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

Test Report No.	**: W16NR-D017**
AGR No.	**: A16OA-174**
Applicant	**: CREMOTECH Co., Ltd.**
Address	**: 401 202 Yemiji Bldg, 31, Hwangsaeul-ro 258beon-gil, Bundang-gu, Gyeonggi-do, Seongnam-si, South Korea**
Manufacturer	**: CREMOTECH Co., Ltd.**
Address	**: 401 202 Yemiji Bldg, 31, Hwangsaeul-ro 258beon-gil, Bundang-gu, Gyeonggi-do, Seongnam-si, South Korea**
Type of Equipment	**: Laser Beam Pro**
FCC ID.	**: 2AEQF-CLB2-UHXW**
Model Name	**: CLB2-UHXW**
Serial number	**: N/A**
Total page of Report	**: 66 pages (including this page)**
Date of Incoming	**: October 31, 2016**
Date of issue	**: November 18, 2016**

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.

Reviewed by: Ki-Hong, Nam / Asst, Chief Engineer, ONETECH Corp.

Approved by: Keun-Young, Choi / Vice President, ONETECH Corp.

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
W16NR-D017	November 18, 2016	Initial Issue	All

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1. VERIFICATION OF COMPLIANCE

Applicant	: CREMOTECH Co., Ltd.
Address	: 401 202 Yemiji Bldg, 31, Hwangsaeul-ro 258beon-gil, Bundang-gu, Gyeonggi-do, Seongnam-si, South Korea
Contact Person	: Yoon-Ho, Lee / Director
Telephone No.	: +82-10-8650-9543
FCC ID	: 2AEQF-CLB2-UHXW
Model Name	: CLB2-UHXW
Serial Number	: N/A
Date	: November 18, 2016

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Laser Beam Pro
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
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.

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Conducted Output Power	Met the Limit / 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 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	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 FCC PART 15 SUBPART C Section 15.247

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-10666 / T-1842

IC (Industry Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. GENERAL INFORMATION

3.1 Product Description

The CREMOTECH Co., Ltd., Model CLB2-UHXW (referred to as the EUT in this report) is a Laser Beam Pro. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Laser Beam Pro		
FREQUENCY RANGE	Bluetooth LE	2 402 MHz ~ 2 480 MHz	
	Bluetooth	2 402 MHz ~ 2 480 MHz	
	WLAN 2.4 GHz Band	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))	
	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11n(HT20))
		5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11n(HT20))
MAX. RF OUTPUT POWER	Bluetooth LE	7.62 dBm	
	Bluetooth	1 Mbps	11.62 dBm
		2 Mbps	10.75 dBm
		3 Mbps	11.11 dBm
	WLAN 2.4 GHz Band	Wi-Fi 802.11b (15.39 dBm) Wi-Fi 802.11g (14.75 dBm) Wi-Fi 802.11n_20 MHz (13.86 dBm)	
	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz Band	Wi-Fi 802.11a (9.96 dBm) Wi-Fi 802.11n_20 MHz (8.67 dBm)
		5 725 MHz ~ 5 850 MHz Band	Wi-Fi 802.11a (10.02 dBm) Wi-Fi 802.11n_20 MHz (8.70 dBm)
MODULATION TYPE	Bluetooth	GFSK for 1 Mbps, DQPSK for 2 Mbps, 8-DPSK for 3 Mbps	
	Bluetooth LE	GFSK	
	WLAN 2.4 GHz Band	DSSS Modulation(DBPSK/DQPSK/CCK)	
	WLAN 5 GHz Band	OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
Antenna Gain	Bluetooth Bluetooth LE WLAN 2.4 GHz Band	1.28 dBi	
	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz Band	3.59 dBi
		5 725 MHz ~ 5 850 MHz Band	-0.1 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 kHz, 12 MHz, 24 MHz, 26 MHz		

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

-. None

4. EUT MODIFICATIONS

-. None

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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	CREMOTECH Co., Ltd.	C100_R0R1_MAIN_REV0.4	N/A
Sub Board (1)	N/A	C100SUB_VER0.5	N/A
Sub Board (2)	Cremotech Co., Ltd.	LD 20160929	N/A
Speaker	N/A	N/A	N/A
Battery	N/A	N/A	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
CLB2-UHXW	CREMOTECH Co., Ltd.	Laser Beam Pro (EUT)	-
CW0504000	ShenZhen Cenwell Technology Co., Ltd.	Adapter	EUT

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5.3 Mode of operation during the test

Modulation & Channel selected	DATA RATE	OUTPUT POWER[dBm]
802.11 b (Middle Channel)	1 Mbps	15.17
	2 Mbps	15.05
	5.5 Mbps	14.97
	11 Mbps	14.9
802.11g (Middle Channel)	6 Mbps	14.59
	9 Mbps	14.31
	12 Mbps	14.23
	18 Mbps	14.13
	24 Mbps	13.91
	36 Mbps	13.8
	48 Mbps	13.63
	54 Mbps	13.54
HT 20 (Middle Channel)	6.5 Mbps	13.78
	13 Mbps	13.33
	19.5 Mbps	13.11
	26 Mbps	12.96
	39 Mbps	12.79
	52 Mbps	12.58
	58.5 Mbps	12.51
	65 Mbps	12.38

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 HT20.

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5.4 Configuration of Test System

Line Conducted Test: The jig board of the EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 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 Chip antenna so no consideration of replacement by the user.

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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

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

7. MIMIMUM 6 dB BANDWIDTH

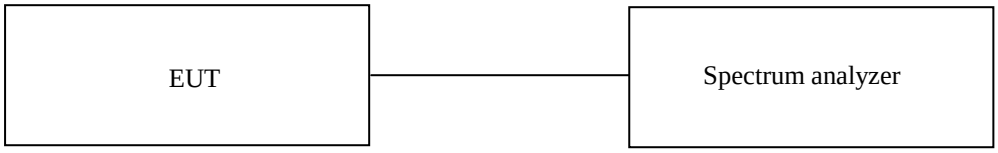
7.1 Operating environment

Temperature : 22.5 ℃

Relative humidity : 44.8 % 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.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May. 31, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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7.4 Test data for 802.11b WLAN Mode

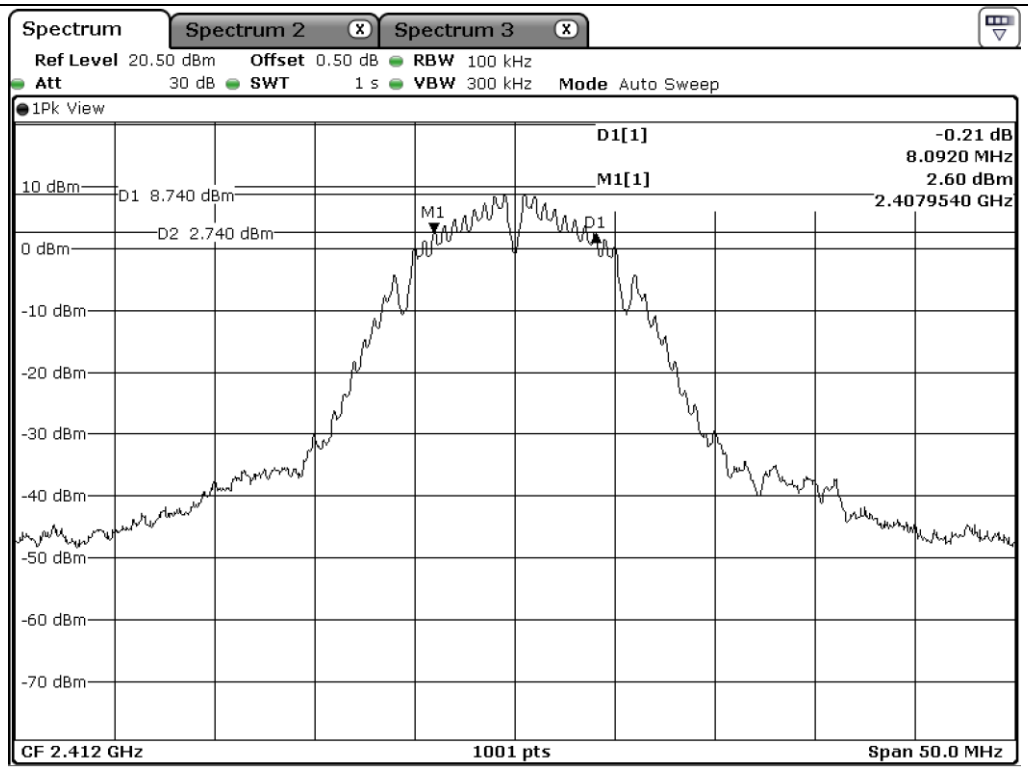
-. Test Date : November 03, 2016

-. Test Result : Pass

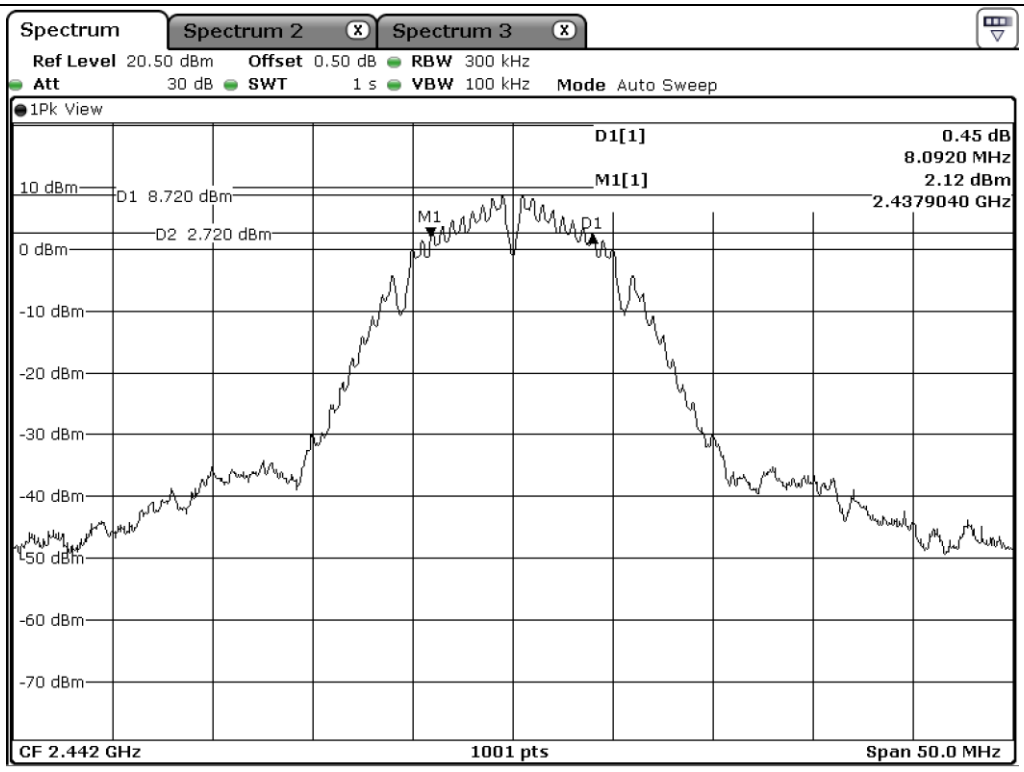
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	8.09	0.50	7.59
Middle	2 442.00	8.09	0.50	7.59
High	2 462.00	8.09	0.50	7.59

Remark. Margin = Measured Value - Limit

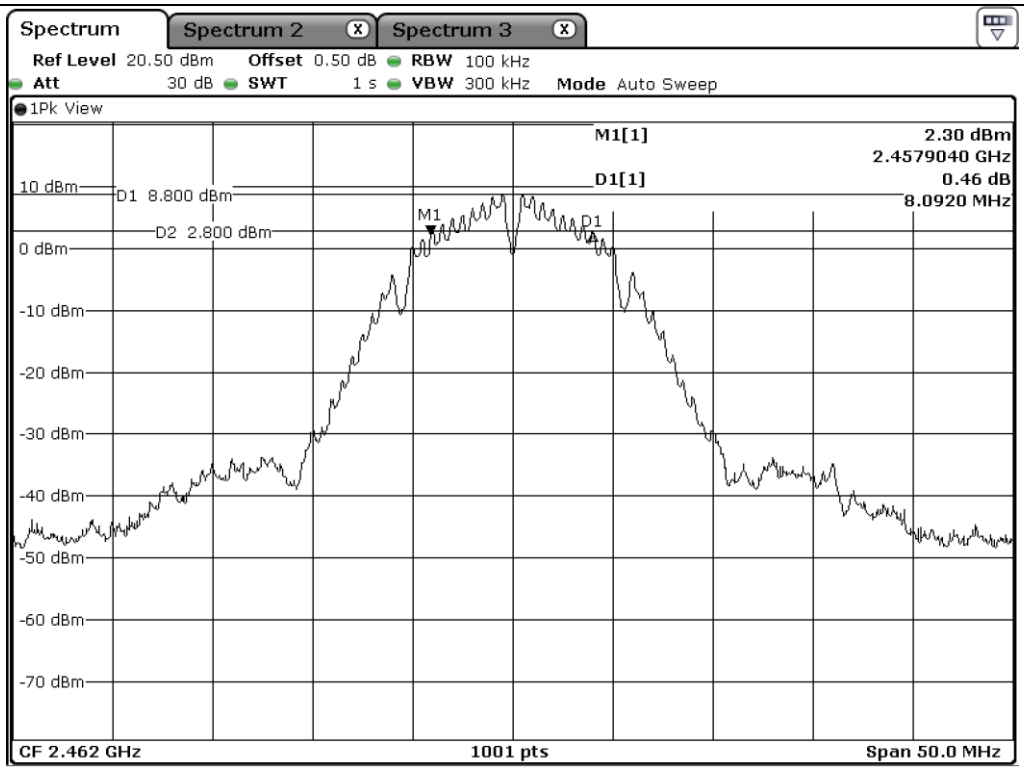
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel



Middle Channel



High Channel

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7.5 Test data for 802.11g WLAN Mode

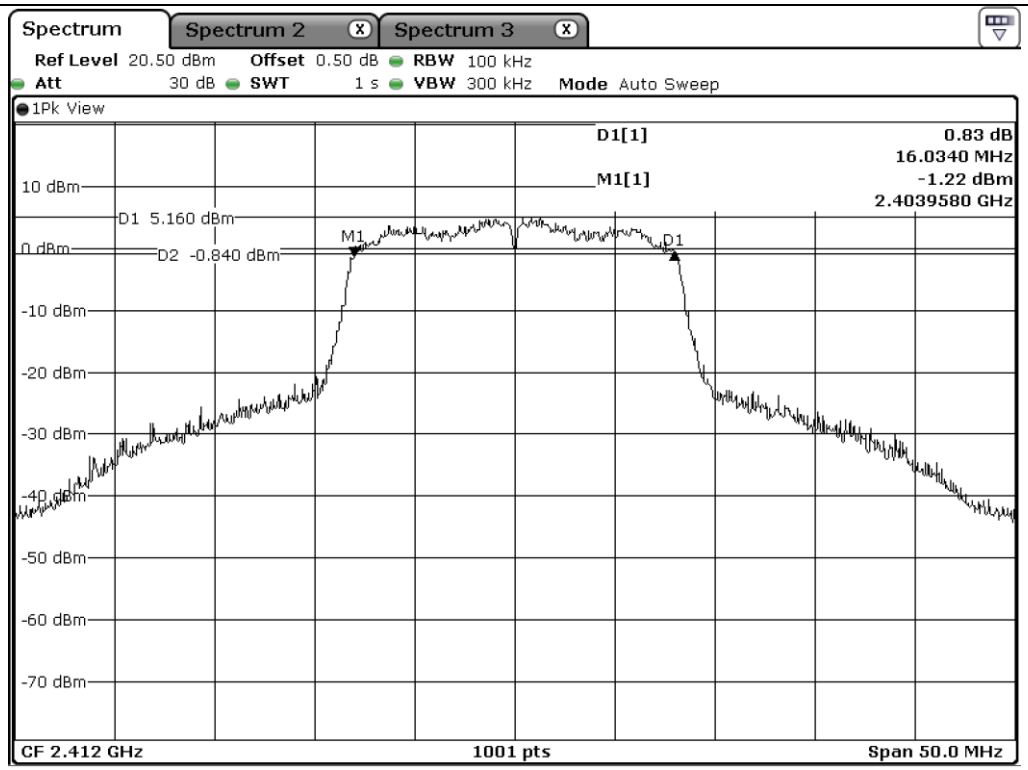
-. Test Date : November 03, 2016

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.03	0.50	15.53
Middle	2 442.00	16.03	0.50	15.53
High	2 462.00	16.03	0.50	15.53

Remark. Margin = Measured Value - Limit

Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel

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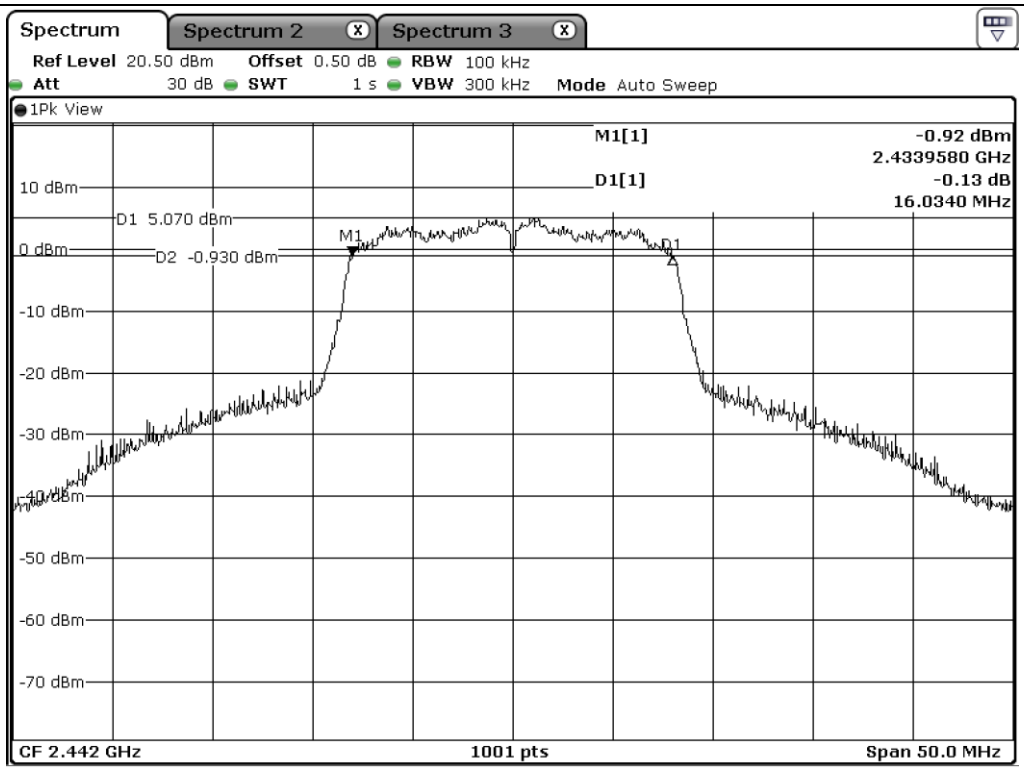
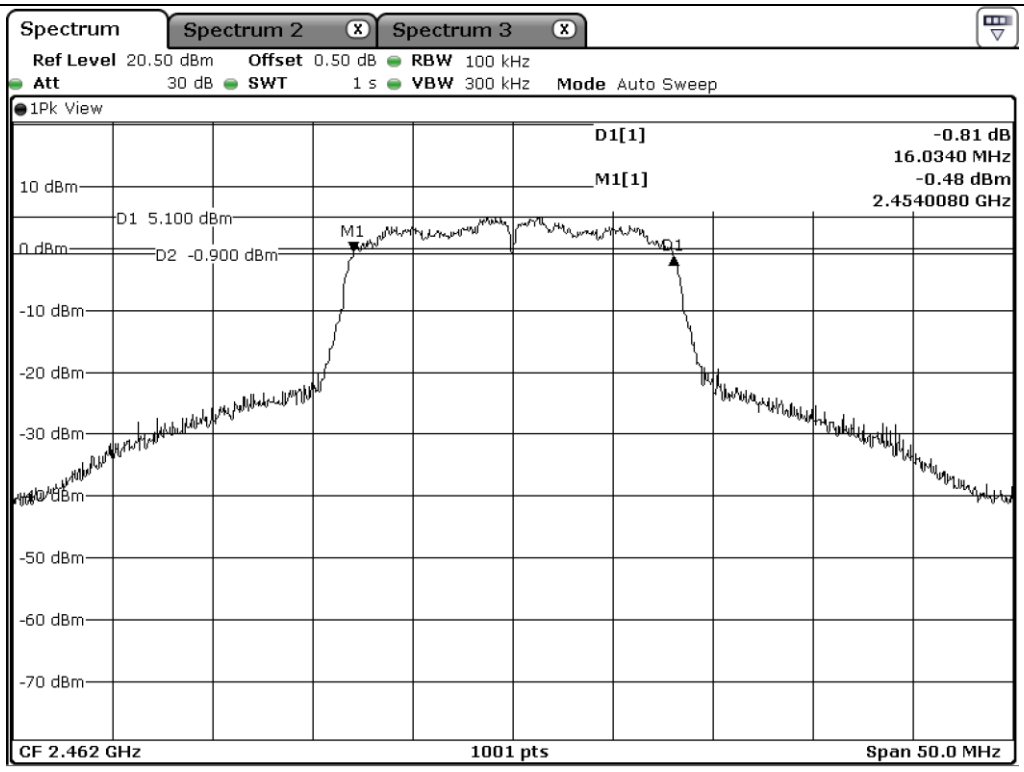


Middle Channel



High Channel

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7.6 Test data for 802.11n_HT20 WLAN Mode

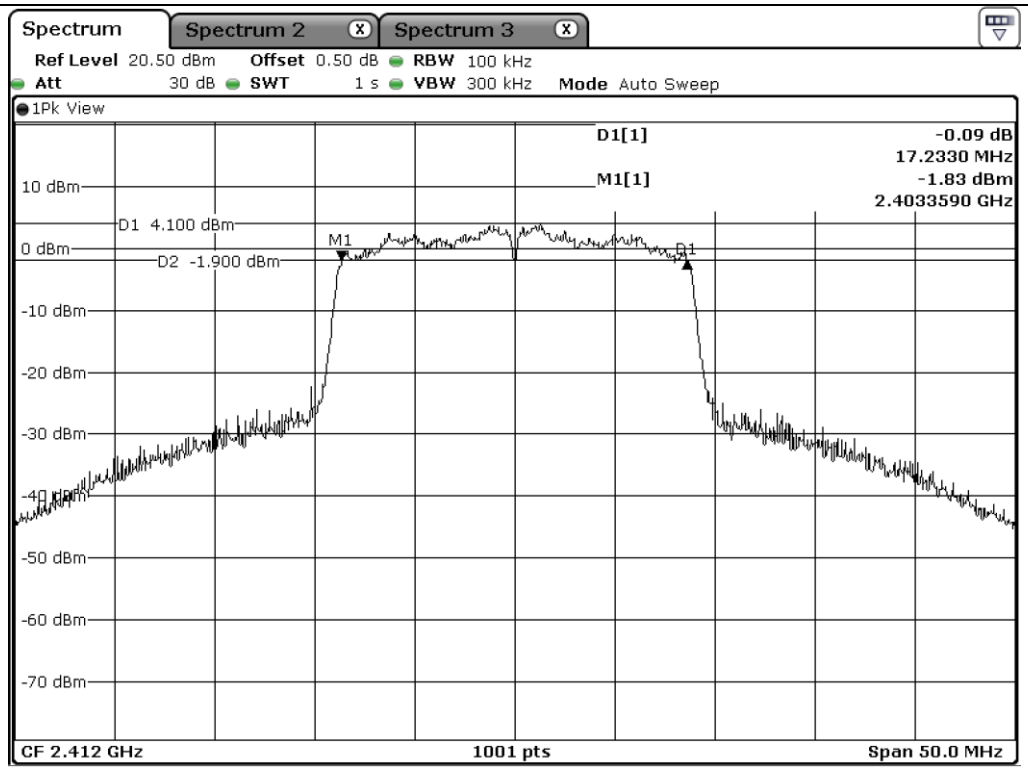
-. Test Date : November 03, 2016

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	17.23	0.50	16.73
Middle	2 442.00	17.28	0.50	16.78
High	2 462.00	17.28	0.50	16.78

Remark. Margin = Measured Value - Limit

Tested by: Tae-Ho, Kim / Senior Engineer



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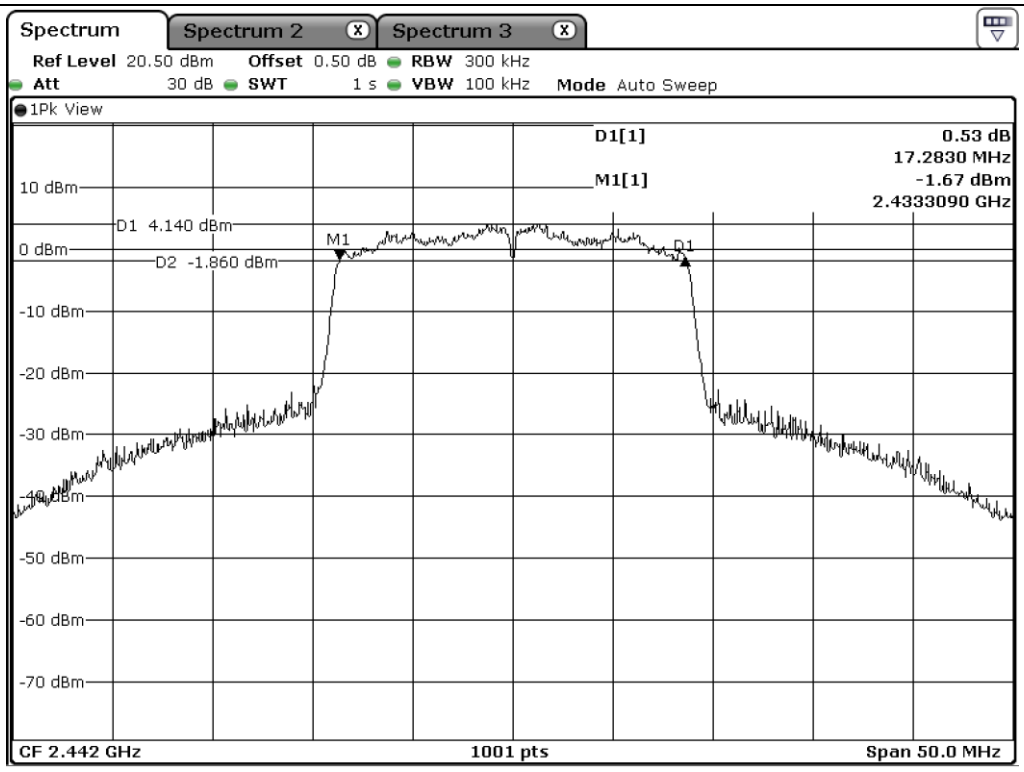
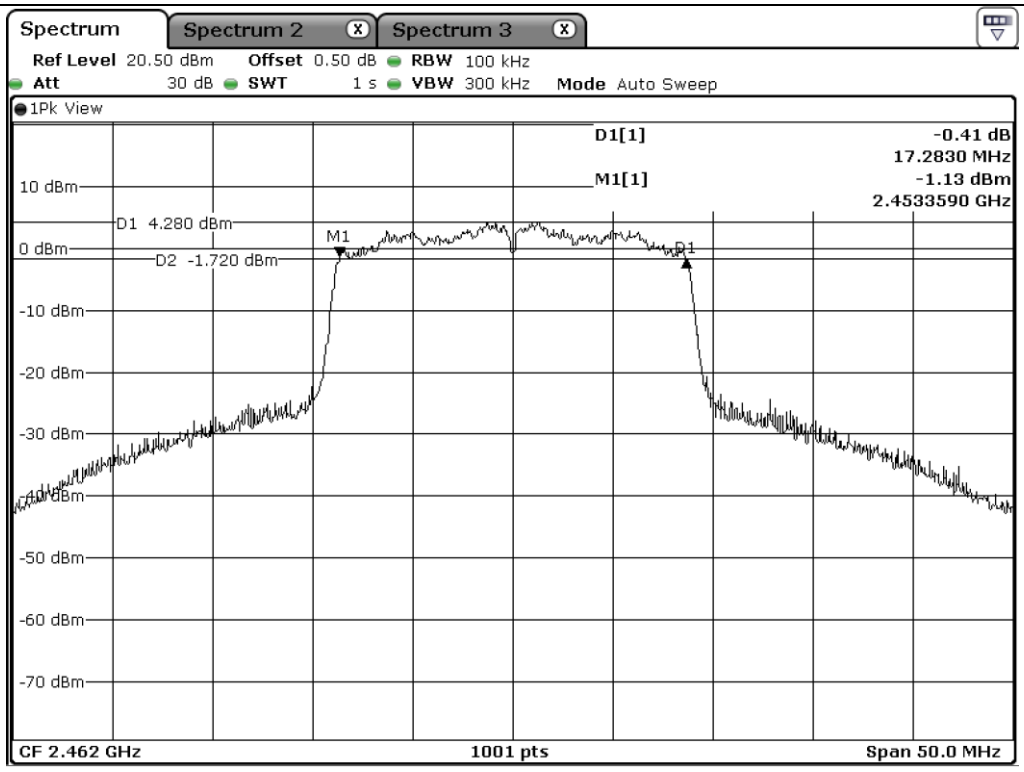


Middle Channel



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8. MAXIMUM PEAK OUTPUT POWER

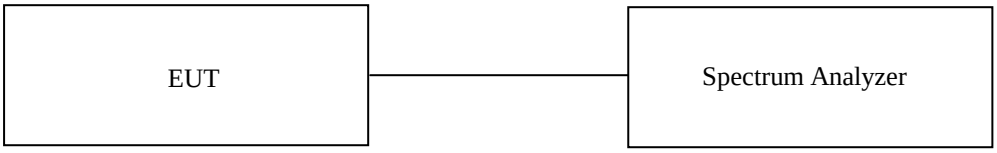
8.1 Operating environment

Temperature : 22.5 ℃

Relative humidity : 44.8 % 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.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May. 31, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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8.4 Test data for 802.11b WLAN Mode

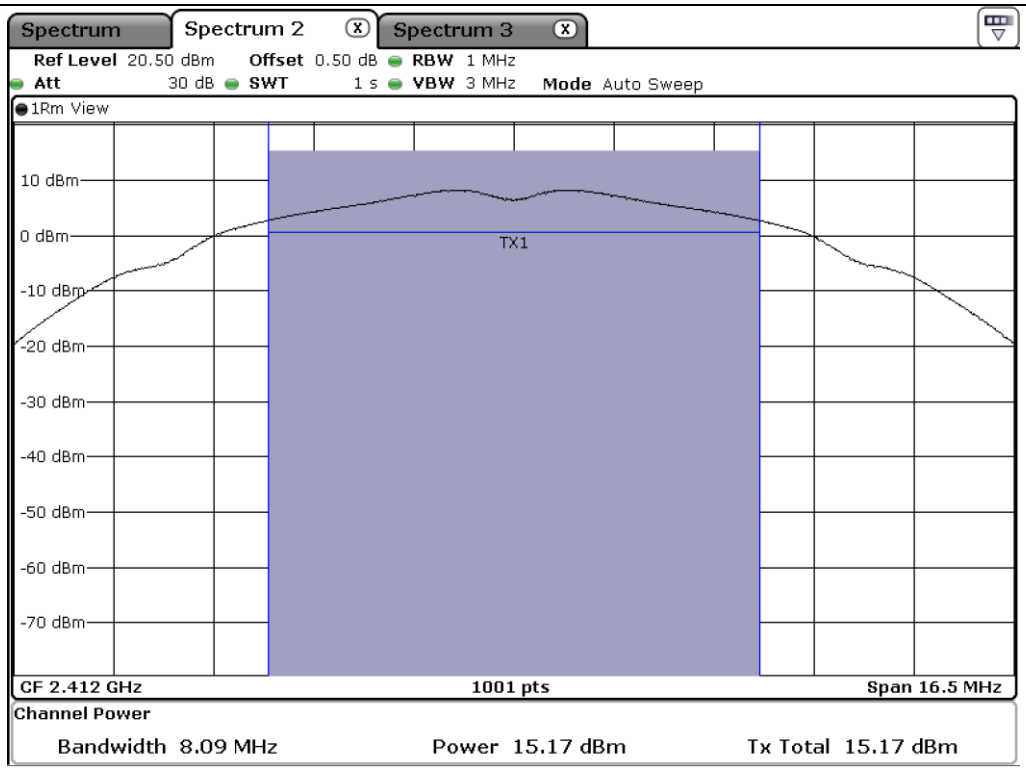
-. Test Date : November 03, 2016

-. Test Result : Pass

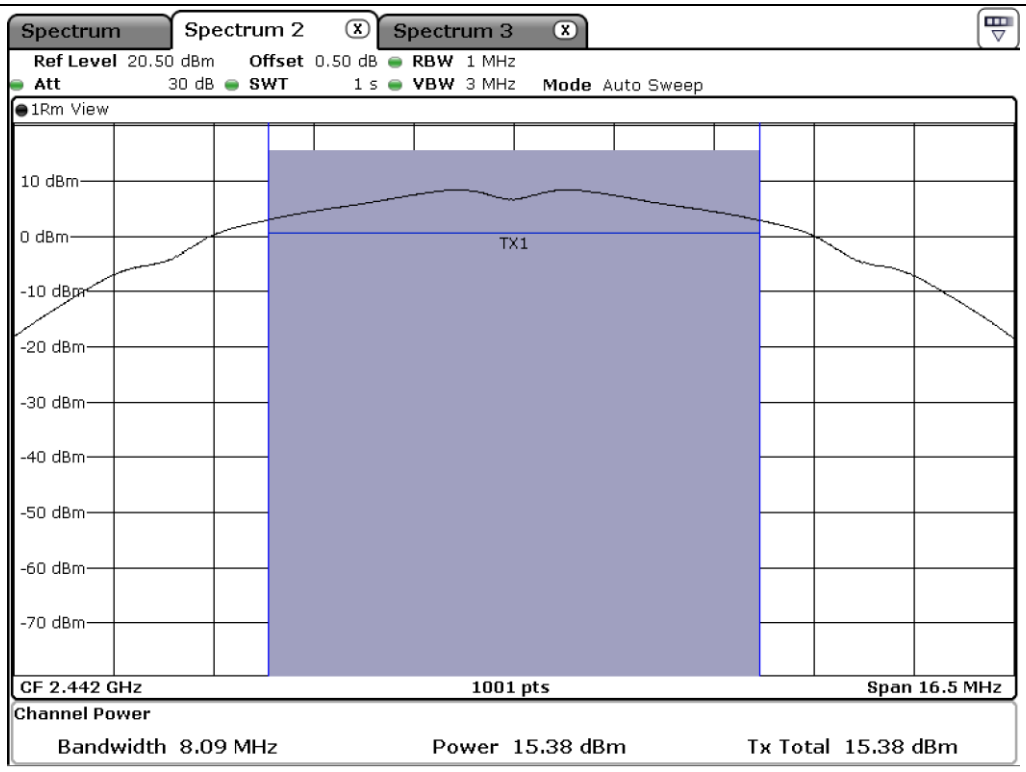
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	8.09	15.17	30.00	14.83
MIDDLE	2 442.00	8.09	15.38	30.00	14.62
HIGH	2 462.00	8.09	15.39	30.00	14.61

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

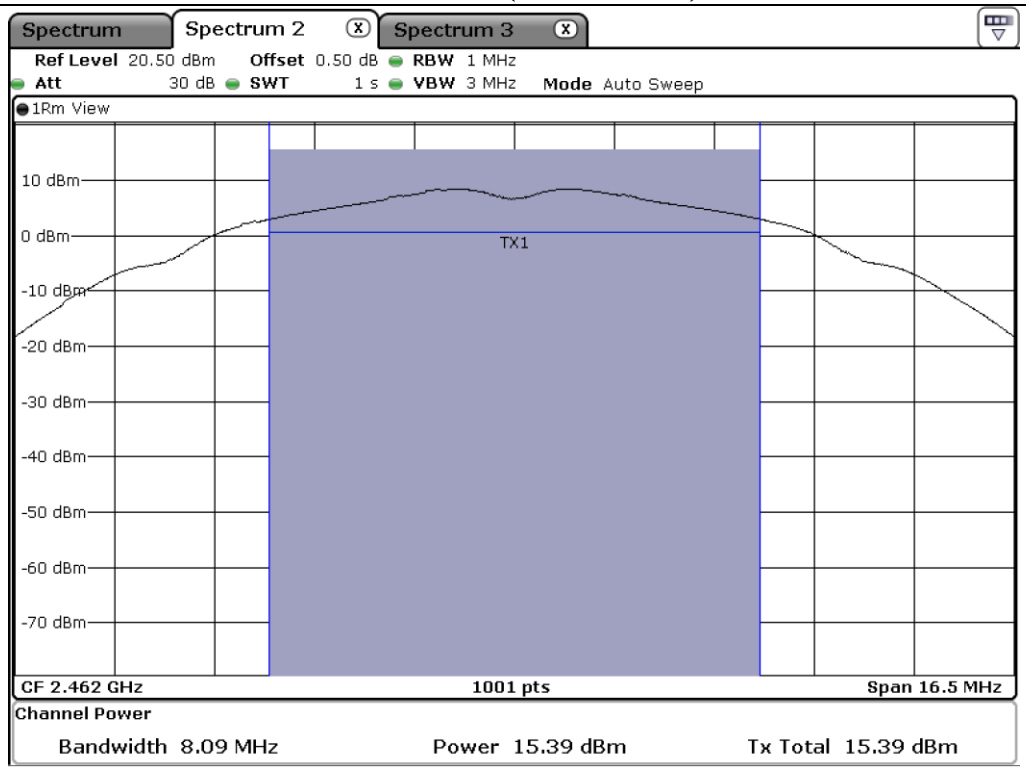
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel (6 dB Bandwidth)



Middle Channel (6 dB Bandwidth)



High Channel (6 dB Bandwidth)

8.5 Test data for 802.11g WLAN Mode

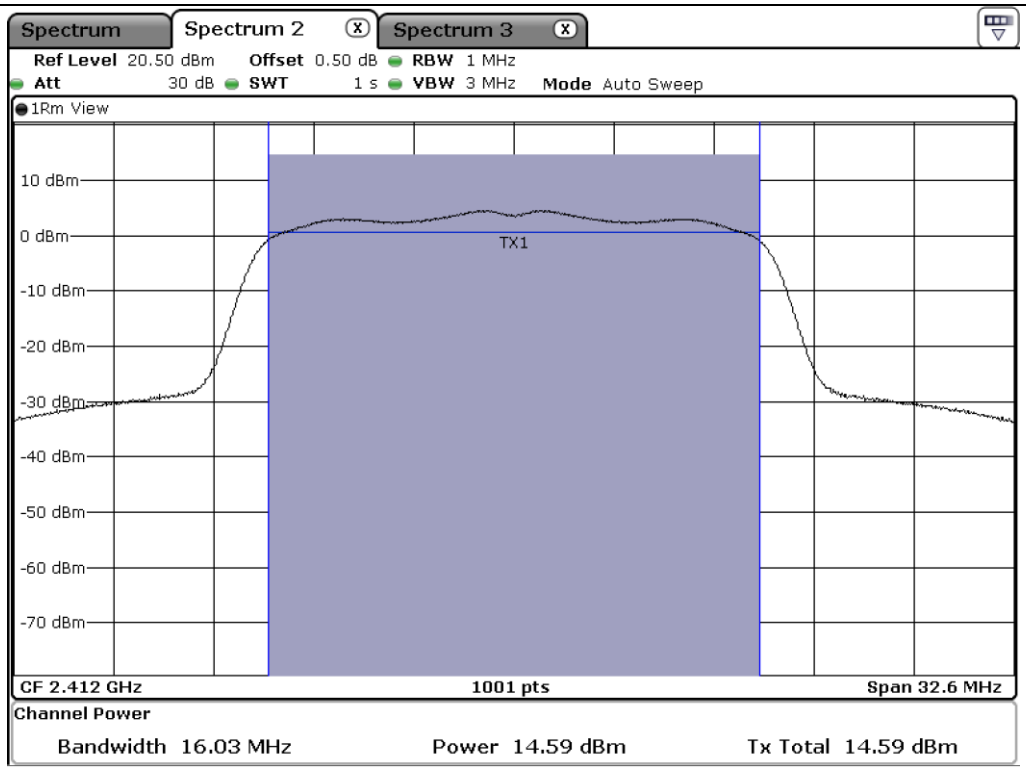
-. Test Date : November 03, 2016

-. Test Result : Pass

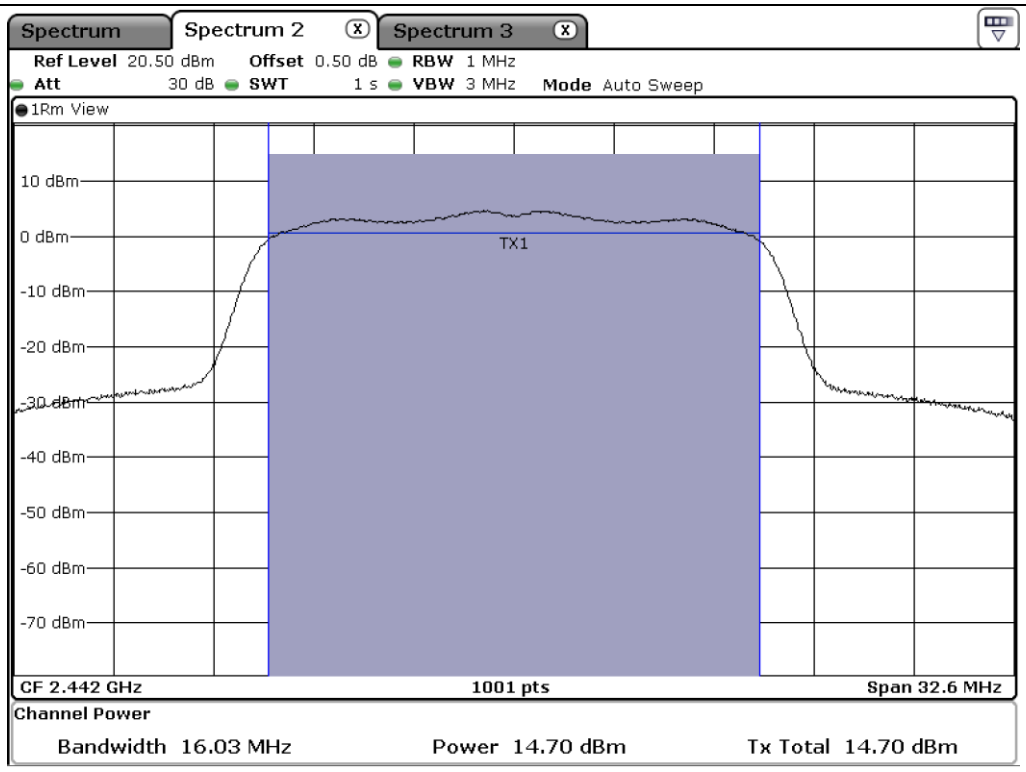
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	16.03	14.59	30.00	15.41
MIDDLE	2 442.00	16.03	14.70	30.00	15.30
HIGH	2 462.00	16.03	14.75	30.00	15.25

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

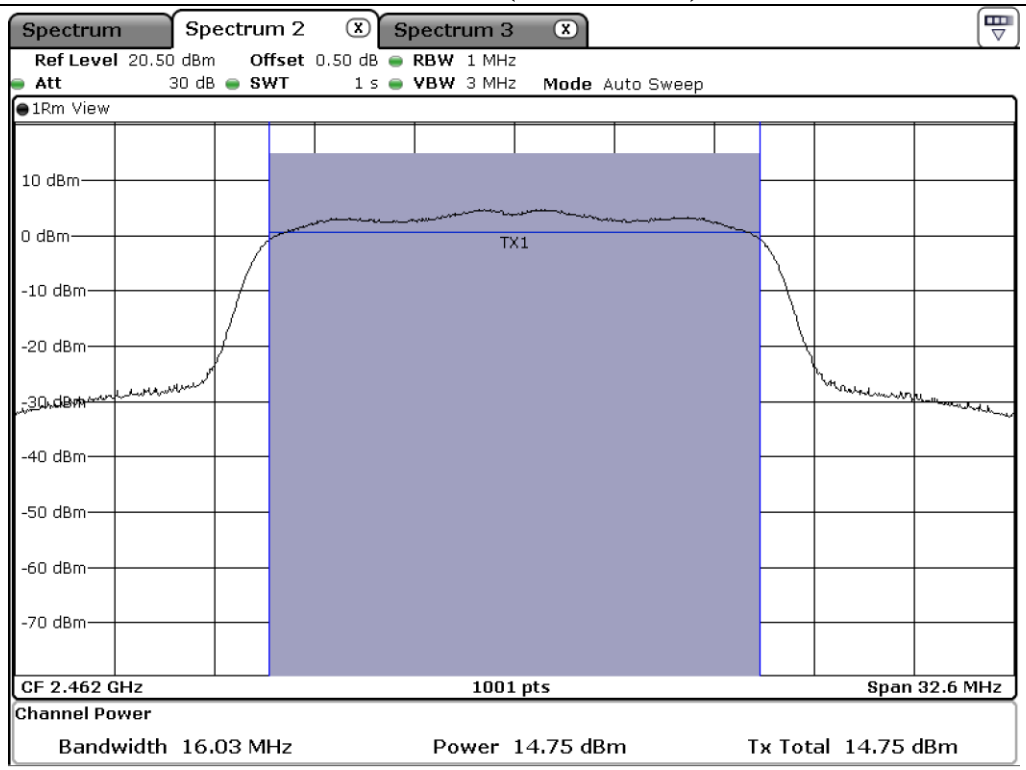
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel (6 dB Bandwidth)



Middle Channel (6 dB Bandwidth)



High Channel (6 dB Bandwidth)

8.6 Test data for 802.11n_HT20 WLAN Mode

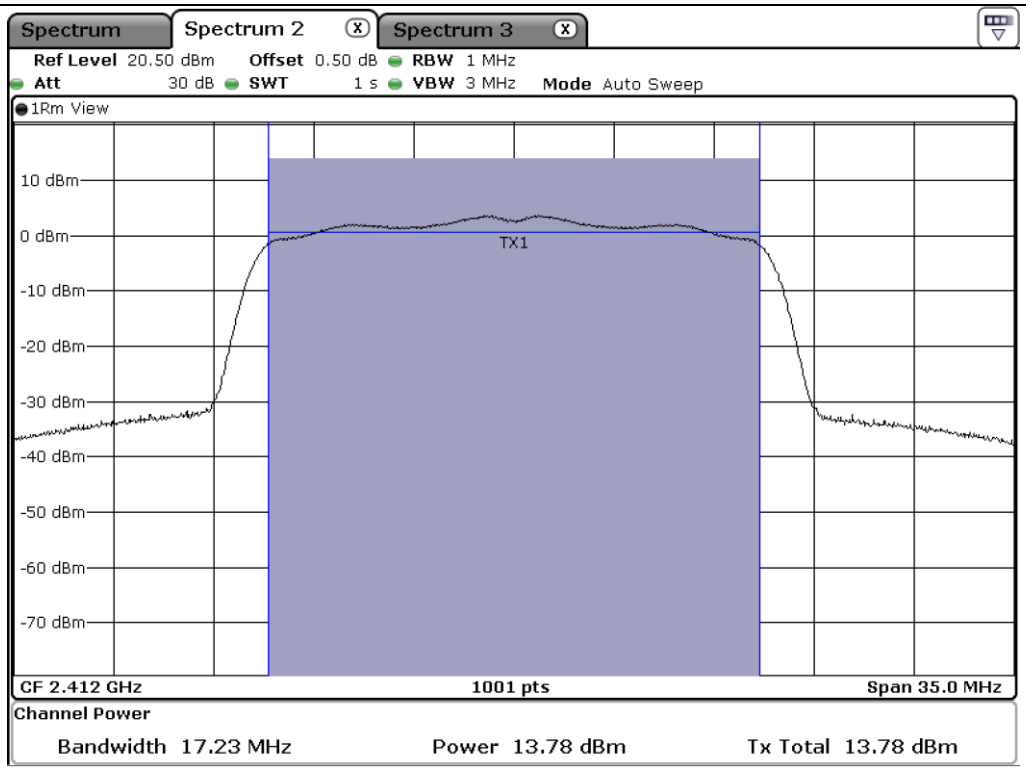
-. Test Date : November 03, 2016

-. Test Result : Pass

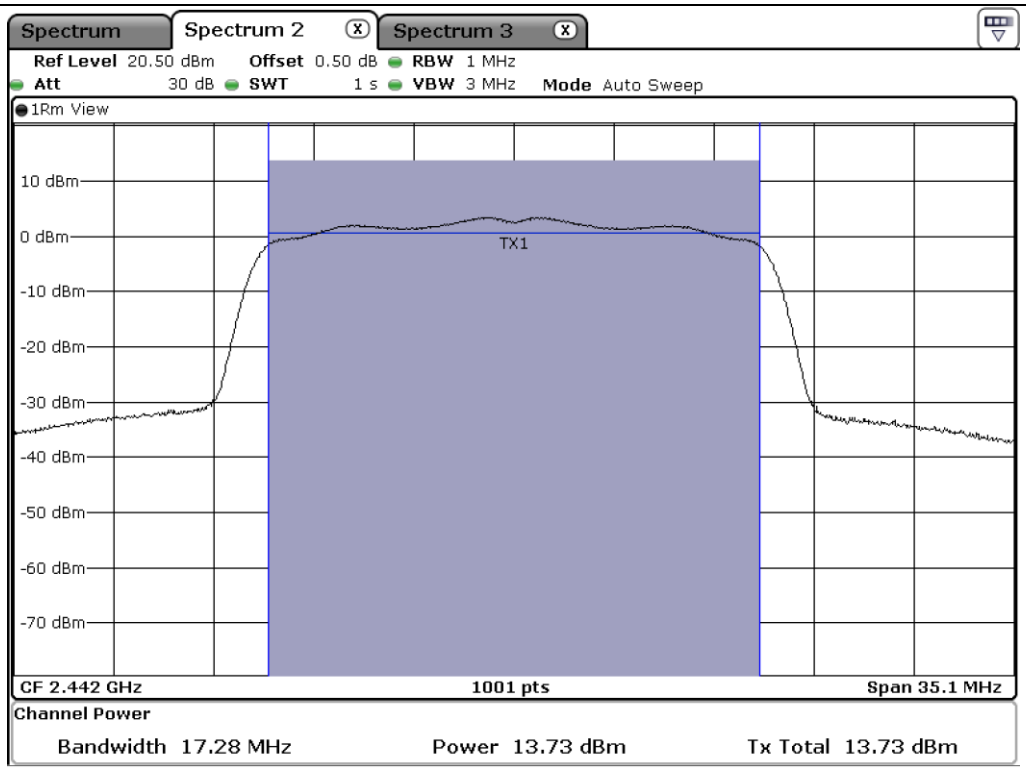
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	17.23	13.78	30.00	16.22
MIDDLE	2 442.00	17.28	13.73	30.00	16.27
HIGH	2 462.00	17.28	13.86	30.00	16.14

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

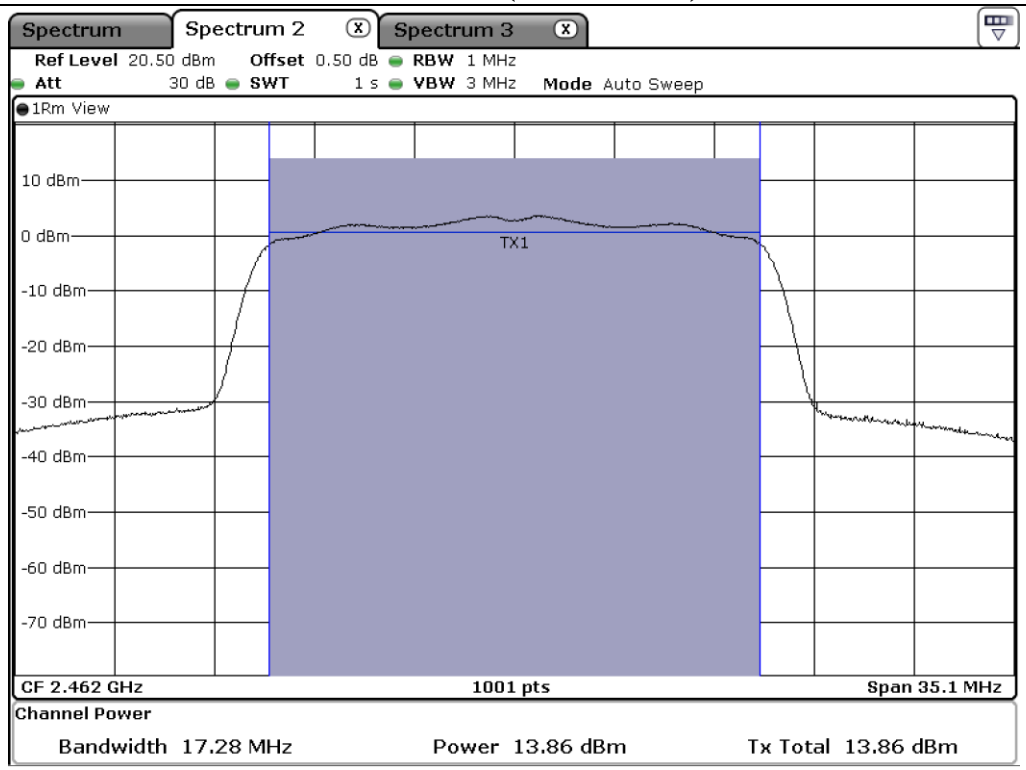
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel (6 dB Bandwidth)



Middle Channel (6 dB Bandwidth)



High Channel (6 dB Bandwidth)

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9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

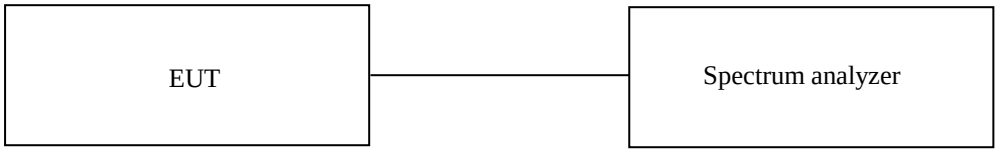
9.1 Operating environment

Temperature : 22.5 ℃

Relative humidity : 44.8 % R.H.

9.2 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.



9.3 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 above the ground plane.

The frequency spectrum from 30 MHz to 40 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.

9.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May 31, 2016 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2016 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	MA4000-EP	Innco System	Antenna Master	3320611	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (1Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Aug. 31, 2015 (2Y)

All test equipment used is calibrated on a regular basis.

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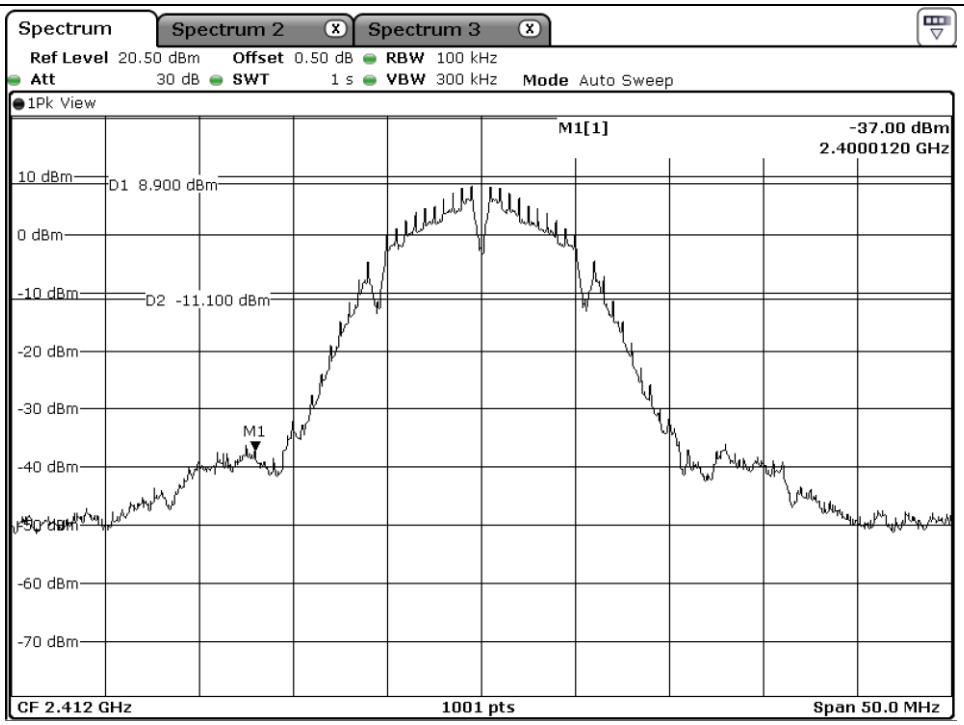
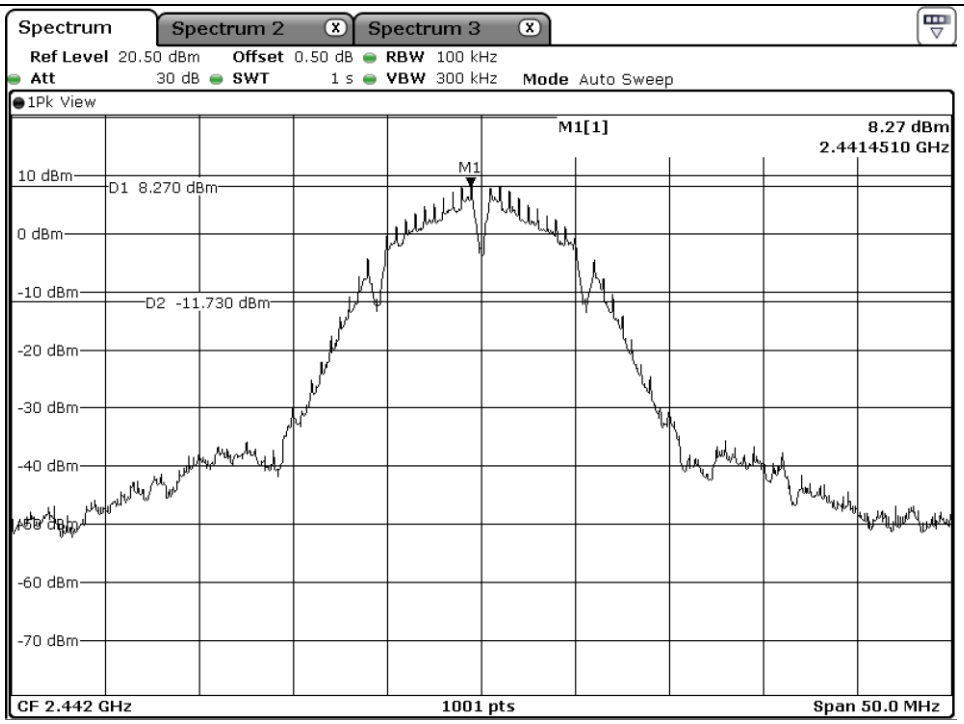
9.5 Test data for conducted emission

9.5.1 Test data for 802.11b WLAN Mode

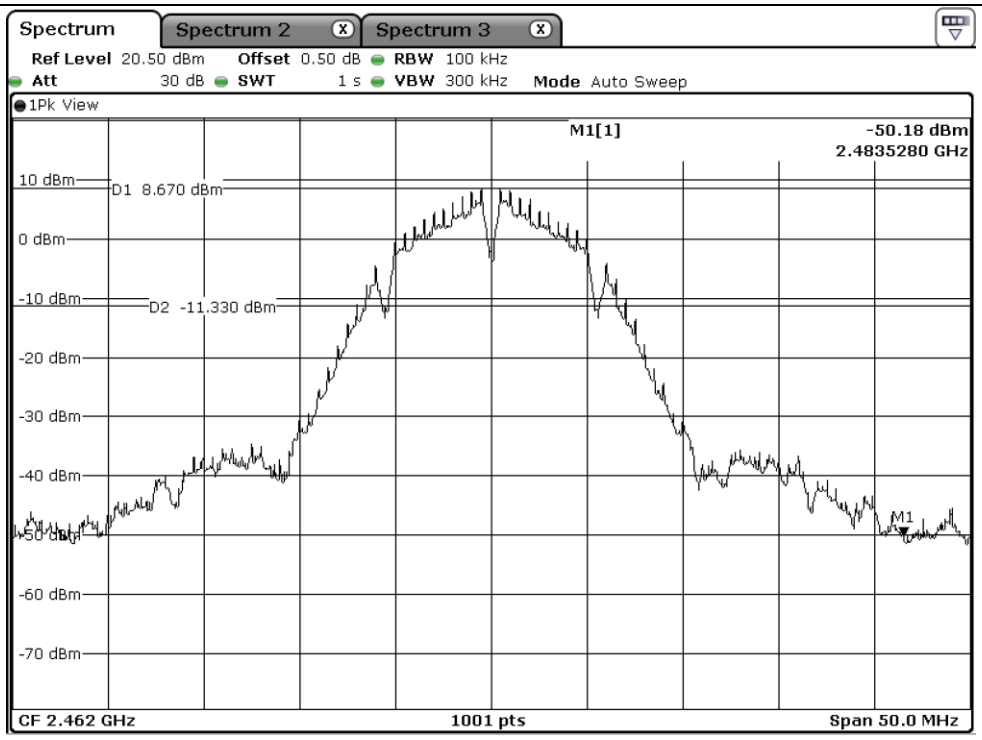


Low Channel



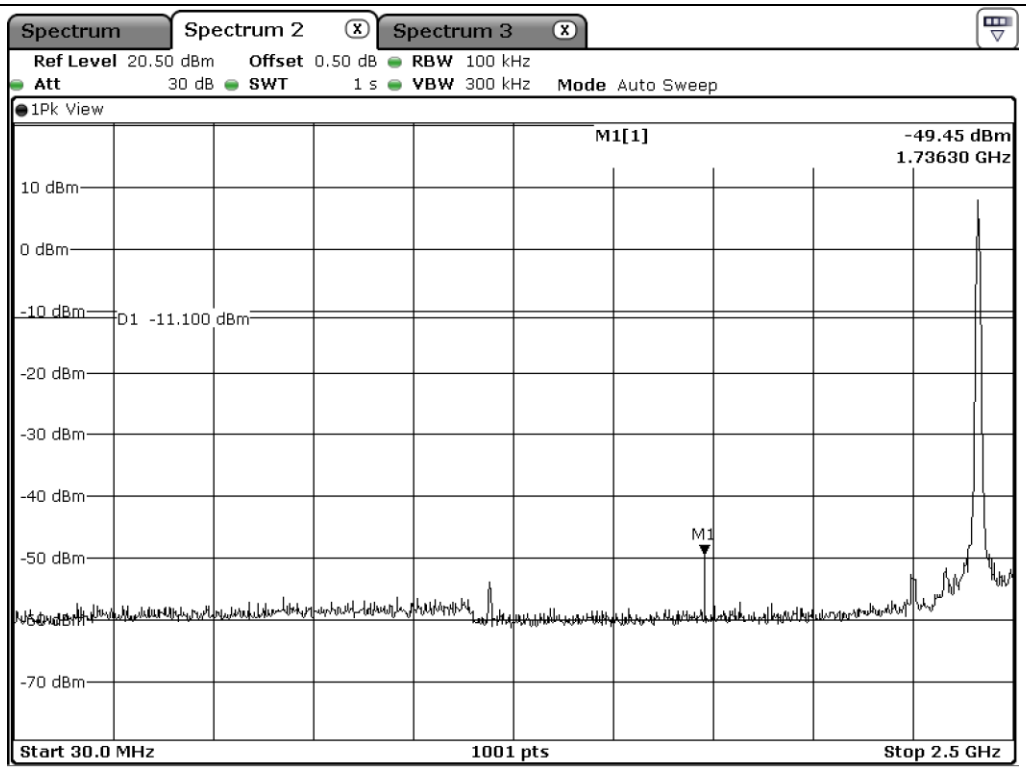
Middle Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

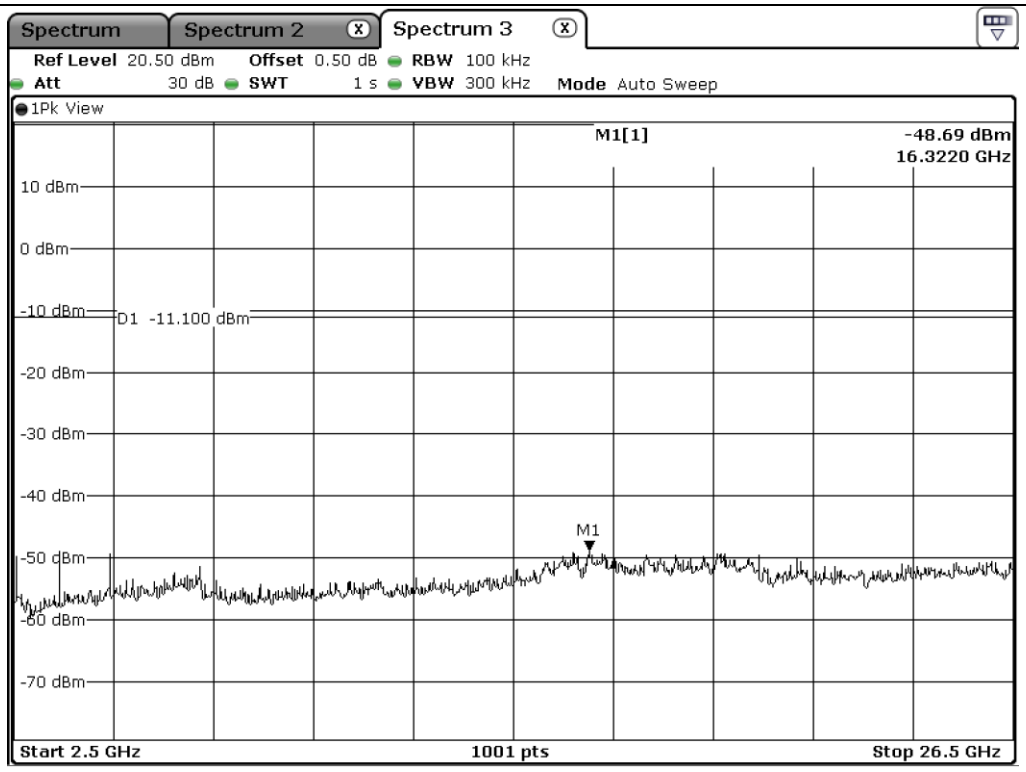


High Channel

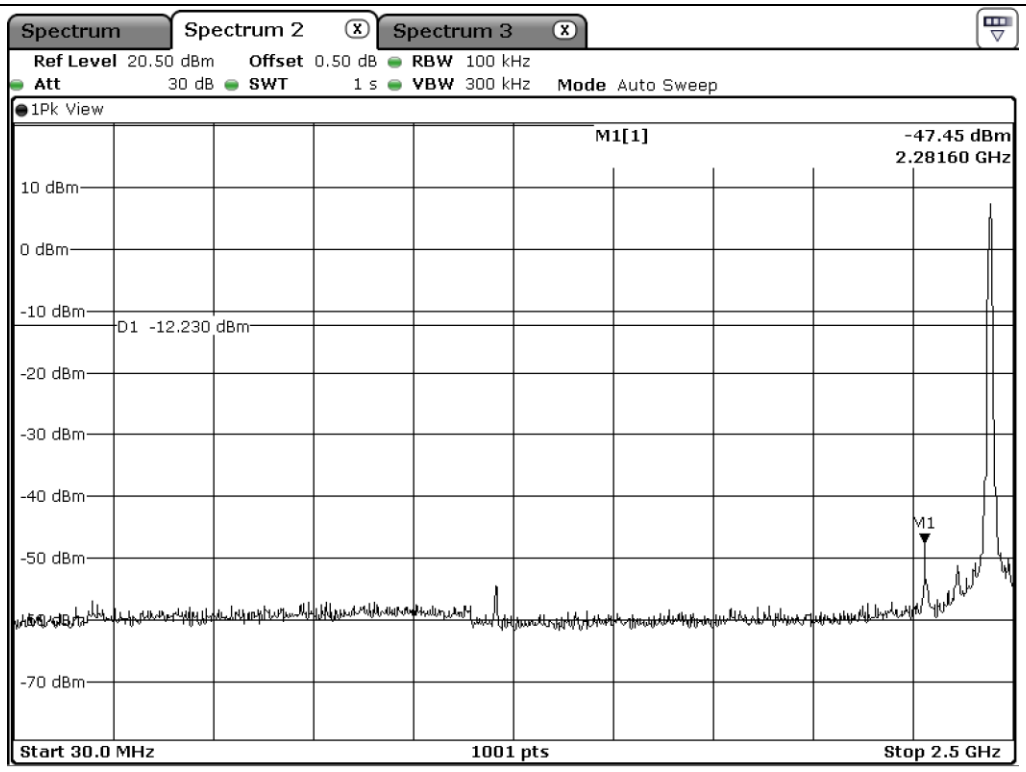
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



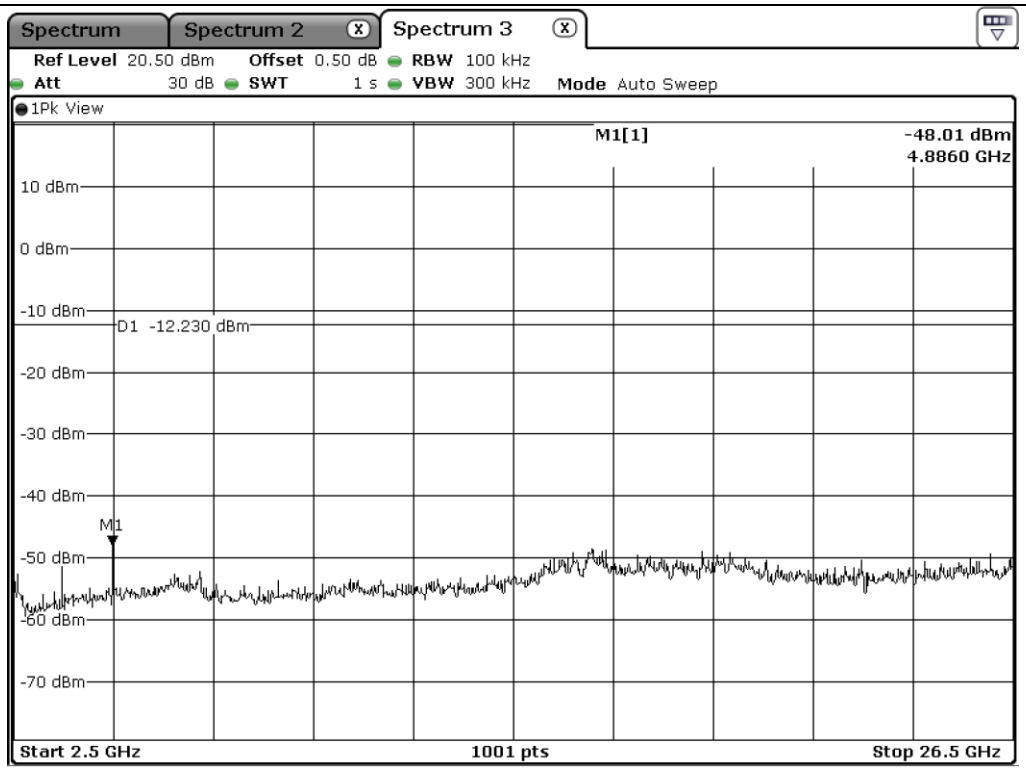
Low Channel



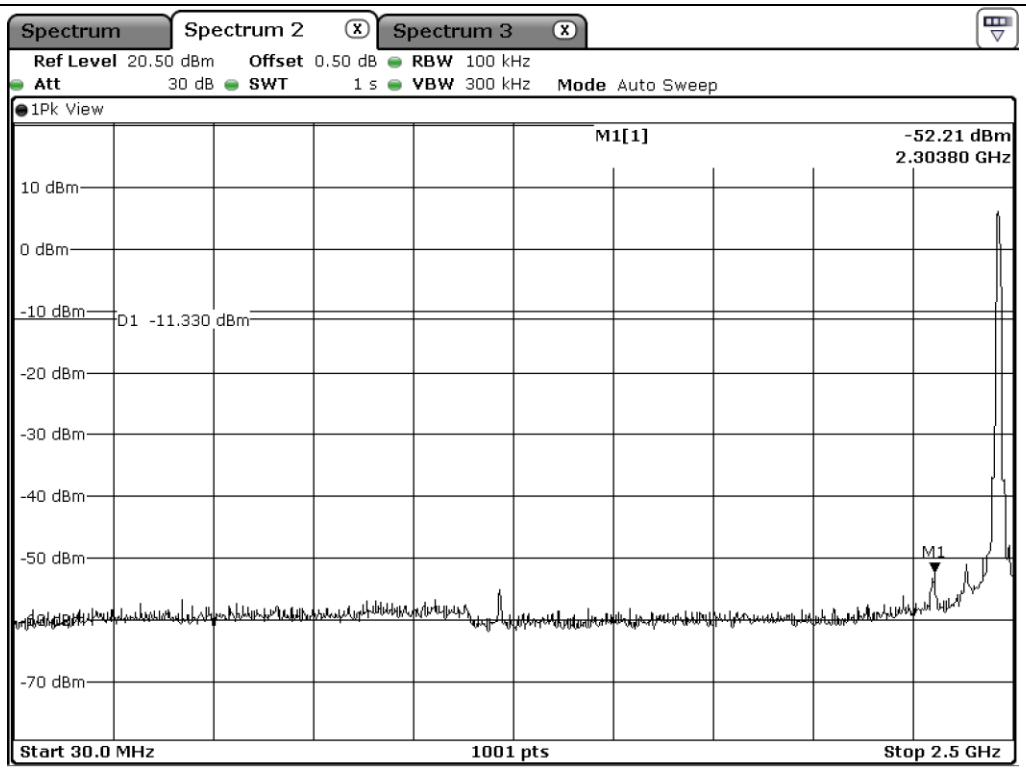
Low Channel



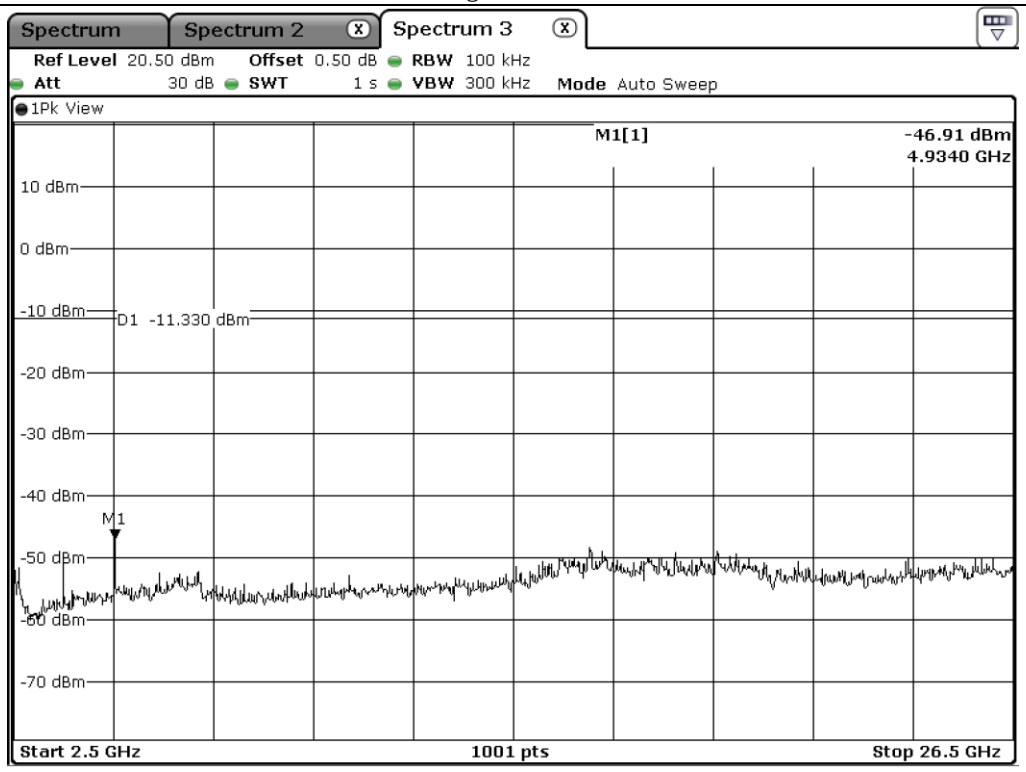
Middle Channel



Middle Channel



High Channel



High Channel

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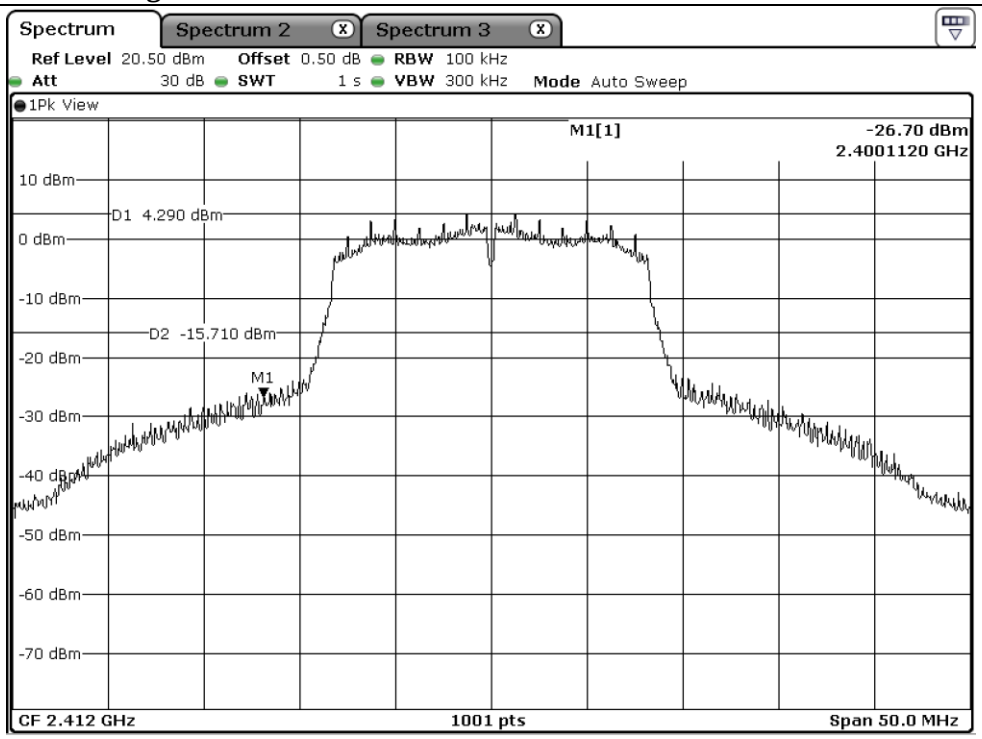
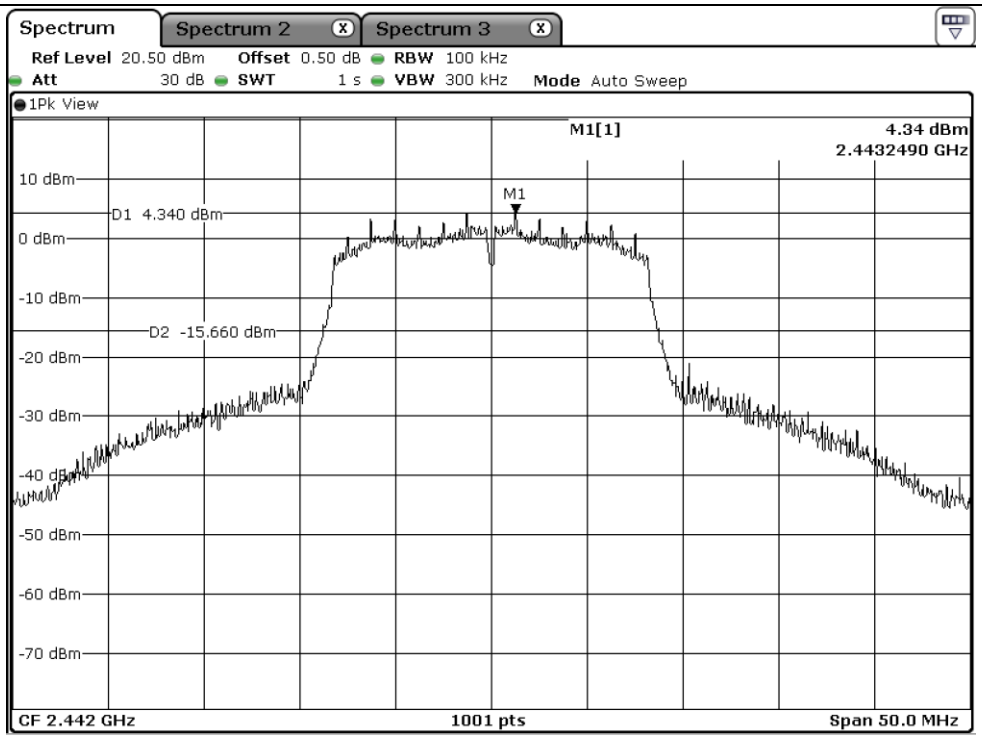
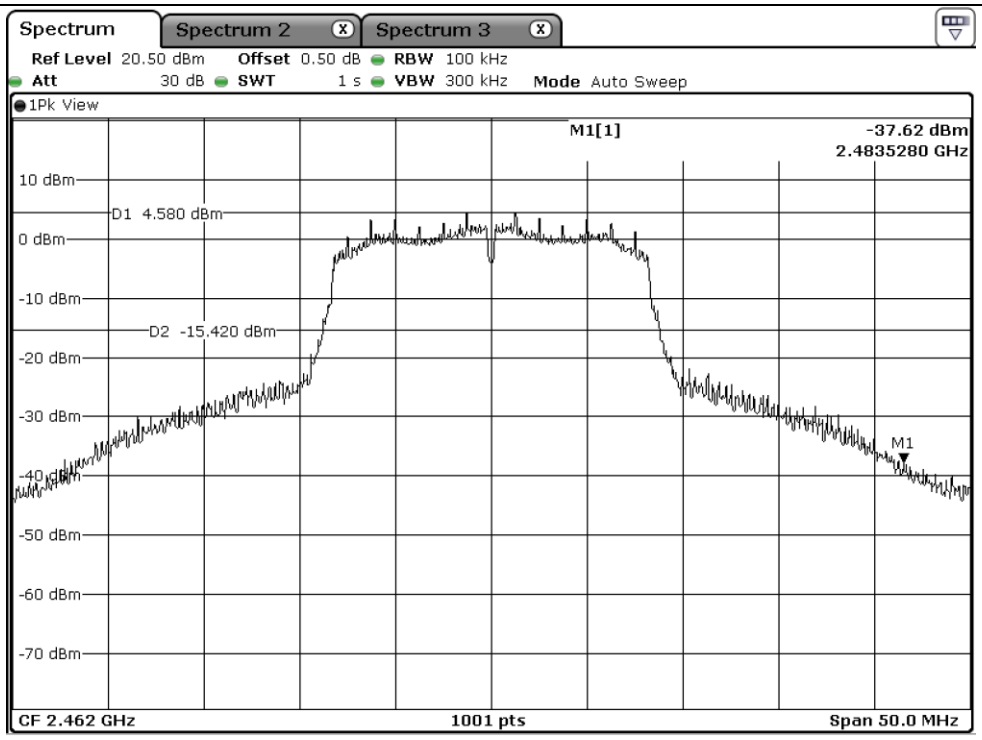
9.5.2 Test data for 802.11g WLAN Mode



Low Channel

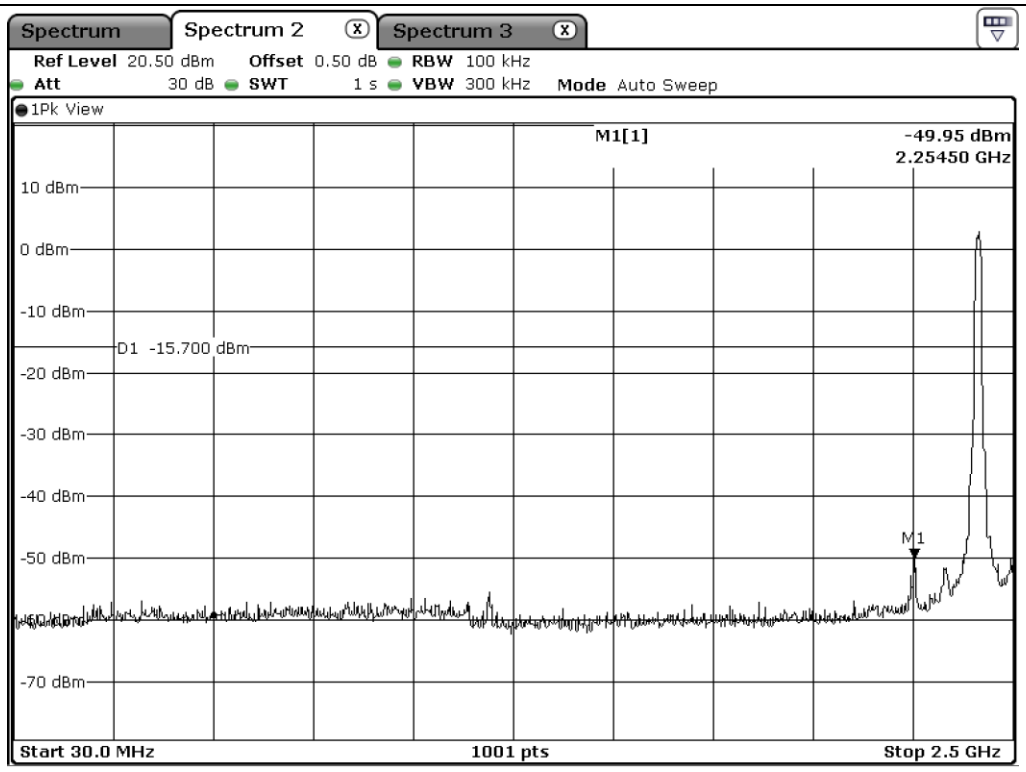


Middle Channel

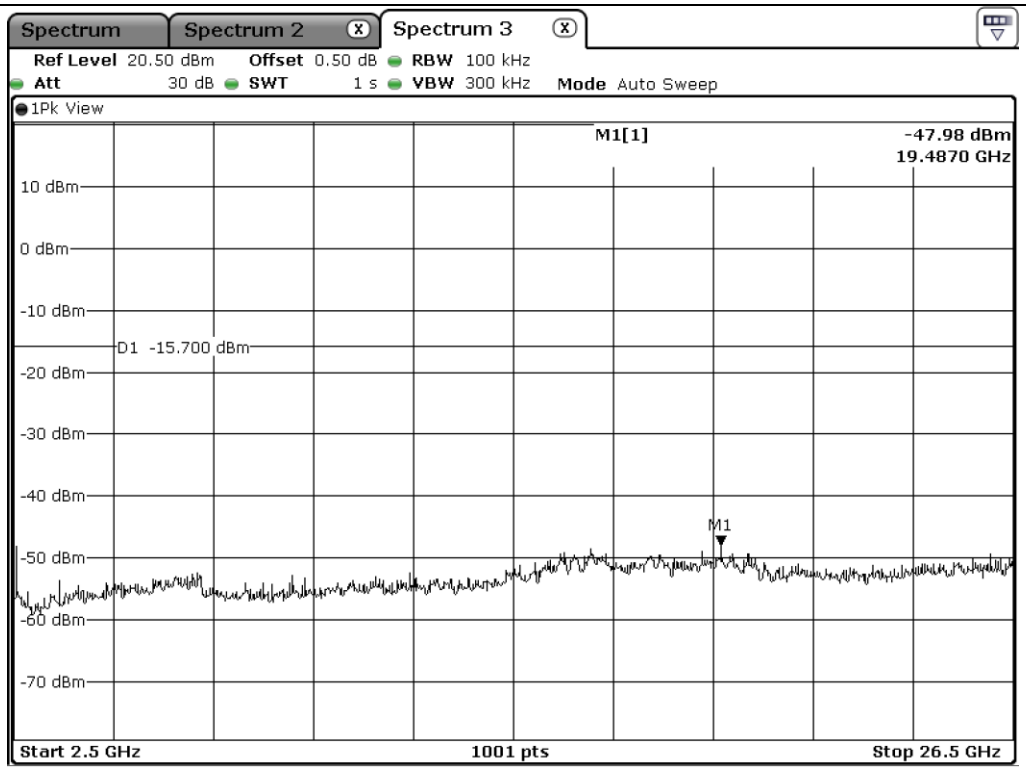


High Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

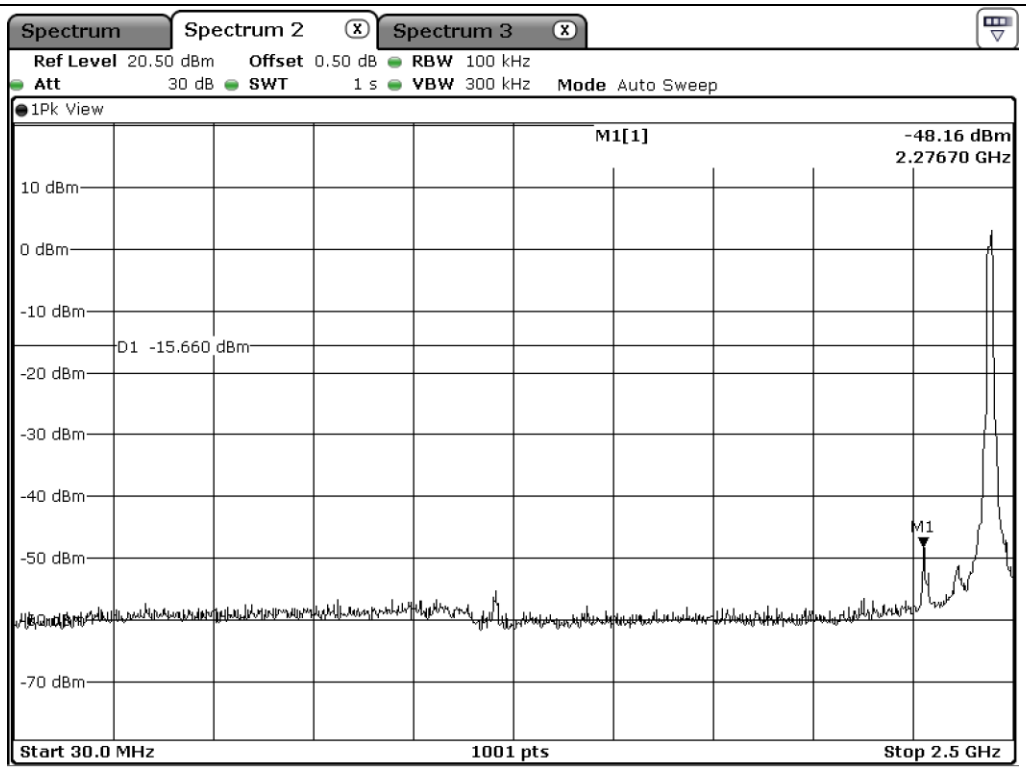


Low Channel

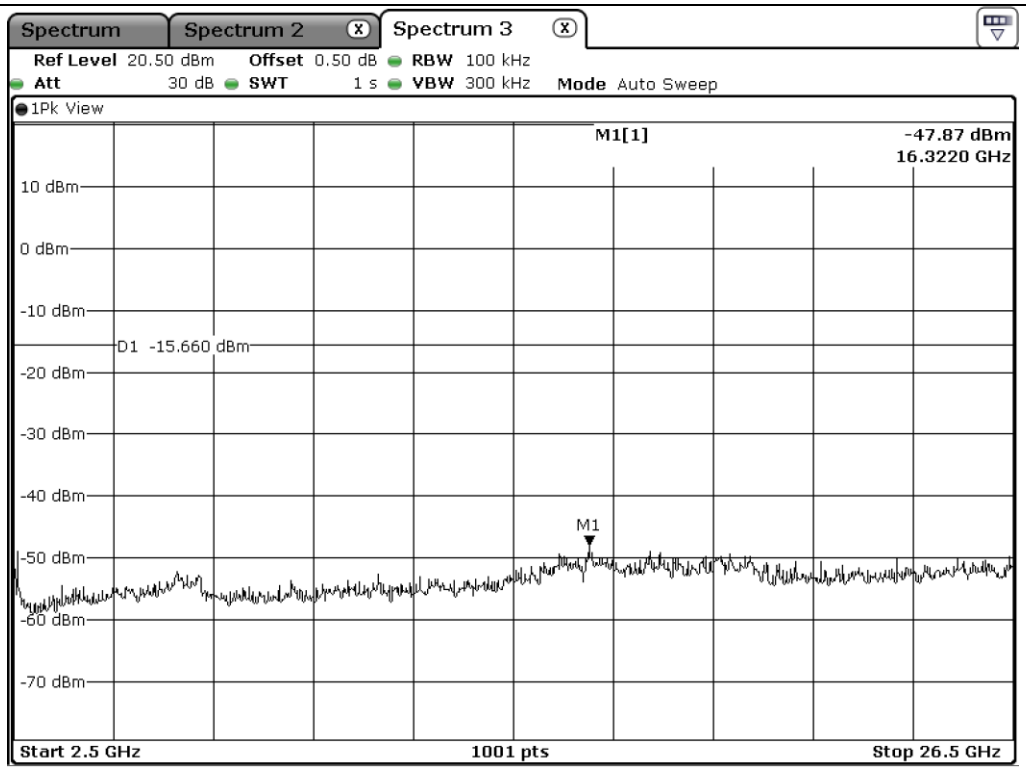


Low Channel

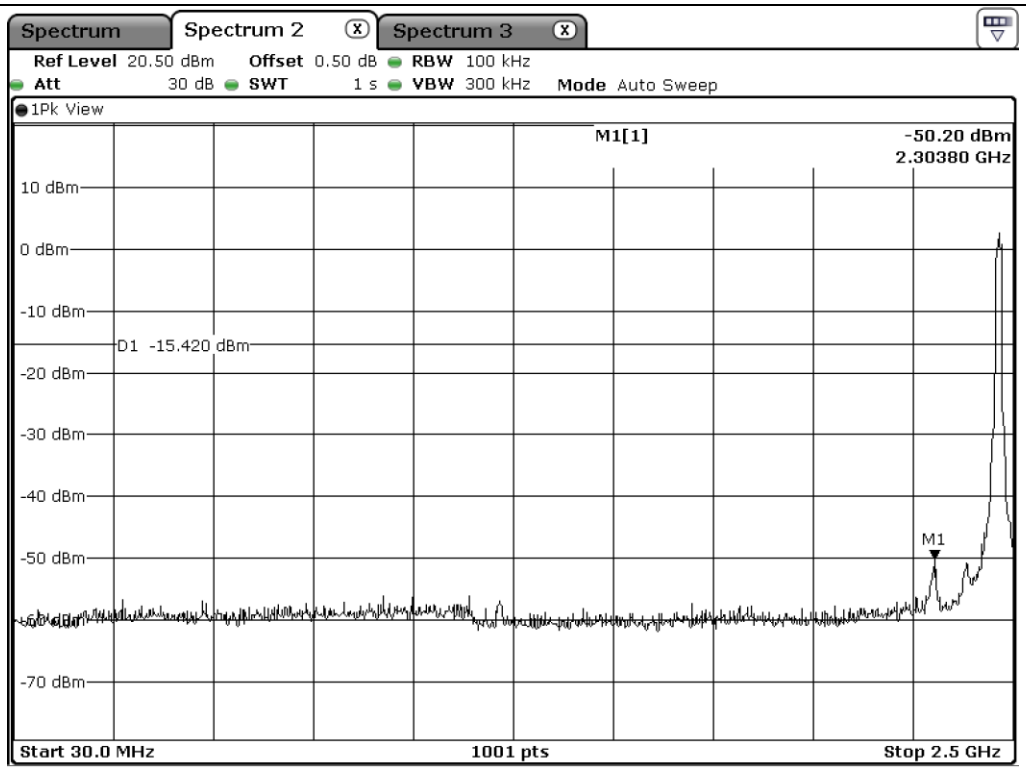
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



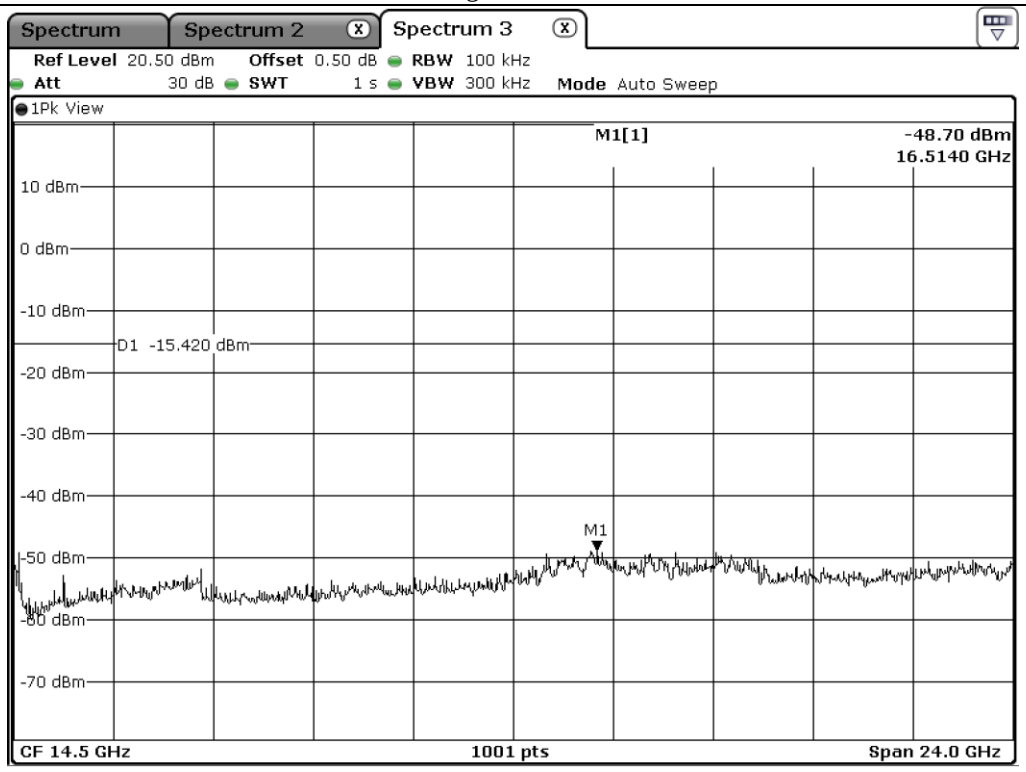
Middle Channel



Middle Channel



High Channel



High Channel

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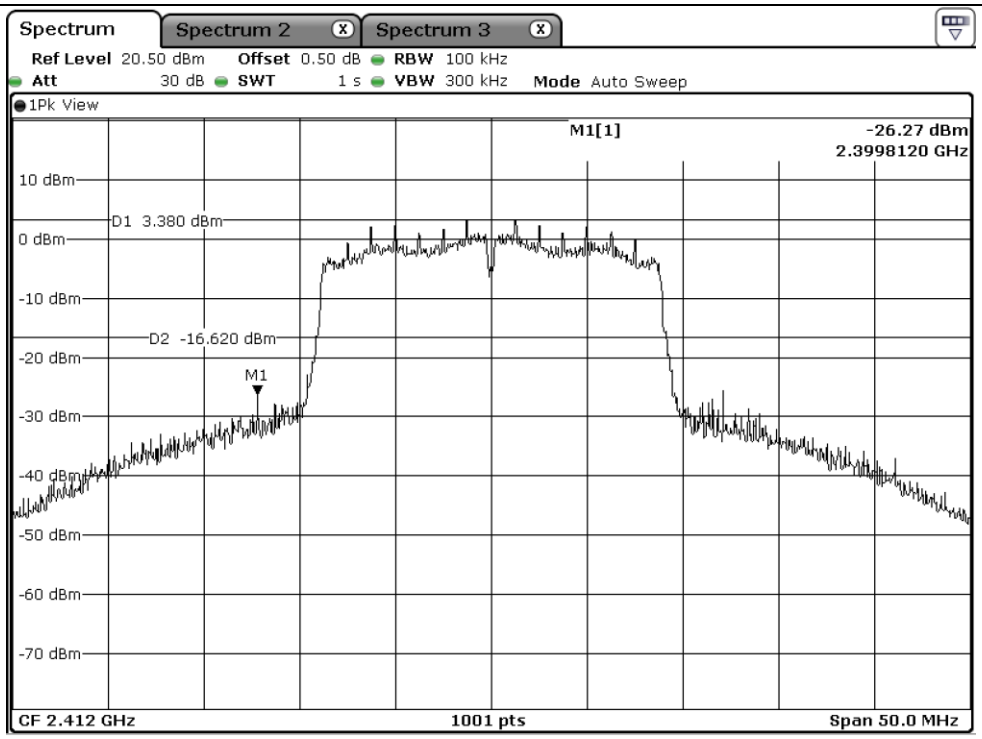
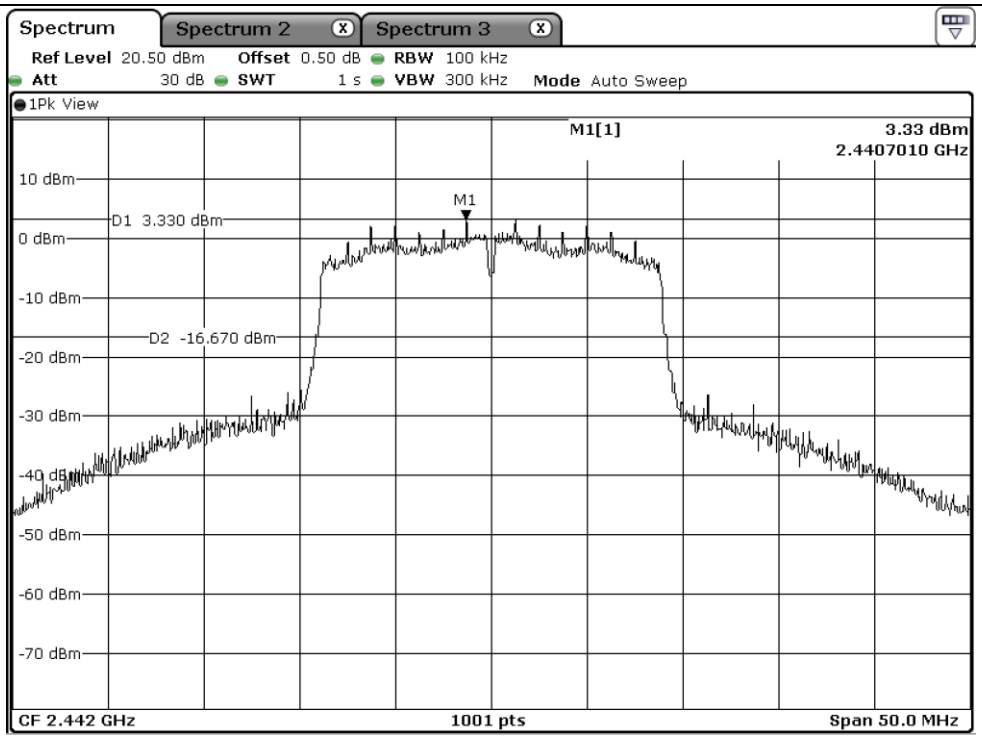
9.5.3 Test data for 802.11n_HT20 WLAN Mode

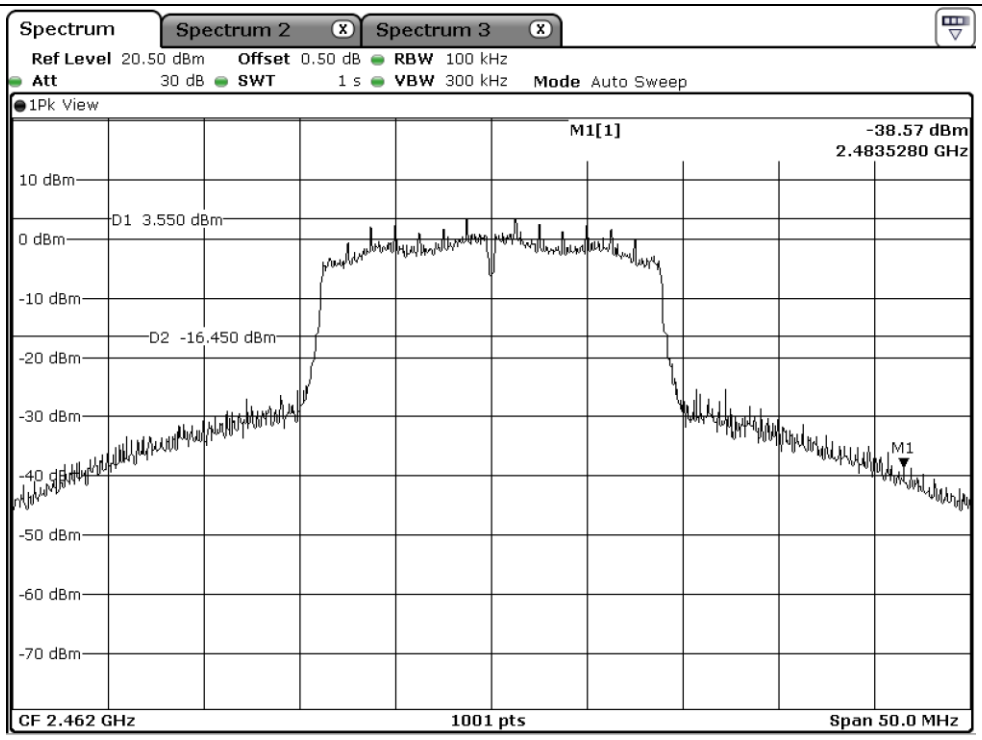


Low Channel



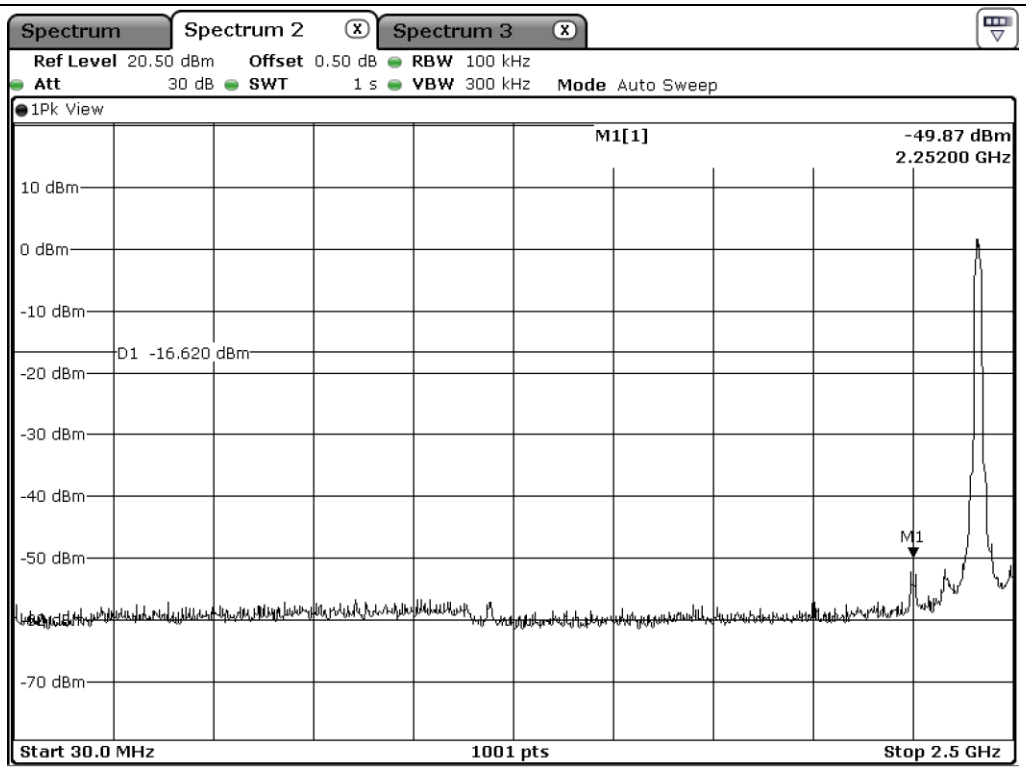
Middle Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

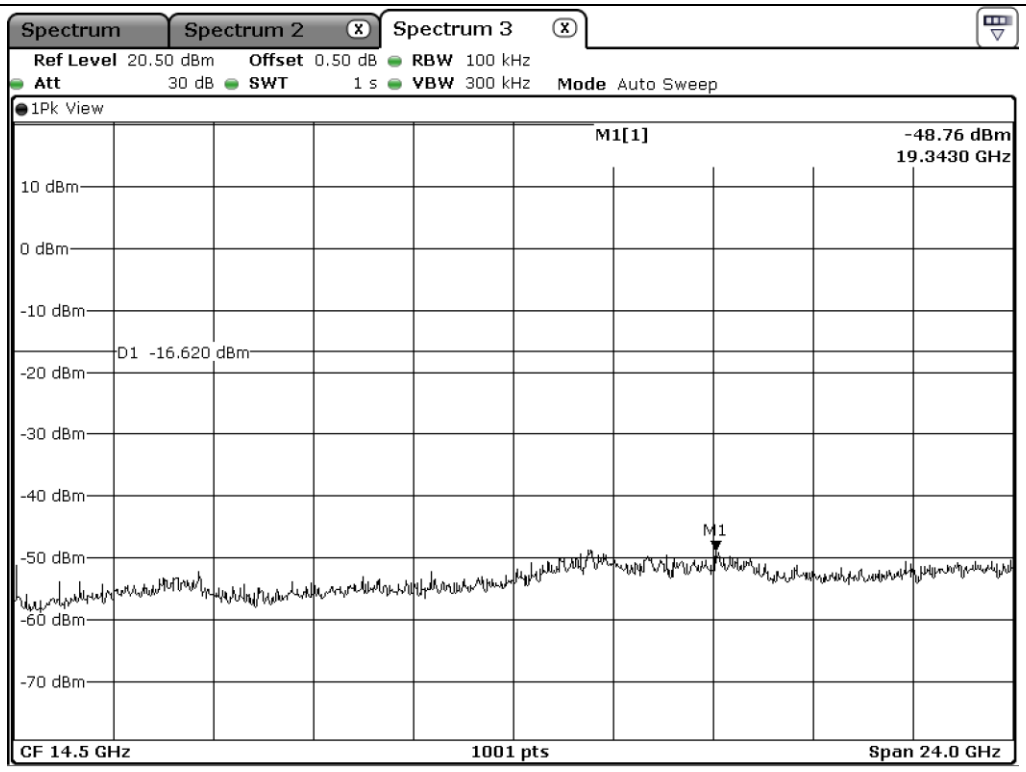


High Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

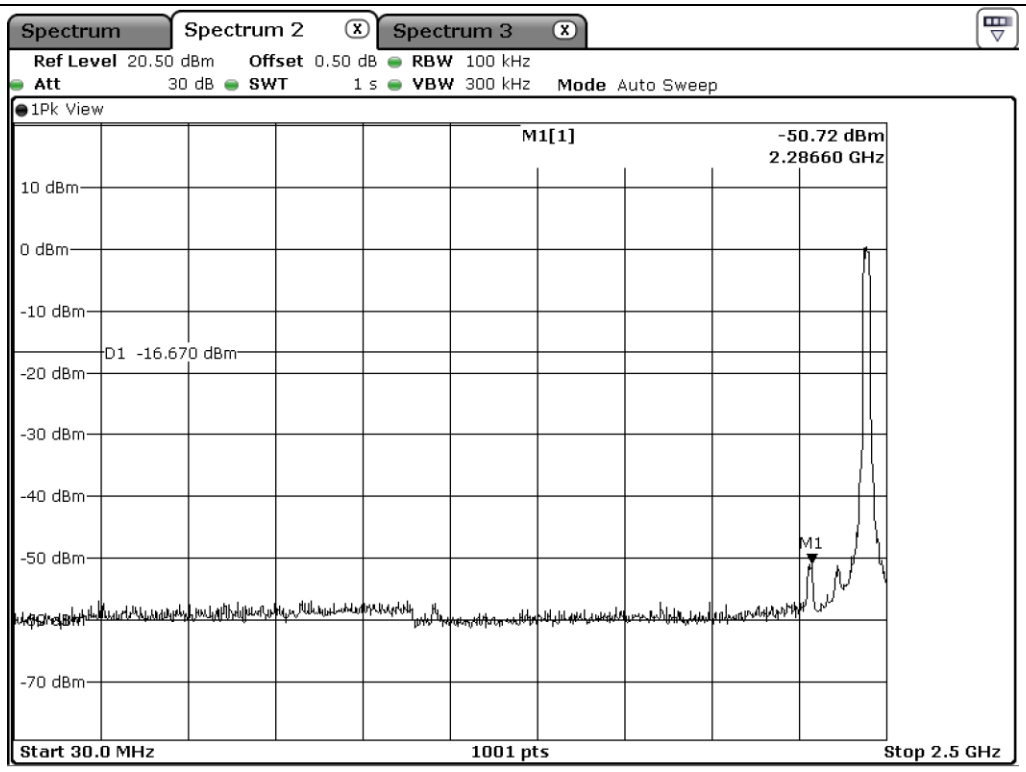


Low Channel

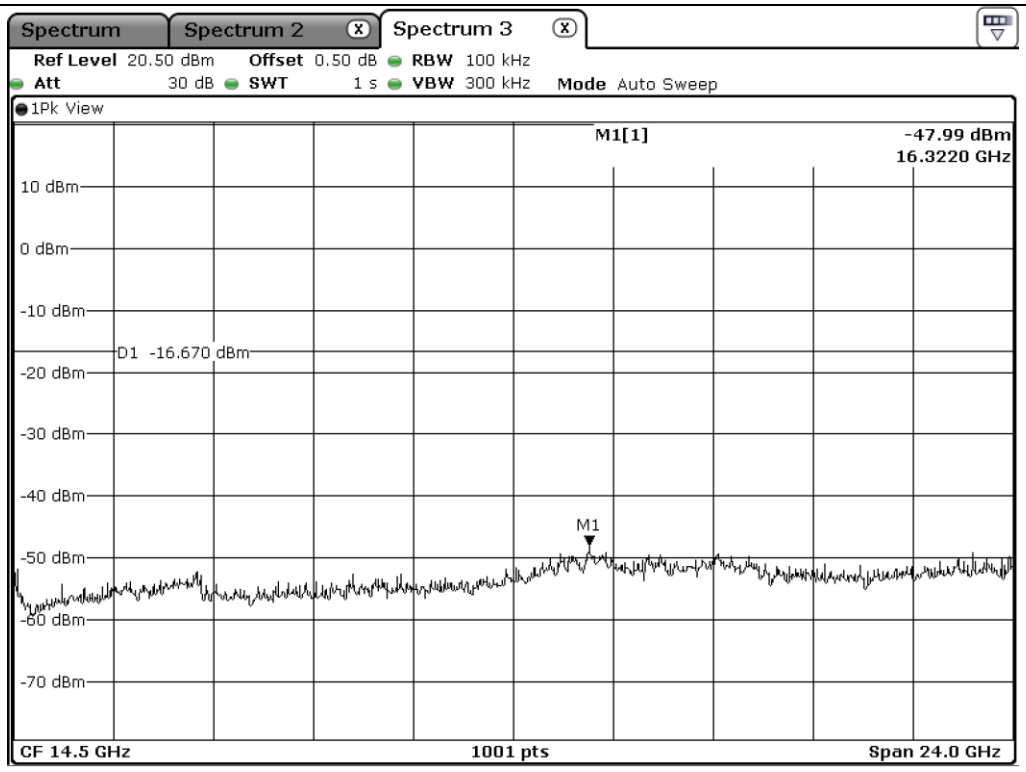


Low Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

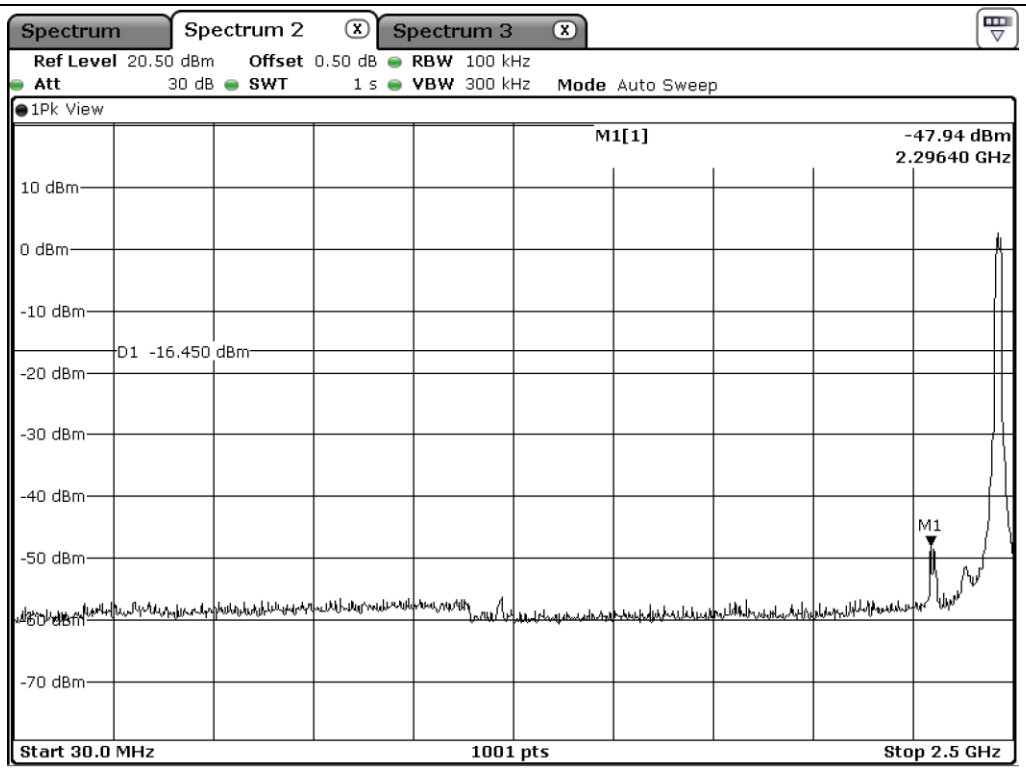


Middle Channel

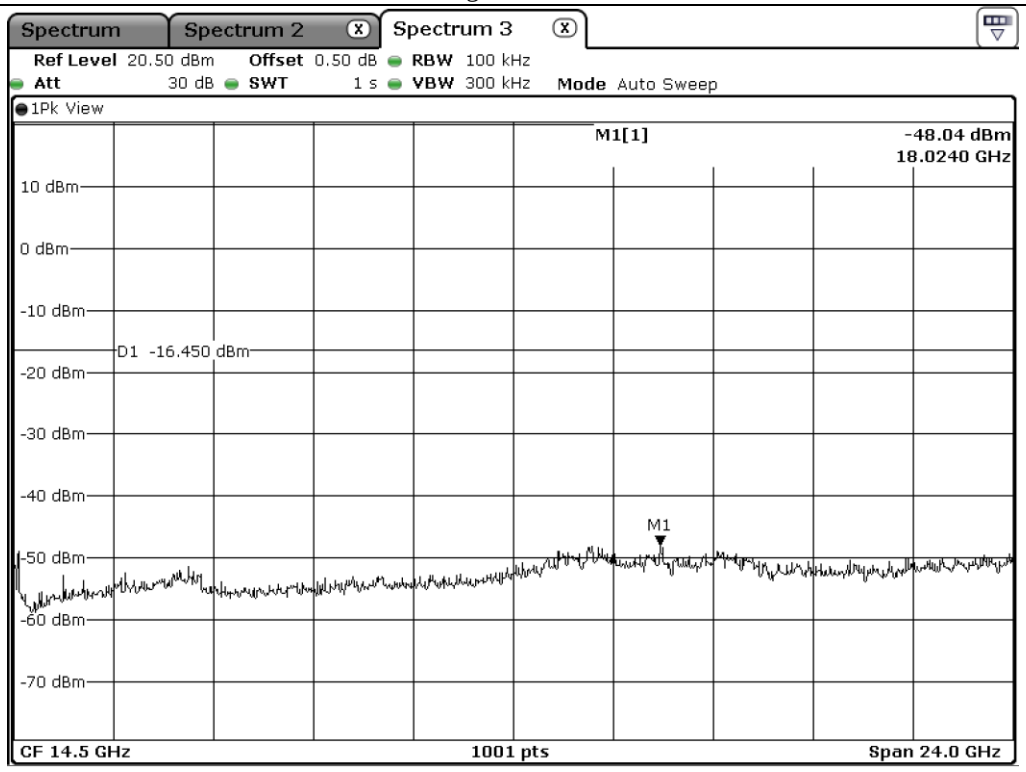


Middle Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



High Channel



High Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

9.6.1.1 Test data for 802.11b WLAN Mode

-. Test Date : November 03, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 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	58.75	Peak	H	27.47	11.36	40.16	57.42	74.00	16.58
	40.21	Average	H				38.88	54.00	15.12
	54.62	Peak	V				53.29	74.00	20.71
	51.19	Average	V				49.86	54.00	4.14
Test Data for Low Channel									
2 400.00	59.90	Peak	H	27.47	11.36	40.16	58.57	85.47	26.90
	40.54	Average	H				39.21	66.11	26.90
	60.68	Peak	V				59.35	86.25	26.90
	50.59	Average	V				49.26	76.16	26.90
Test Data for High Channel									
2 483.50	53.64	Peak	H	27.47	11.36	40.16	52.31	74.00	21.69
	38.94	Average	H				37.61	54.00	16.39
	51.50	Peak	V				50.17	74.00	23.83
	38.03	Average	V				36.70	54.00	17.30

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 / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.6.1.2 Test data for 802.11g WLAN Mode

-. Test Date : November 03, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 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	65.99	Peak	H	27.47	11.36	40.16	64.66	74.00	9.34
	48.79	Average	H				47.46	54.00	6.54
	67.02	Peak	V				65.69	74.00	8.31
	47.82	Average	V				46.49	54.00	7.51
Test Data for Low Channel									
2 400.00	79.08	Peak	H	27.47	11.36	40.16	77.75	88.74	10.99
	64.52	Average	H				63.19	74.18	10.99
	78.90	Peak	V				77.57	88.56	10.99
	63.52	Average	V				62.19	73.18	10.99
Test Data for High Channel									
2 483.50	68.64	Peak	H	27.47	11.36	40.16	67.31	74.00	6.69
	51.25	Average	H				49.92	54.00	4.08
	64.92	Peak	V				63.59	74.00	10.41
	46.35	Average	V				45.02	54.00	8.98

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 / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.6.1.3 Test data for 802.11n_HT20 WLAN Mode

-. Test Date : November 03, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 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	64.39	Peak	H	27.47	11.36	40.16	63.06	74.00	10.94
	49.03	Average	H				47.70	54.00	6.30
	64.24	Peak	V				62.91	74.00	11.09
	49.03	Average	V				47.70	54.00	6.30
Test Data for Low Channel									
2 400.00	76.24	Peak	H	27.47	11.36	40.16	74.91	84.56	9.65
	62.26	Average	H				60.93	70.58	9.65
	74.03	Peak	V				72.70	82.35	9.65
	61.33	Average	V				60.00	69.65	9.65
Test Data for High Channel									
2 483.50	69.27	Peak	H	27.47	11.36	40.16	67.94	74.00	6.06
	46.94	Average	H				45.61	54.00	8.39
	63.48	Peak	V				62.15	74.00	11.85
	45.94	Average	V				44.61	54.00	9.39

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 / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.6.2 Spurious & Harmonic Radiated Emission

9.6.2.1 Test data for 802.11b WLAN Mode

-. Test Date : November 03, 2016

-. 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 ~ 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									
4 824.00	40.68	Peak	H	30.70	16.10	40.60	46.88	73.98	27.10
	31.94	Average	H				38.14	53.98	15.84
	41.11	Peak	V				47.31	73.98	26.67
	32.10	Average	V				38.30	53.98	15.68
Test Data for Middle Channel									
4 884.00	41.03	Peak	H	30.90	16.30	40.60	47.63	73.98	26.35
	32.25	Average	H				38.85	53.98	15.13
	40.98	Peak	V				47.58	73.98	26.40
	32.37	Average	V				38.97	53.98	15.01
Test Data for High Channel									
4 924.00	40.57	Peak	H	31.00	16.50	40.60	47.47	73.98	26.51
	31.68	Average	H				38.58	53.98	15.40
	41.18	Peak	V				48.08	73.98	25.90
	31.89	Average	V				38.79	53.98	15.19

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 / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.6.2.2 Test data for 802.11g WLAN Mode

-. Test Date : November 03, 2016

-. 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 ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

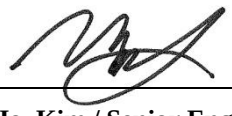
Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	40.39	Peak	H	30.70	16.10	40.60	46.59	73.98	27.39
	31.51	Average	H				37.71	53.98	16.27
	40.69	Peak	V				46.89	73.98	27.09
	31.47	Average	V				37.67	53.98	16.31
Test Data for Middle Channel									
4 884.00	40.84	Peak	H	30.90	16.30	40.60	47.44	73.98	26.54
	31.84	Average	H				38.44	53.98	15.54
	41.55	Peak	V				48.15	73.98	25.83
	32.14	Average	V				38.74	53.98	15.24
Test Data for High Channel									
4 924.00	41.59	Peak	H	31.00	16.50	40.60	48.49	73.98	25.49
	31.20	Average	H				38.10	53.98	15.88
	40.89	Peak	V				47.79	73.98	26.19
	30.98	Average	V				37.88	53.98	16.10

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 / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.6.2.3 Test data for 802.11n_HT20 WLAN Mode

-. Test Date : November 03, 2016

-. 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 ~ 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									
4 824.00	40.87	Peak	H	30.70	16.10	40.60	47.07	73.98	26.91
	30.89	Average	H				37.09	53.98	16.89
	41.21	Peak	V				47.41	73.98	26.57
	31.09	Average	V				37.29	53.98	16.69
Test Data for Middle Channel									
4 884.00	41.25	Peak	H	30.90	16.30	40.60	47.85	73.98	26.13
	31.99	Average	H				38.59	53.98	15.39
	41.84	Peak	V				48.44	73.98	25.54
	31.51	Average	V				38.11	53.98	15.87
Test Data for High Channel									
4 924.00	42.20	Peak	H	31.00	16.50	40.60	49.10	73.98	24.88
	31.89	Average	H				38.79	53.98	15.19
	41.08	Peak	V				47.98	73.98	26.00
	32.05	Average	V				38.95	53.98	15.03

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 / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

10. PEAK POWER SPECTRUL DENSITY

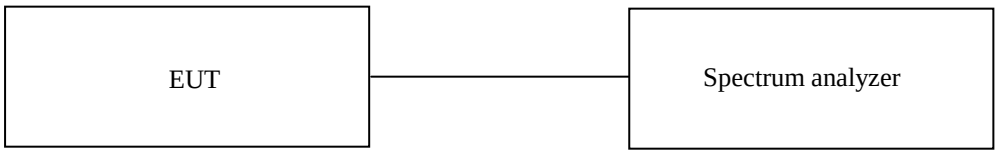
10.1 Operating environment

Temperature : 22.5 ℃

Relative humidity : 44.8 % R.H.

10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth.



10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May 31, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

10.4 Test data for 802.11b WLAN Mode

-. Test Date : November 03, 2016

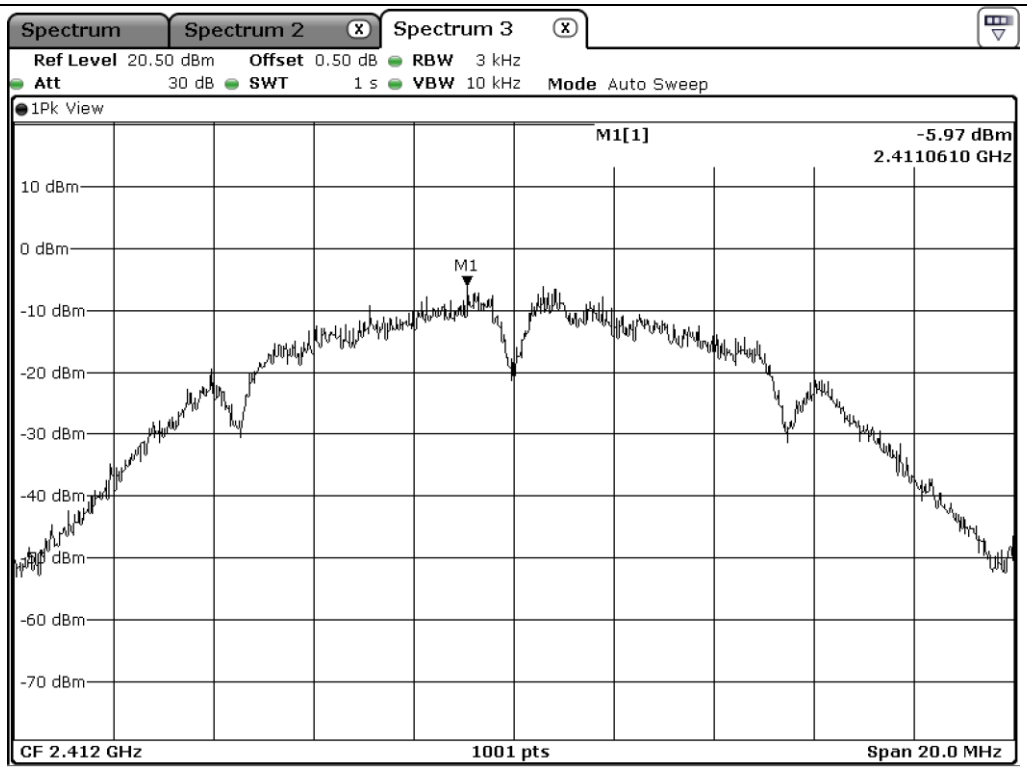
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

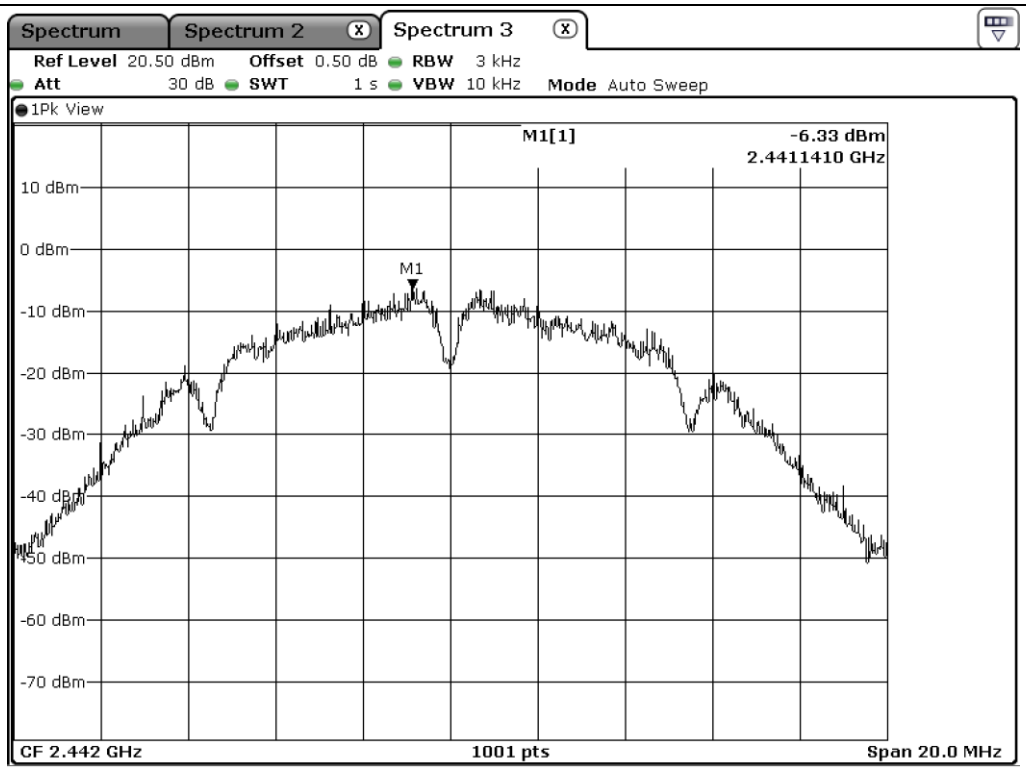
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-5.97	8.00	13.97
Middle	2 442.00	-6.33	8.00	14.33
High	2 462.00	-5.75	8.00	13.75

Remark. Margin = Limit – Measured value

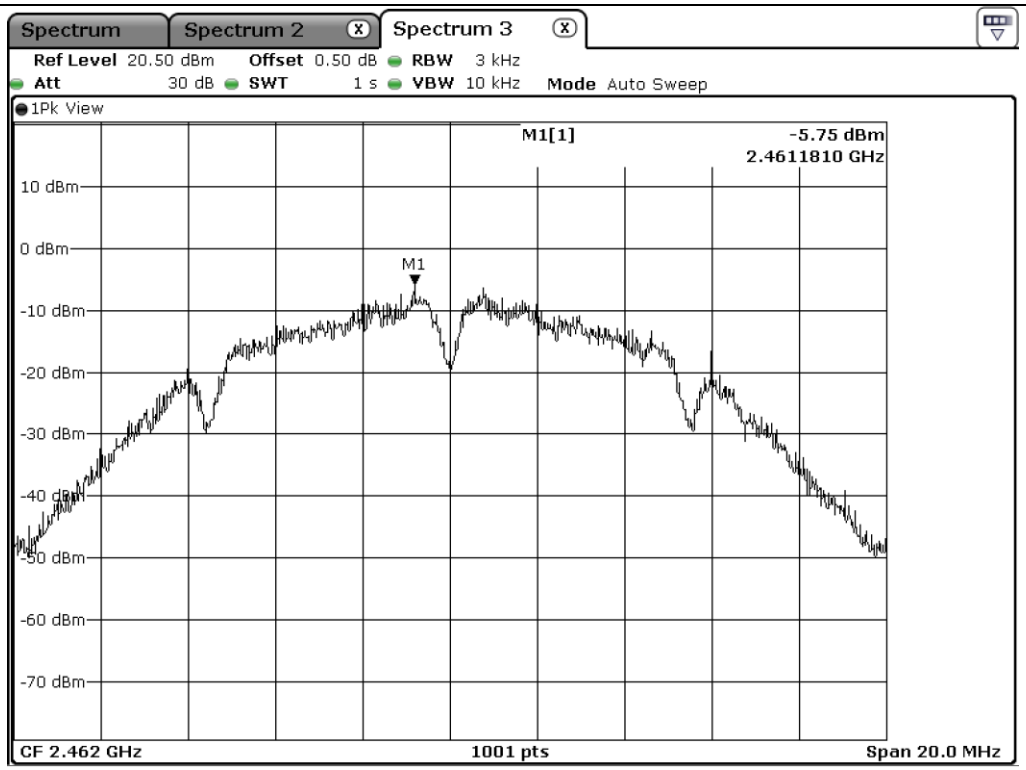
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel



Middle Channel



High Channel

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10.5 Test data for 802.11g WLAN Mode

-. Test Date : November 03, 2016

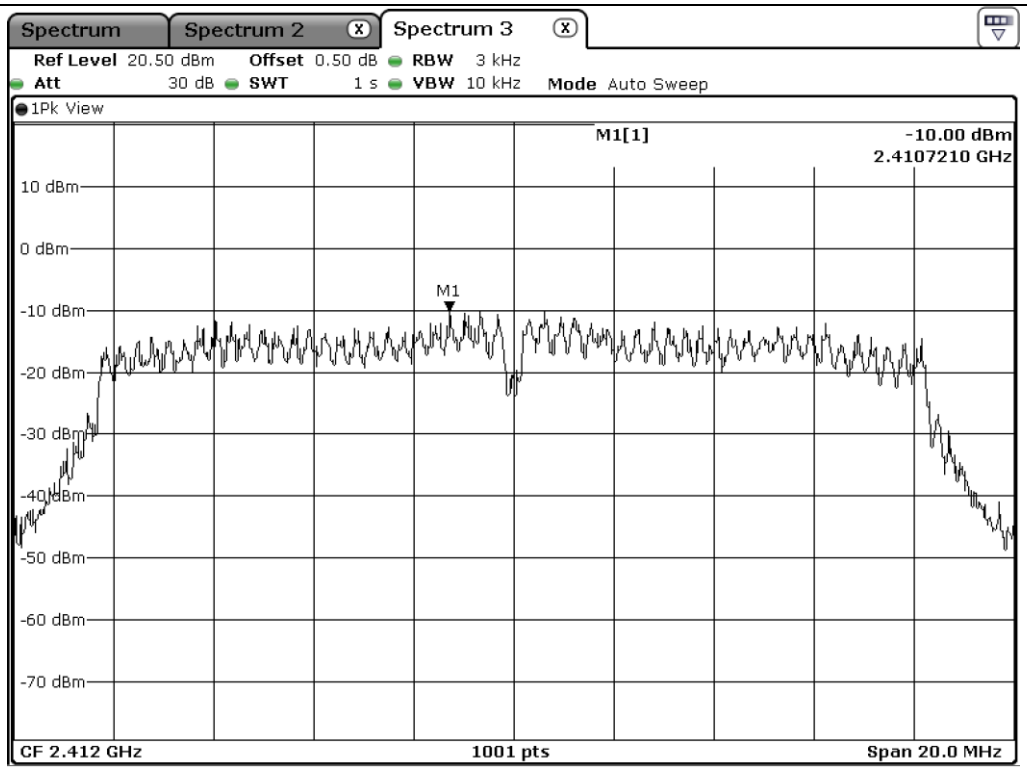
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

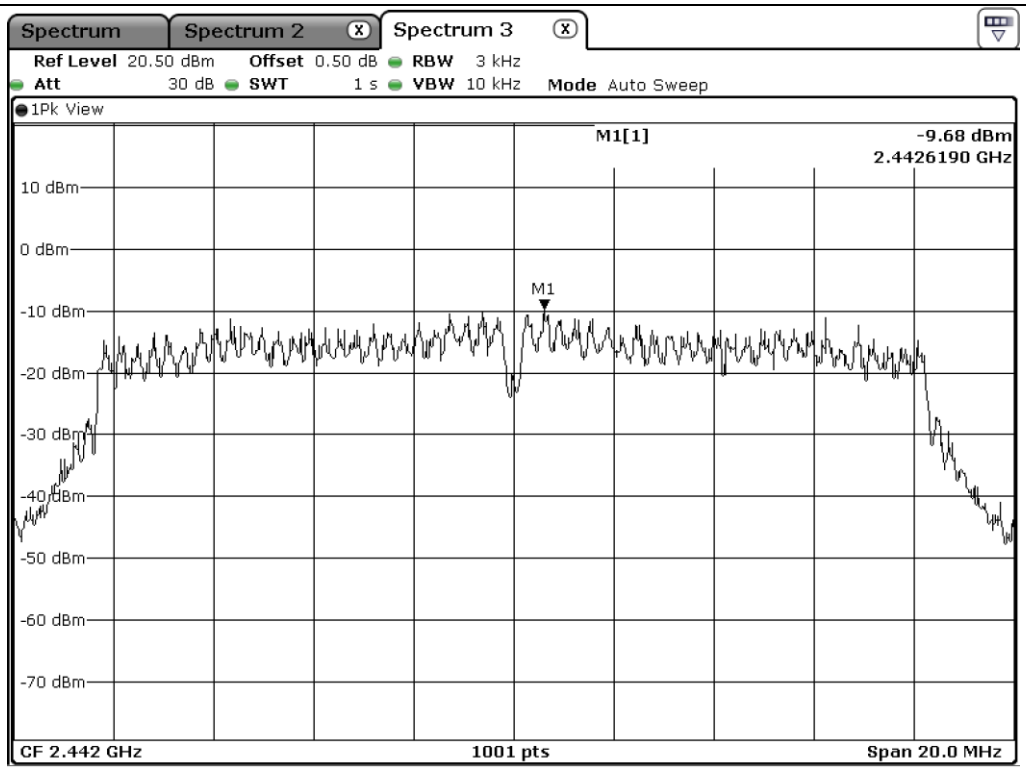
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-10.00	8.00	18.00
Middle	2 442.00	-9.68	8.00	17.68
High	2 462.00	-10.15	8.00	18.15

Remark. Margin = Limit – Measured value

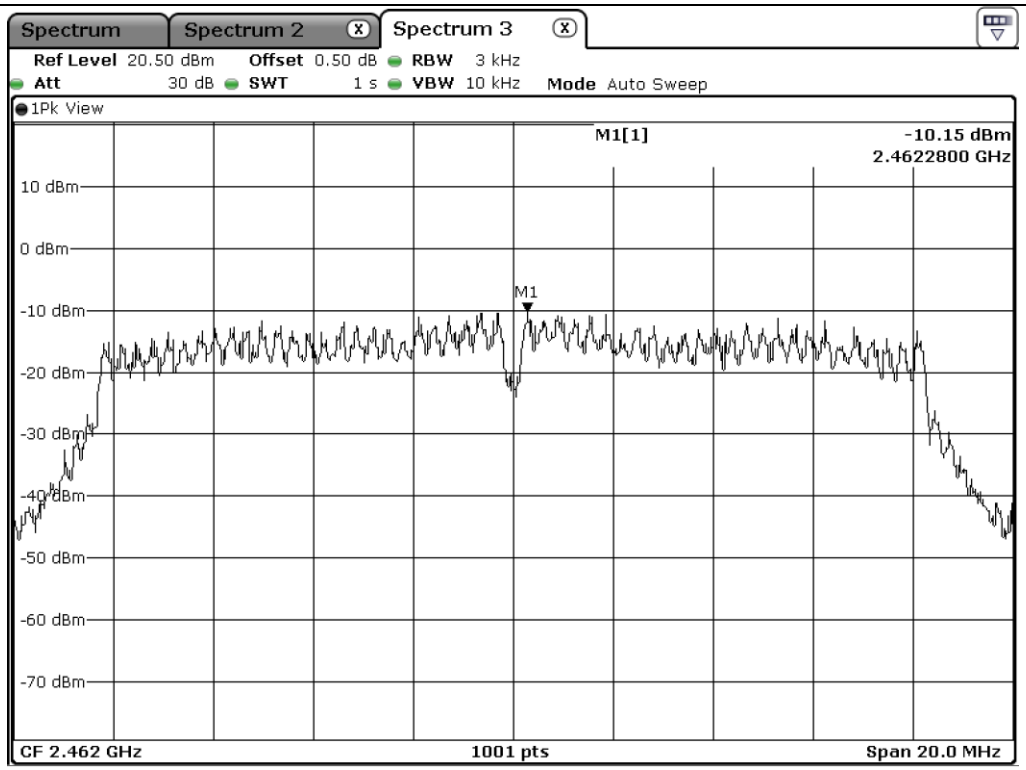
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel



Middle Channel



High Channel

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

10.6 Test data for 802.11n_HT20 WLAN Mode

-. Test Date : November 03, 2016

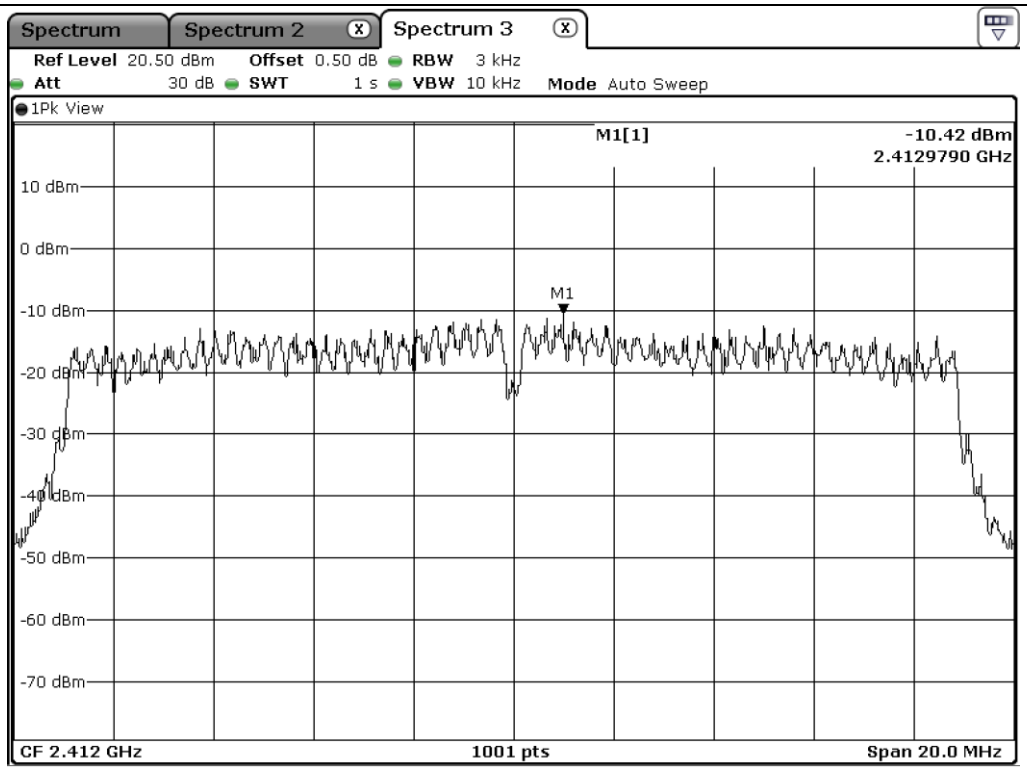
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

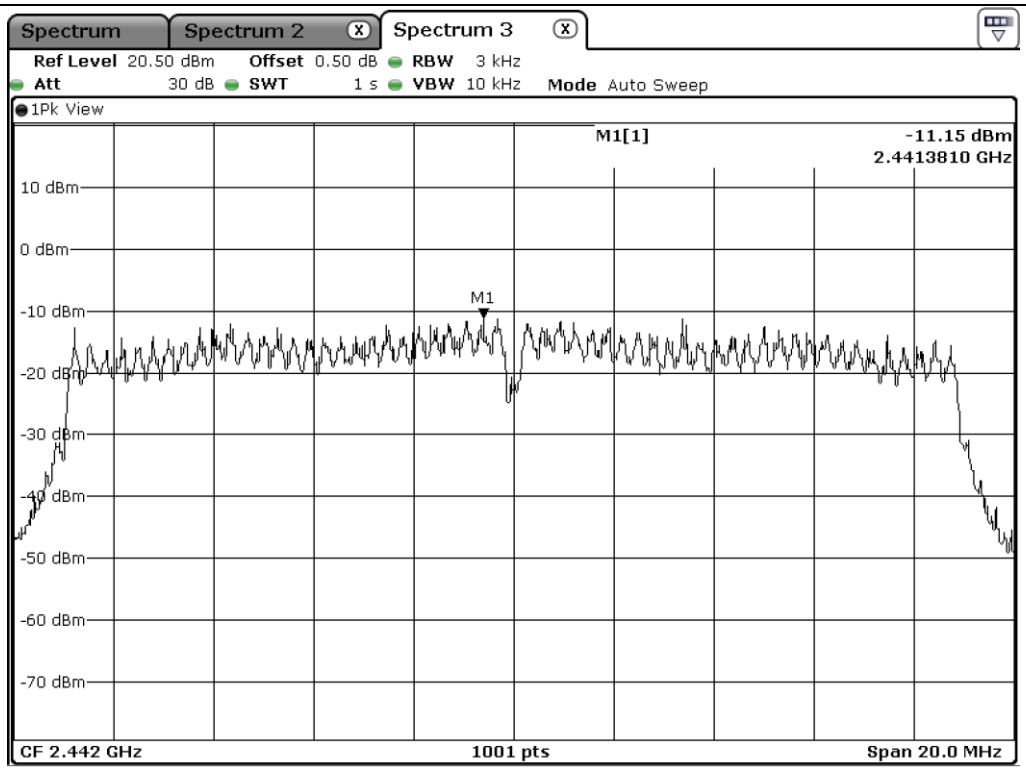
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-10.42	8.00	18.42
Middle	2 442.00	-11.15	8.00	19.15
High	2 462.00	-10.47	8.00	18.47

Remark. Margin = Limit – Measured value

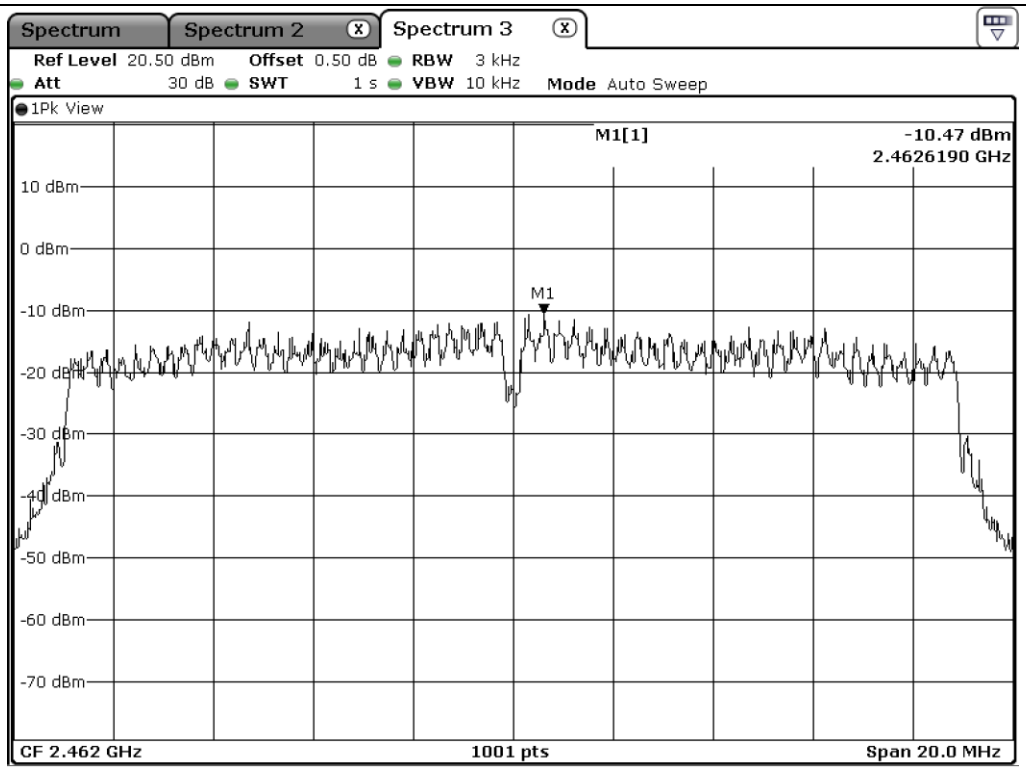
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel



Middle Channel



High Channel

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11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : 23.0 ℃

Relative humidity : 45.2 % R.H.

11.2 Test set-up

The radiated emissions measurements were on the 3 m, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

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

11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May 31, 2016 (1Y)
■ -	ESCI	Rohde & Schwarz	Test Receiver	101012	Apr. 06, 2016 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	MA4000-EP	Innco System	Antenna Master	3320611	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (1Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Aug. 31, 2015 (2Y)

All test equipment used is calibrated on a regular basis.

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11.4 Test data for 802.11b WLAN Mode

11.4.1 Test data for 30 MHz ~ 1 000 MHz

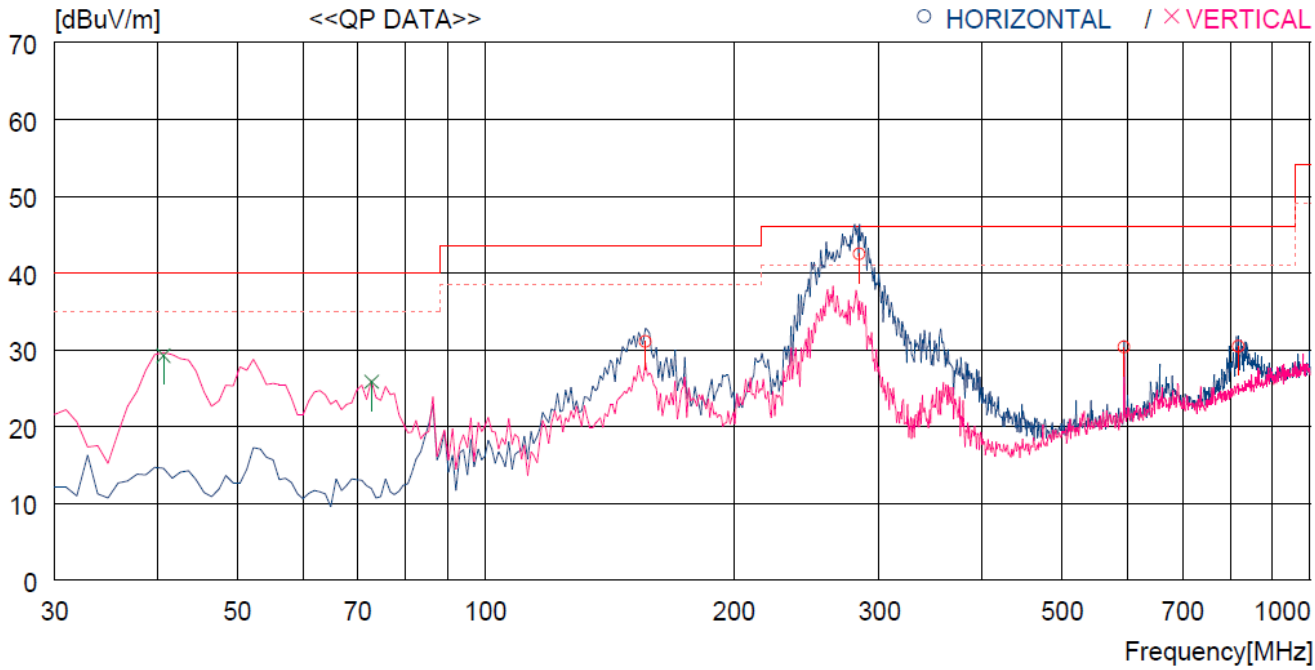
Humidity Level : 45.2 % R.H. Temperature: 23.0 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Laser Beam Pro Date: November 04, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	284.140	57.9	13.1	4.4	33.0	42.4	46.0	3.6	100	359
2	156.100	52.1	8.6	3.3	33.0	31.0	43.5	12.5	200	99
3	594.538	37.8	19.2	6.6	33.3	30.3	46.0	15.7	300	80
4	817.631	34.6	21.0	8.1	33.3	30.4	46.0	15.6	100	359
----- Vertical ------										
5	40.670	46.1	14.2	1.8	32.9	29.2	40.0	10.8	100	0
6	72.680	47.8	8.8	2.3	33.1	25.8	40.0	14.2	200	359

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11.4.2 Test data for Below 30 MHz

-. Test Date : November 04, 2016

-. 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

-.Operating mode : Transmitting mode

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.									

11.4.3 Test data for above 1 GHz

-. Test Date : November 04, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

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: Tae-Ho, Kim / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

11.5 Test data for 802.11g WLAN Mode

11.5.1Test data for 30 MHz ~ 1 000 MHz

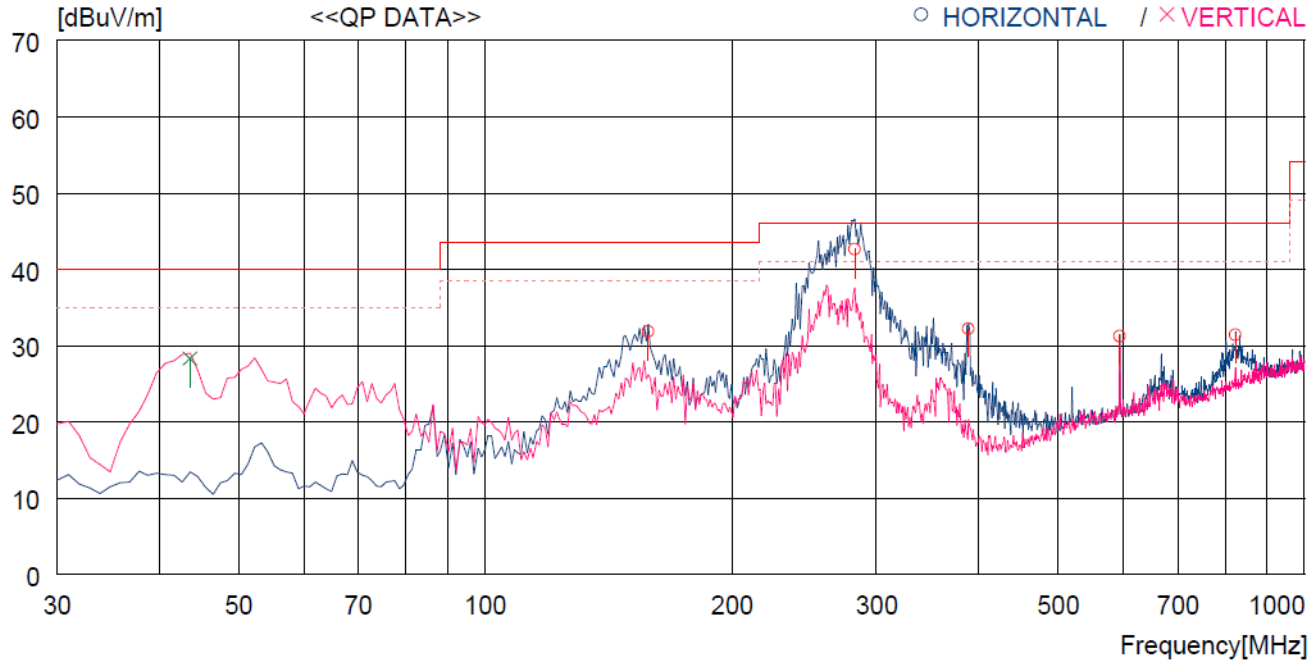
Humidity Level : 45.2 % R.H. Temperature: 23.0 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Laser Beam Pro Date: November 04, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	282.200	58.2	13.0	4.4	33.0	42.6	46.0	3.4	100	359
2	158.040	52.7	8.7	3.4	33.0	31.8	43.5	11.7	200	276
3	388.900	44.1	15.6	5.2	32.7	32.2	46.0	13.8	100	359
4	594.538	38.7	19.2	6.6	33.3	31.2	46.0	14.8	100	359
5	823.451	35.6	21.1	8.1	33.4	31.4	46.0	14.6	100	359
----- Vertical ------										
6	43.580	44.9	14.4	1.9	32.9	28.3	40.0	11.7	100	0

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

11.5.2 Test data for Below 30 MHz

-. Test Date : November 04, 2016

-. 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

-.Operating mode : Transmitting mode

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.									

11.5.3 Test data for above 1 GHz

-. Test Date : November 04, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

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: Tae-Ho, Kim / Senior Engineer

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

11.6 Test data for 802.11n_HT20 WLAN Mode

11.6.1 Test data for 30 MHz ~ 1 000 MHz

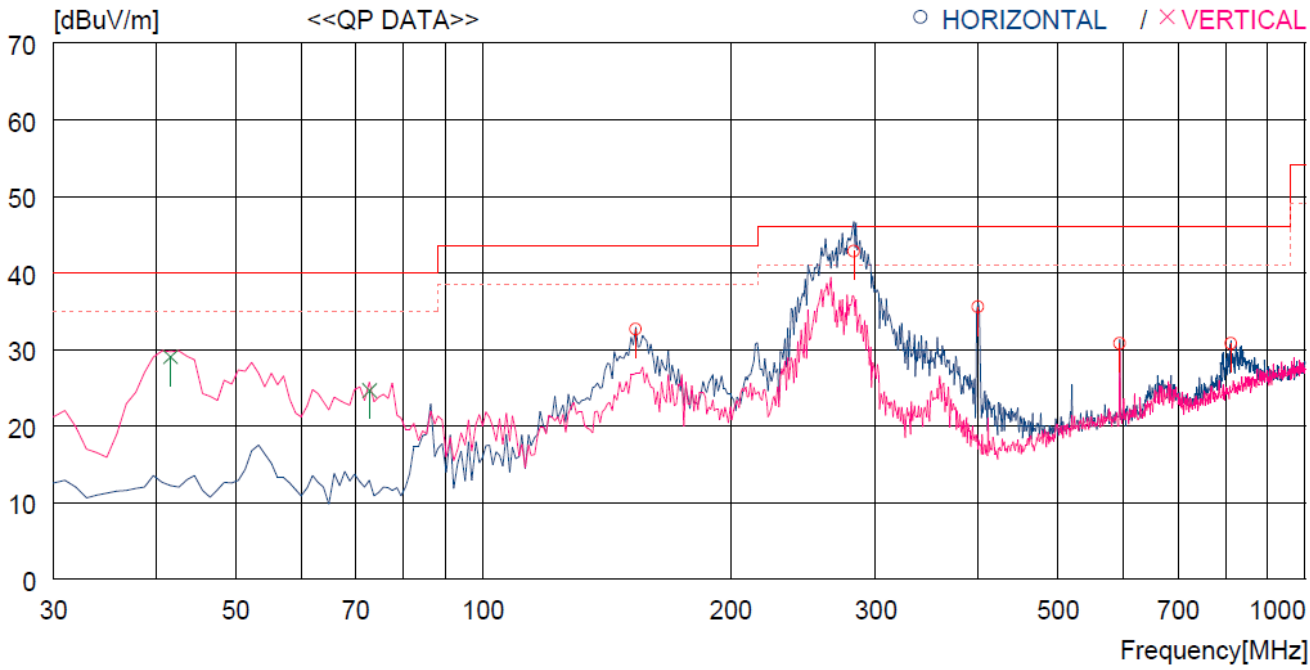
Humidity Level : 45.2 % R.H. Temperature: 23.0 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Laser Beam Pro Date: November 04, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	282.200	58.4	13.0	4.4	33.0	42.8	46.0	3.2	100	258
2	153.190	53.7	8.6	3.3	33.0	32.6	43.5	10.9	200	0
3	399.570	47.1	15.8	5.3	32.7	35.5	46.0	10.5	100	28
4	594.538	38.3	19.2	6.6	33.3	30.8	46.0	15.2	100	217
5	811.812	35.2	20.9	8.0	33.3	30.8	46.0	15.2	100	44
----- Vertical ------										
6	41.640	45.7	14.3	1.9	32.9	29.0	40.0	11.0	100	0
7	72.680	46.6	8.8	2.3	33.1	24.6	40.0	15.4	100	0

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11.6.2 Test data for Below 30 MHz

-. Test Date : November 04, 2016

-. 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

-.Operating mode : Transmitting mode

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.									

11.6.3 Test data for above 1 GHz

-. Test Date : November 04, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

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: Tae-Ho, Kim / Senior Engineer

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12. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature : 23.0 ℃

Relative humidity : 45.2 % R.H.

12.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μH + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESPI	Rohde & Schwarz	Test Receiver	101012	Nov. 01, 2016 (1Y)
■ -	NSLK8126	Schwarzbeck	AMN	8126-404	Apr. 05, 2016 (1Y)
■ -	3825/2	EMCO	AMN	9109-1867	Apr. 06, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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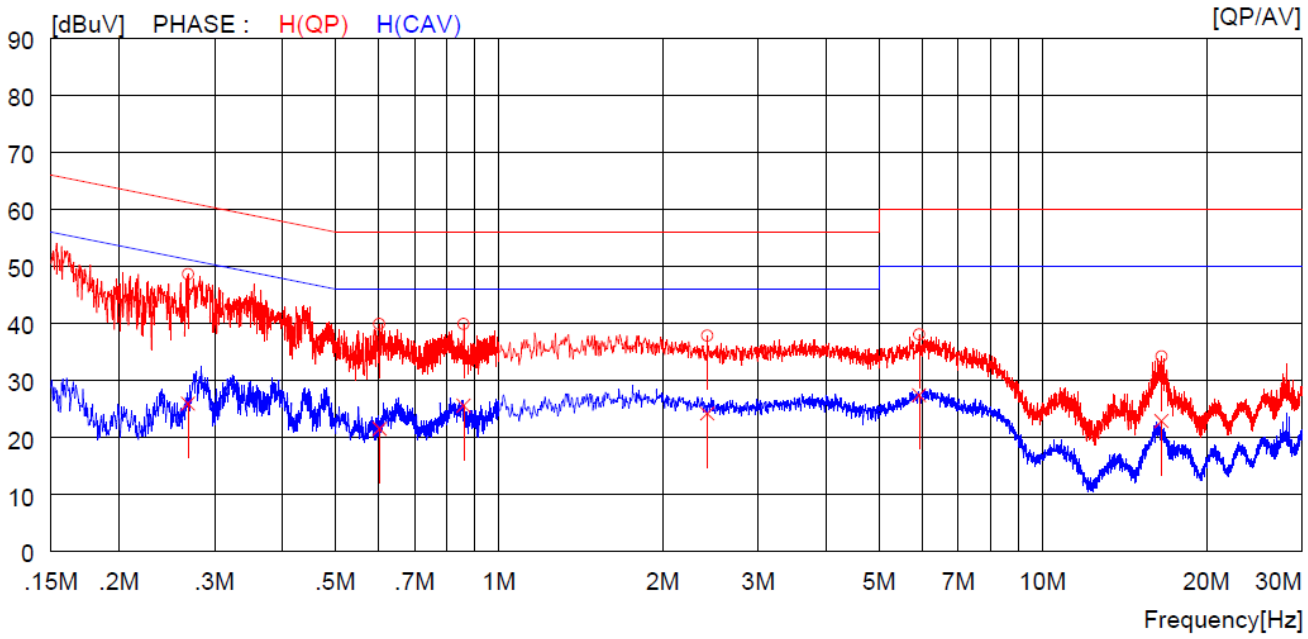
12.4 Test data

-. Test Date : November 04, 2016

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.26800	48.5	----	0.1	48.6	----	61.2	----	12.6	----	H(QP)
2	0.60300	39.8	----	0.1	39.9	----	56.0	----	16.1	----	H(QP)
3	0.86100	39.8	----	0.1	39.9	----	56.0	----	16.1	----	H(QP)
4	2.41600	37.7	----	0.2	37.9	----	56.0	----	18.1	----	H(QP)
5	5.92500	37.9	----	0.2	38.1	----	60.0	----	21.9	----	H(QP)
6	16.54000	33.5	----	0.7	34.2	----	60.0	----	25.8	----	H(QP)
7	0.26800	----	25.9	0.1	----	26.0	----	51.2	----	25.2	H(CAV)
8	0.60300	----	21.4	0.1	----	21.5	----	46.0	----	24.5	H(CAV)
9	0.86100	----	25.5	0.1	----	25.6	----	46.0	----	20.4	H(CAV)
10	2.41600	----	24.0	0.2	----	24.2	----	46.0	----	21.8	H(CAV)
11	5.92500	----	27.2	0.2	----	27.4	----	50.0	----	22.6	H(CAV)
12	16.54000	----	22.2	0.7	----	22.9	----	50.0	----	27.1	H(CAV)

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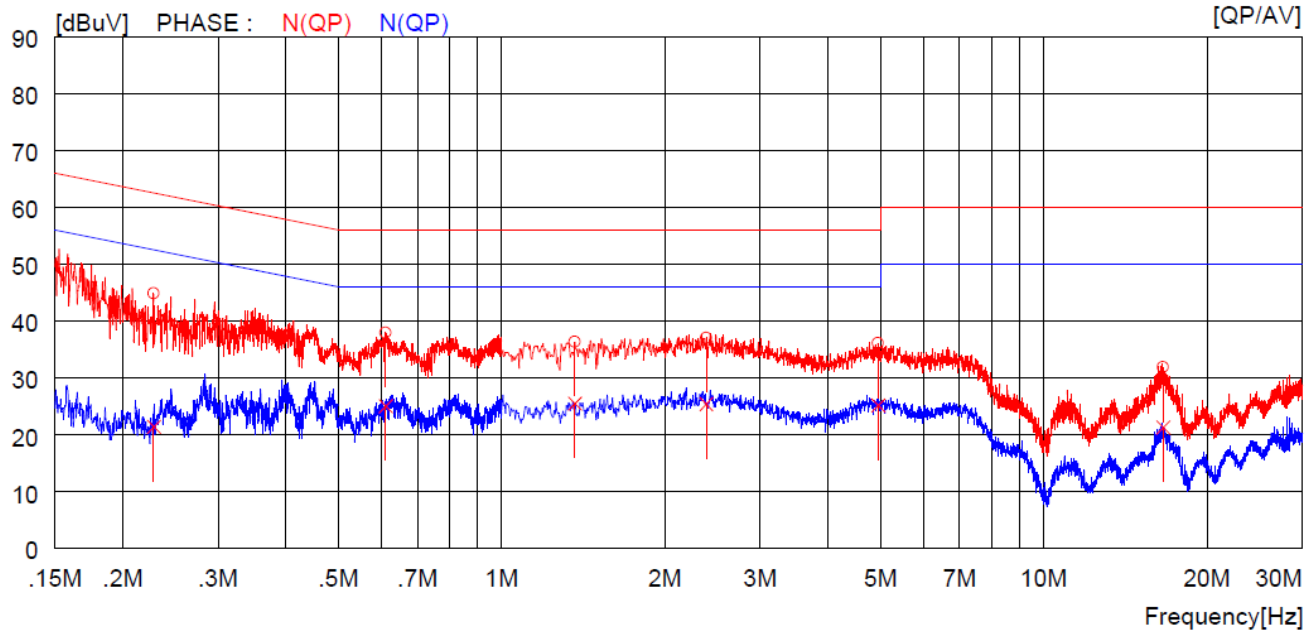
-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.22800	44.8	----	0.1	44.9	----	62.5	----	17.6	----	N(QP)
2	0.61100	37.9	----	0.1	38.0	----	56.0	----	18.0	----	N(QP)
3	1.36400	36.3	----	0.1	36.4	----	56.0	----	19.6	----	N(QP)
4	2.38400	36.9	----	0.2	37.1	----	56.0	----	18.9	----	N(QP)
5	4.95200	35.9	----	0.2	36.1	----	56.0	----	19.9	----	N(QP)
6	16.62000	31.2	----	0.7	31.9	----	60.0	----	28.1	----	N(QP)
7	0.22800	----	21.3	0.1	----	21.4	----	52.5	----	31.1	N(CAV)
8	0.61100	----	25.0	0.1	----	25.1	----	46.0	----	20.9	N(CAV)
9	1.36400	----	25.4	0.1	----	25.5	----	46.0	----	20.5	N(CAV)
10	2.38400	----	25.2	0.2	----	25.4	----	46.0	----	20.6	N(CAV)
11	4.95200	----	25.0	0.2	----	25.2	----	46.0	----	20.8	N(CAV)
12	16.62000	----	20.6	0.7	----	21.3	----	50.0	----	28.7	N(CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Tae-Ho, Kim / Senior Engineer

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