

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E142R-008

AGR No. : A13NA-130

Applicant : RemoteSolution Co.,Ltd.

Address : 92, Chogokri, Nammyun, Kimchon city, Kyungbuk, Korea, 740-871

Manufacturer : RemoteSolution Co.,Ltd.

Address : 326-14, Apo-daero, Nam-myeon, Gimcheon-si, Gyeongsangbuk-do, Korea

Type of Equipment : Remote Control

FCC ID. : TX4RC38A

Model Name : RC38A

Multiple Model Name : XR11

Serial number : N/A

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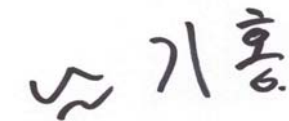
## SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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ONETECH Corp.

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### Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
E142R-008	February 05, 2014	Initial Issue	All

## 1. VERIFICATION OF COMPLIANCE

Applicant : RemoteSolution Co.,Ltd.  
 Address : 92, Chogokri, Nammyun, Kimchon city, Kyungbuk, Korea, 740-871  
 Contact Person : Hak Seok, Cho / Associate Research Engineer  
 Telephone No. : +82-31-420-5723  
 FCC ID : TX4RC38A  
 Model Name : RC38A  
 Serial Number : N/A  
 Date : February 05, 2014

EQUIPMENT CLASS	<b><i>DTS – DIGITAL TRNSMISSION SYSTEM</i></b>
E.U.T. DESCRIPTION	Remote Control
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2009 and FCC KDB 558074 D01 DTS Meas Guidance v03r01
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	3 m semi anechoic chamber.

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. TEST SUMMARY

### 2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
WLAN	15.247 (a) (2)	Minimum 6 dB Bandwidth
	15.247 (b) (3)	Maximum Peak Conducted Output Power
	15.247 (d)	100 kHz Bandwidth Outside the Frequency Band
	15.247 (d)	Radiated Emission which fall in the Restricted Band
	15.247 (e)	Peak Power Spectral Density
	15.209	Radiated Emission Limits
	15.207	Conducted Limits
	15.203	Antenna Requirement
Zigbee	15.247 (a) (2)	Minimum 6 dB Bandwidth
	15.247 (b) (3)	Maximum Peak Conducted Output Power
	15.247 (d)	100 kHz Bandwidth Outside the Frequency Band
	15.247 (d)	Radiated Emission which fall in the Restricted Band
	15.247 (e)	Peak Power Spectral Density
	15.209	Radiated Emission Limits
	15.207	Conducted Limits
	15.203	Antenna Requirement

### 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

### 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

### 2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.10: 2009 at a distance of 3 m from EUT to the antenna.

### 2.6 Test Facility

The open area test site is located at 307-51 Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do and 10 m Semi Anechoic Chamber (SAC) and conducted measurement facilities are located at 301-14, Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. The Onetech Corp. has been accredited as a Conformity Assessment Body (CAB) with designation number KR0013 under APEC TEL MAR between the RRA and the FCC.

### 3. GENERAL INFORMATION

#### 3.1 Product Description

The RemoteSolution Co.,Ltd., Model RC38A (referred to as the EUT in this report) is a Remote Control. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Portable Device		
FREQUENCY RANGE	WLAN	802.11b/g/n(HT20) : 2 412 MHz ~ 2 462 MHz	
		802.11n(HT40) : 2 422 MHz ~ 2 452 MHz	
	Zigbee	2 425 MHz ~ 2 475 MHz	
MAX. RF OUTPUT POWER	WLAN	802.11b	14.80 dBm
		802.11g	13.97 dBm
		802.11n (HT20)	14.05 dBm
		802.11n (HT40)	13.39 dBm
	Zigbee	Antenna 0	-4.67 dBm
		Antenna 1	-4.78 dBm
MODULATION TYPE	WLAN	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK)	
		802.11g/n(HT20/HT40): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
	Zigbee	DSSS Modulation(O-QPSK)	
Number of Channel	WLAN	802.11b/g/n(HT20):11 Channel	
		802.11n(HT40):9 Channel	
	Zigbee	3 Channel	
Antenna Type	WLAN	Inserted into the main board (Chip Antenna)	
	Zigbee	Inserted into the main board (PCB Antenna)	
USED RF CHIP	WLAN	Marker: Chicony Model Name: W704T1	
	Zigbee	Marker: Green Peak Model Name: GP710	
Antenna Gain	WLAN	3.3 dBi	
	Zigbee	Antenna0: -0.61 dBi	
		Antenna1: 1.73 dBi	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 KHz, 16 MHz, 24 MHz		



### 3.2 Alternative type(s)/model(s); also covered by this test report.

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
RC38A	Basic Model	<input checked="" type="checkbox"/>
XR11	These models are identical to basic model except for the model name only.	<input type="checkbox"/>

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacture is responsible for the compliance of all variants.

### 4. EUT MODIFICATIONS

-. None

## 5. SYSTEM TEST CONFIGURATION

### 5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	RemoteSolution Co.,Ltd.	E200175 WM328ML-2	N/A

### 5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
RC38A	RemoteSolution Co.,Ltd.	Remote Control (EUT)	-

### 5.3 Mode of operation during the test

WLAN and Zigbee For the testing, software used to control the EUT for staying in continuous transmitting mode is programmed.

#### 1) WLAN

##### Maximum Output Power

Modulation & Channel selected	DATA RATE	OUTPUT POWER
802.11 b (Middle Channel)	1 Mbps	14.80
	2 Mbps	14.51
	5.5 Mbps	14.19
	11 Mbps	13.91
802.11g (Middle Channel))	6 Mbps	13.94
	9 Mbps	13.74
	12 Mbps	13.48
	18 Mbps	13.46
	24 Mbps	13.25
	36 Mbps	13.08
	48 Mbps	12.89
	54 Mbps	12.82
HT 20 (Middle Channel))	6.5 Mbps	14.05
	13 Mbps	13.84
	19.5 Mbps	13.79
	26 Mbps	13.62
	39 Mbps	13.37
	52 Mbps	13.15
	58.5 Mbps	13.01
	65 Mbps	12.98
HT 40 (Middle Channel))	13.5 Mbps	13.39
	27 Mbps	13.25
	40.5 Mbps	13.10
	54 Mbps	13.02
	81 Mbps	12.86
	108 Mbps	12.65
	121.5 Mbps	12.51
	135 Mbps	12.29

- WLAN: The worse case data rate for each modulation is determined 1 Mbps for IEEE 802.11b, 6 Mbps for IEEE 802.11g, 6.5 Mbps for IEEE 802.11n(HT20), 13.5 Mbps for IEEE 802.11n(HT40).
- WLAN: To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is "XY" axis.

## 2) Zigbee

- Zigbee: To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is "XY" axis.

## 5.4 Configuration of Test System

**Line Conducted Test:** It is not need to test this requirement, because the EUT shall be operated by DC battery.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2009 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

## 5.5 Antenna Requirement

For intentional device, according to section 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.

### Antenna Construction:

The transmitter antenna of the EUT is chip antenna and pcb antenna, so no consideration of replacement by the user.

## 6. PRELIMINARY TEST

### 6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
It is not need to test this requirement, because the power of the EUT is supplied by battery.	

### 6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
TX Mode	X

## 7. Test Data for WLAN

### 7.1 MINIMUM 6 dB BANDWIDTH

#### 7.1.1 Operating environment

Temperature : 21 °C  
Relative humidity : 42 % R.H.

#### 7.1.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



#### 7.1.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - FSV30	R/S	Spectrum Analyzer	101372	May 20, 2013

All test equipment used is calibrated on a regular basis.

#### 7.1.4 Test data for 802.11b Mode

- Test Date : January 24, 2014

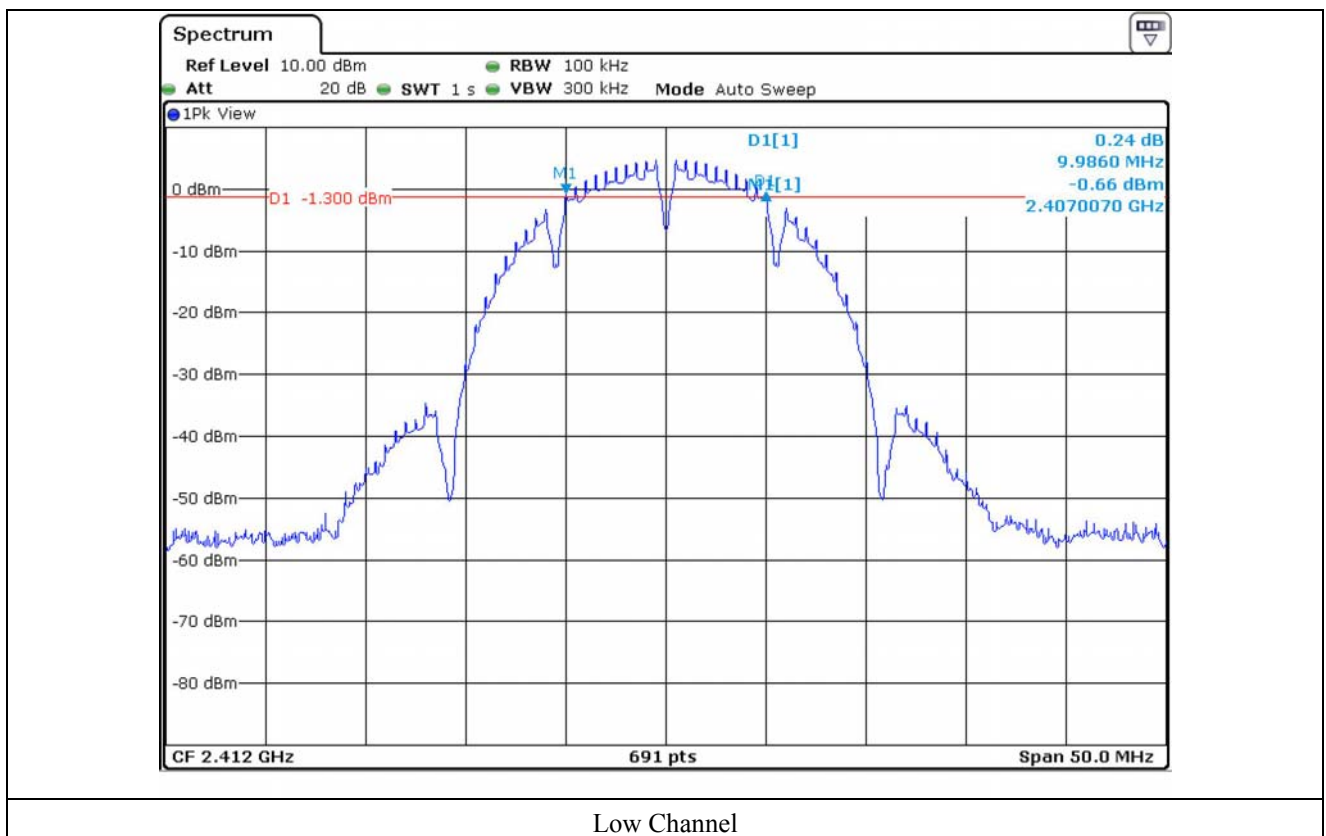
- Test Result : Pass

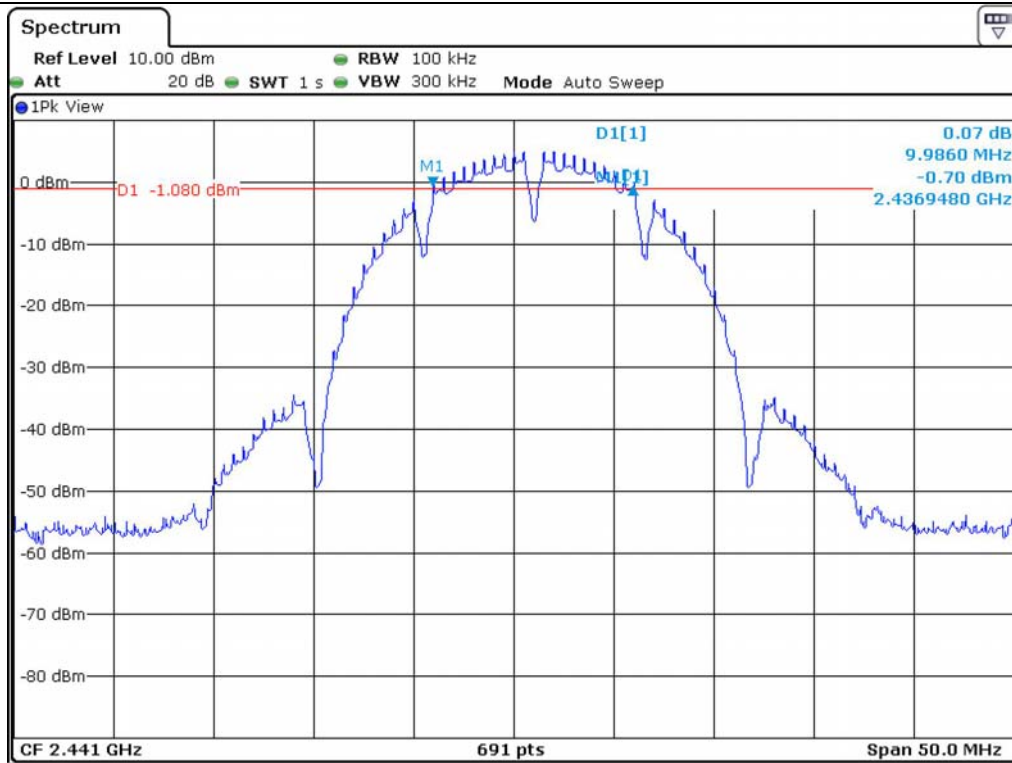
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412	9.99	0.5	9.49
Middle	2 442	9.99	0.5	9.49
High	2 462	9.99	0.5	9.49

Remark. Margin = Measured Value - Limit

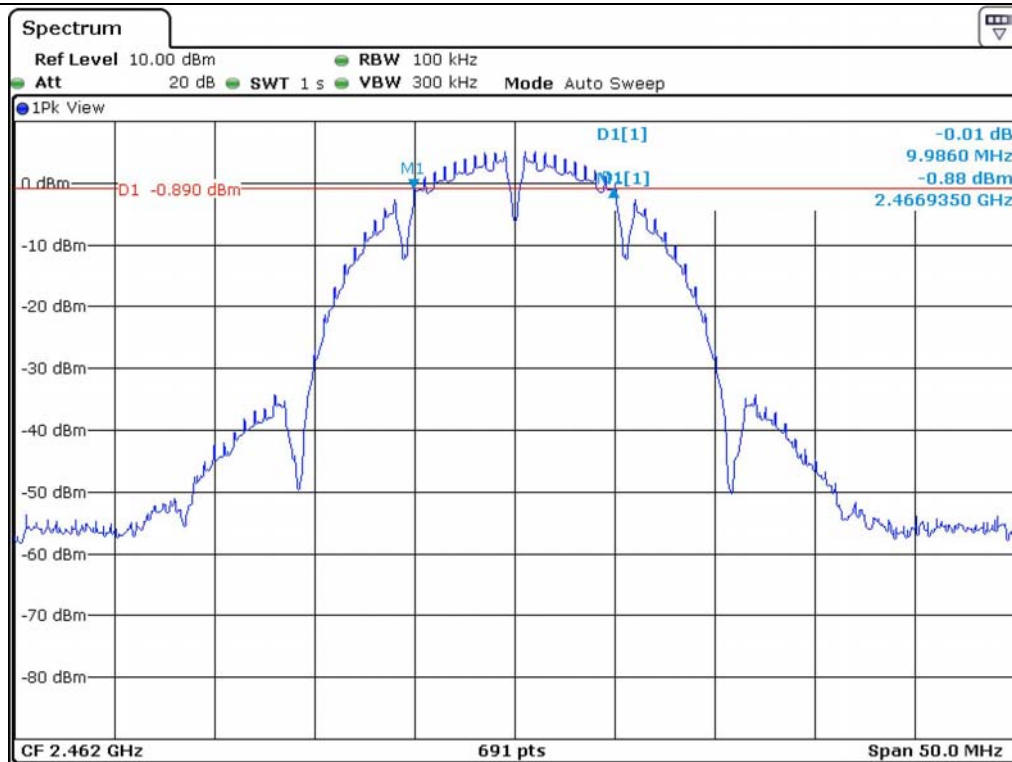


Tested by: Tae-Ho, Kim / Project Engineer





Middle Channel



High Channel



### 7.1.5 Test data for 802.11g Mode

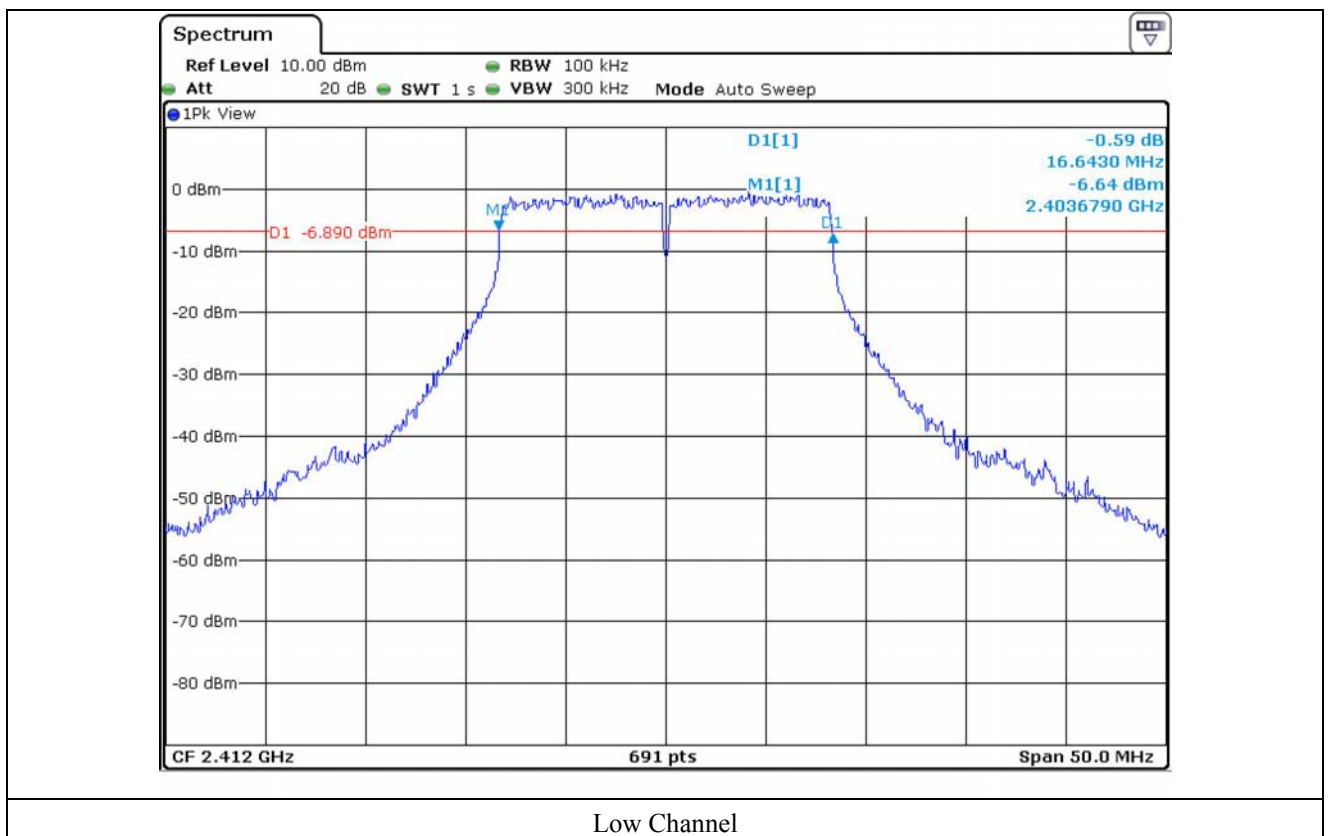
- Test Date : January 24, 2014
- Test Result : Pass

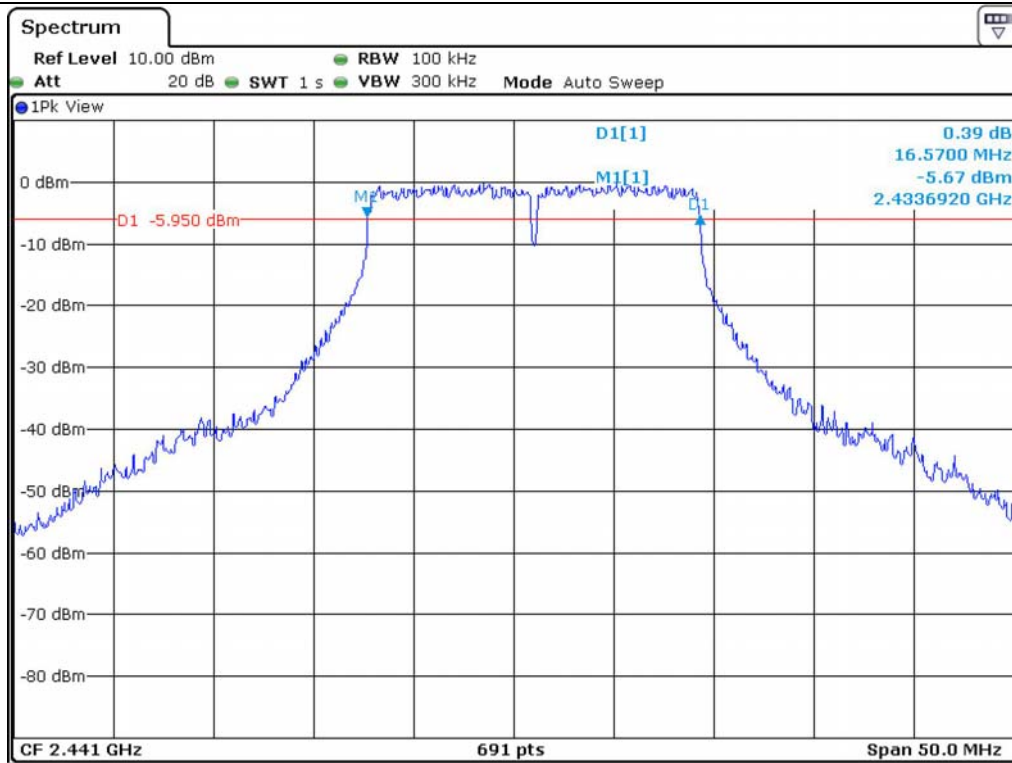
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412	16.64	0.5	16.14
Middle	2 442	16.57	0.5	16.07
High	2 462	16.64	0.5	16.14

Remark. Margin = Measured Value - Limit

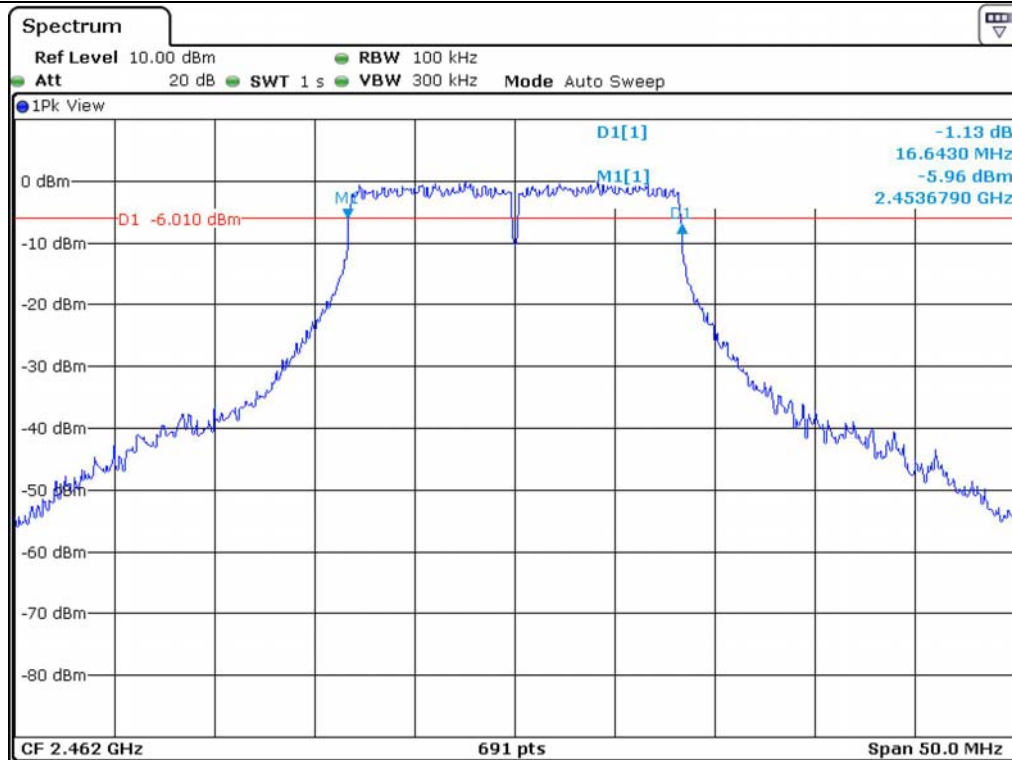


Tested by: Tae-Ho, Kim / Project Engineer





Middle Channel



High Channel

### 7.1.6 Test data for 802.11n\_HT20 Mode

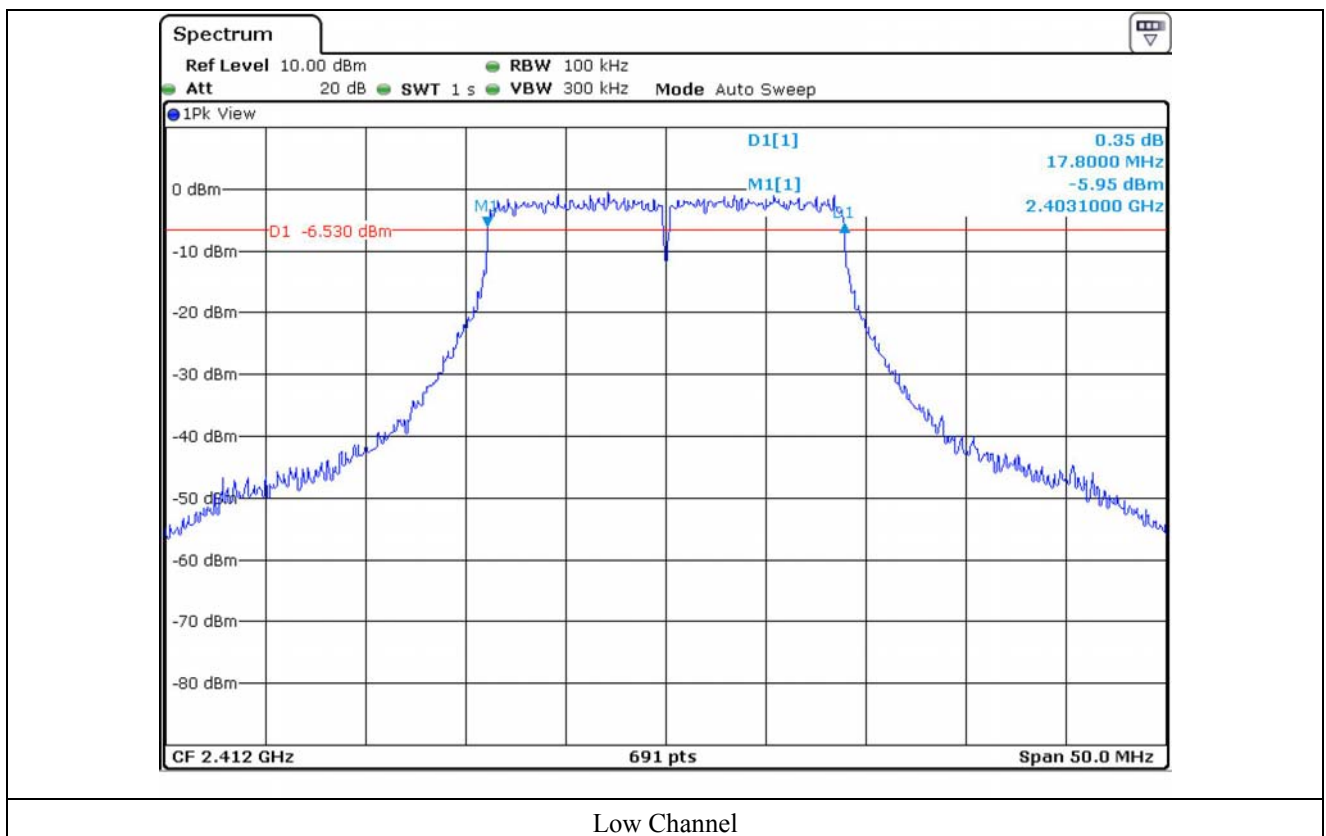
- Test Date : January 24, 2014
- Test Result : Pass

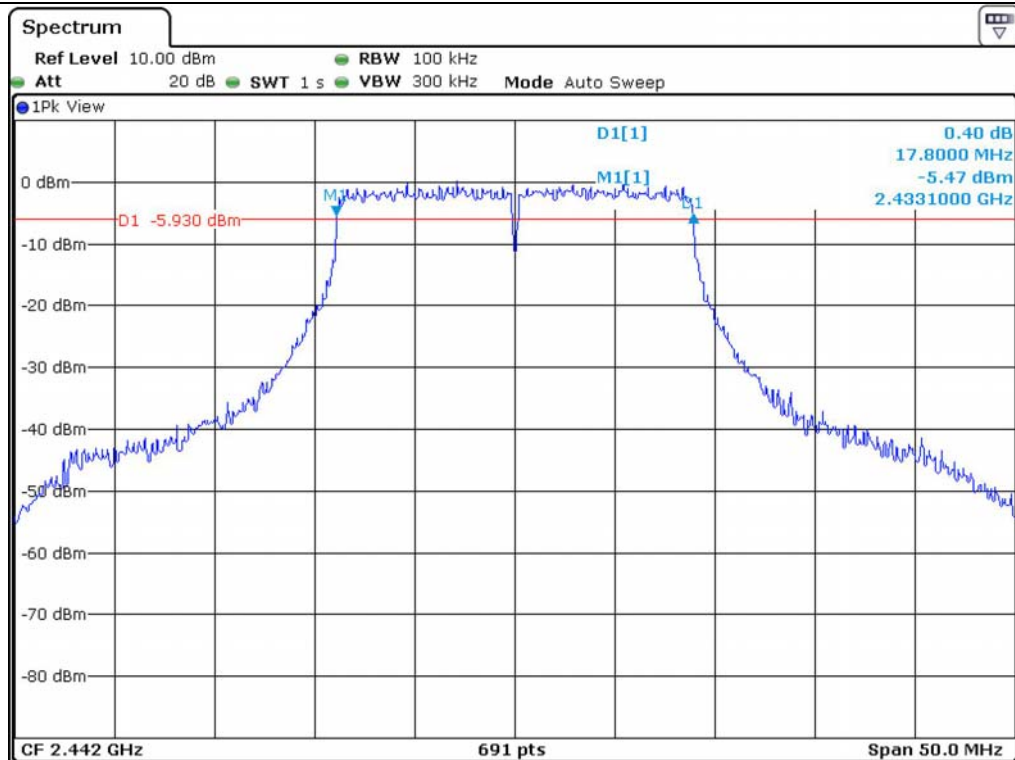
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412	17.80	0.5	17.30
Middle	2 442	17.80	0.5	17.30
High	2 462	17.80	0.5	17.30

Remark. Margin = Measured Value - Limit

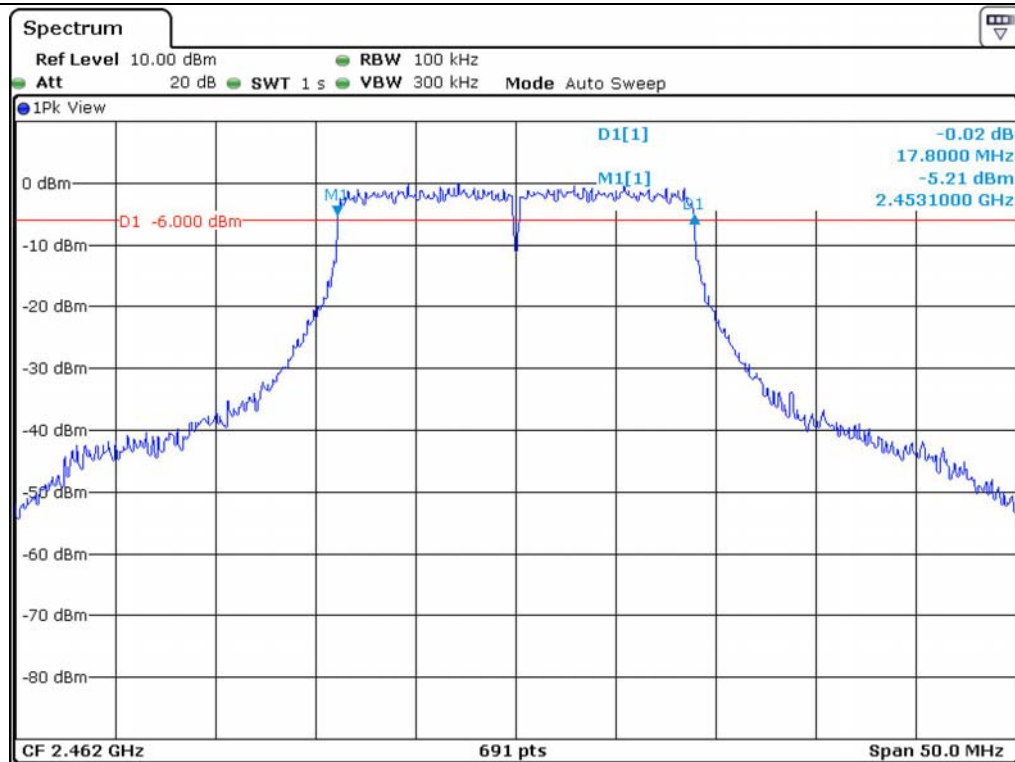


Tested by: Tae-Ho, Kim / Project Engineer





Middle Channel



High Channel

### 7.1.7 Test data for 802.11n\_HT40 Mode

- Test Date : January 24, 2014

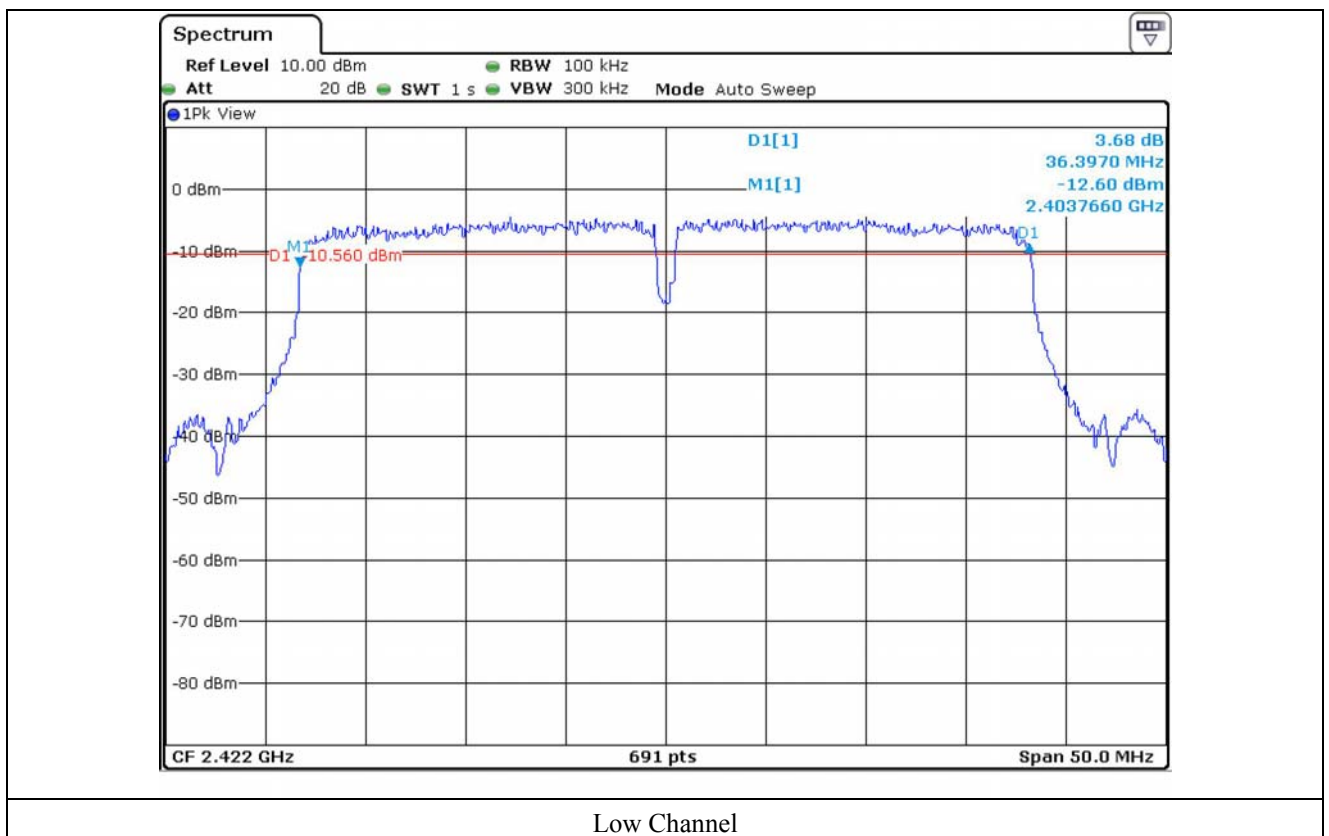
- Test Result : Pass

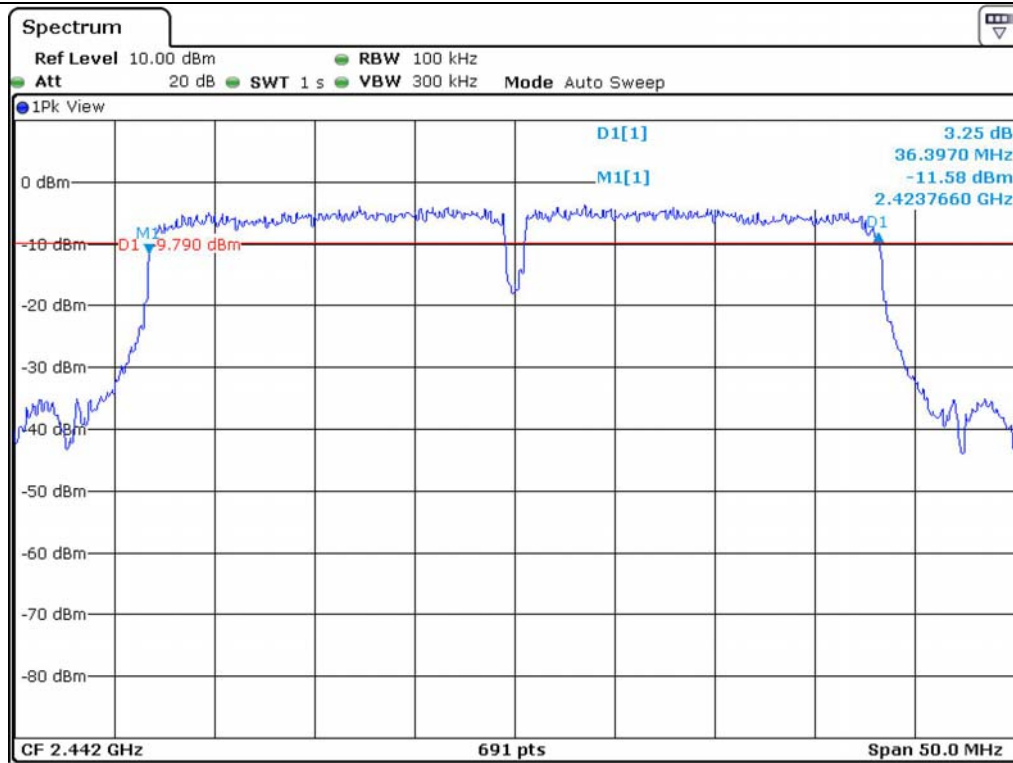
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 422	36.40	0.5	35.90
Middle	2 442	36.40	0.5	35.90
High	2 452	36.40	0.5	35.90

Remark. Margin = Measured Value - Limit

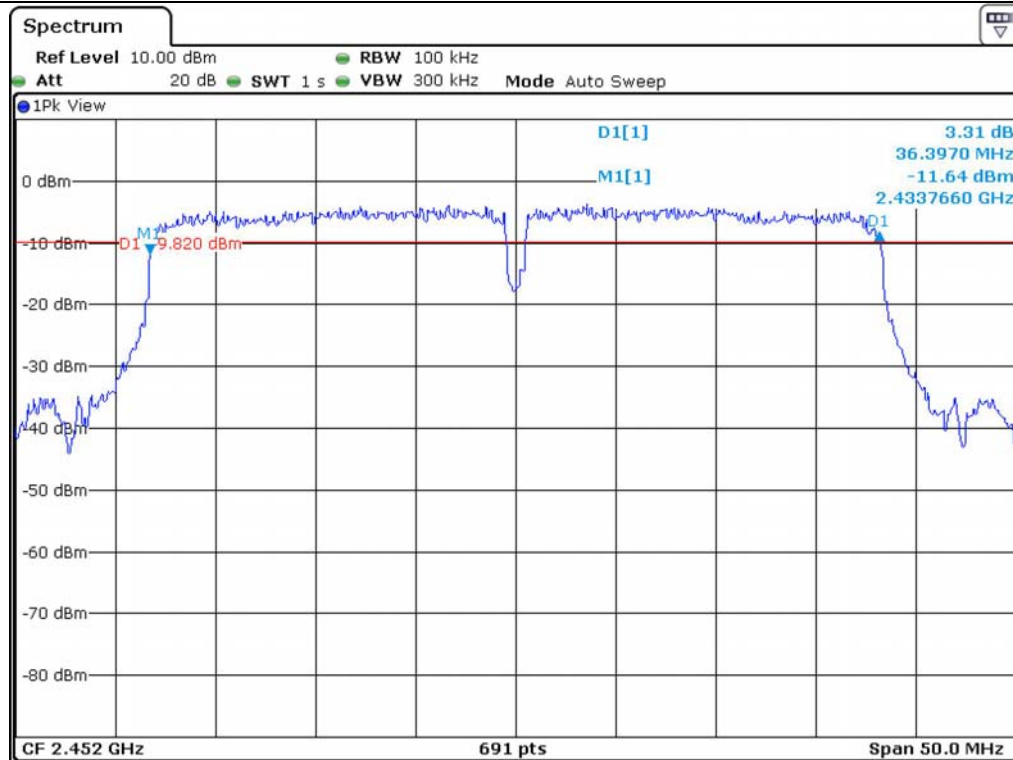


Tested by: Tae-Ho, Kim / Project Engineer





Middle Channel



High Channel

## 7.2 MAXIMUM PEAK OUTPUT POWER

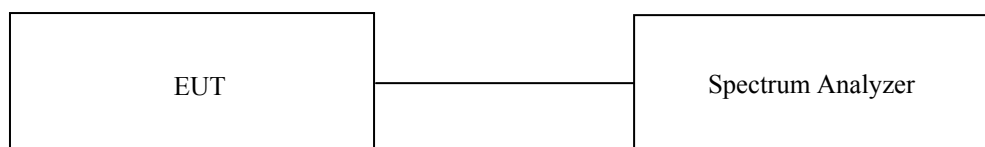
### 7.2.1 Operating environment

Temperature : 21 °C

Relative humidity : 42 % R.H.

### 7.2.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the DTS bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



### 7.2.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - FSV30	R/S	Spectrum Analyzer	101372	May 30, 2013

All test equipment used is calibrated on a regular basis.

#### 7.2.4 Test data for 802.11b Mode

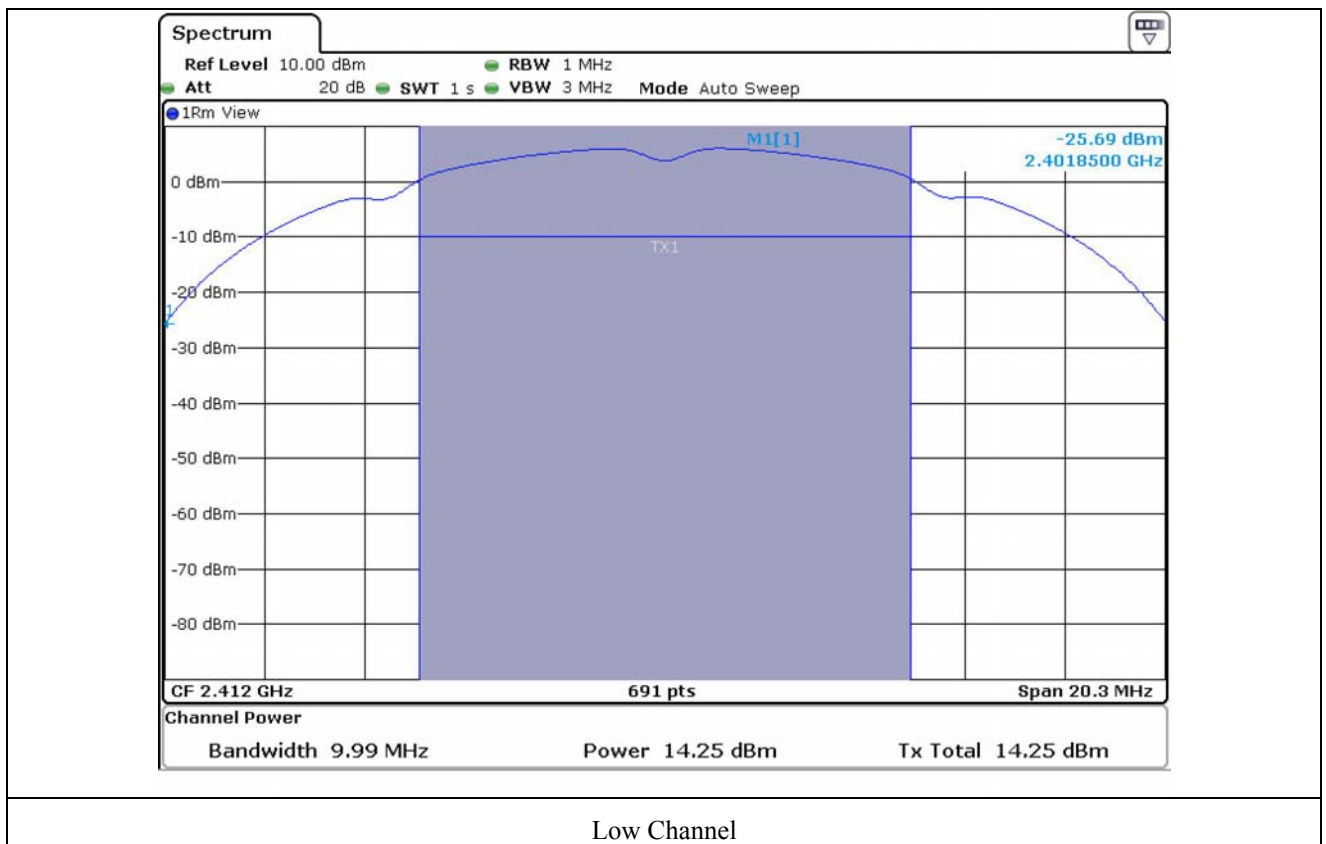
-. Test Date : January 24, 2014  
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	Emission Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412	9.99	14.25	30.00	15.75
MIDDLE	2 442	9.99	14.71	30.00	15.29
HIGH	2 462	9.99	14.80	30.00	15.20

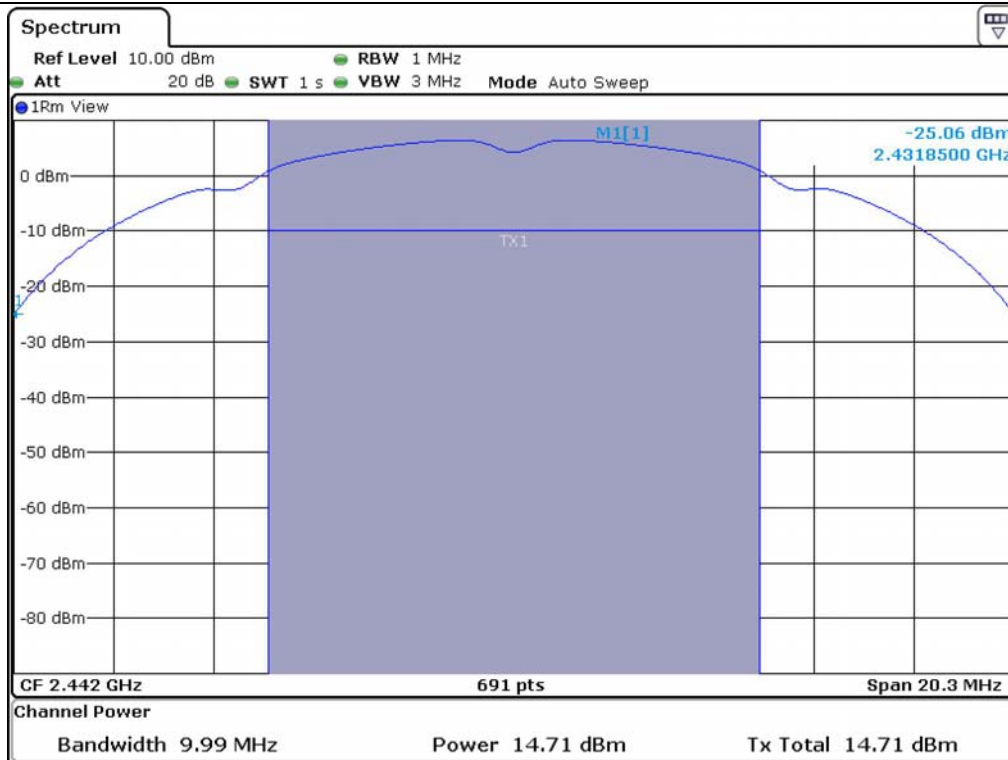
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)



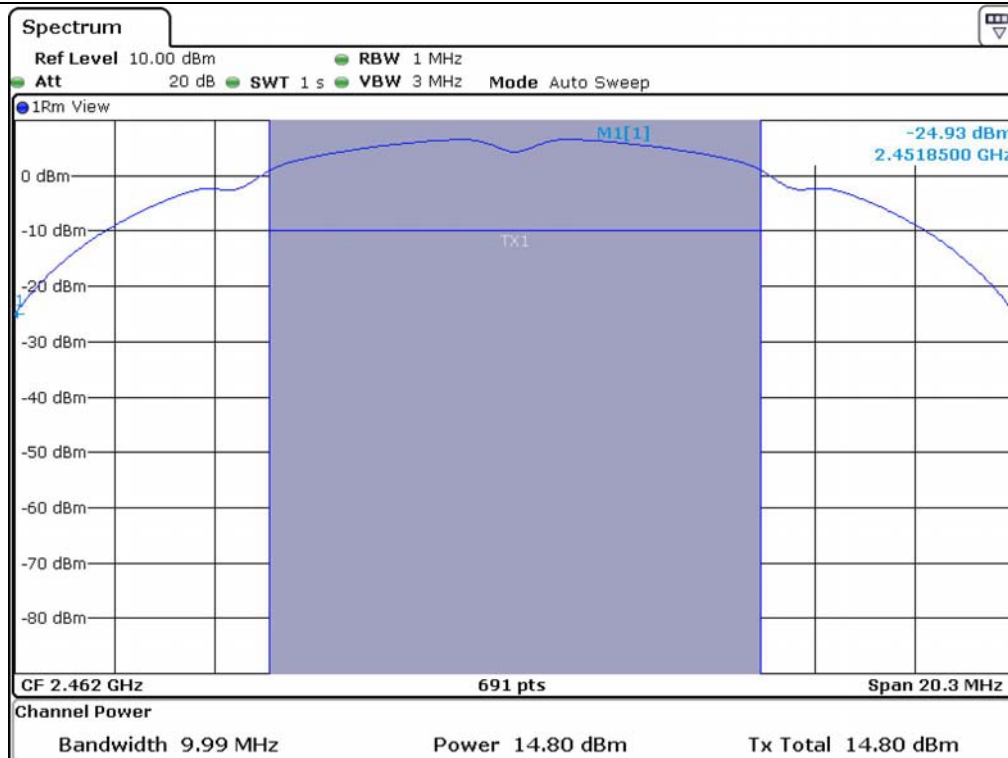
Tested by: Tae-Ho, Kim / Project Engineer







Middle Channel



High Channel

### 7.2.5 Test data for 802.11g Mode

- Test Date : September 13, 2013

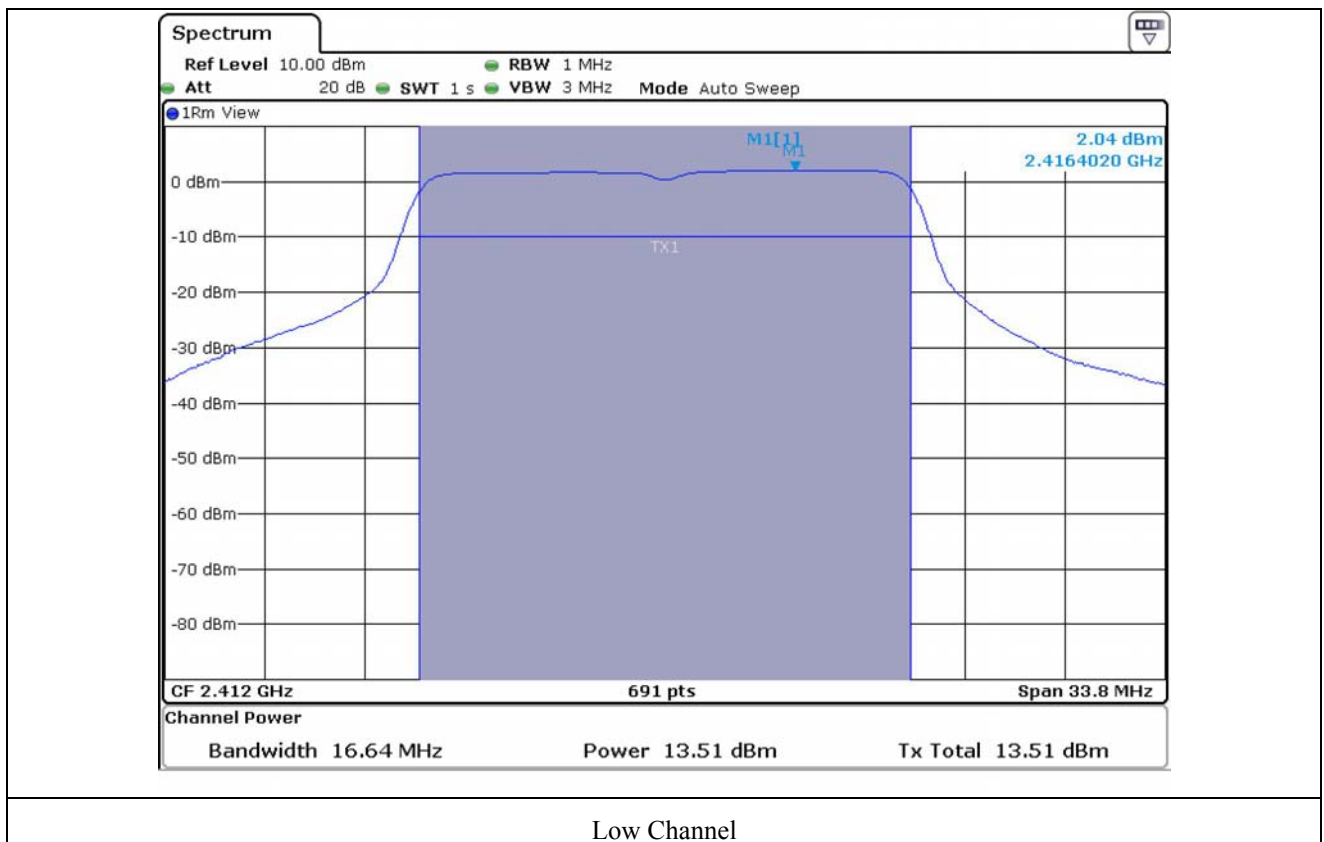
- Test Result : Pass

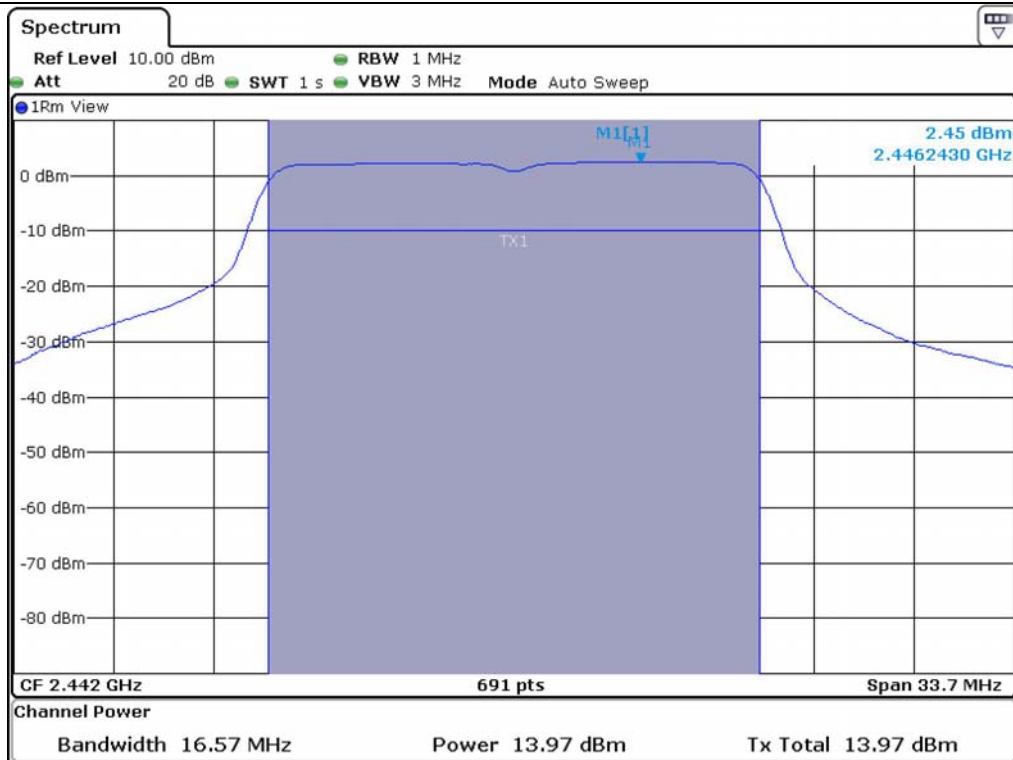
CHANNEL	FREQUENCY (MHz)	Emission Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412	16.64	13.51	30.00	16.49
MIDDLE	2 442	16.57	13.97	30.00	16.03
HIGH	2 462	16.64	13.80	30.00	16.20

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

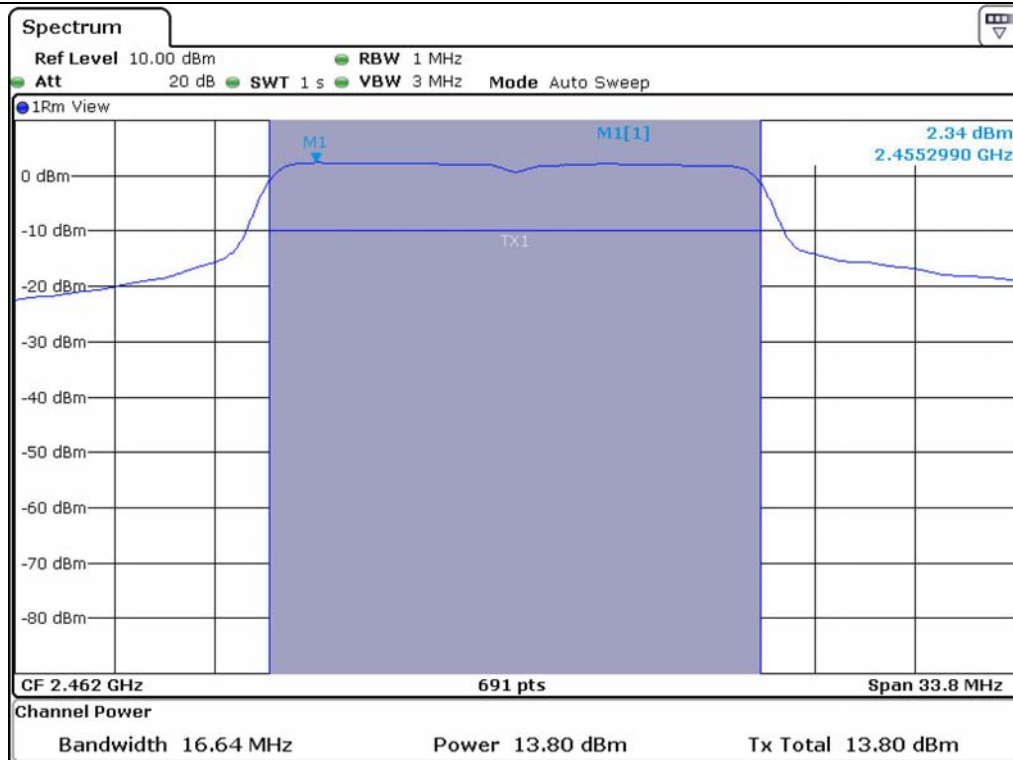


Tested by: Tae-Ho, Kim / Project Engineer





Middle Channel



High Channel

### 7.2.6 Test data for 802.11n\_HT20 Mode

-. Test Date : January 24, 2014

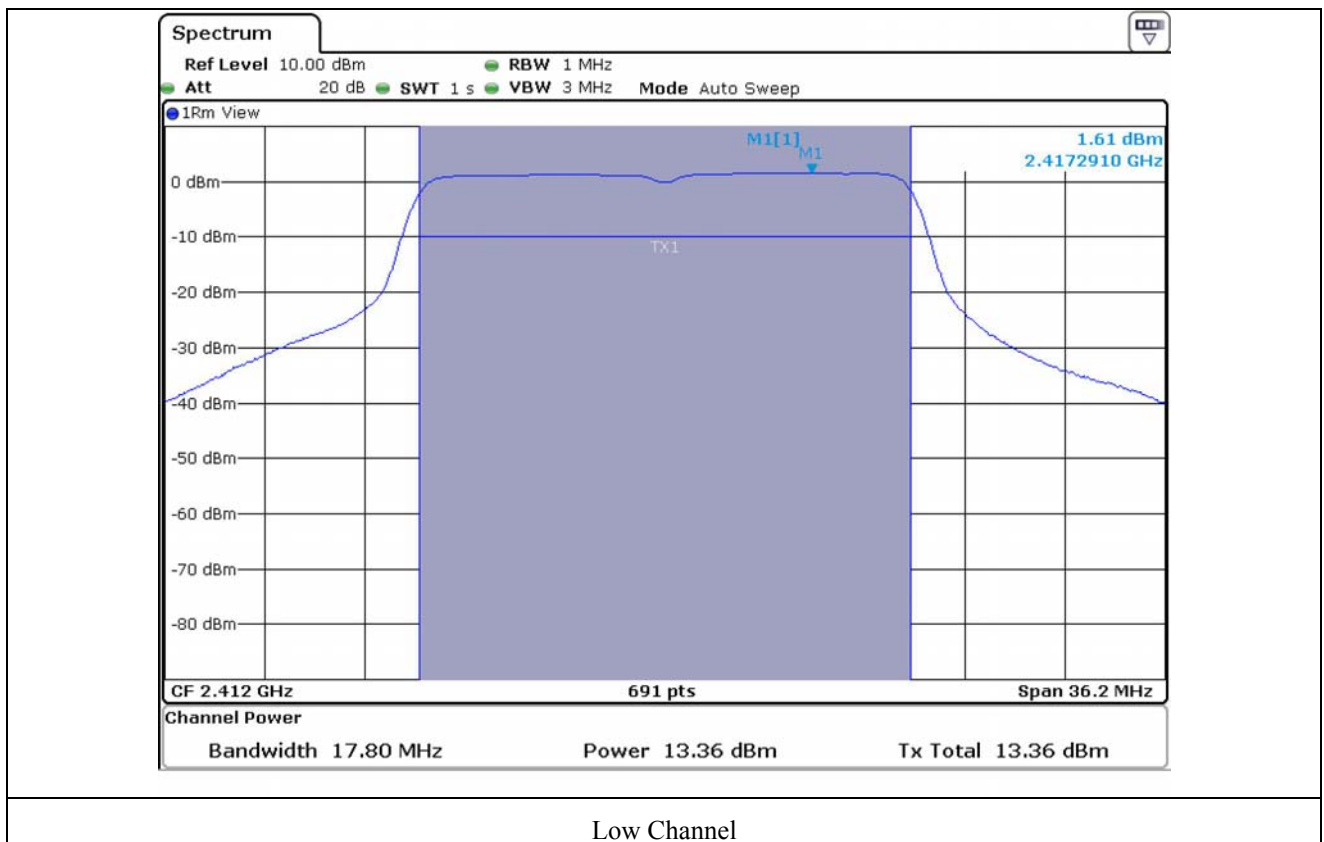
-. Test Result : Pass

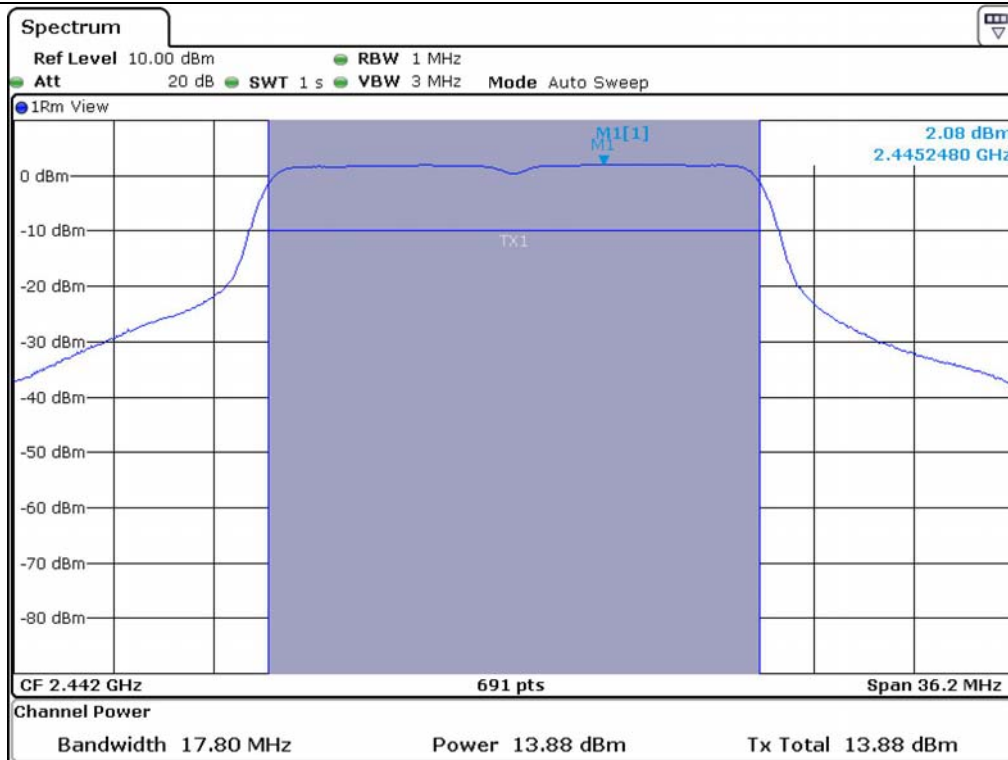
CHANNEL	FREQUENCY (MHz)	Emission Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412	17.80	13.36	30.00	16.64
MIDDLE	2 442	17.80	13.88	30.00	16.12
HIGH	2 462	17.80	14.05	30.00	15.95

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

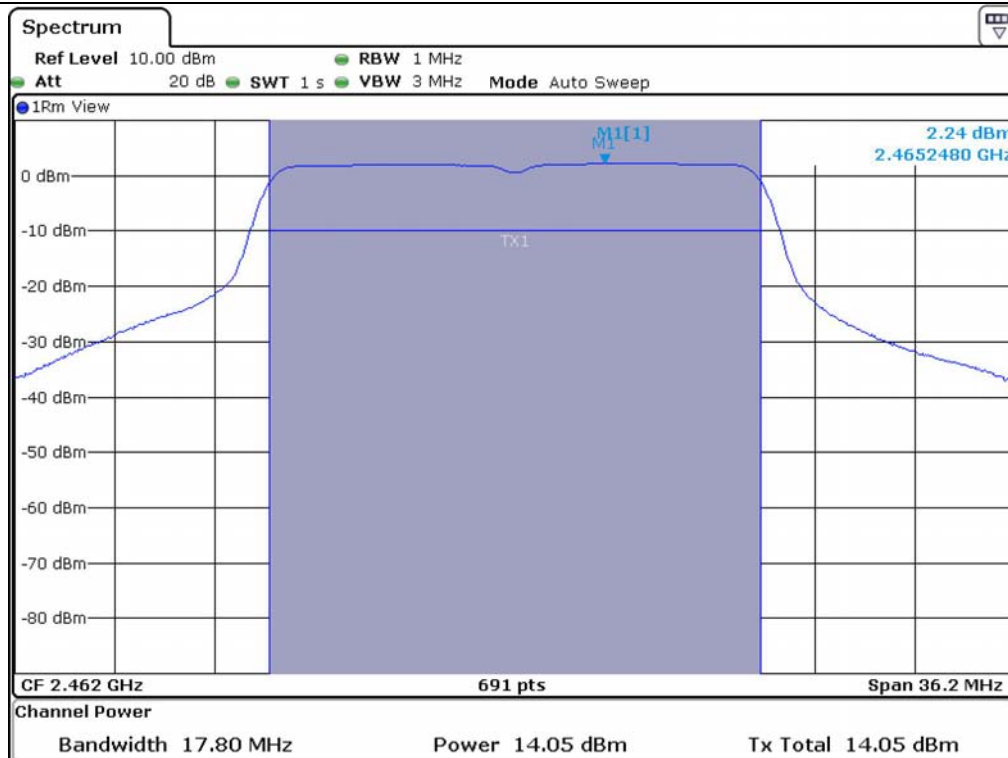


Tested by: Tae-Ho, Kim / Project Engineer





Middle Channel



High Channel

### 7.2.7 Test data for 802.11n\_HT40 Mode

-. Test Date : January 24, 2014

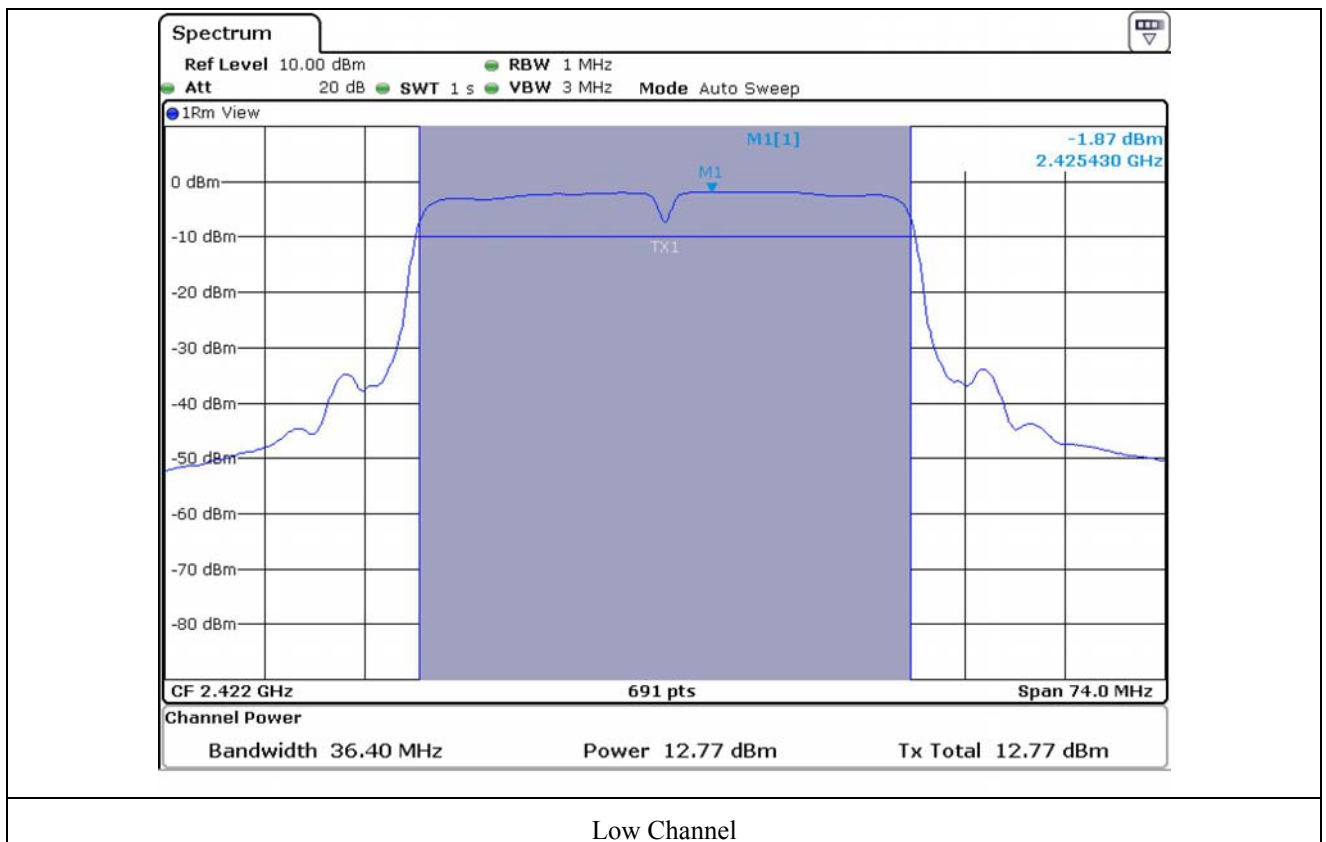
-. Test Result : Pass

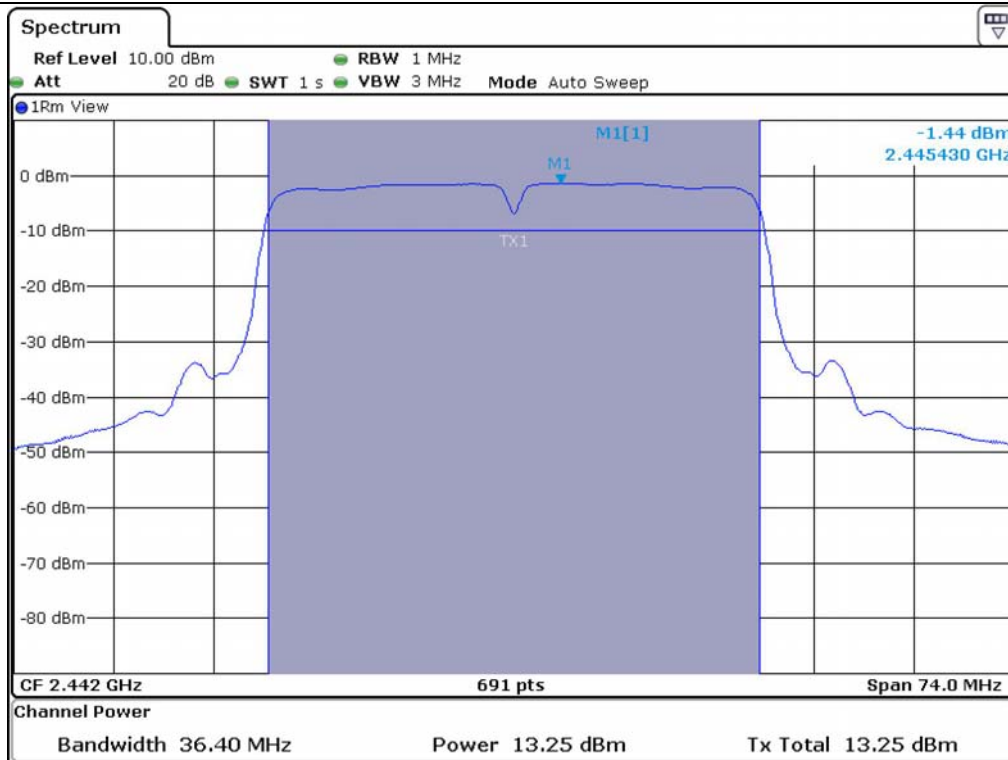
CHANNEL	FREQUENCY (MHz)	Emission Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422	36.4	12.77	30.00	17.23
MIDDLE	2 442	36.4	13.25	30.00	16.75
HIGH	2 452	36.4	13.39	30.00	16.61

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

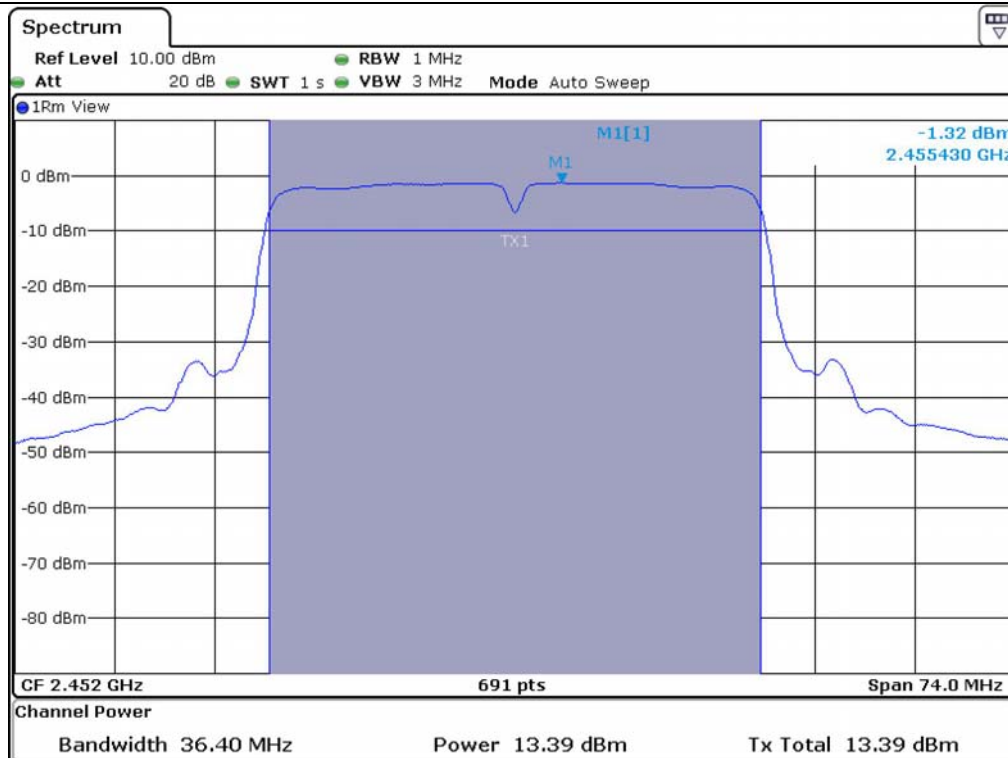


Tested by: Tae-Ho, Kim / Project Engineer





Middle Channel



High Channel

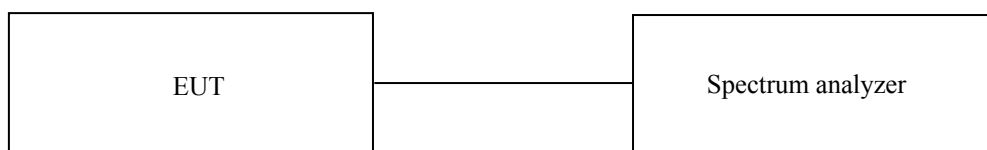
## 7.3 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

### 7.3.1 Operating environment

Temperature : 28 °C  
Relative humidity : 45 % R.H.

### 7.3.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



### 7.3.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

### 7.3.4 Test equipment used

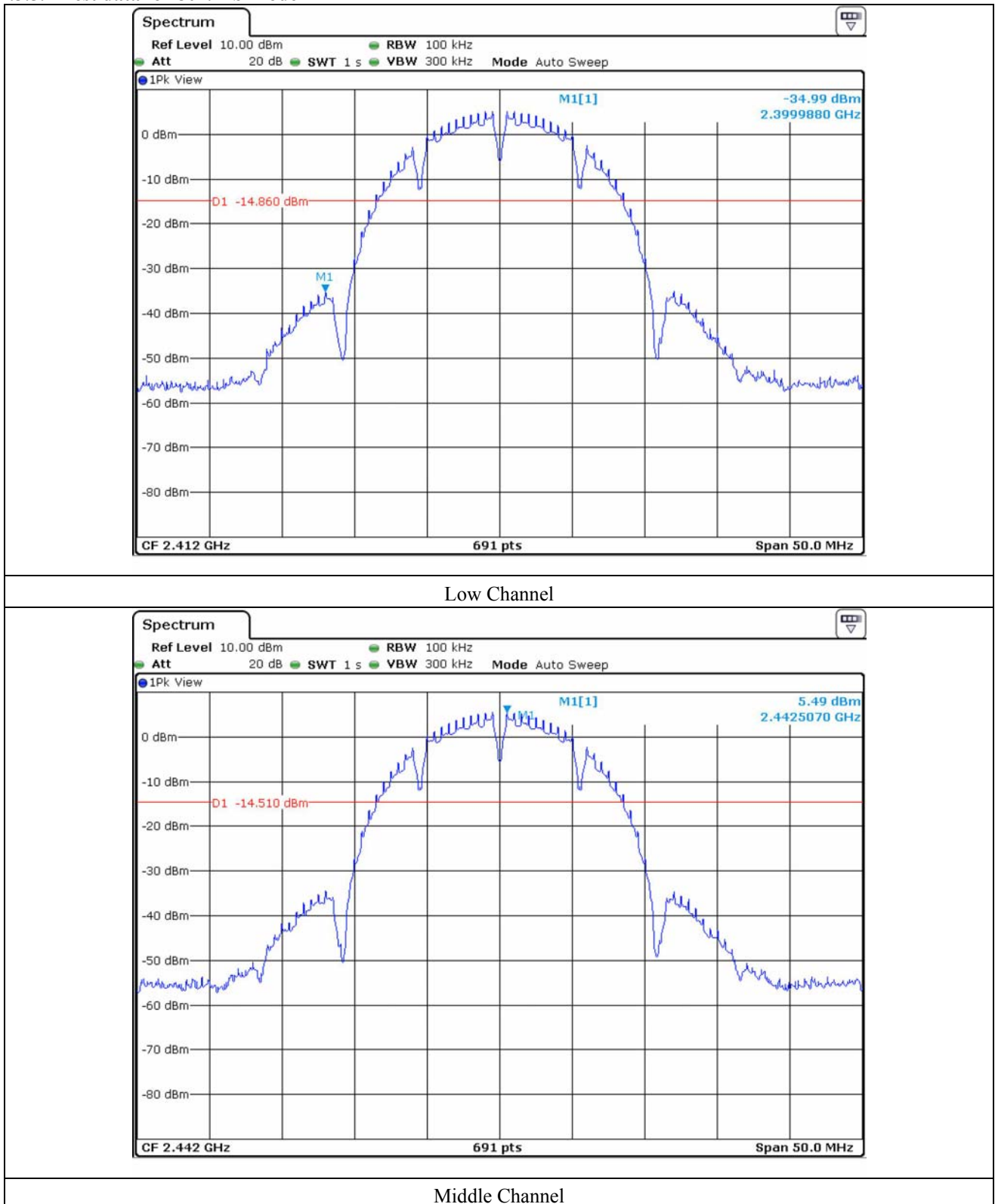
	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	8564E	HP	Spectrum Analyzer	3650A00756	May 03, 2013(1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	May 27, 2013(1Y)
■ -	310N	Sonoma Instrument	AMPLIFIER	312544	May 21, 2013(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 20, 2013(1Y)
■ -	SCU-18	Rohde & Schwarz	PRE-AMPLIFIER	10041	Jan. 25, 2013(1Y)
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	VULB9163-255	Apr. 24, 2012(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2013 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2013 (2Y)
■ -	83051A	Agilent	Microwave System Preamplifier	3950M00201	May 22, 2013(1Y)

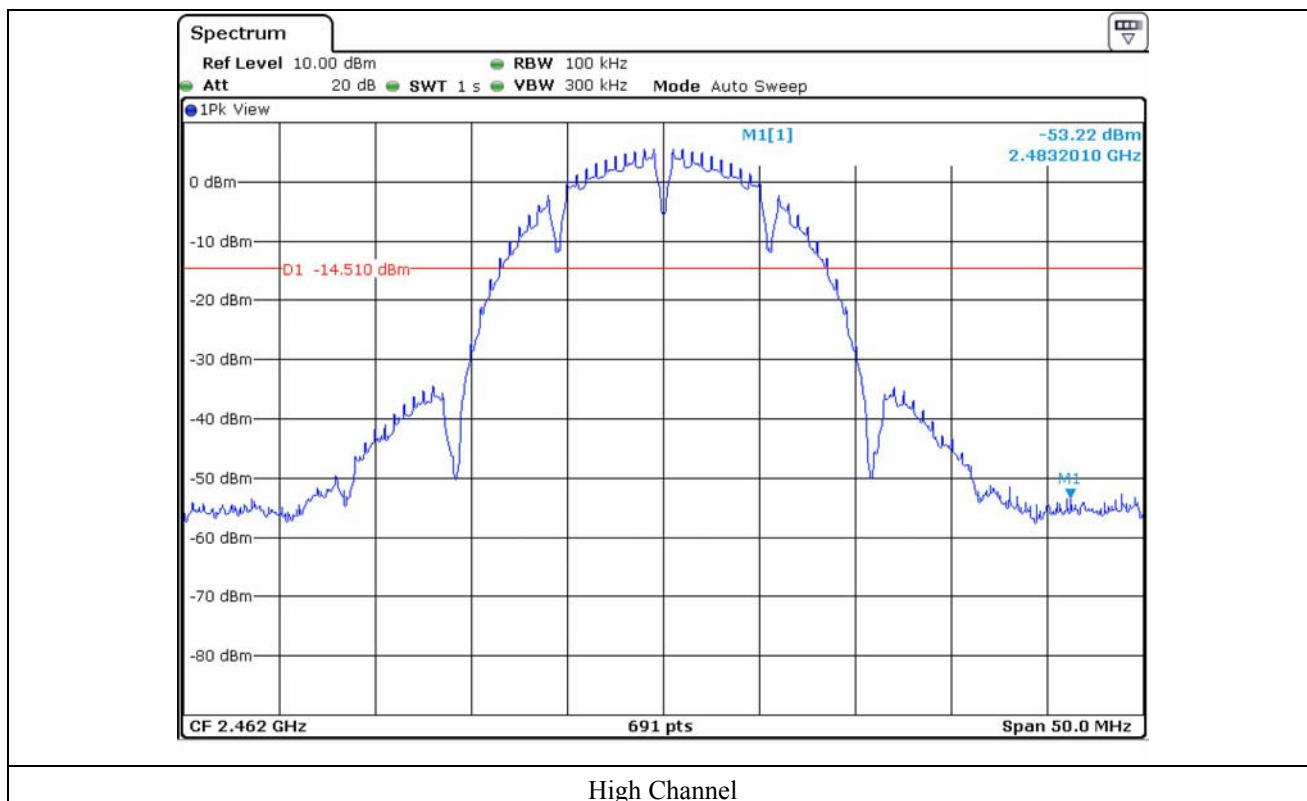
All test equipment used is calibrated on a regular basis.

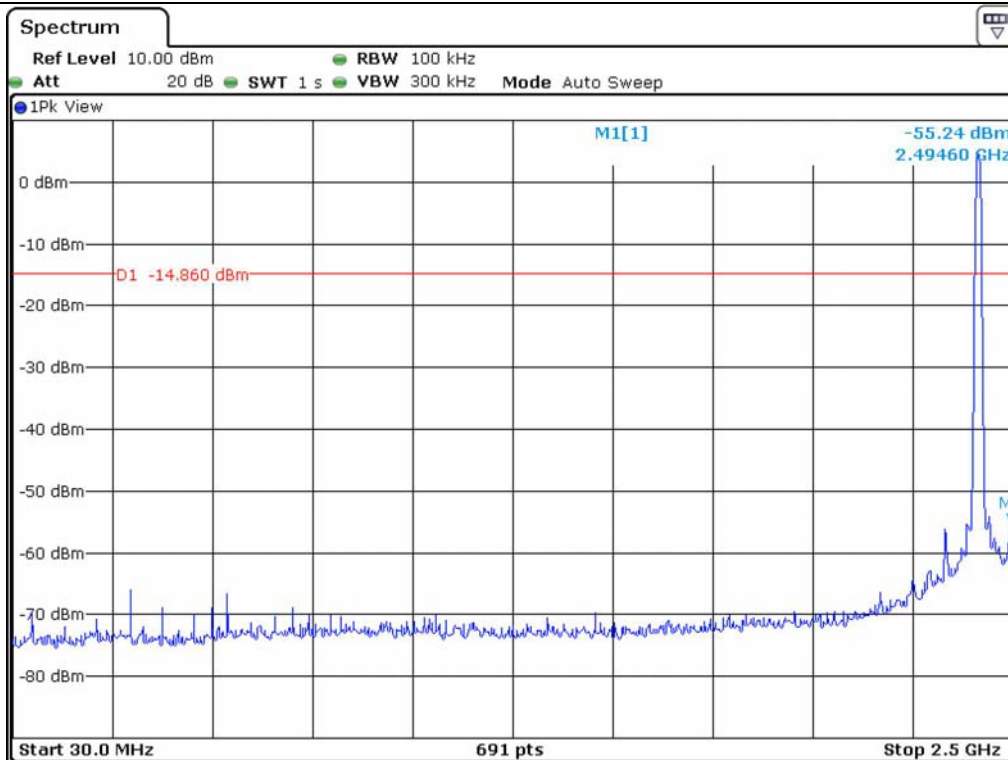


### 7.3.5 Test data for conducted emission

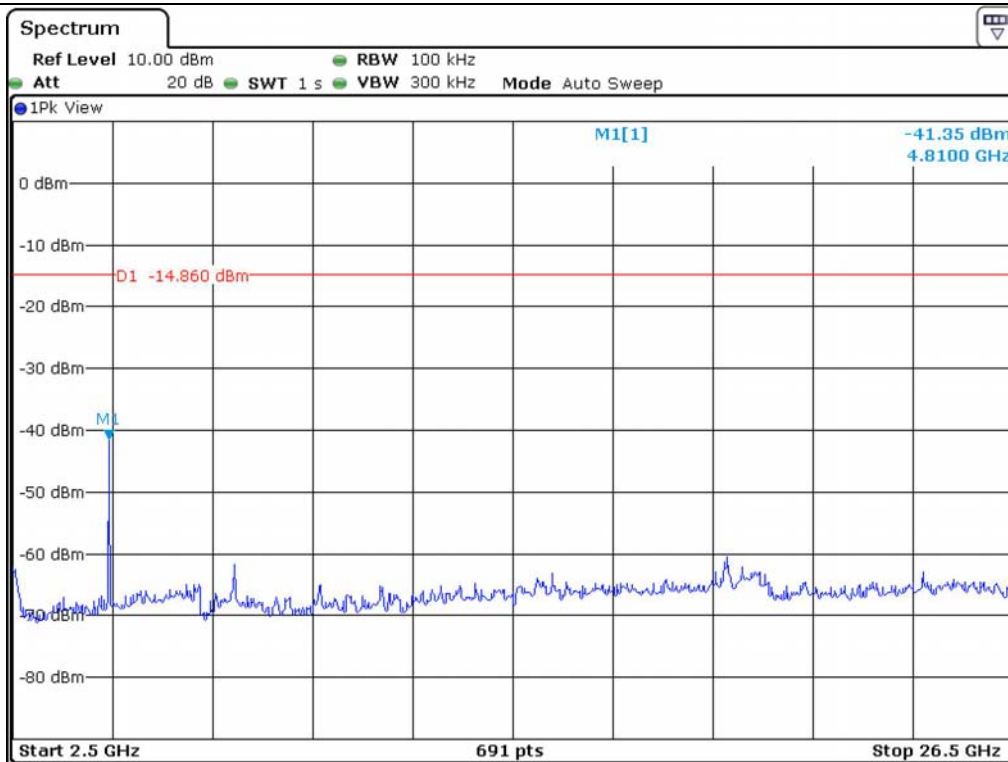
#### 7.3.5.1 Test data for 802.11b Mode



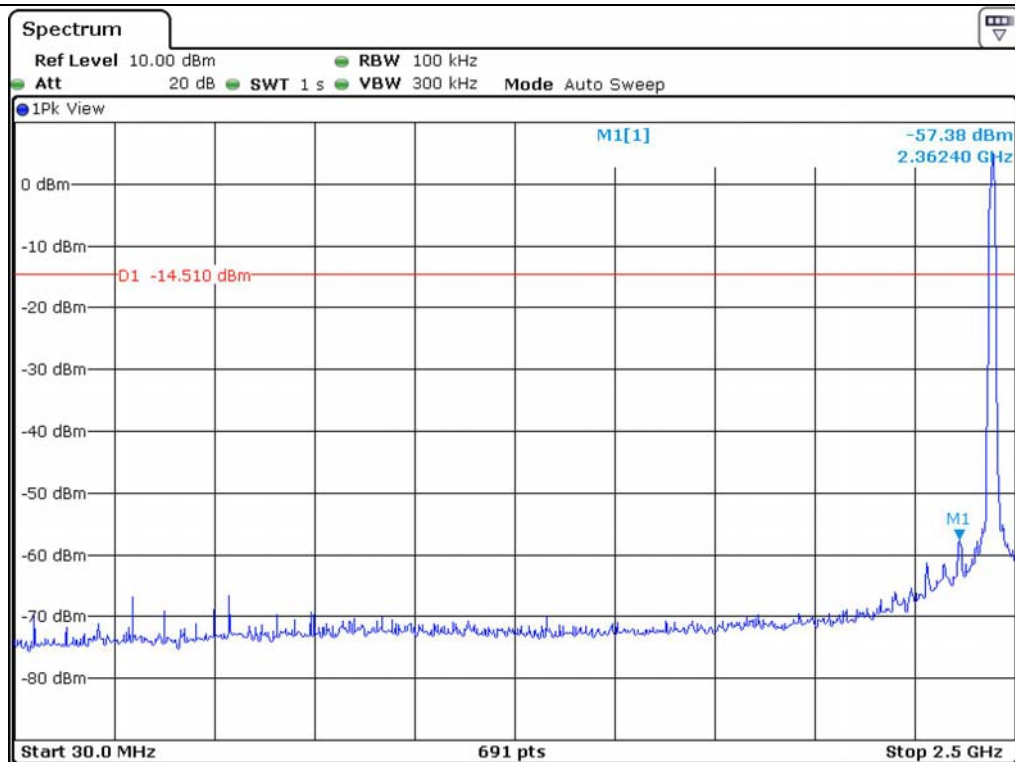




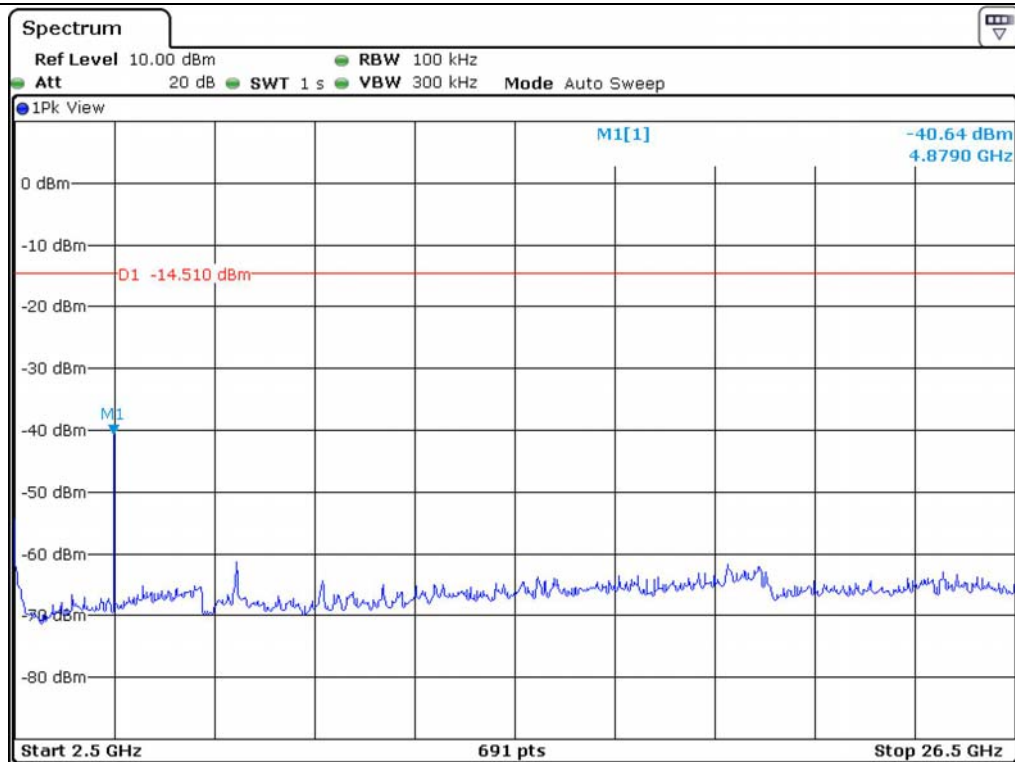
Low Channel



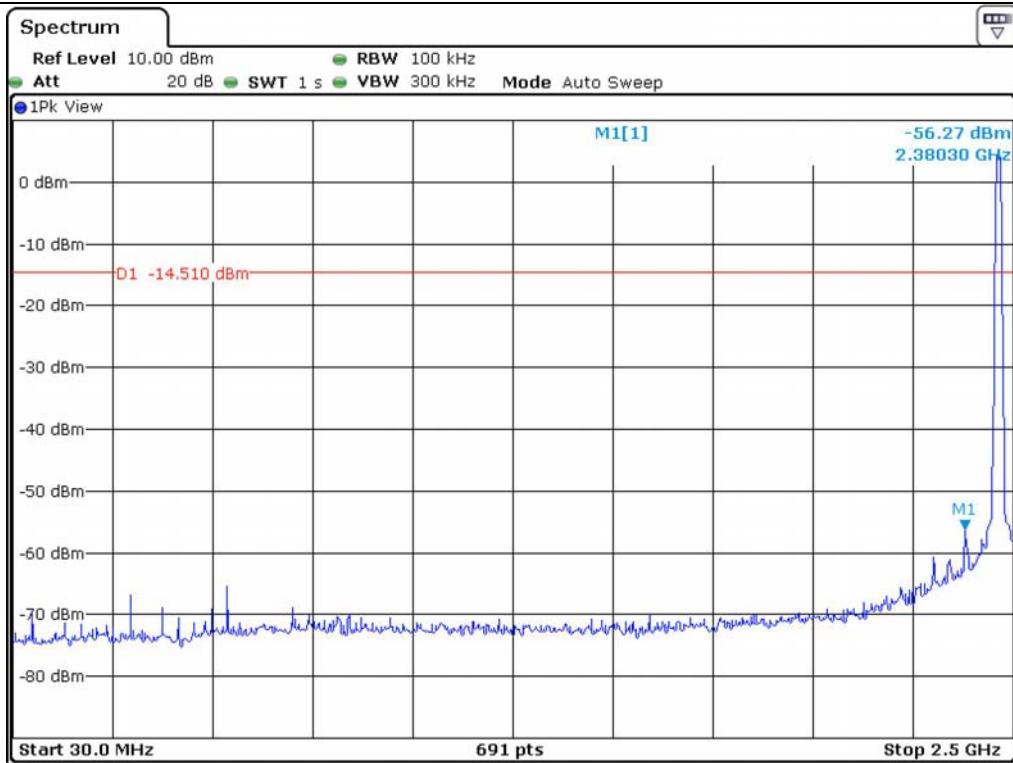
Low Channel



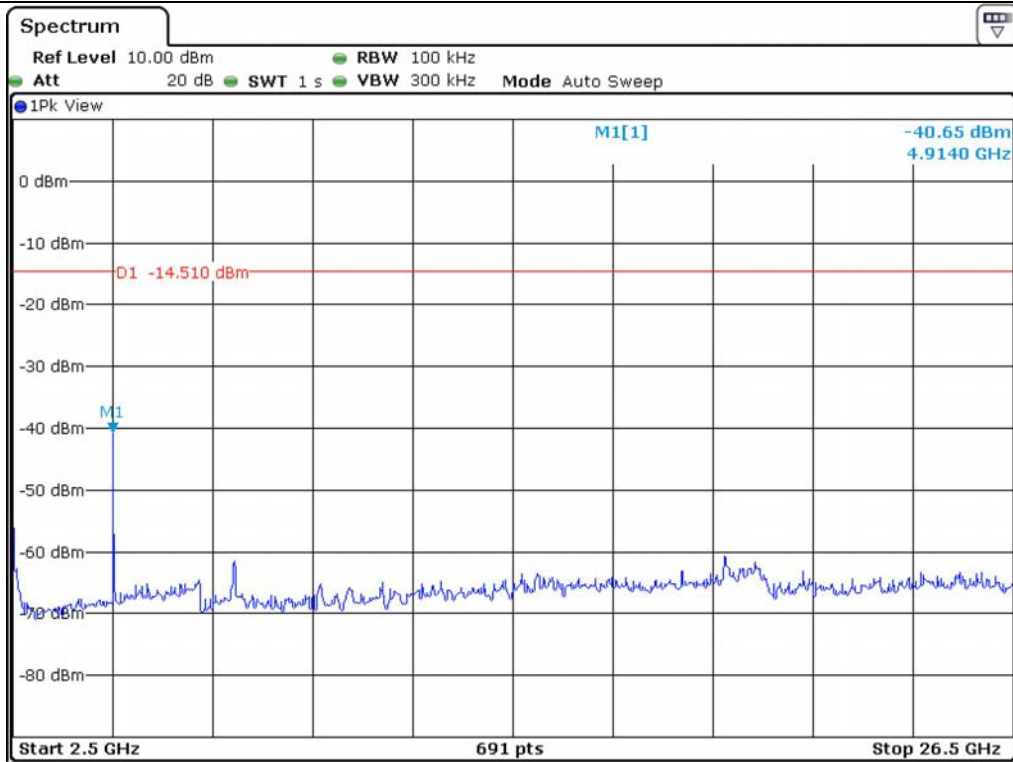
Middle Channel



Middle Channel

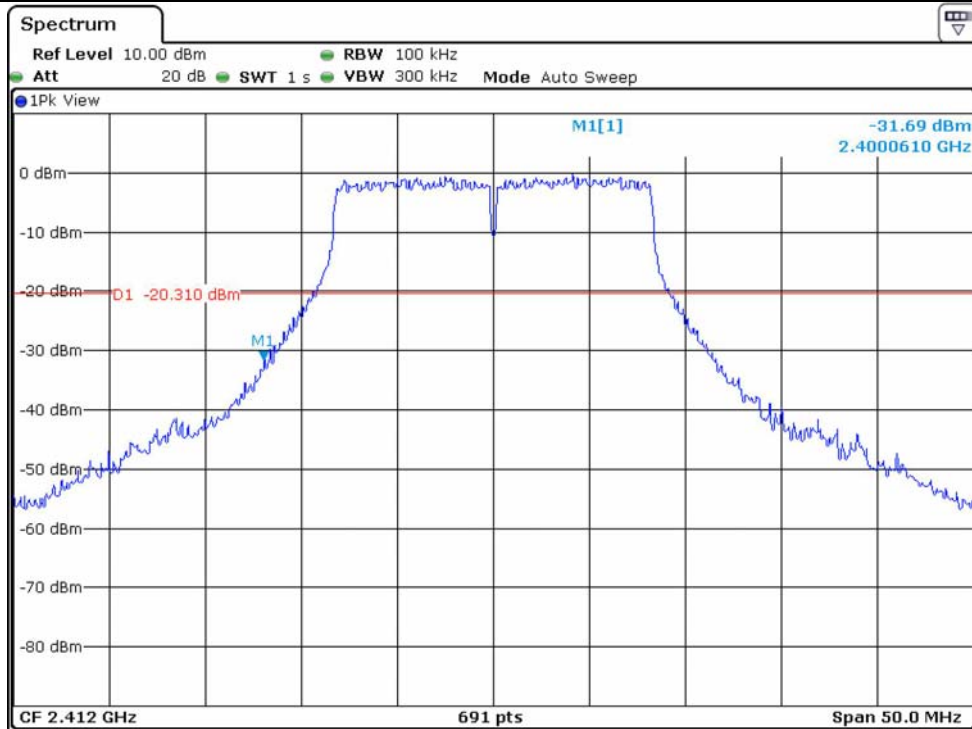


High Channel

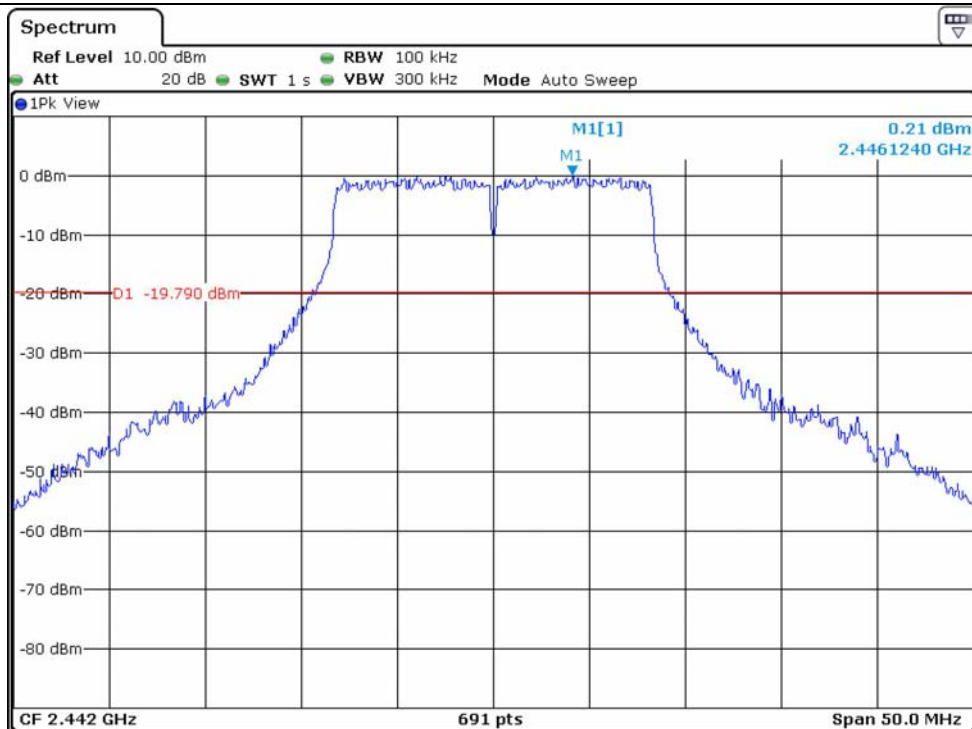


High Channel

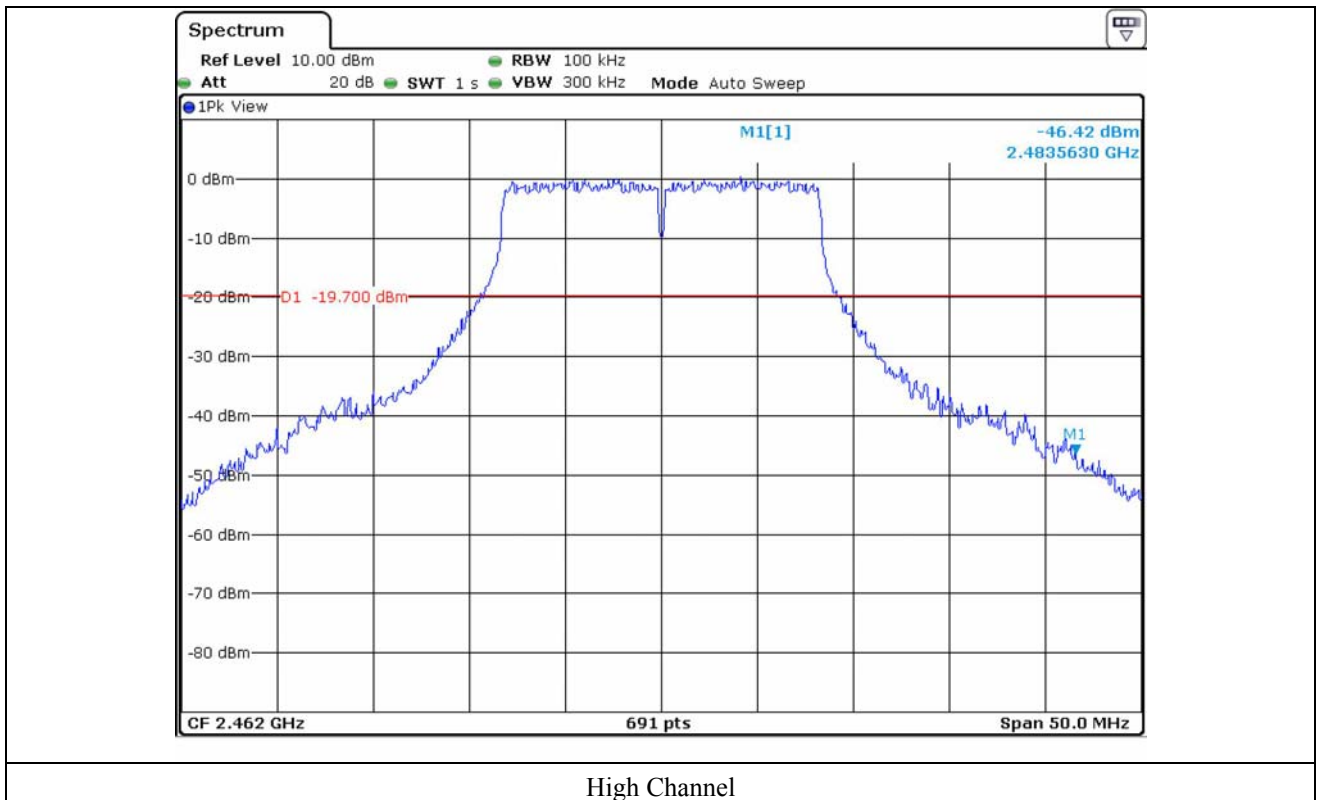
### 7.3.5.2 Test data for 802.11g Mode



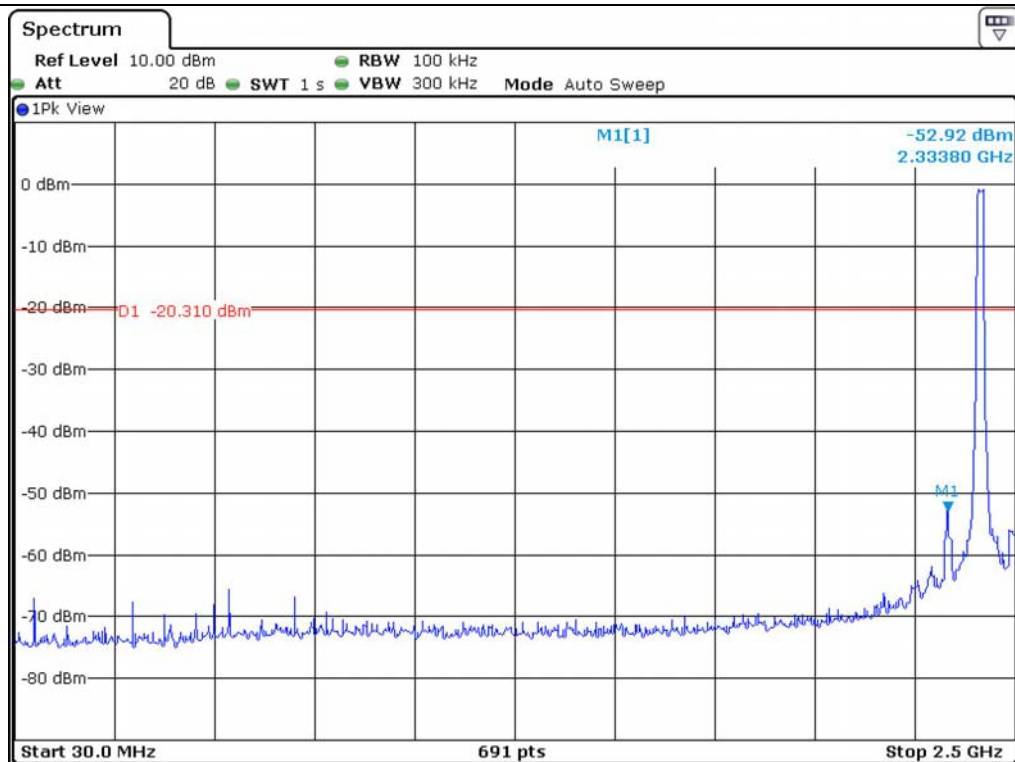
Low Channel



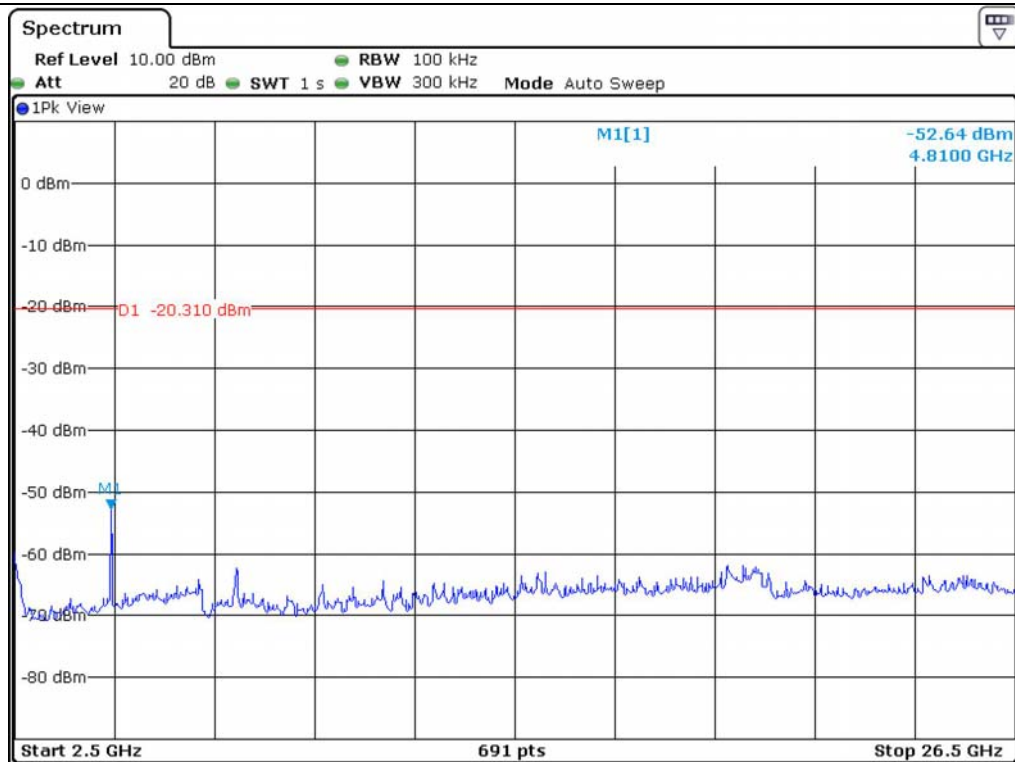
Middle Channel





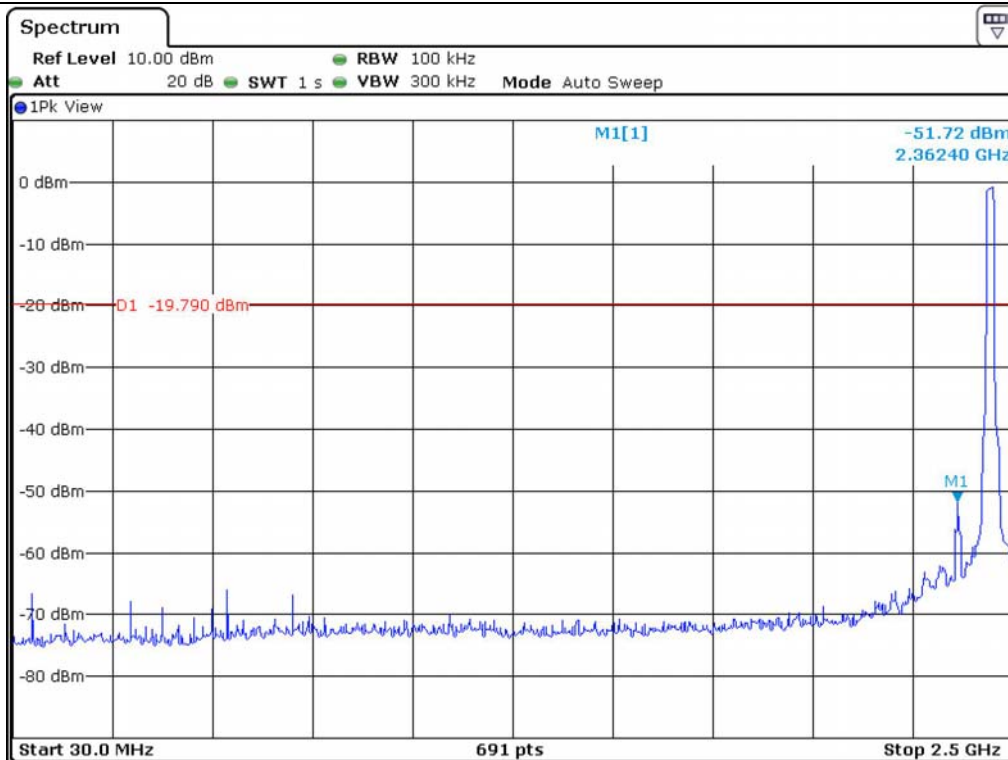


Low Channel

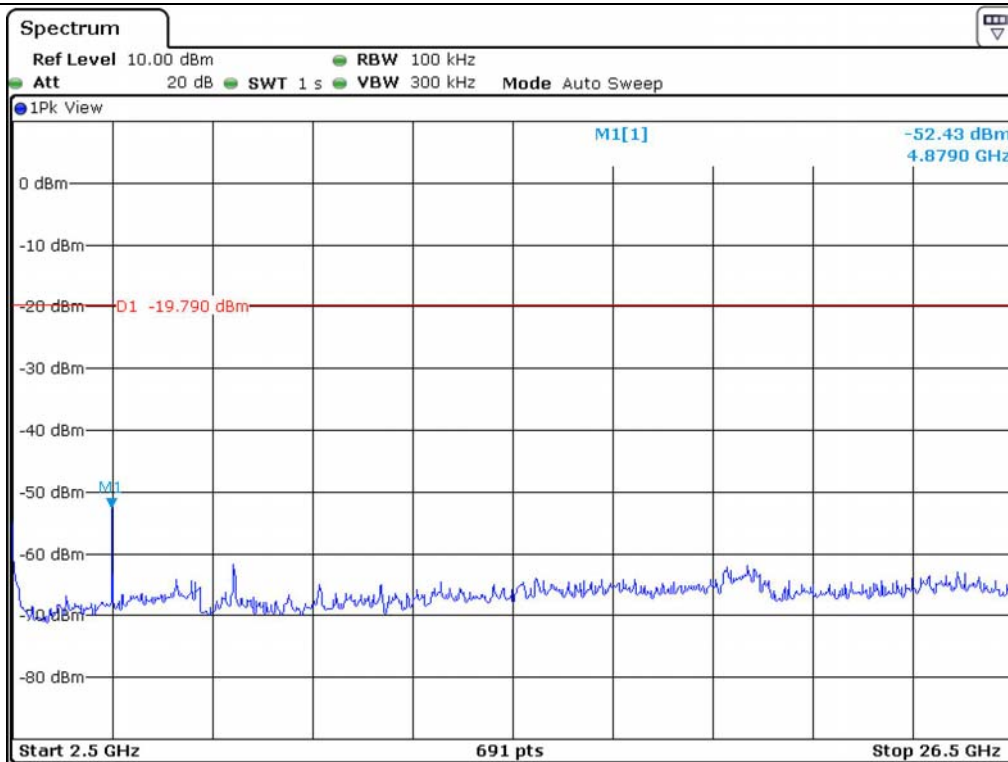


Low Channel

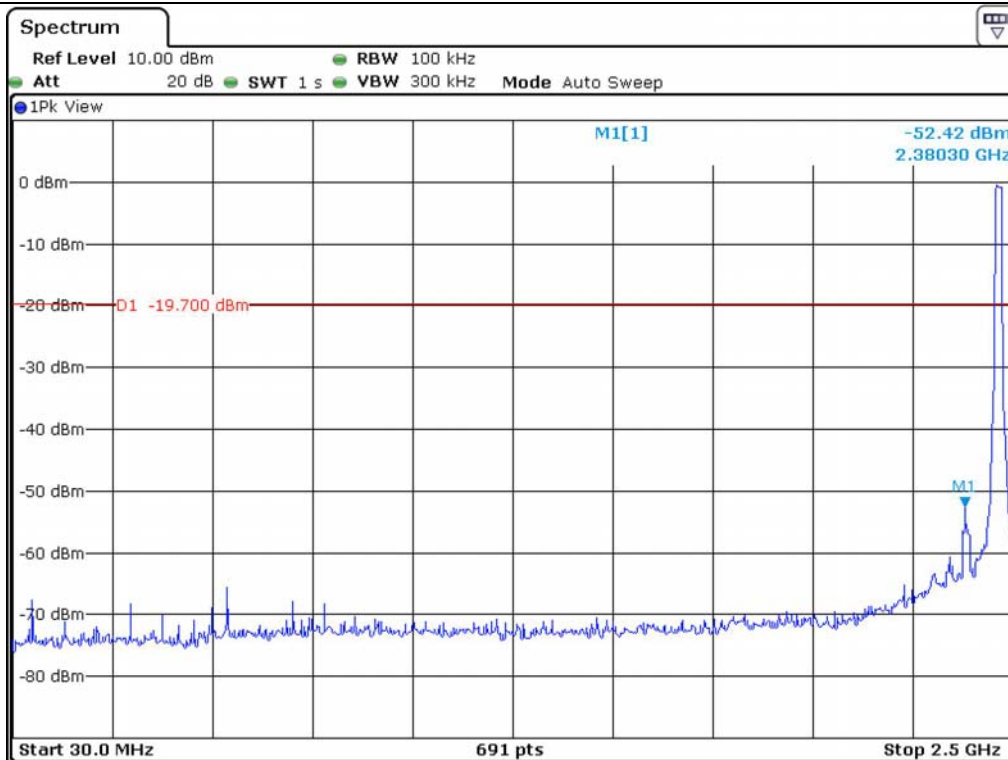




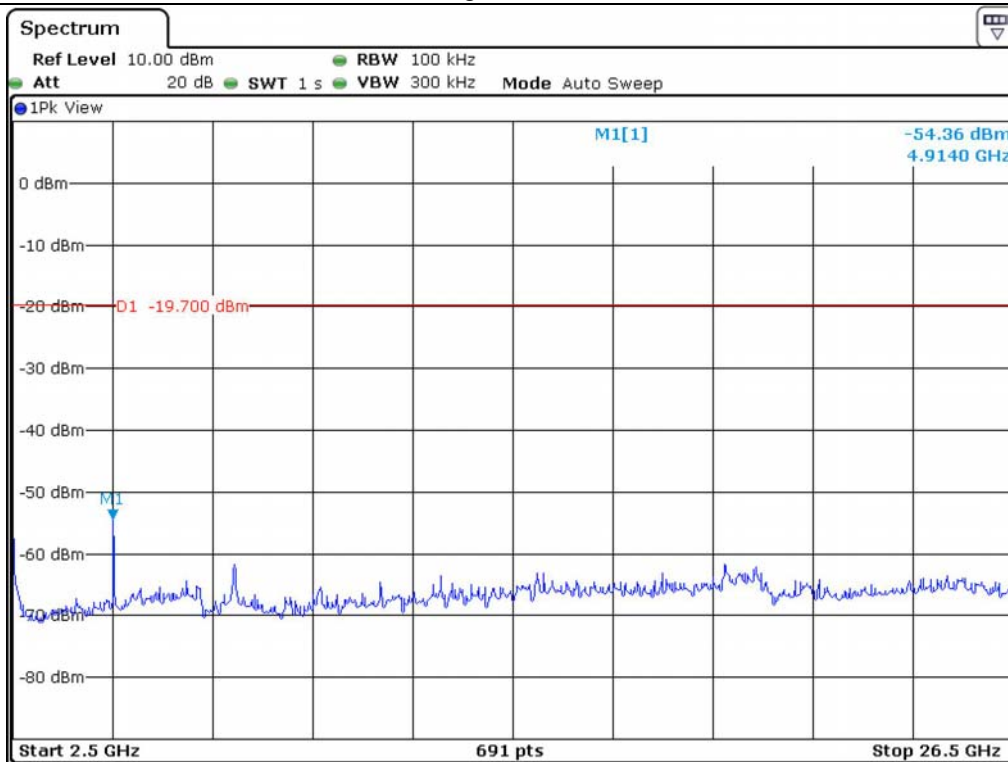
Middle Channel



Middle Channel

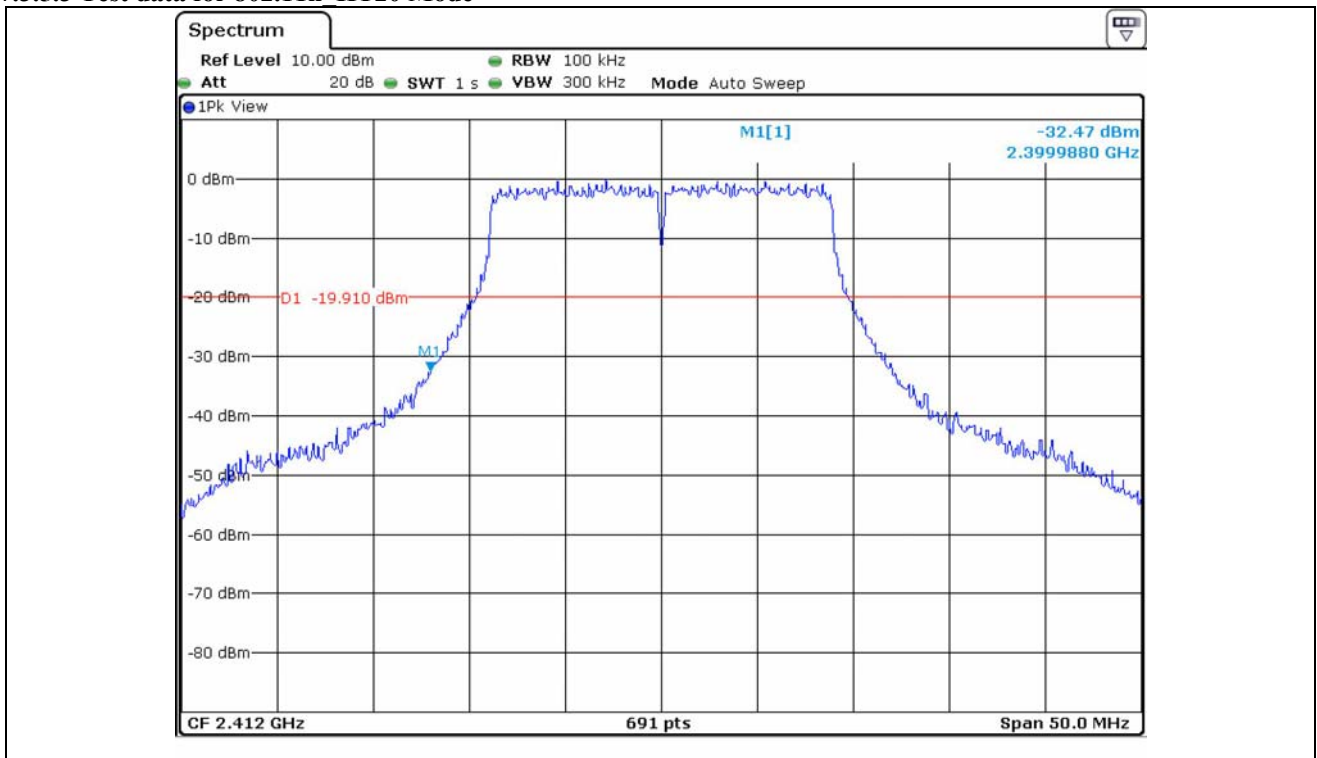


High Channel

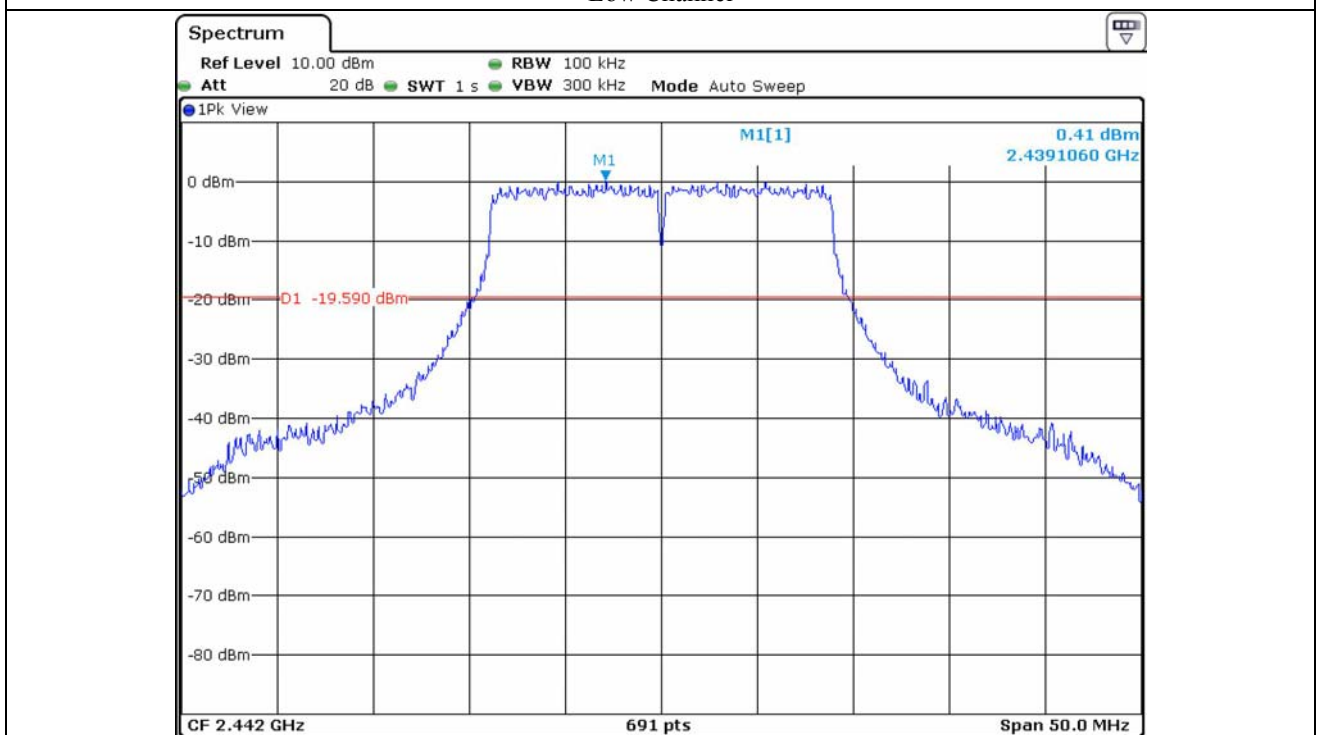


High Channel

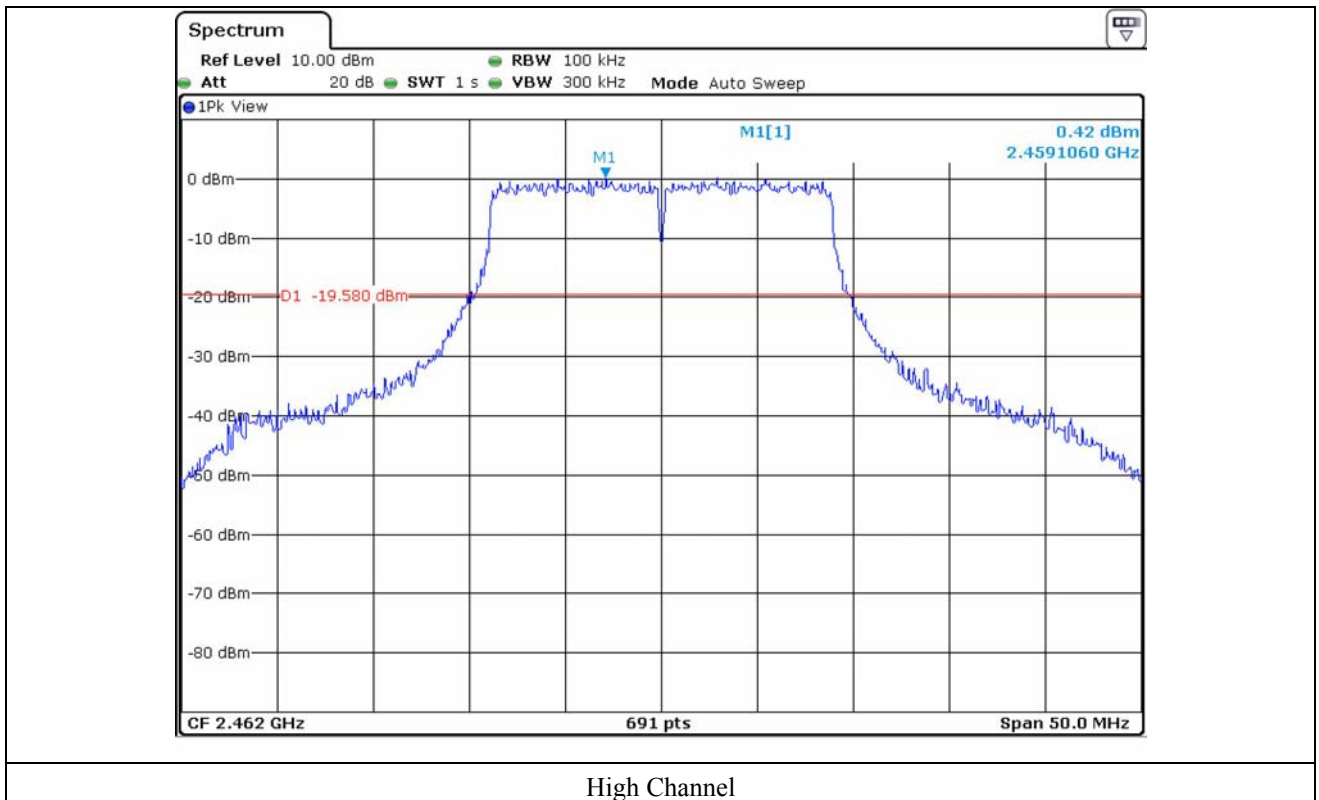
### 7.3.5.3 Test data for 802.11n HT20 Mode

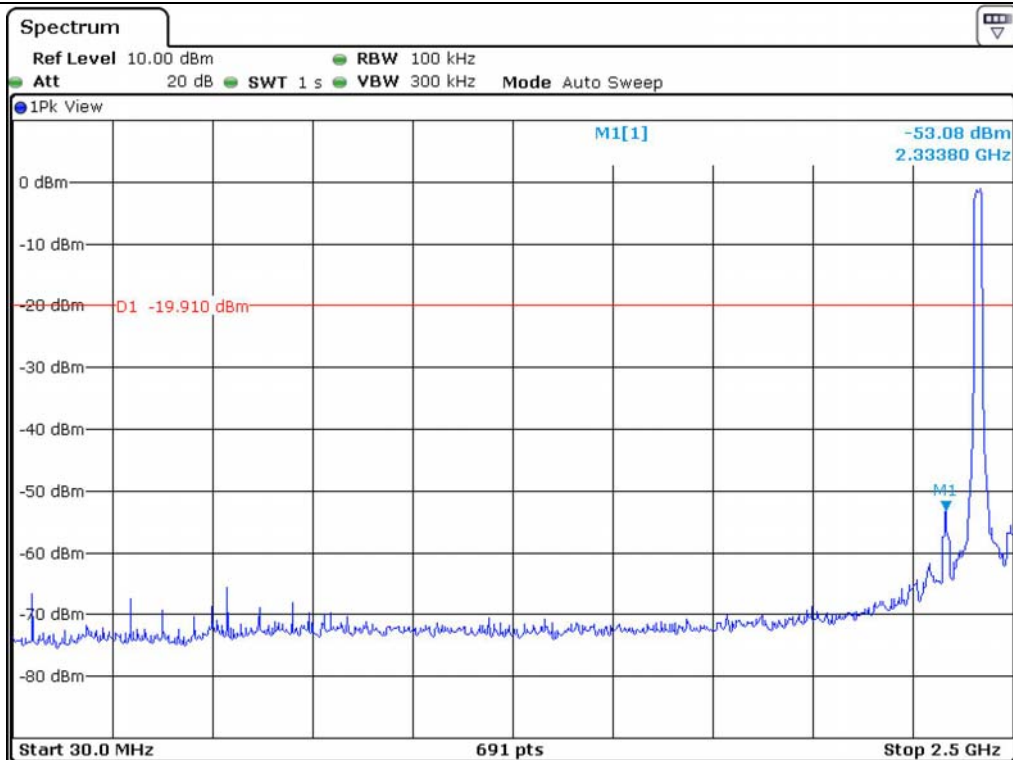


Low Channel

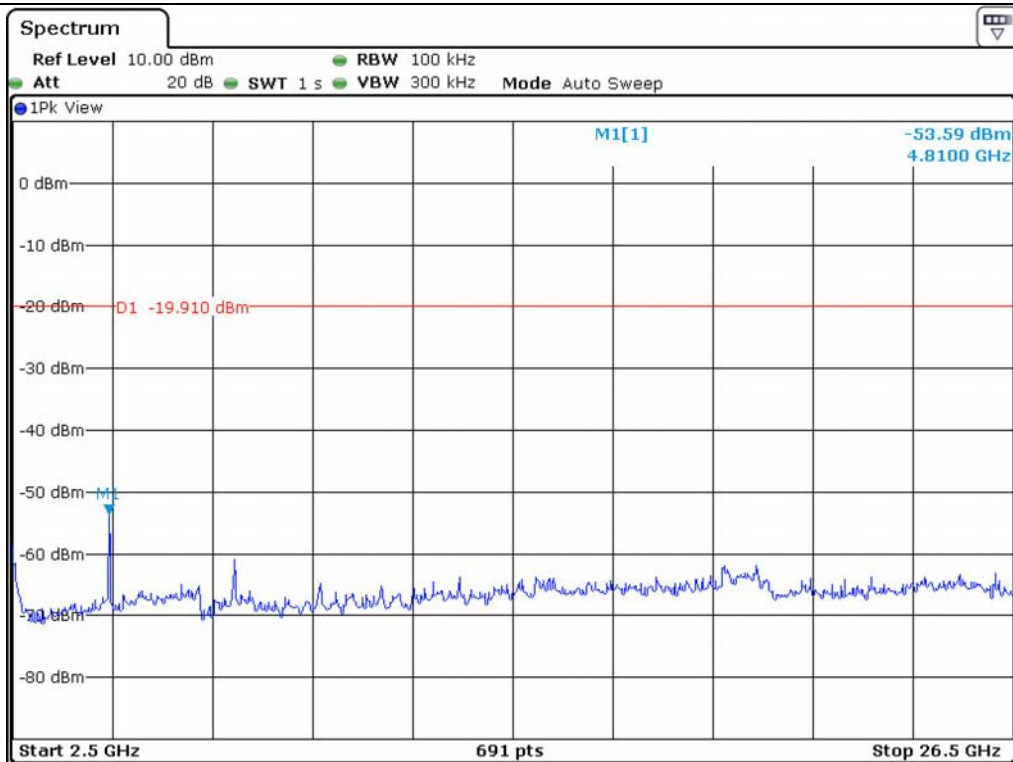


Middle Channel

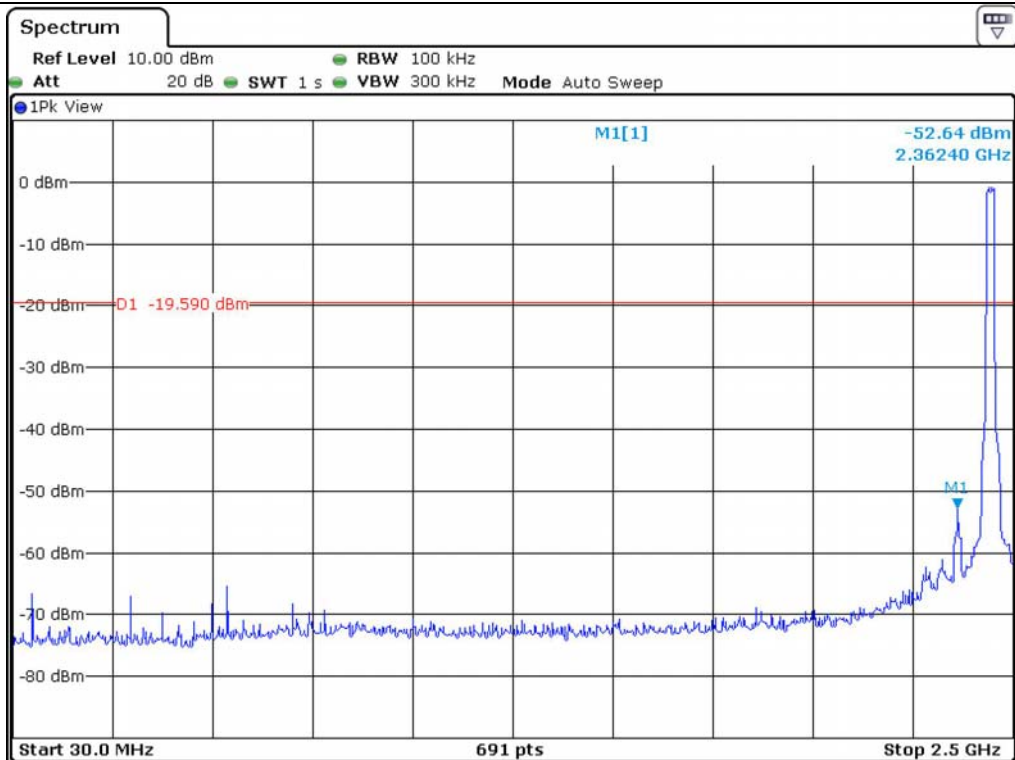




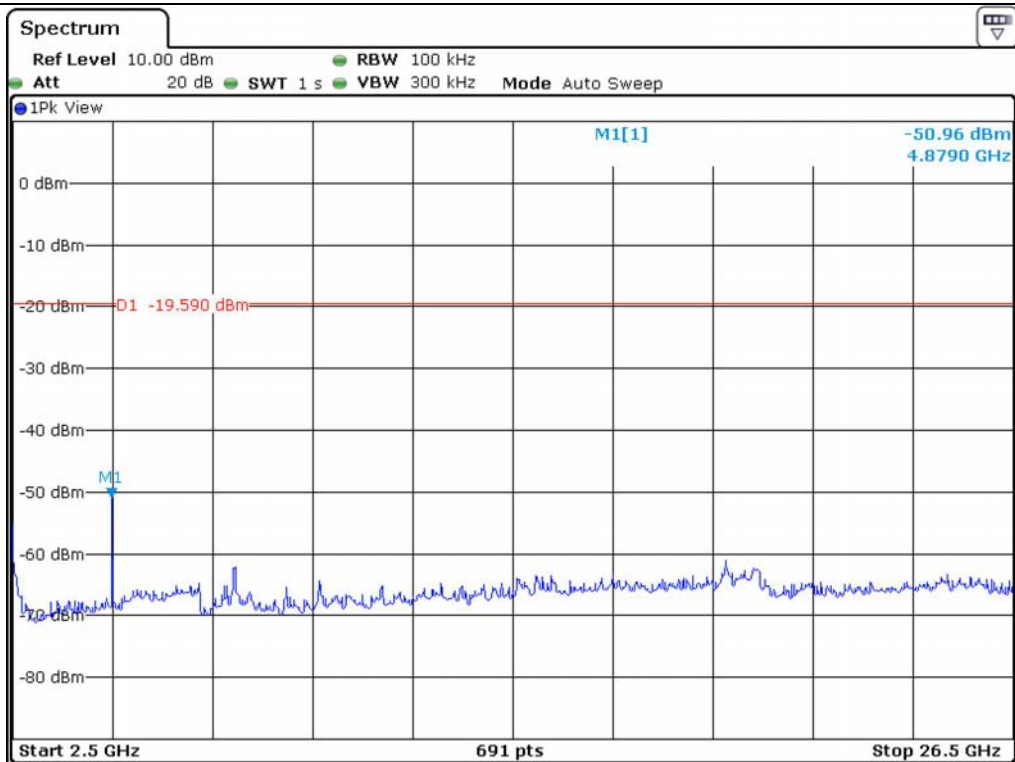
Low Channel



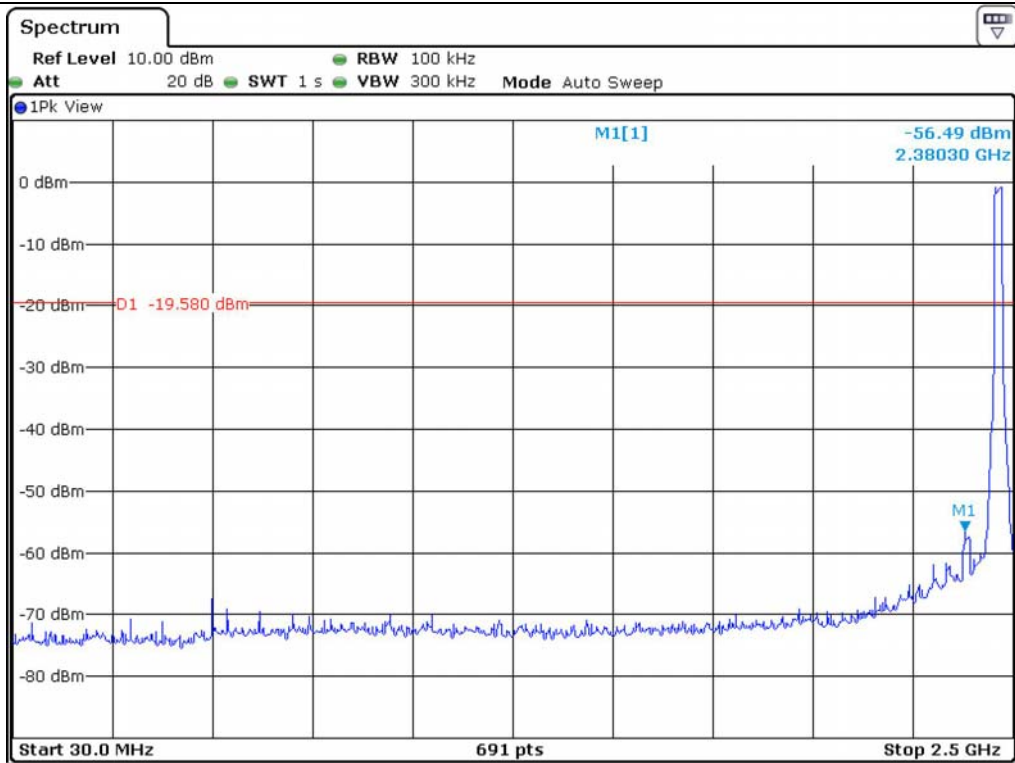
Low Channel



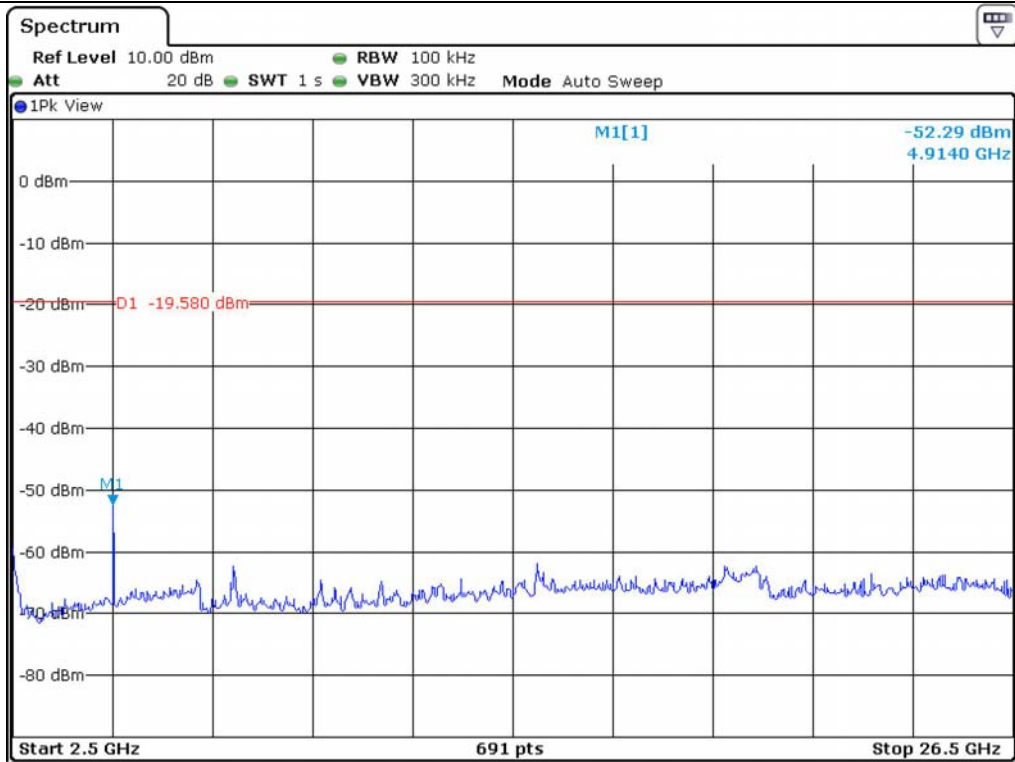
Middle Channel



Middle Channel



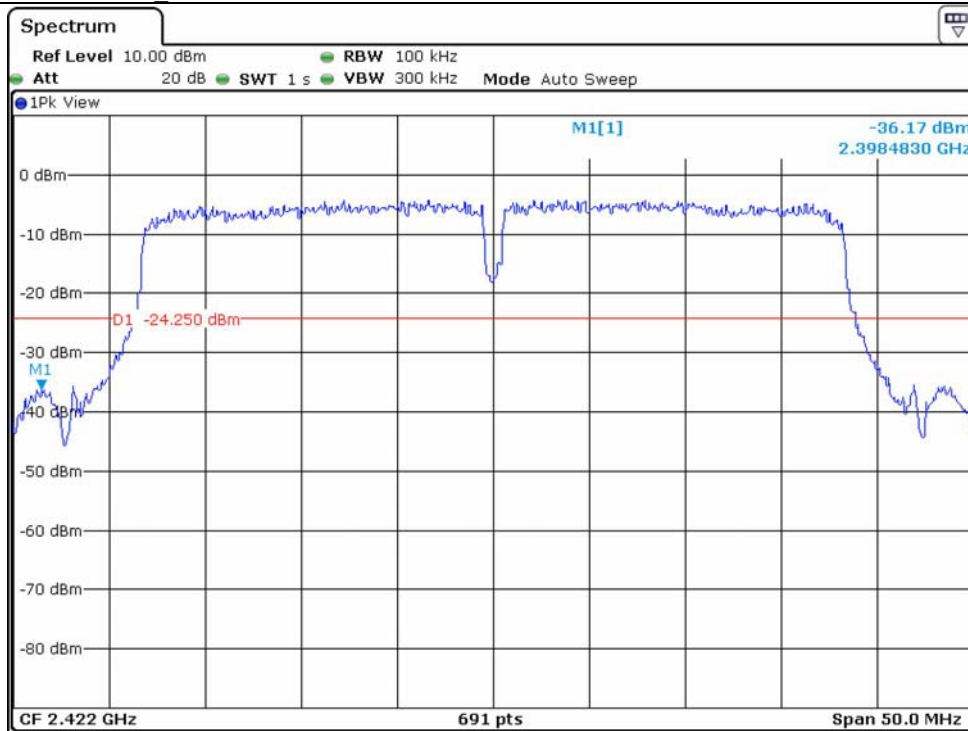
High Channel



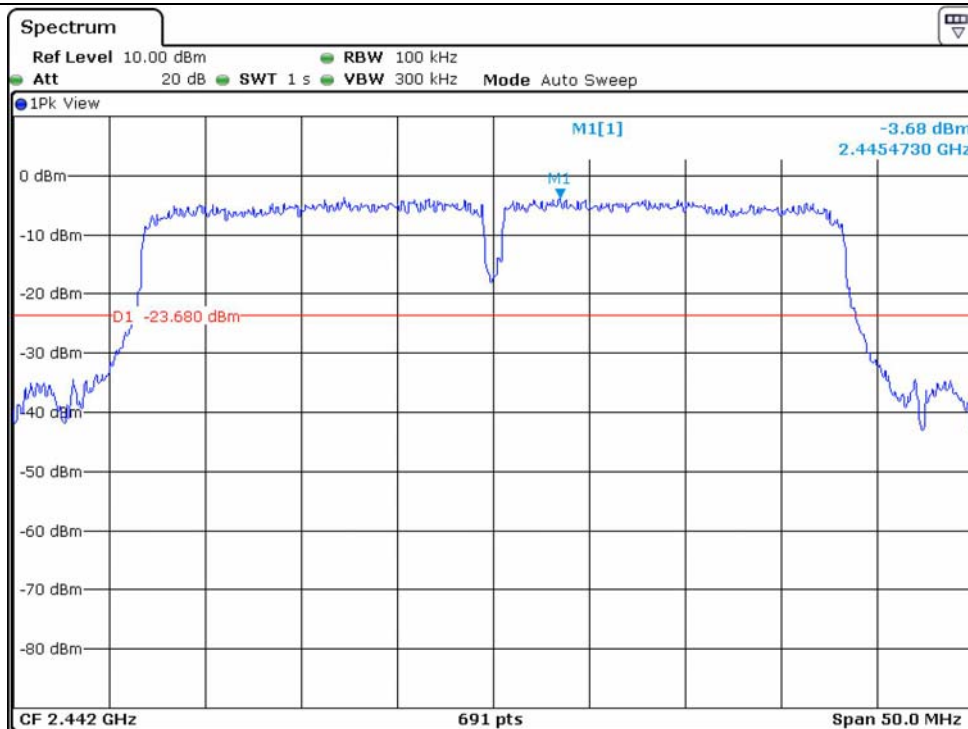
High Channel



### 7.3.5.4 Test data for 802.11n HT40 Mode

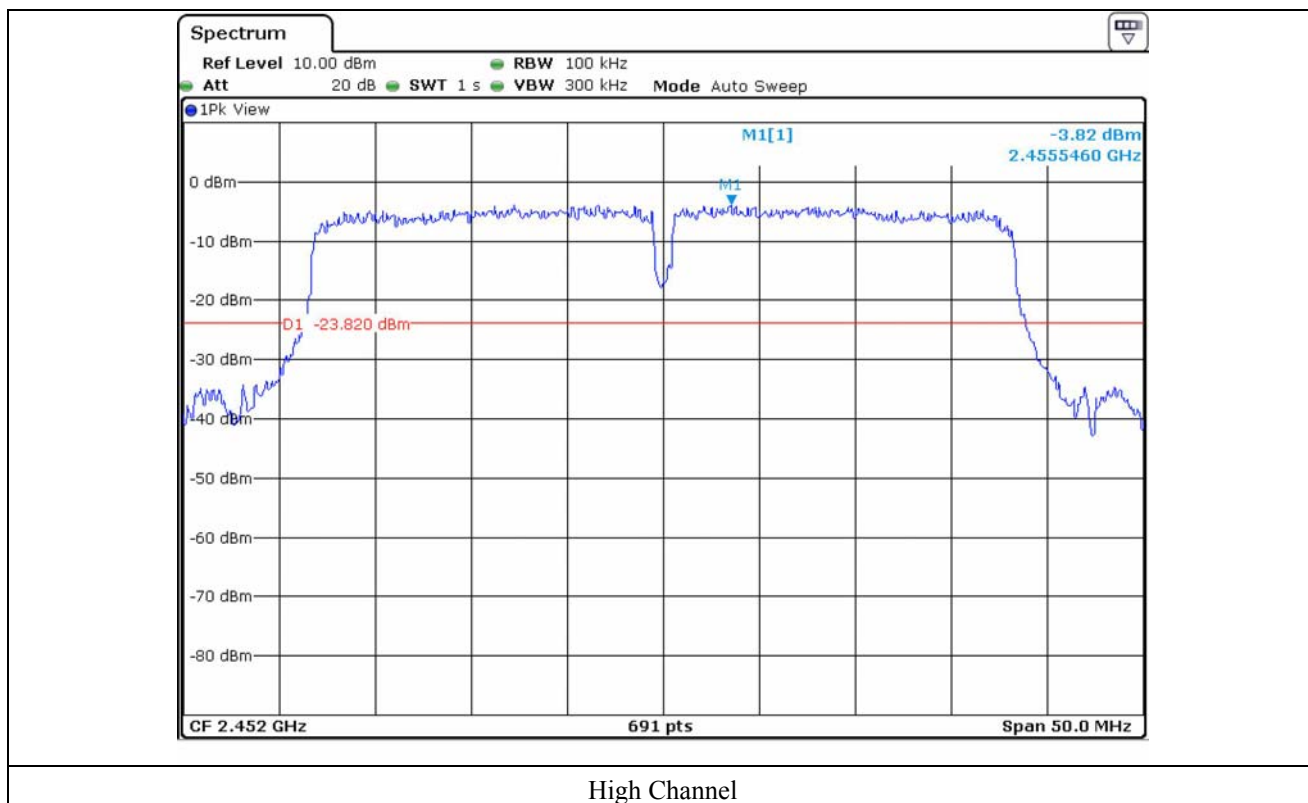


Low Channel

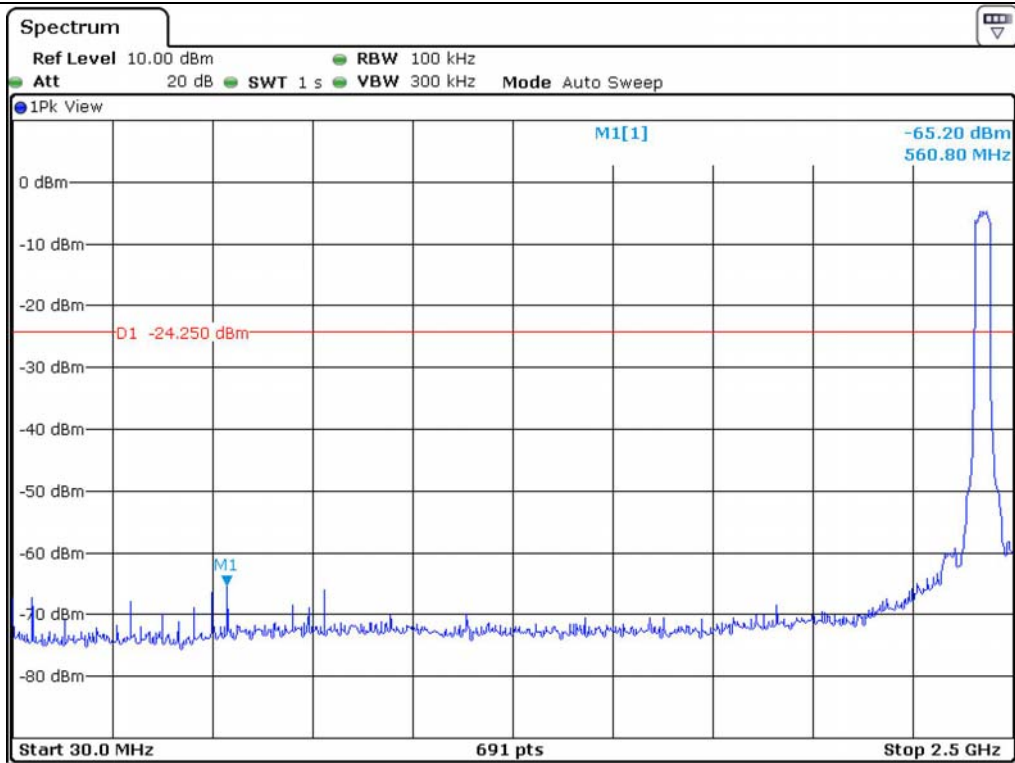


Middle Channel

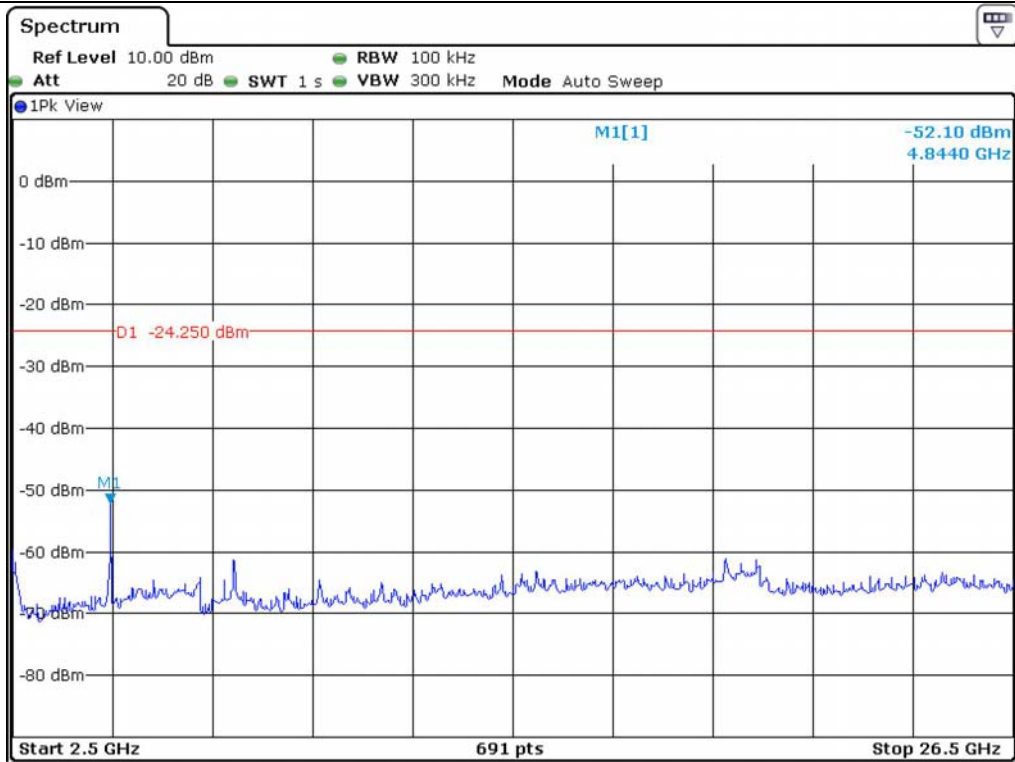




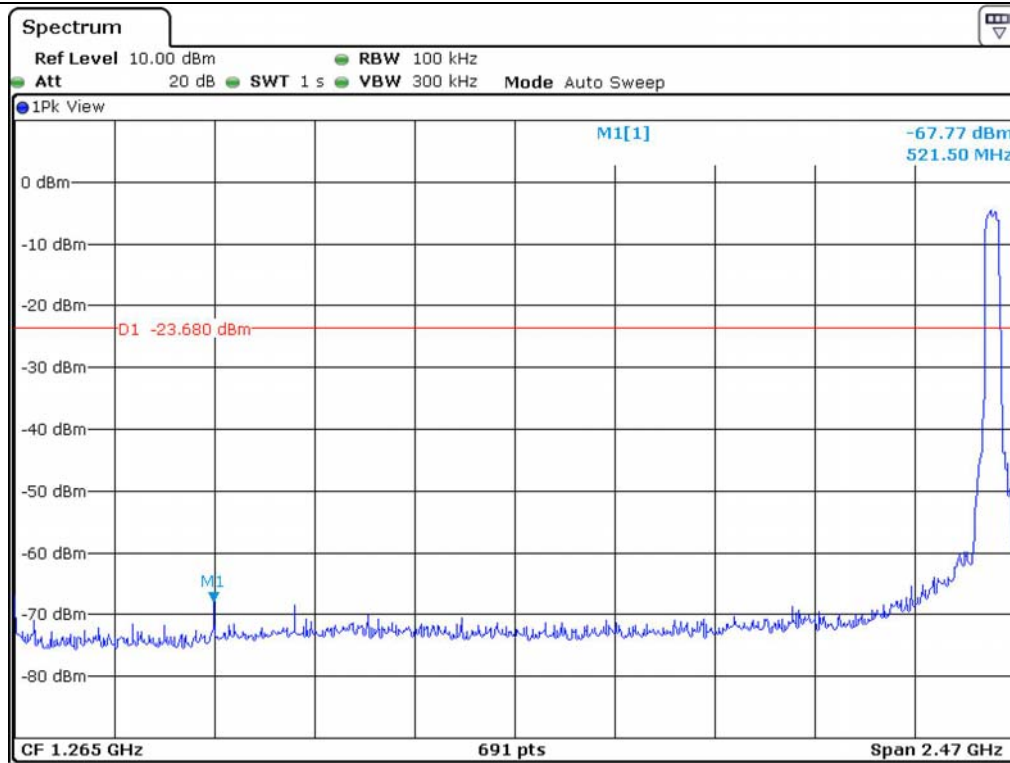
High Channel



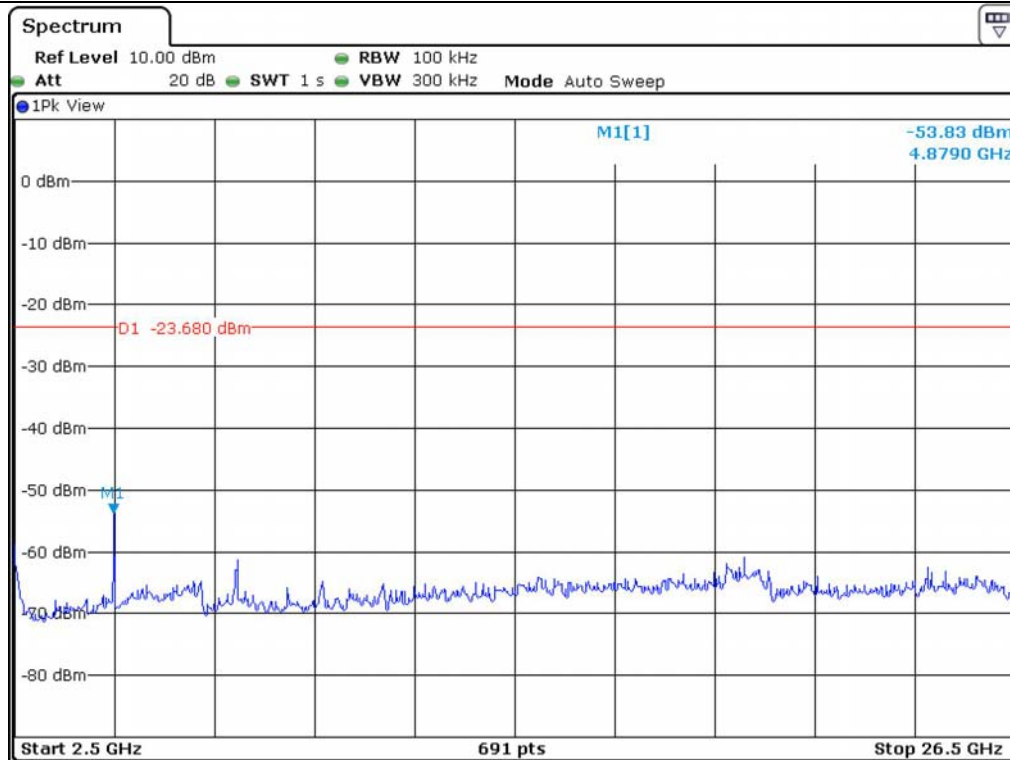
Low Channel



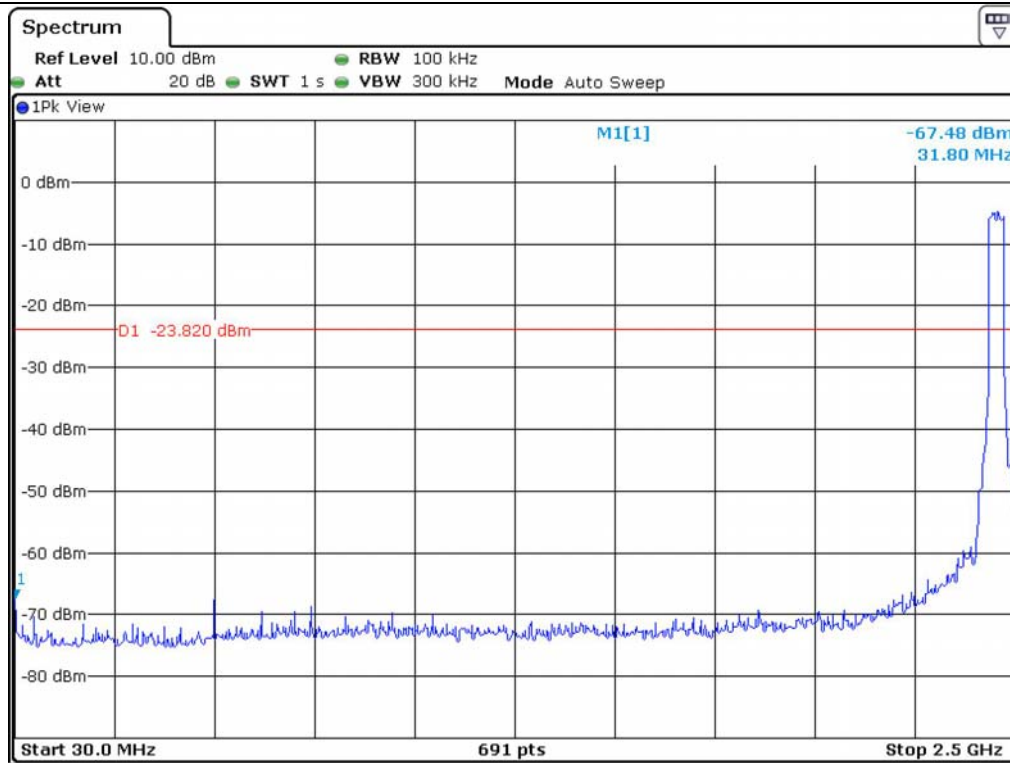
Low Channel



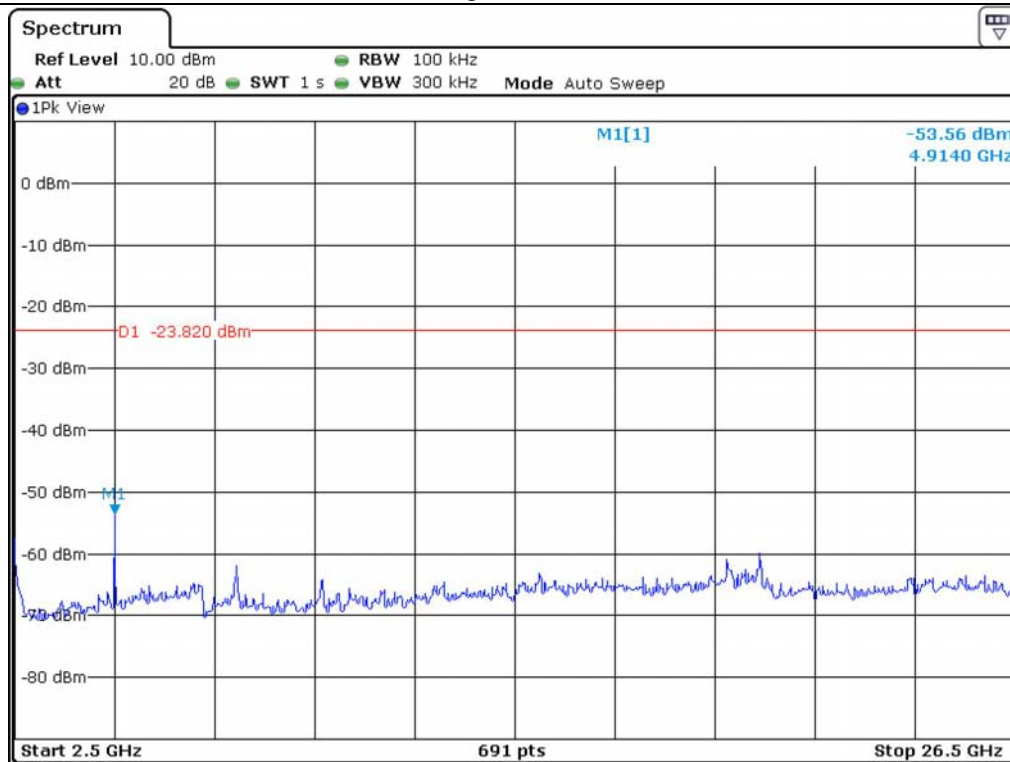
Middle Channel



Middle Channel



High Channel



High Channel

### 7.3.6 Test data for radiated emission

#### 7.3.6.1 Radiated Emission which fall in the Restricted Band

##### 7.3.6.1.1 Test data for 802.11b Mode

- Test Date : January 28, 2014
- Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and Average Mode
- Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	51.69	Peak	H	27.00	7.80	43.00	43.49	74.00	30.51
	38.20	Average	H				30.00	54.00	24.00
	51.20	Peak	V				43.00	74.00	31.00
	38.30	Average	V				30.10	54.00	23.90
Test Data for High Channel									
2 483.50	50.08	Peak	H	27.40	8.00	43.00	42.48	74.00	31.52
	39.46	Average	H				31.86	54.00	22.14
	51.12	Peak	V				43.52	74.00	30.48
	39.24	Average	V				31.64	54.00	22.36

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Tae-Ho, Kim / Project Engineer

### 7.3.6.1.2 Test data for 802.11g Mode

- Test Date : January 28, 2014
- Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and Average Mode
- Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	61.58	Peak	H	27.00	7.80	43.00	53.38	74.00	20.62
	40.83	Average	H				32.63	54.00	21.37
	62.55	Peak	V				54.35	74.00	19.65
	41.95	Average	V				33.75	54.00	20.25
Test Data for High Channel									
2 483.50	73.82	Peak	H	27.40	8.00	43.00	66.22	74.00	7.78
	57.88	Average	H				50.28	54.00	3.72
	74.46	Peak	V				66.86	74.00	7.14
	58.35	Average	V				50.75	54.00	3.25

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Tae-Ho, Kim / Project Engineer

### 7.3.6.1.3 Test data for 802.11n\_HT20 Mode

- Test Date : January 28, 2014
- Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and Average Mode
- Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	62.04	Peak	H	27.00	7.80	43.00	53.84	74.00	20.16
	41.32	Average	H				33.12	54.00	20.88
	63.08	Peak	V				54.88	74.00	19.12
	42.42	Average	V				34.22	54.00	19.78
Test Data for High Channel									
2 483.50	74.33	Peak	H	27.40	8.00	43.00	66.73	74.00	7.27
	58.35	Average	H				50.75	54.00	3.25
	73.66	Peak	V				66.06	74.00	7.94
	56.07	Average	V				48.47	54.00	5.53

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Tae-Ho, Kim / Project Engineer

#### 7.3.6.1.4 Test data for 802.11n\_HT40 Mode

- Test Date : January 28, 2014
- Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and Average Mode
- Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	60.12	Peak	H	27.00	7.80	43.00	51.92	74.00	22.08
	39.14	Average	H				30.94	54.00	23.06
	61.17	Peak	V				52.97	74.00	21.03
	40.35	Average	V				32.15	54.00	21.85
Test Data for High Channel									
2 483.50	72.67	Peak	H	27.40	8.00	43.00	65.07	74.00	8.93
	58.58	Average	H				50.98	54.00	3.02
	70.36	Peak	V				62.76	74.00	11.24
	56.14	Average	V				48.54	54.00	5.46

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Tae-Ho, Kim / Project Engineer



### 7.3.7 Spurious & Harmonic Radiated Emission

#### 7.3.7.1 Test data for 802.11b Mode

- Test Date : January 28, 2014
- Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and Average Mode
- Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 412.00	97.29	Peak	H	27.10	7.90	43.00	89.29	113.98	24.69
	93.98	Average	H				85.98	93.98	8.00
	97.17	Peak	V				89.17	113.98	24.81
	94.60	Average	V				86.60	93.98	7.38
4 824.00	45.27	Peak	H	30.70	11.90	42.50	45.37	73.98	28.61
	42.73	Average	H				42.83	53.98	11.15
	46.34	Peak	V				46.44	73.98	27.54
	42.03	Average	V				42.13	53.98	11.85
Test Data for Middle Channel									
2 442.00	97.83	Peak	H	27.20	7.90	43.00	89.93	113.98	24.05
	94.53	Average	H				86.63	93.98	7.35
	97.76	Peak	V				89.86	113.98	24.12
	94.73	Average	V				86.83	93.98	7.15
4 884.00	45.32	Peak	H	30.70	12.00	42.40	45.62	73.98	28.36
	43.25	Average	H				43.55	53.98	10.43
	46.83	Peak	V				47.13	73.98	26.85
	43.21	Average	V				43.51	53.98	10.47

Test Data for High Channel									
2 462.00	98.92	Peak	H	27.30	8.00	43.00	91.22	113.98	22.76
	96.19	Average	H				88.49	93.98	5.49
	97.82	Peak	V				90.12	113.98	23.86
	94.97	Average	V				87.27	93.98	6.71
4 924.00	45.73	Peak	H	30.80	12.00	42.30	46.23	73.98	27.75
	43.39	Average	H				43.89	53.98	10.09
	47.25	Peak	V				47.75	73.98	26.23
	43.93	Average	V				44.43	53.98	9.55

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Tae-Ho, Kim / Project Engineer

### 7.3.7.2 Test data for 802.11g Mode

- Test Date : January 28, 2014
- Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and Average Mode
- Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode  
1 GHz above 1MHz for Peak and 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 412.00	98.55	Peak	H	27.10	7.90	43.00	90.55	113.98	23.43
	90.14	Average	H				82.14	93.98	11.84
	96.68	Peak	V				88.68	113.98	25.30
	88.01	Average	V				80.01	93.98	13.97
4 824.00	49.15	Peak	H	30.70	11.90	42.50	49.25	73.98	24.73
	37.04	Average	H				37.14	53.98	16.84
	47.72	Peak	V				47.82	73.98	26.16
	33.40	Average	V				33.50	53.98	20.48
Test Data for Middle Channel									
2 442.00	99.46	Peak	H	27.20	7.90	43.00	91.56	113.98	22.42
	91.25	Average	H				83.35	93.98	10.63
	97.14	Peak	V				89.24	113.98	24.74
	89.42	Average	V				81.52	93.98	12.46
4 884.00	49.35	Peak	H	30.70	12.00	42.40	49.65	73.98	24.33
	37.83	Average	H				38.13	53.98	15.85
	48.12	Peak	V				48.42	73.98	25.56
	33.96	Average	V				34.26	53.98	19.72

Test Data for High Channel									
2 462.00	100.14	Peak	H	27.30	8.00	43.00	92.44	113.98	21.54
	91.94	Average	H				84.24	93.98	9.74
	98.63	Peak	V				90.93	113.98	23.05
	90.14	Average	V				82.44	93.98	11.54
4 924.00	50.35	Peak	H	30.80	12.00	42.30	50.85	73.98	23.13
	38.55	Average	H				39.05	53.98	14.93
	53.35	Peak	V				53.85	73.98	20.13
	42.30	Average	V				42.80	53.98	11.18

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Tae-Ho, Kim / Project Engineer