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

Test Report No.	**: W17OR-D002**
AGR No.	**: A178A-264**
Applicant	**: HUMAX Co., Ltd.**
Address	**: HUMAX Village, 11-4, Sunae-dong, Bundang-gu, Seongnam city, Gyeonggi-do, 463-825, South Korea**
Manufacturer	**: HUMAX Co., Ltd.**
Address	**: HUMAX Village, 11-4, Sunae-dong, Bundang-gu, Seongnam city, Gyeonggi-do, 463-825, South Korea**
Type of Equipment	**: Wi-Fi Router**
FCC ID.	**: O6ZT9**
Model Name	**: QUANTUM T9**
Multiple Model Name	**: QUANTUM T7, QUANTUM T5**
Serial number	**: N/A**
Total page of Report	**: 157 pages (including this page)**
Date of Incoming	**: September 11, 2017**
Date of issue	**: October 10, 2017**

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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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
W17OR-D002	October 10, 2017	Initial Issue	All

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

1. VERIFICATION OF COMPLIANCE

Applicant : HUMAX Co., Ltd.

Address : HUMAX Village, 11-4, Sunae-dong, Bundang-gu, Seongnam city, Gyeonggi-do, 463-825, South Korea

Contact Person : Inseok, Seo / Senior Engineer

Telephone No. : +82-31-776-6400

FCC ID : O6ZT9

Model Name : QUANTUM T9

Brand Name : HUMAX

Serial Number : N/A

Date : October 10, 2017

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Wi-Fi Router
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 KDB 558074 D01 DTS Meas Guidance
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-14617/ 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

3. GENERAL INFORMATION

3.1 Product Description

The HUMAX Co., Ltd., Model QUANTUM T9 (referred to as the EUT in this report) is a Wi-Fi Router. Product specification information described herein was obtained from product data sheet or user's manual.

<table>
<tr><td>DEVICE TYPE</td><td colspan="3">Wi-Fi Router</td></tr>
<tr><td rowspan="8">FREQUENCY RANGE</td><td rowspan="2">WLAN
2.4 GHz Band</td><td colspan="2">2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))</td></tr>
<tr><td colspan="2">2 422 MHz ~ 2 452 MHz (802.11n(HT40))</td></tr>
<tr><td rowspan="6">WLAN
5 GHz Band</td><td rowspan="3">5 150 MHz ~
5 250 MHz Band</td><td>5 180 MHz ~ 5 240 MHz (802.11a/n(HT20)/ac(VHT20))</td></tr>
<tr><td>5 190 MHz ~ 5 230 MHz (802.11n(HT40)/ac(VHT40))</td></tr>
<tr><td>5 210 MHz (802.11ac(VHT80))</td></tr>
<tr><td rowspan="3">5 725 MHz ~
5 850 MHz Band</td><td>5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20))</td></tr>
<tr><td>5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40))</td></tr>
<tr><td>5 775 MHz (802.11ac(VHT80))</td></tr>
<tr><td rowspan="4">MAX. RF OUTPUT POWER</td><td rowspan="4">WLAN
2.4 GHz Band</td><td>Antenna 0</td><td>Wi-Fi 802.11b (22.45 dBm)
Wi-Fi 802.11g (22.39 dBm)
Wi-Fi 802.11n(HT20) (16.46 dBm)
Wi-Fi 802.11n(HT40) (16.54 dBm)</td></tr>
<tr><td>Antenna 1</td><td>Wi-Fi 802.11b (22.49 dBm)
Wi-Fi 802.11g (22.34 dBm)
Wi-Fi 802.11n(HT20) (16.40 dBm)
Wi-Fi 802.11n(HT40) (16.52 dBm)</td></tr>
<tr><td>Antenna 2</td><td>Wi-Fi 802.11b (22.47 dBm)
Wi-Fi 802.11g (22.45 dBm)
Wi-Fi 802.11n(HT20) (16.48 dBm)
Wi-Fi 802.11n(HT40) (16.55 dBm)</td></tr>
<tr><td>Multiple transmit</td><td>Wi-Fi 802.11n(HT20) (21.22 dBm)
Wi-Fi 802.11n(HT40) (21.31 dBm)</td></tr>
</table>

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MAX. RF OUTPUT POWER	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz Band	Antenna 0	Wi-Fi 802.11a (18.70 dBm) Wi-Fi 802.11n(HT20) (8.50 dBm) Wi-Fi 802.11n(HT40) (8.57 dBm) Wi-Fi 802.11ac(HT80) (11.44 dBm)
			Antenna 1	Wi-Fi 802.11a (18.56 dBm) Wi-Fi 802.11n(HT20) (8.53 dBm) Wi-Fi 802.11n(HT40) (8.62 dBm) Wi-Fi 802.11ac(HT80) (11.38 dBm)
			Antenna 2	Wi-Fi 802.11a (18.64 dBm) Wi-Fi 802.11n(HT20) (8.47 dBm) Wi-Fi 802.11n(HT40) (8.55 dBm) Wi-Fi 802.11ac(HT80) (11.40 dBm)
			Antenna 3	Wi-Fi 802.11a (18.66 dBm) Wi-Fi 802.11n(HT20) (8.55 dBm) Wi-Fi 802.11n(HT40) (8.41 dBm) Wi-Fi 802.11ac(HT80) (11.50 dBm)
			Multiple transmit	Wi-Fi 802.11n(HT20) (14.53 dBm) Wi-Fi 802.11n(HT40) (14.56 dBm) Wi-Fi 802.11ac(HT80) (17.45 dBm)
		5 725 MHz ~ 5 850 MHz Band	Antenna 0	Wi-Fi 802.11a (22.39 dBm) Wi-Fi 802.11n(HT20) (13.27 dBm) Wi-Fi 802.11n(HT40) (13.01 dBm) Wi-Fi 802.11ac(HT80) (12.86 dBm)
			Antenna 1	Wi-Fi 802.11a (22.33 dBm) Wi-Fi 802.11n(HT20) (13.31 dBm) Wi-Fi 802.11n(HT40) (13.05 dBm) Wi-Fi 802.11ac(HT80) (12.92 dBm)
			Antenna 2	Wi-Fi 802.11a (22.43 dBm) Wi-Fi 802.11n(HT20) (13.25 dBm) Wi-Fi 802.11n(HT40) (13.02 dBm) Wi-Fi 802.11ac(HT80) (12.81 dBm)
			Antenna 3	Wi-Fi 802.11a (22.31 dBm) Wi-Fi 802.11n(HT20) (13.29 dBm) Wi-Fi 802.11n(HT40) (12.95 dBm) Wi-Fi 802.11ac(HT80) (12.84 dBm)
			Multiple transmit	Wi-Fi 802.11n(HT20) (19.30 dBm) Wi-Fi 802.11n(HT40) (19.03 dBm) Wi-Fi 802.11ac(HT80) (18.88 dBm)

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MODULATION TYPE	WLAN 2.4 GHz Band	DSSS Modulation(DBPSK/DQPSK/CCK) OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
	WLAN 5 GHz Band	OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
ANTENNA TYPE	WLAN 2.4 GHz Band	Ant 0 : 5.37 dBi Ant 1 : 5.23 dBi Ant 2 : 5.37 dBi Multiple Antenna : 10.10 dBi	
	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz	Ant 0 : 5.42 dBi Ant 1 : 5.35 dBi Ant 2 : 5.65 dBi Ant 3 : 5.94 dBi Multiple Antenna : 11.62 dBi
		5 725 MHz ~ 5 850 MHz	Ant 0 : 6.88 dBi Ant 1 : 6.62 dBi Ant 2 : 6.85 dBi Ant 3 : 6.96 dBi Multiple Antenna : 12.85 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		40 MHz	
POWER RE QUIREMENT		DC 12.0 V	

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

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

Model Name	Differences	Tested
QUANTUM T9	Basic Model (2.4 GHz: 3Tx3Rx, 5 GHz: 4Tx4Rx)	☑
QUANTUM T7	These models are identical to the basic model except for the Antenna. (2.4 GHz: 3Tx3Rx, 5 GHz: 3Tx3Rx)	☐
QUANTUM T5	These models are identical to the basic model except for the Antenna. (2.4 GHz: 2Tx2Rx, 5 GHz: 3Tx3Rx)	☐

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

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

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

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

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	HUMAX Co., Ltd.	QUANTUM T9 CPU B/D REV.:0.4	N/A
LED Board	HUMAX Co., Ltd.	QUANTUM T9 LED B/D REV.:0.5	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
QUANTUM T9	HUMAX Co., Ltd.	Wi-Fi Router (EUT)	TEST JIG
ADS-30FD-12 12030E	SHENZHEN HONOR ELECTRONIC CO., LTD.	AC/DC ADAPTER	EUT
Pavilion dv3	HP	Notebook PC	TEST JIG
Series PPP0009L-E	LITE-ON TECHNOLOGY CORPORATION	AC/DC ADAPTER	Notebook PC
JIG	N/A	TEST JIG	EUT / Notebook PC

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5.3 Mode of operation during the test

Modulation	DATA RATE	OUTPUT POWER[dBm]		
		Ant 0	Ant 1	Ant 2
802.11 b (Middle Channel)	1 Mbps	22.43	22.43	22.41
	2 Mbps	22.15	22.18	22.15
	5.5 Mbps	21.96	22.05	22.05
	11 Mbps	21.78	21.86	21.83
802.11g (Middle Channel)	6 Mbps	22.39	22.34	22.42
	9 Mbps	22.12	22.21	22.26
	12 Mbps	21.97	22.03	21.99
	18 Mbps	21.83	21.90	21.74
	24 Mbps	21.63	21.68	21.53
	36 Mbps	21.49	21.51	21.35
	48 Mbps	21.35	21.25	21.15
	54 Mbps	21.17	21.05	20.98
HT 20 (Middle Channel)	6.5 Mbps	16.41	16.37	16.42
	13 Mbps	16.23	16.24	16.23
	19.5 Mbps	15.97	16.13	16.03
	26 Mbps	15.71	15.90	15.86
	39 Mbps	15.43	15.73	15.75
	52 Mbps	15.26	15.54	15.62
	58.5 Mbps	15.14	15.39	15.47
	65 Mbps	14.98	15.22	15.21
HT 40 (Middle Channel)	13.5 Mbps	16.54	16.52	16.55
	27 Mbps	16.31	16.23	16.40
	40.5 Mbps	16.12	15.97	16.28
	54 Mbps	15.82	15.78	16.13
	81 Mbps	15.63	15.53	15.99
	108 Mbps	15.36	15.39	15.71
	121.5 Mbps	15.07	15.19	15.52
	135 Mbps	14.84	14.99	15.28

The worse case data rate for each modulation is determined 1 Mbps(Ant.0/Ant.1/Ant.2) for IEEE 802.11b, 6 Mbps(Ant.0/Ant.1/Ant.2) for IEEE 802.11g, 6.5 Mbps(Ant.0/Ant.1/Ant.2) for HT20, 13.5 Mbps(Ant.0/Ant.1/Ant.2) for HT40.

5.4 Configuration of Test System

Line Conducted Test: 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 m Semi Anechoic Chamber.

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 PCB Pattern 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. MINIMUM 6 dB BANDWIDTH

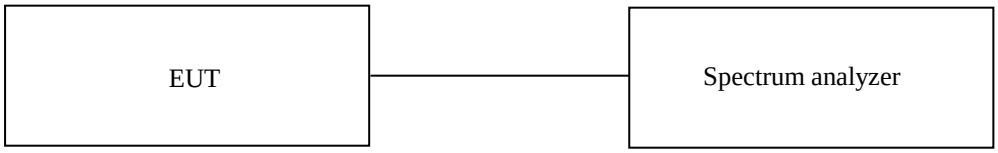
7.1 Operating environment

Temperature : 23 ℃

Relative humidity : 41 % 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	Apr. 05, 2017 (1Y)

All test equipment used is calibrated on a regular basis.

7.4 Test data for 802.11b WLAN Mode

7.4.1 Test data for Antenna 0

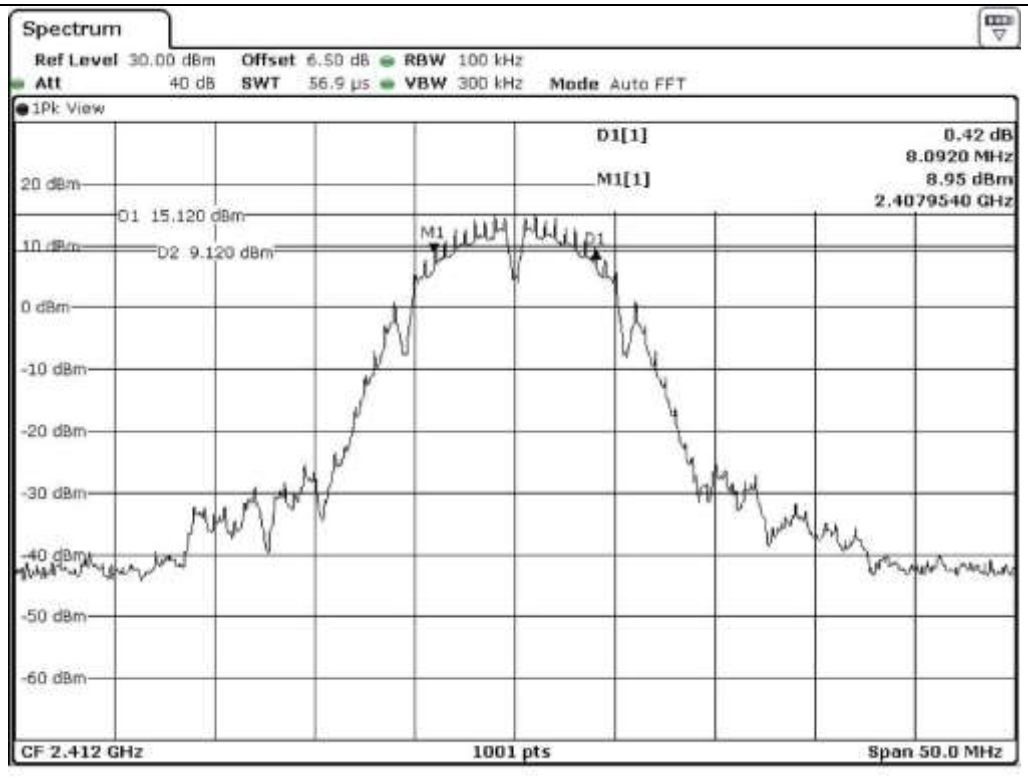
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

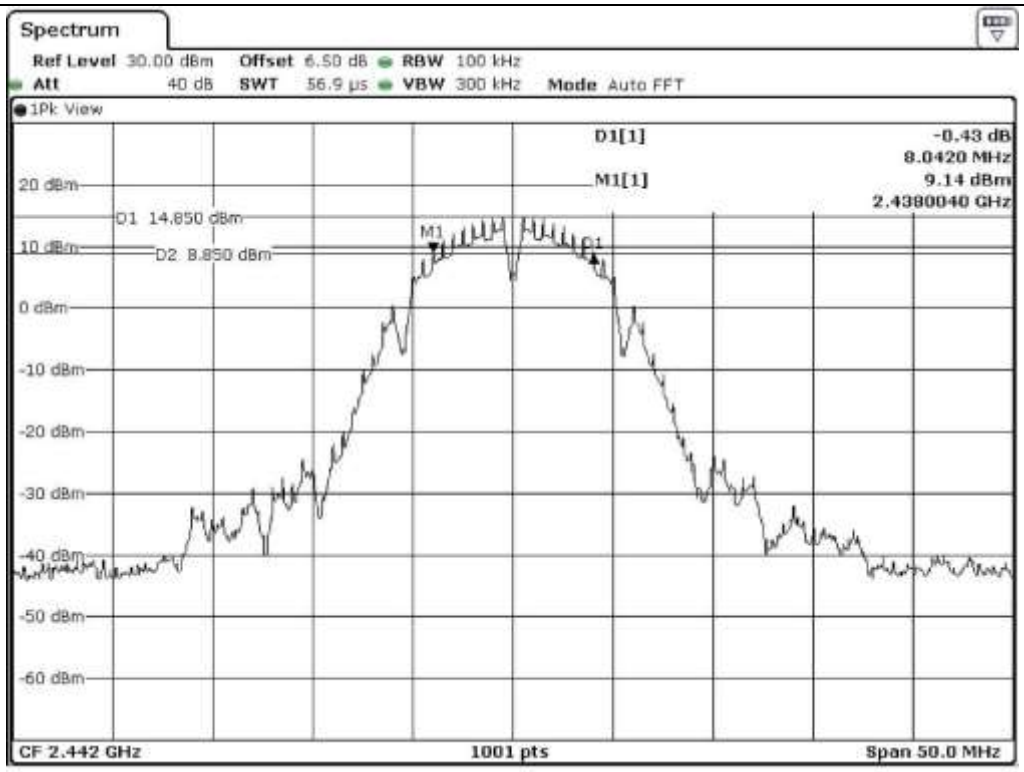
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	8.09	0.50	7.59
Middle	2 442.00	8.04	0.50	7.54
High	2 462.00	8.09	0.50	7.59

Remark. Margin = Measured Value - Limit

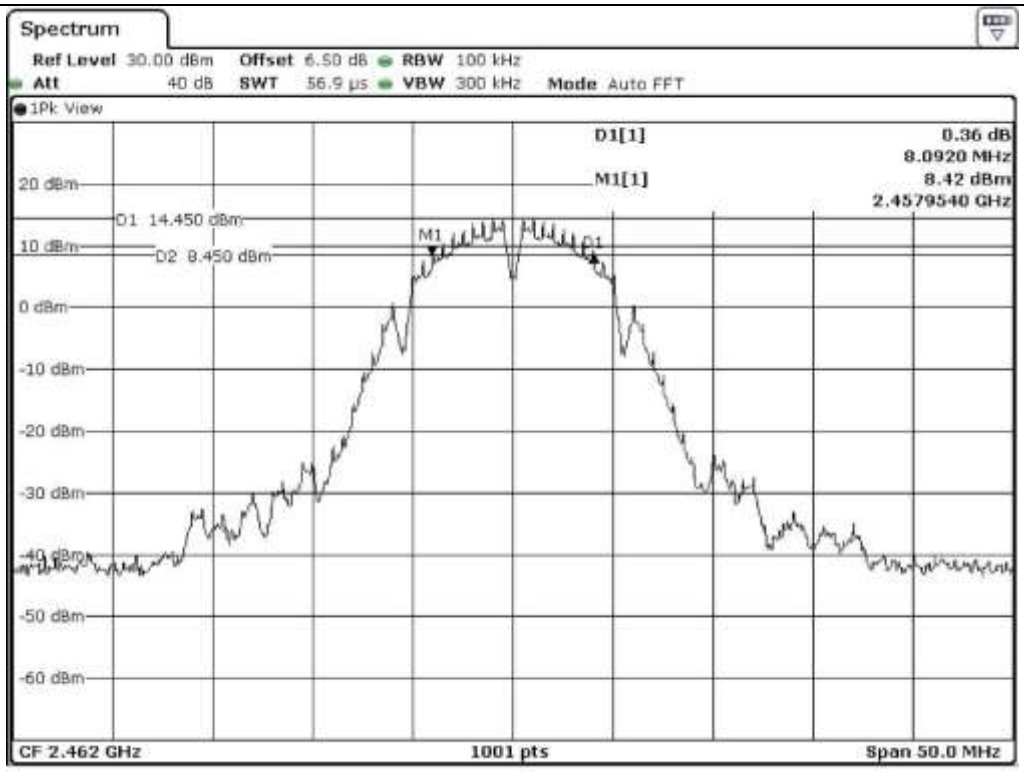
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

7.4.2 Test data for Antenna 1

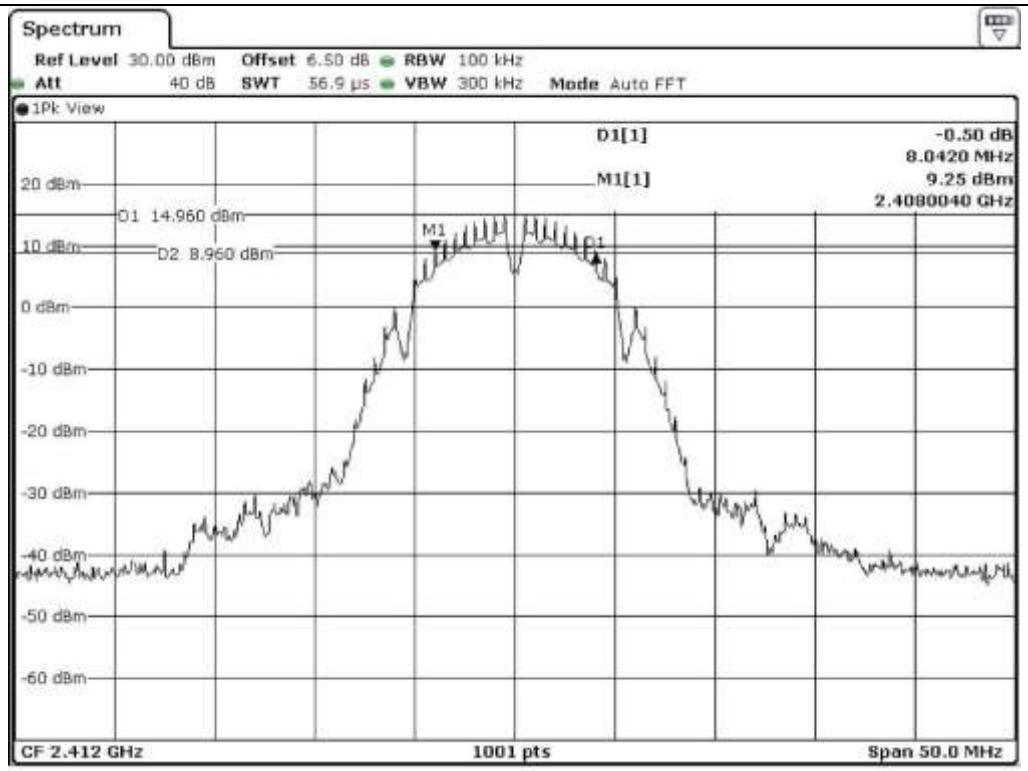
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

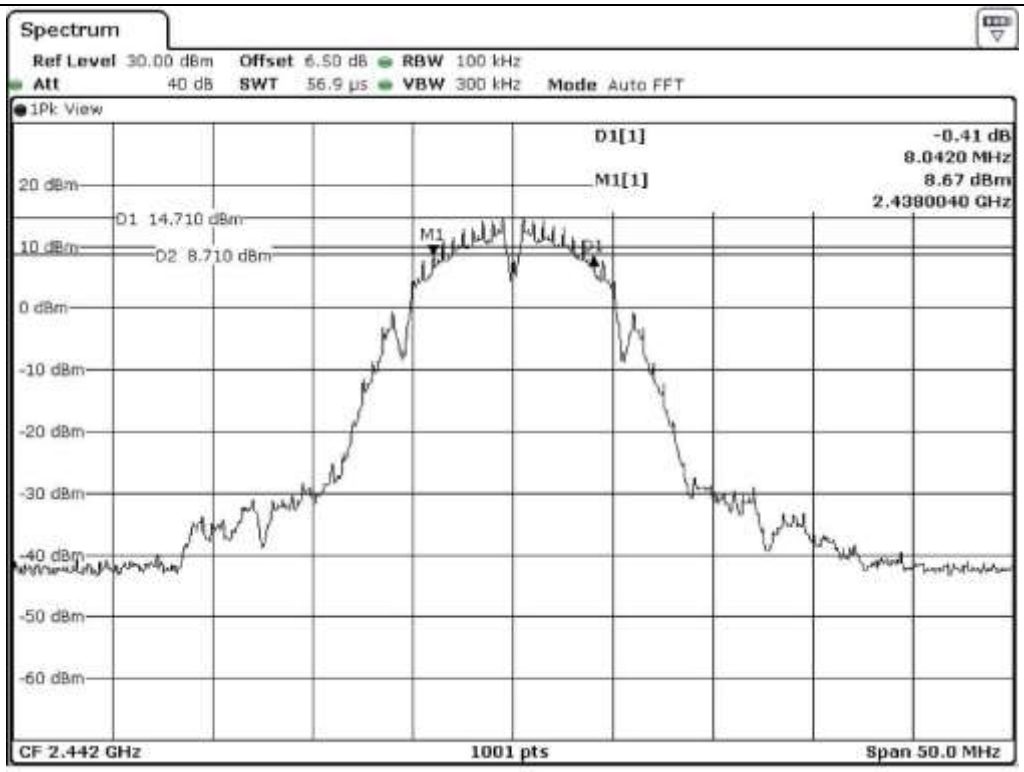
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	8.04	0.50	7.54
Middle	2 442.00	8.04	0.50	7.54
High	2 462.00	8.09	0.50	7.59

Remark. Margin = Measured Value - Limit

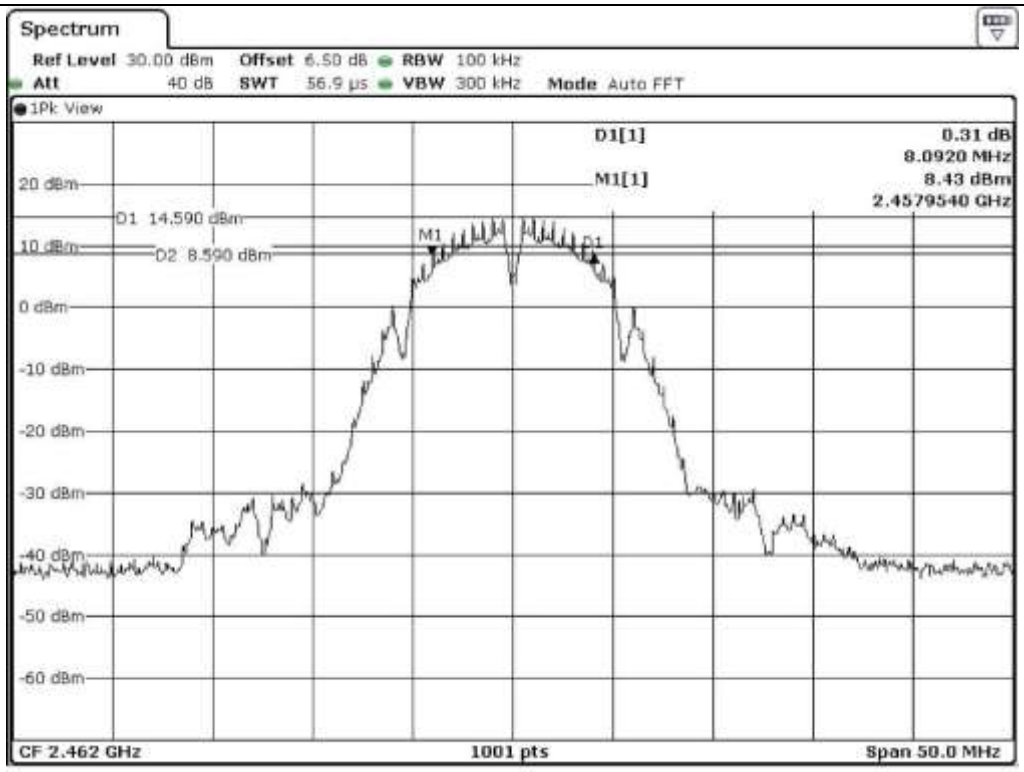
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

7.4.3 Test data for Antenna 2

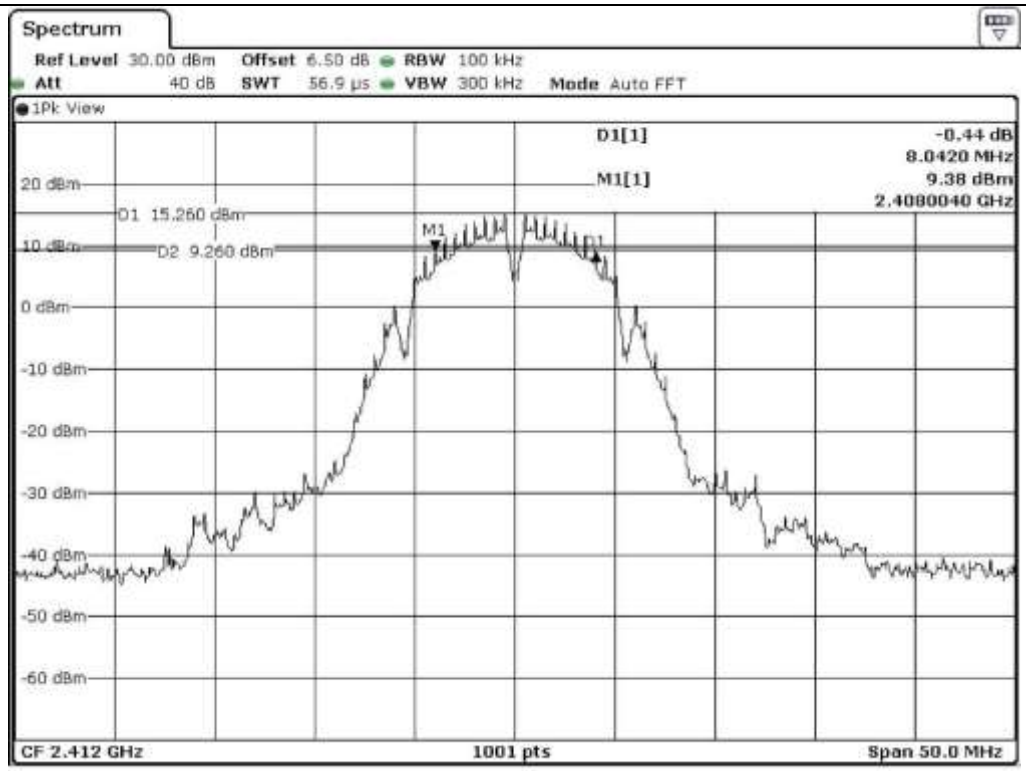
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

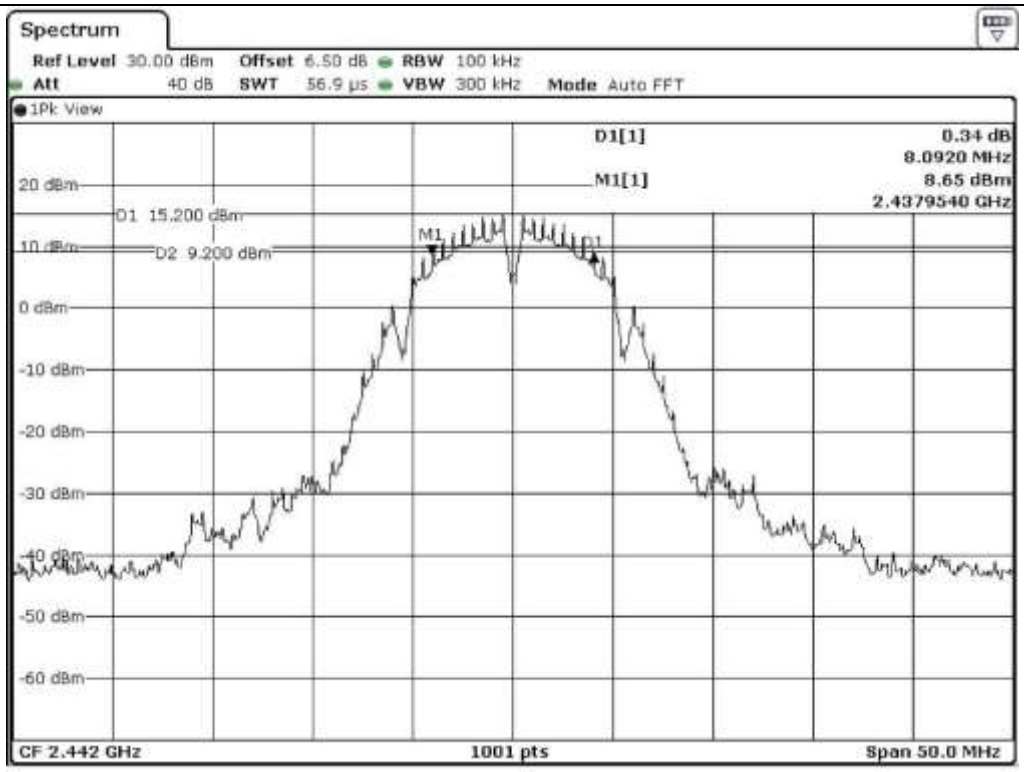
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	8.04	0.50	7.54
Middle	2 442.00	8.09	0.50	7.59
High	2 462.00	8.09	0.50	7.59

Remark. Margin = Measured Value - Limit

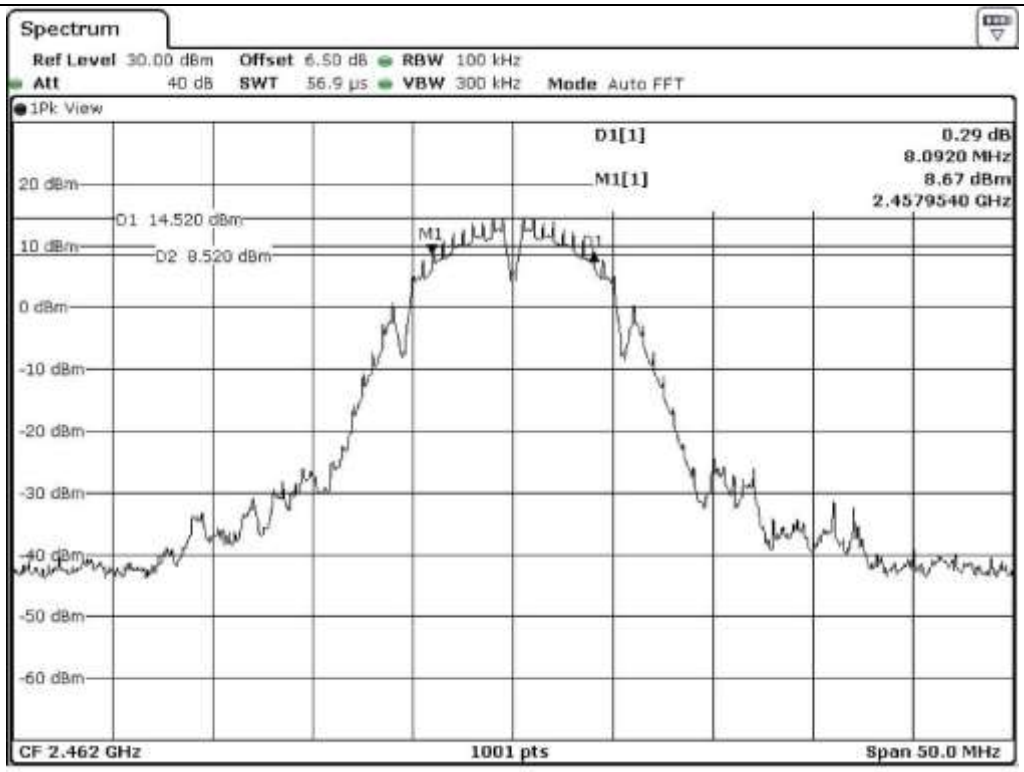
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

7.5 Test data for 802.11g WLAN Mode

7.5.1 Test data for Antenna 0

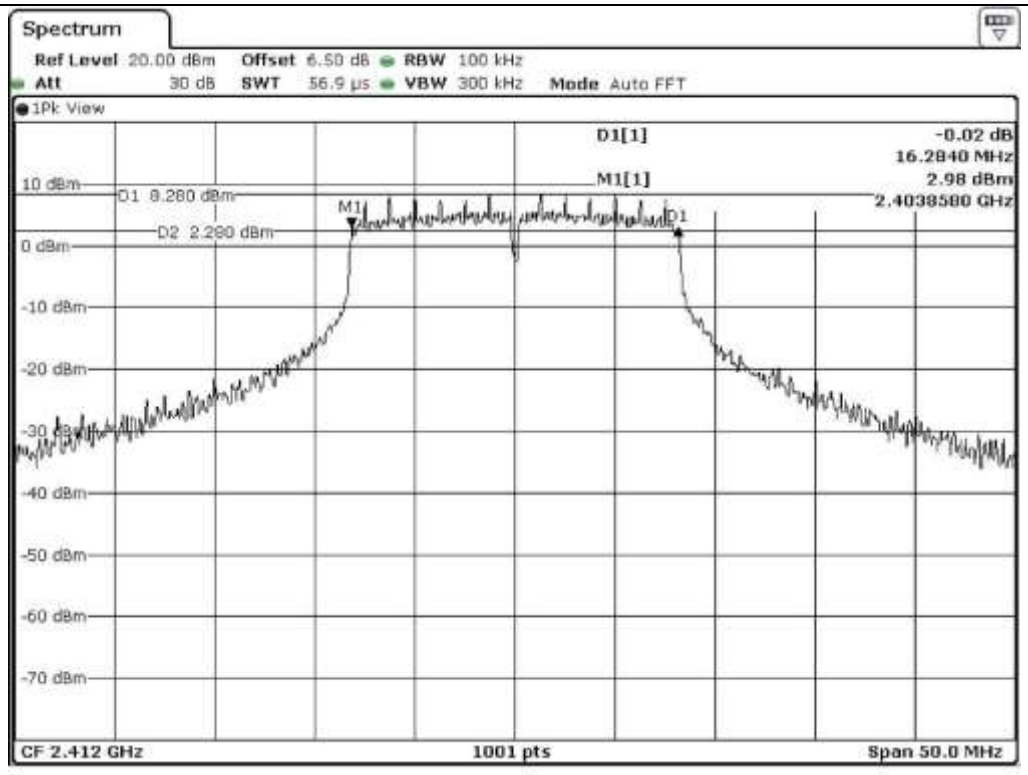
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

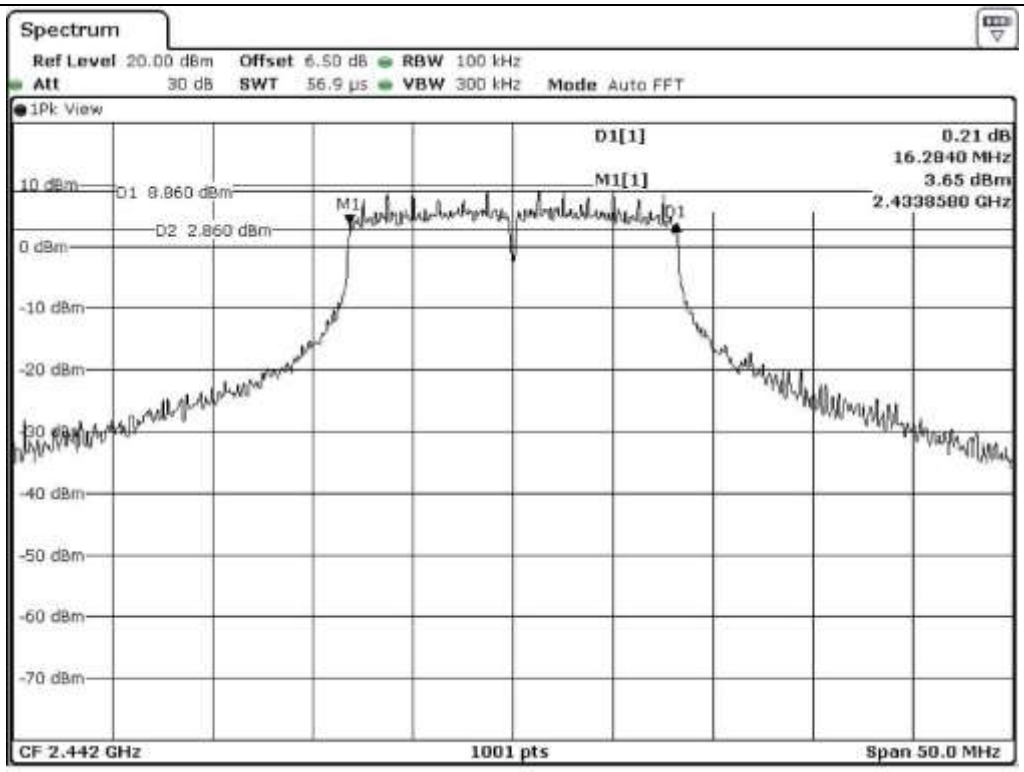
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	16.28	0.50	15.78
Middle	2 442.00	16.28	0.50	15.78
High	2 462.00	16.28	0.50	15.78

Remark. Margin = Measured Value - Limit

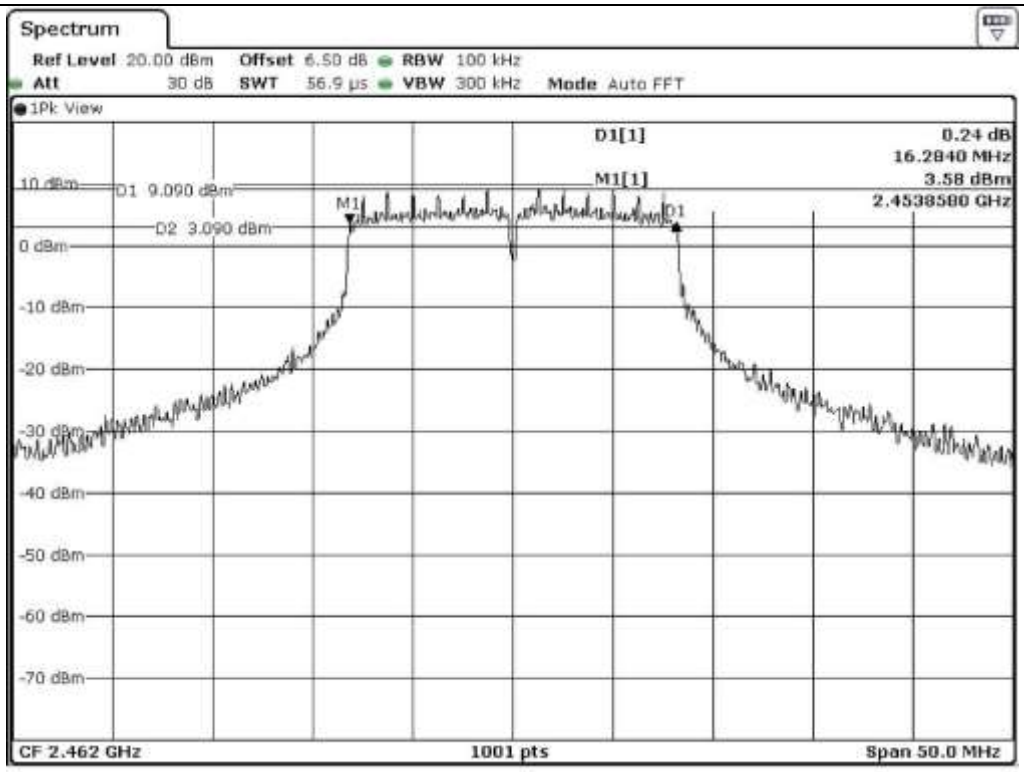
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

7.5.2 Test data for Antenna 1

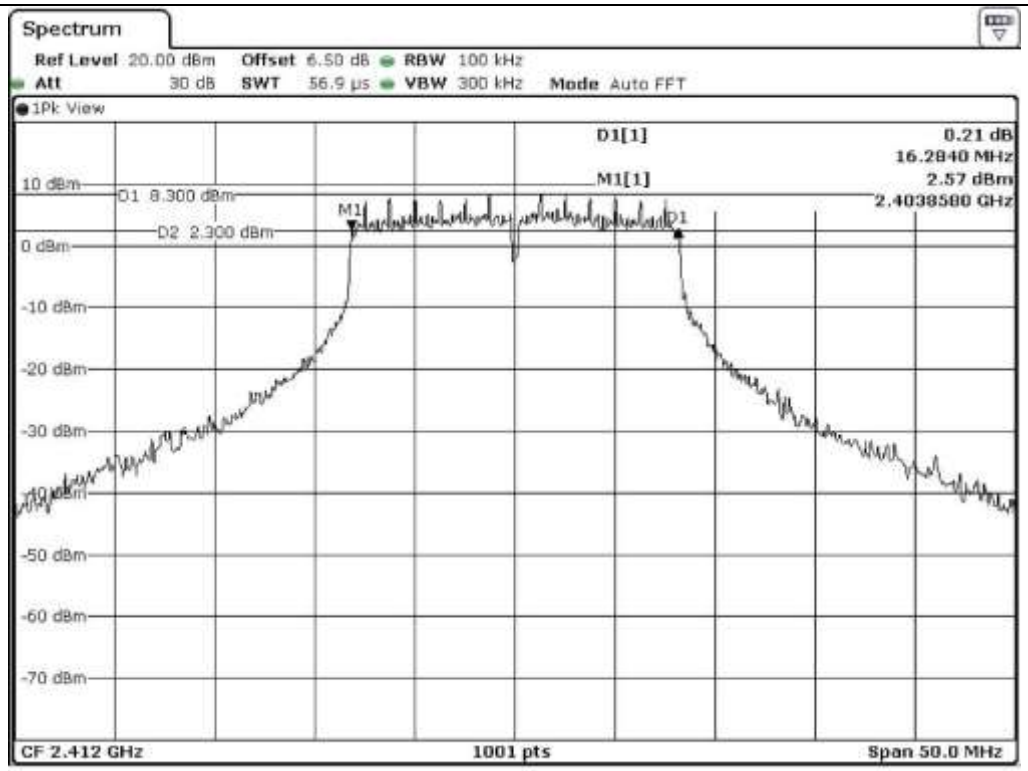
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

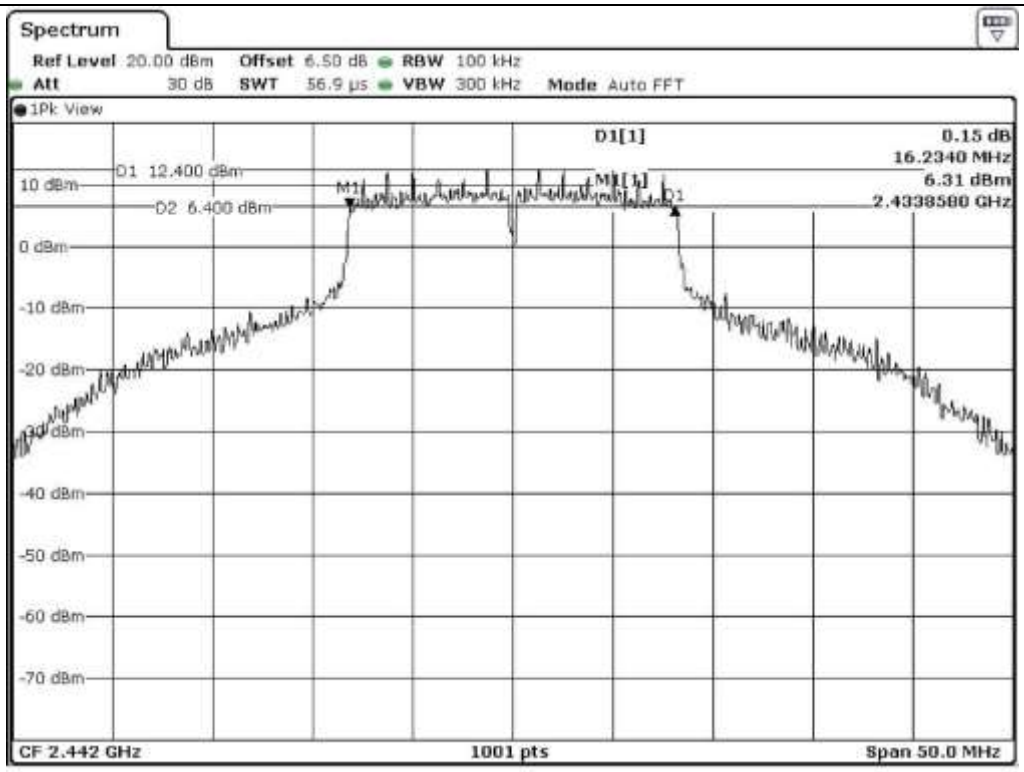
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	16.28	0.50	15.78
Middle	2 442.00	16.23	0.50	15.73
High	2 462.00	16.38	0.50	15.88

Remark. Margin = Measured Value - Limit

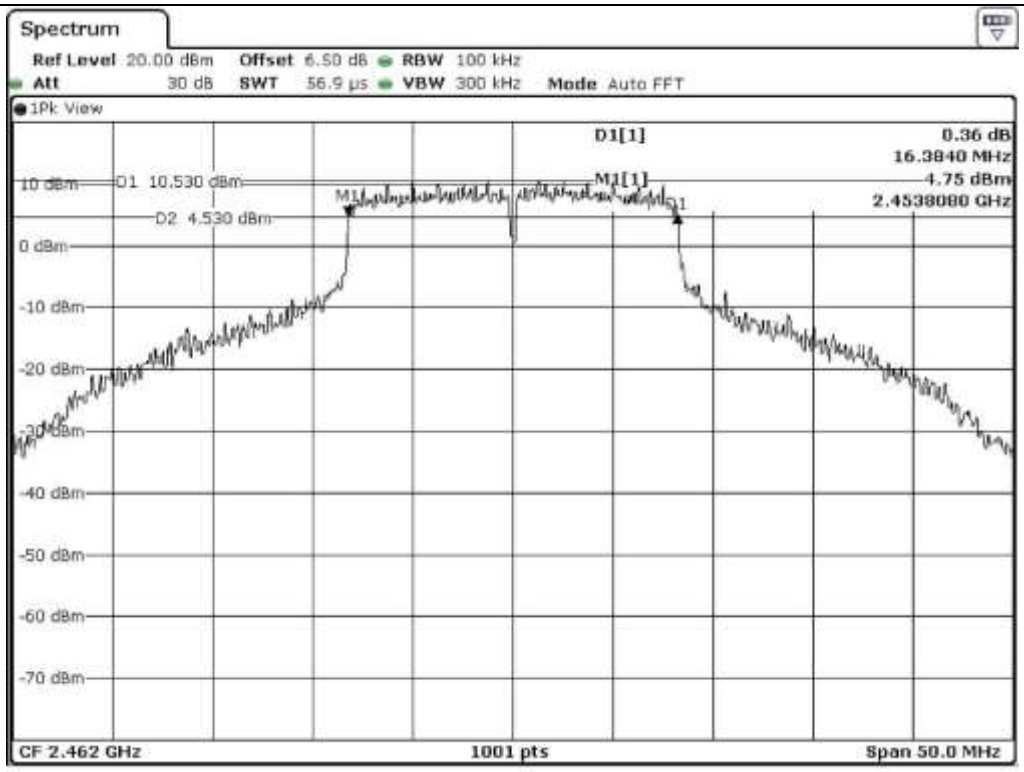
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

7.5.3 Test data for Antenna 2

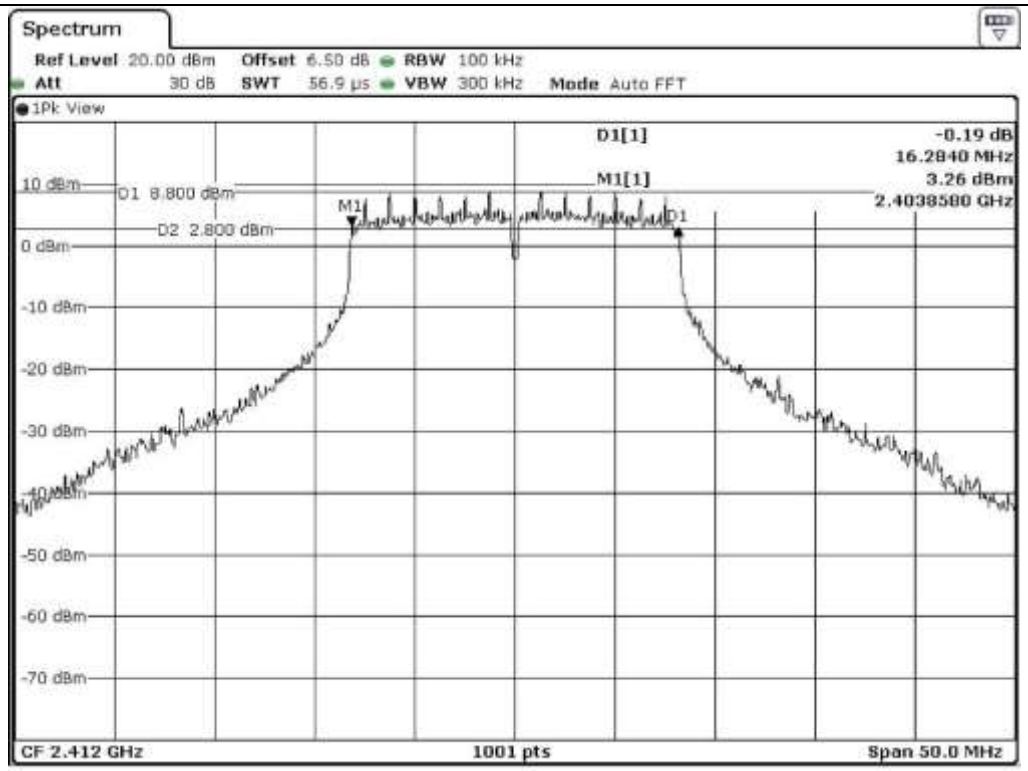
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

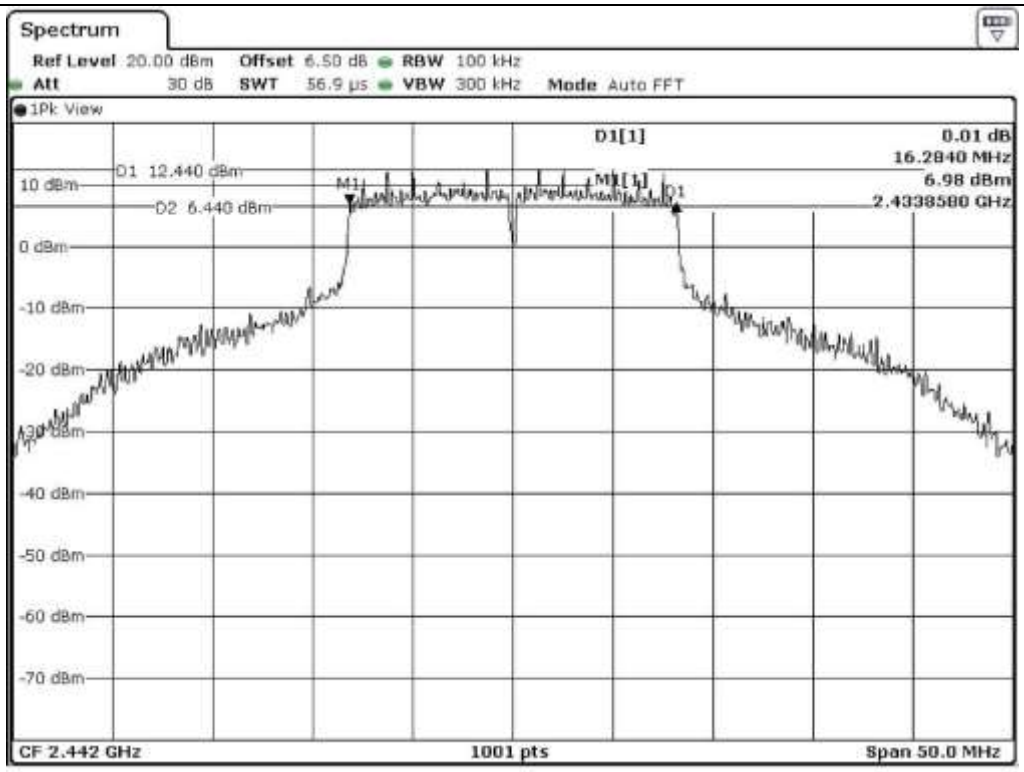
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	16.28	0.50	15.78
Middle	2 442.00	16.28	0.50	15.78
High	2 462.00	16.28	0.50	15.78

Remark. Margin = Measured Value - Limit

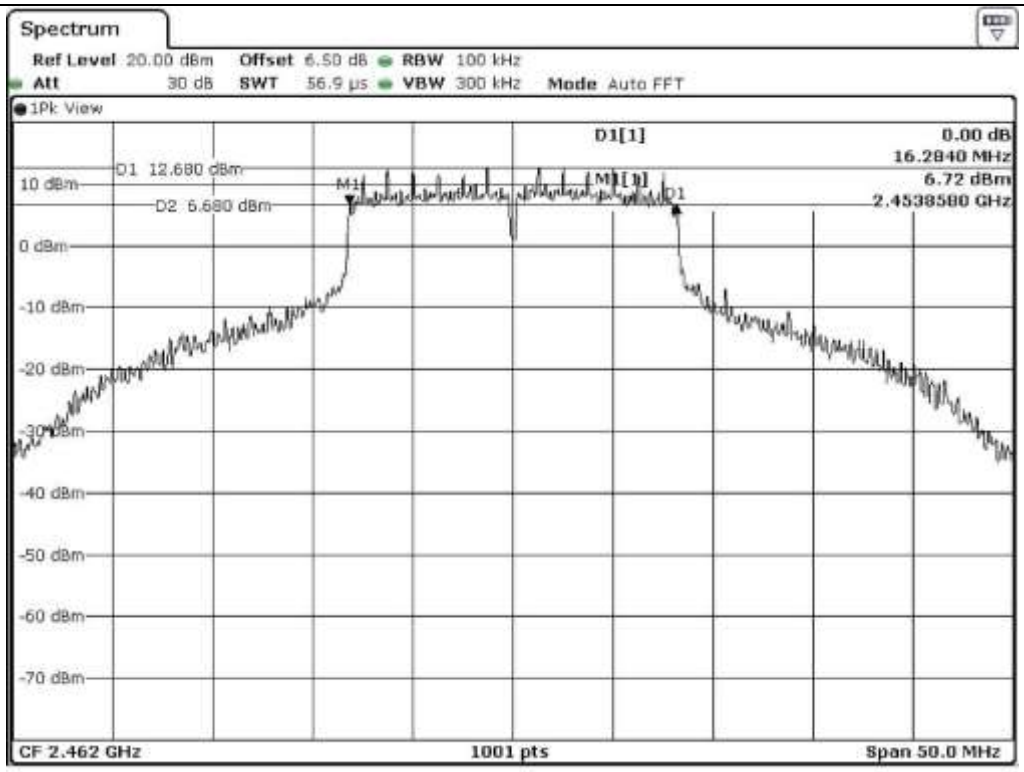
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

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7.6 Test data for 802.11n_HT20 WLAN Mode

7.6.1 Test data for Antenna 0

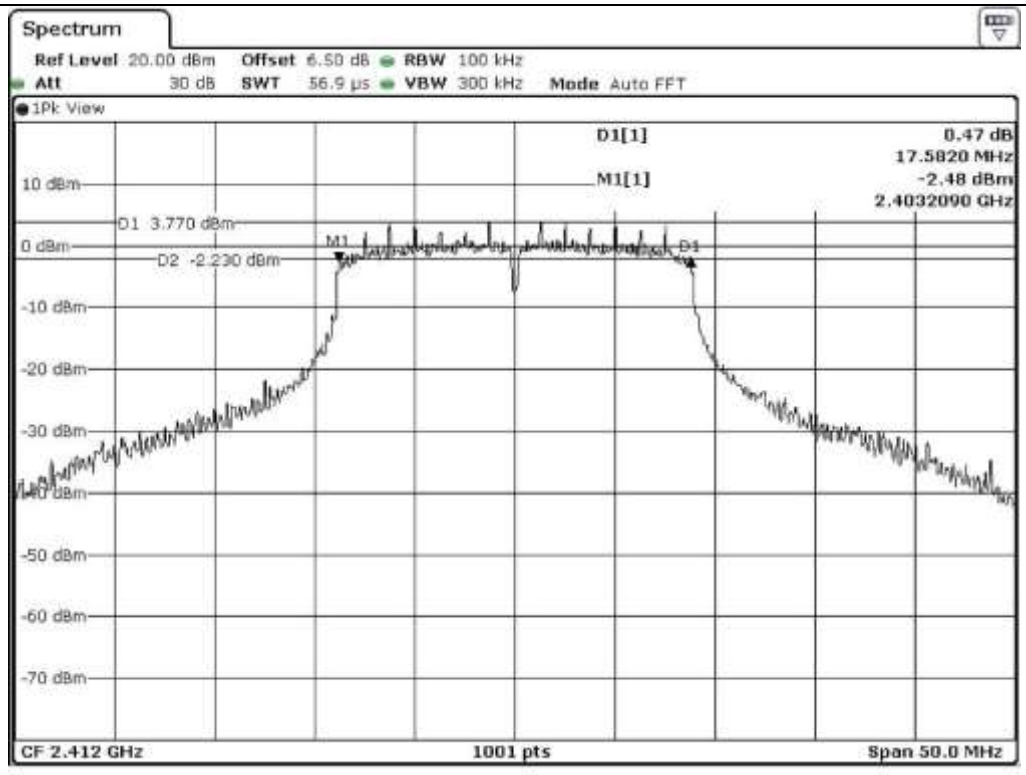
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

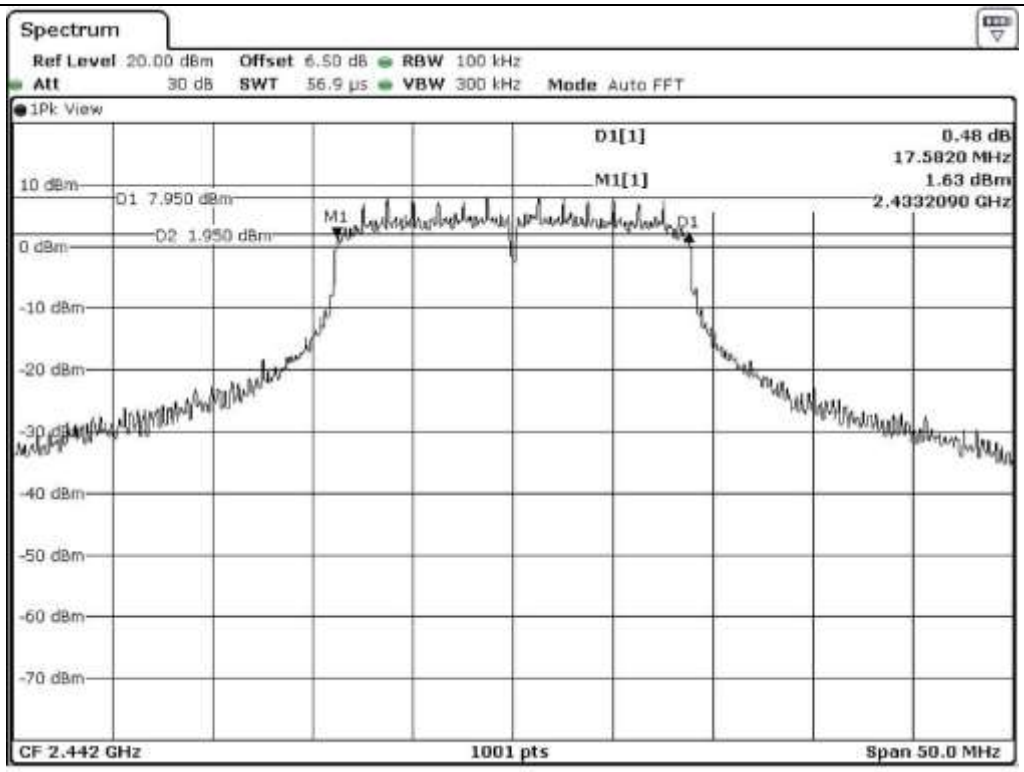
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	17.58	0.50	17.08
Middle	2 442.00	17.58	0.50	17.08
High	2 462.00	17.58	0.50	17.08

Remark. Margin = Measured Value - Limit

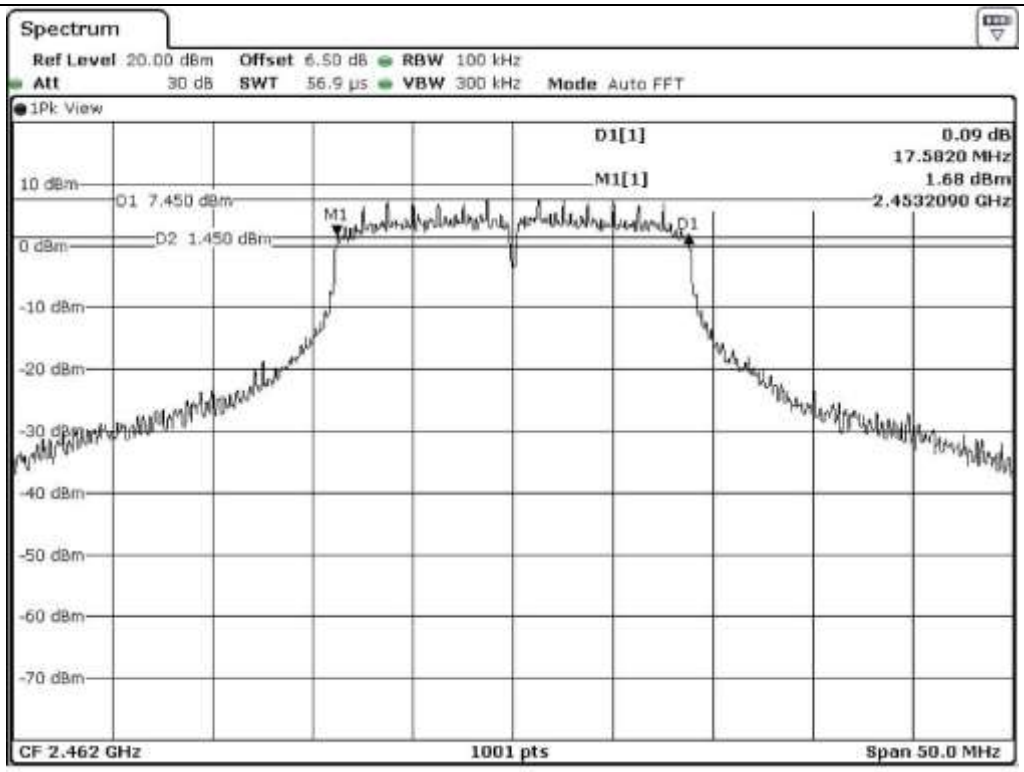
Tested by: Hyung-Kwon, Oh / Assistant Manager



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)

7.6.2 Test data for Antenna 1

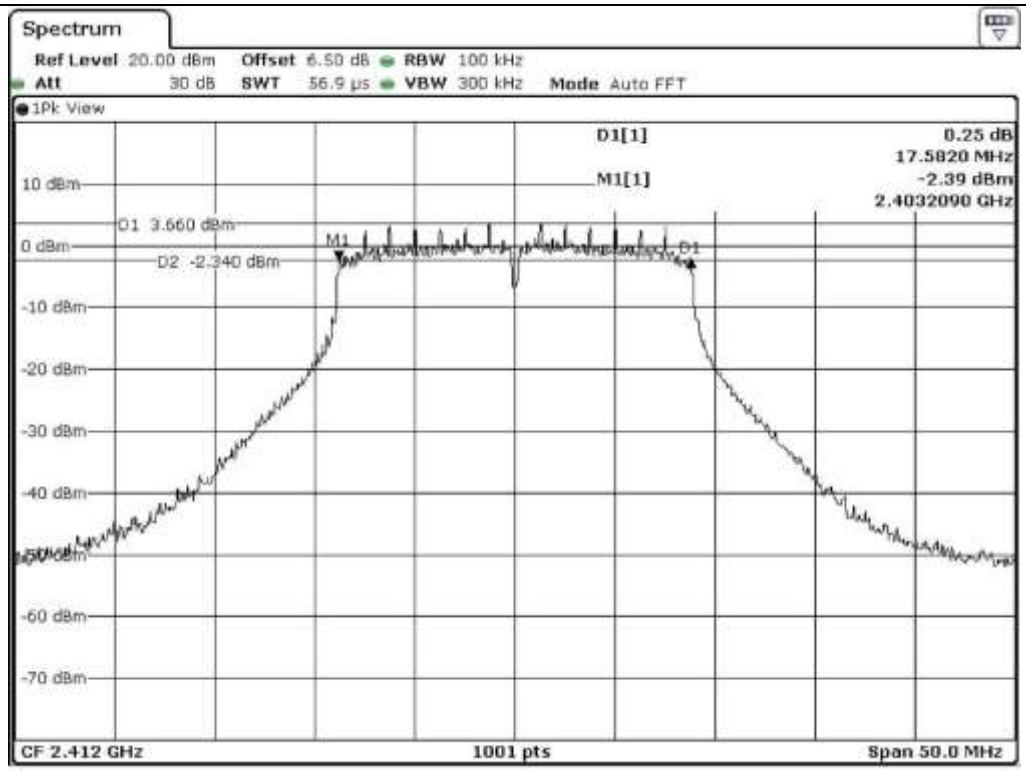
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

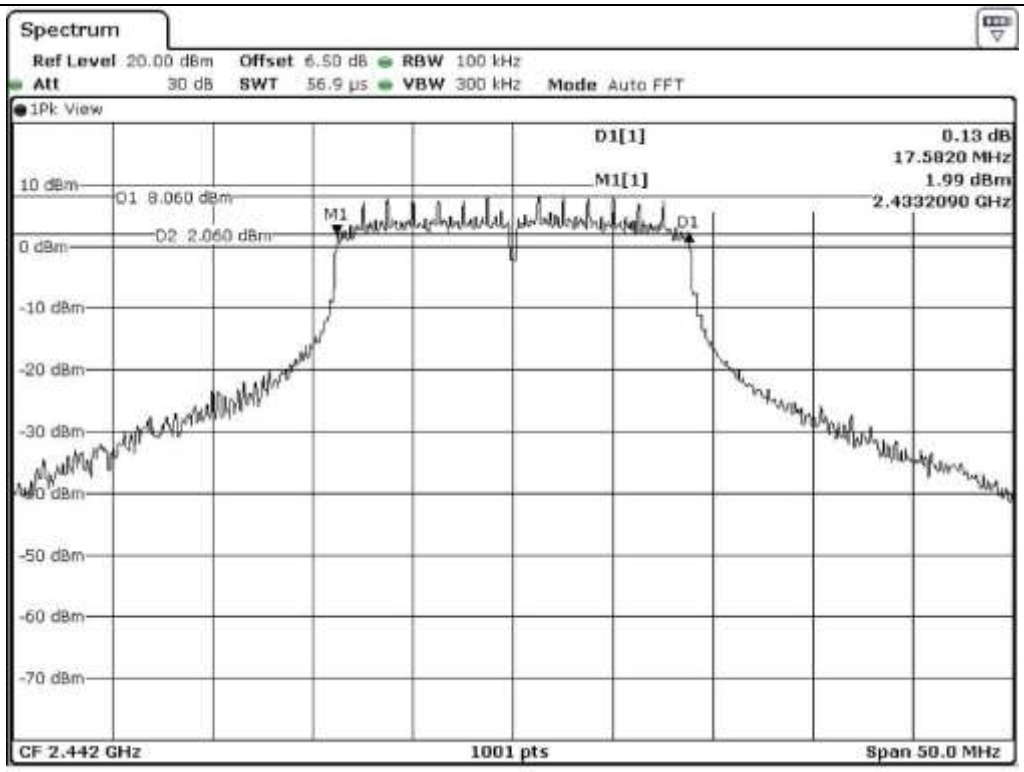
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	17.58	0.50	17.08
Middle	2 442.00	17.58	0.50	17.08
High	2 462.00	17.53	0.50	17.03

Remark. Margin = Measured Value - Limit

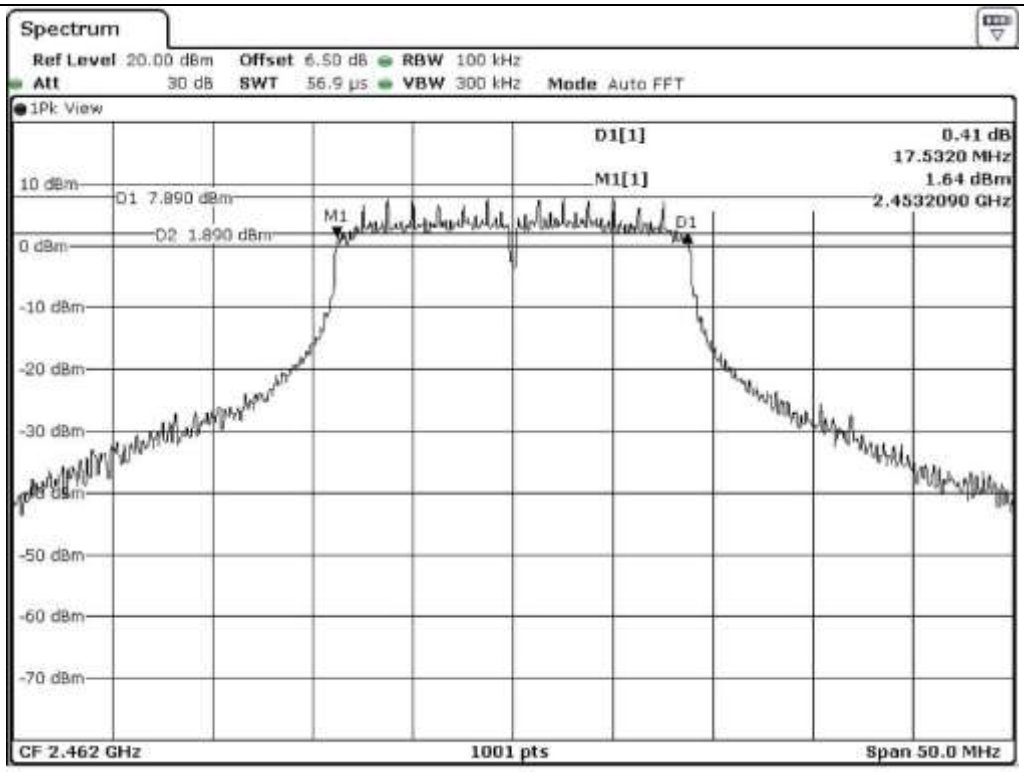
Tested by: Hyung-Kwon, Oh / Assistant Manager



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)

7.6.3 Test data for Antenna 2

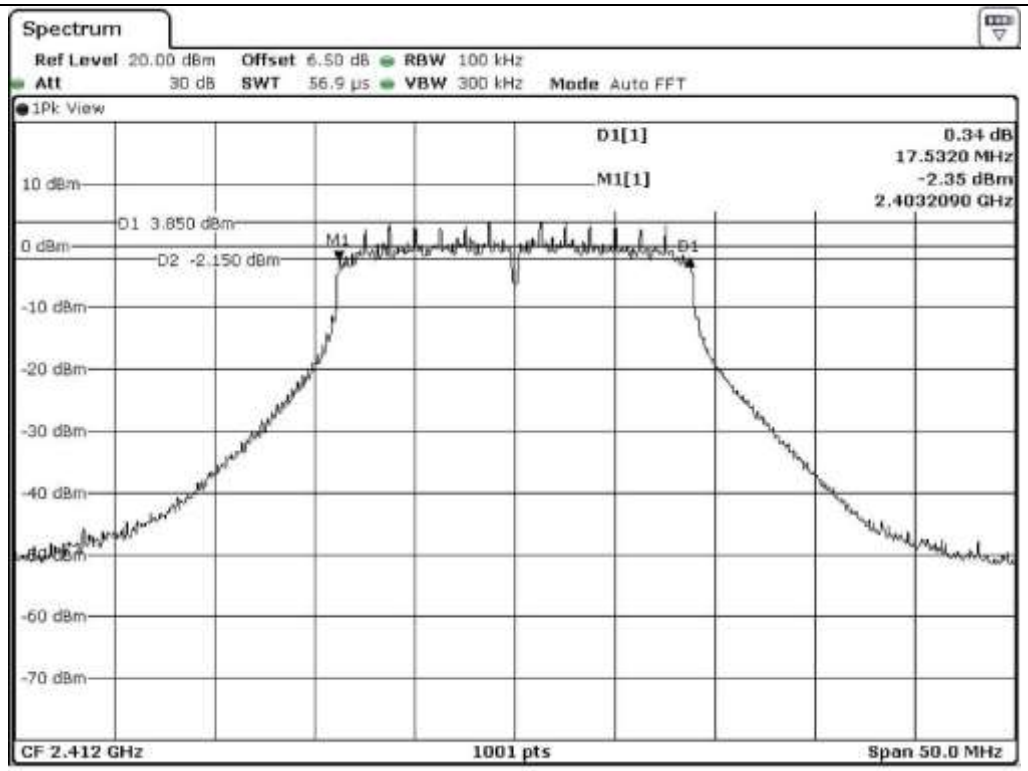
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

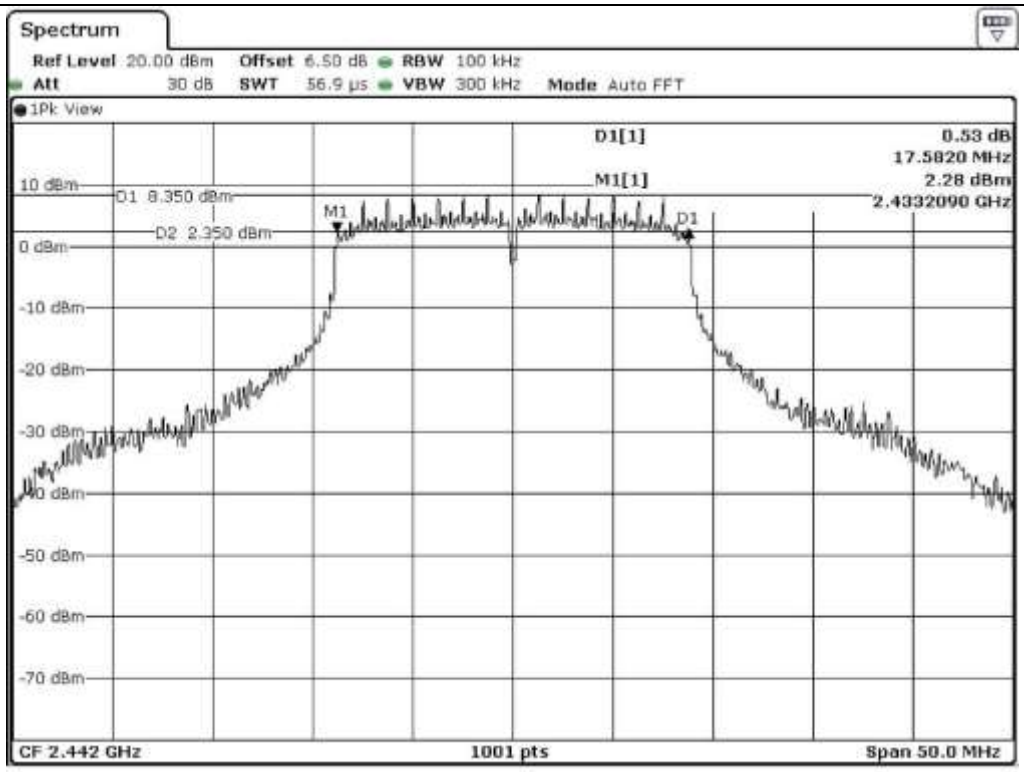
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 412.00	17.53	0.50	17.03
Middle	2 442.00	17.58	0.50	17.08
High	2 462.00	17.58	0.50	17.08

Remark. Margin = Measured Value - Limit

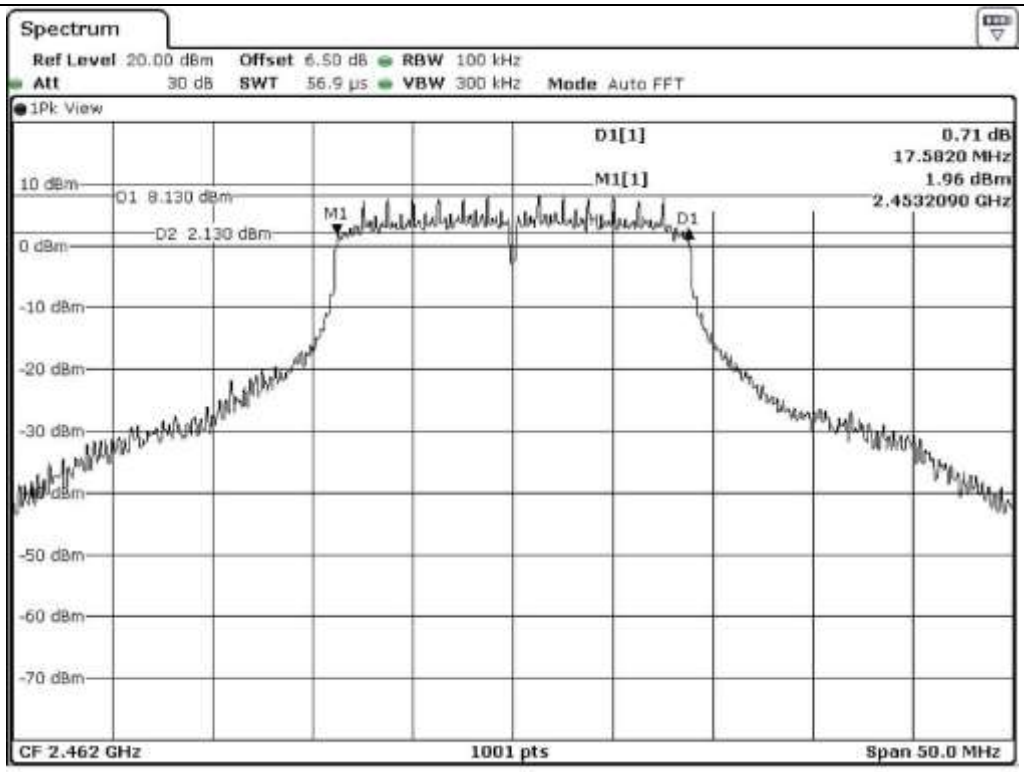
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

7.7 Test data for 802.11n_HT40 WLAN Mode

7.7.1 Test data for Antenna 0

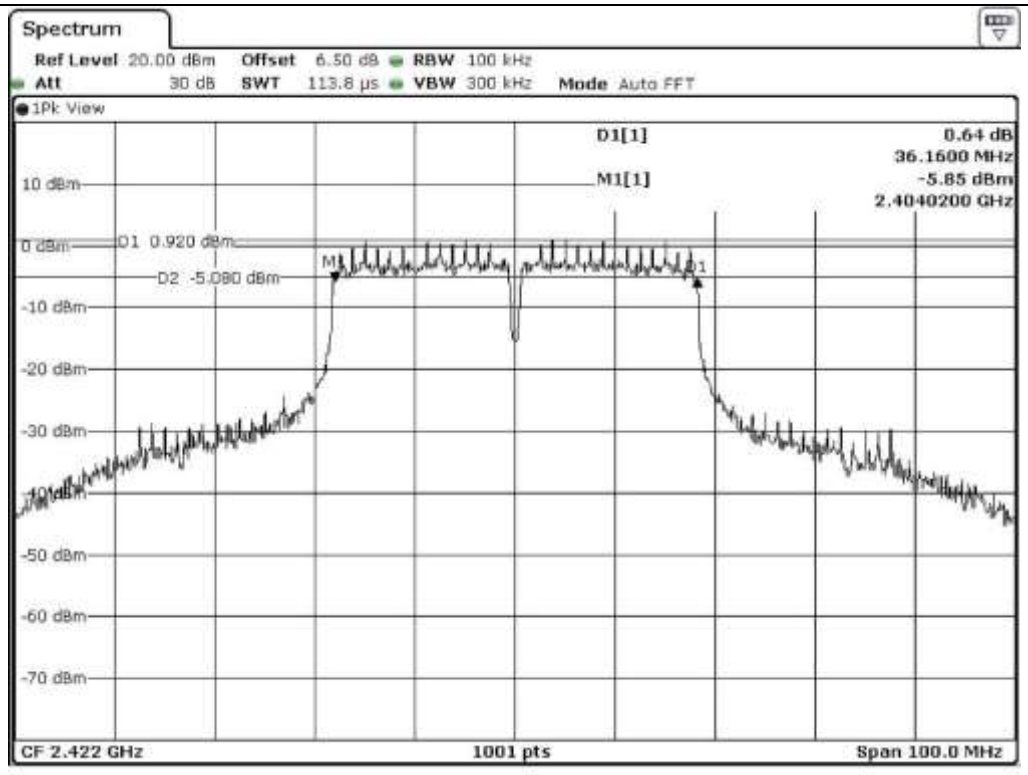
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 422.00	36.16	0.50	35.66
Middle	2 442.00	36.36	0.50	35.86
High	2 452.00	35.76	0.50	35.26

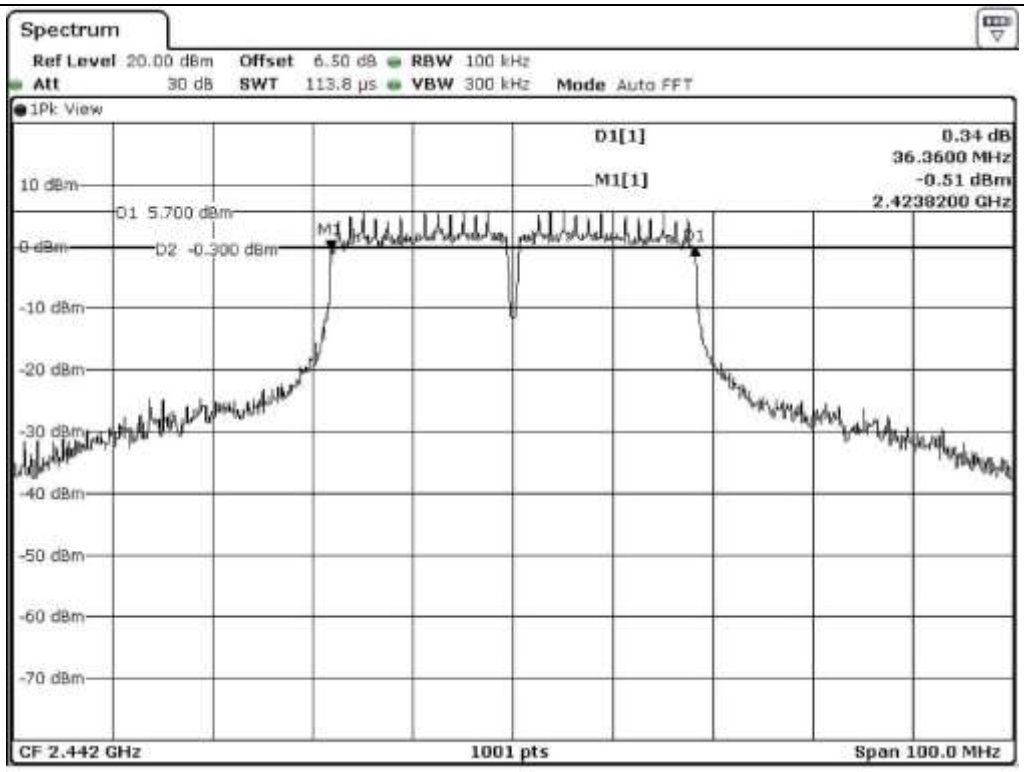
Remark. Margin = Measured Value - Limit

Tested by: Hyung-Kwon, Oh / Assistant Manager

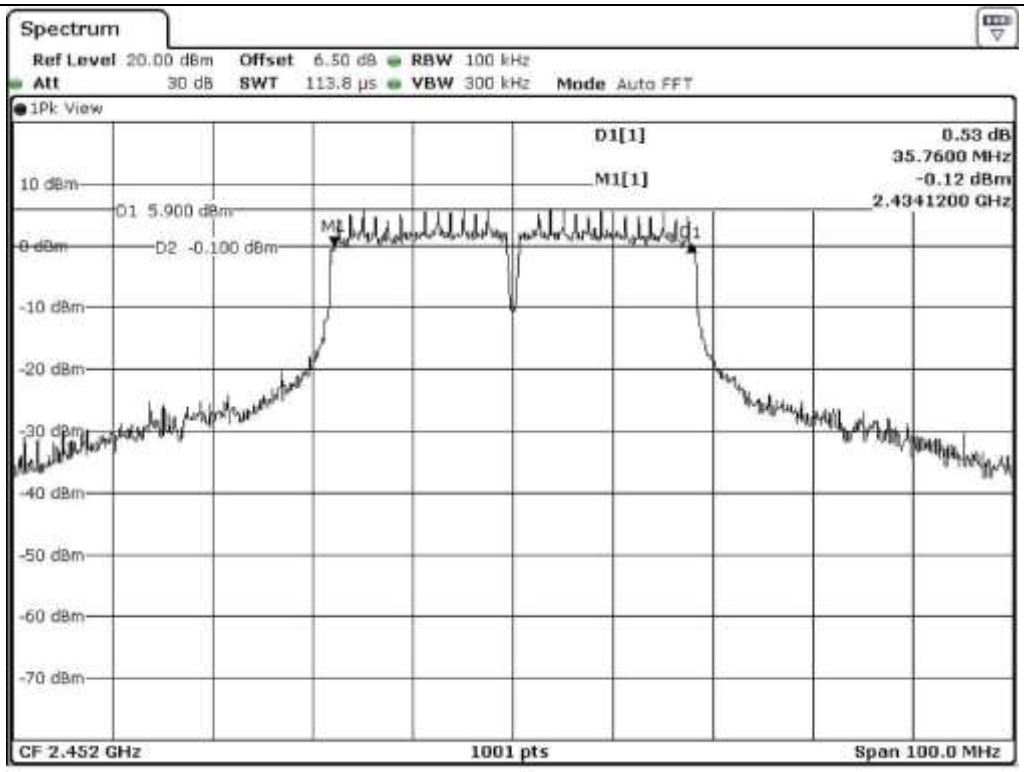


Low Channel

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



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)

7.7.2 Test data for Antenna 1

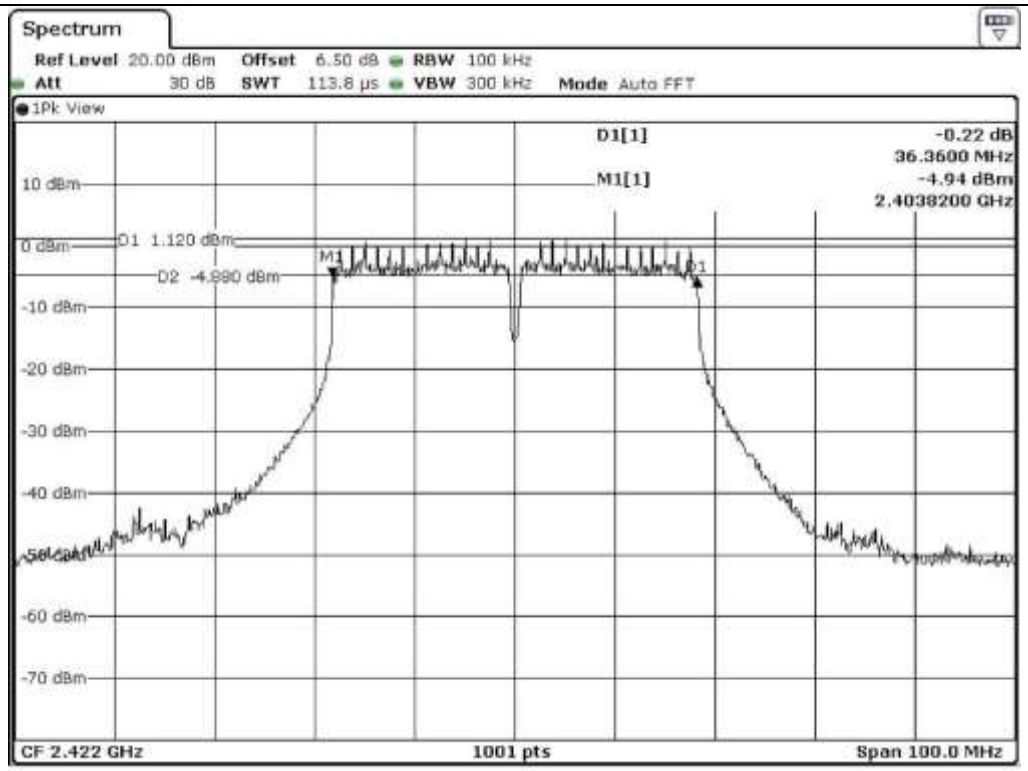
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

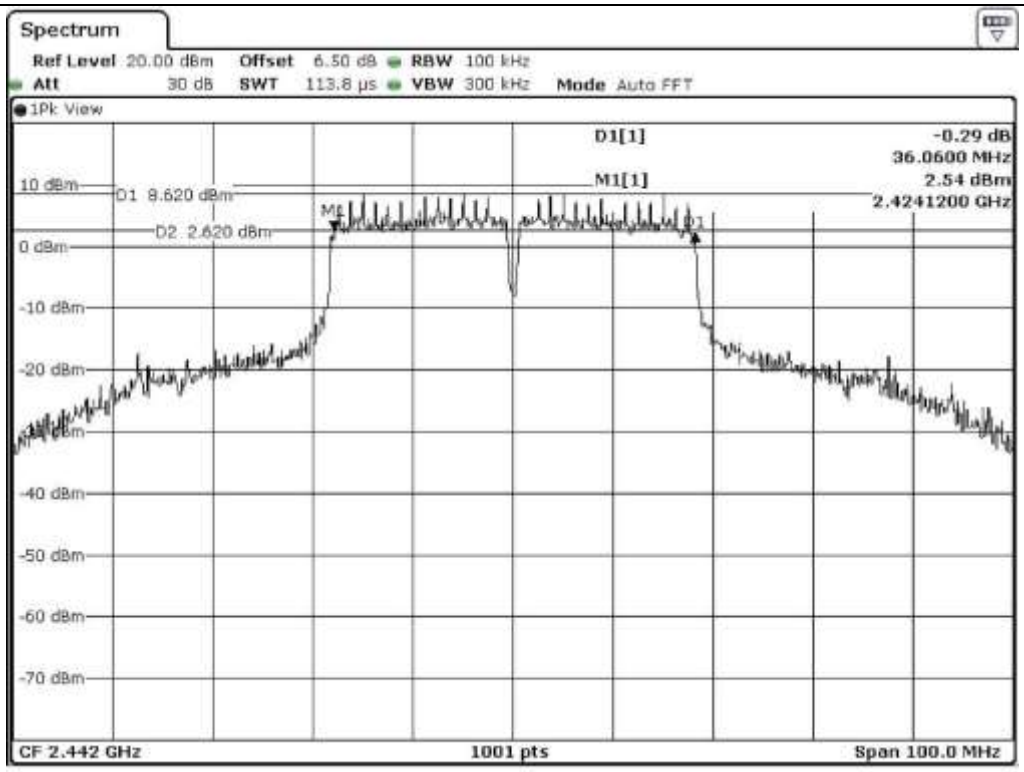
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 422.00	36.36	0.50	35.86
Middle	2 442.00	36.06	0.50	35.56
High	2 452.00	36.26	0.50	35.76

Remark. Margin = Measured Value - Limit

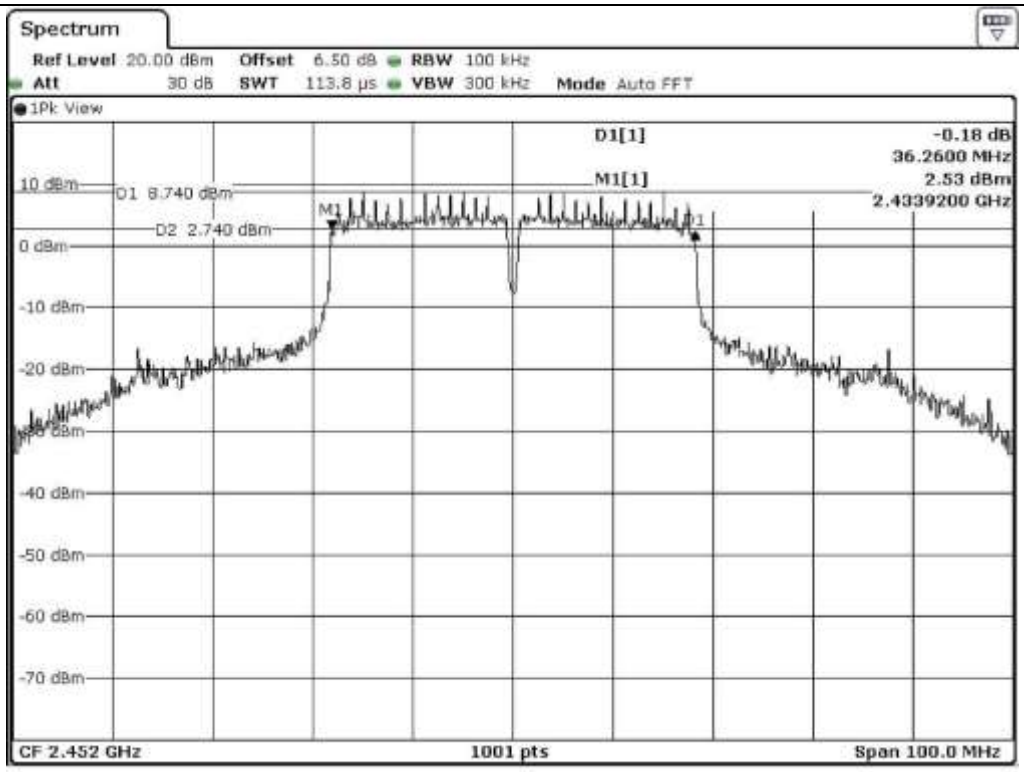
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

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7.7.3 Test data for Antenna 2

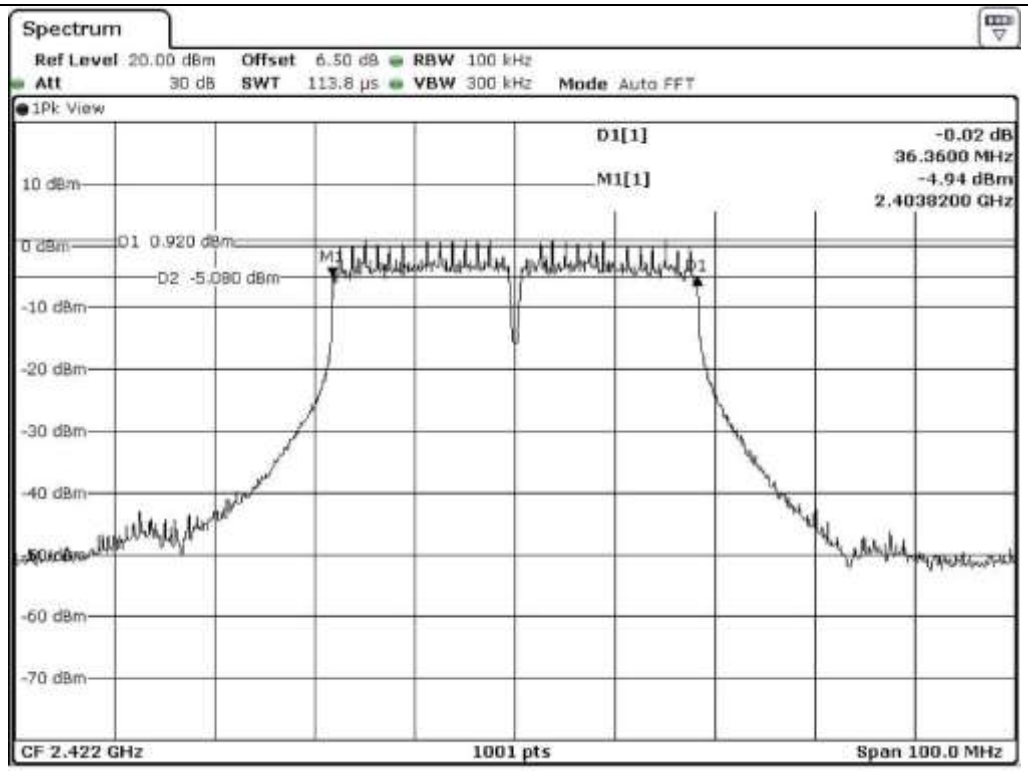
-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

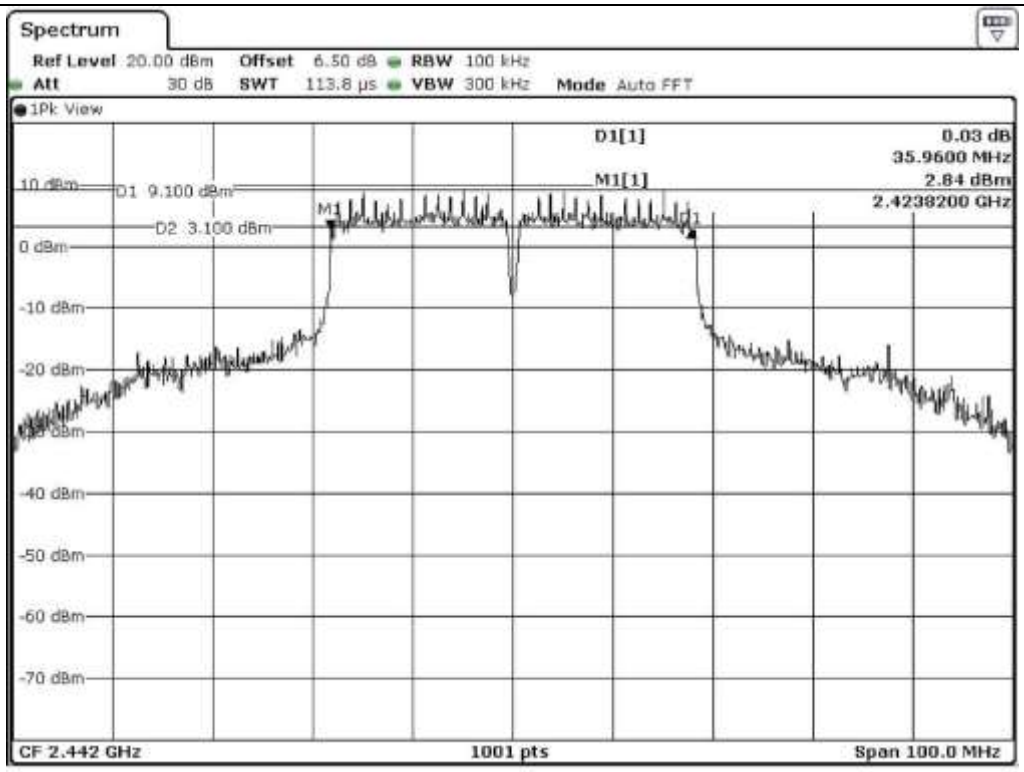
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 422.00	36.36	0.50	35.86
Middle	2 442.00	35.96	0.50	35.46
High	2 452.00	36.06	0.50	35.56

Remark. Margin = Measured Value - Limit

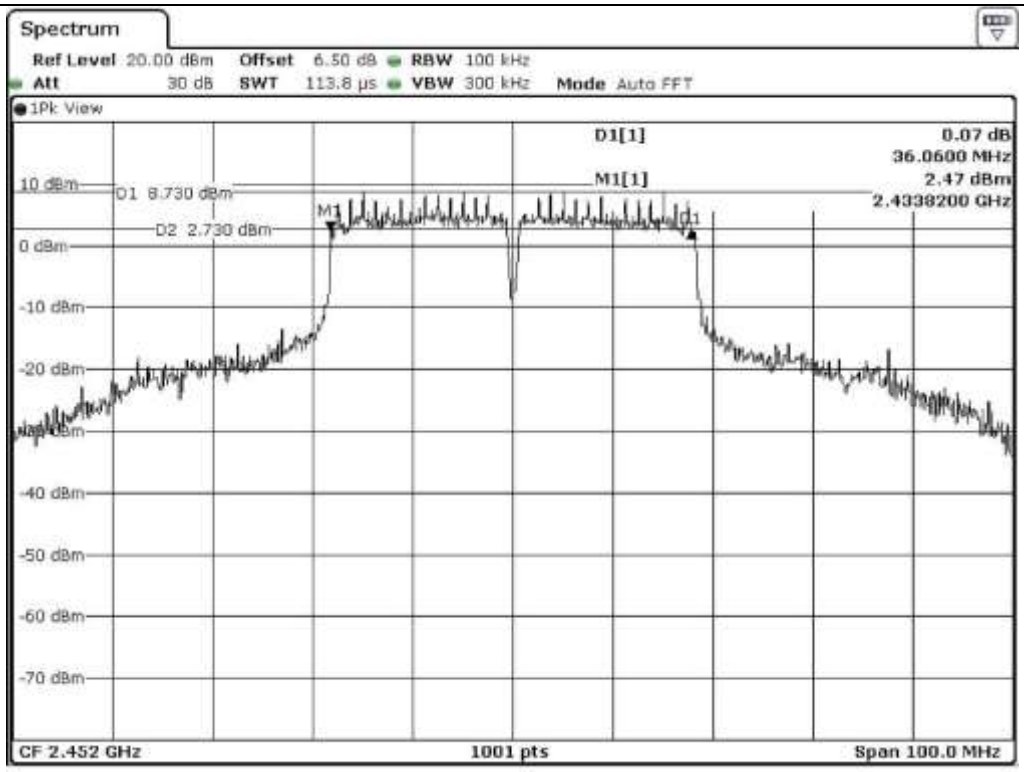
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

8. MAXIMUM PEAK OUTPUT POWER

8.1 Operating environment

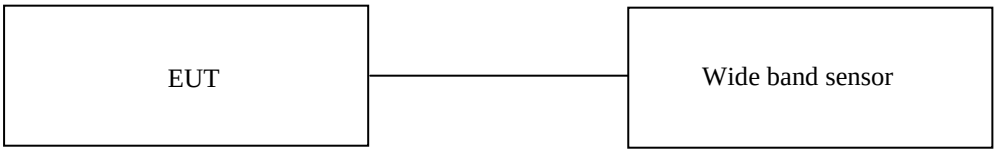
Temperature : 23 ℃

Relative humidity : 41 % R.H.

8.2 Test set-up

The maximum peak output power was measured with the wide band sensor connected to the antenna output of the EUT. The Wide Band Sensor is measured when the EUT is transmitting at the appropriate center frequency its maximum power control level as described in Section 9.2.3.(KDB 558074 D01 DTS Meas Guidance v04).

Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	NRP-Z81	Rohde & Schwarz	Wide band Sensor	101975	Apr. 04, 2017 (1Y)

All test equipment used is calibrated on a regular basis.

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8.4 Test data for 802.11b WLAN Mode

8.4.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	22.44	30.00	7.56
MIDDLE	2 442.00	22.43	30.00	7.57
HIGH	2 462.00	22.45	30.00	7.55

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

8.4.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	22.41	30.00	7.59
MIDDLE	2 442.00	22.43	30.00	7.57
HIGH	2 462.00	22.49	30.00	7.51

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

8.4.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	22.43	30.00	7.57
MIDDLE	2 442.00	22.41	30.00	7.59
HIGH	2 462.00	22.47	30.00	7.53

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

Tested by: Hyung-Kwon, Oh / Assistant Manager

8.5 Test data for 802.11g WLAN Mode

8.5.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	19.15	30.00	10.85
MIDDLE	2 442.00	22.39	30.00	7.61
HIGH	2 462.00	22.39	30.00	7.61

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

8.5.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	19.07	30.00	10.93
MIDDLE	2 442.00	22.34	30.00	7.66
HIGH	2 462.00	22.31	30.00	7.69

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

8.5.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	19.10	30.00	10.90
MIDDLE	2 442.00	22.42	30.00	7.58
HIGH	2 462.00	22.45	30.00	7.55

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

Tested by: Hyung-Kwon, Oh / Assistant Manager

8.6 Test data for 802.11n_HT20 WLAN Mode

8.6.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	14.34	30.00	15.66
MIDDLE	2 442.00	16.41	30.00	13.59
HIGH	2 462.00	16.46	30.00	13.54

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

8.6.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	14.31	30.00	15.69
MIDDLE	2 442.00	16.37	30.00	13.63
HIGH	2 462.00	16.40	30.00	13.60

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

8.6.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	14.38	30.00	15.62
MIDDLE	2 442.00	16.42	30.00	13.58
HIGH	2 462.00	16.48	30.00	13.52

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

Tested by: Hyung-Kwon, Oh / Assistant Manager

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8.6.4 Test data for Multiple transmit

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	CALCULATED OUTPUT POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	19.11	23.90	4.79
MIDDLE	2 442.00	21.17	23.90	2.73
HIGH	2 462.00	21.22	23.90	2.68

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 : Calculated Output Power= $10\log (10^{(\text{Antenna0 Output Power}/10)}+10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Remark 3 : Directional gain = $10*\log[(10^{G0/20}+10^{G1/20}+10^{G2/20})^2/N]$ dBi

Remark 4 : Limit = 30 dBm – Exceeds Antenna gain

Remark 5 : Exceeds Antenna gain = Above the limits is calculated according to antenna gain.
Because antenna gain is higher than 6 dBi.

Tested by: Hyung-Kwon, Oh / Assistant Manager

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8.7 Test data for 802.11n_HT40 WLAN Mode

8.7.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	14.49	30.00	15.51
MIDDLE	2 442.00	16.54	30.00	13.46
HIGH	2 452.00	16.33	30.00	13.67

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

8.7.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	14.51	30.00	15.49
MIDDLE	2 442.00	16.52	30.00	13.48
HIGH	2 452.00	16.31	30.00	13.69

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

8.7.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	14.53	30.00	15.47
MIDDLE	2 442.00	16.55	30.00	13.45
HIGH	2 452.00	16.27	30.00	13.73

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

Tested by: Hyung-Kwon, Oh / Assistant Manager

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

8.7.4 Test data for Multiple transmit

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	CALCULATED OUTPUT POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	19.28	23.90	4.62
MIDDLE	2 442.00	21.31	23.90	2.59
HIGH	2 452.00	21.07	23.90	2.83

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 : Calculated Output Power= $10\log (10^{(\text{Antenna0 Output Power}/10)}+10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Remark 3 : Directional gain = $10*\log[(10^{G0/20}+10^{G1/20}+10^{G2/20})^2/N]$ dBi

Remark 4 : Limit = 30 dBm – Exceeds Antenna gain

Remark 5 : Exceeds Antenna gain = Above the limits is calculated according to antenna gain.
Because antenna gain is higher than 6 dBi.

Tested by: Hyung-Kwon, Oh / Assistant Manager

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9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

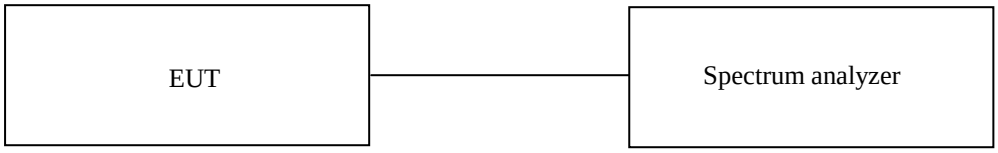
9.1 Operating environment

Temperature : 23 ℃

Relative humidity : 41 % 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 semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

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

9.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Apr. 05, 2017 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2017 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2017 (1Y)
■ -	BBV9718	Schwarzbeck	Amplifier	310	Sep. 01, 2017 (1Y)
■	SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Apr. 04, 2017 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	May 26, 2017 (2Y)
■ -	BBHA 9170	Schwarzbeck	Horn Antenna	BBHA9170179	Jul. 28, 2017 (2Y)

All test equipment used is calibrated on a regular basis.

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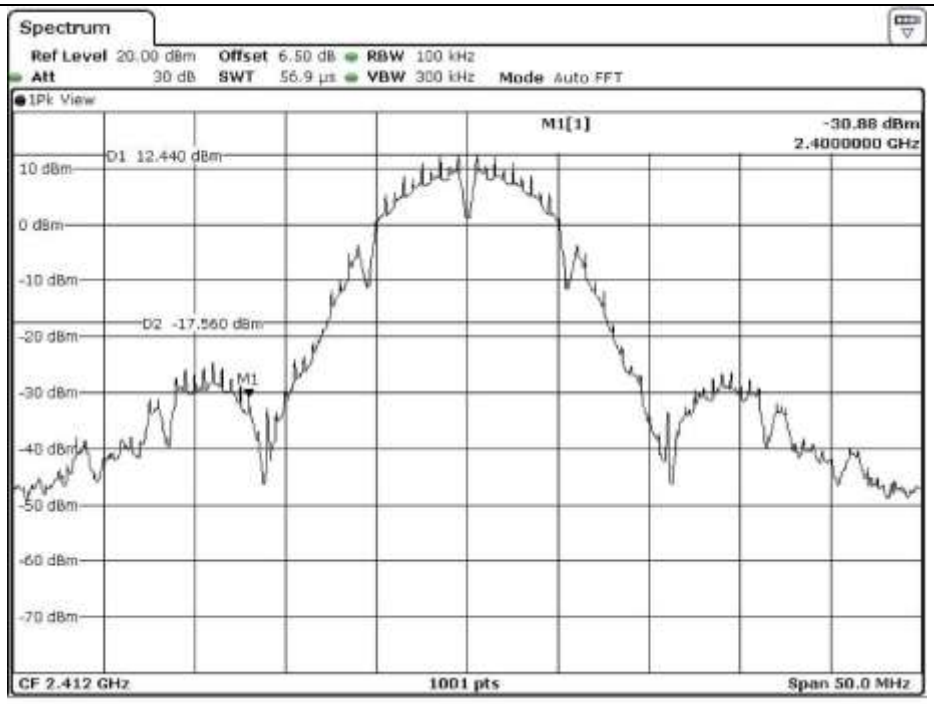
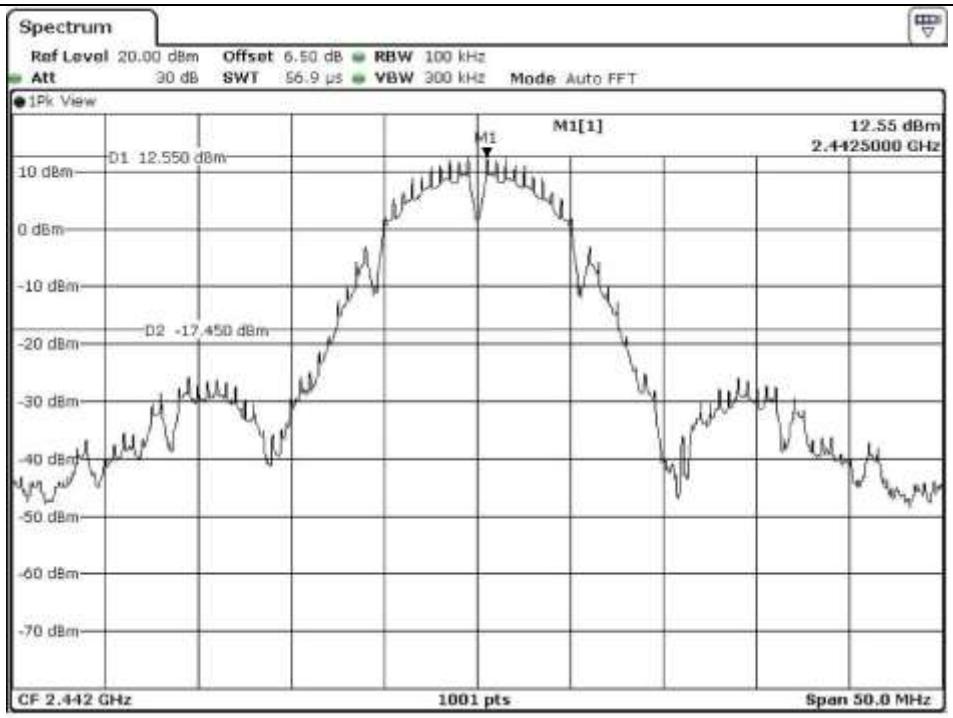
9.5 Test data for conducted emission

9.5.1 Test data for 802.11b WLAN Mode

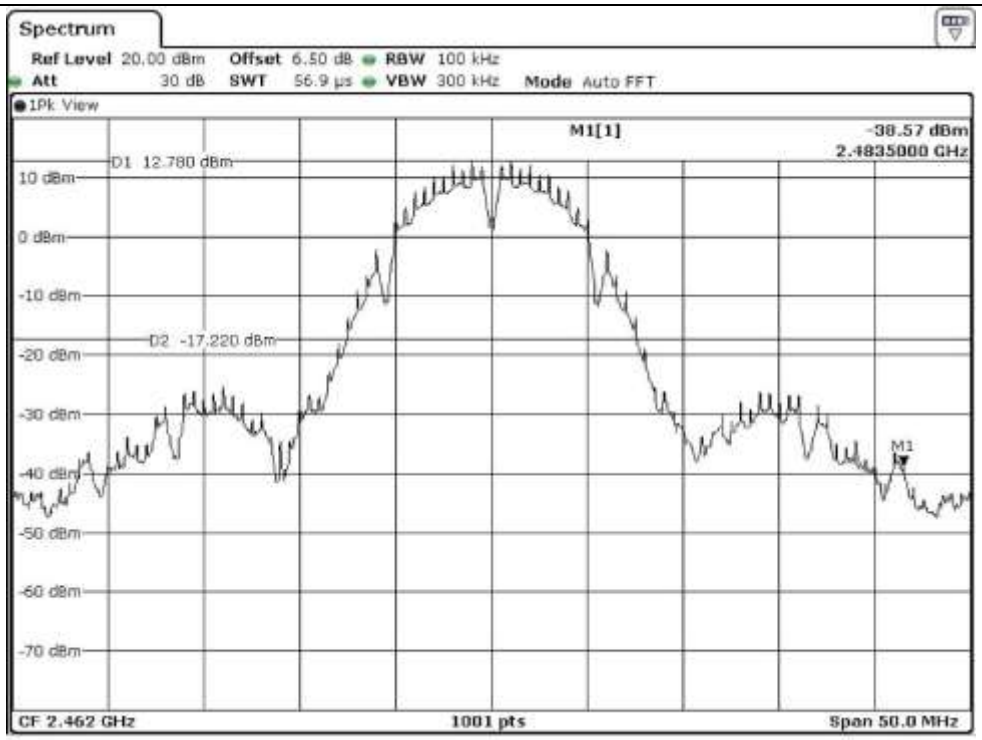
9.5.1.1 Test data for Antenna 0



Low Channel

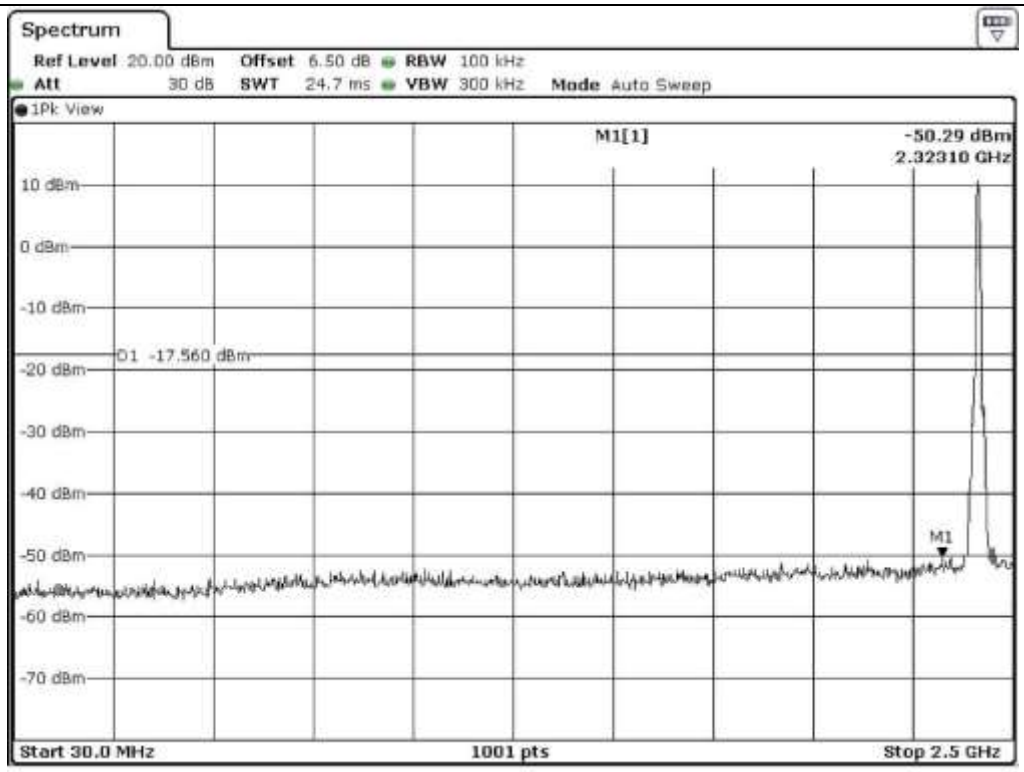


Middle Channel

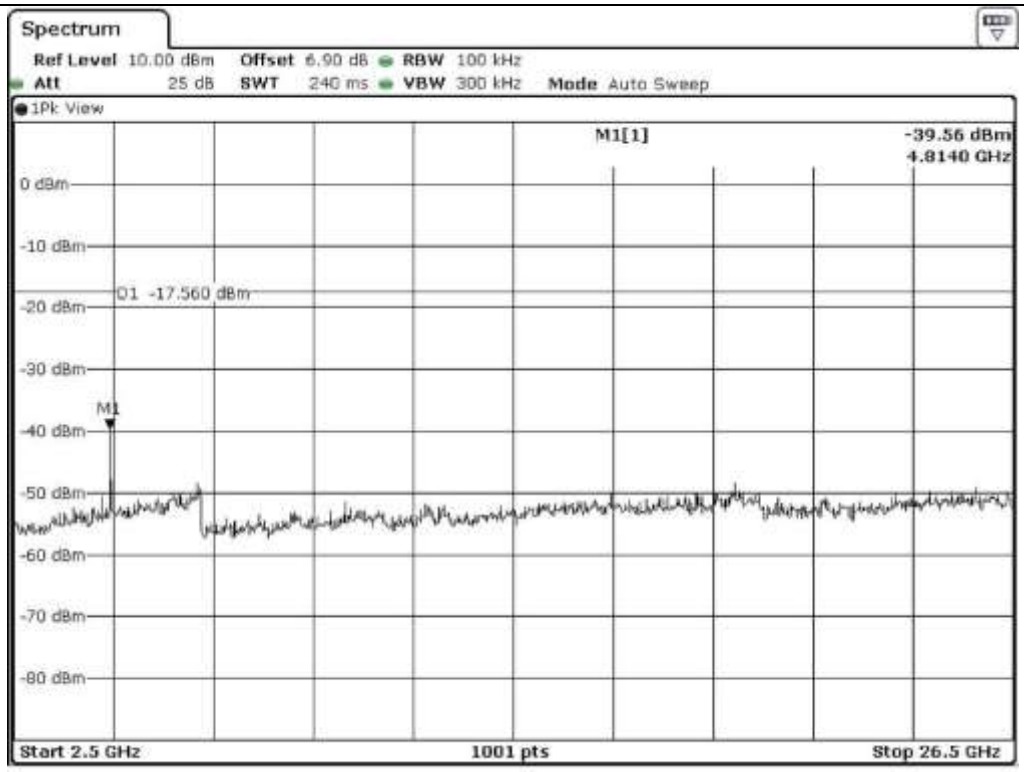


High Channel

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

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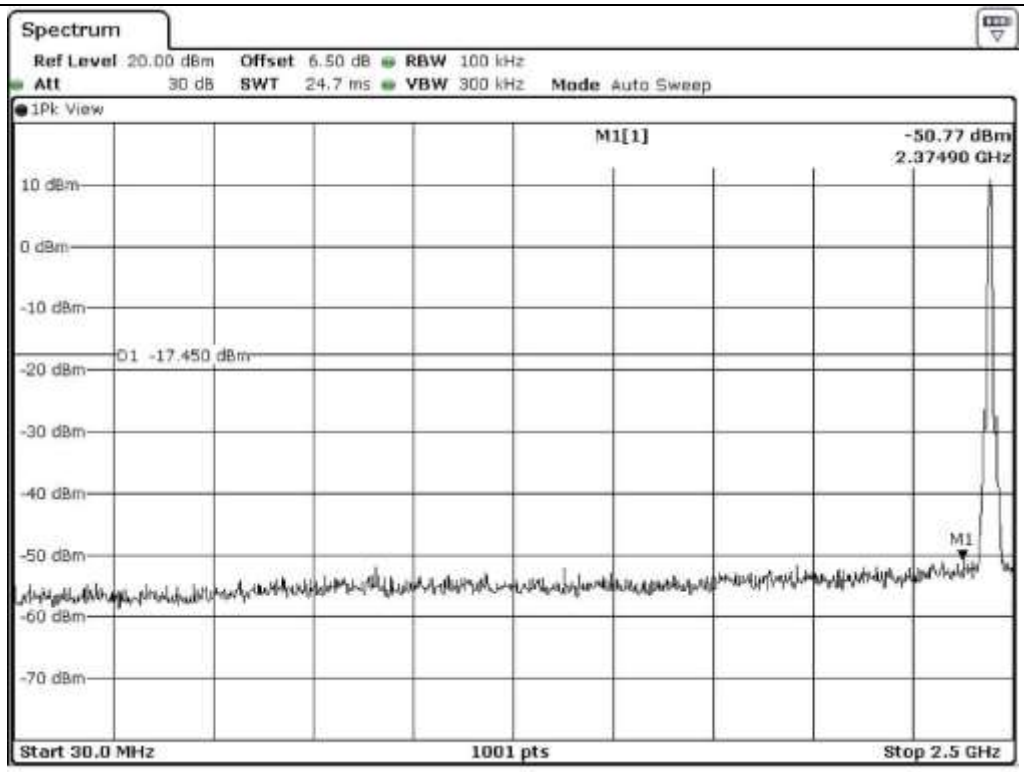
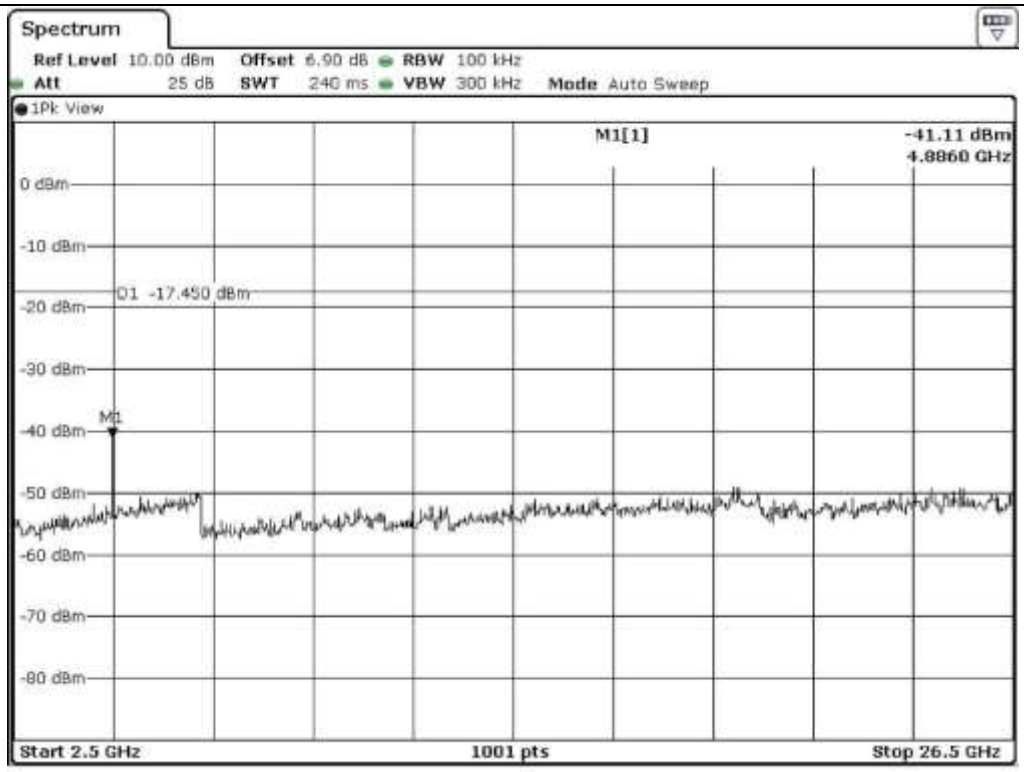
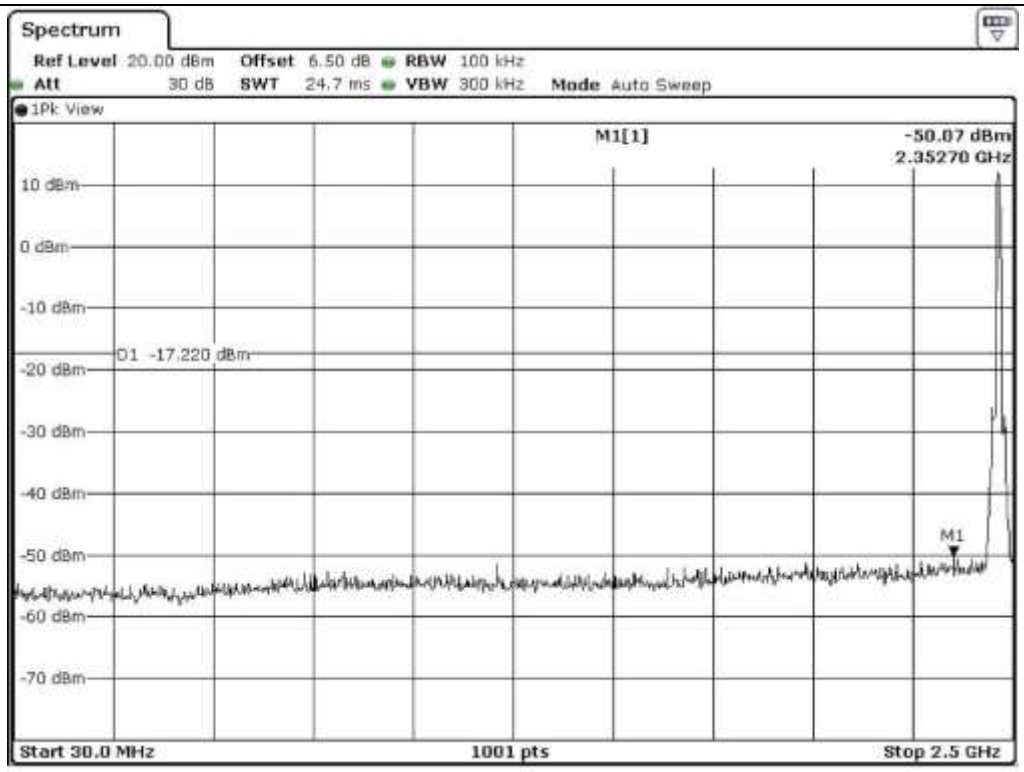


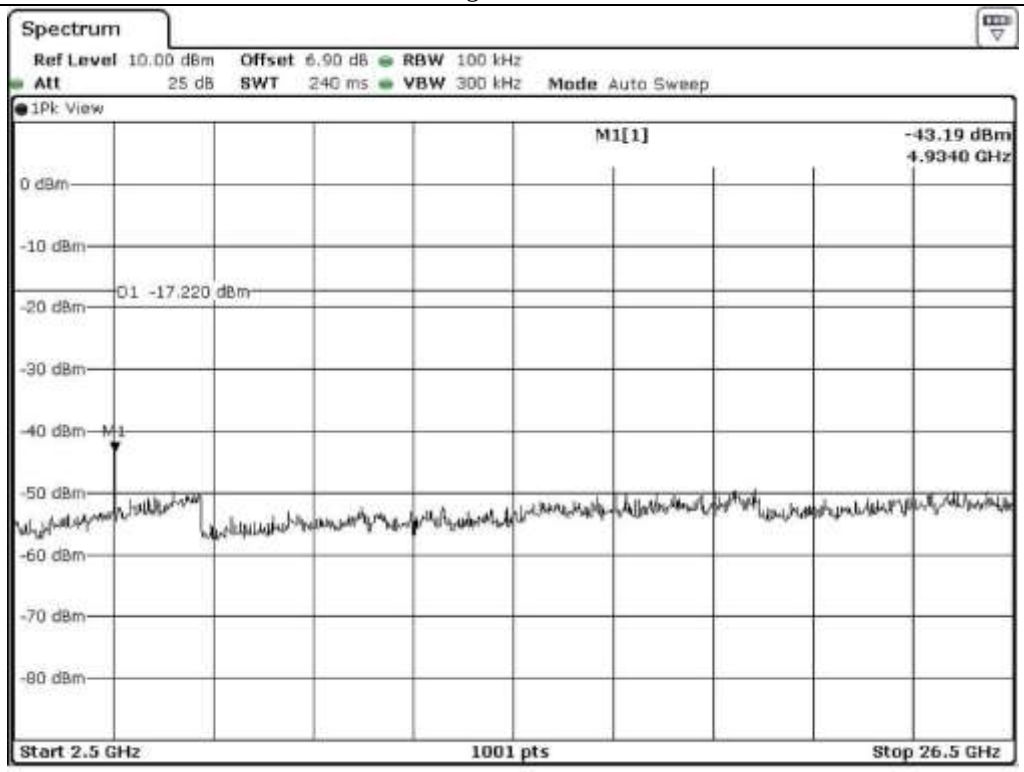
Middle Channel



Middle Channel



High Channel



High Channel

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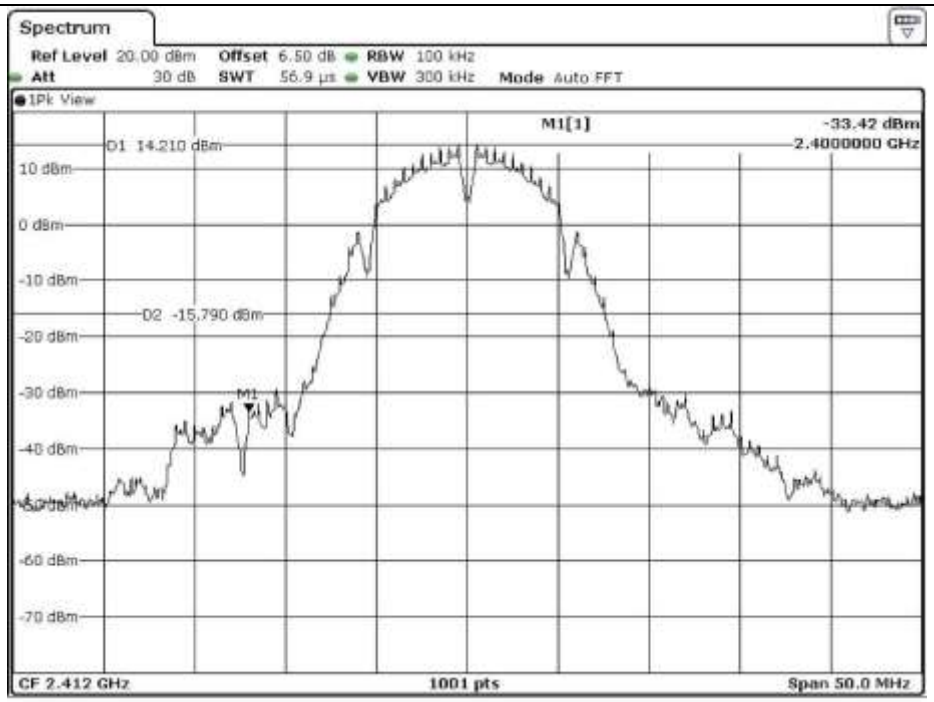
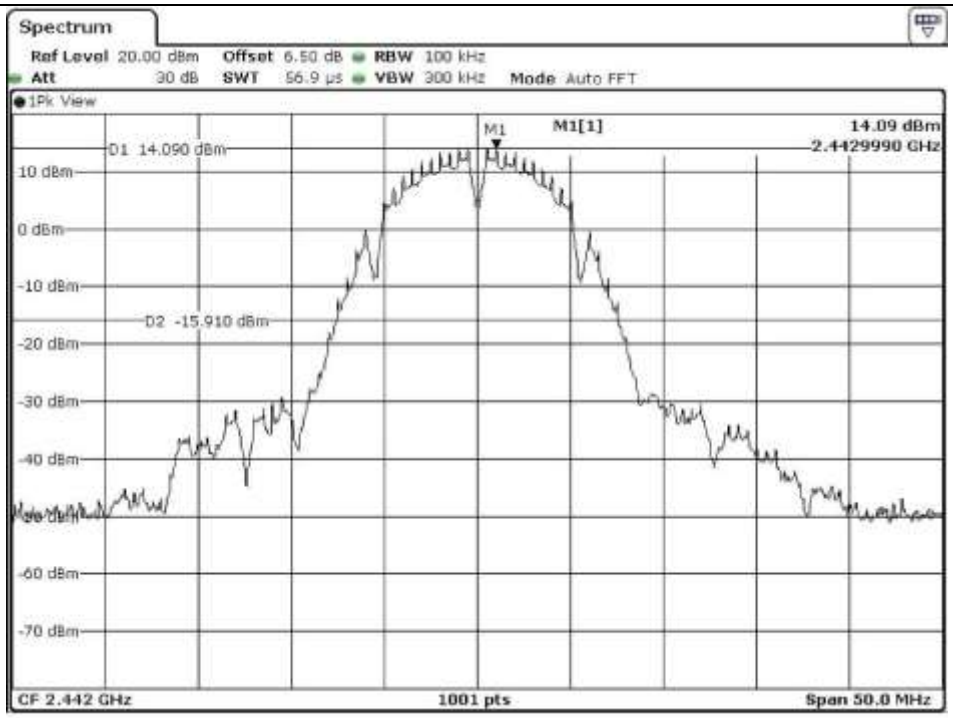
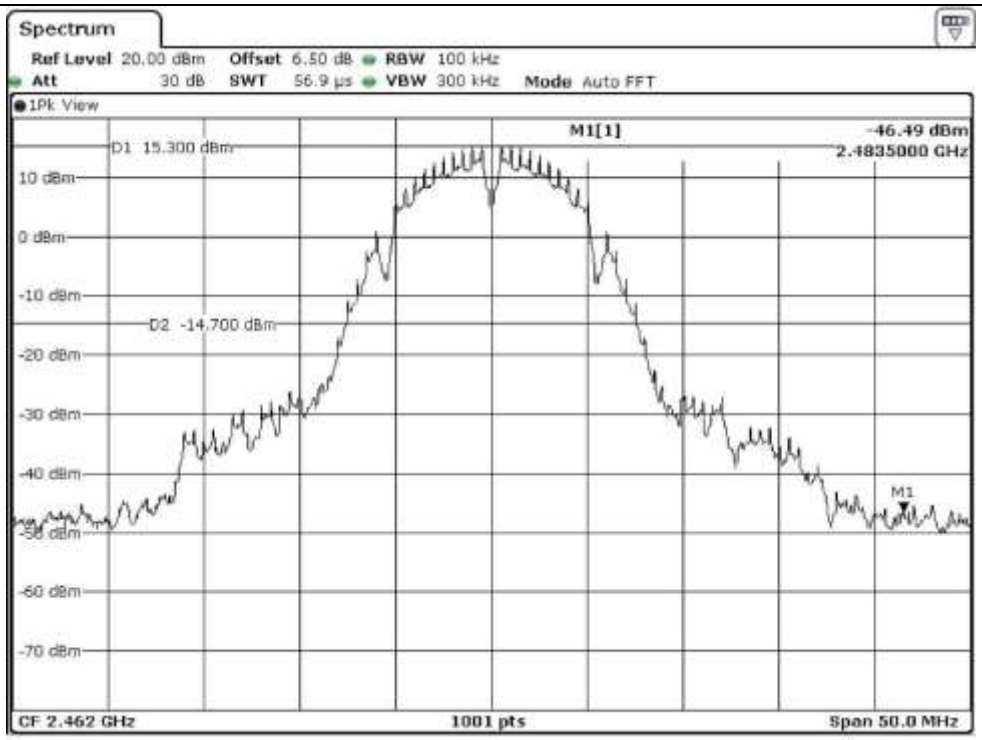
9.5.1.2 Test data for Antenna 1



Low Channel



Middle Channel



High Channel

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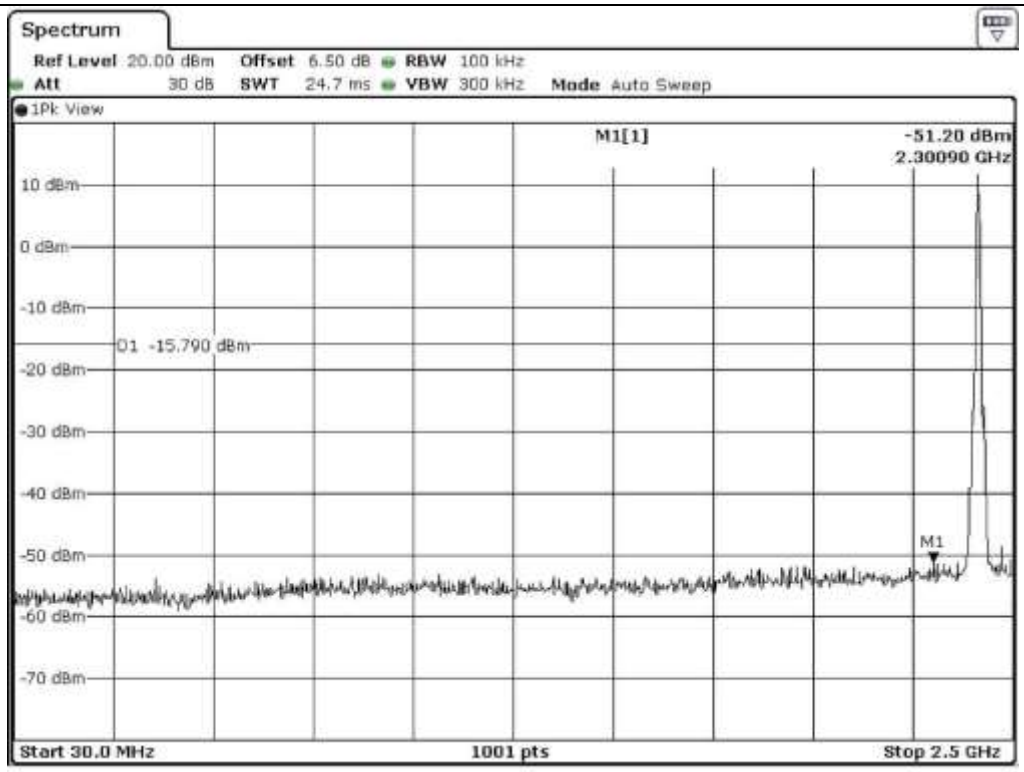
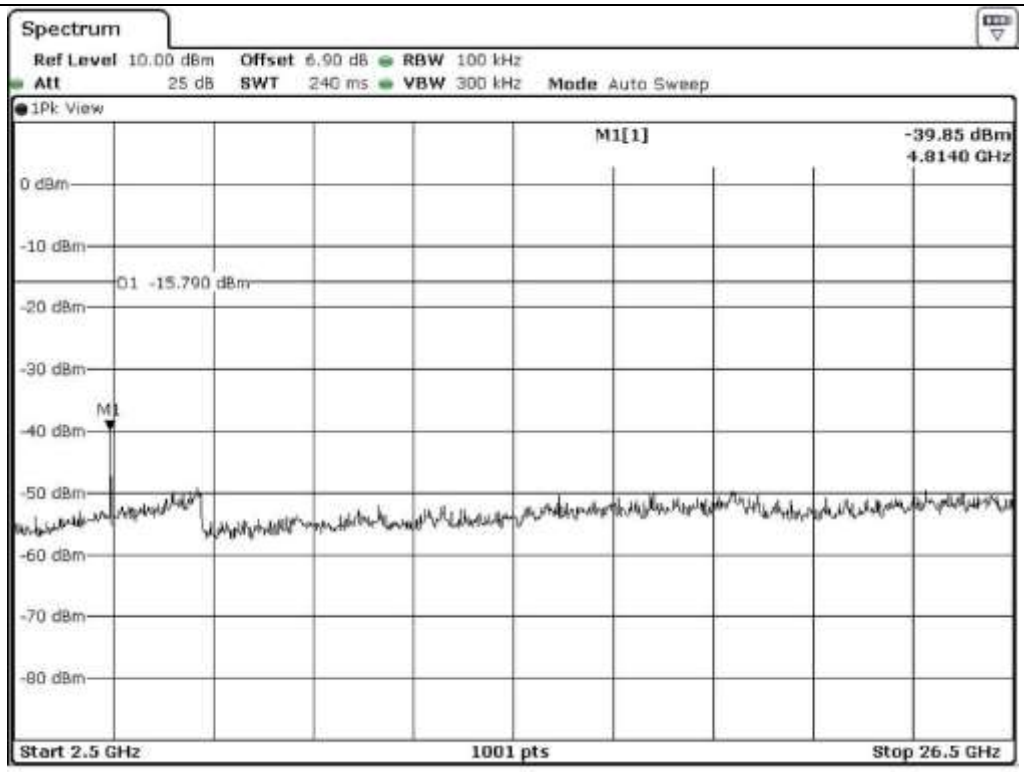
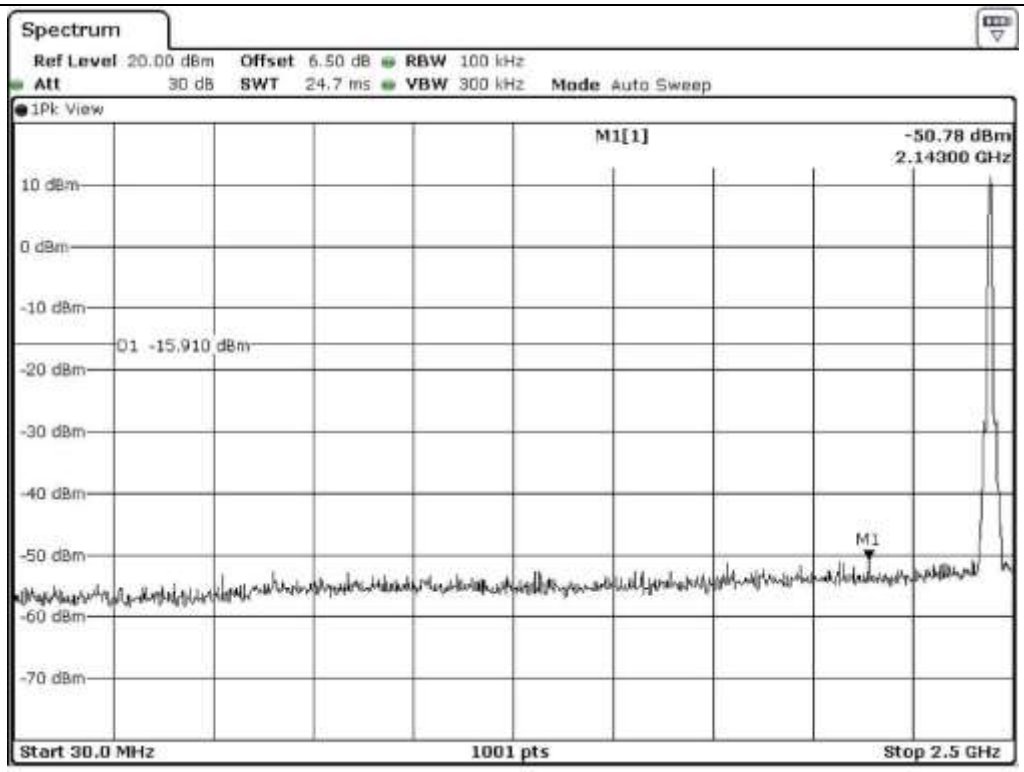


Low Channel

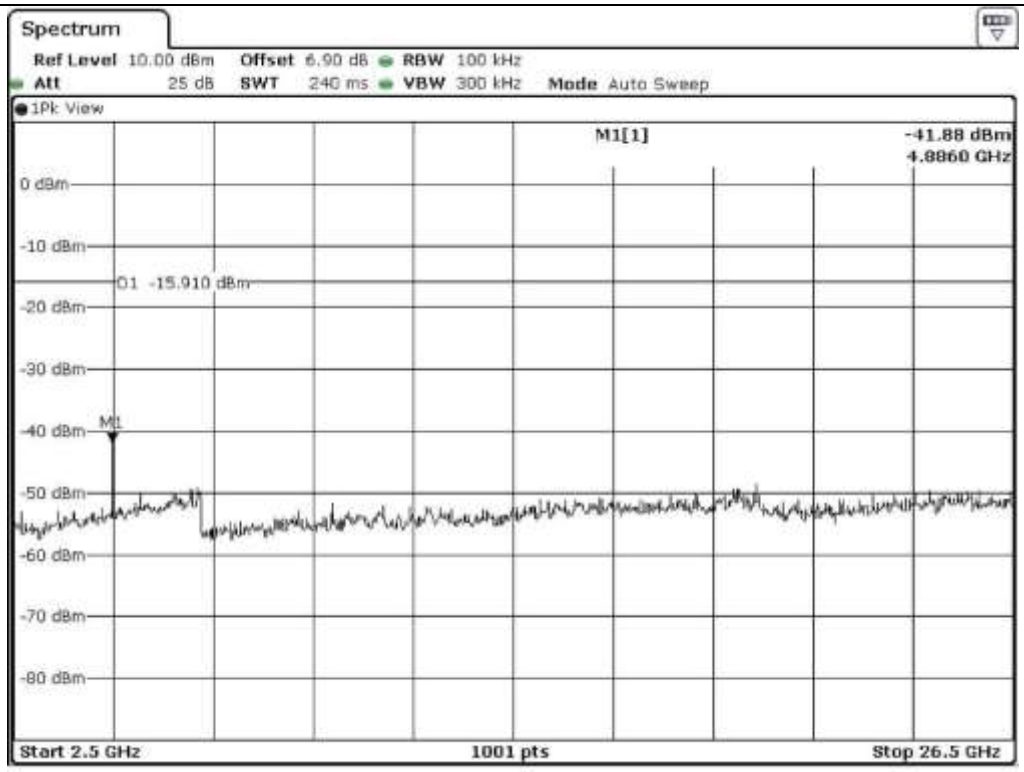


Low Channel

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

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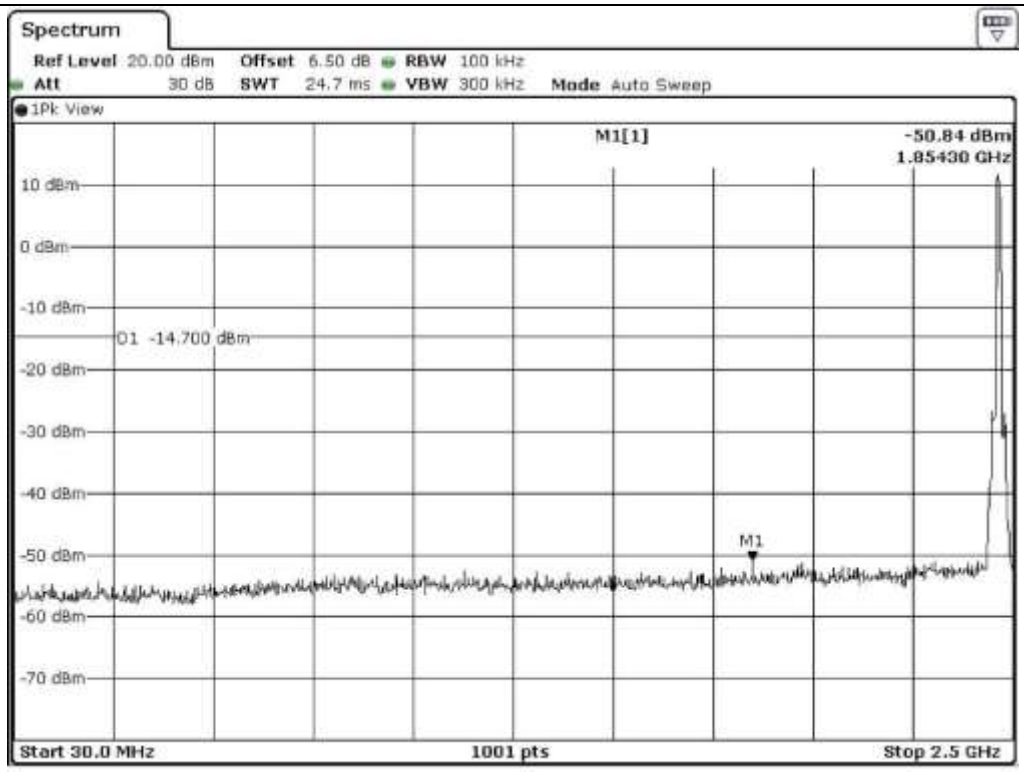
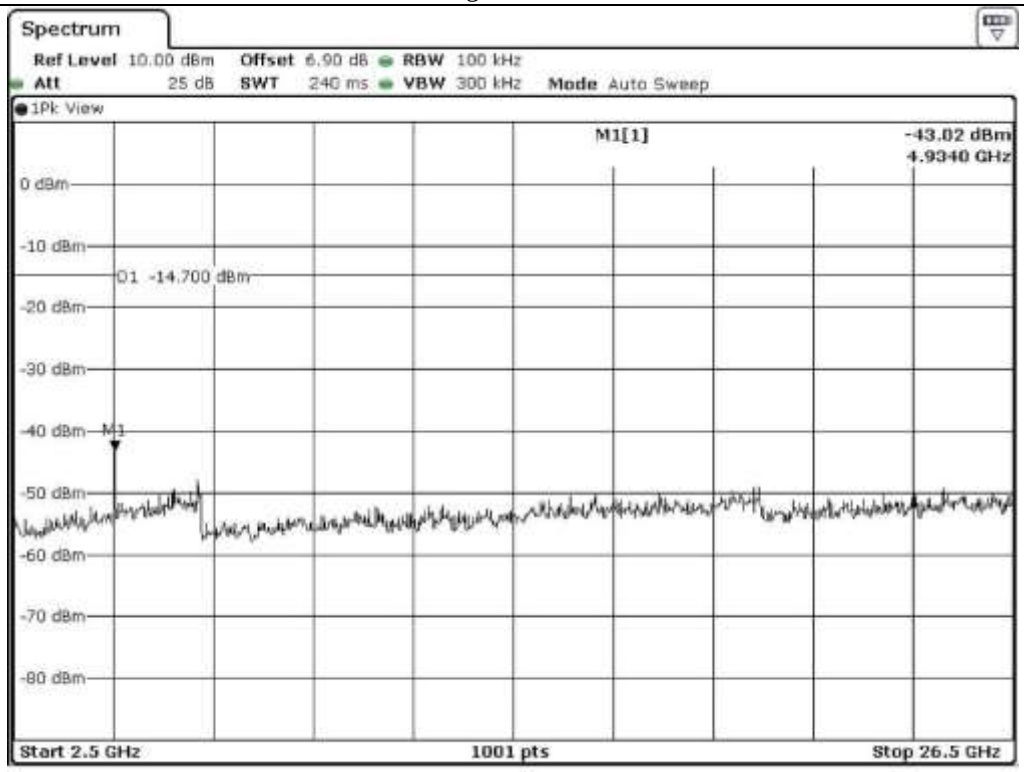
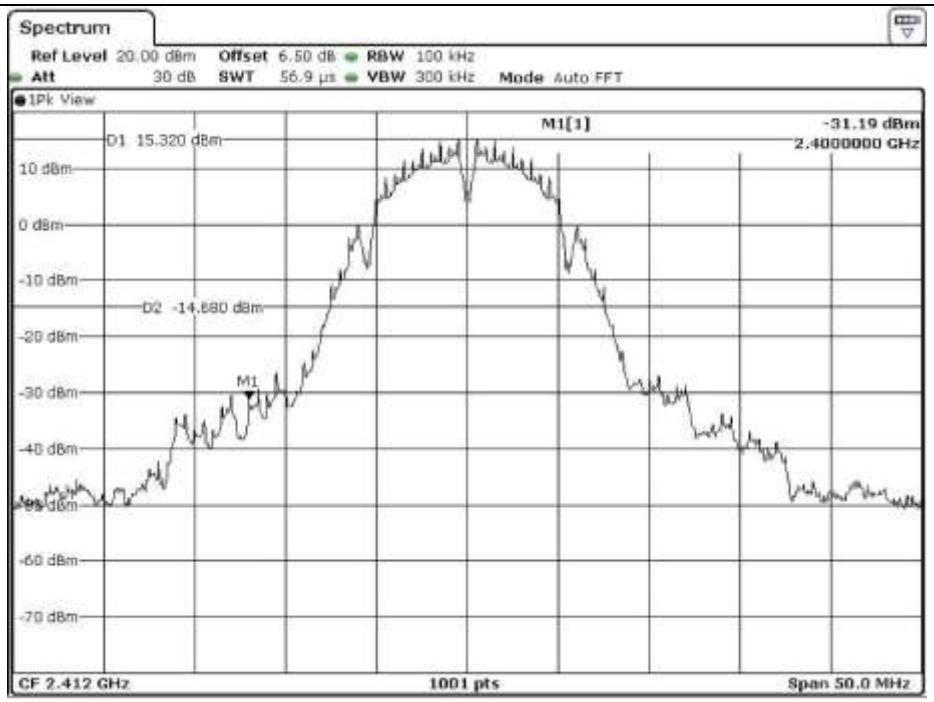


High Channel

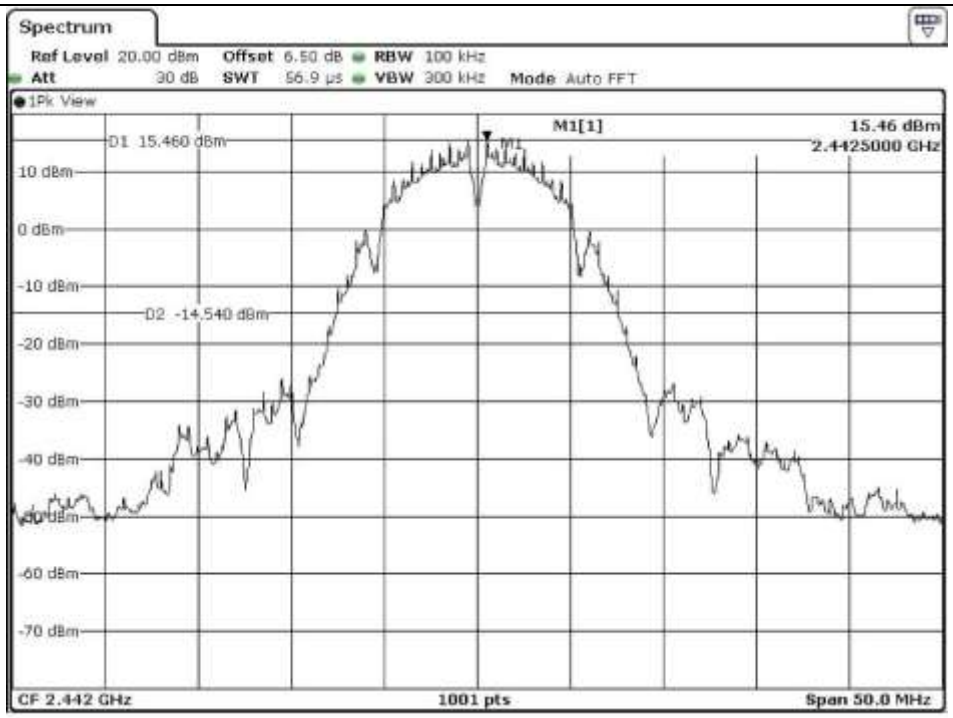


High Channel

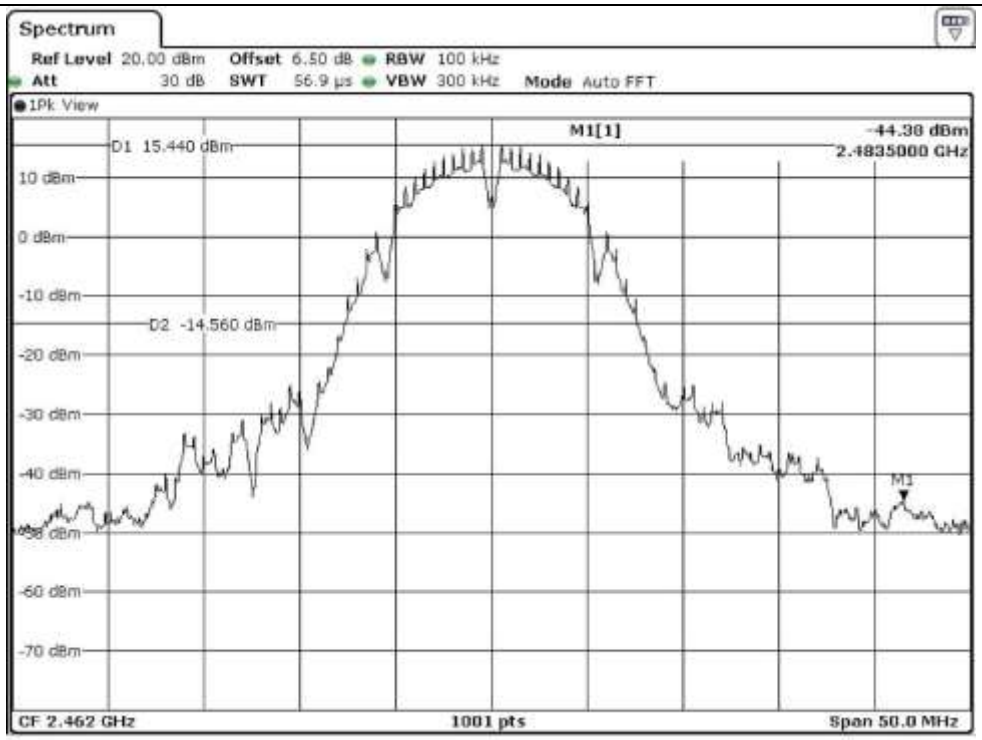
9.5.1.3 Test data for Antenna 2



Low Channel



Middle Channel



High Channel

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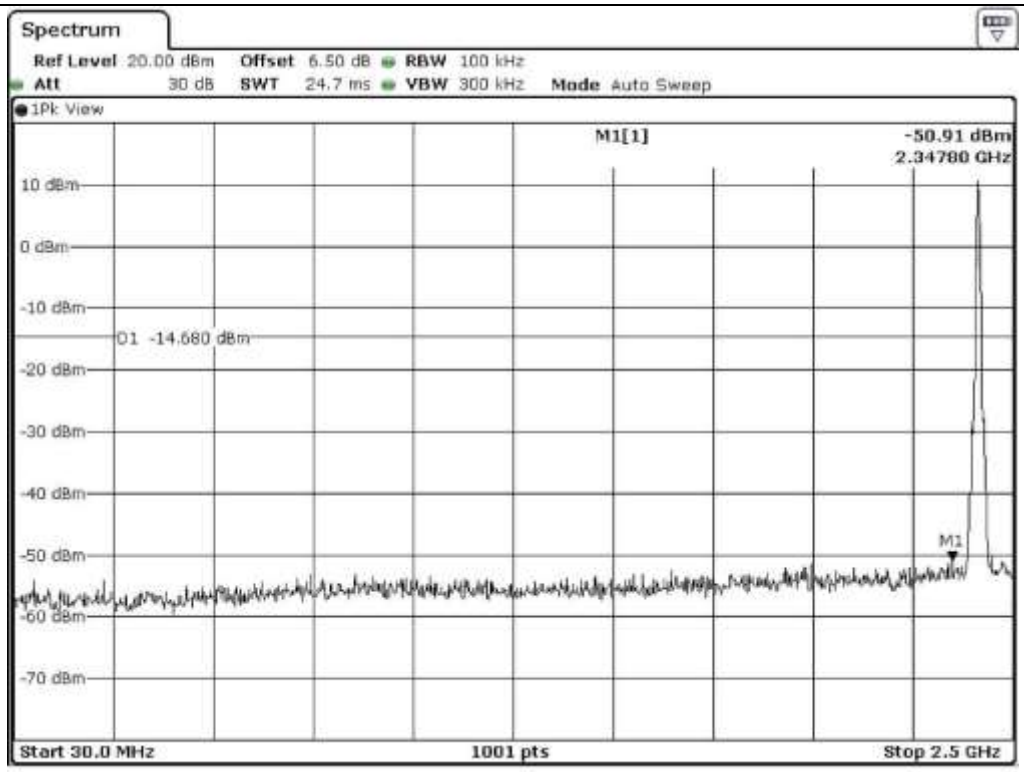
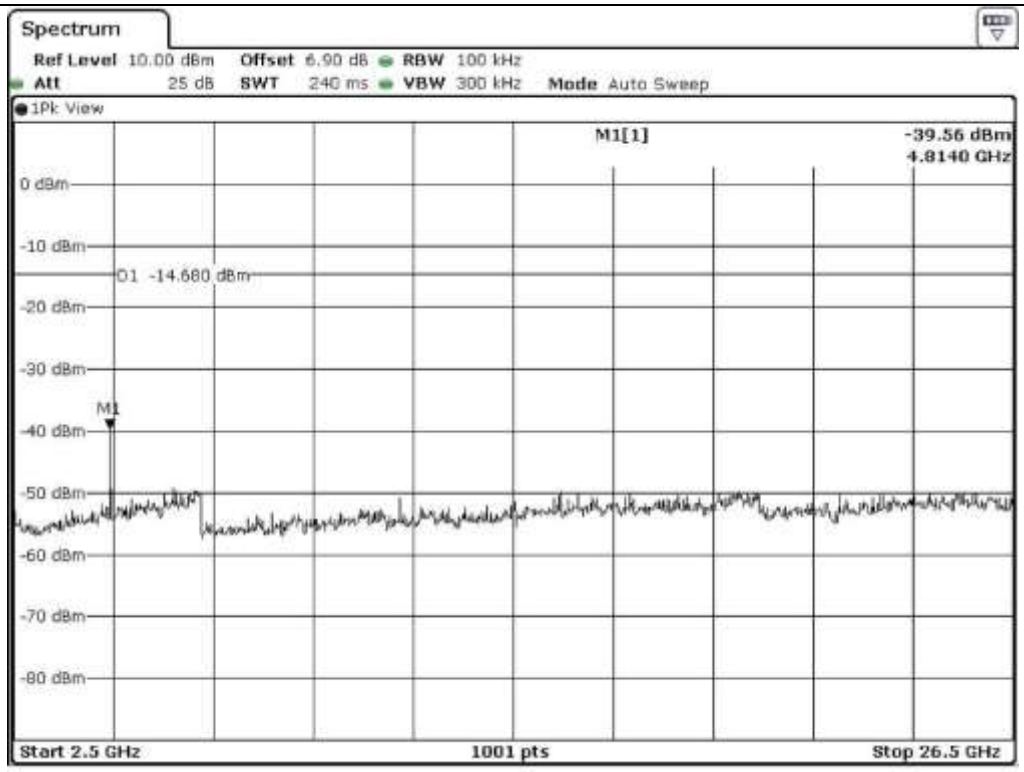
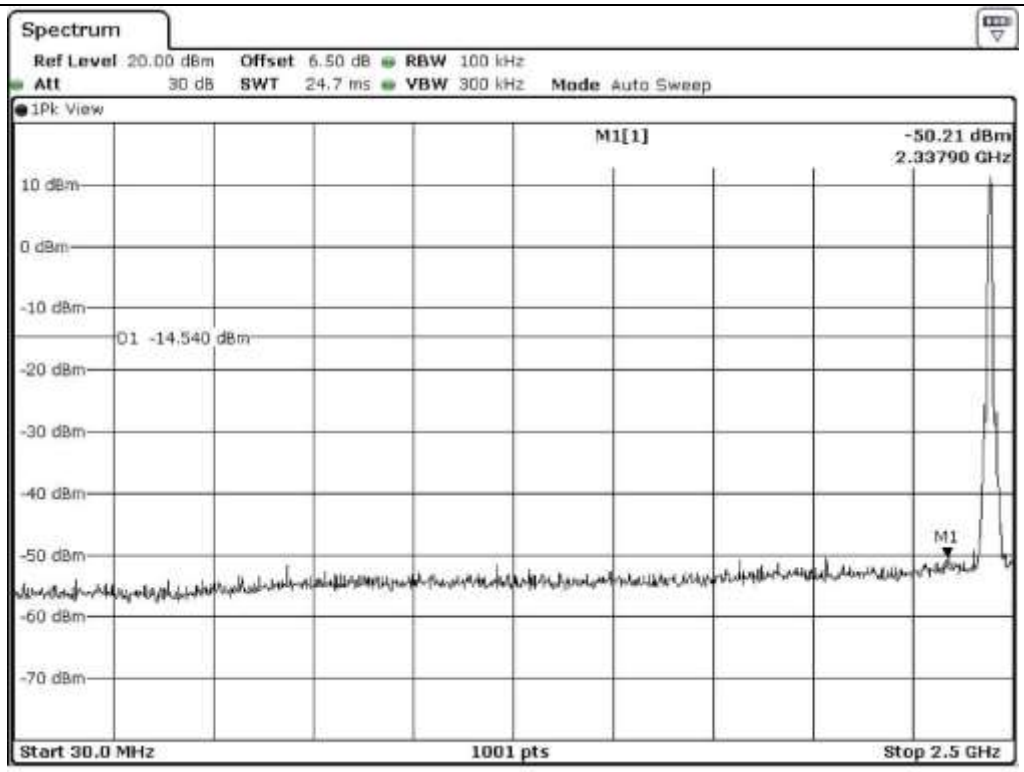


Low Channel

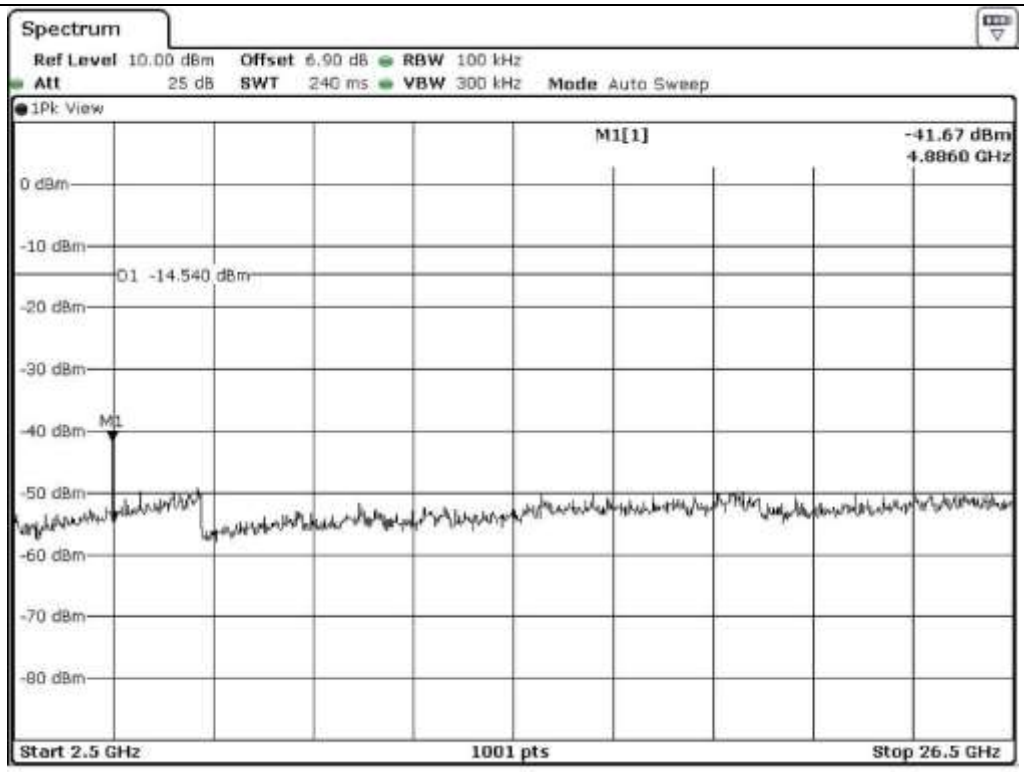


Low Channel

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

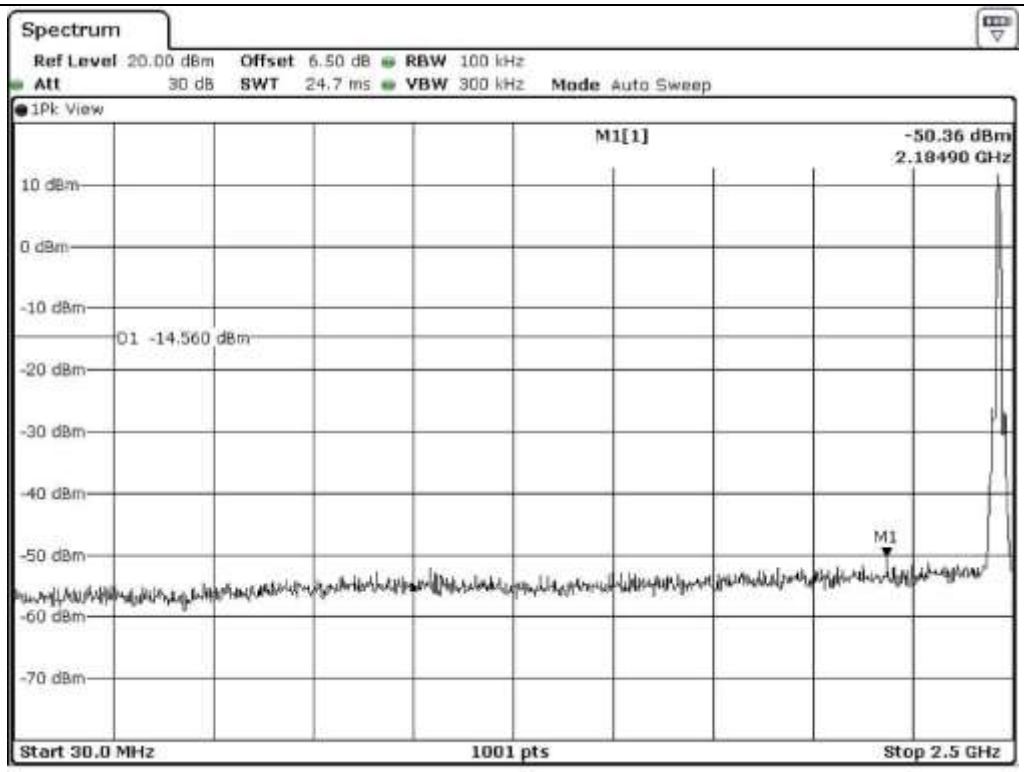


Middle Channel

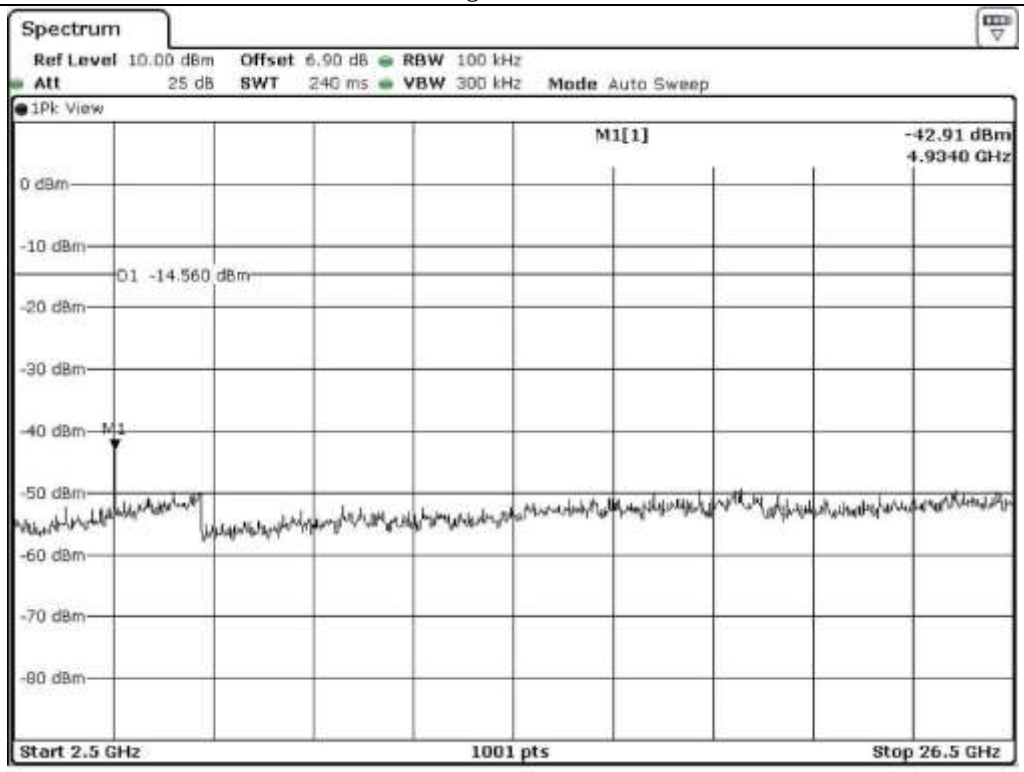


Middle Channel

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



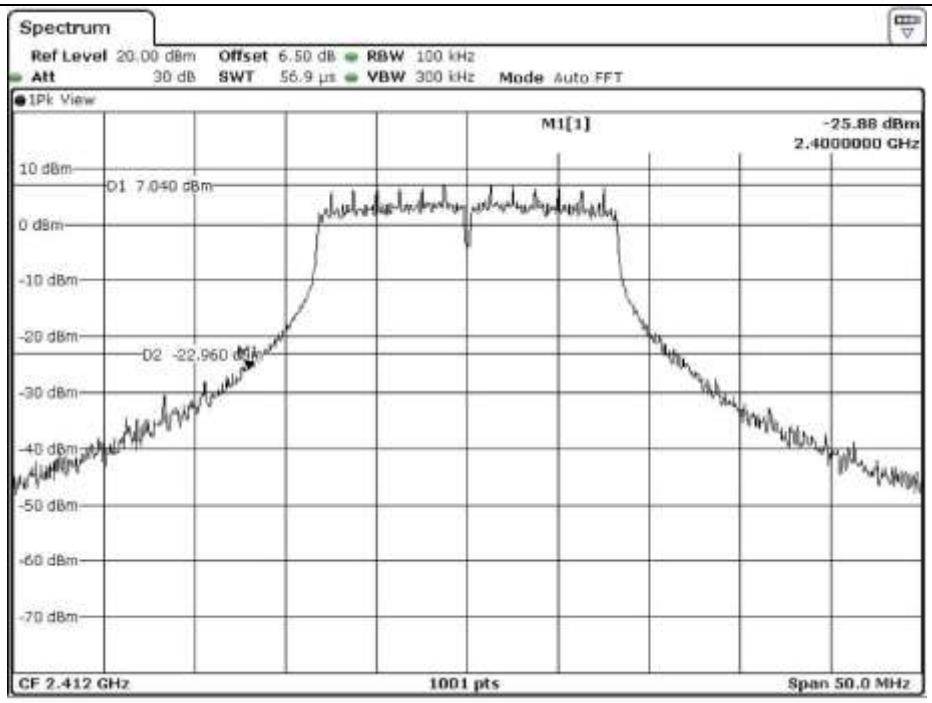
High Channel



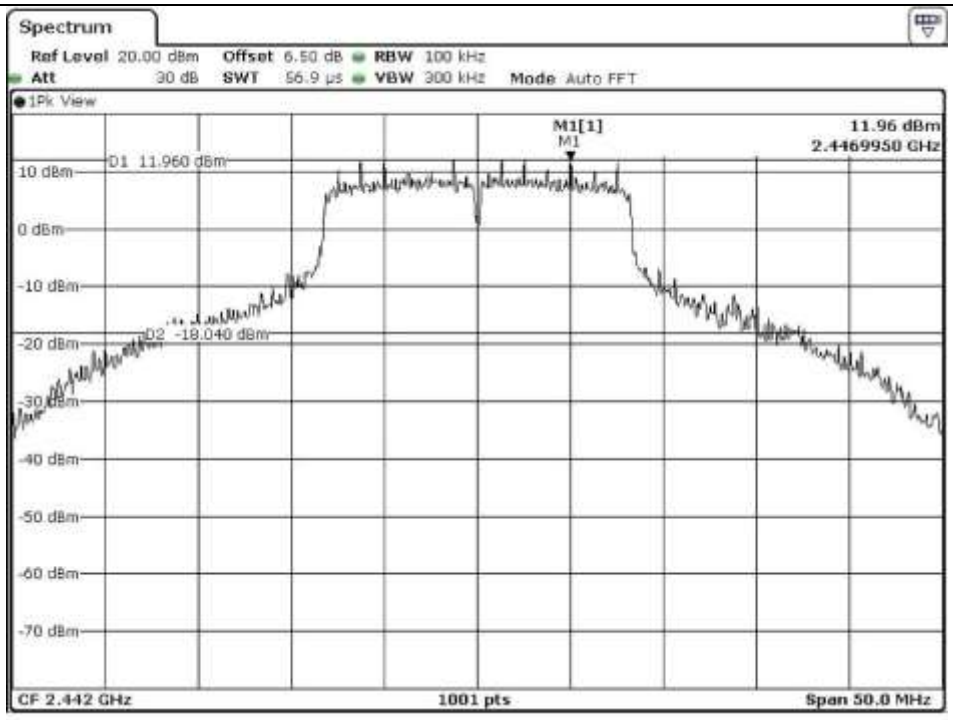
High Channel

9.5.2 Test data for 802.11g WLAN Mode

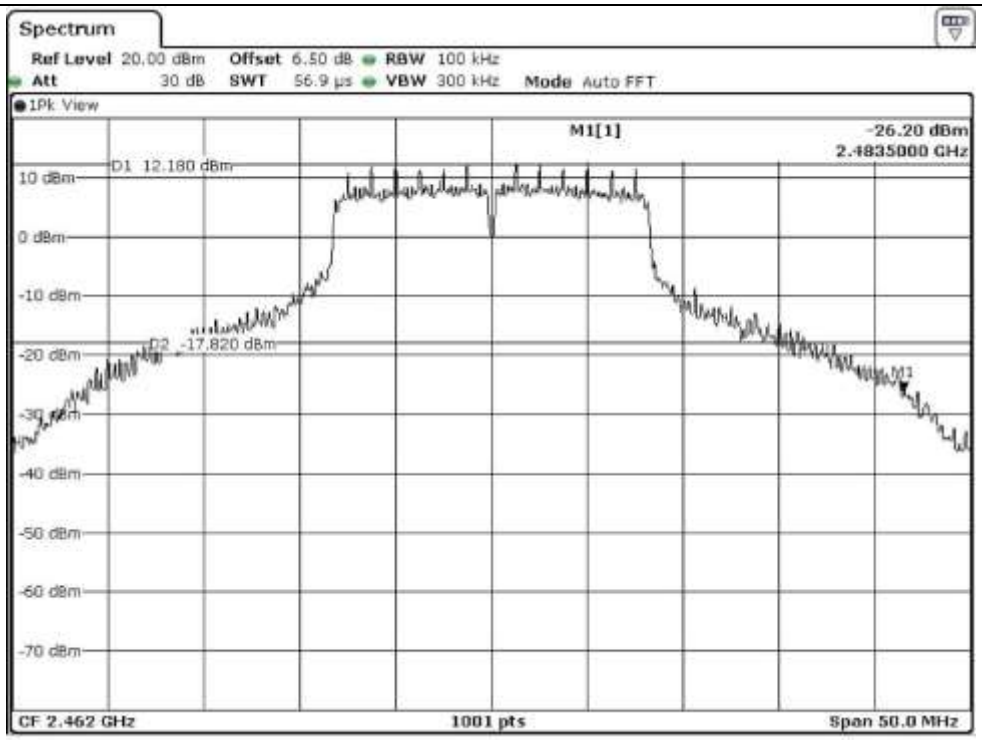
9.5.2.1 Test data for Antenna 0



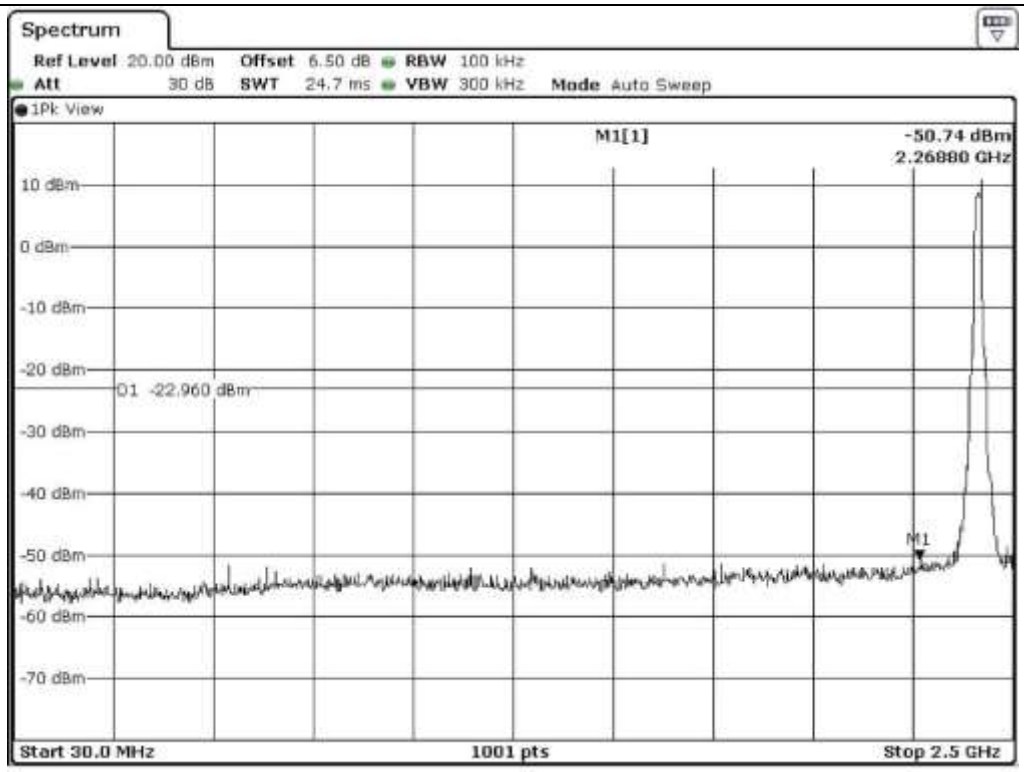
Low Channel



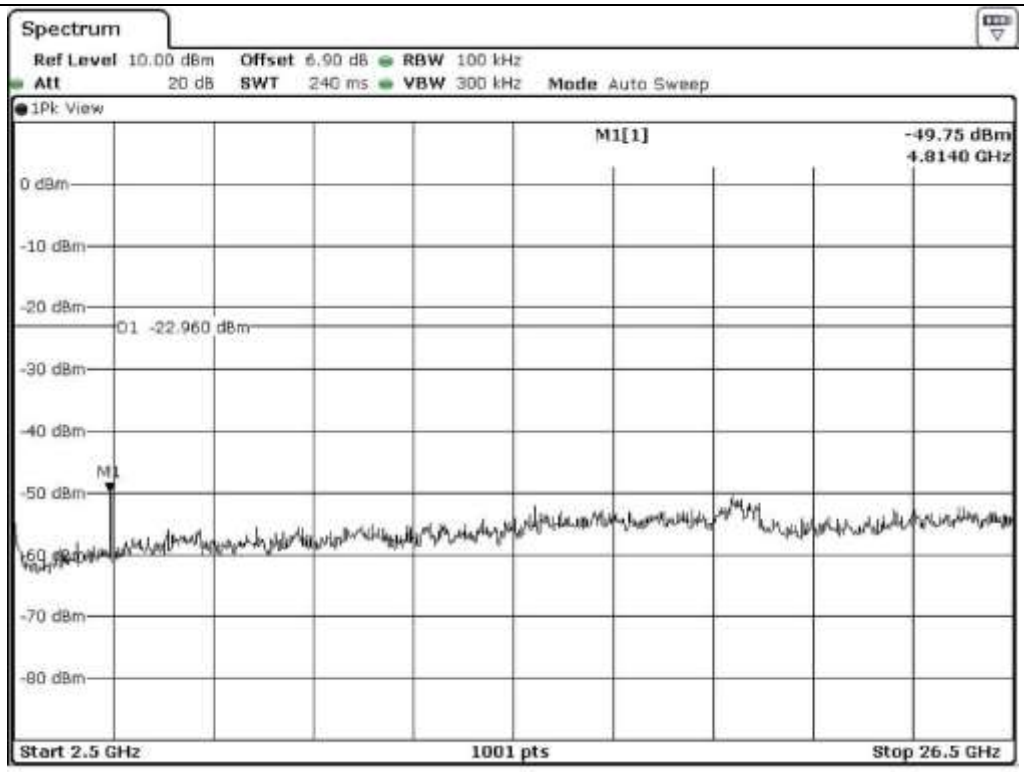
Middle Channel



High Channel



Low Channel



Low Channel

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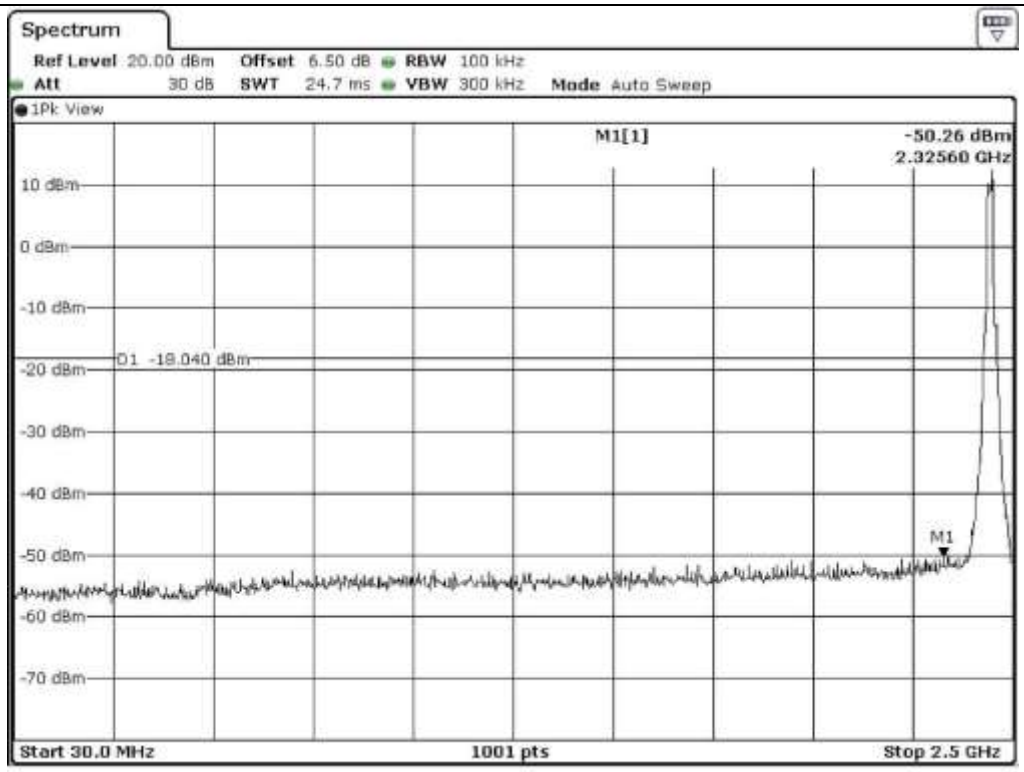
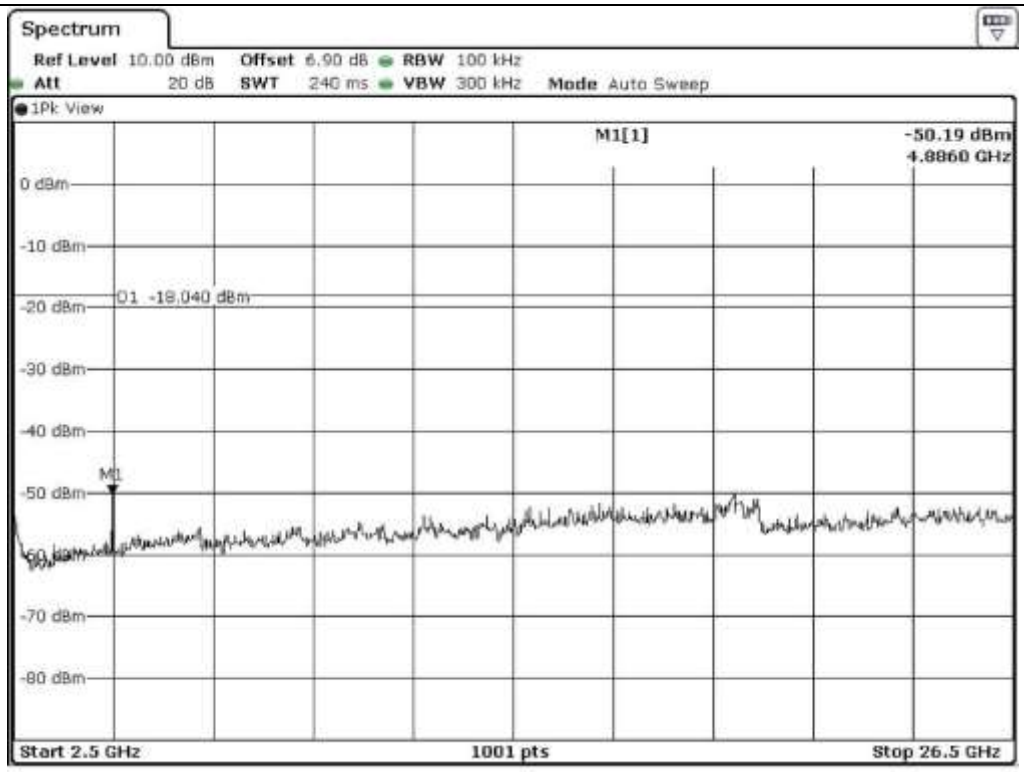
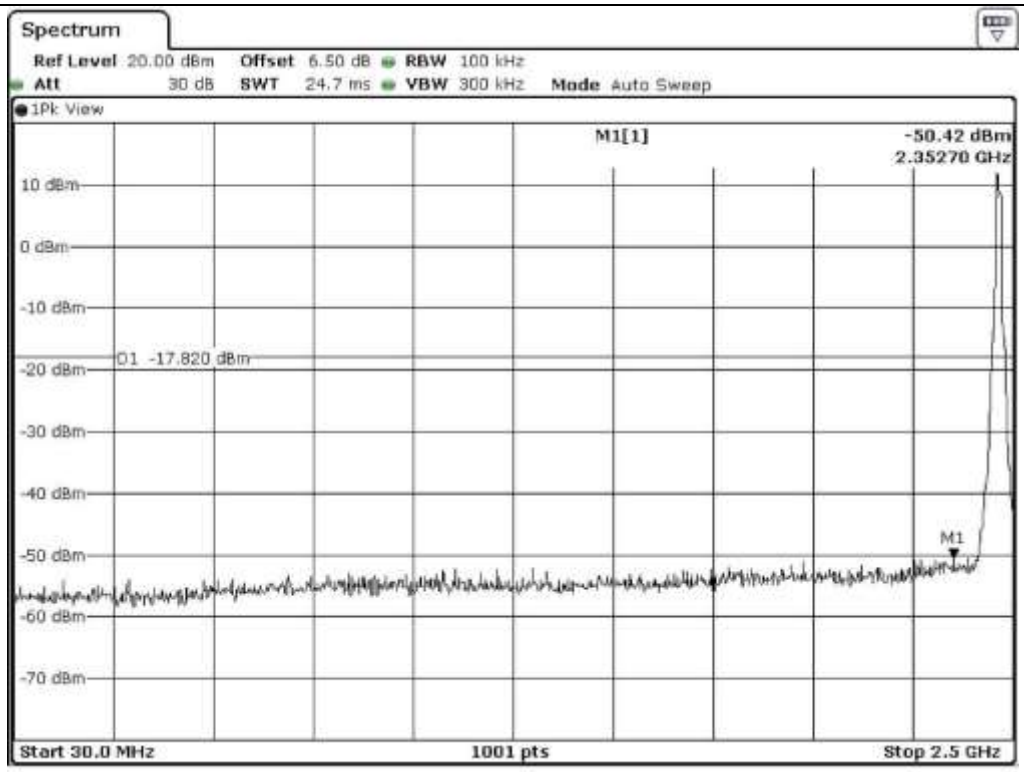


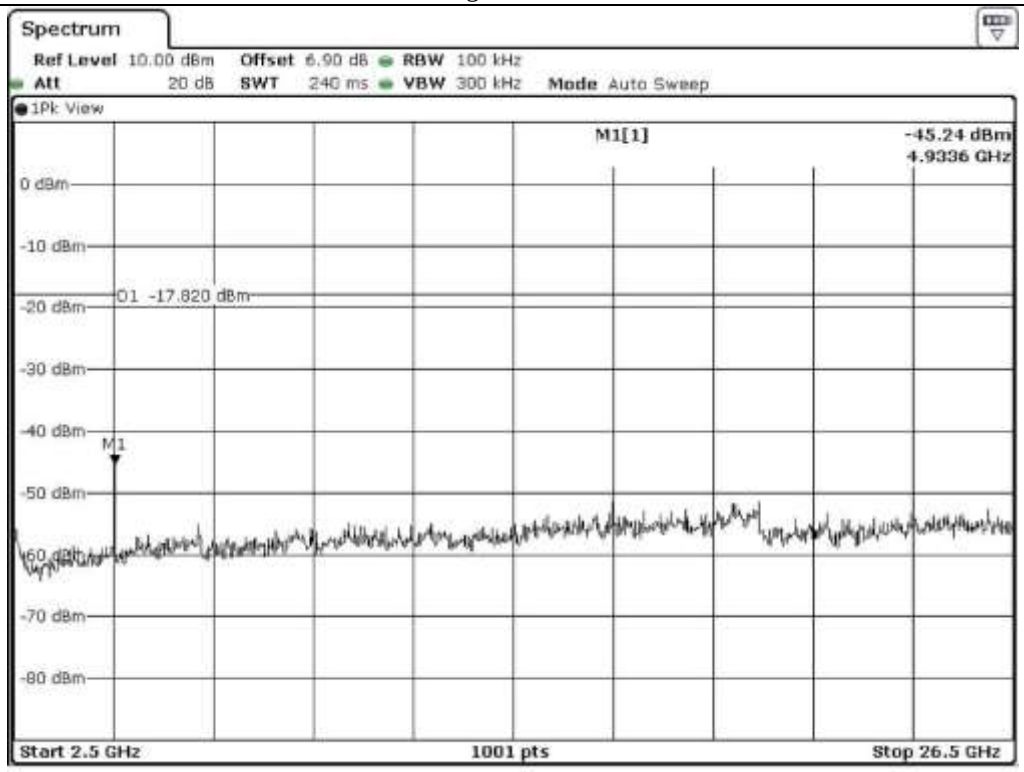
Middle Channel



Middle Channel

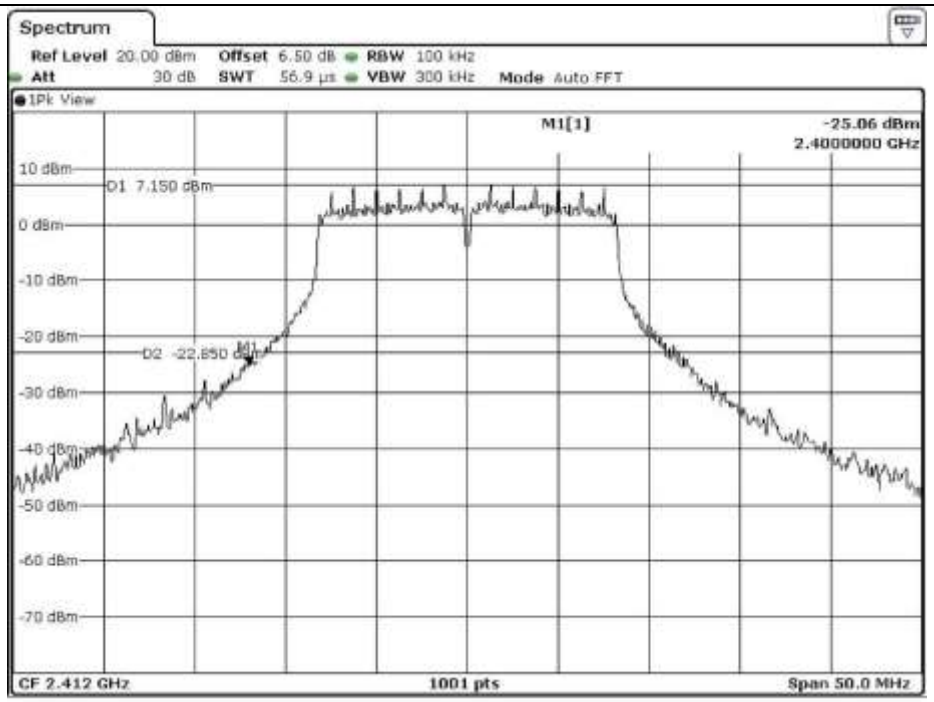


High Channel

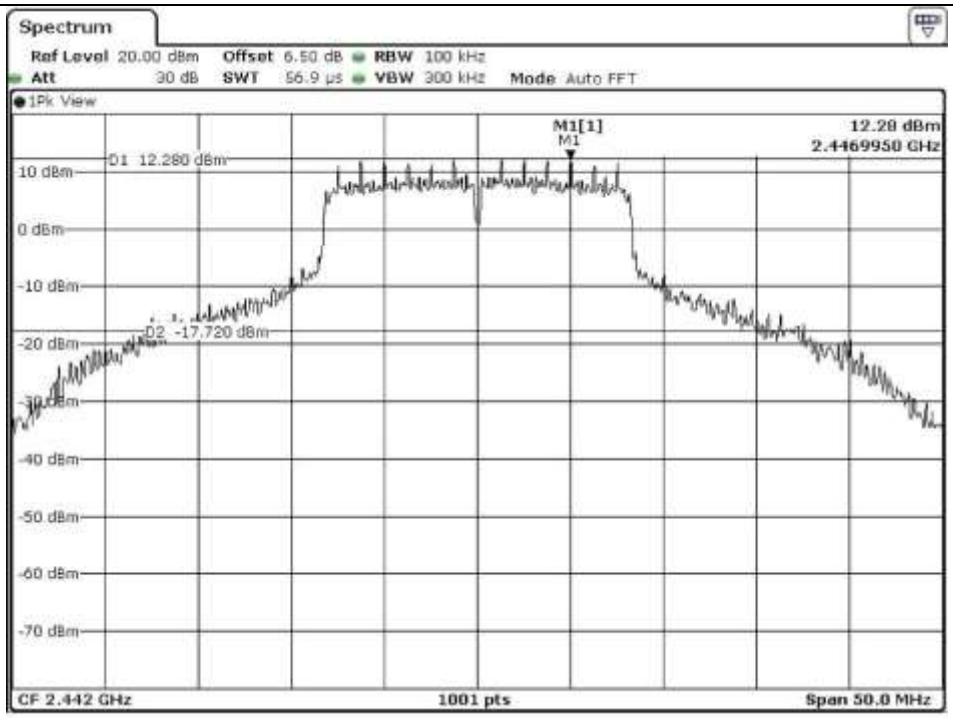


High Channel

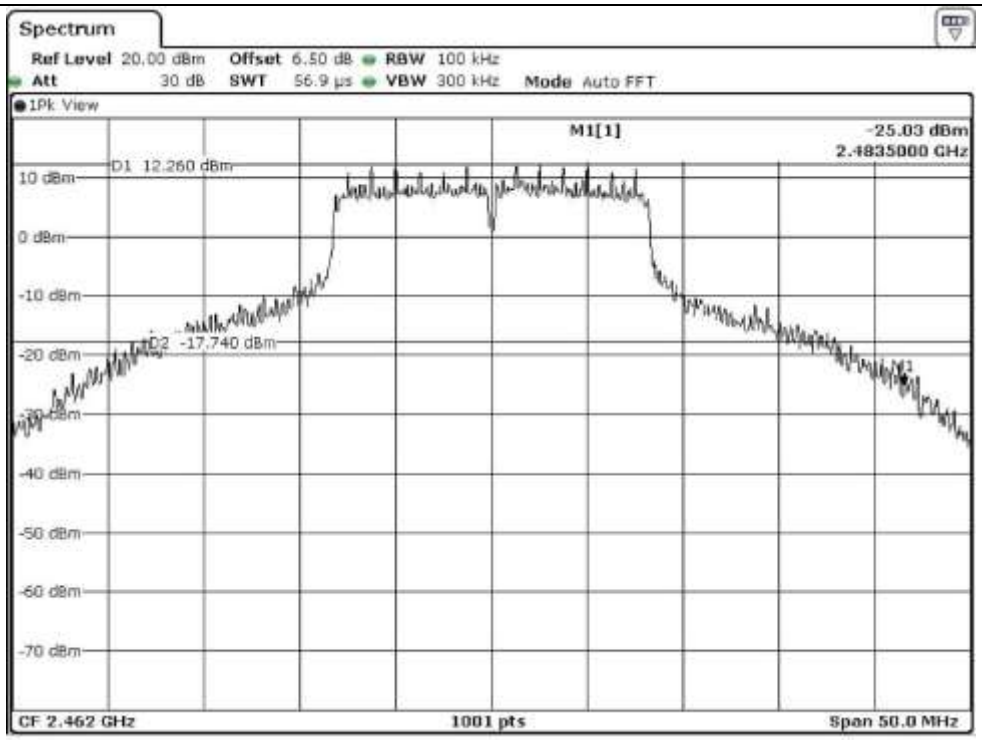
9.5.2.2 Test data for Antenna 1



Low Channel



Middle Channel



High Channel

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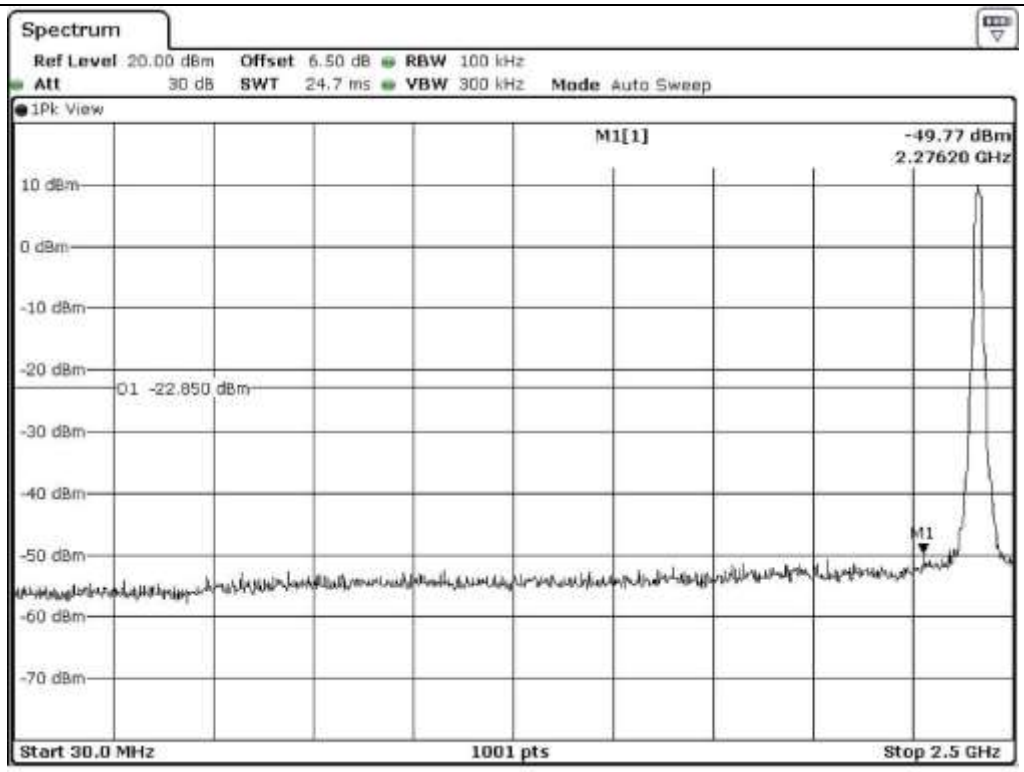
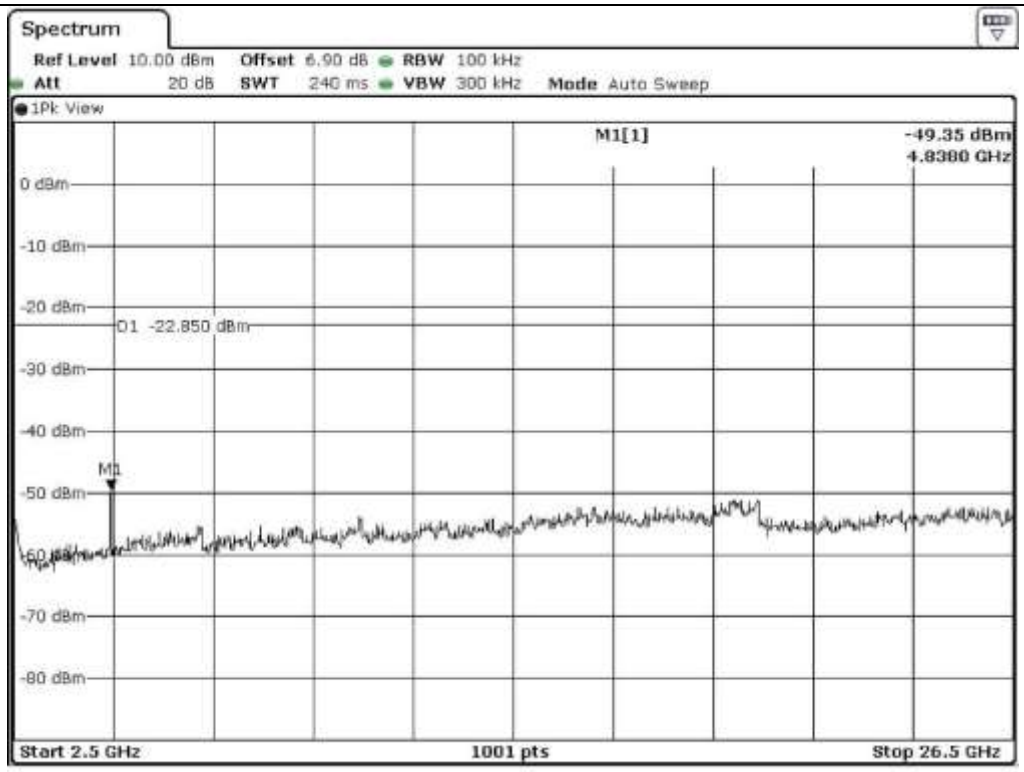


Low Channel



Low Channel

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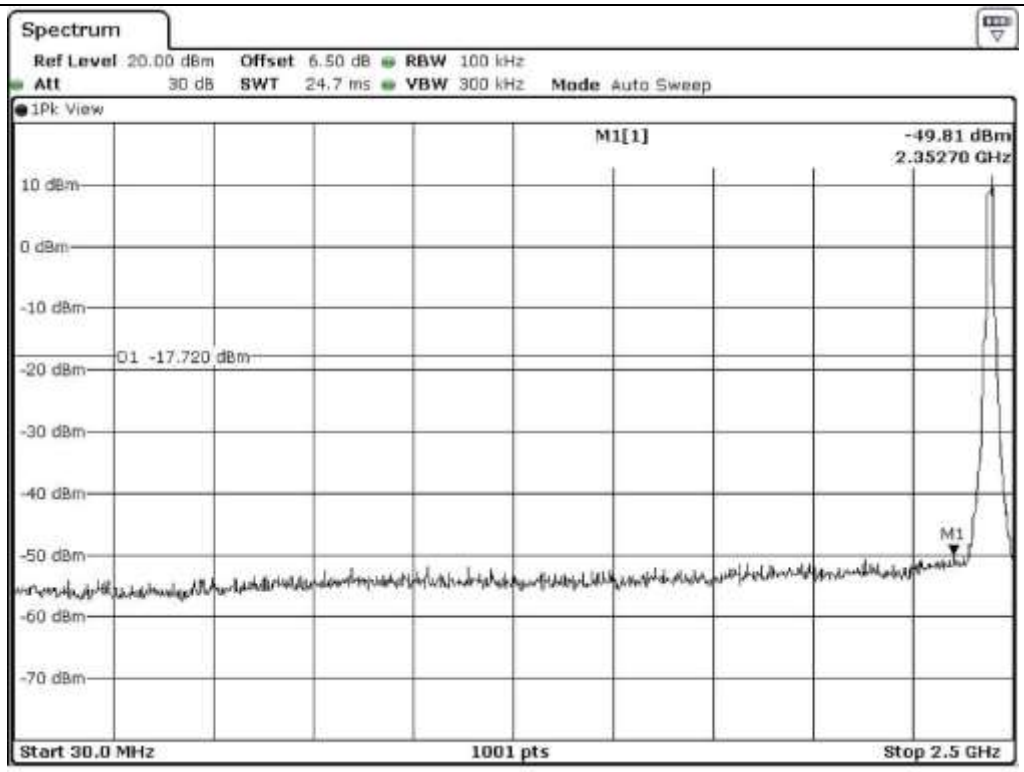
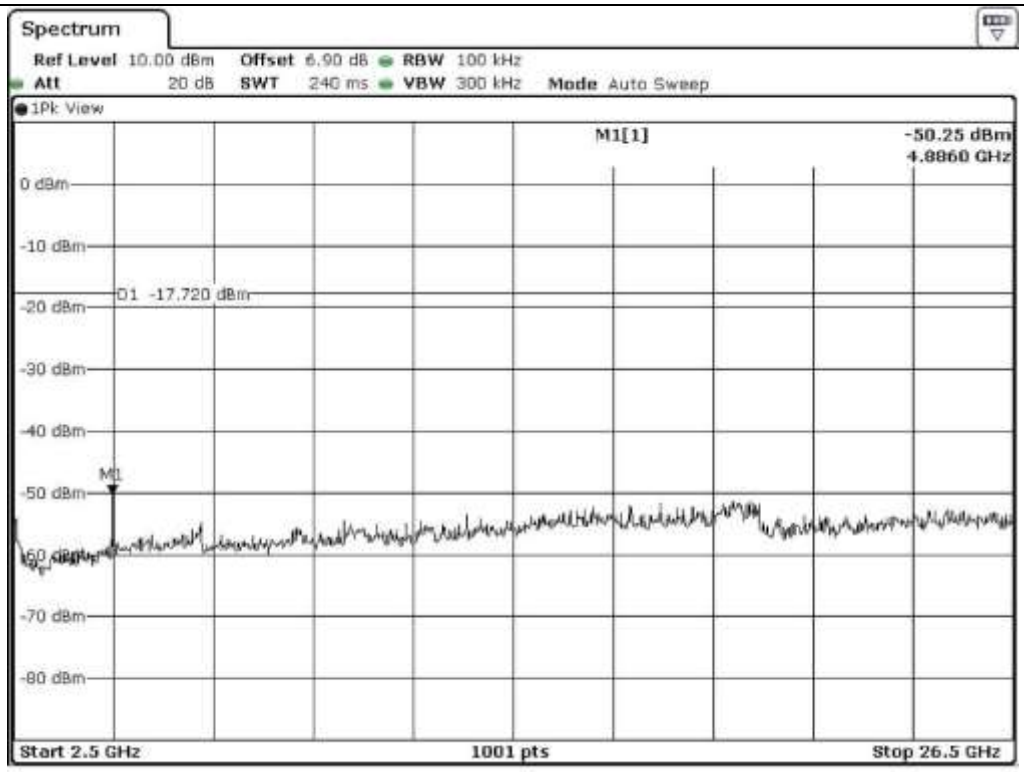
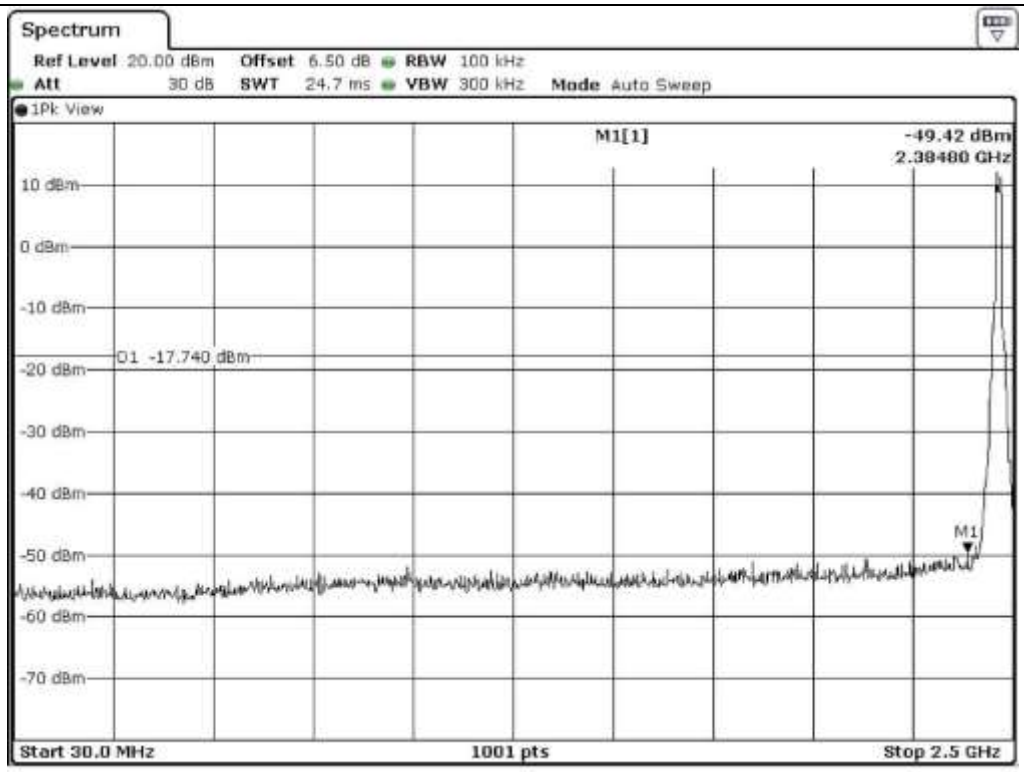


Middle Channel

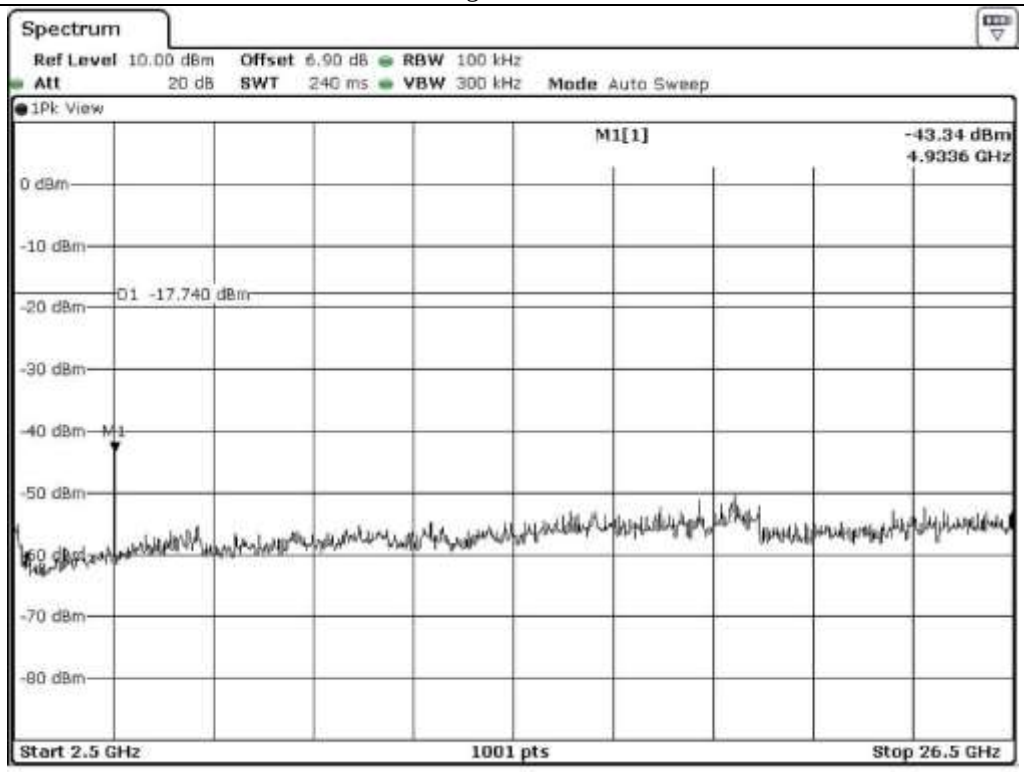


Middle Channel

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

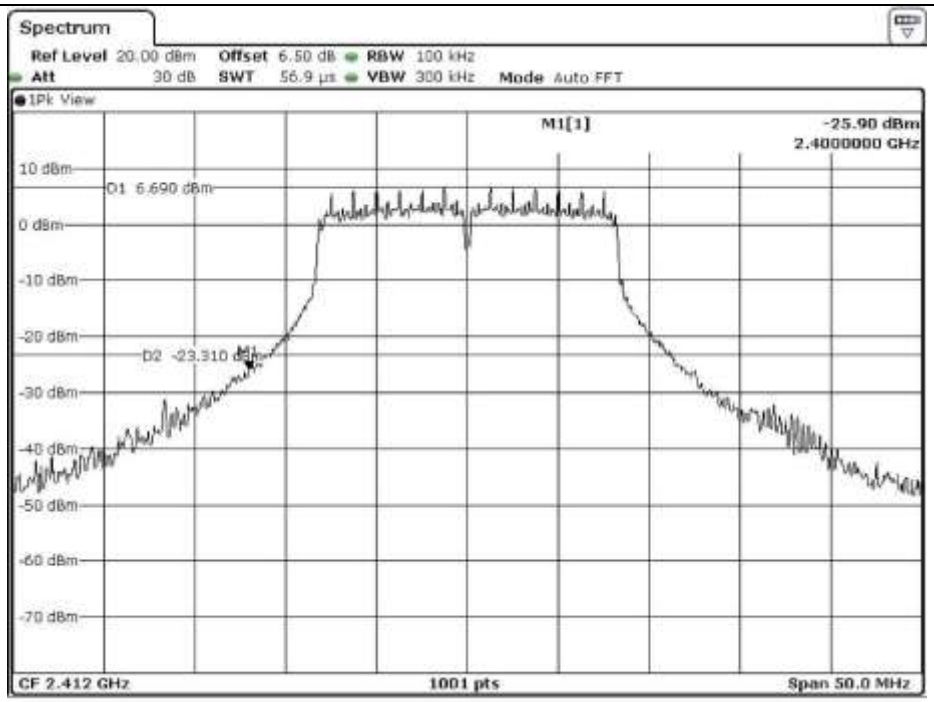


High Channel

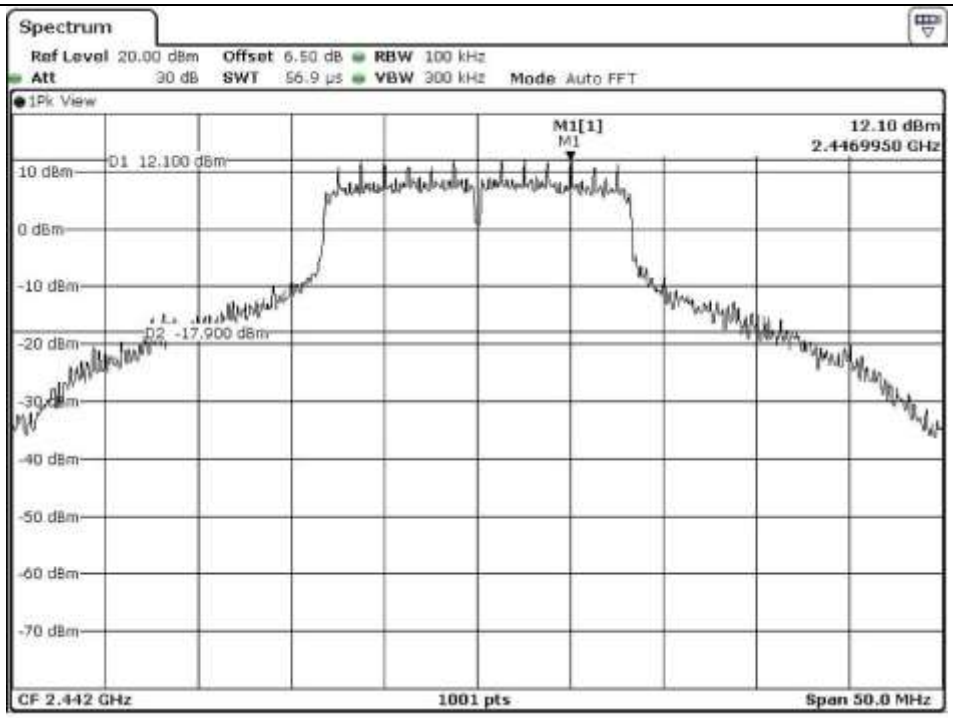


High Channel

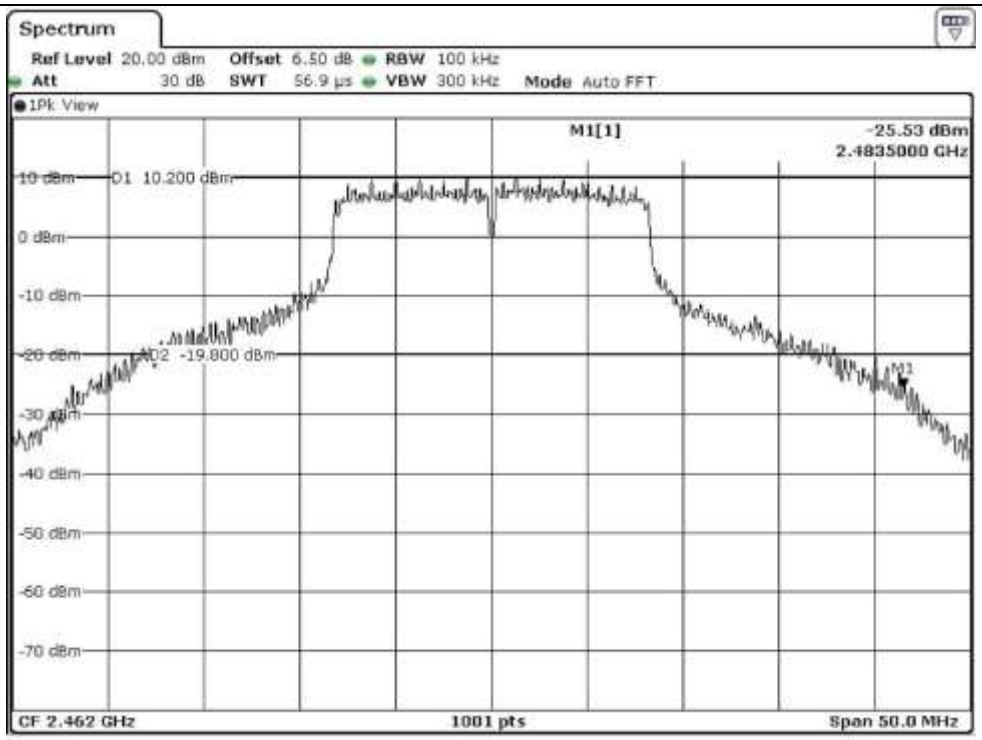
9.5.2.3 Test data for Antenna 2



Low Channel

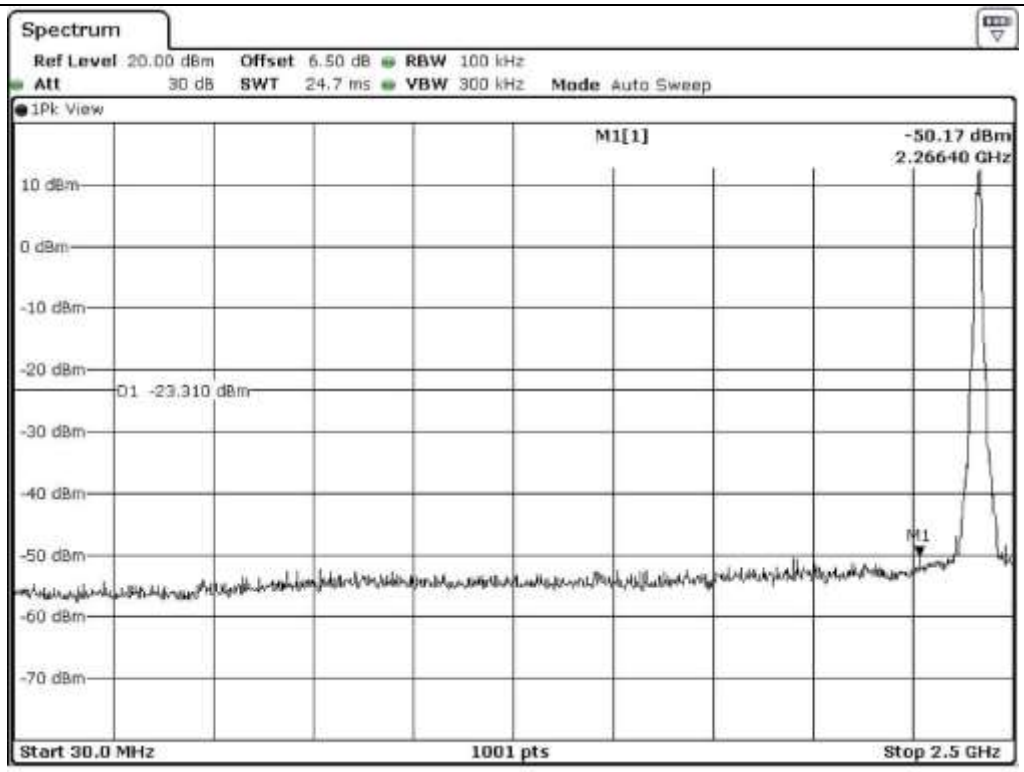


Middle Channel

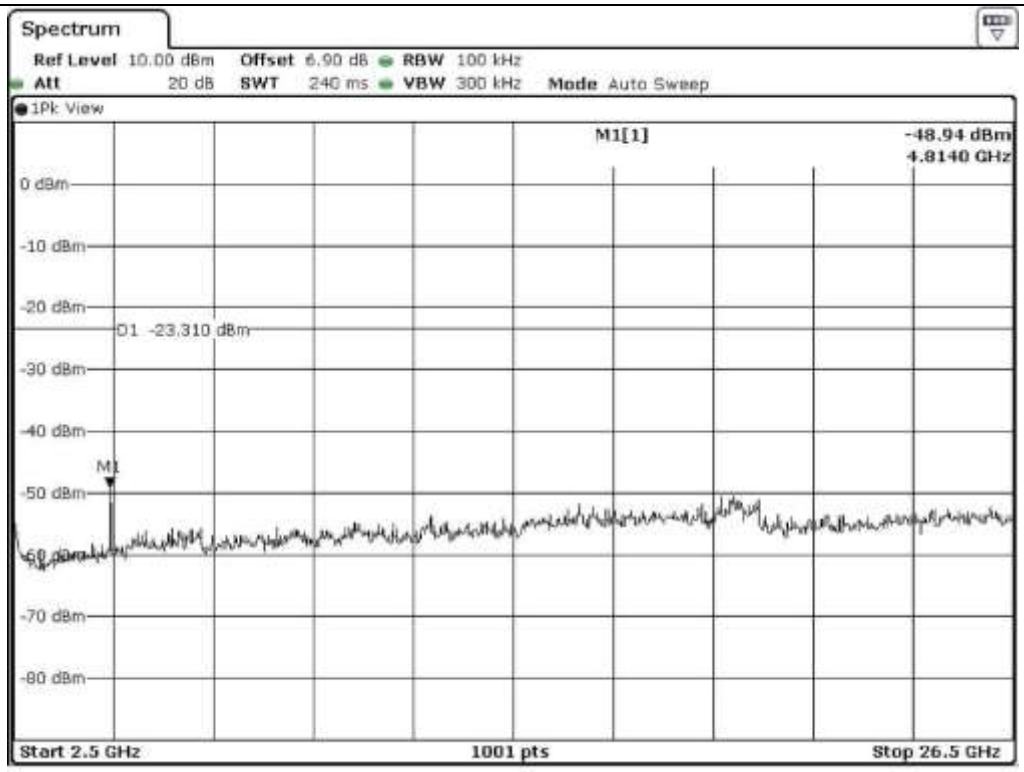


High Channel

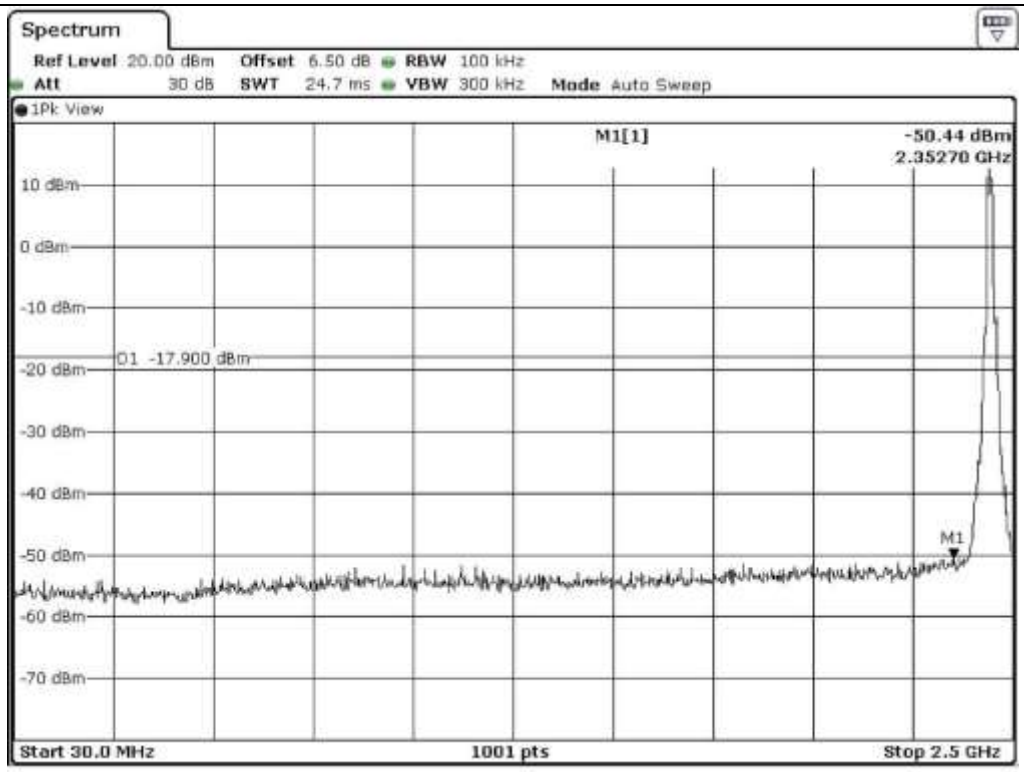
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



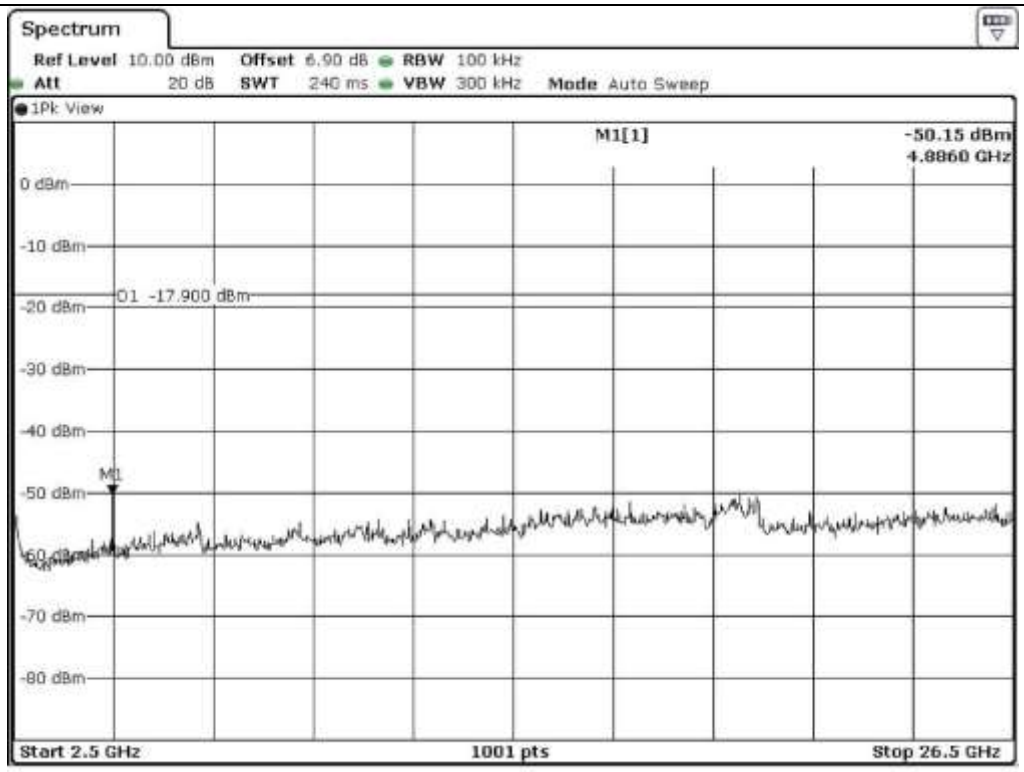
Low Channel



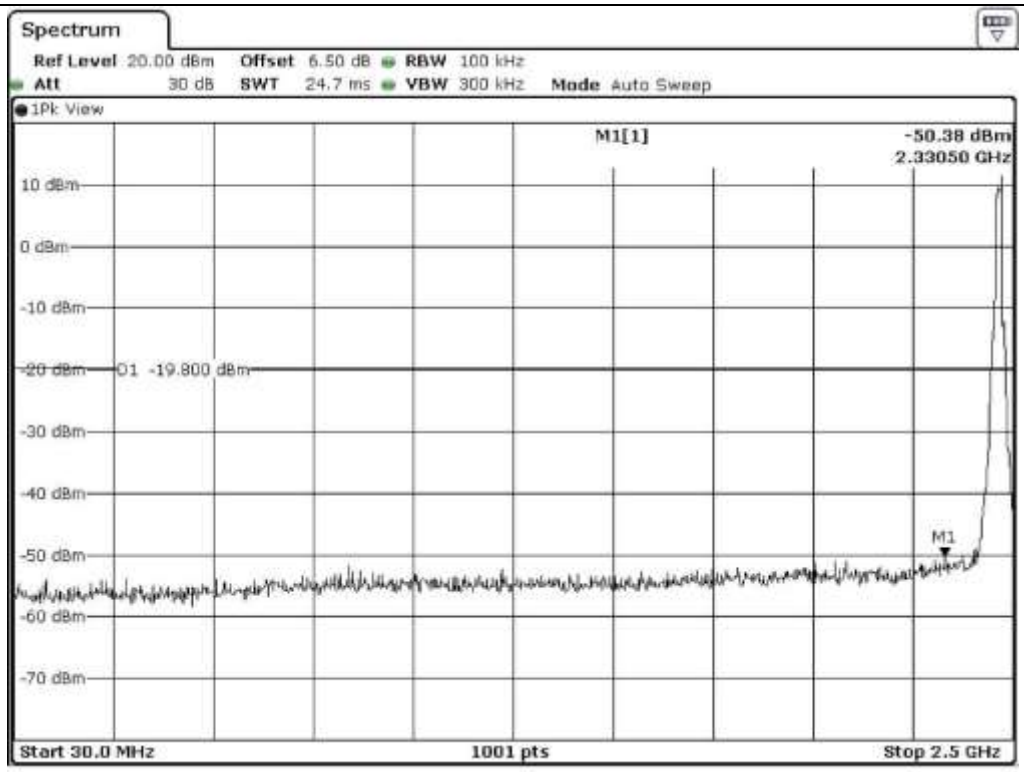
Low Channel



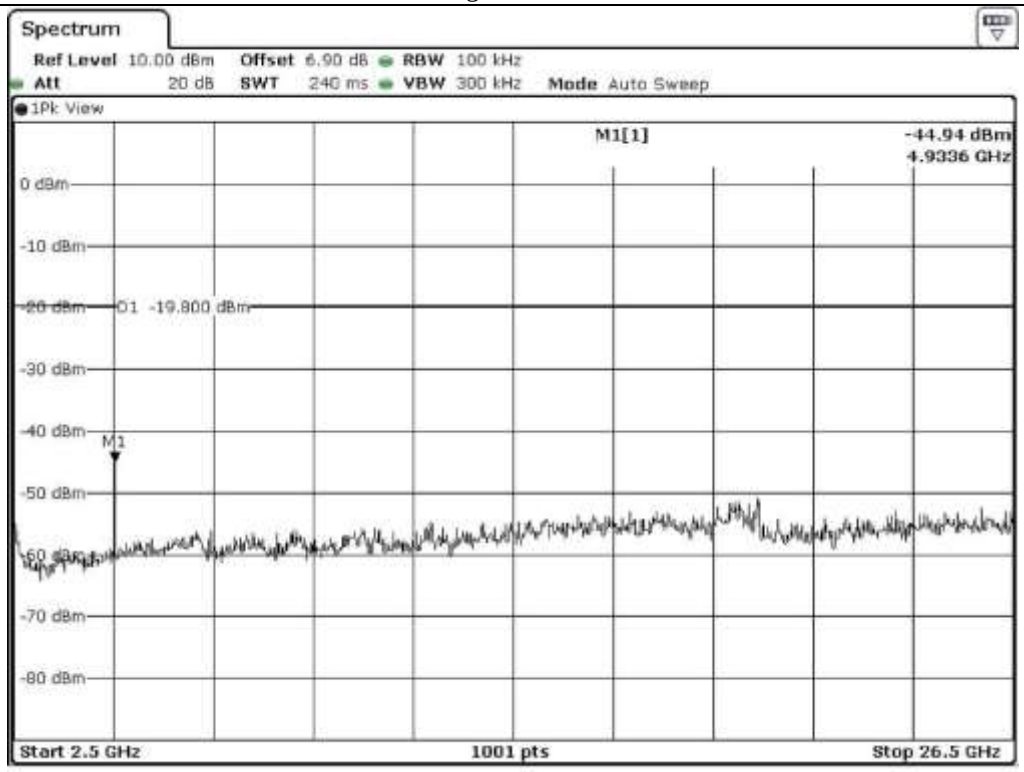
Middle Channel



Middle Channel



High Channel

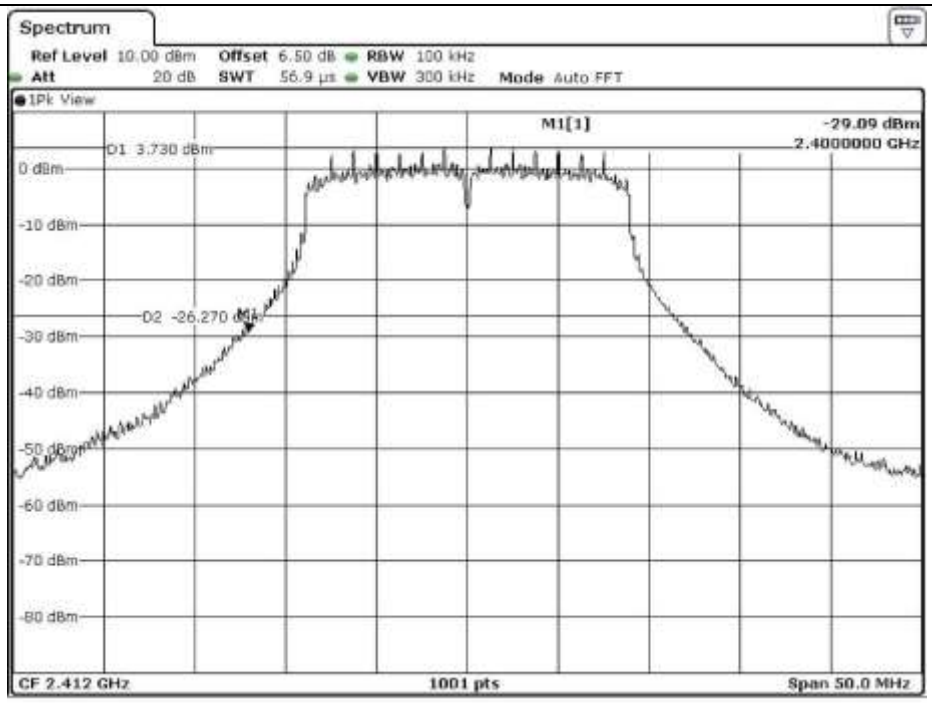


High Channel

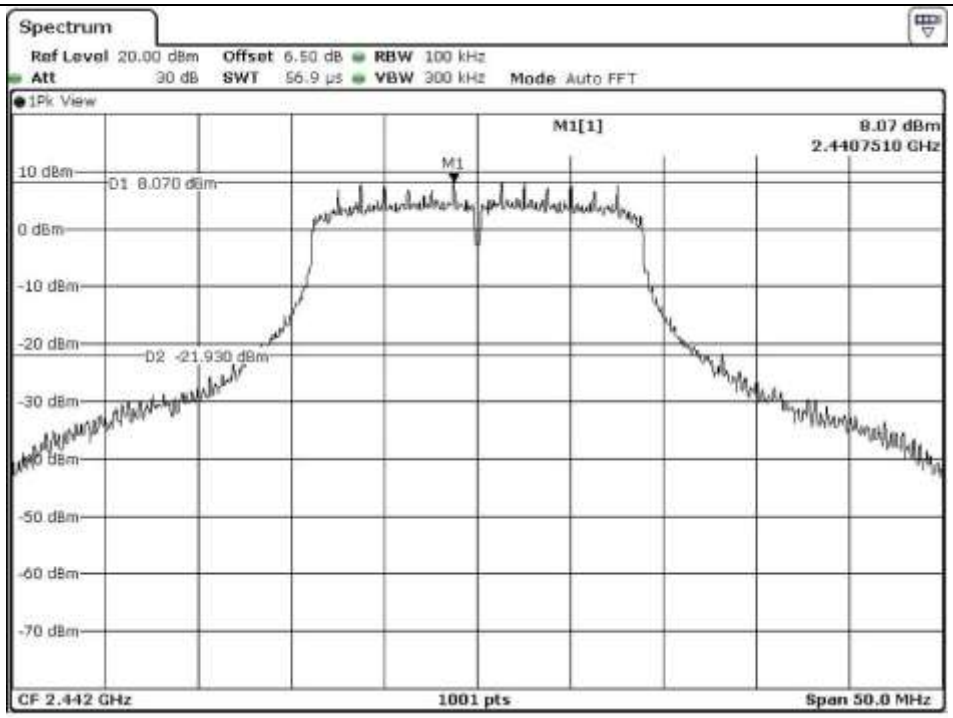
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.5.3 Test data for 802.11n_HT20 WLAN Mode

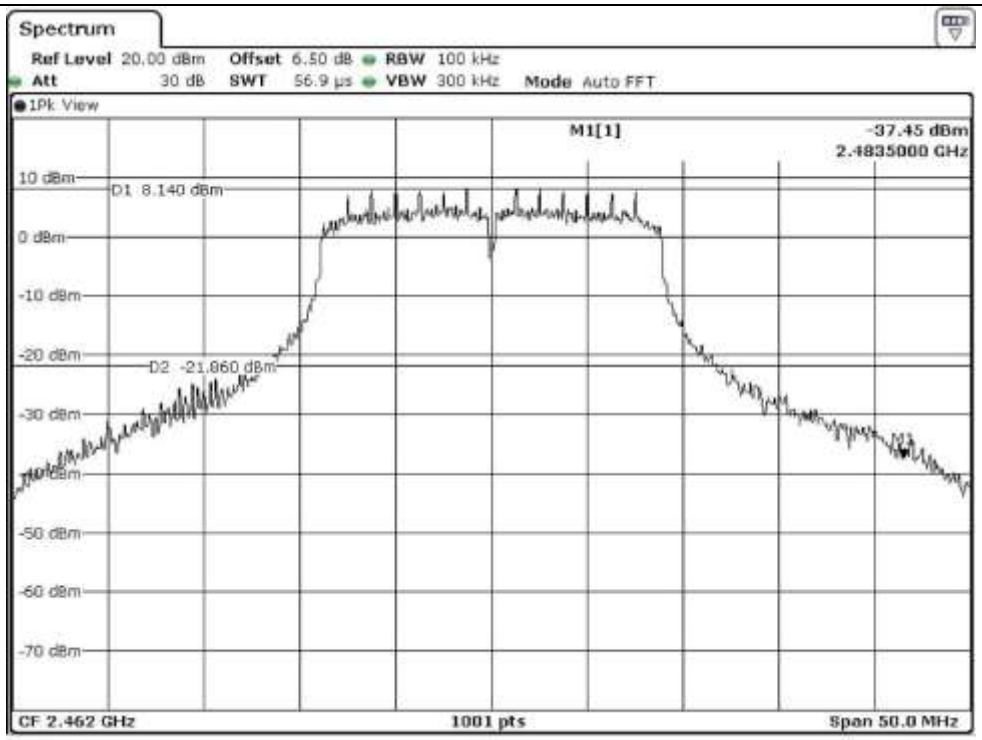
9.5.3.1 Test data for Antenna 0



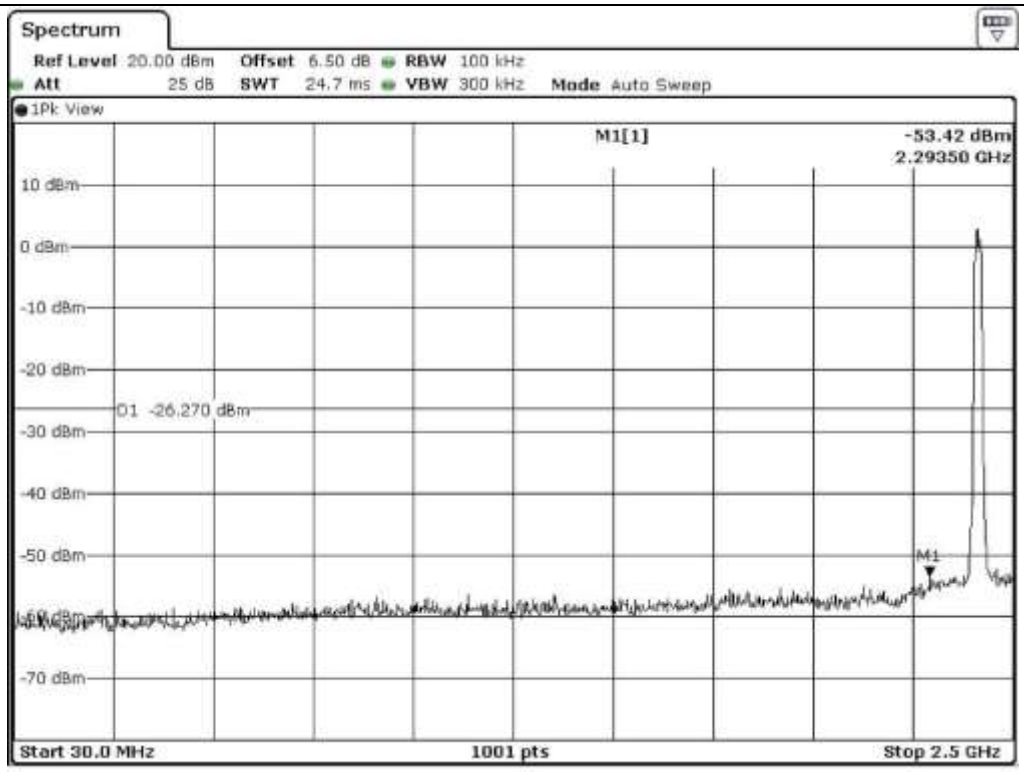
Low Channel



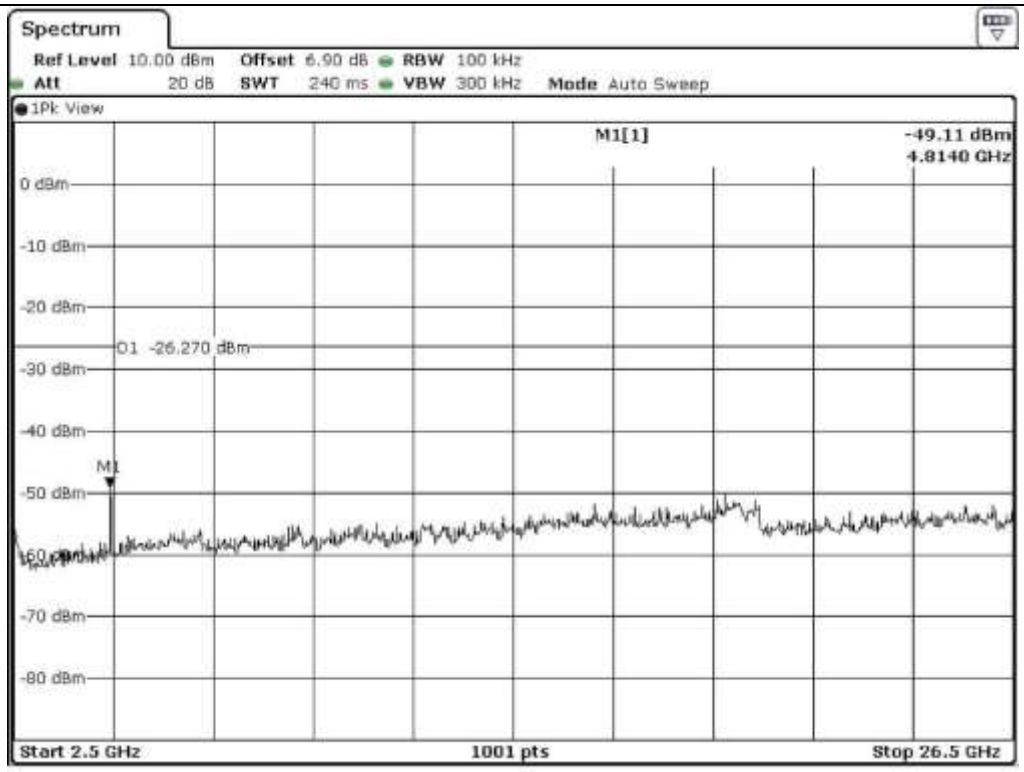
Middle Channel



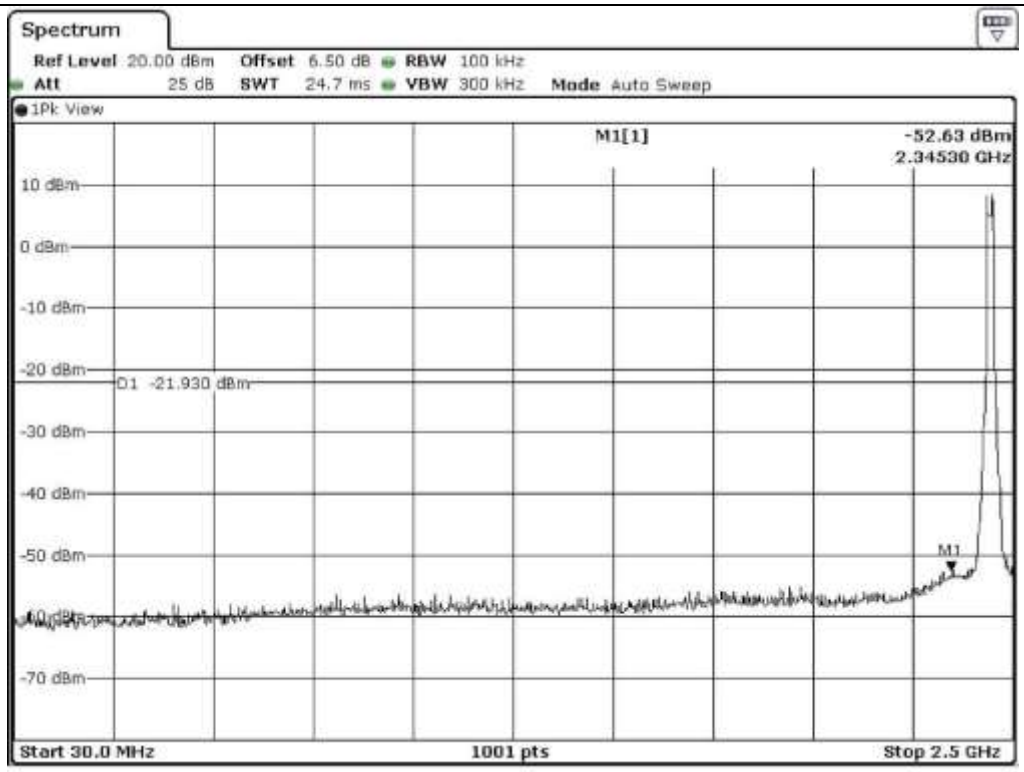
High Channel



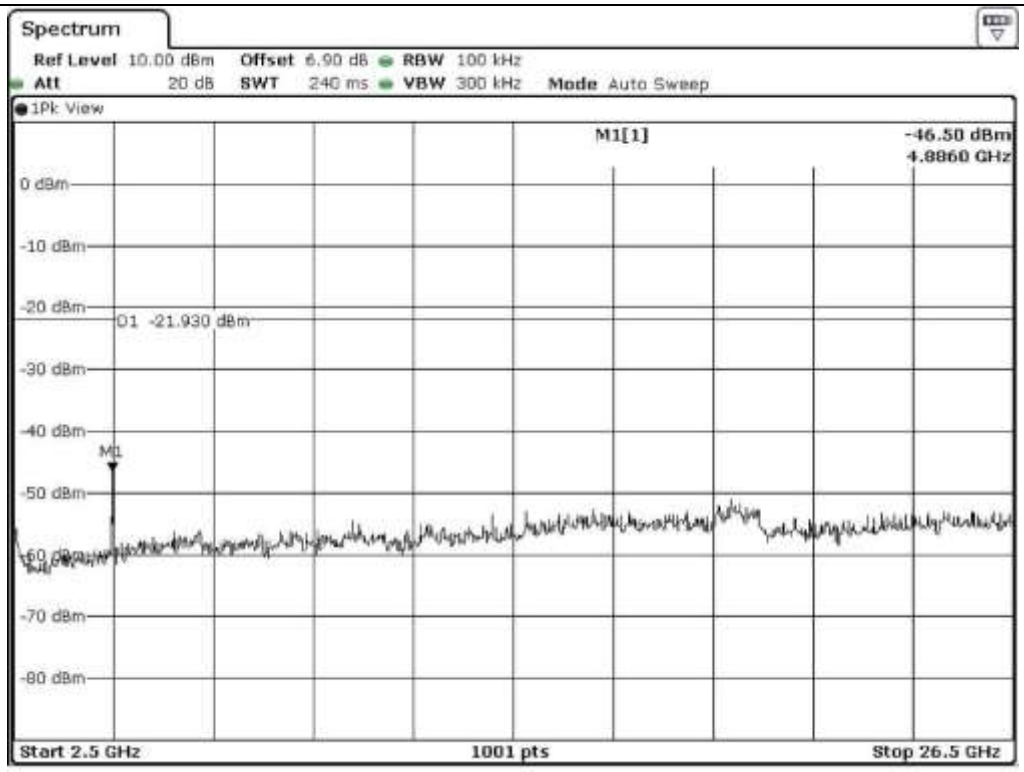
Low Channel



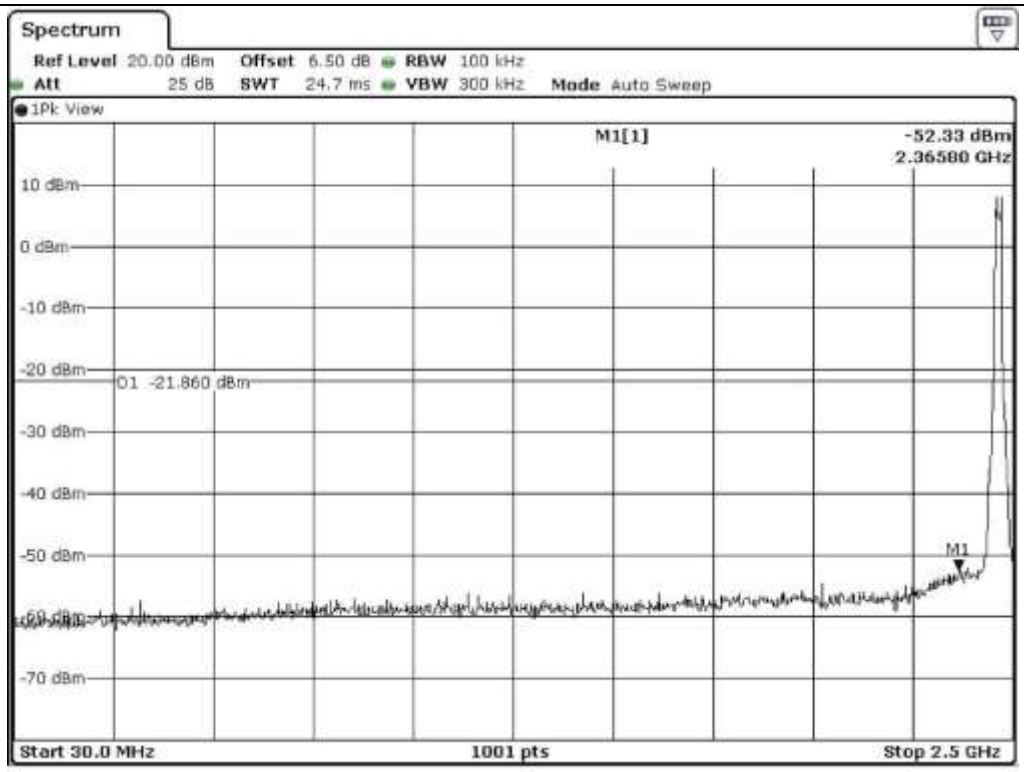
Low Channel



Middle Channel



Middle Channel



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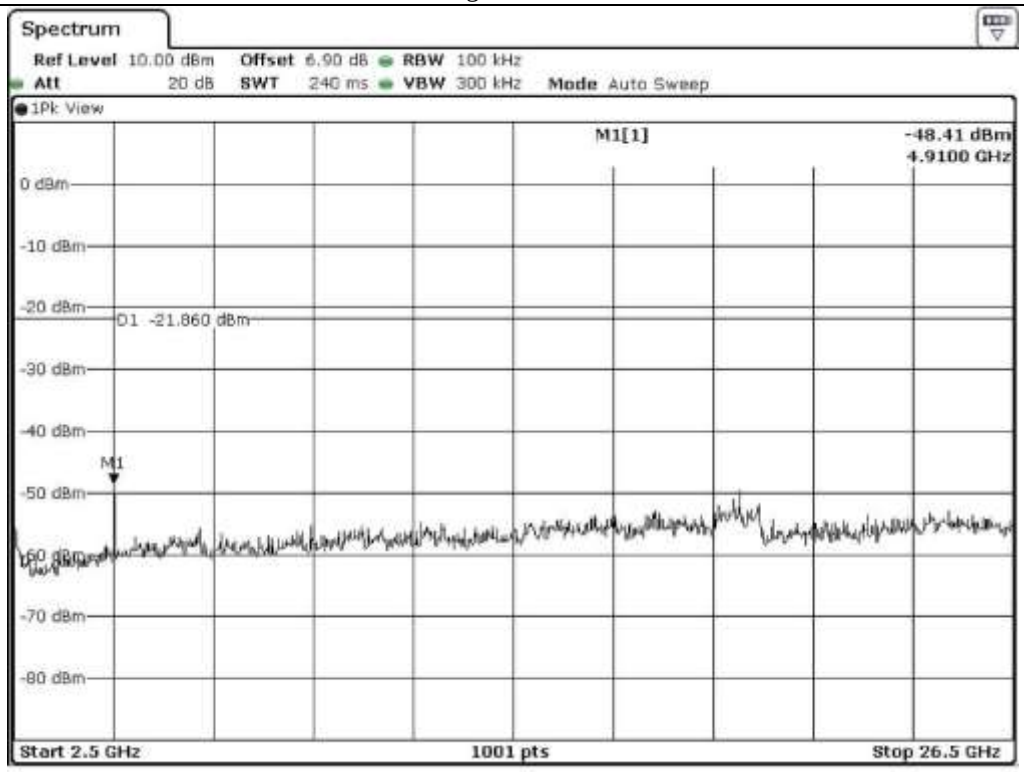

High Channel

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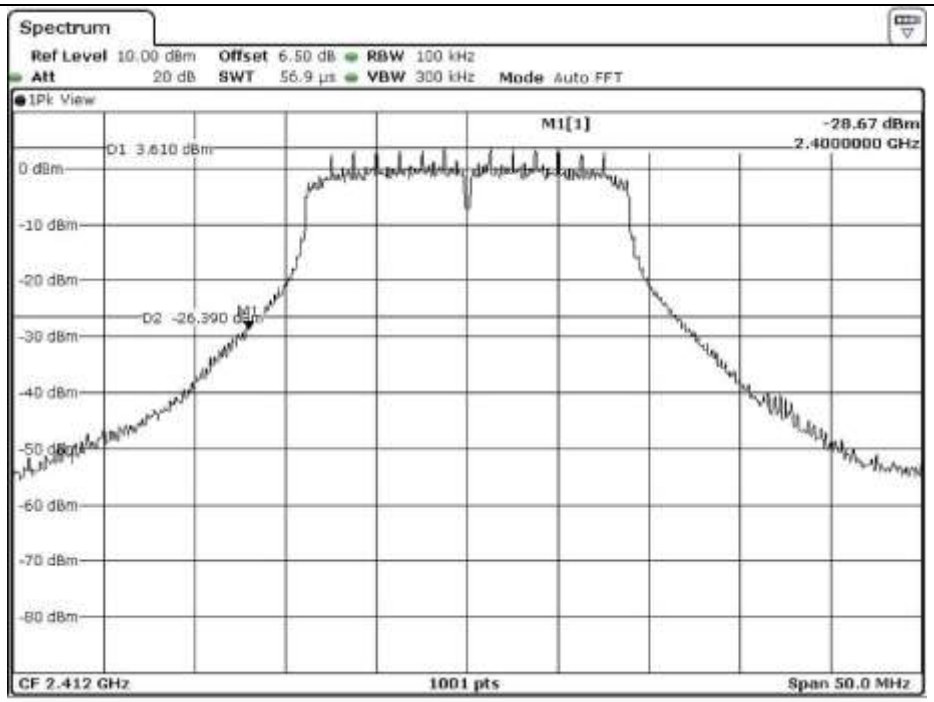
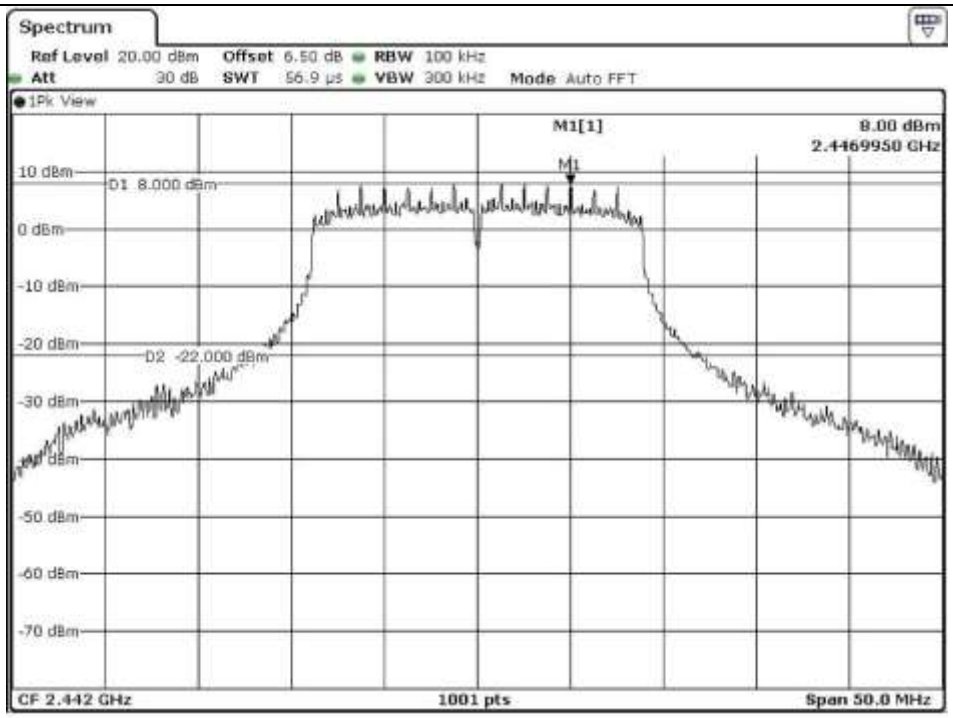
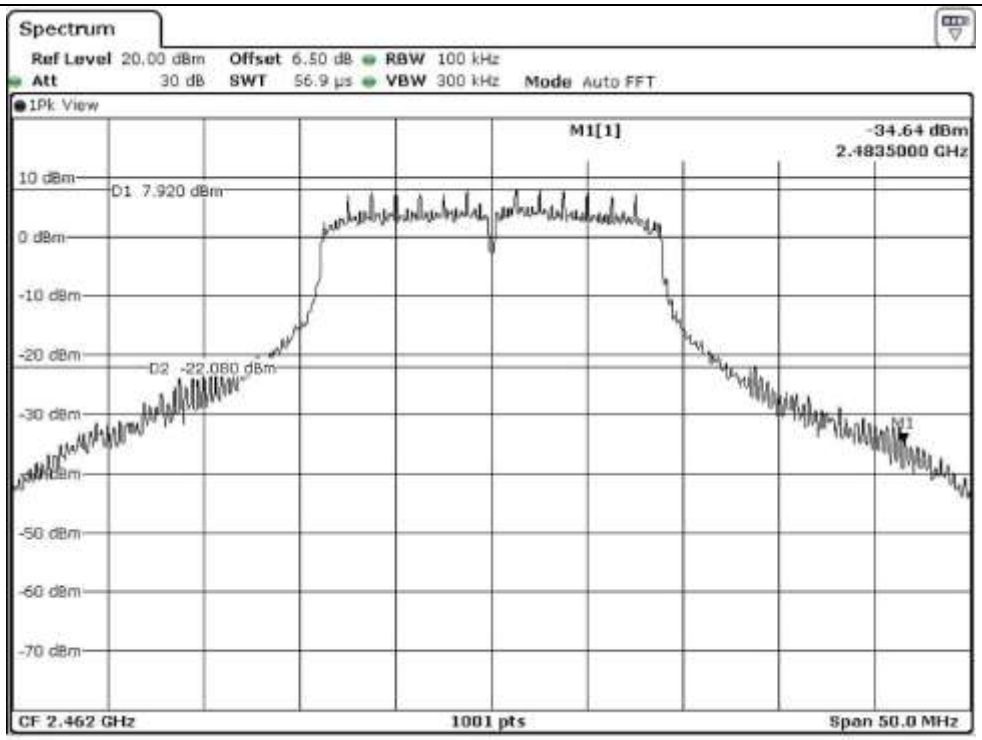
9.5.3.2 Test data for Antenna 1



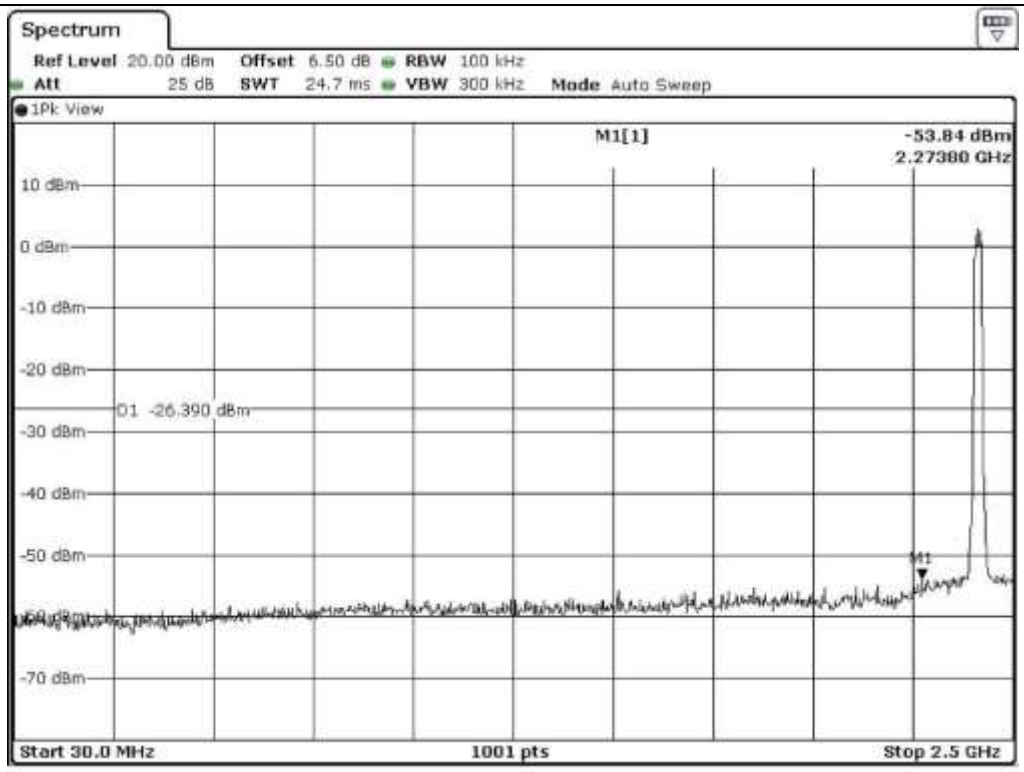
Low Channel



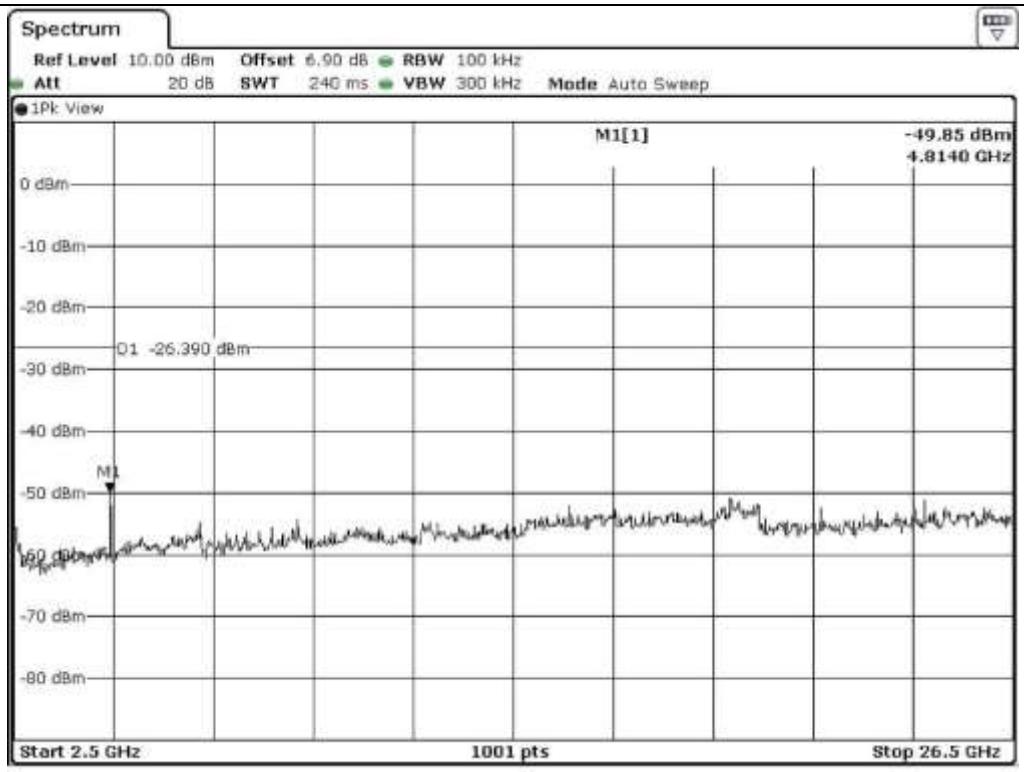
Middle Channel



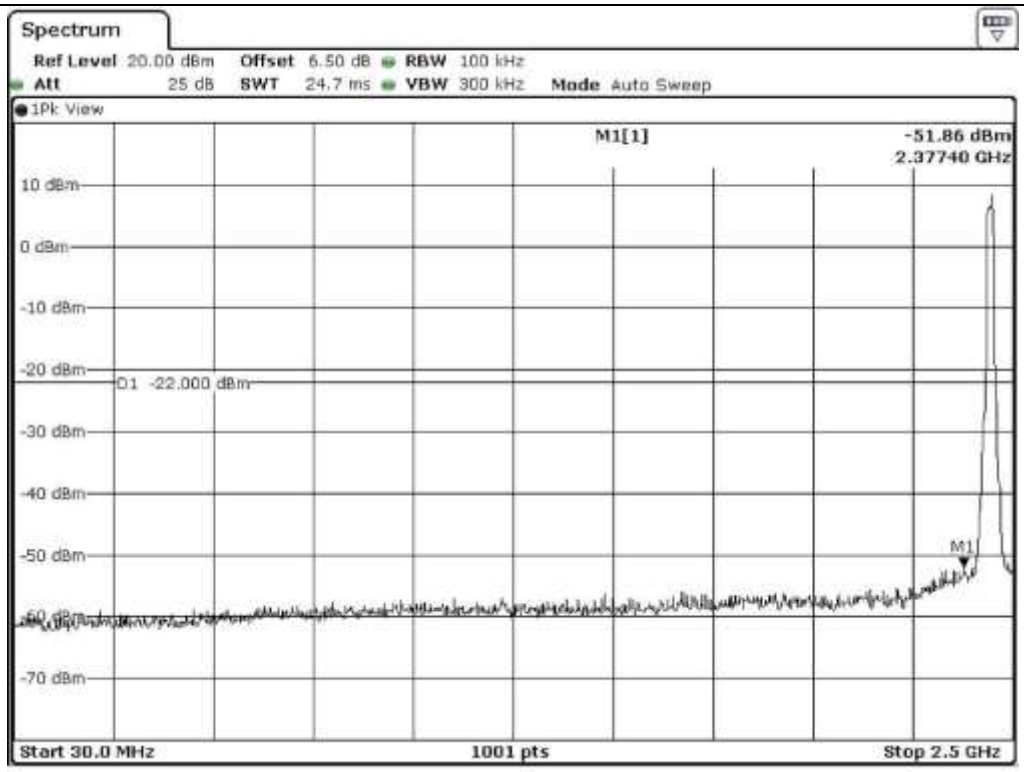
High Channel



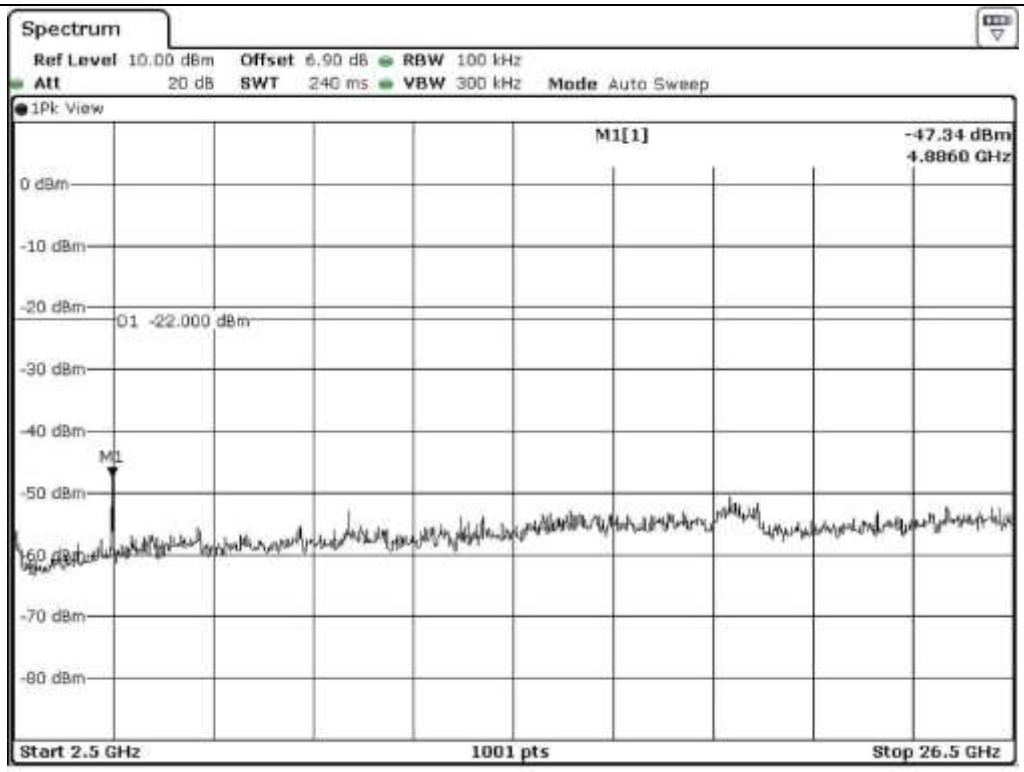
Low Channel



Low Channel

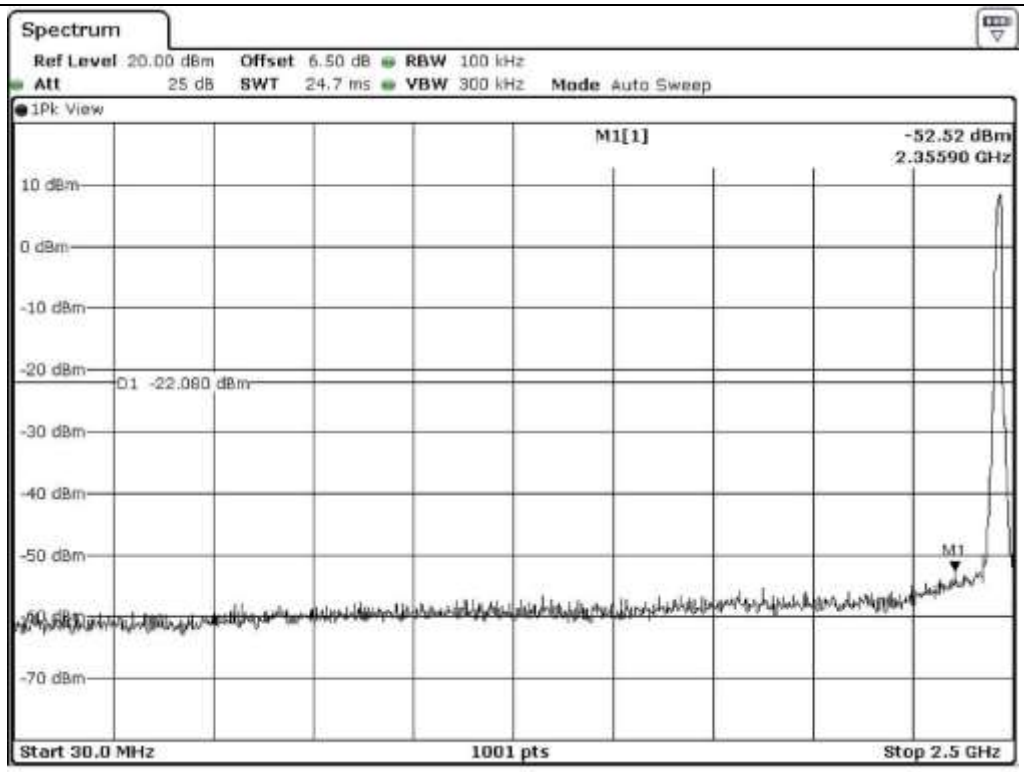


Middle Channel

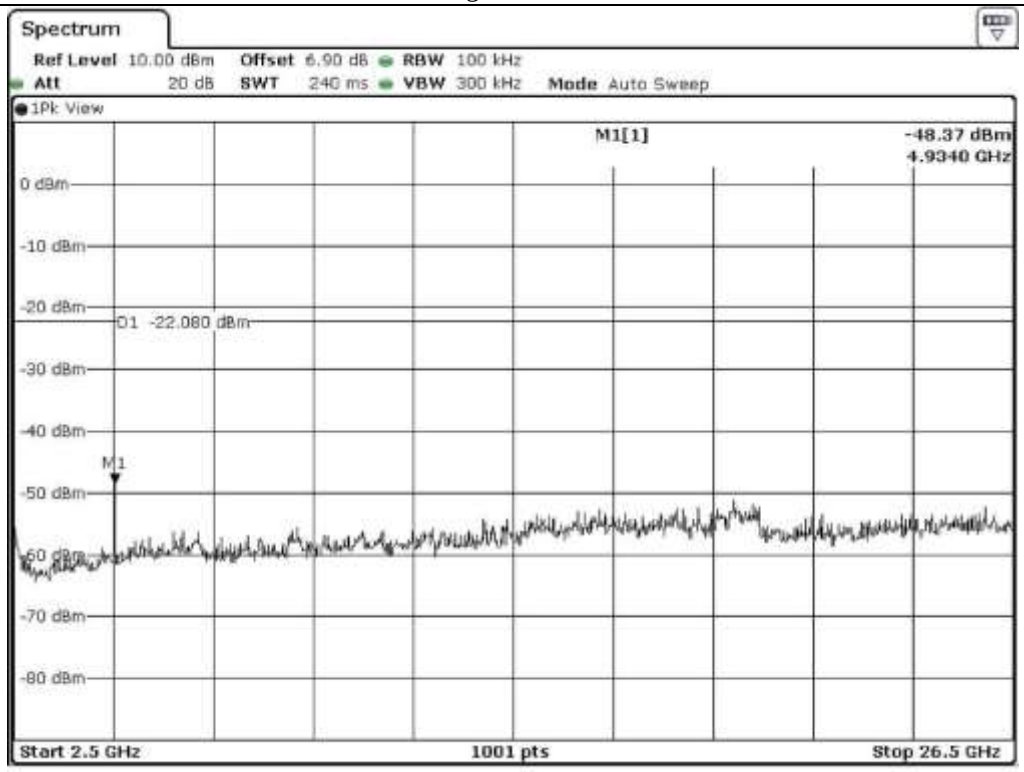


Middle Channel

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



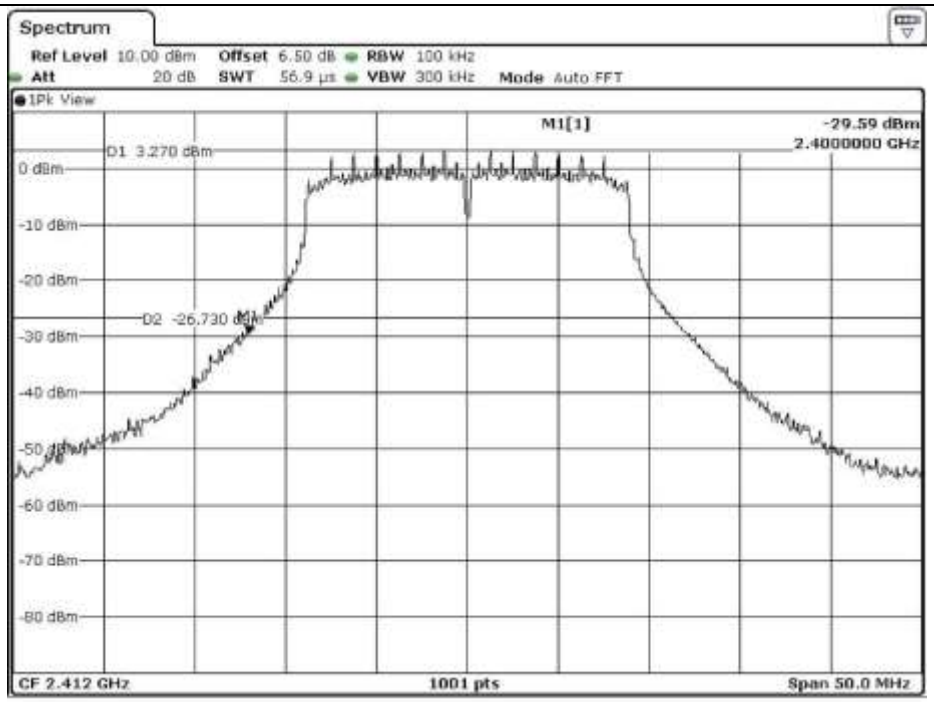
High Channel



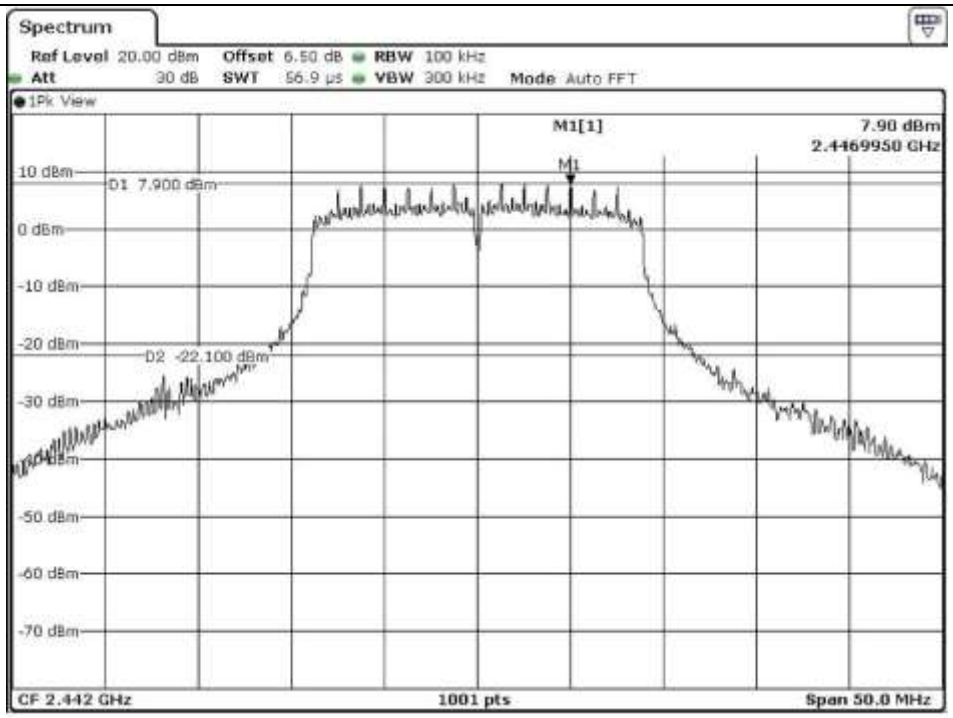
High Channel

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

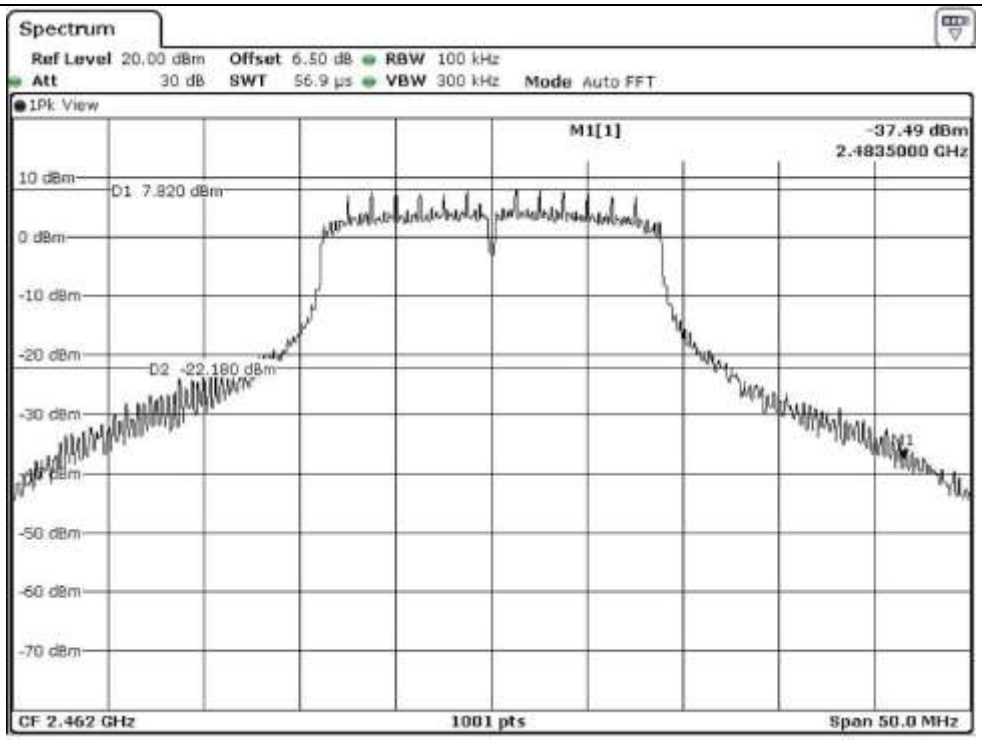
9.5.3.3 Test data for Antenna 2



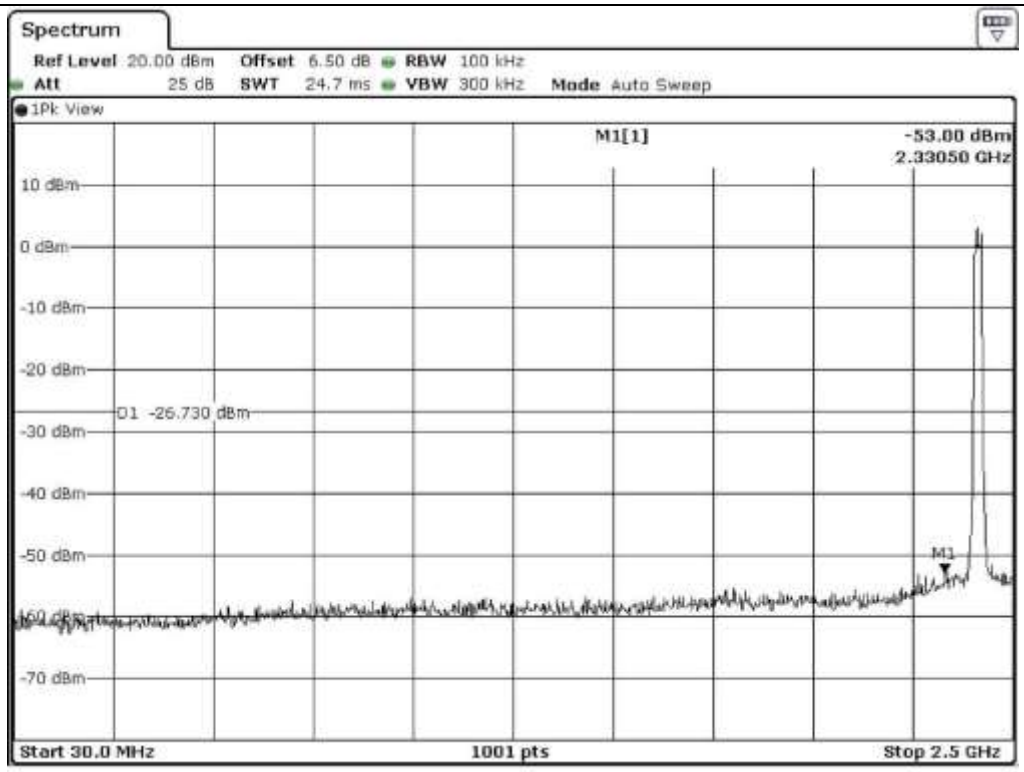
Low Channel



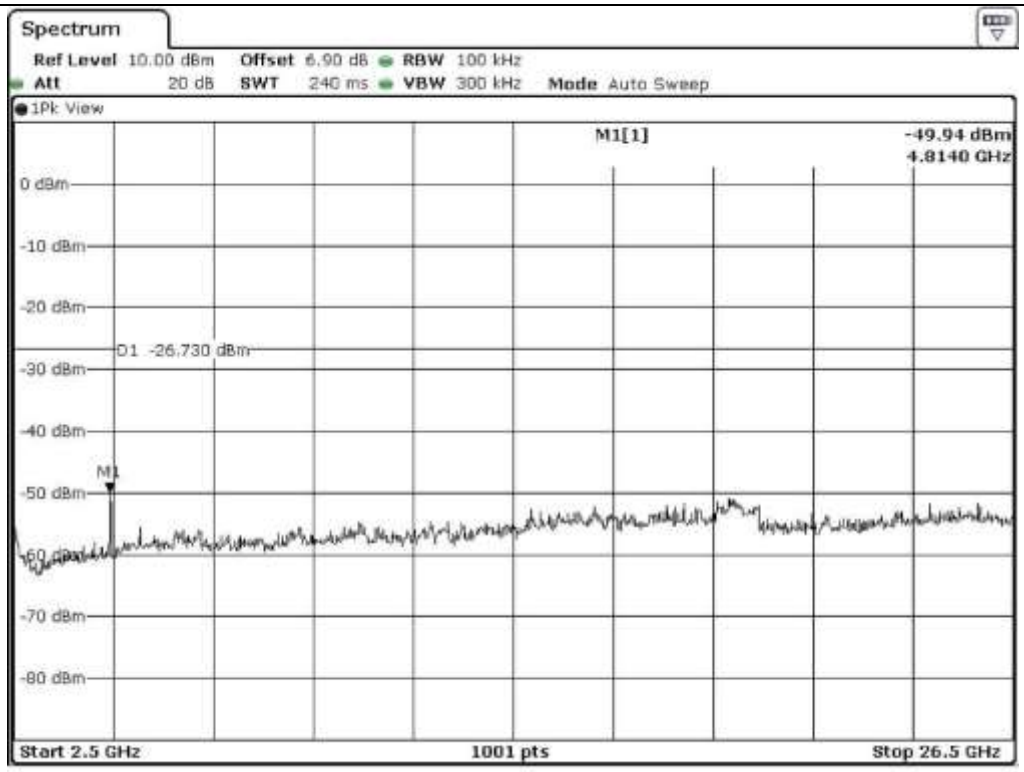
Middle Channel



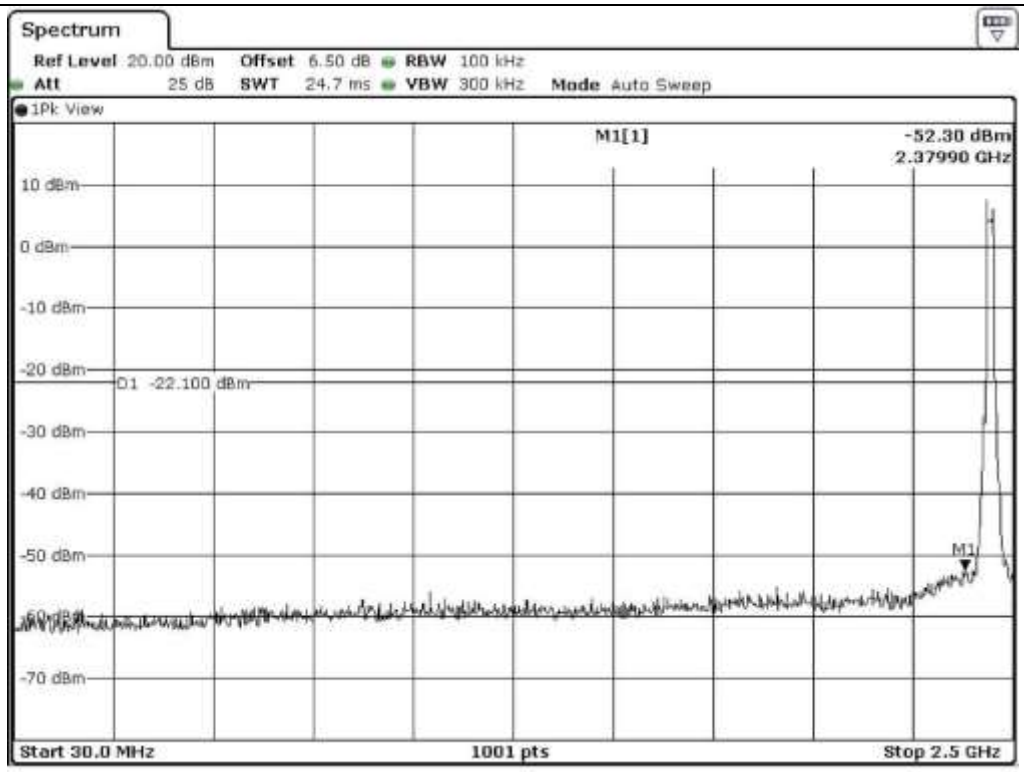
High Channel



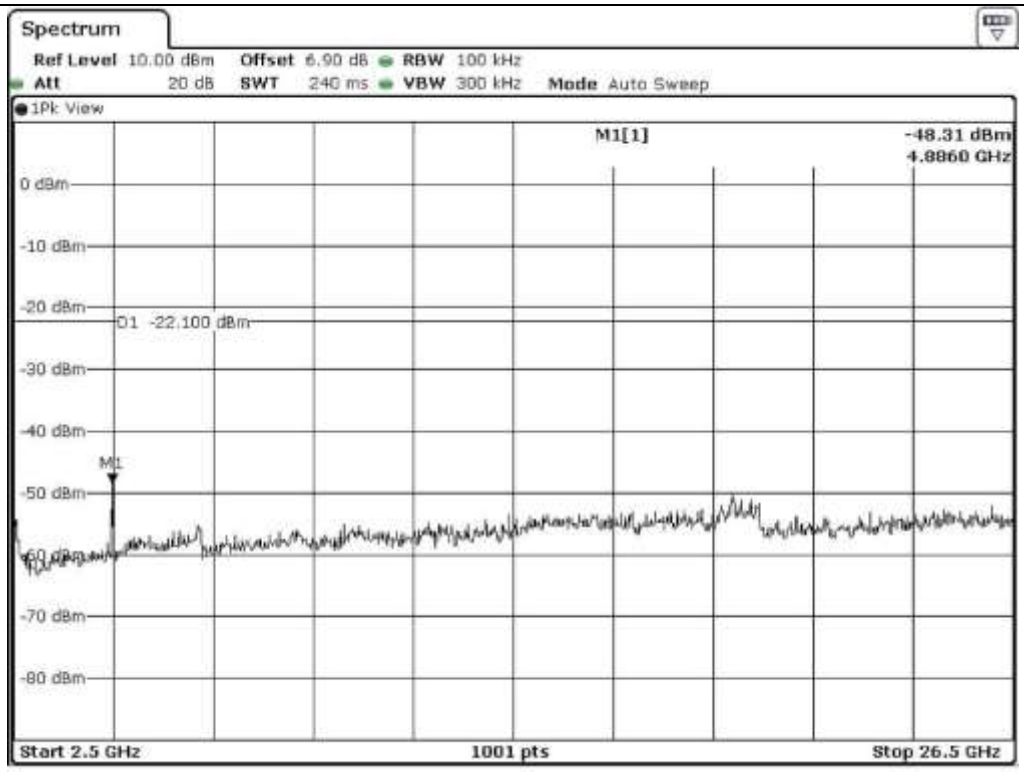
Low Channel



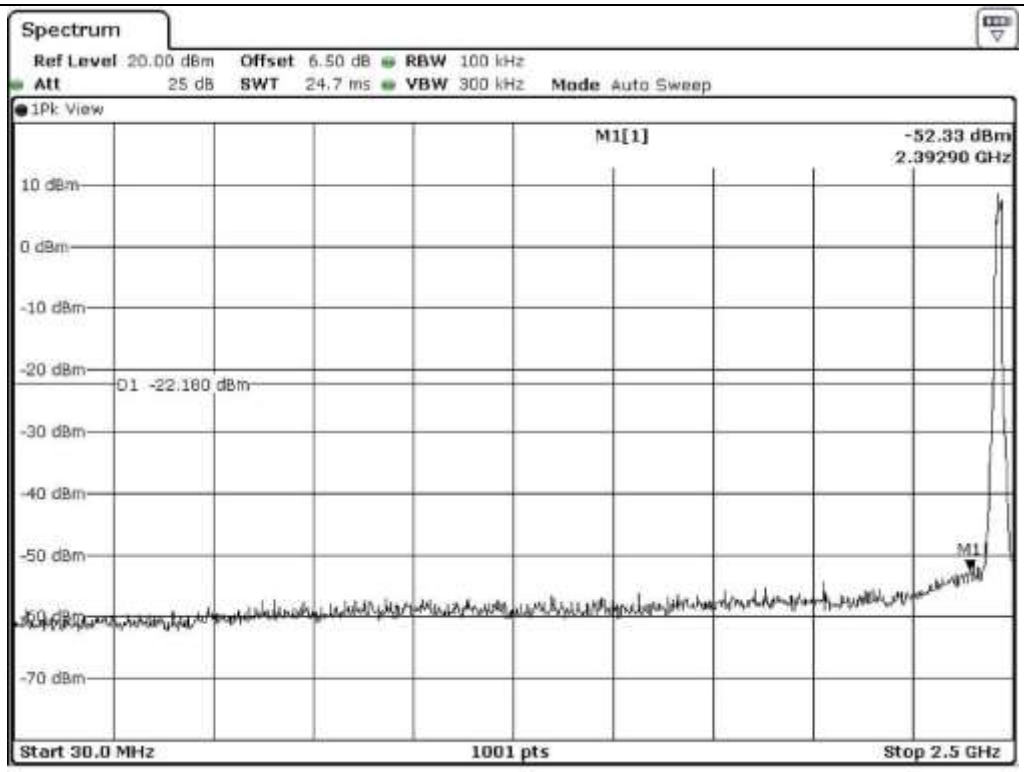
Low Channel



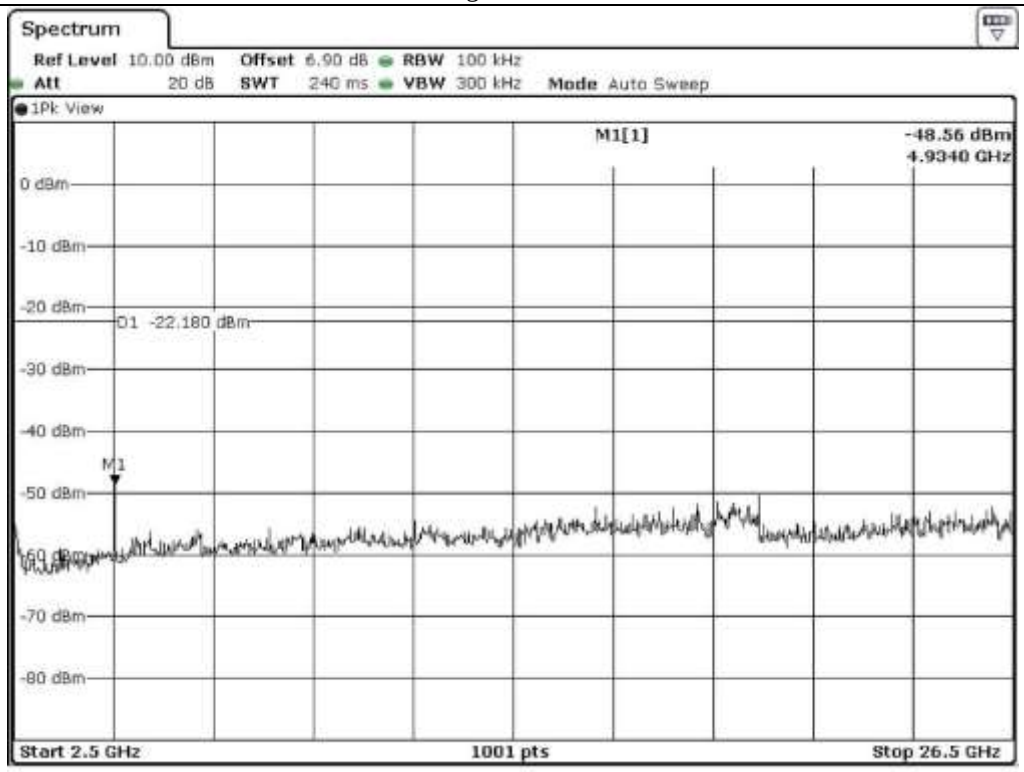
Middle Channel



Middle Channel



High Channel



High Channel

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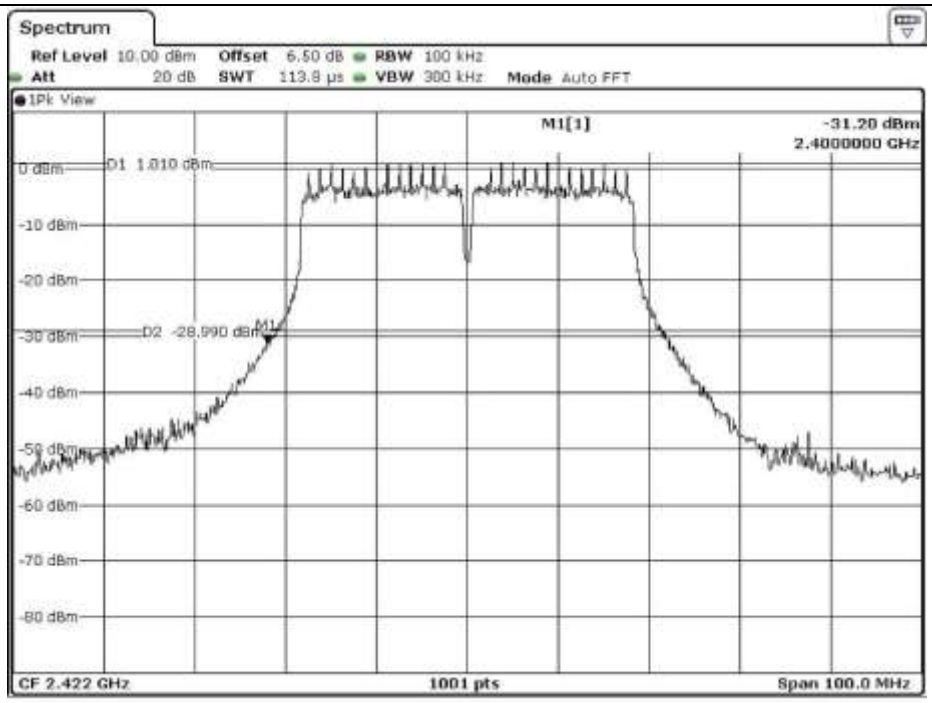
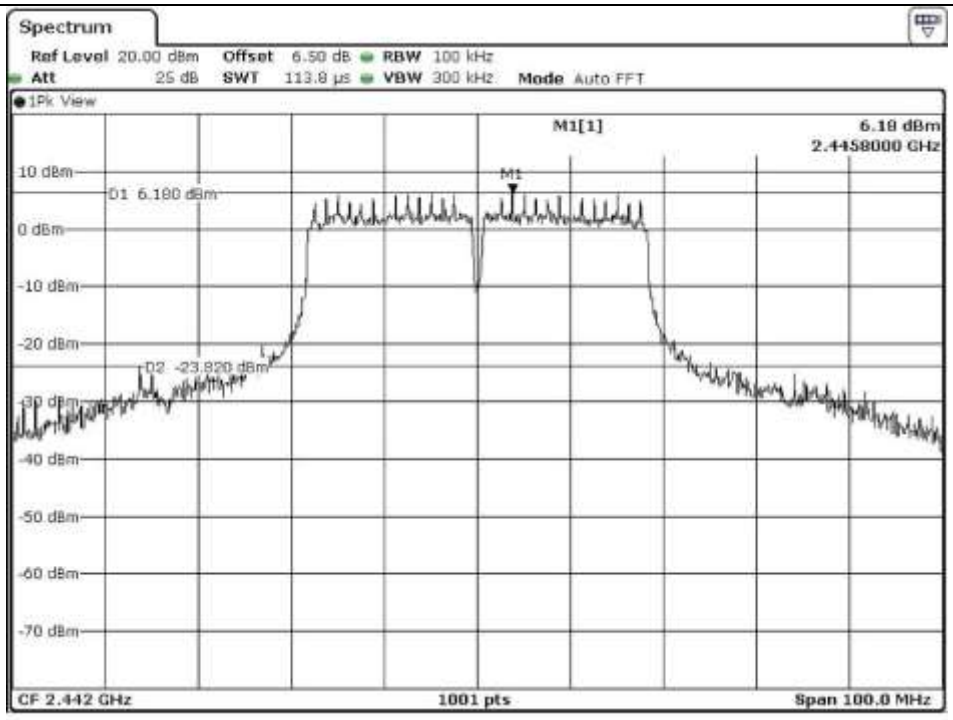
9.5.4 Test data for 802.11n_HT40 WLAN Mode

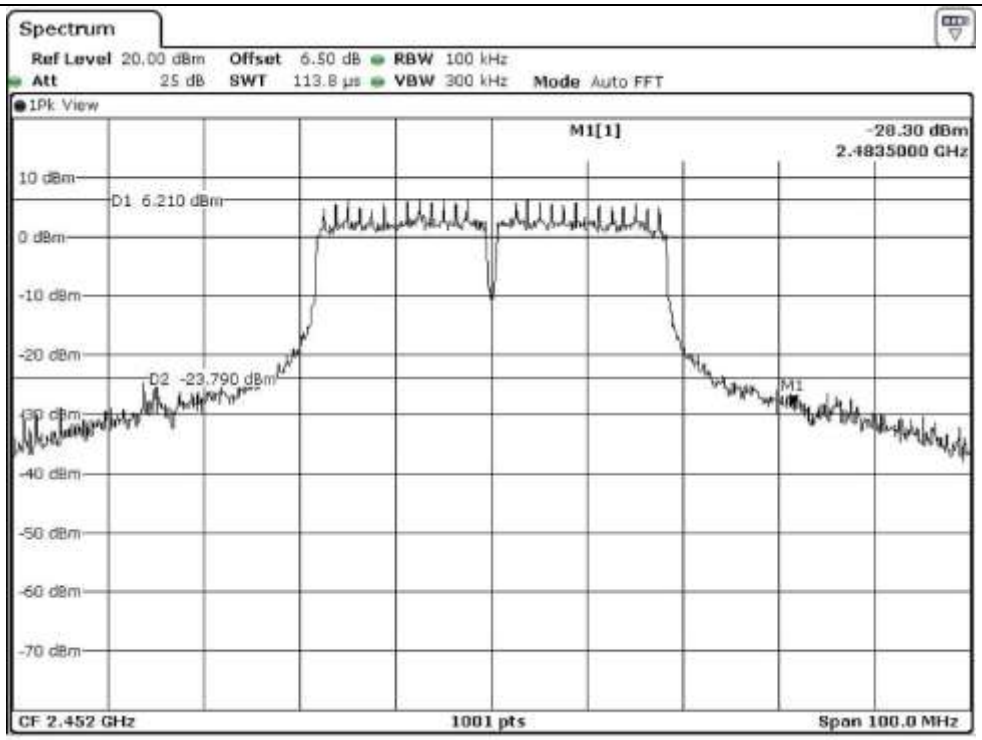
9.5.4.1 Test data for Antenna 0



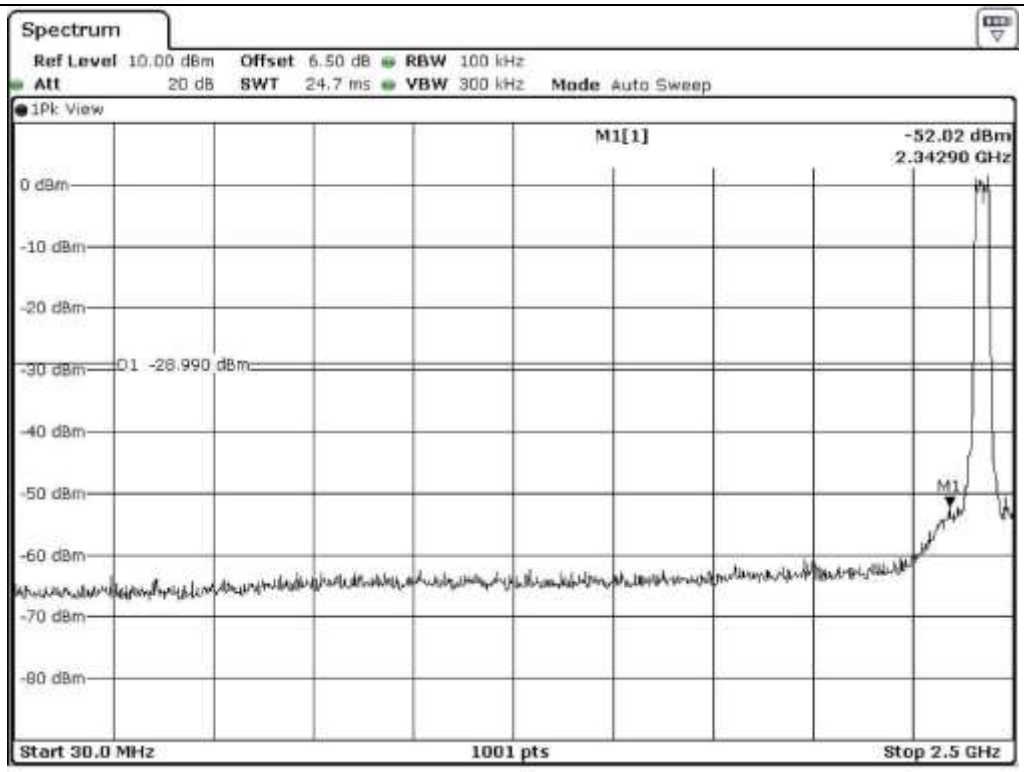
Low Channel



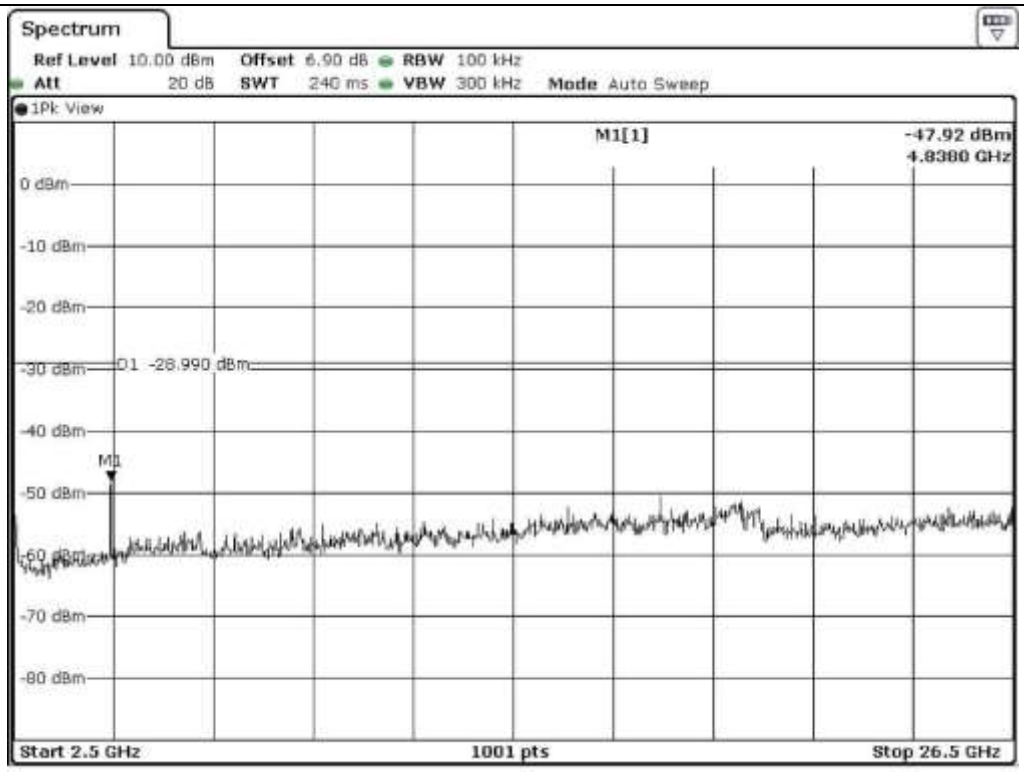
Middle Channel



High Channel

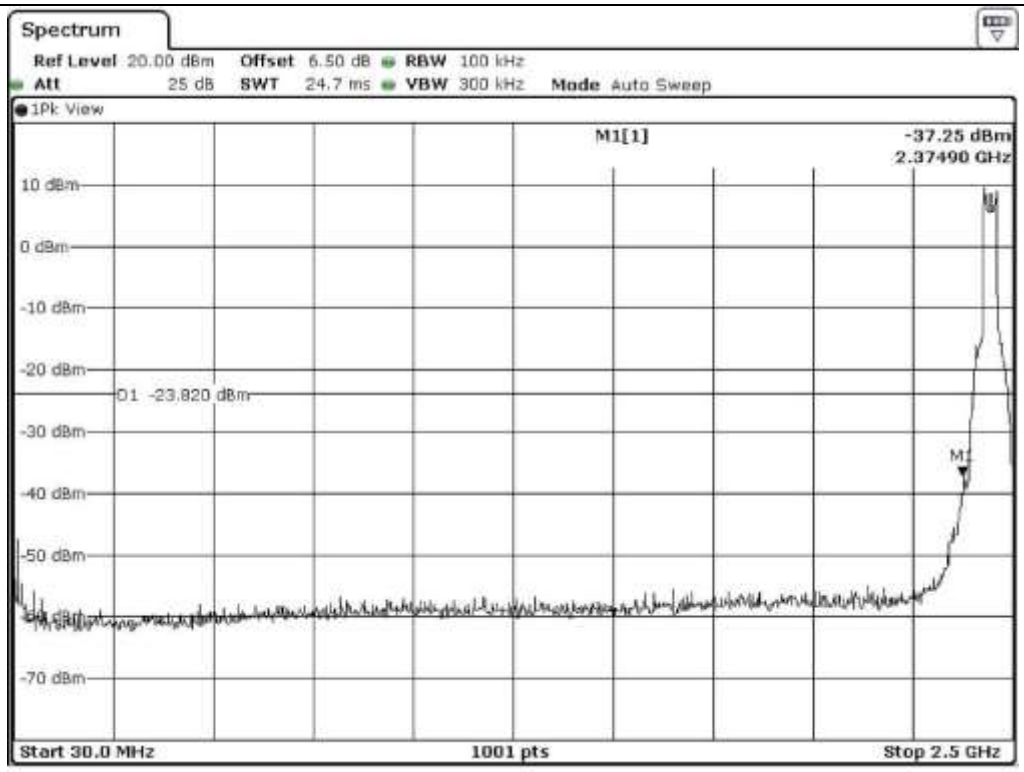


Low Channel

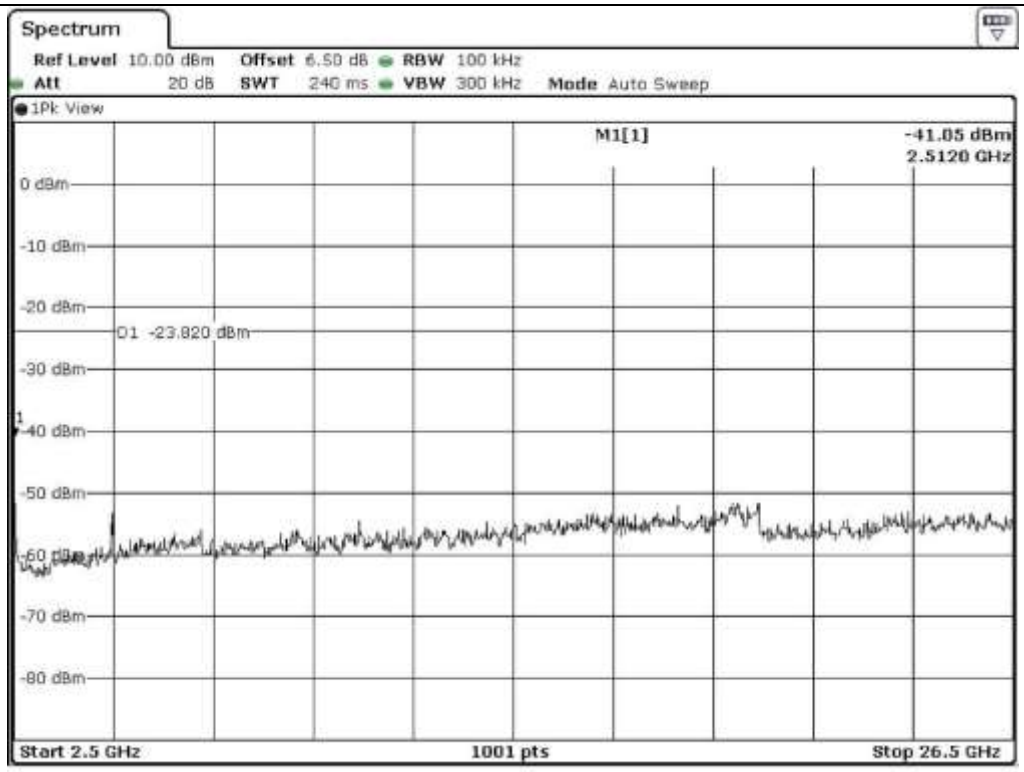


Low Channel

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

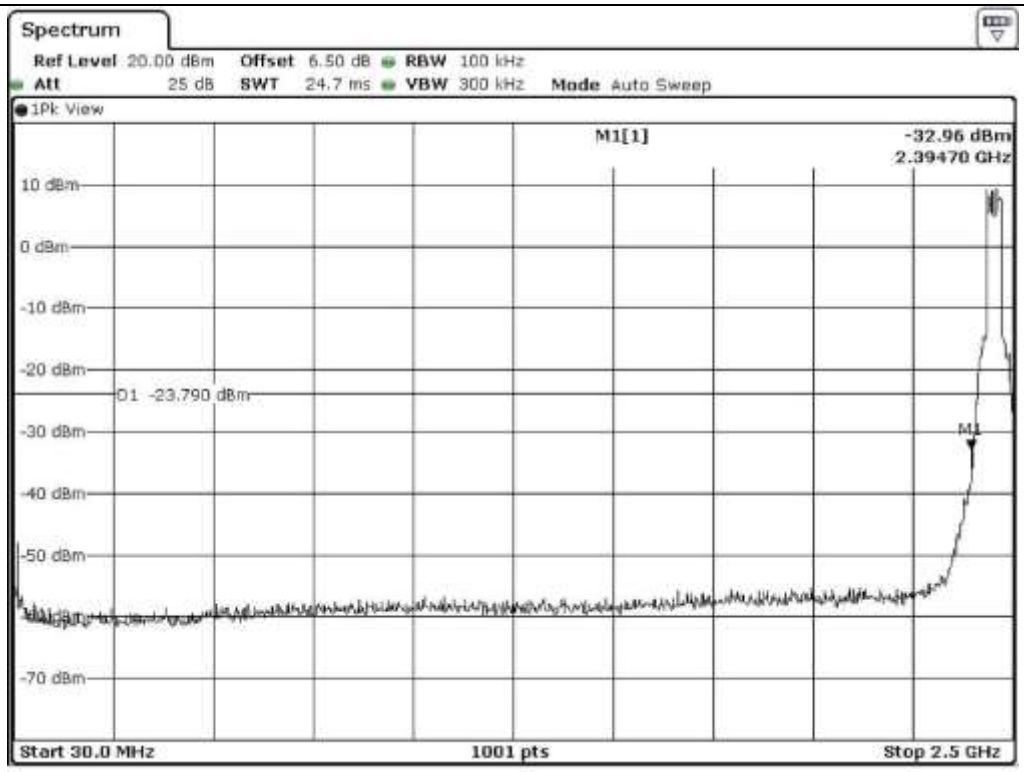


Middle Channel

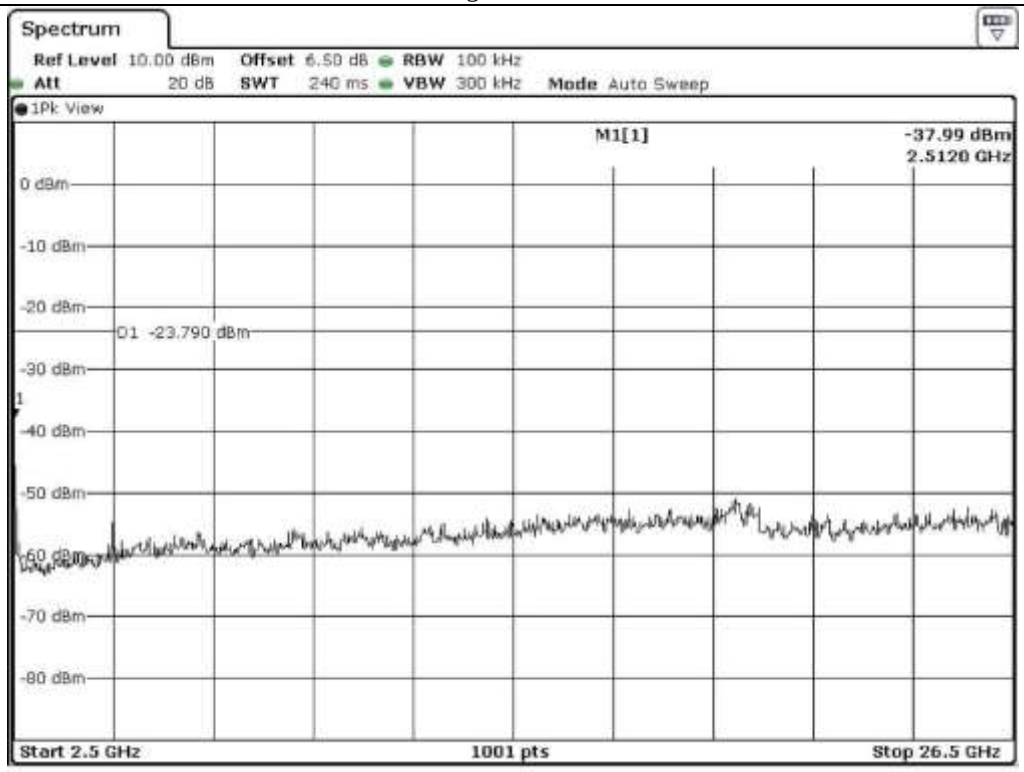


Middle Channel

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



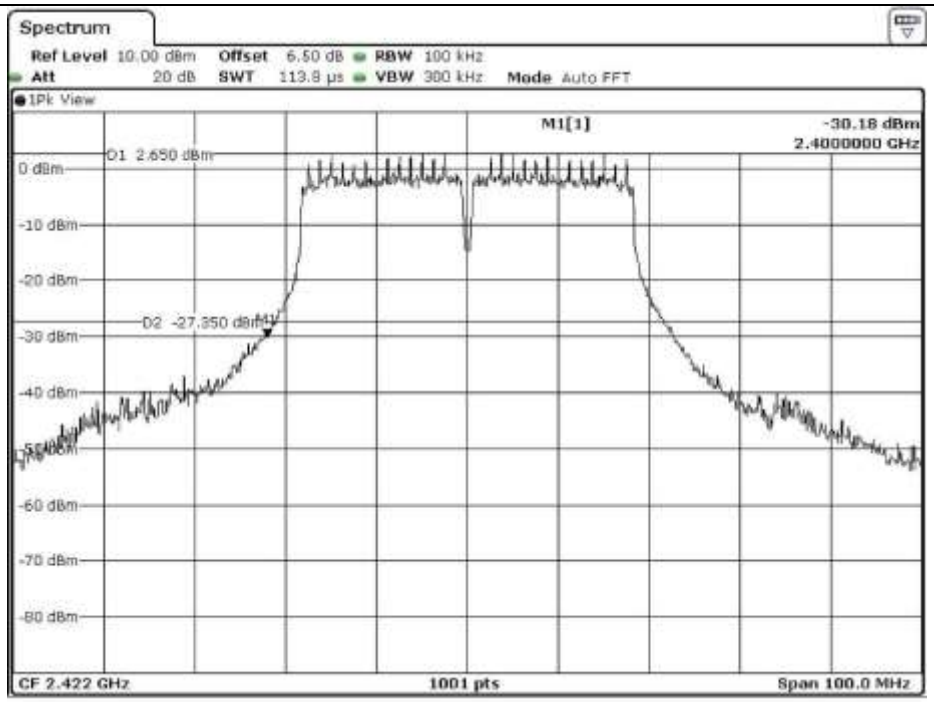
High Channel



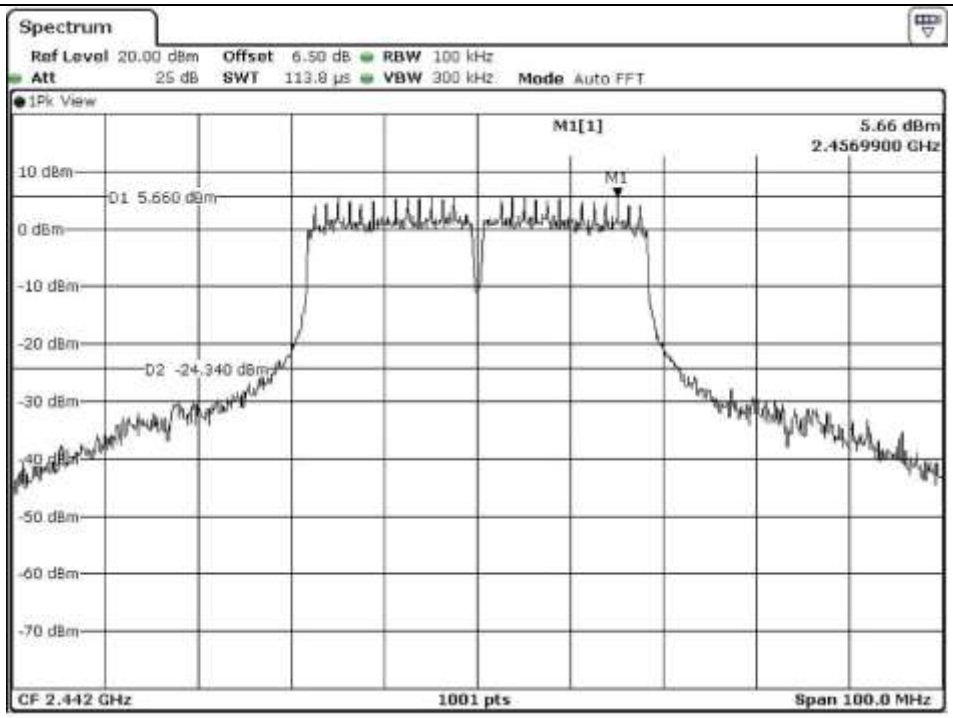
High Channel

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

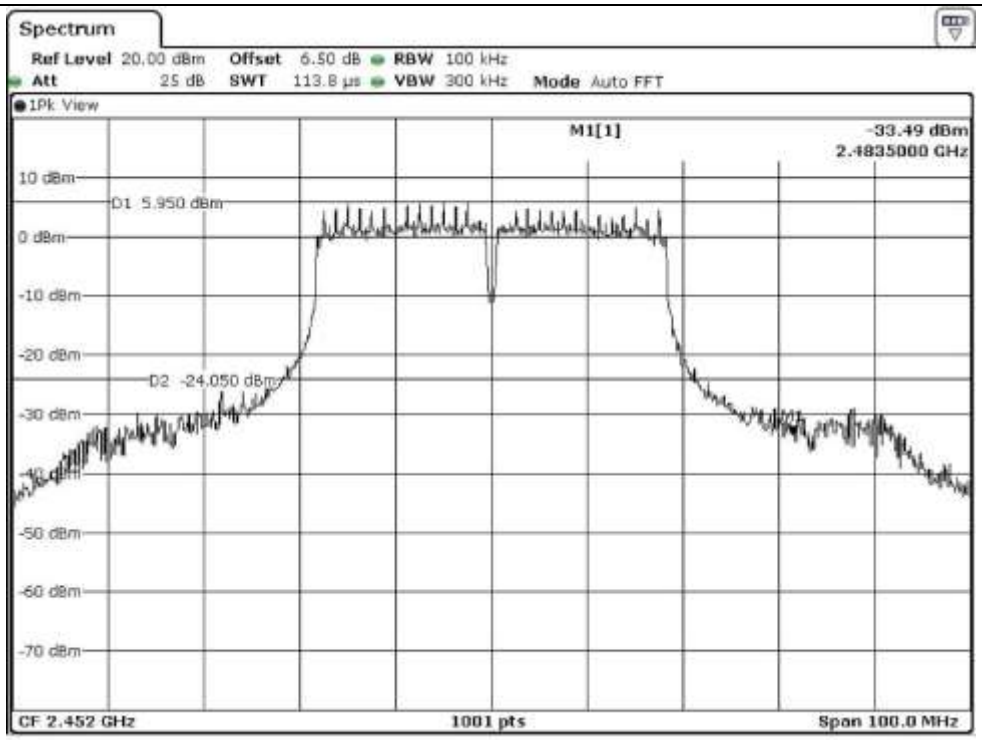
9.5.4.2 Test data for Antenna 1



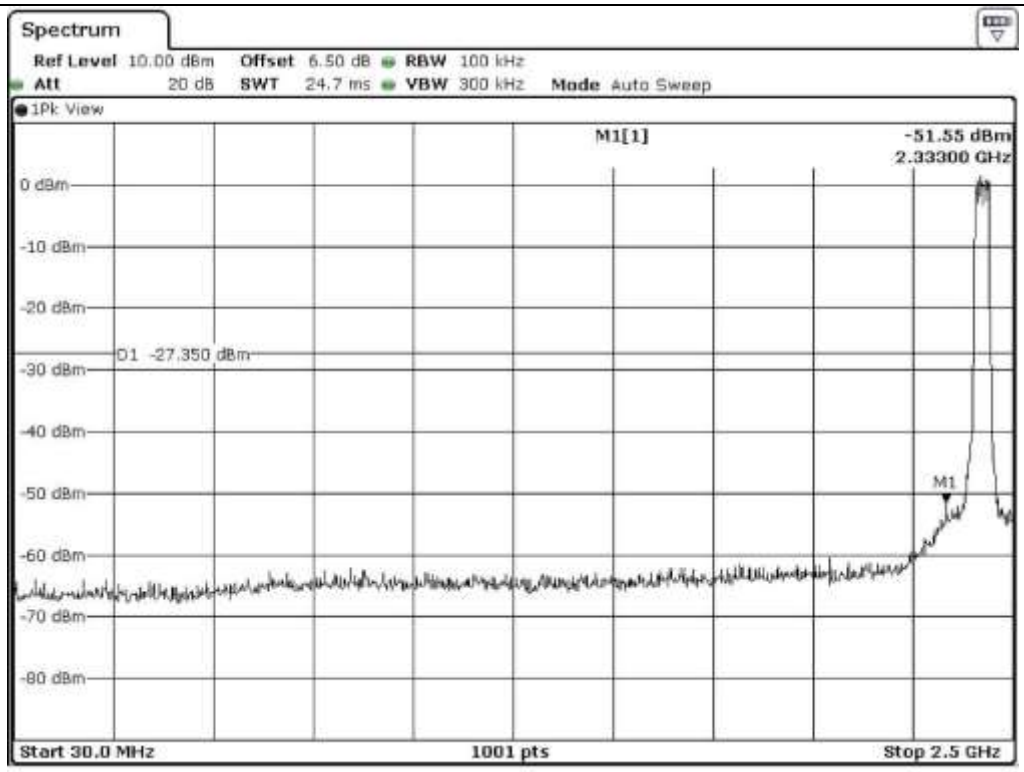
Low Channel



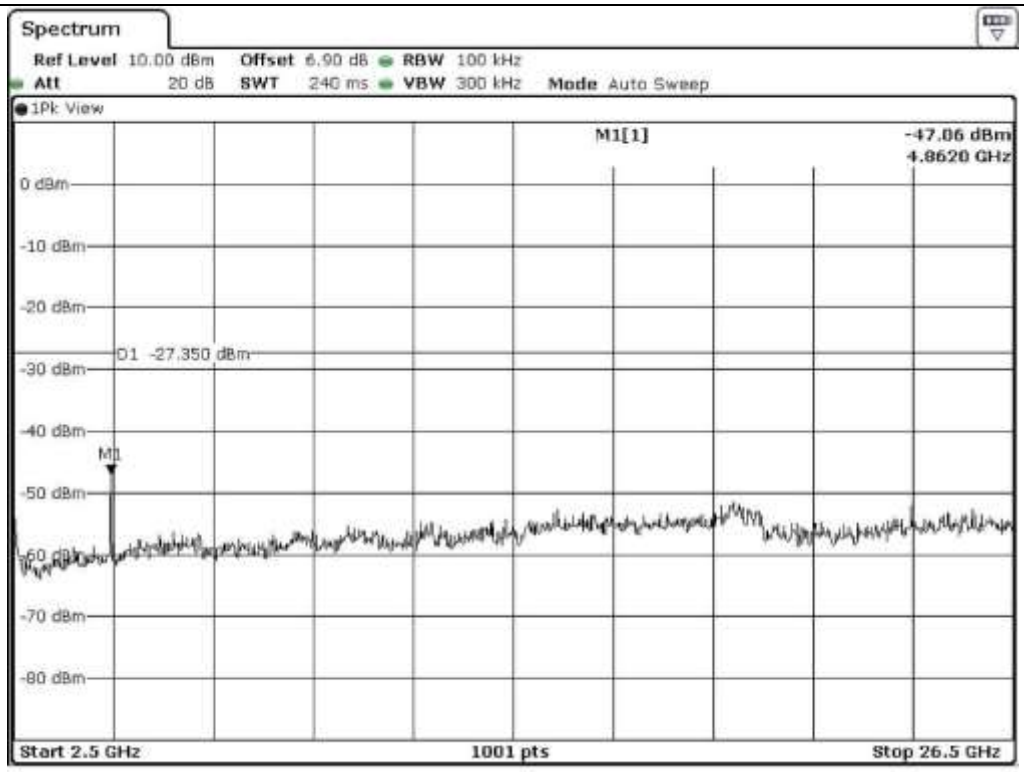
Middle Channel



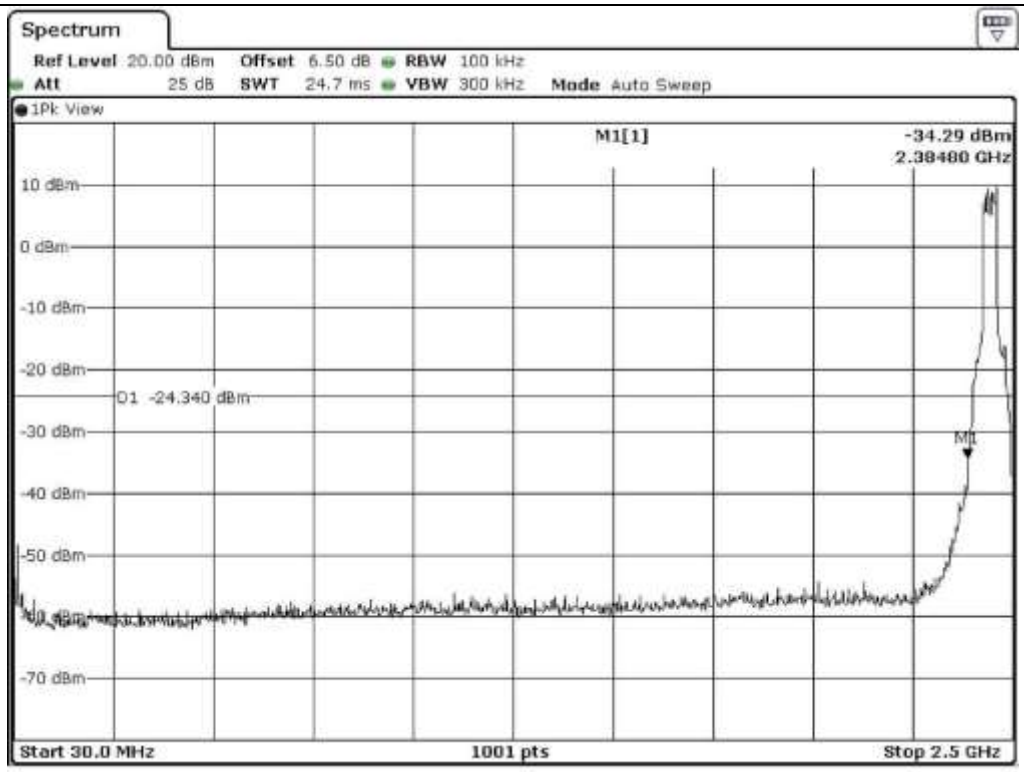
High Channel



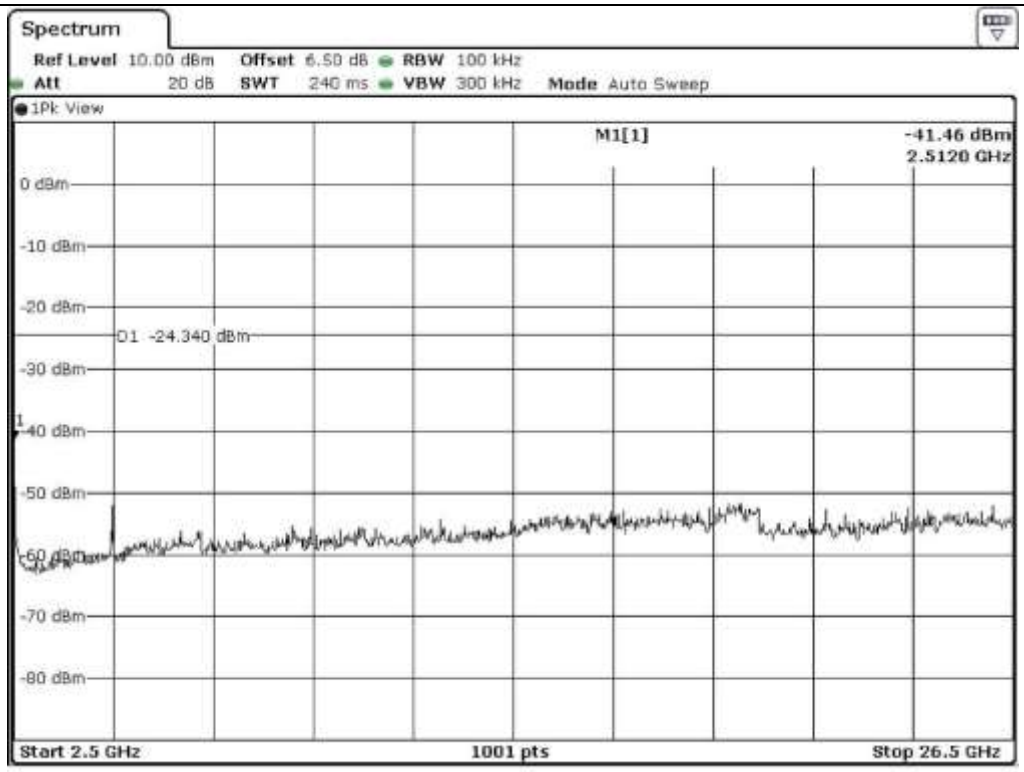
Low Channel



Low Channel



Middle Channel



Middle Channel

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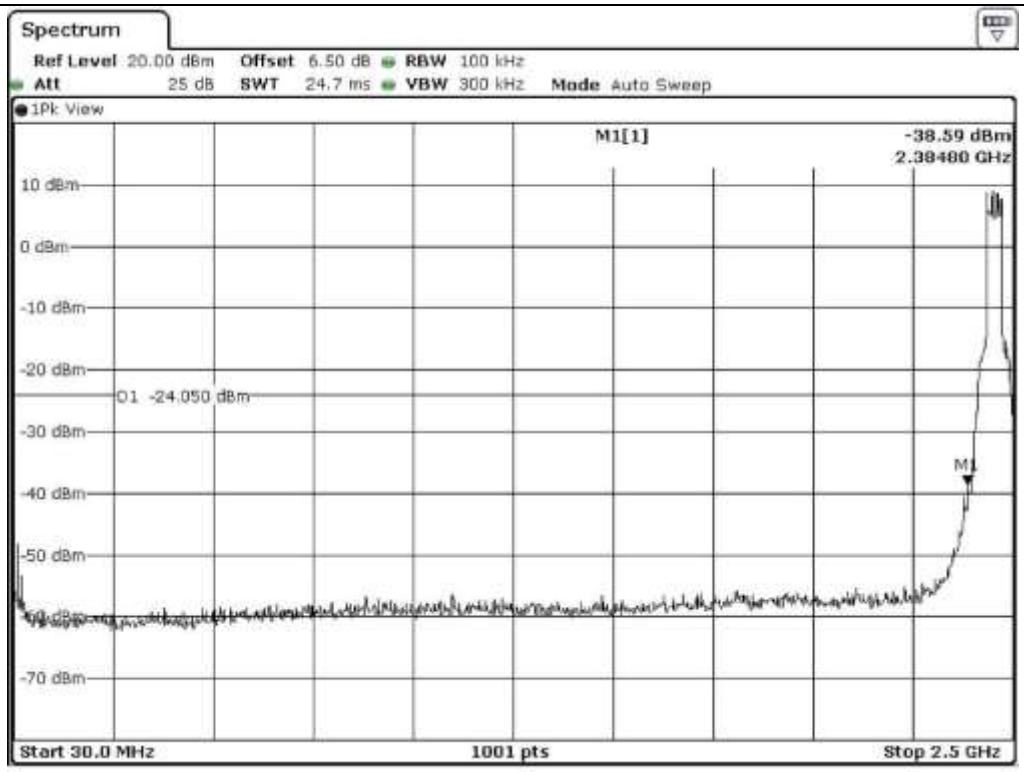
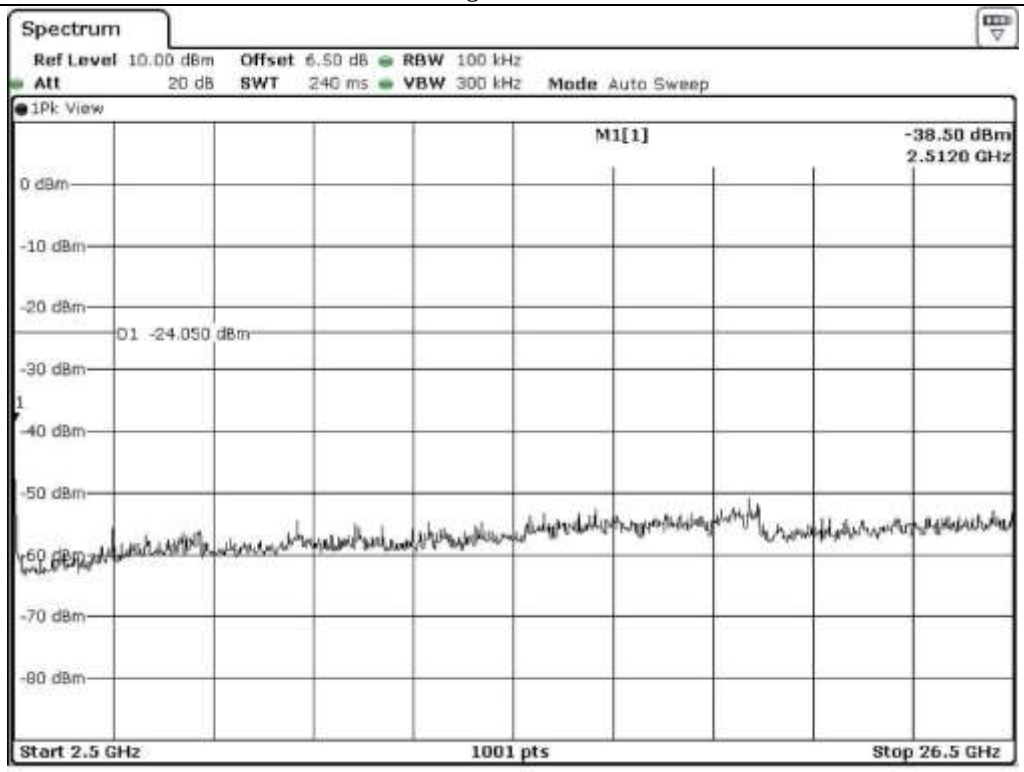


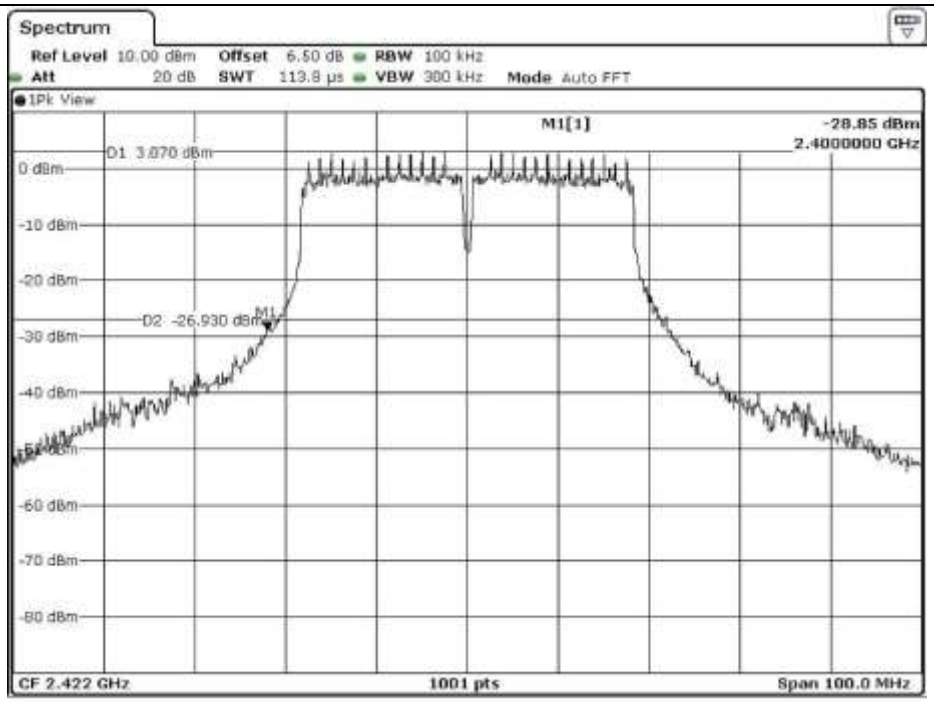
High Channel



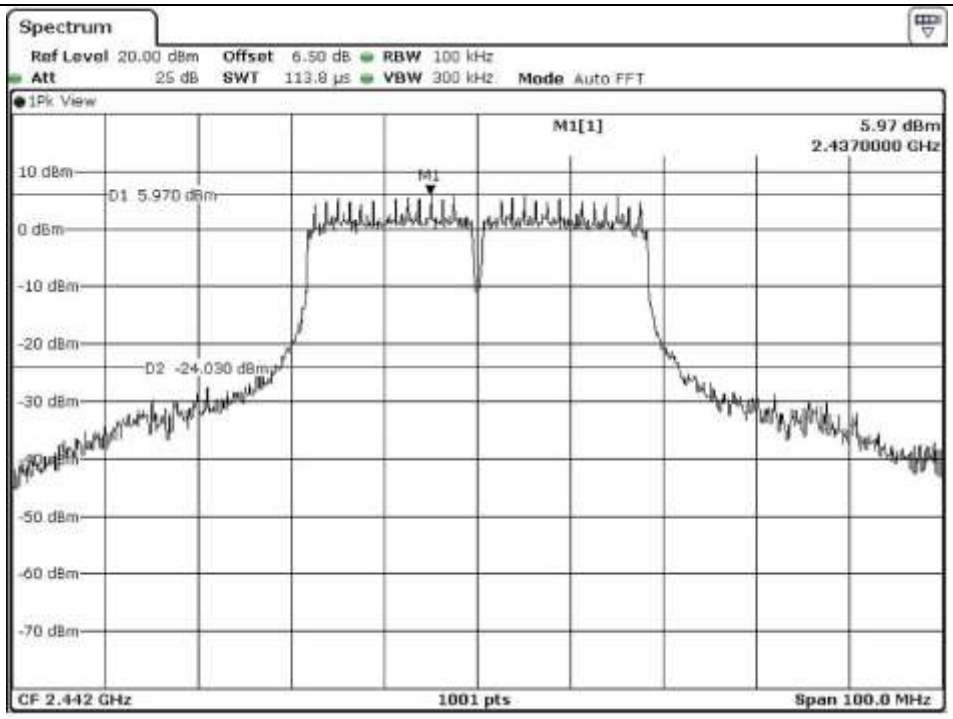
High Channel

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

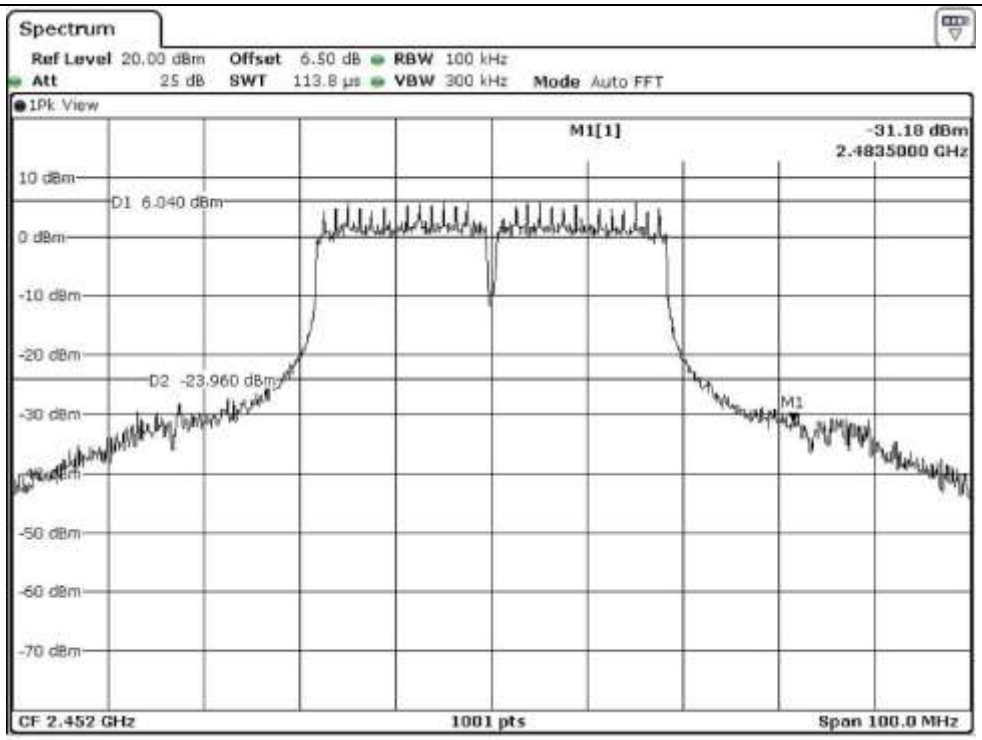
9.5.4.3 Test data for Antenna 2



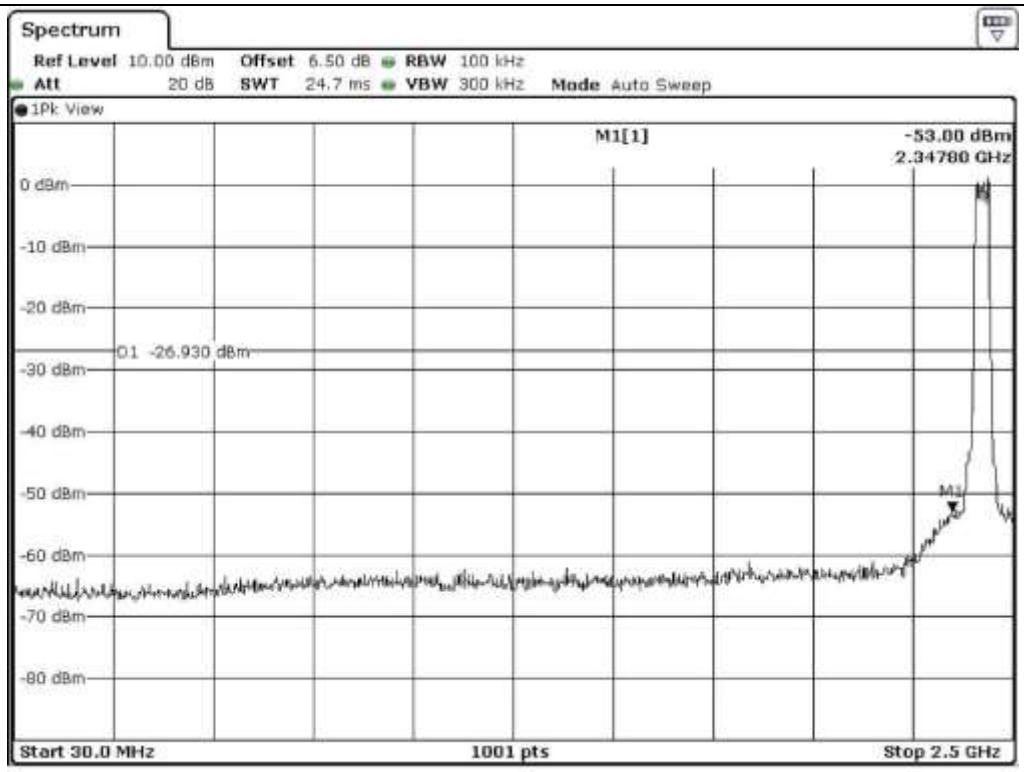
Low Channel



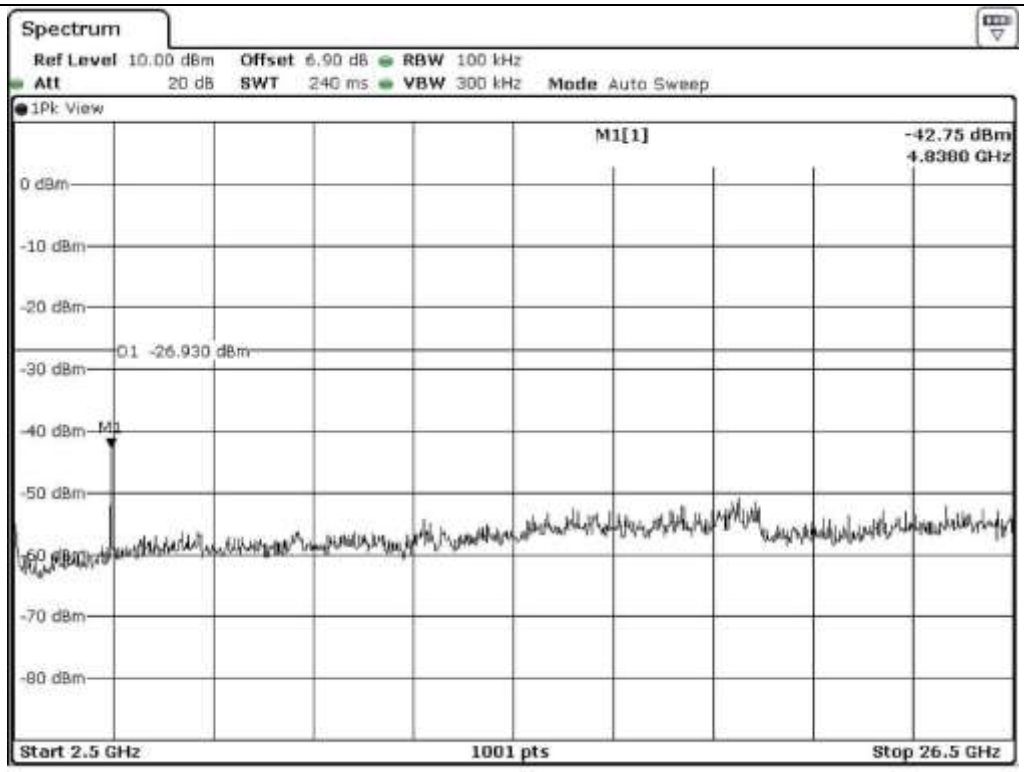
Middle Channel



High Channel

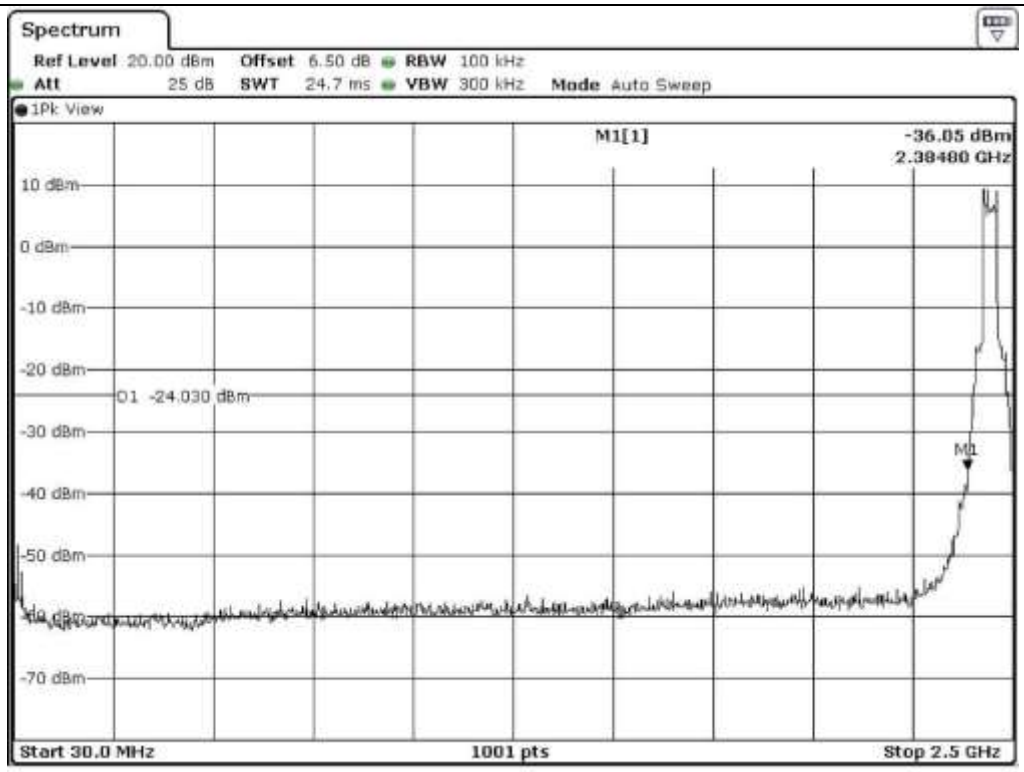


Low Channel

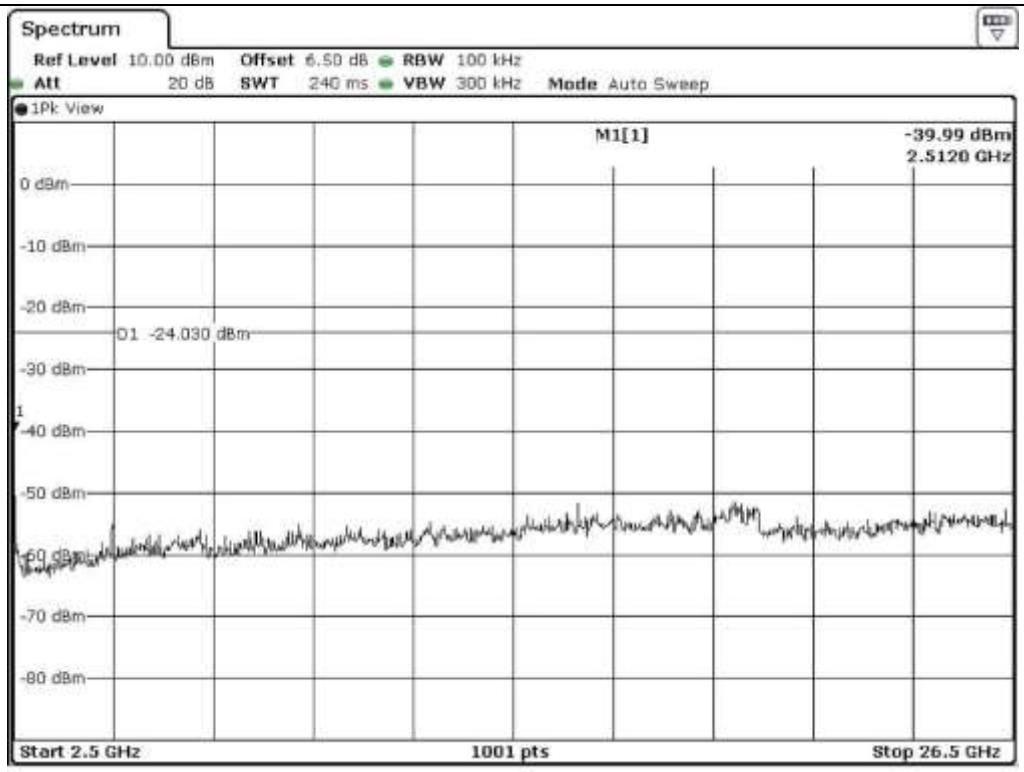


Low Channel

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

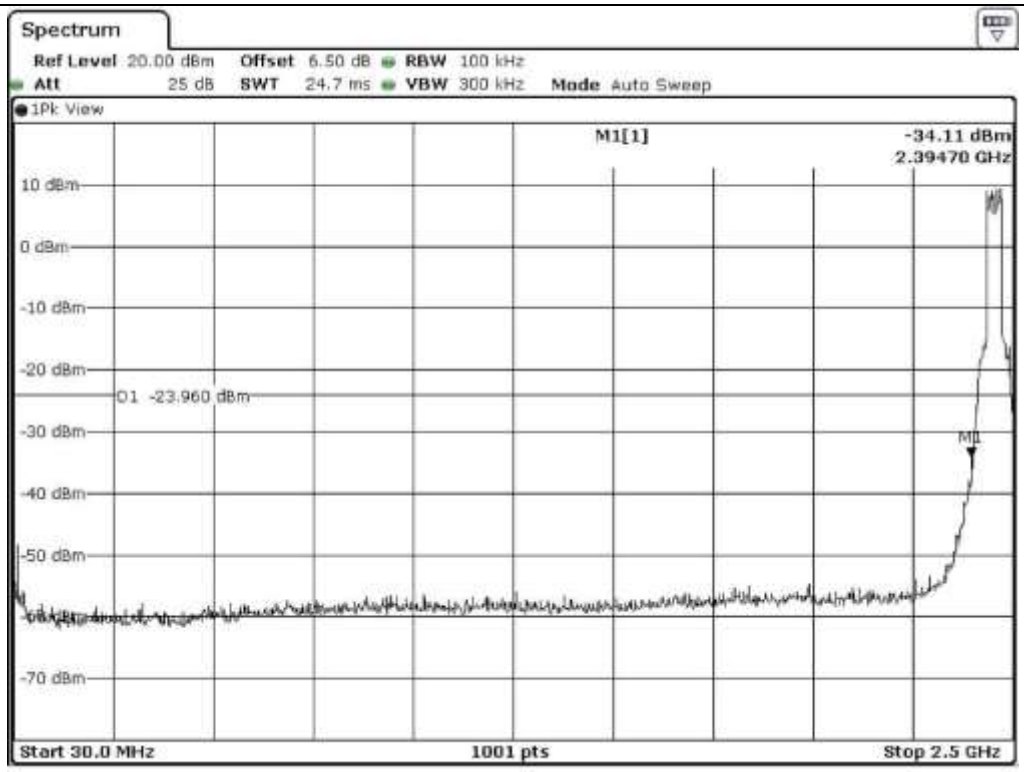


Middle Channel

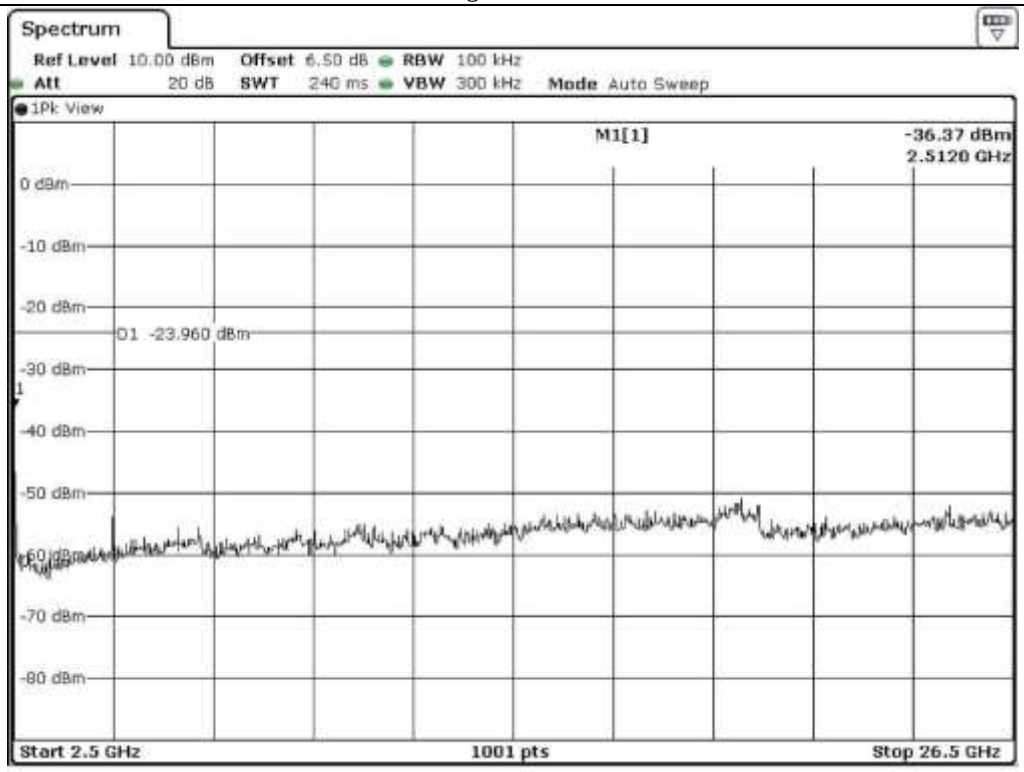


Middle Channel

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 and Band Edge

9.6.1.1 Test data for 802.11b WLAN Mode

9.6.1.1.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

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

1 MHz and RMS Detector for Average Mode

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. 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	53.67	Peak	H	26.94	9.20	34.76	55.05	74.00	18.95
	41.83	Average	H				43.21	54.00	10.79
	44.00	Peak	V				45.38	74.00	28.62
	33.26	Average	V				34.64	54.00	19.36
Test Data for Band Edge									
2 400.00	53.21	Peak	H	27.20	9.35	34.81	54.95	74.00	19.05
	41.50	Average	H				43.24	54.00	10.76
	40.30	Peak	V				42.04	74.00	31.96
	28.04	Average	V				29.78	54.00	24.22
Test Data for High Channel									
2 483.50	47.54	Peak	H	27.47	9.49	35.51	48.99	74.00	25.01
	36.38	Average	H				37.83	54.00	16.17
	44.48	Peak	V				45.93	74.00	28.07
	31.91	Average	V				33.36	54.00	20.64

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.1.1.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

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

1 MHz and RMS Detector for Average Mode

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	51.83	Peak	H	26.94	9.20	34.76	53.21	74.00	20.79
	41.06	Average	H				42.44	54.00	11.56
	41.88	Peak	V				43.26	74.00	30.74
	36.15	Average	V				37.53	54.00	16.47
Test Data for Band Edge									
2 400.00	53.83	Peak	H	27.20	9.35	34.81	55.57	74.00	18.43
	42.78	Average	H				44.52	54.00	9.48
	41.33	Peak	V				43.07	74.00	30.93
	27.40	Average	V				29.14	54.00	24.86
Test Data for High Channel									
2 483.50	50.35	Peak	H	27.47	9.49	35.51	51.80	74.00	22.20
	38.81	Average	H				40.26	54.00	13.74
	45.00	Peak	V				46.45	74.00	27.55
	31.99	Average	V				33.44	54.00	20.56

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.1.1.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

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

1 MHz and RMS Detector for Average Mode

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. 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	54.72	Peak	H	26.94	9.20	34.76	56.10	74.00	17.90
	39.67	Average	H				41.05	54.00	12.95
	42.94	Peak	V				44.32	74.00	29.68
	30.47	Average	V				31.85	54.00	22.15
Test Data for Band Edge									
2 400.00	51.20	Peak	H	27.20	9.35	34.81	52.94	74.00	21.06
	41.10	Average	H				42.84	54.00	11.16
	41.19	Peak	V				42.93	74.00	31.07
	27.51	Average	V				29.25	54.00	24.75
Test Data for High Channel									
2 483.50	44.56	Peak	H	27.47	9.49	35.51	46.01	74.00	27.99
	35.51	Average	H				36.96	54.00	17.04
	44.75	Peak	V				46.20	74.00	27.80
	32.45	Average	V				33.90	54.00	20.10

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.1.2.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

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

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. 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	48.52	Peak	H	26.94	9.20	34.76	49.90	74.00	24.10
	36.73	Average	H				38.11	54.00	15.89
	44.13	Peak	V				45.51	74.00	28.49
	32.57	Average	V				33.95	54.00	20.05
Test Data for Band Edge									
2 400.00	58.50	Peak	H	27.20	9.35	34.81	60.24	74.00	13.76
	49.94	Average	H				51.68	54.00	2.32
	48.42	Peak	V				50.16	74.00	23.84
	39.67	Average	V				41.41	54.00	12.59
Test Data for High Channel									
2 483.50	48.19	Peak	H	27.47	9.49	35.51	49.64	74.00	24.36
	36.62	Average	H				38.07	54.00	15.93
	43.60	Peak	V				45.05	74.00	28.95
	31.84	Average	V				33.29	54.00	20.71

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: Hyung-Kwon, Oh / Assistant Manager

9.6.1.2.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

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

1 MHz and RMS Detector for Average Mode

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. 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	48.96	Peak	H	26.94	9.20	34.76	50.34	74.00	23.66
	35.58	Average	H				36.96	54.00	17.04
	43.74	Peak	V				45.12	74.00	28.88
	34.02	Average	V				35.40	54.00	18.60
Test Data for Band Edge									
2 400.00	57.65	Peak	H	27.20	9.35	34.81	59.39	74.00	14.61
	50.22	Average	H				51.96	54.00	2.04
	47.14	Peak	V				48.88	74.00	25.12
	41.37	Average	V				43.11	54.00	10.89
Test Data for High Channel									
2 483.50	48.77	Peak	H	27.47	9.49	35.51	50.22	74.00	23.78
	37.64	Average	H				39.09	54.00	14.91
	46.06	Peak	V				47.51	74.00	26.49
	31.16	Average	V				32.61	54.00	21.39

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.1.2.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

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

1 MHz and RMS Detector for Average Mode

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. 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	45.88	Peak	H	26.94	9.20	34.76	47.26	74.00	26.74
	37.15	Average	H				38.53	54.00	15.47
	42.59	Peak	V				43.97	74.00	30.03
	30.52	Average	V				31.90	54.00	22.10
Test Data for Band Edge									
2 400.00	61.36	Peak	H	27.20	9.35	34.81	63.10	74.00	10.90
	50.27	Average	H				52.01	54.00	1.99
	51.04	Peak	V				52.78	74.00	21.22
	38.11	Average	V				39.85	54.00	14.15
Test Data for High Channel									
2 483.50	46.25	Peak	H	27.47	9.49	35.51	47.70	74.00	26.30
	37.28	Average	H				38.73	54.00	15.27
	45.85	Peak	V				47.30	74.00	26.70
	33.22	Average	V				34.67	54.00	19.33

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: Hyung-Kwon, Oh / Assistant Manager

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 (3 Tx Multiple Transmit (Worst case))

-. Test Date : September 20, 2017 ~ September 27, 2017

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

1 MHz and RMS Detector for Average Mode

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. 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	43.56	Peak	H	26.94	9.20	34.76	44.94	74.00	29.06
	32.85	Average	H				34.23	54.00	19.77
	42.73	Peak	V				44.11	74.00	29.89
	30.22	Average	V				31.60	54.00	22.40
Test Data for Band Edge									
2 400.00	57.36	Peak	H	27.20	9.35	34.81	59.10	74.00	14.90
	49.28	Average	H				51.02	54.00	2.98
	49.68	Peak	V				51.42	74.00	22.58
	41.76	Average	V				43.50	54.00	10.50
Test Data for High Channel									
2 483.50	52.92	Peak	H	27.47	9.49	35.51	54.37	74.00	19.63
	40.95	Average	H				42.40	54.00	11.60
	47.79	Peak	V				49.24	74.00	24.76
	35.91	Average	V				37.36	54.00	16.64

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: Hyung-Kwon, Oh / Assistant Manager

9.6.1.4 Test data for 802.11n_HT40 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : September 20, 2017 ~ September 27, 2017

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

1 MHz and RMS Detector for Average Mode

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	51.81	Peak	H	26.94	9.20	34.76	53.19	74.00	20.81
	38.37	Average	H				39.75	54.00	14.25
	45.57	Peak	V				46.95	74.00	27.05
	33.64	Average	V				35.02	54.00	18.98
Test Data for Band Edge									
2 400.00	56.74	Peak	H	27.20	9.35	34.81	58.48	74.00	15.52
	48.29	Average	H				50.03	54.00	3.97
	48.42	Peak	V				50.16	74.00	23.84
	40.10	Average	V				41.84	54.00	12.16
Test Data for High Channel									
2 483.50	57.78	Peak	H	27.47	9.49	35.51	59.23	74.00	14.77
	43.69	Average	H				45.14	54.00	8.86
	51.01	Peak	V				52.46	74.00	21.54
	39.58	Average	V				41.03	54.00	12.97

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.2.1.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	46.82	Peak	H	30.84	12.31	35.74	54.23	74.00	19.77
	34.69	Average	H				42.10	54.00	11.90
	41.50	Peak	V				48.91	74.00	25.09
	30.92	Average	V				38.33	54.00	15.67
Test Data for Middle Channel									
4 884.00	44.02	Peak	H	30.01	12.43	35.80	50.66	74.00	23.34
	32.41	Average	H				39.05	54.00	14.95
	44.05	Peak	V				50.69	74.00	23.31
	33.17	Average	V				39.81	54.00	14.19
Test Data for High Channel									
4 924.00	46.64	Peak	H	31.15	12.81	35.96	54.64	74.00	19.36
	33.46	Average	H				41.46	54.00	12.54
	43.62	Peak	V				51.62	74.00	22.38
	30.96	Average	V				38.96	54.00	15.04

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.2.1.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

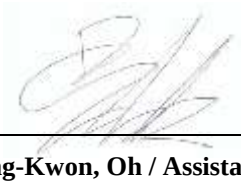
Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	42.13	Peak	H	30.84	12.31	35.74	49.54	74.00	24.46
	29.66	Average	H				37.07	54.00	16.93
	41.24	Peak	V				48.65	74.00	25.35
	31.99	Average	V				39.40	54.00	14.60
Test Data for Middle Channel									
4 884.00	42.00	Peak	H	30.01	12.43	35.80	48.64	74.00	25.36
	30.88	Average	H				37.52	54.00	16.48
	41.66	Peak	V				48.30	74.00	25.70
	34.81	Average	V				41.45	54.00	12.55
Test Data for High Channel									
4 924.00	42.90	Peak	H	31.15	12.81	35.96	50.90	74.00	23.10
	29.64	Average	H				37.64	54.00	16.36
	40.64	Peak	V				48.64	74.00	25.36
	31.12	Average	V				39.12	54.00	14.88

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.2.1.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

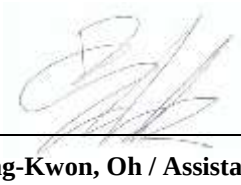
Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	41.52	Peak	H	30.84	12.31	35.74	48.93	74.00	25.07
	32.66	Average	H				40.07	54.00	13.93
	40.93	Peak	V				48.34	74.00	25.66
	30.29	Average	V				37.70	54.00	16.30
Test Data for Middle Channel									
4 884.00	39.79	Peak	H	30.01	12.43	35.80	46.43	74.00	27.57
	31.09	Average	H				37.73	54.00	16.27
	43.98	Peak	V				50.62	74.00	23.38
	30.12	Average	V				36.76	54.00	17.24
Test Data for High Channel									
4 924.00	42.11	Peak	H	31.15	12.81	35.96	50.11	74.00	23.89
	31.92	Average	H				39.92	54.00	14.08
	45.21	Peak	V				53.21	74.00	20.79
	33.41	Average	V				41.41	54.00	12.59

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.2.2.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

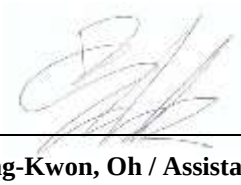
Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	42.05	Peak	H	30.84	12.31	35.74	49.46	74.00	24.54
	31.49	Average	H				38.90	54.00	15.10
	42.05	Peak	V				49.46	74.00	24.54
	30.30	Average	V				37.71	54.00	16.29
Test Data for Middle Channel									
4 884.00	42.17	Peak	H	30.01	12.43	35.80	48.81	74.00	25.19
	34.47	Average	H				41.11	54.00	12.89
	41.04	Peak	V				47.68	74.00	26.32
	31.22	Average	V				37.86	54.00	16.14
Test Data for High Channel									
4 924.00	45.08	Peak	H	31.15	12.81	35.96	53.08	74.00	20.92
	35.05	Average	H				43.05	54.00	10.95
	44.18	Peak	V				52.18	74.00	21.82
	35.14	Average	V				43.14	54.00	10.86

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.2.2.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

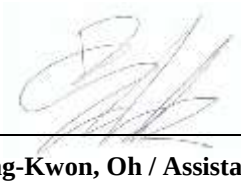
Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	45.26	Peak	H	30.84	12.31	35.74	52.67	74.00	21.33
	31.46	Average	H				38.87	54.00	15.13
	42.93	Peak	V				50.34	74.00	23.66
	32.41	Average	V				39.82	54.00	14.18
Test Data for Middle Channel									
4 884.00	40.92	Peak	H	30.01	12.43	35.80	47.56	74.00	26.44
	32.28	Average	H				38.92	54.00	15.08
	44.22	Peak	V				50.86	74.00	23.14
	31.18	Average	V				37.82	54.00	16.18
Test Data for High Channel									
4 924.00	41.19	Peak	H	31.15	12.81	35.96	49.19	74.00	24.81
	33.22	Average	H				41.22	54.00	12.78
	43.11	Peak	V				51.11	74.00	22.89
	33.30	Average	V				41.30	54.00	12.70

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: Hyung-Kwon, Oh / Assistant Manager

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

9.6.2.2.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

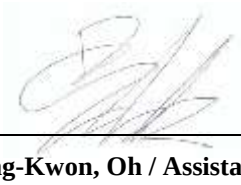
Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	43.22	Peak	H	30.84	12.31	35.74	50.63	74.00	23.37
	32.19	Average	H				39.60	54.00	14.40
	42.86	Peak	V				50.27	74.00	23.73
	29.40	Average	V				36.81	54.00	17.19
Test Data for Middle Channel									
4 884.00	43.48	Peak	H	30.01	12.43	35.80	50.12	74.00	23.88
	30.26	Average	H				36.90	54.00	17.10
	40.82	Peak	V				47.46	74.00	26.54
	29.83	Average	V				36.47	54.00	17.53
Test Data for High Channel									
4 924.00	41.88	Peak	H	31.15	12.81	35.96	49.88	74.00	24.12
	34.98	Average	H				42.98	54.00	11.02
	41.28	Peak	V				49.28	74.00	24.72
	30.87	Average	V				38.87	54.00	15.13

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: Hyung-Kwon, Oh / Assistant Manager

9.6.2.3 Test data for 802.11n_HT20 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

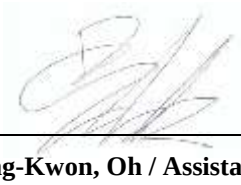
Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	45.05	Peak	H	30.84	12.31	35.74	52.46	74.00	21.54
	33.40	Average	H				40.81	54.00	13.19
	43.23	Peak	V				50.64	74.00	23.36
	31.03	Average	V				38.44	54.00	15.56
Test Data for Middle Channel									
4 884.00	41.01	Peak	H	30.01	12.43	35.80	47.65	74.00	26.35
	35.37	Average	H				42.01	54.00	11.99
	41.90	Peak	V				48.54	74.00	25.46
	33.70	Average	V				40.34	54.00	13.66
Test Data for High Channel									
4 924.00	41.60	Peak	H	31.15	12.81	35.96	49.60	74.00	24.40
	29.19	Average	H				37.19	54.00	16.81
	42.35	Peak	V				50.35	74.00	23.65
	33.82	Average	V				41.82	54.00	12.18

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

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

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



Tested by: Hyung-Kwon, Oh / Assistant Manager

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

9.6.2.4 Test data for 802.11n_HT40 WLAN Mode (3 Tx Multiple Transmit (Worst case))

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

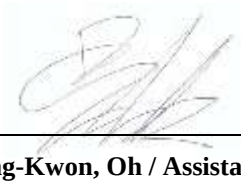
Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 844.00	43.21	Peak	H	30.84	12.31	35.76	50.60	74.00	23.40
	30.82	Average	H				38.21	54.00	15.79
	41.94	Peak	V				49.33	74.00	24.67
	34.12	Average	V				41.51	54.00	12.49
Test Data for Middle Channel									
4 884.00	43.25	Peak	H	30.01	12.43	35.80	49.89	74.00	24.11
	30.66	Average	H				37.30	54.00	16.70
	43.54	Peak	V				50.18	74.00	23.82
	34.77	Average	V				41.41	54.00	12.59
Test Data for High Channel									
4 904.00	44.33	Peak	H	31.15	12.81	35.94	52.35	74.00	21.65
	32.55	Average	H				40.57	54.00	13.43
	40.87	Peak	V				48.89	74.00	25.11
	34.24	Average	V				42.26	54.00	11.74

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: Hyung-Kwon, Oh / Assistant Manager

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

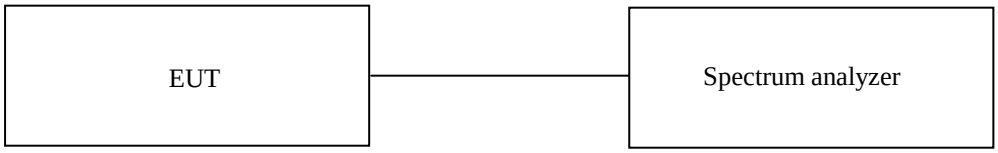
Temperature : 23 ℃

Relative humidity : 41 % 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 ≤ RBW ≤100 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	Apr. 05, 2017 (1Y)

All test equipment used is calibrated on a regular basis.

10.4 Test data for 802.11b WLAN Mode

10.4.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

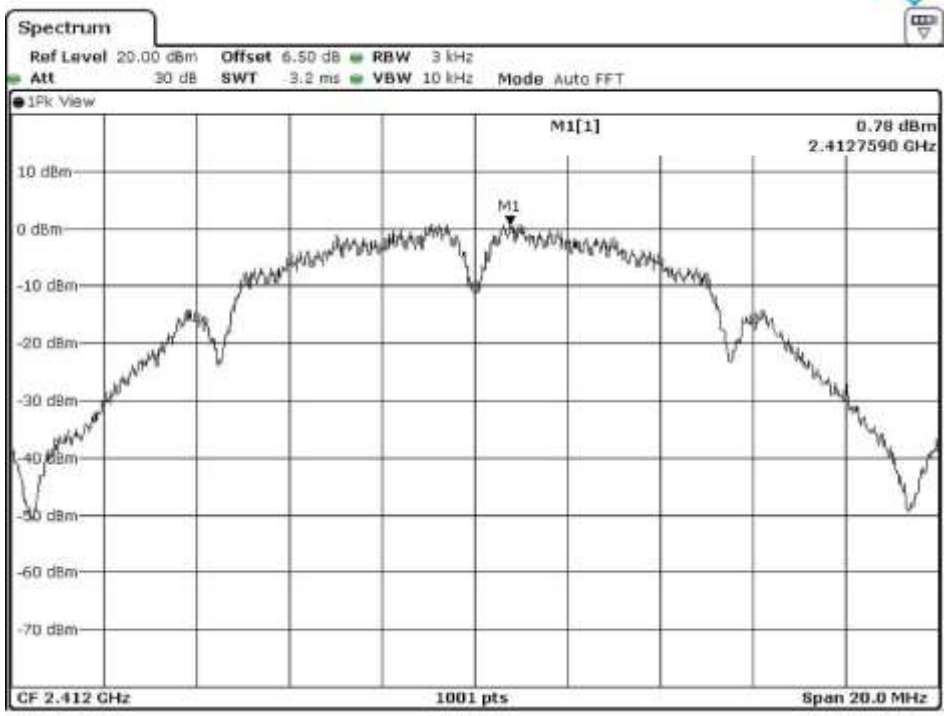
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

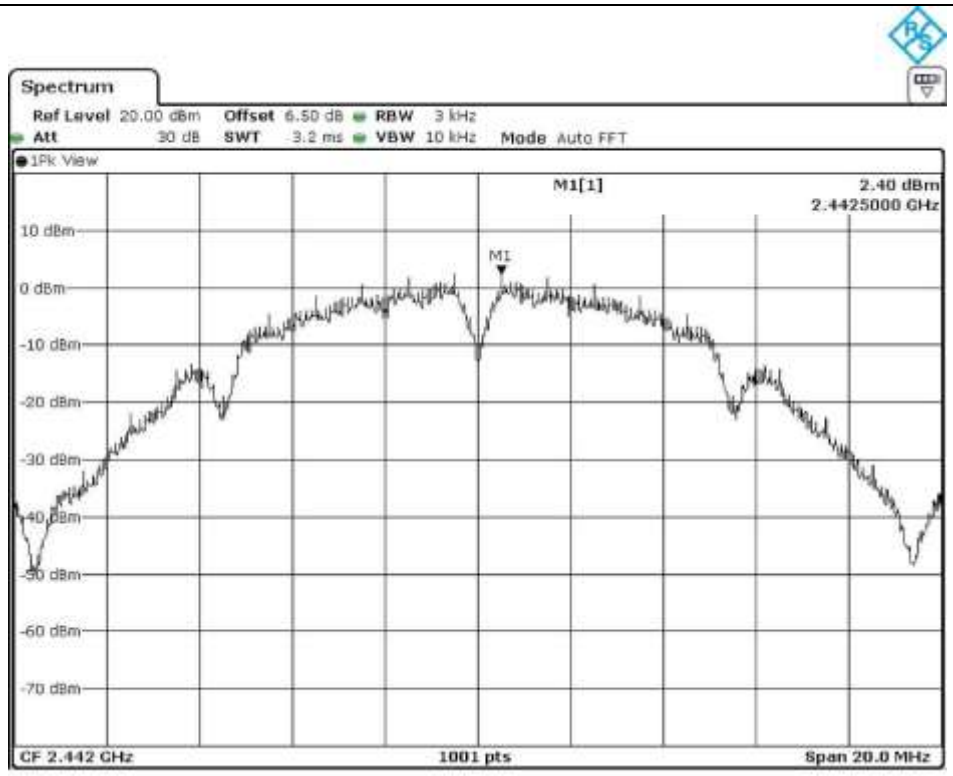
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	0.78	8.00	7.22
Middle	2 442.00	2.40	8.00	5.60
High	2 462.00	0.93	8.00	7.07

Remark. Margin = Limit – Measured value

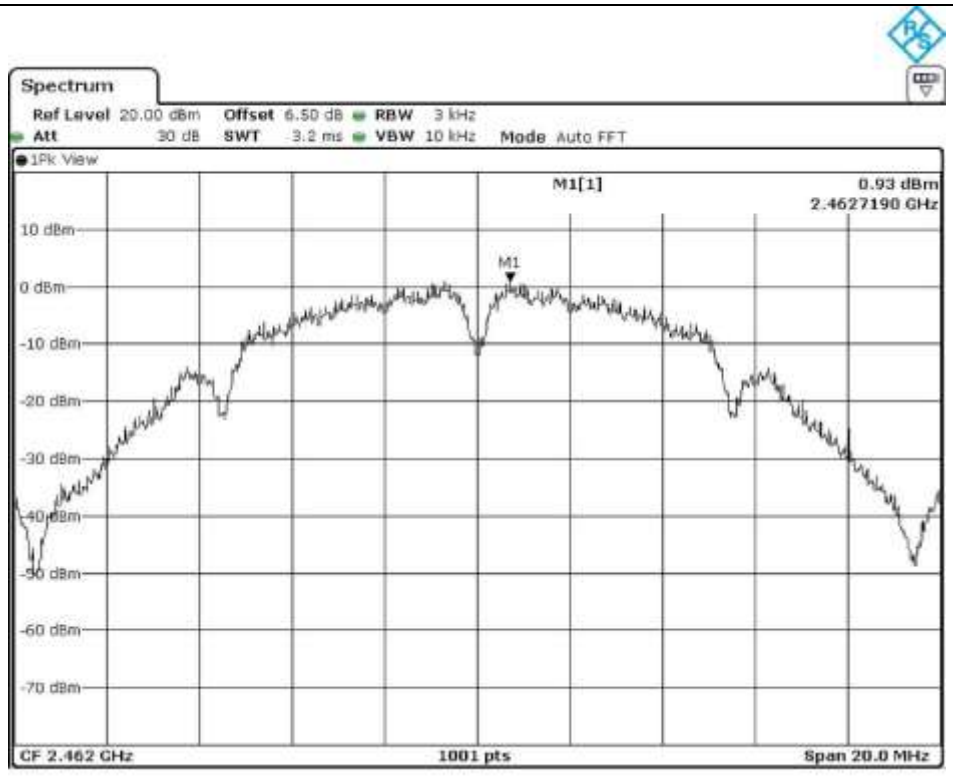
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.4.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

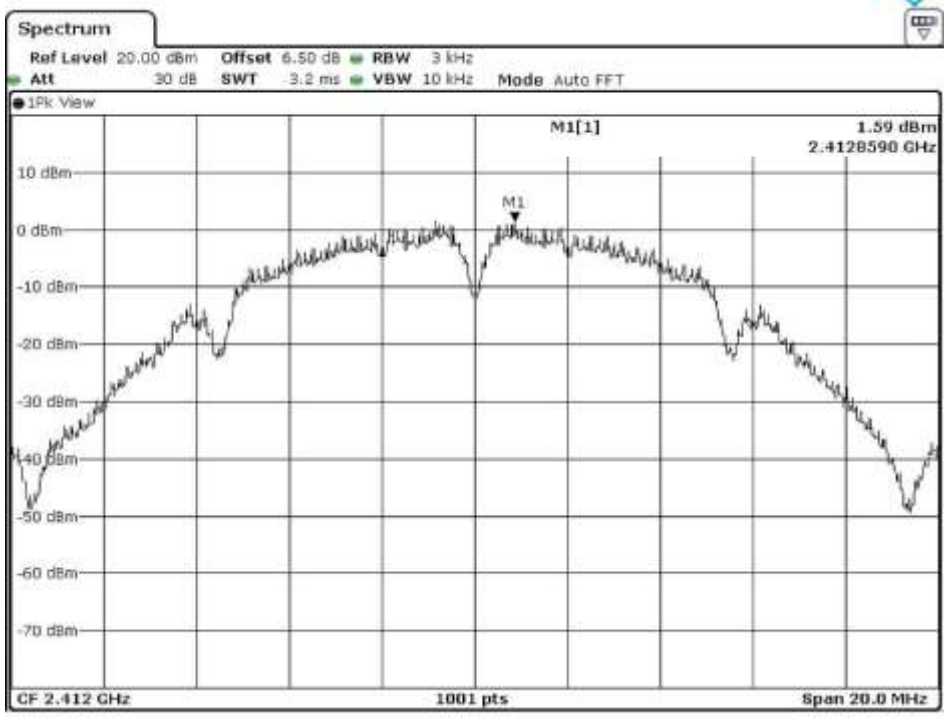
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

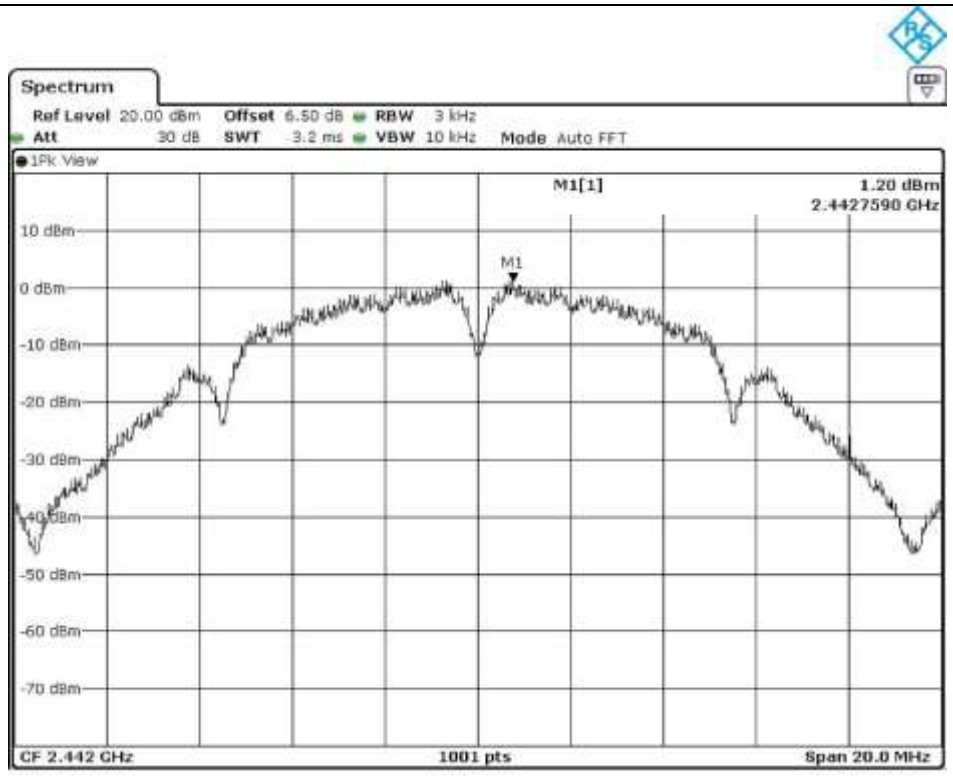
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	1.59	8.00	6.41
Middle	2 442.00	1.20	8.00	6.80
High	2 462.00	1.96	8.00	6.04

Remark. Margin = Limit – Measured value

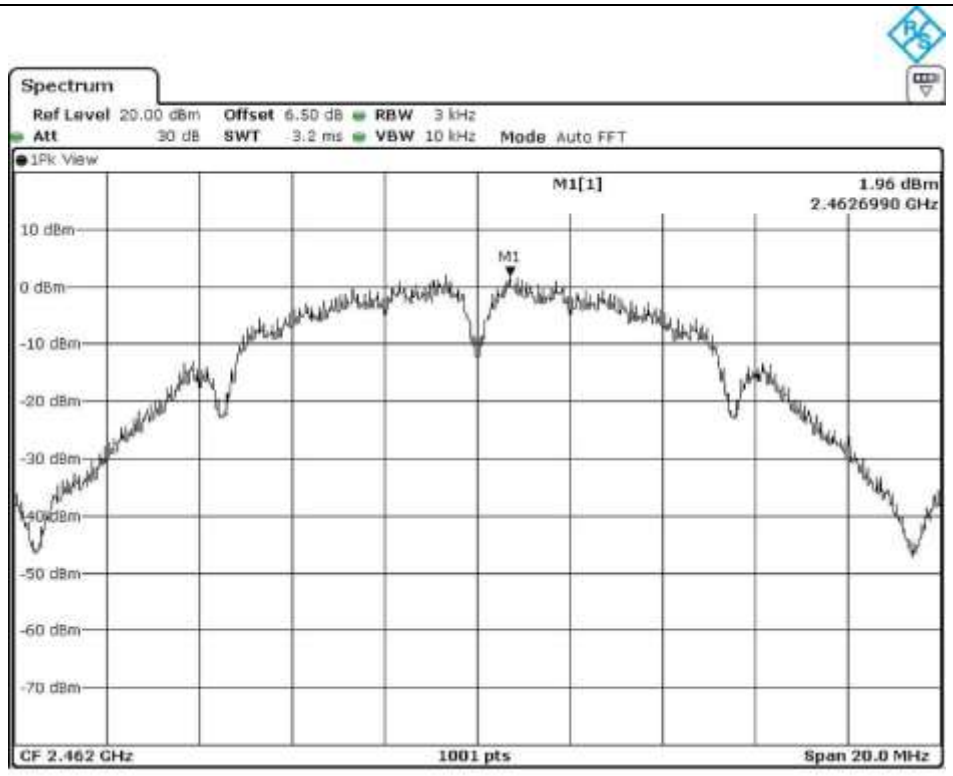
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.4.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

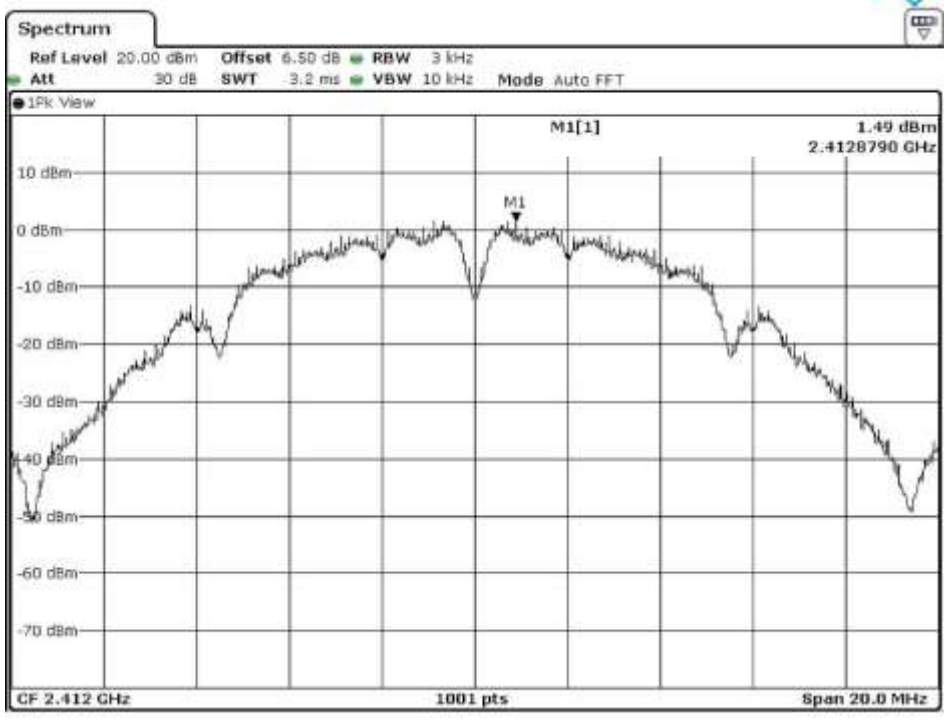
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

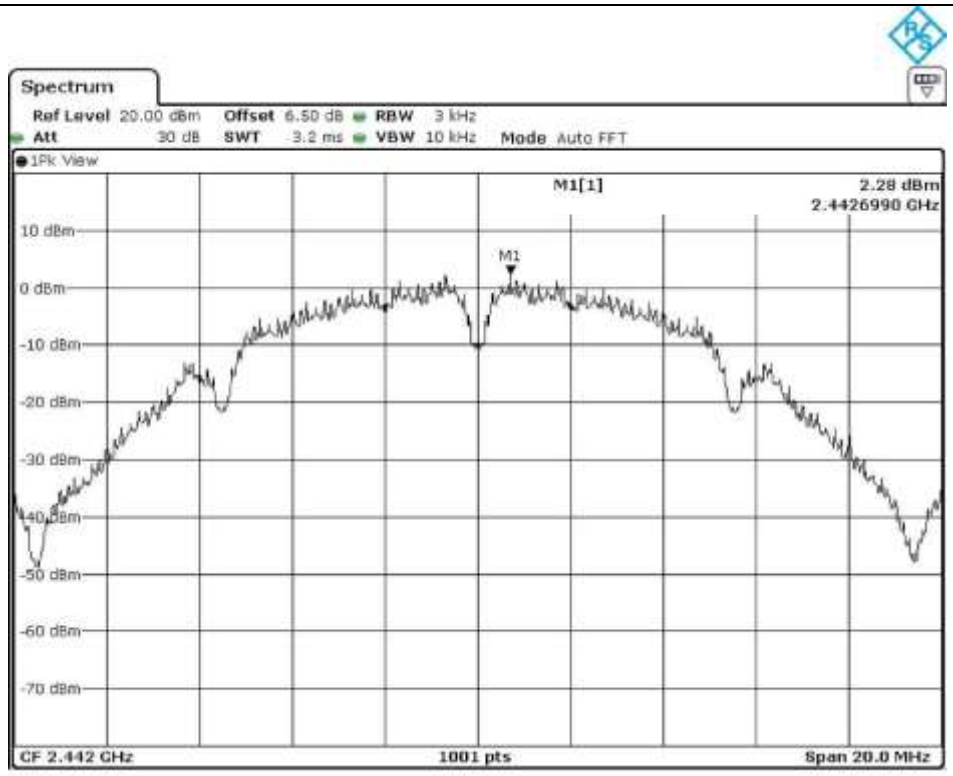
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	1.49	8.00	6.51
Middle	2 442.00	2.28	8.00	5.72
High	2 462.00	2.00	8.00	6.00

Remark. Margin = Limit – Measured value

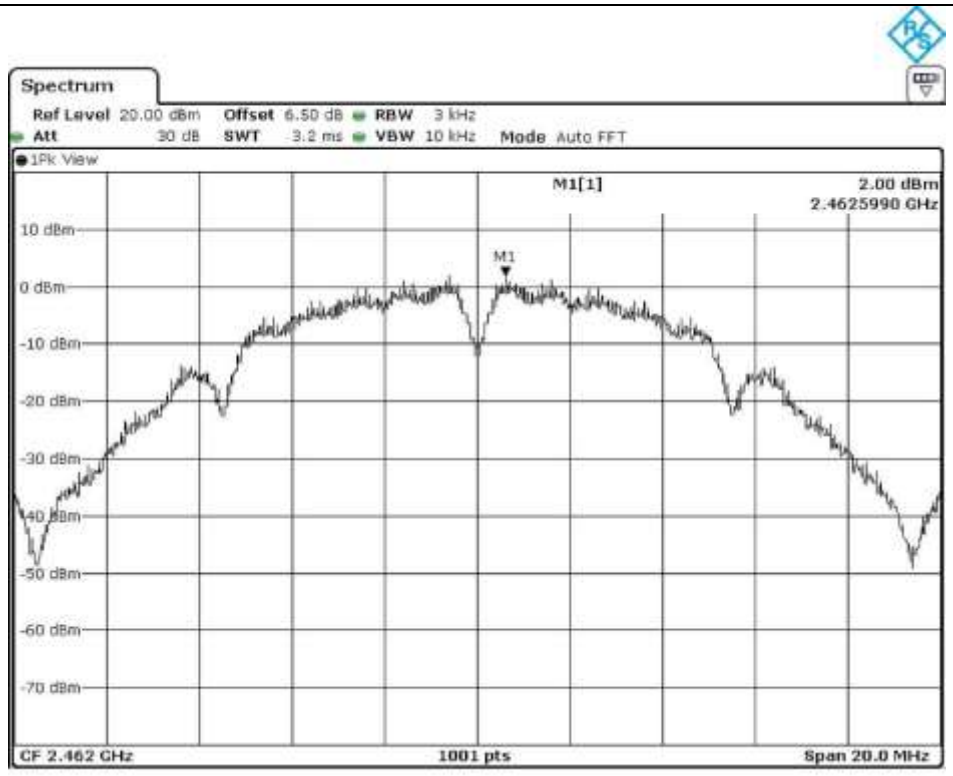
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.5 Test data for 802.11g WLAN Mode

10.5.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

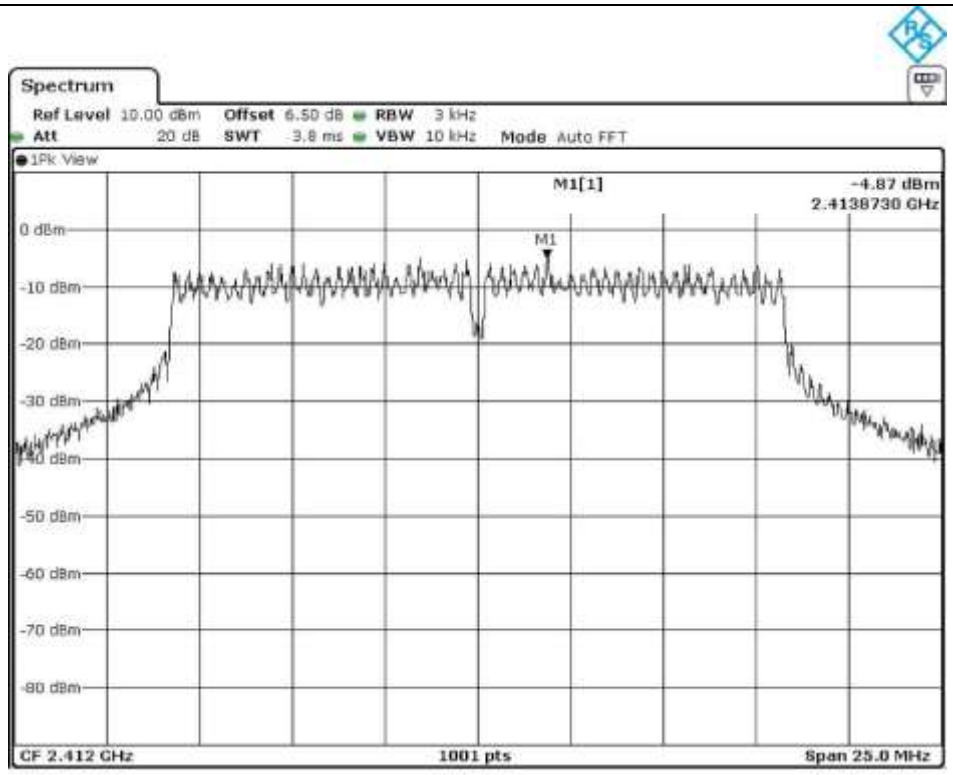
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

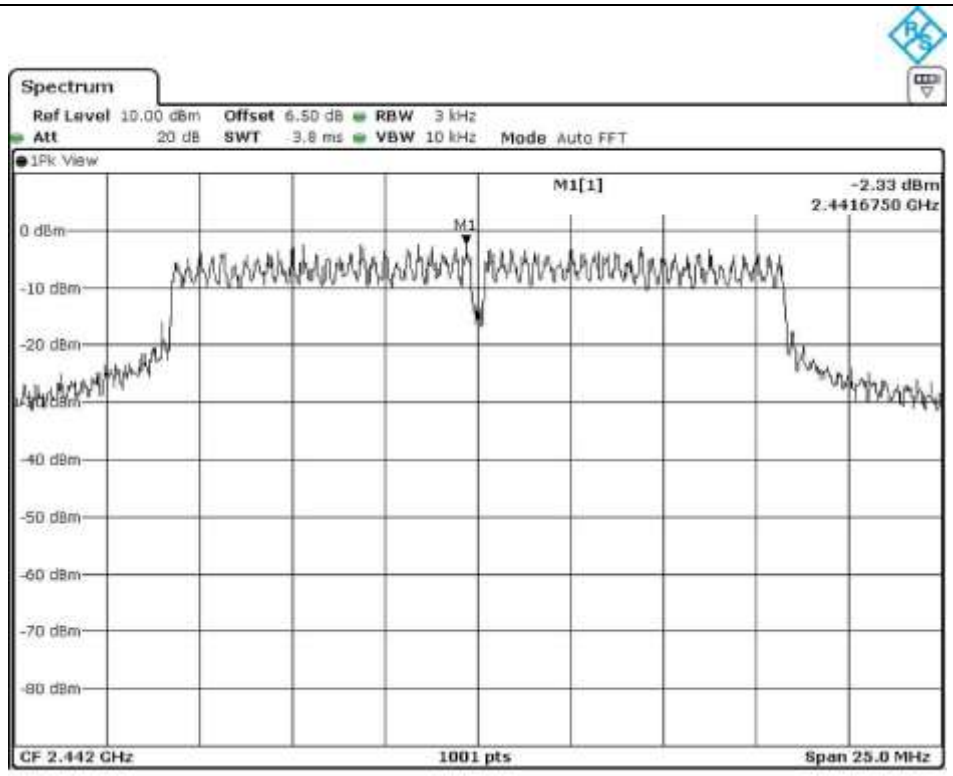
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-4.87	8.00	12.87
Middle	2 442.00	-2.33	8.00	10.33
High	2 462.00	-2.19	8.00	10.19

Remark. Margin = Limit – Measured value

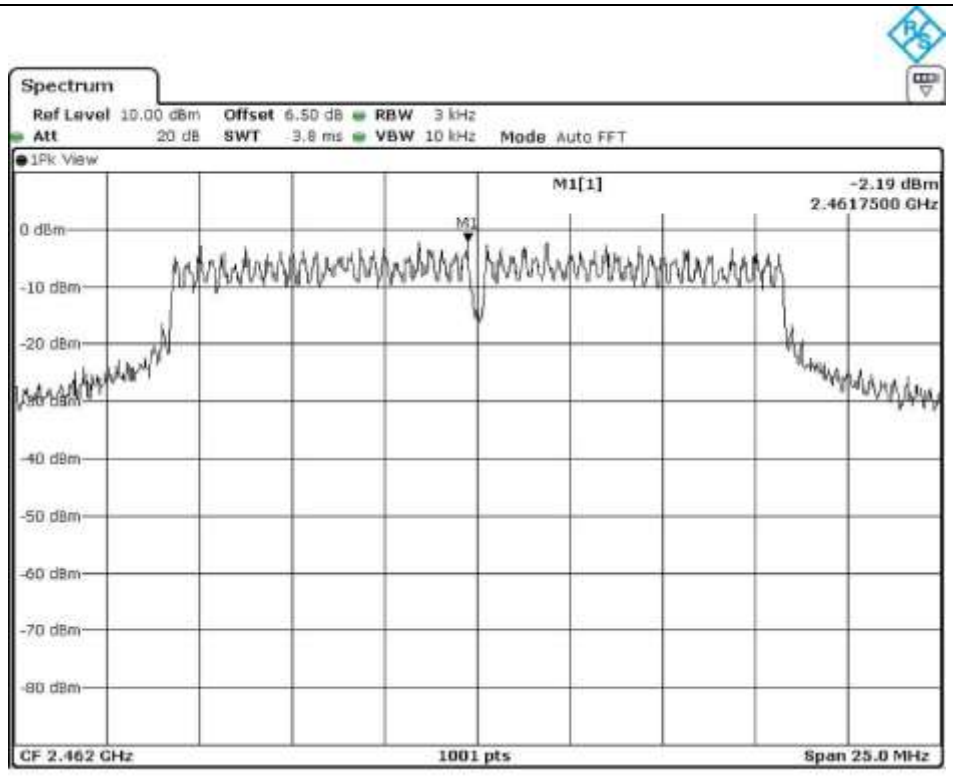
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.5.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

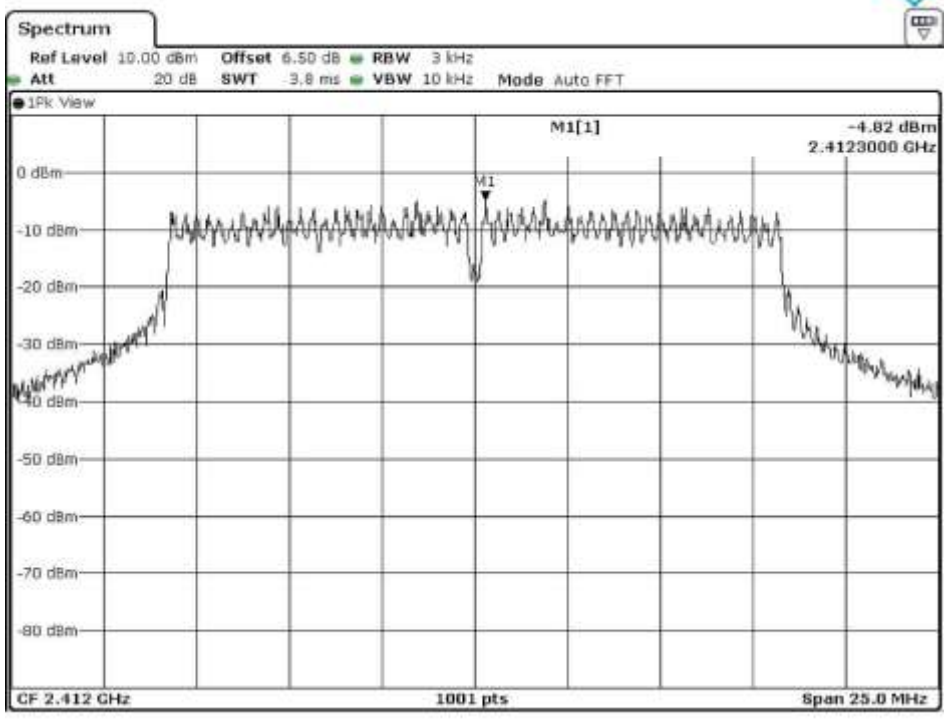
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

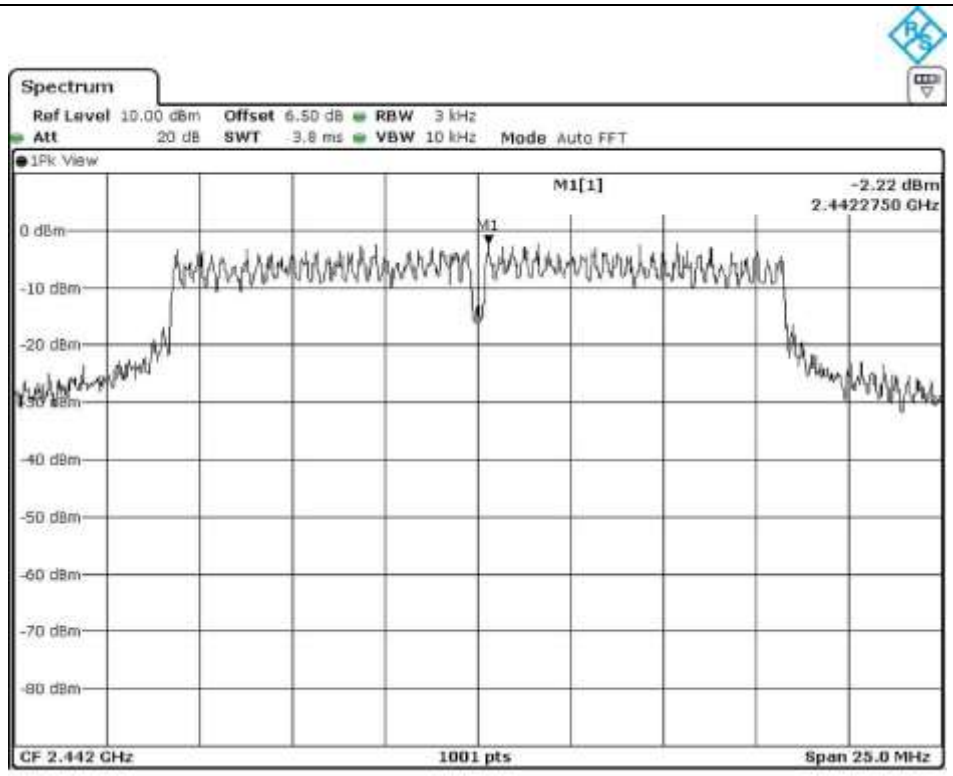
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-4.82	8.00	12.82
Middle	2 442.00	-2.22	8.00	10.22
High	2 462.00	-1.93	8.00	9.93

Remark. Margin = Limit – Measured value

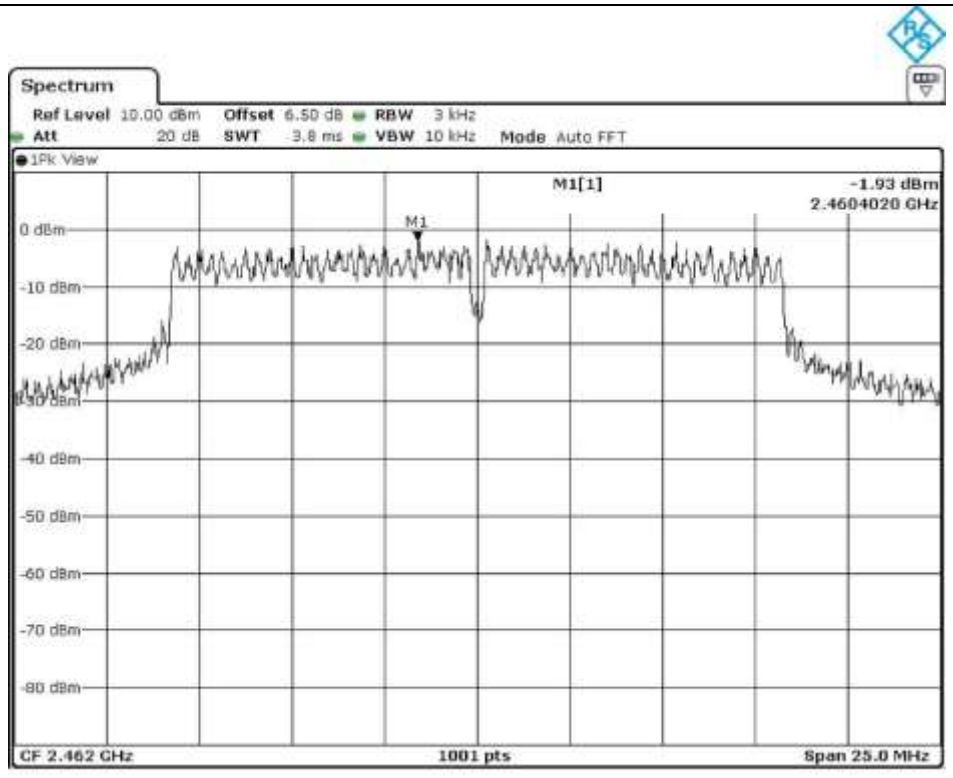
Tested by: Hyung-Kwon, Oh / Assistant Manager



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)

10.5.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

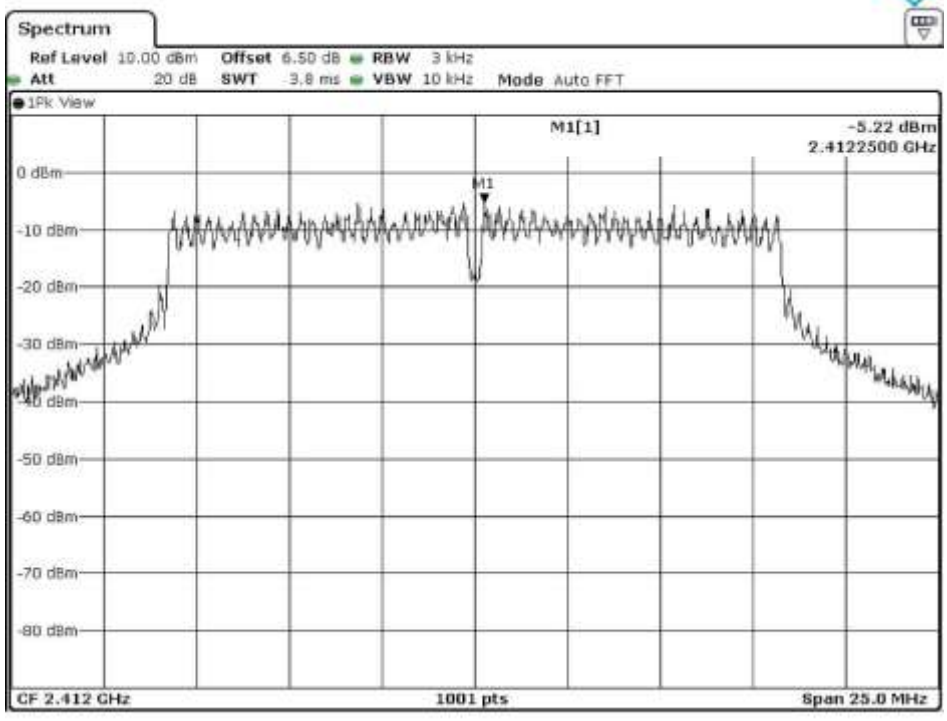
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

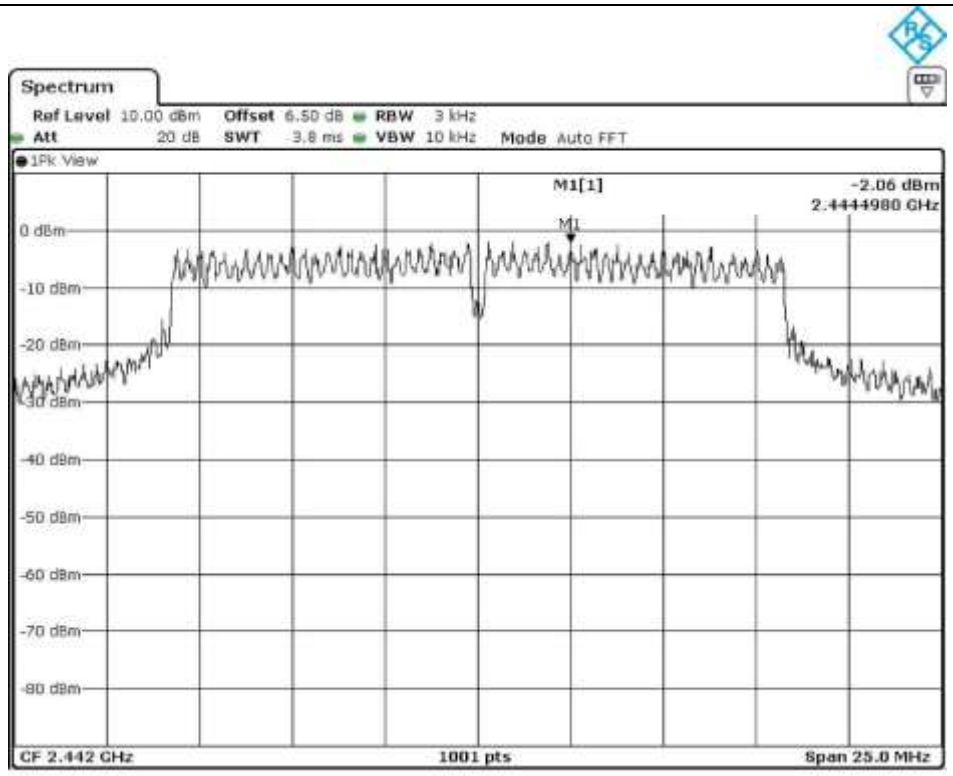
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-5.22	8.00	13.22
Middle	2 442.00	-2.06	8.00	10.06
High	2 462.00	-1.63	8.00	9.63

Remark. Margin = Limit – Measured value

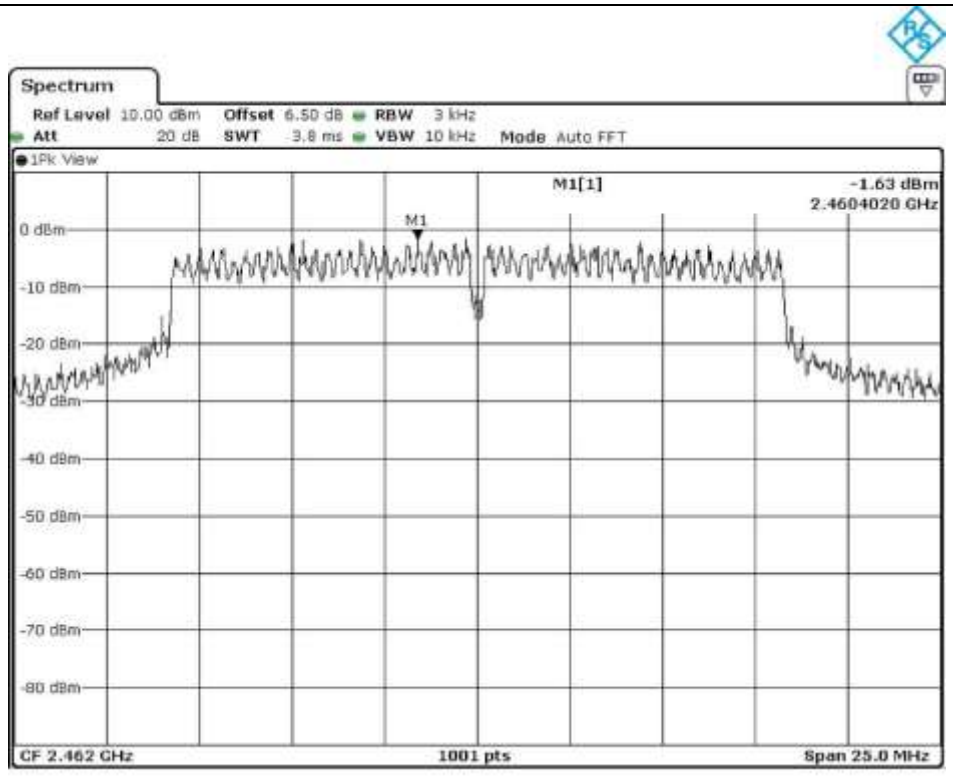
Tested by: Hyung-Kwon, Oh / Assistant Manager



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

10.6.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

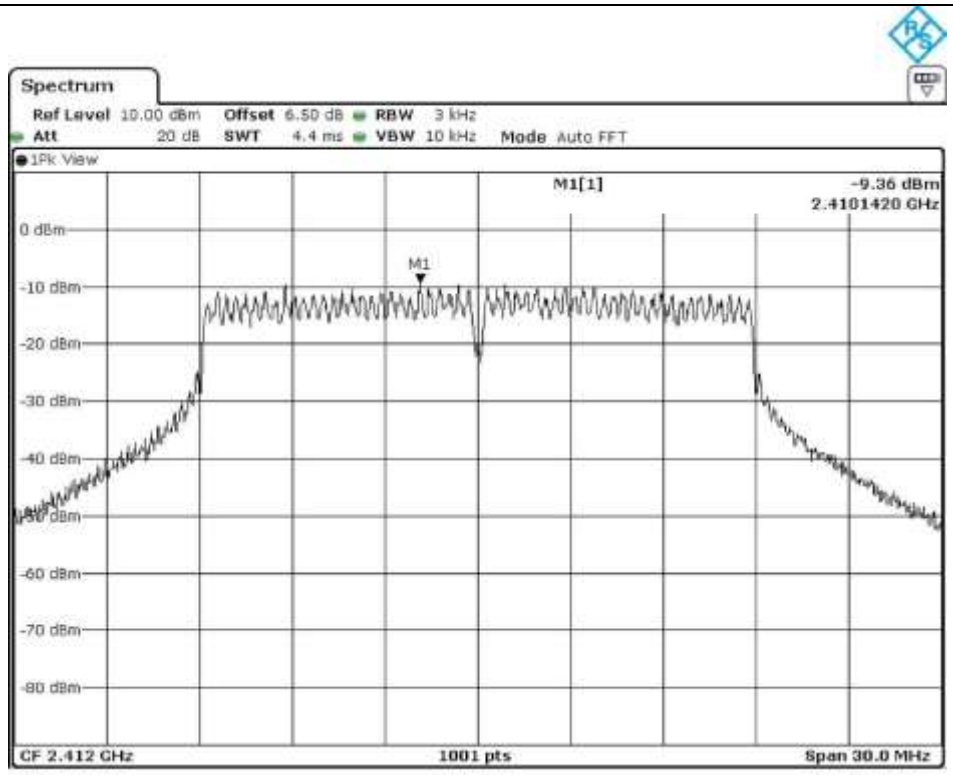
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

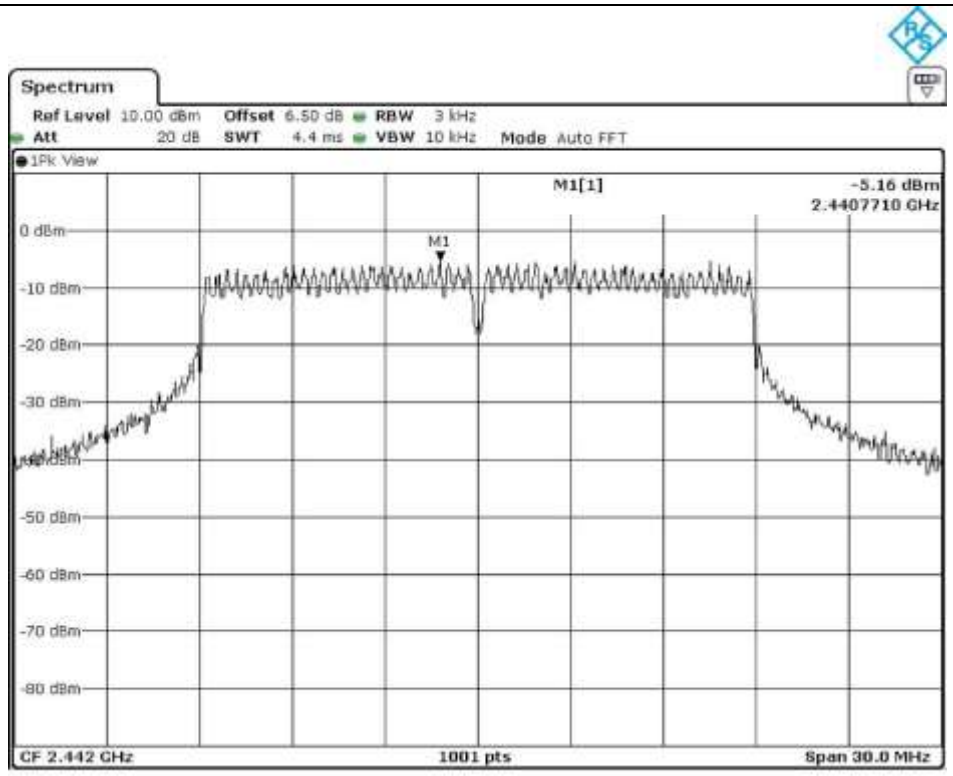
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-9.36	8.00	17.36
Middle	2 442.00	-5.16	8.00	13.16
High	2 462.00	-4.28	8.00	12.28

Remark. Margin = Limit – Measured value

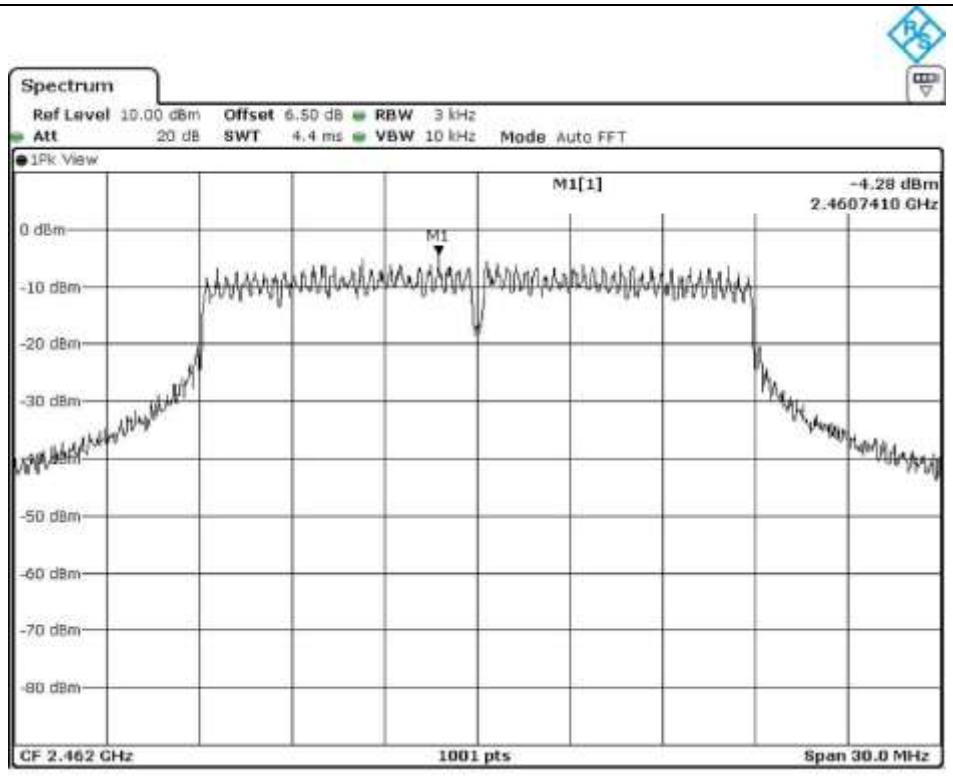
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.6.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

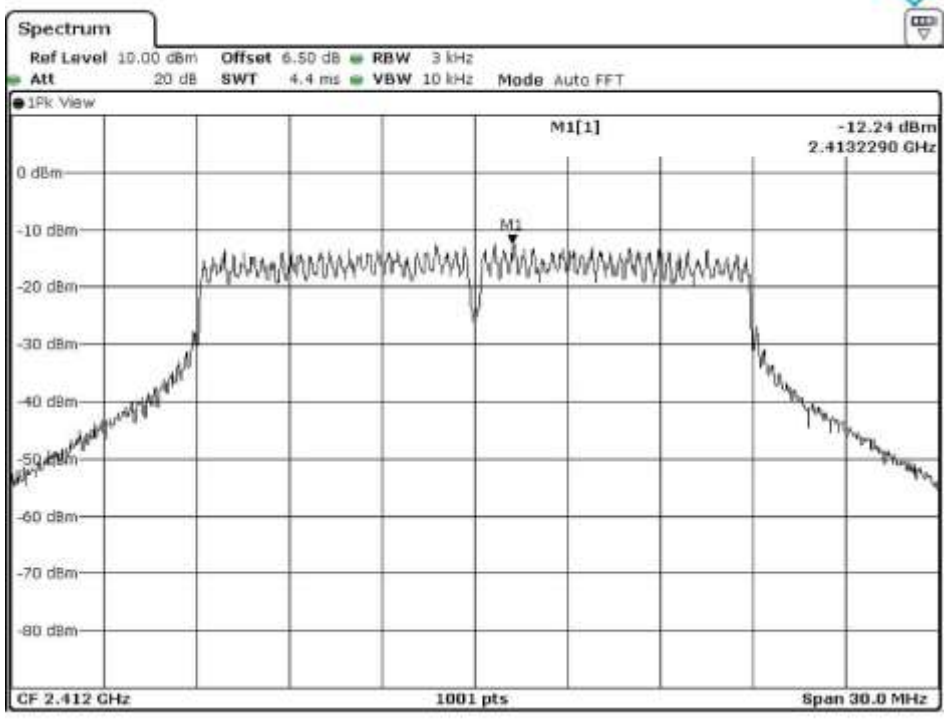
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

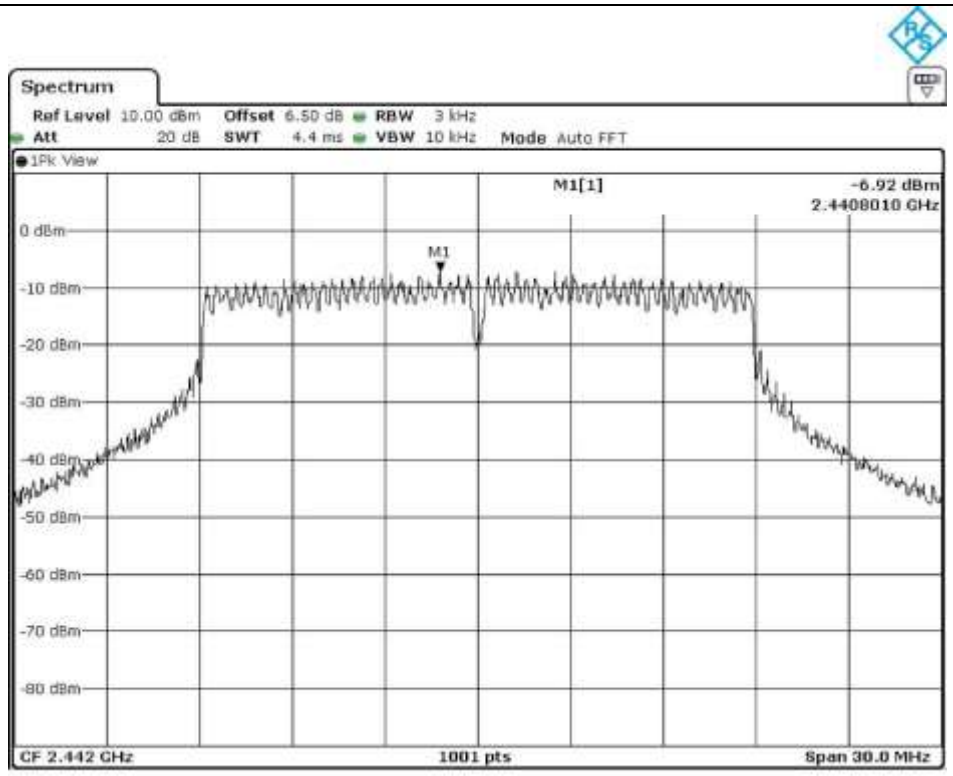
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-12.24	8.00	20.24
Middle	2 442.00	-6.92	8.00	14.92
High	2 462.00	-7.23	8.00	15.23

Remark. Margin = Limit – Measured value

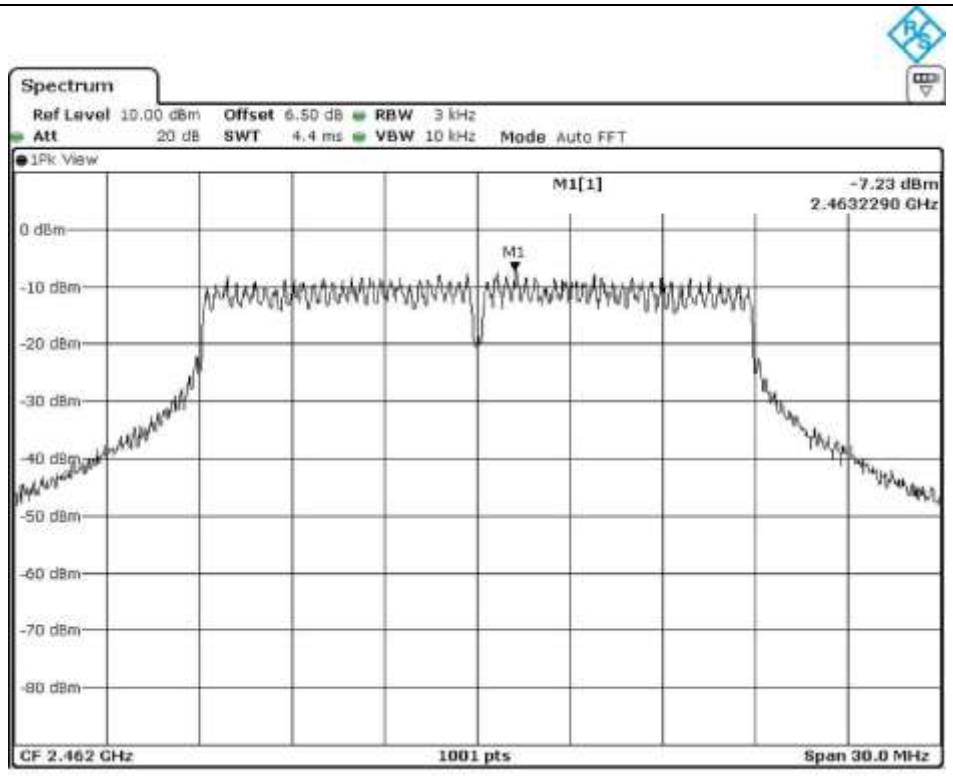
Tested by: Hyung-Kwon, Oh / Assistant Manager



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)

10.6.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

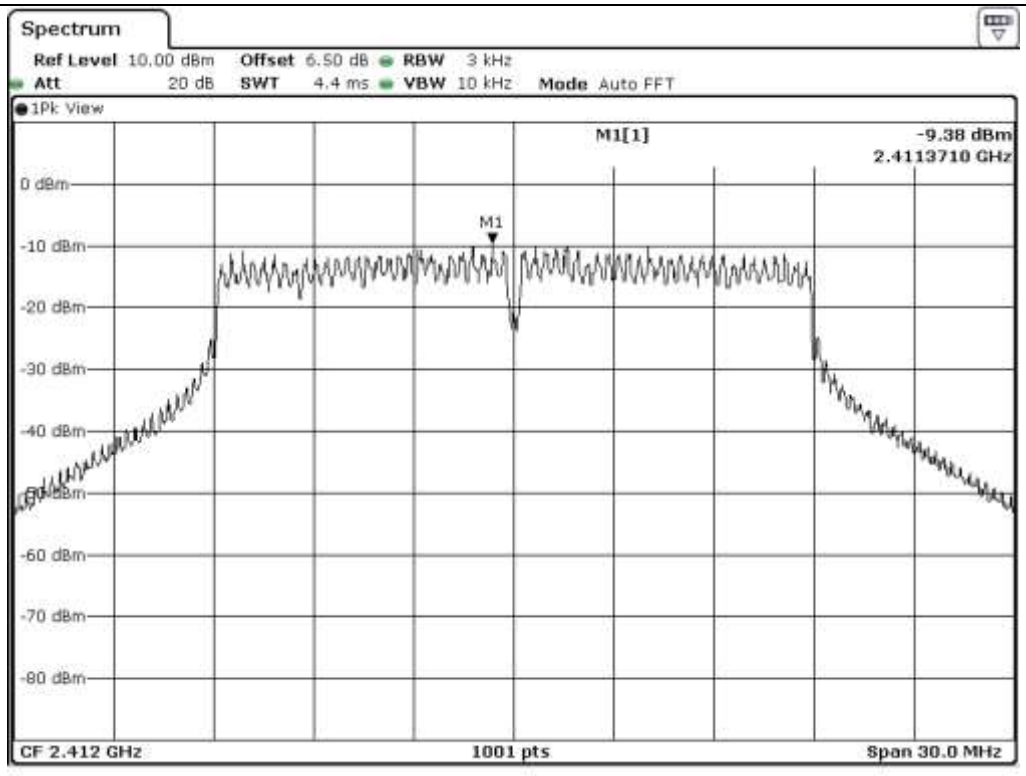
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

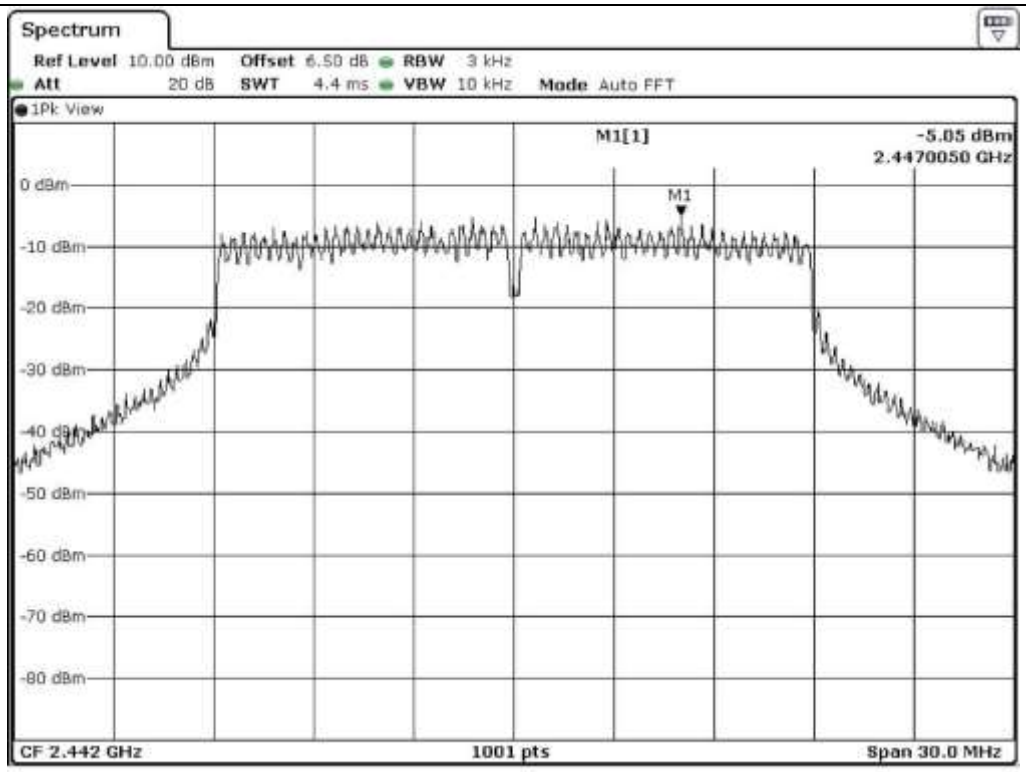
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-9.38	8.00	17.38
Middle	2 442.00	-5.05	8.00	13.05
High	2 462.00	-5.60	8.00	13.60

Remark. Margin = Limit – Measured value

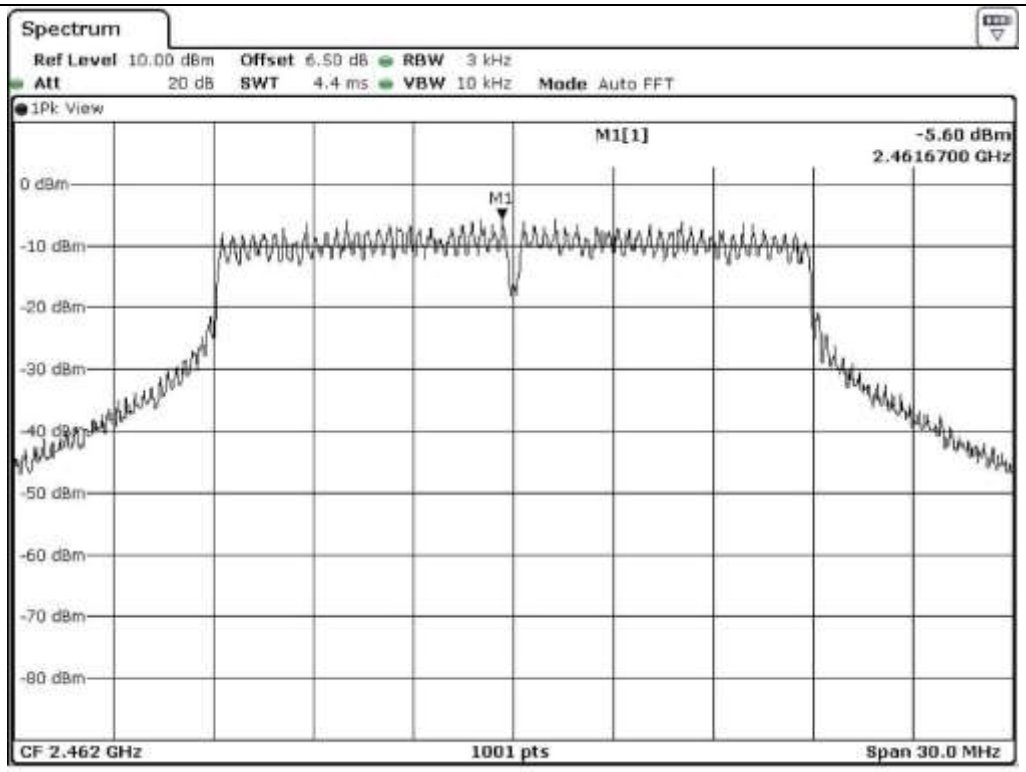
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.6.4 Test data for Multiple transmit

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	CALCULATED POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-5.36	1.90	7.26
Middle	2 442.00	-0.86	1.90	2.76
High	2 462.00	-0.77	1.90	2.67

Remark 1 : Margin = Limit – Measured value

Remark 2 : Calculated Power Density = $10\log(10^{(\text{Antenna 0 Power Density}/10)}+10^{(\text{Antenna 1 Power Density}/10)}+10^{(\text{Antenna 2 Power Density}/10)})$

Tested by: Hyung-Kwon, Oh / Assistant Manager

10.7 Test data for 802.11n_HT40 WLAN Mode

10.7.1 Test data for Antenna 0

-. Test Date : September 20, 2017 ~ September 27, 2017

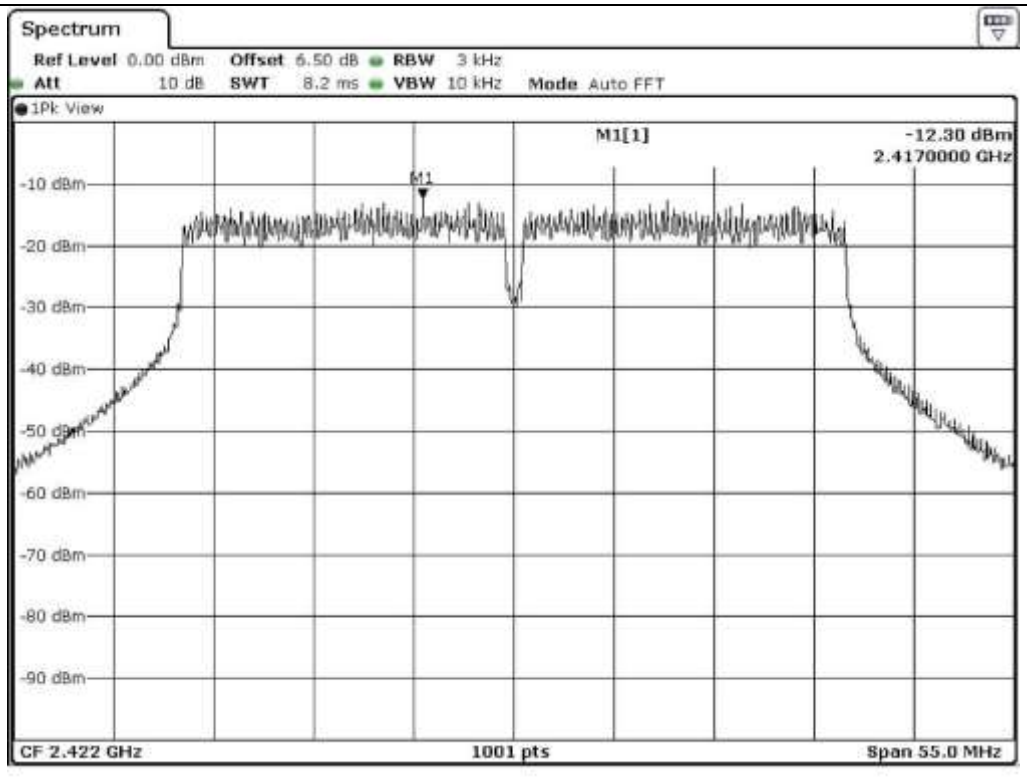
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

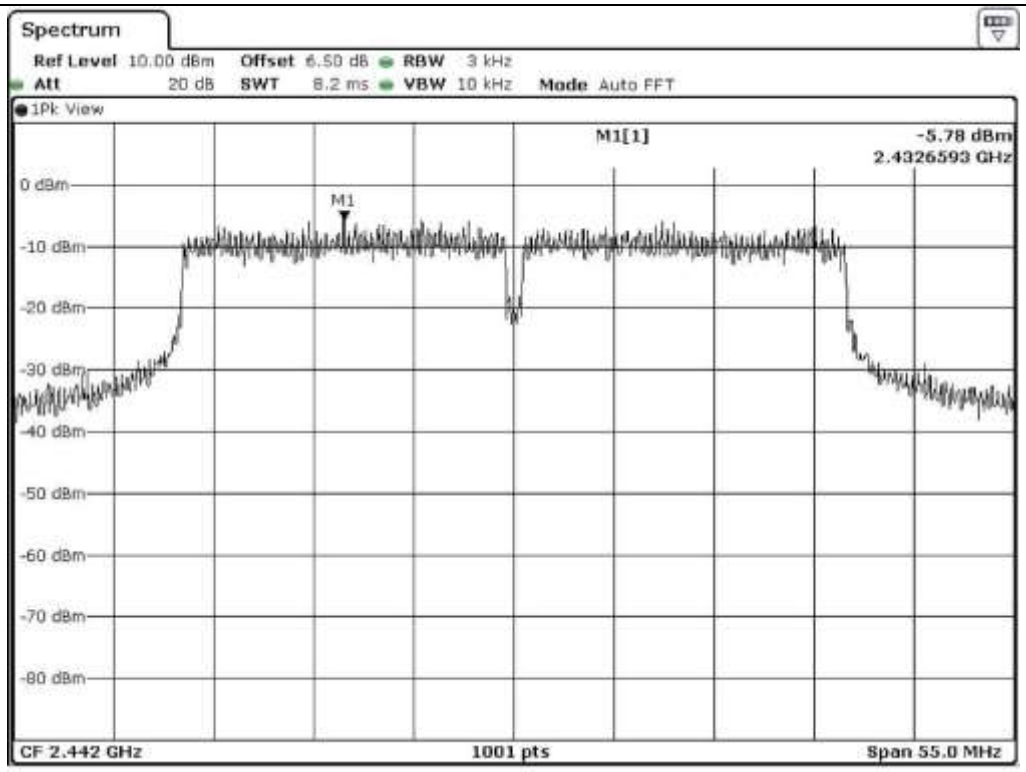
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-12.30	8.00	20.30
Middle	2 442.00	-5.78	8.00	13.78
High	2 452.00	-5.60	8.00	13.60

Remark. Margin = Limit – Measured value

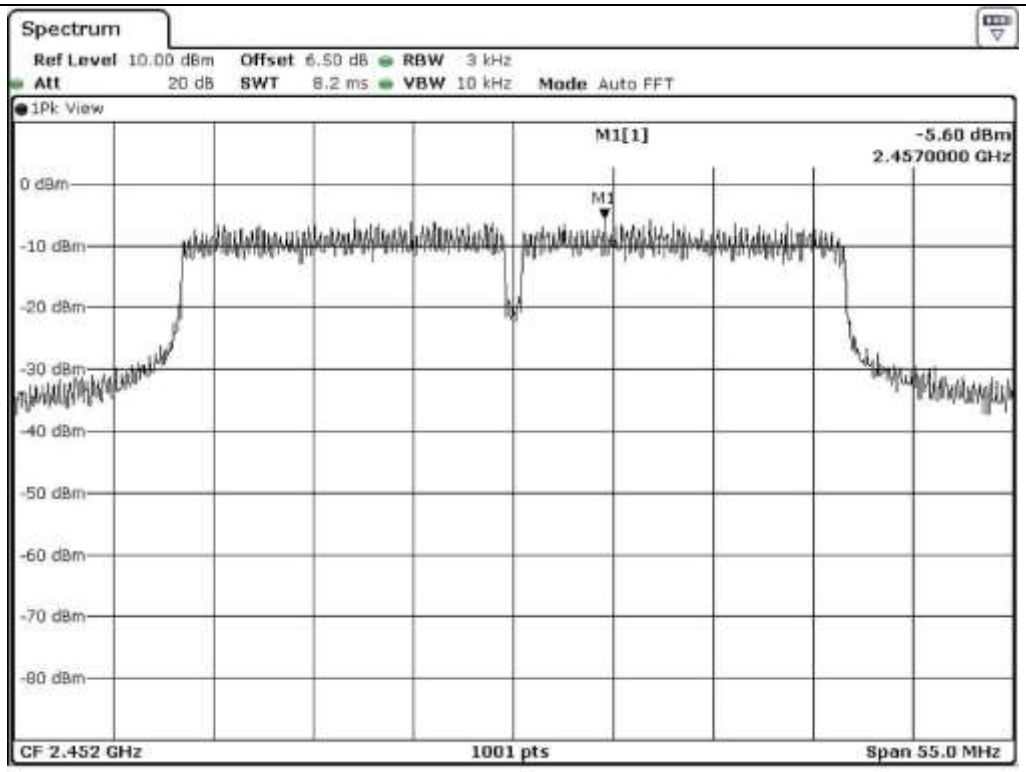
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.7.2 Test data for Antenna 1

-. Test Date : September 20, 2017 ~ September 27, 2017

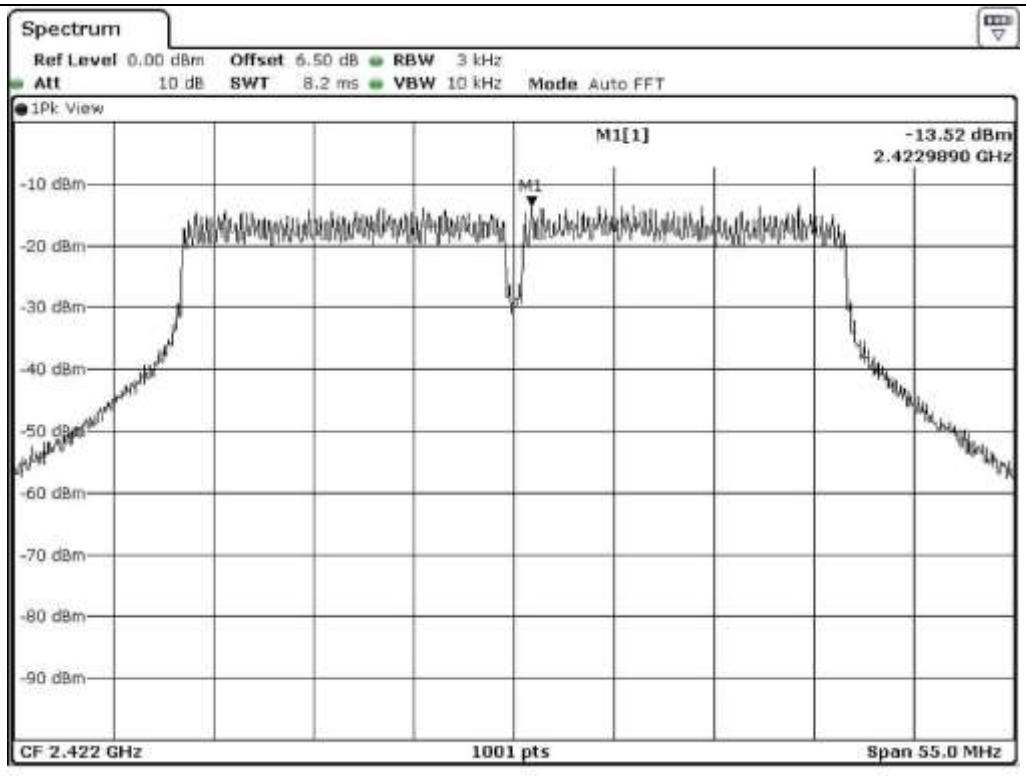
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

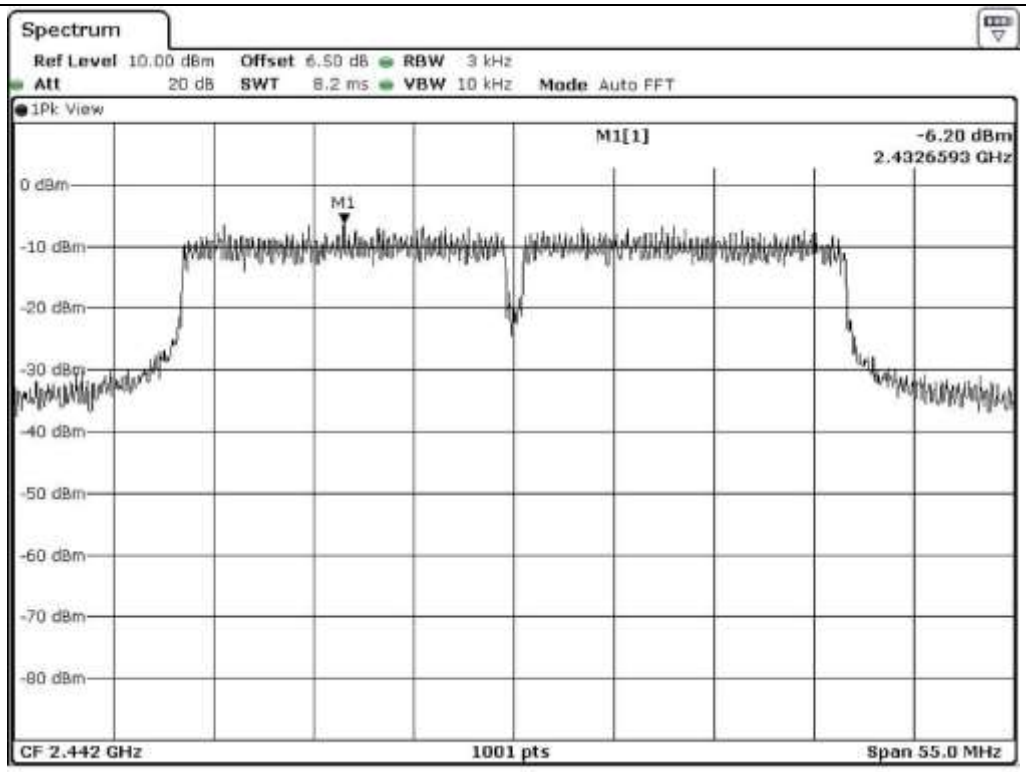
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-13.52	8.00	21.52
Middle	2 442.00	-6.20	8.00	14.20
High	2 452.00	-5.29	8.00	13.29

Remark. Margin = Limit – Measured value

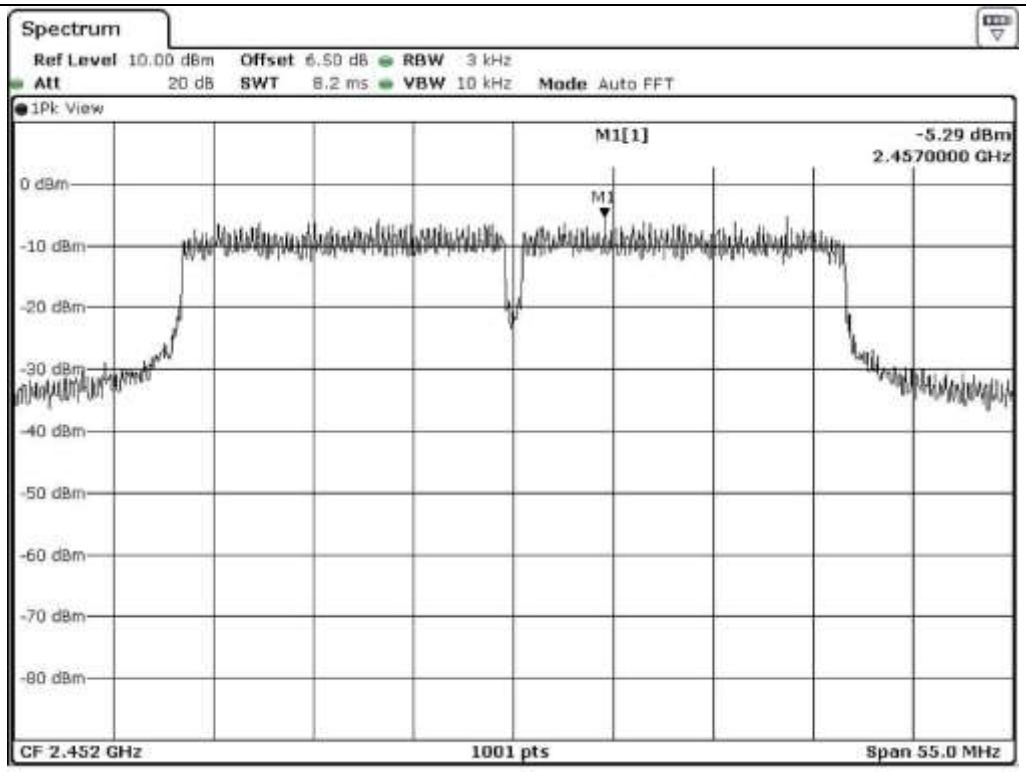
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

10.7.3 Test data for Antenna 2

-. Test Date : September 20, 2017 ~ September 27, 2017

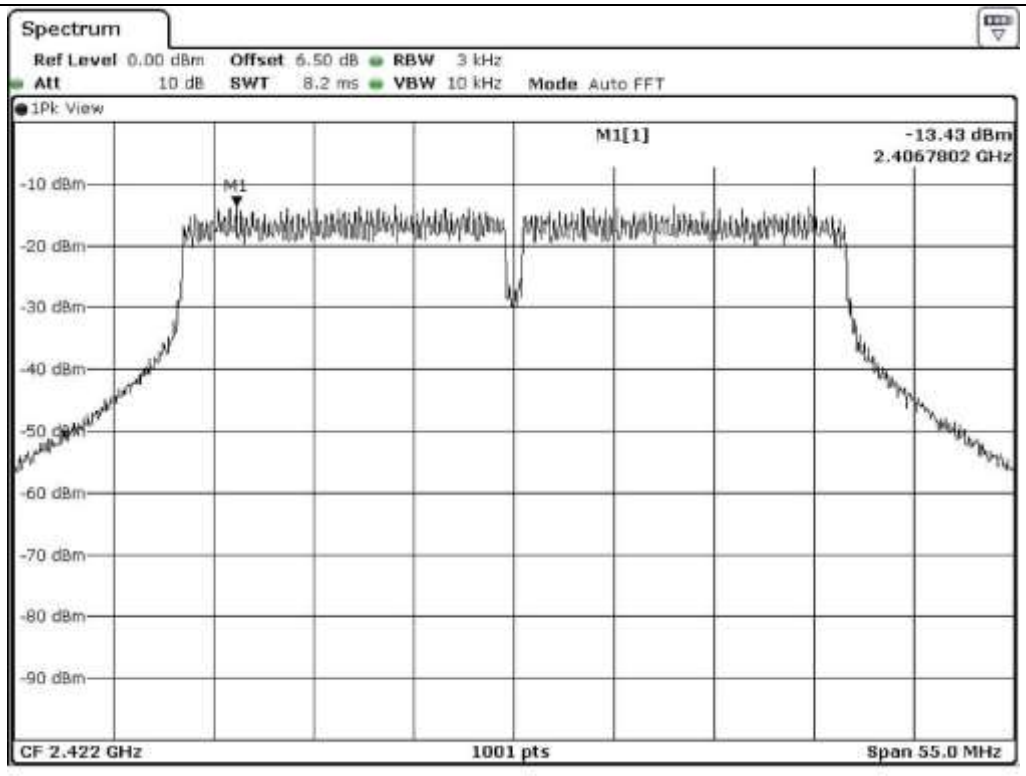
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

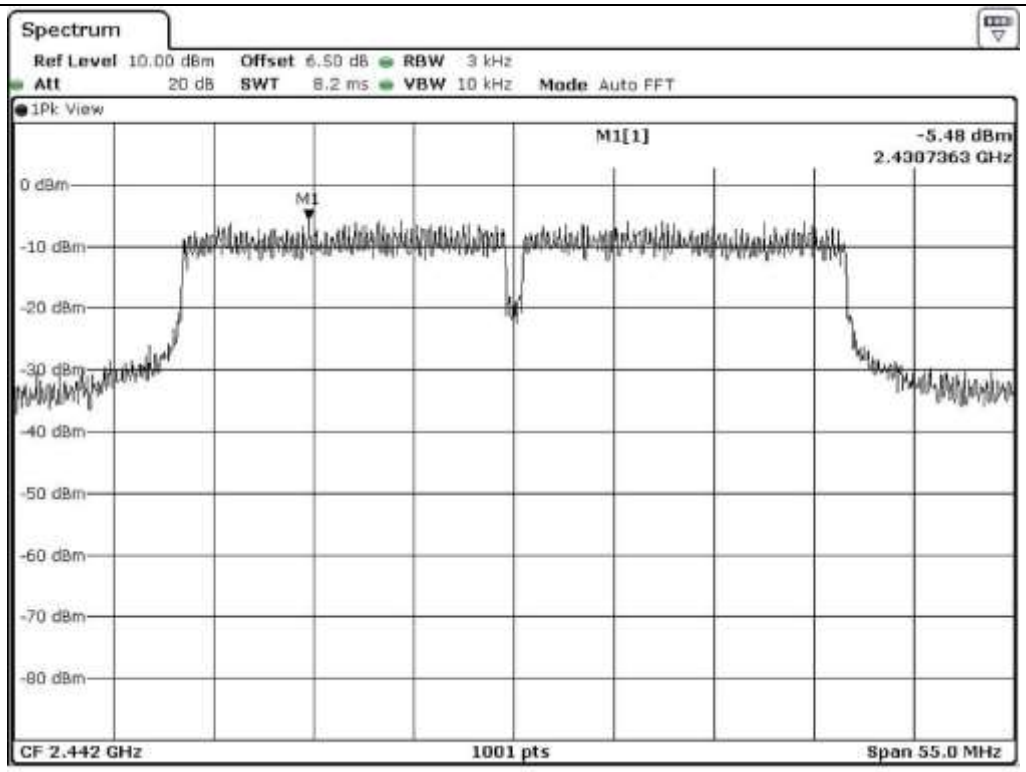
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-13.43	8.00	21.43
Middle	2 442.00	-5.48	8.00	13.48
High	2 452.00	-4.35	8.00	12.35

Remark. Margin = Limit – Measured value

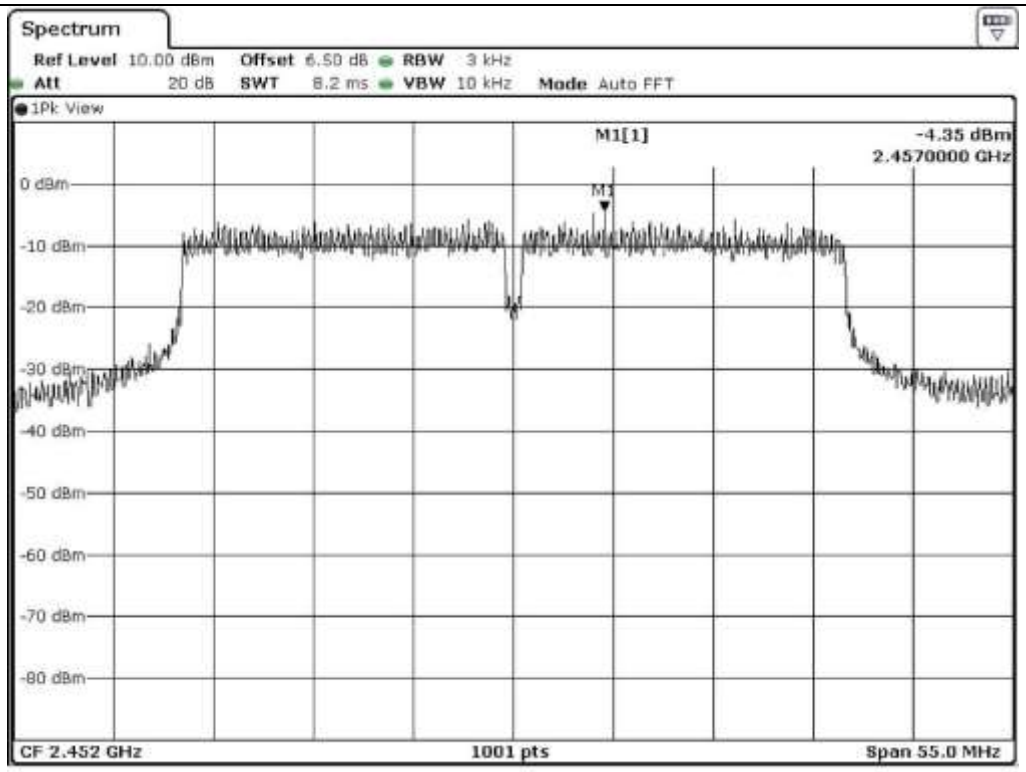
Tested by: Hyung-Kwon, Oh / Assistant Manager



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)

10.7.4 Test data for Multiple transmit

-. Test Date : September 20, 2017 ~ September 27, 2017

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	CALCULATED POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-8.28	1.90	10.18
Middle	2 442.00	-1.04	1.90	2.94
High	2 452.00	-0.28	1.90	2.18

Remark 1 : Margin = Limit – Measured value

Remark 2 : Calculated Power Density = $10\log(10^{(\text{Antenna 0 Power Density}/10)}+10^{(\text{Antenna 1 Power Density}/10)}+10^{(\text{Antenna 2 Power Density}/10)})$

Tested by: Hyung-Kwon, Oh / Assistant Manager

11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : (24 ~ 25) ℃

Relative humidity : (45 ~ 46) % 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 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.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Apr. 05, 2017 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2017 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2017 (1Y)
■ -	BBV9718	Schwarzbeck	Amplifier	310	Sep. 01, 2017 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	May 26, 2017 (2Y)
■ -	BBHA 9170	Schwarzbeck	Horn Antenna	BBHA9170179	Jul. 28, 2017 (2Y)

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)

11.4 Test data for 30 MHz ~ 1 GHz

Humidity Level : (45 ~ 46) % R.H. Temperature: (24 ~ 25) ℃

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

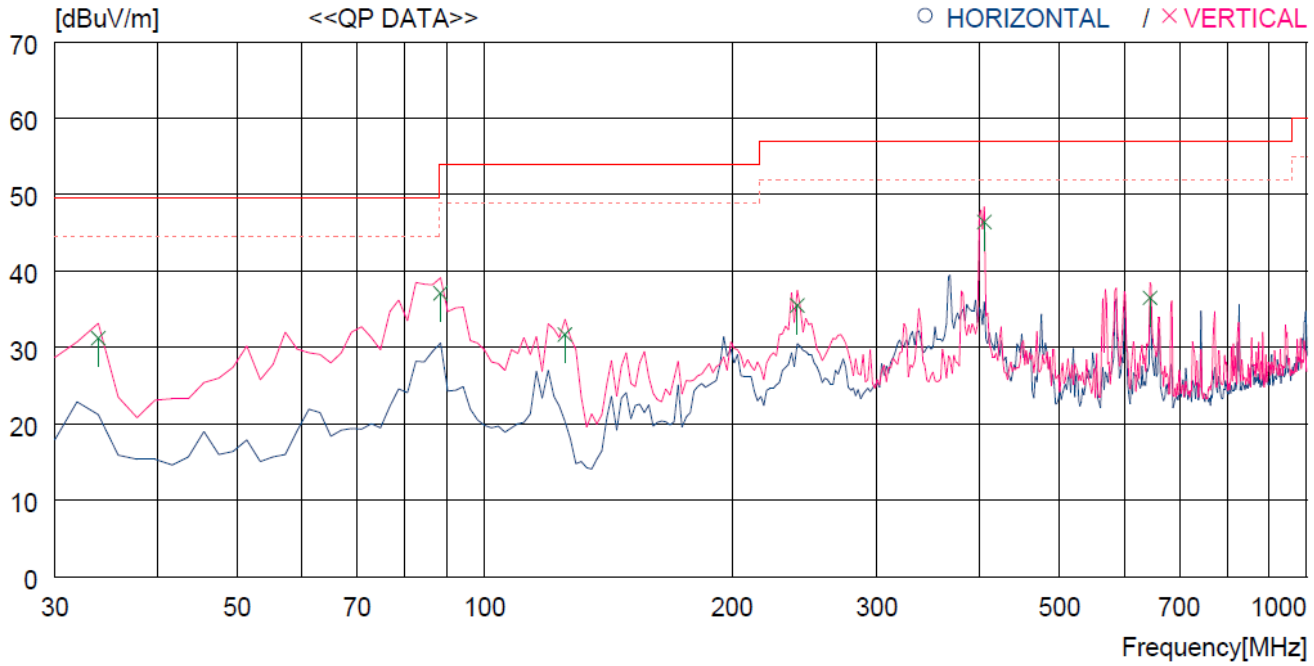
Result : PASSED

EUT : Wi-Fi Router Date: September 25, 2017

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

Note : 2.4 GHz operating mode were tested, but the worst data were recorded.

(802.11b WLAN Mode)



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]
----- Vertical ------										
1	33.888	31.2	0.0	0.0	0.0	31.2	49.5	18.3	100	134
2	88.317	37.1	0.0	0.0	0.0	37.1	54.0	16.9	200	254
3	125.251	31.7	0.0	0.0	0.0	31.7	54.0	22.3	100	265
4	239.940	35.5	0.0	0.0	0.0	35.5	56.9	21.4	100	359
5	405.170	46.4	0.0	0.0	0.0	46.4	56.9	10.5	100	359
6	644.269	36.5	0.0	0.0	0.0	36.5	56.9	20.4	100	359

Tested by: Hyung-Kwon, Oh / Assistant Manager

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 Below 30 MHz

-. Test Date : September 25, 2017

-. 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 Test data for above 1 GHz

-. Test Date : September 25, 2017

-. 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: Hyung-Kwon, Oh / Assistant Manager

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

12. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature : (24 ~ 25) ℃

Relative humidity : (45 ~ 46) % 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)
□ -	ESHS10	Rohde & Schwarz	Test Receiver	834467/007	Apr. 03, 2017 (1Y)
□ -	NSLK8128	Schwarzbeck	AMN	8128-216	Apr. 05, 2017 (1Y)
■ -	NSLK8126	Schwarzbeck	AMN	8126-404	Apr. 03, 2017 (1Y)
□ -	3825/2	EMCO	AMN	9109-1869	Apr. 06, 2017 (1Y)
■ -	3825/2	EMCO	AMN	9109-1867	Apr. 07, 2017 (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)

12.4 Test data

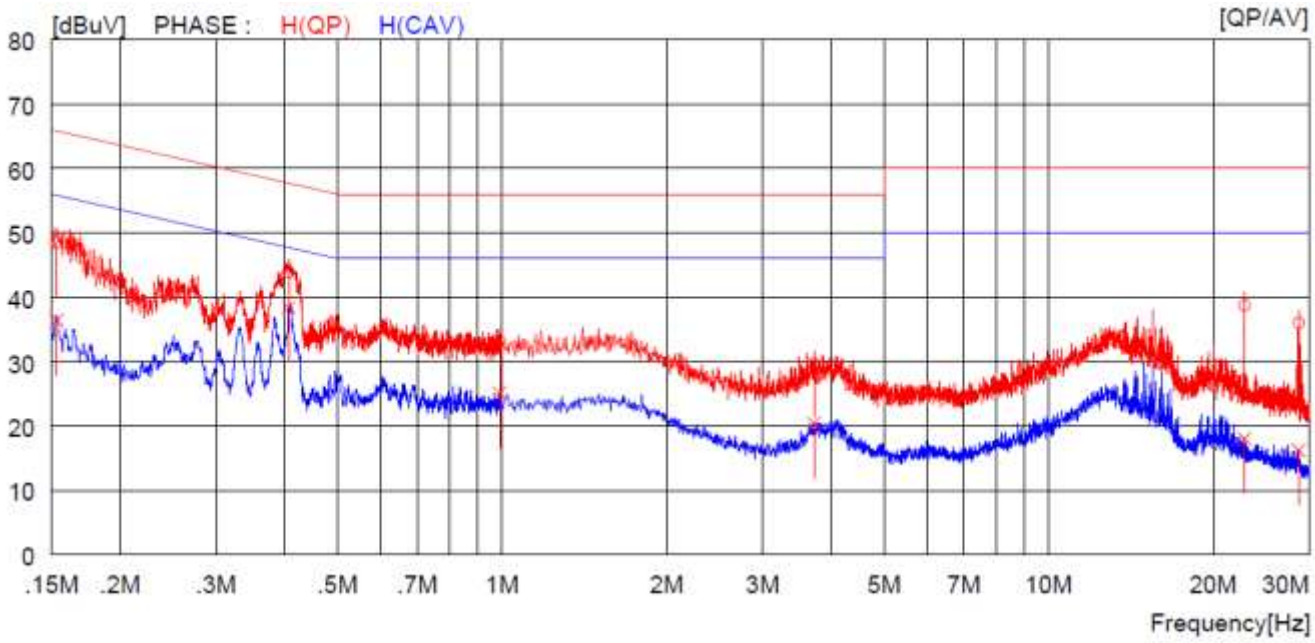
-. Test Date : September 25, 2017

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Note : 2.4 GHz operating mode were tested, but the worst data were recorded.
(802.11b WLAN Mode)

-. 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	0.15300	38.4	----	10.0	48.4	----	65.8	----	17.4	----	H(QP)
2	0.40700	33.9	----	10.0	43.9	----	57.7	----	13.8	----	H(QP)
3	0.99000	23.0	----	10.1	33.1	----	56.0	----	22.9	----	H(QP)
4	3.72400	19.5	----	10.2	29.7	----	56.0	----	26.3	----	H(QP)
5	22.82000	27.9	----	10.8	38.7	----	60.0	----	21.3	----	H(QP)
6	28.69000	25.2	----	10.8	36.0	----	60.0	----	24.0	----	H(QP)
7	0.15300	----	26.4	10.0	----	36.4	----	55.8	----	19.4	H(CAV)
8	0.40700	----	28.4	10.0	----	38.4	----	47.7	----	9.3	H(CAV)
9	0.99000	----	15.0	10.1	----	25.1	----	46.0	----	20.9	H(CAV)
10	3.72400	----	10.2	10.2	----	20.4	----	46.0	----	25.6	H(CAV)
11	22.82000	----	7.2	10.8	----	18.0	----	50.0	----	32.0	H(CAV)
12	28.69000	----	5.4	10.8	----	16.2	----	50.0	----	33.8	H(CAV)

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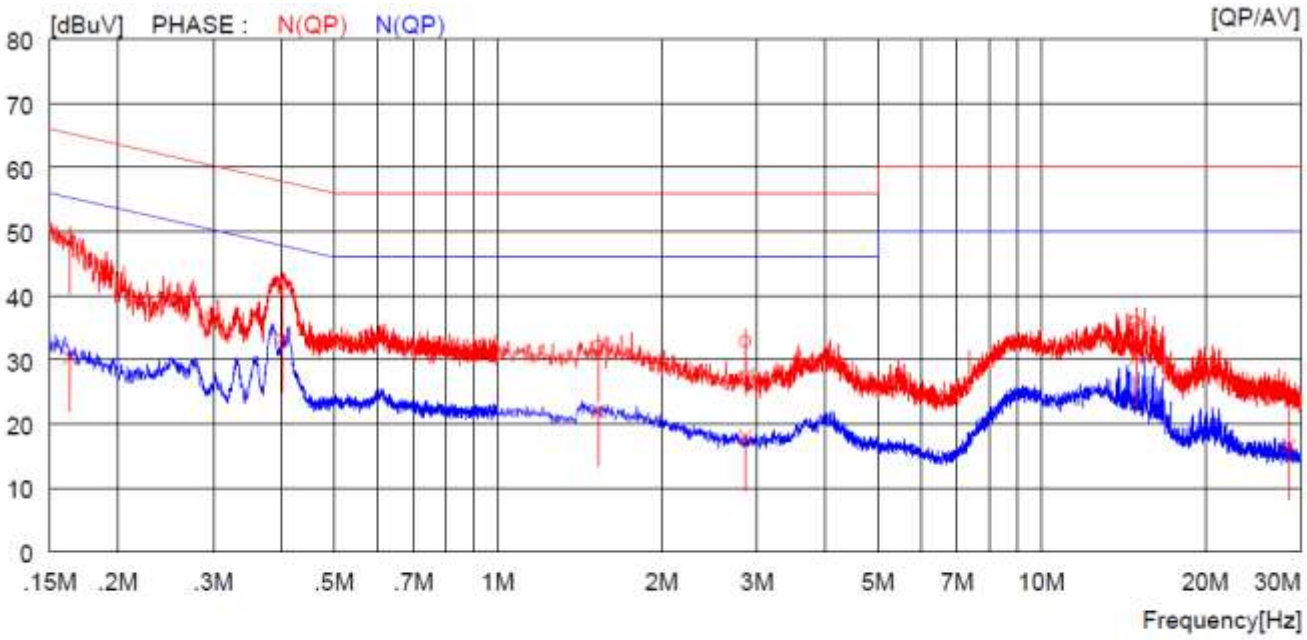
-. Tested Line : NEUTRAL LINE



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	0.16300	38.8	----	10.0	48.8	----	65.3	----	16.5	----	N(QP)
2	0.40100	31.9	----	10.0	41.9	----	57.8	----	15.9	----	N(QP)
3	1.53200	22.0	----	10.1	32.1	----	56.0	----	23.9	----	N(QP)
4	2.85200	22.6	----	10.2	32.8	----	56.0	----	23.2	----	N(QP)
5	14.93000	25.4	----	10.6	36.0	----	60.0	----	24.0	----	N(QP)
6	28.54000	13.8	----	10.8	24.6	----	60.0	----	35.4	----	N(QP)
7	0.16300	----	20.4	10.0	----	30.4	----	55.3	----	24.9	N(CAV)
8	0.40100	----	23.3	10.0	----	33.3	----	47.8	----	14.5	N(CAV)
9	1.53200	----	11.9	10.1	----	22.0	----	46.0	----	24.0	N(CAV)
10	2.85200	----	7.8	10.2	----	18.0	----	46.0	----	28.0	N(CAV)
11	14.93000	----	19.8	10.6	----	30.4	----	50.0	----	19.6	N(CAV)
12	28.54000	----	5.8	10.8	----	16.6	----	50.0	----	33.4	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: Hyung-Kwon, Oh / Assistant Manager

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