

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

**Test Report No.** : E12OR-051

**AGR No.** : A120A-084

**Applicant** : Biospace Co., Ltd.  
**Address** : 272-1 Yongjeong-ri, Ipjang-myeon, Seobuk-gu, Cheonan-si, Chungcheongnam-do  
330-824 KOREA

**Manufacturer** : Biospace Co., Ltd.  
**Address** : 272-1 Yongjeong-ri, Ipjang-myeon, Seobuk-gu, Cheonan-si, Chungcheongnam-do  
330-824 KOREA

**Type of Equipment** : Bluetooth Dongle

**FCC ID.** : F60-INBT-UART

**Model Name** : InBT-UART

**Serial number** : N/A

**Total page of Report** : 67 pages (including this page)

**Date of Incoming** : January 02, 2012

**Date of issue** : October 24, 2012

## 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.

Prepared by:



Ki-Hong, Nam / Senior Engineer  
ONETECH Corp.

Approved by:



Y. K. Kwon / Exe. Managing Director  
ONETECH Corp.

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### Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
E12OR-051	October 24, 2012	Initial Issue	All

## 1. VERIFICATION OF COMPLIANCE

APPLICANT : Biospace Co., Ltd.  
 ADDRESS : 272-1 Yongjeong-ri, Ipjang-myeon, Seobuk-gu, Cheonan-si, Chungcheongnam-do  
 330-824 KOREA  
 CONTACT PERSON : Park Jae-woo / Certification Team Assistant Manager  
 TELEPHONE NO : +82-2-3498-2842  
 FCC ID : F6O-INBT-UART  
 MODEL NAME : InBT-UART  
 BRAND NAME : **BIOSPACE**  
 SERIAL NUMBER : N/A  
 DATE : October 24, 2012

EQUIPMENT CLASS	<i><b>DSS – PART 15 SPREAD SPECTRUM TRANSMITTER</b></i>
KIND OF EQUIPMENT	Bluetooth Dongle
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.4: 2009
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	10 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
15.247 (a) (1)	Carrier Frequency Separation	Met the Limit / PASS
15.247 (a) (1) (iii)	Minimum Number of Hopping Channels	Met the Limit / PASS
15.247 (a) (1) (iii)	Average Time of Occupancy	Met the Limit / PASS
15.247 (b) (1)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (b) (5)	Radio Frequency Exposure Level	Met requirement / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (d)	Peak Power Spectral Density	Met the Limit / PASS
15.209 and 15.109	Radiated Emission Limits, General Requirement	Met the Limit / PASS
15.207 and 15.107	Conducted Limits	Met the Limit / PASS
15.203	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 section 2.1.

### 2.5 Test Methodology

The radiated testing was performed according to the procedures in ANSI C63.4: 2009 at a distance of 3 m from EUT to the antenna.

### 2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 301-14, Daessangnyeong-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.

### 3. GENERAL INFORMATION

#### 3.1 Product Description

The Biospace Co., Ltd., Model InBT-UART (referred to as the EUT in this report) is a Bluetooth Dongle which shall be assembled into the Body Composition Analyzer or Blood Pressure Monitor only manufactured by the applicant for making data communication between the Body Composition Analyzer or Blood Pressure Monitor and a personal computer, or external device has Bluetooth function. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Bluetooth Dongle
OPERATING FREQUENCY	2 402 MHz ~ 2 480 MHz
RF OUTPUT POWER	12.30 dBm
NUMBER OF CHANNEL	79 Channels
MODULATION TYPE	GFSK for 1Mbps, DQPSK for 2Mbps, 8-DPSK for 3Mbps
ANTENNA TYPE	Chip Antenna
ANTENNA GAIN	0.5 dBi
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1 MHz)	6 MHz
RATED SUPPLY VOLTAGE	DC 5 V

#### 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
PCB Board	Biospace.co.,Ltd	BLUE-A-L2111	N/A

### 5.2 Peripheral equipment

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

Model	Manufacturer	FCC ID	Description	Connected to
InBT-UART	Biospace Co., Ltd.	F6O-INBT-UART	Bluetooth Dongle (EUT)	-
LGR51	LG Electronics	-	Note Pc	EUT

### 5.3 Mode of operation during the test

For Bluetooth function testing, software used to control the EUT for staying in continuous transmitting and receiving mode is programmed. The EUT was set at Low Channel (2 402 MHz), Middle Channel (2 441 MHz), and High Channel (2 480 MHz) with each data transfer rate, 1 Mbps, 2 Mbps, and 3 Mbps. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XZ” axis, but the worst data was recorded in this test report.

### 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 C63.4: 2009 8.3.1.1 and 13.1.4.1 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 a chip antenna, so no consideration of replacement by the user.

### 6. PRELIMINARY TEST

During Preliminary Tests, the following operating modes were investigated

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

## 7. OCCUPIED BANDWIDTH

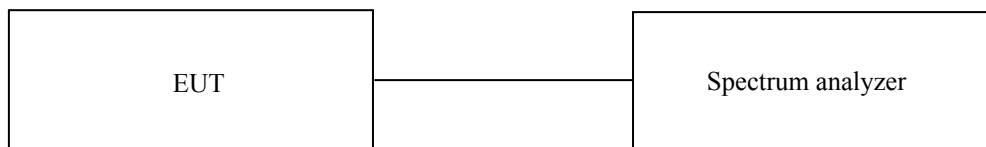
### 7.1 20 dB BANDWIDTH

#### 7.1.1 Operating environment

Temperature : 26 °C  
Relative humidity : 46 % 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 10 kHz, and peak detection was used. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



#### 7.1.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

#### 7.1.4 Test data

##### 7.1.4.1 Test data for 1 Mbps

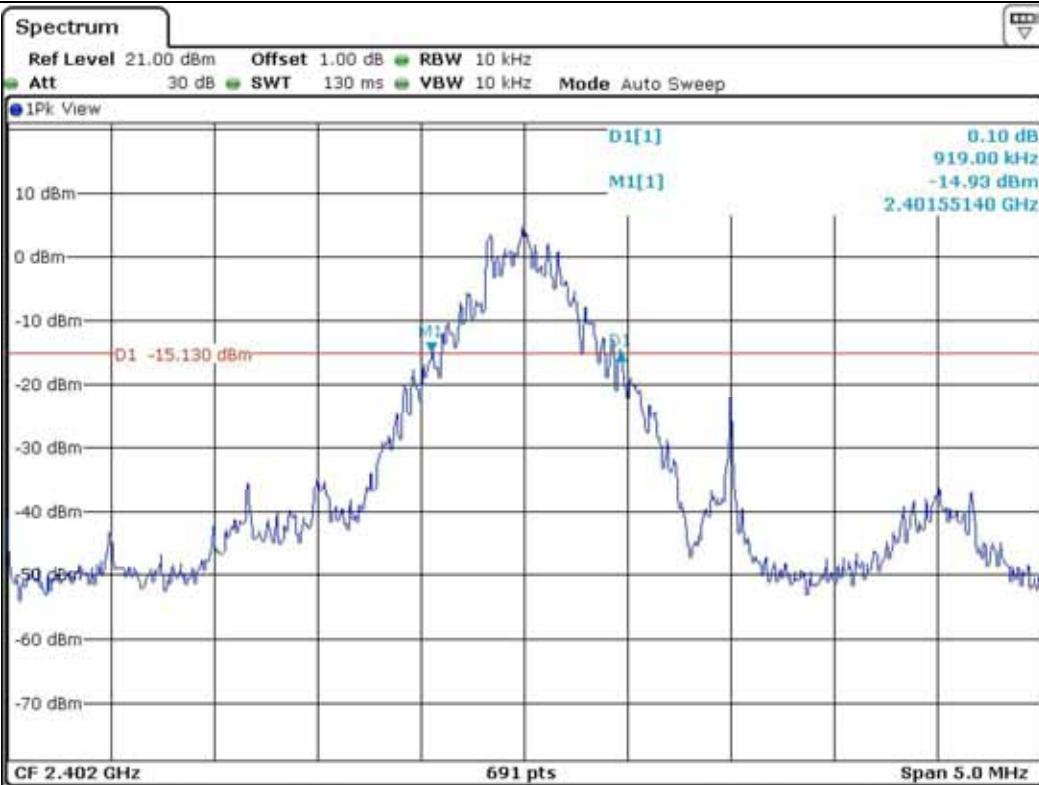
-. Test Date : January 23, 2012

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (kHz)
Low	2 402	919.0
Middle	2 441	926.2
High	2 480	919.0

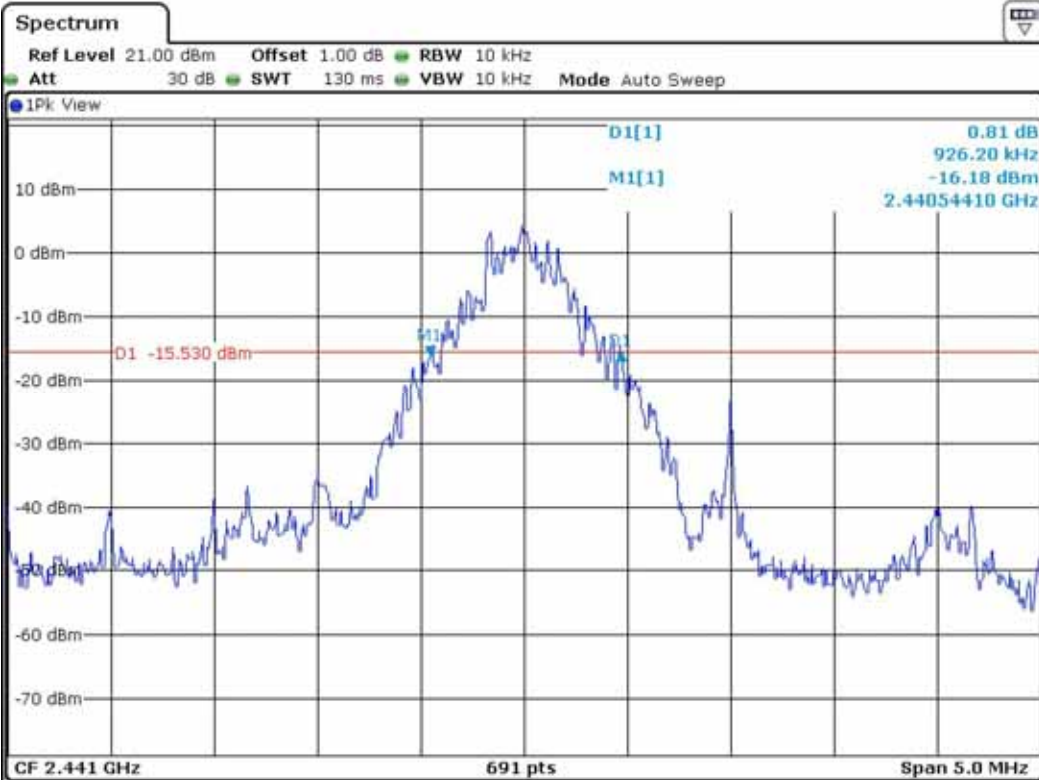
Remark: See next page for an overview sweep performed with peak detector.



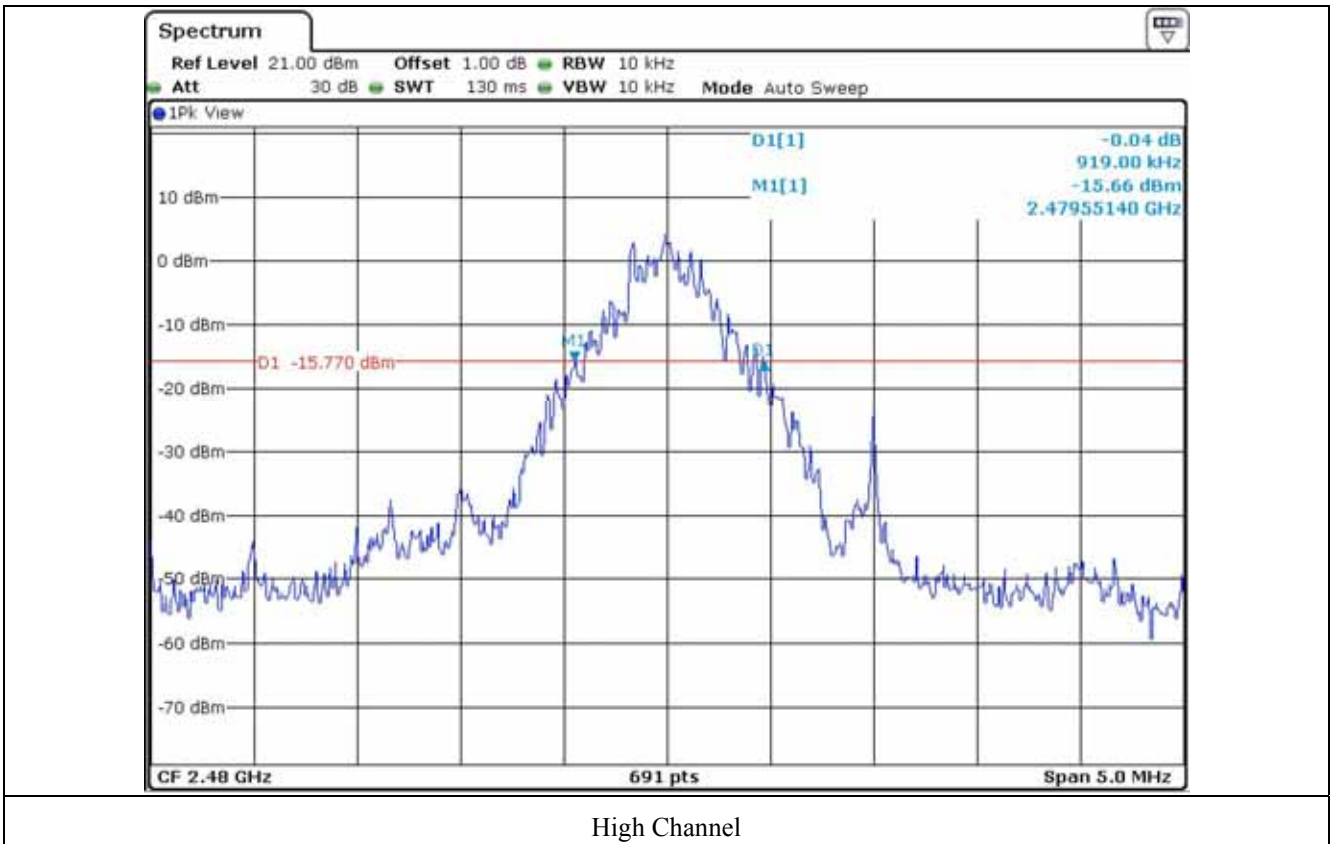
**Tested by: Chang-Uk, Jun / Engineer**



Low Channel



Middle Channel



High Channel

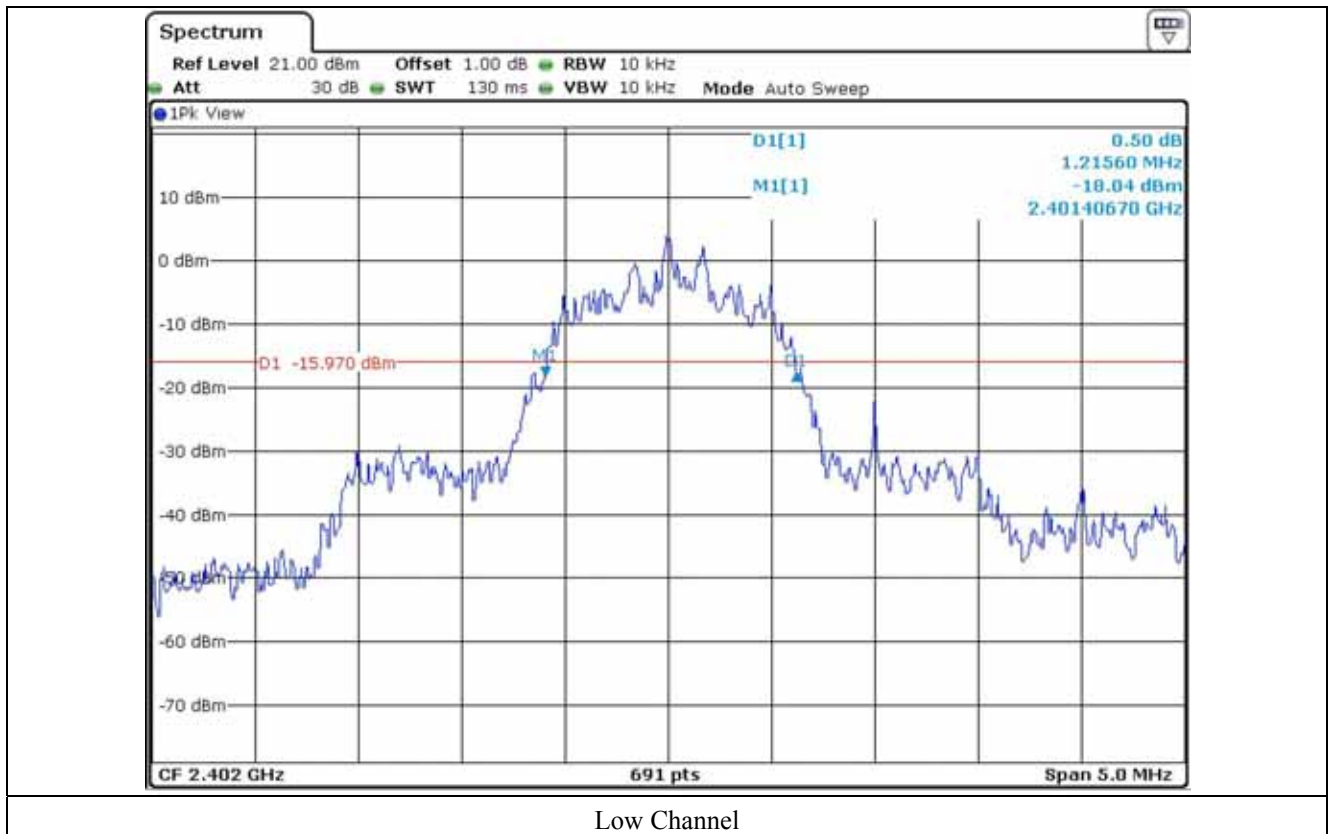
**7.1.4.2 Test data for 2 Mbps**

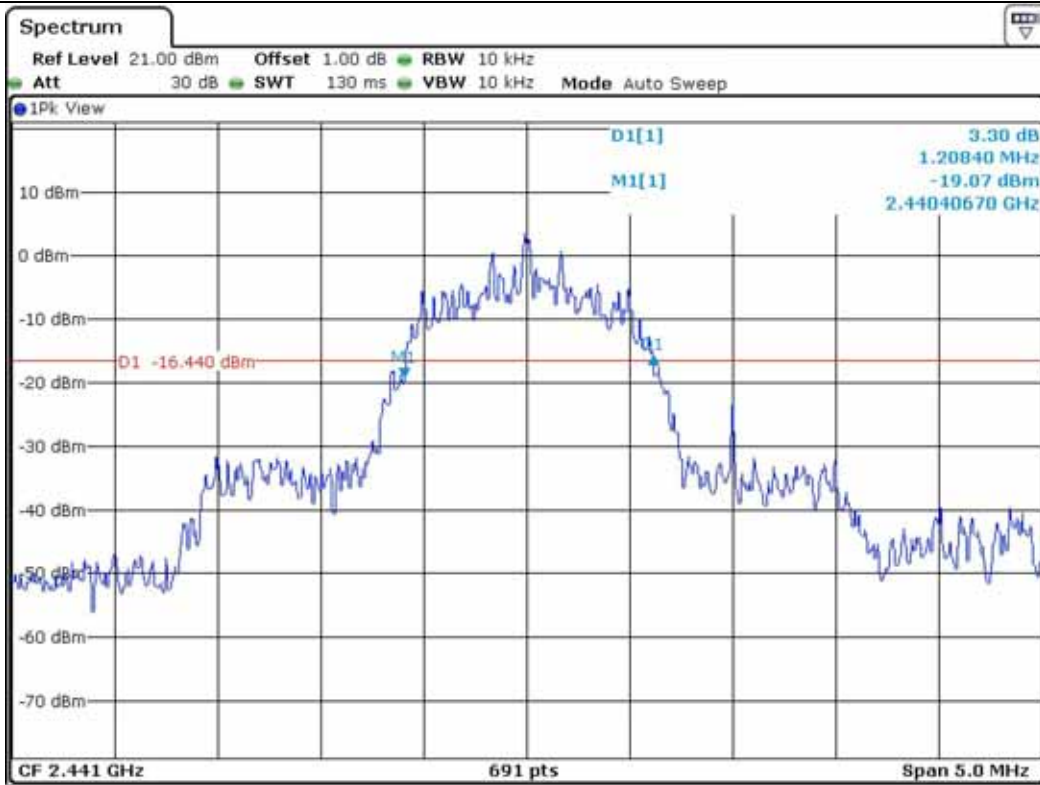
- Test Date : January 23, 2012

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (kHz)
Low	2 402	1 215.6
Middle	2 441	1 208.4
High	2 480	1 208.4

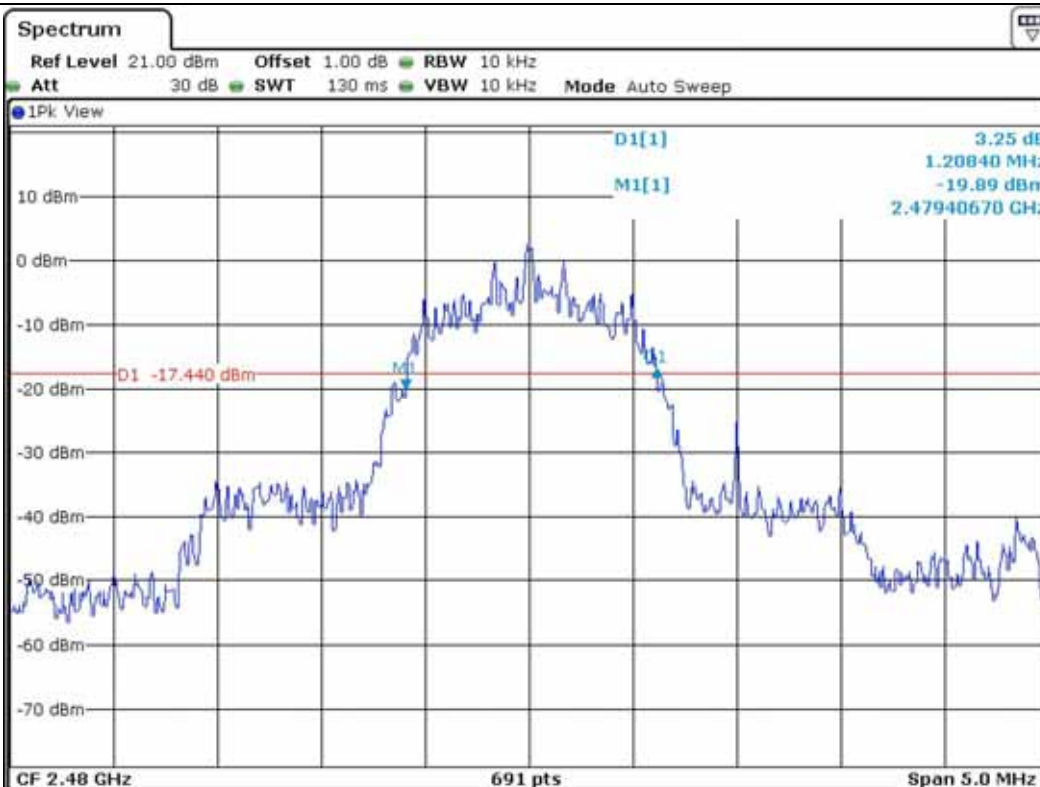


**Tested by: Chang-Uk, Jun / Engineer**





Middle Channel



High Channel

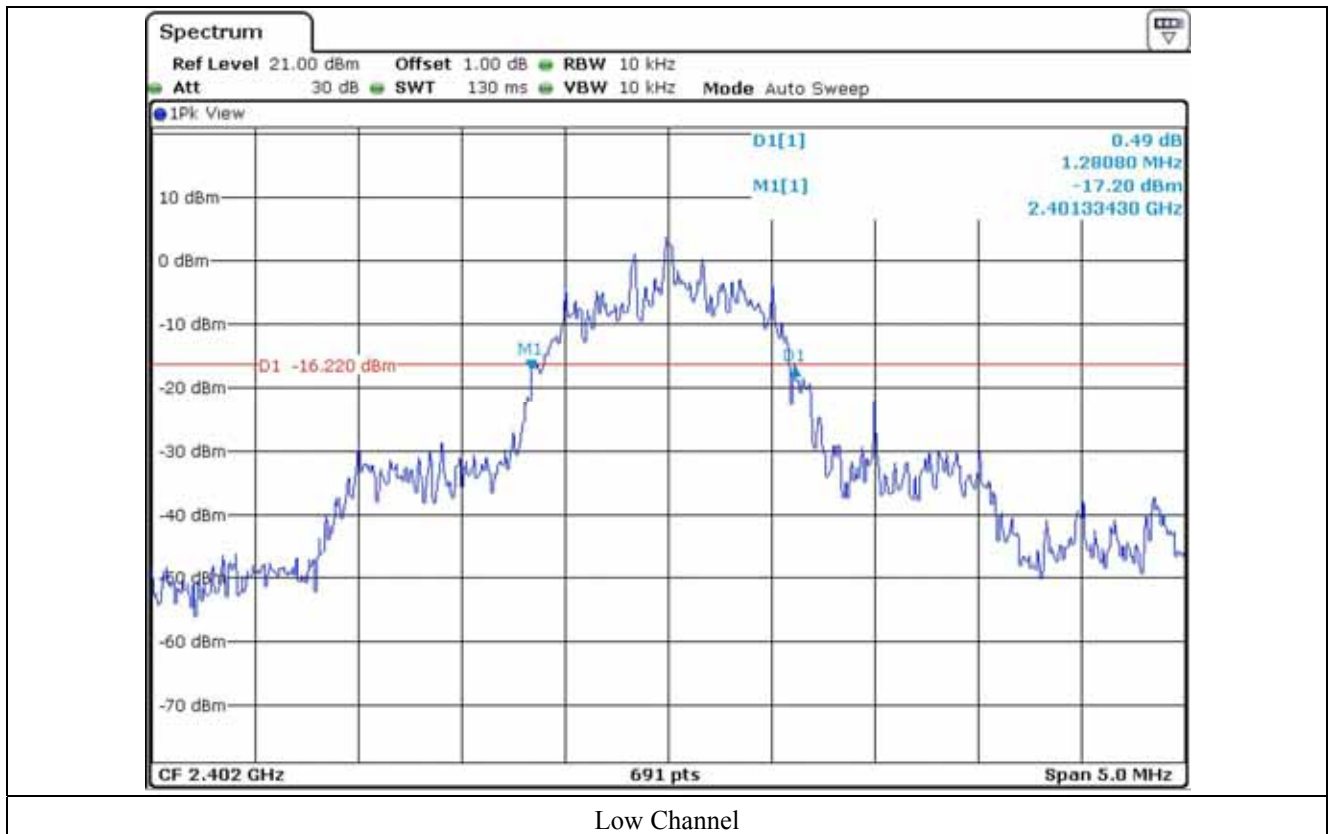
**7.1.4.3 Test data for 3 Mbps**

- Test Date : January 23, 2012

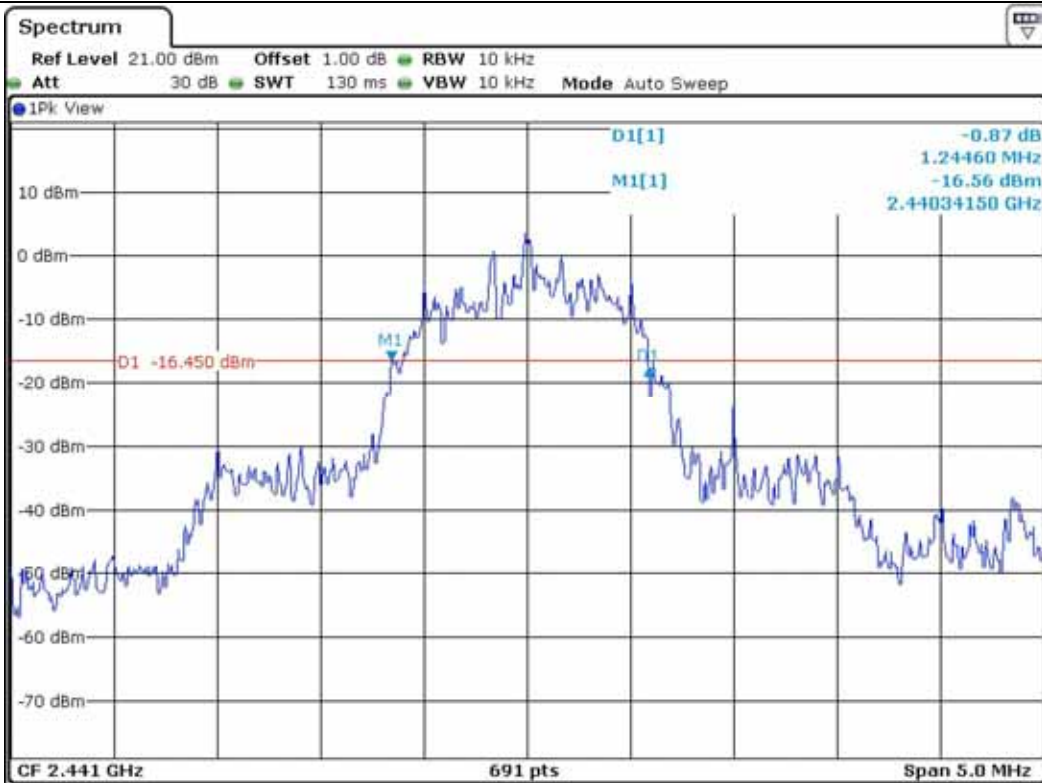
CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (kHz)
Low	2 402	1 280.8
Middle	2 441	1 244.6
High	2 480	1 244.6



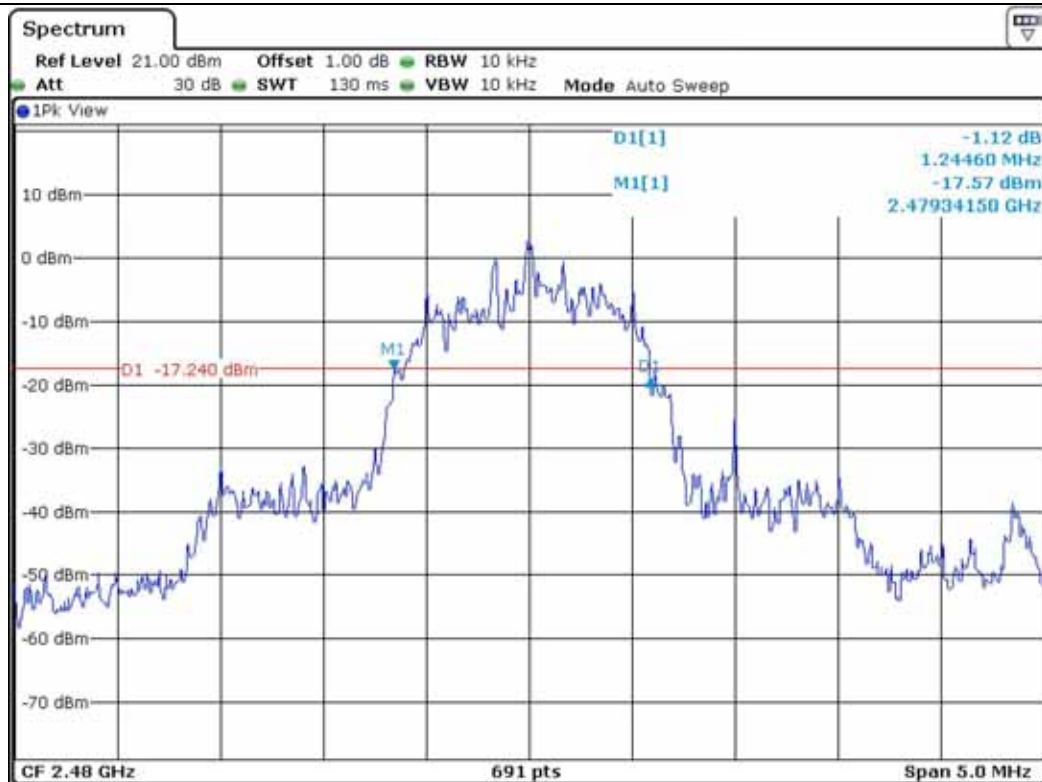
**Tested by: Chang-Uk, Jun / Engineer**







Middle Channel



High Channel

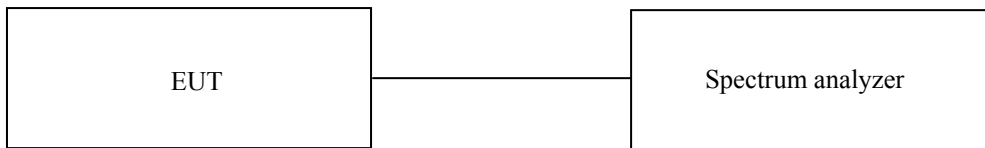
## 7.2 HOPPING FREQUENCY SEPARATION

### 7.2.1 Operating environment

Temperature : 26 °C  
Relative humidity : 46 % R.H.

### 7.2.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 10 MHz. The analyzer is set to peak hold then a pseudo-random hopping sequence of the transmitter is captured. The mark delta function was used to measure the frequency separation between two adjacent hopping channels.



### 7.2.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

### 7.2.4 Test data

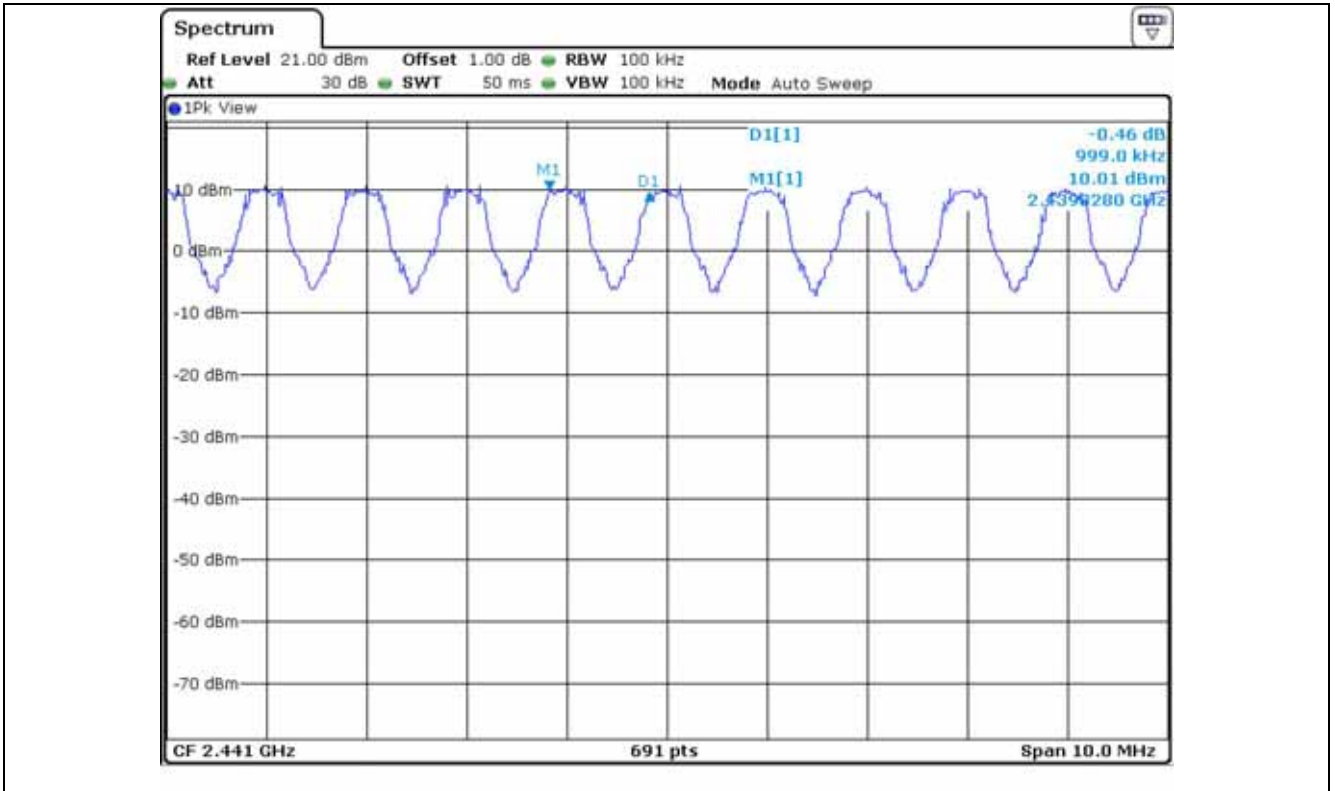
#### 7.2.4.1 Test data for 1 Mbps

-. Test Date : January 23, 2012  
-. Test Result : Pass

MEASURED VLAUE (kHz)	Two-third of 20 dB Bandwidth (kHz)	LIMIT
999	617.5	Separated by a minimum of 25 kHz

Remark: See next page for an overview sweep performed with peak detector.

**Tested by: Chang-Uk, Jun / Engineer**



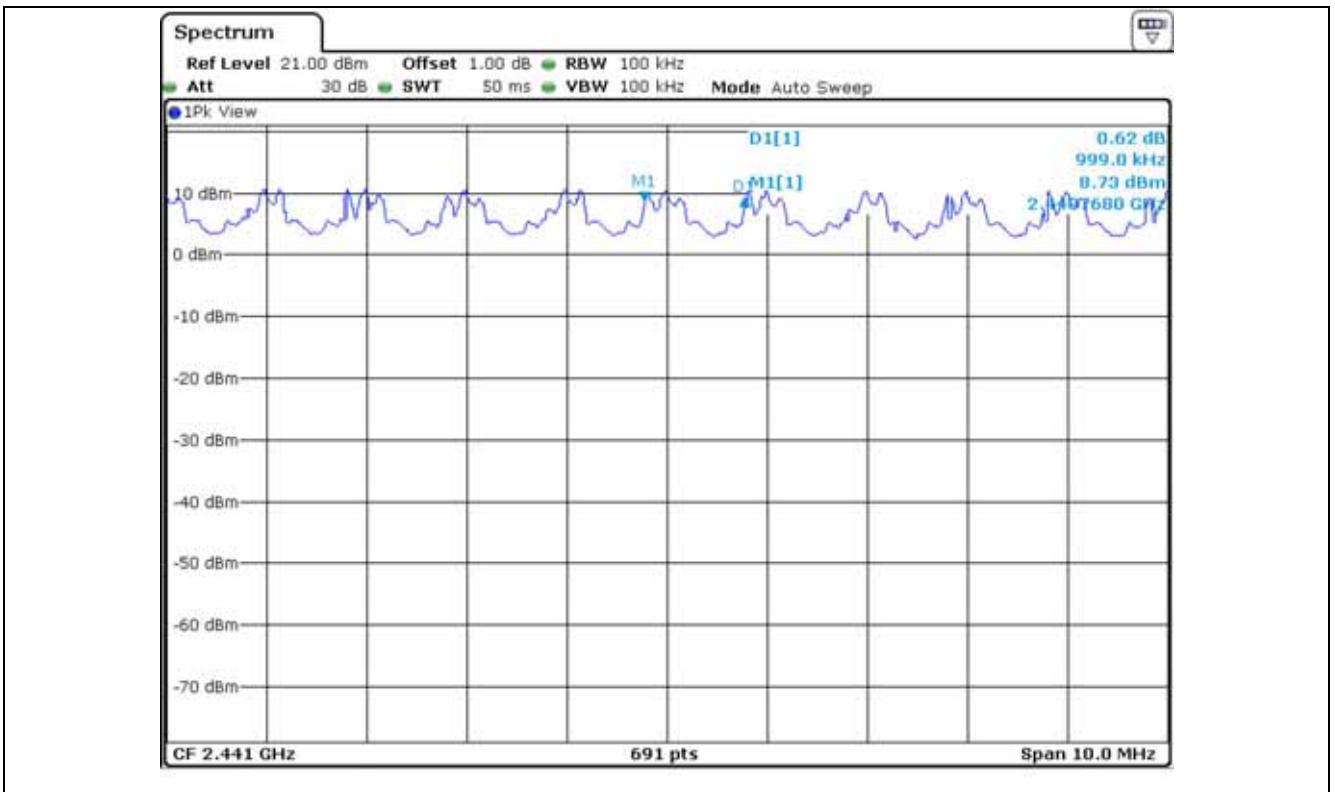
**7.2.4.2 Test data for 2 Mbps**

- Test Date : January 23, 2012
- Test Result : Pass

MEASURED VLAUE (kHz)	Two-third of 20 dB Bandwidth (kHz)	LIMIT
999	810.4	Separated by a minimum of 25 kHz



**Tested by: Chang-Uk, Jun / Engineer**



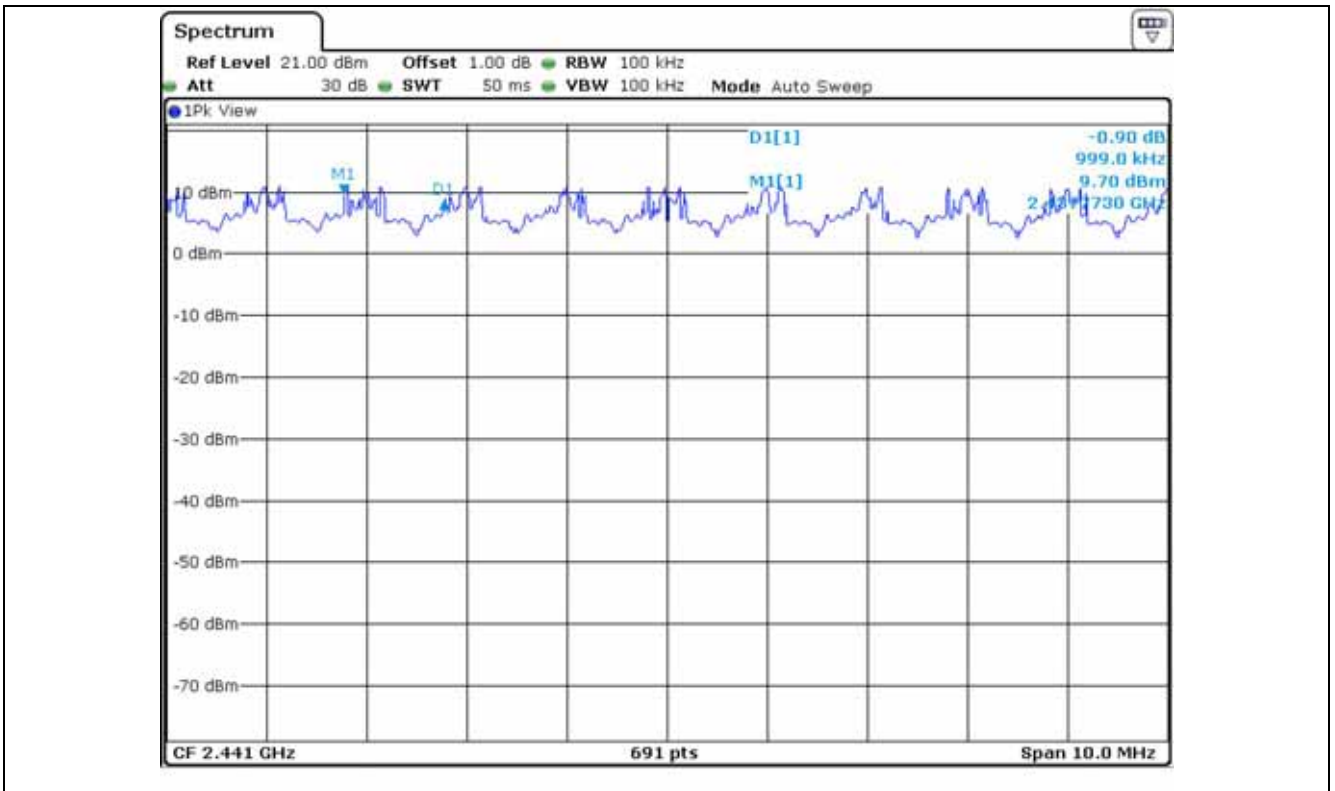
**7.2.4.3 Test data for 3 Mbps**

- Test Date : January 23, 2012
- Test Result : Pass

MEASURED VLAUE (kHz)	Two-third of 20 dB Bandwidth (kHz)	LIMIT
999	853.9	Separated by a minimum of 25 kHz



**Tested by: Chang-Uk, Jun / Engineer**



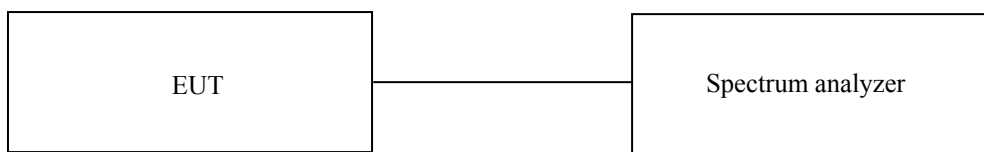
### 7.3. NUMBER OF HOPPING CHANNELS

#### 7.3.1 Operating environment

Temperature : 26 °C  
Relative humidity : 46 % R.H.

#### 7.3.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 100 MHz and the resolution bandwidth is set to 100 kHz. The analyzer is set to peak hold and then complete pseudo-random hopping sequence of the transmitter is captured.



#### 7.3.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

#### 7.3.4 Test data

##### 7.3.4.1 Test data for 1 Mbps

- Test Date : January 23, 2012  
- Test Result : Pass

MEASURED VLAUE (Number)	LIMIT (Number)	MARGIN (Number)
79	Minimum of 15	64

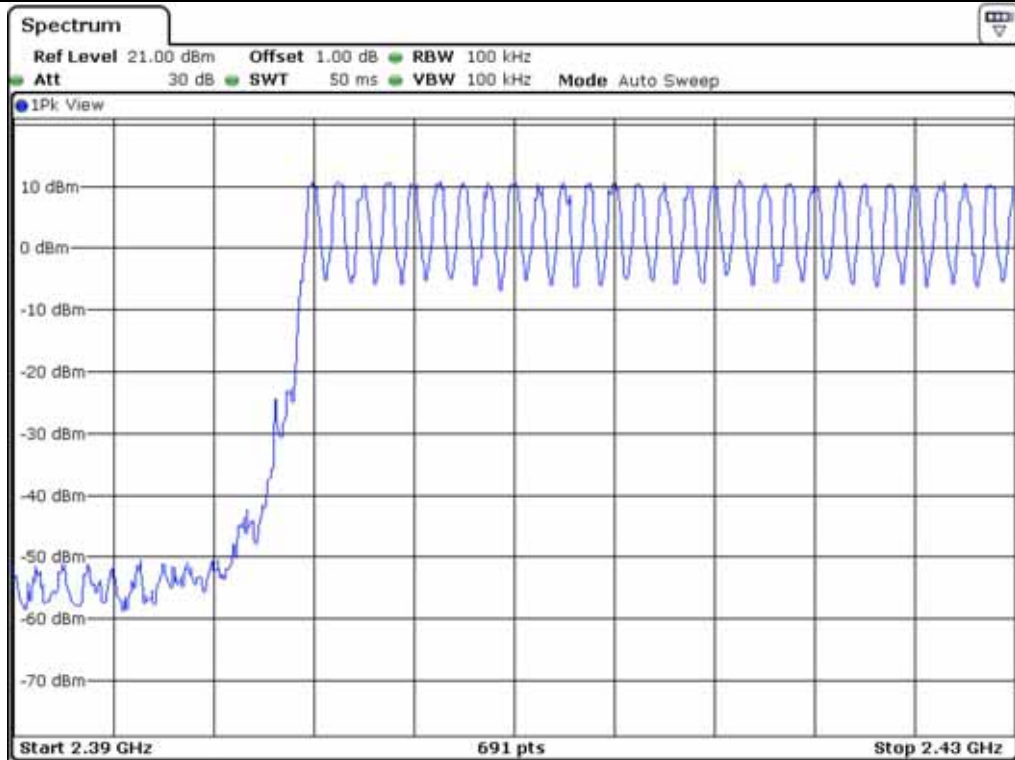
Remark: See next page for an overview sweep performed with peak detector.



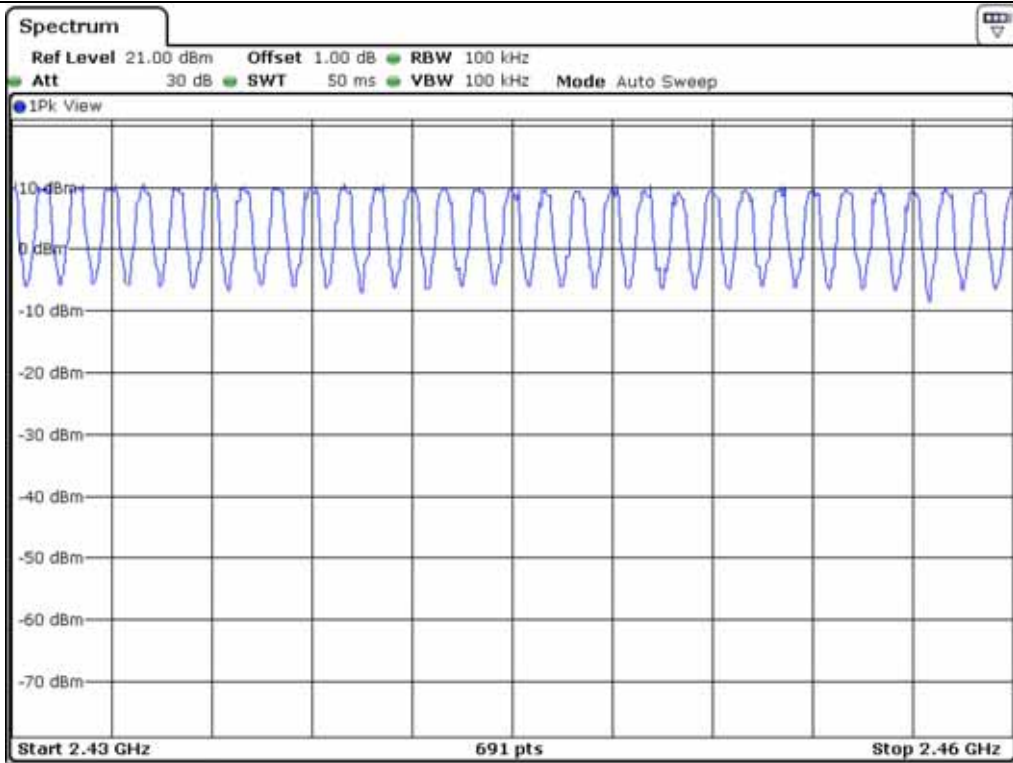
**Tested by: Chang-Uk, Jun / Engineer**



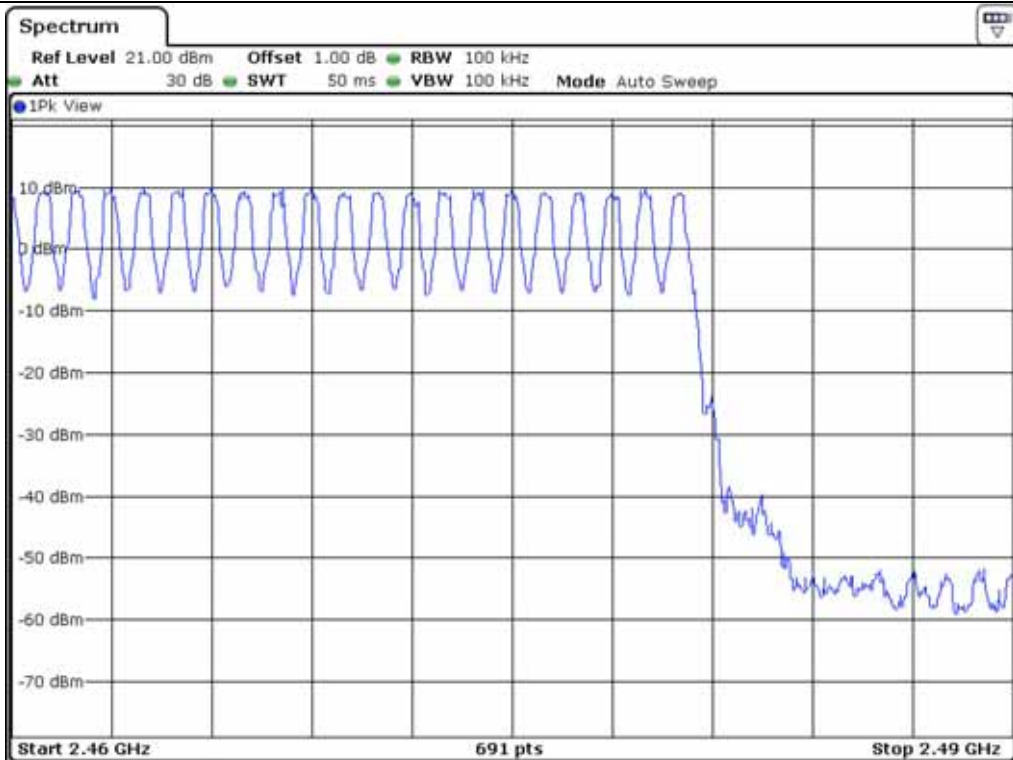
Total number of hopping channel:  $28+30+21 = 79$



Number of hopping channel: 28



Number of hopping channel: 30



Number of hopping channel: 21



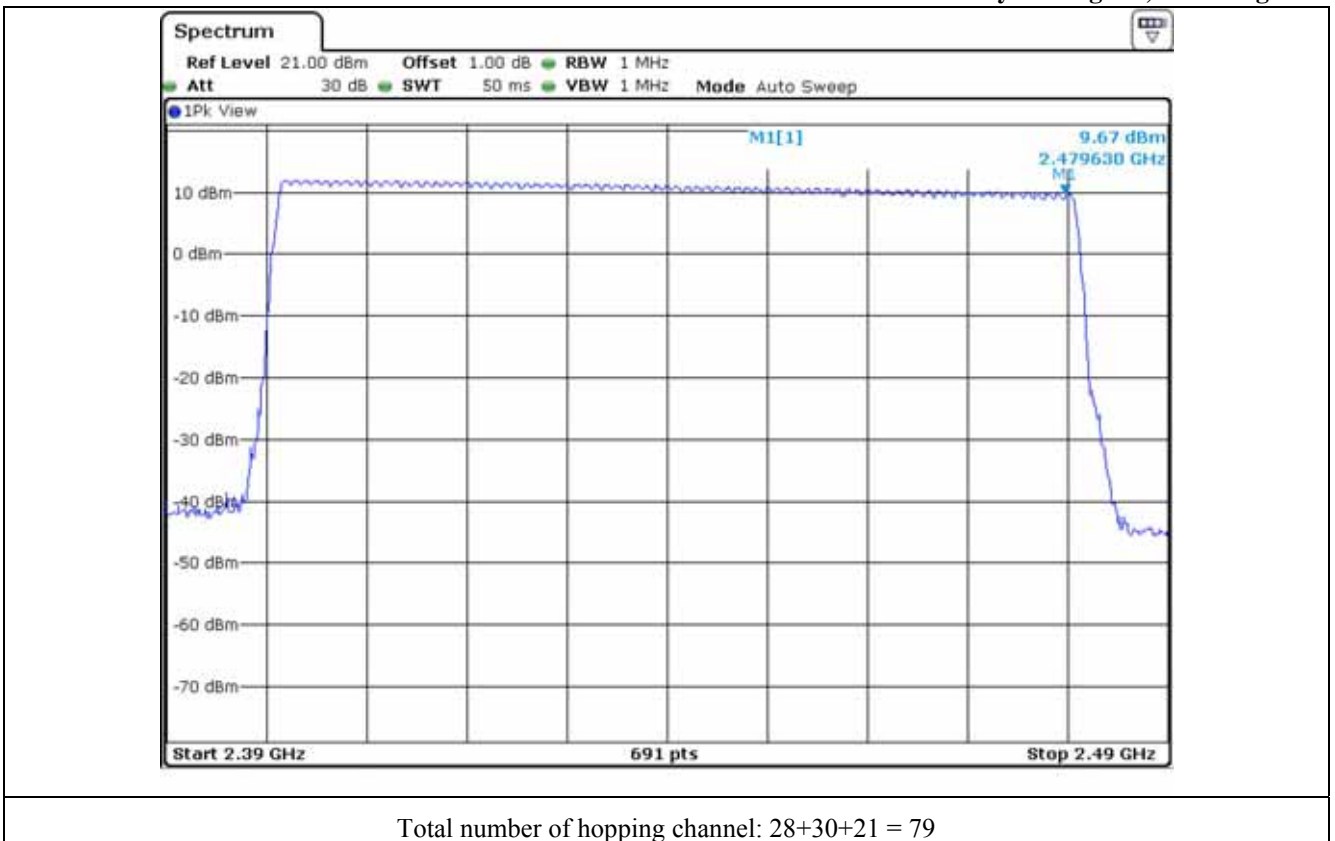
7.3.4.2 Test data for 2 Mbps

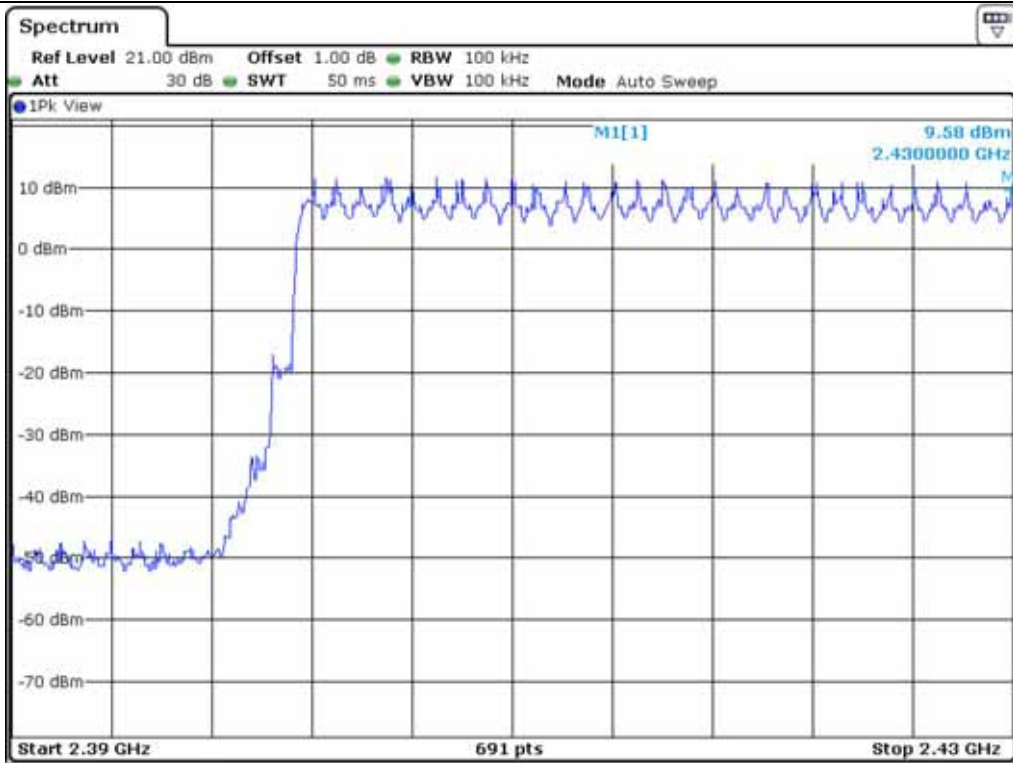
- Test Date : January 23, 2012
- Test Result : Pass

MEASURED VLAUE (Number)	LIMIT (Number)	MARGIN (Number)
79	Minimum of 15	64

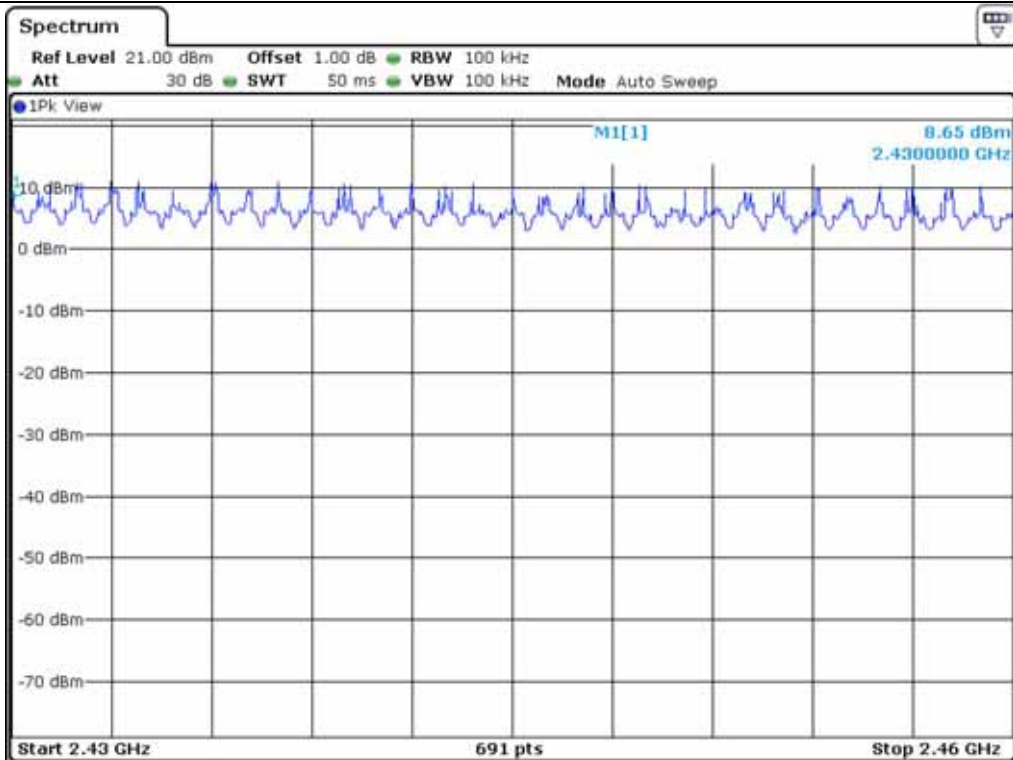


Tested by: Chang-Uk, Jun / Engineer

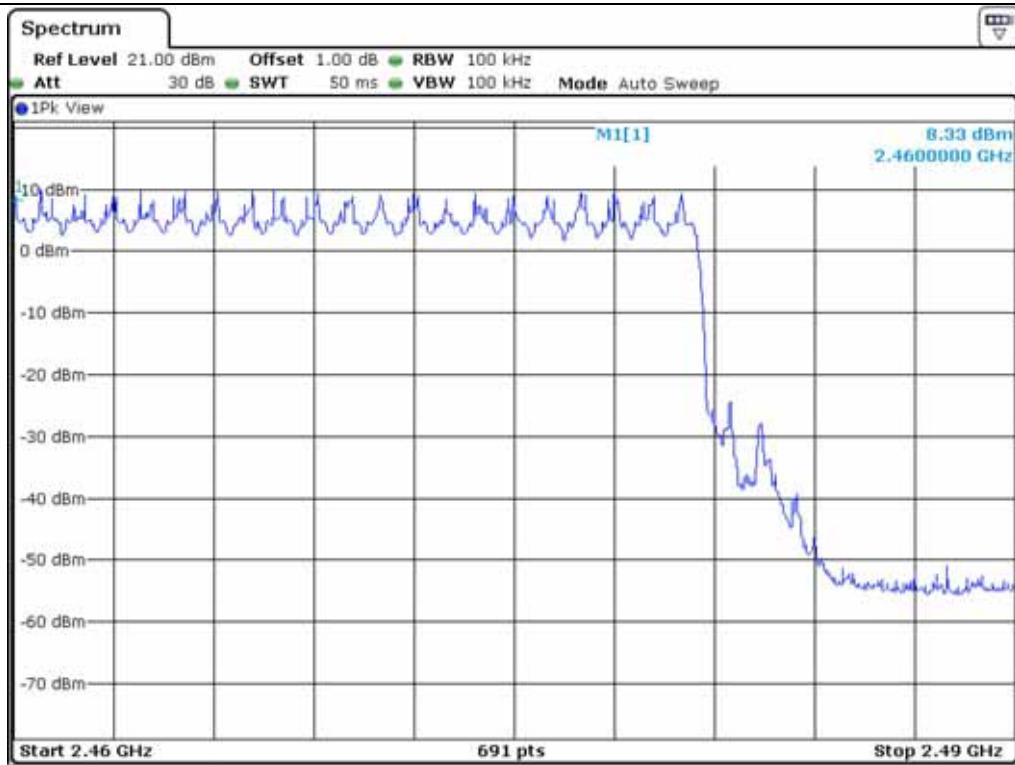




Number of hopping channel: 28



Number of hopping channel: 30



Number of hopping channel: 21

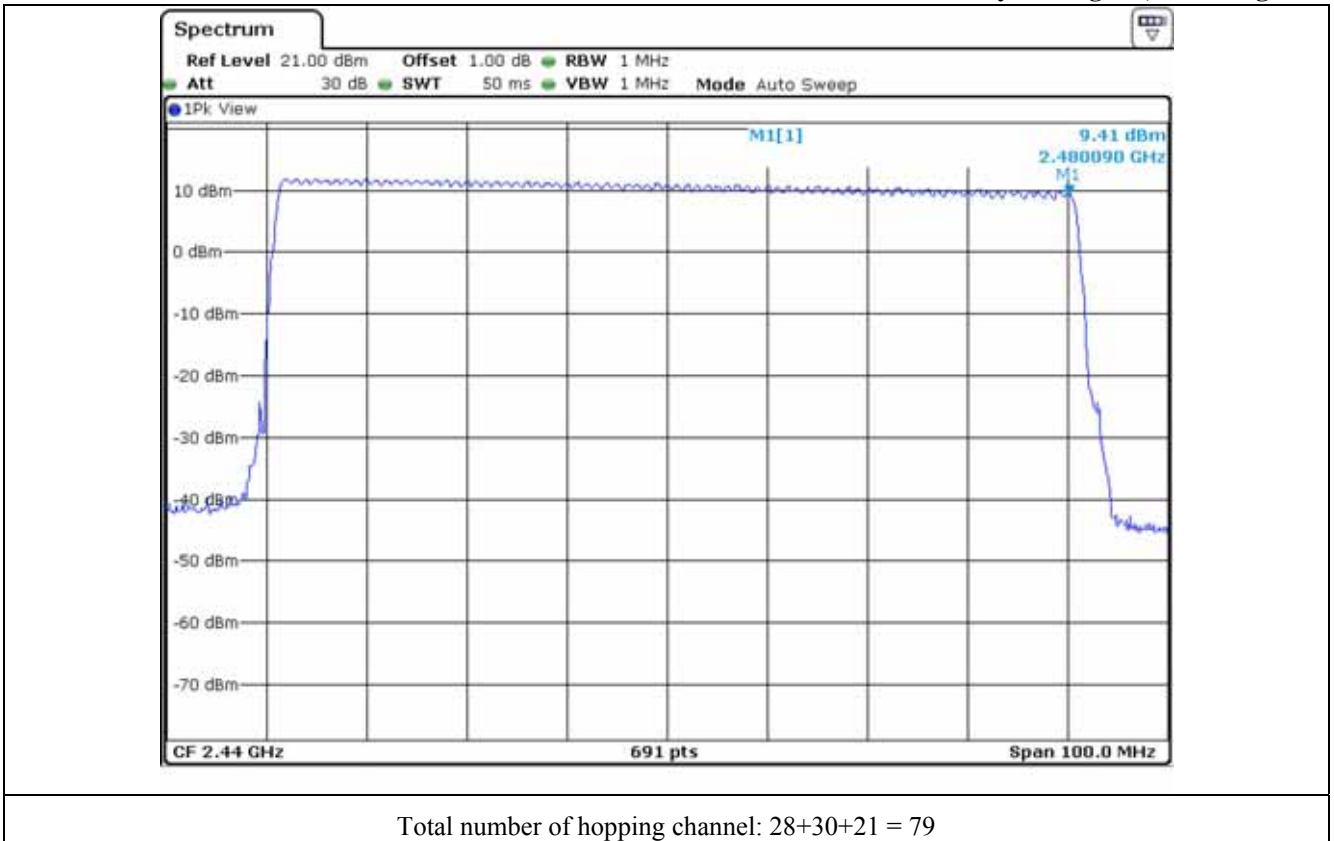
**7.3.4.3 Test data for 3 Mbps**

- Test Date : January 24, 2012
- Test Result : Pass

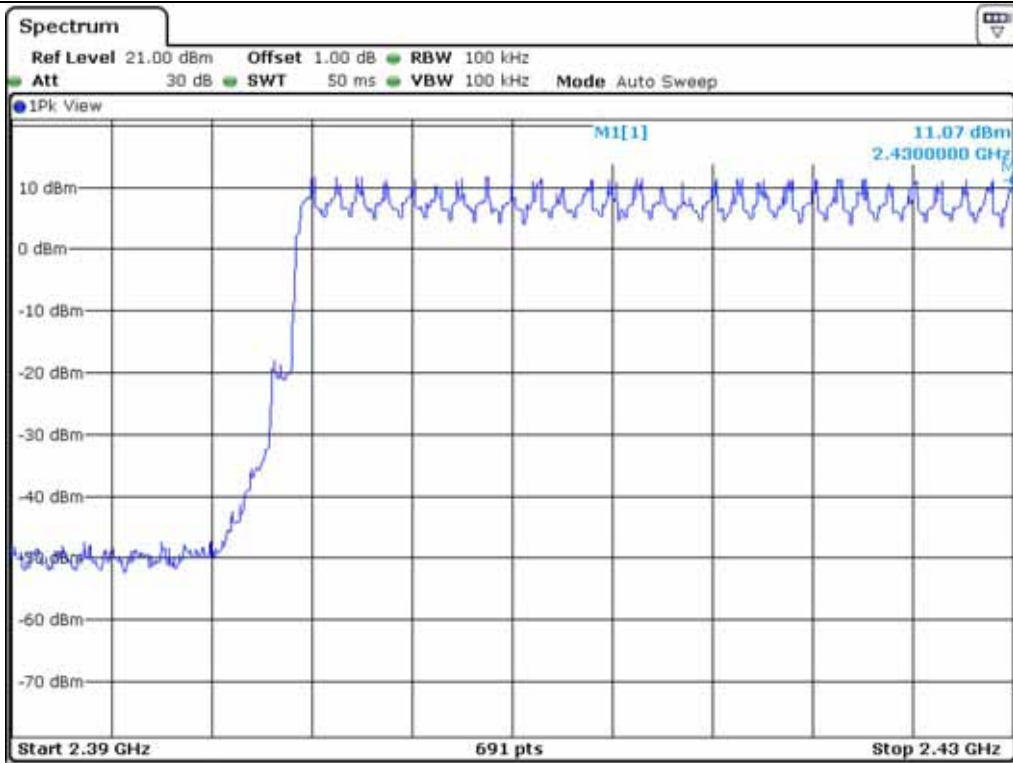
MEASURED VLAUE (Number)	LIMIT (Number)	MARGIN (Number)
79	Minimum of 15	64



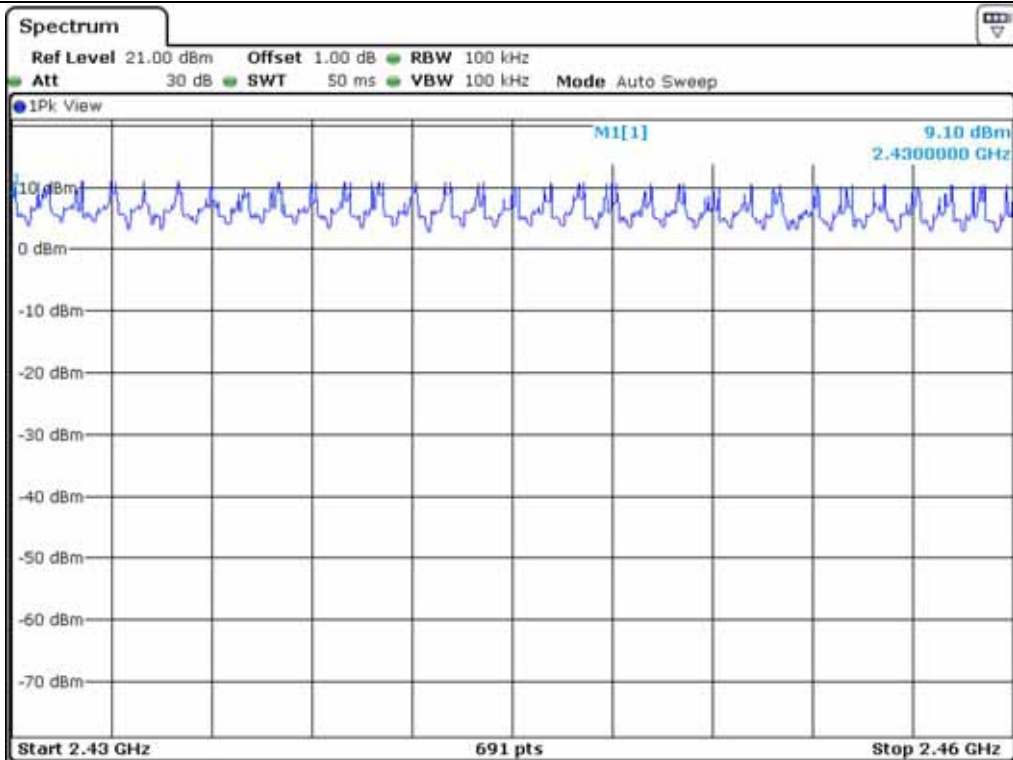
**Tested by: Chang-Uk, Jun / Engineer**



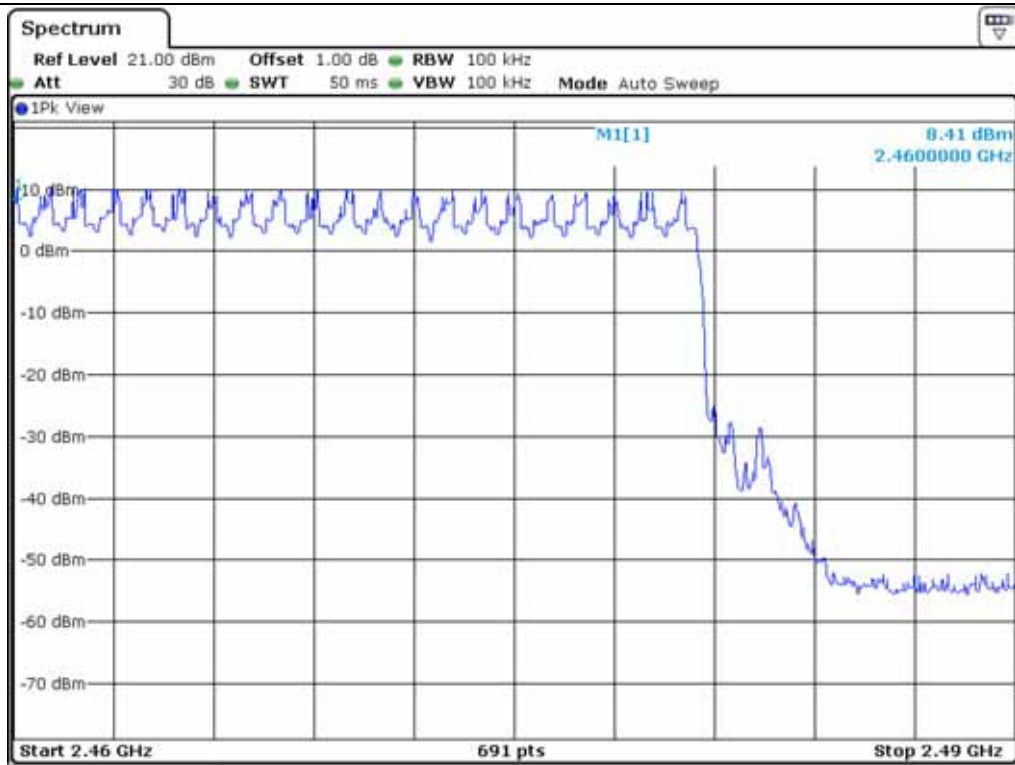
Total number of hopping channel: 28+30+21 = 79



Number of hopping channel: 28



Number of hopping channel: 30



Number of hopping channel: 21

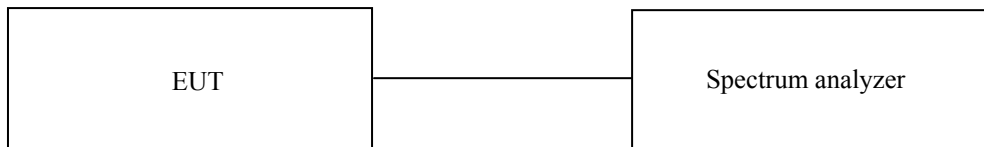
## 7.4 TIME OF OCCUPANCY

### 7.4.1 Operating environment

Temperature : 26 °C  
Relative humidity : 46 % R.H.

### 7.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The transmitter is set to operate in its normal frequency hopping mode. The center frequency of the spectrum analyzer is set to one of hopping channels near the center of the operating band and span is set to zero Hz. The sweep time is set to display one complete pulse. The mark delta function is used to measure the duration of the pulses.



### 7.4.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

**7.4.4 Test data**

**7.4.4.1 Test data for 1 Mbps**

- Test Date : January 23, 2012

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

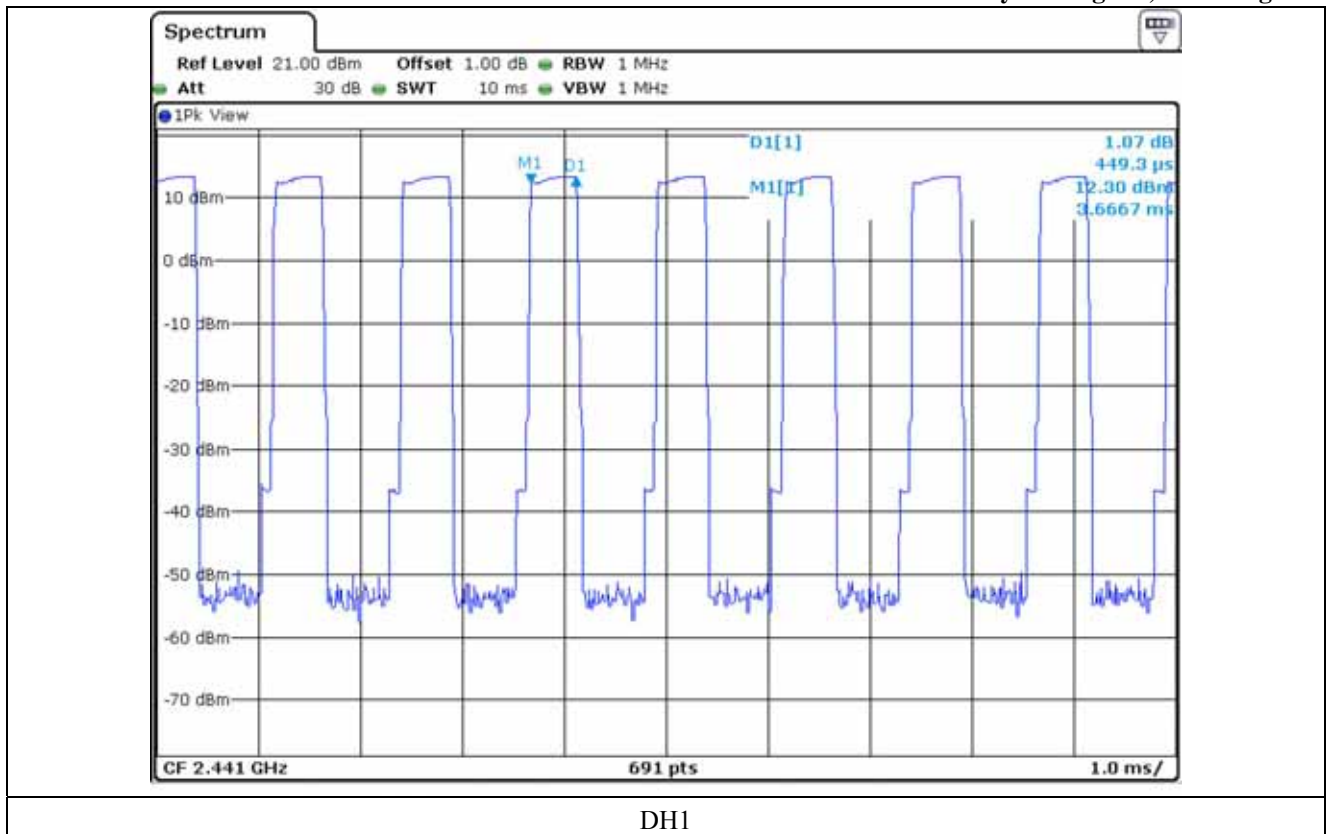
Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.449 3	10.13	31.6	143.82	400	PASS
DH3	1.681 2	5.06	31.6	268.81	400	PASS
DH5	2.942 0	3.38	31.6	314.23	400	PASS

Total dwell time is calculated as following.

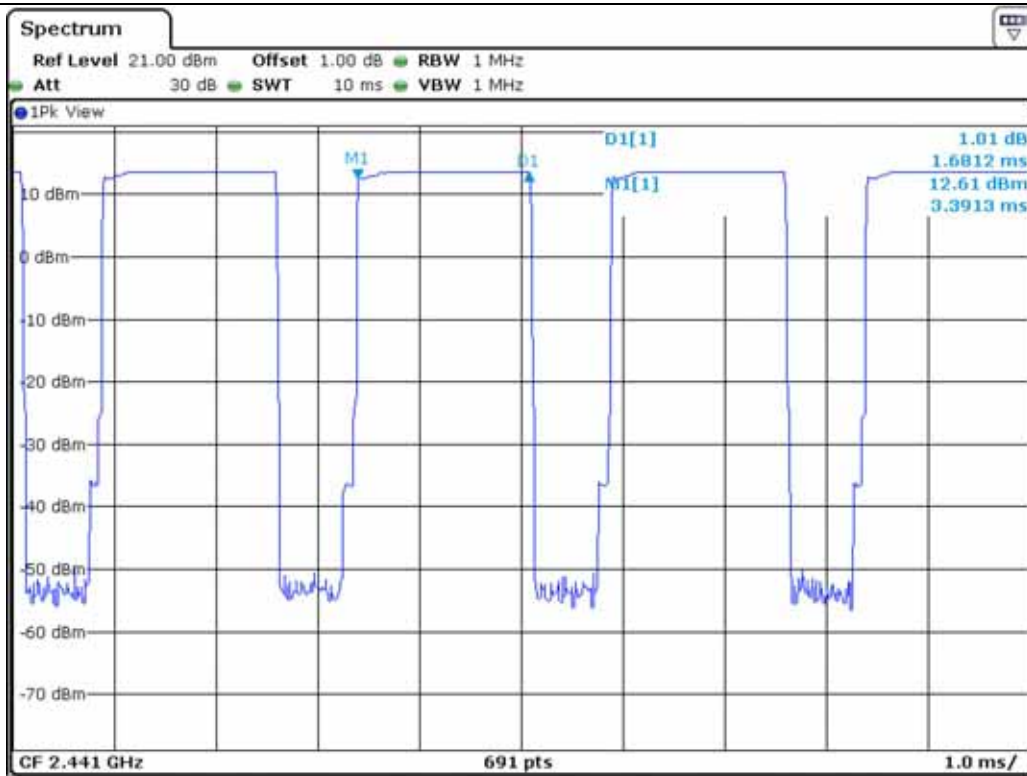
Total Dwell Time = Pulse time \* Hops per second with channels \* period time



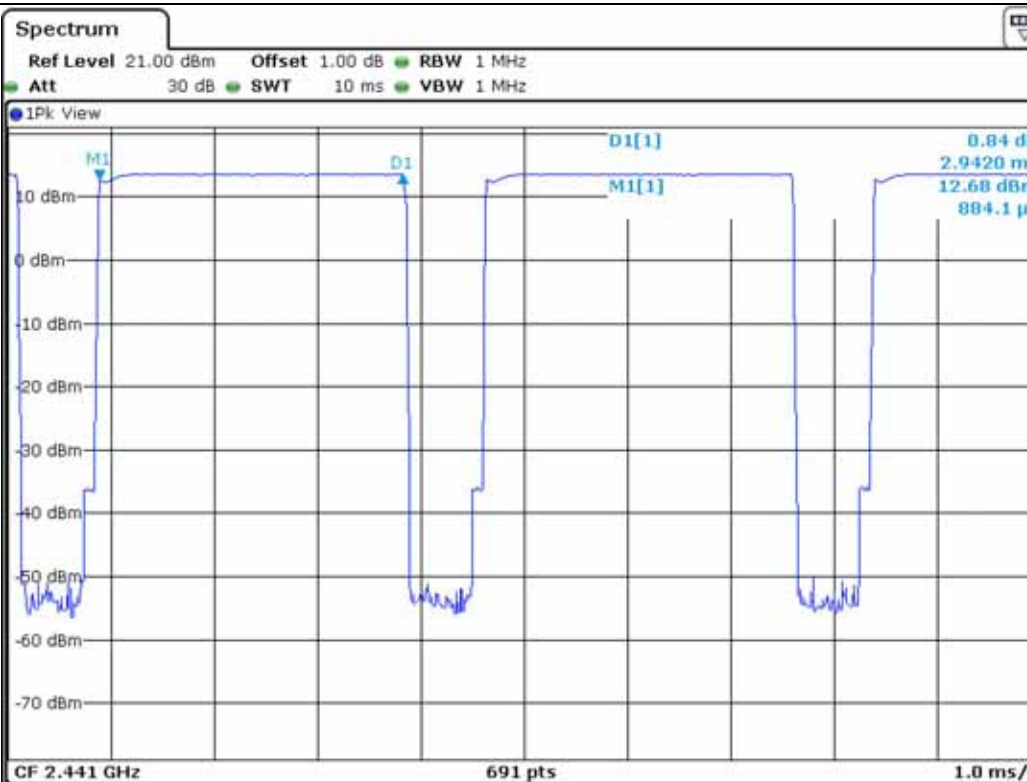
**Tested by: Chang-Uk, Jun / Engineer**







DH3



DH5

**7.4.4.2 Test data for 2 Mbps**

- Test Date : January 23, 2012

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

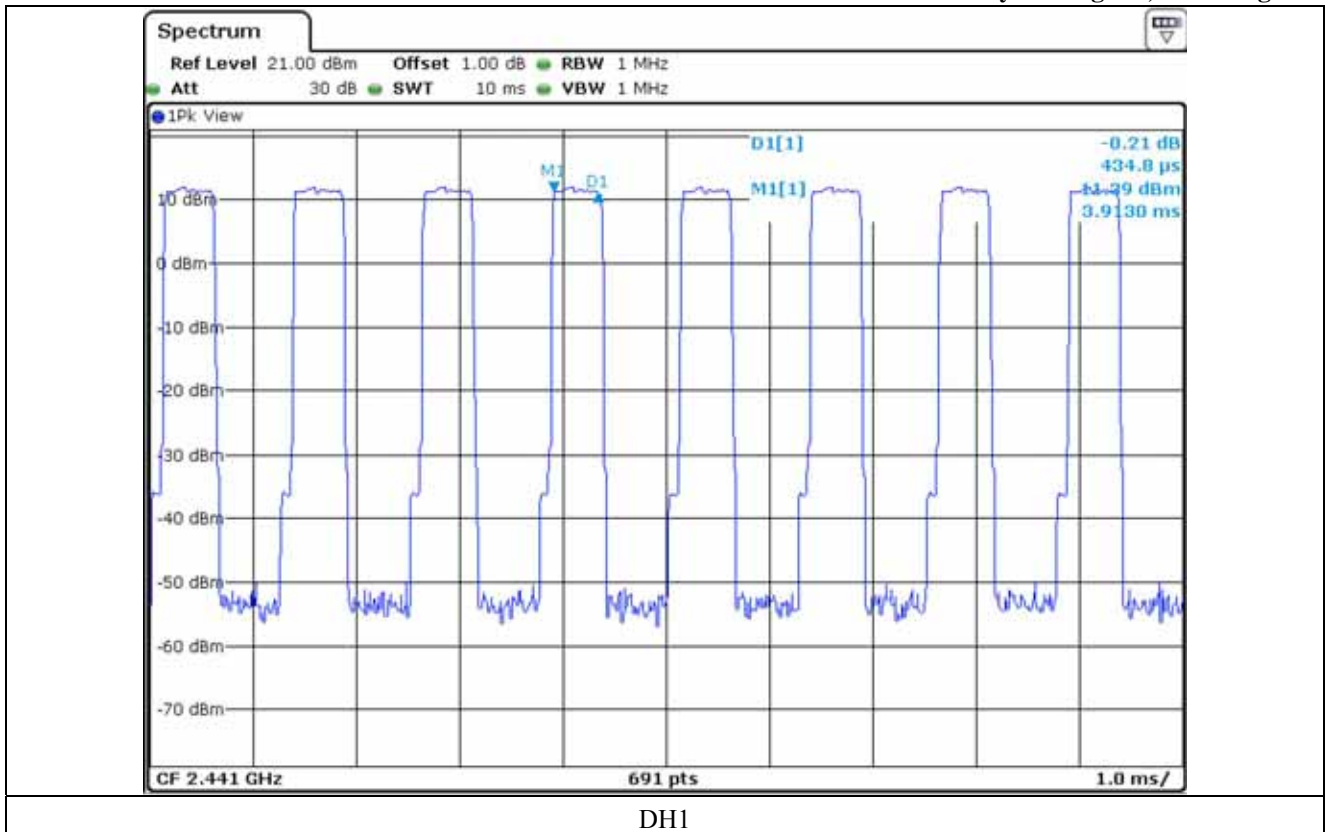
Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.434 8	10.13	31.6	139.18	400	PASS
DH3	1.695 7	5.06	31.6	271.14	400	PASS
DH5	2.956 5	3.38	31.6	315.78	400	PASS

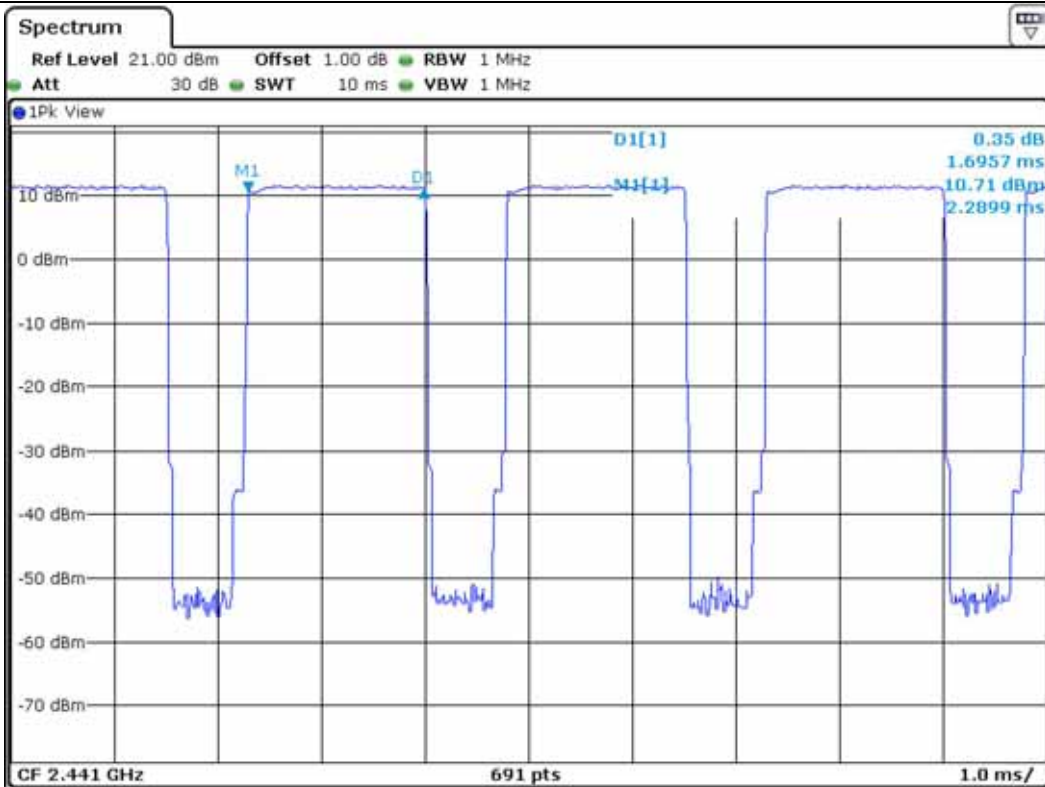
Total dwell time is calculated as following.

Total Dwell Time = Pulse time \* Hops per second with channels \* period time

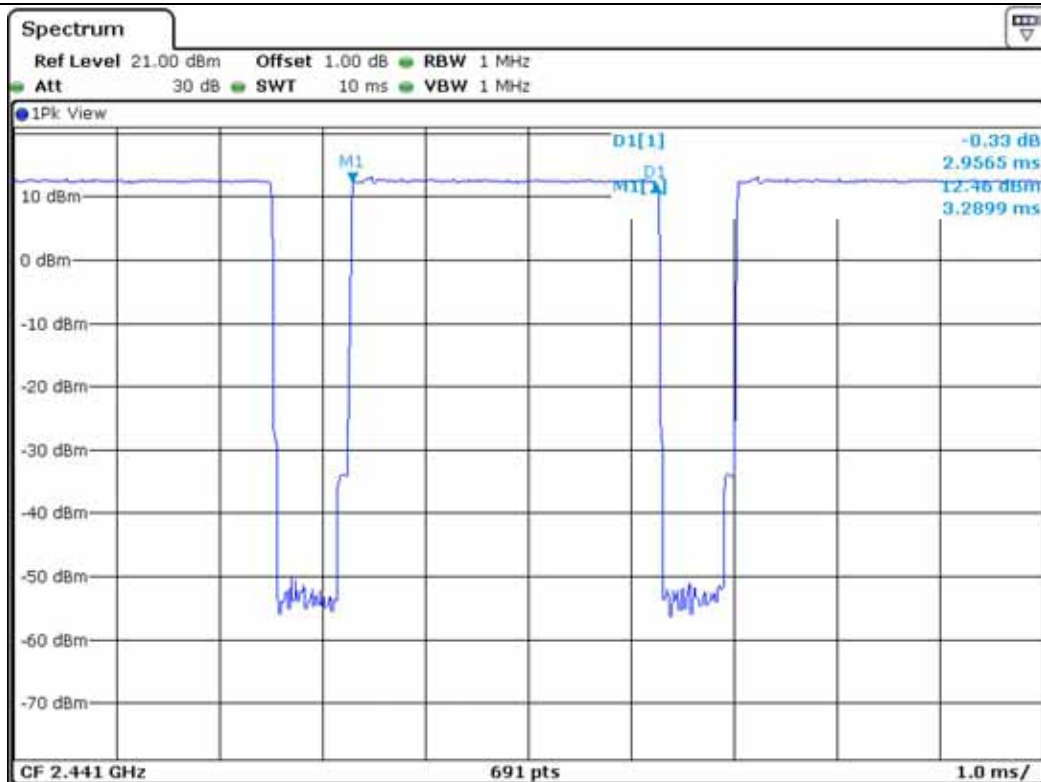


Tested by: Chang-Uk, Jun / Engineer





DH3



DH5

**7.4.4.3 Test data for 3 Mbps**

- Test Date : January 23, 2012

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

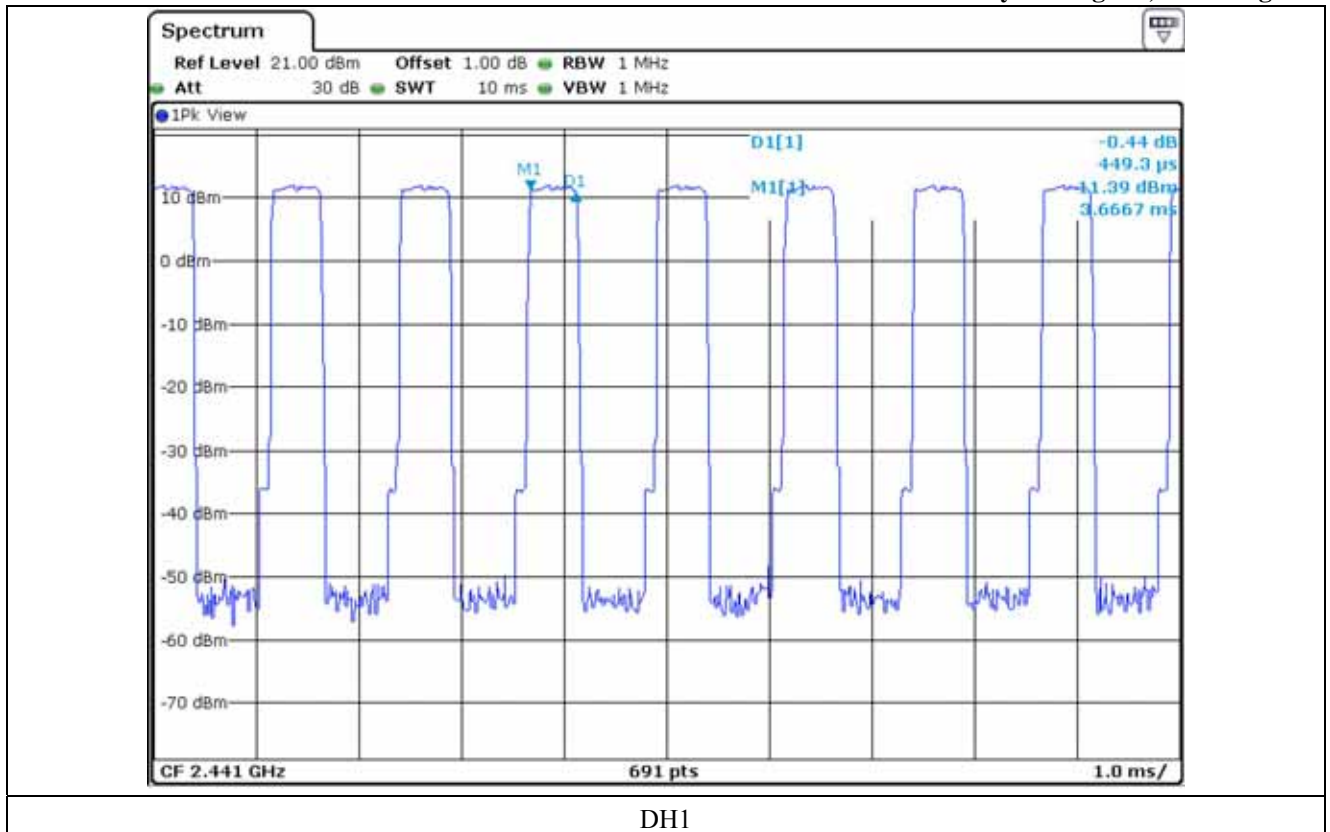
Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.449 3	10.13	31.6	143.82	400	PASS
DH3	1.695 7	5.06	31.6	271.14	400	PASS
DH5	2.971 0	3.38	31.6	317.33	400	PASS

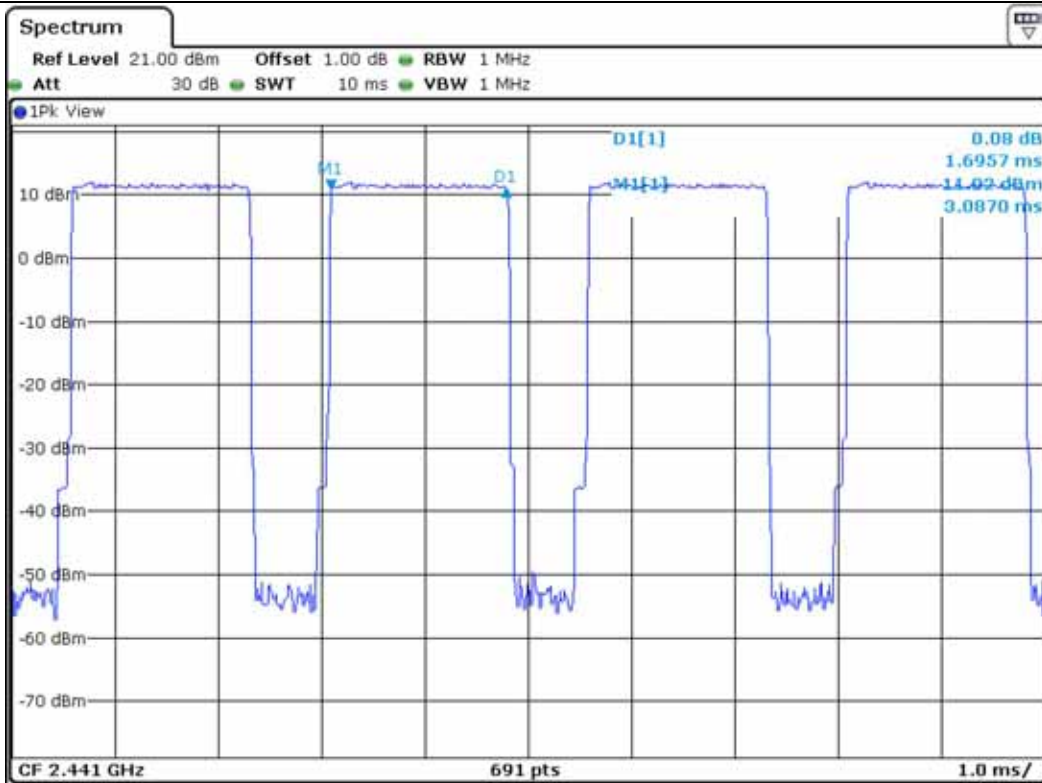
Total dwell time is calculated as following.

Total Dwell Time = Pulse time \* Hops per second with channels \* period time

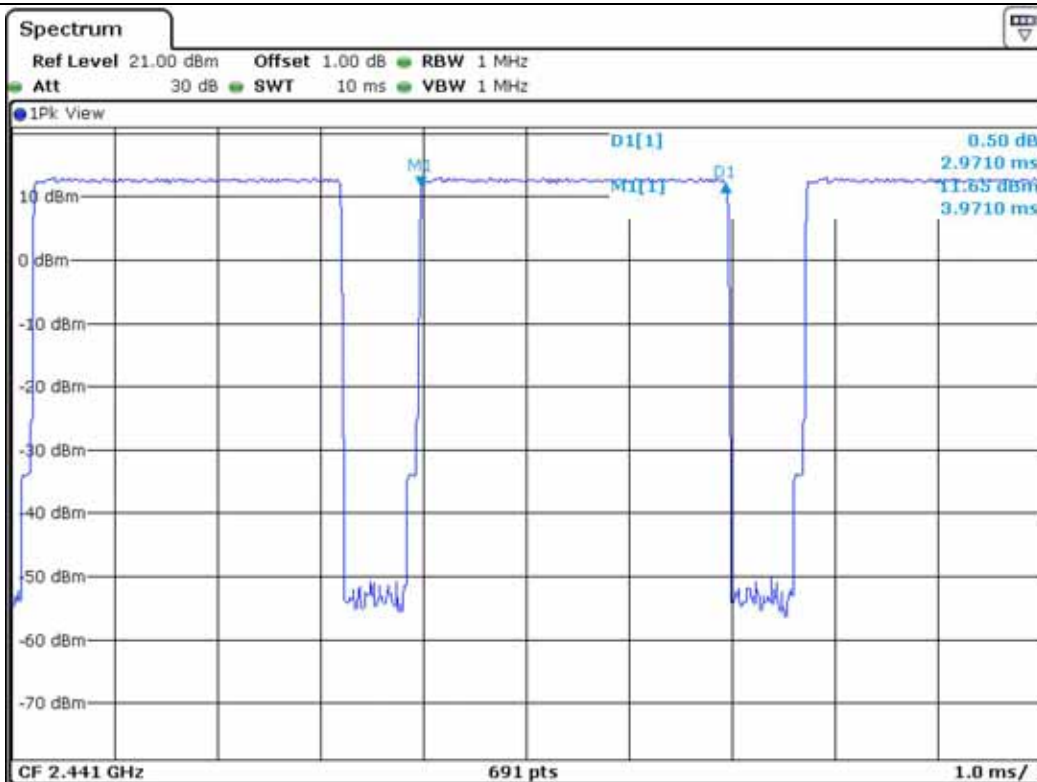


**Tested by: Chang-Uk, Jun / Engineer**





DH3



DH5

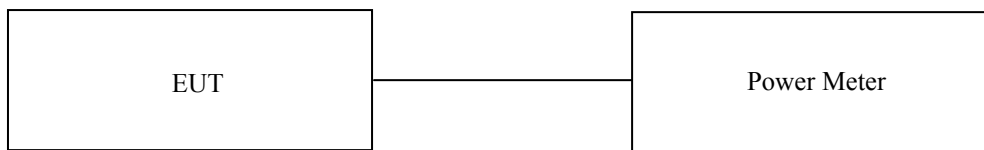
## 7.5 MAXIMUM PEAK OUTPUT POWER

### 7.5.1 Operating environment

Temperature : 25 °C  
Relative humidity : 43 % R.H.

### 7.5.2 Test set-up

The maximum peak output power was measured with the power meter connected to the antenna output of the EUT. The EUT was operating in transmit mode at the appropriate center frequency.



### 7.5.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

### 7.5.4 Test data

#### 7.5.4.1 Test data for 1 Mbps

- Test Date : January 23, 2012  
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	11.41	30.0	18.59
Middle	2 441	11.56	30.0	18.44
High	2 480	11.36	30.0	18.64



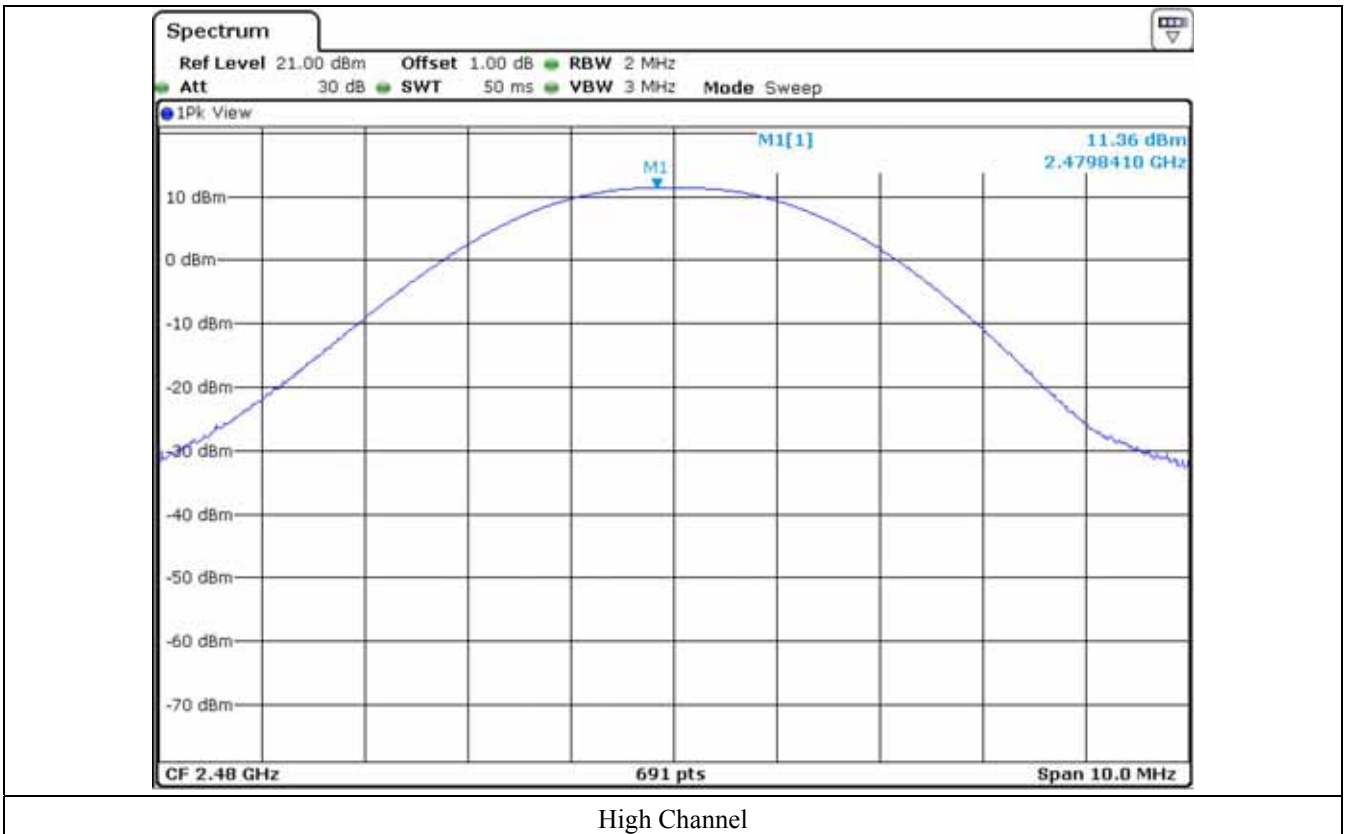
**Tested by: Chang-Uk, Jun / Engineer**



Low Channel



Middle Channel



High Channel

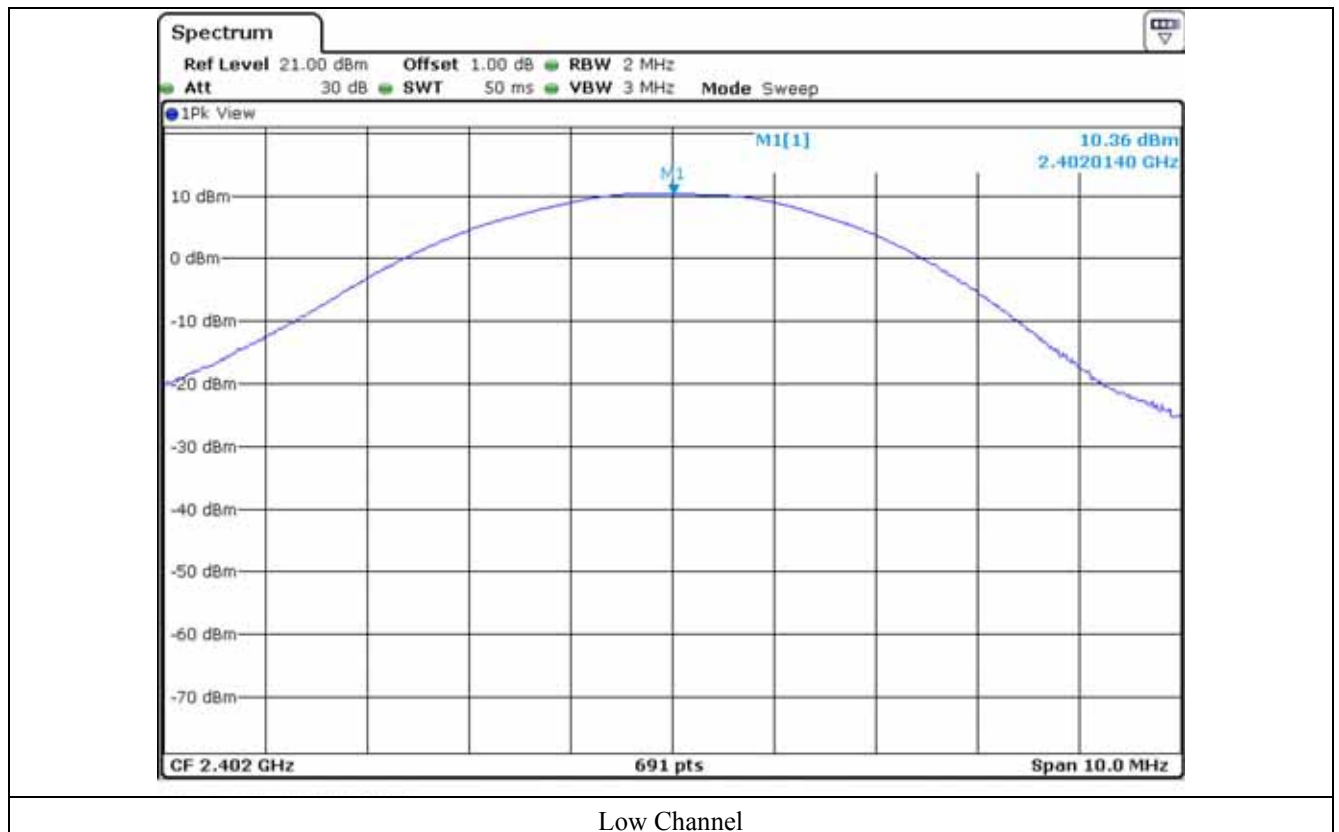


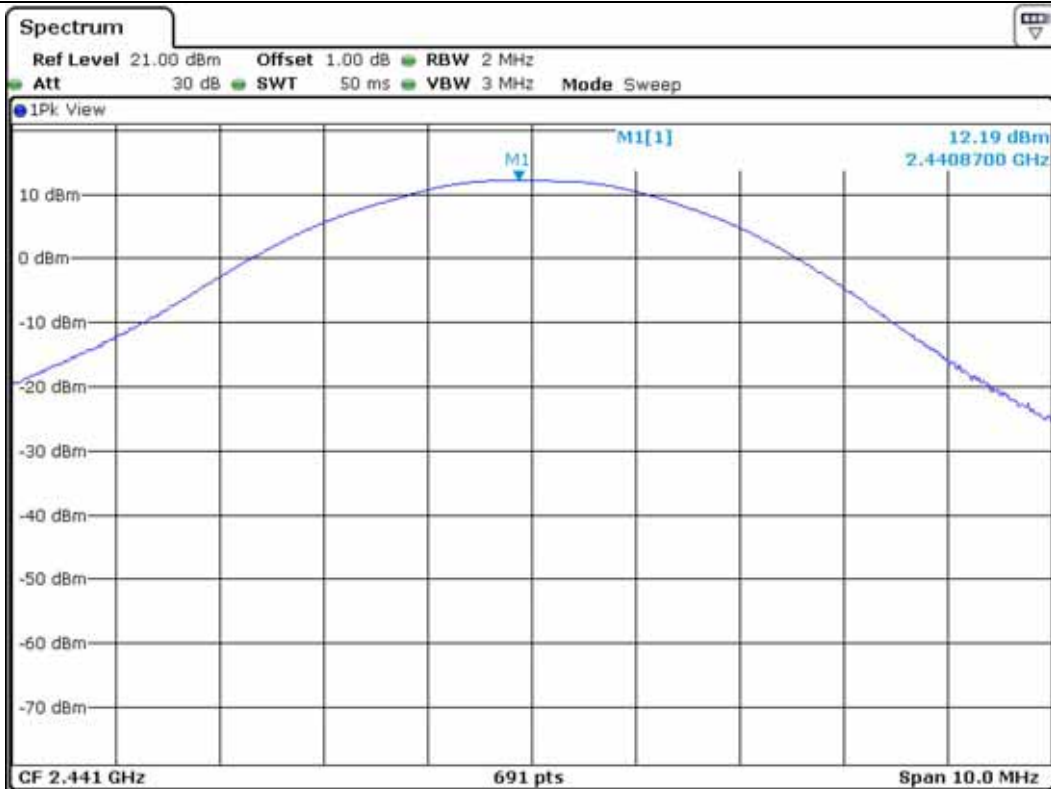
**7.5.4.2 Test data for 2 Mbps**

- Test Date : January 23, 2012
- Test Result : Pass

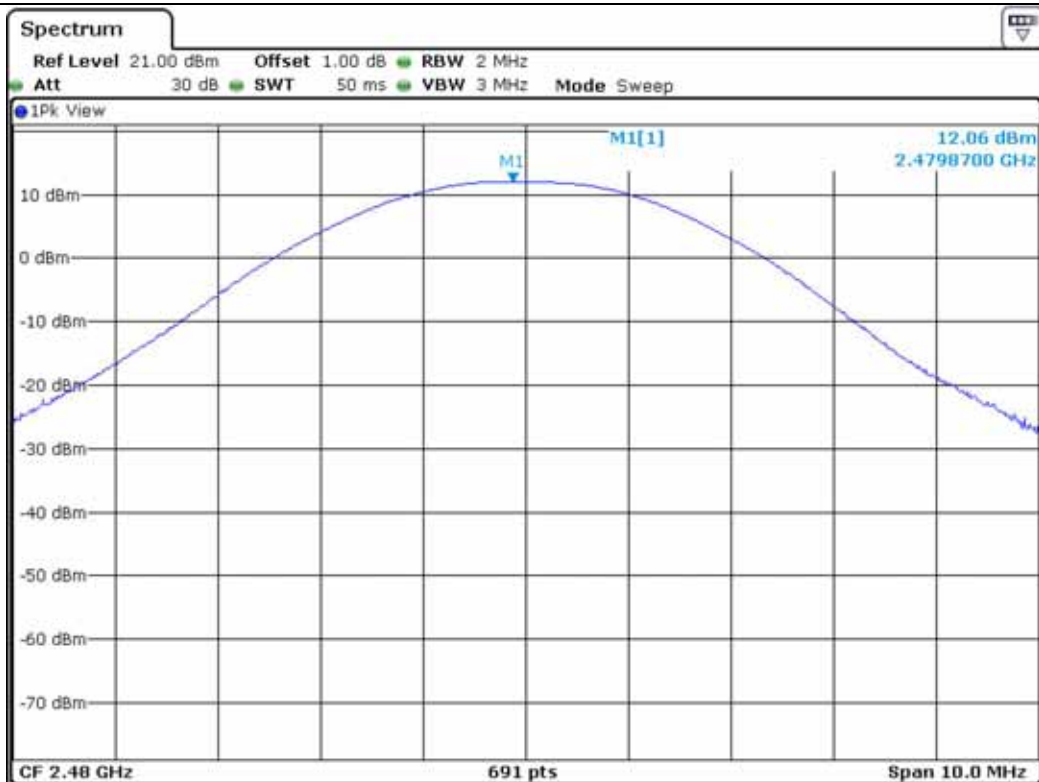
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	10.36	30.0	19.64
Middle	2 441	12.19	30.0	17.81
High	2 480	12.06	30.0	17.94

**Tested by: Chang-Uk, Jun / Engineer**





Middle Channel



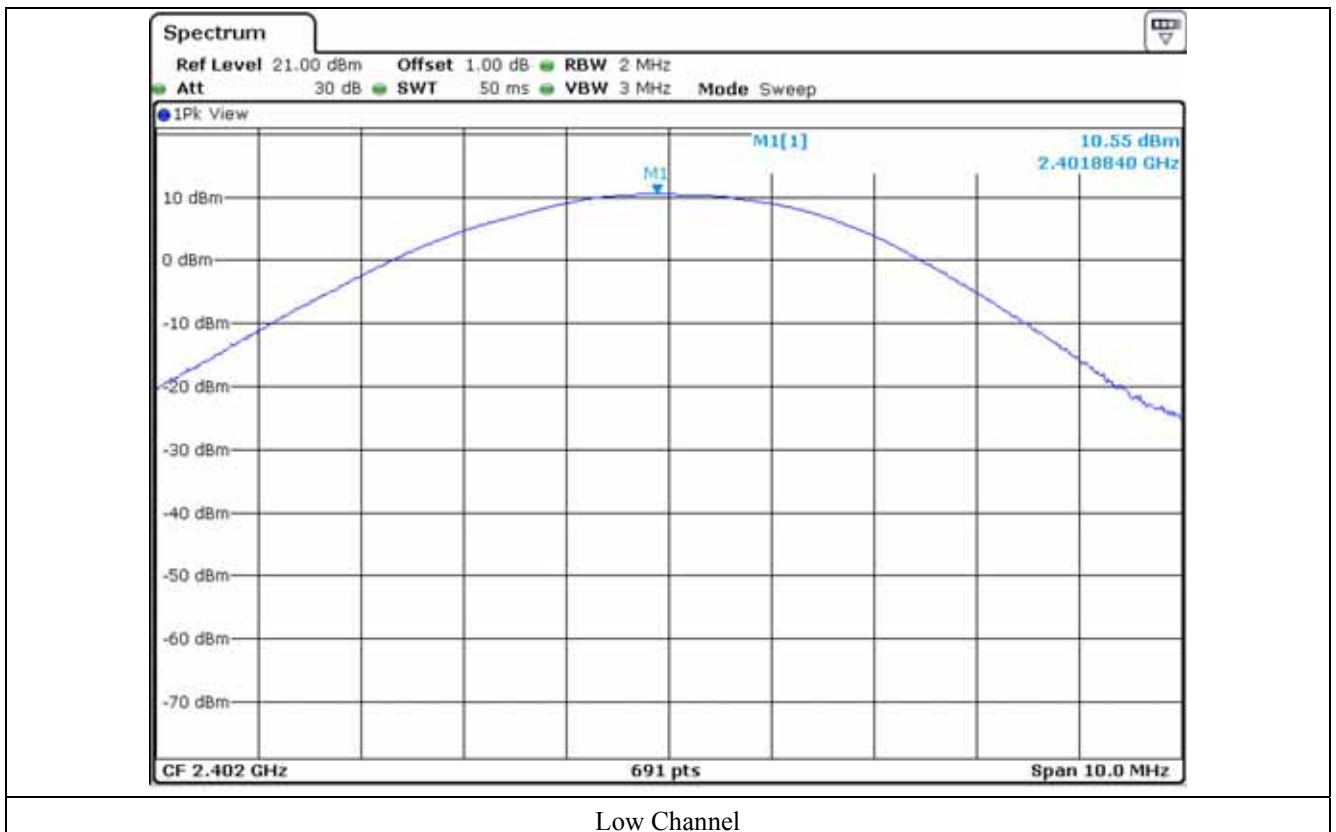
High Channel

**7.5.4.3 Test data for 3 Mbps**

- Test Date : January 25, 2012
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	10.55	30.0	19.45
Middle	2 441	12.30	30.0	17.70
High	2 480	12.08	30.0	17.92

**Tested by: Chang-Uk, Jun / Engineer**





Middle Channel



High Channel

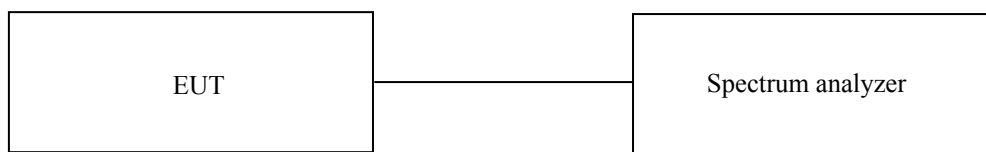
## 7.6 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

### 7.6.1 Operating environment

Temperature : 25 °C  
Relative humidity : 43 % R.H.

### 7.6.2 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.



### 7.6.3 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 9 KHz to 25 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 ms in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

### 7.6.4 Test equipment used

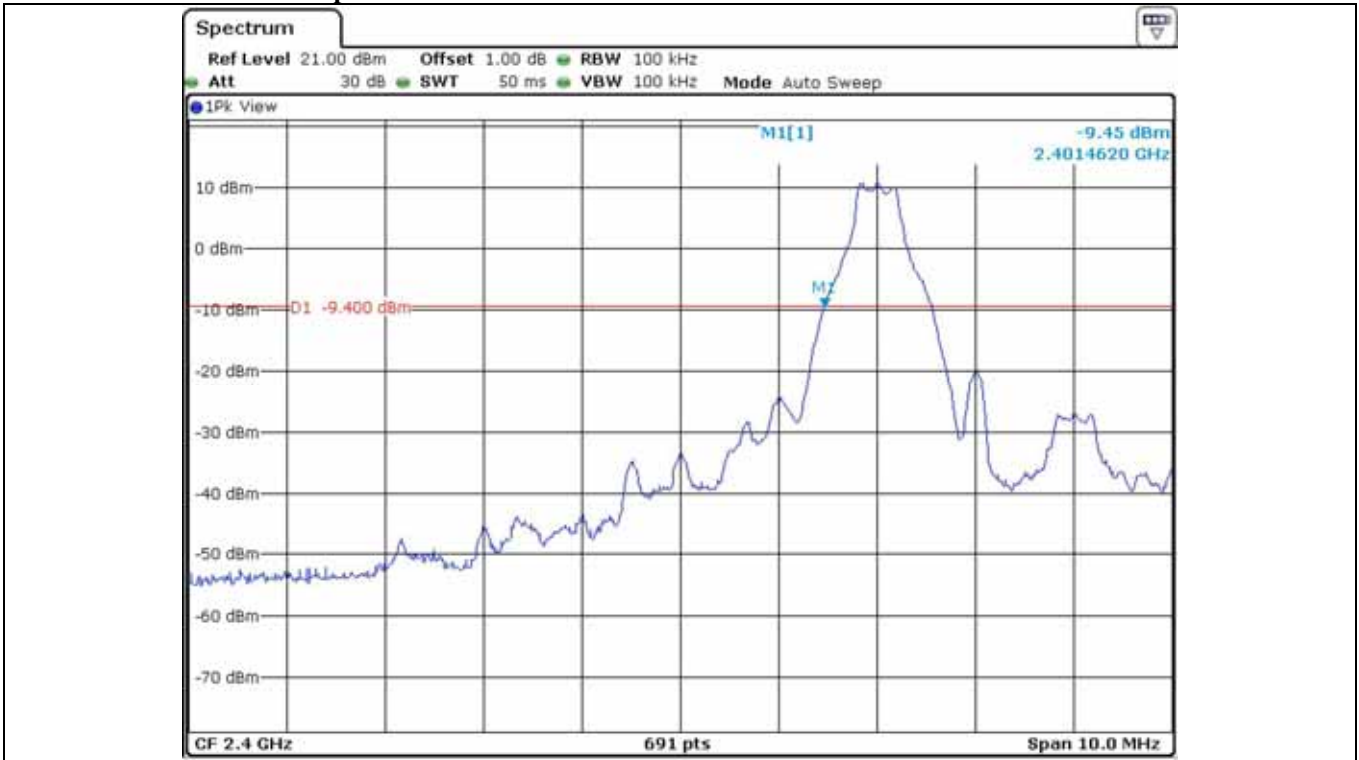
	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
□ -	ESCI	Rohde & Schwarz	EMI Test Receiver	101012	Feb. 06, 2012 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	SEP.11, 2012 (1Y)
■ -	310N	Sonoma Instrument	AMPLIFIER	312544	Oct 11, 2012(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)
■ -	SCU-18	Rohde & Schwarz	PRE-AMPLIFIER	10041	Dec 15, 2011 (1Y)
■ -	MA240	HD GmbH	Antenna Master	N/A	N/A
■ -	HD100	HD GmbH	Position Controller	N/A	N/A
■ -	DS420S	HD GmbH	Turn Table	N/A	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	VULB9163-202	May 27, 2010(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2011 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2011 (2Y)
■ -	HFH2-Z2	Rohde & Schwarz	Loop Antenna	889 285 / 26	Nov. 08, 2010(2Y)

All test equipment used is calibrated on a regular basis.

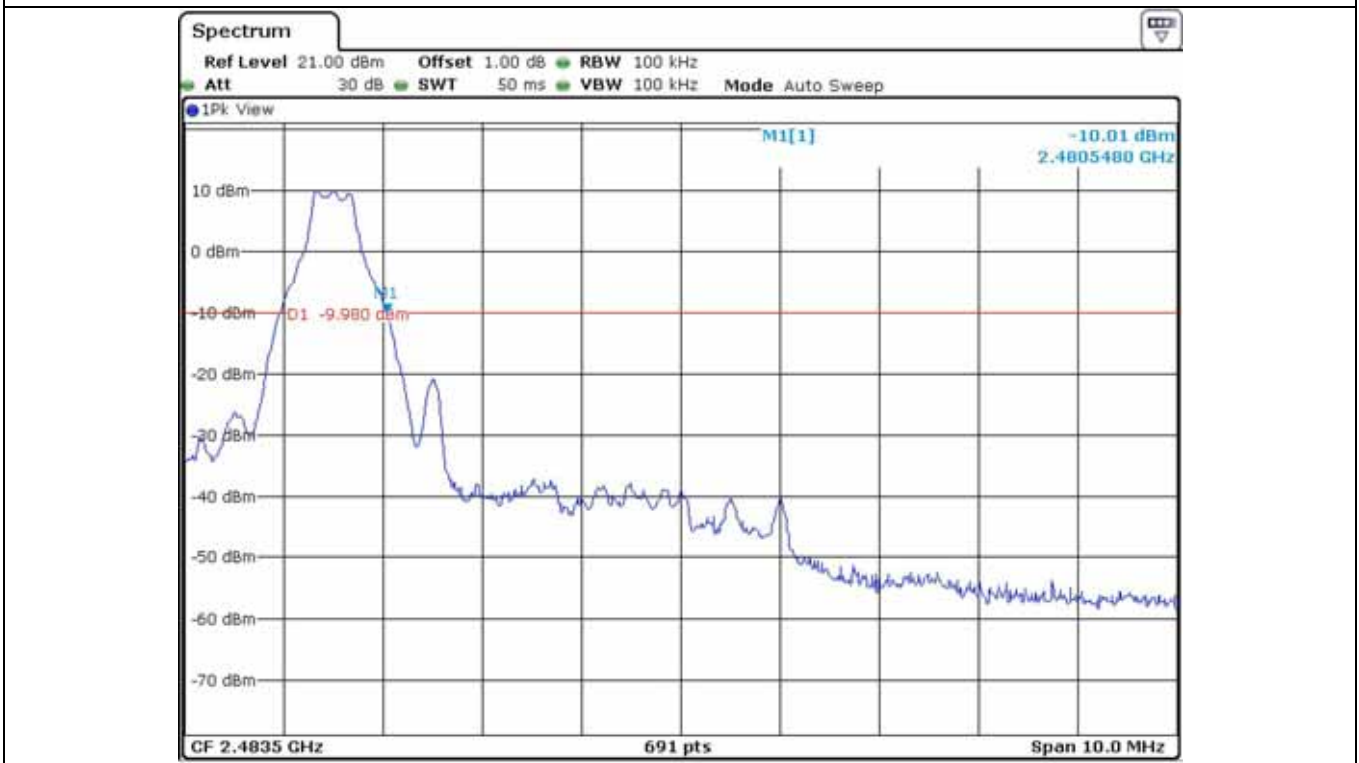
7.6.5. Test data

7.6.5.1. Test data for conducted emission

7.6.5.1.1 Test data for 1 Mbps



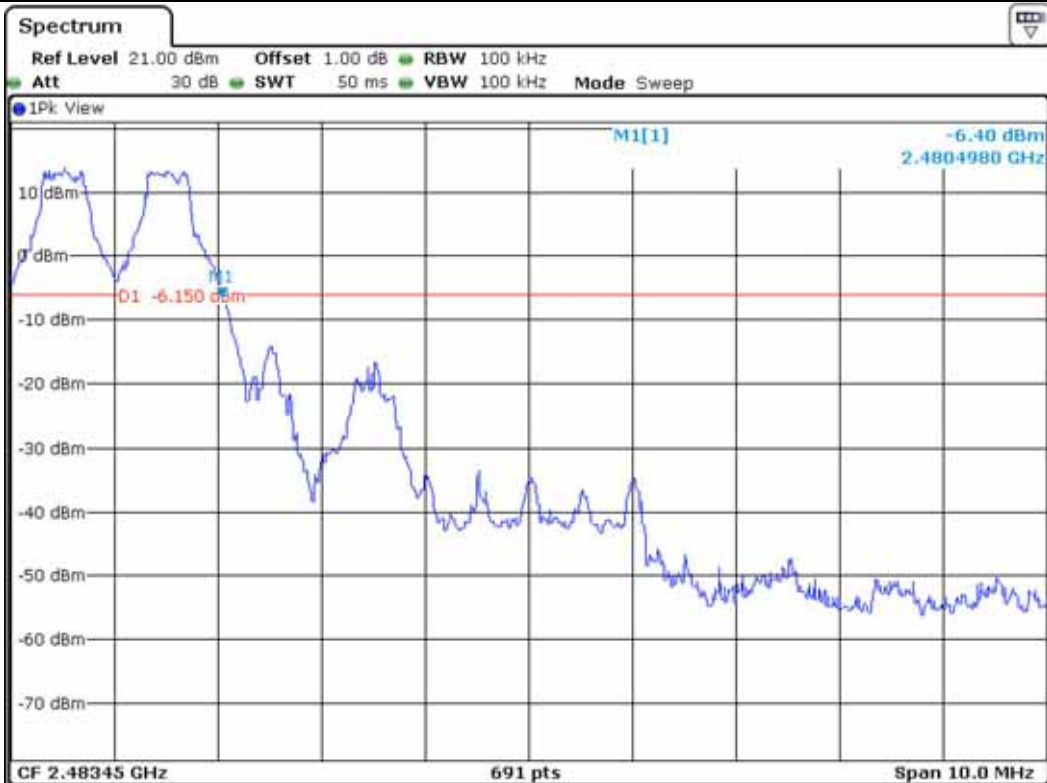
Low Channel



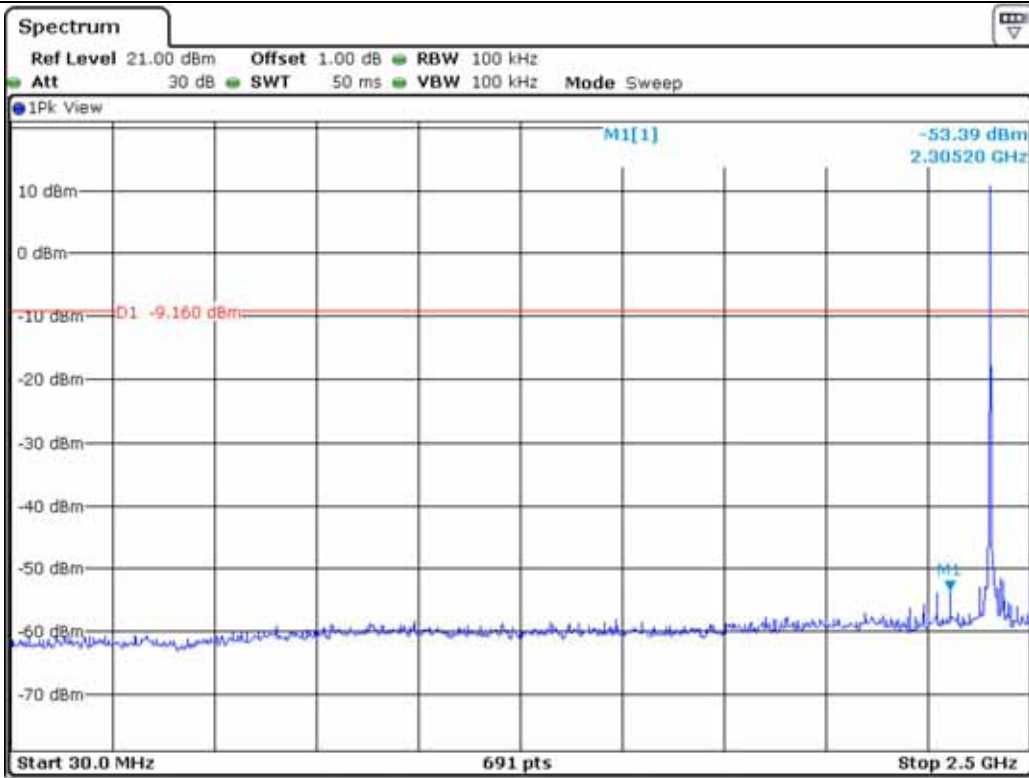
High Channel



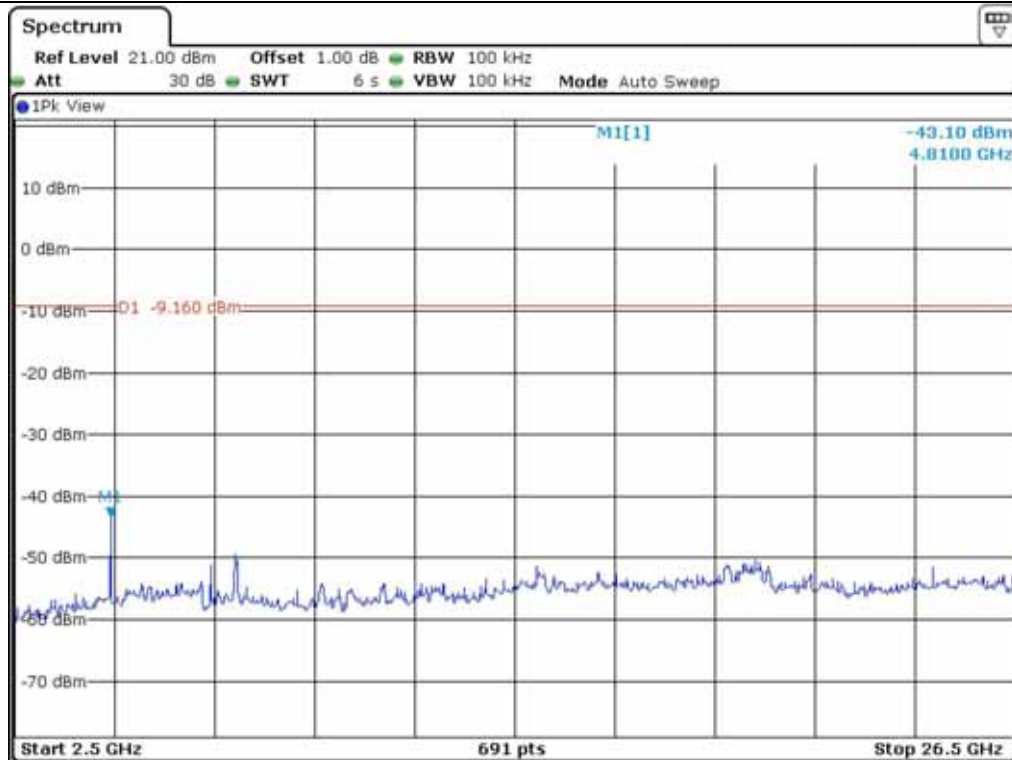
Low Channel



High Channel

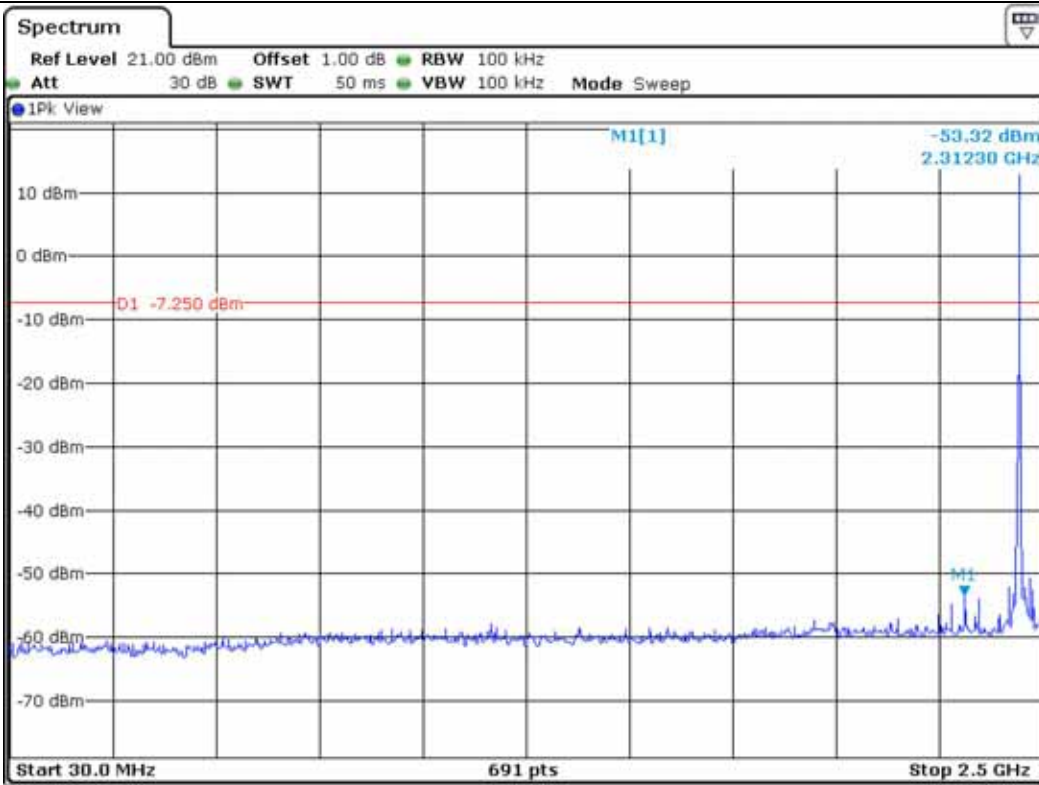


Low Channel

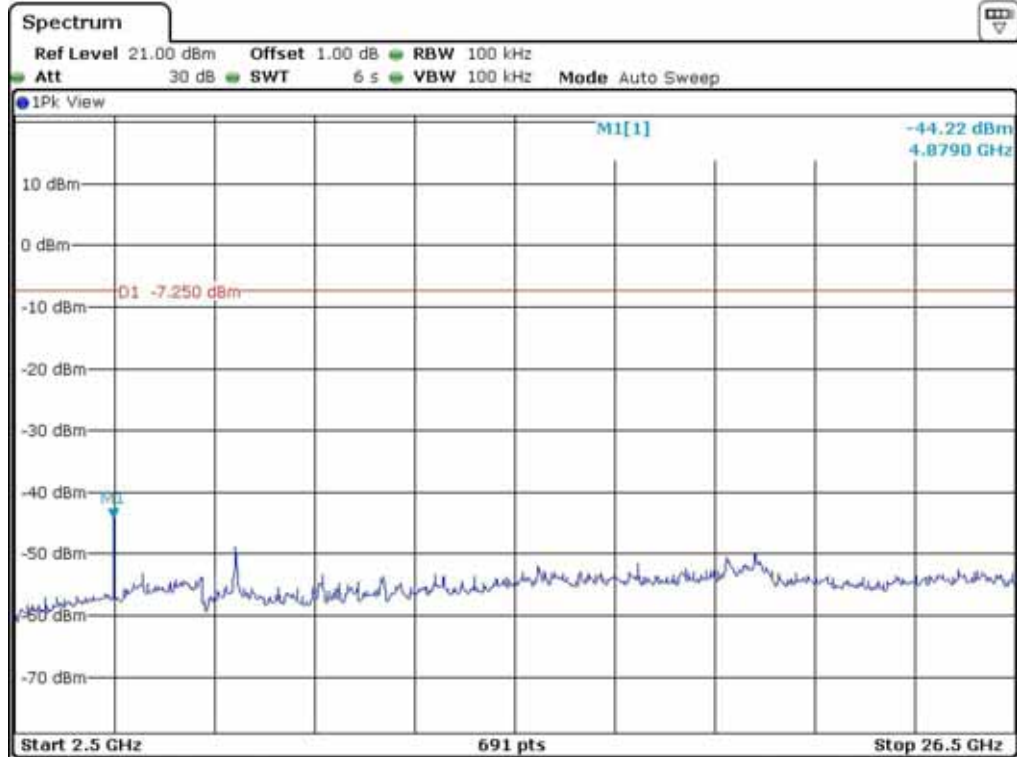


Low Channel

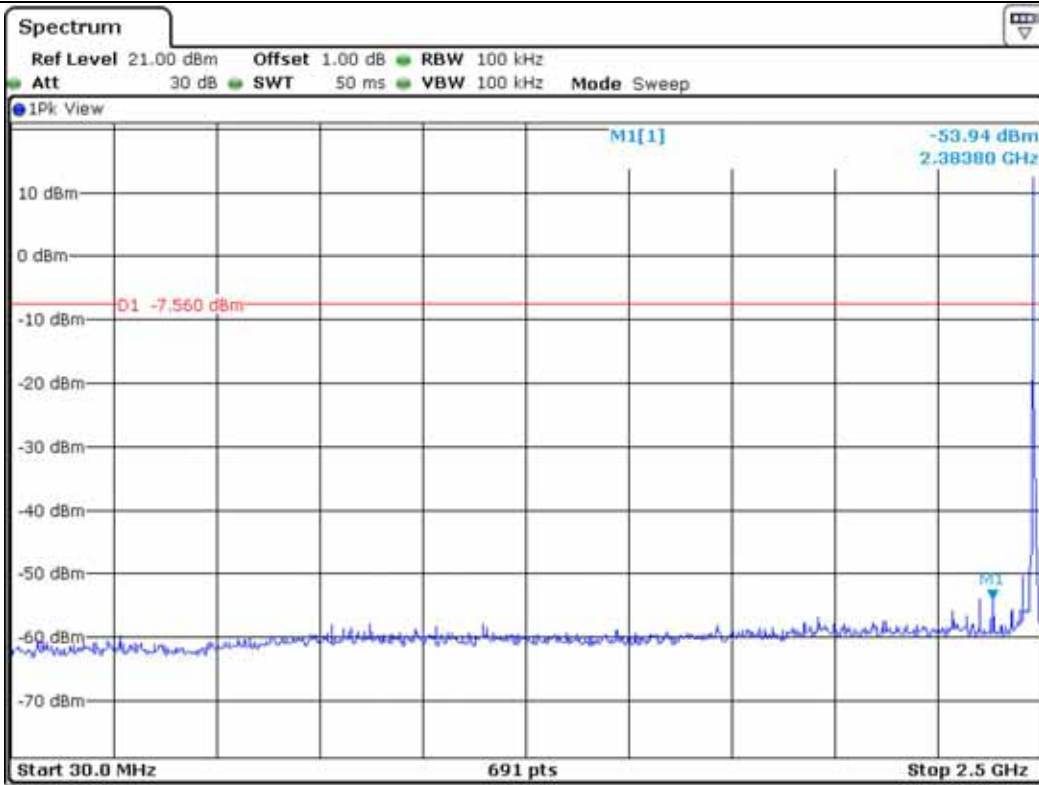




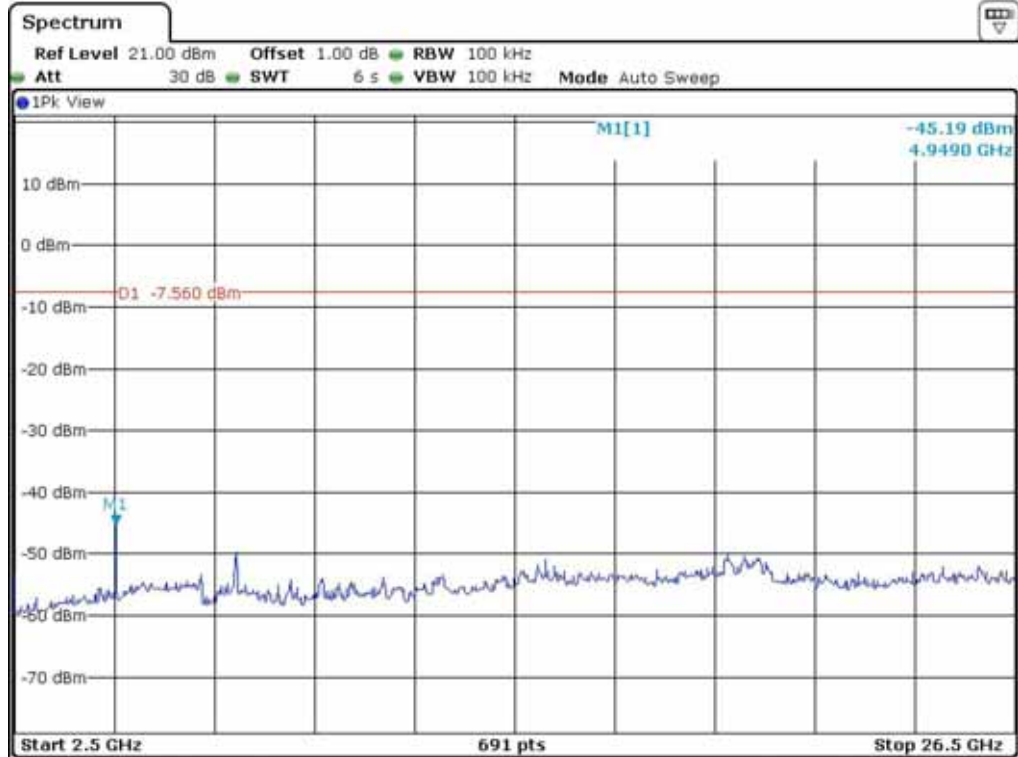
Middle Channel



Middle Channel

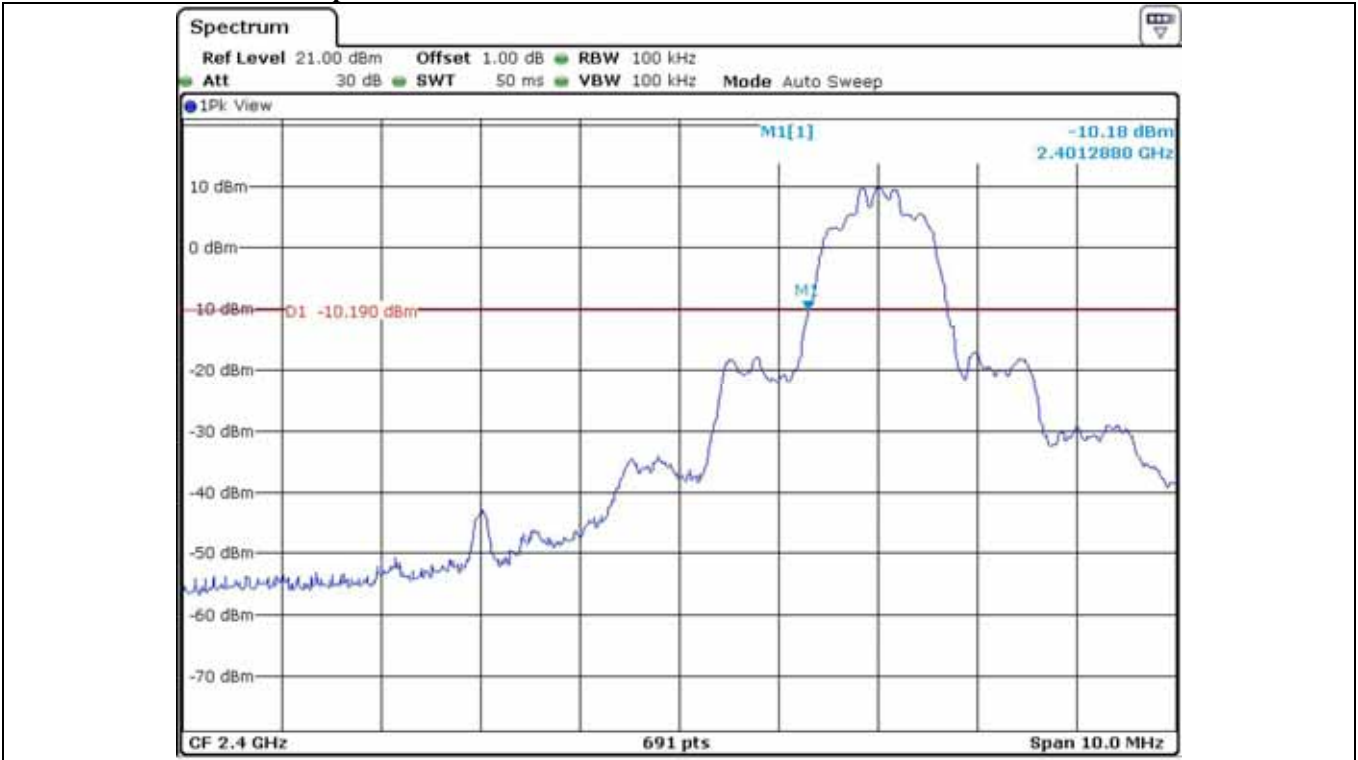


High Channel

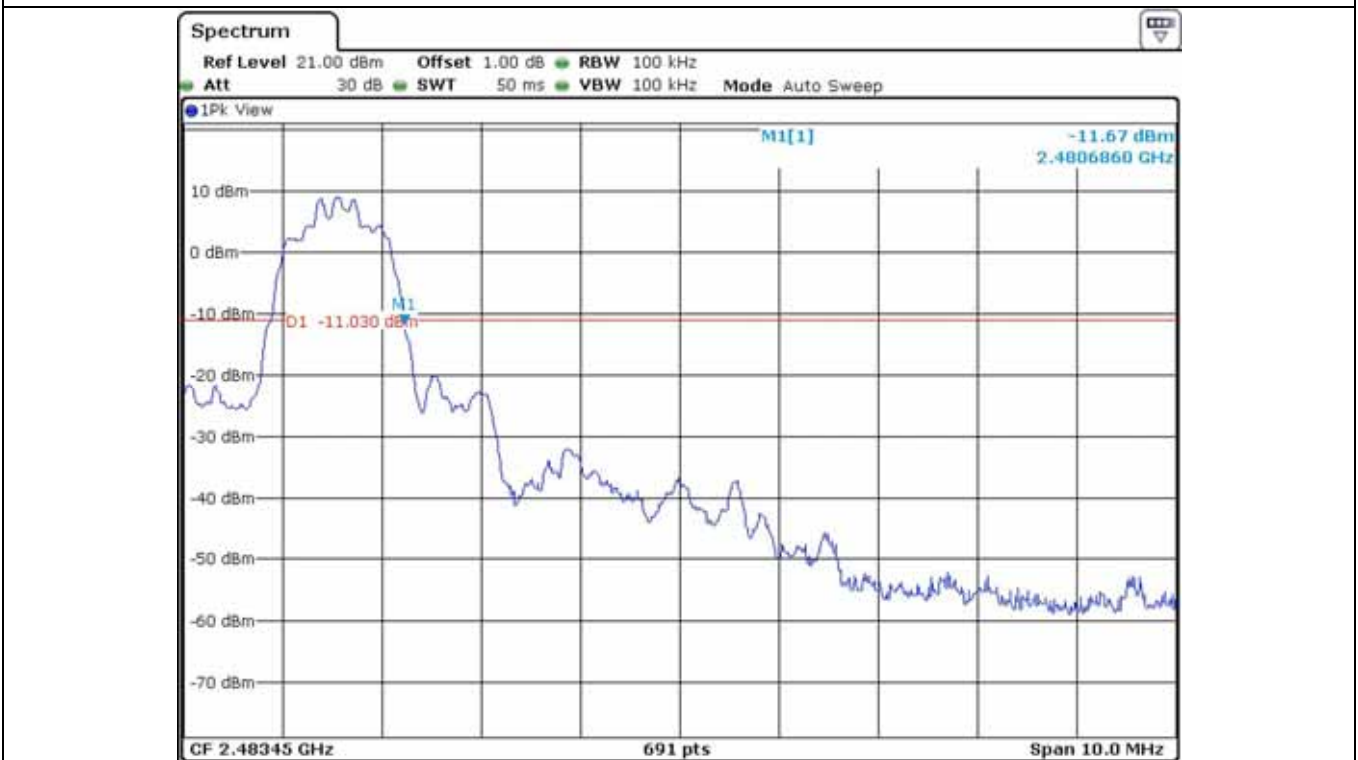


High Channel

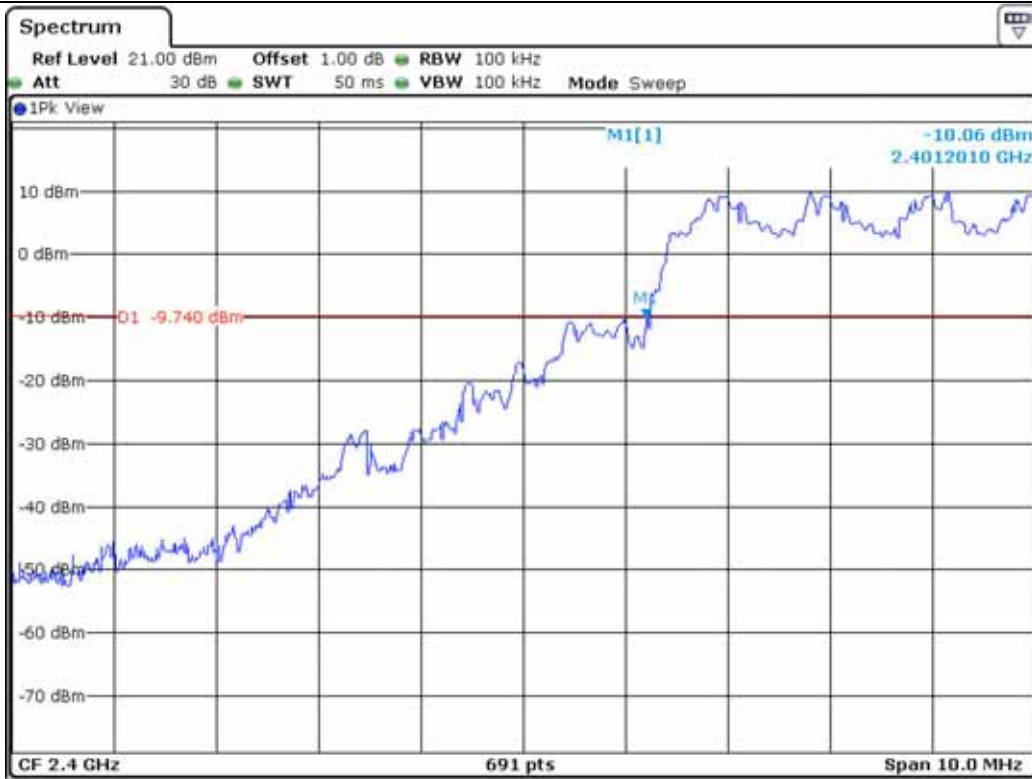
7.6.5.1.2 Test data for 2 Mbps



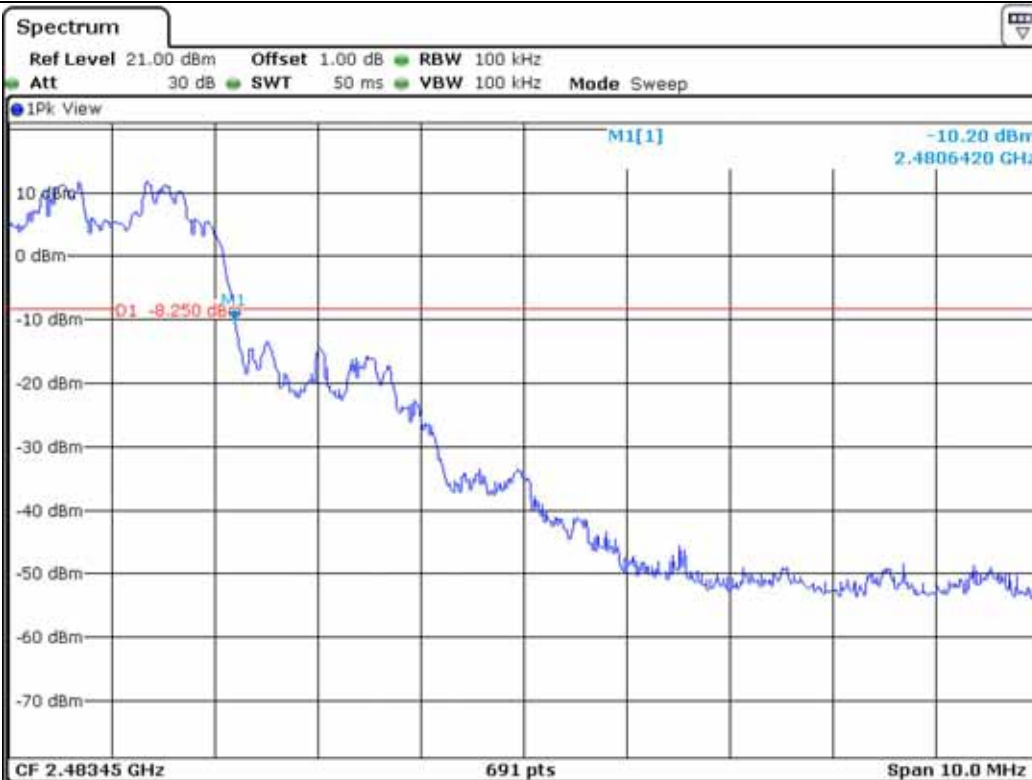
Low Channel



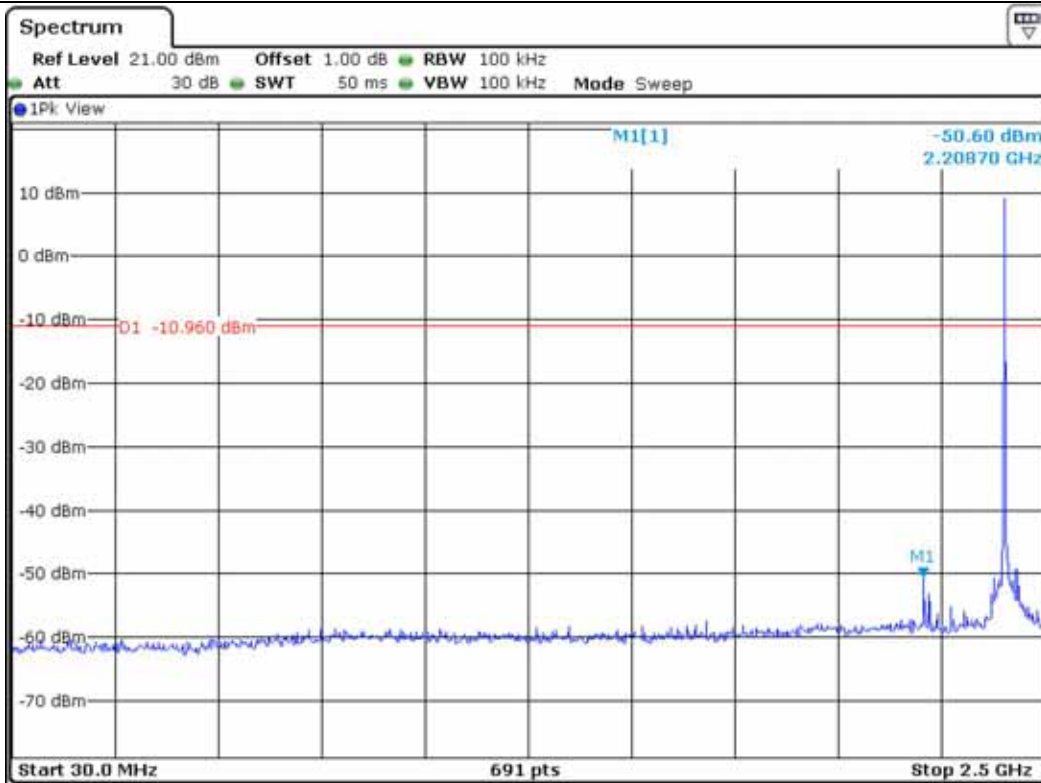
High Channel



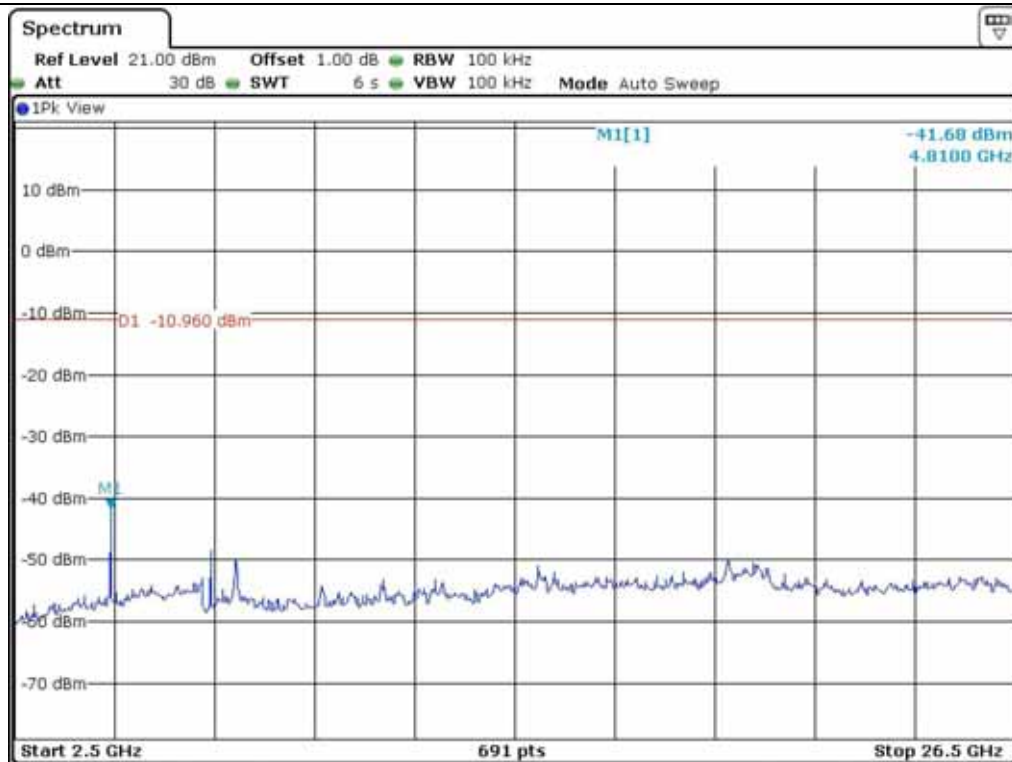
Low Channel



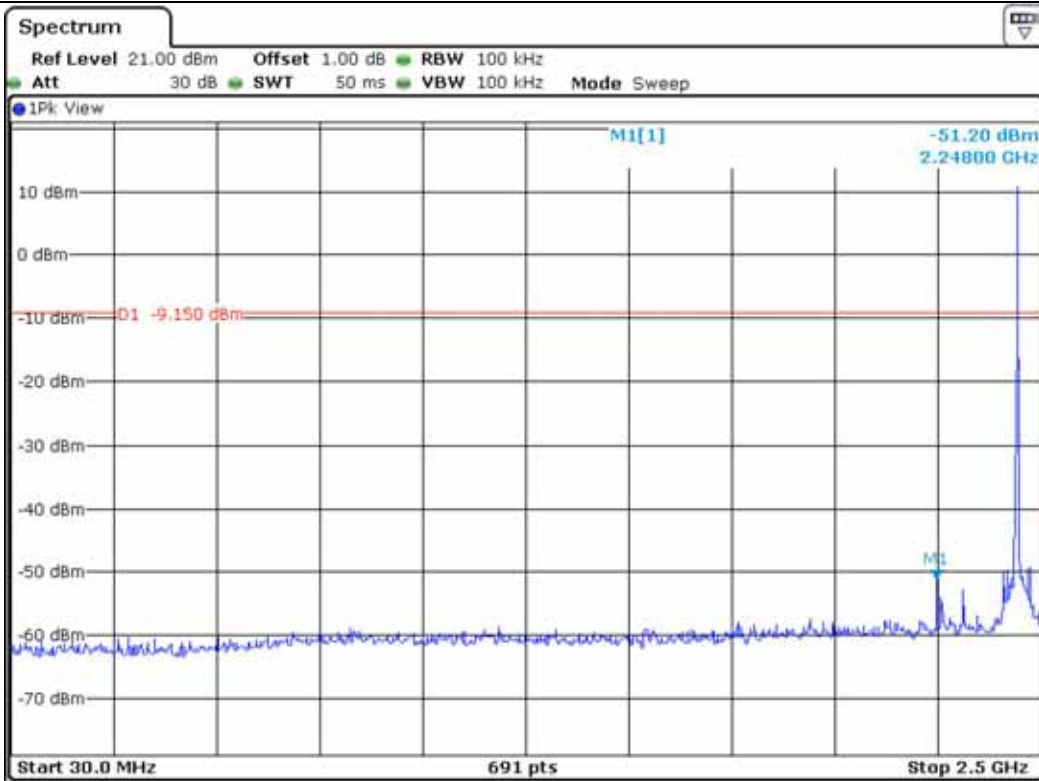
High Channel



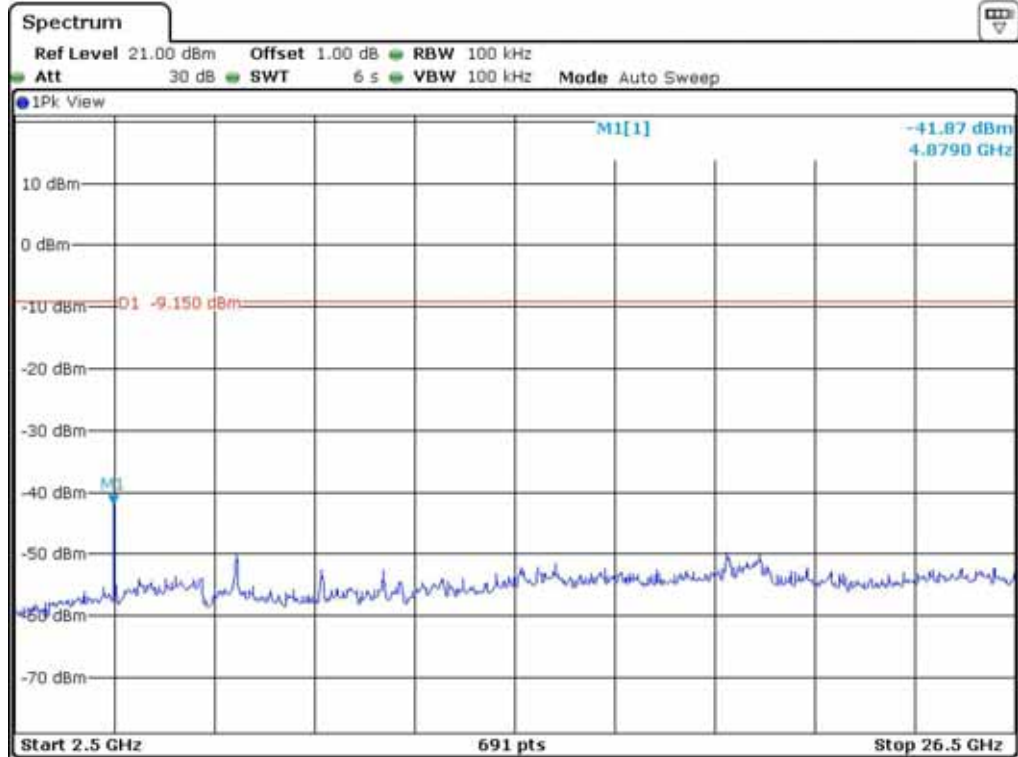
Low Channel



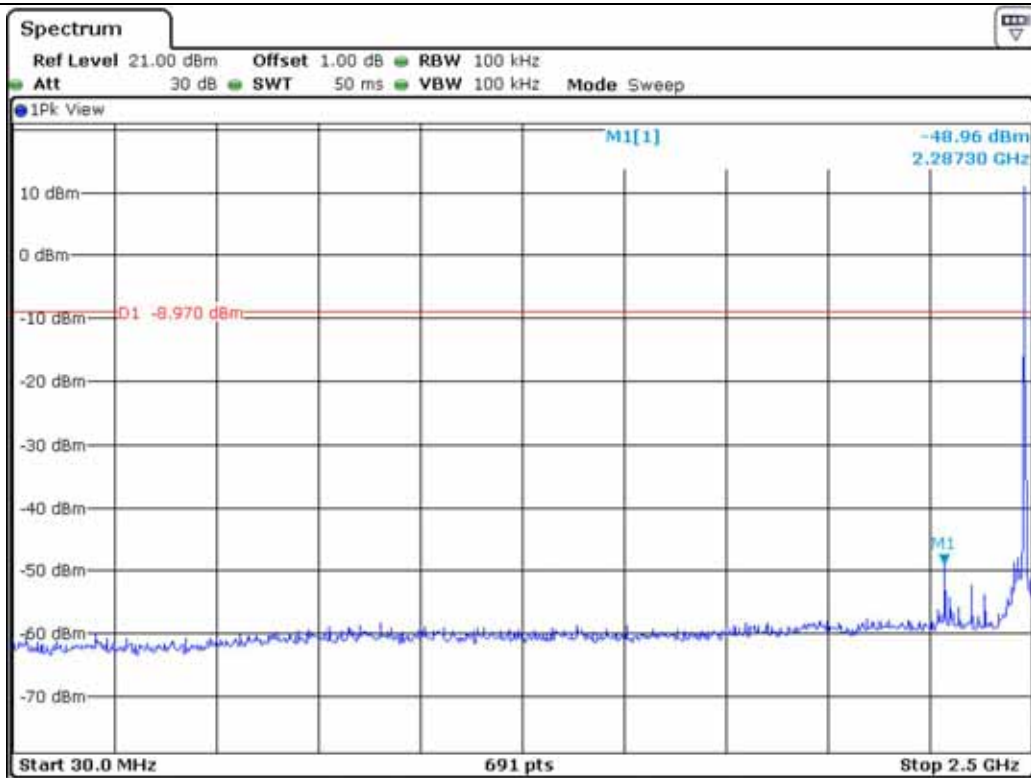
Low Channel



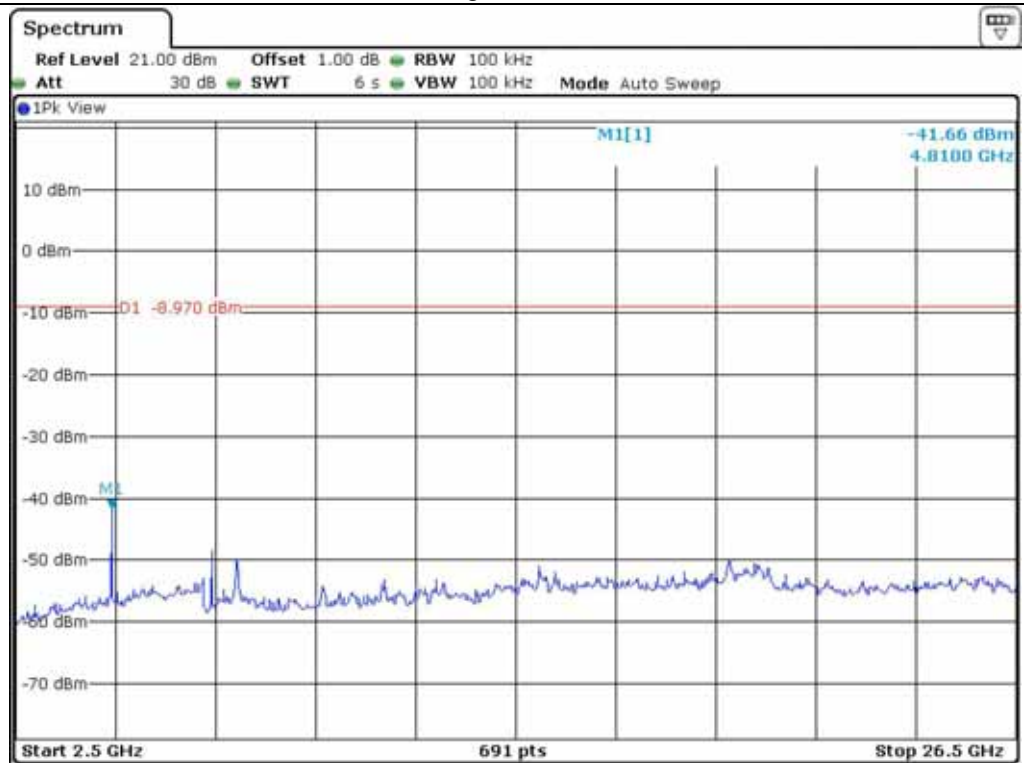
Middle Channel



Middle Channel

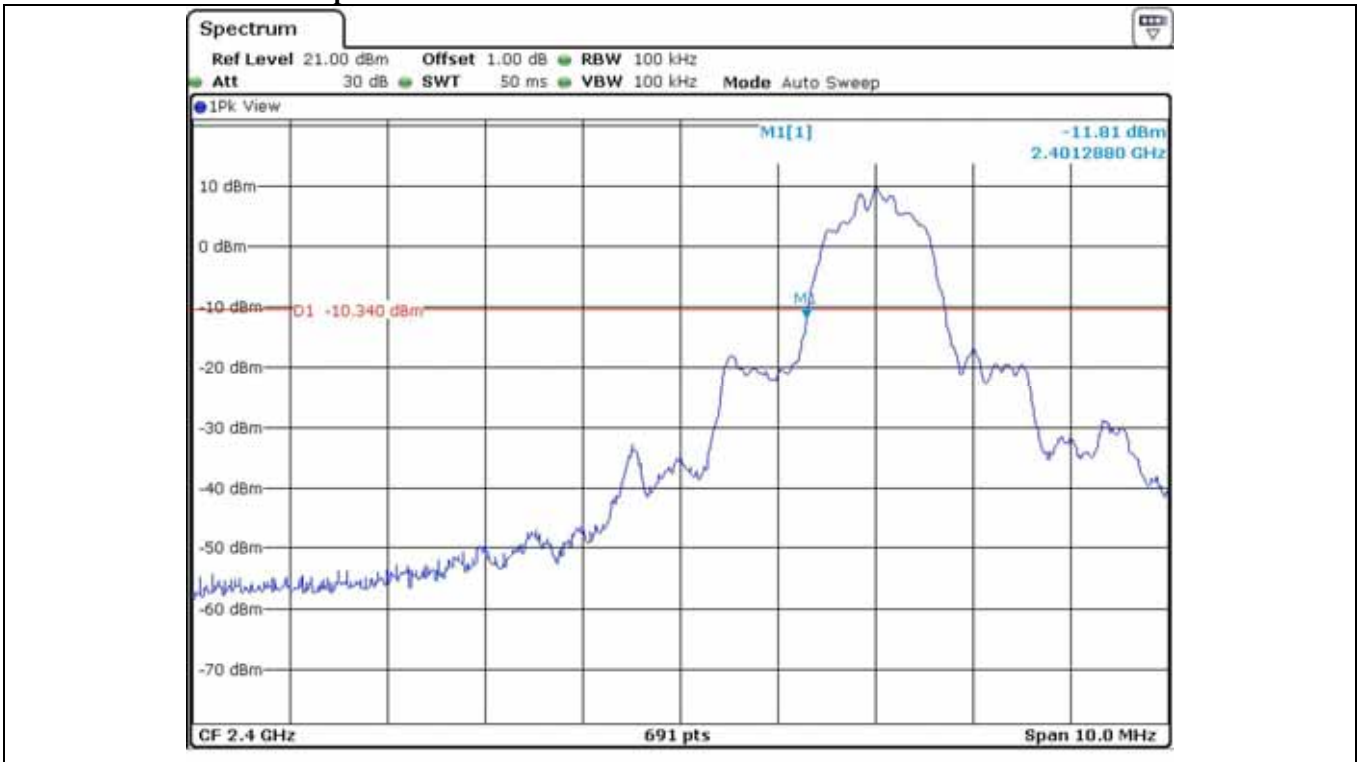


High Channel

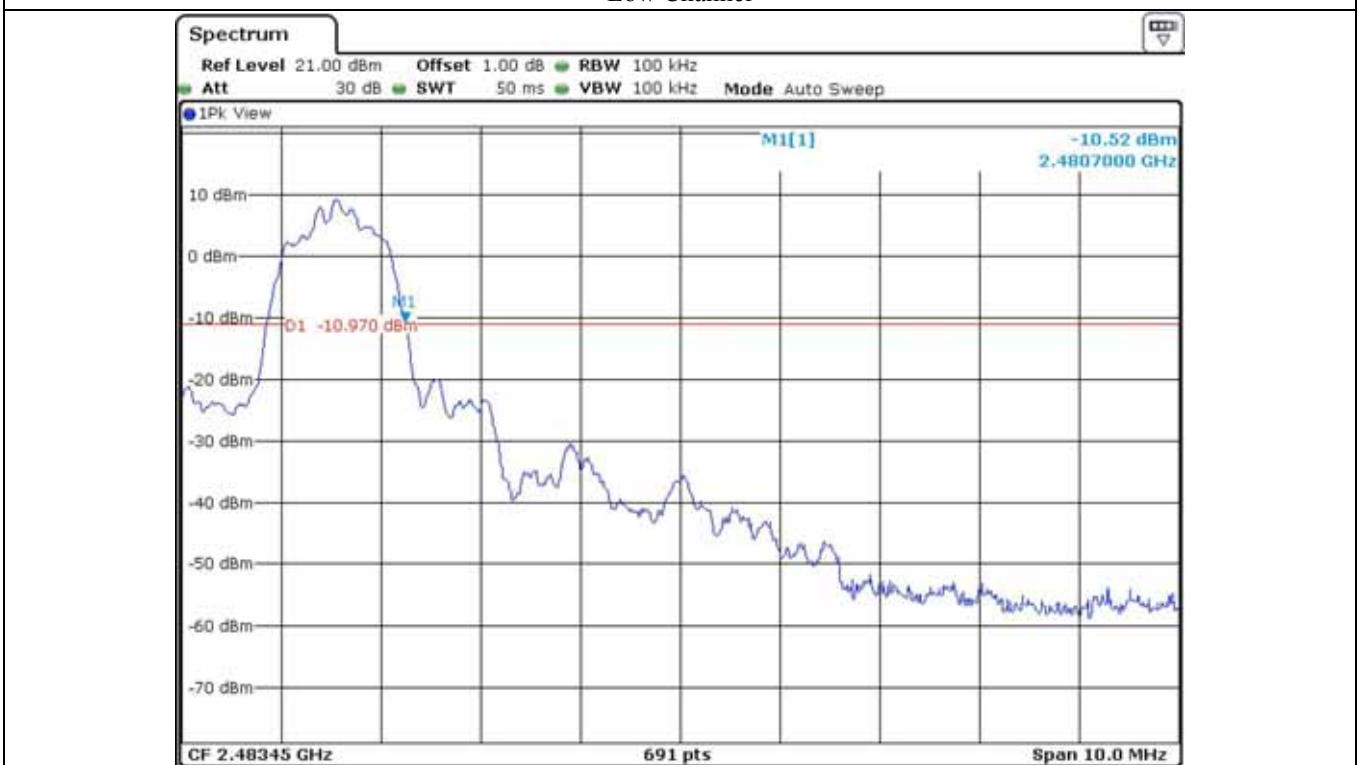


High Channel

7.6.5.1.3 Test data for 3 Mbps

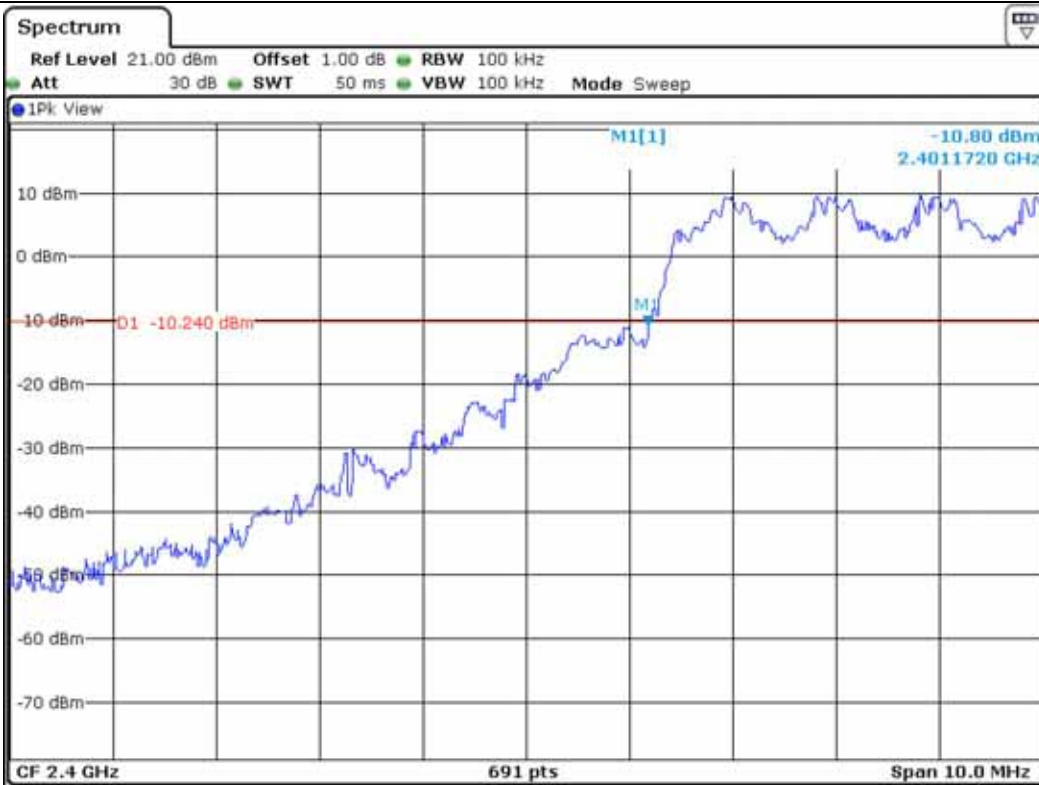


Low Channel

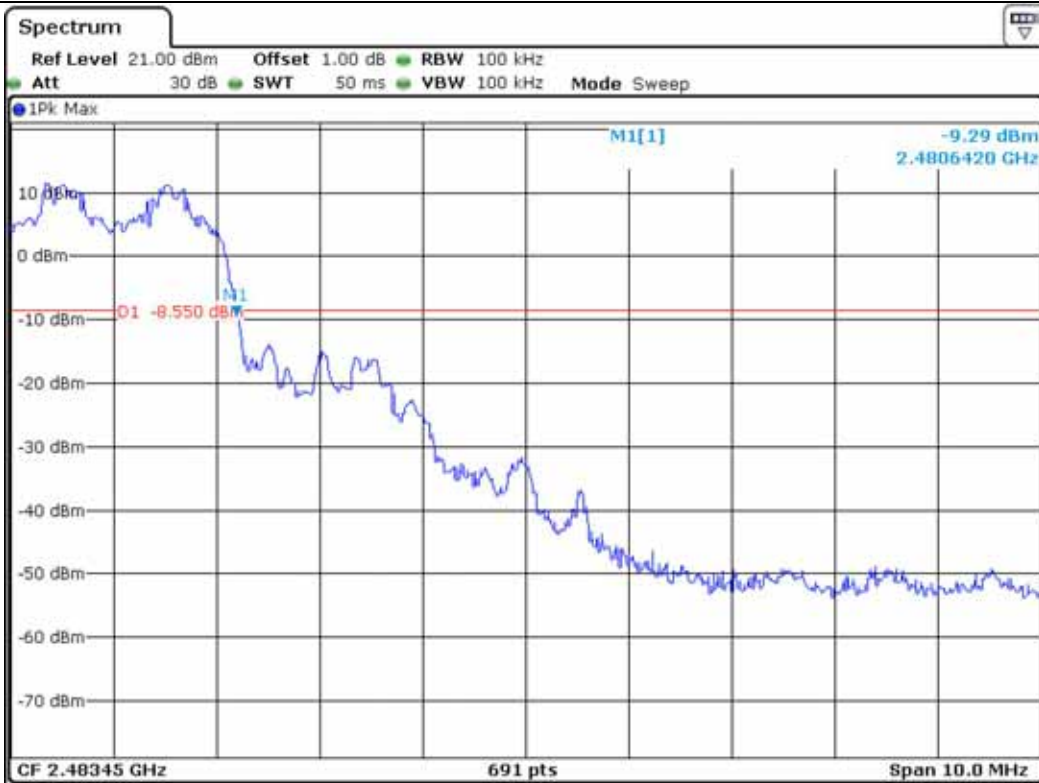


High Channel

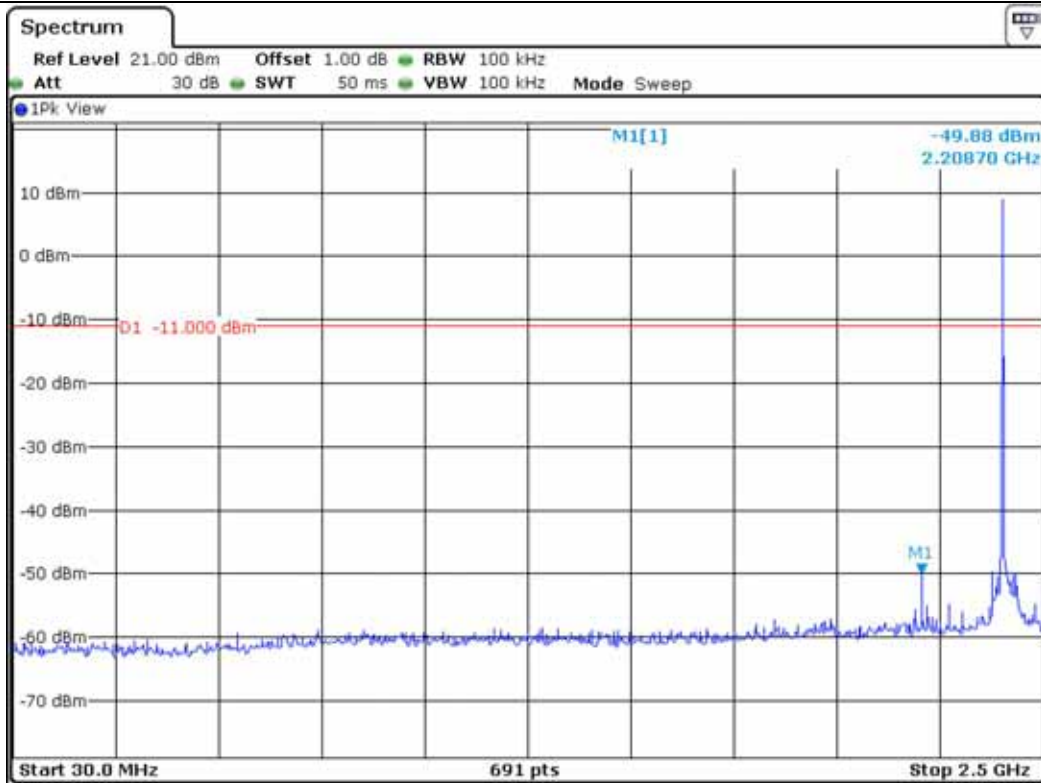




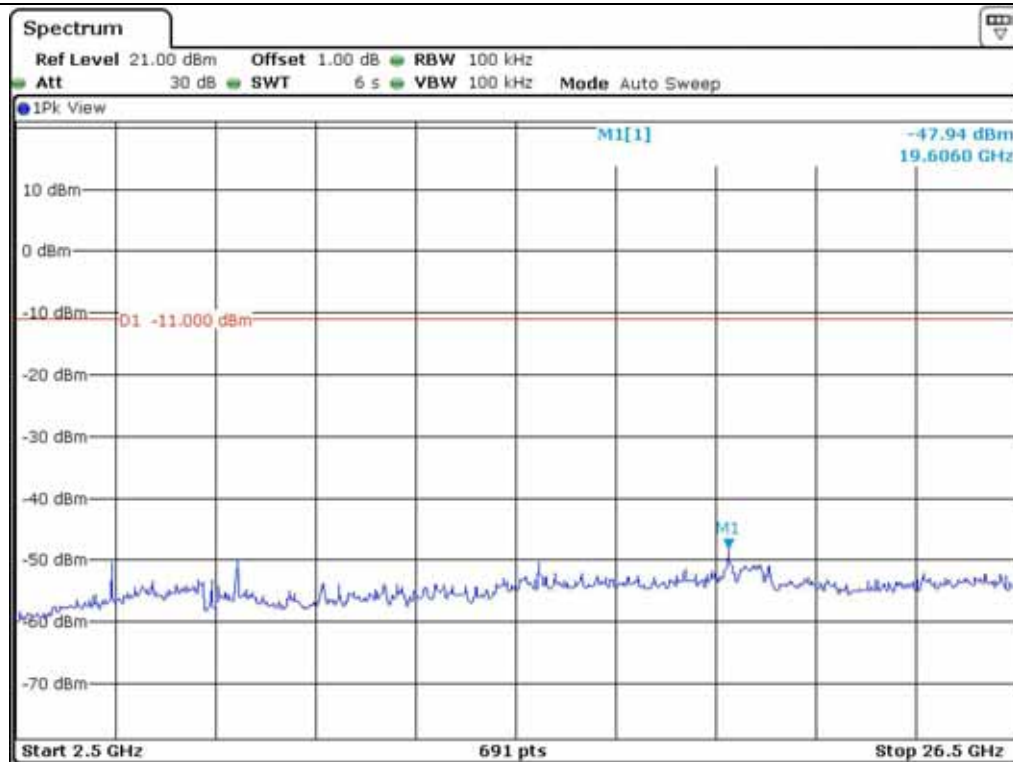
Low Channel



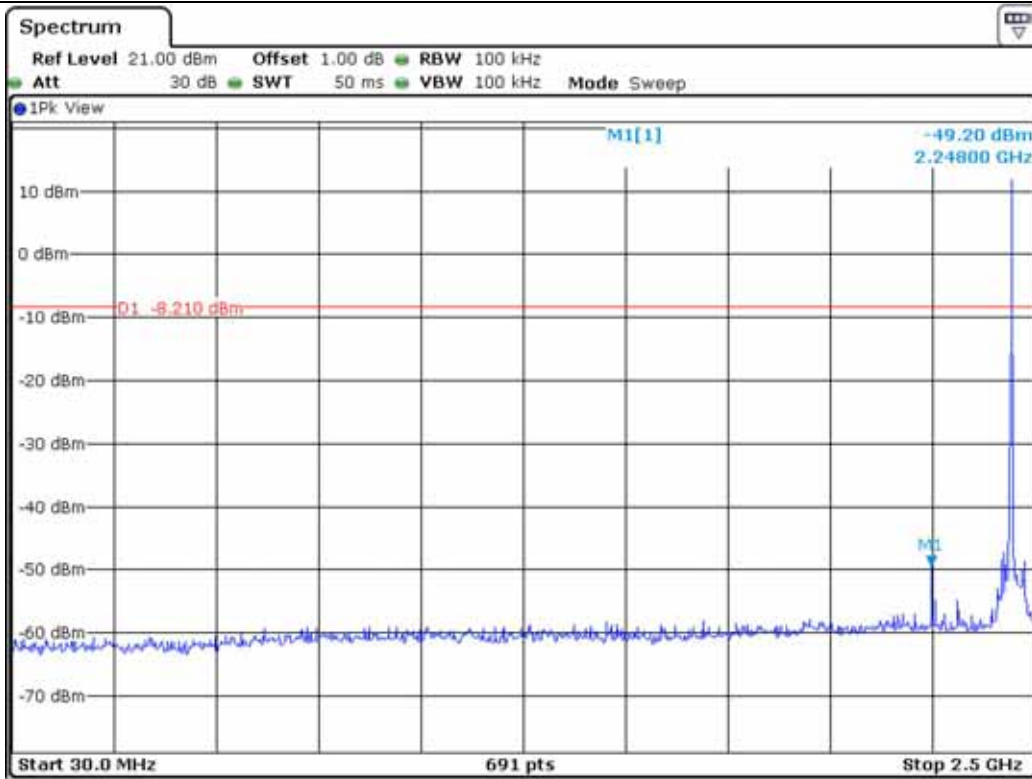
High Channel



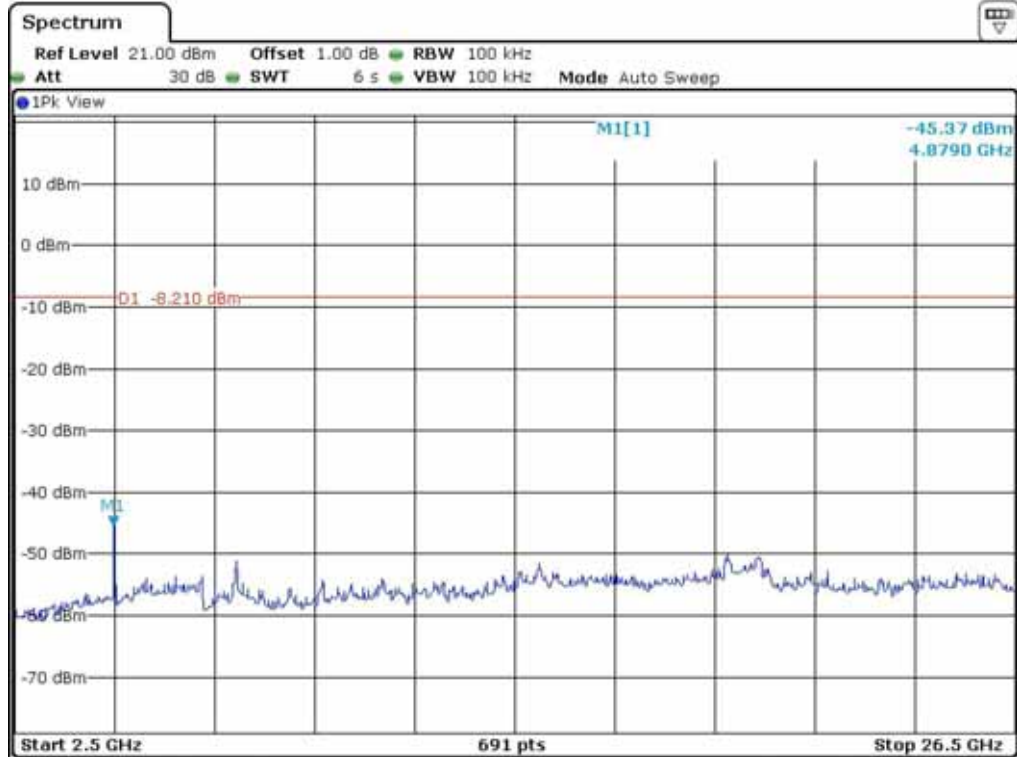
Low Channel



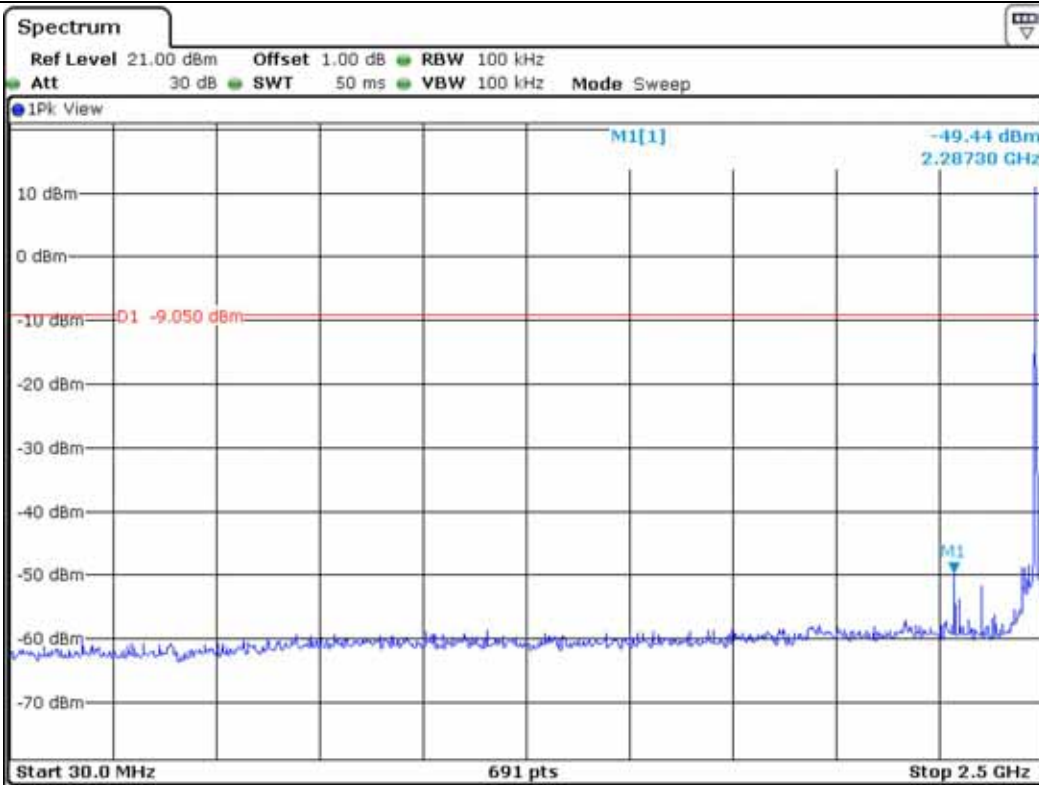
Low Channel



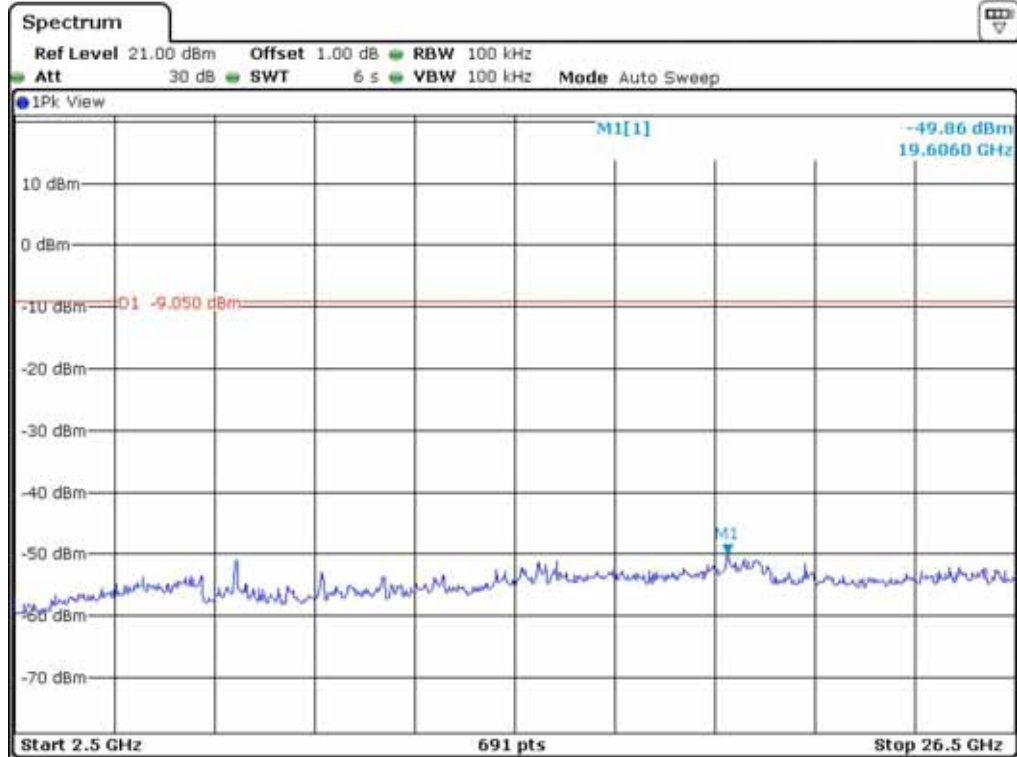
Middle Channel



Middle Channel



High Channel



High Channel

**7.6.5.2. Test data for radiated emission**

**7.6.5.2.1. Radiated Emission which fall in the Restricted Band**

- Test Date : January 24, 2012
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Measurement distance : 3 m
- Operating Condition : Low / High Channel
- 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)
<b>Test Data for Low Channel</b>									
2389.62	36.38	Peak	H	27.05	3.13	28.98	37.58	74.00	-36.42
	25.14	Average	H				26.34	54.00	-27.66
	35.25	Peak	V				36.45	74.00	-37.55
	25.08	Average	V				26.28	54.00	-27.72
<b>Test Data for High Channel</b>									
2483.48	35.52	Peak	H	27.05	3.13	28.82	37.18	74.00	-36.82
	25.47	Average	H				27.13	54.00	-26.87
	36.28	Peak	V				37.94	74.00	-36.06
	25.47	Average	V				27.13	54.00	-26.87

Tabulated test data for Restricted Band

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

Each data transfer rate, 1 Mbps, 2 Mbps, and 3 Mbps was tested, but the worst data was recorded.



**Tested by: Chang-Uk, Jun / Engineer**

**7.6.5.2.2. Spurious & Harmonic Radiated Emission above 1 GHz**

- Test Date : January 24, 2012
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 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)
<b>Test Data for Low Channel</b>									
2 402.00	61.27	Peak	H	27.09	3.16	-	91.52	-	91.52
	55.14	Peak	V				85.39	-	85.39
4 804.00*	34.17	Peak	H	31.07	4.10	28.80	40.54	74.00	-33.46
	23.85	Average	H				30.22	54.00	-23.78
	36.47	Peak	V				42.84	74.00	-31.16
	24.28	Average	V				30.65	54.00	-23.35
<b>Test Data for Middle Channel</b>									
2 441.00	61.22	Peak	H	27.19	3.16	-	91.57		91.57
	54.74	Peak	V				85.09		85.09
4 882.00*	33.42	Peak	H	31.19	4.12	28.73	40.00	74.00	-34.00
	23.25	Average	H				29.83	54.00	-24.17
	34.12	Peak	V				40.70	74.00	-33.30
	23.97	Average	V				30.55	54.00	-23.45

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical, "\*" Frequency fall in restricted band

Each data transfer rate, 1 Mbps, 2 Mbps, and 3 Mbps was tested, but the worst data was recorded.

-Continued

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
<b>Test Data for High Channel</b>									
2 480.00	61.25	Peak	H	27.30	3.16	-	91.71		91.71
	53.28	Peak	V				83.74		83.74
4 960.00*	34.28	Peak	H	31.32	4.15	28.67	41.08	74.00	-32.92
	22.11	Average	H				28.91	54.00	-25.09
	34.28	Peak	V				41.08	74.00	-32.92
	23.23	Average	V				30.03	54.00	-23.97

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical, "\*" Frequency fall in restricted band

Each data transfer rate, 1 Mbps, 2 Mbps, and 3 Mbps was tested, but the worst data was recorded.



**Tested by: Chang-Uk, Jun / Engineer**

**7.6.5.2.3. Spurious Radiated Emission below 1 GHz**

- Test Date : January 24, 2012
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m
- Channel : Low

Frequency (MHz)	Reading (dB $\mu$ V)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss(dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)
33.60	15.20	v	100.00	60.00	16.90	1.07	33.17	40.00	-6.83
130.80	14.58	v	110.00	340.00	14.18	2.51	31.27	43.52	-12.25
232.70	16.25	v	110.00	350.00	17.27	3.33	36.85	46.02	-9.17
451.70	15.29	v	120.00	110.00	18.45	4.50	38.24	46.02	-7.78
479.20	16.22	h	110.00	120.00	18.98	4.56	39.76	46.02	-6.26
603.80	16.47	h	110.00	310.00	19.91	5.11	41.49	46.02	-4.53

Tabulated test data for Radiated Electromagnetic Field

- Channel : Middle

Frequency (MHz)	Reading (dB $\mu$ V)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss(dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)
34.50	15.74	v	100.00	60.00	16.52	1.09	33.35	40.00	-6.65
131.70	15.30	v	110.00	340.00	14.23	2.52	32.05	43.52	-11.47
223.80	15.37	v	110.00	350.00	17.21	3.29	35.87	46.02	-10.15
452.10	14.82	v	120.00	110.00	18.46	4.50	37.78	46.02	-8.24
482.70	16.65	h	110.00	120.00	19.05	4.57	40.27	46.02	-5.75
605.20	16.22	h	110.00	310.00	19.95	5.11	41.28	46.02	-4.74

Tabulated test data for Radiated Electromagnetic Field



-. Channel : High

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss(dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
35.90	15.87	v	100.00	60.00	16.08	1.14	33.09	40.00	-6.91
134.70	15.32	v	110.00	340.00	14.38	2.55	32.25	43.52	-11.27
227.90	16.24	v	110.00	350.00	17.24	3.31	36.79	46.02	-9.23
455.80	16.84	v	120.00	110.00	18.53	4.51	39.88	46.02	-6.14
486.20	15.87	h	110.00	120.00	19.12	4.57	39.56	46.02	-6.46
607.70	16.87	h	110.00	310.00	20.02	5.12	42.01	46.02	-4.01

Tabulated test data for Radiated Electromagnetic Field

Remark: "H": Horizontal, "V": Vertical, "\*" Frequency fall in restricted band

Each data transfer rate, 1 Mbps, 2 Mbps, and 3 Mbps was tested, but the worst data was recorded.



**Tested by: Chang-Uk, Jun / Engineer**

**7.6.5.2.4 Test Data for Below 30 MHz**

Humidity Level : 47 % R.H. Temperature: 22 °C  
 Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)  
 Frequency range : 9 kHz ~ 30 MHz  
 Measurement distance : 3 m  
 Result : PASSED

EUT :Bluetooth Dongle Date: March 06, 2012  
 Detector : CISPR Quasi-Peak (Resolution Bandwidth: 9 kHz)

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
It was not observed any emissions from the EUT.									



**Tested by: Chang-Uk, Jun / Engineer**

## 8. RADIO FREQUENCY EXPOSURE

### 8.1 RF Exposure Limit

According to the FCC rule §1.1310, the limit for General Population/Uncontrolled exposure is 1 mW/cm<sup>2</sup> for the device operating 1 500 ~ 100 000 MHz.

### 8.2 EUT Description

Kind of EUT	Bluetooth Dongle
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 320 MHz / 5 500 MHz ~ 5 700 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input checked="" type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz
Device Category	<input checked="" type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input type="checkbox"/> Others
Max. Output Power	1 Mbps: 11.56 dBm (14.32 mW) 2 Mbps: 12.19 dBm (16.56 mW) 3 Mbps: 12.30 dBm (16.98 mW)
Used Antenna	Chip antenna
Used Antenna Gain	0.50 dBi
Exposure Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> N/A

### 8.3 Test Result

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

$$[(\text{Max. Power of channel, including tune-up tolerance, mW})/(\text{Mim. test separation distance, mm})] \times [f(\text{GHz})] < 3$$

$$= [(16.98/50)] \times 2.480 = 0.53$$

Conclusion: The SAR test exclusion threshold is less than 3, so the device meets the RF Exposure Requirement and excluded SAR Test.