

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

**Test Report No.** : E141R-009  
**AGR No.** : A13NA-058, A13NA-059  
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**Address** : 978-1, Jangduk-dong, Gwangsan-gu, Gwangju, Korea. 506-731  
**Type of Equipment** : Wi-Fi module  
**FCC ID.** : YZP-TWFML006D  
**IC Certification No.** : 7414C-TWFML006D  
**Model Name** : TWFM-L006D  
**Serial number** : N/A  
**Total page of Report** : 459 pages (including this page)  
**Date of Incoming** : December 03, 2013  
**Date of issue** : January 06, 2014

## SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247 and IC RSS-Gen Issue 3 and RSS 210 Issue 8.*

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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### Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
E141R-009	January 06, 2014	Initial Issue	All



## 1. VERIFICATION OF COMPLIANCE

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 FCC ID : YZP-TWFML006D  
 CERTIFICATION NO. : 7414C-TWFML006D  
 Model Name : TWFM-L006D  
 Serial Number : N/A  
 Date : January 06, 2014

EQUIPMENT CLASS	FCC: DTS – DIGITAL TRNSMISSION SYSTEM IC: Low Power License-Exempt Radio-communication Device
E.U.T. DESCRIPTION	Modular Transmitter, Wi-Fi module
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2009
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification, Modular Approval
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 and RSS 210 Issue 8, RSS-Gen Issue 3.
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m open area test site

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the IC 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
15.247 (a) (2)	RSS-210, A8.2(a)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	RSS-210, A8.4(4)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (d)	RSS-210, A8.5	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	RSS-210, A8.5	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	RSS-210, A8.2(b)	Peak Power Spectral Density	Met the Limit / PASS
15.209	RSS-210, A8.5	Radiated Emission Limits	Met the Limit / PASS
15.207	RSS-Gen, Section 7.2.4	Conducted Limits	Met the Limit / PASS
15.203	RSS-Gen, Section 7.1.2	Antenna Requirement	Met requirement / PASS

### 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 FCC PART 15 SUBPART C Section 15.247 and IC RSS-Gen Issue 3 and RSS 210 Issue 8

### 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2009. Radiated testing was performed 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 LG Innotek Co., Ltd., Model TWFM-L006D (referred to as the EUT in this report) is a Wi-Fi module. Product specification information described herein was obtained from product data sheet or user’s manual.

DEVICE TYPE	Wi-Fi module		
FREQUENCY RANGE	2 400 MHz ~ 2 483.5 MHz Band	2 412 MHz ~ 2 462 MHz_20 MHz BW	
		2 422 MHz ~ 2 452 MHz_40 MHz BW	
	5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz_20 MHz BW	
		5 755 MHz ~ 5 795 MHz_40 MHz BW	
MAX. RF OUTPUT POWER:	Ant.0	2 400 MHz ~ 2 483.5 MHz Band	Wi-Fi 802.11b(14.24 dBm) Wi-Fi 802.11g (12.36 dBm) Wi-Fi 802.11n_20 MHz (11.01 dBm) Wi-Fi 802.11n_40 MHz (10.09 dBm)
		5 725 MHz ~ 5 850 MHz Band	Wi-Fi 802.11a (10.24 dBm) Wi-Fi 802.11n_20 MHz (8.70 dBm) Wi-Fi 802.11n_40 MHz (8.22 dBm)
MAX. RF OUTPUT POWER:	Ant.1	2 400 MHz ~ 2 483.5 MHz Band	Wi-Fi 802.11b(14.85 dBm) Wi-Fi 802.11g (11.97 dBm) Wi-Fi 802.11n_20 MHz (10.58 dBm) Wi-Fi 802.11n_40 MHz (9.72 dBm)
		5 725 MHz ~ 5 850 MHz Band	Wi-Fi 802.11a (10.59 dBm) Wi-Fi 802.11n_20 MHz (9.12 dBm) Wi-Fi 802.11n_40 MHz (7.48 dBm)
MODULATION TYPE	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11a/g/n(HT20)/n(HT40): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)		
Antenna Gain	1.5 dBi		
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	40 MHz		

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

-. None

### 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	LG Innotek Co., Ltd.	TWFM-L006D	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
TWFM-L006D	LG Innotek Co., Ltd.	Wi-Fi module (EUT)	Note PC
LGR51	LG Electronics	Notebook PC	EUT

### 5.3 Mode of operation during the test

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

#### Maximum Output Power

Modulation & Channel selected	DATA RATE	OUTPUT POWER	
		Ant 0	Ant 1
802.11 b (Middle Channel)	1 Mbps	14.24	14.85
	2 Mbps	14.17	14.81
	5.5 Mbps	13.86	14.50
	11 Mbps	13.23	13.88
802.11g (Middle Channel))	6 Mbps	12.36	11.97
	9 Mbps	12.08	11.66
	12 Mbps	11.87	11.51
	18 Mbps	11.53	11.16
	24 Mbps	11.15	10.78
	36 Mbps	10.47	10.10
	48 Mbps	10.05	9.71
	54 Mbps	9.78	9.43
HT 20 (Middle Channel))	6.5 Mbps	11.01	10.58
	13 Mbps	10.46	10.04
	19.5 Mbps	10.17	9.75
	26 Mbps	9.76	9.40
	39 Mbps	9.20	8.88
	52 Mbps	8.75	8.37
	58.5 Mbps	8.61	8.27
	65 Mbps	8.41	8.08
HT 40 (Middle Channel))	13 Mbps	10.09	9.72
	26 Mbps	8.94	8.78
	39 Mbps	8.66	8.02
	52 Mbps	8.14	7.51
	78 Mbps	6.93	6.92
	104 Mbps	6.58	6.43
	117 Mbps	6.54	6.27
	130 Mbps	6.40	5.69

Modulation & Channel selected	DATA RATE	OUTPUT POWER	
		Ant 0	Ant 1
802.11 a (Middle Channel)	6 Mbps	9.96	8.65
	9 Mbps	9.75	8.46
	12 Mbps	9.56	8.16
	18 Mbps	9.32	7.80
	24 Mbps	8.83	7.44
	36 Mbps	8.36	6.85
	48 Mbps	7.98	6.47
	54 Mbps	7.72	6.43
HT 20 (Middle Channel)	6.5 Mbps	8.53	8.42
	13 Mbps	8.11	7.86
	19.5 Mbps	7.76	7.59
	26 Mbps	7.47	7.31
	39 Mbps	7.05	6.80
	52 Mbps	6.66	6.33
	58.5 Mbps	6.54	6.25
	65 Mbps	6.36	6.09
HT 40 (High Channel)	13 Mbps	8.22	7.48
	26 Mbps	7.10	6.57
	39 Mbps	6.85	5.89
	52 Mbps	6.34	5.45
	78 Mbps	5.11	5.03
	104 Mbps	4.78	4.62
	117 Mbps	4.76	4.48
	130 Mbps	4.64	4.16

**-2 GHz Band**

The worse case data rate for each modulation is determined 1 Mbps(Ant.0) / 1 Mbps(Ant.1) for IEEE 802.11b, 6 Mbps(Ant.0) / 6 Mbps(Ant.1) for IEEE 802.11g, 6.5 Mbps(Ant.0) / 6.5 Mbps(Ant.1) for HT20, 13 Mbps(Ant.0)/ 13 Mbps(Ant1) for HT40.

**-5 GHz Band**

The worse case data rate for each modulation is determined 6 Mbps(Ant.0) / 6 Mbps(Ant.1) for IEEE 802.11a, 6.5 Mbps(Ant.0) / 6.5 Mbps(Ant.1) for HT20, 13 Mbps(Ant.0) / 13 Mbps(Ant.1) for HT40.

- 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:** The EUT was connected to USB and the power of USB was connected to Notebook PC. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2009 7.3.3 to determine the worse operating conditions.

**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 meter 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 a PIFA antenna, so no consideration of replacement by the user.

## 6. PRELIMINARY TEST

### 6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X
Receiving Mode	-

### 6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X
Receiving Mode	-



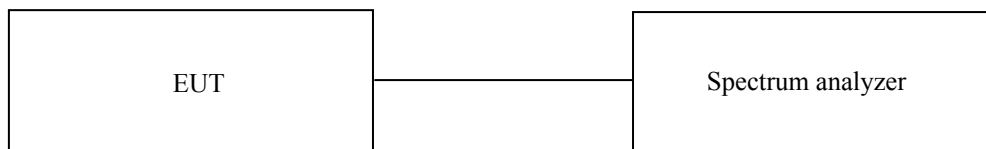
## 7. MIMIMUM 6 dB BANDWIDTH & 99 % OCCUPIED BANDWIDTH

### 7.1 Operating environment

Temperature : 24 °C  
 Relative humidity : 44 % R.H.

### 7.2 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.



### 7.3 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.

7.4 Test data for 802.11b WLAN Mode

7.4.1 Test data for Antenna 0

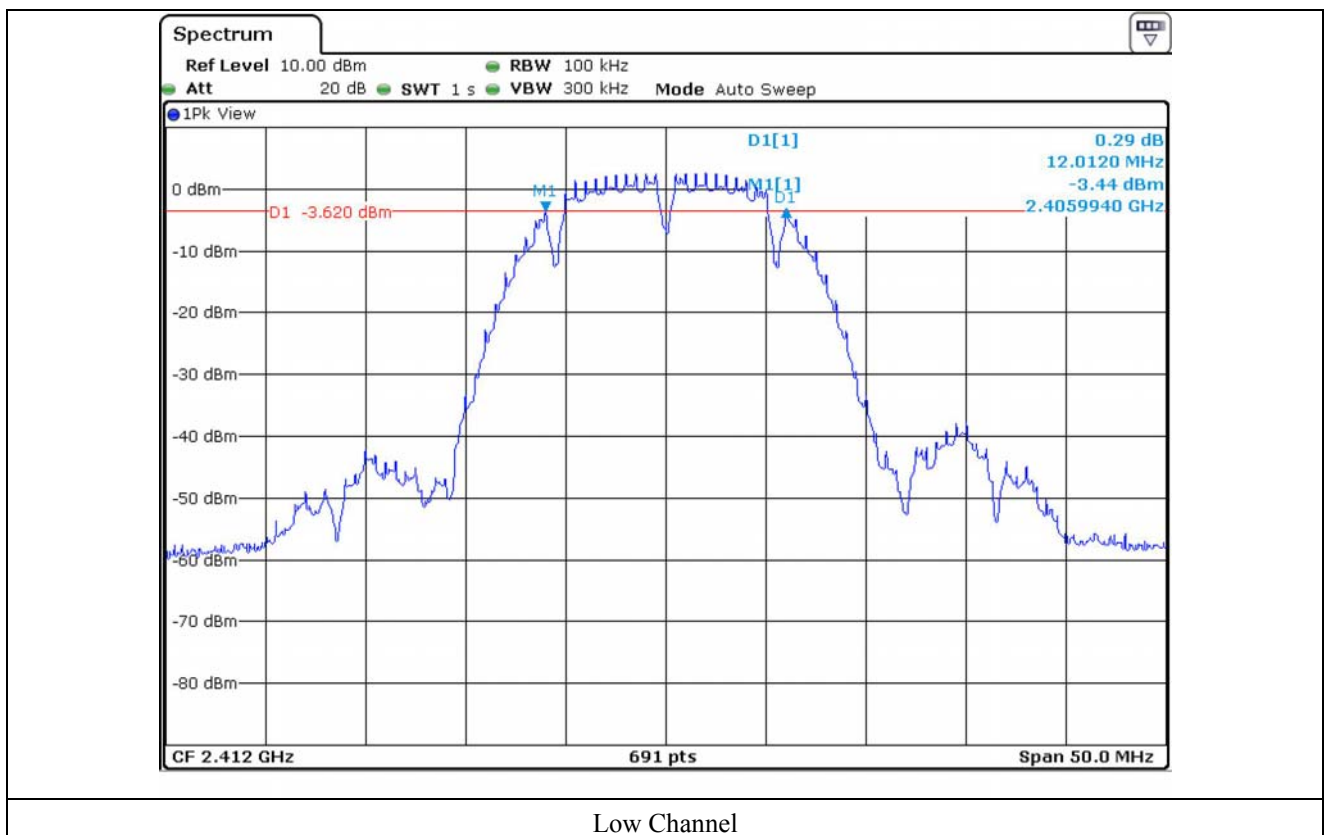
- Test Date : December 26, 2013
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 412	12.01	14.40	0.5
Middle	2 442	12.01	14.40	0.5
High	2 462	12.01	14.40	0.5

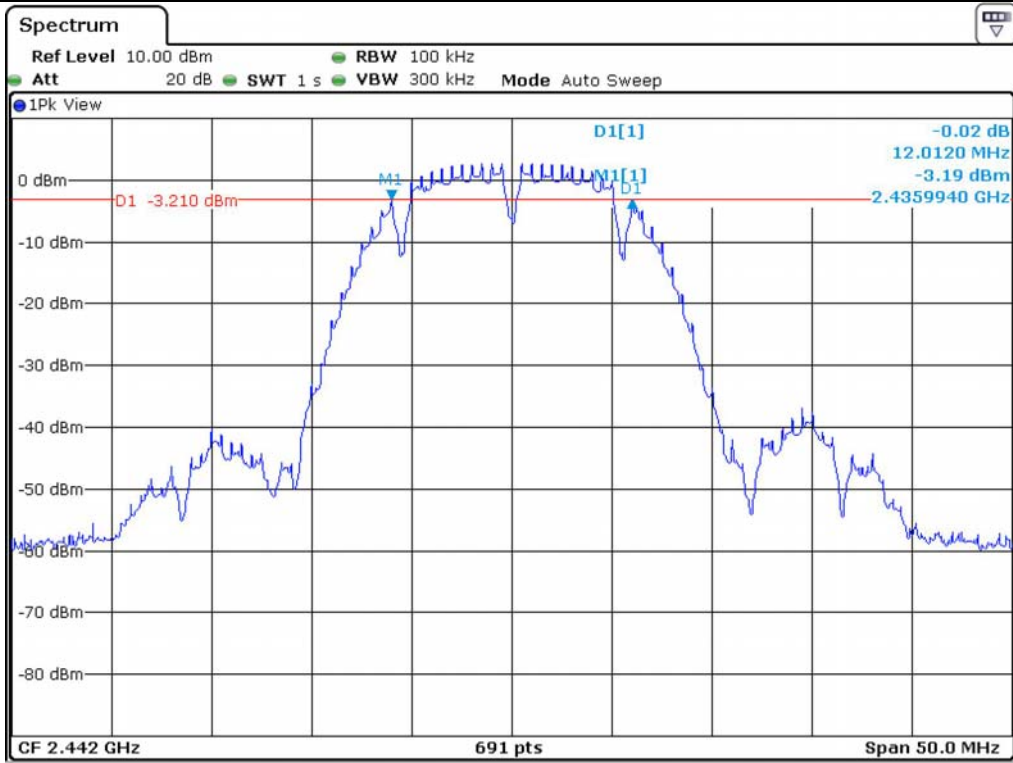
Remark. Margin = Measured Value - Limit

*이 홍규*

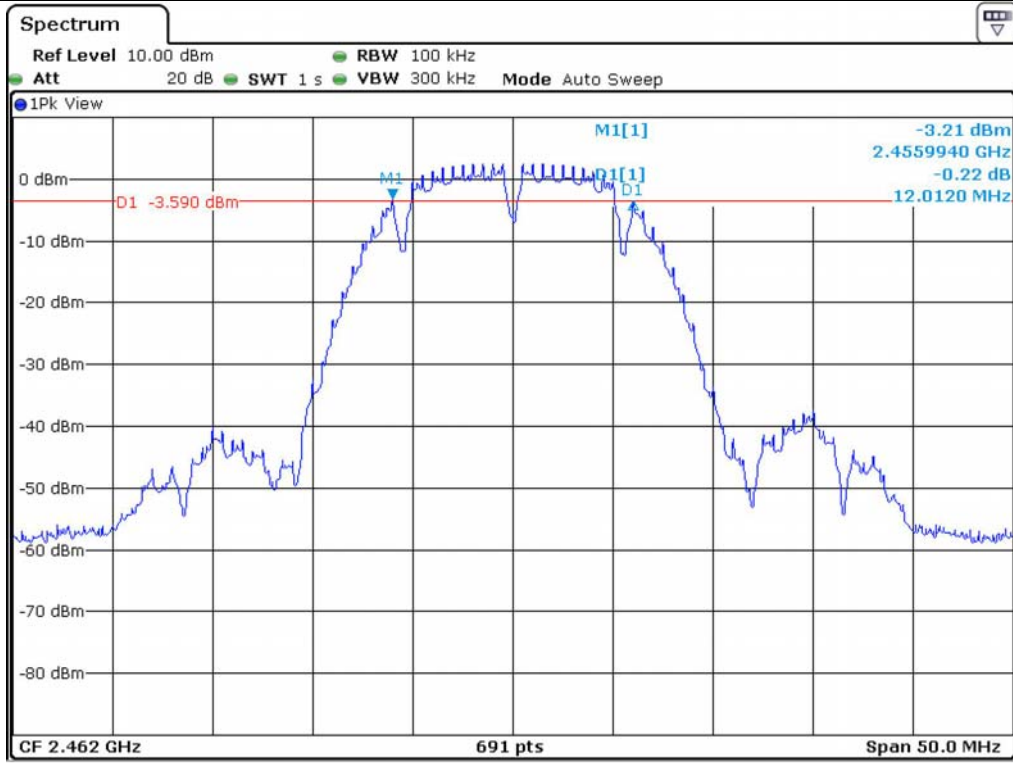
Tested by: Hong-Kyu, Lee/ Engineer



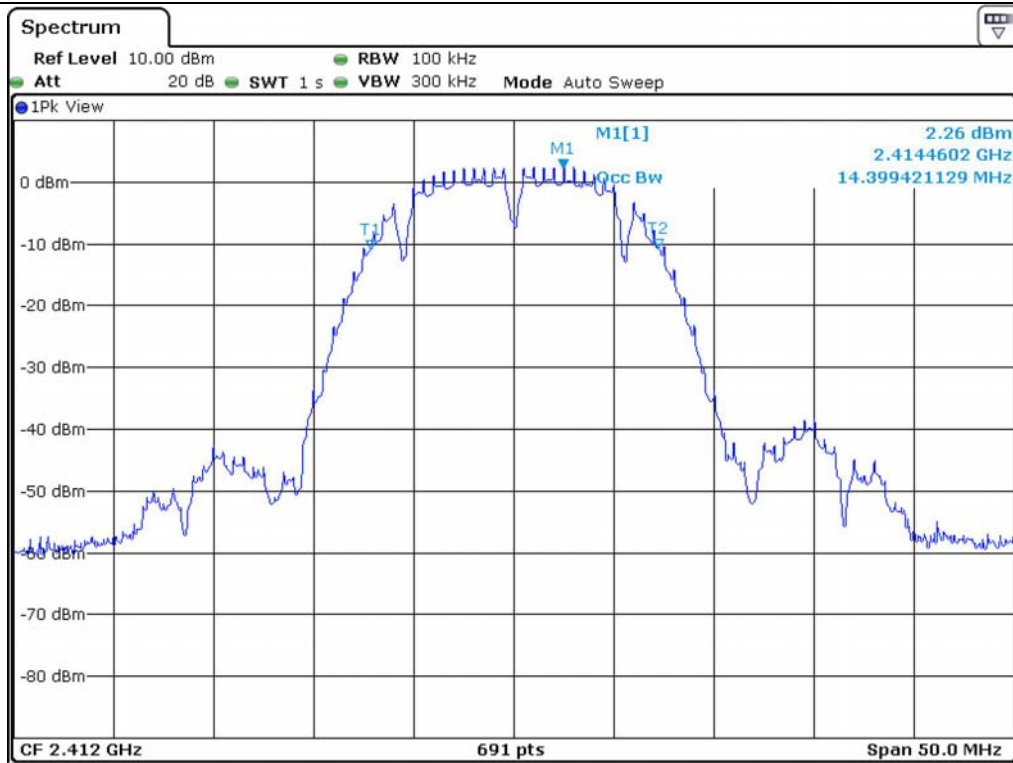
Low Channel



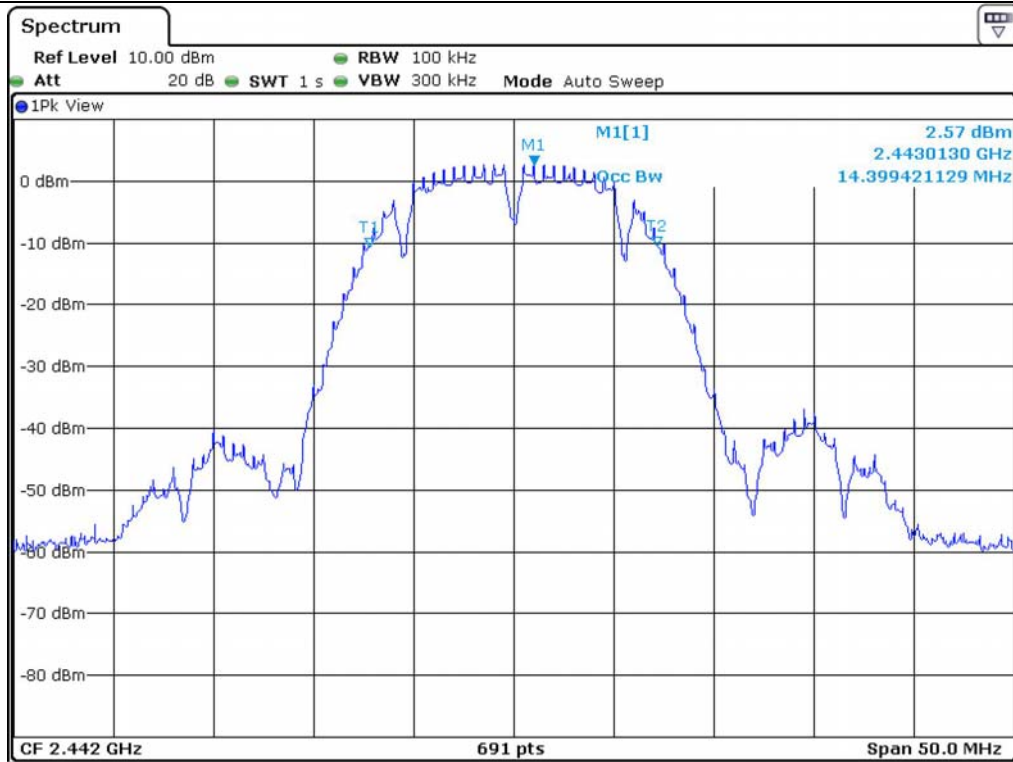
Middle Channel



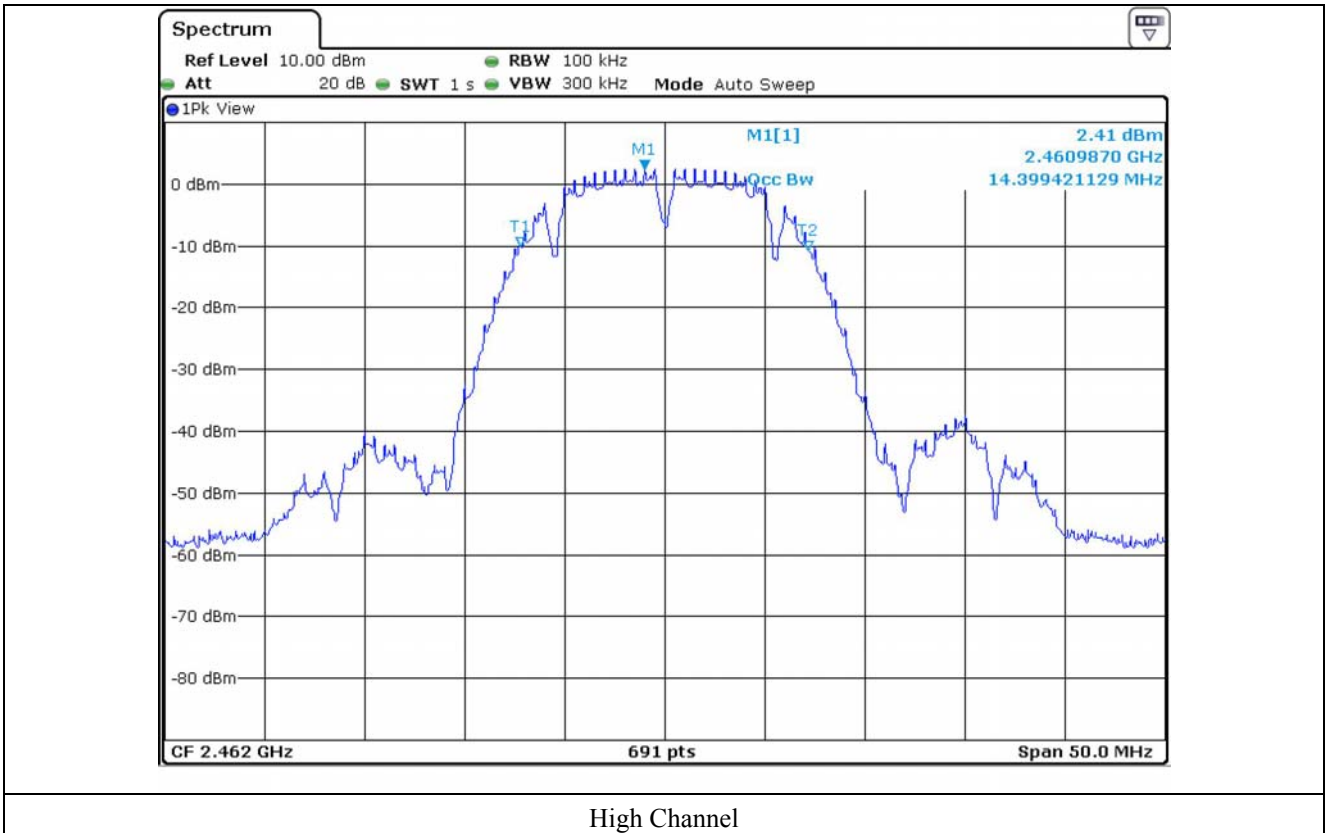
High Channel



Low Channel



Middle Channel



High Channel

7.4.2 Test data for Antenna 1

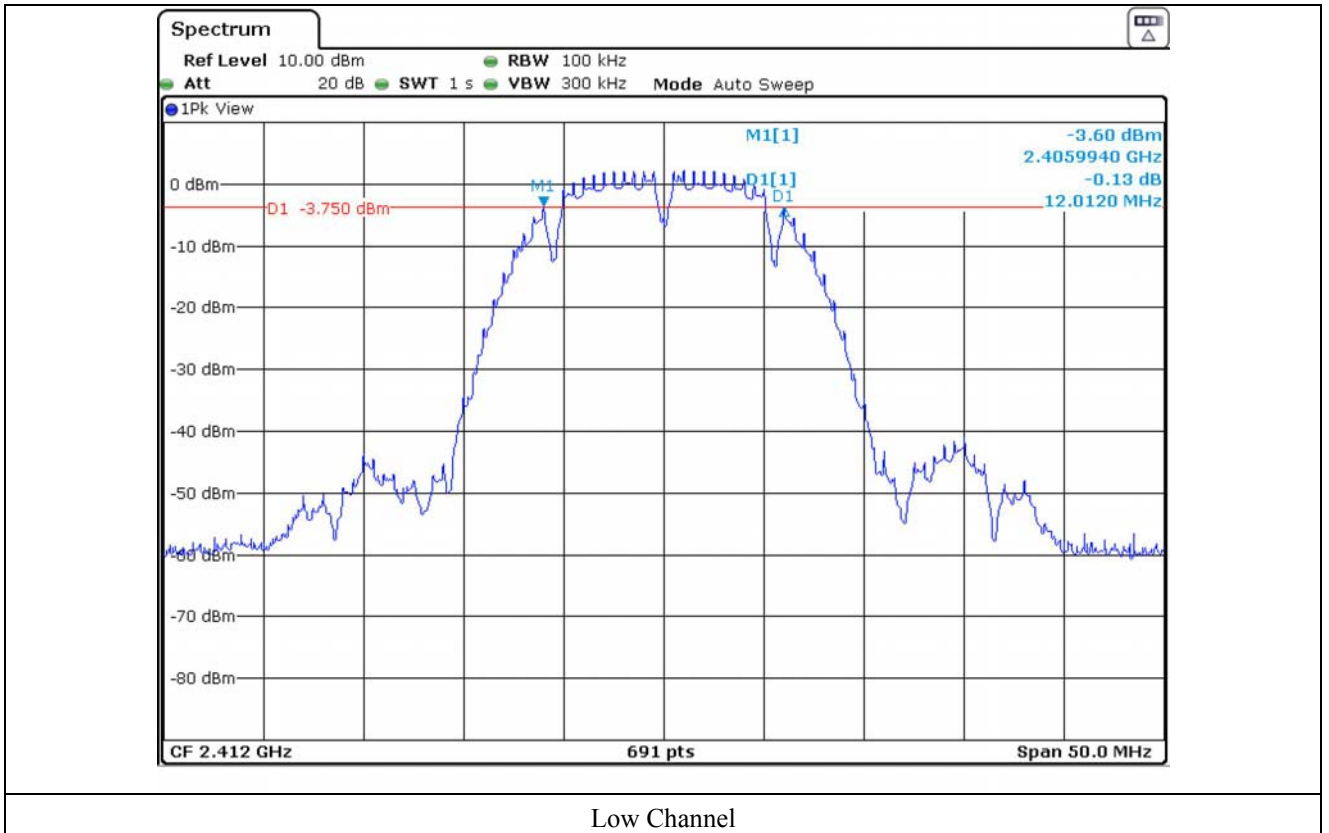
- Test Date : December 26, 2013
- Test Result : Pass

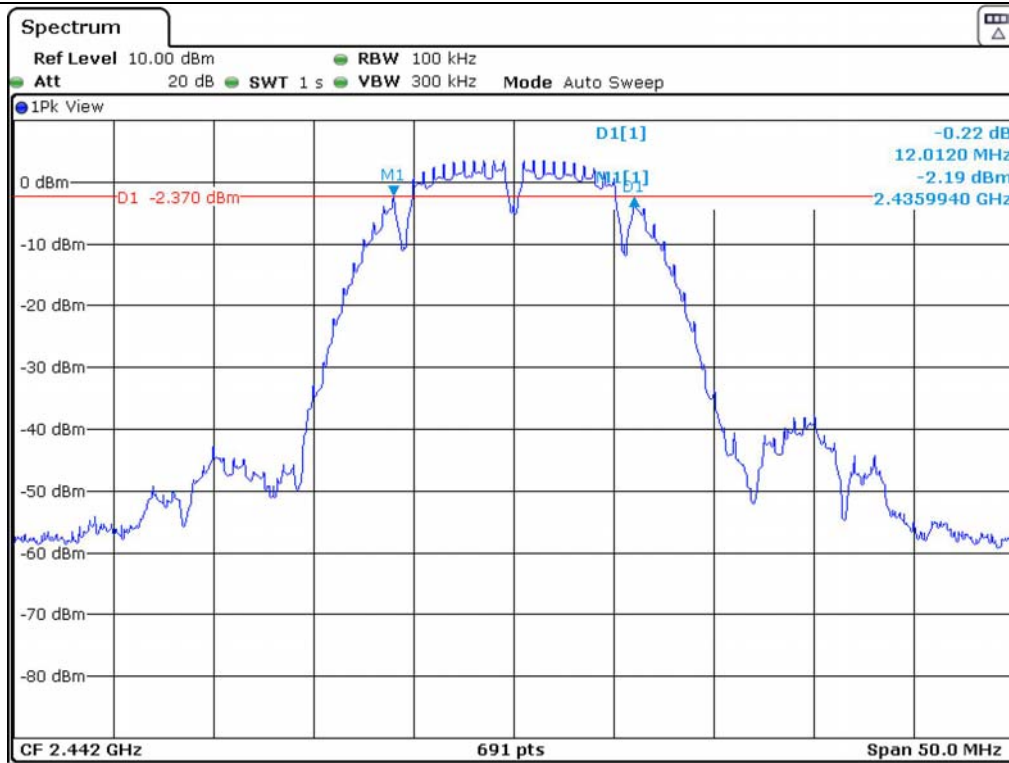
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 412	12.01	14.40	0.5
Middle	2 442	12.01	14.40	0.5
High	2 462	12.01	14.40	0.5

Remark. Margin = Measured Value - Limit

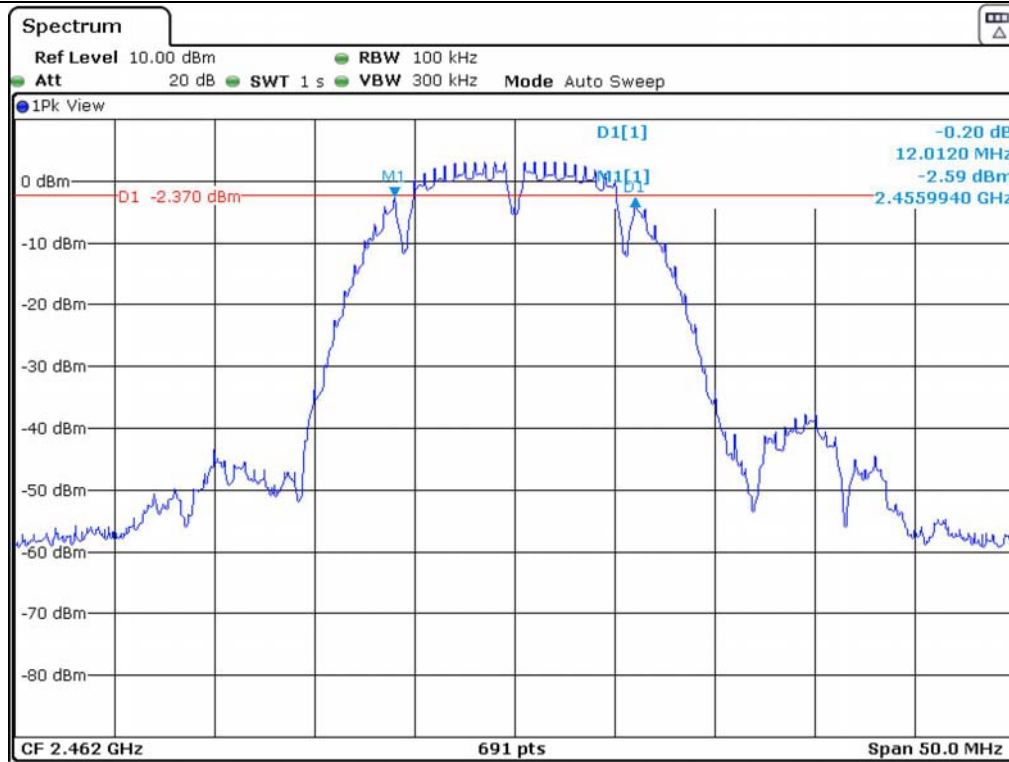
*이 홍규*

Tested by: Hong-Kyu, Lee/ Engineer

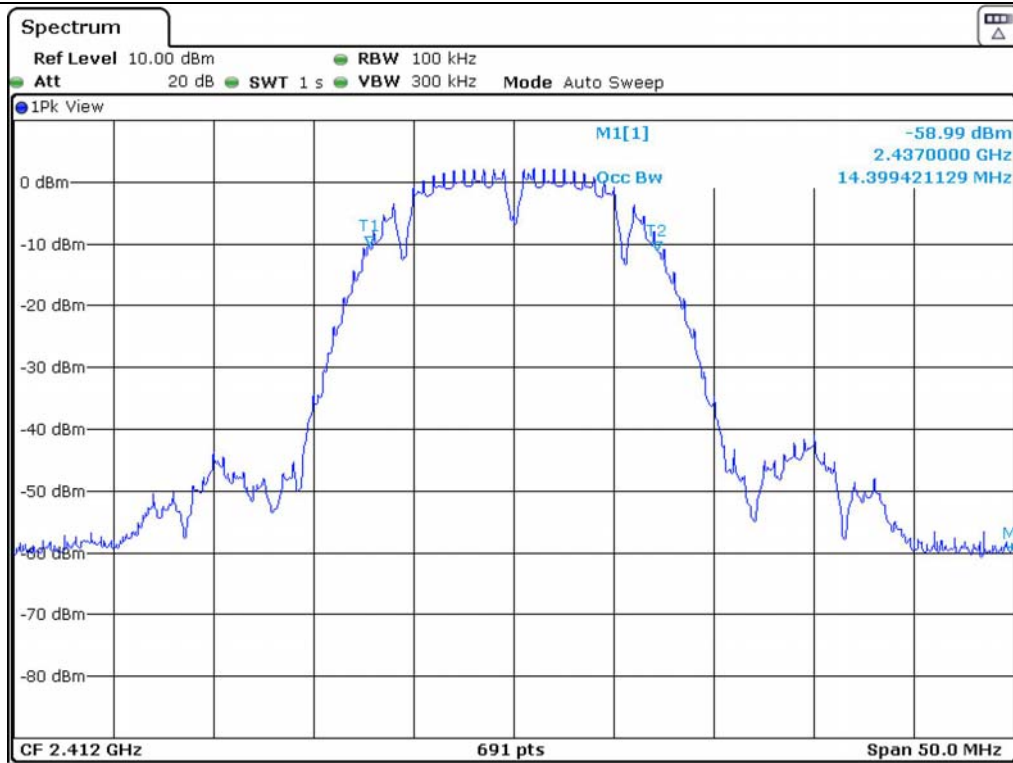




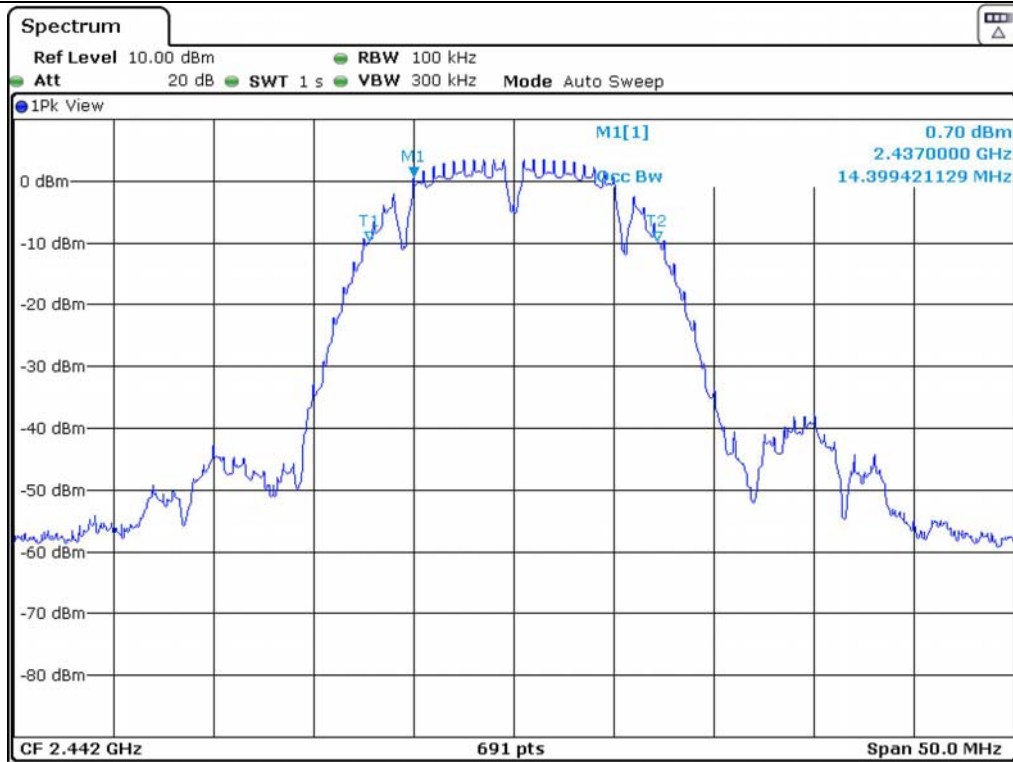
Middle Channel



High Channel

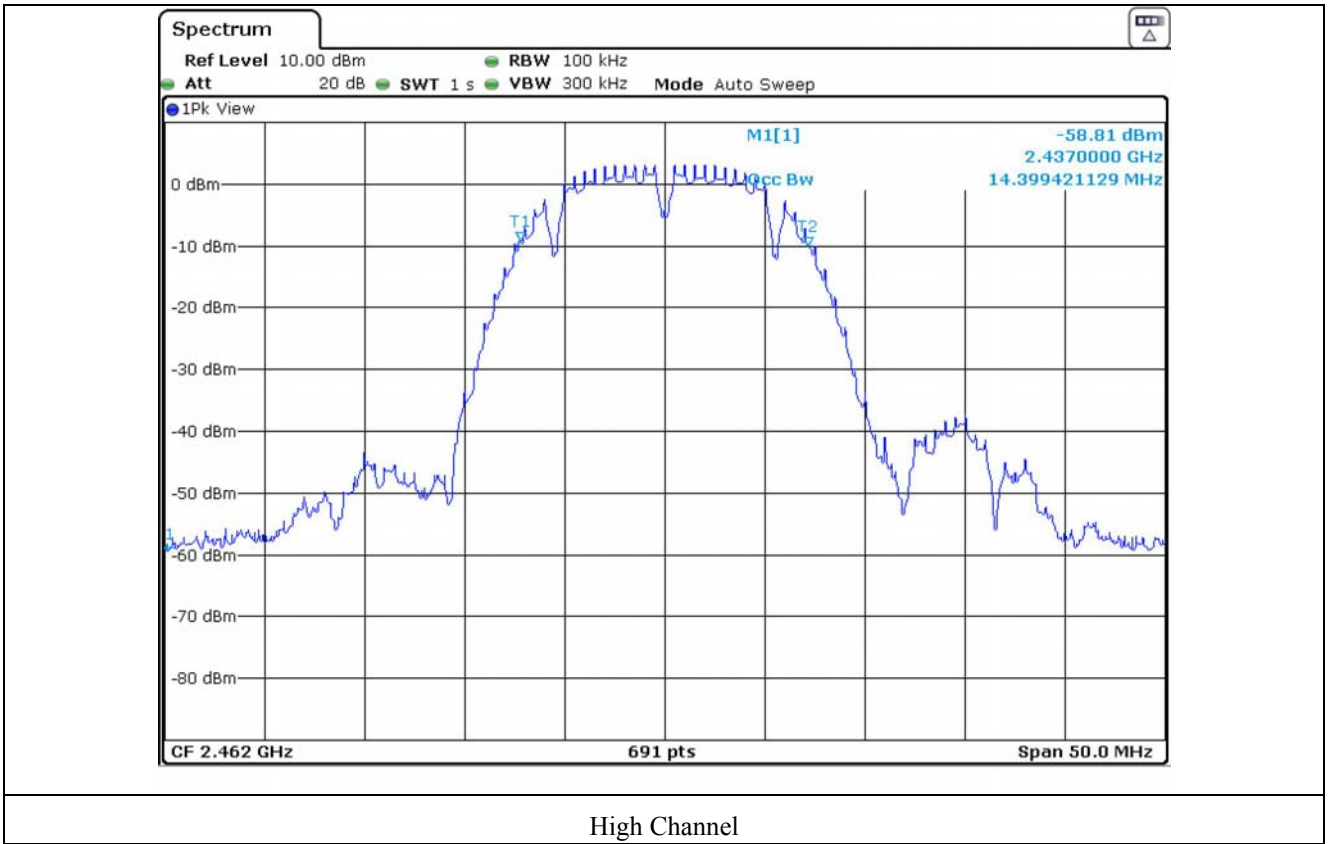


Low Channel



Middle Channel





High Channel

7.5 Test data for 802.11g WLAN Mode

7.5.1 Test data for Antenna 0

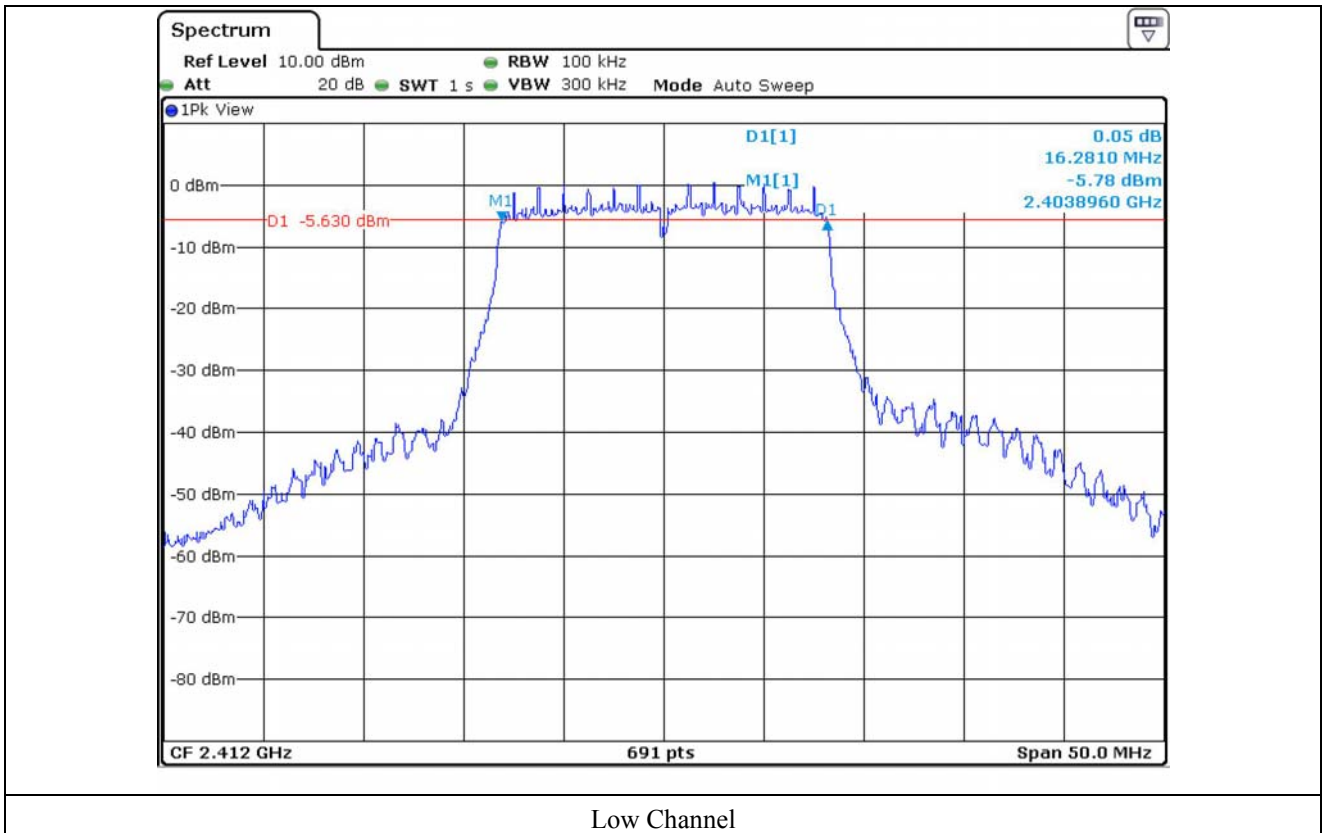
- Test Date : December 26, 2013
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 412	16.28	16.35	0.5
Middle	2 442	16.28	16.35	0.5
High	2 462	16.28	16.35	0.5

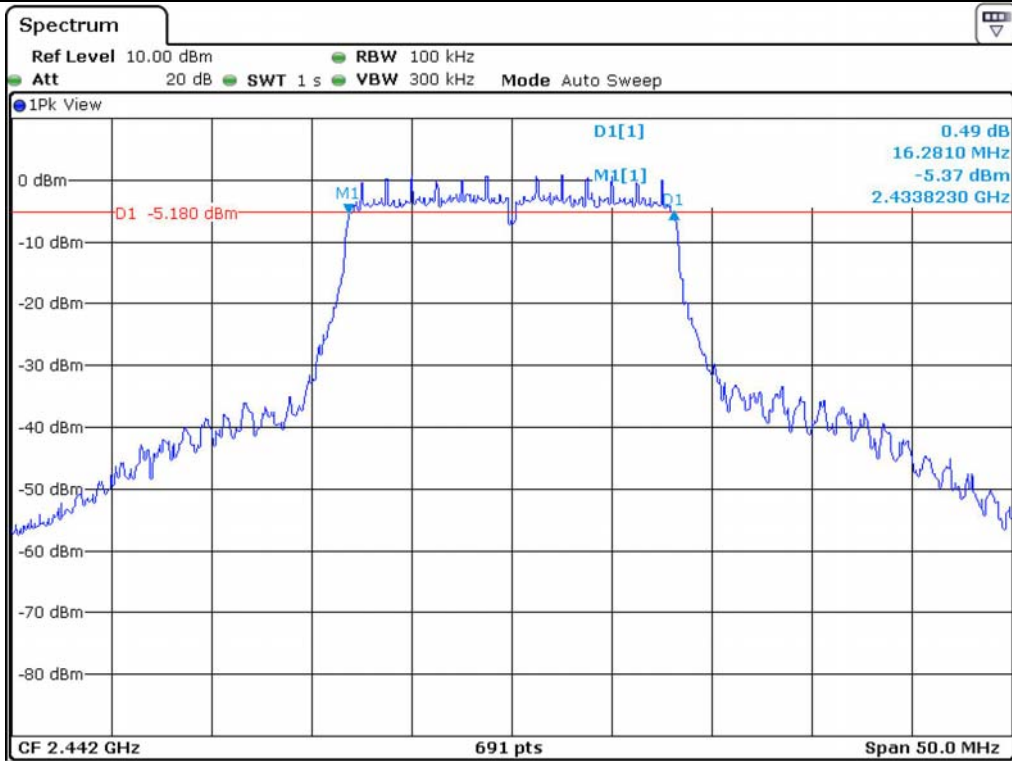
Remark. Margin = Measured Value - Limit

*이 홍규*

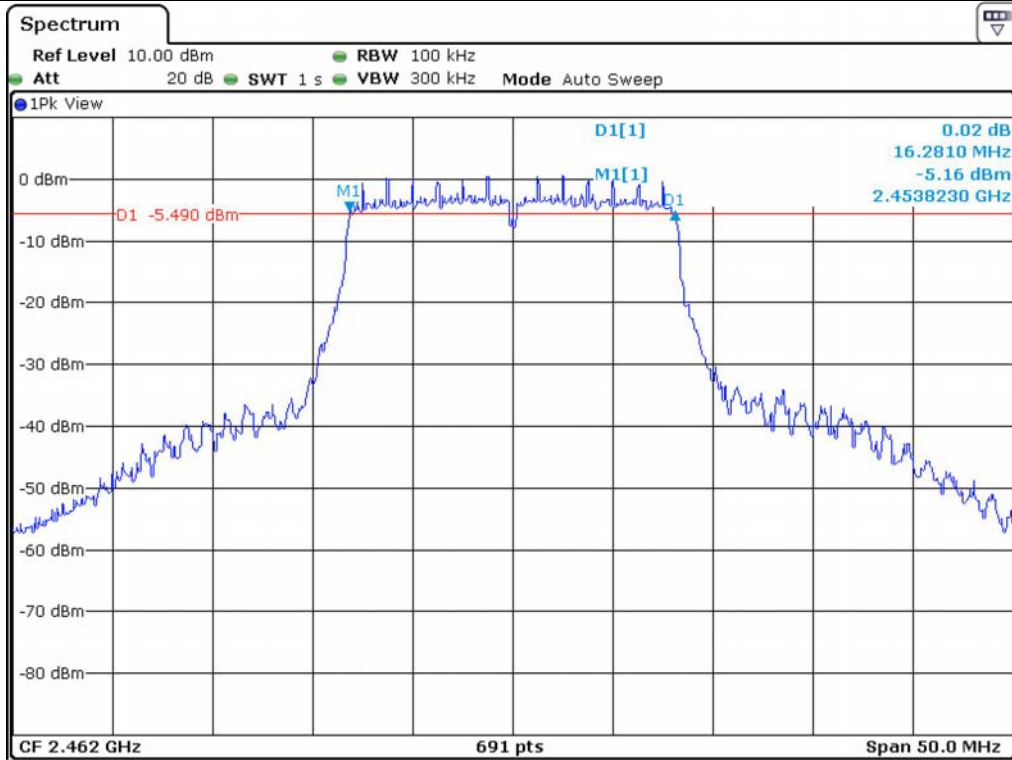
Tested by: Hong-Kyu, Lee/ Engineer



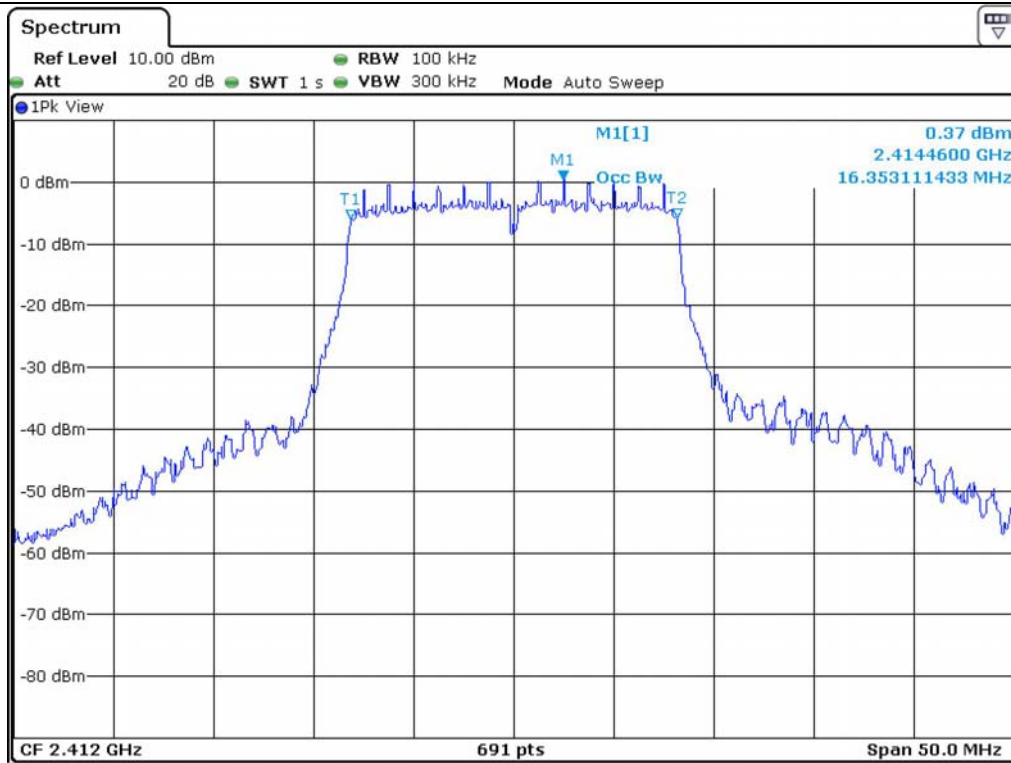
Low Channel



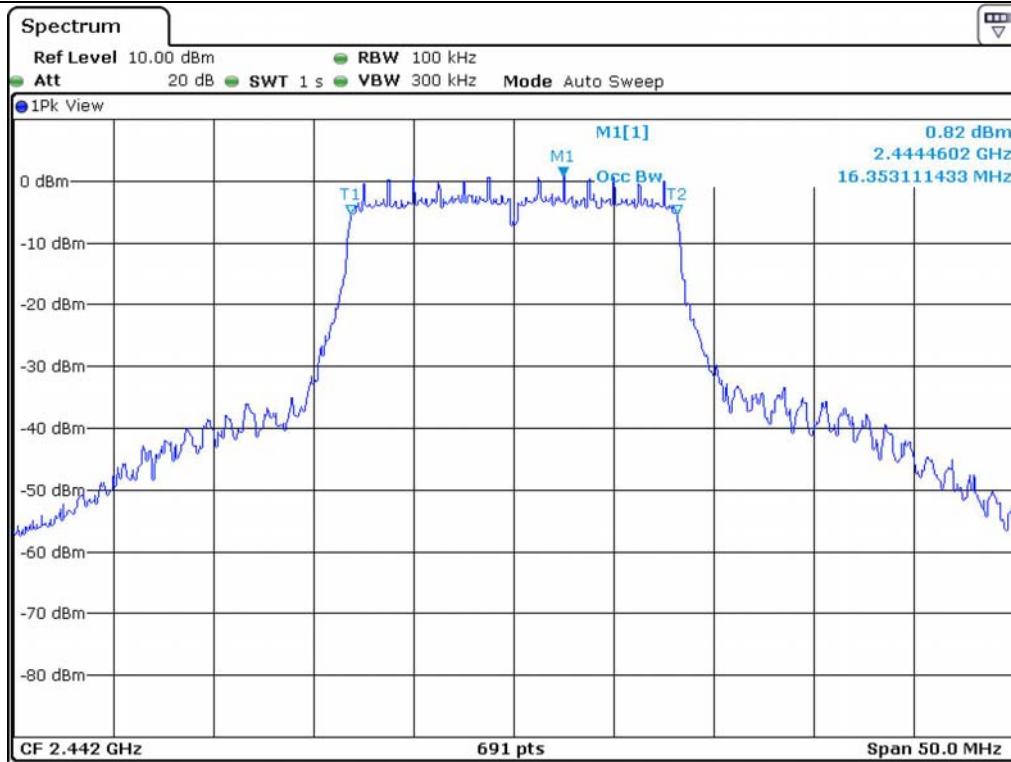
Middle Channel



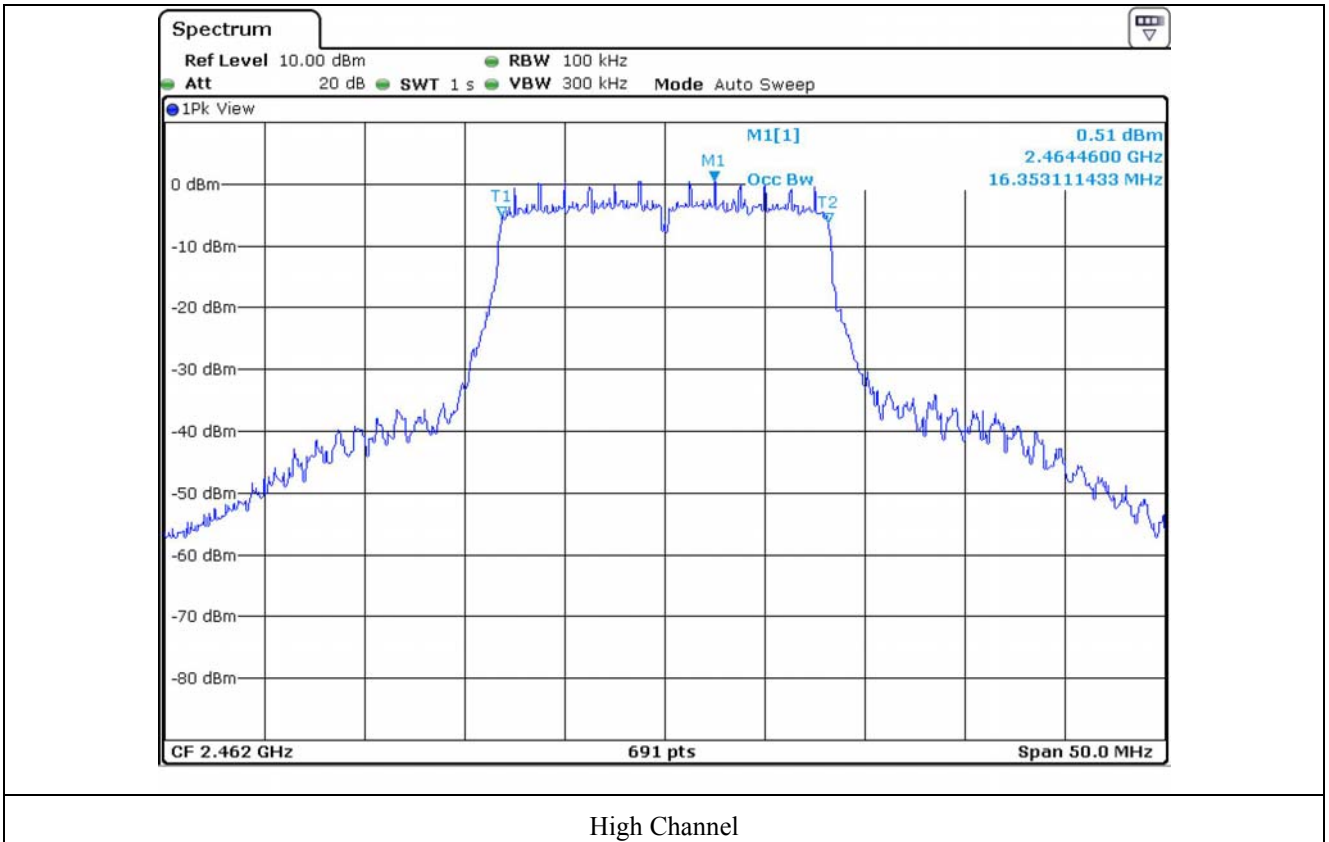
High Channel



Low Channel



Middle Channel



High Channel

7.5.2 Test data for Antenna 1

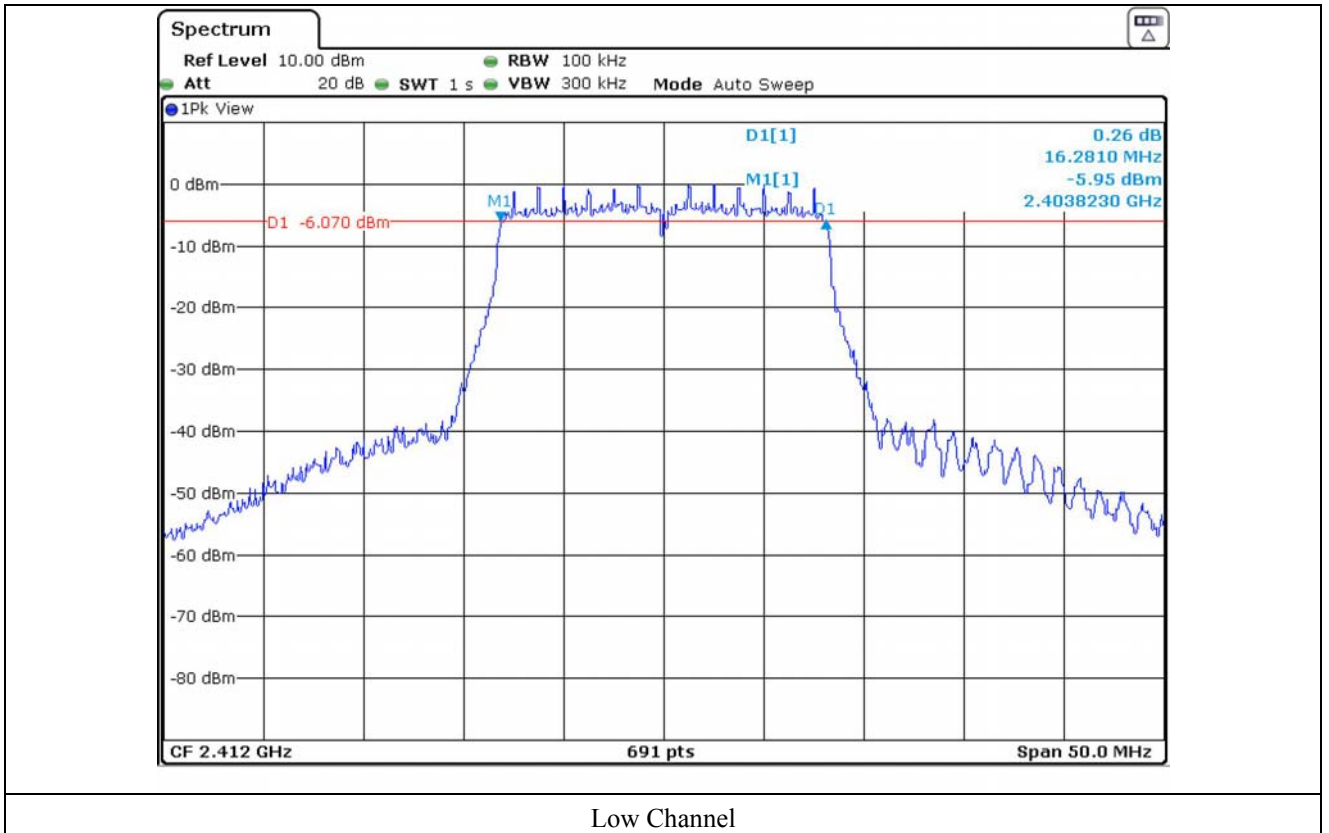
- Test Date : December 26, 2013
- Test Result : Pass

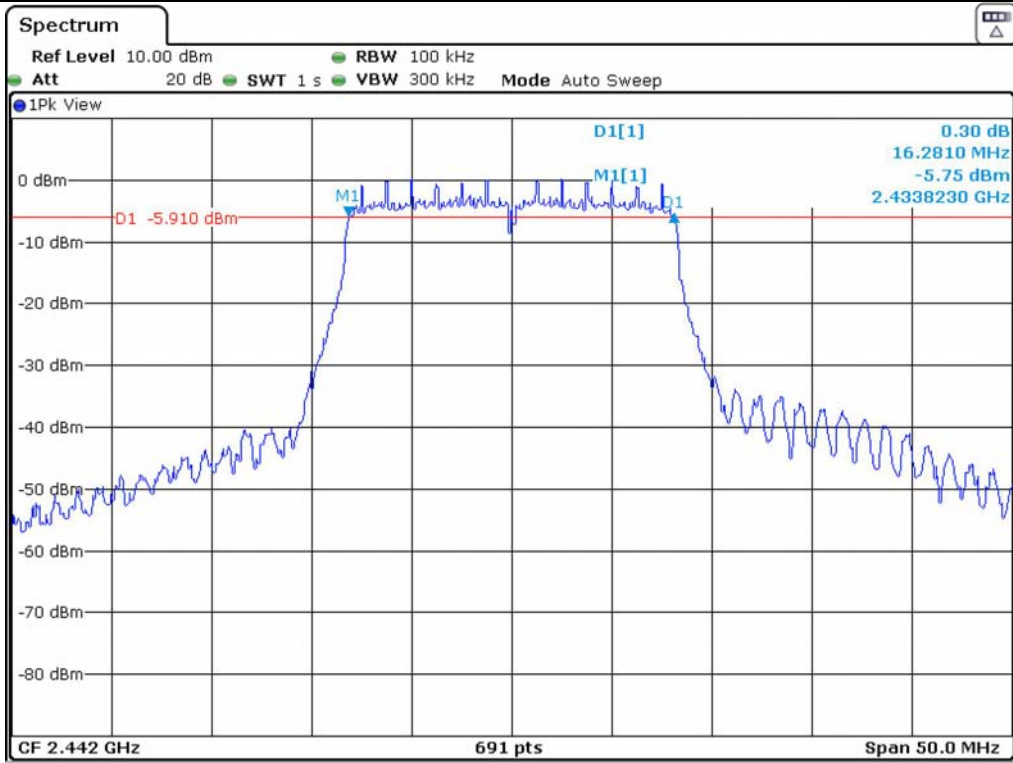
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 412	16.28	16.35	0.5
Middle	2 442	16.28	16.35	0.5
High	2 462	16.28	16.35	0.5

Remark. Margin = Measured Value - Limit

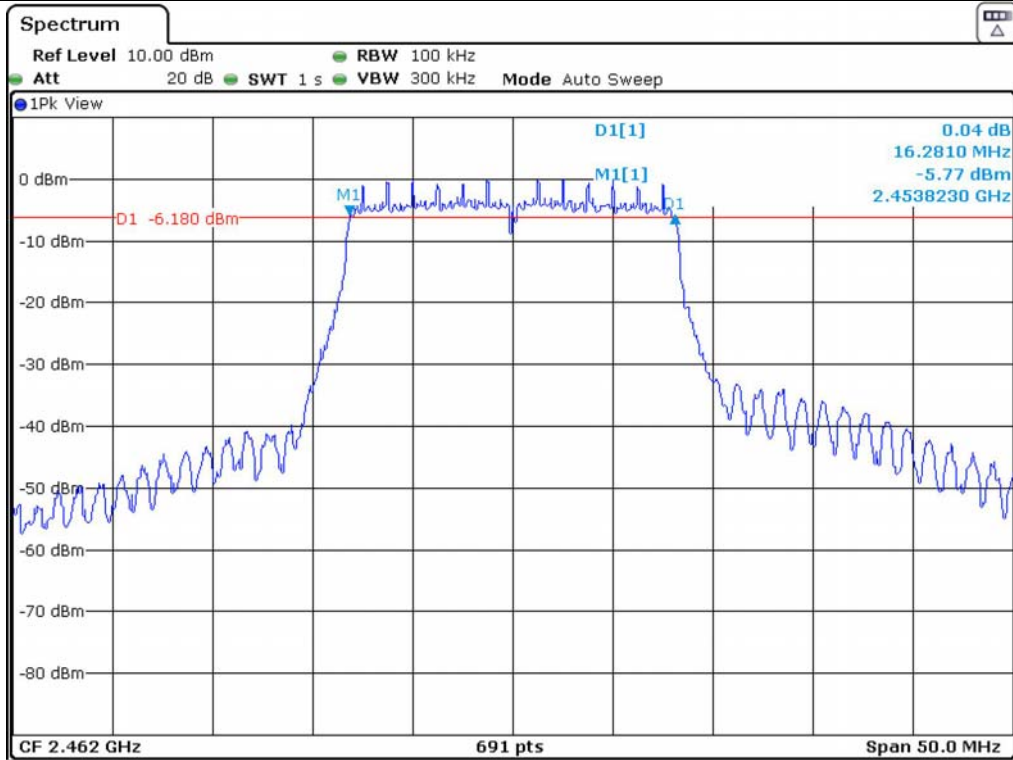
*이 홍규*

Tested by: Hong-Kyu, Lee/ Engineer

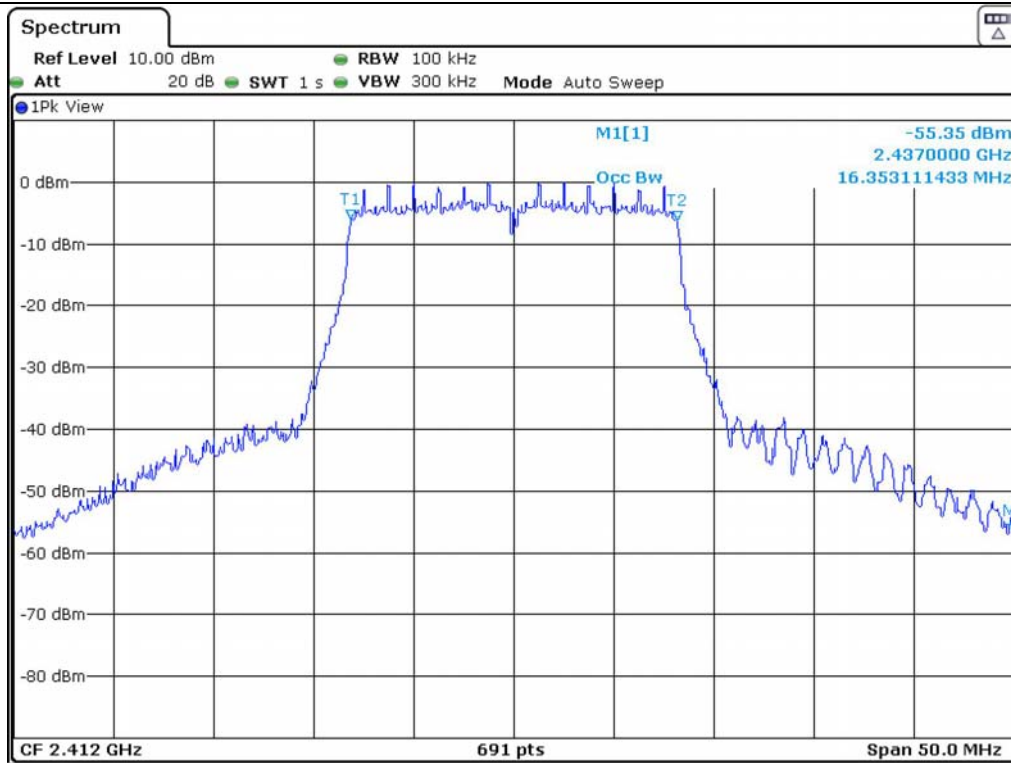




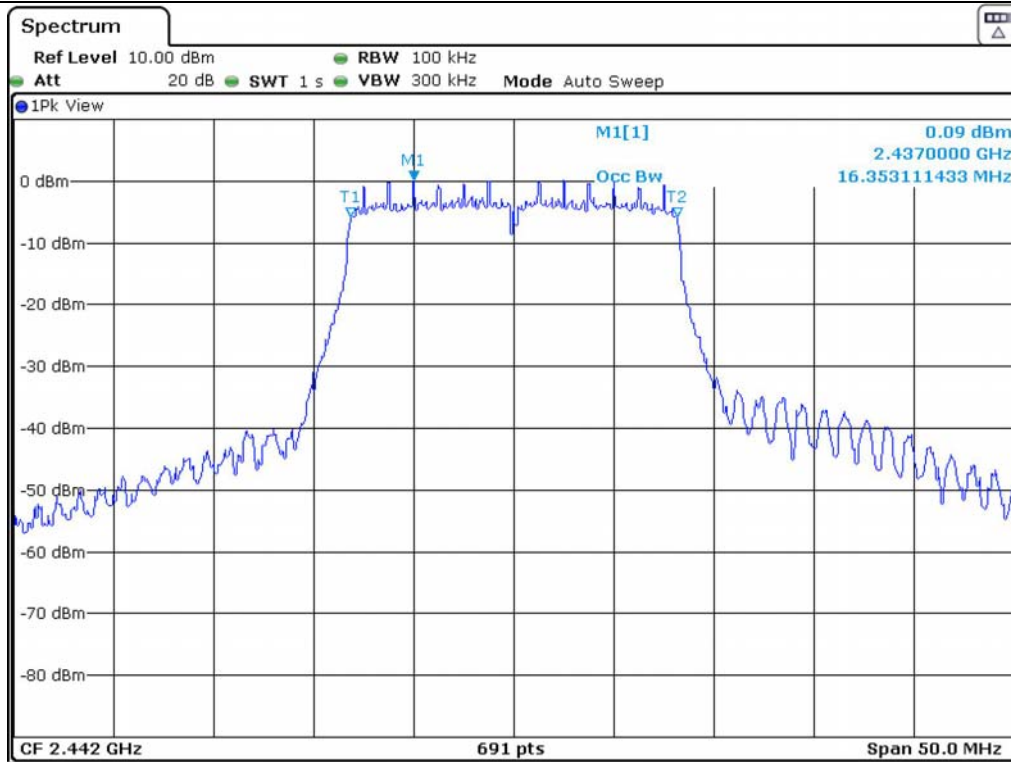
Middle Channel



High Channel

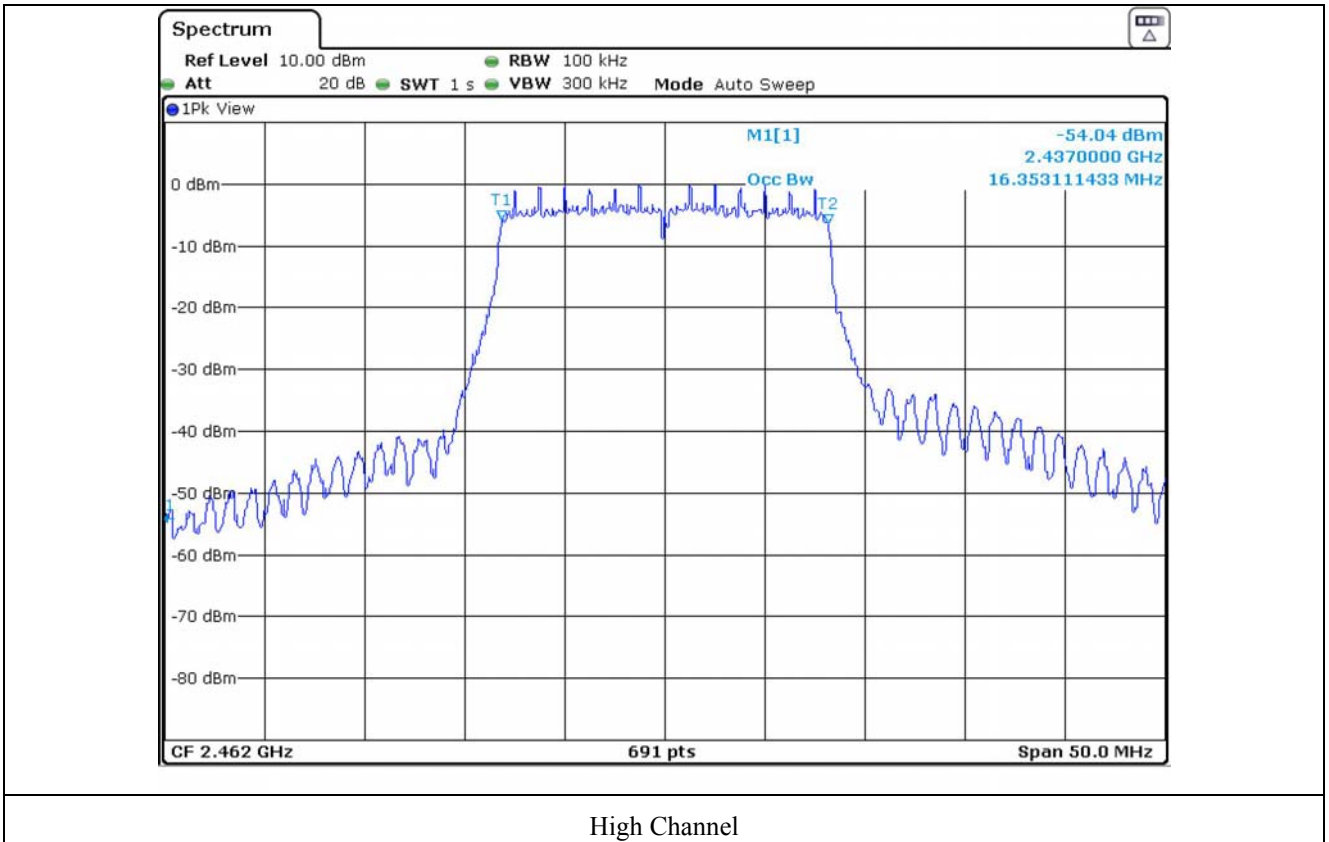


Low Channel



Middle Channel





High Channel

7.6 Test data for 802.11n\_HT20 WLAN Mode

7.6.1 Test data for Antenna 0

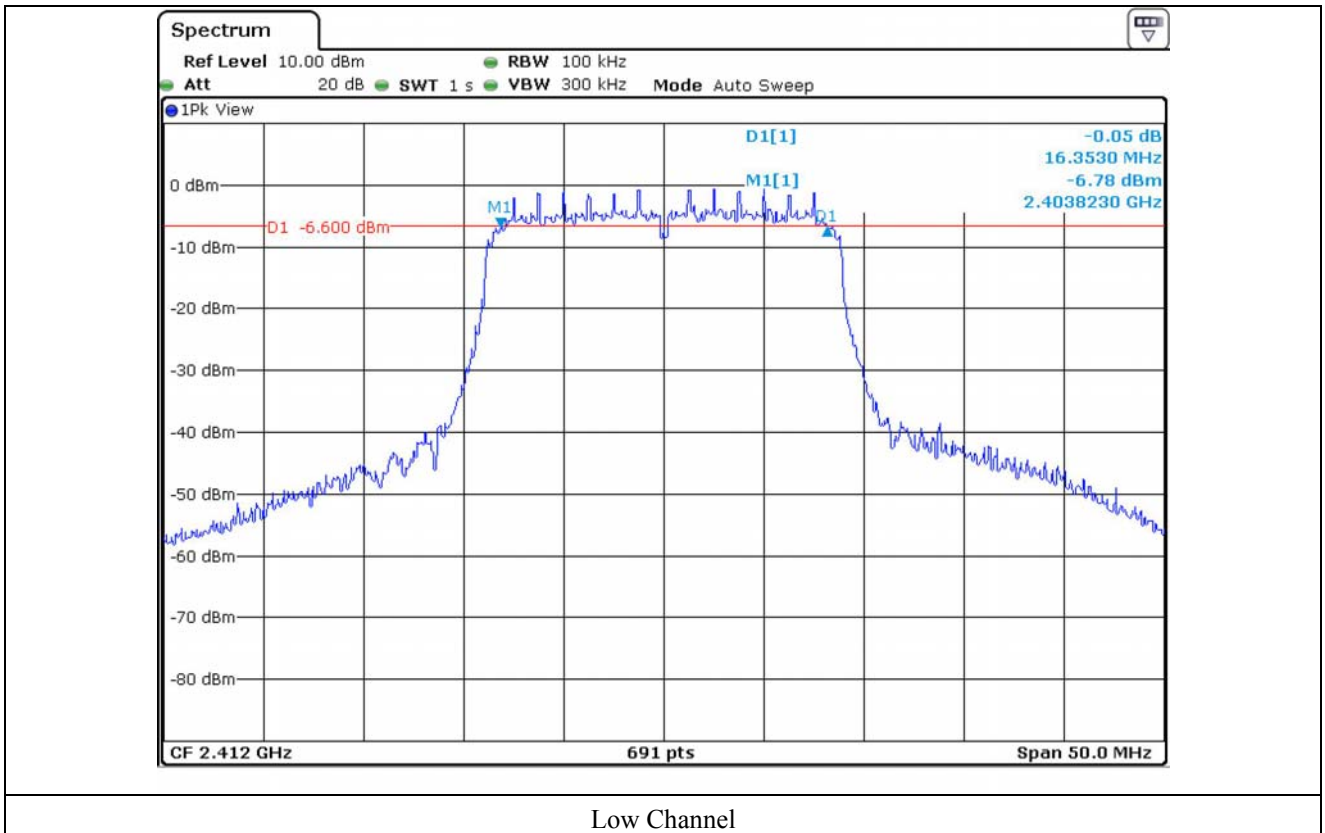
- Test Date : December 26, 2013
- Test Result : Pass

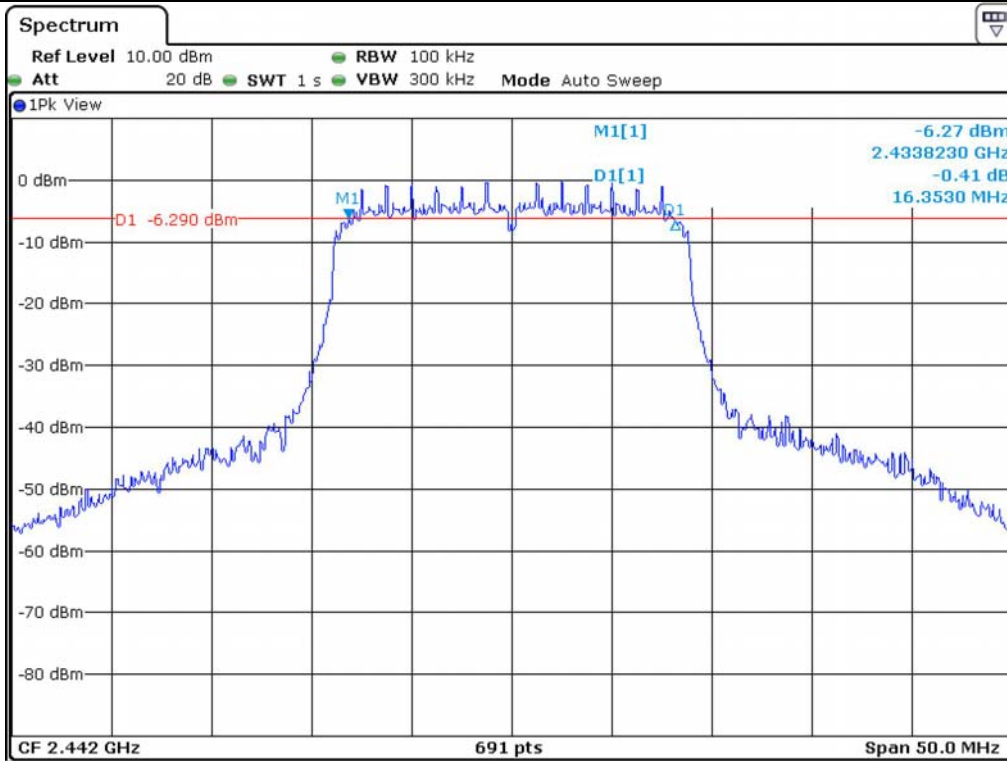
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 412	16.35	17.37	0.5
Middle	2 442	16.35	17.37	0.5
High	2 462	16.35	17.37	0.5

Remark. Margin = Measured Value - Limit

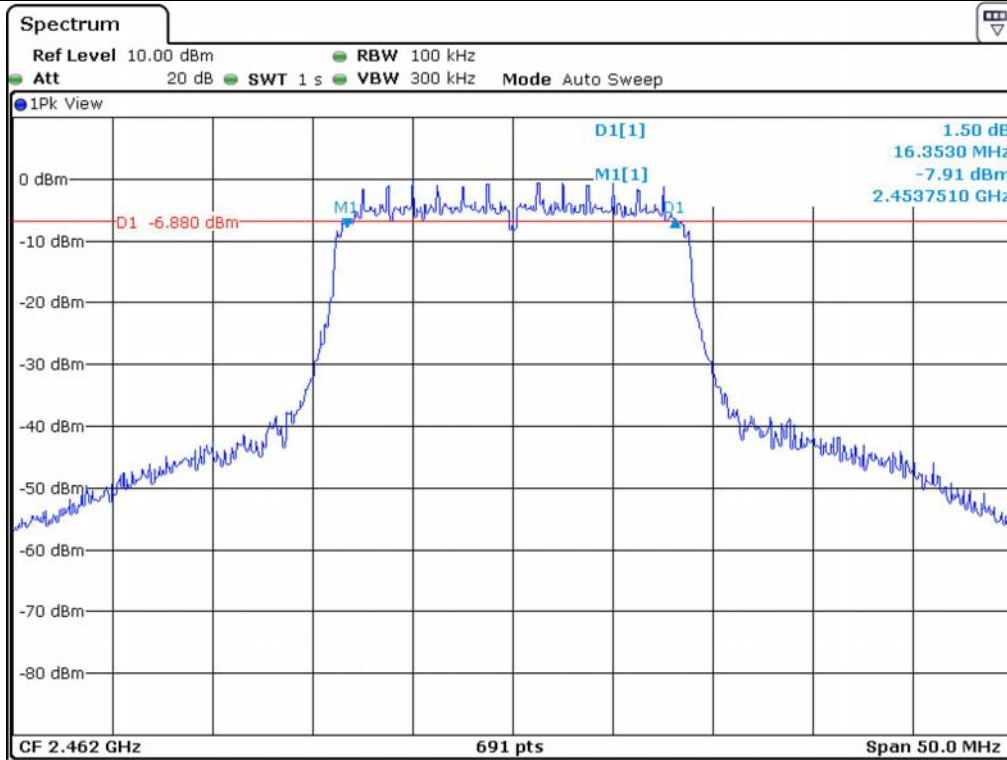
이영주

Tested by: Hong-Kyu, Lee/ Engineer

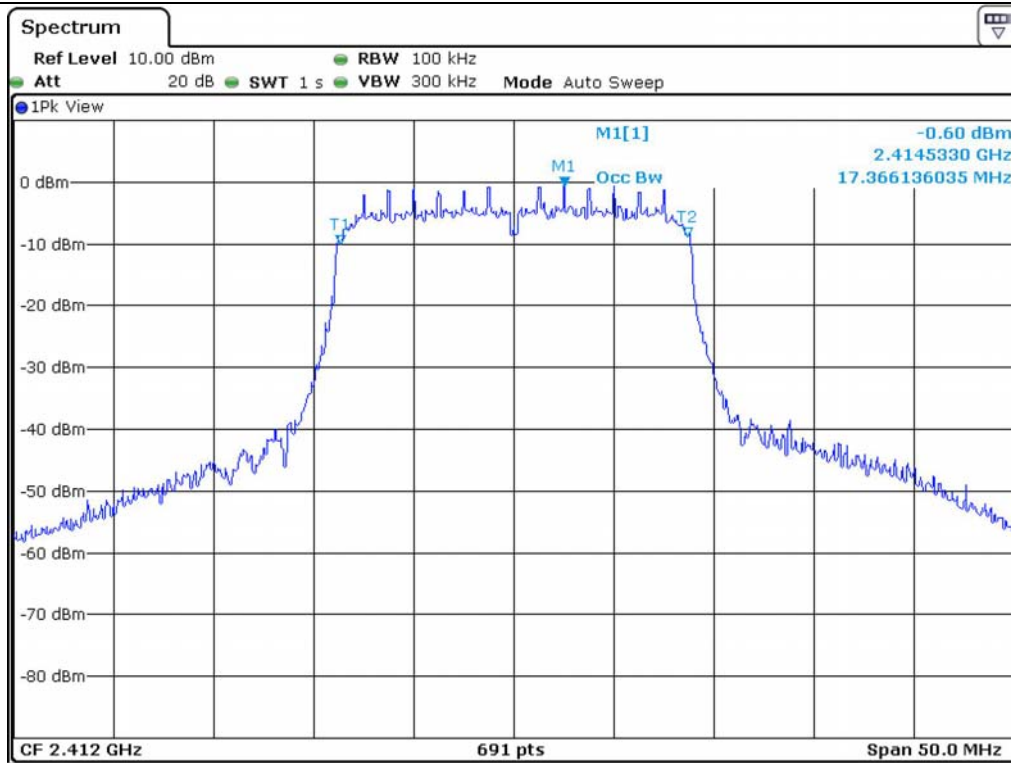




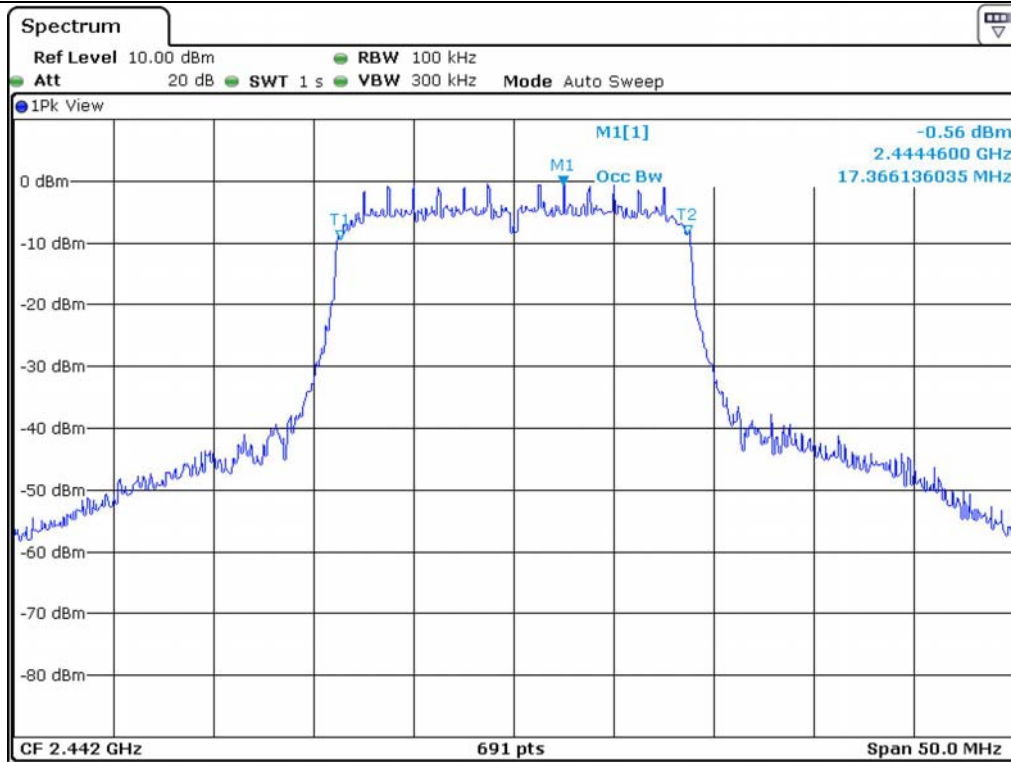
Middle Channel



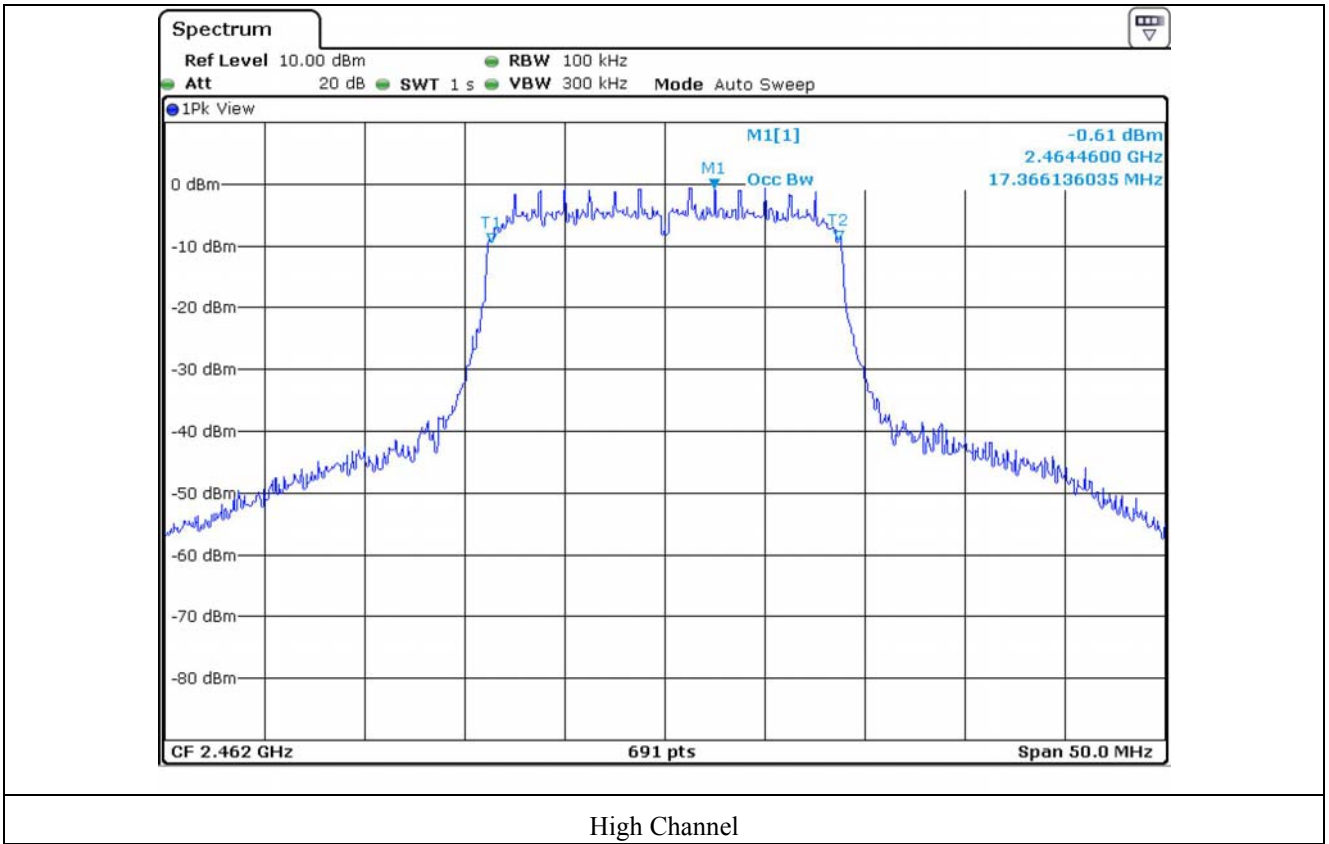
High Channel



Low Channel



Middle Channel



7.6.2 Test data for Antenna 1

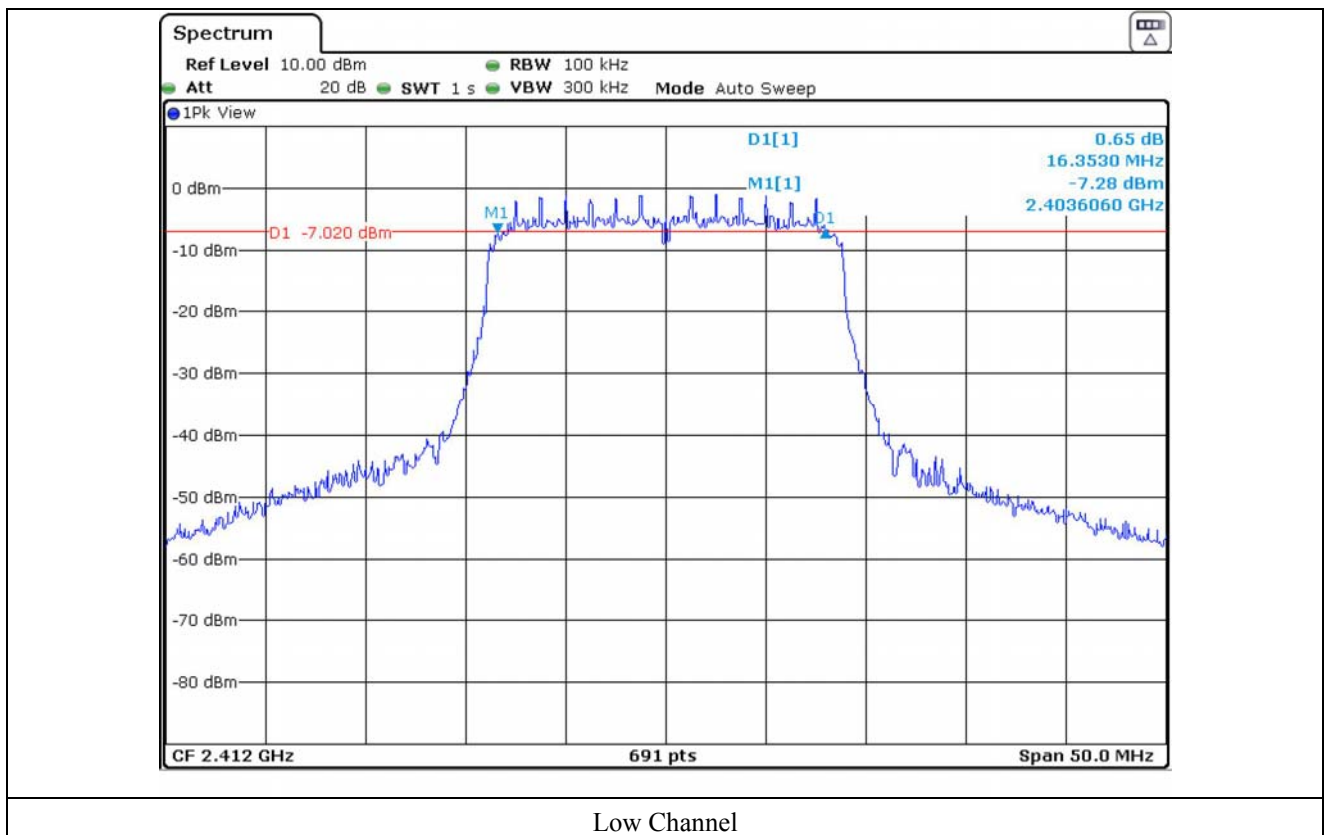
- Test Date : December 26, 2013
- Test Result : Pass

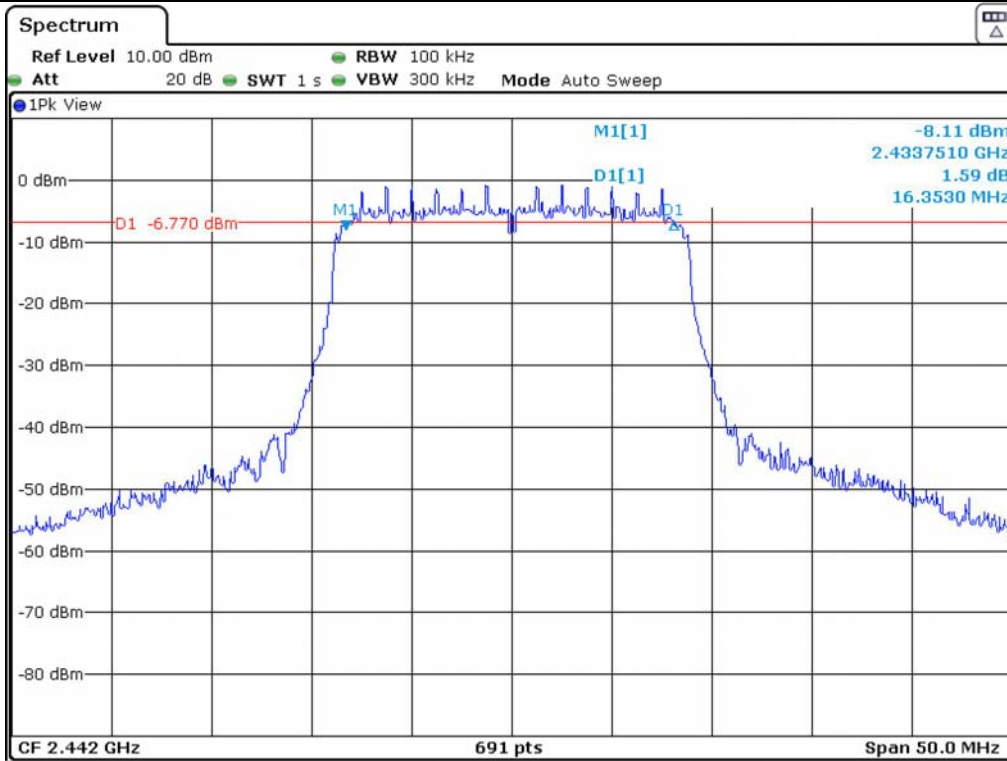
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 412	16.35	17.37	0.5
Middle	2 442	16.35	17.37	0.5
High	2 462	16.35	17.37	0.5

Remark. Margin = Measured Value - Limit

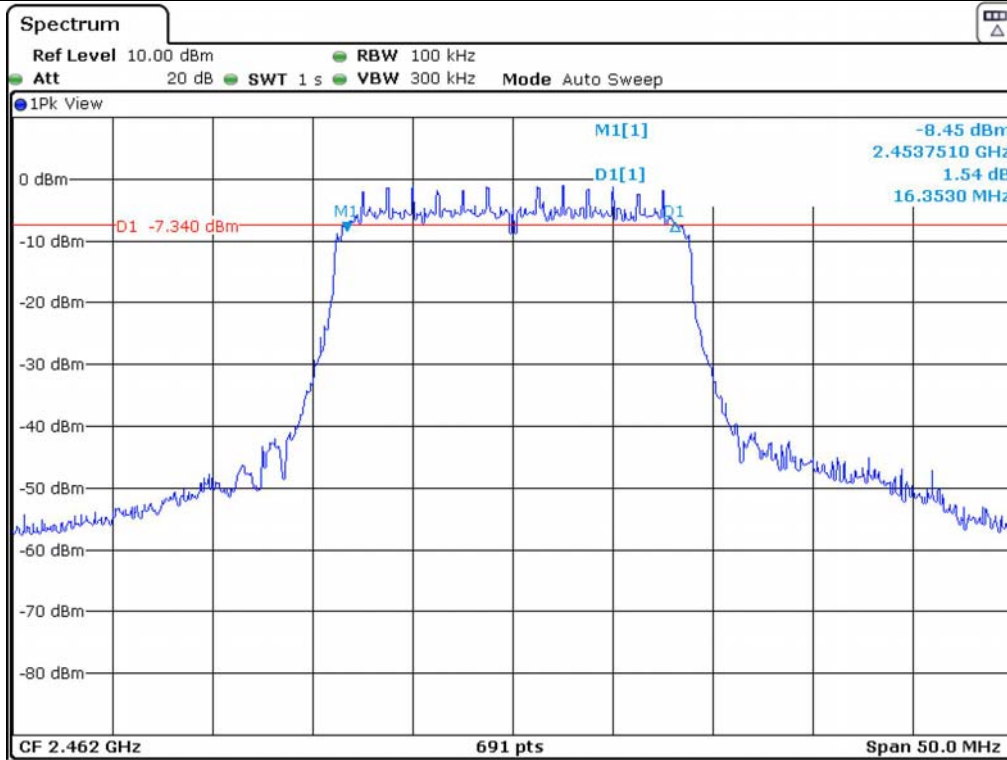
이영주

Tested by: Hong-Kyu, Lee/ Engineer

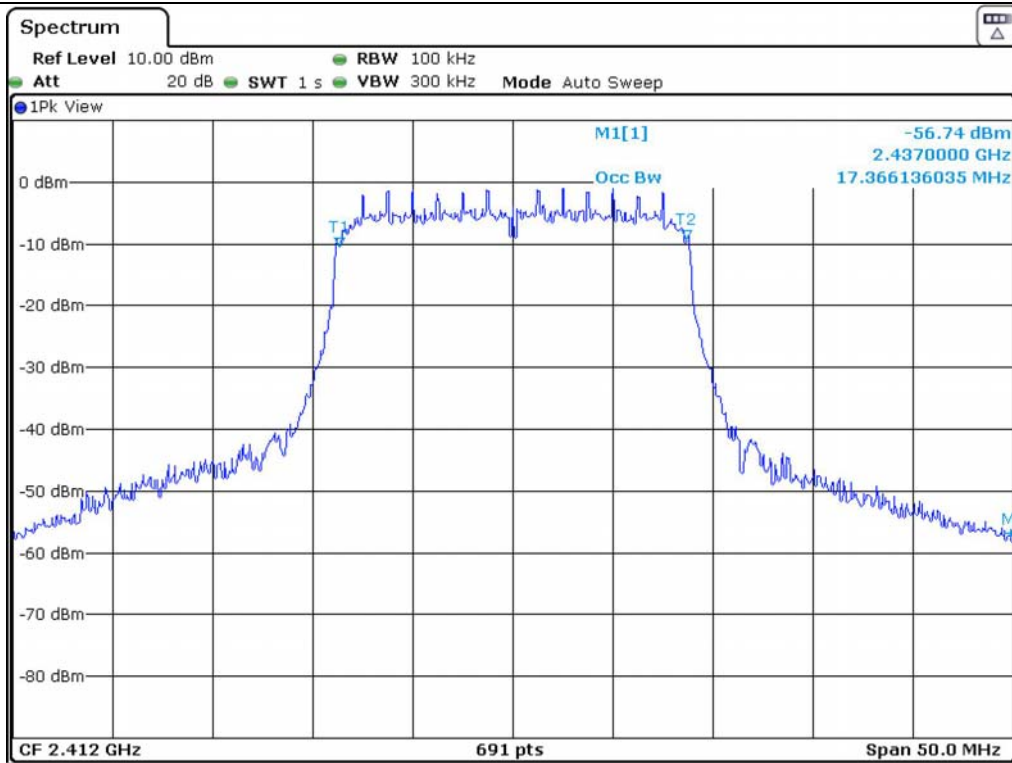




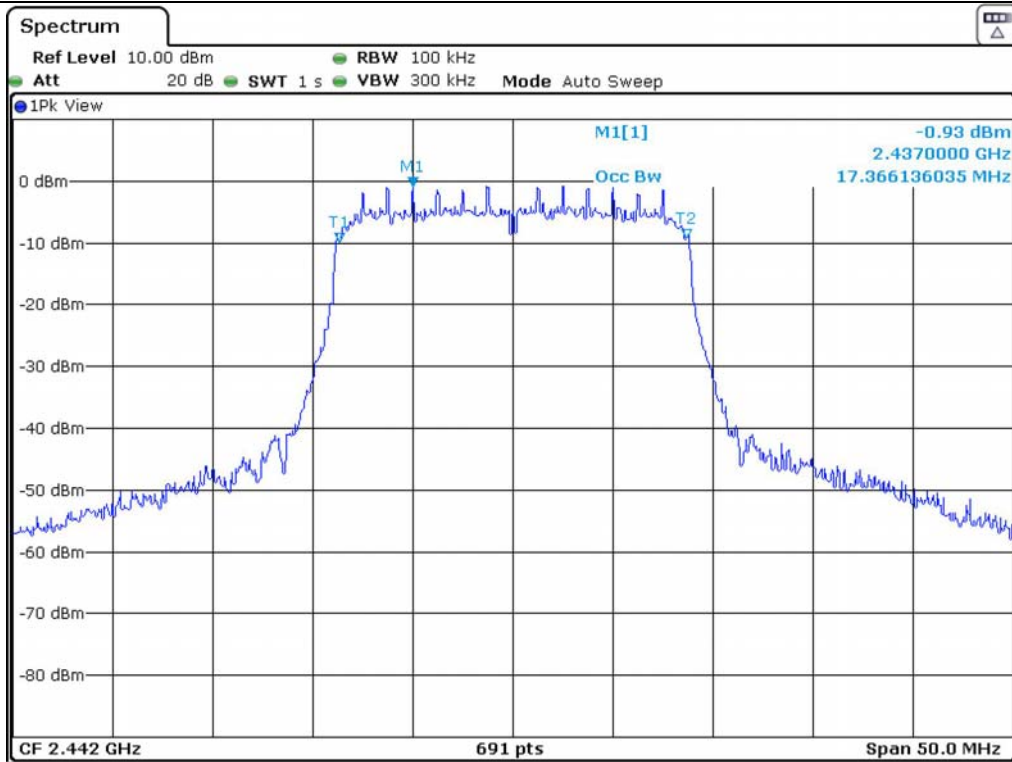
Middle Channel



High Channel

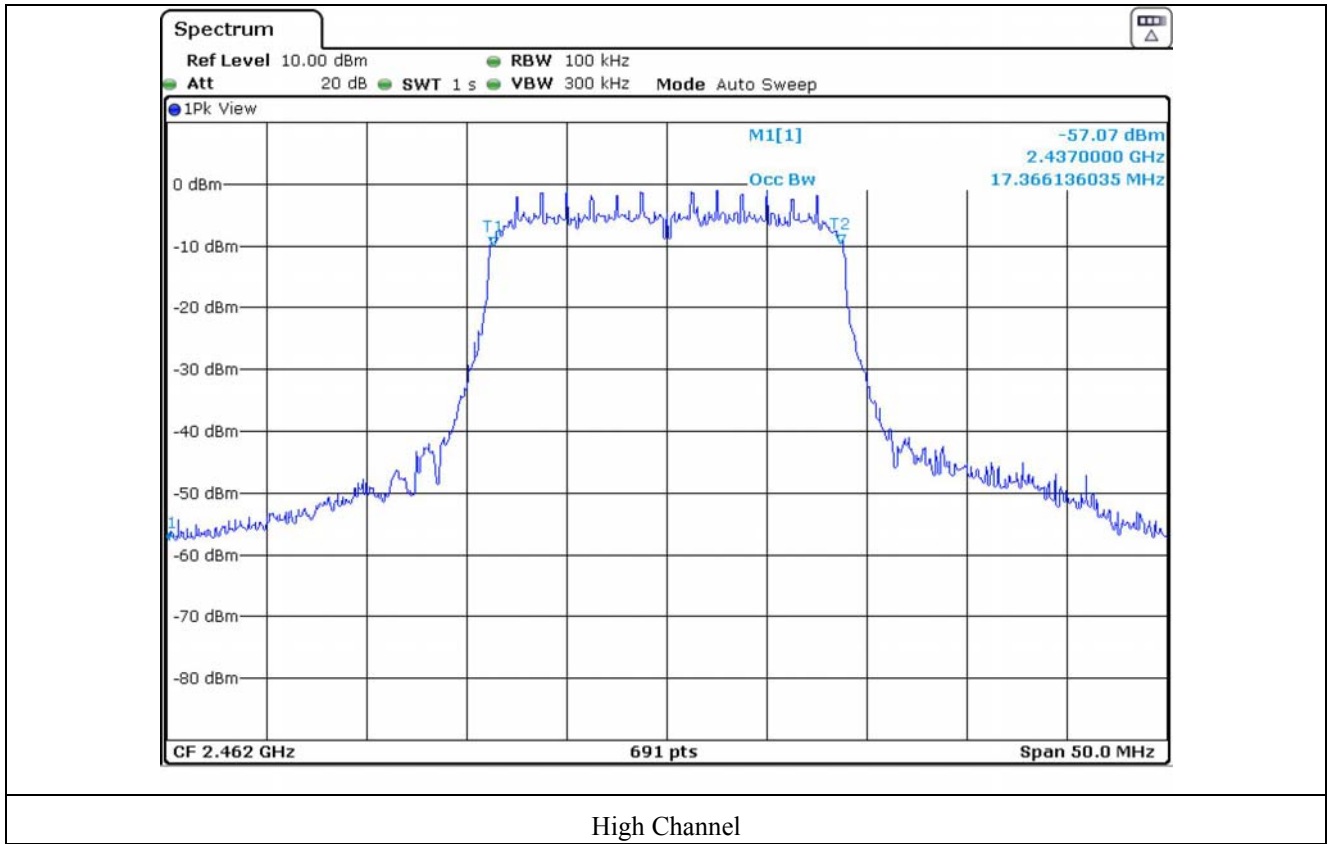


Low Channel



Middle Channel





**7.7 Test data for 802.11n\_HT40 WLAN Mode**

**7.7.1 Test data for Antenna 0**

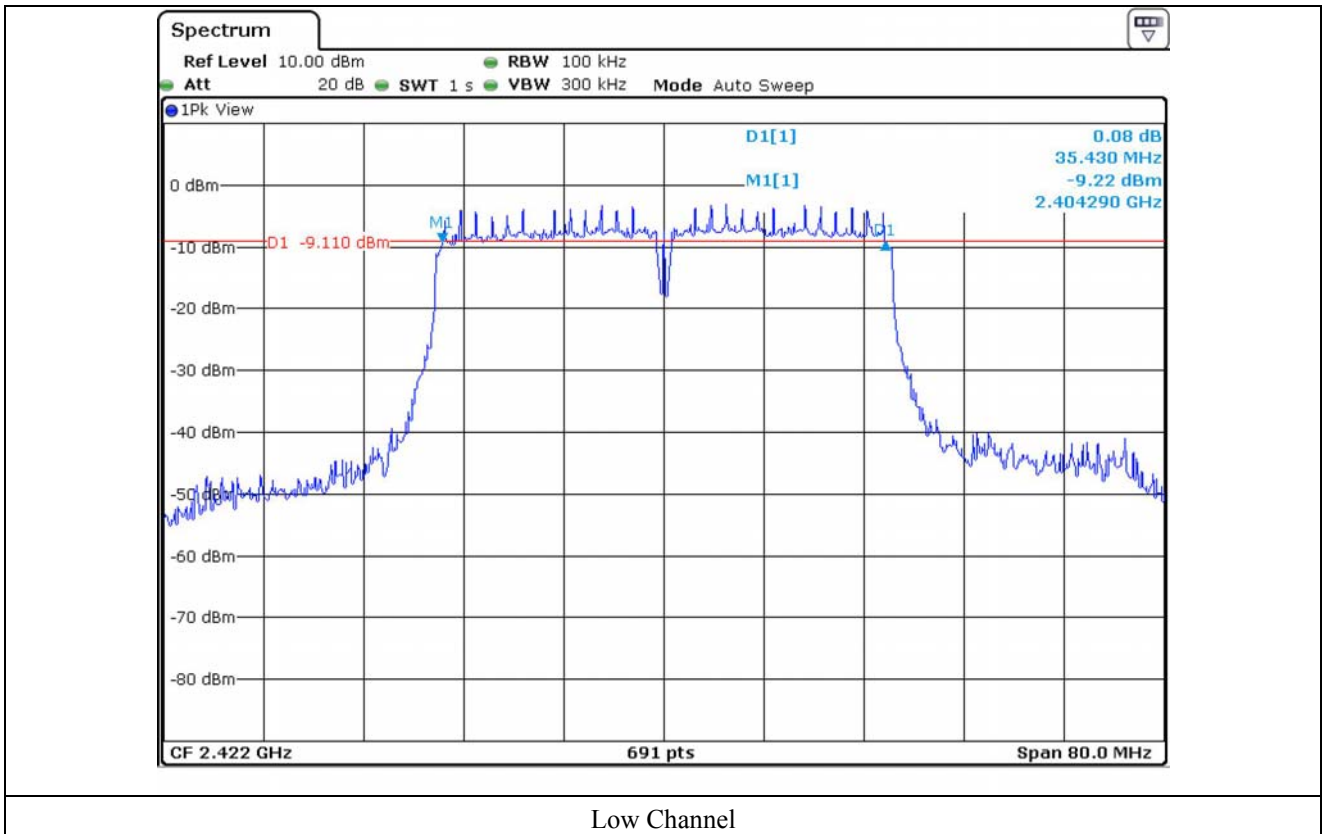
- Test Date : December 26, 2013
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 422	35.43	35.89	0.5
Middle	2 442	35.43	35.89	0.5
High	2 452	35.43	35.89	0.5

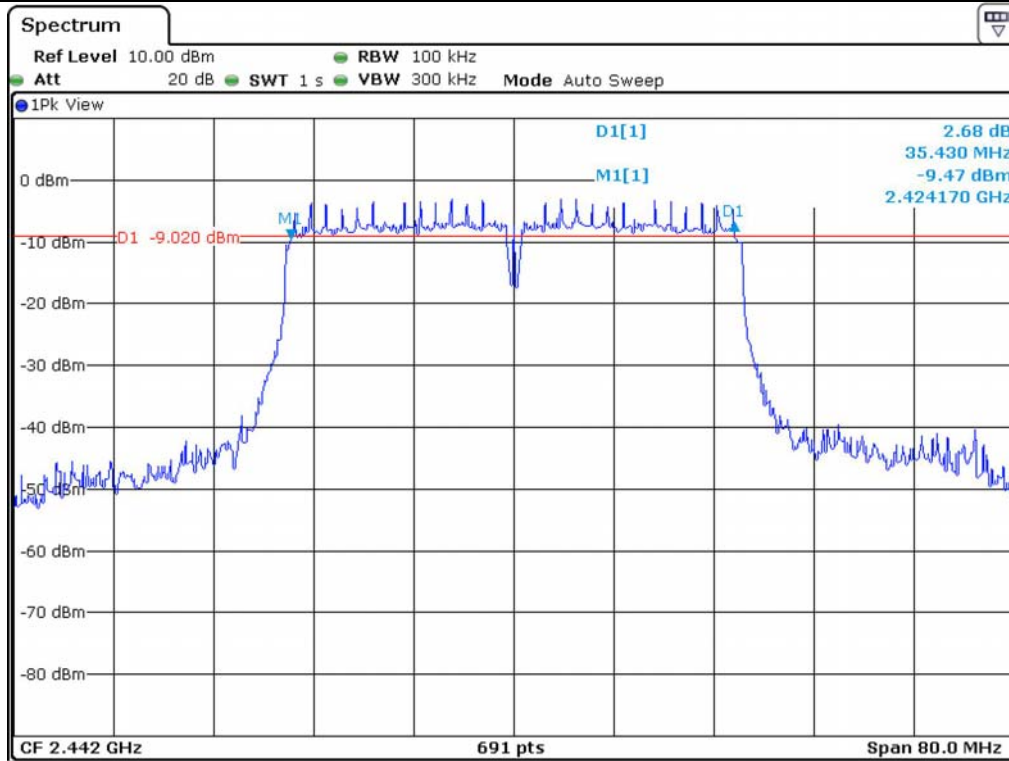
Remark. Margin = Measured Value - Limit

*이 홍규*

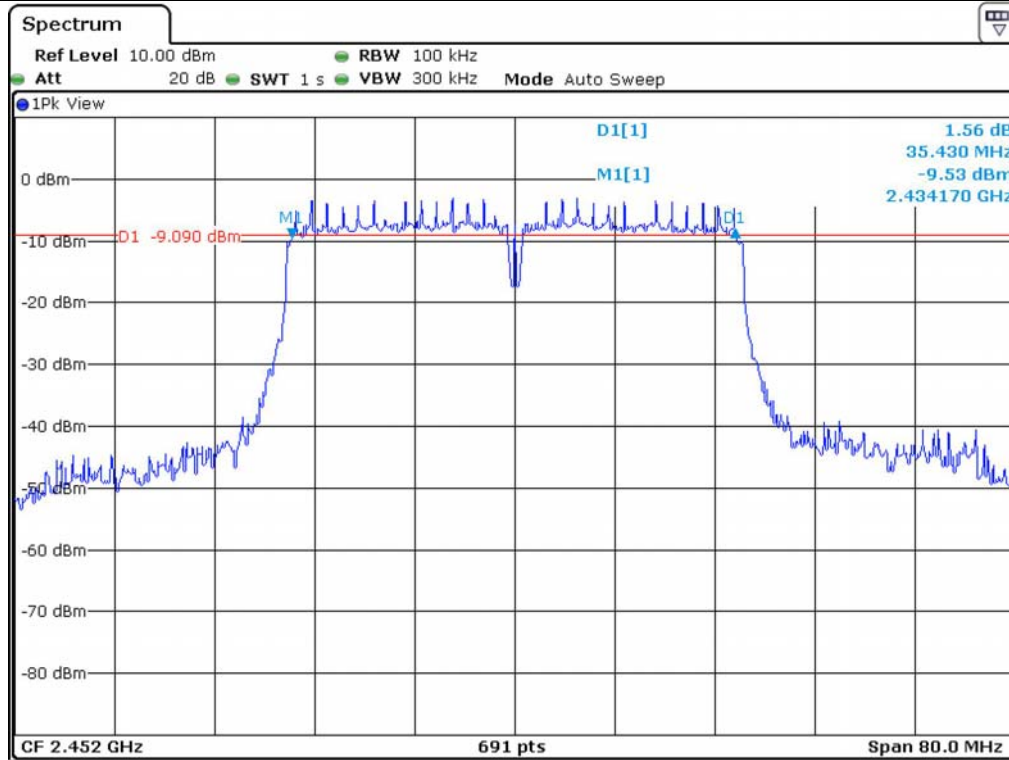
**Tested by: Hong-Kyu, Lee/ Engineer**



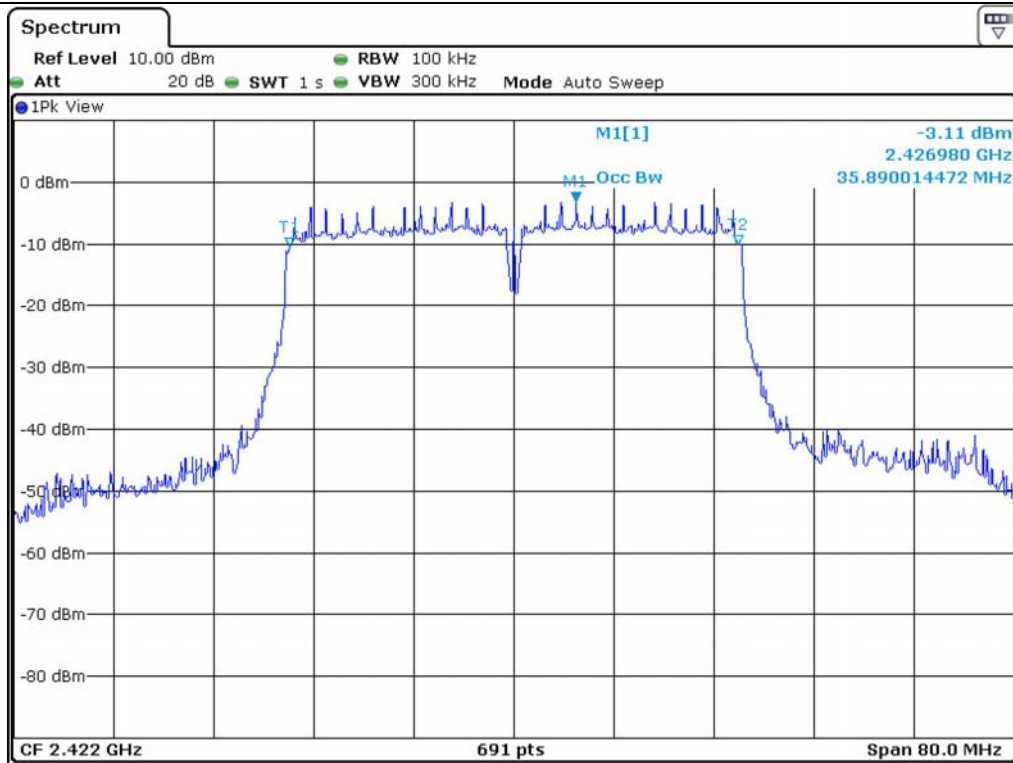
Low Channel



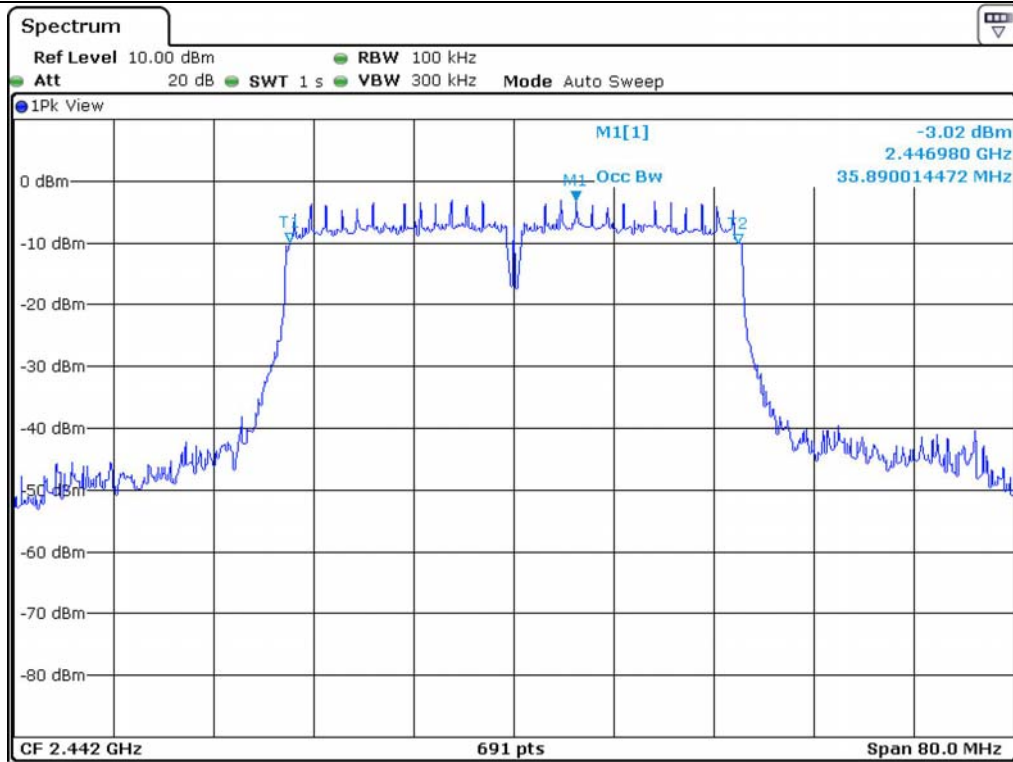
Middle Channel



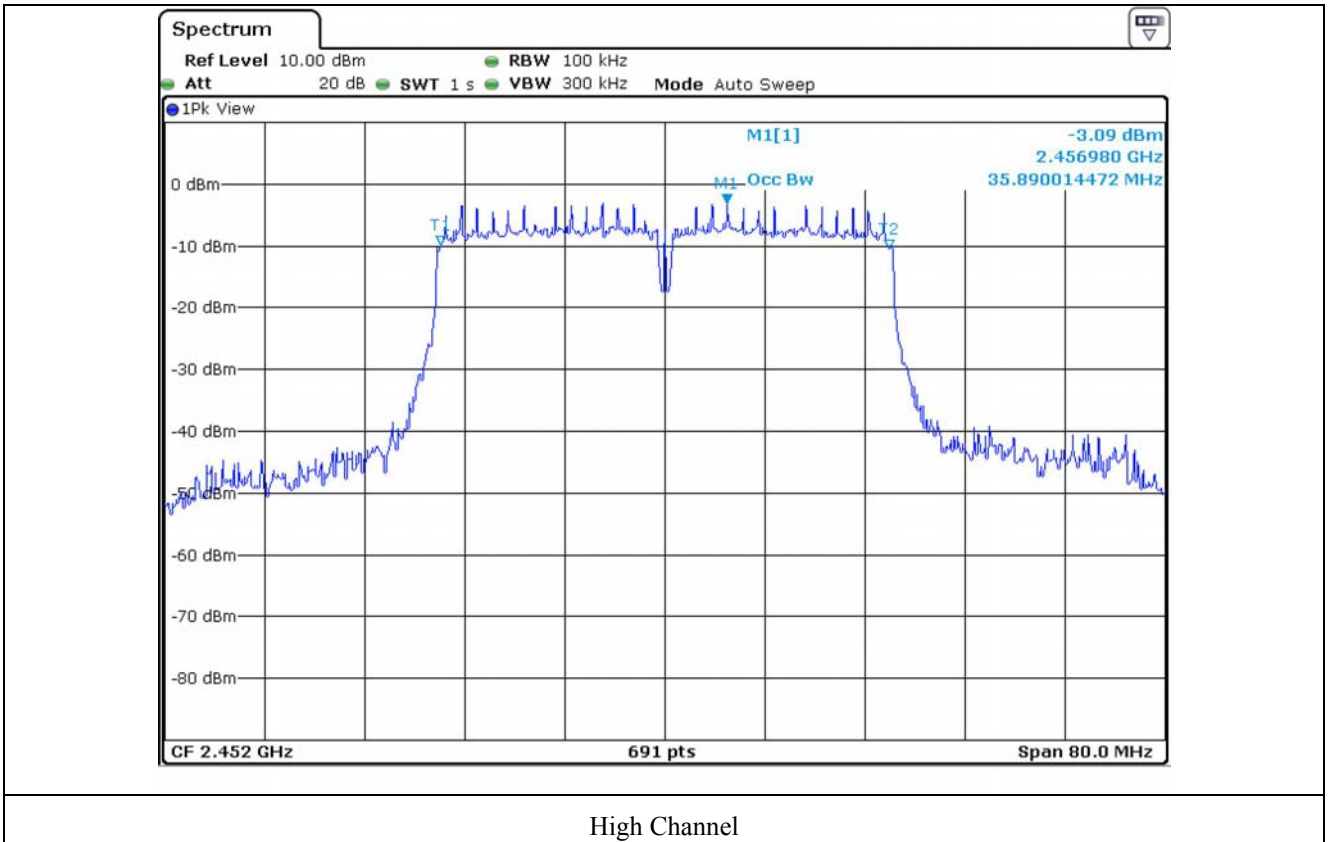
High Channel



Low Channel



Middle Channel



High Channel

7.7.2 Test data for Antenna 1

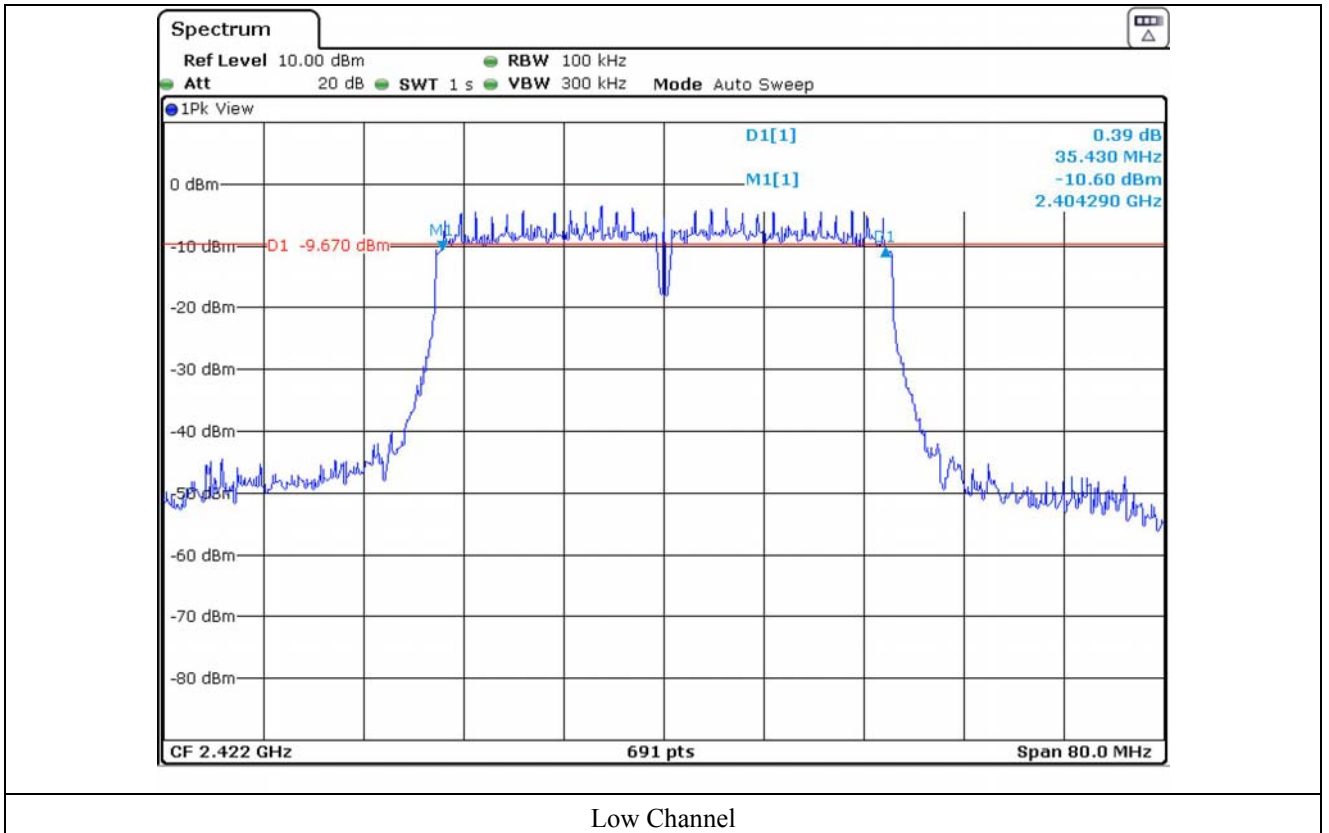
- Test Date : December 26, 2013
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	2 422	35.43	35.89	0.5
Middle	2 442	35.43	35.89	0.5
High	2 452	35.43	35.89	0.5

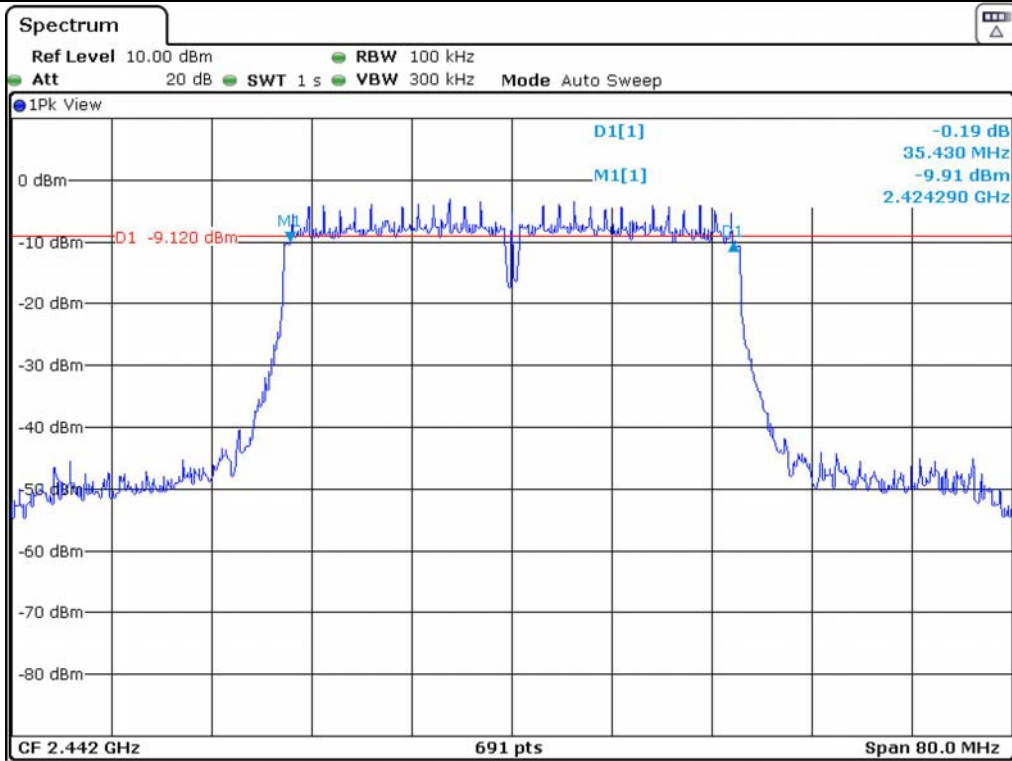
Remark. Margin = Measured Value - Limit

이영주

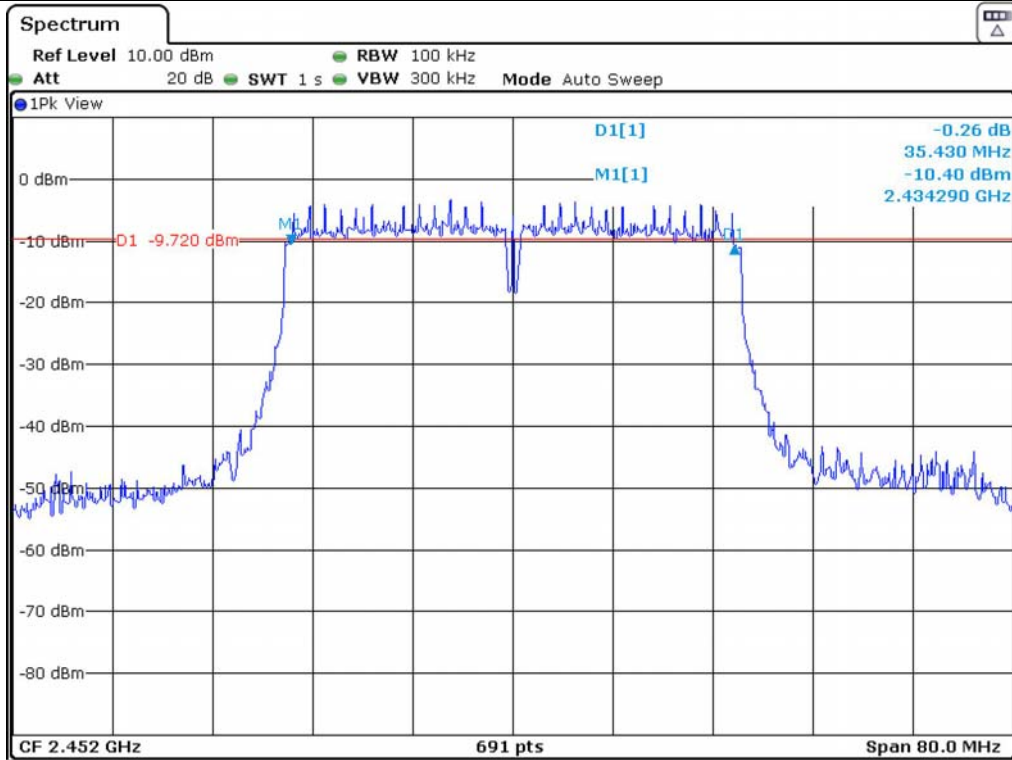
Tested by: Hong-Kyu, Lee/ Engineer



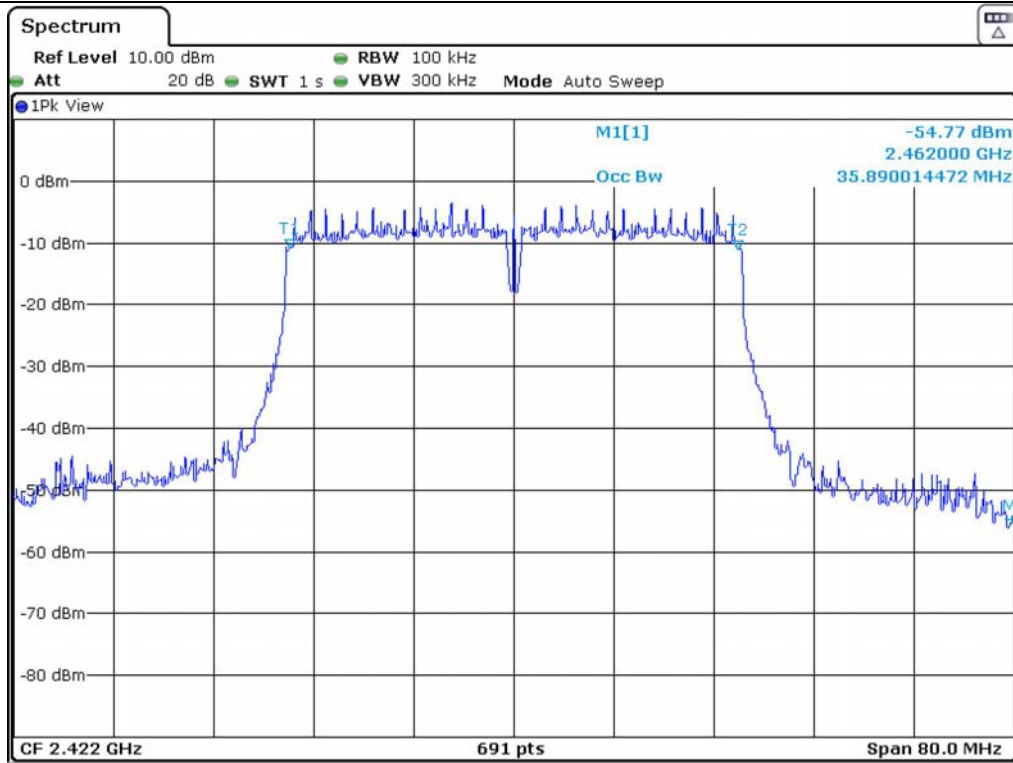
Low Channel



Middle Channel



High Channel

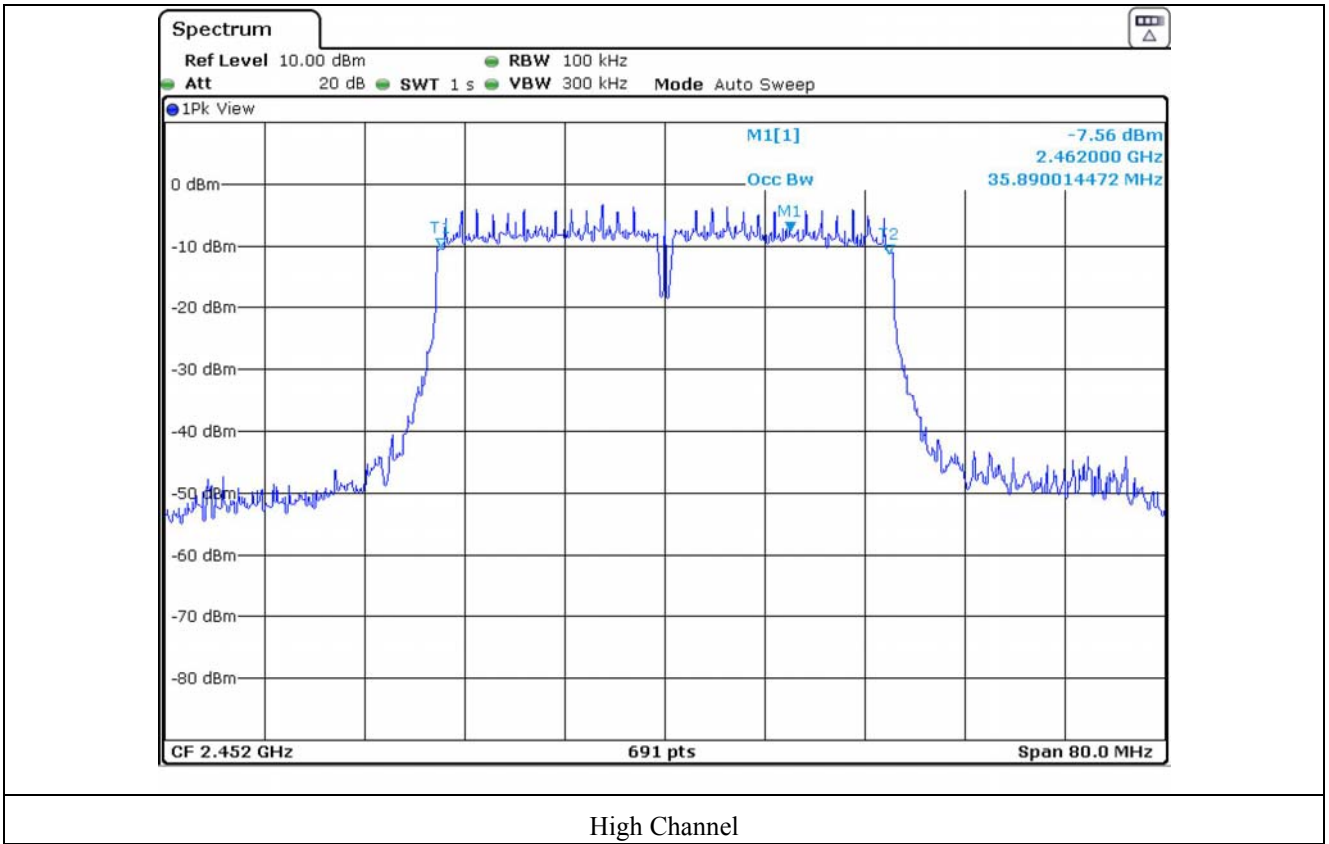


Low Channel



Middle Channel





High Channel

**7.8 Test data for 802.11a RLAN Mode**

**7.8.1 Test data for Antenna 0**

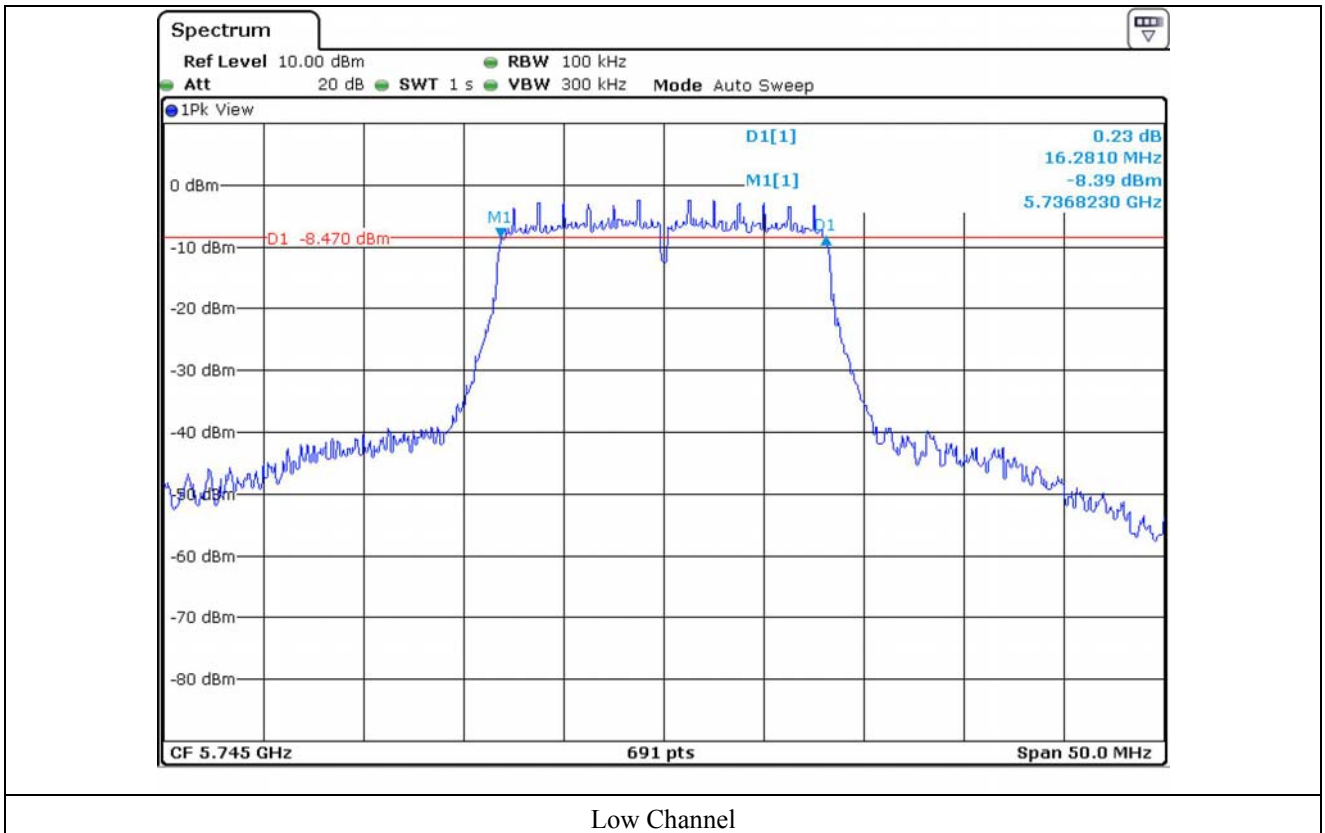
- Test Date : December 27, 2013
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	5 745	16.28	16.35	0.5
Middle	5 785	16.28	16.35	0.5
High	5 825	16.28	16.35	0.5

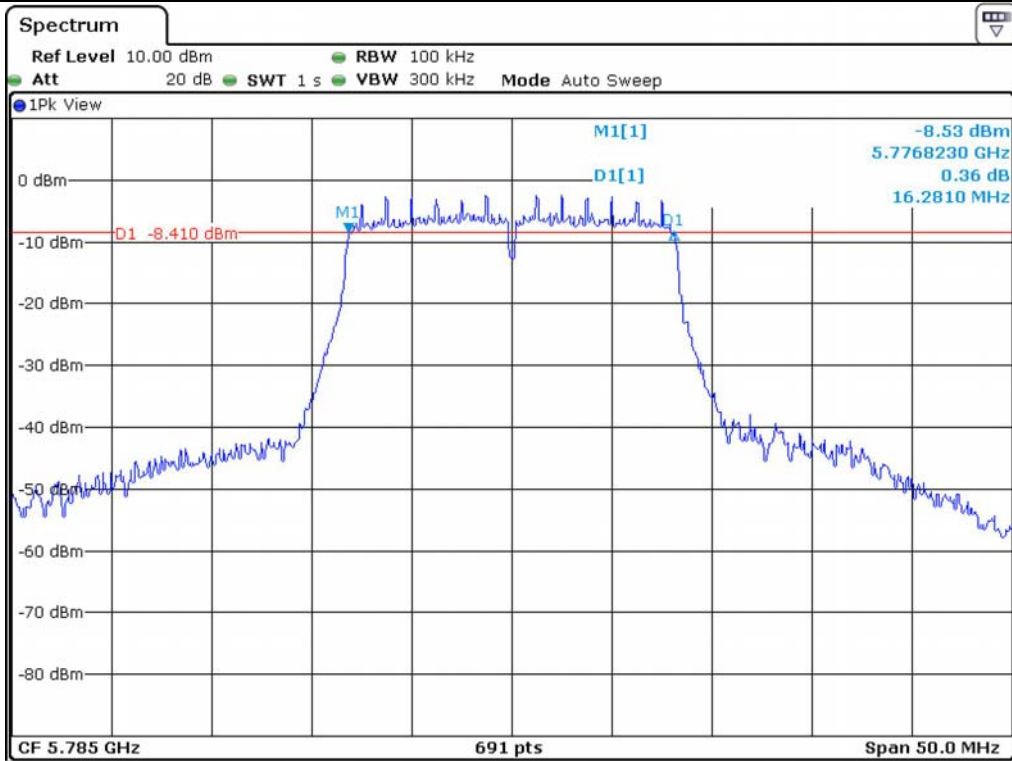
Remark. Margin = Measured Value - Limit

*이 홍규*

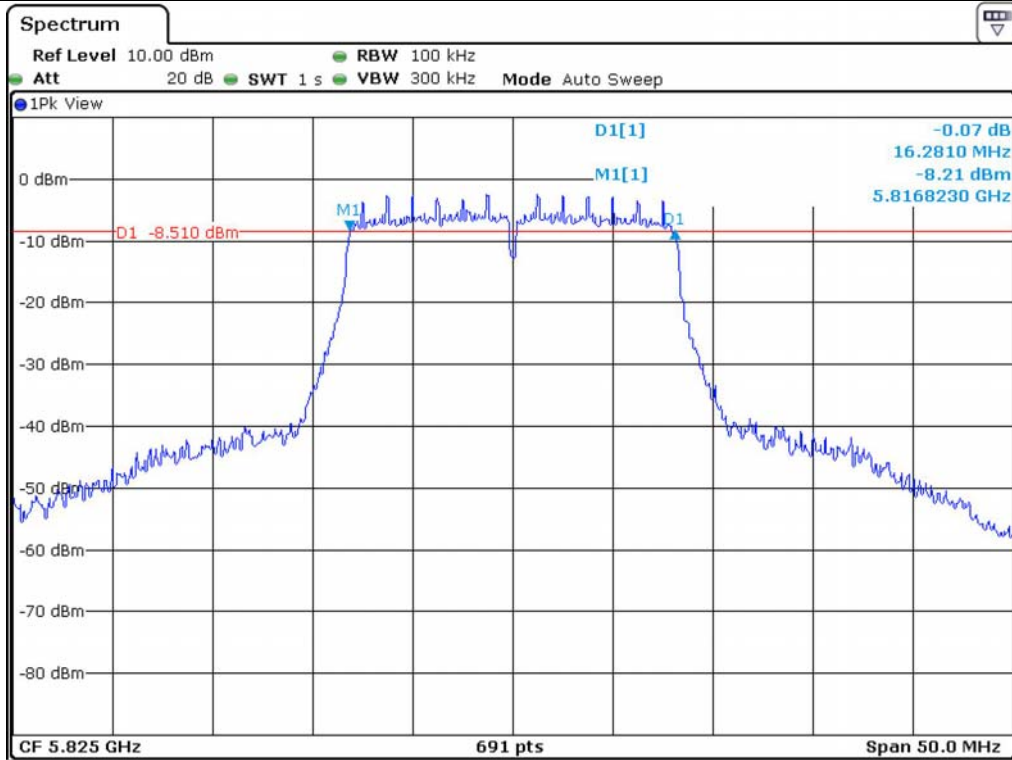
**Tested by: Hong-Kyu, Lee/ Engineer**



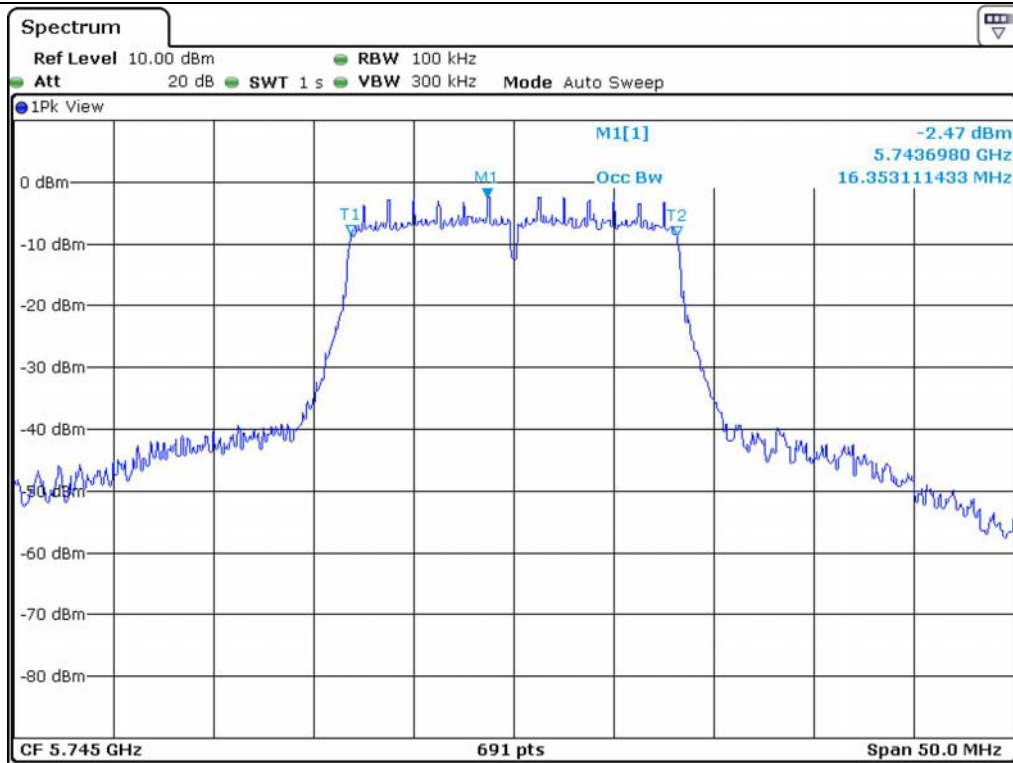
Low Channel



Middle Channel



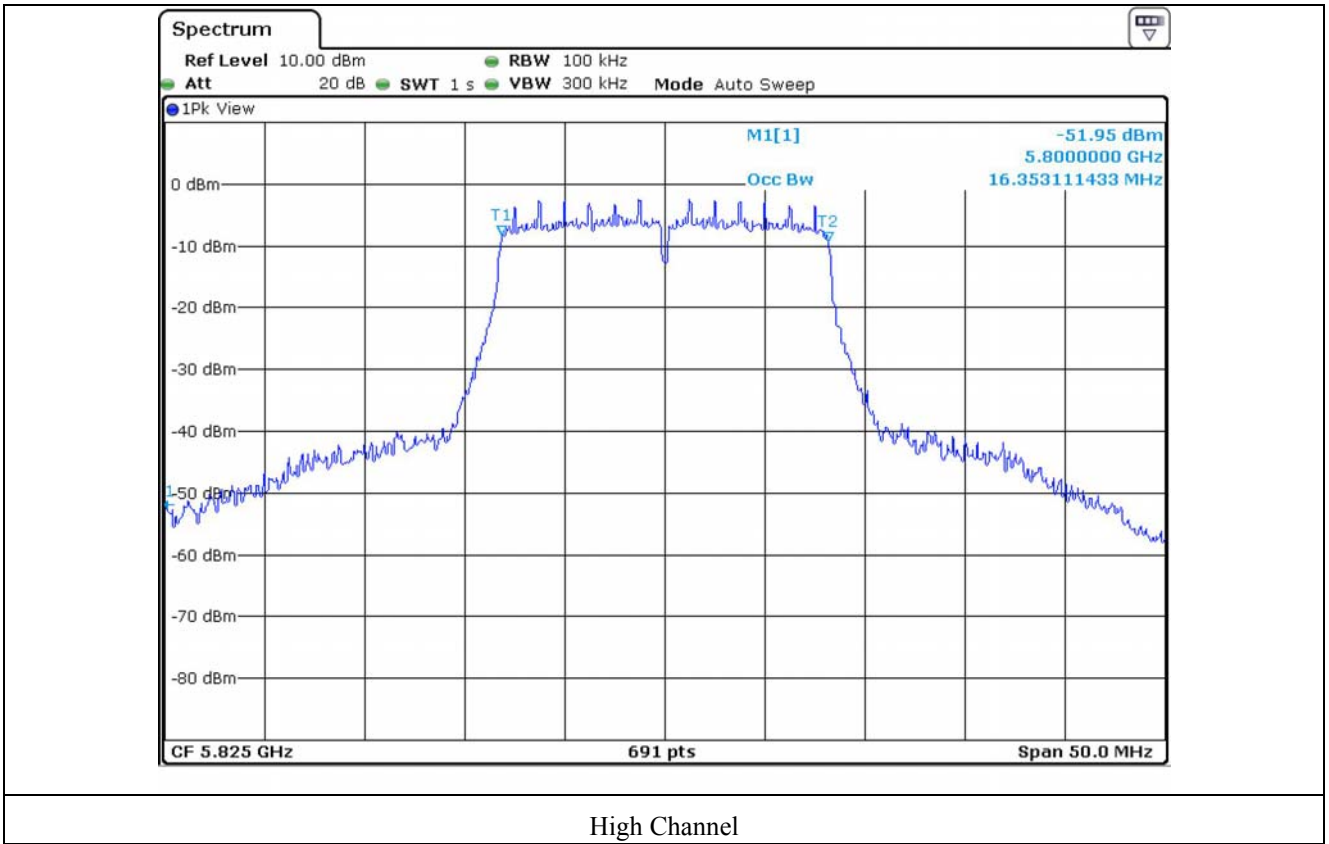
High Channel



Low Channel



Middle Channel



7.8.2 Test data for Antenna 1

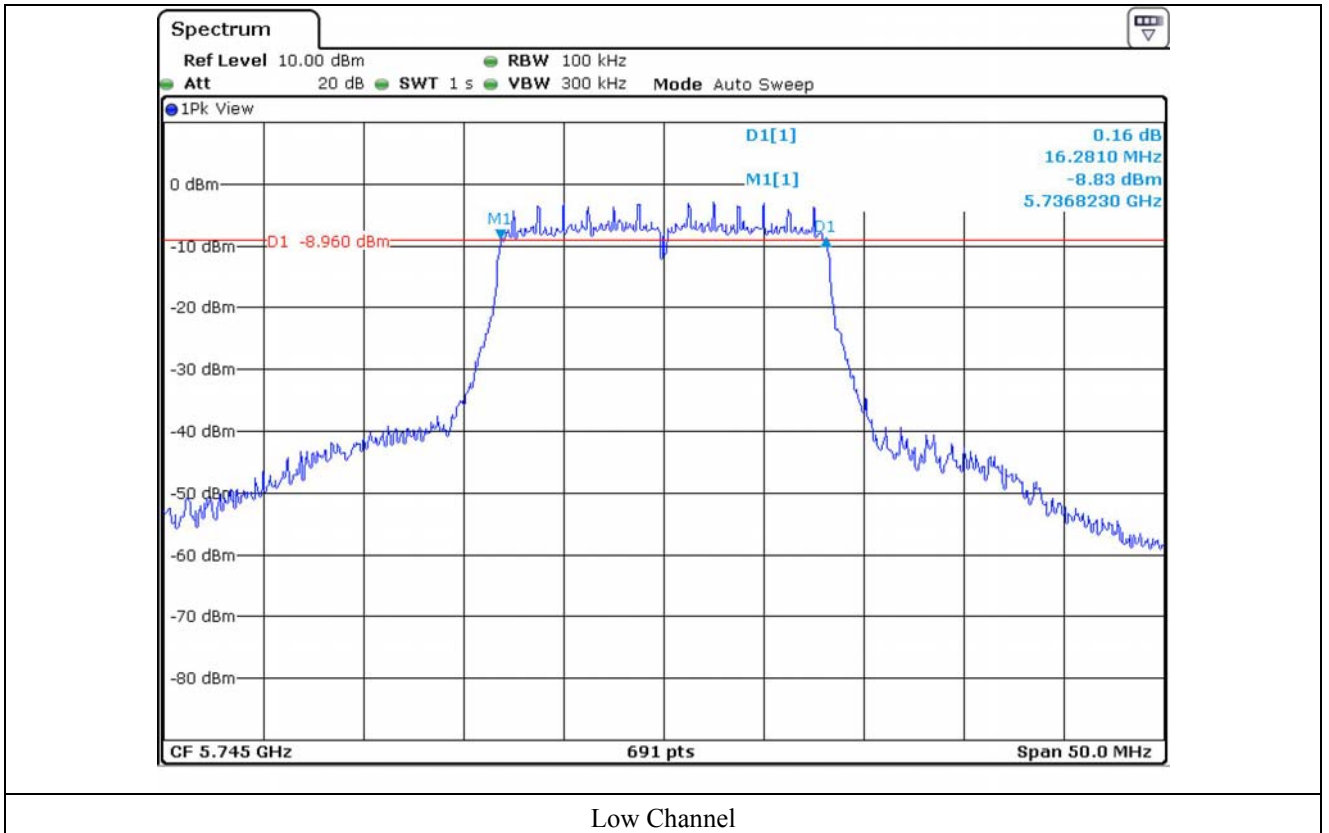
- Test Date : December 27, 2013
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	5 745	16.28	16.35	0.5
Middle	5 785	16.28	16.35	0.5
High	5 825	16.28	16.35	0.5

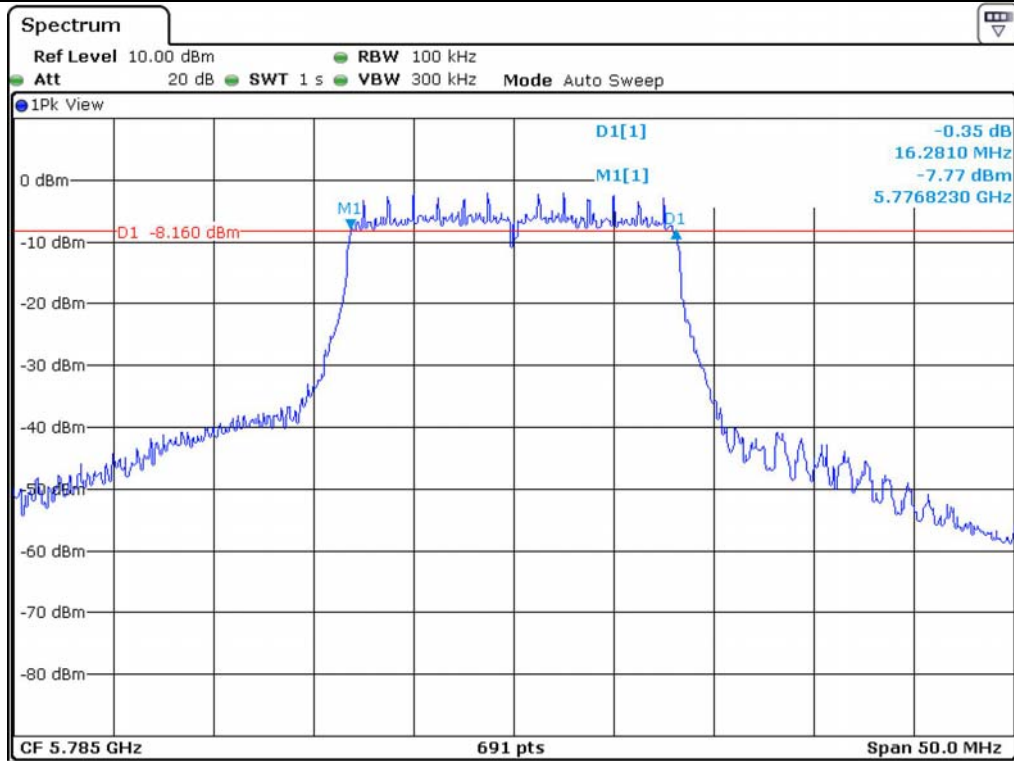
Remark. Margin = Measured Value - Limit

이영주

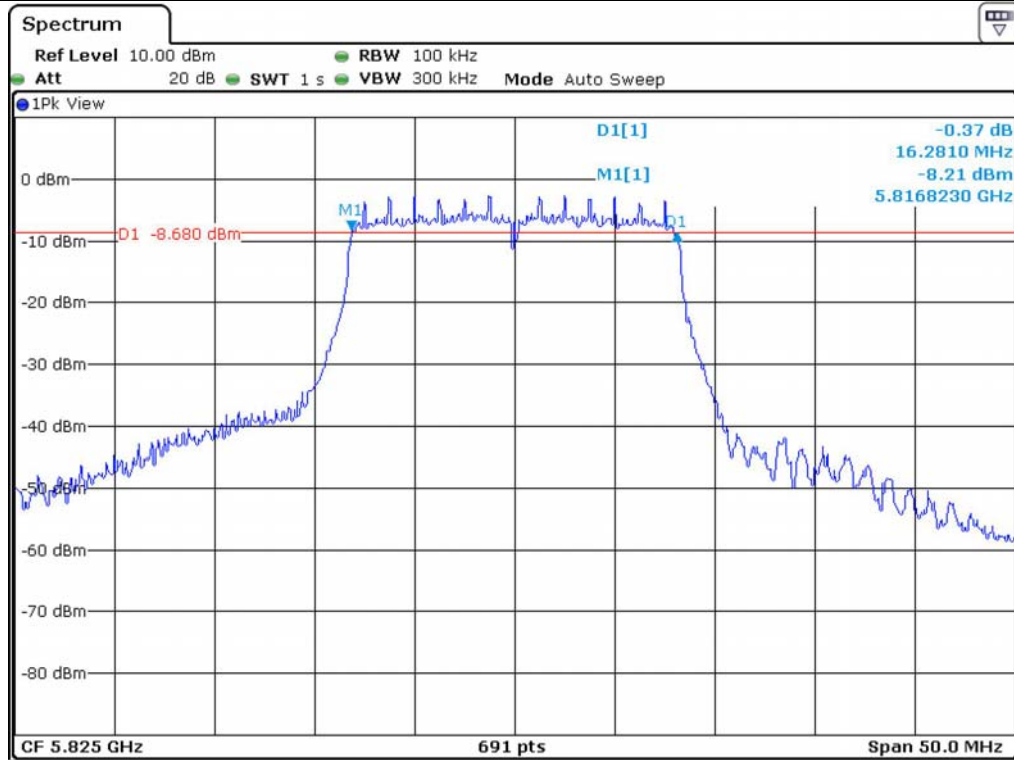
Tested by: Hong-Kyu, Lee/ Engineer



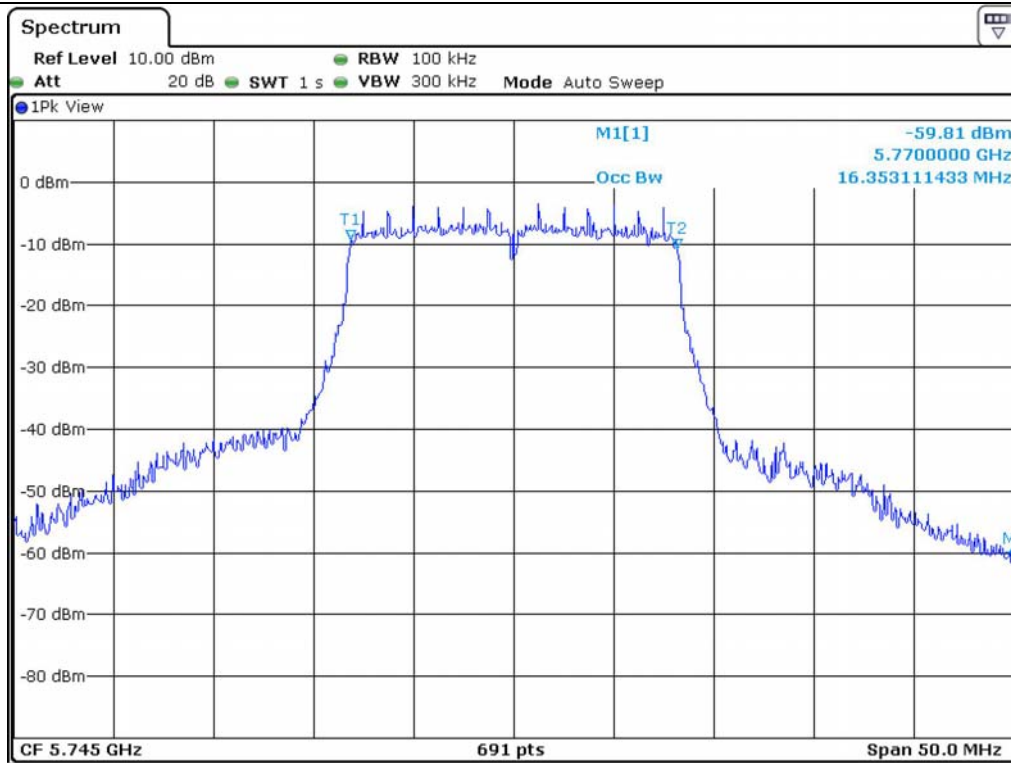
Low Channel



Middle Channel



High Channel

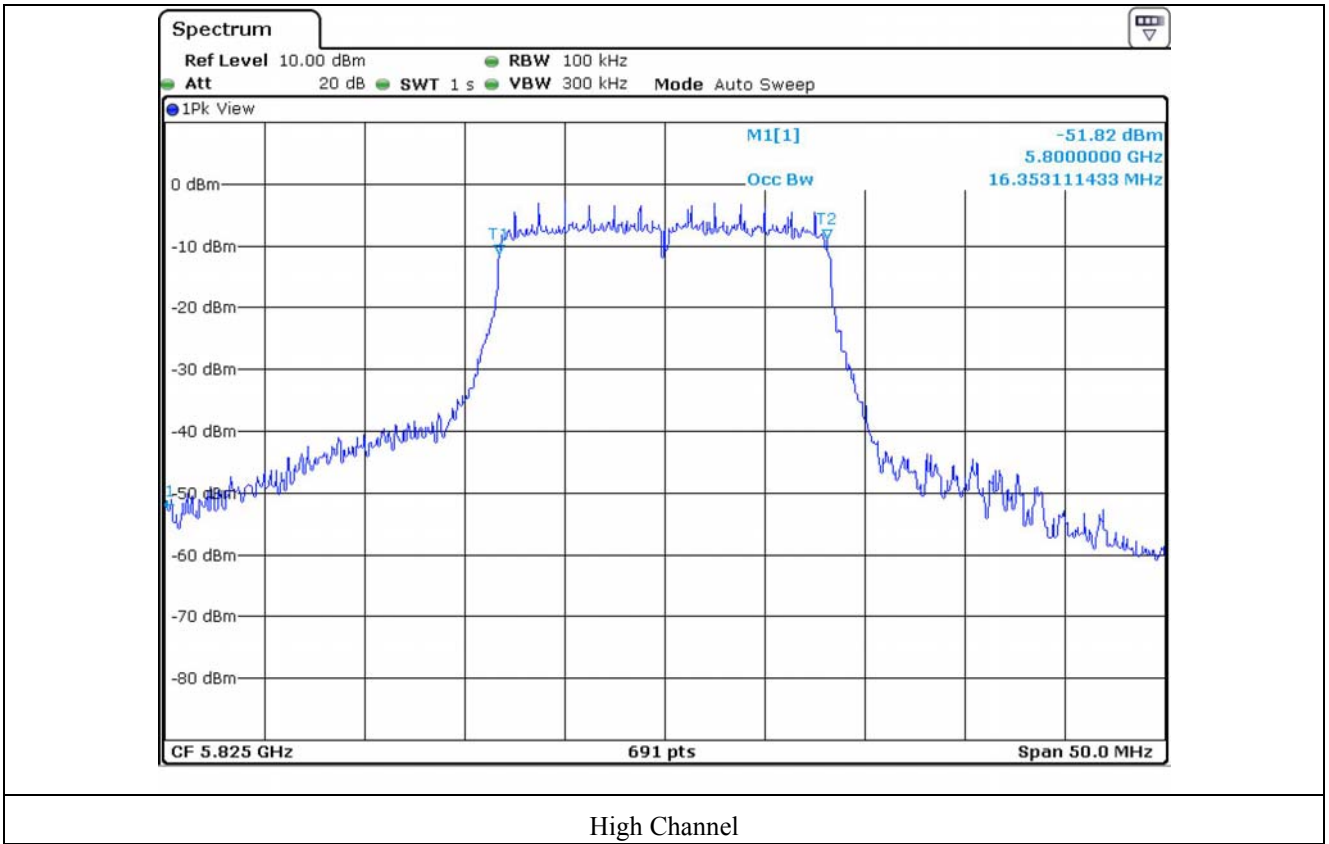


Low Channel



Middle Channel





High Channel

### 7.9 Test data for 802.11n\_HT20 RLAN Mode

#### 7.9.1 Test data for Antenna 0

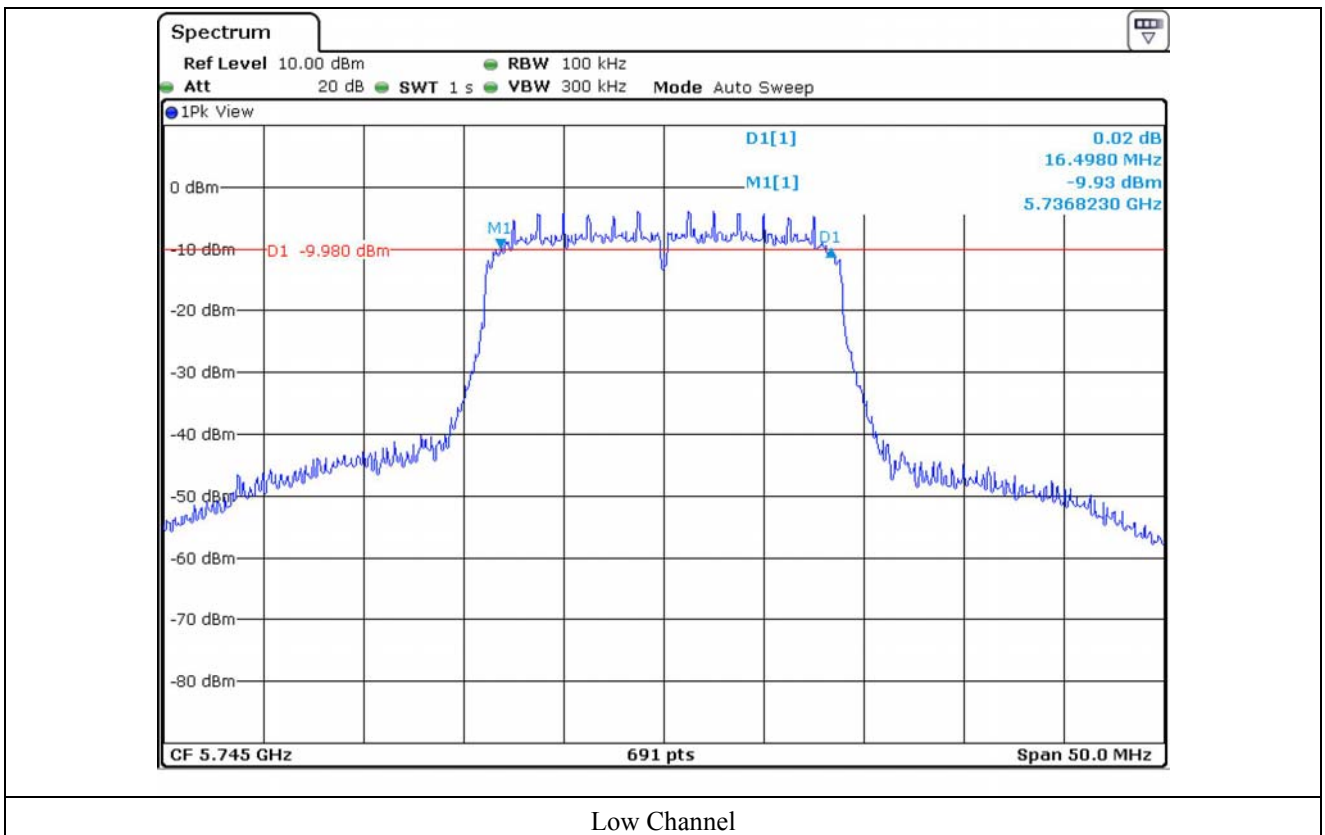
- Test Date : December 27, 2013
- Test Result : Pass

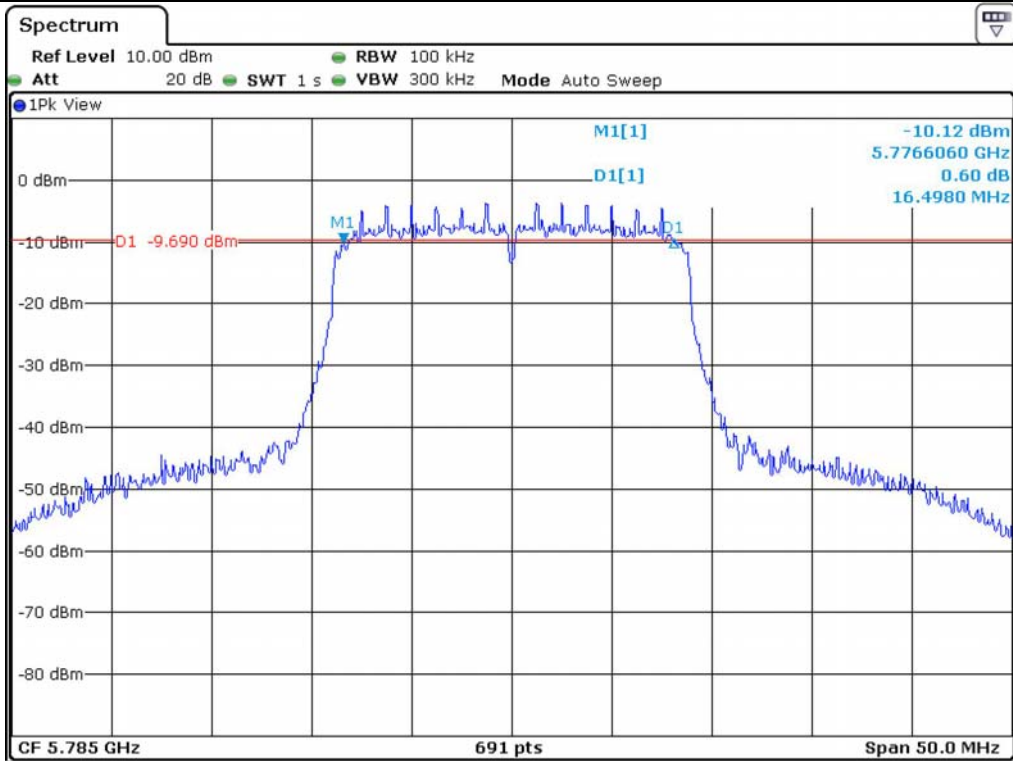
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	5 745	16.50	17.44	0.5
Middle	5 785	16.50	17.44	0.5
High	5 825	16.50	17.44	0.5

Remark. Margin = Measured Value - Limit

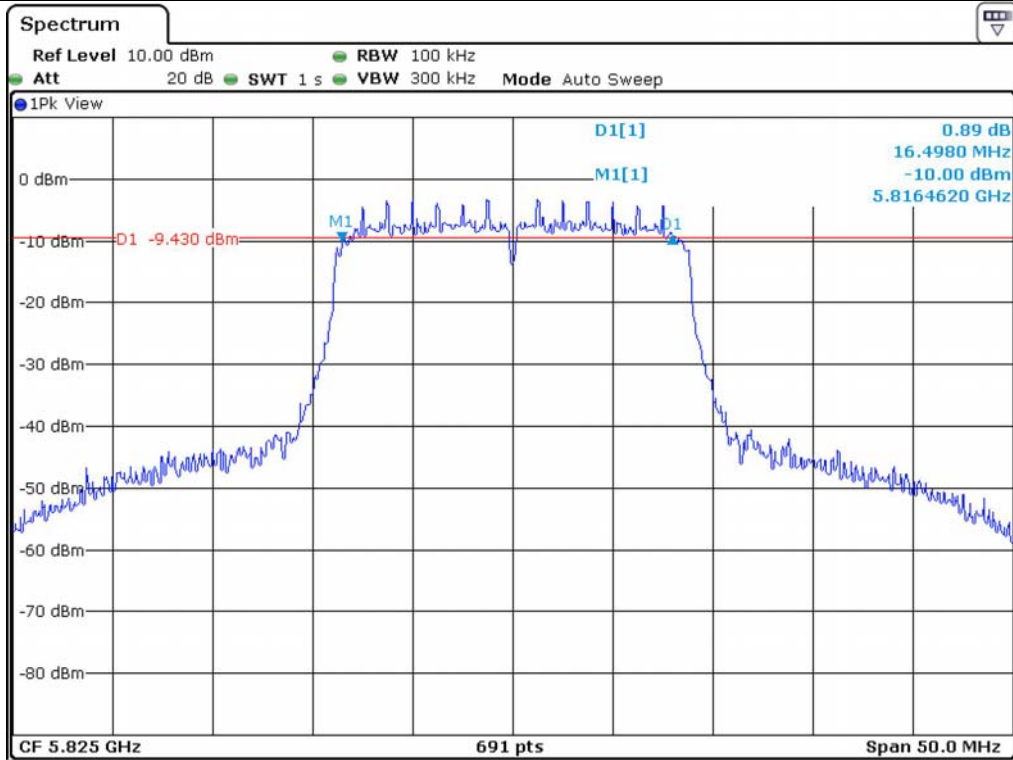
*이 홍규*

**Tested by: Hong-Kyu, Lee/ Engineer**

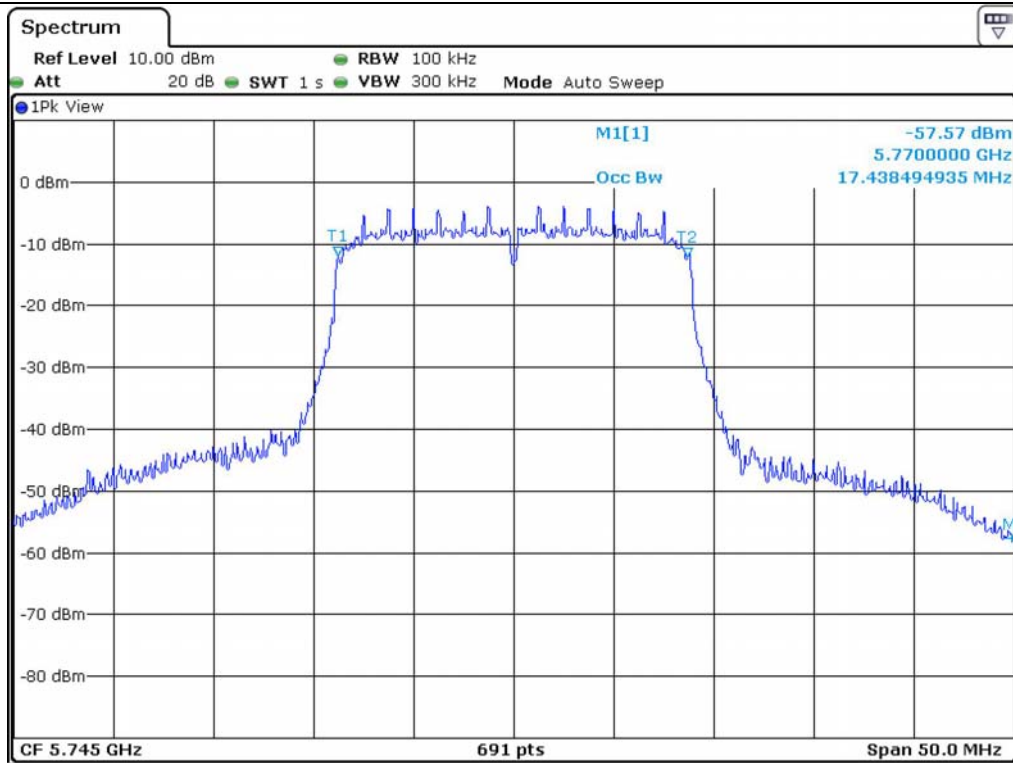




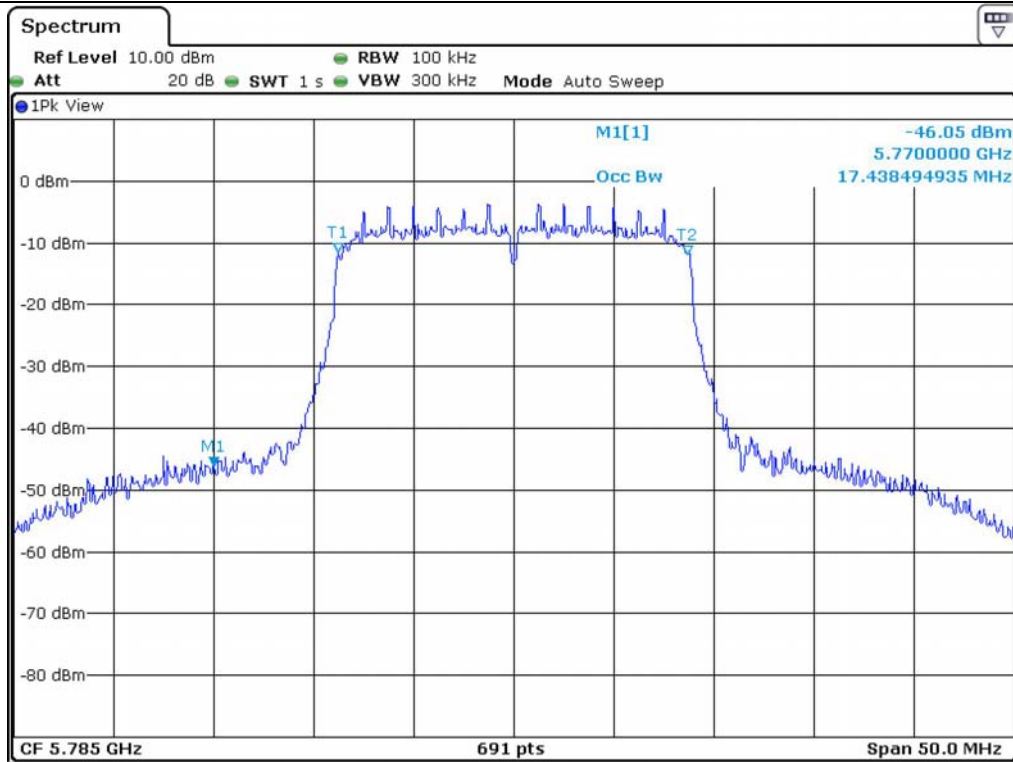
Middle Channel



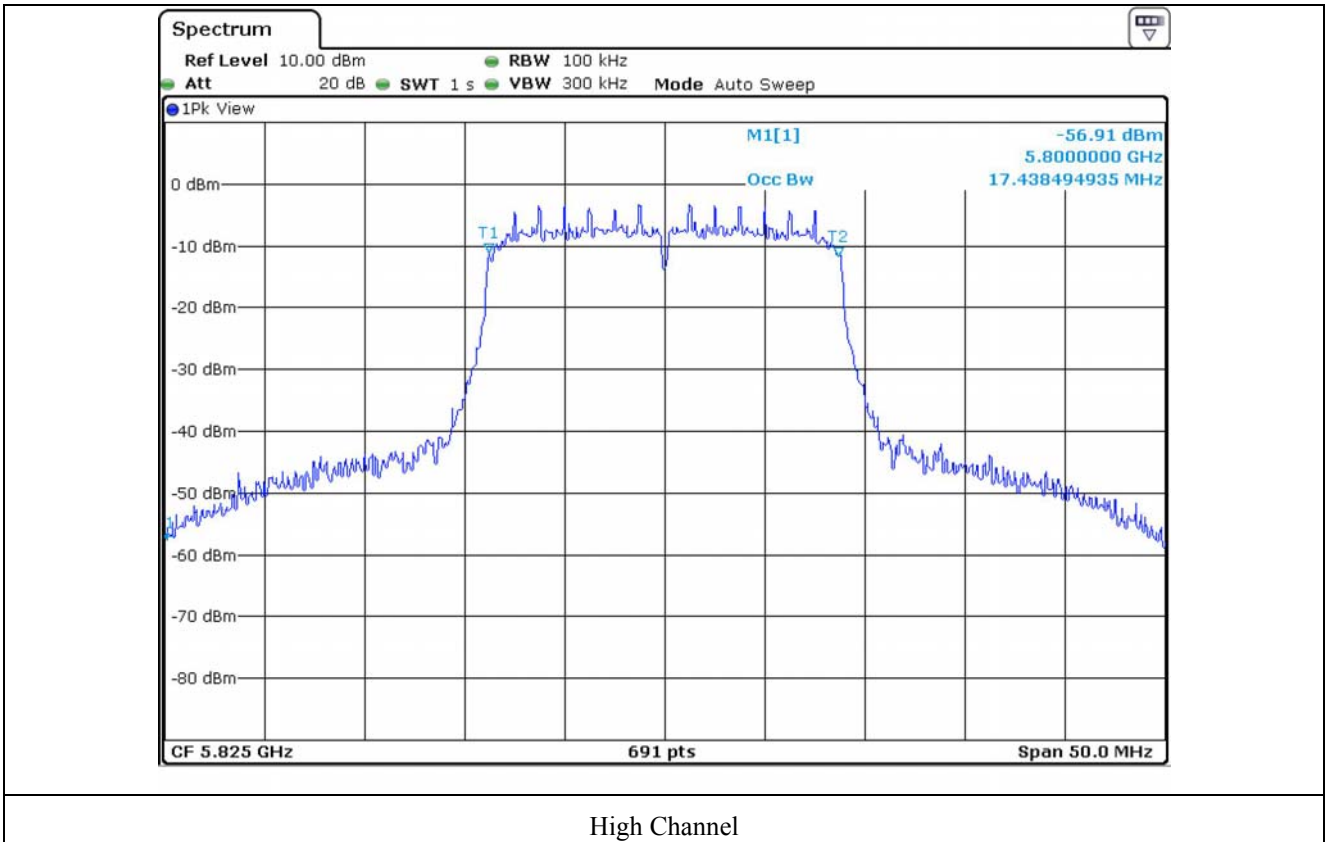
High Channel



Low Channel



Middle Channel



7.9.2 Test data for Antenna 1

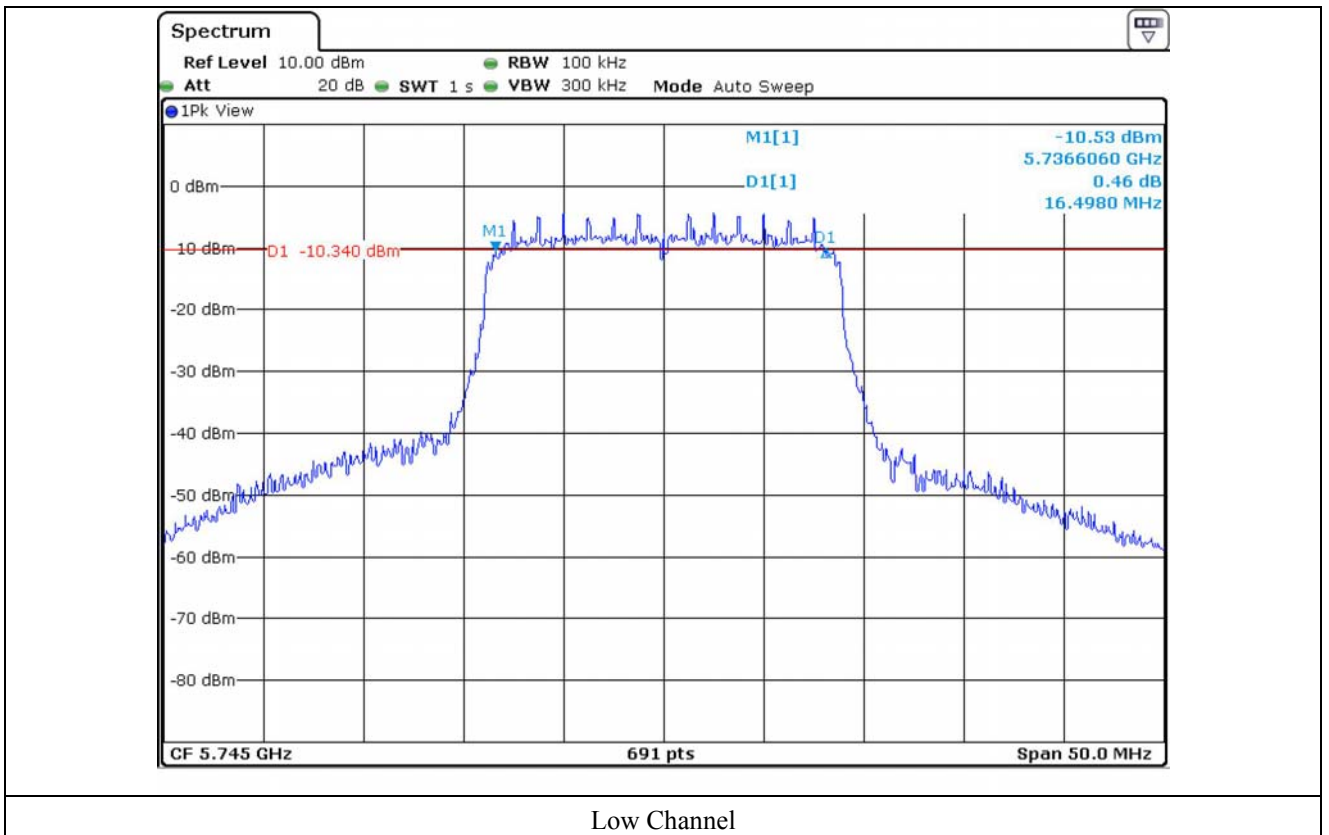
- Test Date : December 27, 2013
- Test Result : Pass

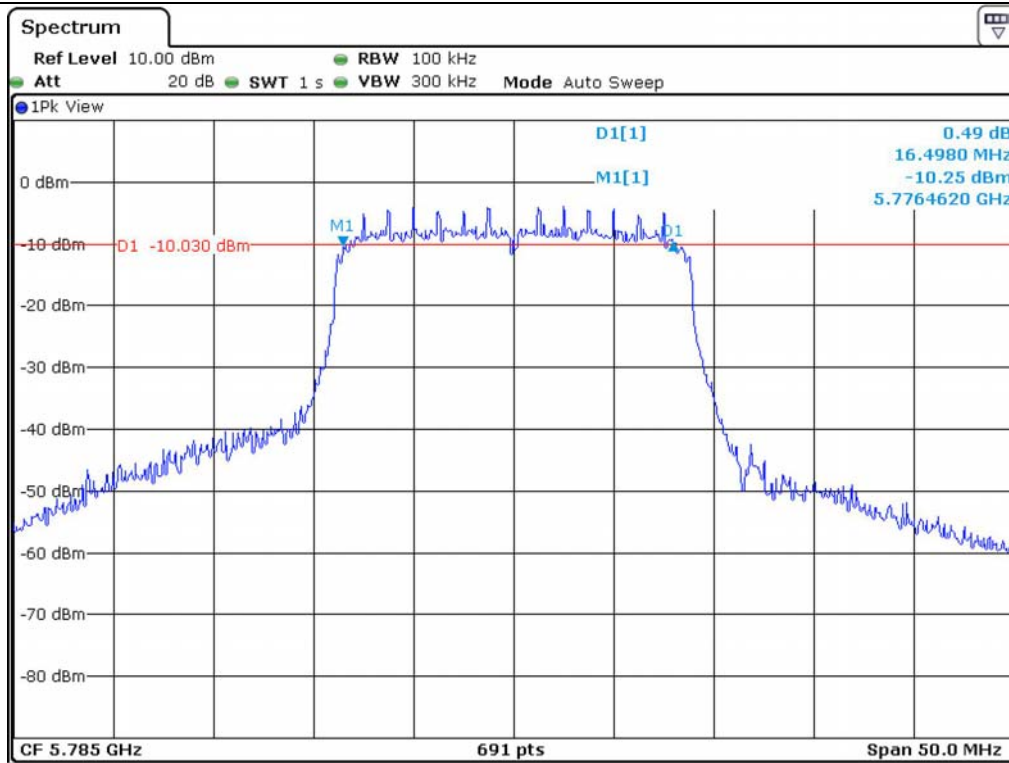
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	5 745	16.50	17.44	0.5
Middle	5 785	16.50	17.44	0.5
High	5 825	16.50	17.44	0.5

Remark. Margin = Measured Value - Limit

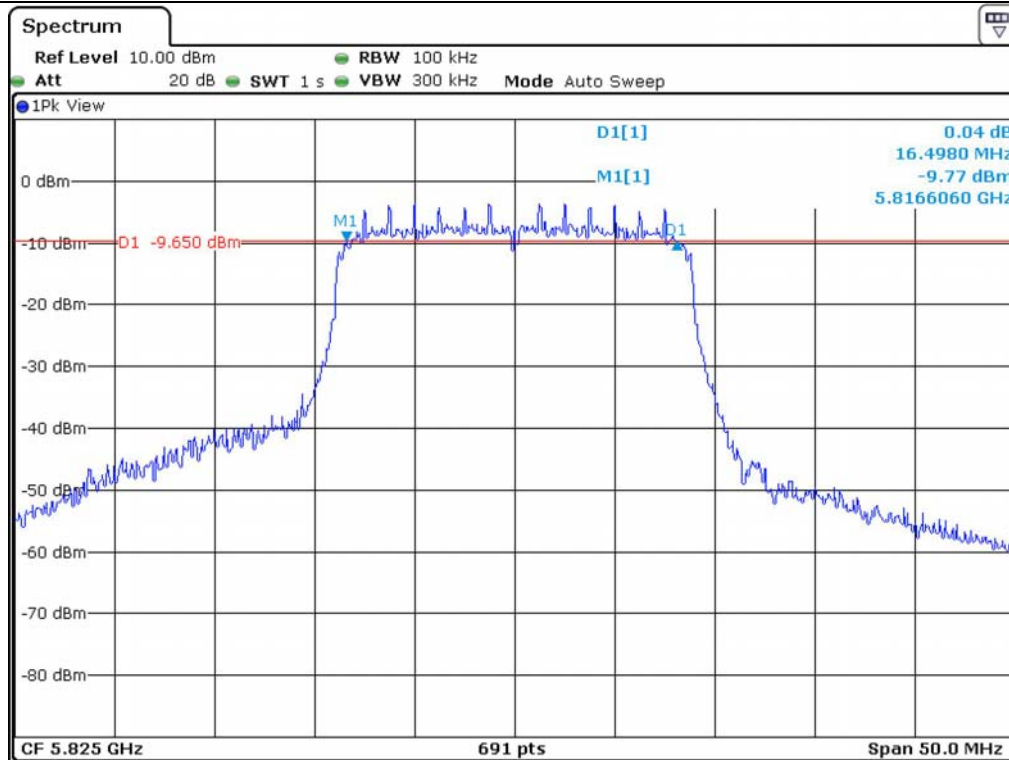
*이 홍규*

Tested by: Hong-Kyu, Lee/ Engineer

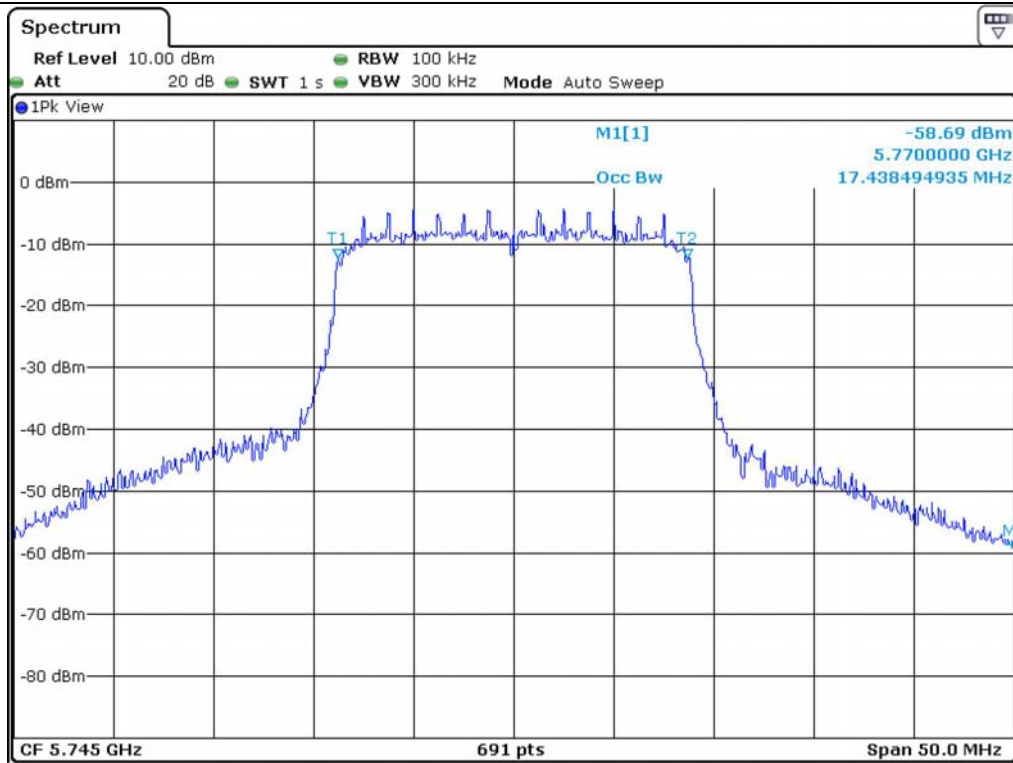




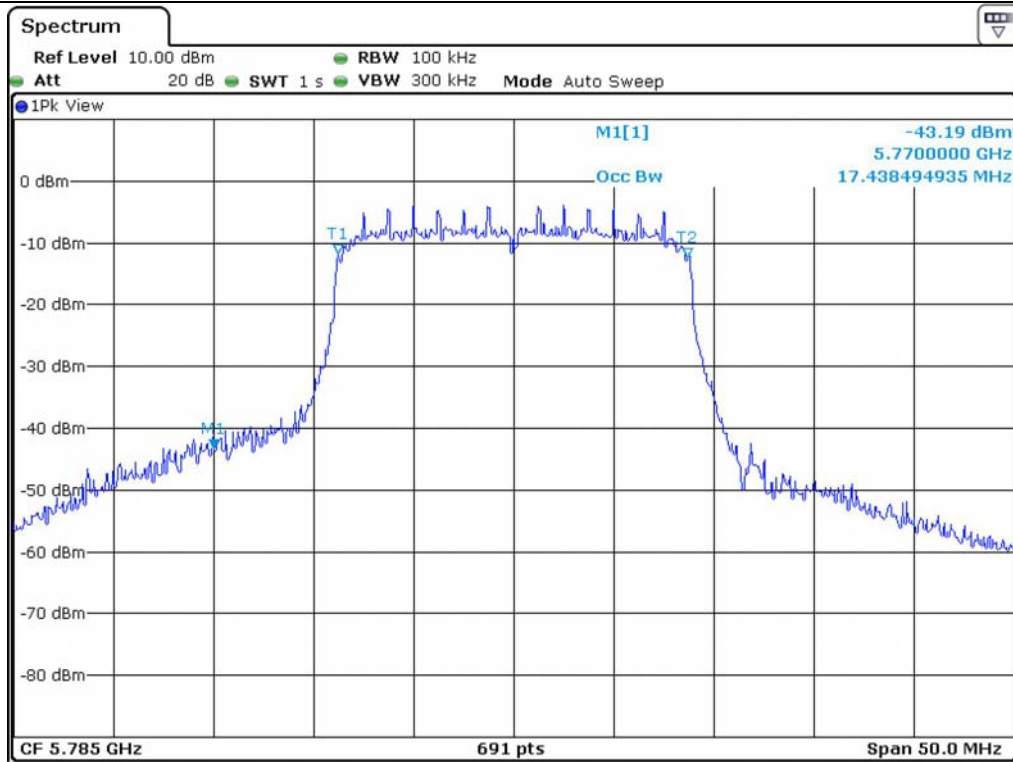
Middle Channel



High Channel

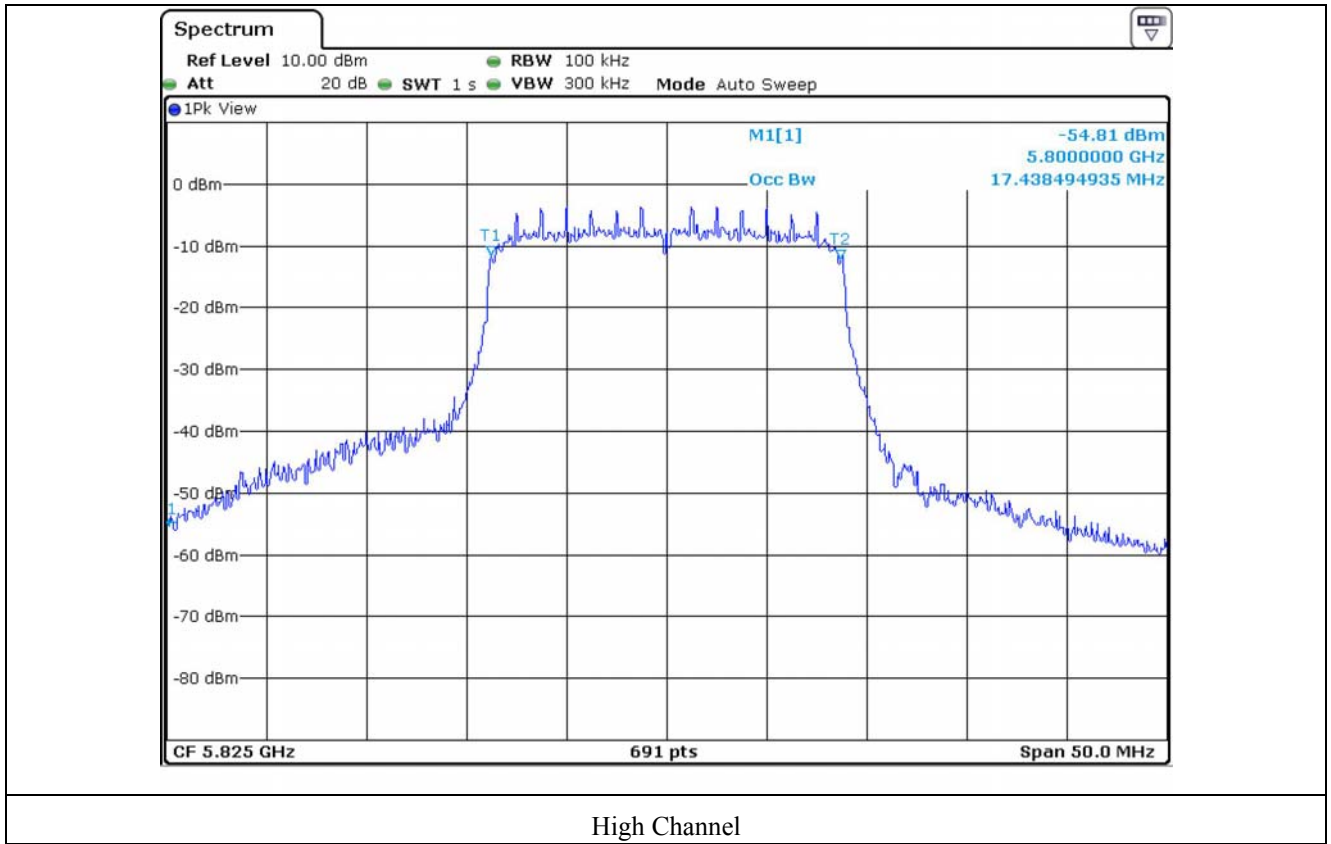


Low Channel



Middle Channel





7.10 Test data for 802.11n\_HT40 RLAN Mode

7.10.1 Test data for Antenna 0

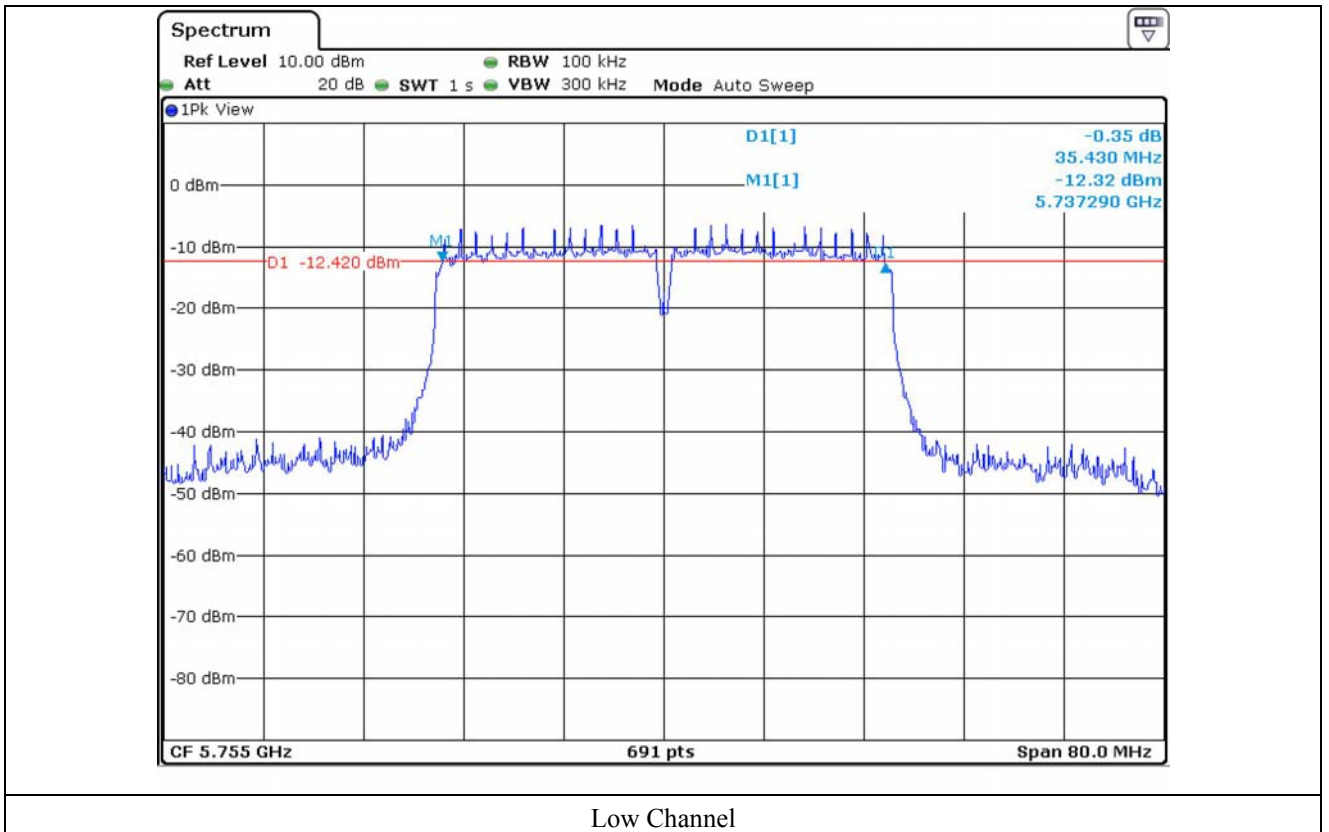
- Test Date : December 27, 2013
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	LIMIT (MHz)
Low	5 755	35.43	35.89	0.5
High	5 795	35.43	35.89	0.5

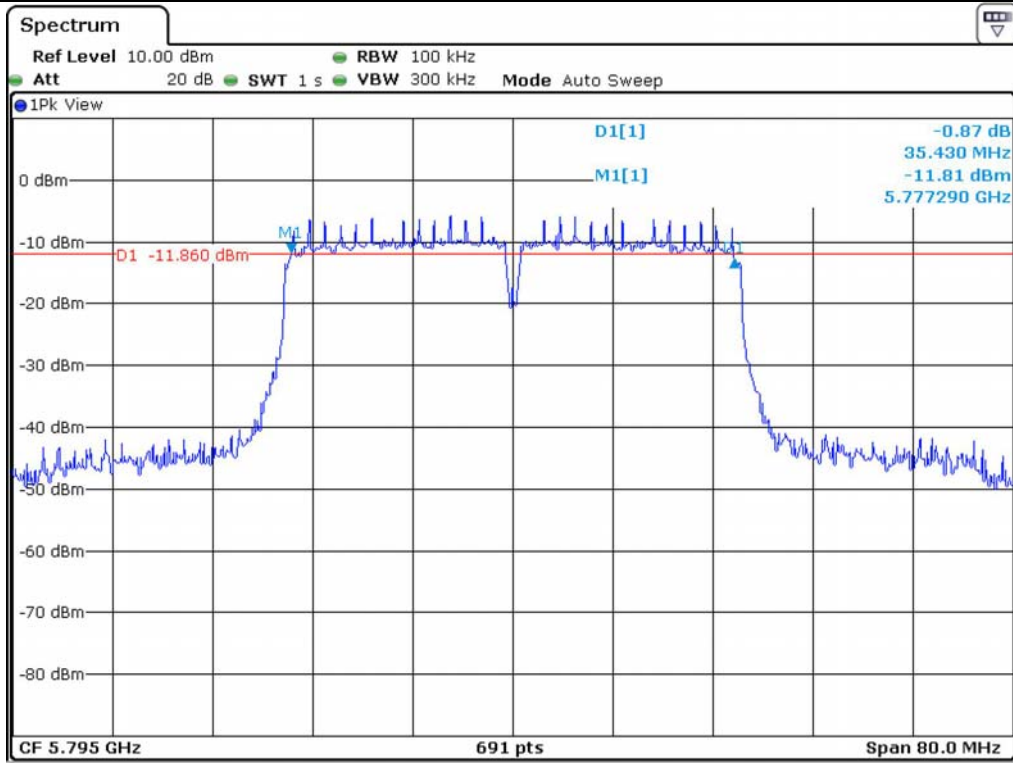
Remark. Margin = Measured Value - Limit

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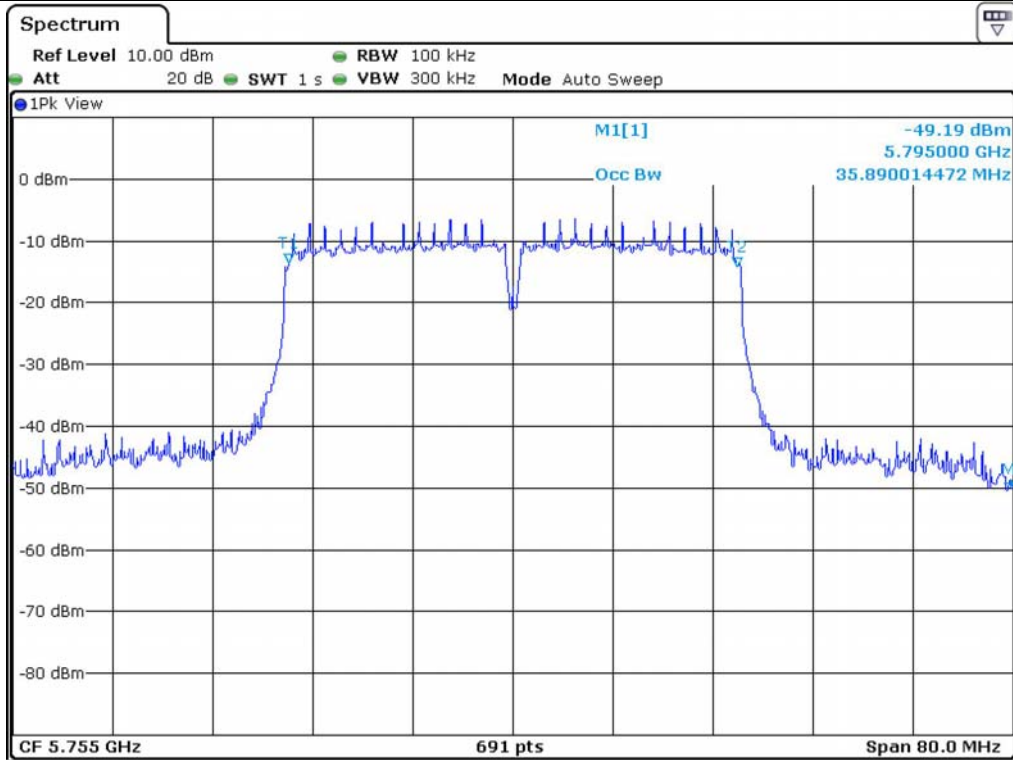
Tested by: Hong-Kyu, Lee/ Engineer



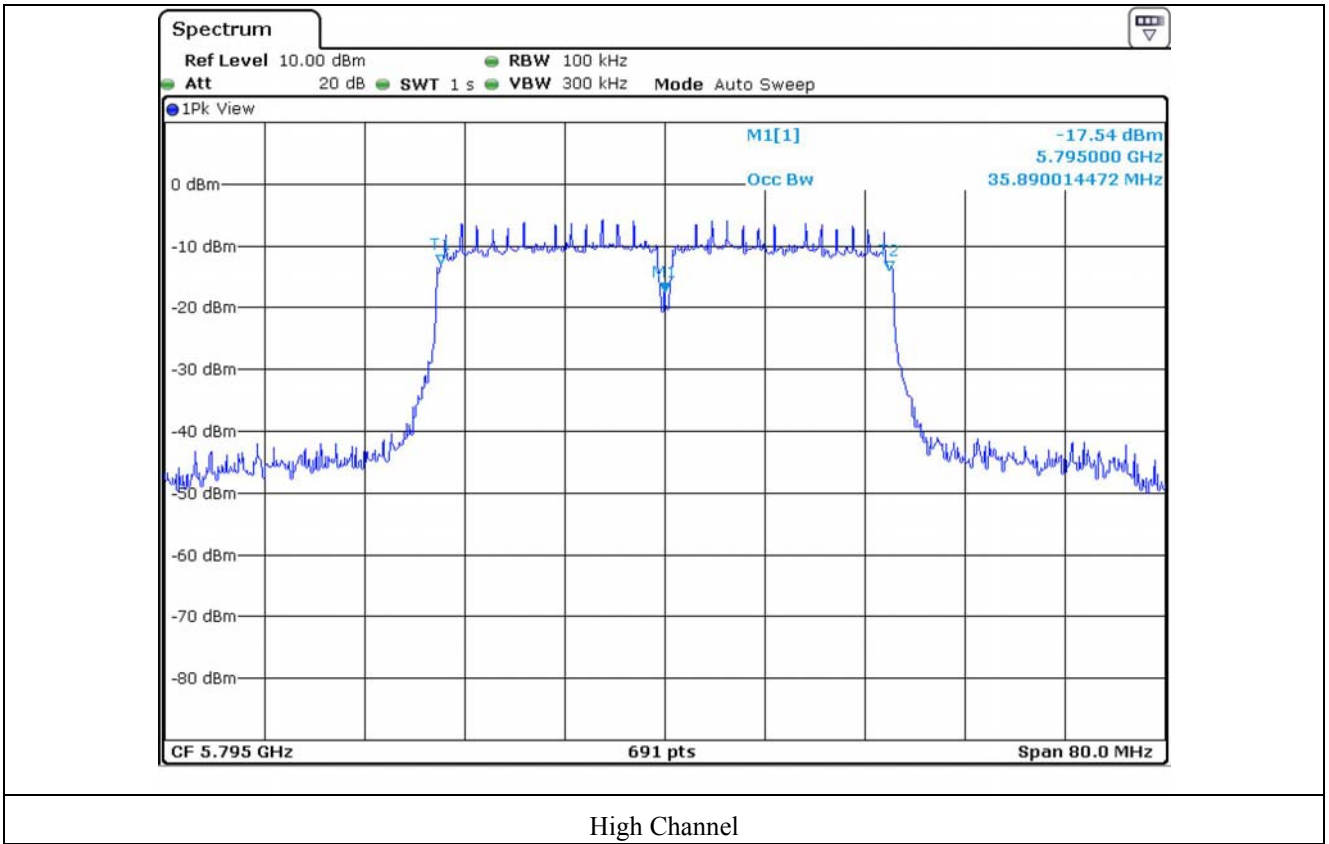
Low Channel



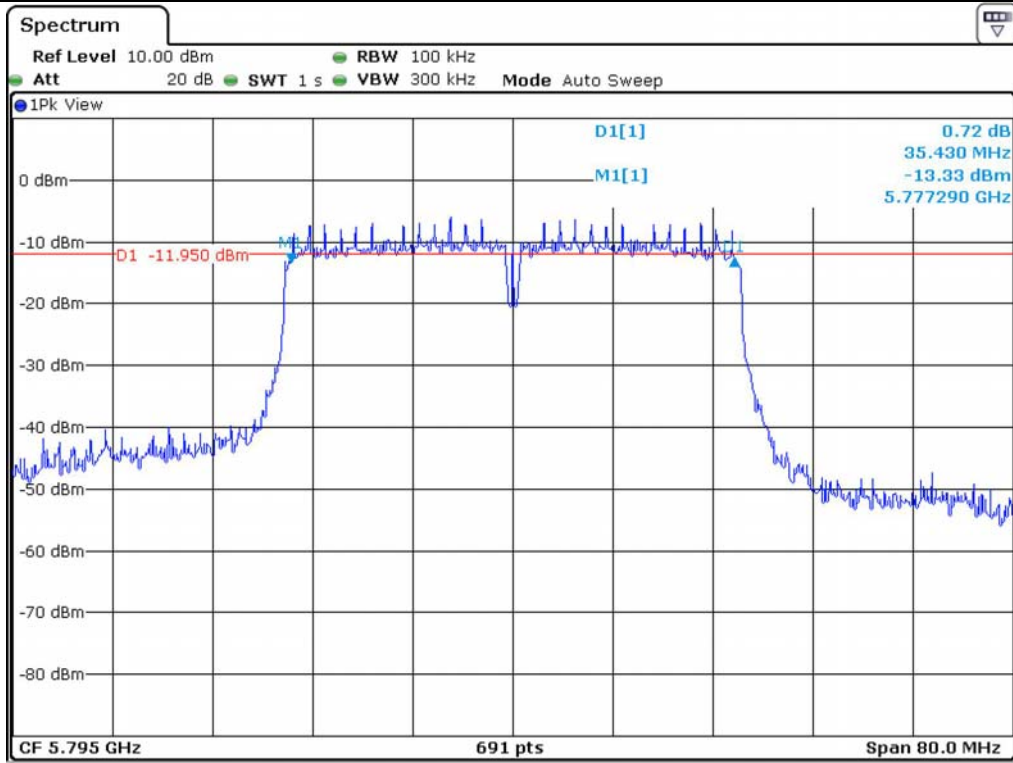
High Channel



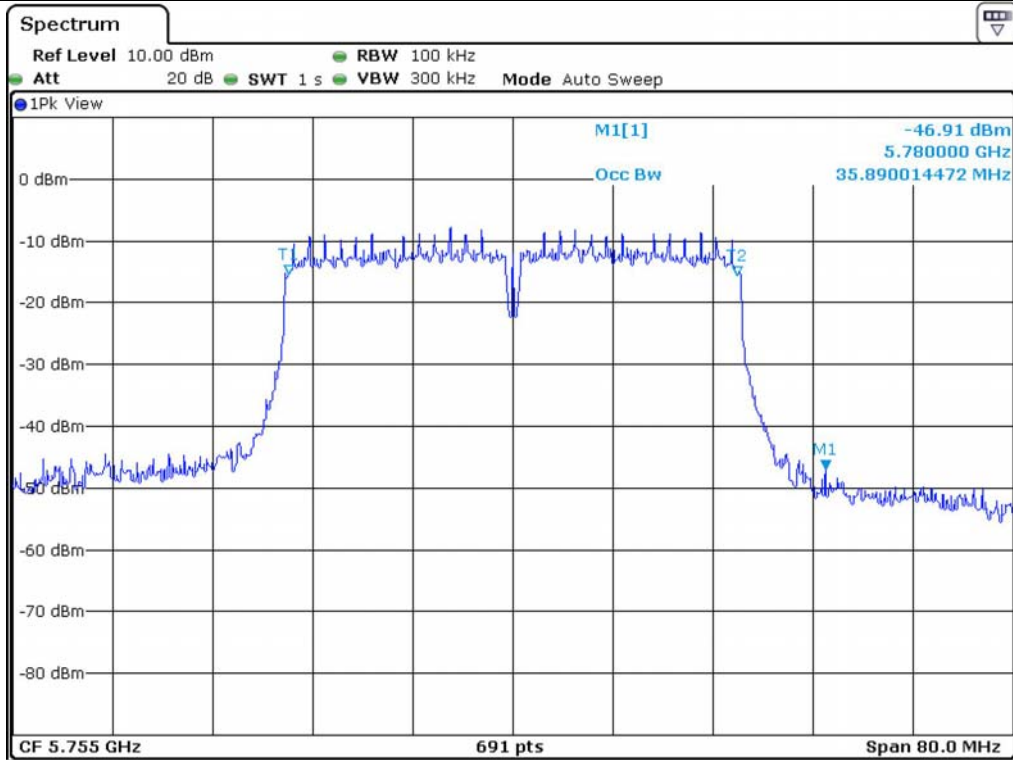
Low Channel



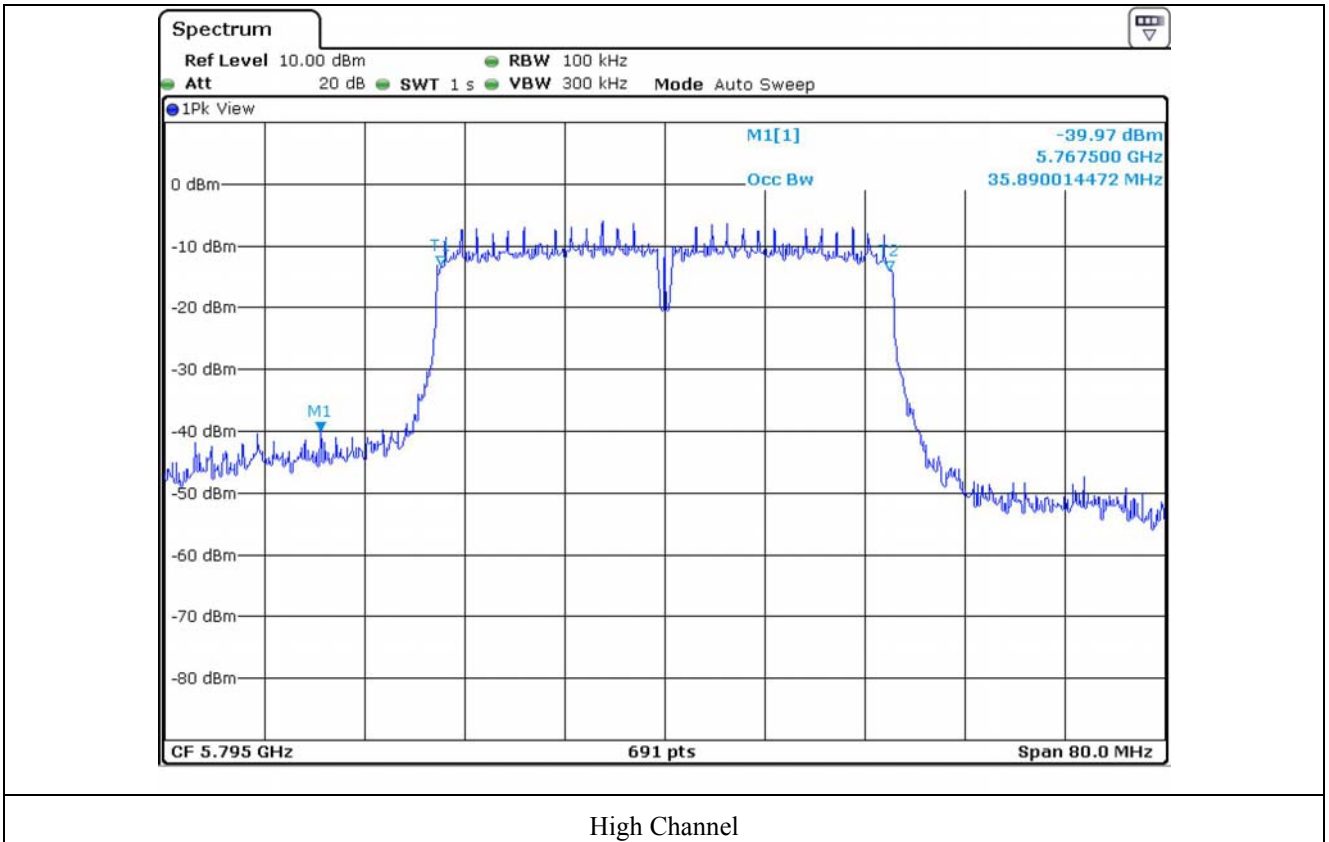




High Channel



Low Channel



High Channel

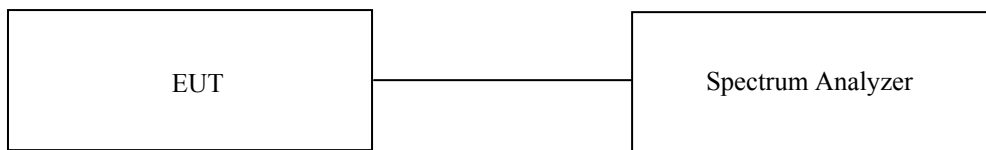
## 8. MAXIMUM PEAK OUTPUT POWER

### 8.1 Operating environment

Temperature : 24 °C  
 Relative humidity : 44 % R.H.

### 8.2 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 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



### 8.3 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.



### 8.4 Test data for 802.11b WLAN Mode

#### 8.4.1 Test data for Antenna 0

- Test Date : December 26, 2013

- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412	12.01	13.97	30	16.03
MIDDLE	2 442	12.01	14.22	30	15.78
HIGH	2 462	12.01	14.06	30	15.94

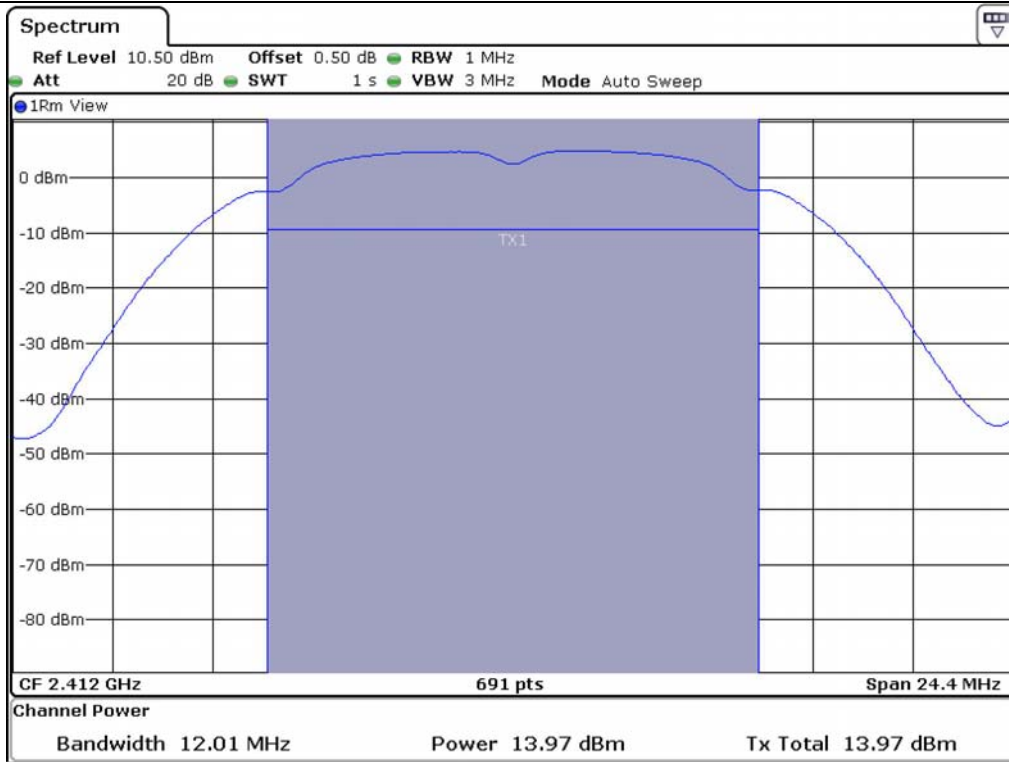
CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412	14.40	14.10	30	15.90
MIDDLE	2 442	14.40	14.24	30	15.76
HIGH	2 462	14.40	14.01	30	15.99

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

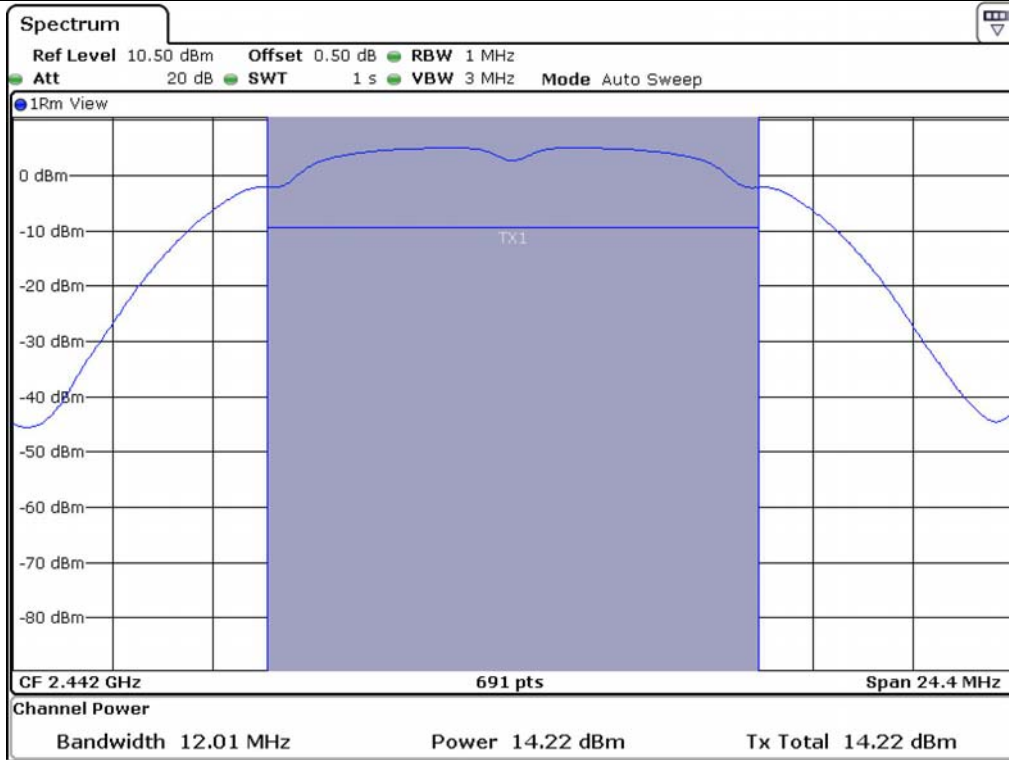



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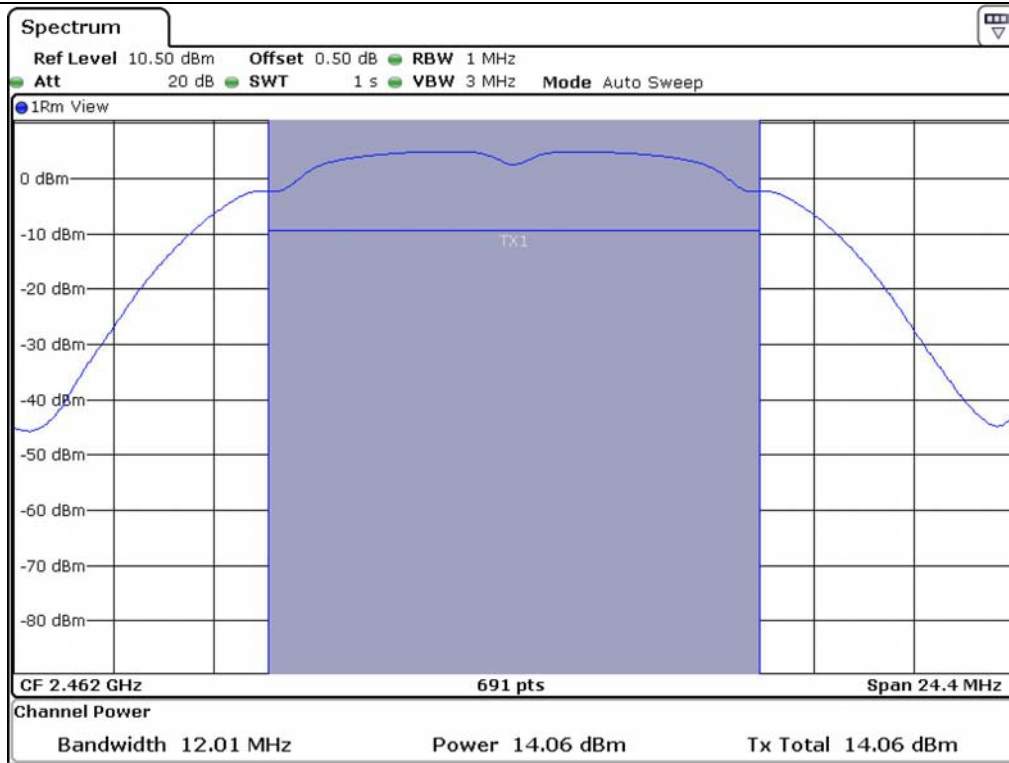
**Tested by: Hong-Kyu, Lee/ Engineer**



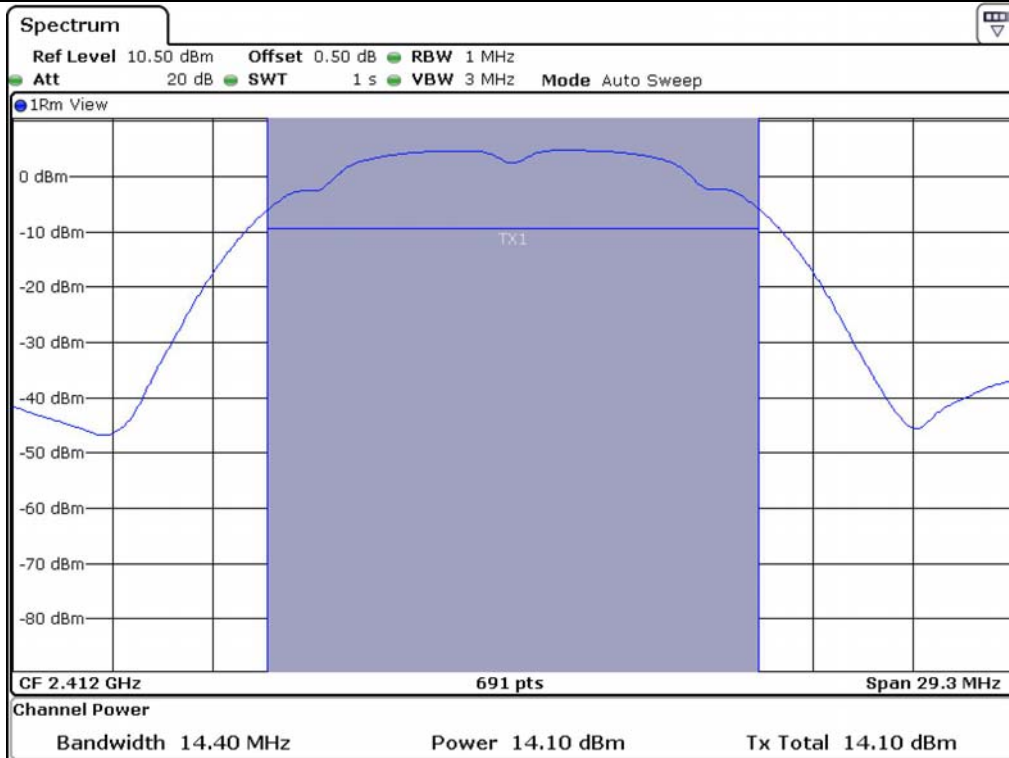
Low Channel (6 dB Bandwidth)



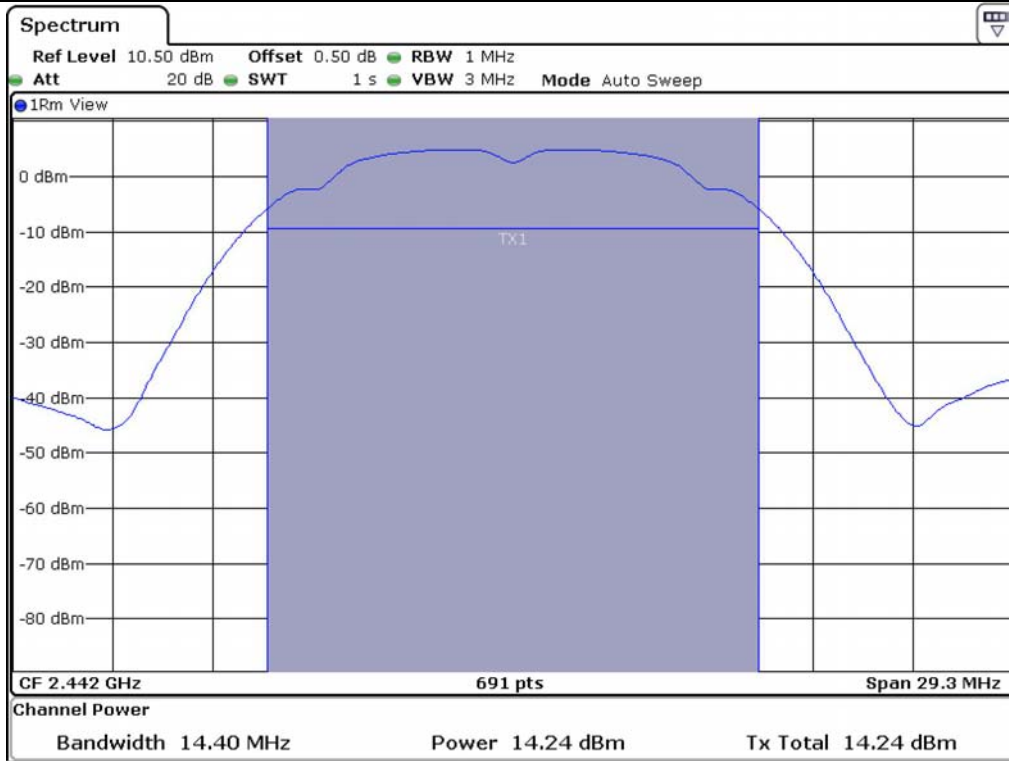
Middle Channel (6 dB Bandwidth)



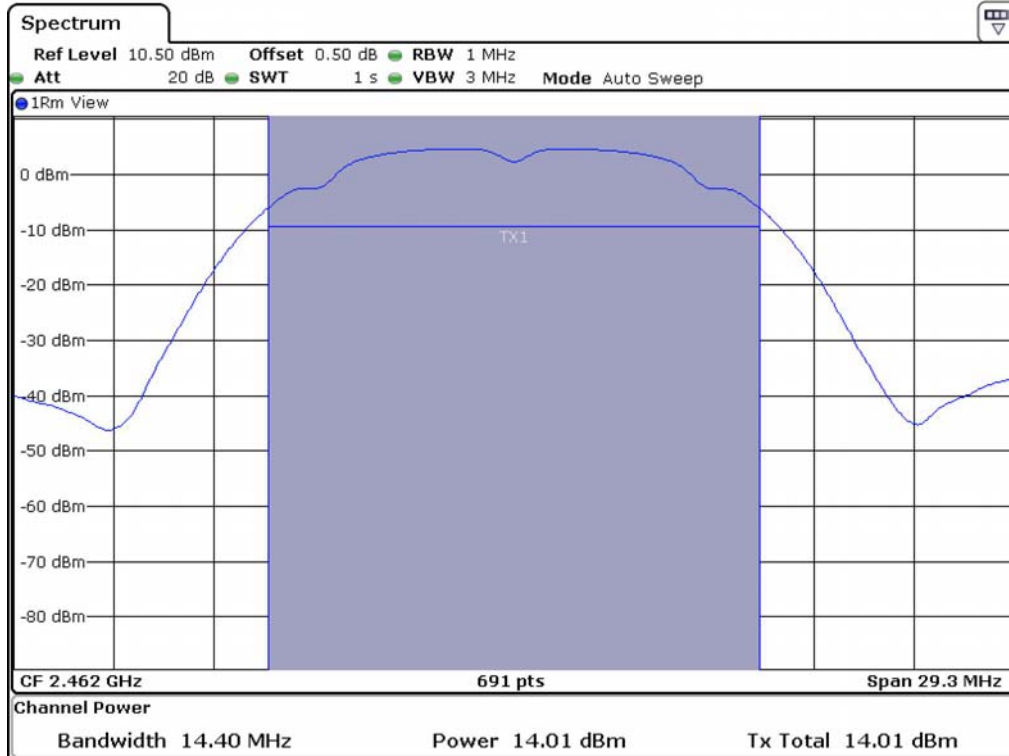
High Channel (6 dB Bandwidth)



Low Channel (99 % bandwidth)



Middle Channel (99 % bandwidth)



High Channel (99 % bandwidth)

**8.4.2 Test data for Antenna 1**

- Test Date : December 26, 2013

- Test Result : Pass

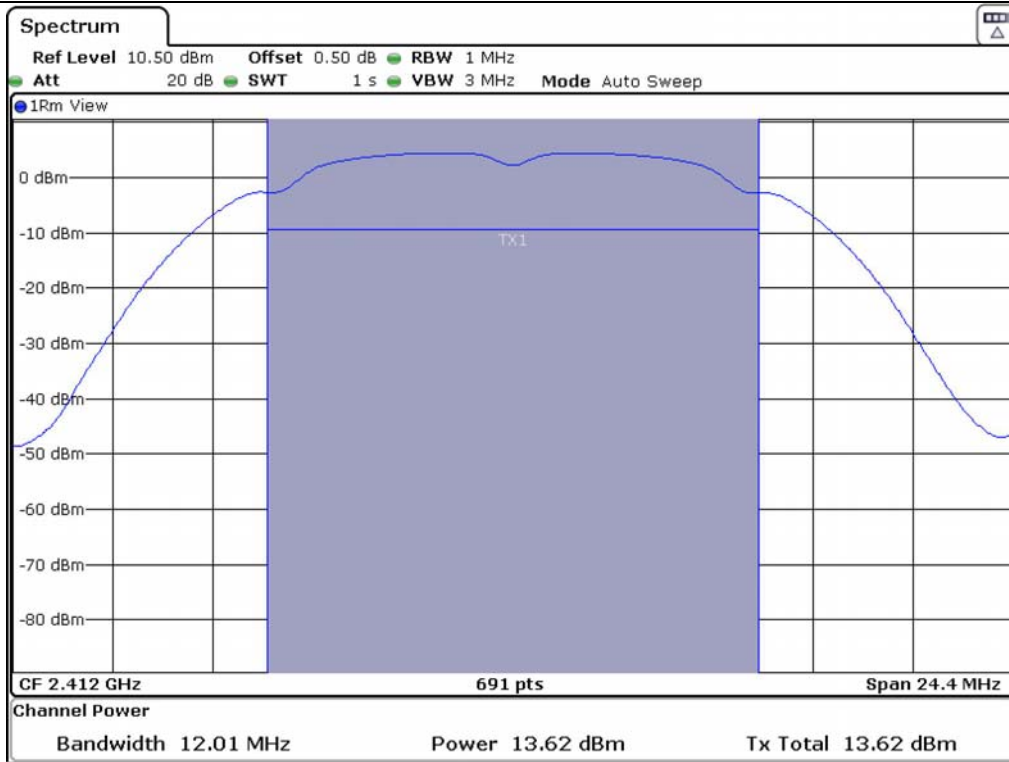
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412	12.01	13.62	30	16.38
MIDDLE	2 442	12.01	14.59	30	15.41
HIGH	2 462	12.01	14.63	30	15.37

CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412	14.40	14.03	30	15.97
MIDDLE	2 442	14.40	14.85	30	15.15
HIGH	2 462	14.40	14.84	30	15.16

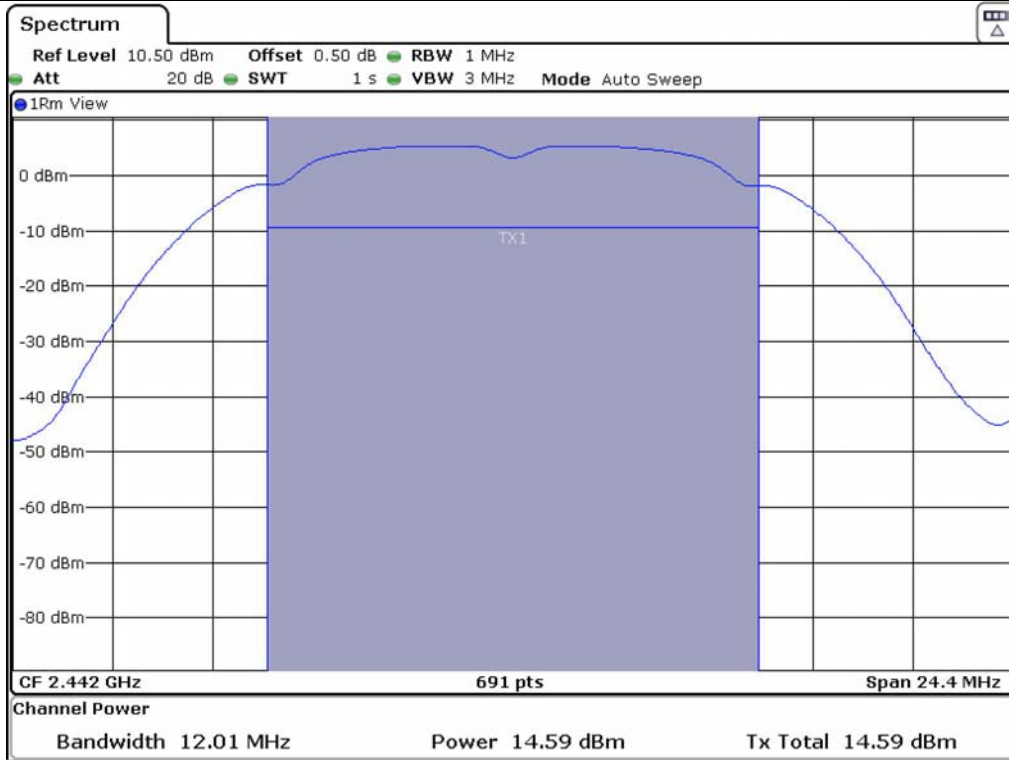
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)



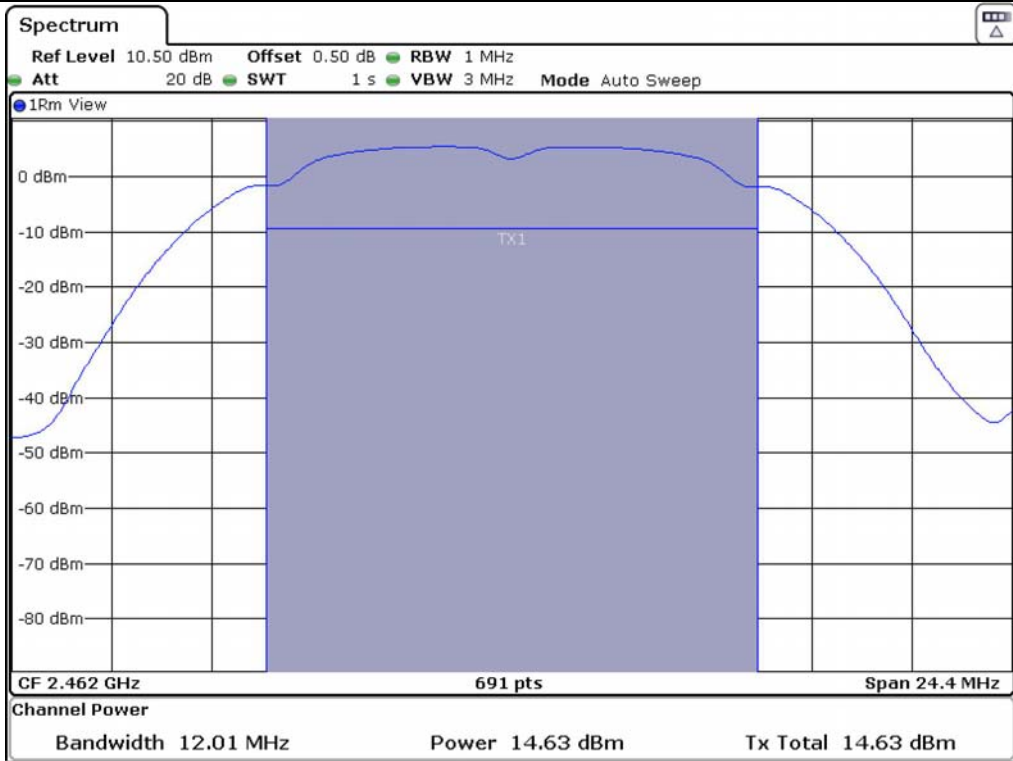
**Tested by: Hong-Kyu, Lee/ Engineer**



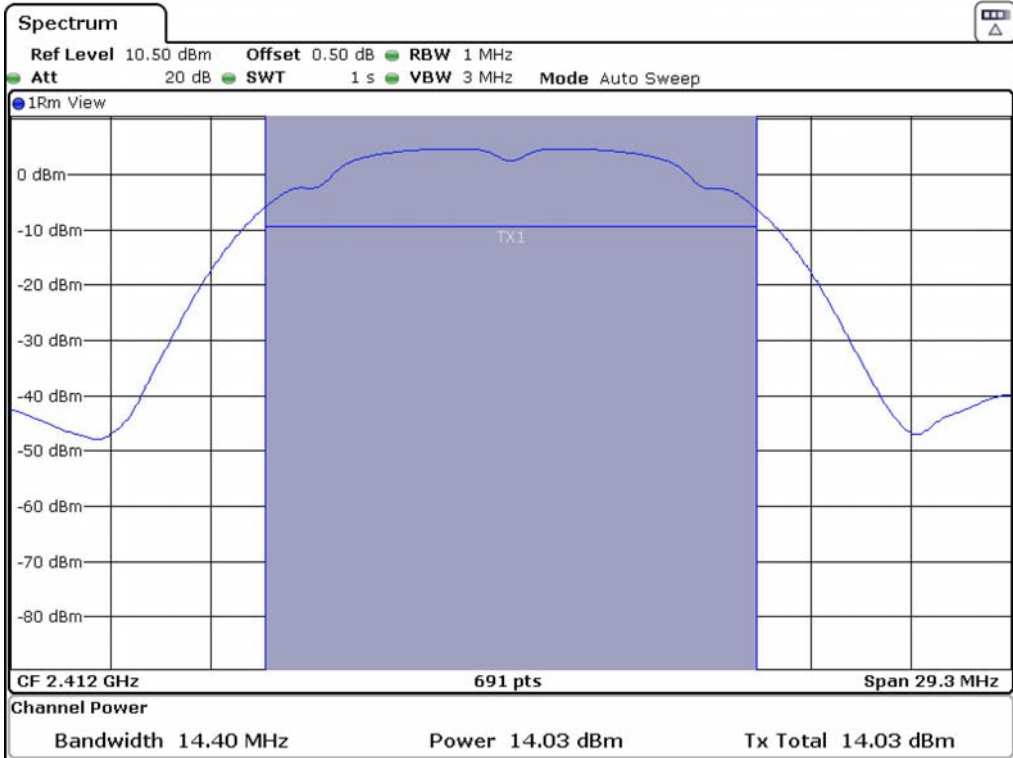
Low Channel (6 dB Bandwidth)



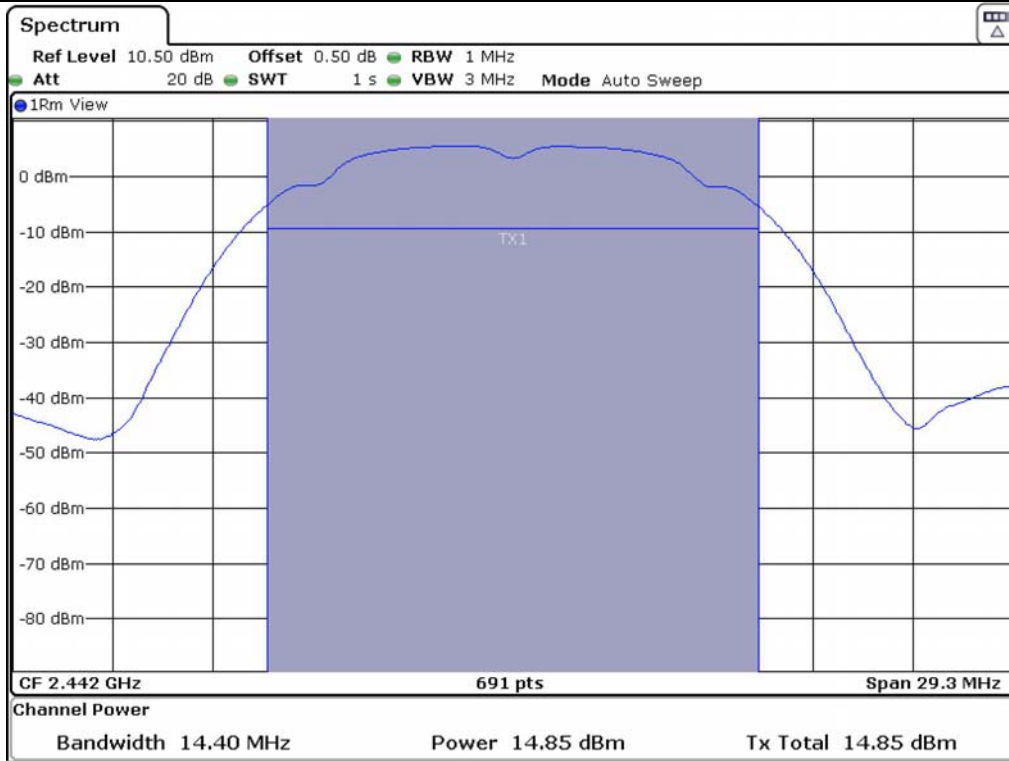
Middle Channel (6 dB Bandwidth)



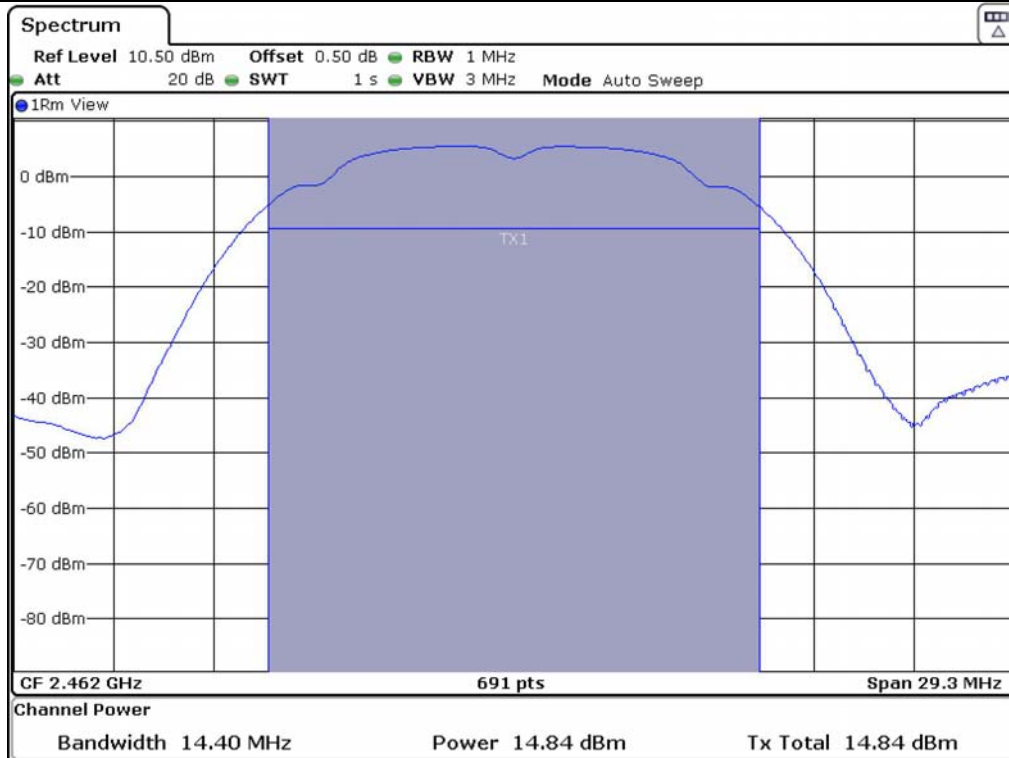
High Channel (6 dB Bandwidth)



Low Channel (99 % bandwidth)



Middle Channel (99 % bandwidth)



High Channel (99 % bandwidth)