RADIO PERFORMANCE TEST REPORT

Test Report No.	**: OT-214-RWD-097**
Reception No.	**: 2104001603**
Applicant	**: LG Electronics USA**
Address	**: 111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United States**
Manufacturer	**: LG Electronics Inc.**
Address	**: Pyeongtaek-si, Gyeonggi-do 17709, Republic of Korea**
Type of Equipment	**: WOWCAST**
FCC ID.	**: BEJ-WTP3**
Model Name	**: WTP3**
Serial number	**: N/A**
Total page of Report	**: 127 pages (including this page)**
Date of Incoming	**: March 26, 2021**
Date of issue	**: April 28, 2021**

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.

Tested by	Reviewed by	Approved by
Ju Yun Park / Manager	Ha-Ram Lee / Manager	Ki-Hong, Nam / General Manager
ONETECH Corp.	ONETECH Corp.	ONETECH Corp.

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

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-214-RWD-097	April 28, 2021	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

Applicant : LG Electronics USA

Address : 111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United States

Contact Person : Dae Woong Kim / Director, Regulatory and Environmental Affairs

Telephone No. : 201-266-2215

FCC ID : BEJ-WTP3

Model Name : WTP3

Brand Name : LG

Serial Number : N/A

Date : April 28, 2021

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	WOWCAST
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 15.247 Meas Guidance v05r02
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 Conducted(average) 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-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

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

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. GENERAL INFORMATION

3.1 Product Description

The LG Electronics USA, Model WTP3 (referred to as the EUT in this report) is a WOWCAST. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	WOWCAST	
Temperature Range	0 °C ~ 60 °C	
MAX RF OUTPUT POWER	WLAN 2.4 GHz	17.16 dBm
	5 150 MHz ~ 5 250 MHz Band	15.67 dBm
	5 250 MHz ~ 5 350 MHz Band	20.88 dBm
	5 470 MHz ~ 5 725 MHz Band	19.07 dBm
	5 725 MHz ~ 5 850 MHz Band	20.94 dBm
OPERATING FREQUENCY	WLAN 2.4 GHz	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))
	5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11a/n(HT20)/ac(VHT20))
		5 190 MHz ~ 5 230 MHz (802.11n(HT40)/ac(VHT40))
		5 210 MHz (802.11ac(VHT80))
	5 250 MHz ~ 5 350 MHz Band	5 260 MHz ~ 5 320 MHz (802.11a/n(HT20)/ac(VHT20))
		5 270 MHz ~ 5 310 MHz (802.11n(HT40)/ac(VHT40))
		5 290 MHz (802.11ac(VHT80))
	5 470 MHz ~ 5 725 MHz Band	5 500 MHz ~ 5 720 MHz (802.11a/n(HT20)/ac(VHT20))
		5 510 MHz ~ 5 710 MHz (802.11n(HT40)/ac(VHT40))
		5 530 MHz ~ 5 690 MHz (802.11ac(VHT80))
	5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20))
		5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40))
		5 775 MHz (802.11ac(VHT80))
MODULATION TYPE	WLAN 2.4 GHz	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11g/n(HT20): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
	WLAN 5 GHz	802.11a/n(HT20)/n(HT40)/ac(VHT80): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)

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RF OUTPUT POWER	WLAN 2.4 GHz	Antenna 0	12.32 dBm(802.11b) **14.76 dBm(802.11g)** 13.96 dBm(802.11n_HT20)
		Antenna 1	13.84 dBm(802.11b) 15.34 dBm(802.11g) 14.34 dBm(802.11n_HT20)
		Multiple Antenna	**17.16 dBm(802.11n_HT20)**
	5 150 MHz ~ 5 250 MHz Band	Antenna 0	**15.67 dBm(802.11a)** 10.81 dBm(802.11n_HT20) 11.06 dBm(802.11n_HT40) 3.04 dBm(802.11ac_VHT80)
		Antenna 1	15.45 dBm(802.11a) 10.64 dBm(802.11n_HT20) 10.97 dBm(802.11n_HT40) 2.17 dBm(802.11ac_VHT80)
		Multiple Antenna	13.74 dBm(802.11n_HT20) **14.03 dBm(802.11n_HT40)** 5.64 dBm(802.11ac_VHT80)
	5 250 MHz ~ 5 350 MHz Band	Antenna 0	16.68 dBm(802.11a) 15.16 dBm(802.11n_HT20) **18.48 dBm(802.11n_HT40)** 5.31 dBm(802.11ac_VHT80)
		Antenna 1	15.61 dBm(802.11a) 12.96 dBm(802.11n_HT20) 17.15 dBm(802.11n_HT40) 2.96 dBm(802.11ac_VHT80)
		Multiple Antenna	17.21 dBm(802.11n_HT20) **20.88 dBm(802.11n_HT40)** 7.20 dBm(802.11ac_VHT80)

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RF OUTPUT POWER	5 470 MHz ~ 5 725 MHz Band	Antenna 0	17.88 dBm(802.11a) 15.36 dBm(802.11n_HT20) 15.93 dBm(802.11n_HT40) 5.10 dBm(802.11ac_VHT80)
		Antenna 0_Straddle	16.58 dBm(802.11a) 14.06 dBm(802.11n_HT20) 9.98 dBm(802.11n_HT40) 4.57 dBm(802.11ac_VHT80)
		Antenna 1	**18.37 dBm(802.11a)** 15.29 dBm(802.11n_HT20) 16.18 dBm(802.11n_HT40) 4.83 dBm(802.11ac_VHT80)
		Antenna 1_Straddle	16.90 dBm(802.11a) 13.89 dBm(802.11n_HT20) 9.43 dBm(802.11n_HT40) 4.78 dBm(802.11ac_VHT80)
		Multiple Antenna	18.20 dBm(802.11n_HT20) **19.07 dBm(802.11n_HT40)** 7.98 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	16.99 dBm(802.11n_HT20) 12.72 dBm(802.11n_HT40) 7.69 dBm(802.11ac_VHT80)

RF OUTPUT POWER	5 725 MHz ~ 5 850 MHz Band	Antenna 0	**<u>19.37 dBm(802.11a)</u>** 18.00 dBm(802.11n_HT20) 16.10 dBm(802.11n_HT40) 7.67 dBm(802.11ac_VHT80)
		Antenna 0_Straddle	8.65 dBm(802.11a) 6.79 dBm(802.11n_HT20) -2.25 dBm(802.11n_HT40) -12.51 dBm(802.11ac_VHT80)
		Antenna 1	19.11 dBm(802.11a) 17.85 dBm(802.11n_HT20) 15.60 dBm(802.11n_HT40) 7.60 dBm(802.11ac_VHT80)
		Antenna 1_Straddle	8.89 dBm(802.11a) 6.26 dBm(802.11n_HT20) -2.75 dBm(802.11n_HT40) -10.04 dBm(802.11ac_VHT80)
		Multiple Antenna	**<u>20.94 dBm(802.11n_HT20)</u>** 18.87 dBm(802.11n_HT40) 10.65 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	9.54 dBm(802.11n_HT20) 0.52 dBm(802.11n_HT40) -8.09 dBm(802.11ac_VHT80)

ANTENNA TYPE		Antenna 0	PCB Antenna
		Antenna 1	
ANTENNA GAIN	WLAN 2.4 GHz	Antenna 0	0.61 dBi
		Antenna 1	0.90 dBi
		Multiple Antenna	3.77 dBi
	5 150 MHz ~ 5 250 MHz Band	Antenna 0	0.30 dBi
		Antenna 1	0.65 dBi
		Multiple Antenna	3.49 dBi
	5 250 MHz ~ 5 350 MHz Band	Antenna 0	0.30 dBi
		Antenna 1	0.28 dBi
		Multiple Antenna	3.30 dBi
	5 470 MHz ~ 5 725 MHz Band	Antenna 0	0.70 dBi
		Antenna 1	0.67 dBi
		Multiple Antenna	3.70 dBi
	5 725 MHz ~ 5 850 MHz Band	Antenna 0	0.66 dBi
		Antenna 1	0.62 dBi
		Multiple Antenna	3.65 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		26 MHz, 27 MHz	

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

-. None

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

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

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	LG Electronics Inc.	-	-

5.2 Peripheral equipment

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

Model	Manufacturer	Description	Connected to
WTP3	LG Electronics Inc.	WOWCAST (EUT)	
HP Probook 4540s	HP	Notebook PC	EUT
Series PPP009H	Hipro Electronics(Dongguan)Co., Ltd	AC Adapter	

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5.3 Mode of operation during the test

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

-. Frequency / Channel Operations

Channel	Frequency
1	2 412
2	2 417
3	2 422
4	2 427
5	2 432
6	2 437
7	2 442
8	2 447
9	2 452
10	2 457
11	2 462

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Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 0	Antenna 1
802.11 b (Low Channel)	1 Mbps	11.99	13.79
	2 Mbps	11.97	13.78
	5.5 Mbps	11.95	13.74
	11 Mbps	11.90	13.69
802.11 g (Low Channel)	6 Mbps	13.16	13.78
	9 Mbps	13.10	13.70
	12 Mbps	13.07	13.65
	18 Mbps	13.16	13.73
	24 Mbps	13.14	13.70
	36 Mbps	13.10	13.70
	48 Mbps	11.69	12.39
	54 Mbps	11.42	11.99
802.11 HT 20 (Low Channel)	6.5 Mbps	9.21	9.79
	13 Mbps	9.14	9.70
	19.5 Mbps	8.96	9.70
	26 Mbps	8.93	9.38
	39 Mbps	7.92	8.54
	52 Mbps	7.95	8.61
	58.5 Mbps	7.88	8.33
	65 Mbps	7.02	7.70

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

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

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 0	Antenna 1
802.11 b (Middle Channel)	1 Mbps	12.20	13.66
	2 Mbps	12.18	13.65
	5.5 Mbps	12.16	13.61
	11 Mbps	12.11	13.56
802.11 g (Middle Channel)	6 Mbps	14.76	15.34
	9 Mbps	14.70	15.26
	12 Mbps	14.67	15.21
	18 Mbps	14.76	15.29
	24 Mbps	14.74	15.26
	36 Mbps	14.70	15.26
	48 Mbps	13.29	13.95
	54 Mbps	13.02	13.55
802.11 HT 20 (Middle Channel)	6.5 Mbps	13.96	14.34
	13 Mbps	13.89	14.25
	19.5 Mbps	13.71	14.25
	26 Mbps	13.68	13.93
	39 Mbps	12.67	13.09
	52 Mbps	12.70	13.16
	58.5 Mbps	12.63	12.88
	65 Mbps	11.77	12.25

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

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

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 0	Antenna 1
802.11 b (High Channel_11)	1 Mbps	12.32	13.84
	2 Mbps	12.30	13.83
	5.5 Mbps	12.28	13.79
	11 Mbps	12.23	13.74
802.11 g (High Channel_11)	6 Mbps	11.88	14.34
	9 Mbps	11.82	14.26
	12 Mbps	11.79	14.21
	18 Mbps	11.88	14.29
	24 Mbps	11.86	14.26
	36 Mbps	11.82	14.26
	48 Mbps	10.41	12.95
	54 Mbps	10.14	12.55
802.11 HT 20 (High Channel_11)	6.5 Mbps	10.35	10.91
	13 Mbps	10.28	10.82
	19.5 Mbps	10.10	10.82
	26 Mbps	10.07	10.50
	39 Mbps	9.06	9.66
	52 Mbps	9.09	9.73
	58.5 Mbps	9.02	9.45
	65 Mbps	8.16	8.82

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

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

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-. Duty Cycle

Mode	Tx On Time [ms]	Tx Off Time [ms]	Duty Cycle [%]	Correction Factor [dB]
802.11 b_Antenna 0	8.37	0.09	98.94	0.05
802.11 g _Antenna 0	1.36	0.12	91.89	0.37
802.11 HT 20_Antenna 0	0.66	0.12	84.62	0.73
802.11 b_Antenna 1	8.37	0.09	98.94	0.05
802.11 g _Antenna 1	1.35	0.13	91.22	0.40
802.11 HT 20_Antenna 1	0.66	0.11	85.71	0.67

Note – Duty Cycle : (Tx On Time / (Tx On Time + Tx Off Time)) * 100

Correction Factor : 10 * Log(1 / (Duty Cycle / 100))

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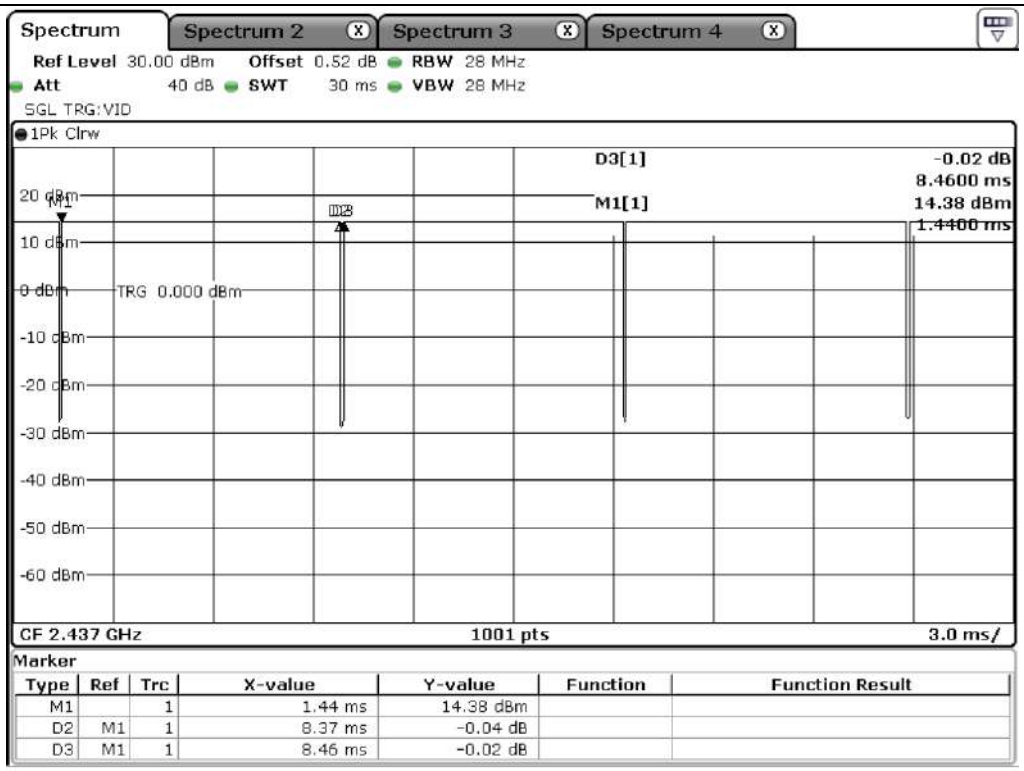
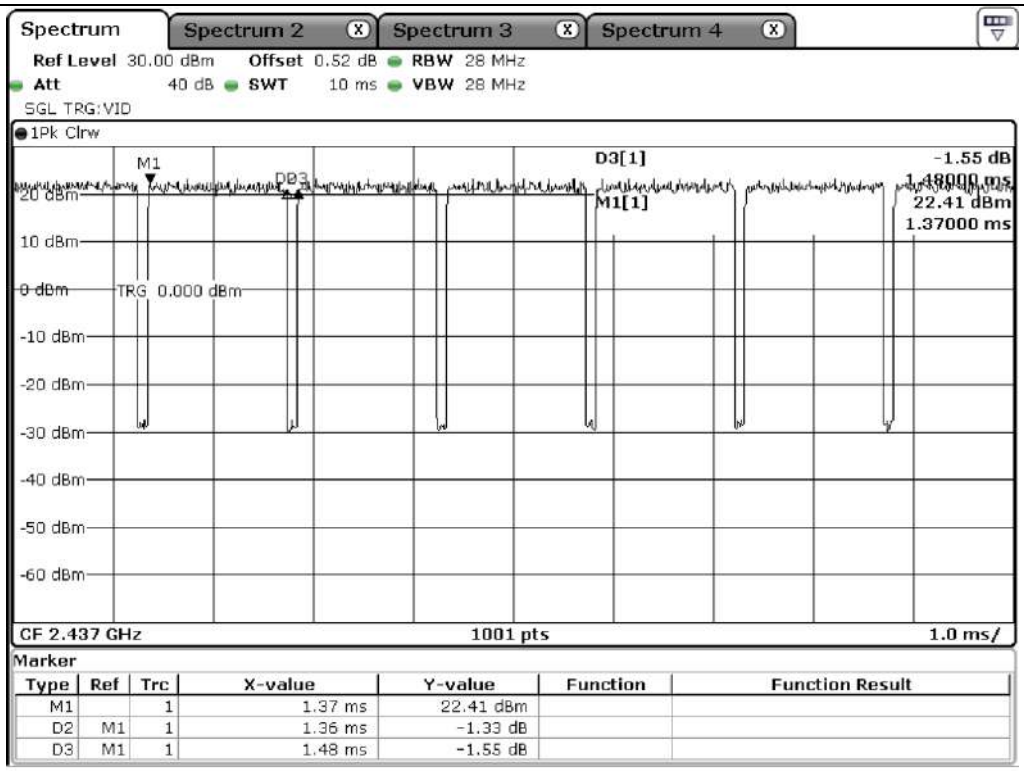
-. Test Plot



802.11 b_Antenna 0



802.11 g_Antenna 0

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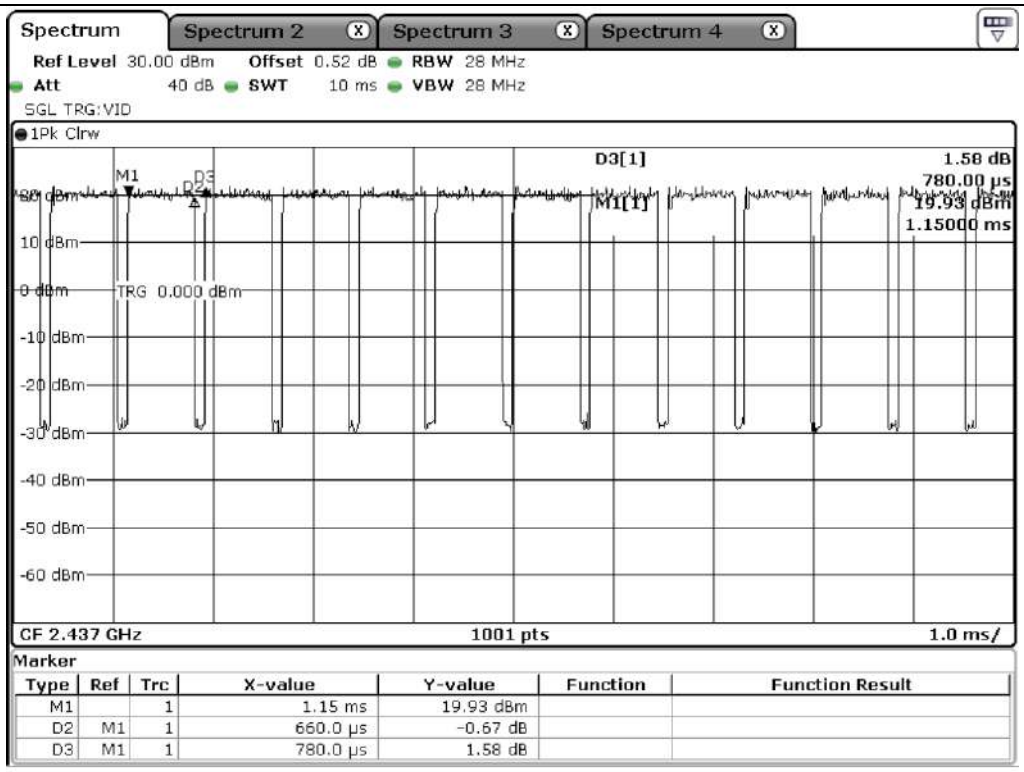

802.11 HT 20_Antenna 0

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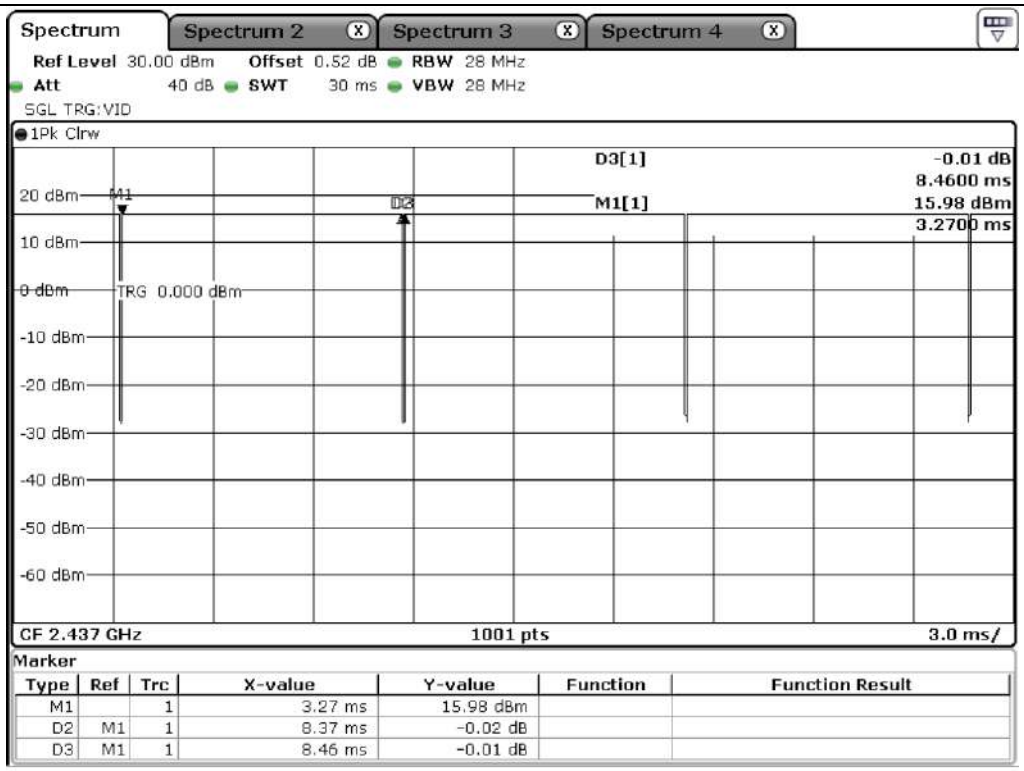
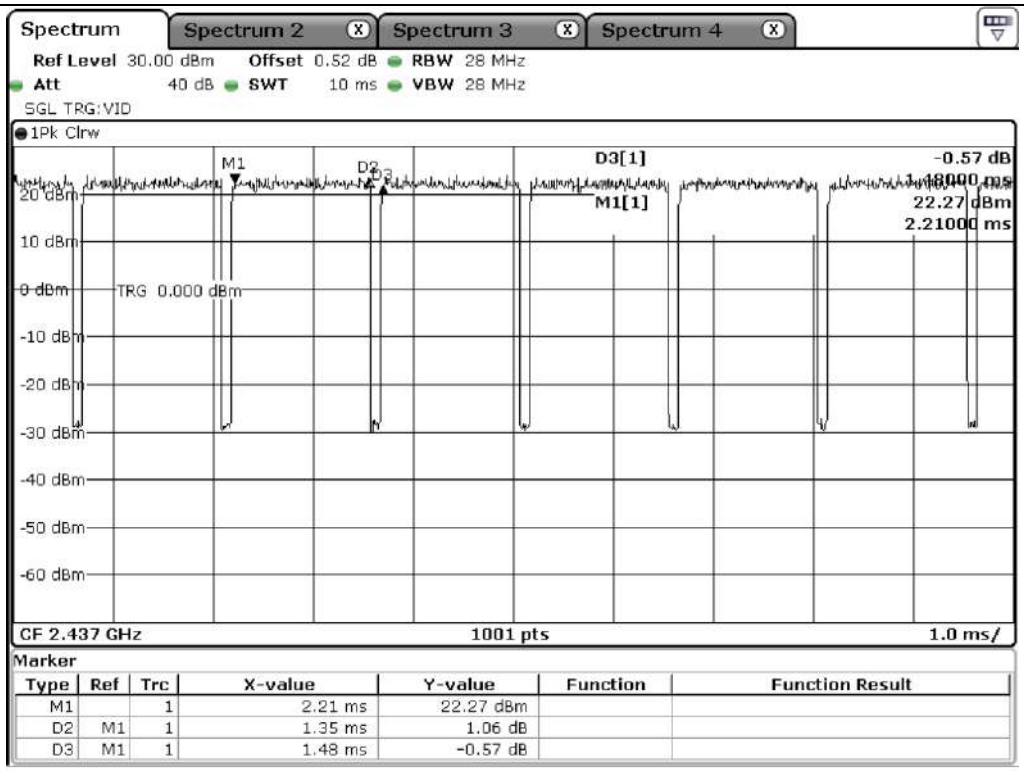


802.11 b_Antenna 1



802.11 g_Antenna 1

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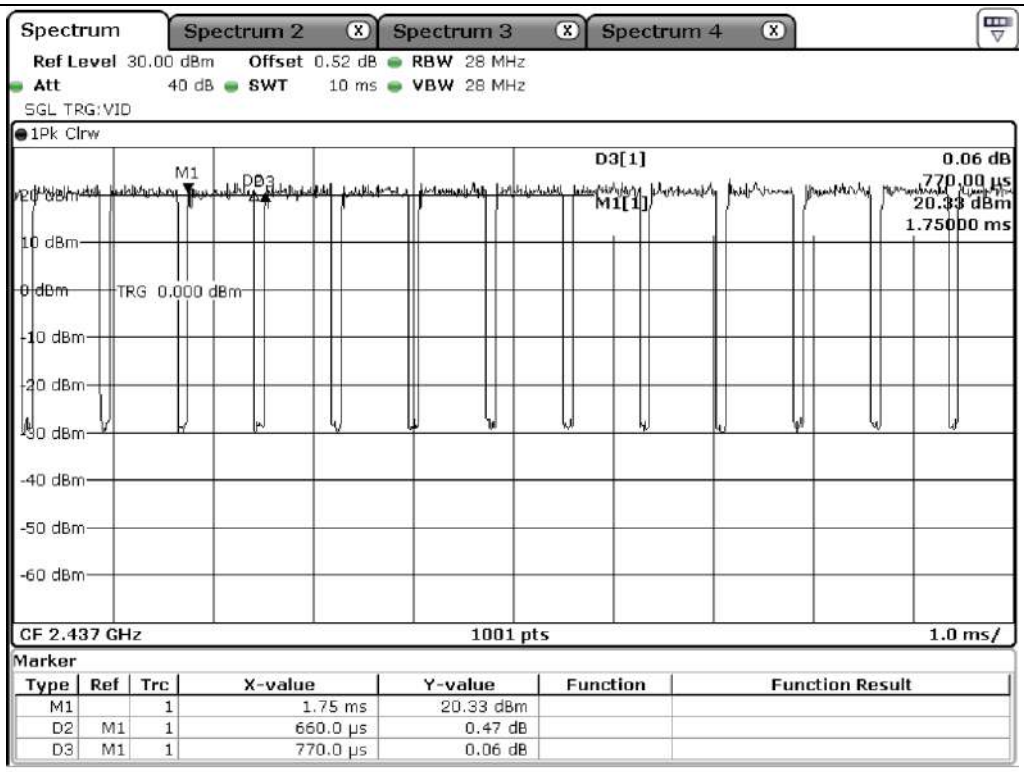

802.11 HT 20_Antenna 1

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5.4 Configuration of Test System

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

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter 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 antenna of the EUT is PCB Antenna on the main board in the EUT, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

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

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. 99 % OCCUPIED BANDWIDTH & MIMIMUM 6 dB BANDWIDTH

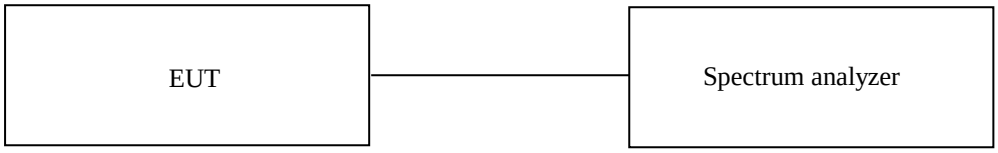
7.1 Operating environment

Temperature : 24 °C

Relative humidity : 45 % R.H.

7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The 6 dB bandwidth is the RBW set to 100 kHz, the VBW set to 300 kHz and peak detection was used. The 99 % bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission(RBW set to 1 ~ 5 % OBW).



7.3 Test Date

March 29, 2021 ~ April 13, 2021

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7.4 Test data for 802.11b WLAN Mode

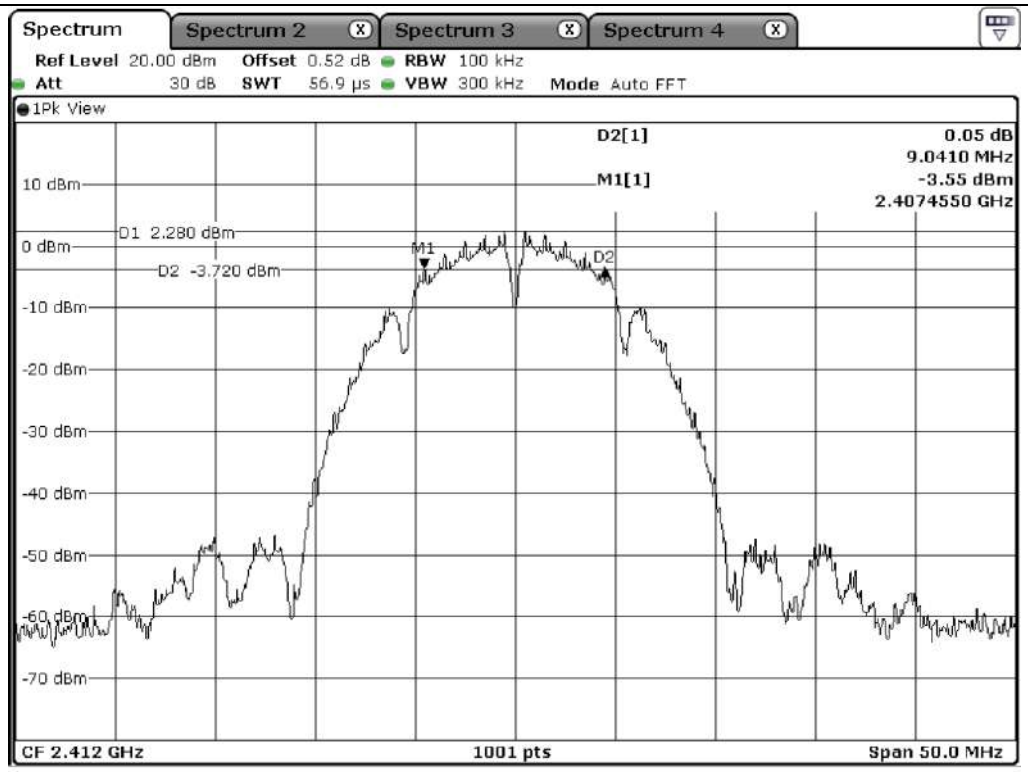
7.4.1 Test data for Antenna 0

7.4.1.1 MINIMUM 6 dB BANDWIDTH

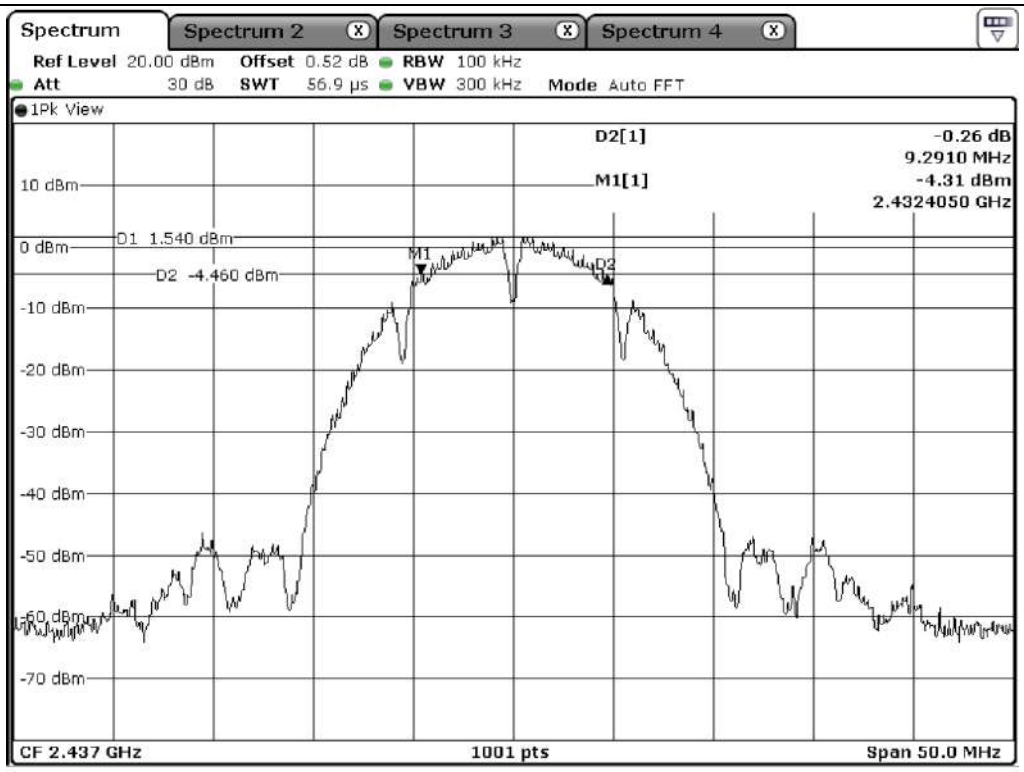
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	9.04	0.50	8.54
Middle	2 437.00	9.29	0.50	8.79
High	2 462.00	9.09	0.50	8.59

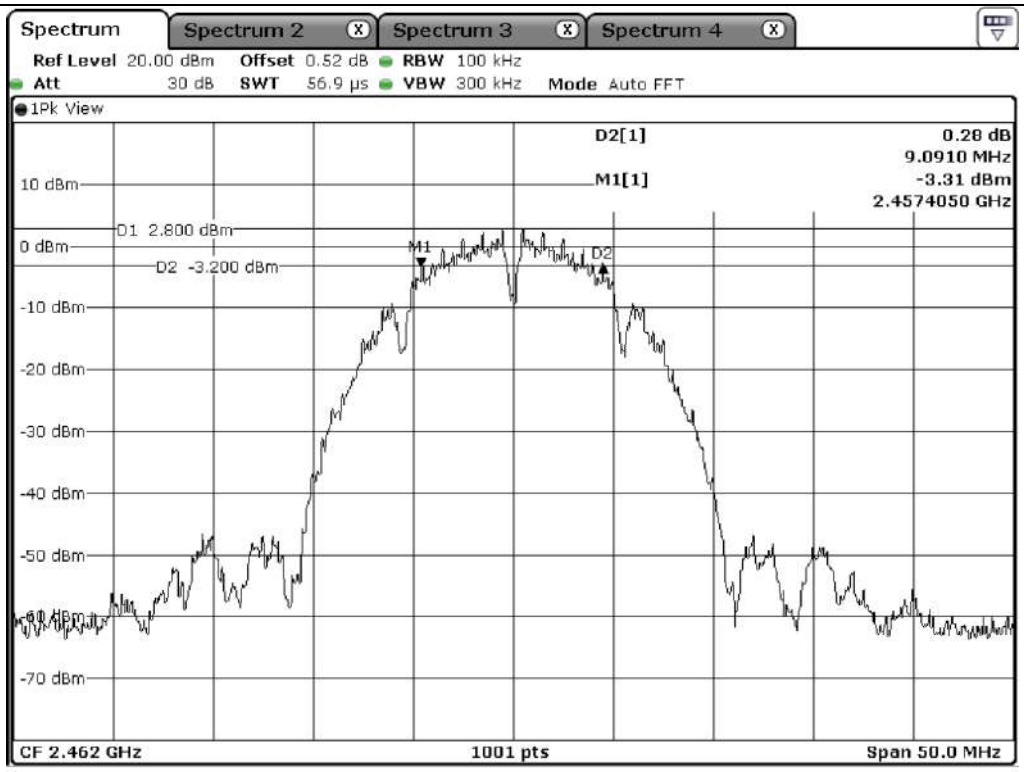
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

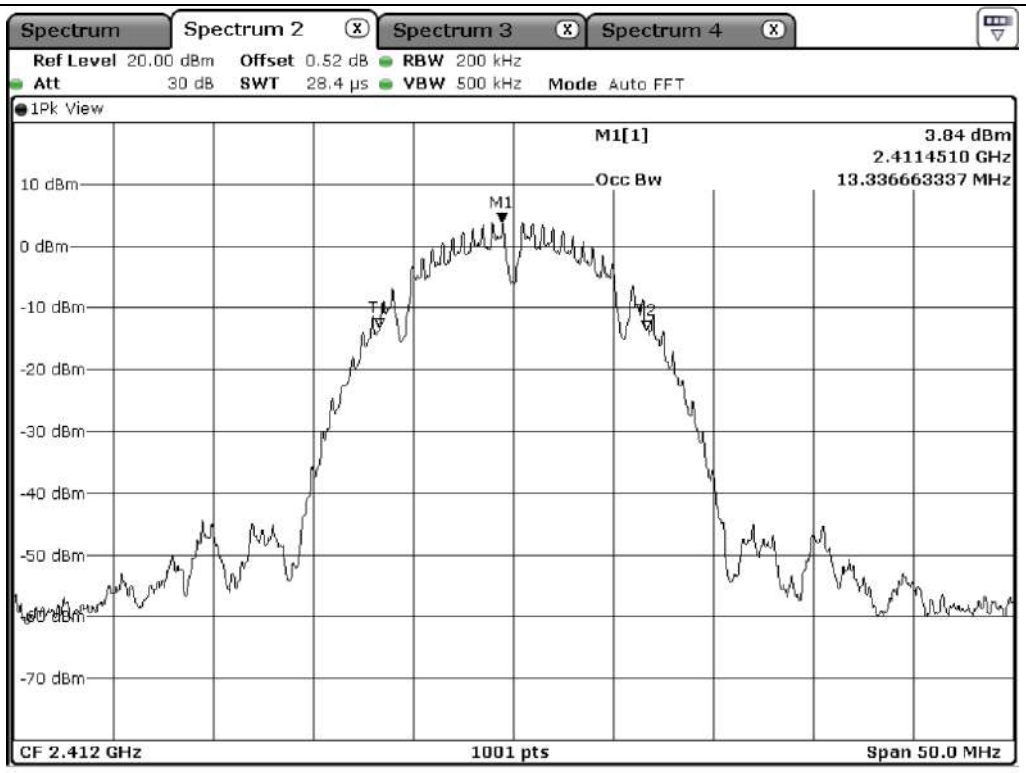
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

7.4.1.2 99 % OCCUPIED BANDWIDTH

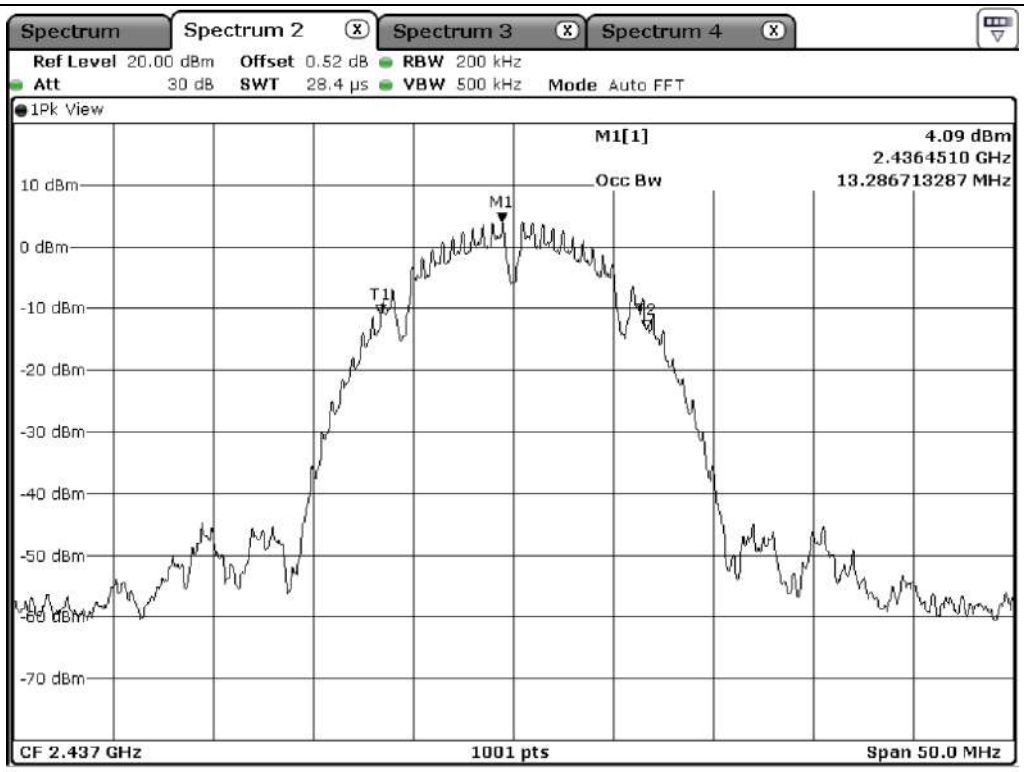
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)
Low	2 412.00	13.34
Middle	2 437.00	13.29
High	2 462.00	13.34

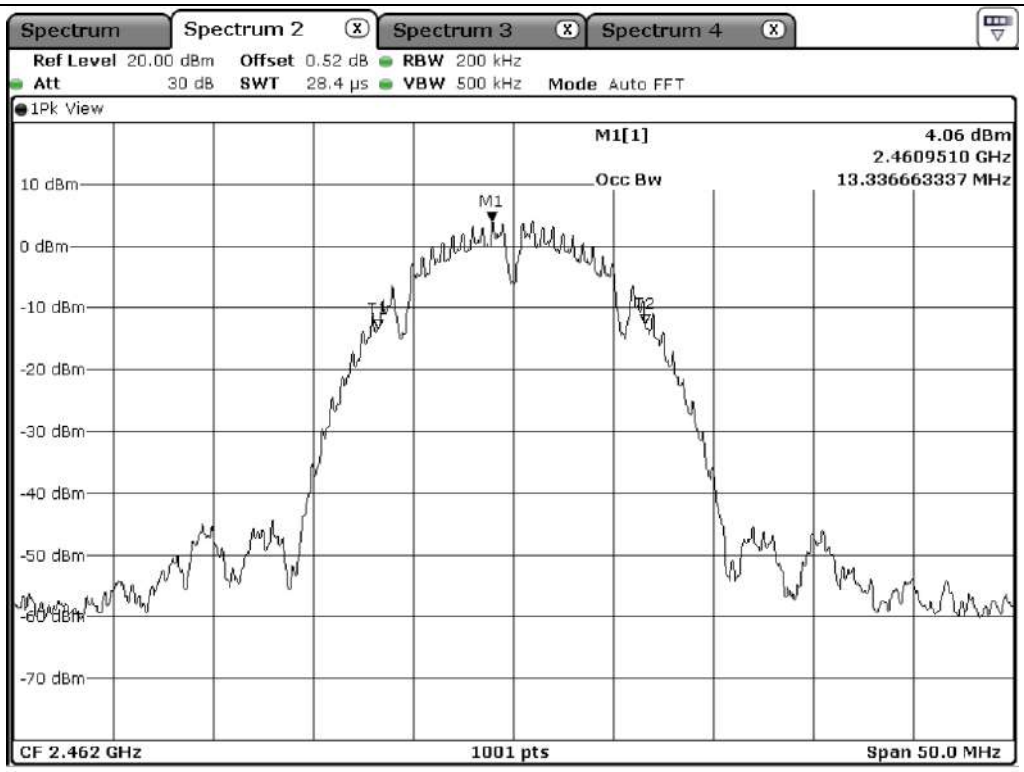
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

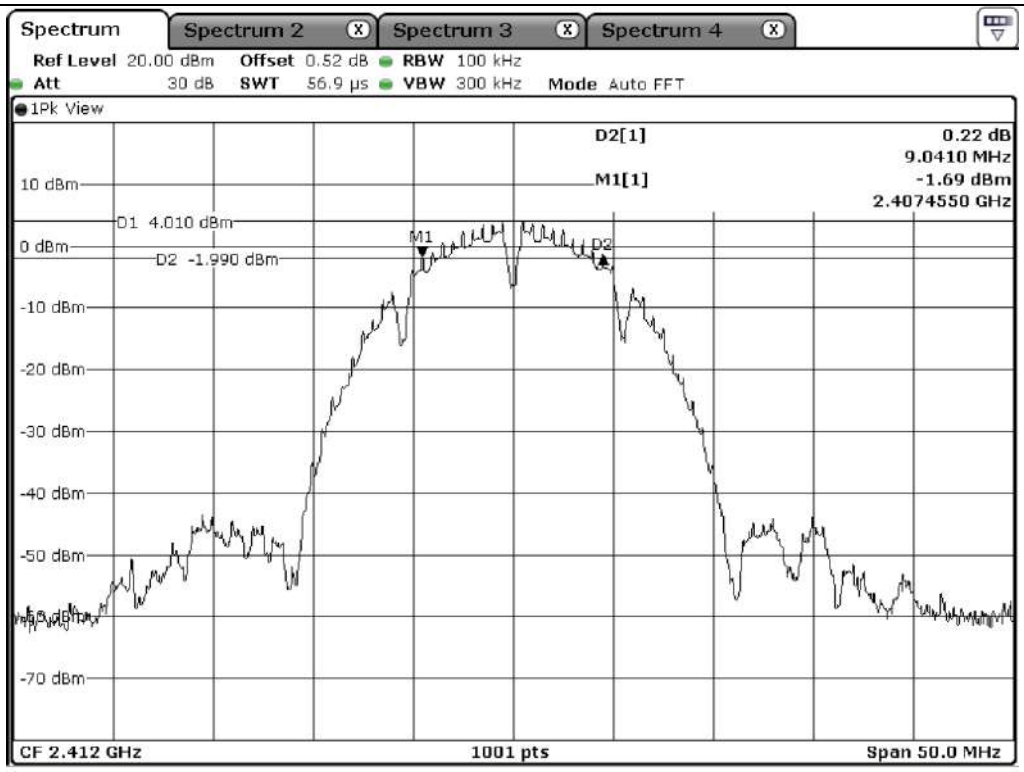
7.4.2 Test data for Antenna 1

7.4.2.1 MINIMUM 6 dB BANDWIDTH

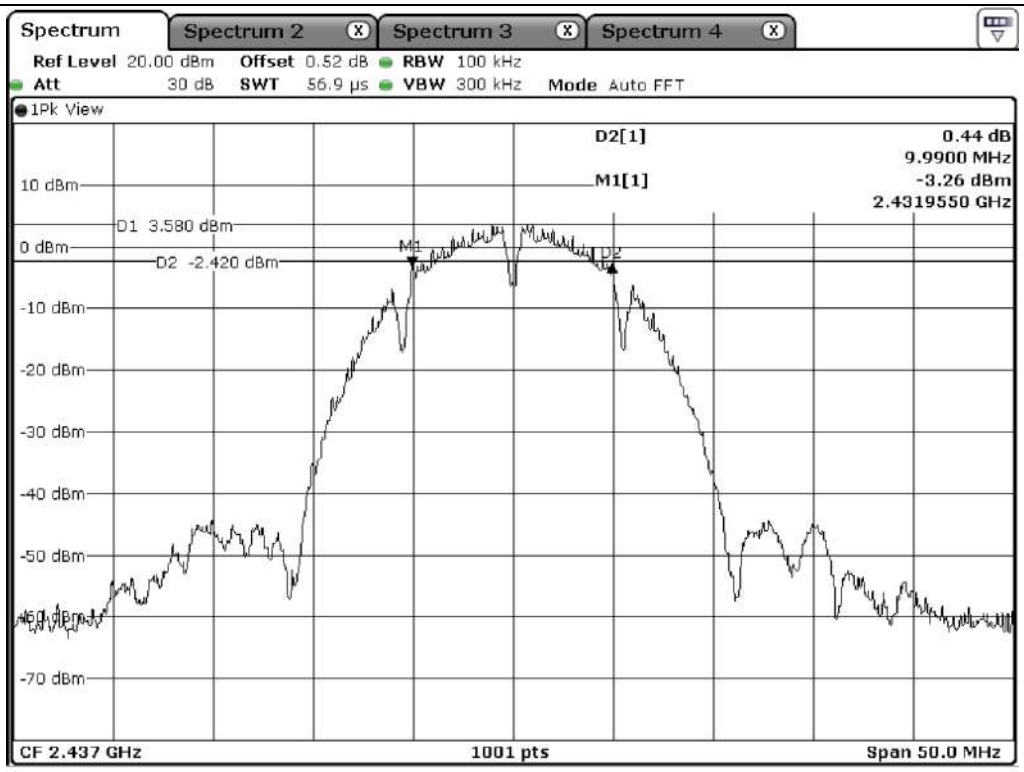
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	9.04	0.50	8.54
Middle	2 437.00	9.99	0.50	9.49
High	2 462.00	9.09	0.50	8.59

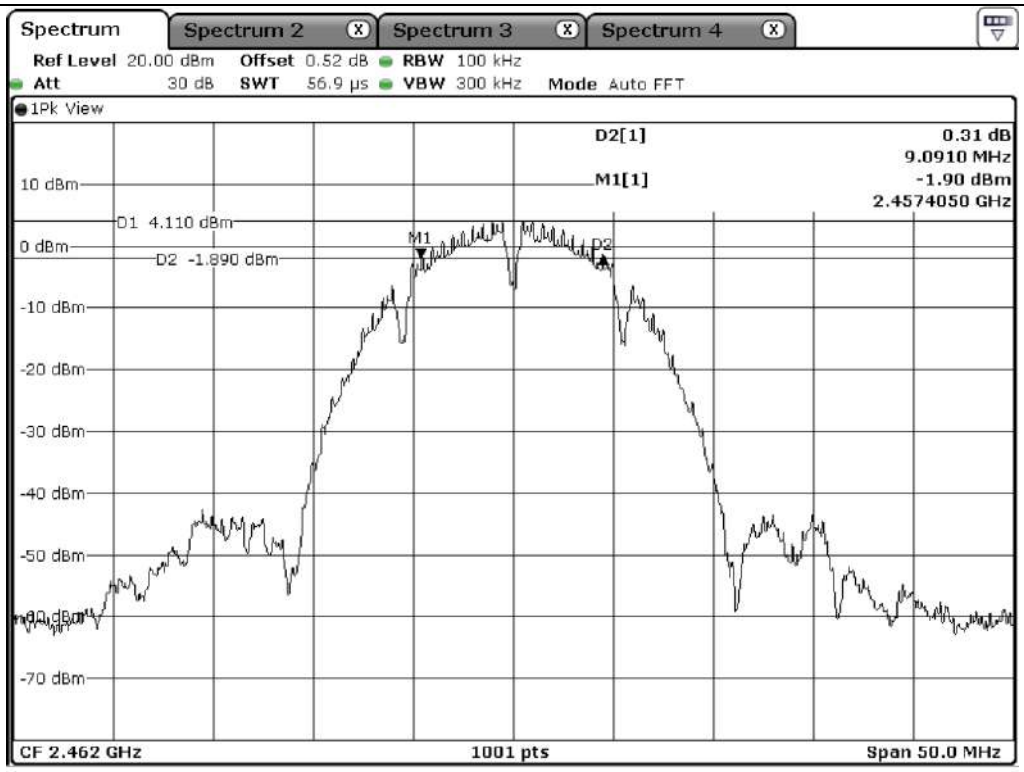
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

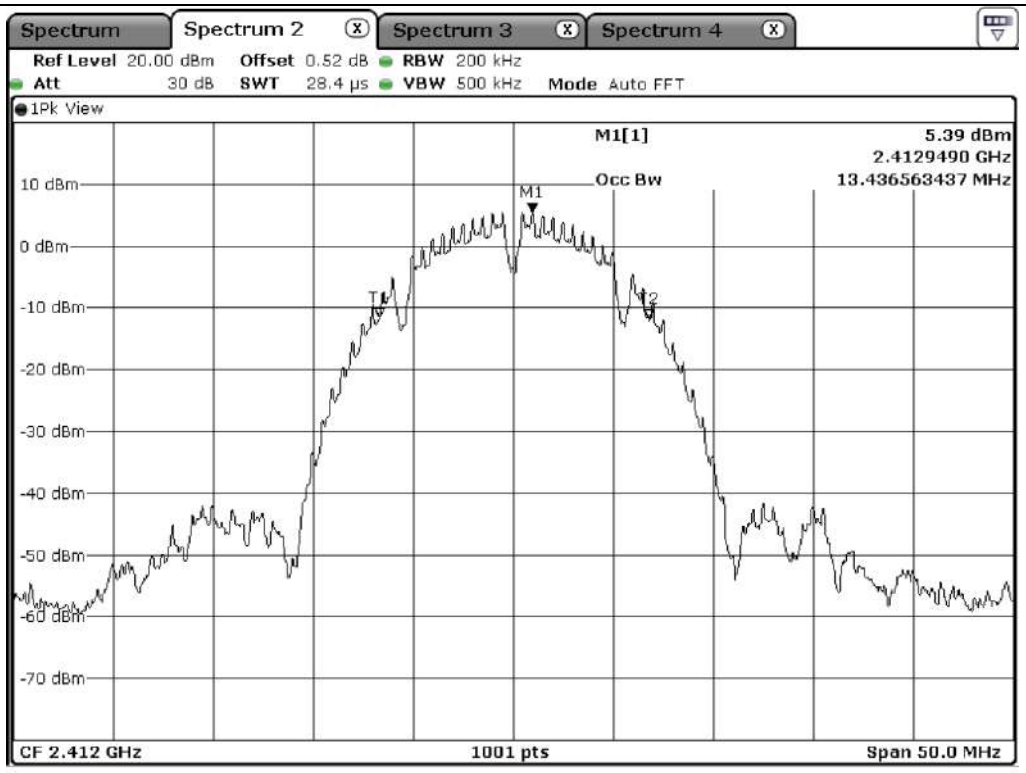
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

7.4.2.2 99 % OCCUPIED BANDWIDTH

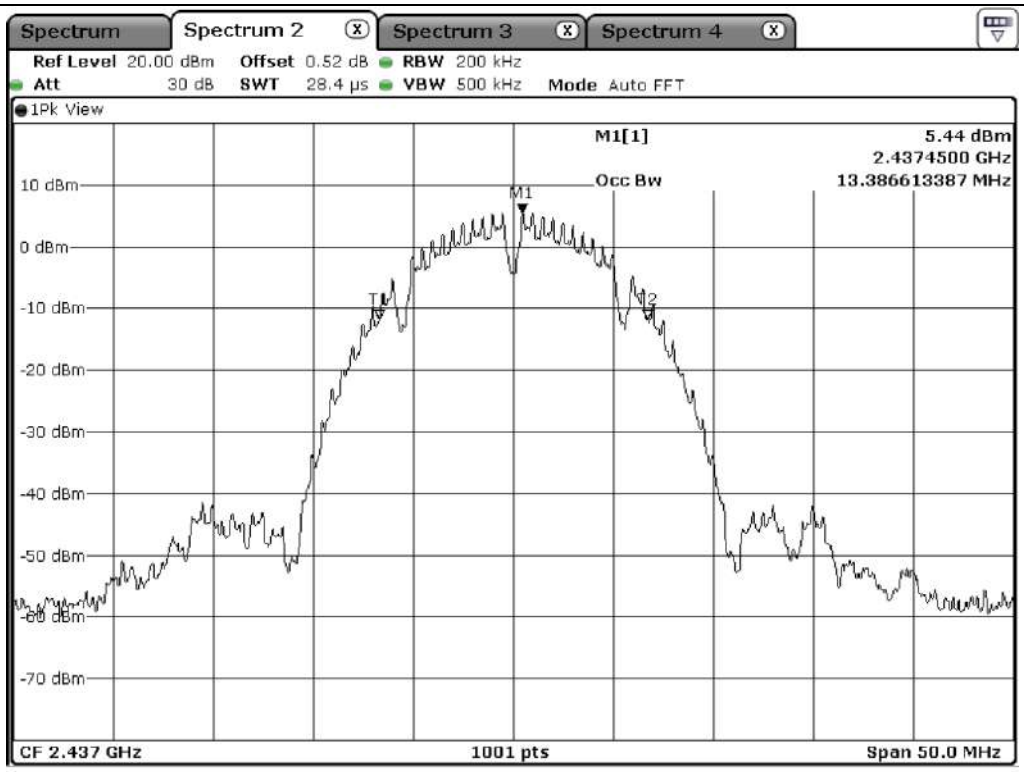
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)
Low	2 412.00	13.44
Middle	2 437.00	13.39
High	2 462.00	13.39

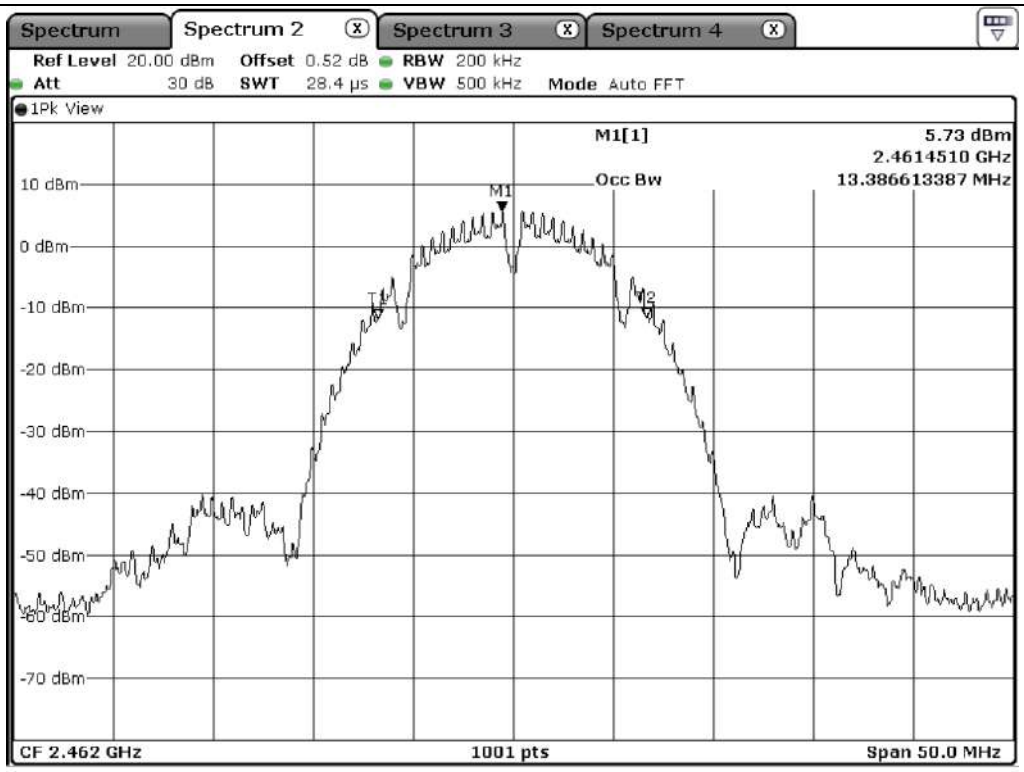
Remark. Margin = Measured Value - Limit



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)

7.5 Test data for 802.11g WLAN Mode

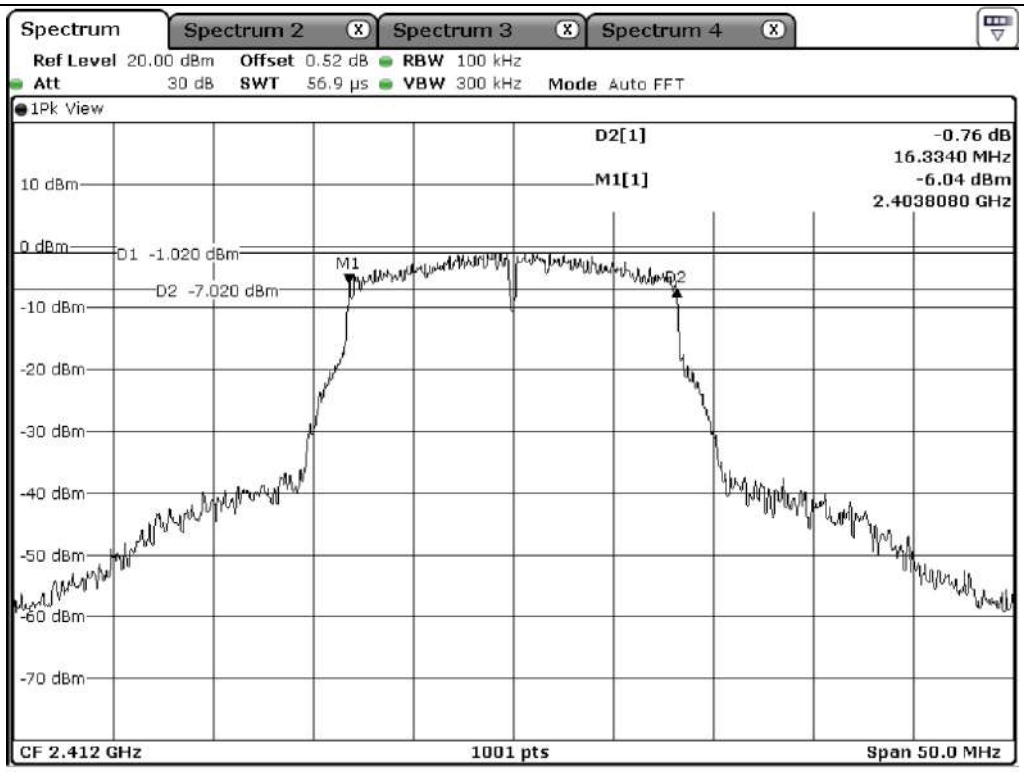
7.5.1 Test data for Antenna 0

7.5.1.1 MINIMUM 6 dB BANDWIDTH

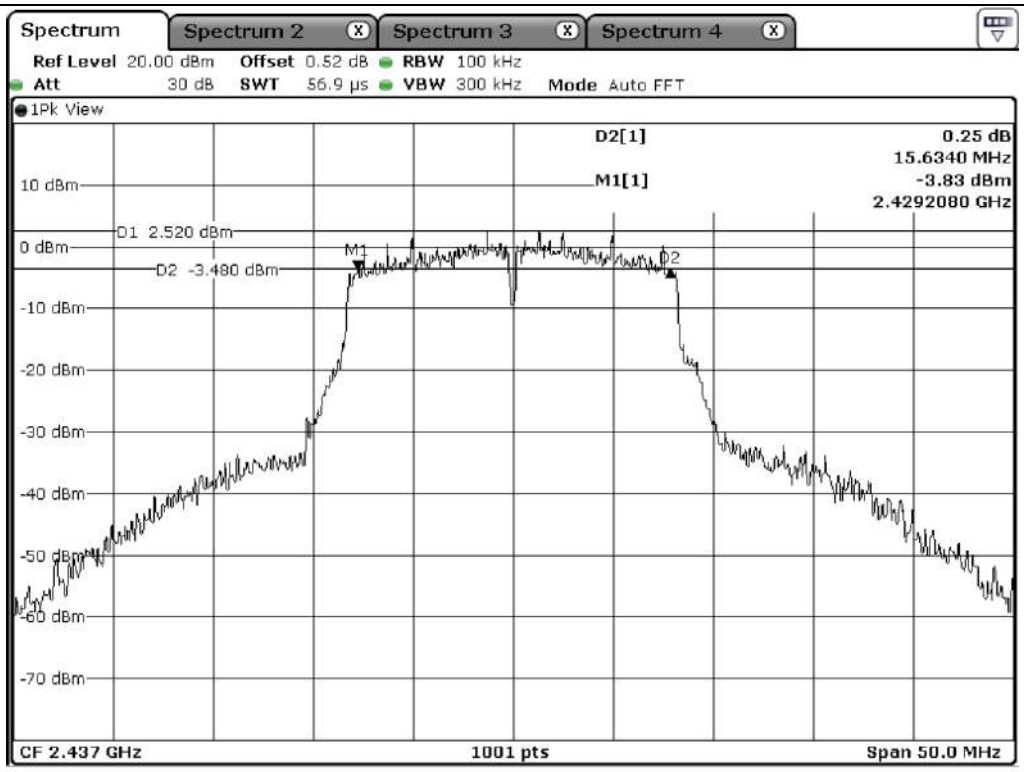
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.33	0.50	15.83
Middle	2 437.00	15.63	0.50	15.13
High	2 462.00	16.28	0.50	15.78

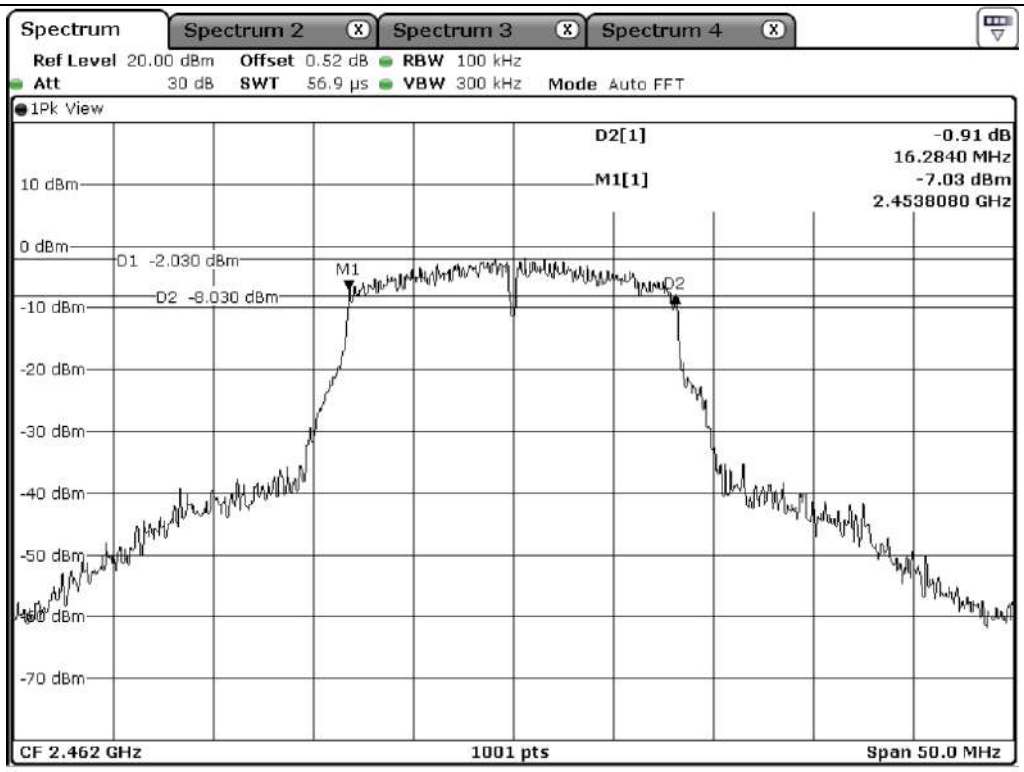
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

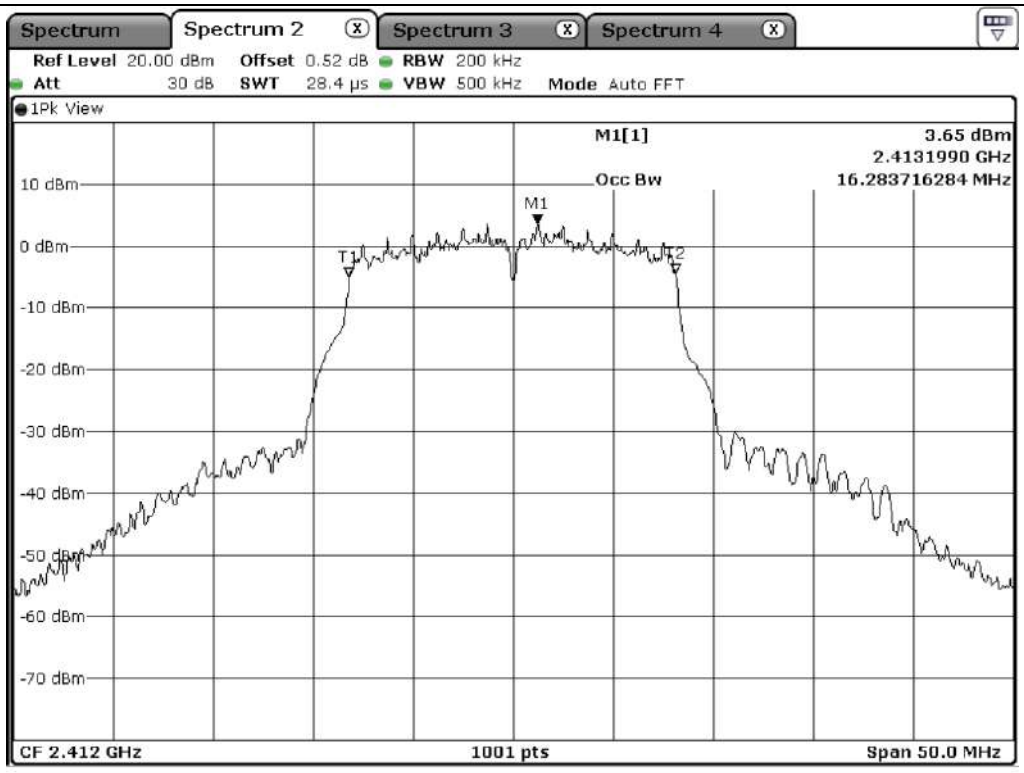
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

7.5.1.2 99 % OCCUPIED BANDWIDTH

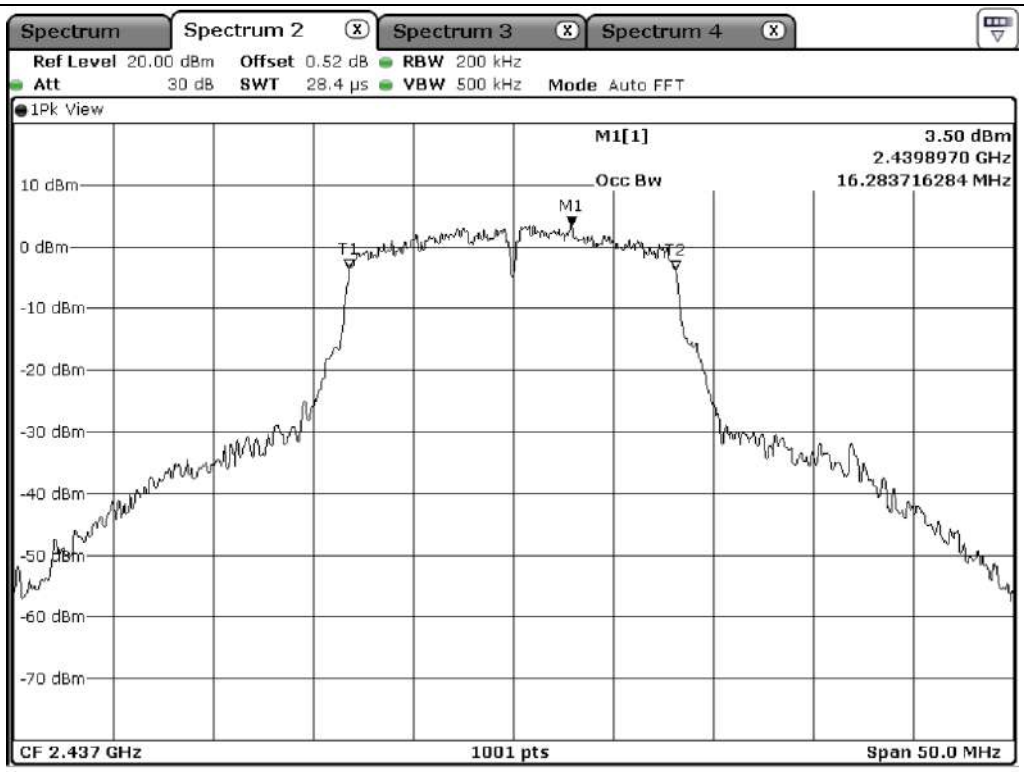
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)
Low	2 412.00	16.28
Middle	2 437.00	16.28
High	2 462.00	16.33

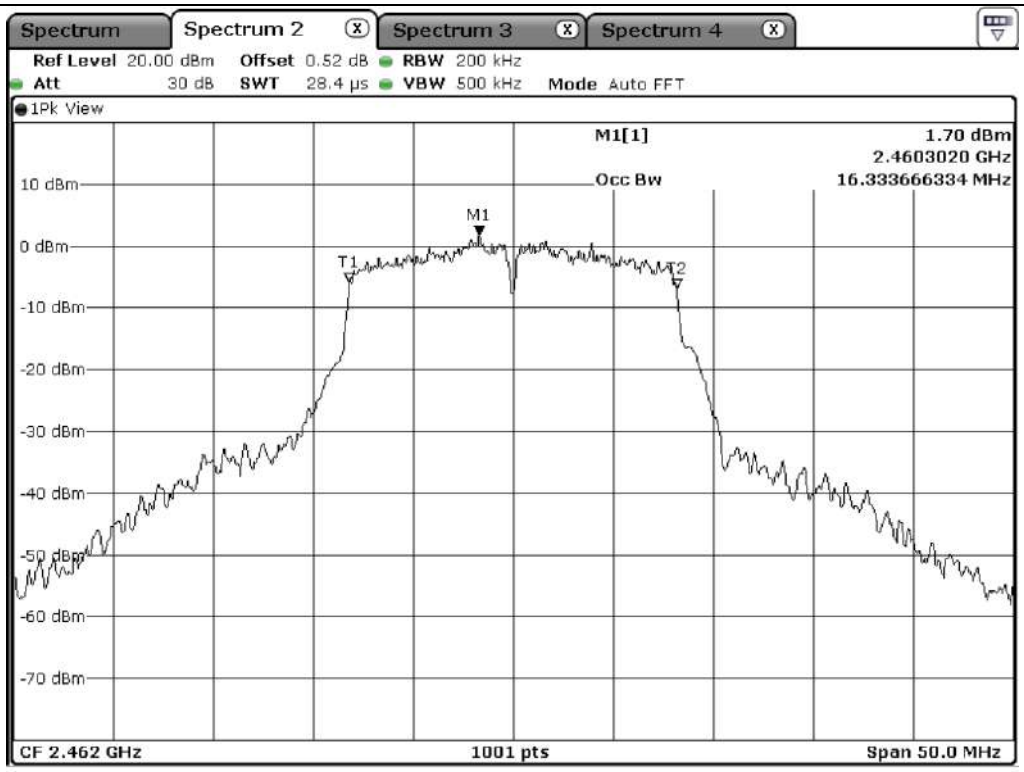
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

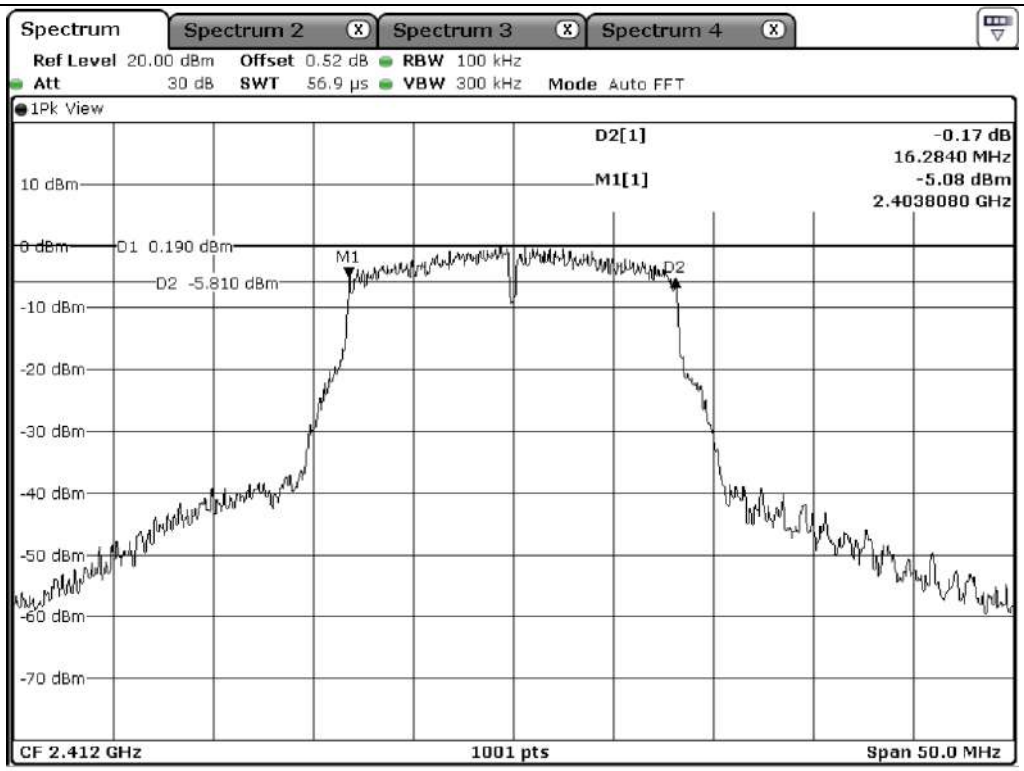
7.5.2 Test data for Antenna 1

7.5.2.1 MINIMUM 6 dB BANDWIDTH

-. Test Result : Pass

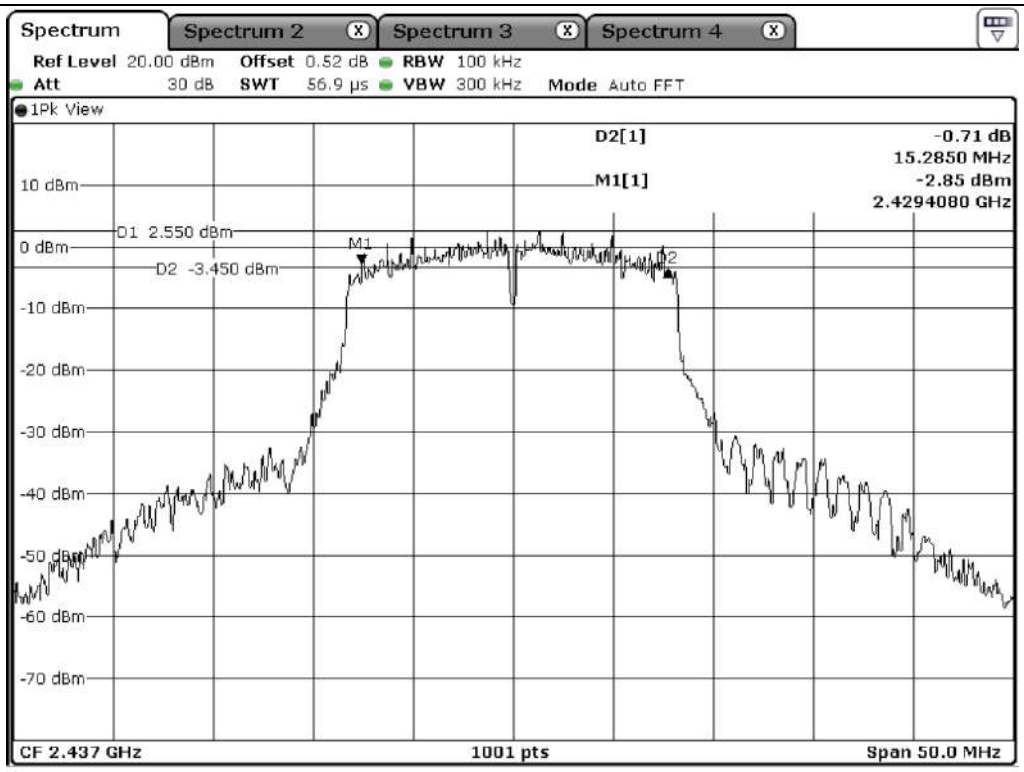
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.28	0.50	15.78
Middle	2 437.00	15.29	0.50	14.79
High	2 462.00	16.28	0.50	15.78

Remark. Margin = Measured Value - Limit

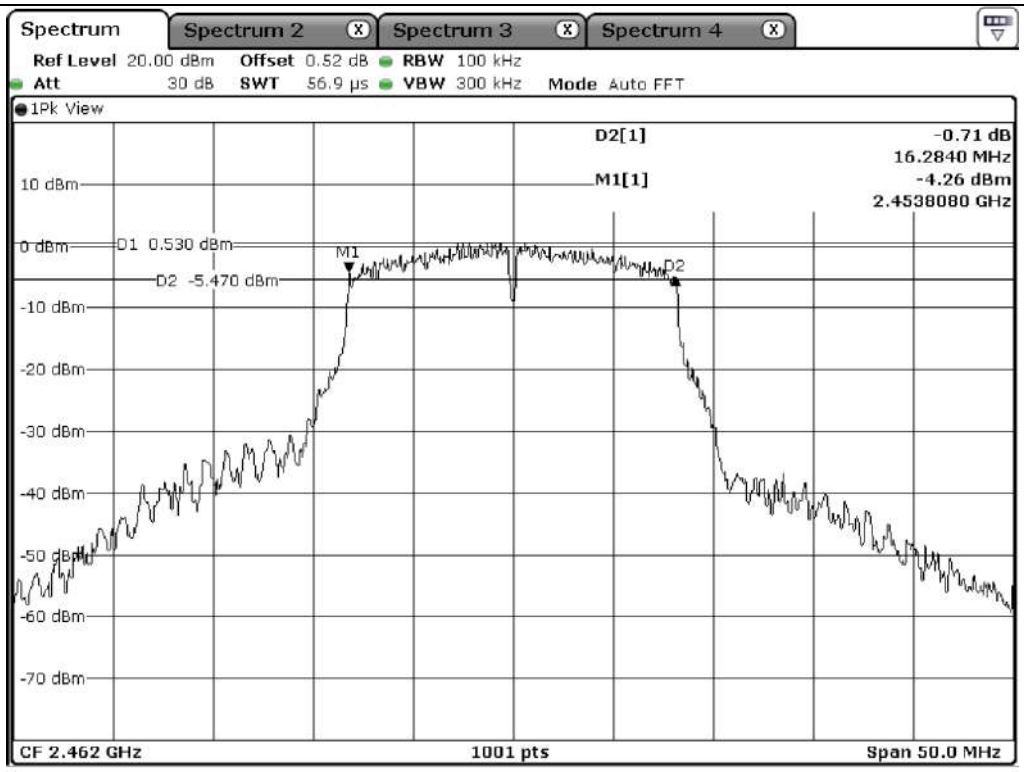


Low Channel

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

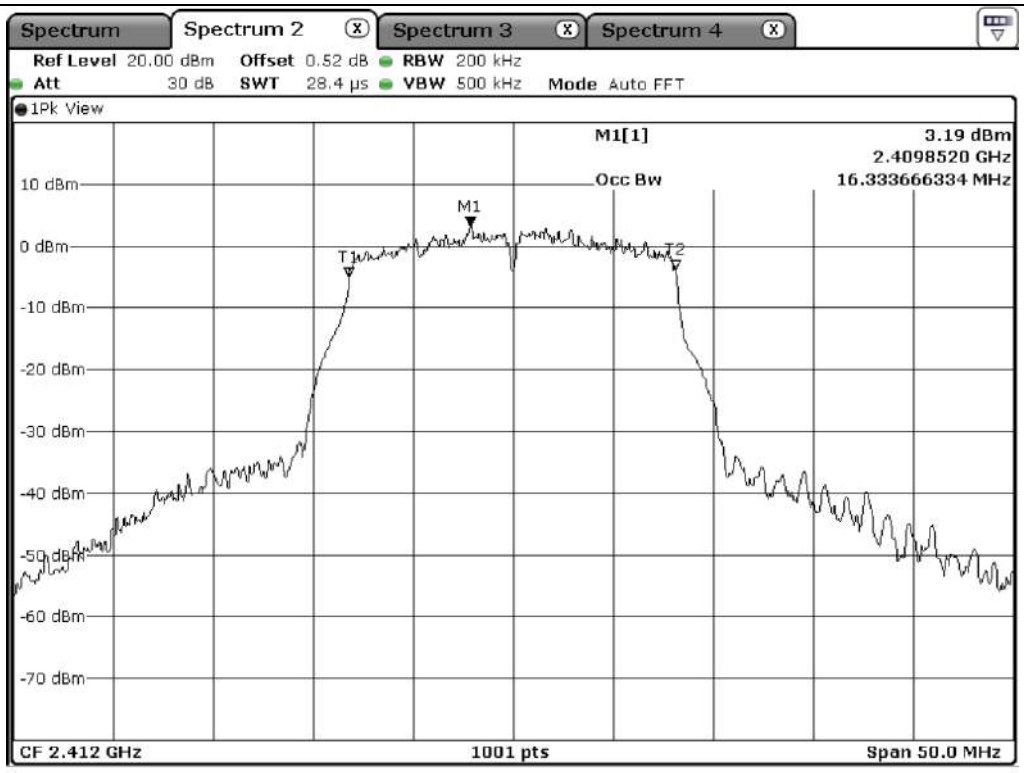
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

7.5.2.2 99 % OCCUPIED BANDWIDTH

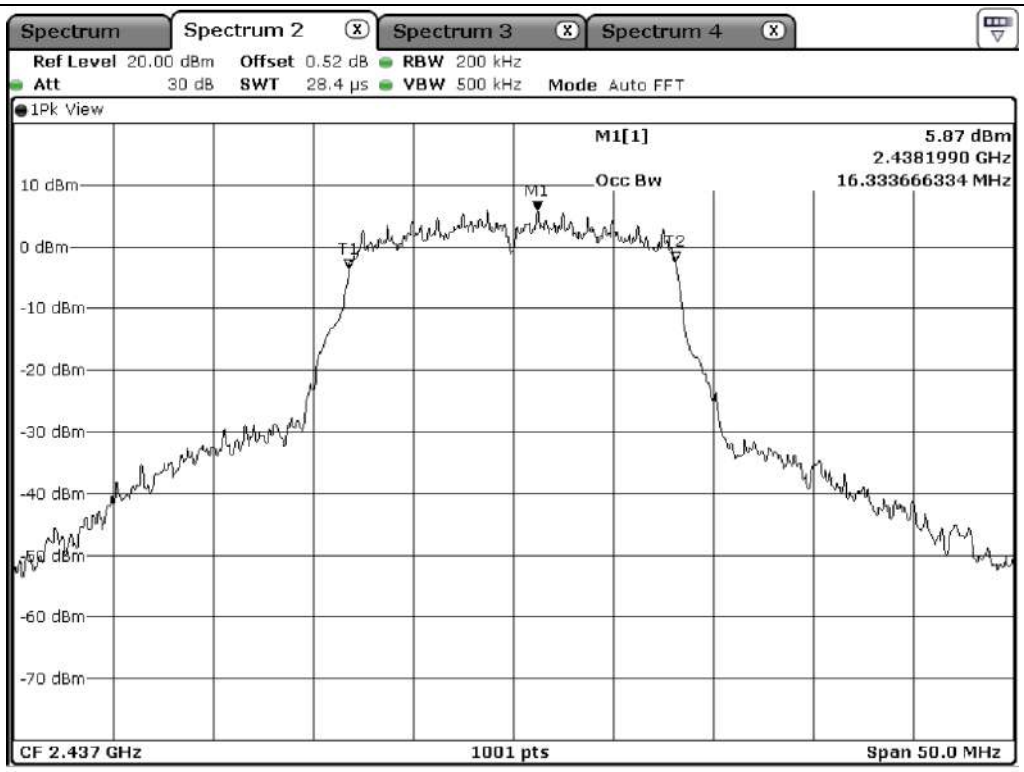
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)
Low	2 412.00	16.33
Middle	2 437.00	16.33
High	2 462.00	16.33

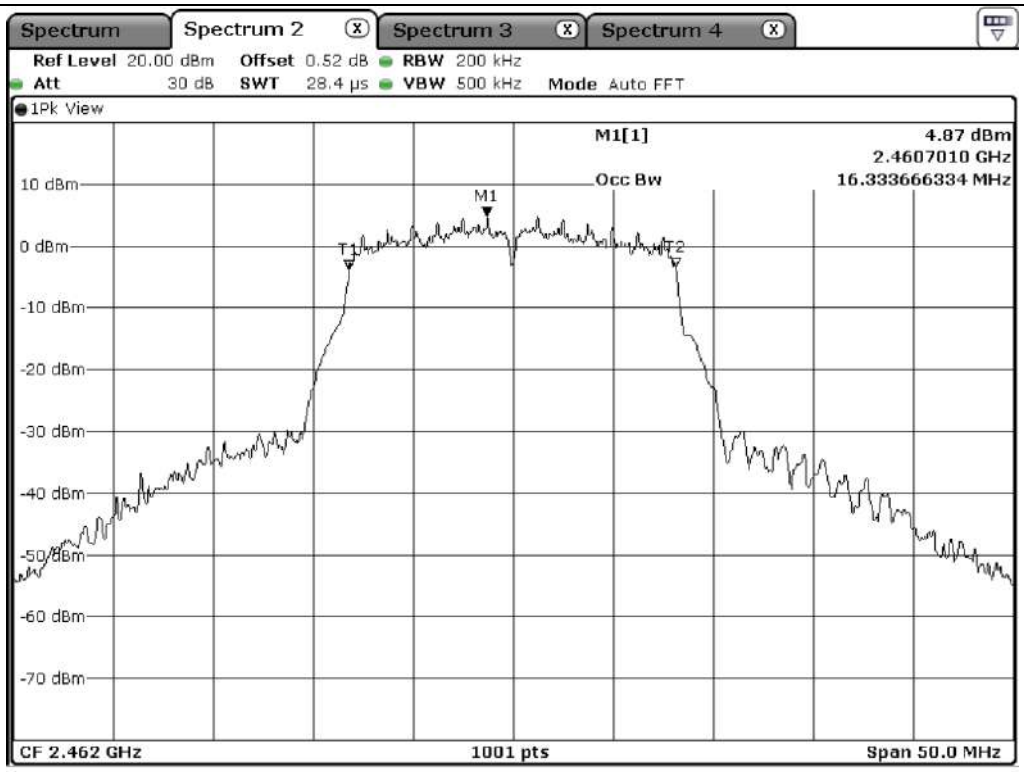
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

7.6 Test data for 802.11n_HT20 WLAN Mode

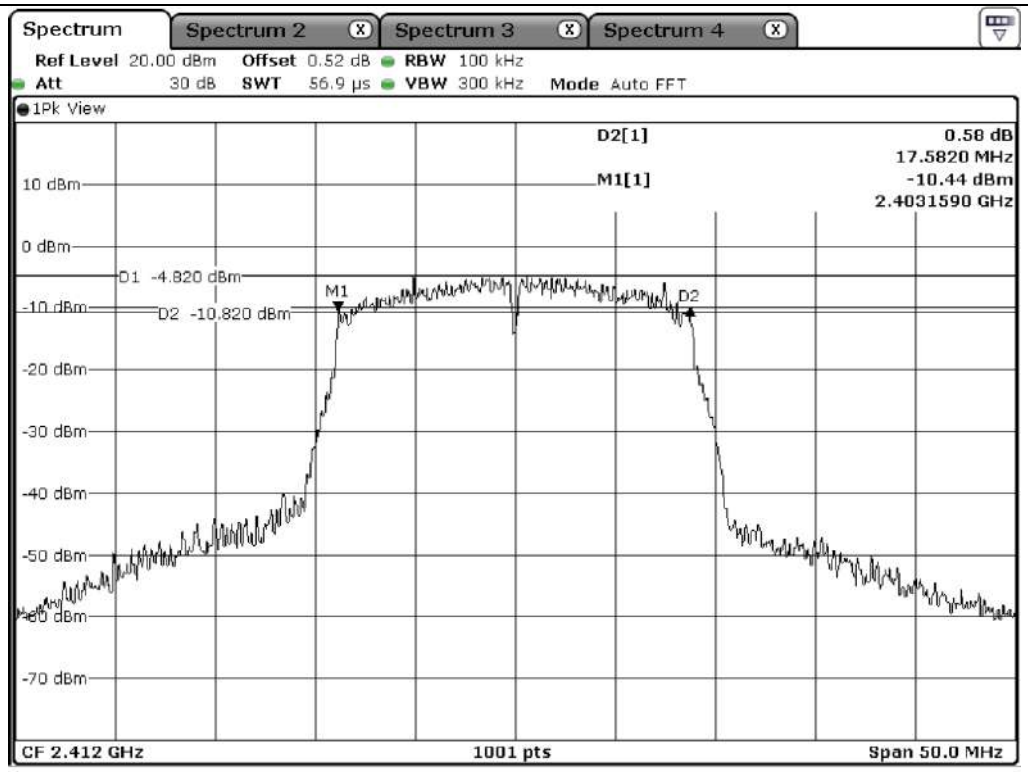
7.6.1 Test data for Antenna 0

7.6.1.1 MINIMUM 6 dB BANDWIDTH

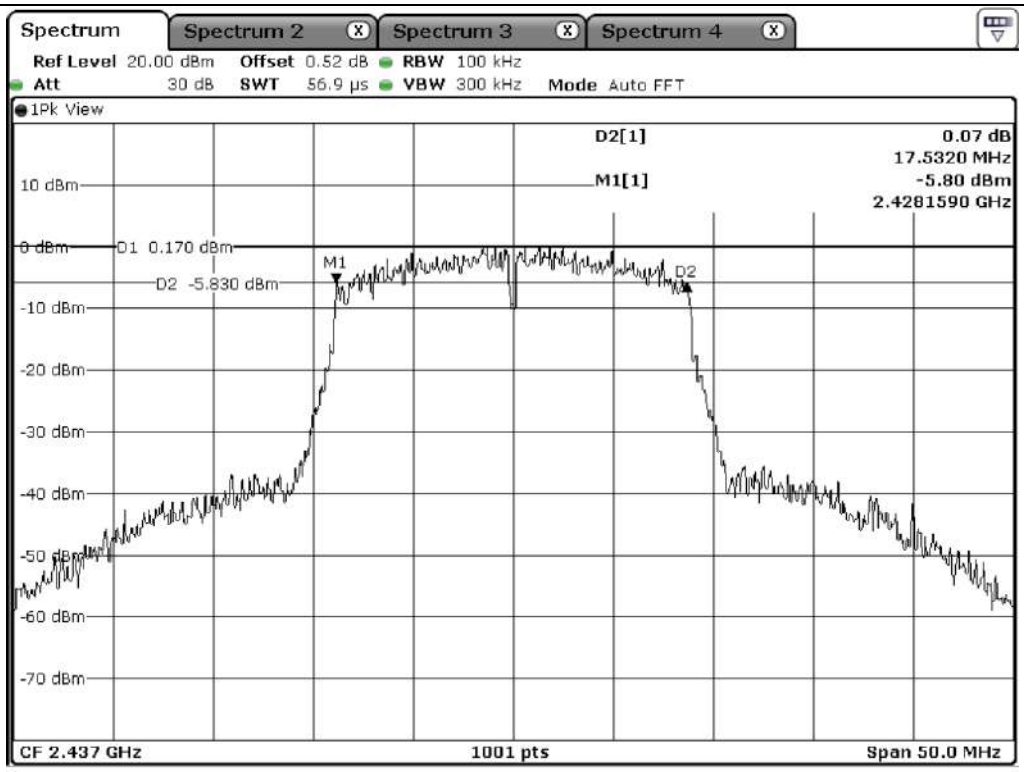
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	17.58	0.50	17.08
Middle	2 437.00	17.53	0.50	17.03
High	2 462.00	17.48	0.50	16.98

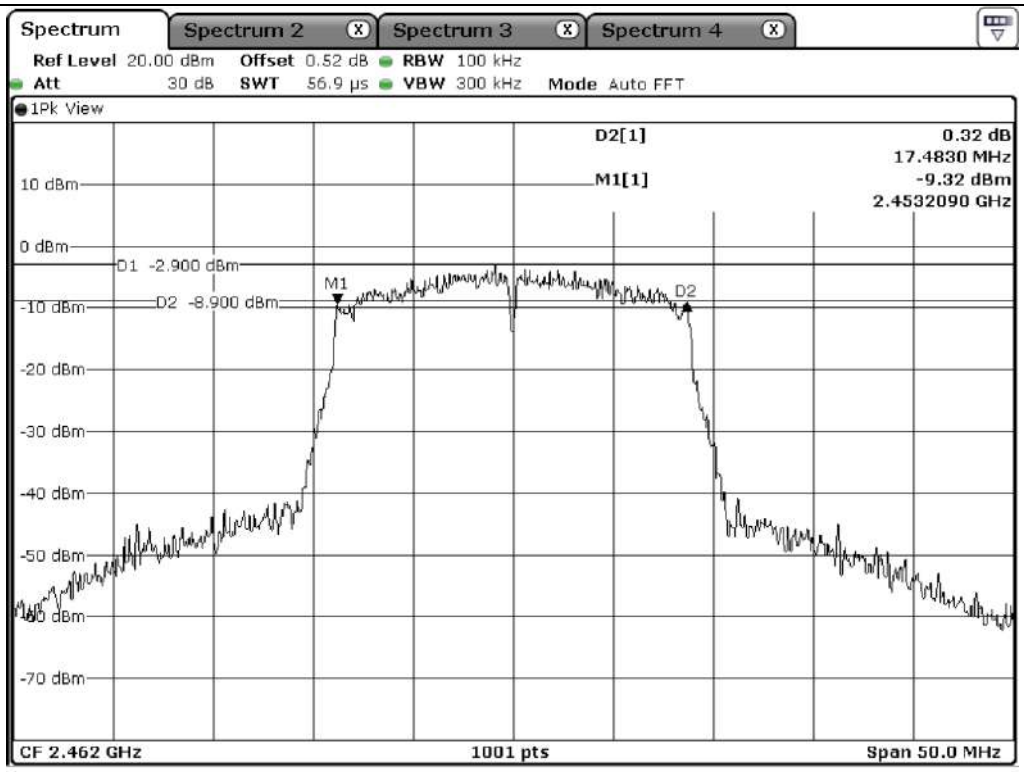
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

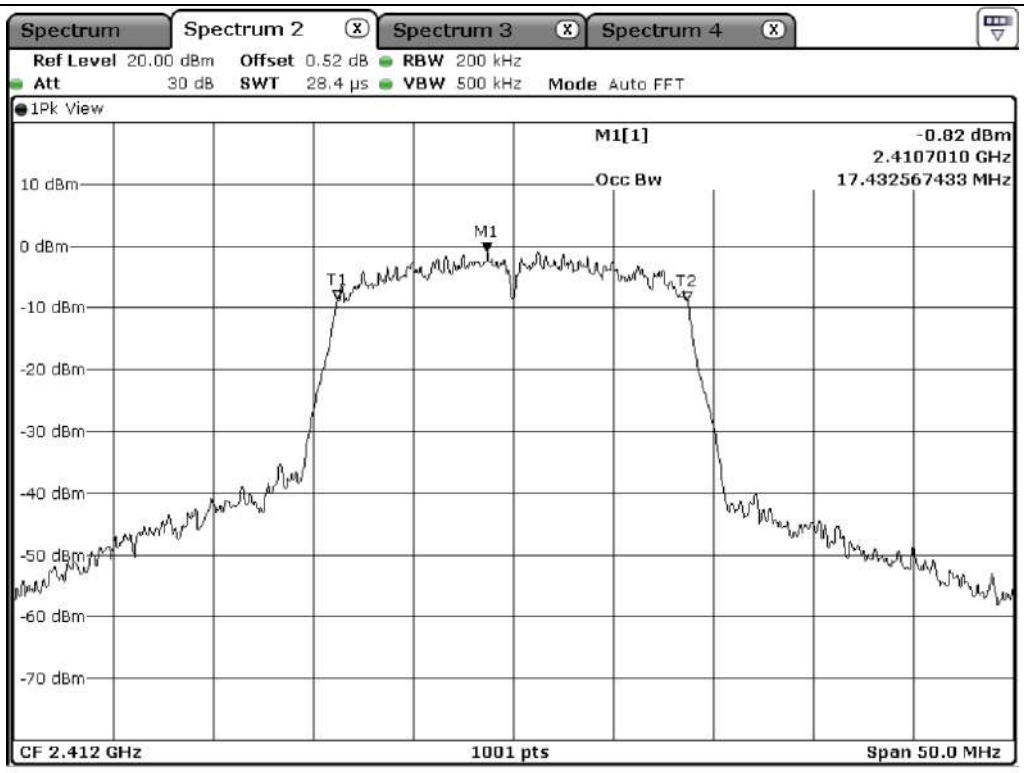
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

7.6.1.2 99 % OCCUPIED BANDWIDTH

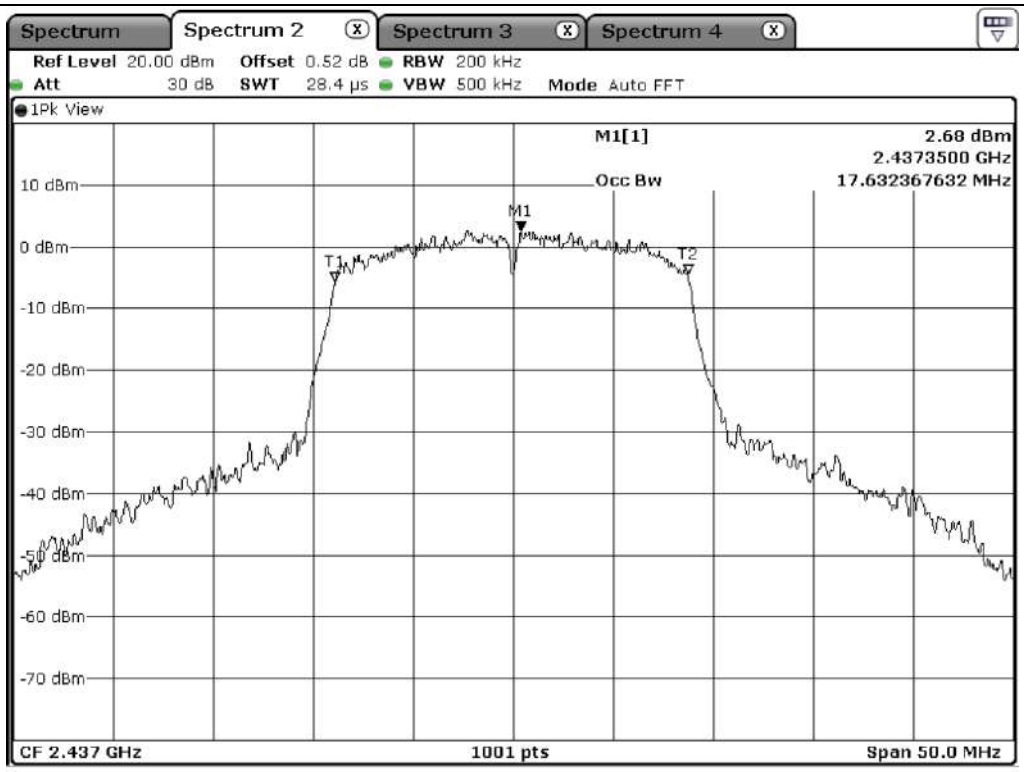
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)
Low	2 412.00	17.43
Middle	2 437.00	17.63
High	2 462.00	17.48

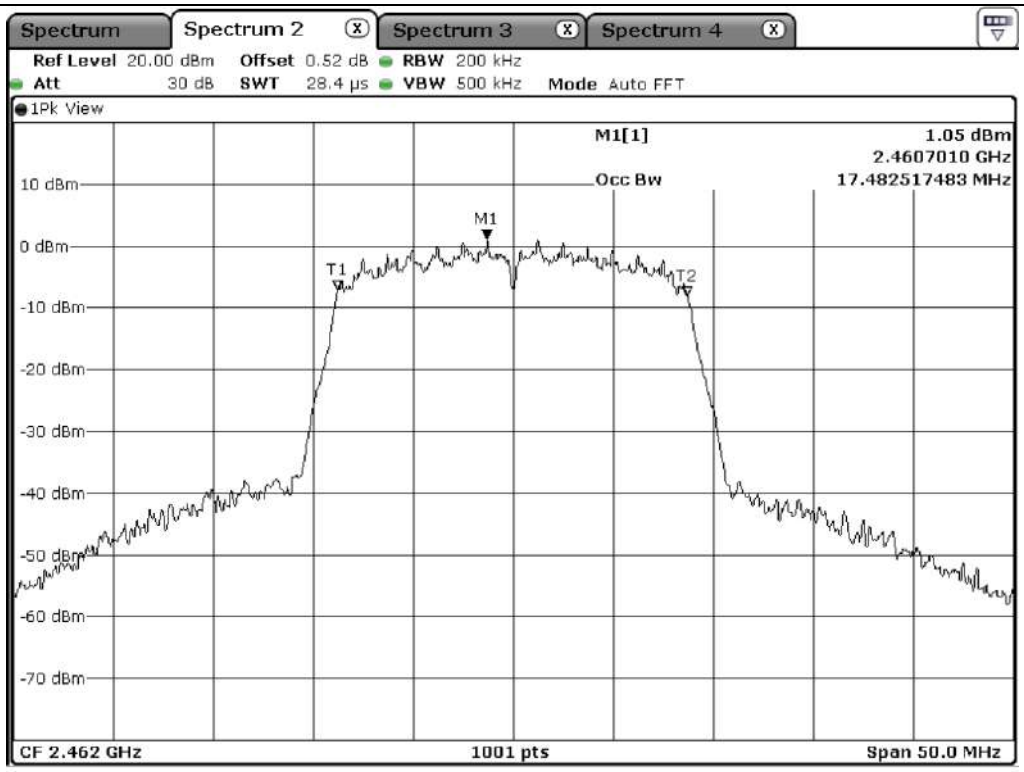
Remark. Margin = Measured Value - Limit



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)

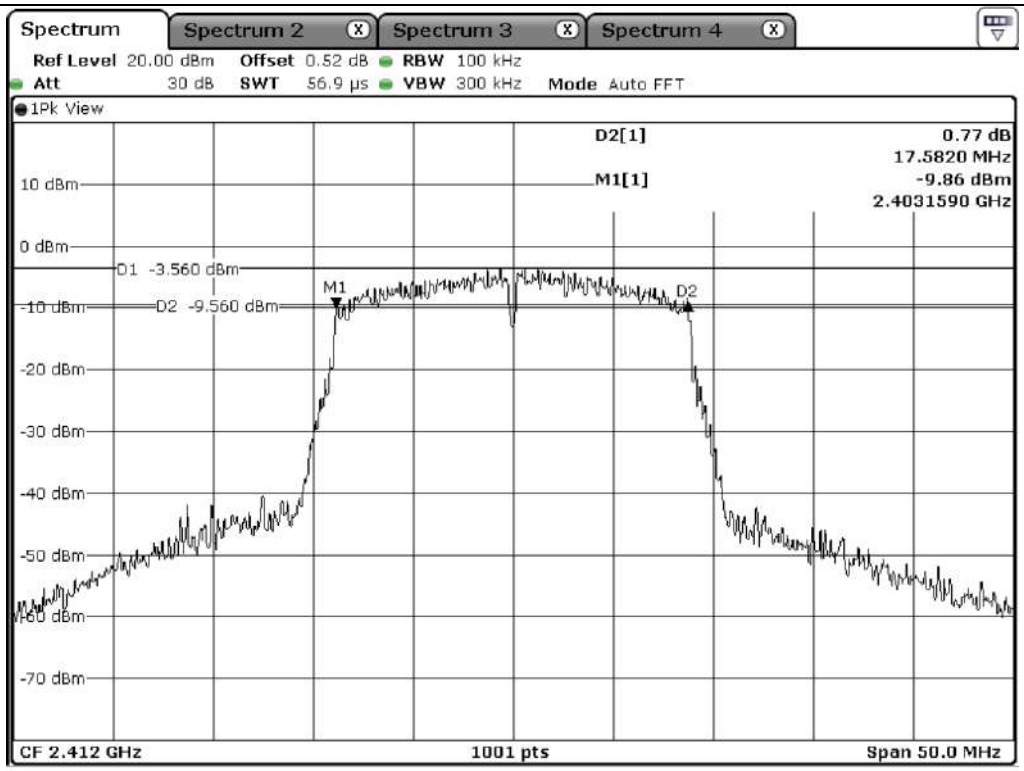
7.6.2 Test data for Antenna 1

7.6.2.1 MINIMUM 6 dB BANDWIDTH

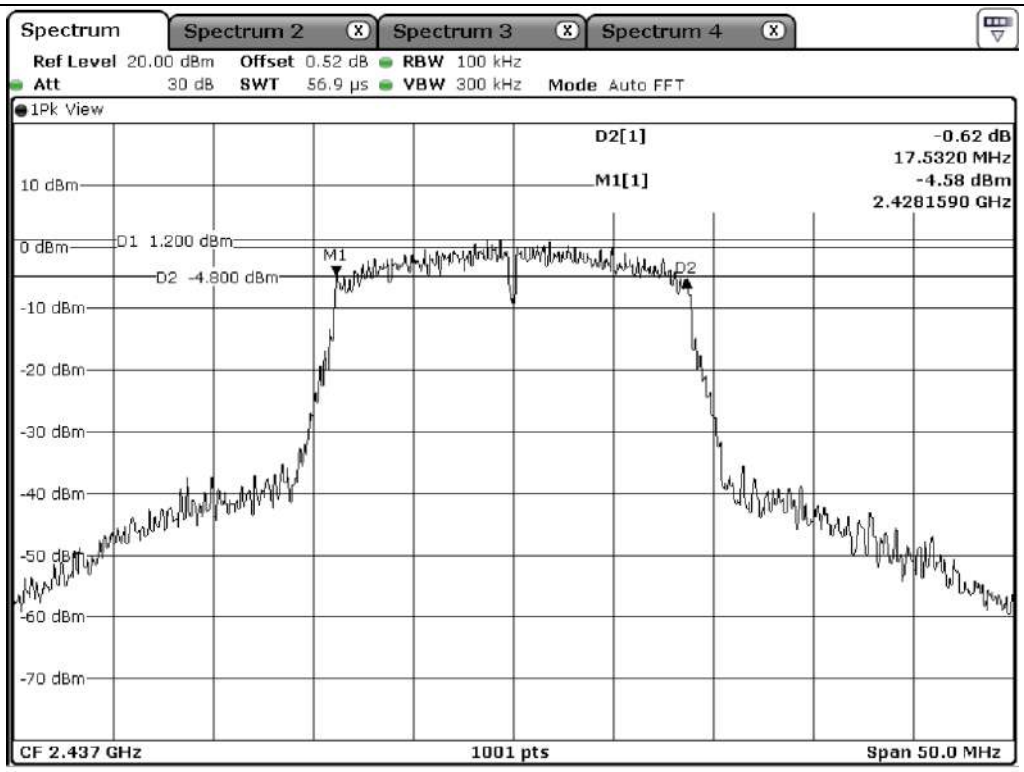
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	17.58	0.50	17.08
Middle	2 437.00	17.53	0.50	17.03
High	2 462.00	17.58	0.50	17.08

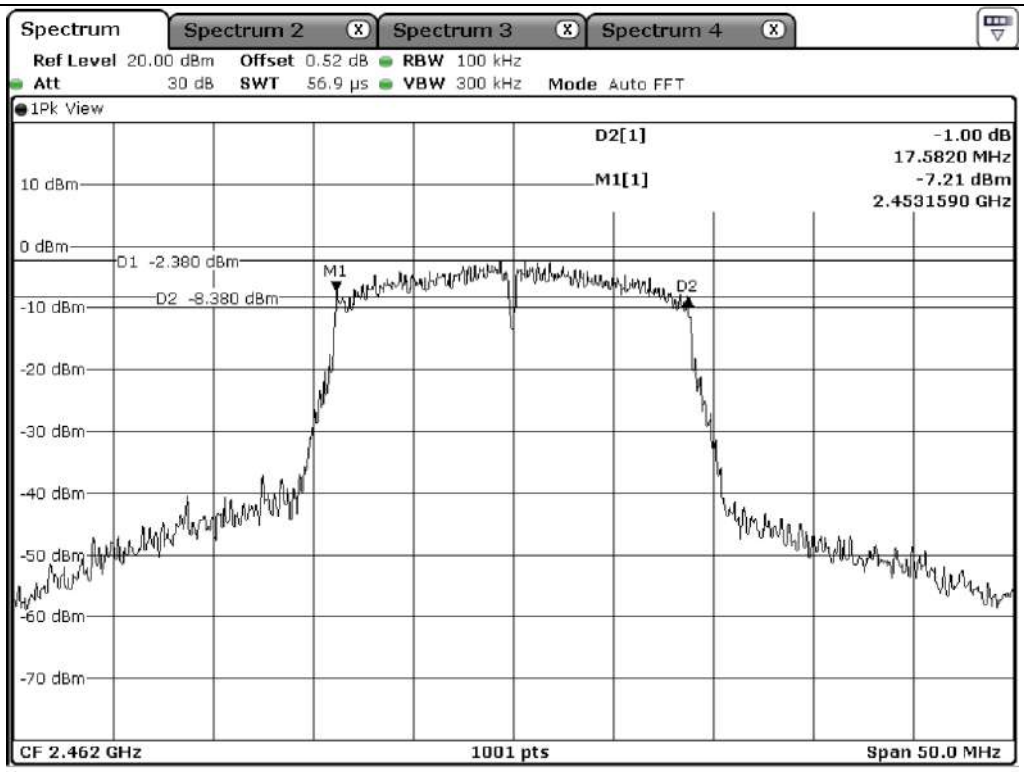
Remark. Margin = Measured Value - Limit



Low Channel



Middle Channel



High Channel

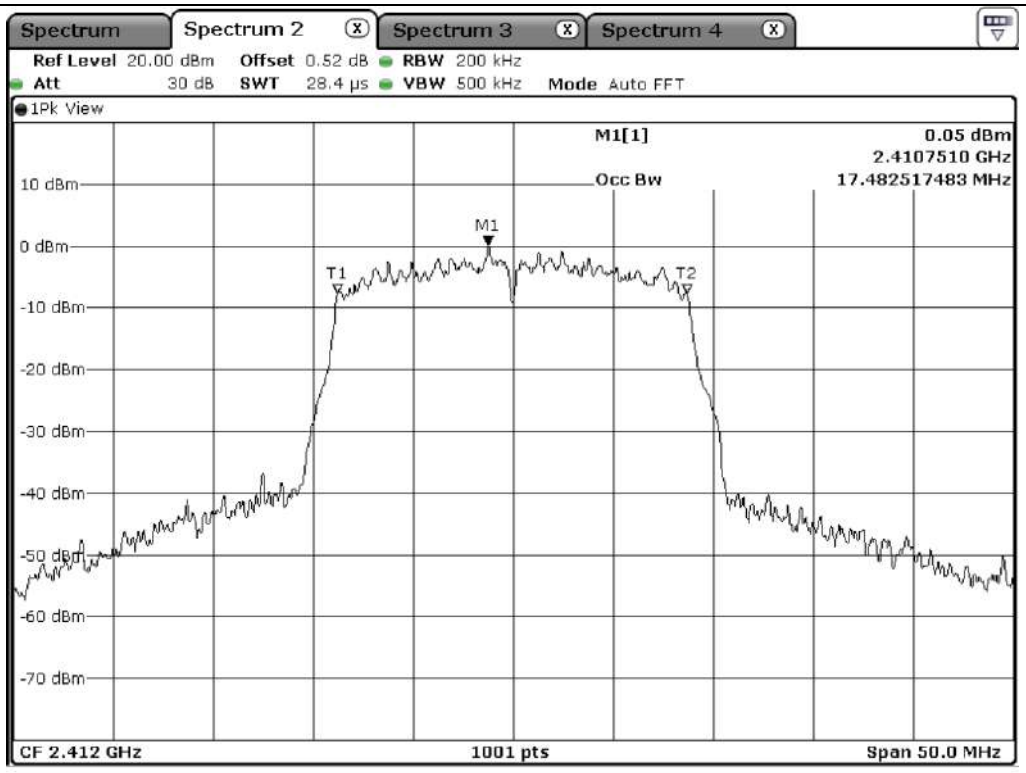
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

7.6.2.2 99 % OCCUPIED BANDWIDTH

-. Test Result : Pass

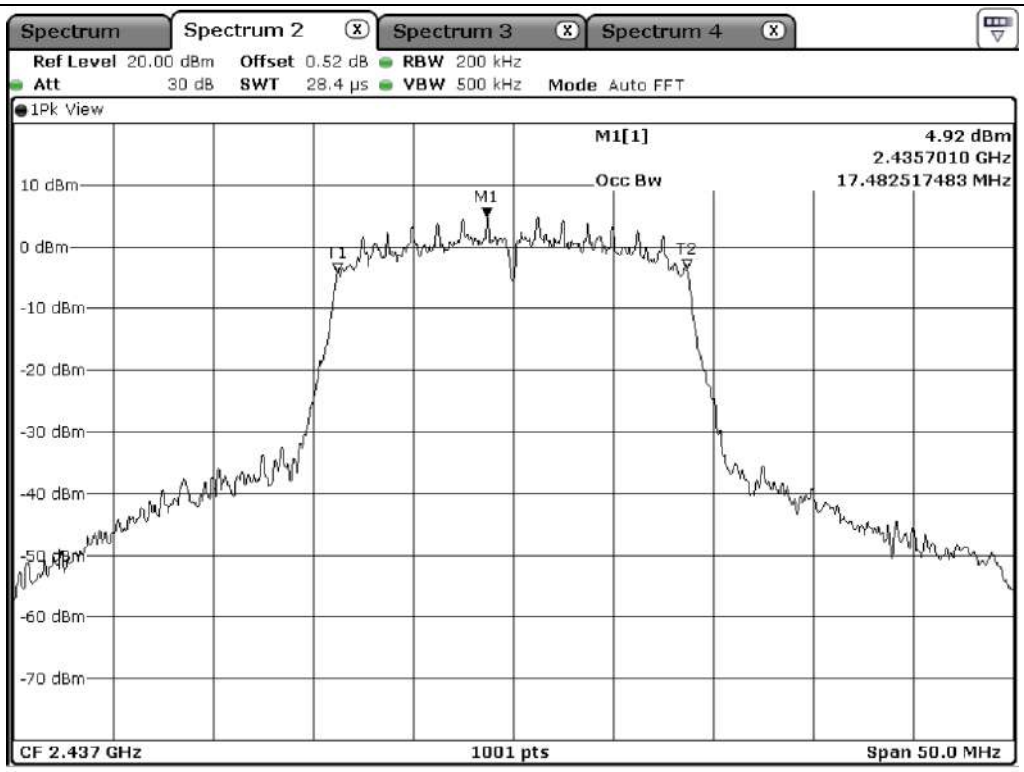
CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)
Low	2 412.00	17.48
Middle	2 437.00	17.48
High	2 462.00	17.53

Remark. Margin = Measured Value - Limit

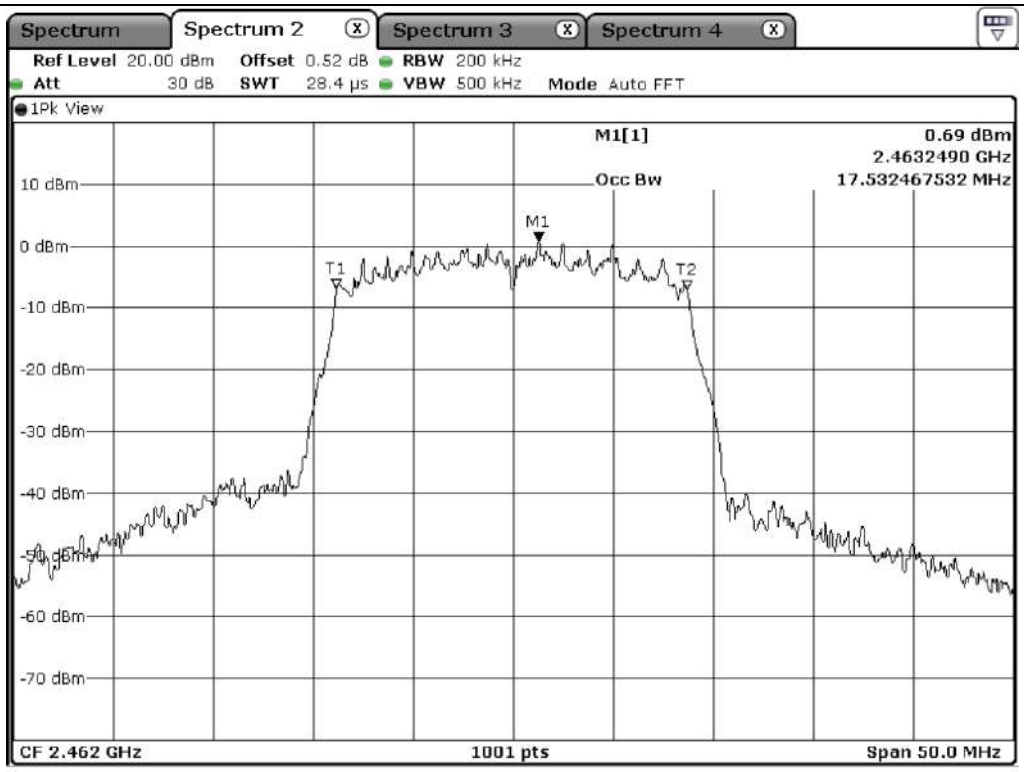


Low Channel

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)

8. MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER

8.1 Operating environment

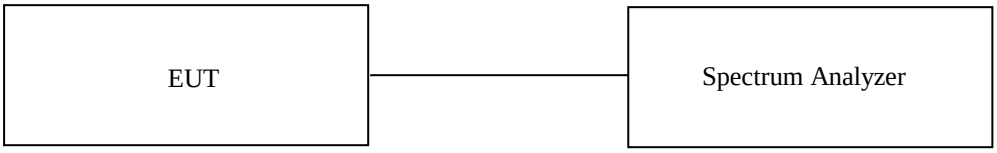
Temperature : 24 °C

Relative humidity : 45 % R.H.

8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 times the resolution bandwidth.



8.3 Test Date

March 29, 2021 ~ April 13, 2021

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

8.4 Test data for 802.11b WLAN Mode

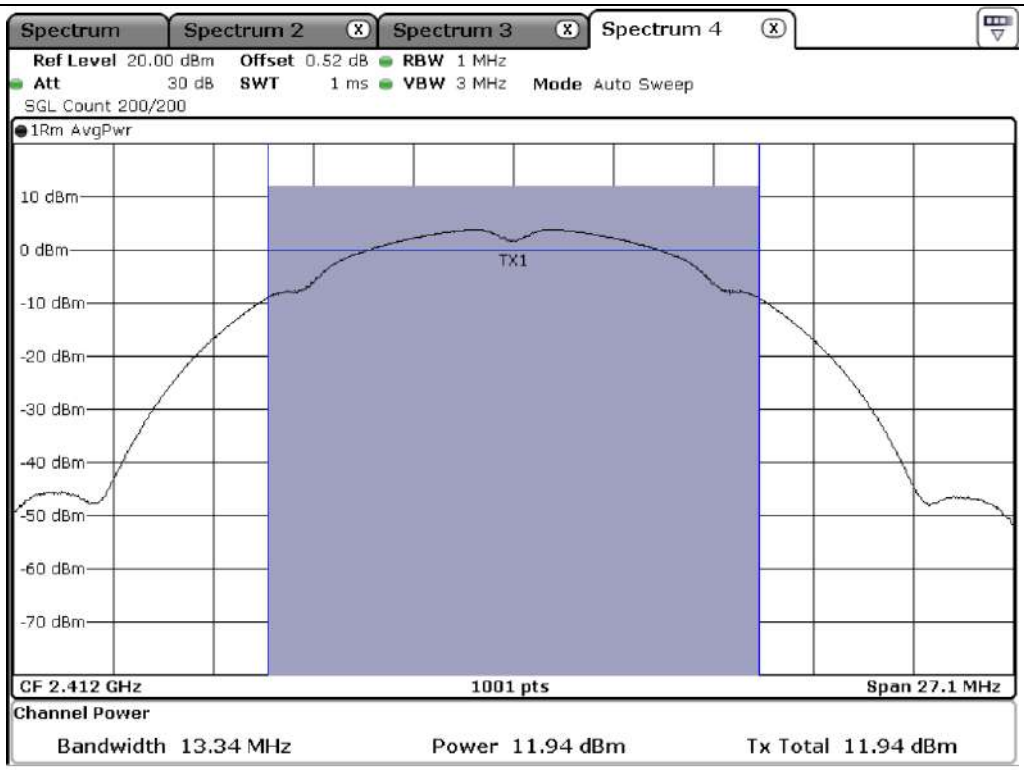
8.4.1 Test data for Antenna 0

-. Test Result : Pass

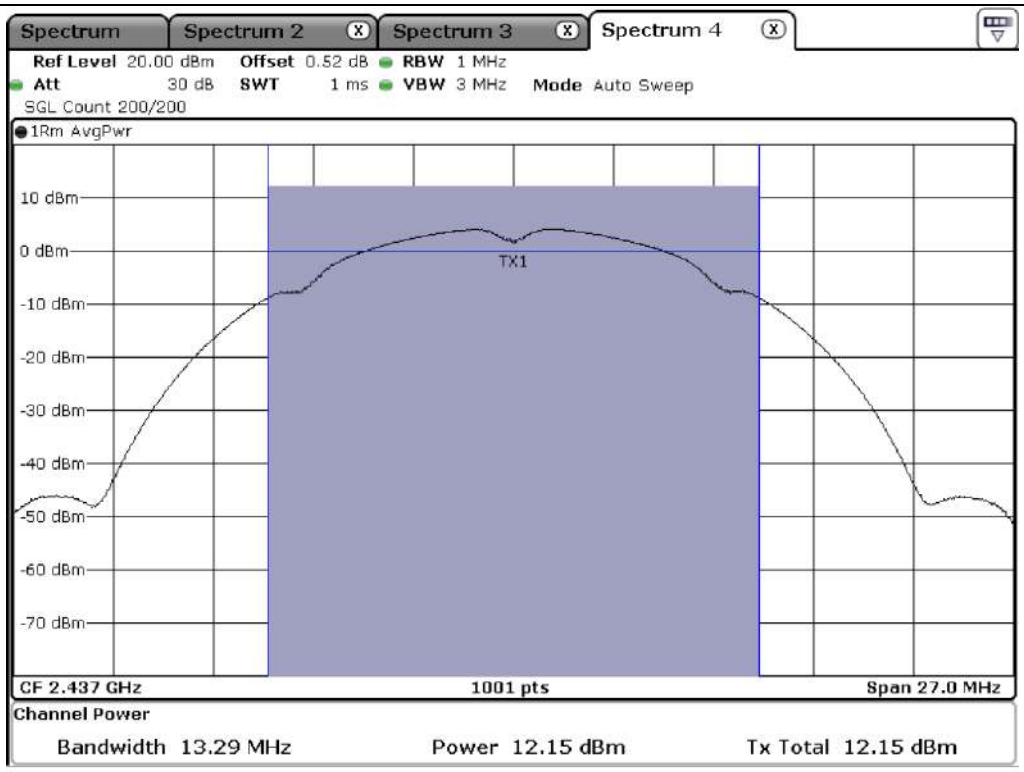
-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	13.34	11.94	0.05	11.99	30.00	18.01
MIDDLE	2 437.00	13.29	12.15	0.05	12.20	30.00	17.80
HIGH	2 462.00	13.34	12.27	0.05	12.32	30.00	17.68

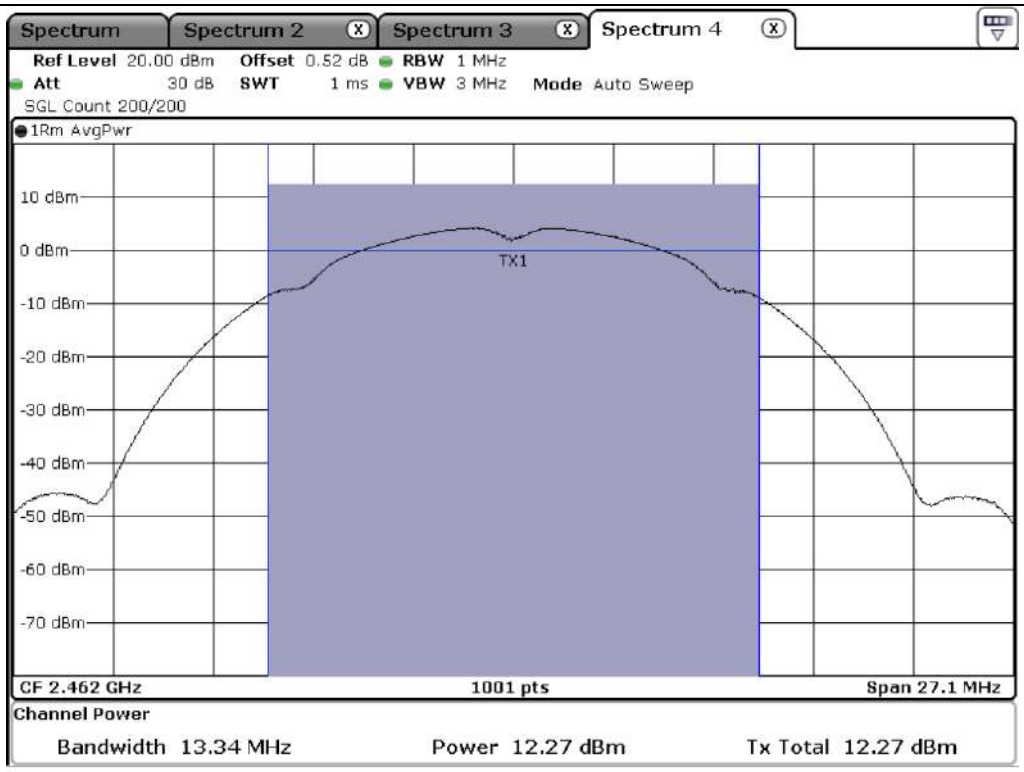
Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)



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)

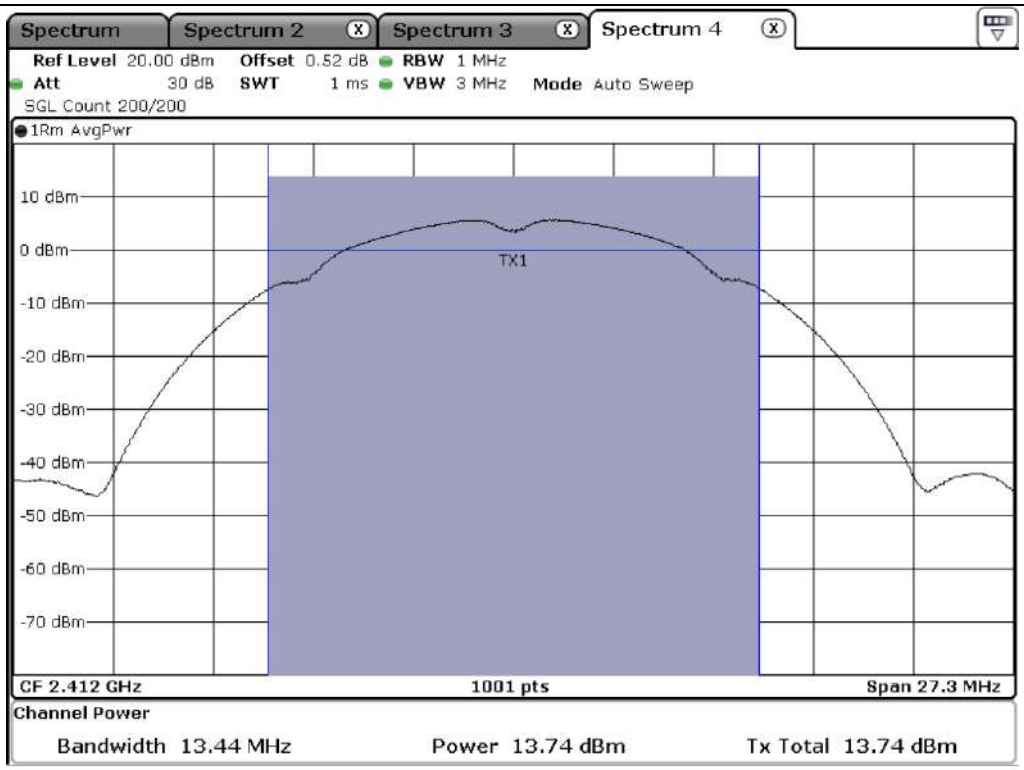
8.4.2 Test data for Antenna 1

-. Test Result : Pass

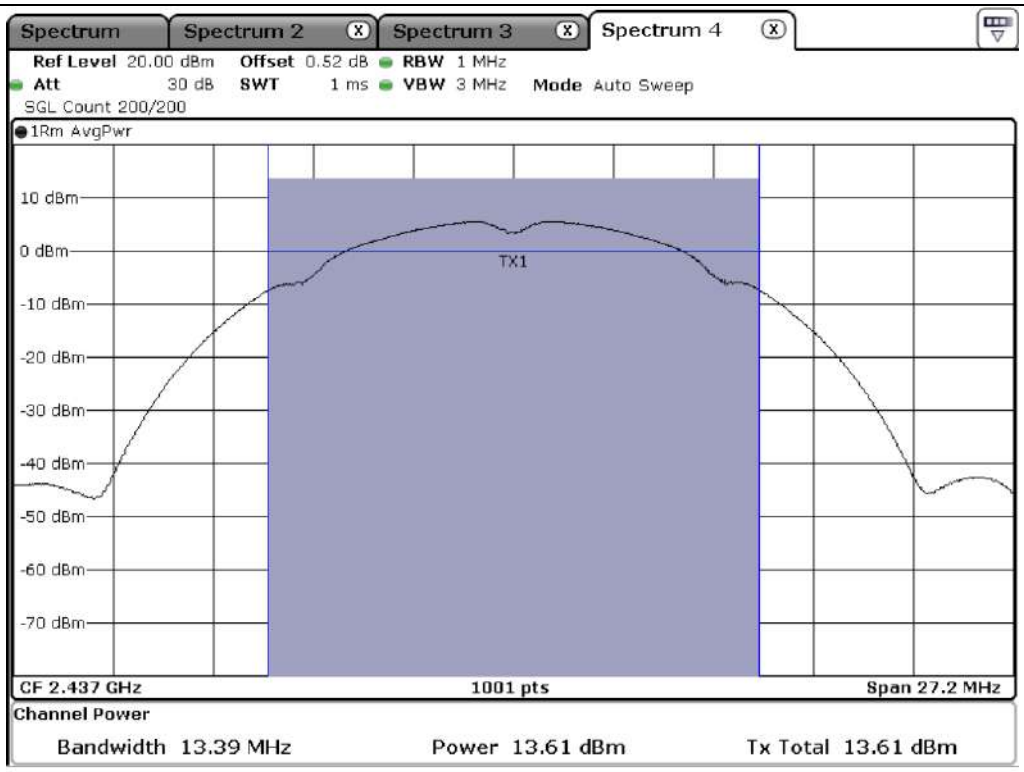
-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	13.44	13.74	0.05	13.79	30.00	16.21
MIDDLE	2 437.00	13.39	13.61	0.05	13.66	30.00	16.34
HIGH	2 462.00	13.39	13.79	0.05	13.84	30.00	16.16

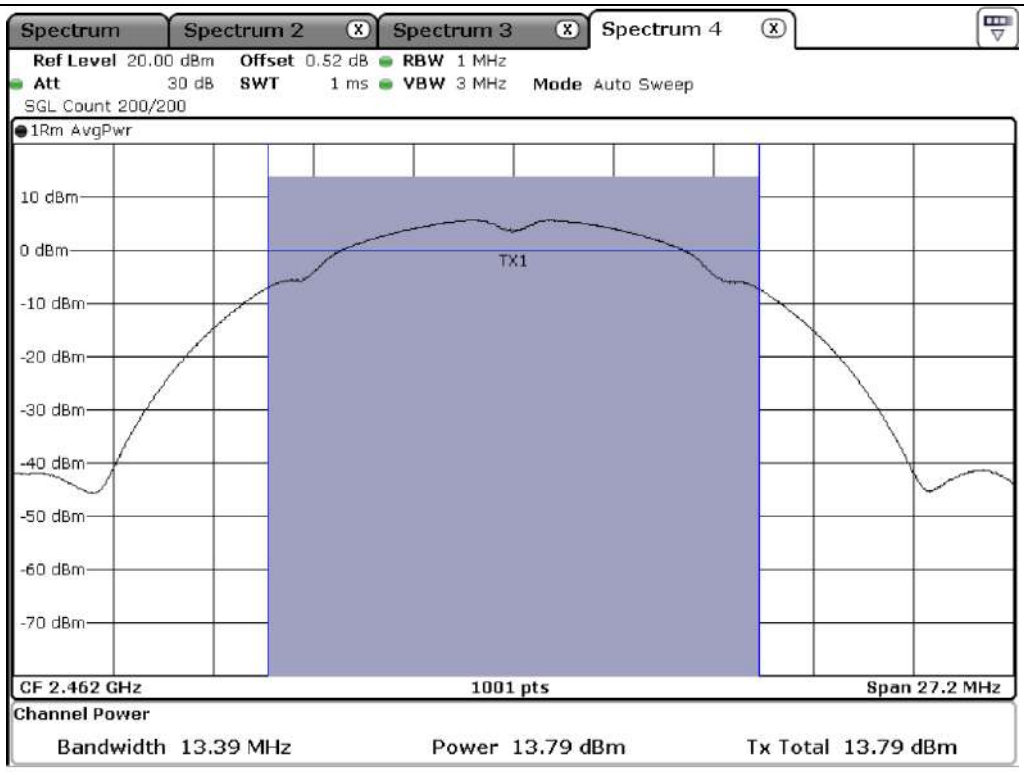
Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)



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)

8.5 Test data for 802.11g WLAN Mode

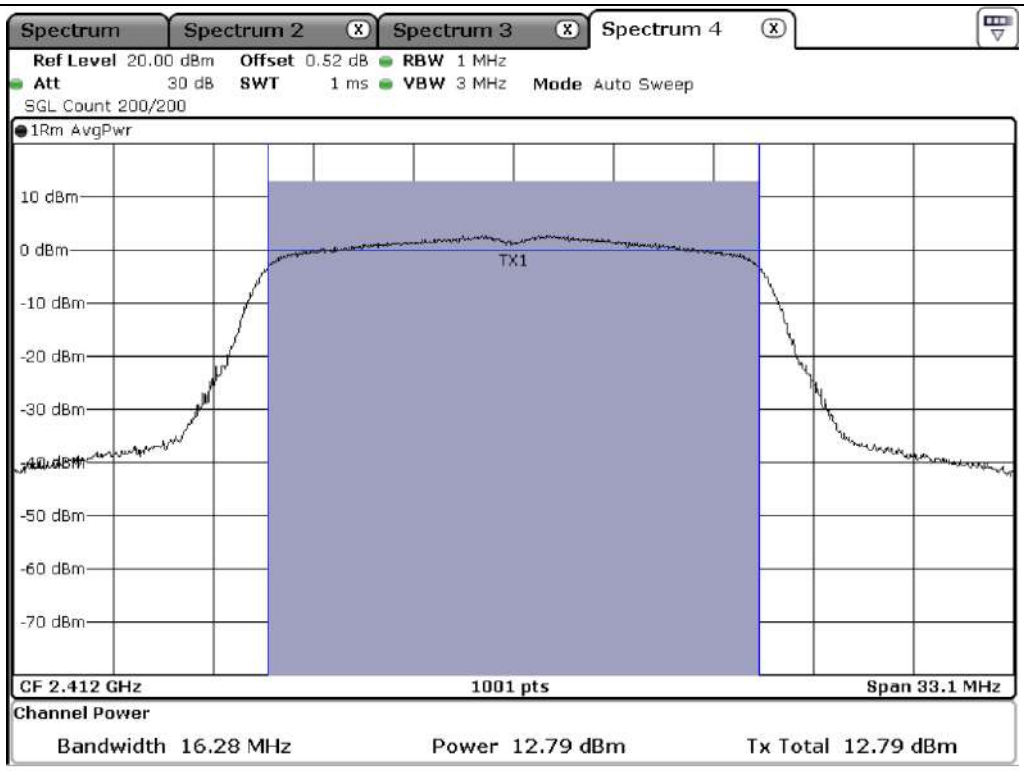
8.5.1 Test data for Antenna 0

-. Test Result : Pass

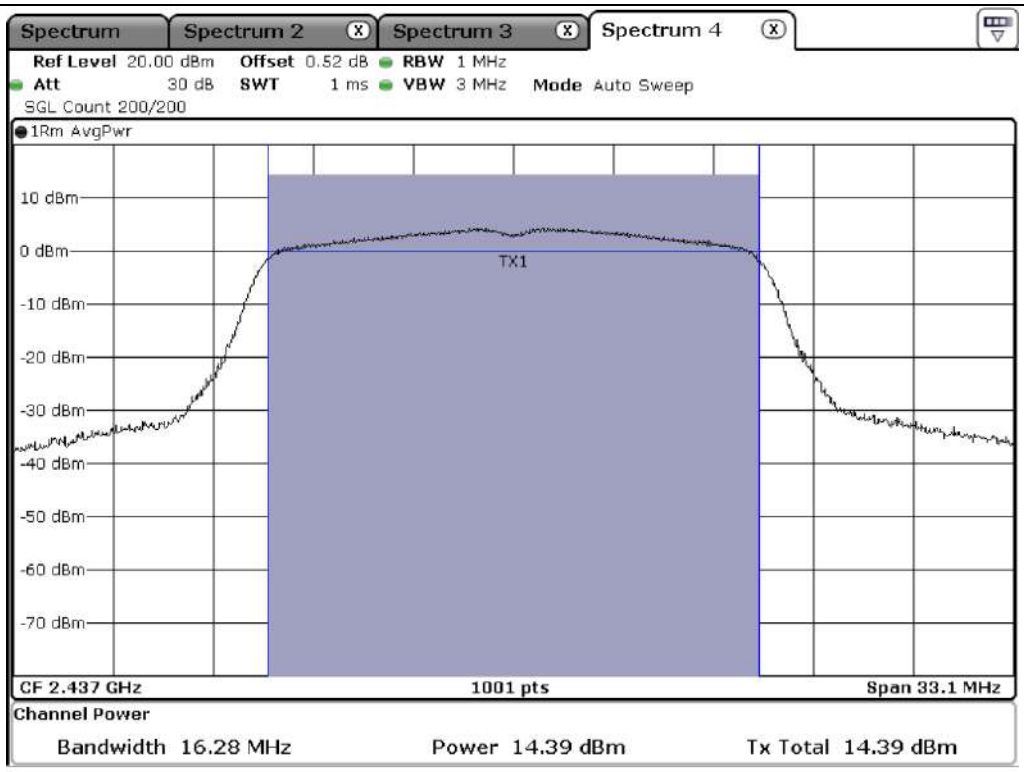
-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	16.28	12.79	0.37	13.16	30.00	16.84
MIDDLE	2 437.00	16.28	14.39	0.37	14.76	30.00	15.24
HIGH	2 462.00	16.33	11.51	0.37	11.88	30.00	18.12

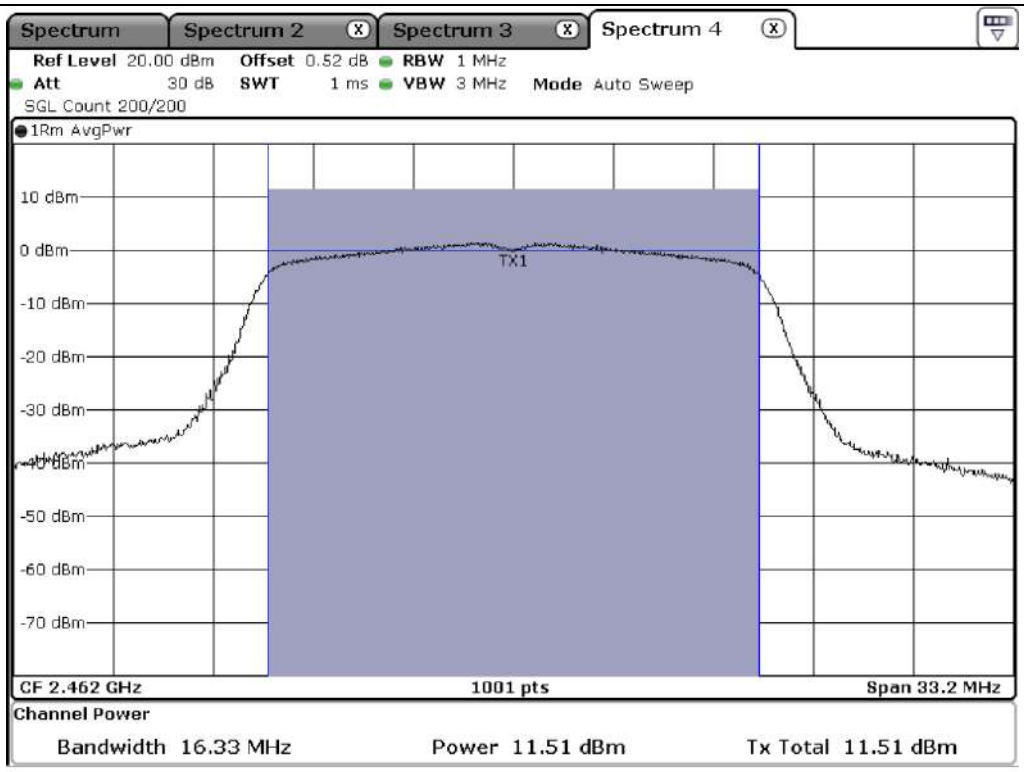
Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)



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)

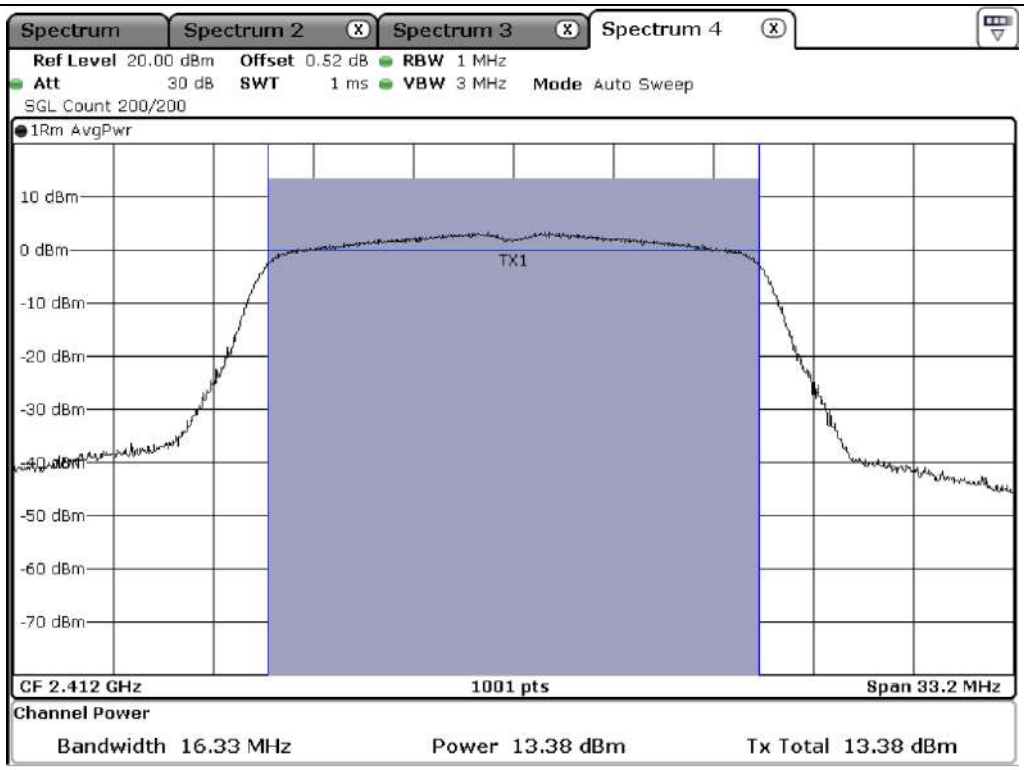
8.5.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : > 98 %

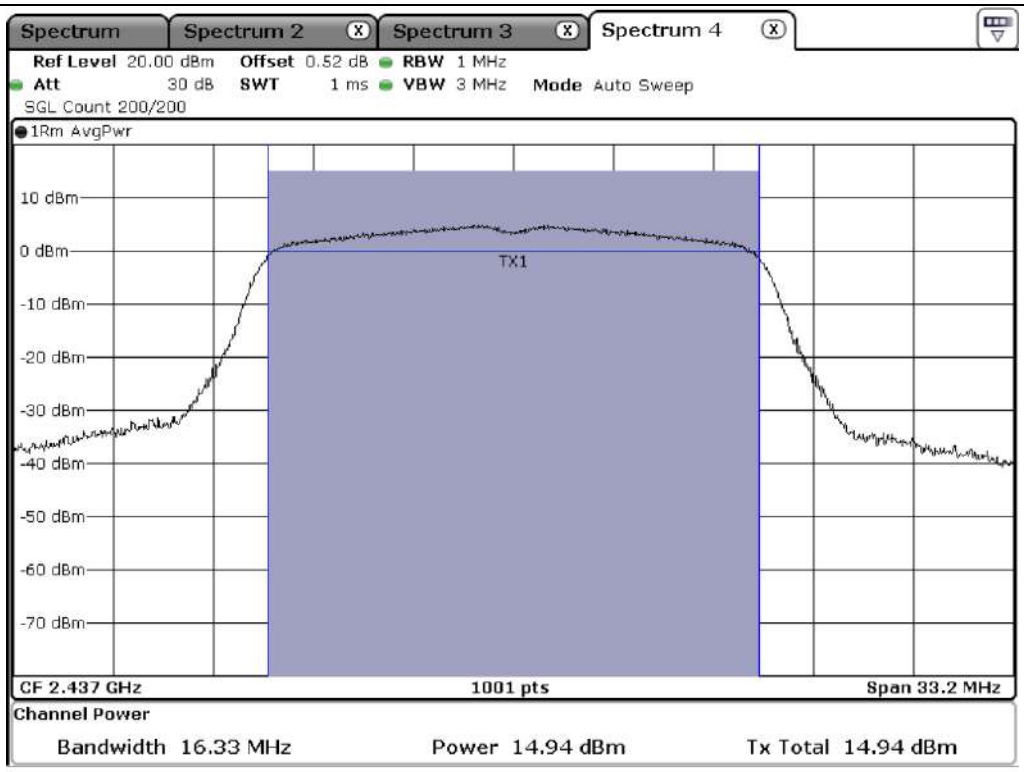
CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	16.33	13.38	0.40	13.78	30.00	16.22
MIDDLE	2 437.00	16.33	14.94	0.40	15.34	30.00	14.66
HIGH	2 462.00	16.33	13.94	0.40	14.34	30.00	15.66

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

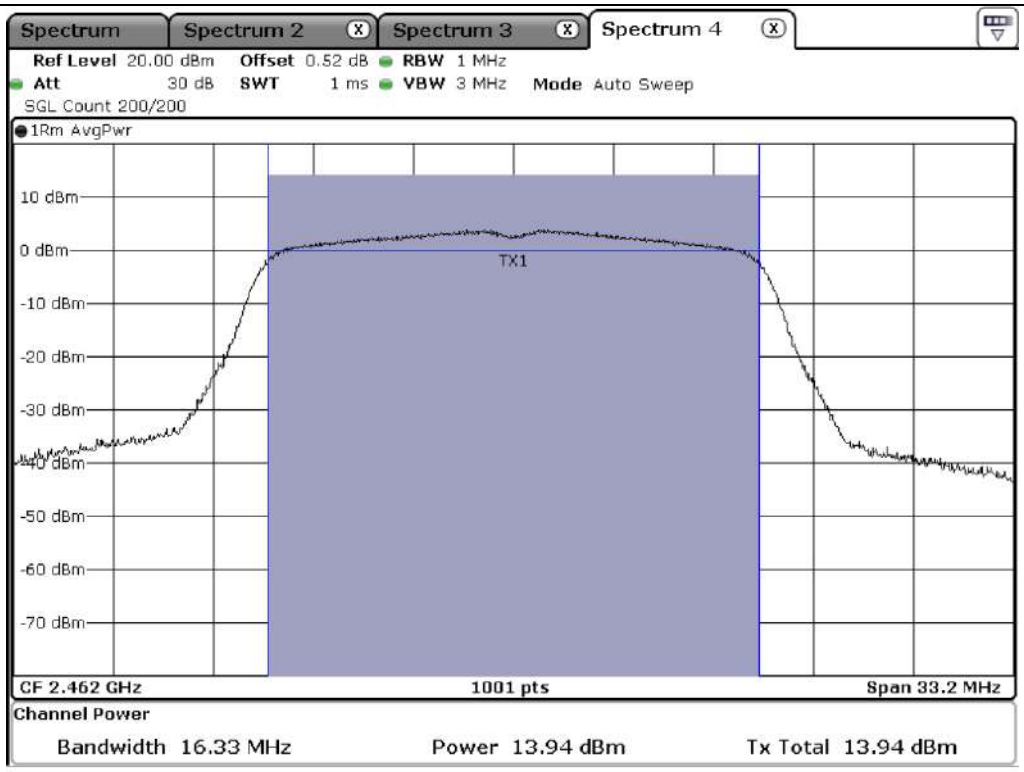


Low Channel

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)

8.6 Test data for 802.11n_HT20 WLAN Mode

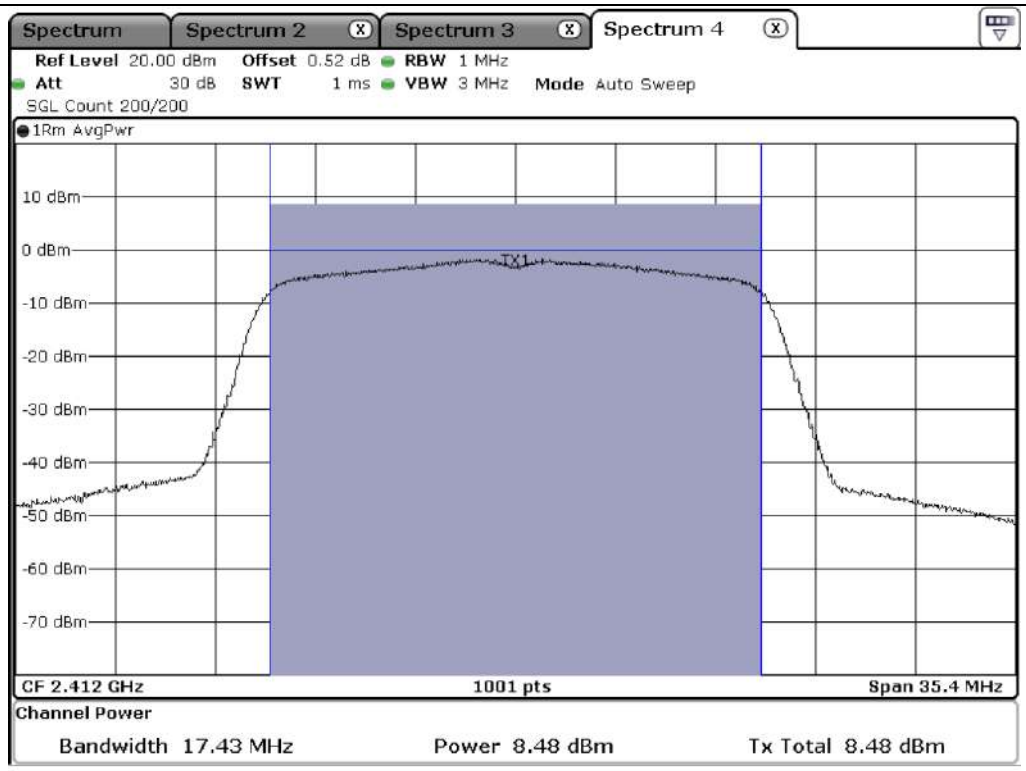
8.6.1 Test data for Antenna 0

-. Test Result : Pass

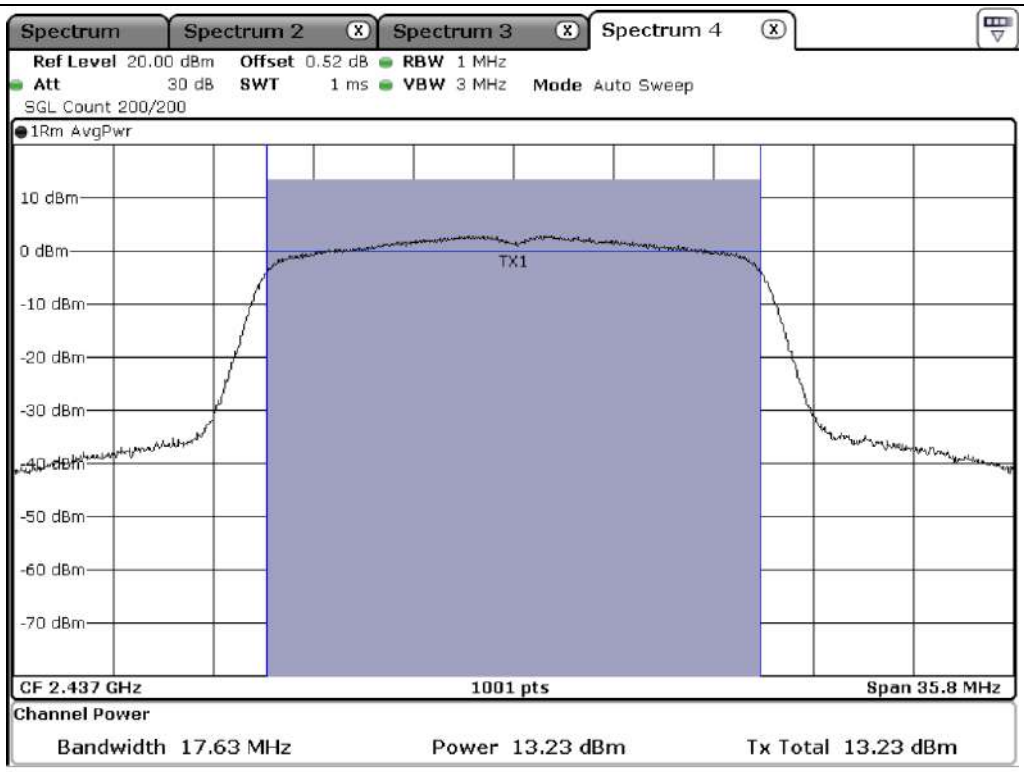
-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	17.43	8.48	0.73	9.21	30.00	20.79
MIDDLE	2 437.00	17.63	13.23	0.73	13.96	30.00	16.04
HIGH	2 462.00	17.48	9.62	0.73	10.35	30.00	19.65

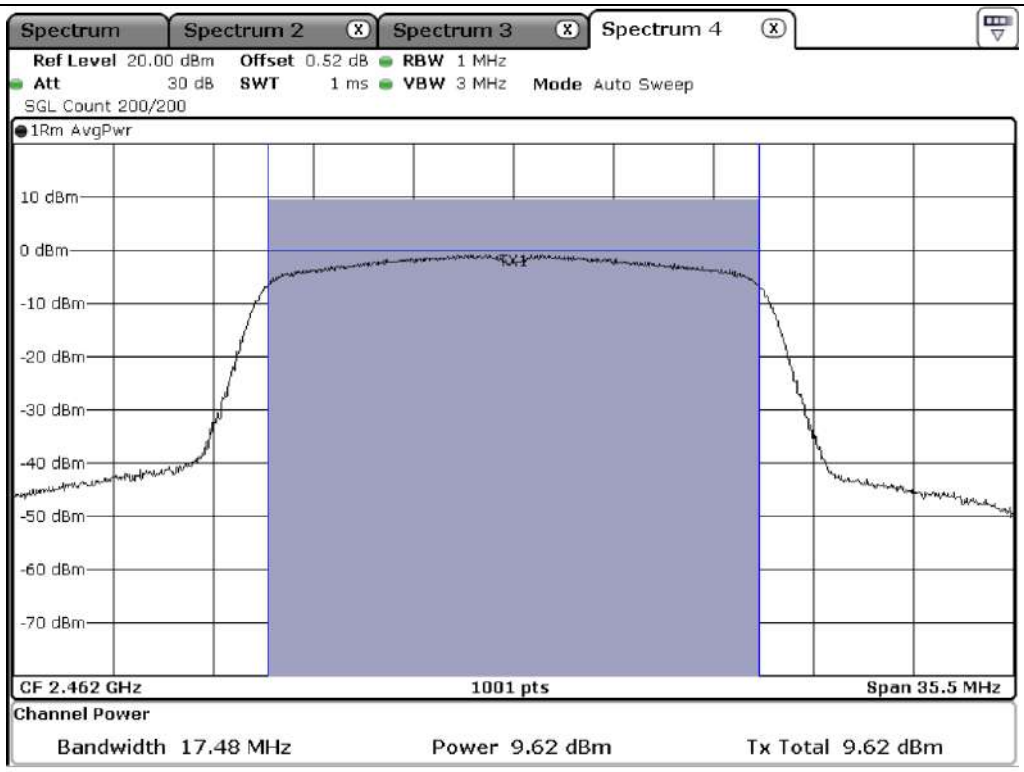
Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)



Low Channel



Middle Channel



High Channel

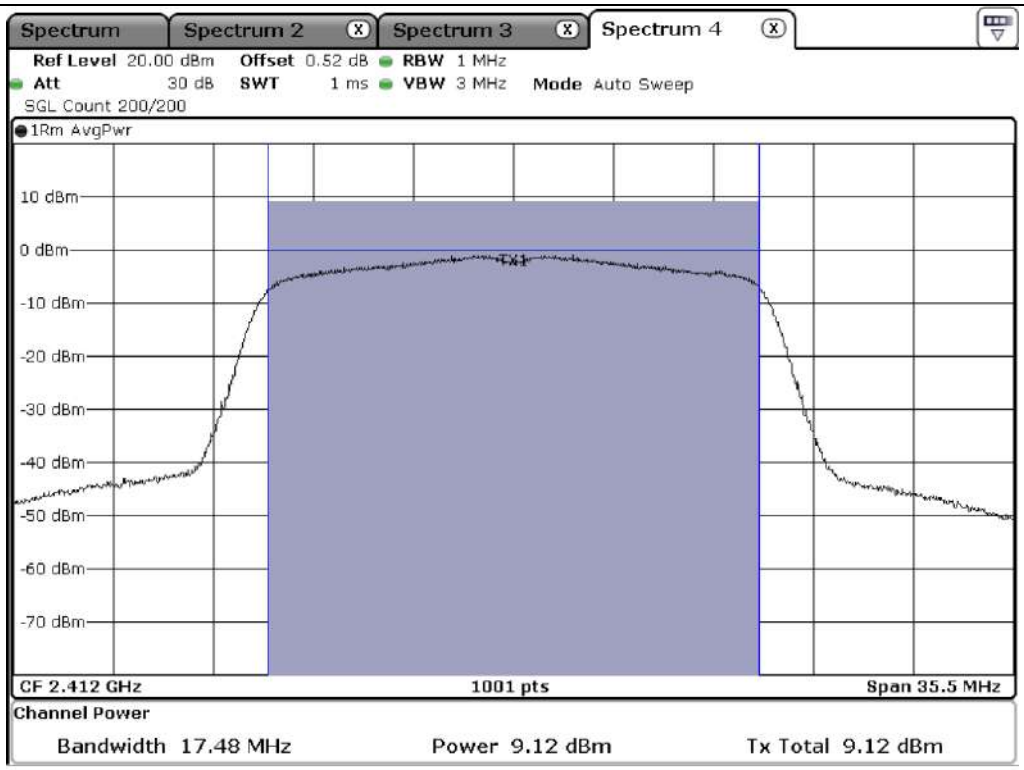
8.6.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : > 98 %

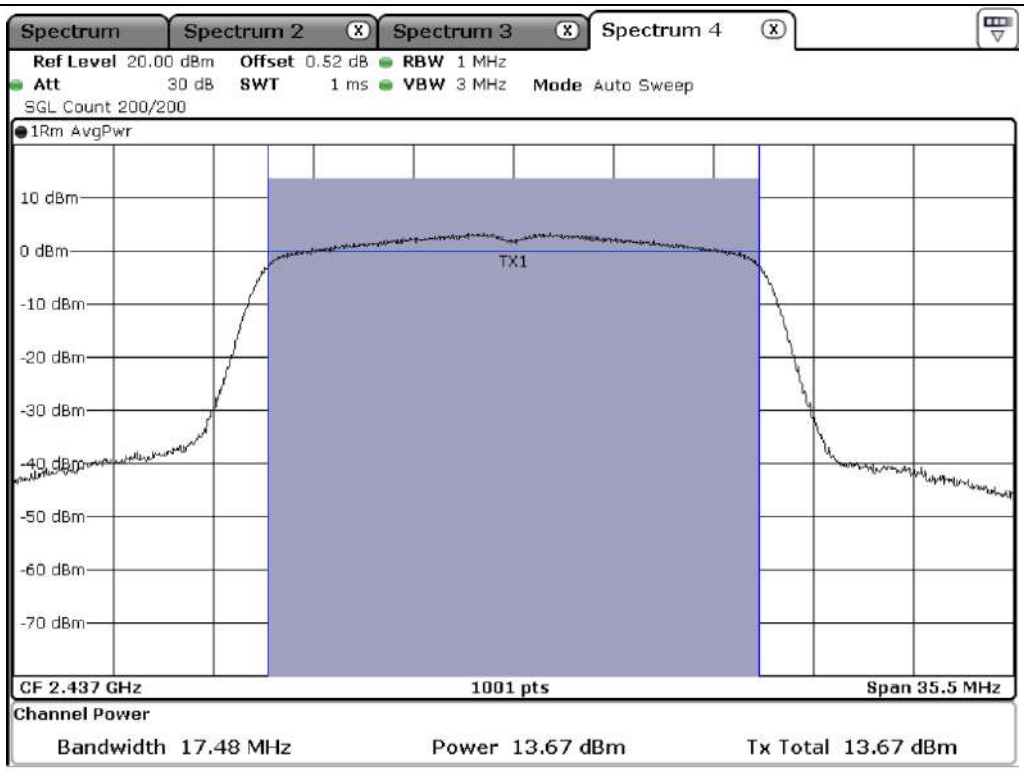
CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth (MHz)	MEASURED VALUE (dBm)	Duty Factor (dB)	Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	17.48	9.12	0.67	9.79	30.00	20.21
MIDDLE	2 437.00	17.48	13.67	0.67	14.34	30.00	15.66
HIGH	2 462.00	17.53	10.24	0.67	10.91	30.00	19.09

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

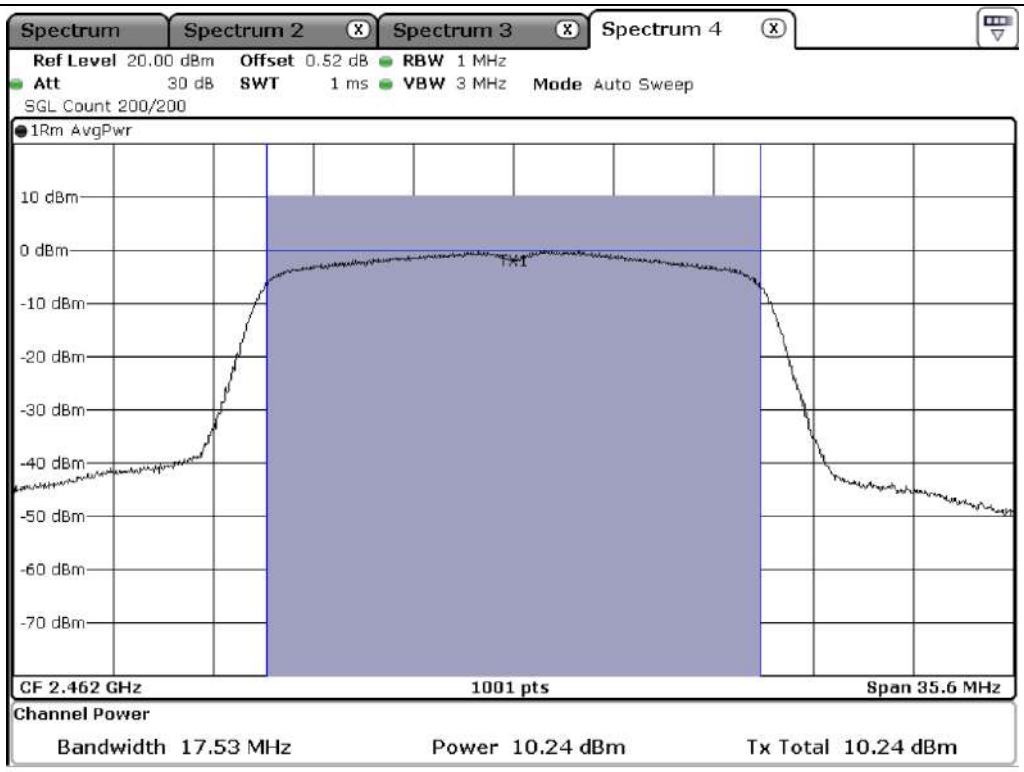


Low Channel

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

8.6.3 Test data for Multiple Transmit

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	12.52	30.00	17.48
MIDDLE	2 437.00	17.16	30.00	12.84
HIGH	2 462.00	13.65	30.00	16.35

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

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

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

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9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

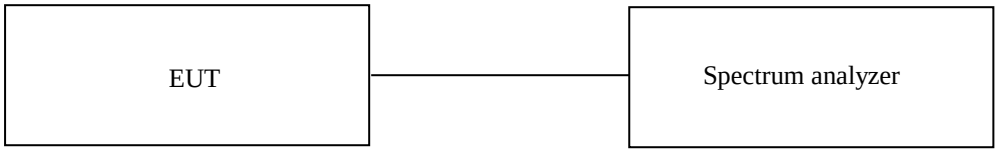
9.1 Operating environment

Temperature : 24 °C

Relative humidity : 45 % 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.

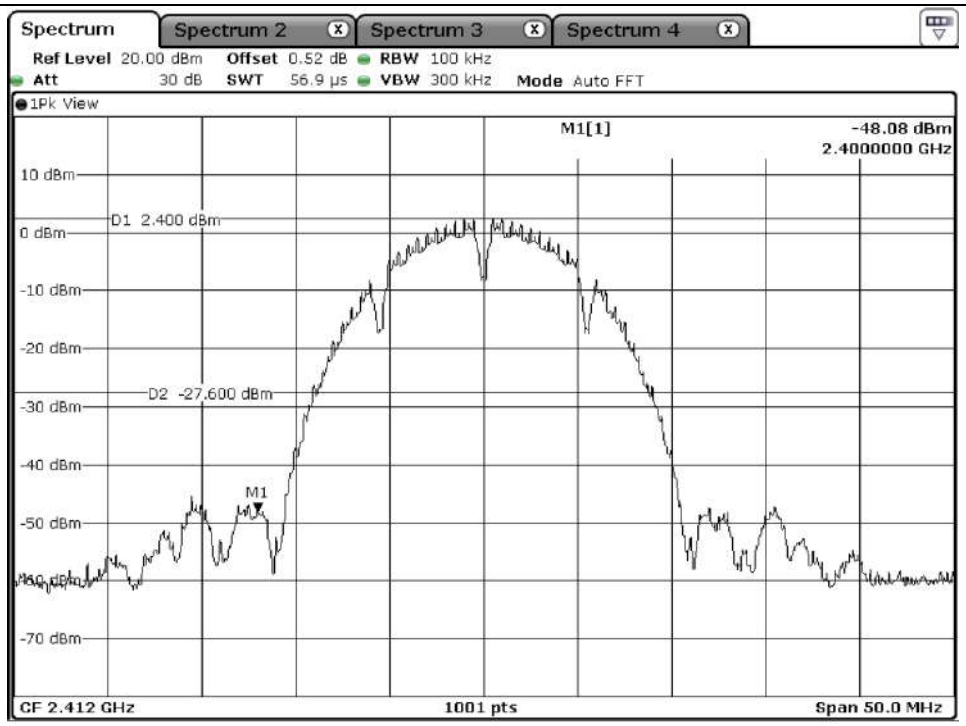
9.4 Test Date

March 29, 2021 ~ April 13, 2021

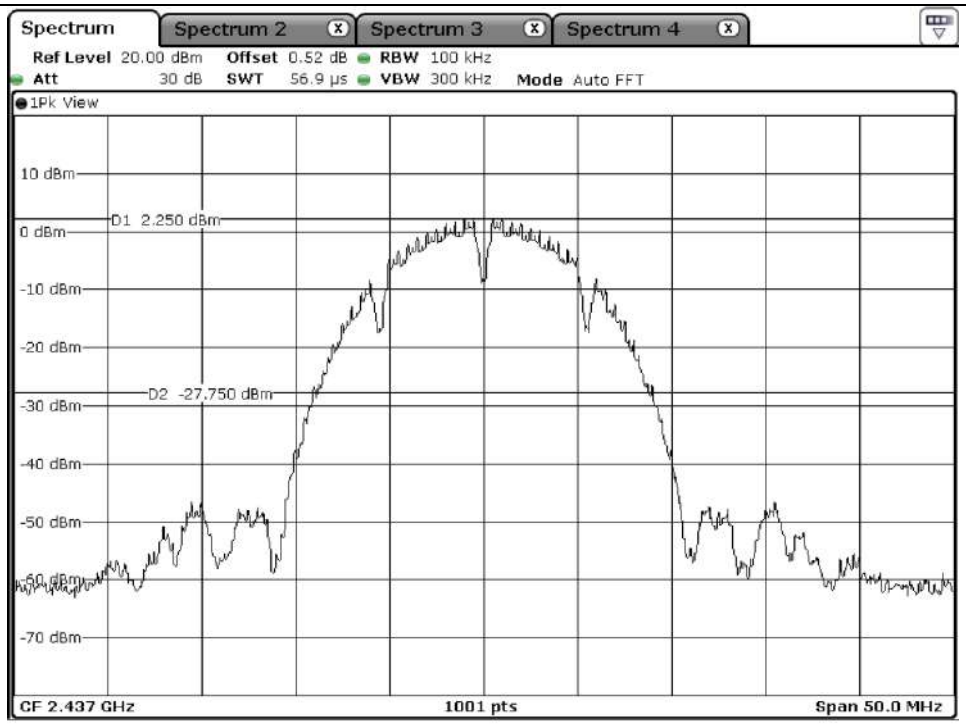
9.5 Test data for conducted emission

9.5.1 Test data for 802.11b WLAN Mode

9.5.1.1 Test data for Antenna 0



Low Channel



Middle Channel

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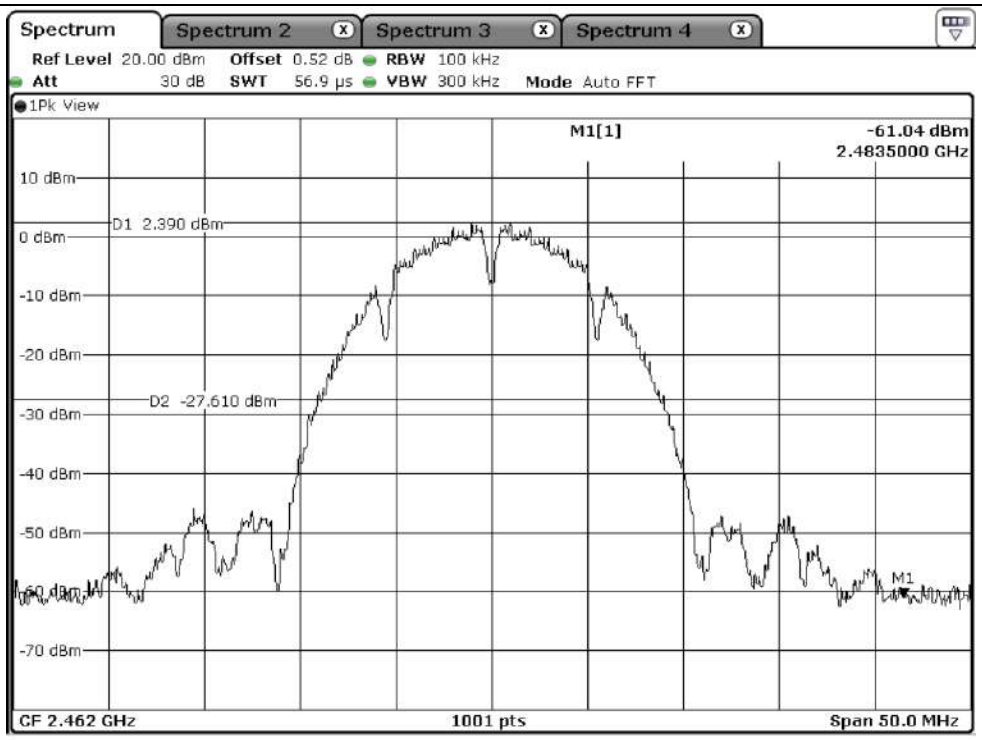
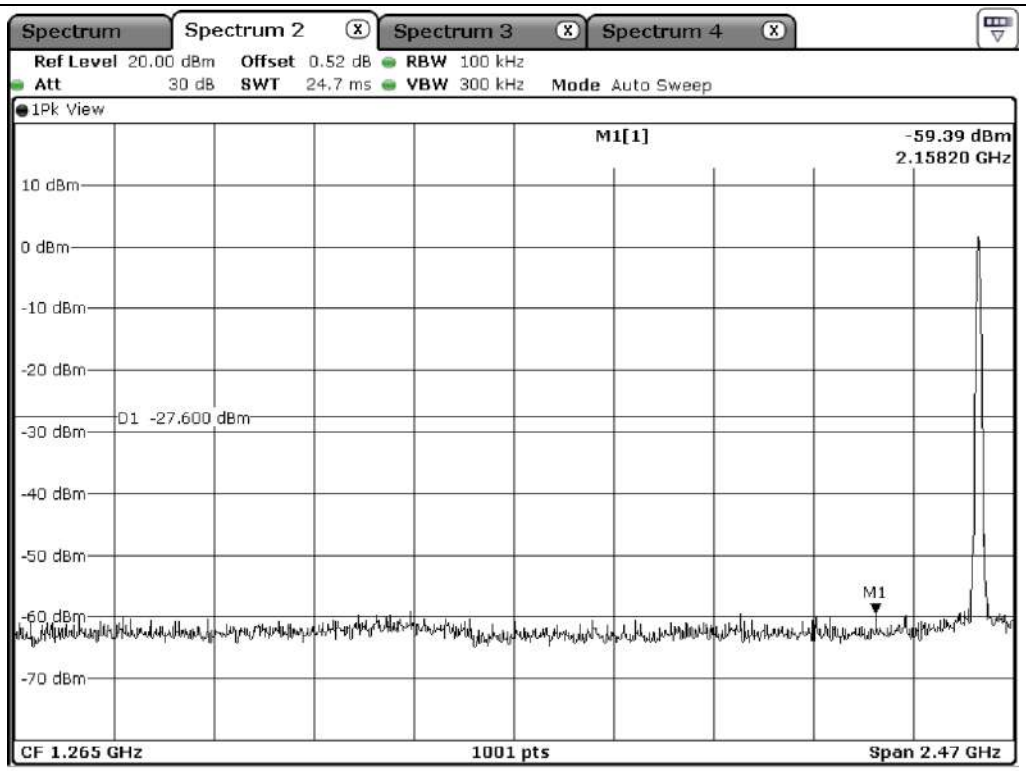
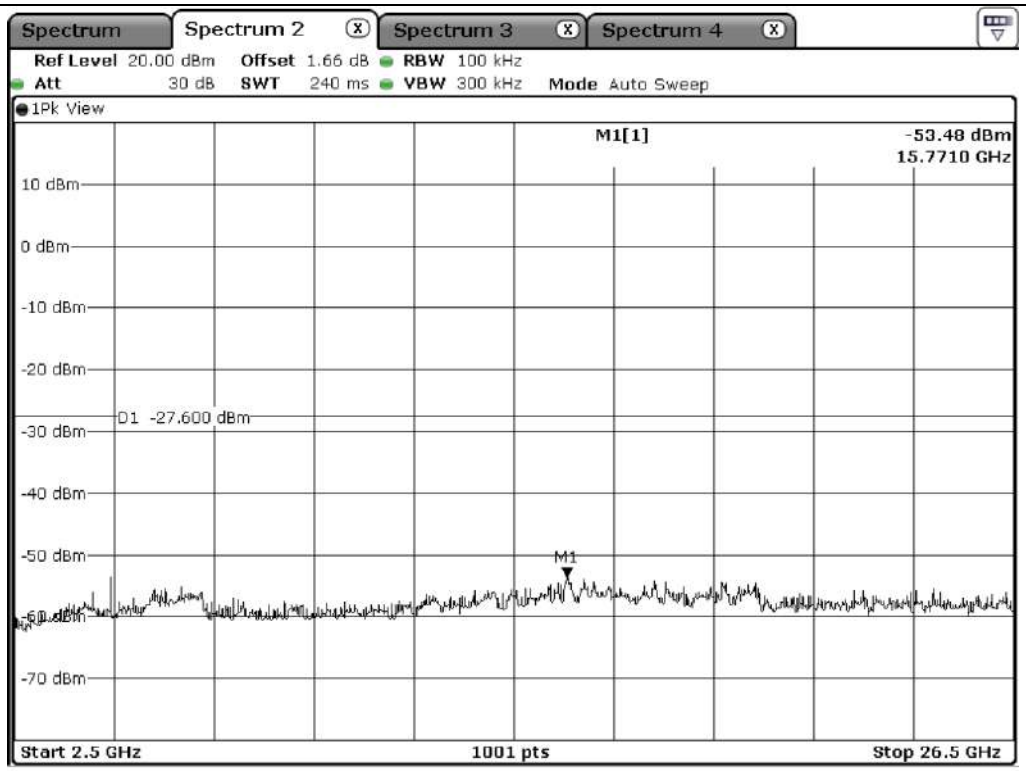


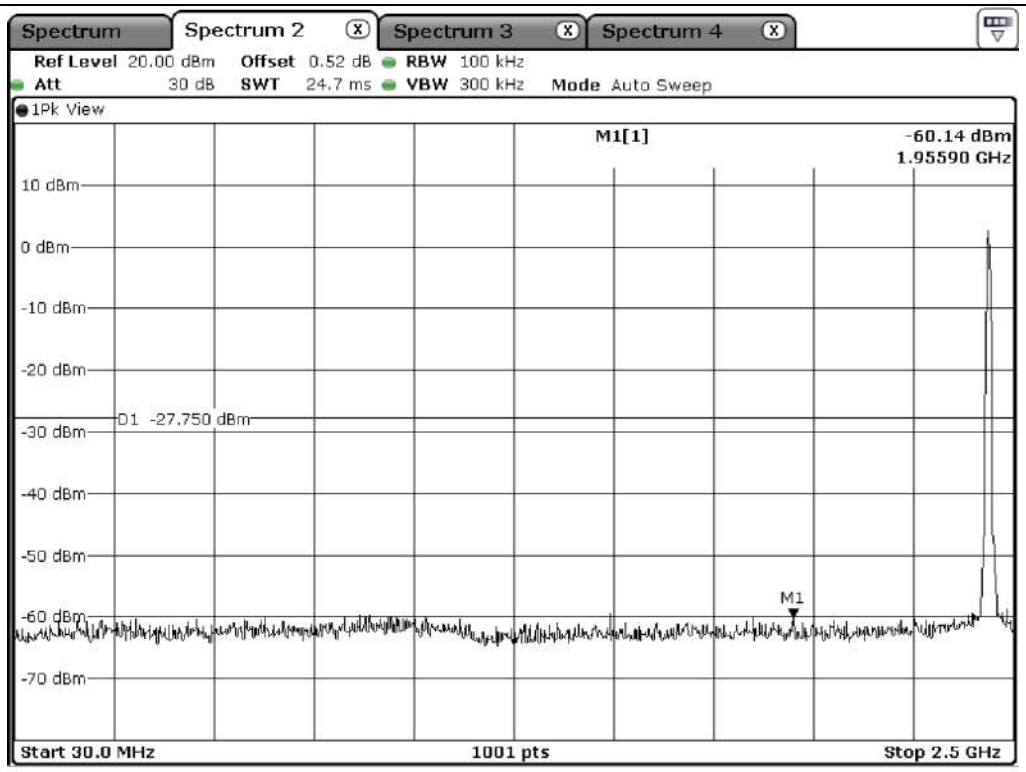
High Channel



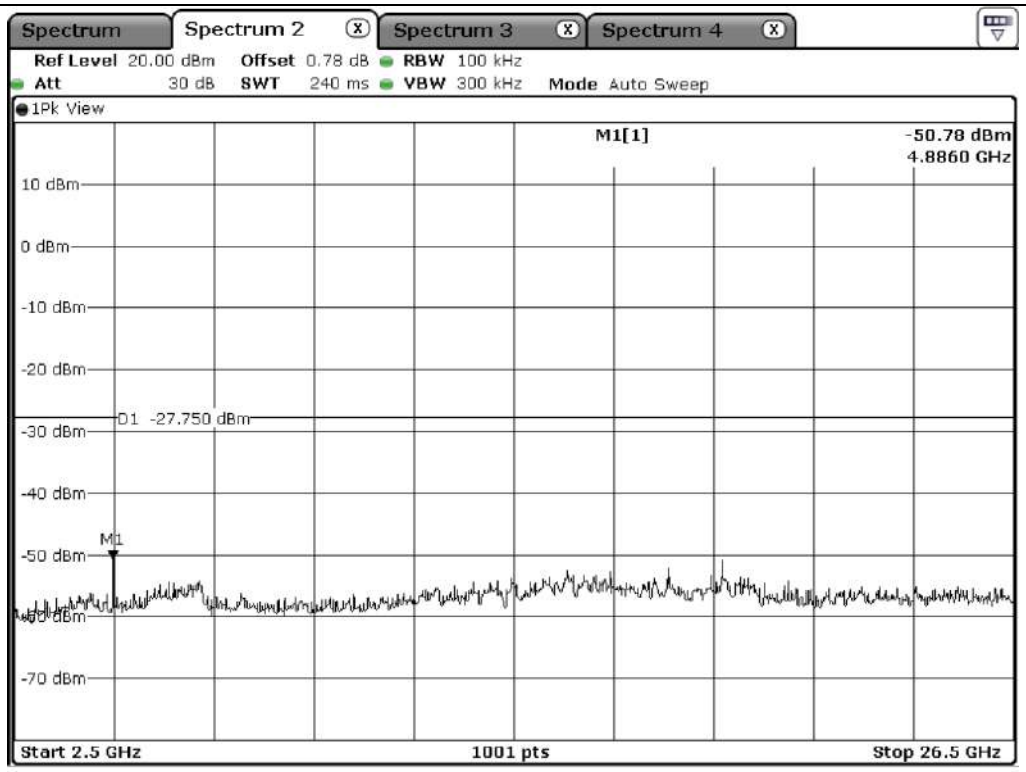
Low Channel



Low Channel



Middle Channel



Middle Channel

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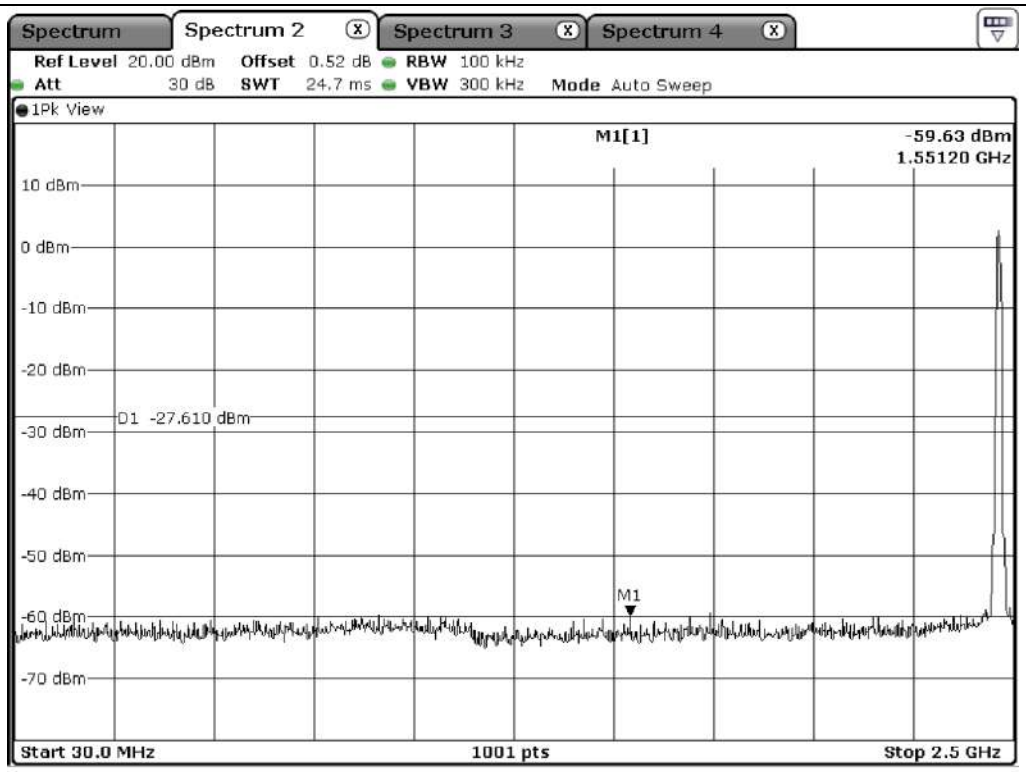
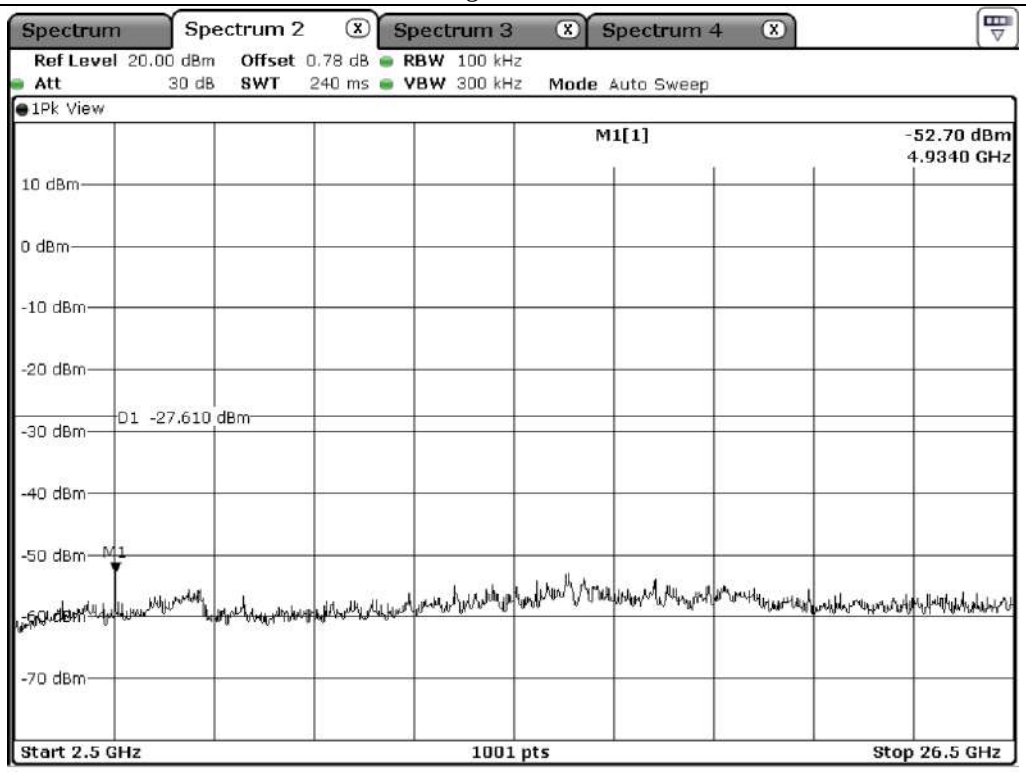
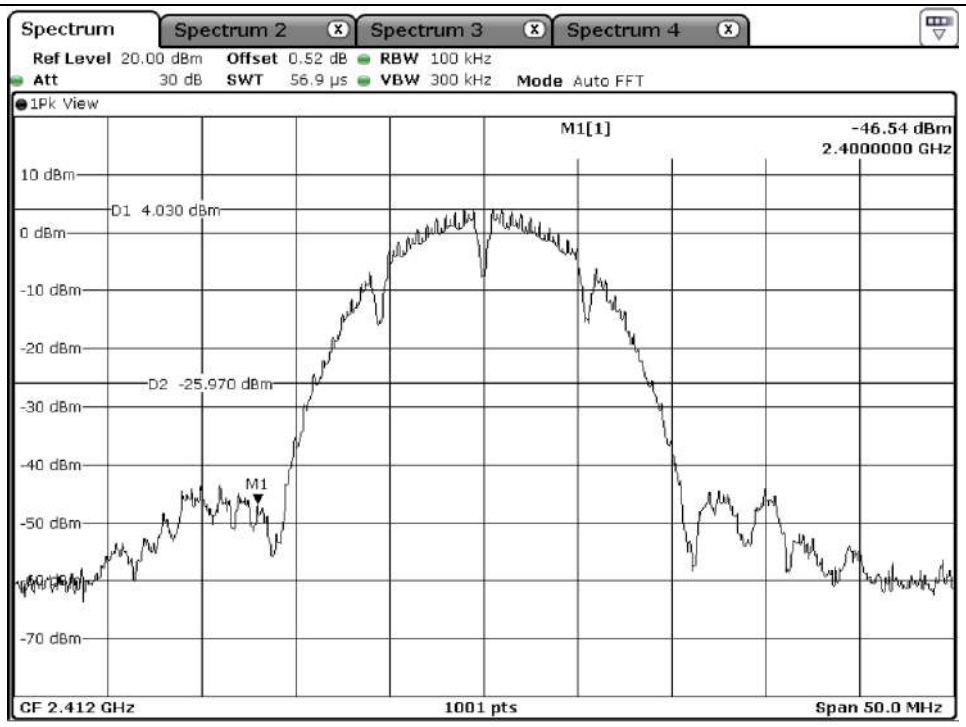


High Channel

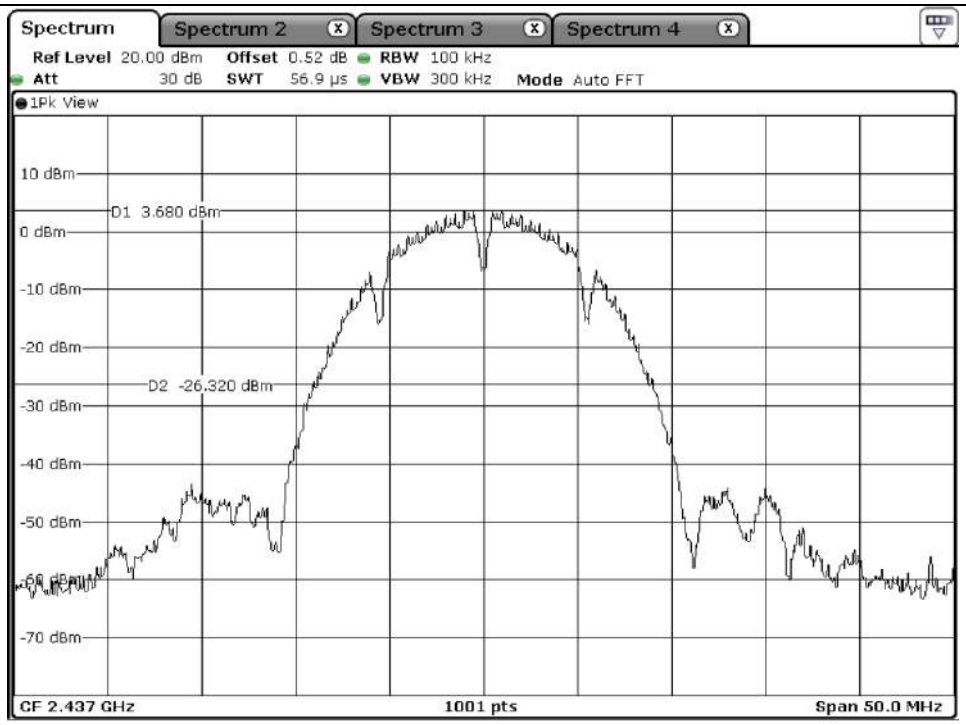


High Channel

9.5.1.2 Test data for Antenna 1

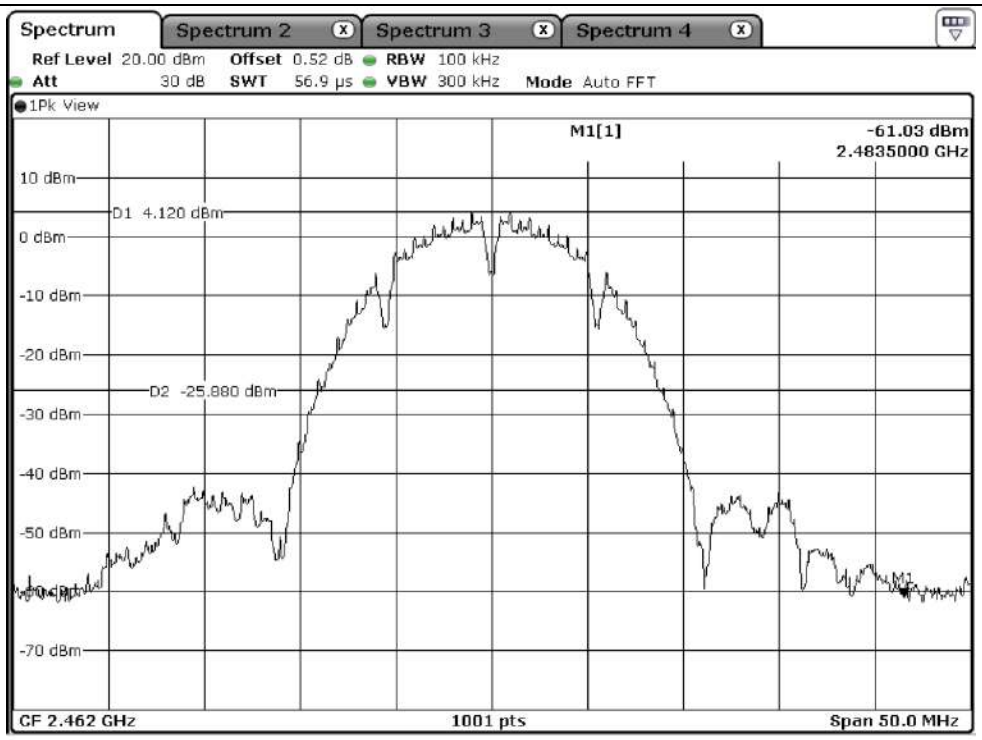


Low Channel

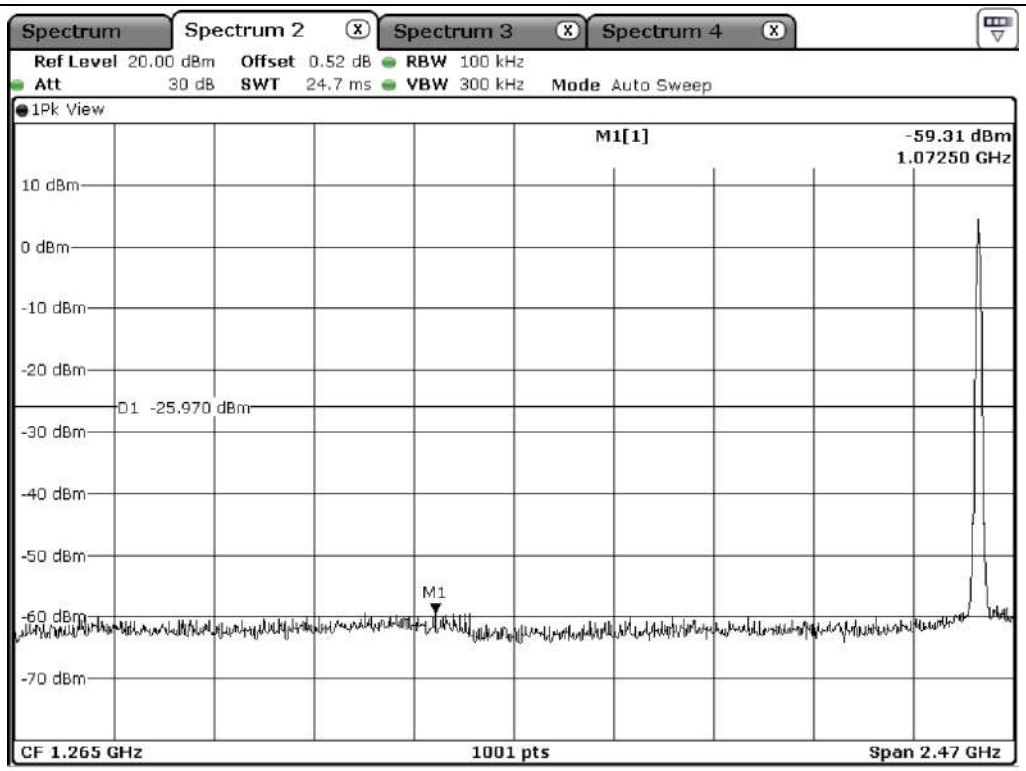


Middle Channel

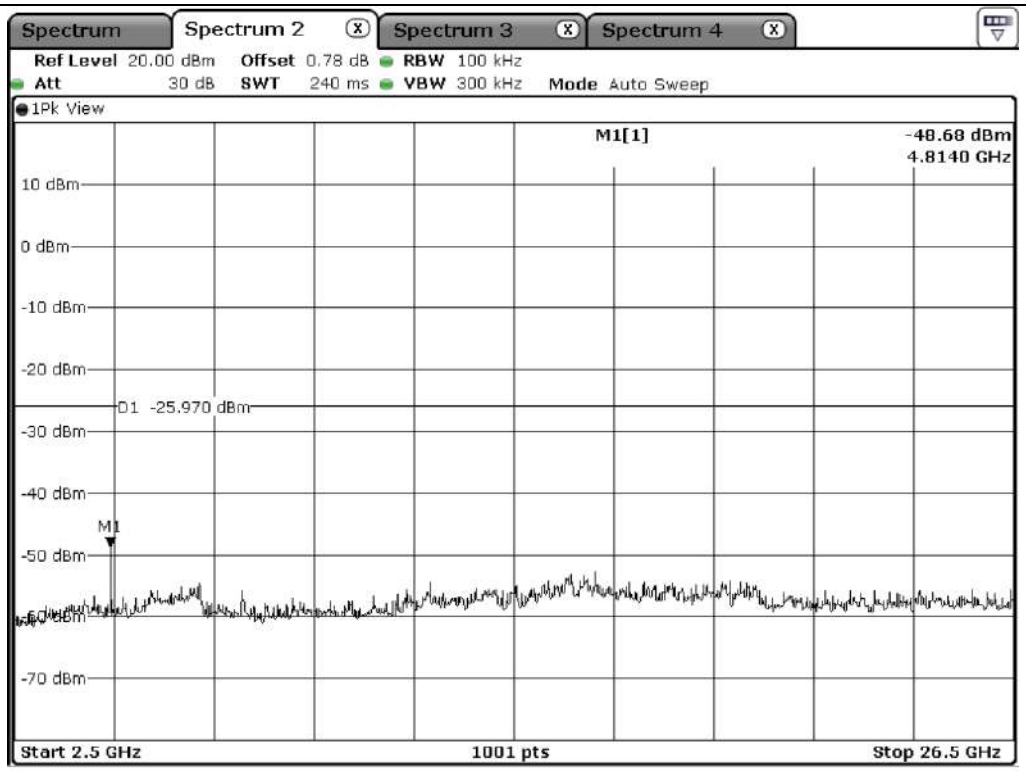
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



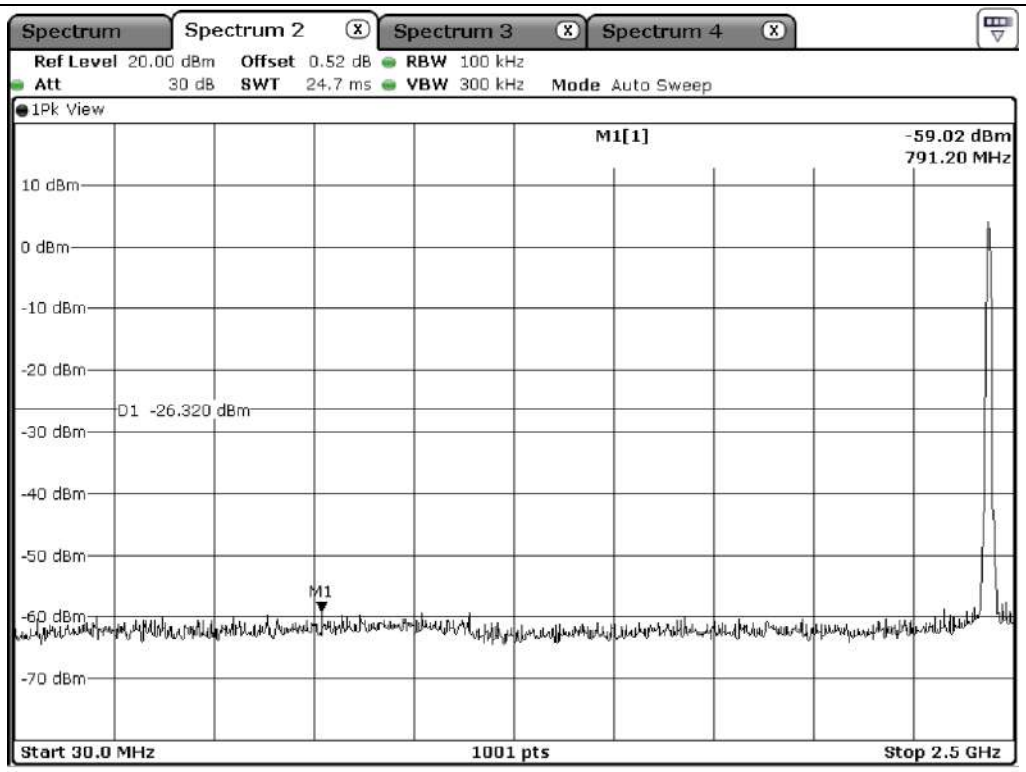
High Channel



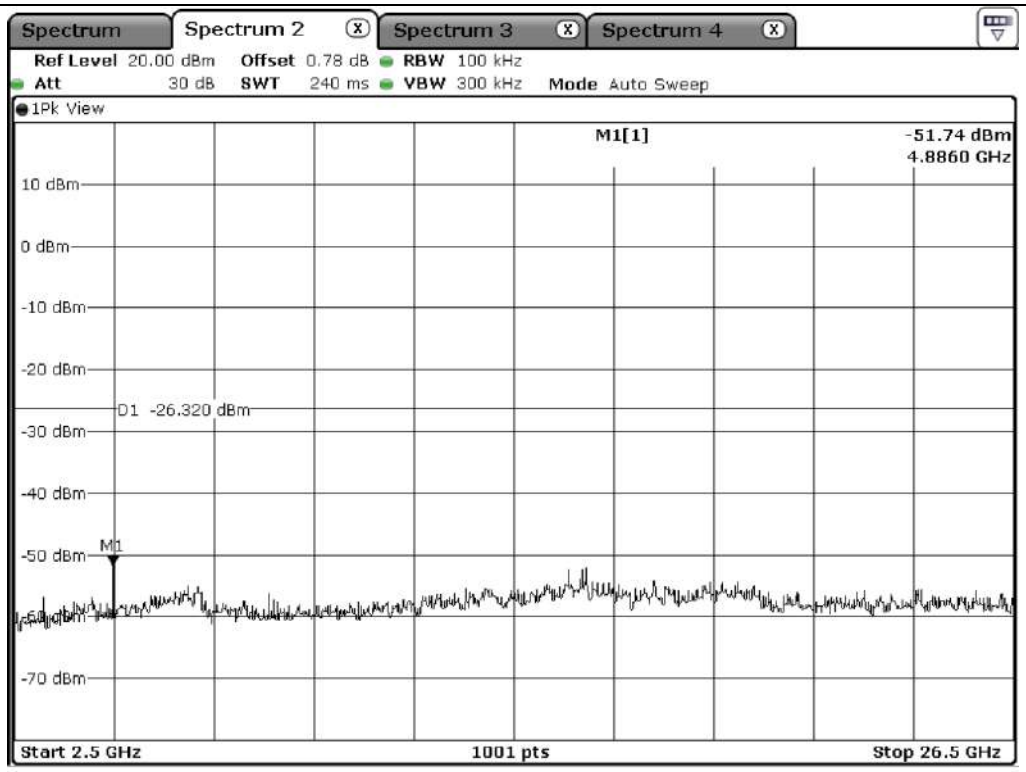
Low Channel



Low Channel

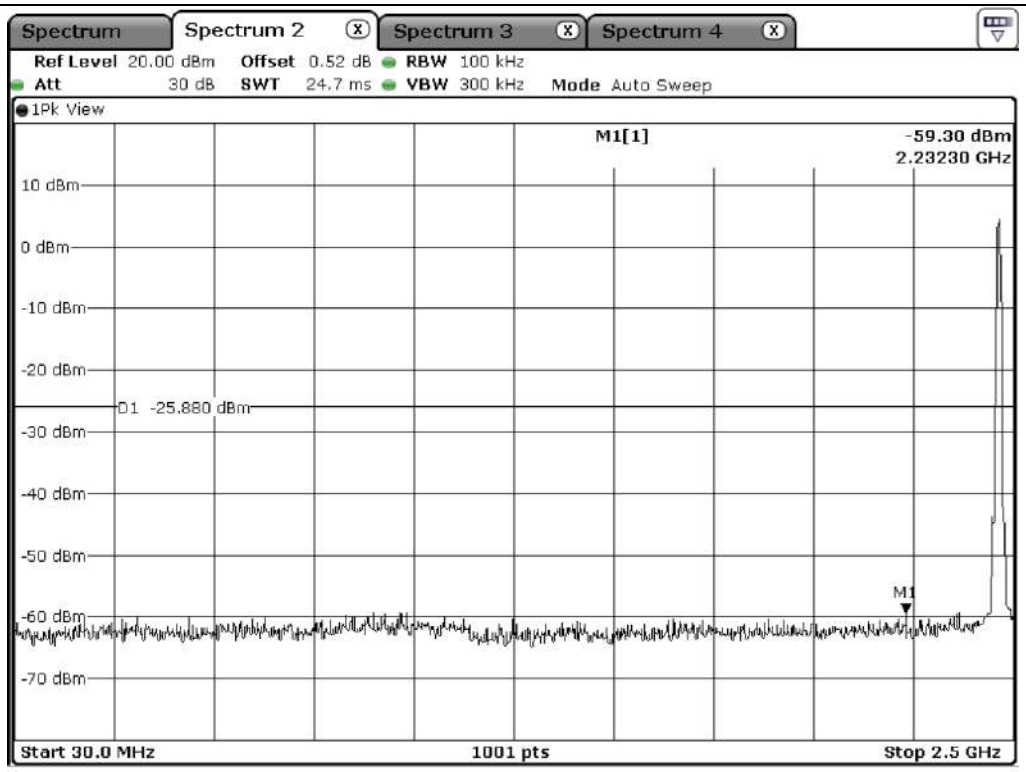


Middle Channel

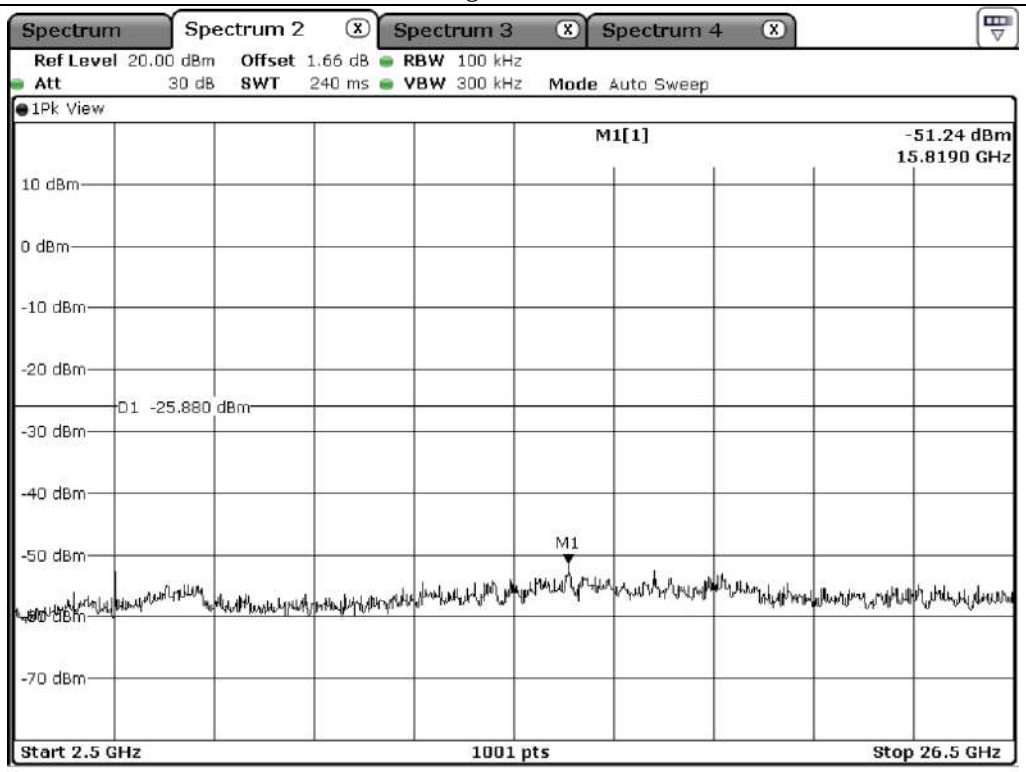


Middle Channel

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

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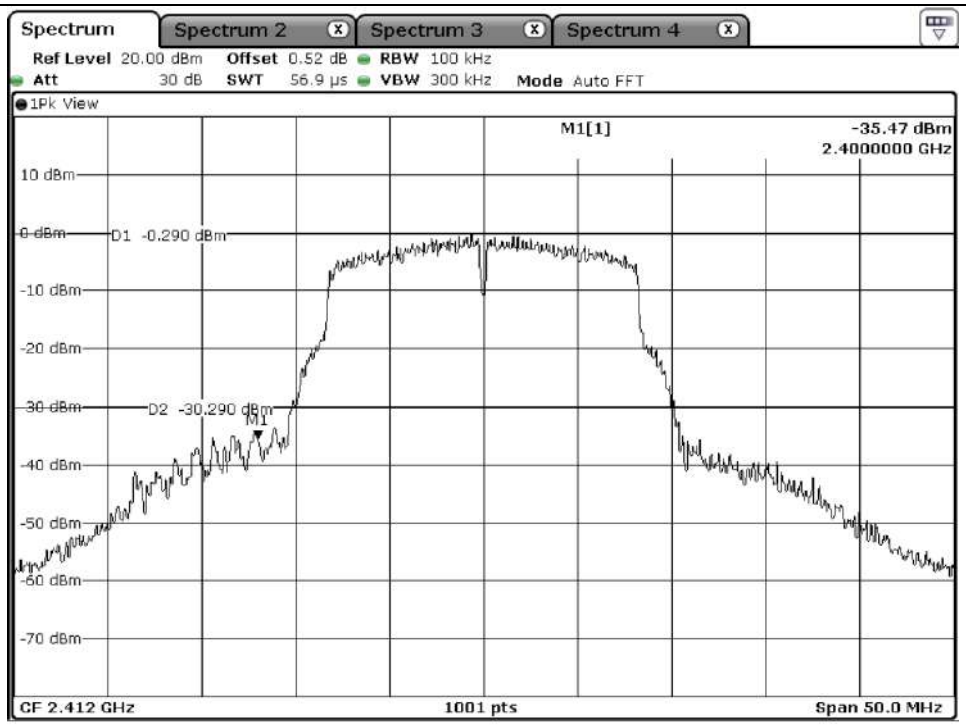
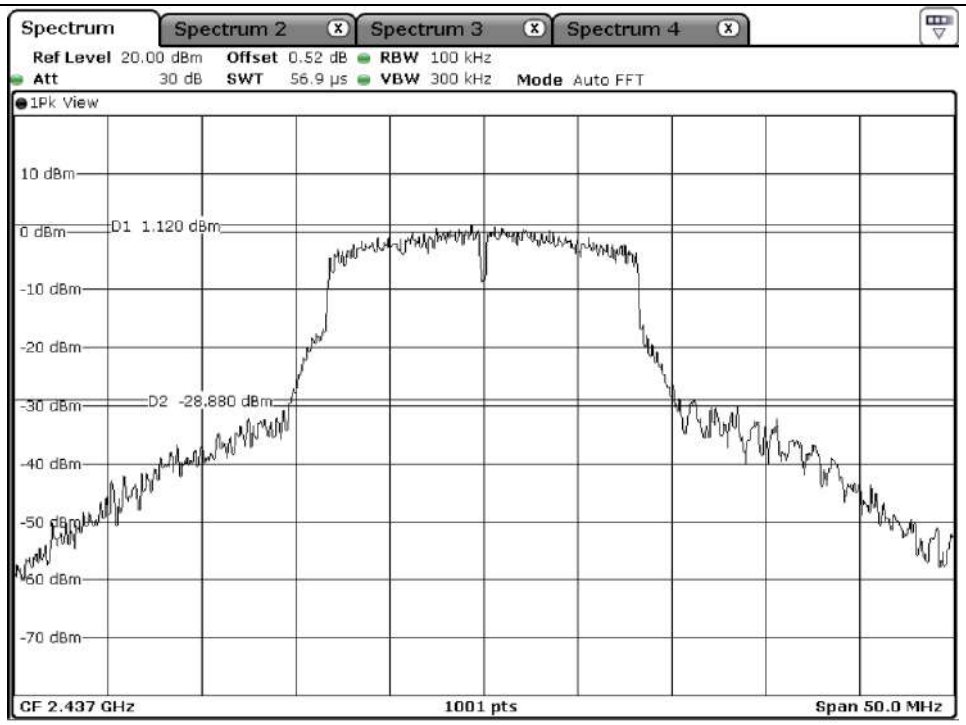
9.5.2 Test data for 802.11g WLAN Mode

9.5.2.1 Test data for Antenna 0

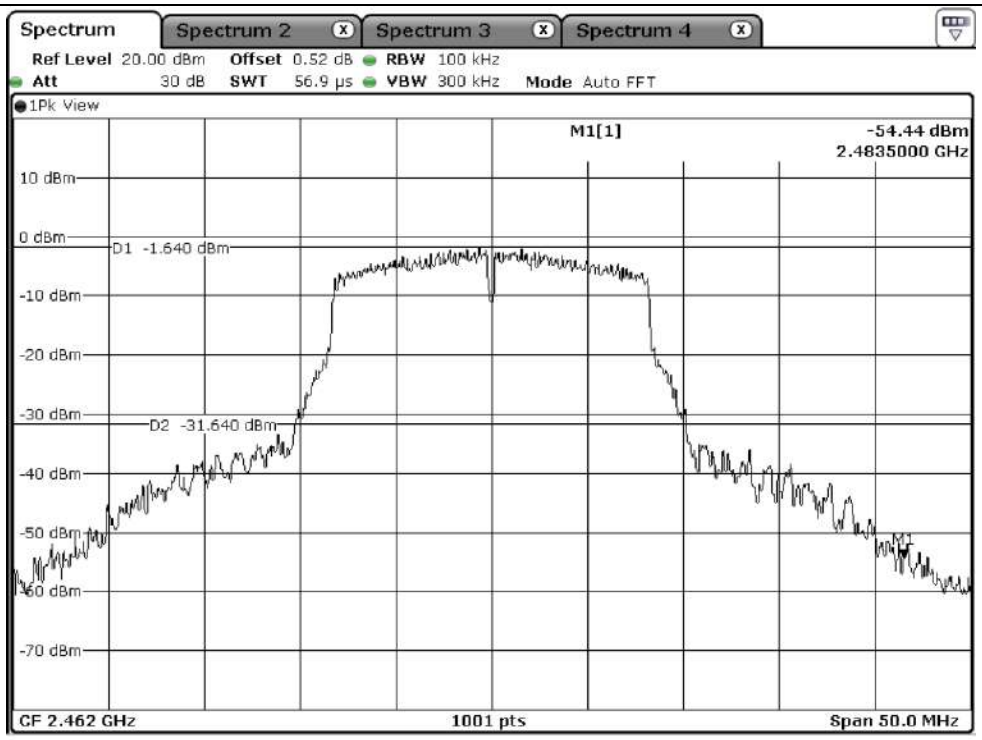


Low Channel

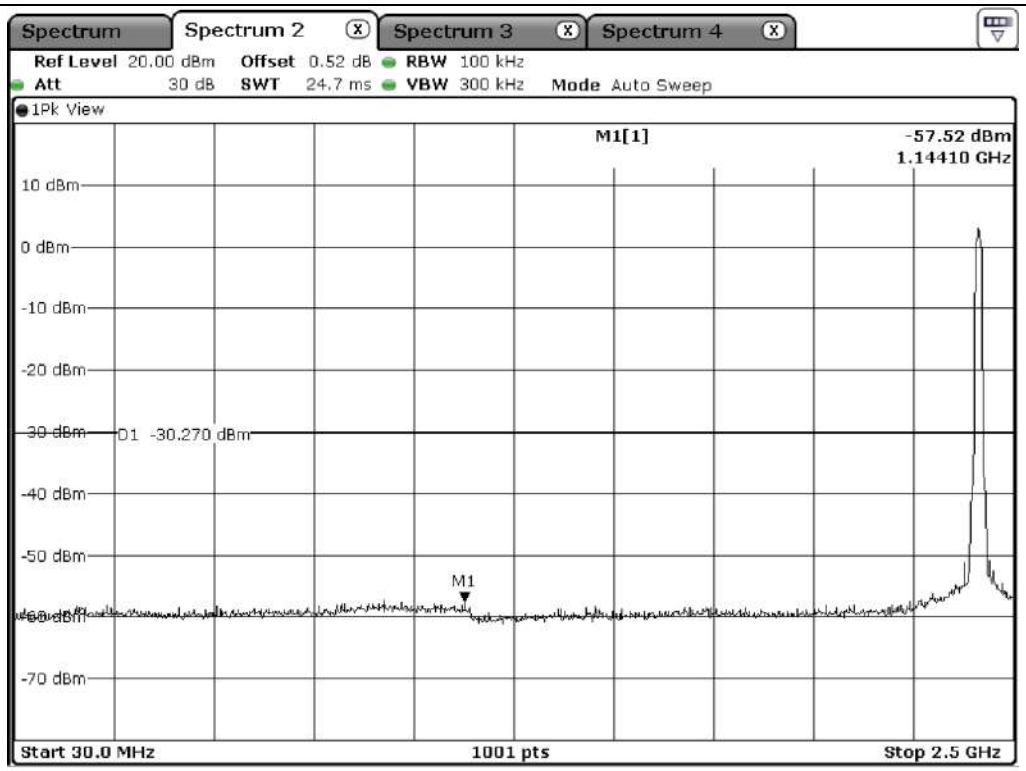


Middle Channel

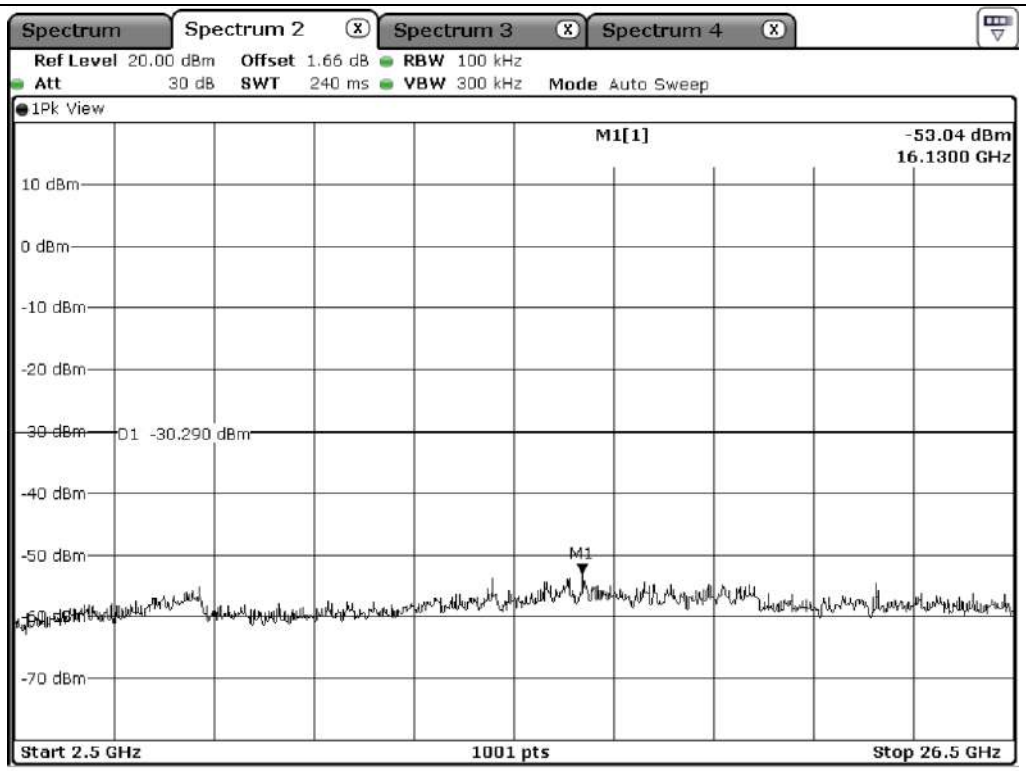
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



High Channel

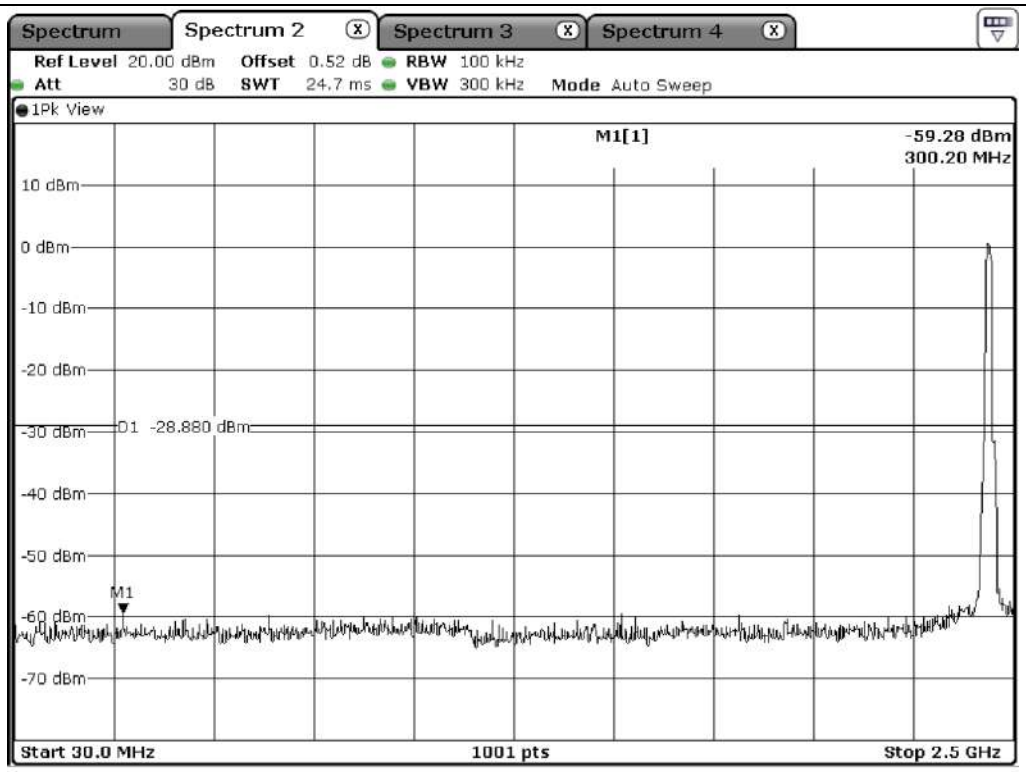


Low Channel

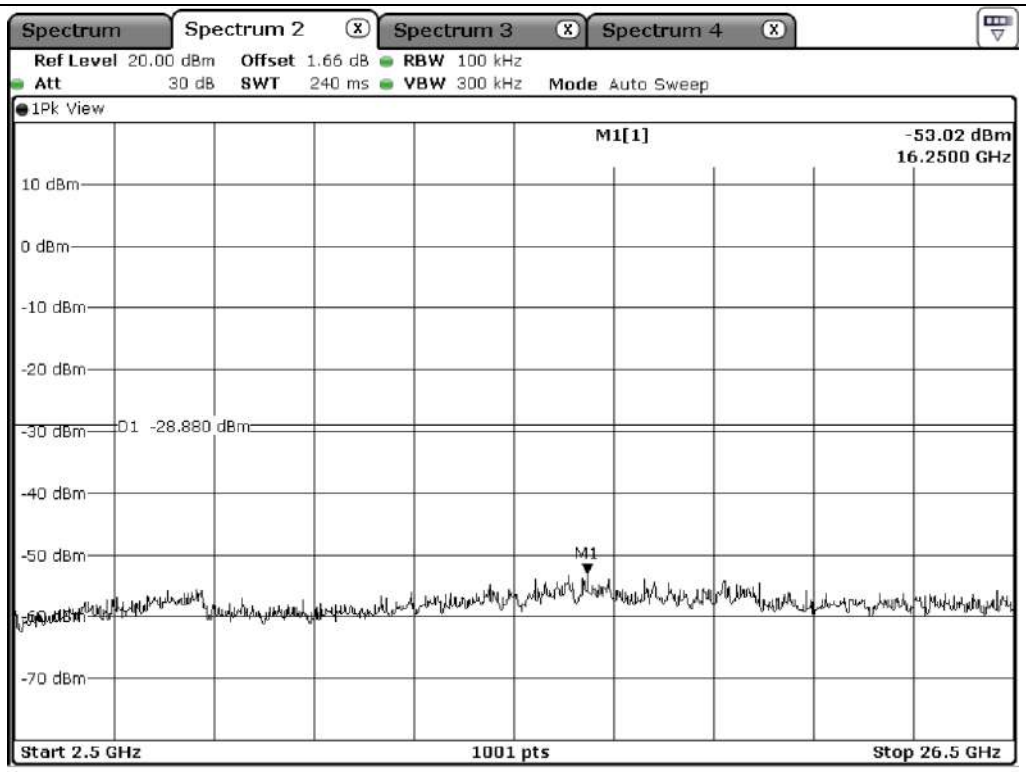


Low Channel

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

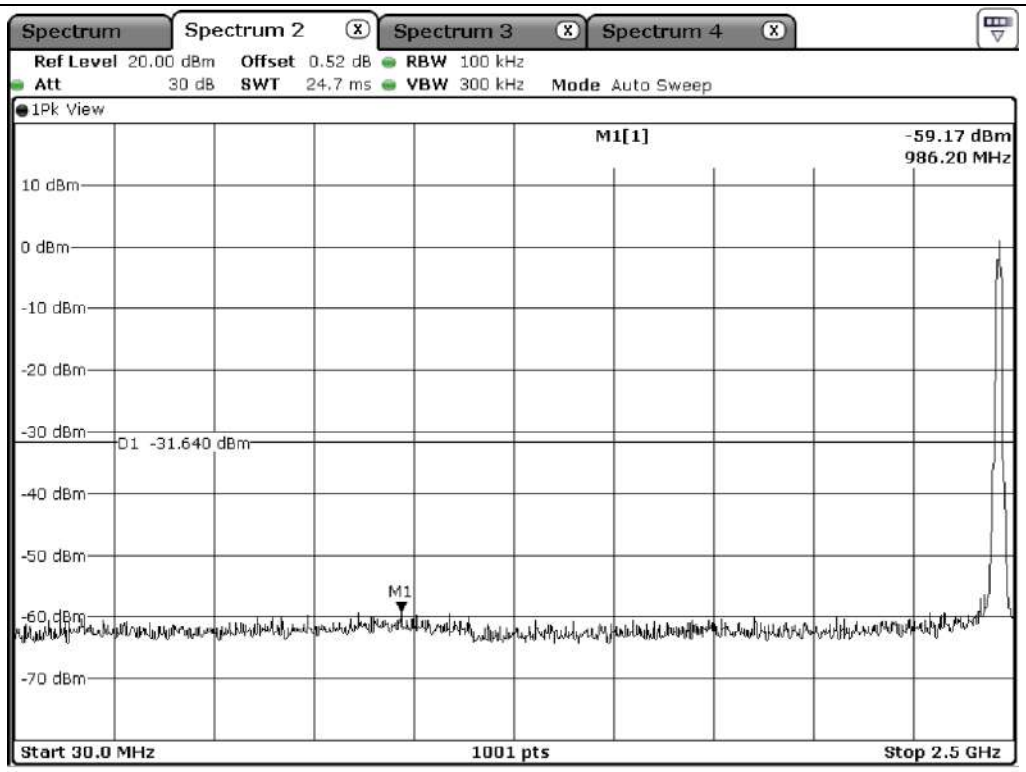


Middle Channel

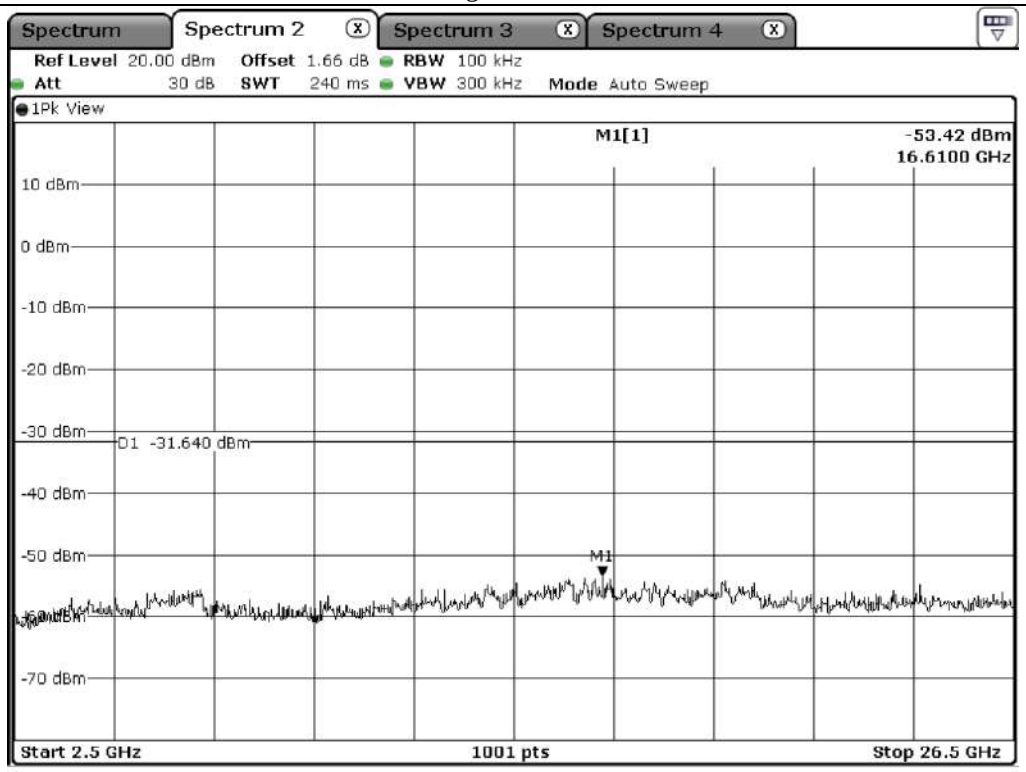


Middle Channel

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



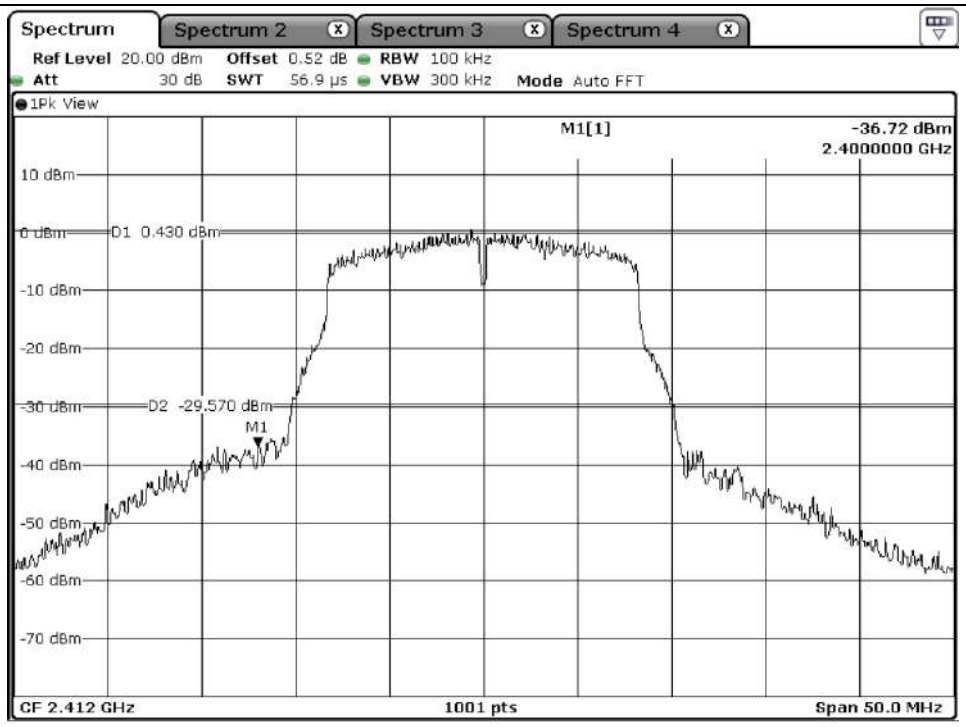
High Channel



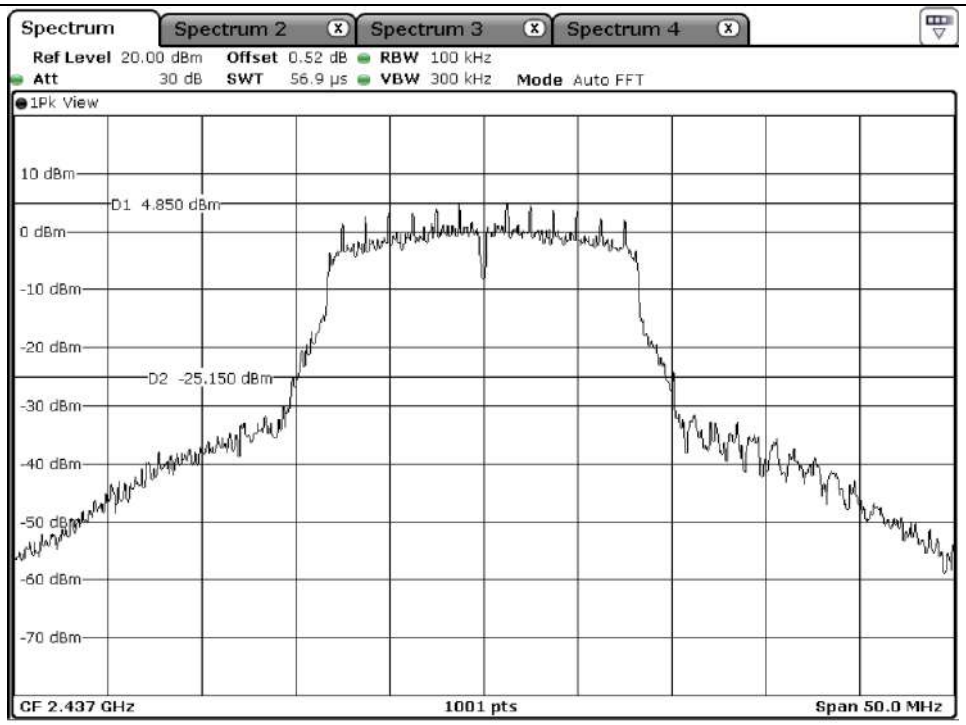
High Channel

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

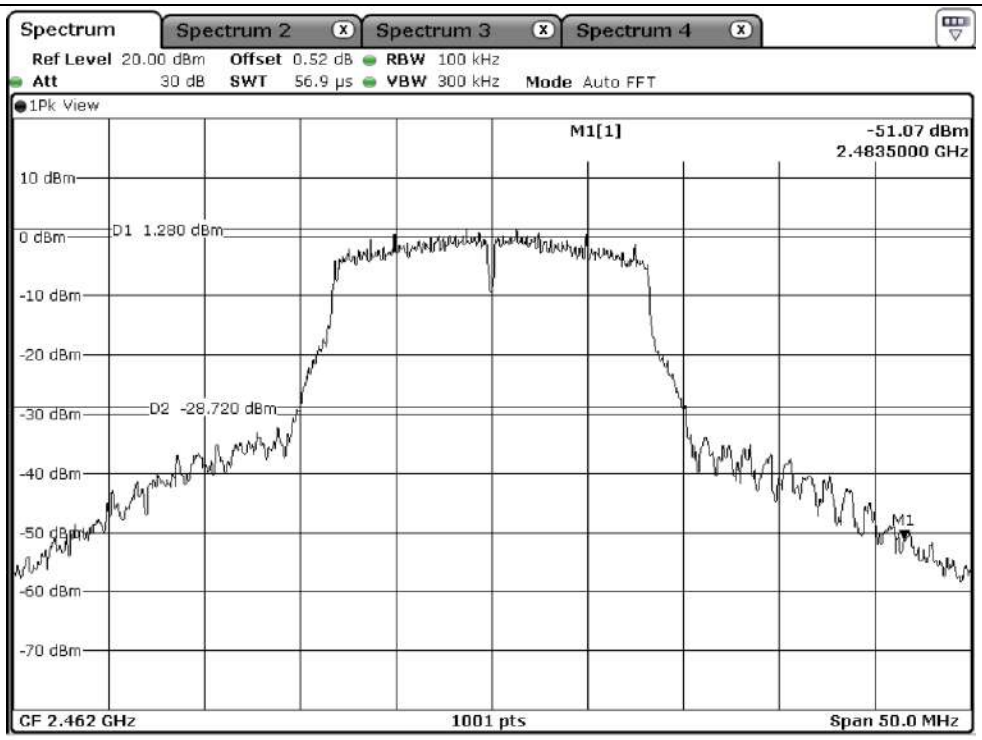
9.5.2.2 Test data for Antenna 1



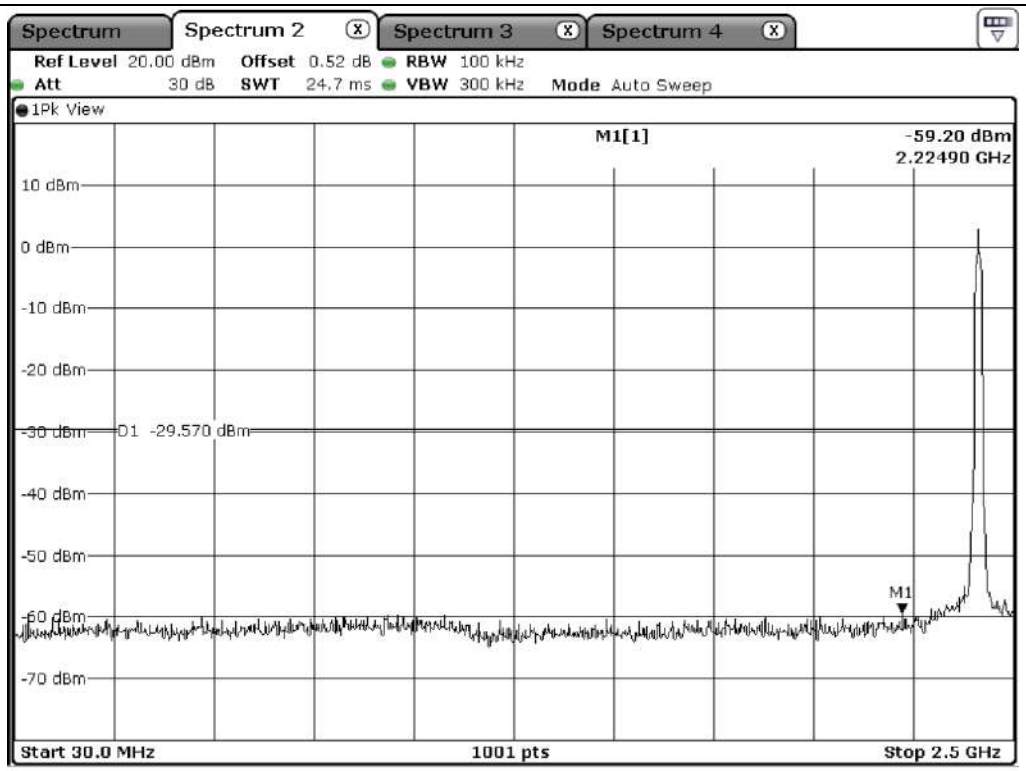
Low Channel



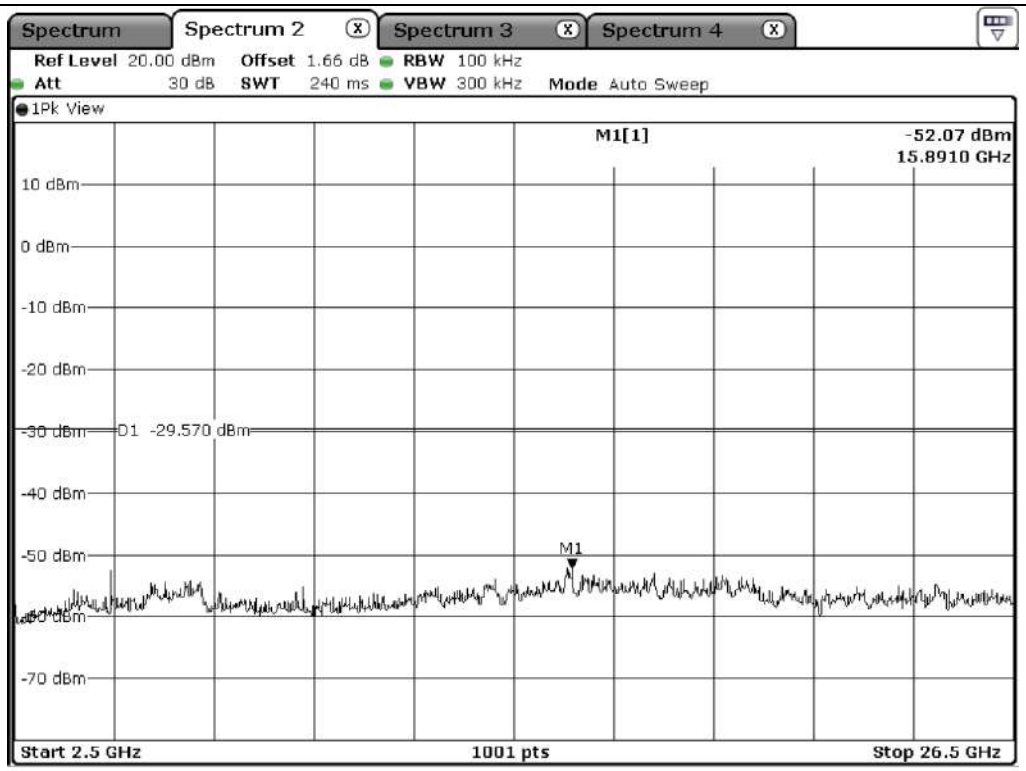
Middle Channel



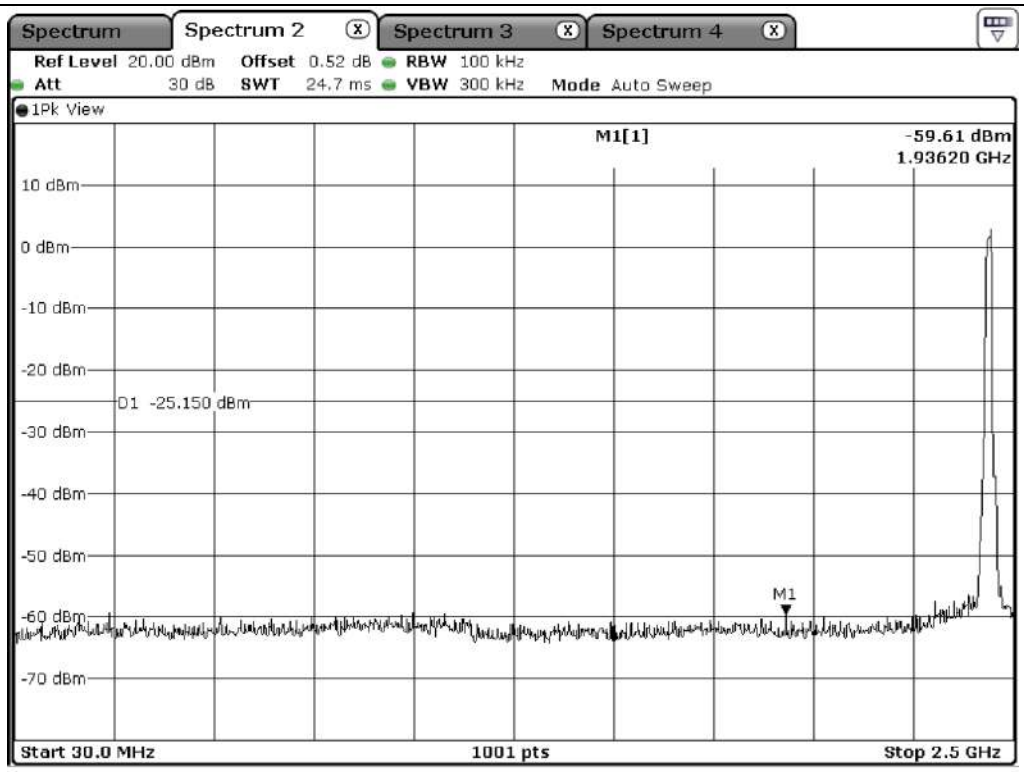
High Channel



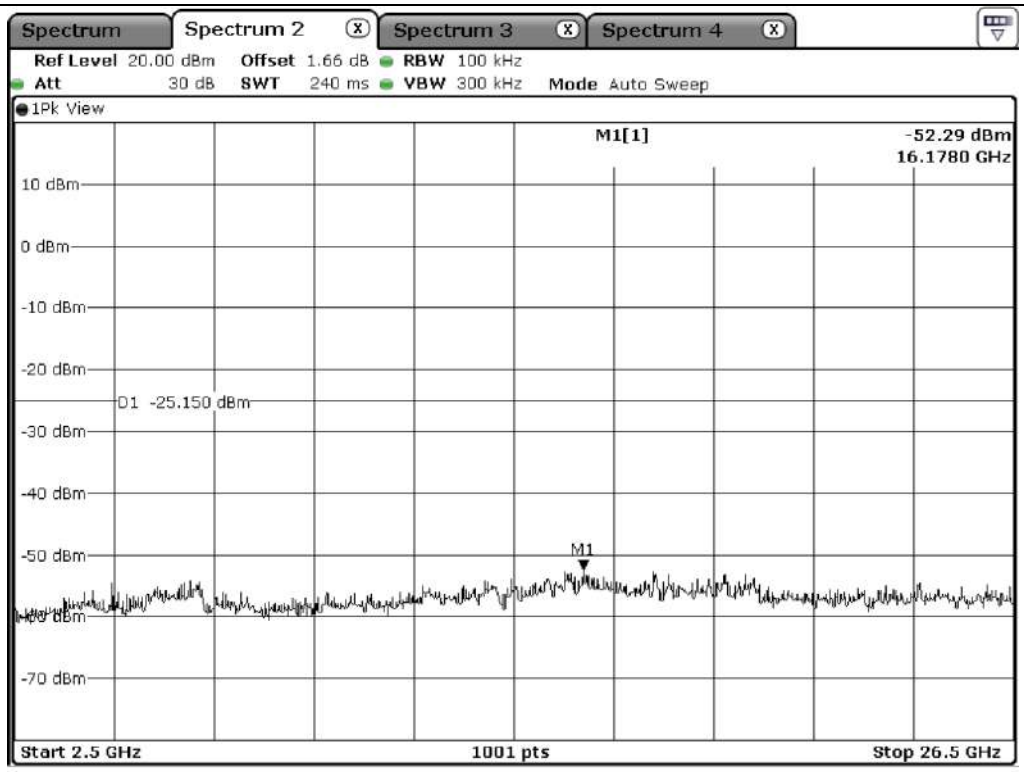
Low Channel



Low Channel

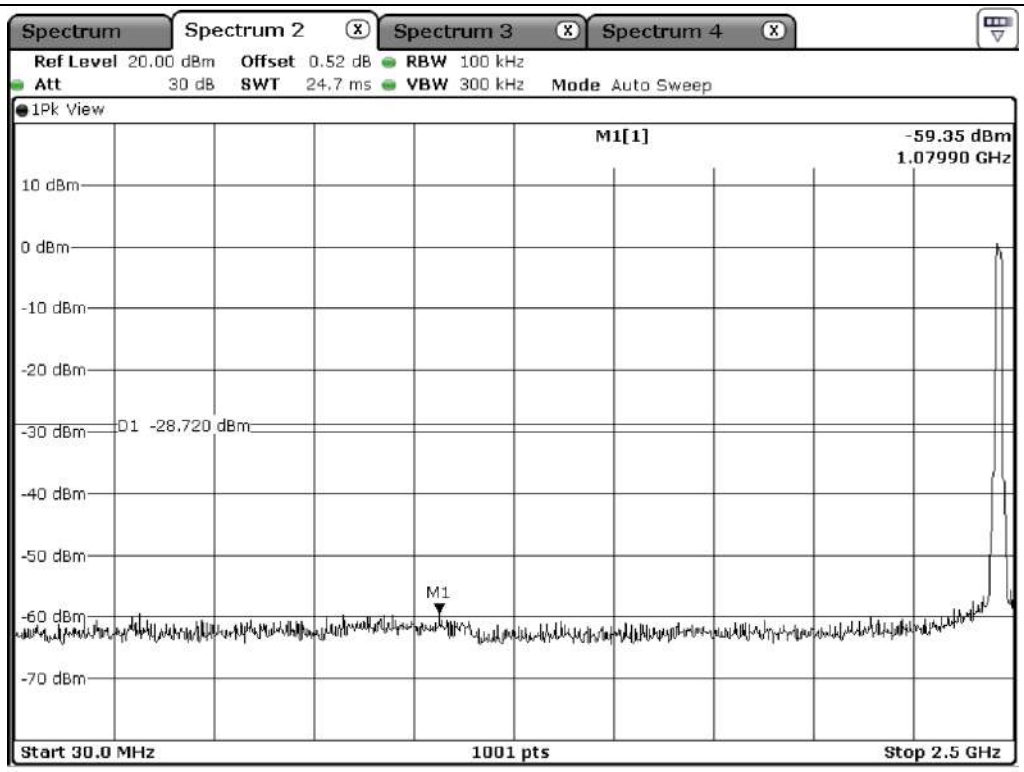


Middle Channel

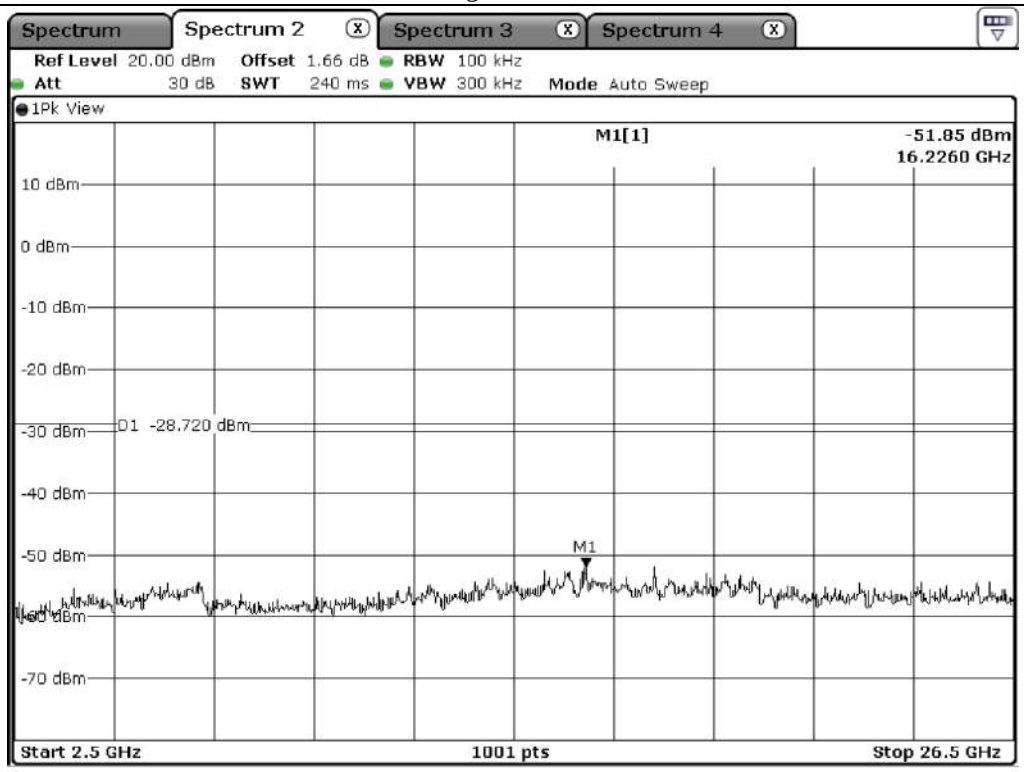


Middle Channel

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

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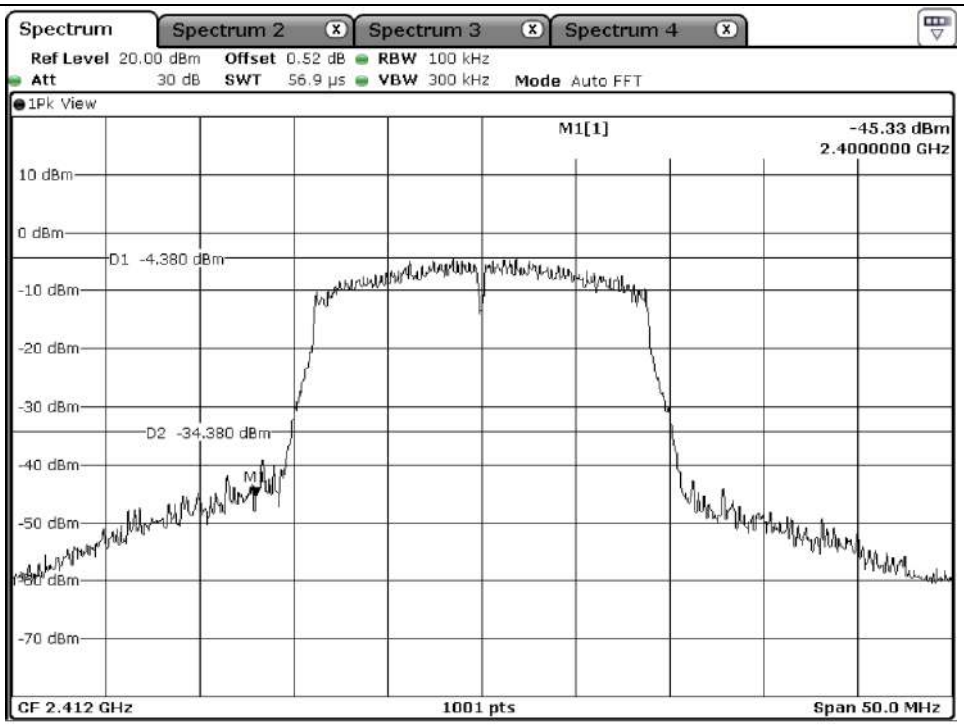
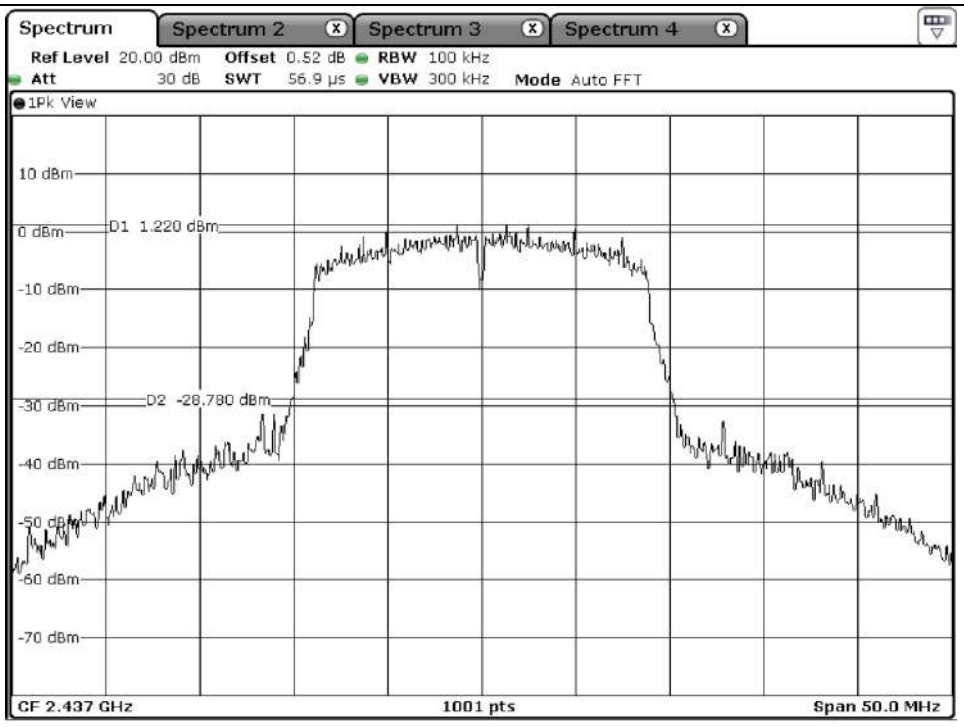
9.5.3 Test data for 802.11n_HT20 WLAN Mode

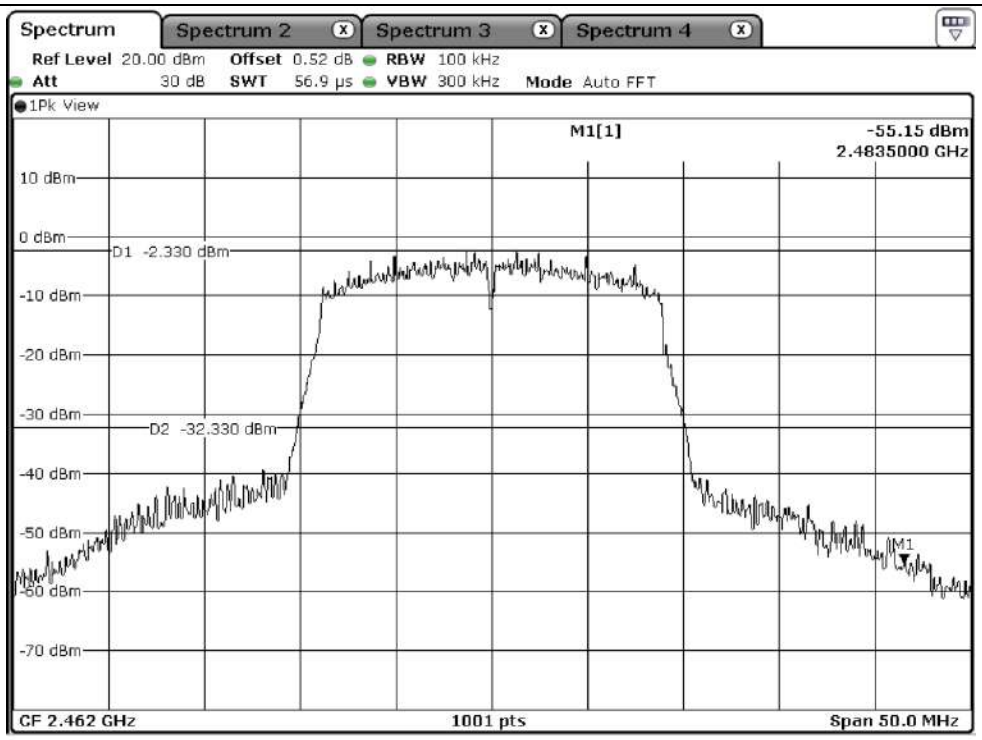
9.5.3.1 Test data for Antenna 0



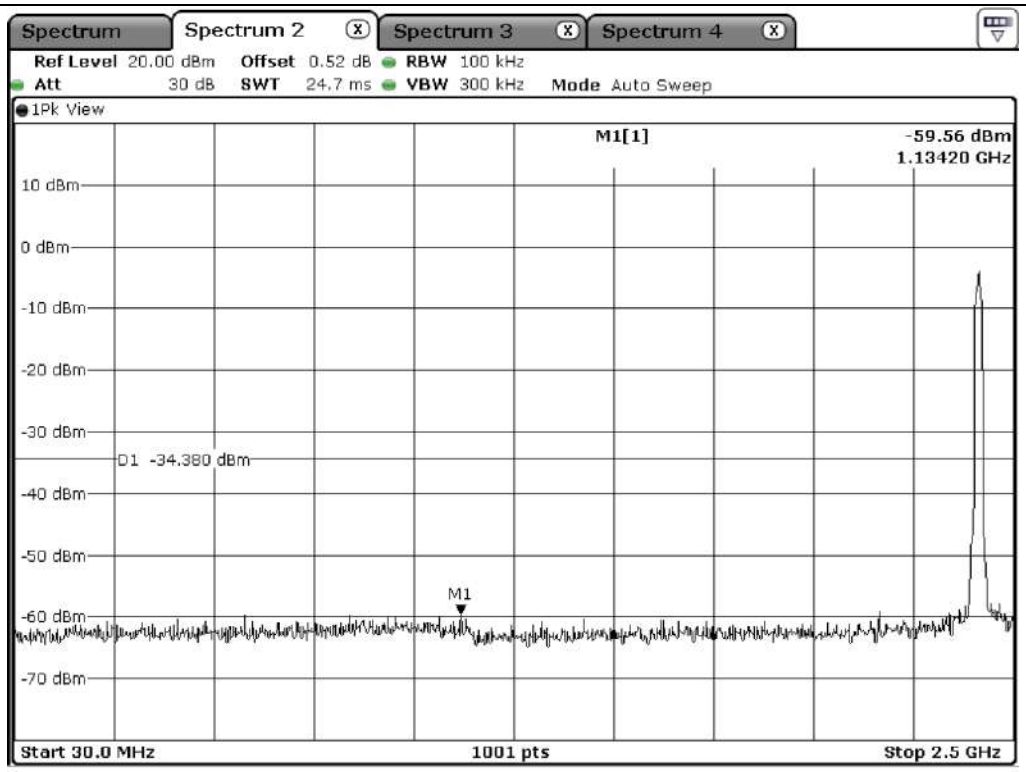
Low Channel



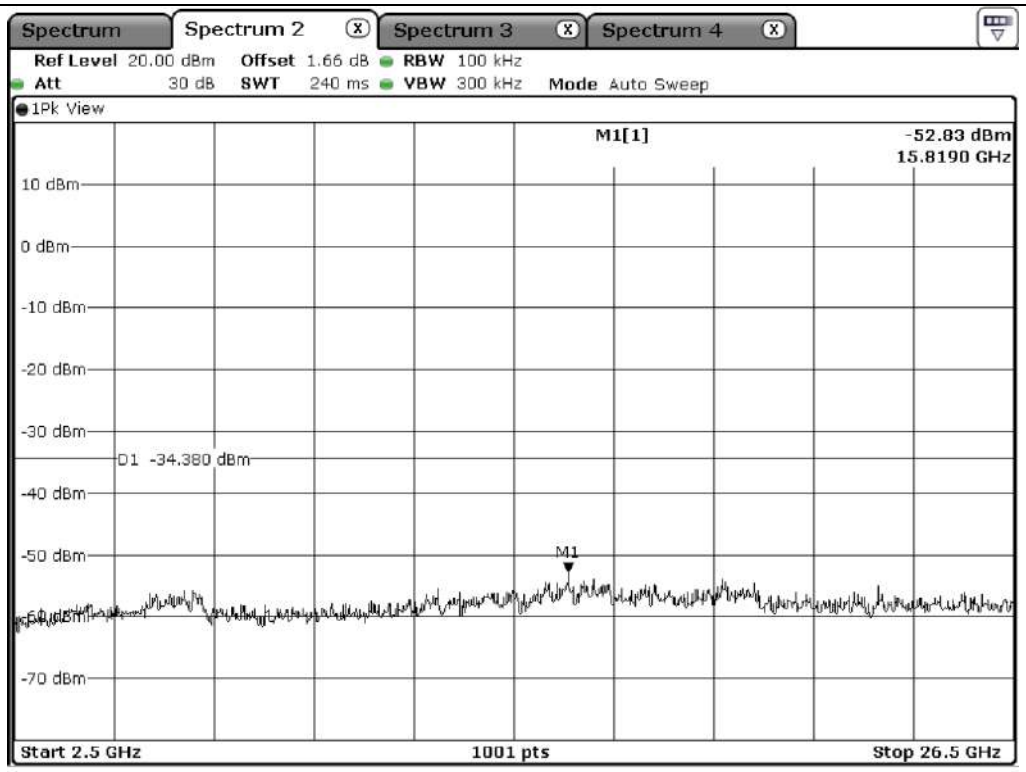
Middle Channel



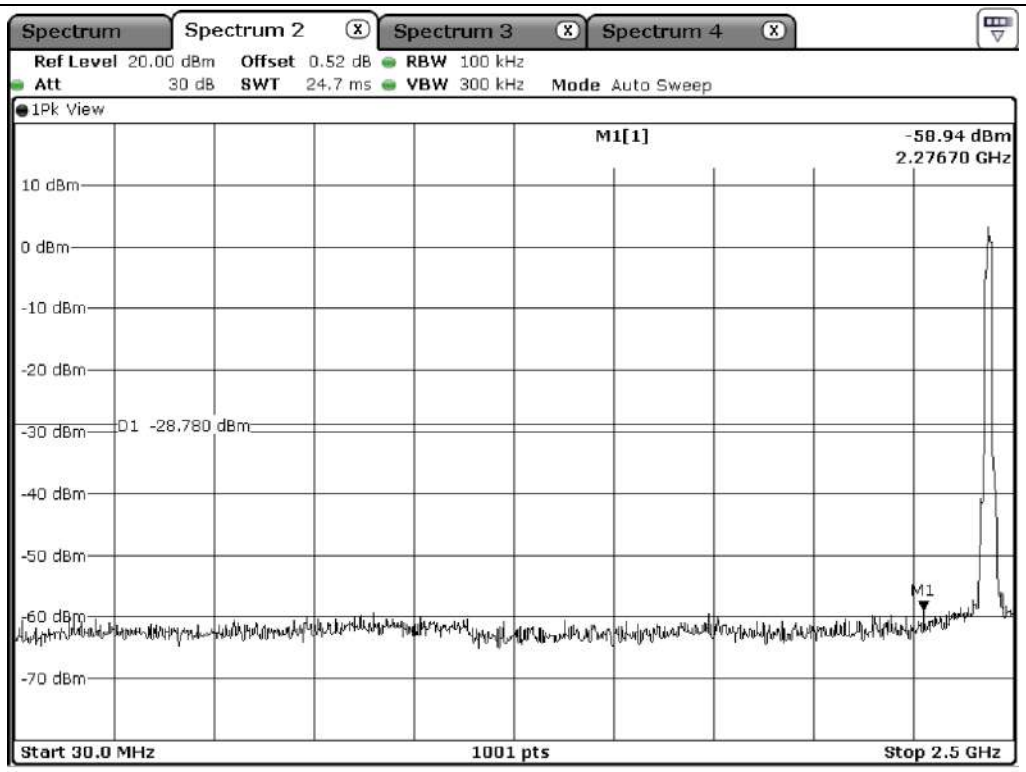
High Channel



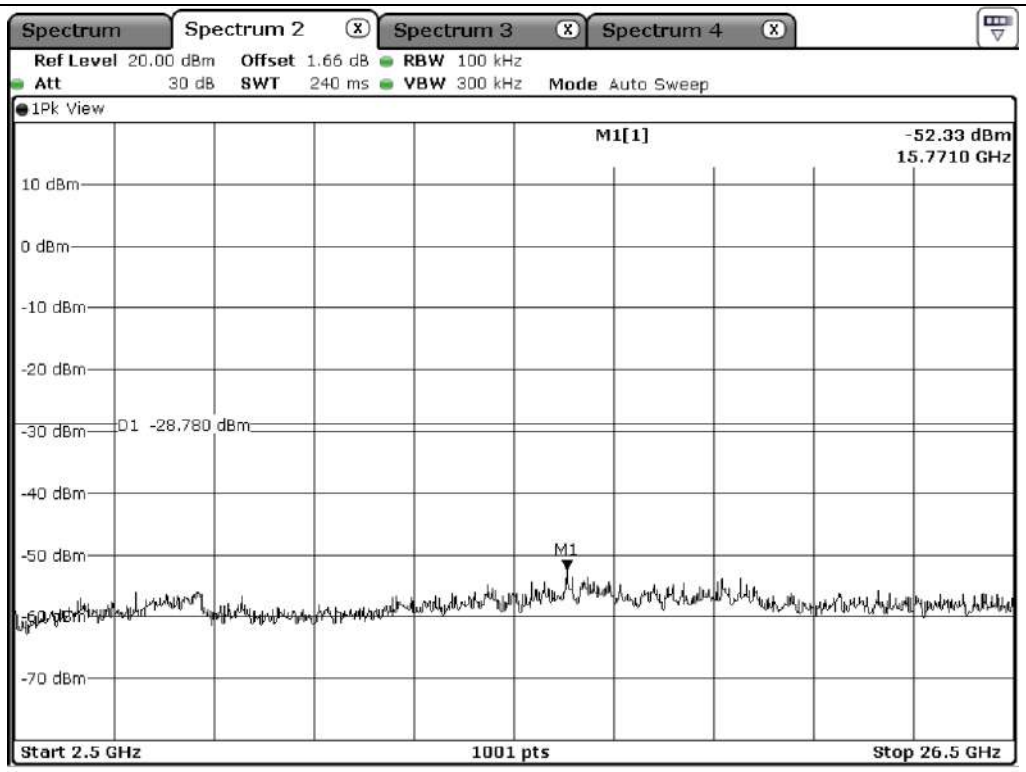
Low Channel



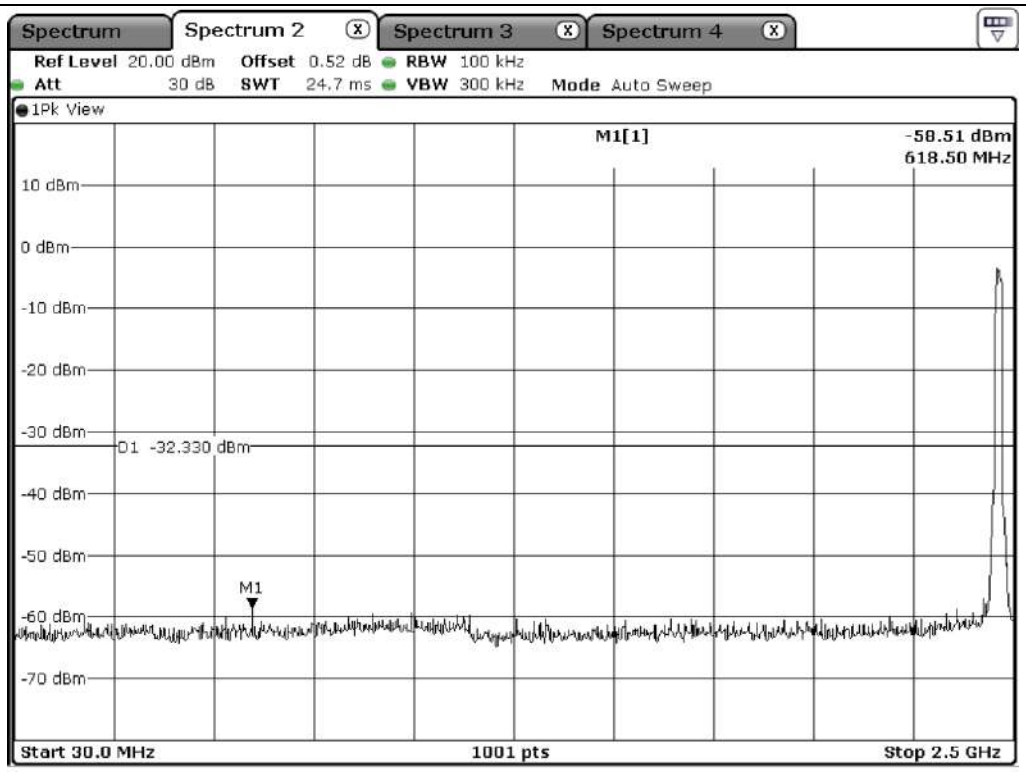
Low Channel



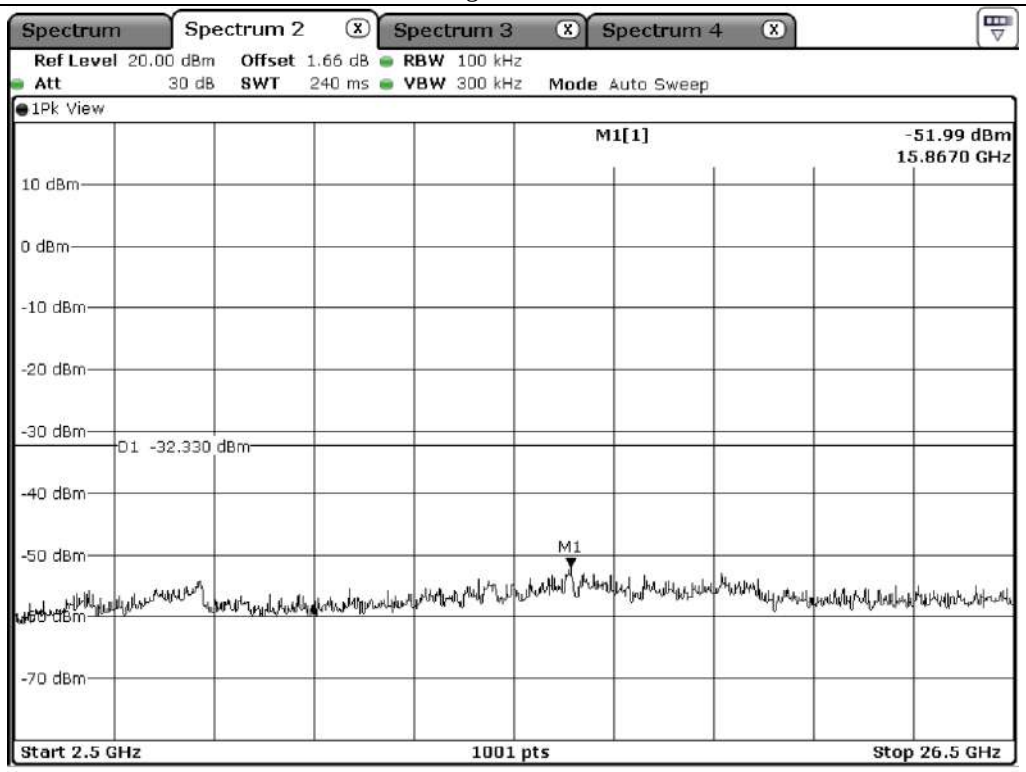
Middle Channel



Middle Channel



High Channel



High Channel

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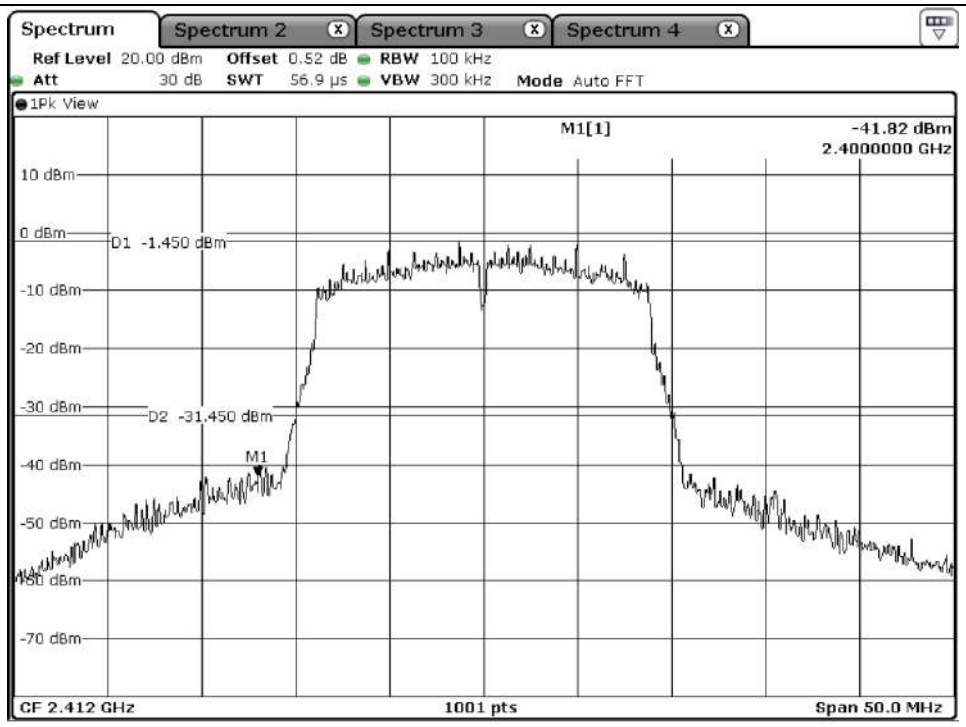
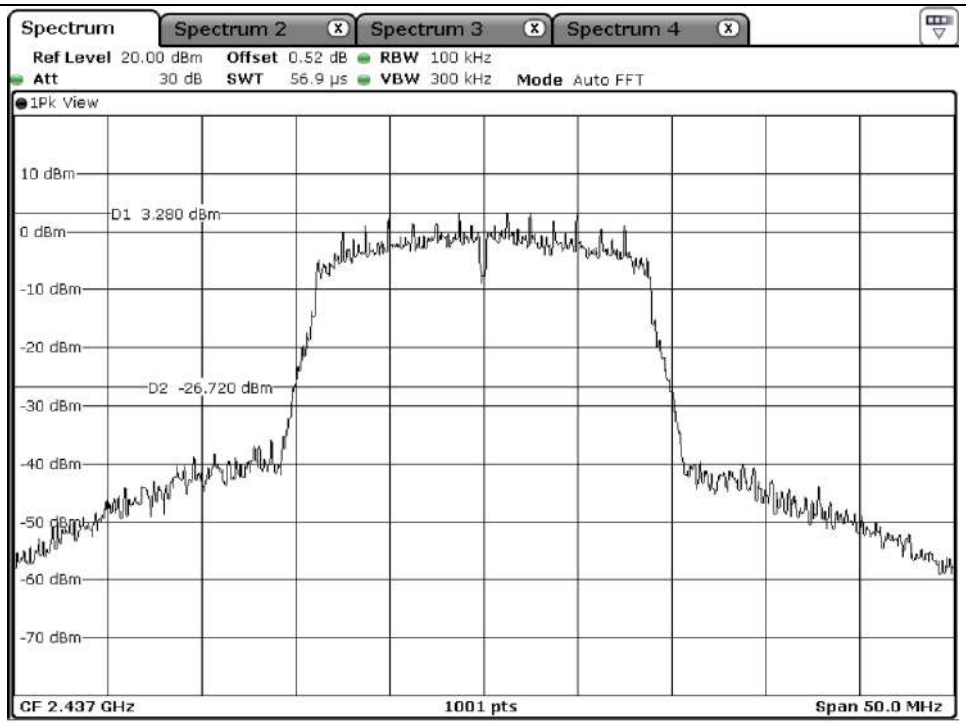
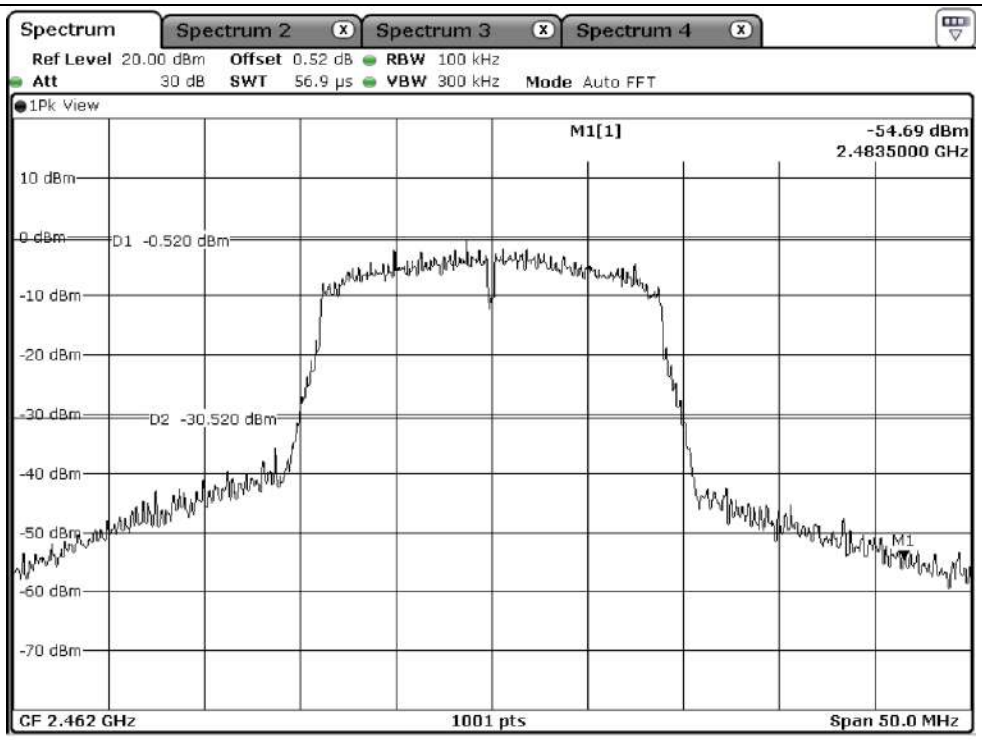
9.5.3.2 Test data for Antenna 1



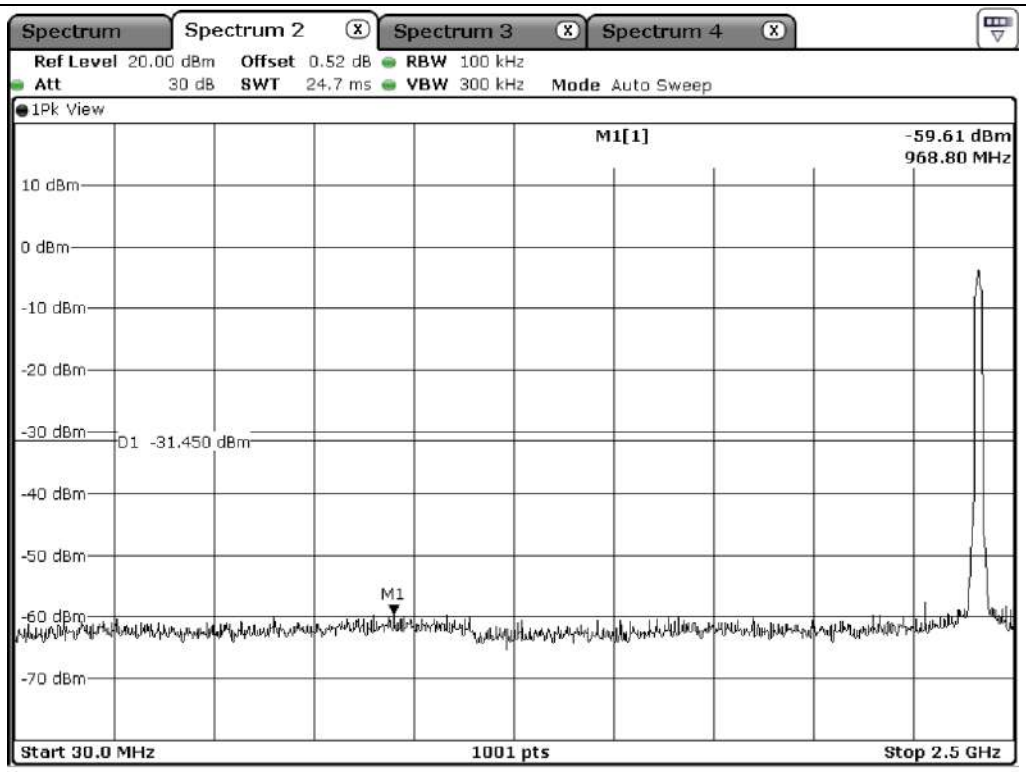
Low Channel



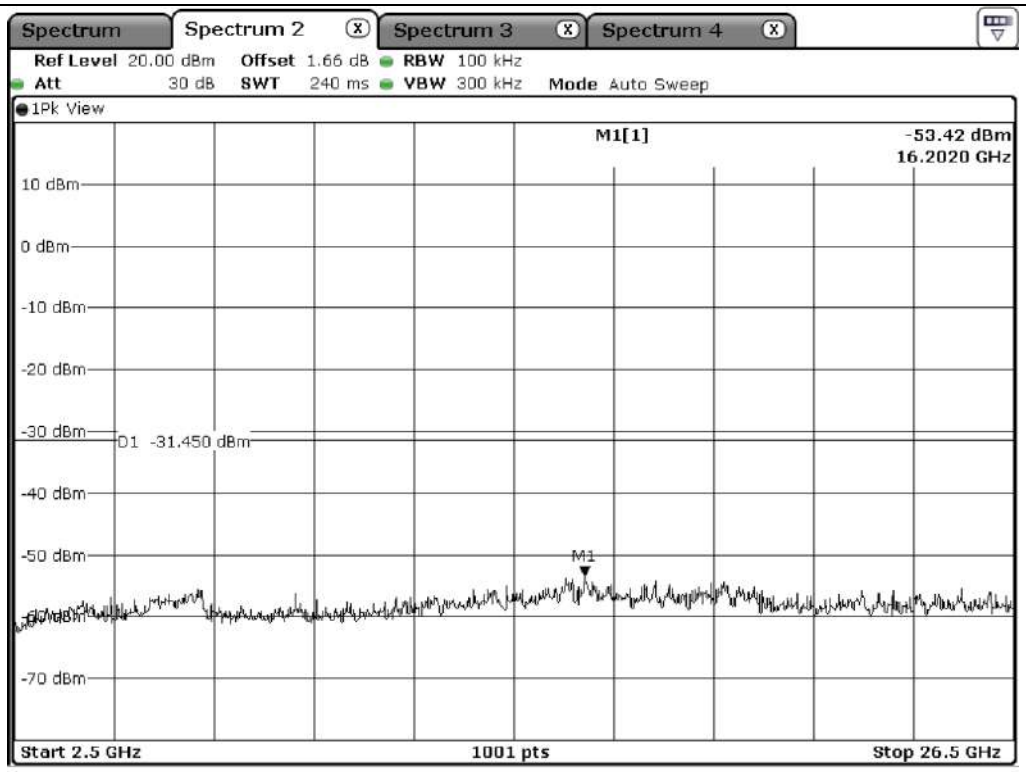
Middle Channel



High Channel

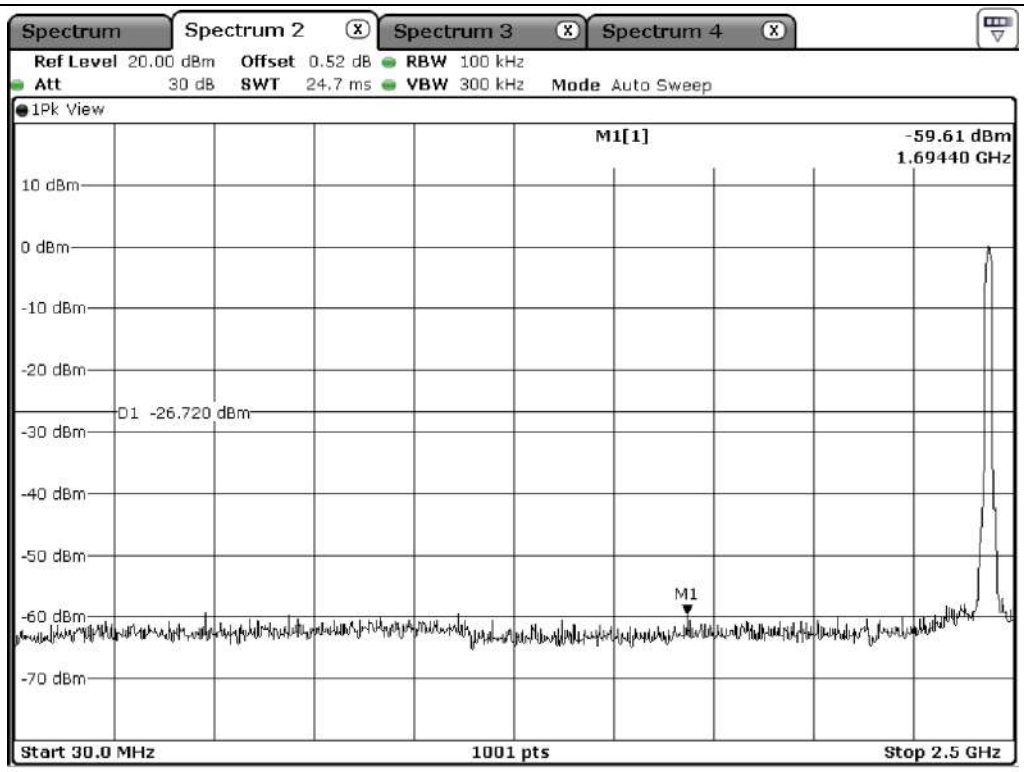


Low Channel

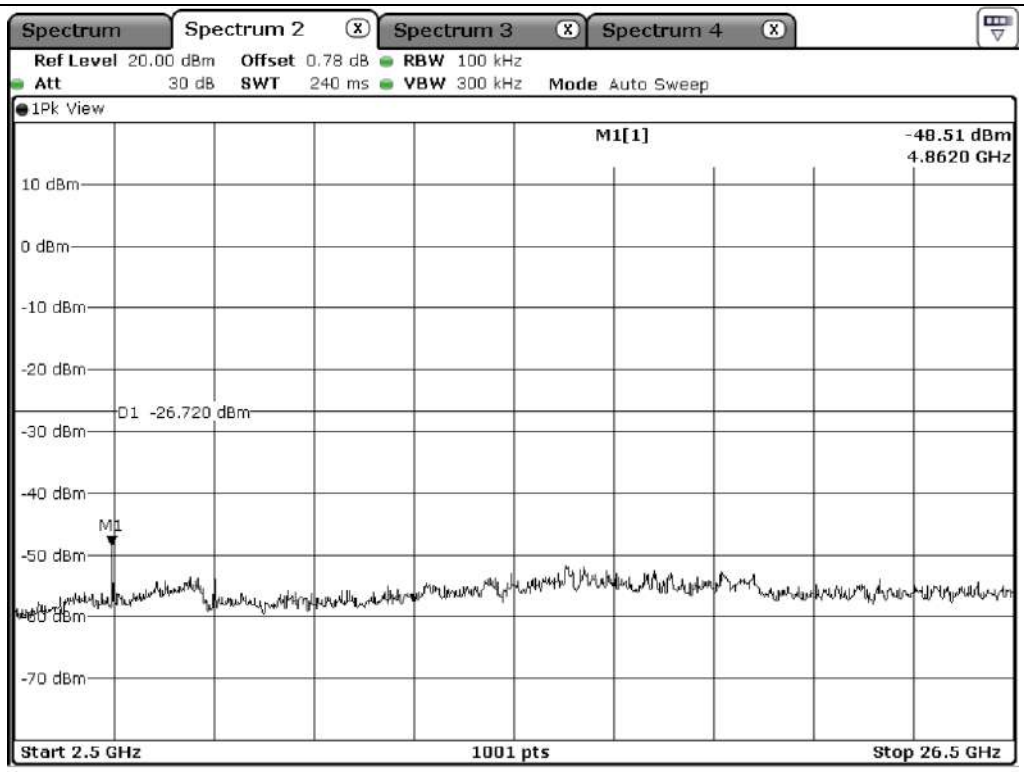


Low Channel

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

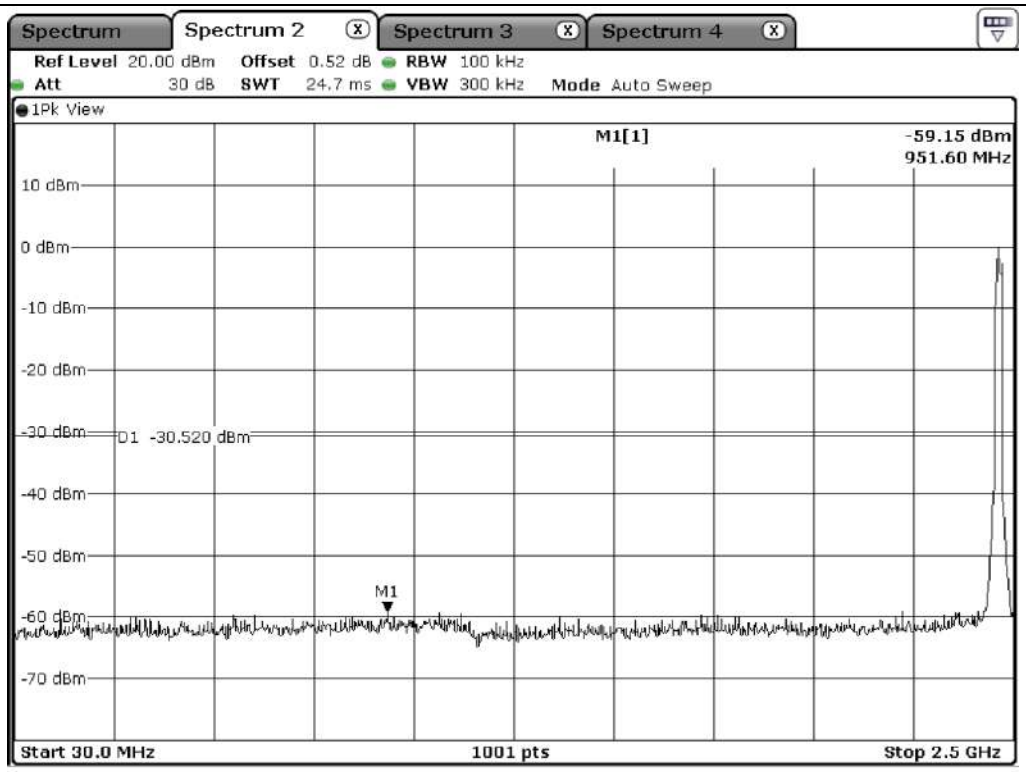


Middle Channel

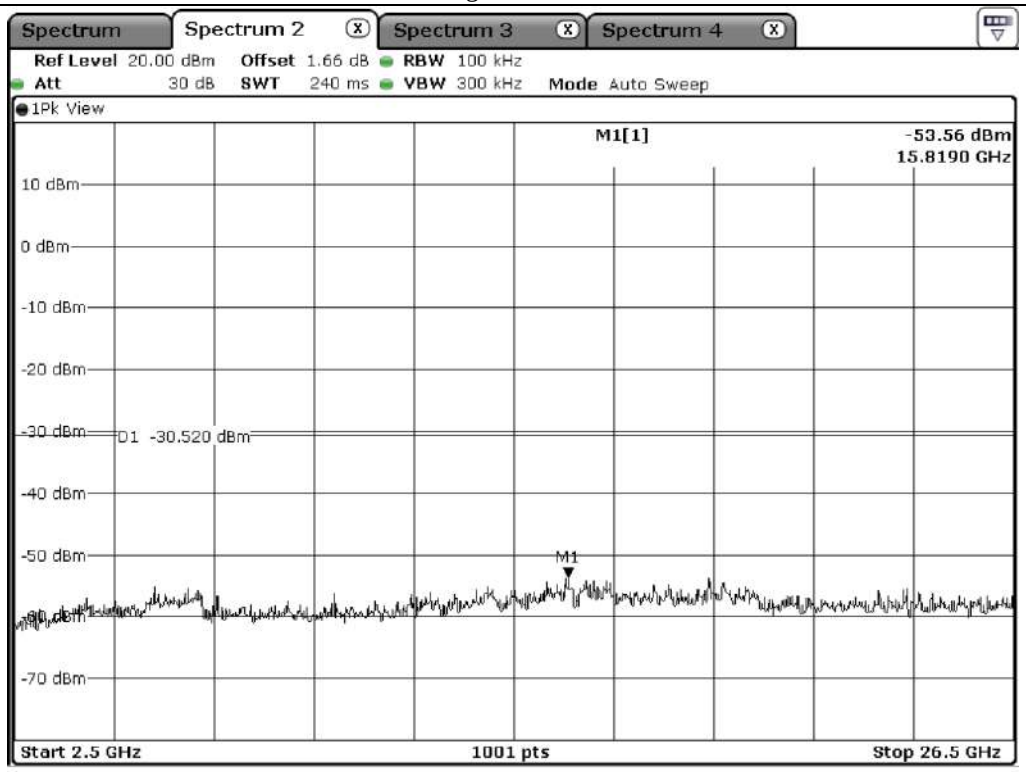


Middle Channel

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



High Channel



High Channel

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

9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

9.6.1.1 Test data for 802.11b WLAN Mode

9.6.1.1.1 Test data for Antenna 0

-. 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 : 98.94 %

-. Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 386.140	55.98	Peak	H	28.30	8.20	45.30	10.48	-	57.66	74.00	16.34
2 386.840	44.58	Average	H	28.30	8.20	45.30	10.48	0.05	46.31	54.00	7.69
2 388.780	55.80	Peak	V	28.30	8.20	45.30	10.48	-	57.48	74.00	16.52
2 386.540	42.99	Average	V	28.30	8.20	45.30	10.48	0.05	44.72	54.00	9.28
Test Data for High Channel											
2 486.084	55.37	Peak	H	28.70	8.23	45.50	10.51	-	57.31	74.00	16.69
2 487.902	43.49	Average	H	28.70	8.23	45.50	10.51	0.05	45.48	54.00	8.52
2 485.357	54.98	Peak	V	28.70	8.23	45.50	10.51	-	56.92	74.00	17.08
2 487.259	43.11	Average	V	28.70	8.23	45.50	10.51	0.05	45.10	54.00	8.90

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 + ATT + Duty Factor – AMP Factor

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9.6.1.1.2 Test data for Antenna 1

-. 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 : 98.94 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel											
2 385.820	55.64	Peak	H	28.30	8.20	45.30	10.48	-	57.32	74.00	16.68
2 383.890	43.90	Average	H	28.30	8.20	45.30	10.48	0.05	45.63	54.00	8.37
2 387.960	55.84	Peak	V	28.30	8.20	45.30	10.48	-	57.52	74.00	16.48
2 387.490	43.64	Average	V	28.30	8.20	45.30	10.48	0.05	45.37	54.00	8.63
Test Data for High Channel											
2 487.919	56.87	Peak	H	28.70	8.23	45.50	10.51	-	58.81	74.00	15.19
2 488.087	43.86	Average	H	28.70	8.23	45.50	10.51	0.05	45.85	54.00	8.15
2 484.227	55.98	Peak	V	28.70	8.23	45.50	10.51	-	57.92	74.00	16.08
2 490.129	44.54	Average	V	28.70	8.23	45.50	10.51	0.05	46.53	54.00	7.47

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 + ATT + Duty Factor – AMP Factor

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9.6.1.2 Test data for 802.11g WLAN Mode

9.6.1.2.1 Test data for Antenna 0

-. 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 : 91.89 %

-. Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.490	63.30	Peak	H	28.30	8.20	45.30	10.48	-	64.98	74.00	9.02
2 390.000	49.42	Average	H	28.30	8.20	45.30	10.48	0.37	51.47	54.00	2.53
2 389.180	61.54	Peak	V	28.30	8.20	45.30	10.48	-	63.22	74.00	10.78
2 390.000	48.15	Average	V	28.30	8.20	45.30	10.48	0.37	50.20	54.00	3.80
Test Data for High Channel											
2 484.322	66.96	Peak	H	28.70	8.23	45.50	10.51	-	68.90	74.00	5.10
2 483.500	48.56	Average	H	28.70	8.23	45.50	10.51	0.37	50.87	54.00	3.13
2 483.790	65.20	Peak	V	28.70	8.23	45.50	10.51	-	67.14	74.00	6.86
2 483.500	48.36	Average	V	28.70	8.23	45.50	10.51	0.37	50.67	54.00	3.33

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 + ATT + Duty Factor – AMP Factor

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9.6.1.2.2 Test data for Antenna 1

-. 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 : 91.22 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel											
2 389.630	60.90	Peak	H	28.30	8.20	45.30	10.48		62.58	74.00	11.42
2 390.000	49.11	Average	H	28.30	8.20	45.30	10.48	0.40	51.19	54.00	2.81
2 389.530	59.78	Peak	V	28.30	8.20	45.30	10.48		61.46	74.00	12.54
2 390.000	47.64	Average	V	28.30	8.20	45.30	10.48	0.40	49.72	54.00	4.28
Test Data for High Channel											
2 483.528	61.86	Peak	H	28.70	8.23	45.50	10.51		63.80	74.00	10.20
2 483.500	46.79	Average	H	28.70	8.23	45.50	10.51	0.40	49.13	54.00	4.87
2 484.199	59.92	Peak	V	28.70	8.23	45.50	10.51		61.86	74.00	12.14
2 483.584	45.78	Average	V	28.70	8.23	45.50	10.51	0.40	48.12	54.00	5.88

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 + ATT + Duty Factor – AMP Factor

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9.6.1.3 Test data for 802.11n_HT20 WLAN Mode

9.6.1.3.1 Test data for Multiple Transmit

-. 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 Factor	ATT (dB)	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel											
2 389.800	64.88	Peak	H	28.30	8.20	45.30	10.48	-	66.56	74.00	7.44
2 390.000	48.64	Average	H	28.30	8.20	45.30	10.48	0.73	51.05	54.00	2.95
2 389.690	63.08	Peak	V	28.30	8.20	45.30	10.48	-	64.76	74.00	9.24
2 390.000	47.29	Average	V	28.30	8.20	45.30	10.48	0.73	49.70	54.00	4.30
Test Data for High Channel											
2 485.122	68.40	Peak	H	28.70	8.23	45.50	10.51	-	70.34	74.00	3.66
2 483.556	48.72	Average	H	28.70	8.23	45.50	10.51	0.73	51.39	54.00	2.61
2 486.353	59.48	Peak	V	28.70	8.23	45.50	10.51	-	61.42	74.00	12.58
2 483.556	47.15	Average	V	28.70	8.23	45.50	10.51	0.73	49.82	54.00	4.18

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 + ATT + Duty Factor – AMP Factor

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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

-. 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 : 98.94 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel										
4 824.00	57.27	Peak	H	33.40	11.21	46.30	-	55.58	74.00	18.42
4 824.00	51.43	Average	H	33.40	11.21	46.30	0.05	49.79	54.00	4.21
4 824.00	57.18	Peak	V	33.40	11.21	46.30	-	55.49	74.00	18.51
4 824.00	51.16	Average	V	33.40	11.21	46.30	0.05	49.52	54.00	4.48
Test Data for Middle Channel										
4 874.00	58.35	Peak	H	33.50	11.23	46.33	-	56.75	74.00	17.25
4 874.00	52.14	Average	H	33.50	11.23	46.33	0.05	50.59	54.00	3.41
4 874.00	57.95	Peak	V	33.50	11.23	46.33	-	56.35	74.00	17.65
4 874.00	51.98	Average	V	33.50	11.23	46.33	0.05	50.43	54.00	3.57
Test Data for High Channel										
4 924.00	57.73	Peak	H	33.30	11.25	46.35	-	55.93	74.00	18.07
4 924.00	53.57	Average	H	33.30	11.25	46.35	0.05	51.82	54.00	2.18
4 924.00	57.65	Peak	V	33.30	11.25	46.35	-	55.85	74.00	18.15
4 924.00	53.49	Average	V	33.30	11.25	46.35	0.05	51.74	54.00	2.26

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 + Duty Factor– AMP Factor

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9.6.2.1.2 Test data for Antenna 1

-. 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 : 98.94 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel										
4 824.00	52.86	Peak	H	33.40	11.21	46.30		51.17	74.00	22.83
4 824.00	43.33	Average	H	33.40	11.21	46.30	0.05	41.69	54.00	12.31
4 824.00	54.22	Peak	V	33.40	11.21	46.30		52.53	74.00	21.47
4 824.00	48.65	Average	V	33.40	11.21	46.30	0.05	47.01	54.00	6.99
Test Data for Middle Channel										
4 874.00	54.16	Peak	H	33.50	11.23	46.33		52.56	74.00	21.44
4 874.00	44.51	Average	H	33.50	11.23	46.33	0.05	42.96	54.00	11.04
4 874.00	54.67	Peak	V	33.50	11.23	46.33		53.07	74.00	20.93
4 874.00	48.77	Average	V	33.50	11.23	46.33	0.05	47.22	54.00	6.78
Test Data for High Channel										
4 924.00	53.14	Peak	H	33.30	11.25	46.35		51.34	74.00	22.66
4 924.00	44.57	Average	H	33.30	11.25	46.35	0.05	42.82	54.00	11.18
4 924.00	54.56	Peak	V	33.30	11.25	46.35		52.76	74.00	21.24
4 924.00	48.61	Average	V	33.30	11.25	46.35	0.05	46.86	54.00	7.14

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 + Duty Factor– AMP Factor

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9.6.2.2 Test data for 802.11g WLAN Mode

9.6.2.2.1 Test data for Antenna 0

-. 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 : 91.89 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel										
4 824.00	57.05	Peak	H	33.40	11.21	46.30		55.36	74.00	18.64
4 824.00	44.64	Average	H	33.40	11.21	46.30	0.37	43.32	54.00	10.68
4 824.00	56.99	Peak	V	33.40	11.21	46.30		55.30	74.00	18.70
4 824.00	44.54	Average	V	33.40	11.21	46.30	0.37	43.22	54.00	10.78
Test Data for Middle Channel										
4 874.00	59.80	Peak	H	33.50	11.23	46.33		58.20	74.00	15.80
4 874.00	48.21	Average	H	33.50	11.23	46.33	0.37	46.98	54.00	7.02
4 874.00	58.76	Peak	V	33.50	11.23	46.33		57.16	74.00	16.84
4 874.00	48.15	Average	V	33.50	11.23	46.33	0.37	46.92	54.00	7.08
Test Data for High Channel										
4 924.00	56.92	Peak	H	33.30	11.25	46.35		55.12	74.00	18.88
4 924.00	46.17	Average	H	33.30	11.25	46.35	0.37	44.74	54.00	9.26
4 924.00	56.81	Peak	V	33.30	11.25	46.35		55.01	74.00	18.99
4 924.00	45.95	Average	V	33.30	11.25	46.35	0.37	44.52	54.00	9.48

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 + Duty Factor– AMP Factor

9.6.2.2.2 Test data for Antenna 1

-. 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 : 91.22 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel										
4 824.00	56.01	Peak	H	33.40	11.21	46.30		54.32	74.00	19.68
4 824.00	43.60	Average	H	33.40	11.21	46.30	0.40	42.31	54.00	11.69
4 824.00	55.95	Peak	V	33.40	11.21	46.30		54.26	74.00	19.74
4 824.00	43.50	Average	V	33.40	11.21	46.30	0.40	42.21	54.00	11.79
Test Data for Middle Channel										
4 874.00	58.76	Peak	H	33.50	11.23	46.33		57.16	74.00	16.84
4 874.00	47.17	Average	H	33.50	11.23	46.33	0.40	45.97	54.00	8.03
4 874.00	57.72	Peak	V	33.50	11.23	46.33		56.12	74.00	17.88
4 874.00	47.11	Average	V	33.50	11.23	46.33	0.40	45.91	54.00	8.09
Test Data for High Channel										
4 924.00	55.88	Peak	H	33.30	11.25	46.35		54.08	74.00	19.92
4 924.00	45.13	Average	H	33.30	11.25	46.35	0.40	43.73	54.00	10.27
4 924.00	55.77	Peak	V	33.30	11.25	46.35		53.97	74.00	20.03
4 924.00	44.91	Average	V	33.30	11.25	46.35	0.40	43.51	54.00	10.49

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 + Duty Factor– AMP Factor

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9.6.2.3 Test data for 802.11n_HT20 WLAN Mode

9.6.2.3.1 Test data for Multiple Transmit

-. 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 : 84.62 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel										
4 824.00	55.30	Peak	H	33.40	11.21	46.30		53.61	74.00	20.39
4 824.00	42.57	Average	H	33.40	11.21	46.30	0.73	41.61	54.00	12.39
4 824.00	55.18	Peak	V	33.40	11.21	46.30		53.49	74.00	20.51
4 824.00	42.35	Average	V	33.40	11.21	46.30	0.73	41.39	54.00	12.61
Test Data for Middle Channel										
4 874.00	58.46	Peak	H	33.50	11.23	46.33		56.86	74.00	17.14
4 874.00	47.47	Average	H	33.50	11.23	46.33	0.73	46.60	54.00	7.40
4 874.00	58.15	Peak	V	33.50	11.23	46.33		56.55	74.00	17.45
4 874.00	47.24	Average	V	33.50	11.23	46.33	0.73	46.37	54.00	7.63
Test Data for High Channel										
4 924.00	52.73	Peak	H	33.30	11.25	46.35		50.93	74.00	23.07
4 924.00	42.17	Average	H	33.30	11.25	46.35	0.73	41.10	54.00	12.90
4 924.00	52.54	Peak	V	33.30	11.25	46.35		50.74	74.00	23.26
4 924.00	41.85	Average	V	33.30	11.25	46.35	0.73	40.78	54.00	13.22

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 + Duty Factor– AMP Factor

10. PEAK POWER SPECTRUL DENSITY

10.1 Operating environment

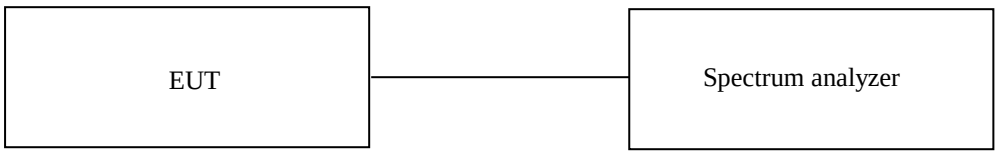
Temperature : 24 °C

Relative humidity : 45 % 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 Date

March 29, 2021 ~ April 13, 2021

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10.4 Test data for 802.11b WLAN Mode

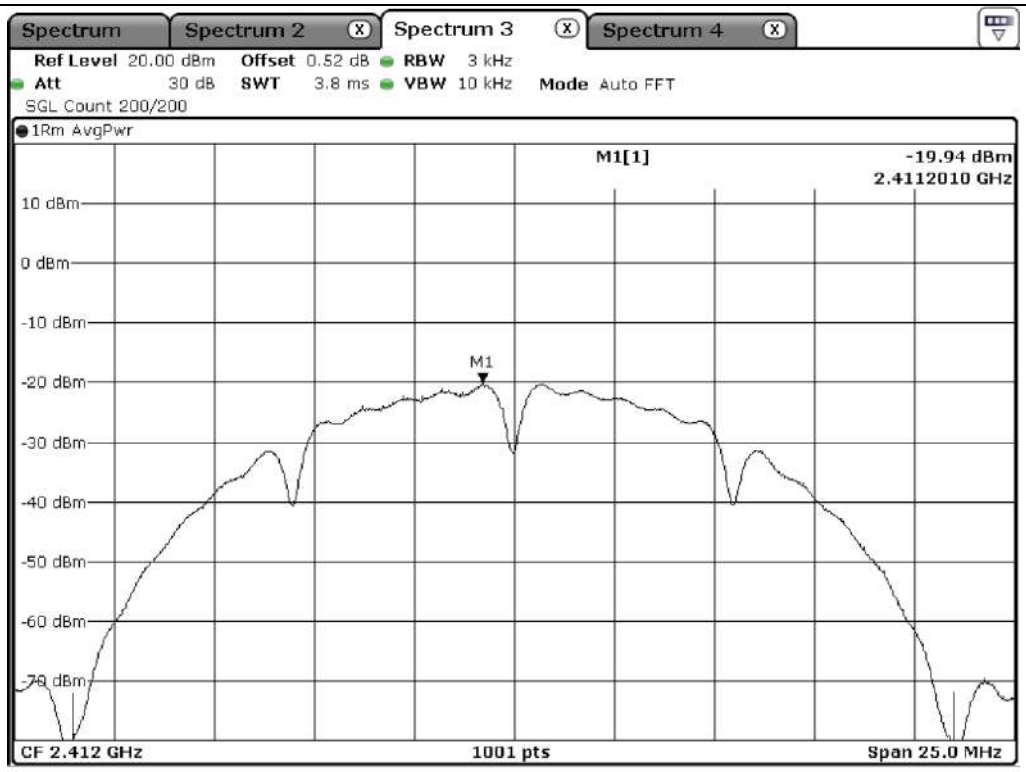
10.4.1 Test data for Antenna 0

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

Channel	Frequency (MHz)	Measured Value (dBm)	Duty Factor (dB)	Total Value (dBm)	Limit (dBm)	Margin (dB)
Low	2 412.00	-19.94	0.05	-19.89	8.00	27.89
Middle	2 437.00	-19.64	0.05	-19.59	8.00	27.59
High	2 462.00	-19.89	0.05	-19.84	8.00	27.84

Remark. Margin = Limit – Total Value (Measured Value + Duty Factor)



Low Channel

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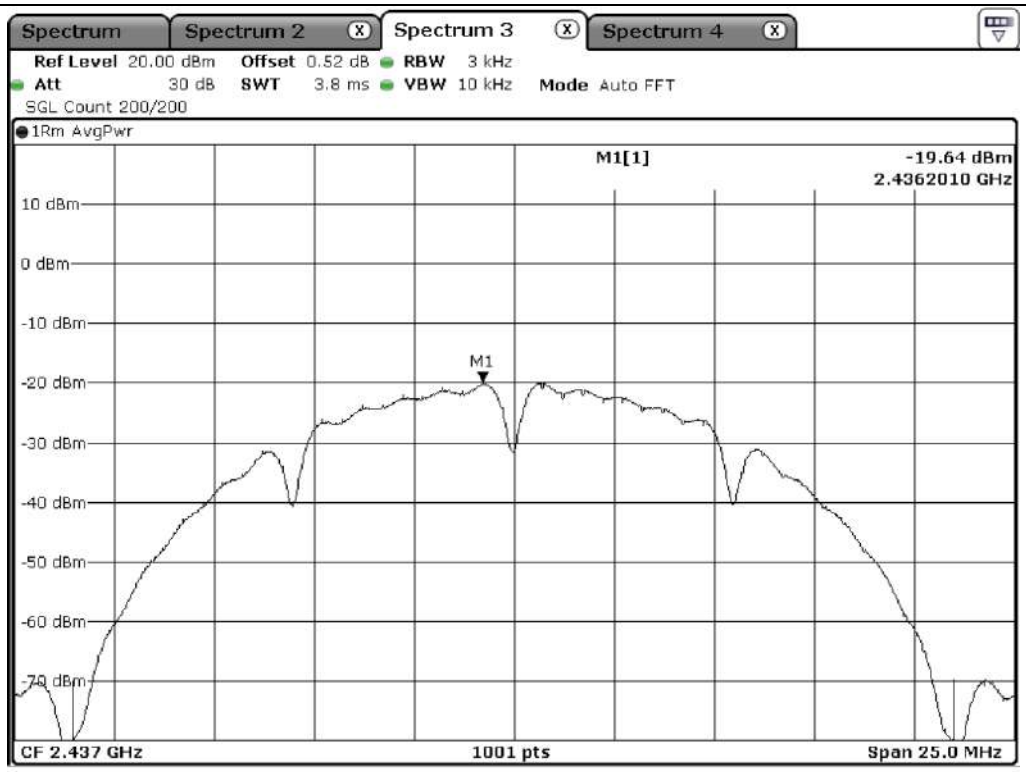
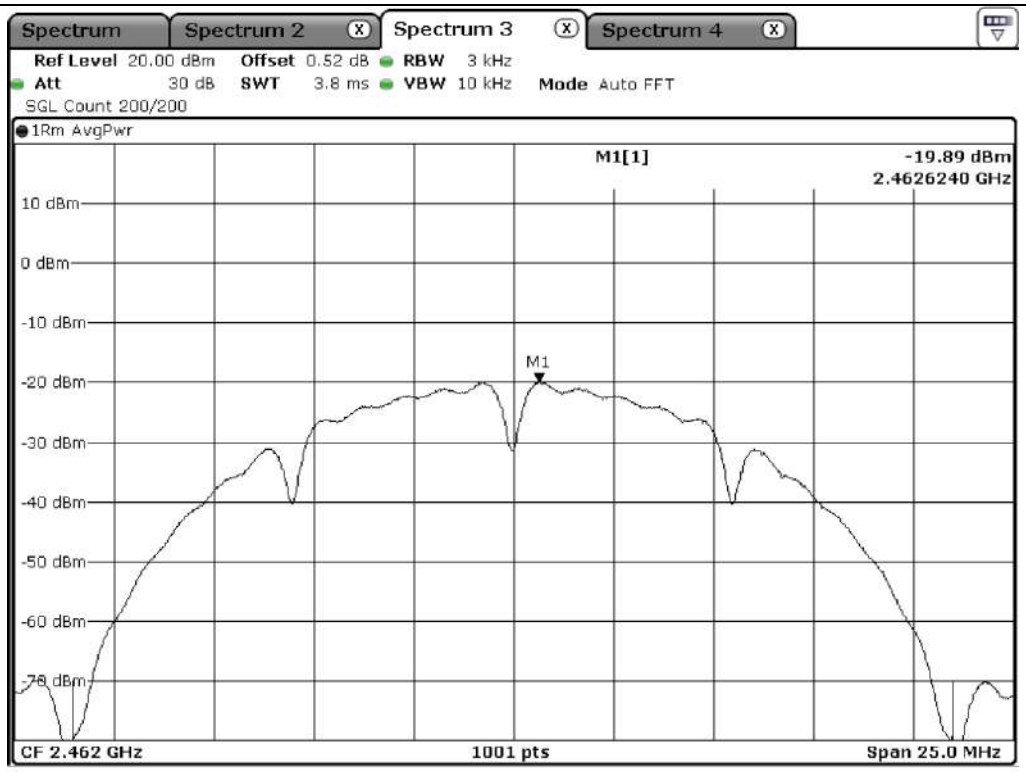


Middle Channel



High Channel

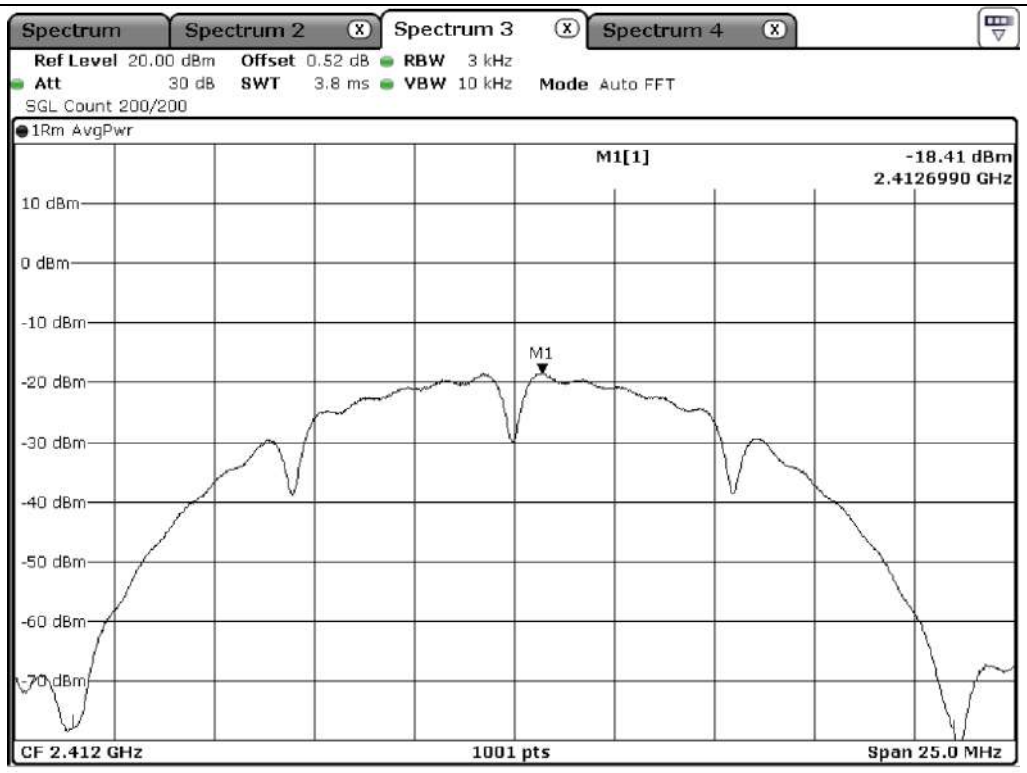
10.4.2 Test data for Antenna 1

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

Channel	Frequency (MHz)	Measured Value (dBm)	Duty Factor (dB)	Total Value (dBm)	Limit (dBm)	Margin (dB)
Low	2 412.00	-18.41	0.05	-18.36	8.00	26.36
Middle	2 437.00	-18.27	0.05	-18.22	8.00	26.22
High	2 462.00	-18.35	0.05	-18.30	8.00	26.30

Remark. Margin = Limit – Total Value (Measured Value + Duty Factor)



Low Channel

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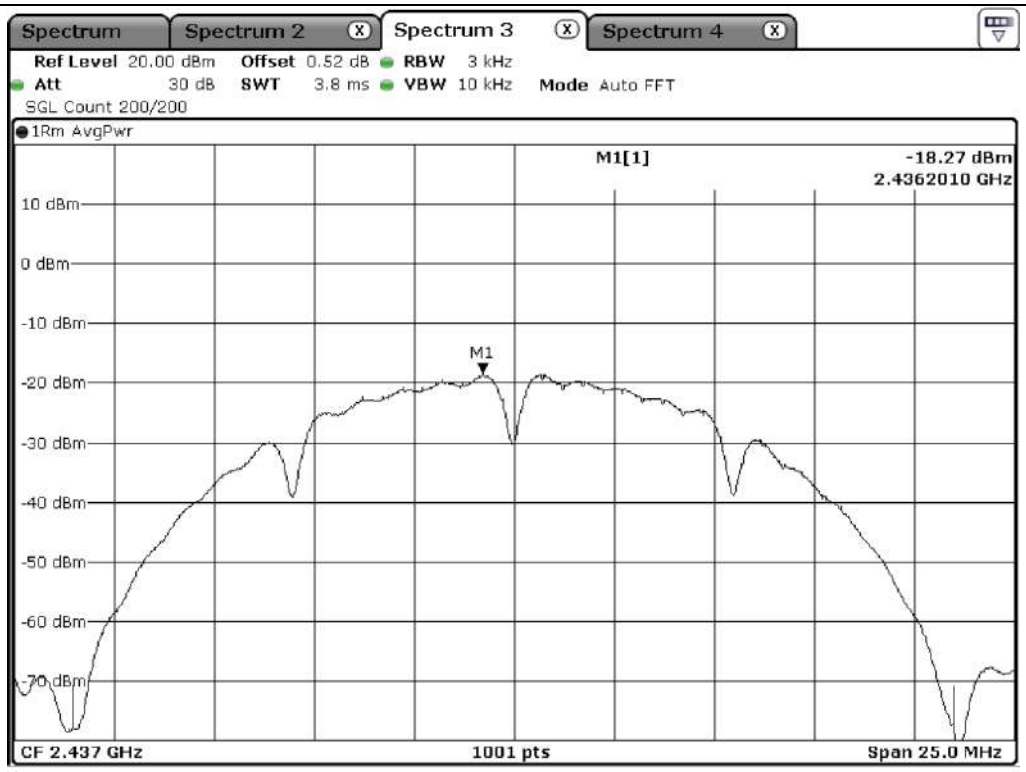
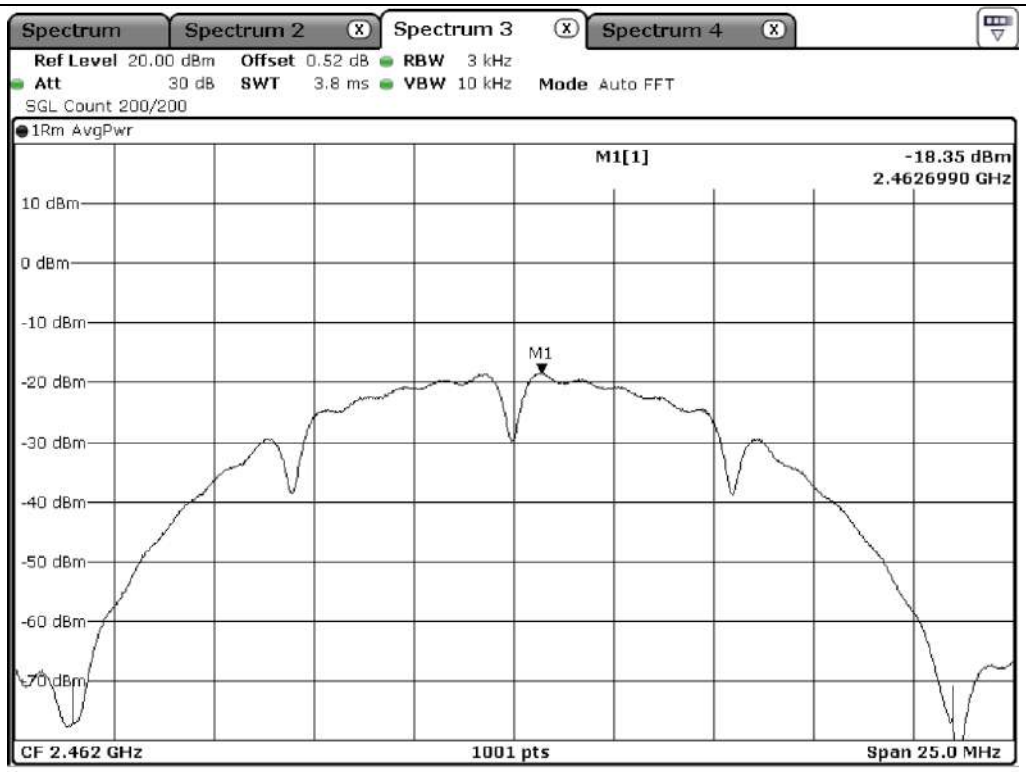


Middle Channel



High Channel

10.5 Test data for 802.11g WLAN Mode

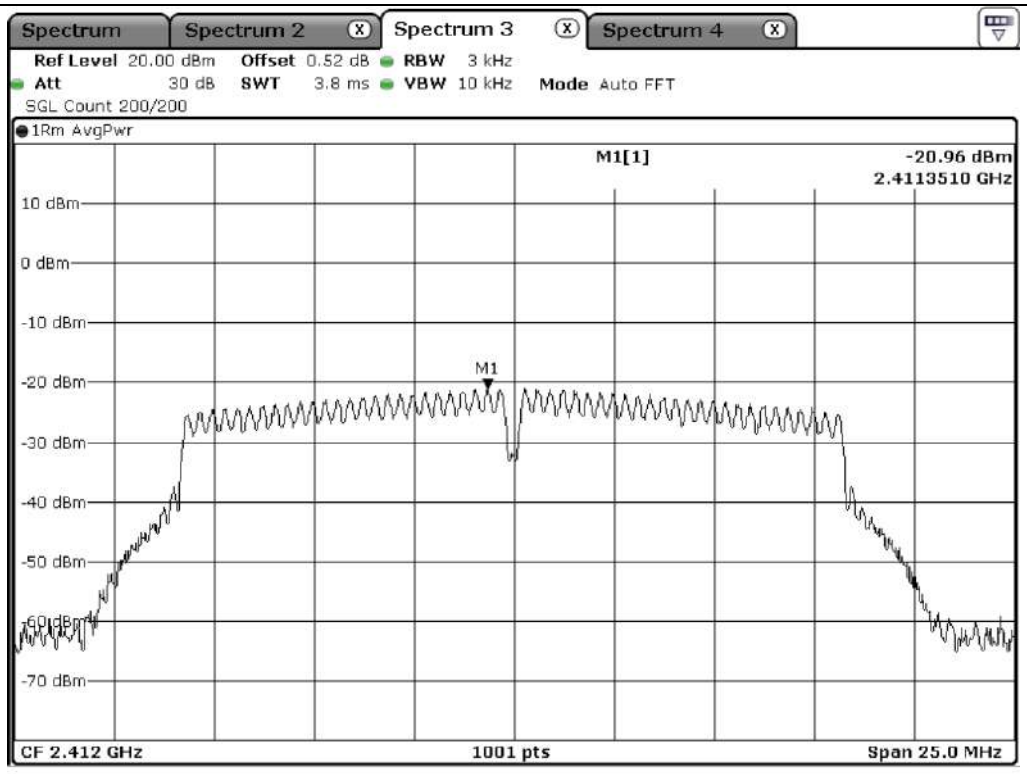
10.5.1 Test data for Antenna 0

-. Test Result : Pass

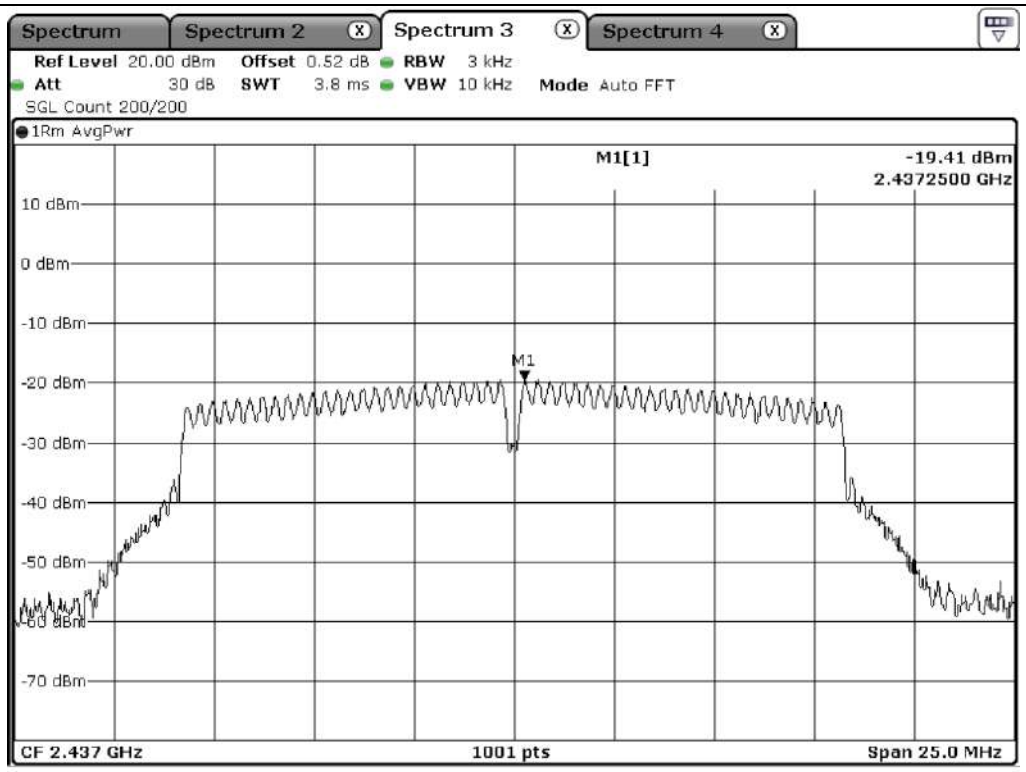
-. Operating Condition : Continuous transmitting mode

Channel	Frequency (MHz)	Measured Value (dBm)	Duty Factor (dB)	Total Value (dBm)	Limit (dBm)	Margin (dB)
Low	2 412.00	-20.96	0.37	-20.59	8.00	28.59
Middle	2 437.00	-19.41	0.37	-19.04	8.00	27.04
High	2 462.00	-22.14	0.37	-21.77	8.00	29.77

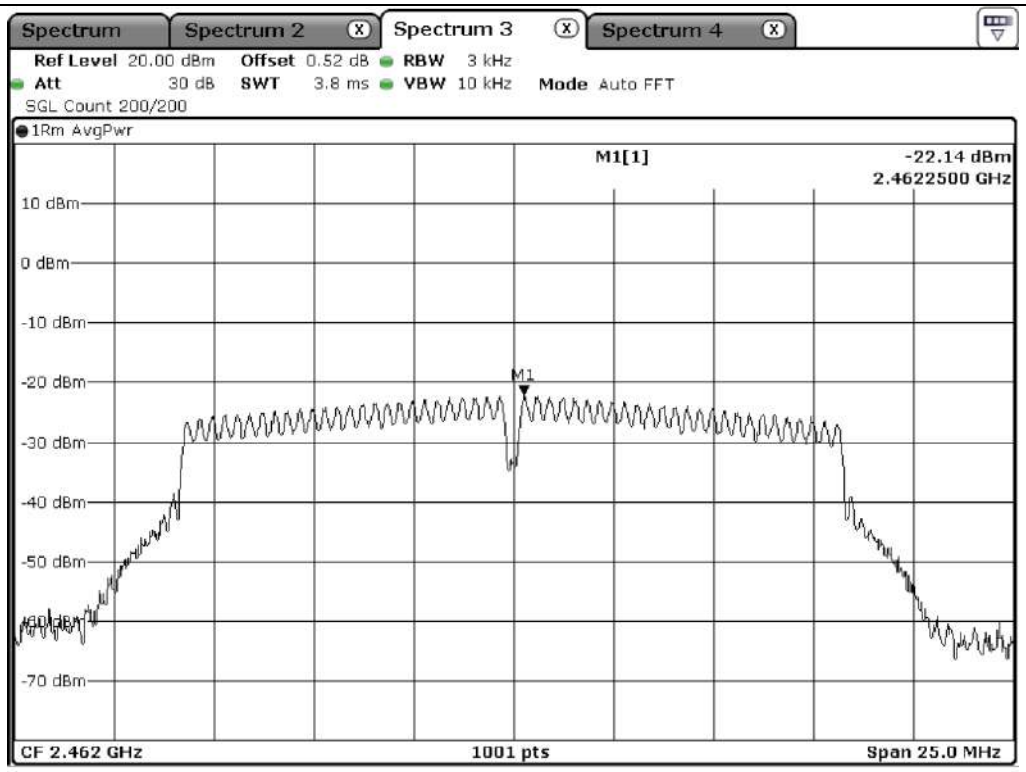
Remark. Margin = Limit – Total Value (Measured Value + Duty Factor)



Low Channel



Middle Channel



High Channel

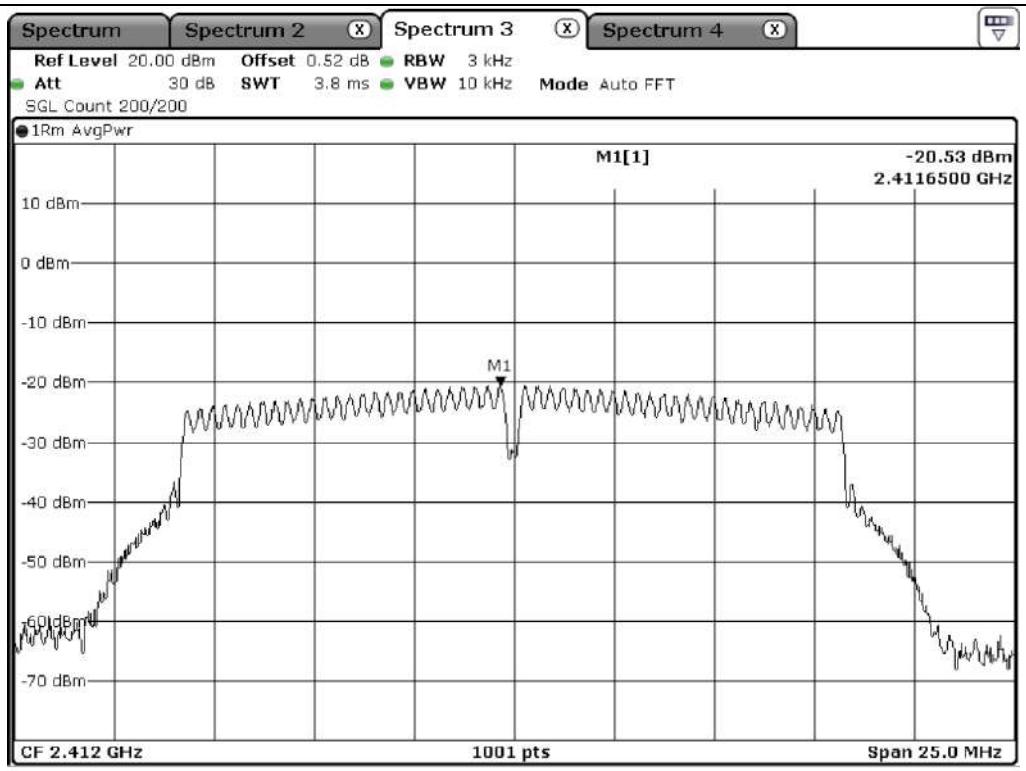
10.5.2 Test data for Antenna 1

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

Channel	Frequency (MHz)	Measured Value (dBm)	Duty Factor (dB)	Total Value (dBm)	Limit (dBm)	Margin (dB)
Low	2 412.00	-20.53	0.40	-20.13	8.00	28.13
Middle	2 437.00	-18.68	0.40	-18.28	8.00	26.28
High	2 462.00	-19.76	0.40	-19.36	8.00	27.36

Remark. Margin = Limit – Total Value (Measured Value + Duty Factor)



Low Channel

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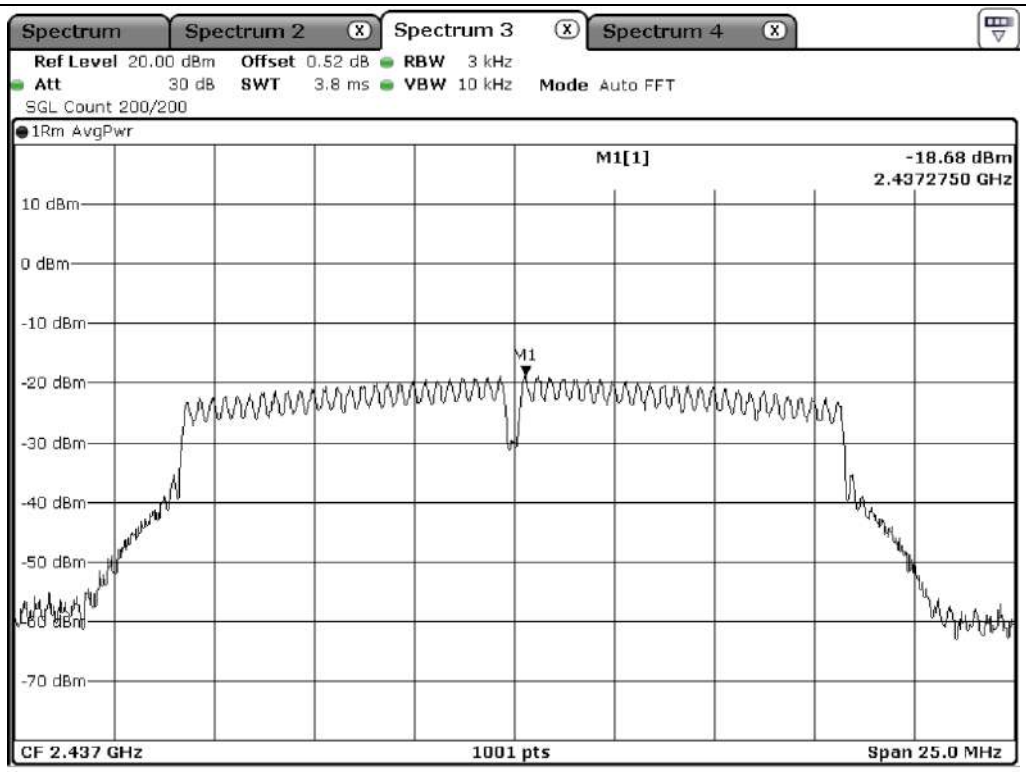
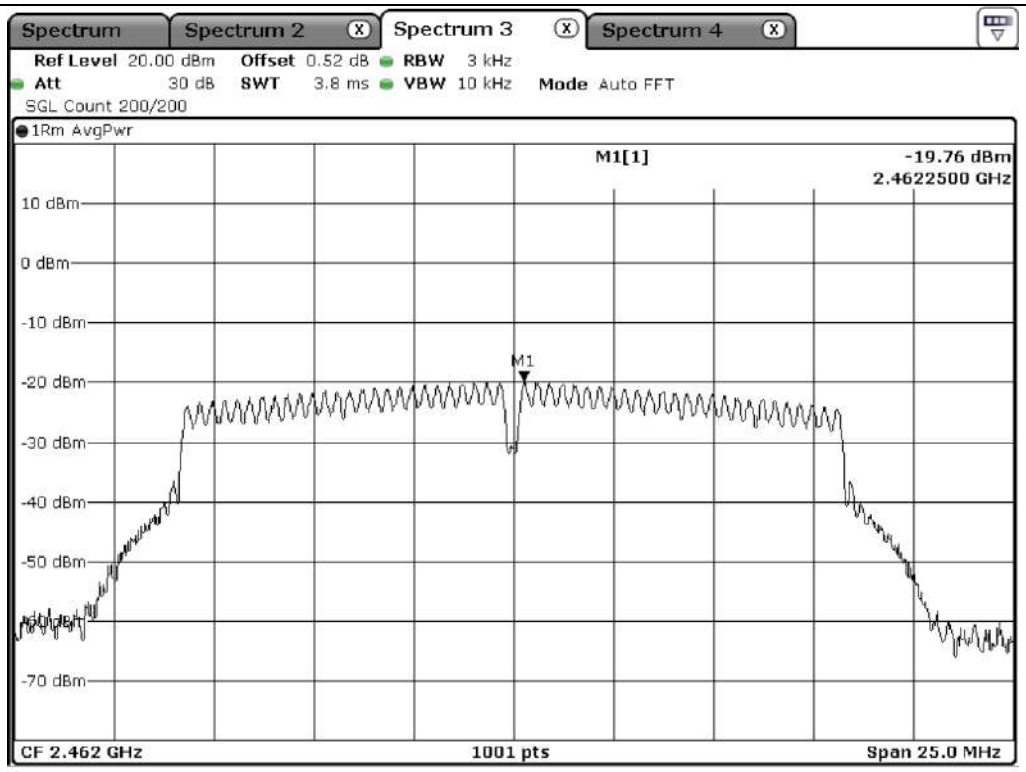


Middle Channel



High Channel

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10.6 Test data for 802.11n_HT20 WLAN Mode

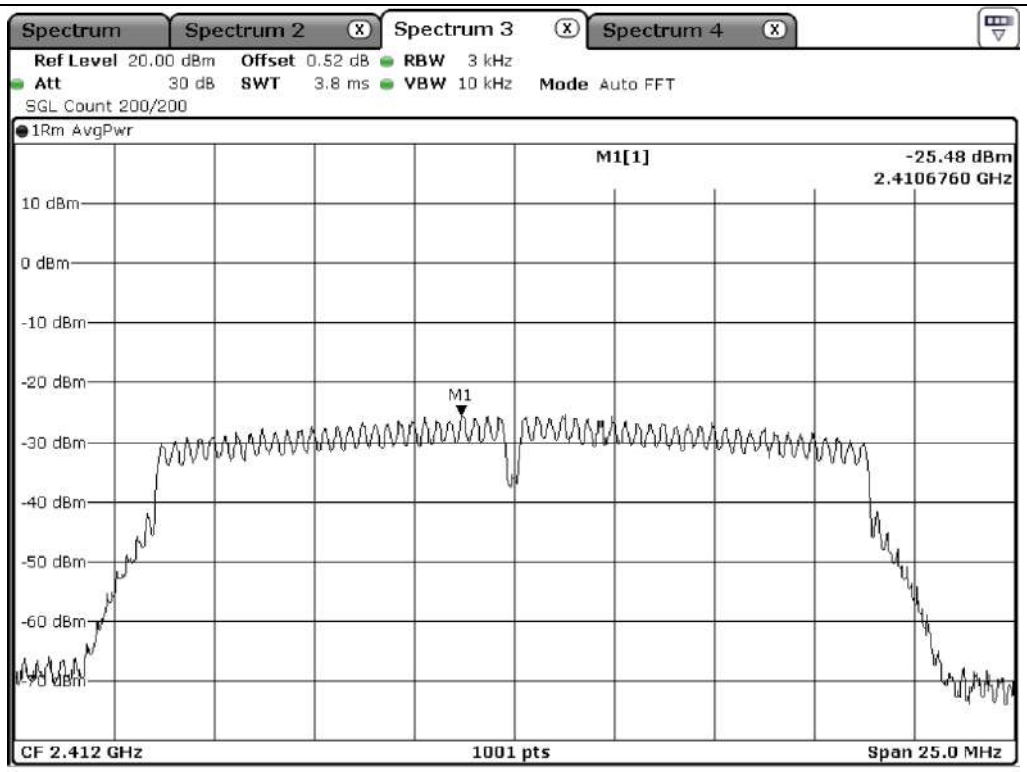
10.6.1 Test data for Antenna 0

-. Test Result : Pass

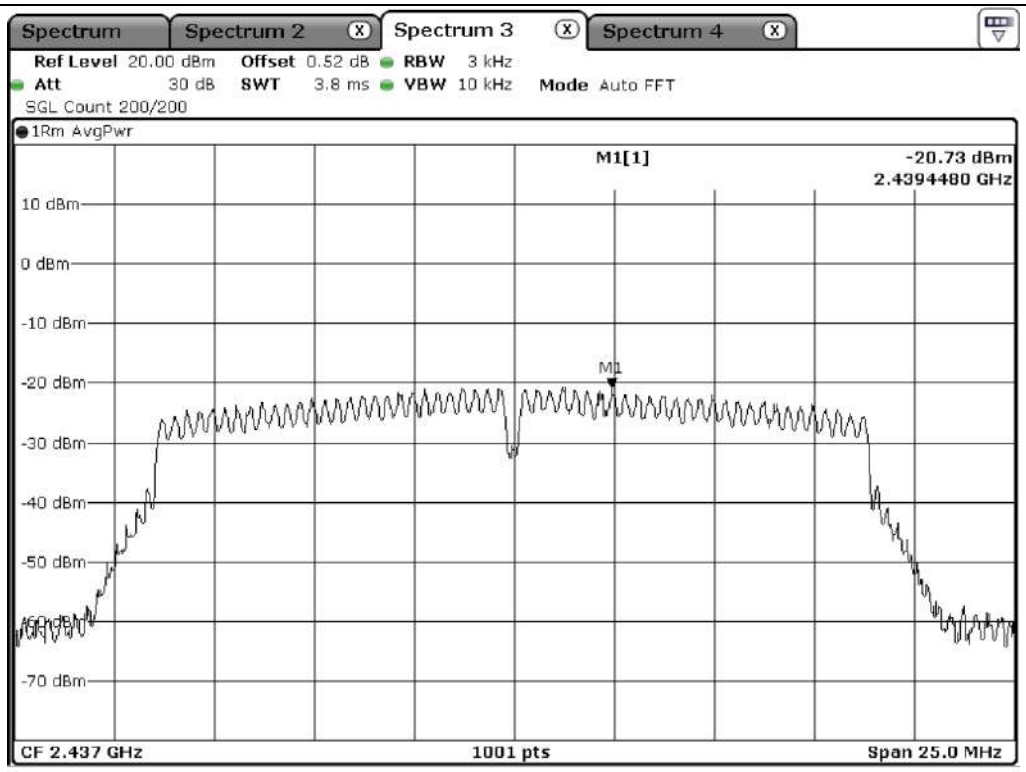
-. Operating Condition : Continuous transmitting mode

Channel	Frequency (MHz)	Measured Value (dBm)	Duty Factor (dB)	Total Value (dBm)	Limit (dBm)	Margin (dB)
Low	2 412.00	-25.48	0.73	-24.75	8.00	32.75
Middle	2 437.00	-20.73	0.73	-20.00	8.00	28.00
High	2 462.00	-24.18	0.73	-23.45	8.00	31.45

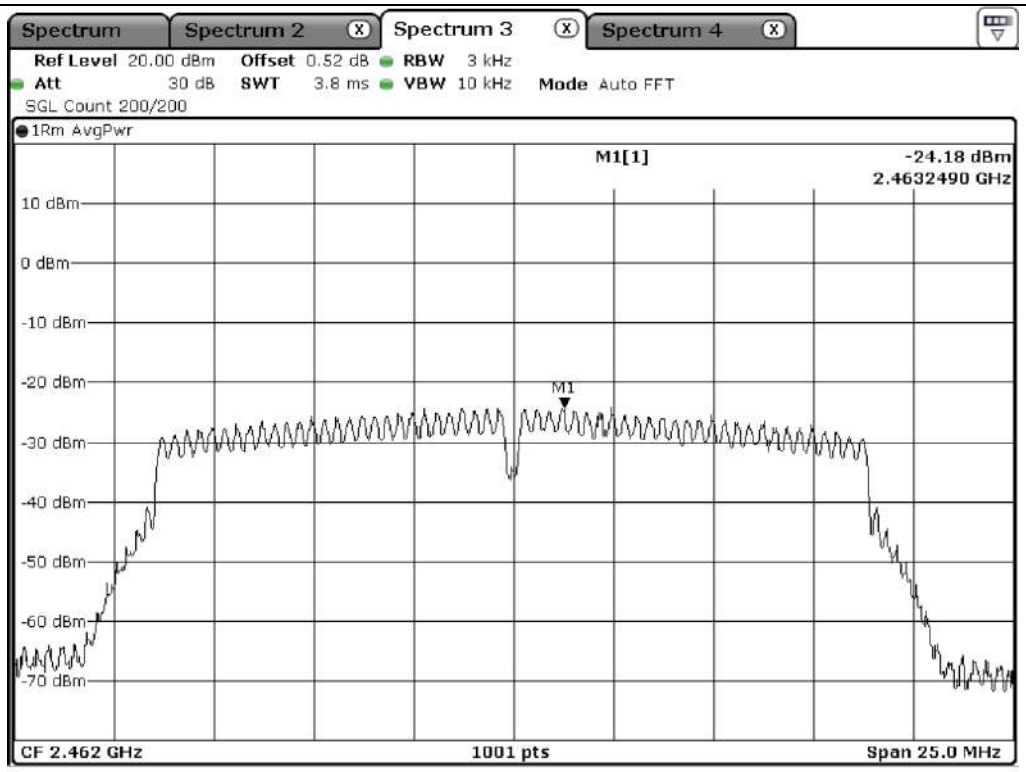
Remark. Margin = Limit – Measured value



Low Channel



Middle Channel



High Channel

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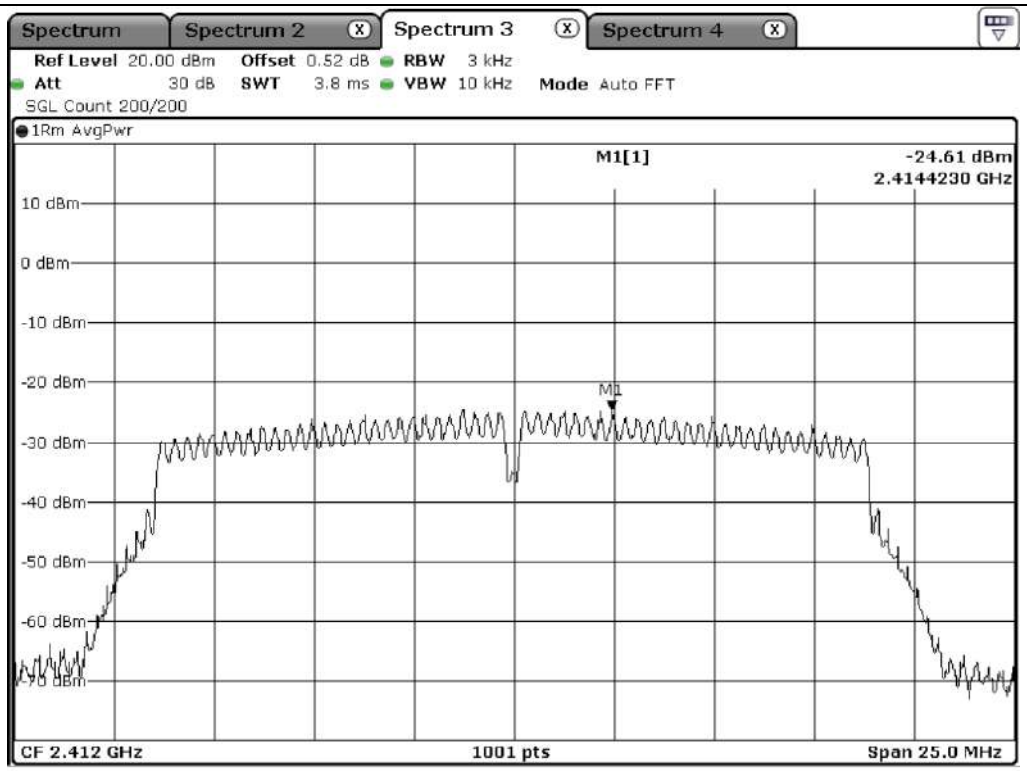
10.6.2 Test data for Antenna 1

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

Channel	Frequency (MHz)	Measured Value (dBm)	Duty Factor (dB)	Total Value (dBm)	Limit (dBm)	Margin (dB)
Low	2 412.00	-24.61	0.67	-23.94	8.00	31.94
Middle	2 437.00	-19.94	0.67	-19.27	8.00	27.27
High	2 462.00	-23.38	0.67	-22.71	8.00	30.71

Remark. Margin = Limit – Measured value



Low Channel

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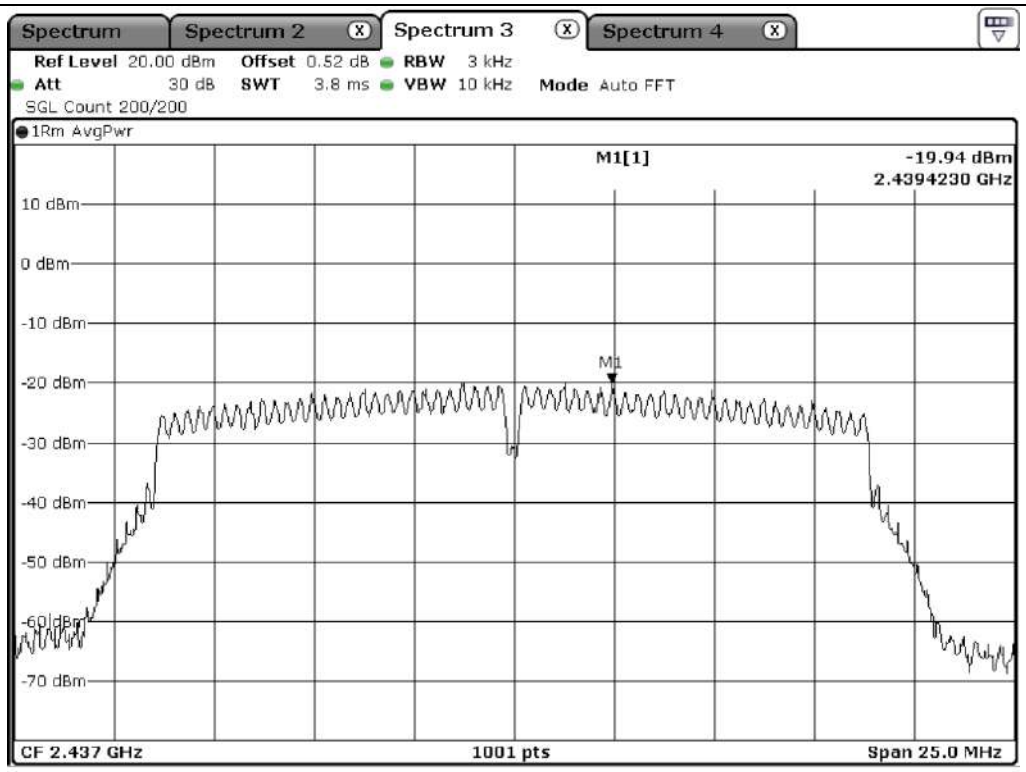
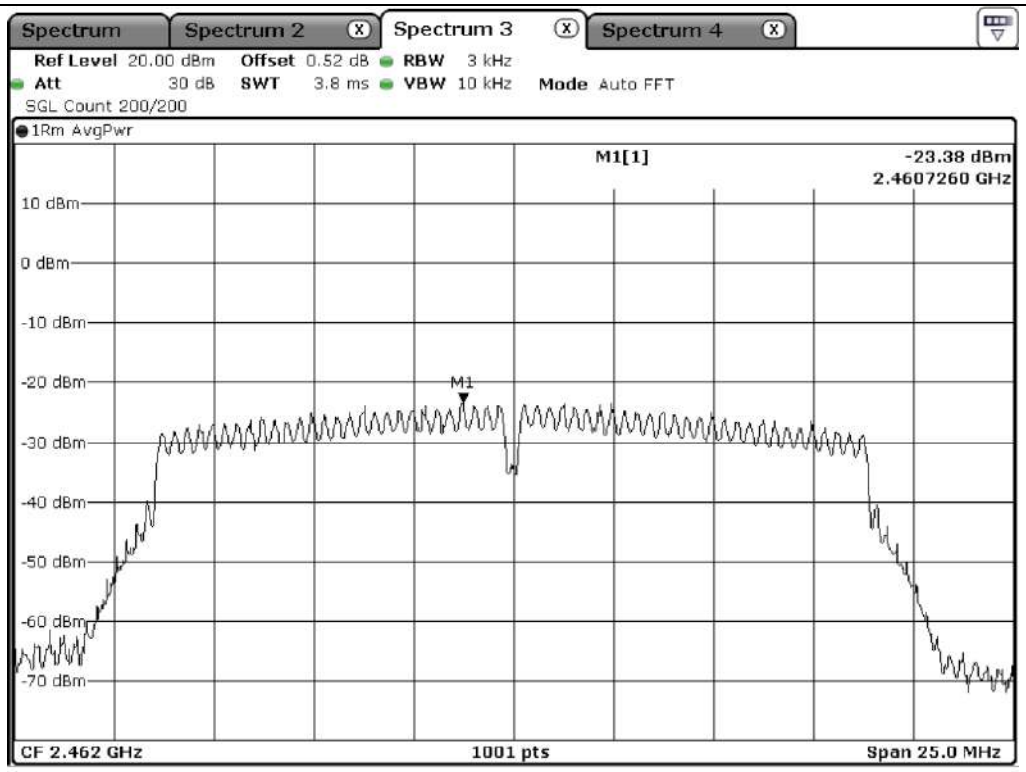


Middle Channel



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 Multiple Transmit

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-21.32	8.00	29.32
Middle	2 437.00	-16.61	8.00	24.61
High	2 462.00	-20.05	8.00	28.05

Remark 1 : Margin = Limit – Measured value

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

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

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11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature	:	24 °C
Relative humidity	:	45 % R.H.

11.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

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

11.3 Test Date

March 29, 2021 ~ April 13, 2021

11.4 Test data for 30 MHz ~ 1 000 MHz

11.4.1 Test data for WLAN 2.4 GHz

Humidity Level : 45 % R.H. Temperature: 23 °C

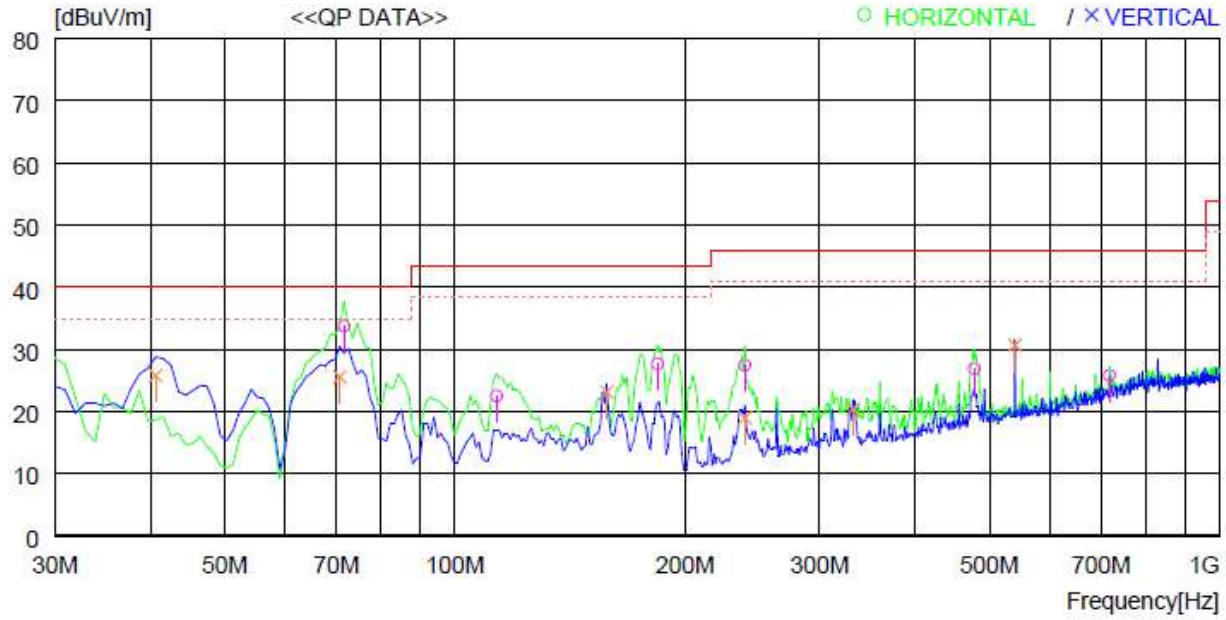
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : WOWCAST

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

-. Antenna 0, Antenna 1 and Multiple transmit tested, but the worst data were recorded.



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	71.710	52.1	12.9	0.9	32.1	33.8	40.0	6.2	400	177
2	113.420	35.8	17.5	1.2	32.0	22.5	43.5	21.0	300	359
3	184.230	41.7	16.4	1.6	32.0	27.7	43.5	15.8	200	0
4	239.520	40.3	17.3	1.9	32.0	27.5	46.0	18.5	200	0
5	478.141	33.9	22.6	2.7	32.3	26.9	46.0	19.1	100	343
6	718.694	28.5	25.9	3.6	32.2	25.8	46.0	20.2	300	290
----- Vertical ------										
7	40.670	40.1	17.0	0.7	32.0	25.8	40.0	14.2	300	109
8	70.740	43.9	12.9	0.9	32.1	25.6	40.0	14.4	400	0
9	158.040	35.7	18.1	1.4	32.0	23.2	43.5	20.3	400	64
10	239.520	31.8	17.3	1.9	32.0	19.0	46.0	27.0	300	252
11	331.670	30.5	19.7	2.2	32.0	20.4	46.0	25.6	400	32
12	540.220	36.7	23.5	2.8	32.3	30.7	46.0	15.3	300	252

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11.4.2 Test data for Intermodulation Mode(WLAN 2.4 GHz + WLAN 5 GHz)

Humidity Level : 45 % R.H. Temperature: 23 °C

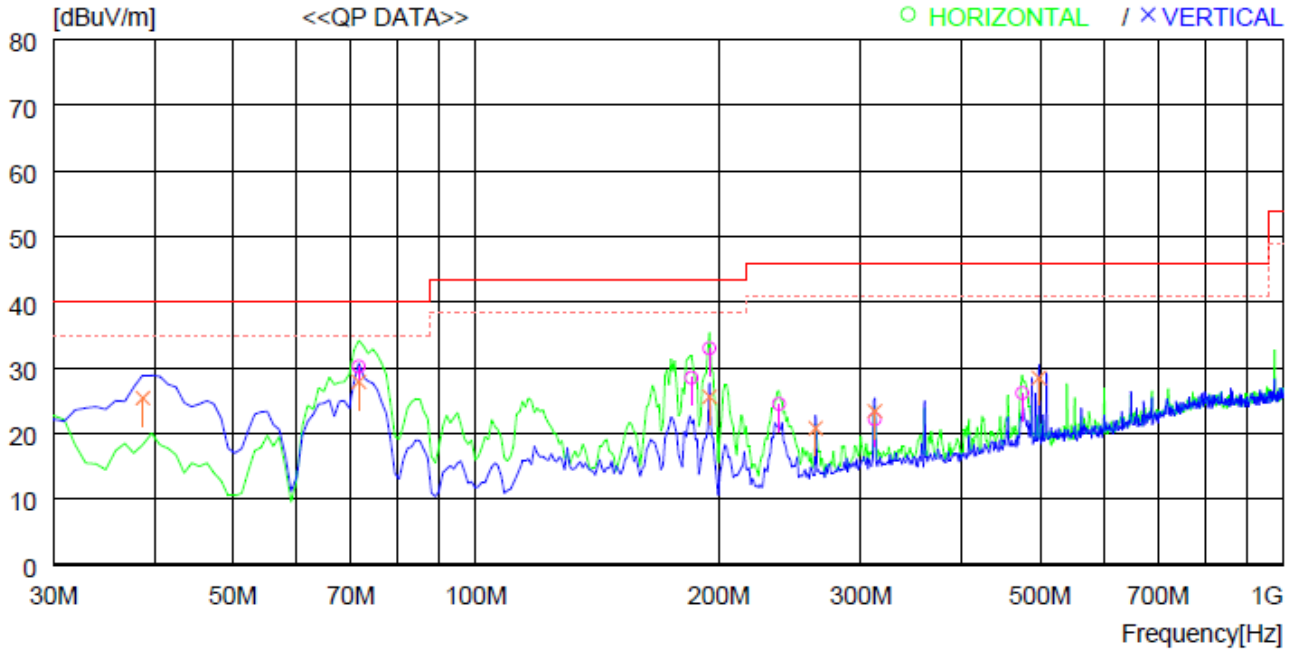
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : WOWCAST

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

-. Antenna 0, Antenna 1 and Multiple transmit tested, but the worst data were recorded.



No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	71.710	48.5	12.9	0.9	32.1	30.2	40.0	9.8	400	344
2	185.200	42.6	16.3	1.6	32.0	28.5	43.5	15.0	200	0
3	194.900	47.5	15.9	1.6	32.0	33.0	43.5	10.5	200	0
4	237.580	37.3	17.3	1.9	32.0	24.5	46.0	21.5	200	0
5	312.270	32.7	19.4	2.1	32.0	22.2	46.0	23.8	200	66
6	475.231	33.3	22.5	2.7	32.3	26.2	46.0	19.8	200	0
----- Vertical ------										
7	38.730	38.9	17.8	0.7	32.0	25.4	40.0	14.6	200	0
8	71.710	46.2	12.9	0.9	32.1	27.9	40.0	12.1	400	0
9	194.900	40.1	15.9	1.6	32.0	25.6	43.5	17.9	300	348
10	263.770	32.7	18.2	1.9	32.0	20.8	46.0	25.2	200	229
11	312.270	33.9	19.4	2.1	32.0	23.4	46.0	22.6	200	220
12	498.511	34.9	23.1	2.8	32.3	28.5	46.0	17.5	200	0

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11.5 Test data for Below 30 MHz

-. 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)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

11.6 Test data for above 1 GHz

-. 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

-. 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)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

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 °C

Relative humidity : 45 % 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 Date

March 29, 2021 ~ April 13, 2021

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

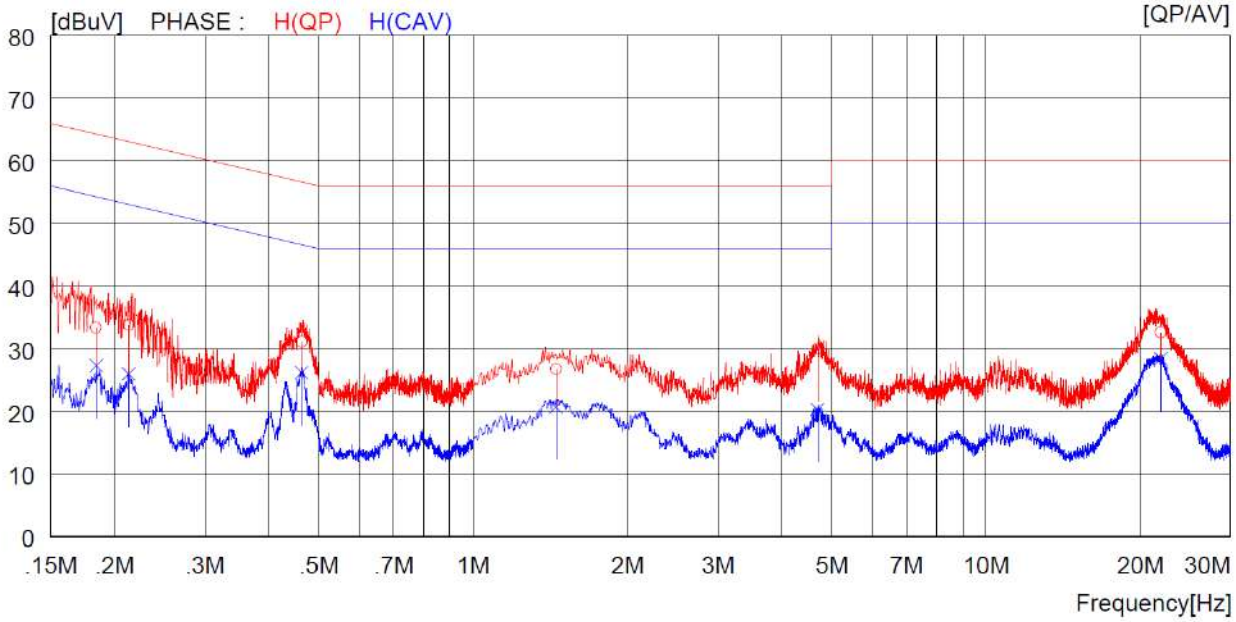
12.4 Test data for WLAN 2.4 GHz

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE

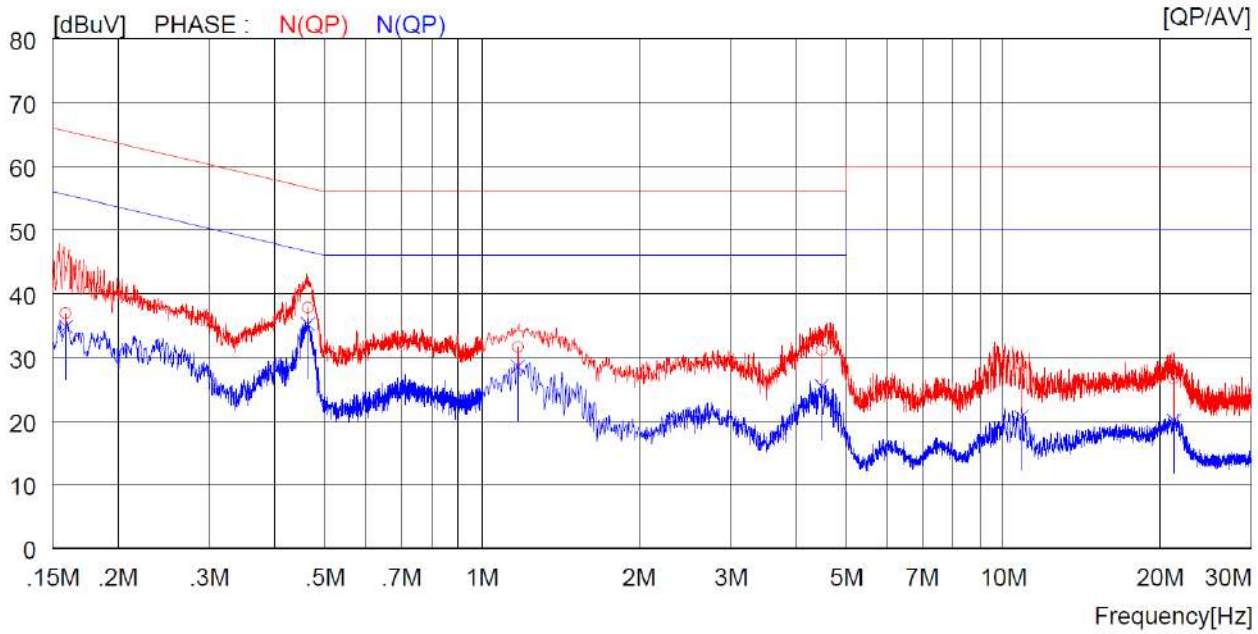
-. Antenna 0, Antenna 1 and Multiple transmit tested, but the worst data were recorded.



NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.18400	23.4	----	10.0	33.4	----	64.3	----	30.9	----	H(QP)
2	0.21300	23.7	----	10.0	33.7	----	63.1	----	29.4	----	H(QP)
3	0.46300	21.1	----	10.0	31.1	----	56.6	----	25.5	----	H(QP)
4	1.45200	16.7	----	10.1	26.8	----	56.0	----	29.2	----	H(QP)
5	4.69600	19.8	----	10.2	30.0	----	56.0	----	26.0	----	H(QP)
6	21.90000	22.2	----	10.4	32.6	----	60.0	----	27.4	----	H(QP)
7	0.18400	----	17.3	10.0	----	27.3	----	54.3	----	27.0	H(CAV)
8	0.21300	----	16.0	10.0	----	26.0	----	53.1	----	27.1	H(CAV)
9	0.46300	----	16.2	10.0	----	26.2	----	46.6	----	20.4	H(CAV)
10	1.45200	----	10.7	10.1	----	20.8	----	46.0	----	25.2	H(CAV)
11	4.69600	----	10.2	10.2	----	20.4	----	46.0	----	25.6	H(CAV)
12	21.90000	----	18.0	10.4	----	28.4	----	50.0	----	21.6	H(CAV)

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

-. 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	0.15900	26.9	----	10.0	36.9	----	65.5	----	28.6	----	N(QP)
2	0.46300	27.8	----	10.0	37.8	----	56.6	----	18.8	----	N(QP)
3	1.17200	21.5	----	10.1	31.6	----	56.0	----	24.4	----	N(QP)
4	4.48800	21.0	----	10.1	31.1	----	56.0	----	24.9	----	N(QP)
5	10.83000	18.7	----	10.2	28.9	----	60.0	----	31.1	----	N(QP)
6	21.26000	16.4	----	10.4	26.8	----	60.0	----	33.2	----	N(QP)
7	0.15900	----	24.8	10.0	----	34.8	----	55.5	----	20.7	N(CAV)
8	0.46300	----	25.2	10.0	----	35.2	----	46.6	----	11.4	N(CAV)
9	1.17200	----	18.4	10.1	----	28.5	----	46.0	----	17.5	N(CAV)
10	4.48800	----	15.4	10.1	----	25.5	----	46.0	----	20.5	N(CAV)
11	10.83000	----	10.5	10.2	----	20.7	----	50.0	----	29.3	N(CAV)
12	21.26000	----	9.7	10.4	----	20.1	----	50.0	----	29.9	N(CAV)

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

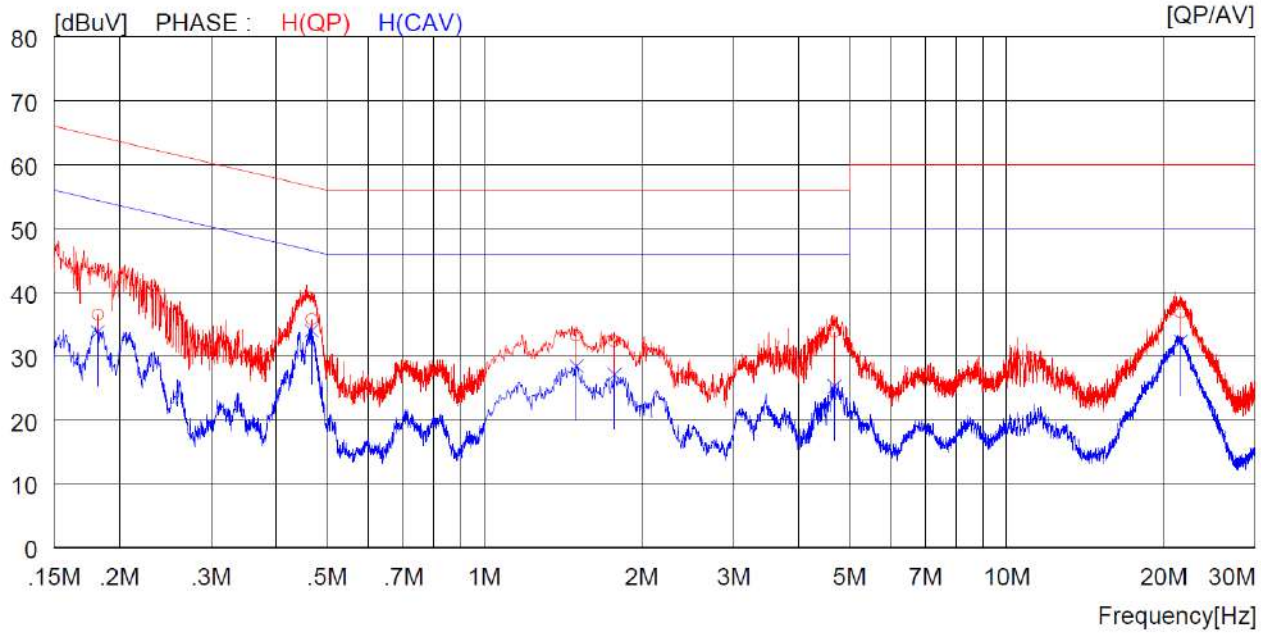
The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

12.5 Test data for Intermodulation Mode(WLAN 2.4 GHz + WLAN 5 GHz)

-. Resolution bandwidth : 9 kHz

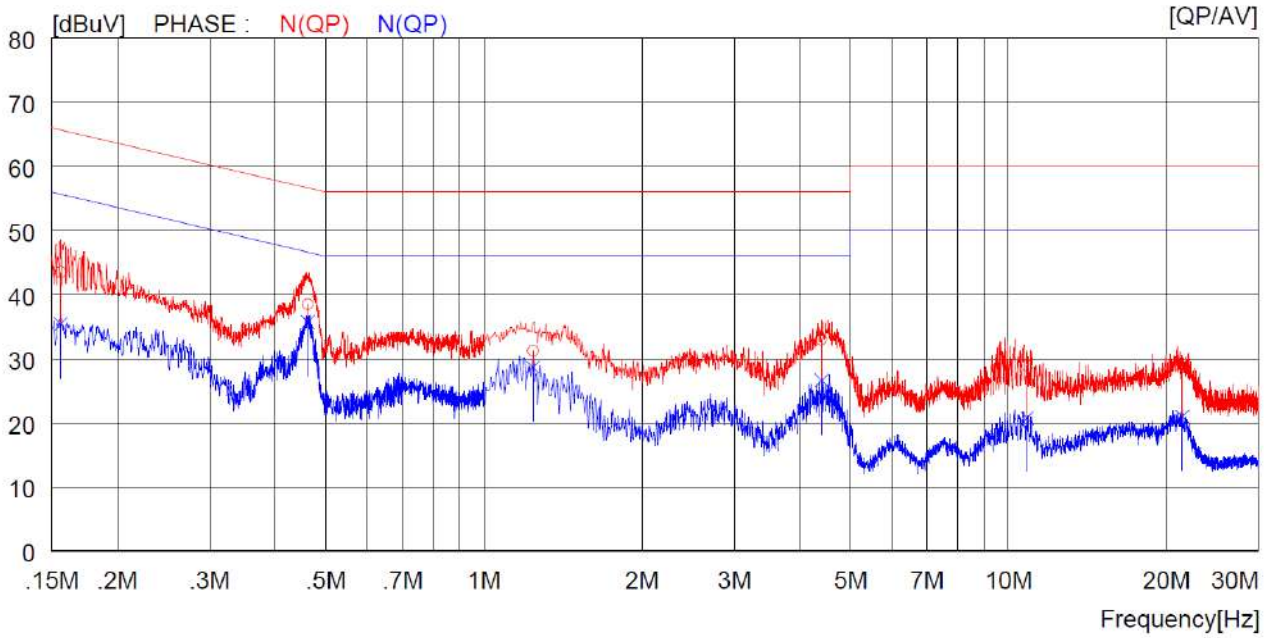
-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.18200	26.5	----	10.0	36.5	----	64.4	----	27.9	----	H(QP)
2	0.46700	25.8	----	10.0	35.8	----	56.6	----	20.8	----	H(QP)
3	1.50000	23.1	----	10.1	33.2	----	56.0	----	22.8	----	H(QP)
4	1.77600	22.2	----	10.1	32.3	----	56.0	----	23.7	----	H(QP)
5	4.68800	23.5	----	10.2	33.7	----	56.0	----	22.3	----	H(QP)
6	21.57000	26.4	----	10.4	36.8	----	60.0	----	23.2	----	H(QP)
7	0.18200	----	23.8	10.0	----	33.8	----	54.4	----	20.6	H(CAV)
8	0.46700	----	24.0	10.0	----	34.0	----	46.6	----	12.6	H(CAV)
9	1.50000	----	18.3	10.1	----	28.4	----	46.0	----	17.6	H(CAV)
10	1.77600	----	17.0	10.1	----	27.1	----	46.0	----	18.9	H(CAV)
11	4.68800	----	15.1	10.2	----	25.3	----	46.0	----	20.7	H(CAV)
12	21.57000	----	21.9	10.4	----	32.3	----	50.0	----	17.7	H(CAV)

-. Tested Line : NEUTRAL LINE



NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15600	33.4	----	10.0	43.4	----	65.7	----	22.3	----	N(QP)
2	0.46200	28.5	----	10.0	38.5	----	56.7	----	18.2	----	N(QP)
3	1.24000	21.1	----	10.1	31.2	----	56.0	----	24.8	----	N(QP)
4	4.40400	22.9	----	10.1	33.0	----	56.0	----	23.0	----	N(QP)
5	10.85000	18.7	----	10.2	28.9	----	60.0	----	31.1	----	N(QP)
6	21.44000	18.2	----	10.4	28.6	----	60.0	----	31.4	----	N(QP)
7	0.15600	----	25.4	10.0	----	35.4	----	55.7	----	20.3	N(CAV)
8	0.46200	----	25.7	10.0	----	35.7	----	46.7	----	11.0	N(CAV)
9	1.24000	----	18.6	10.1	----	28.7	----	46.0	----	17.3	N(CAV)
10	4.40400	----	16.5	10.1	----	26.6	----	46.0	----	19.4	N(CAV)
11	10.85000	----	10.6	10.2	----	20.8	----	50.0	----	29.2	N(CAV)
12	21.44000	----	10.6	10.4	----	21.0	----	50.0	----	29.0	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.

13. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102177	Apr. 16, 2021 (1Y)
FSW43	Rohde & Schwarz	Signal Analyzer	104544	Jul. 15, 2020 (1Y)
ESW	Rohde & Schwarz	EMI Test Receiver	101851	Mar. 23, 2021 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 16, 2020 (1Y)
PAM-118A	Com-Power	Pre-Amplifier	18040081	Oct. 12, 2020 (1Y)
PAM-840A	Com-Power	Pre-Amplifier	461339	Oct. 16, 2020 (1Y)
DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 24, 2020 (2Y)
HLP-2008	TDK	Hybrid Antenna	131316	Feb. 27, 2020 (2Y)
AH-118	Com-Power	Horn Antenna	10050061	Oct. 15, 2020 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 07, 2021(1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter (1-3 GHz)	N/A	Feb. 08, 2021 (1Y)
10 dB Attenuator	Rohde & Schwarz	10 dB Attenuator	14100882-6	Jul. 15, 2020 (1Y)
ESCI	Rohde & Schwarz	EMI TEST RECEIVER	101012	Oct. 19, 2020 (1Y)
NSLK8128	Schwarzbeck	AMN	8218-216	Oct. 19, 2020 (1Y)
ESH3-Z2	Rohde & Schwarz	PULSE LIMITER	100655	Mar. 15, 2021 (1Y)

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