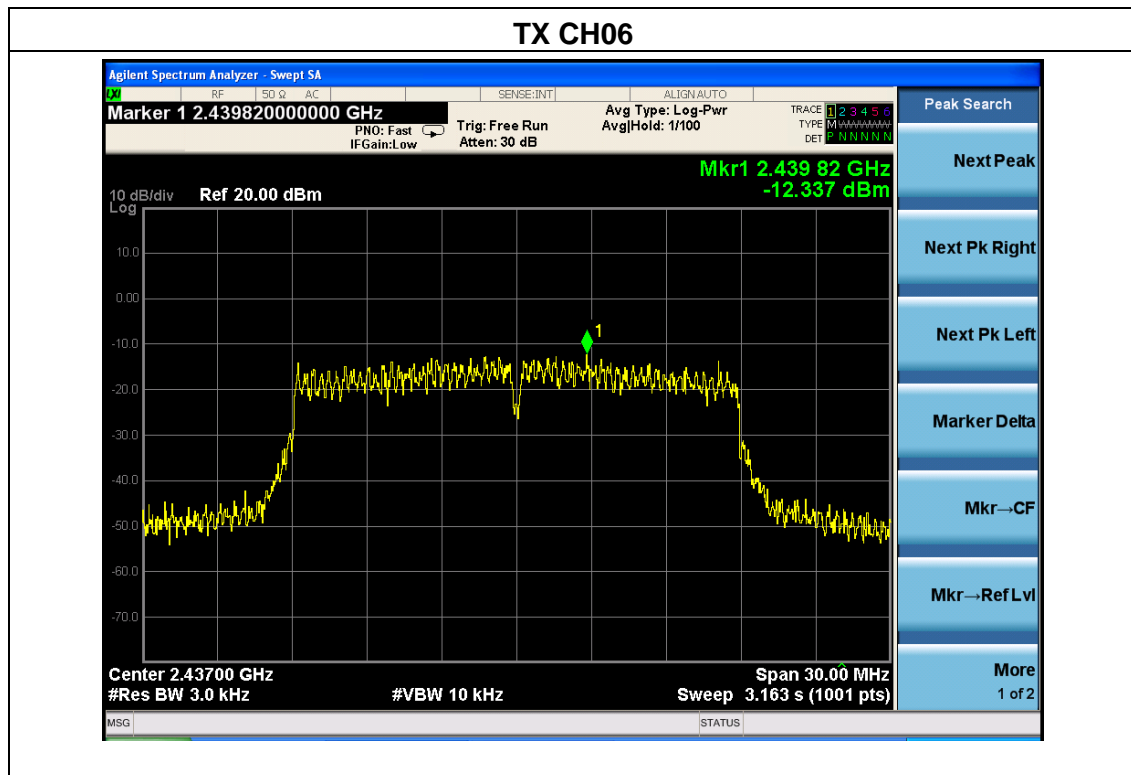
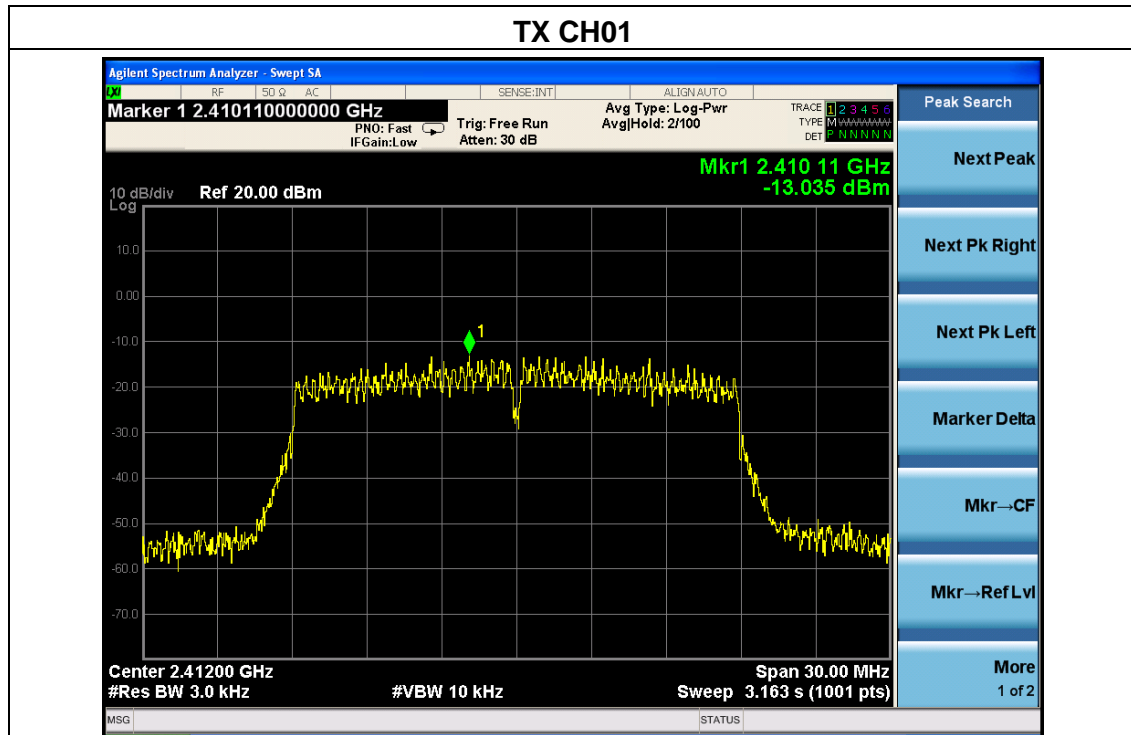
802.11g

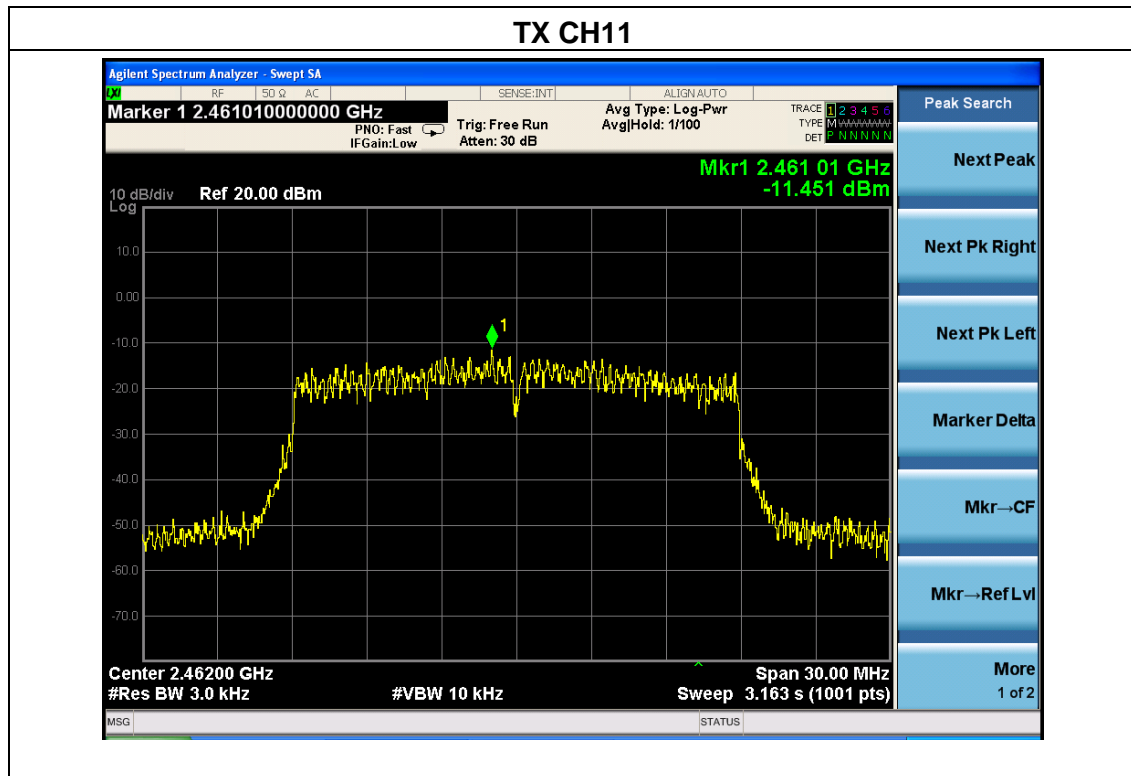




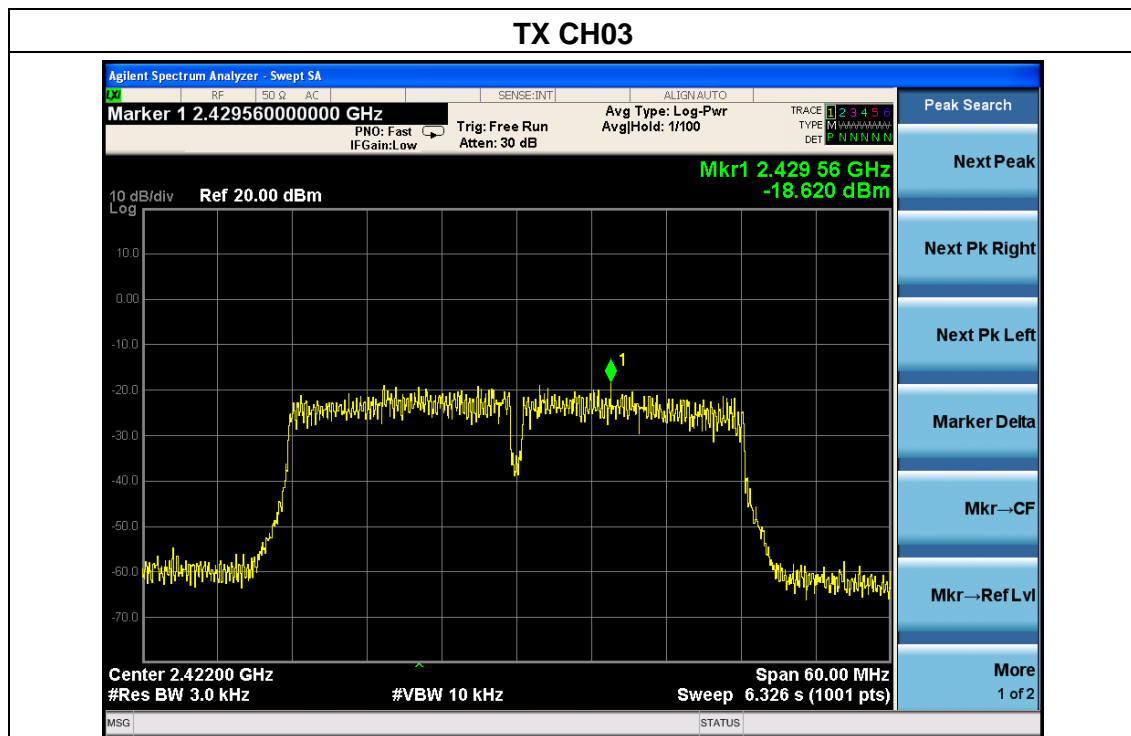


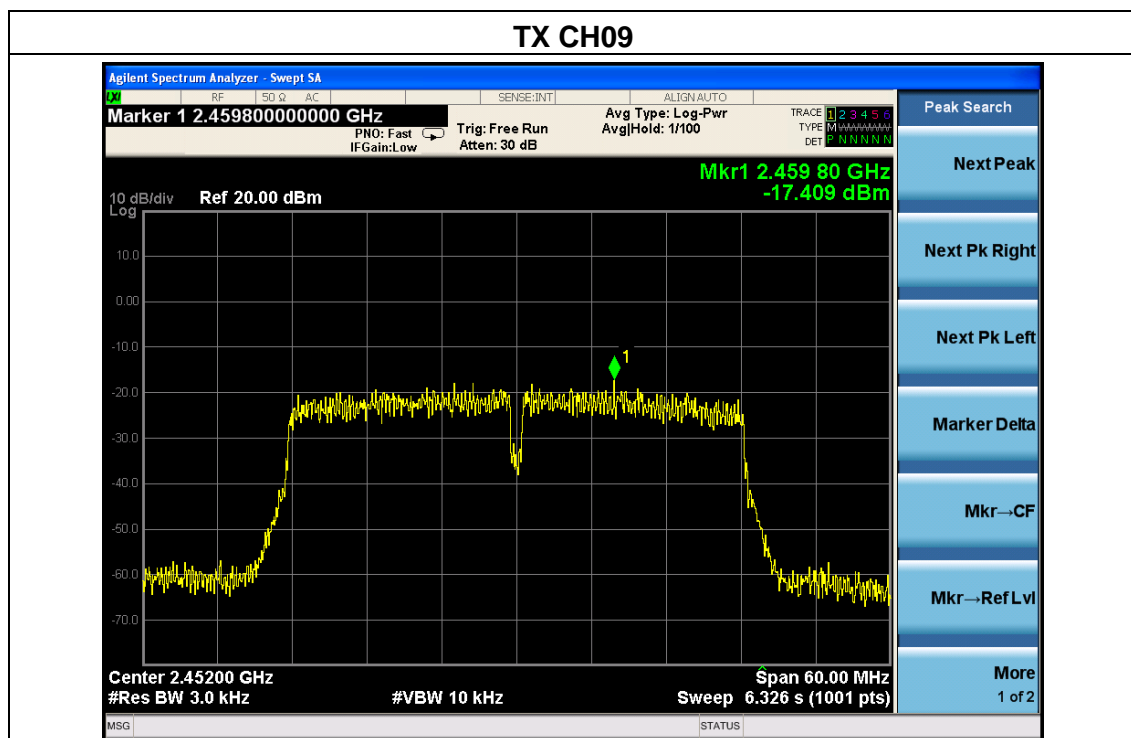
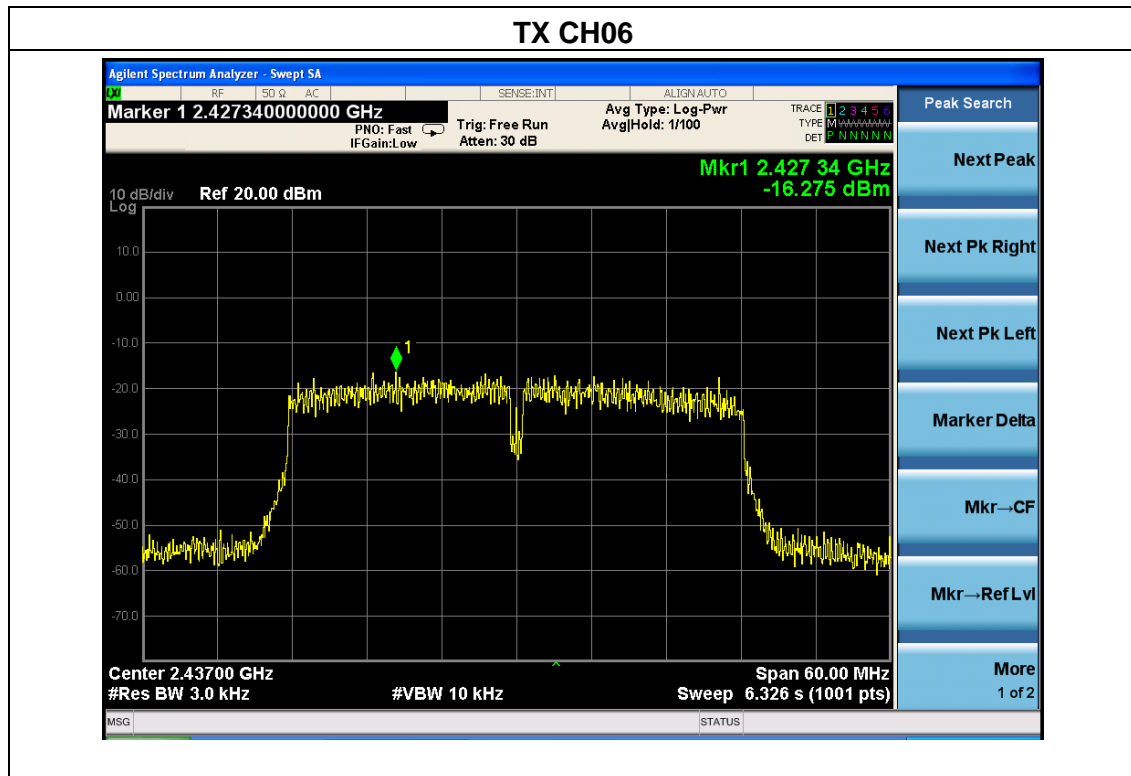
802.11n20





802.11n40





## 5. BANDWIDTH TEST

### 5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

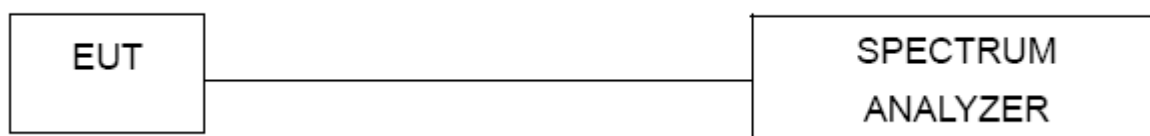
#### 5.1.1 TEST PROCEDURE

1. Set RBW= 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times \text{RBW}$ .
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### 5.1.2 DEVIATION FROM STANDARD

No deviation.

#### 5.1.3 TEST SETUP



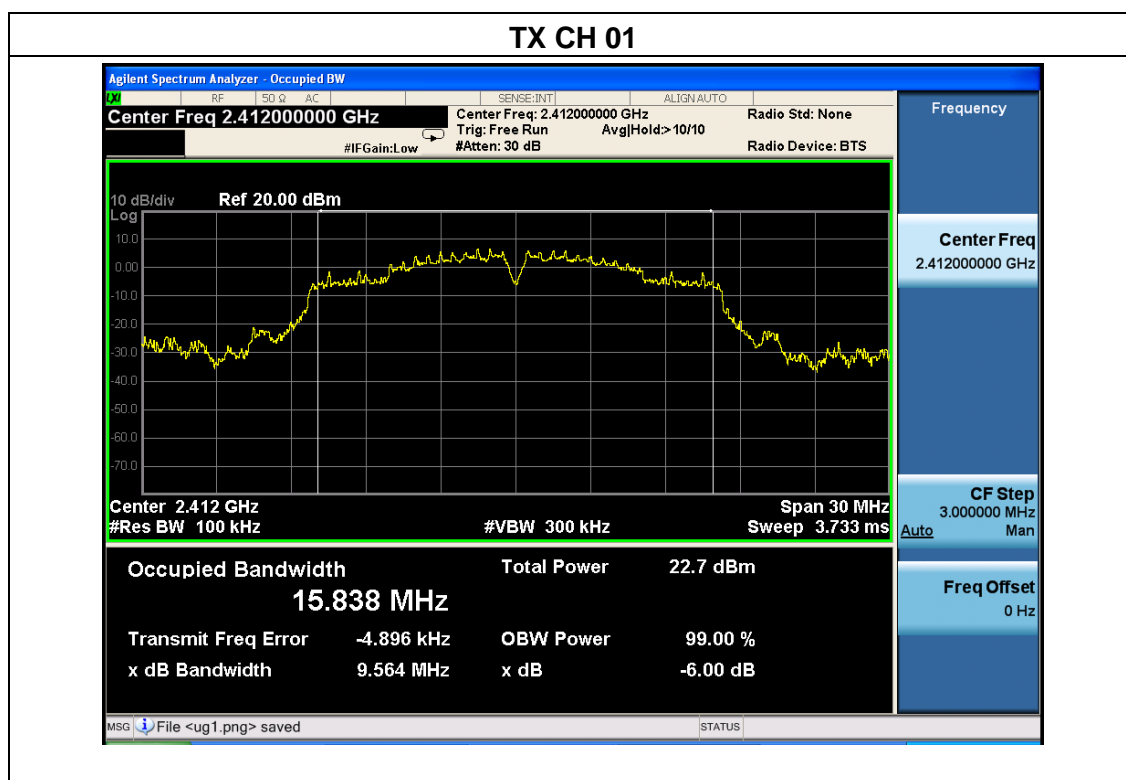
#### 5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.  
All transmitter chains has been tested, and only worst data was listed in this report.

### 5.1.5 TEST RESULTS

EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12Vfrom adapter
Test Mode :	TX b Mode /CH01, CH06, CH11		

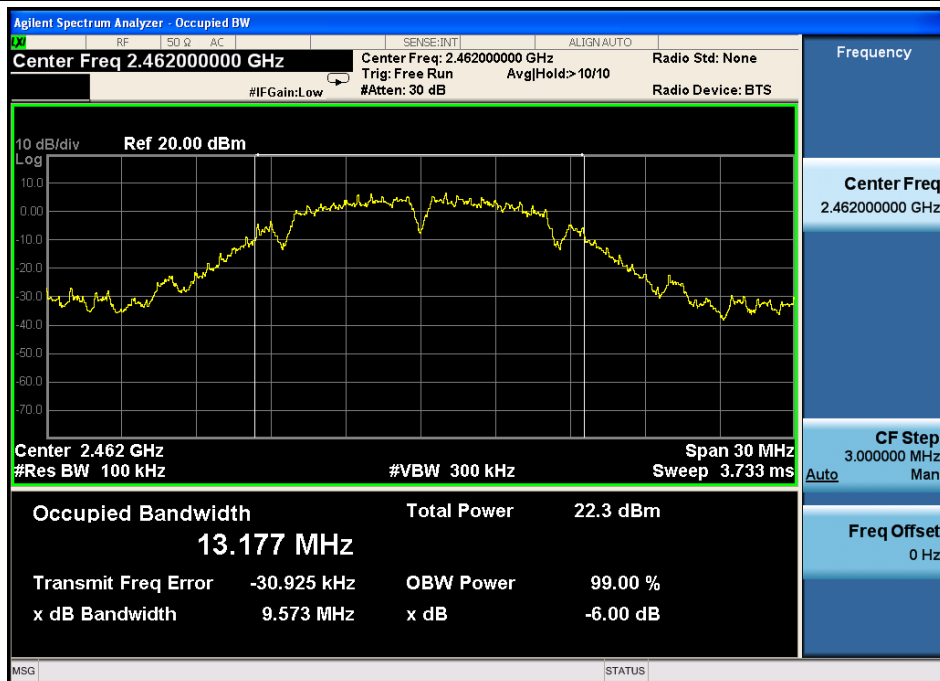
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	9.564	500	Pass
Middle	2437	10.05	500	Pass
High	2462	9.573	500	Pass



### TX CH 06

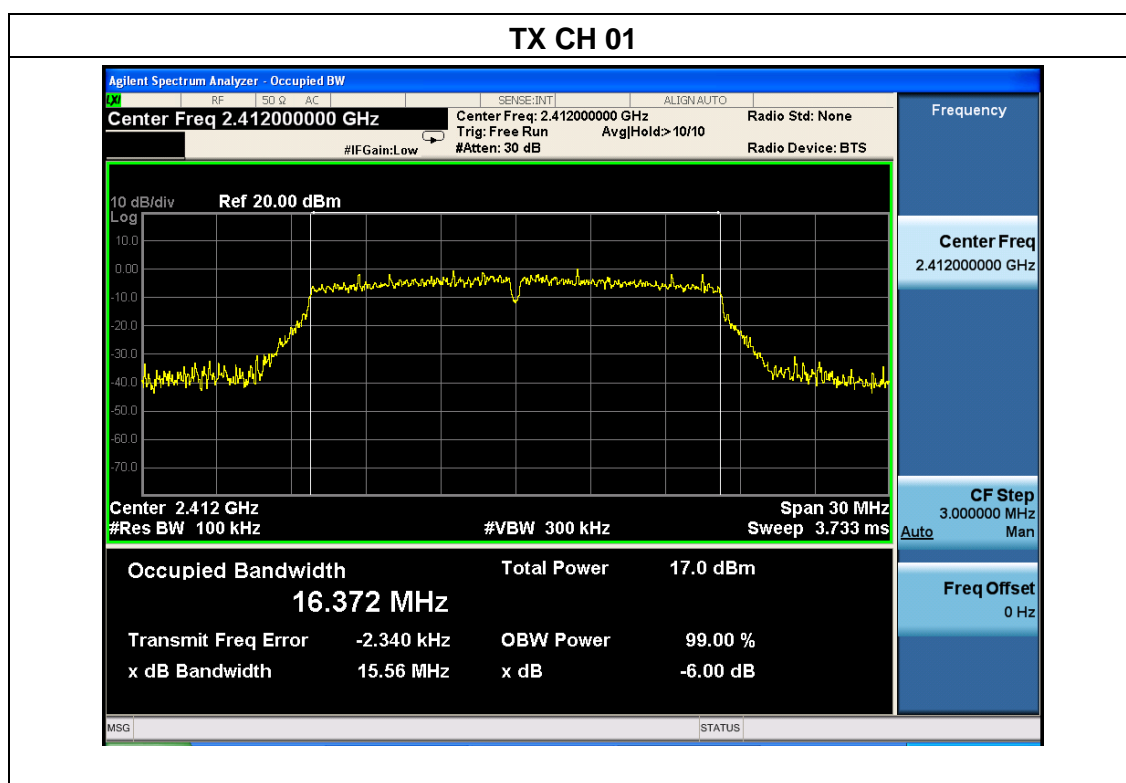


### TX CH 11

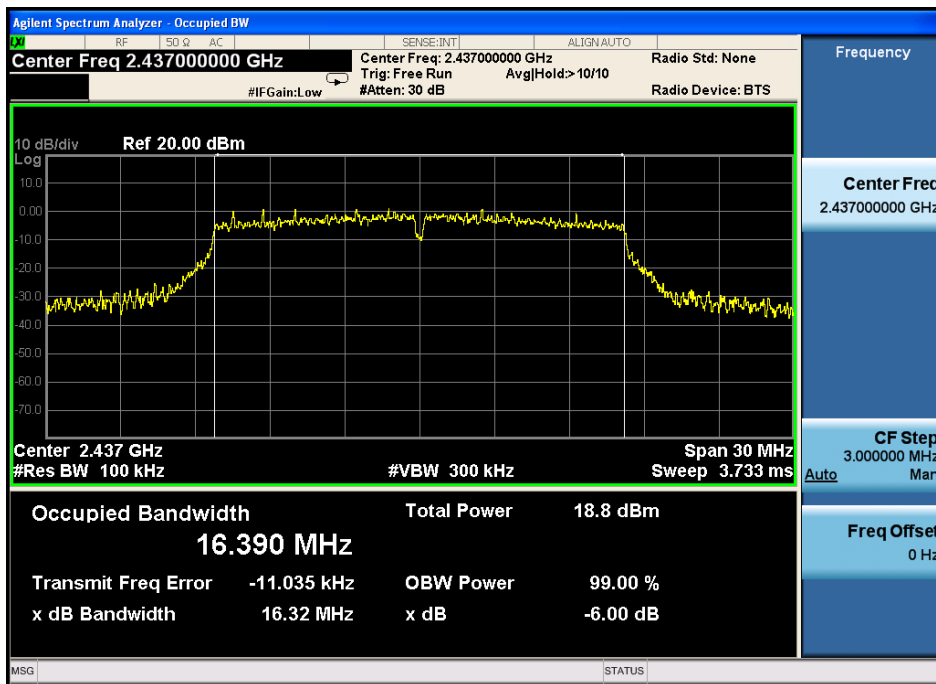


EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12Vfrom adapter
Test Mode :	TX g Mode /CH01, CH06, CH11		

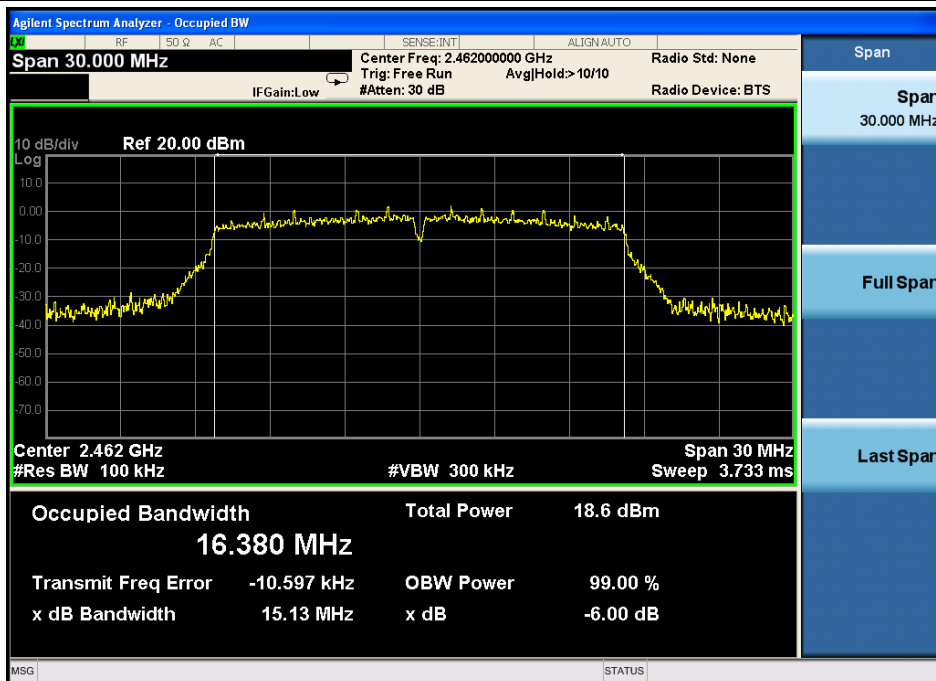
Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.56	500	Pass
Middle	2437	16.32	500	Pass
High	2462	15.13	500	Pass



### TX CH 06



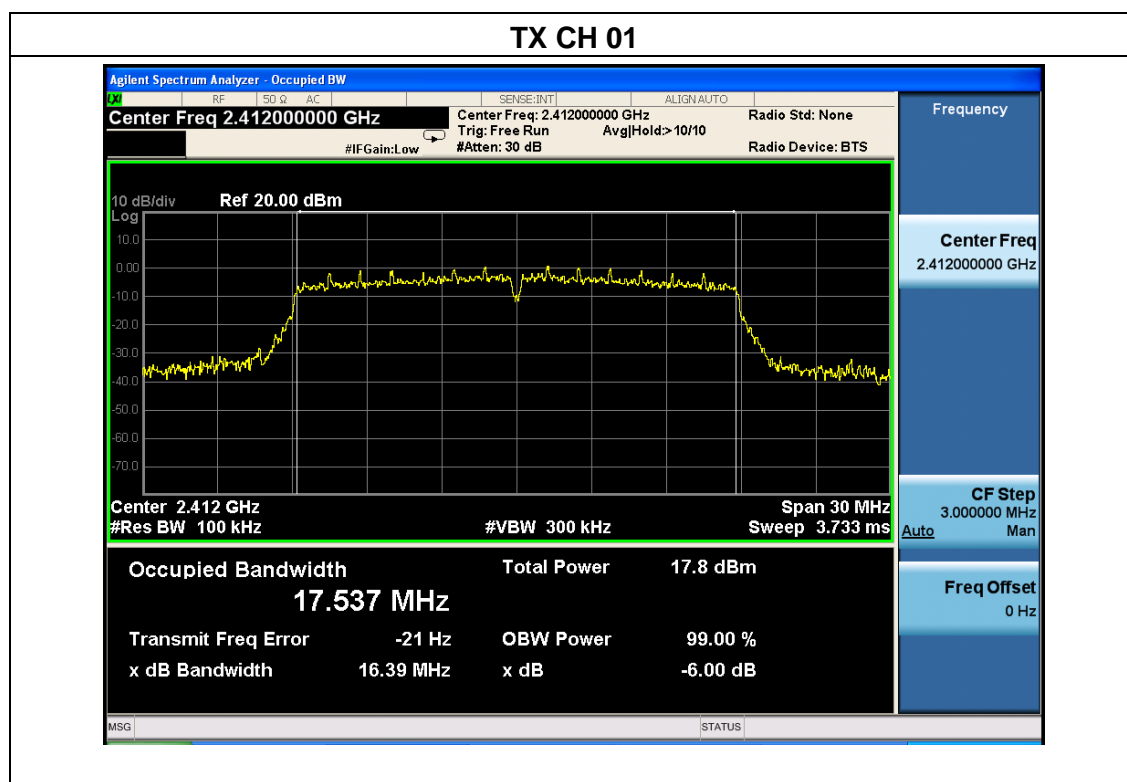
### TX CH 11

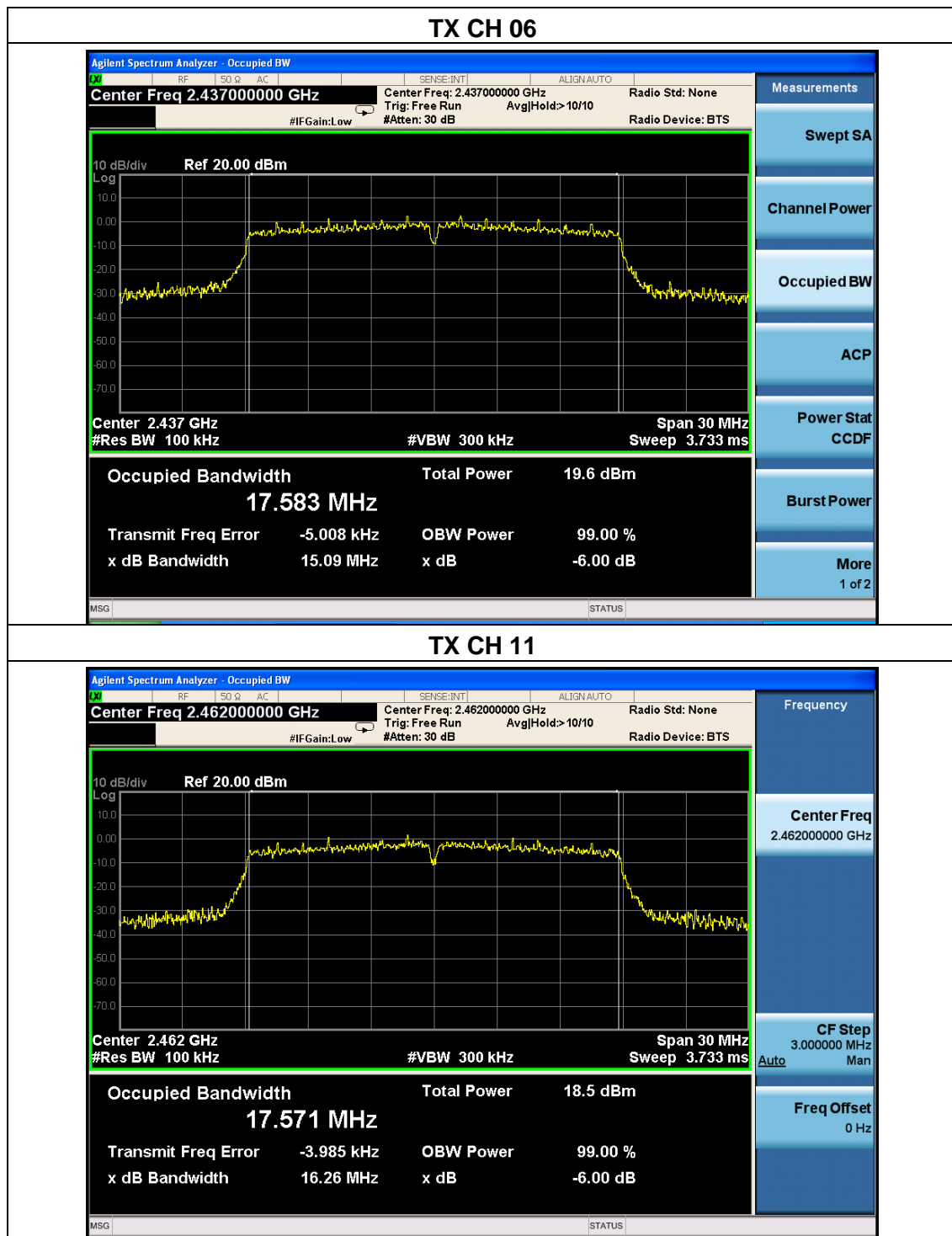




EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12Vfrom adapter
Test Mode :	TX n20 Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.39	500	Pass
Middle	2437	15.09	500	Pass
High	2462	16.26	500	Pass




**TX CH 11**

Frequency

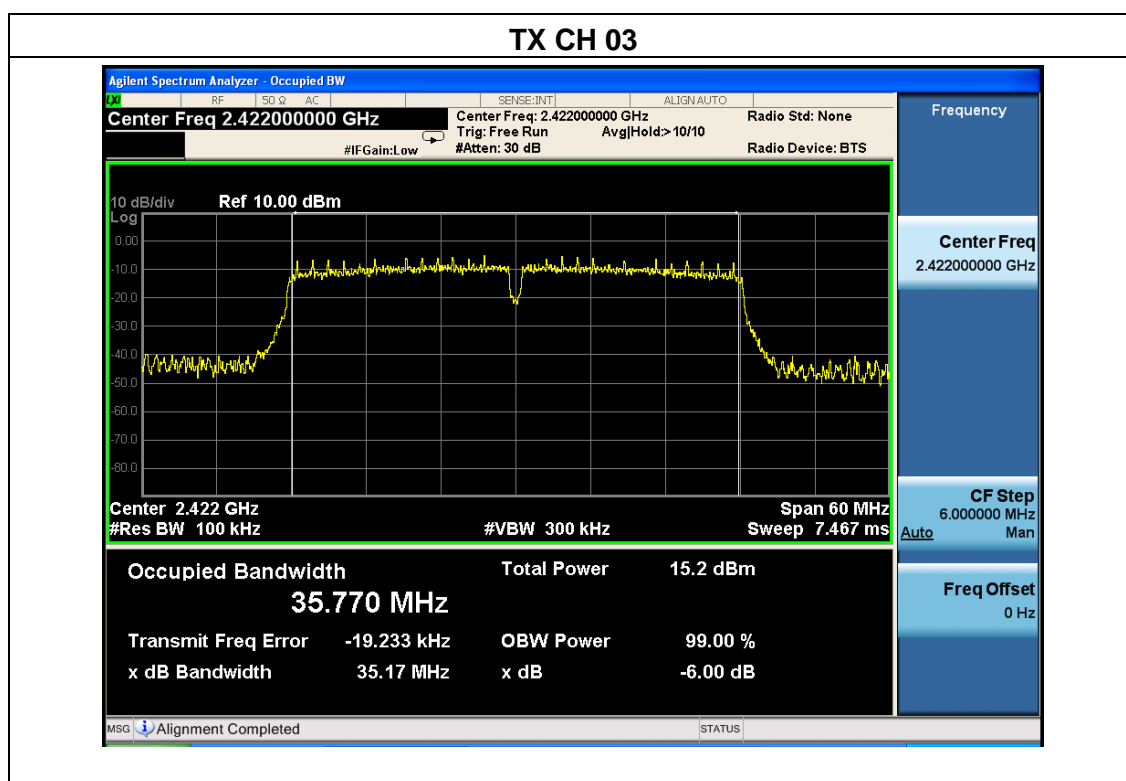
Center Freq  
2.462000000 GHz

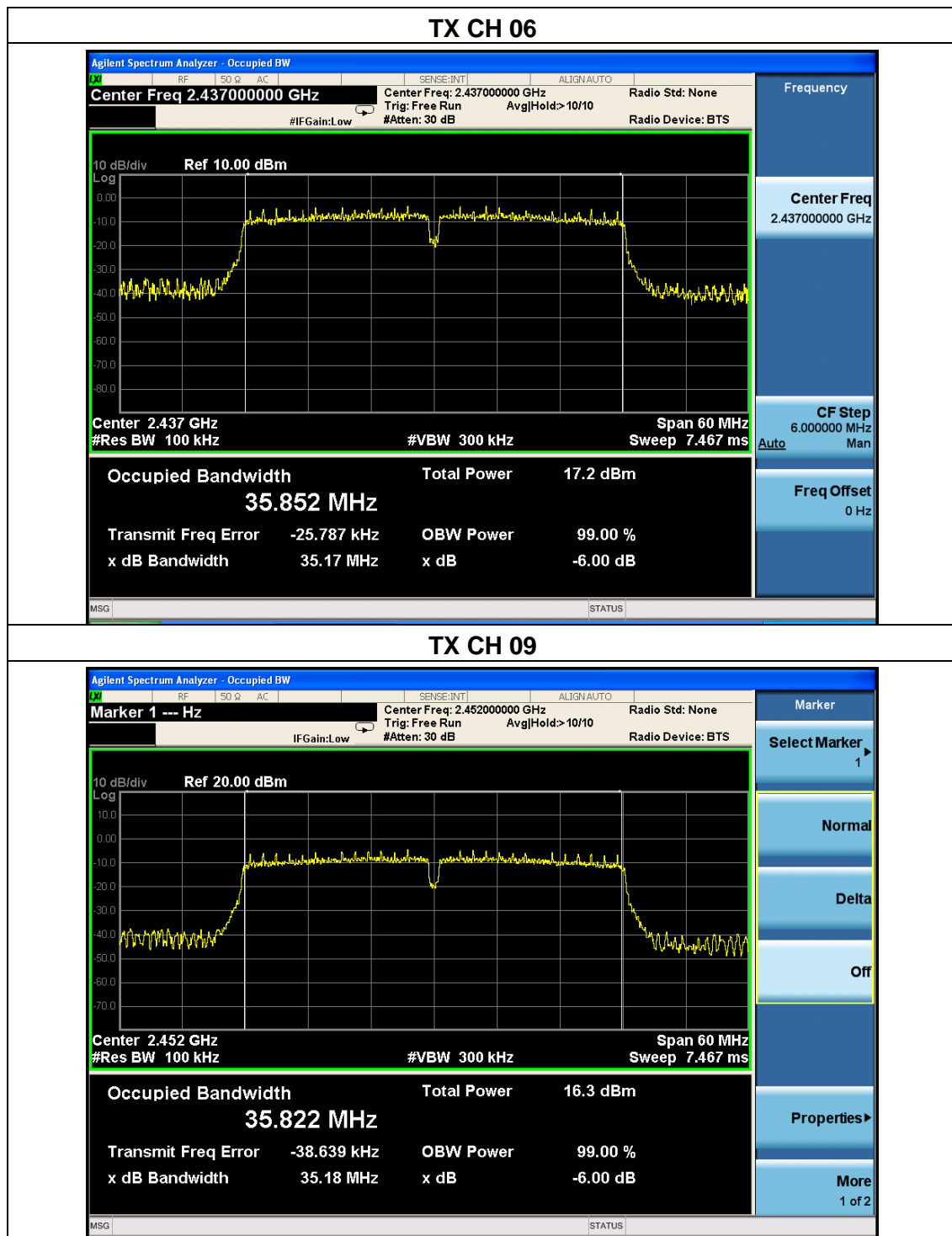
CF Step  
3.000000 MHz  
Auto    Man

Freq Offset  
0 Hz

EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12Vfrom adapter
Test Mode :	TX n40 Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2422	35.17	500	Pass
Middle	2437	35.17	500	Pass
High	2452	35.18	500	Pass




**TX CH 09**

## 6. PEAK OUTPUT POWER TEST

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

#### 6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

#### 6.1.2 DEVIATION FROM STANDARD

No deviation.

#### 6.1.3 TEST SETUP



#### 6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 6.1.5 TEST RESULTS

EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12Vfrom adapter
Test Mode :	TX b/g/n Mode /CH01, CH06, CH11		

TX 802.11b Mode ant1					
Test Channe	Frequency	Maximum Conducted Output Power(PK)			LIMIT
	(MHz)	(dBm)			dBm
CH01	2412	18.80			30
CH06	2437	18.71			30
CH11	2462	18.85			30
TX 802.11b Mode ant2					
CH01	2412	18.65			30
CH06	2437	18.79			30
CH11	2462	18.74			30
TX 802.11g Mode ant1					
CH01	2412	17.92			30
CH06	2437	17.87			30
CH11	2462	17.87			30
TX 802.11b Mode ant2					
CH01	2412	17.75			30
CH06	2437	17.69			30
CH11	2462	17.82			30
TX 802.11n20 Mode					
		Ant port	Power	Total Power	
CH01	2412	1	13.11	16.20	30
		2	13.26		
CH06	2437	1	13.19	16.21	30
		2	13.21		
CH11	2462	1	13.25	16.25	30
		2	13.22		
TX 802.11n40 Mode					
		Ant port	Power	Total Power	
CH03	2412	1	13.02	16.00	30
		2	12.95		
CH06	2437	1	13.09	16.07	30
		2	13.02		
CH09	2462	1	12.87	16.02	30
		2	13.15		

III

## 7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

### APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)).

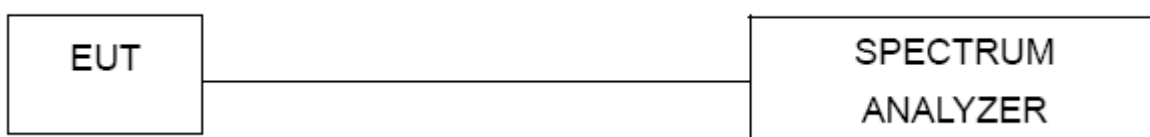
### TEST PROCEDURE

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- Repeat above procedures until all measured frequencies were complete.

### 7.1 DEVIATION FROM STANDARD

No deviation.

### 7.2 TEST SETUP



### 7.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing. All transmitter chains has been tested, and only worst data was listed in this report.

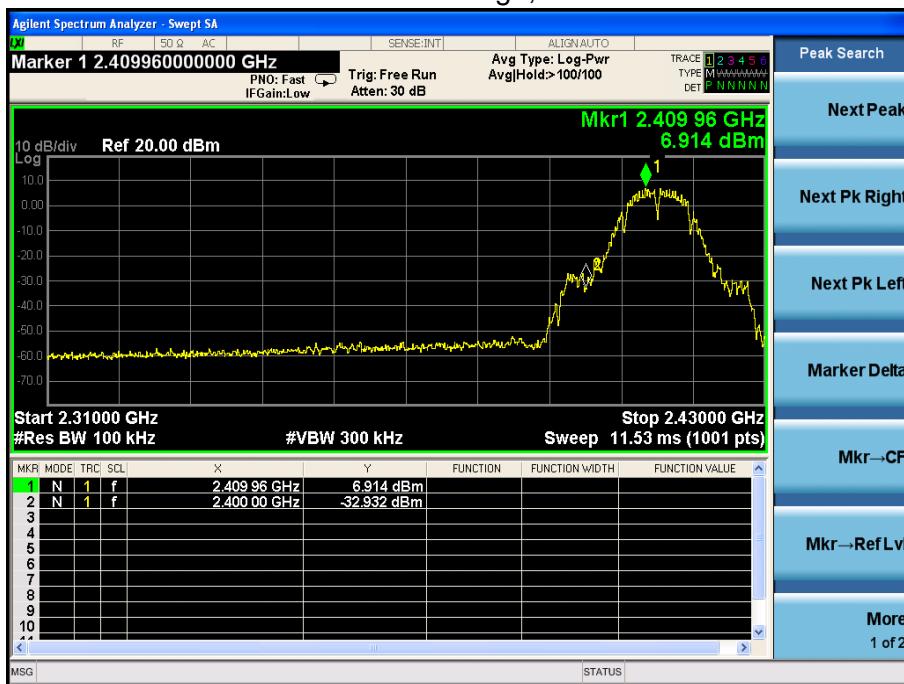
## 7.4 TEST RESULTS

EUT :	Laptop	Model Name :	TM141WT720C
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 12Vfrom adapter

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
802.11b mode			
Left-band	39.846	20	Pass
Right-band	55.027	20	Pass
802.11g mode			
Left-band	39.1	20	Pass
Right-band	42.256	20	Pass
802.11n20 mode			
Left-band	36.401	20	Pass
Right-band	42.306	20	Pass
802.11n40 mode			
Left-band	36.019	20	Pass
Right-band	41.529	20	Pass



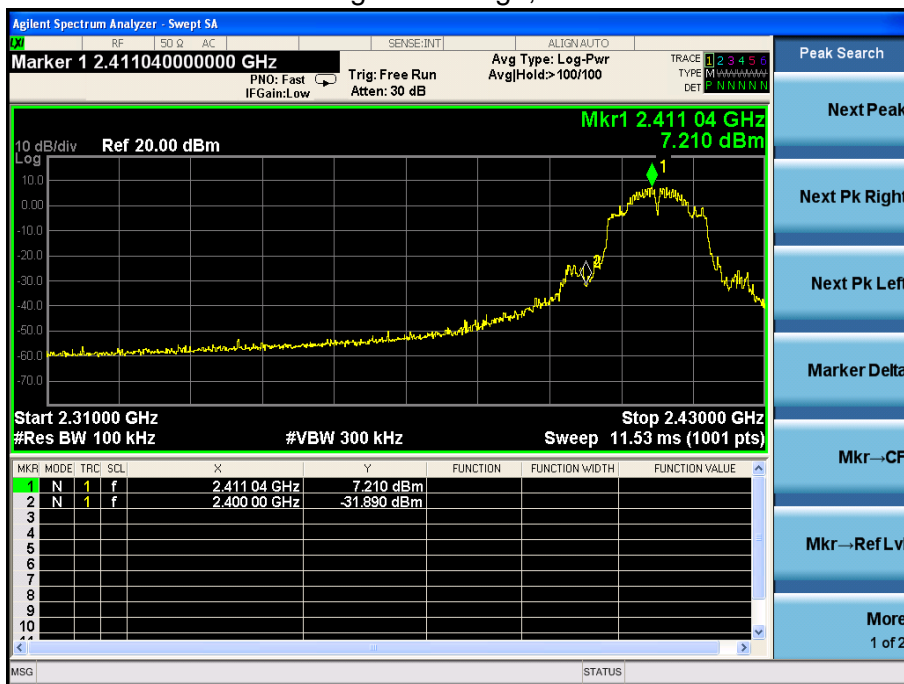
### 802.11b: Band Edge, Left Side



### 802.11b: Band Edge, Right Side



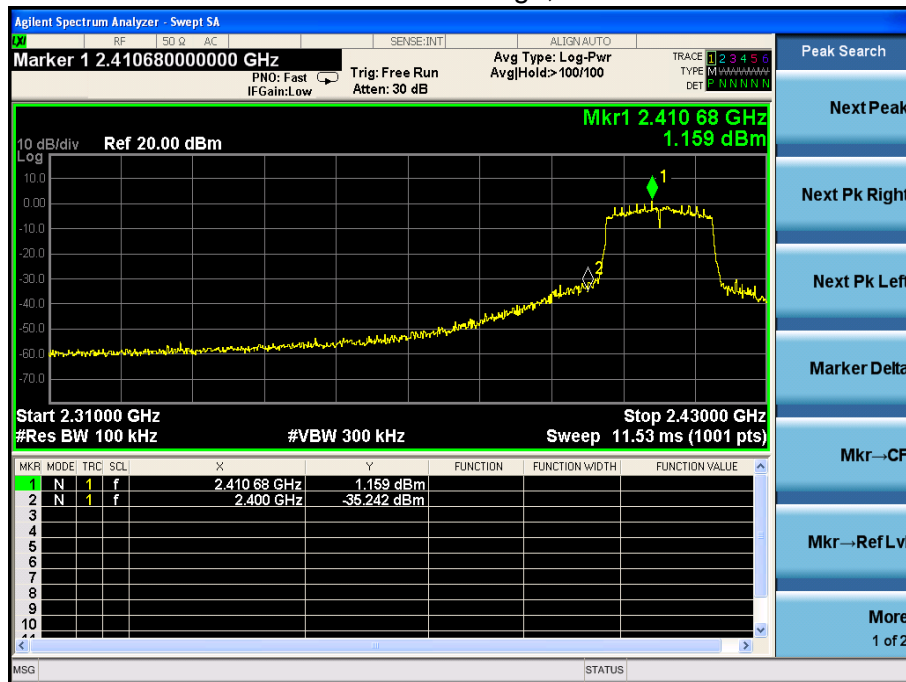
### 802.11g: Band Edge, Left Side



### 802.11g: Band Edge, Right Side



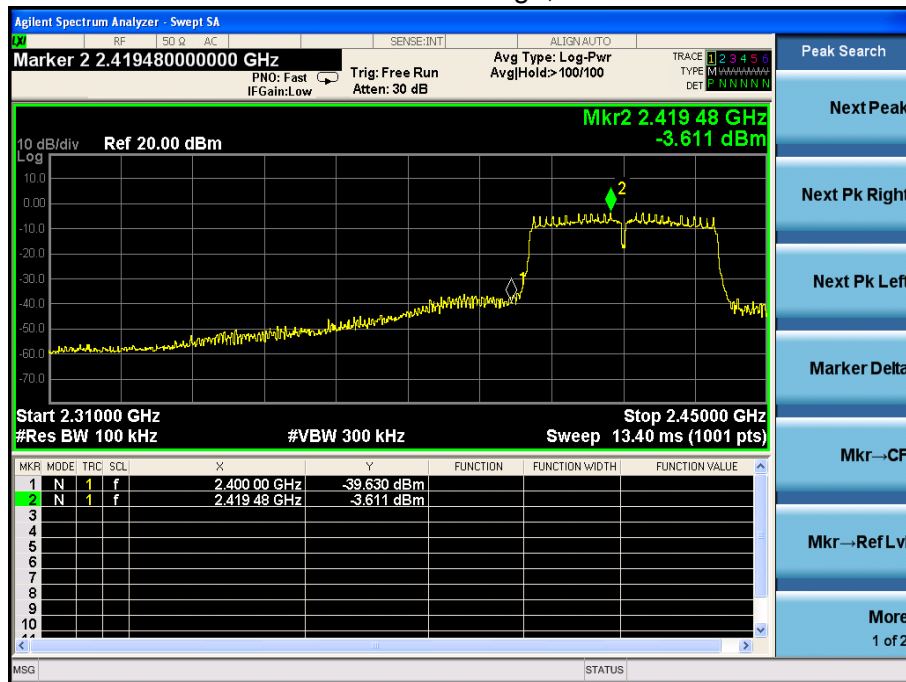
### 802.11n20: Band Edge, Left Side



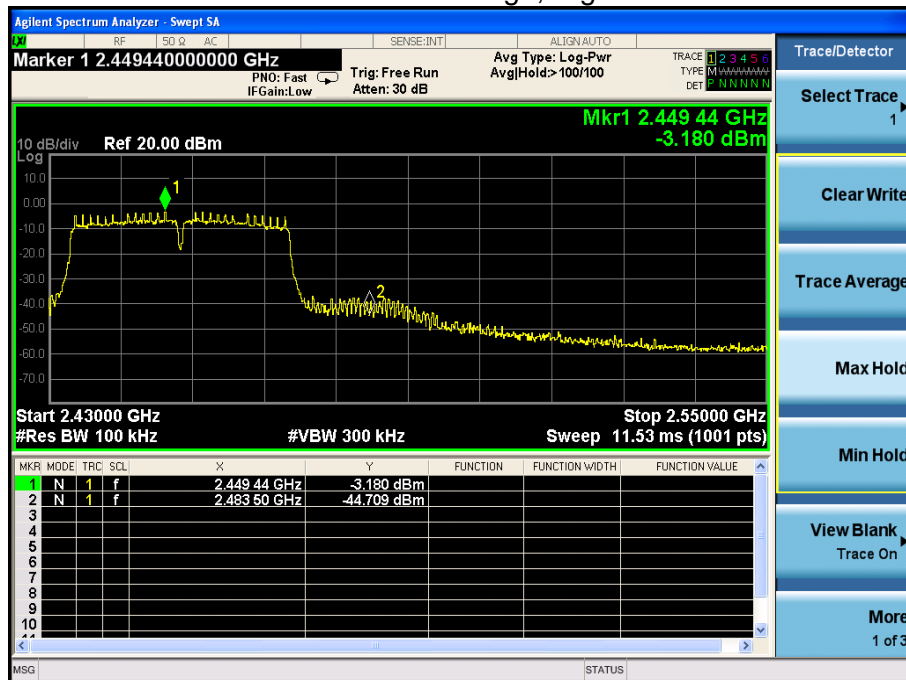
### 802.11n20: Band Edge, Right Side



### 802.11n40: Band Edge, Left Side



### 802.11n40: Band Edge, Right Side



## **8. ANTENNA REQUIREMENT**

### **8.1 STANDARD REQUIREMENT**

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### **8.2 EUT ANTENNA**

The EUT antenna is integrated antenna, 0dbi. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

**----END OF REPORT----**