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

Test Report No. : **OT-201-RWD-044**

AGR No. : **A19DA-403**

Applicant : **Homecast CO., LTD.**

Address : **14F, Doosan Bldg, 726, Eonju-ro, Gangnam-gu, Seoul, South Korea**

Manufacturer : **Homecast CO., LTD.**

Address : **14F, Doosan Bldg, 726, Eonju-ro, Gangnam-gu, Seoul, South Korea**

Type of Equipment : **OTT BOX**

FCC ID. : **2AVNC-NUI-7050**

Model Name : **NUI-7050**

Multiple Model Name : **N/A**

Serial number : **N/A**

Total page of Report : **145 pages (including this page)**

Date of Incoming : **January 03, 2020**

Date of issue : **January 31, 2020**

SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART C Section 15.247***

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by: Tae-Ho, Kim / Senior Manager, ONETECH Corp.

Approved by: Ki-Hong, Nam / General Manager, ONETECH Corp.

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

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

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-201-RWD-044	January 31, 2020	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

Applicant	: Homecast CO., LTD.
Address	: 14F, Doosan Bldg, 726, Eonju-ro, Gangnam-gu, Seoul, South Korea
Contact Person	: Seoung-Hyun LEE / Deputy General Manager
Telephone No.	: +82-2-3400-8475
FCC ID	: 2AVNC-NUI-7050
Model Name	: NUI-7050
Serial Number	: N/A
Date	: January 31, 2020

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	OTT BOX
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 558074 D01 15.247 Meas Guidance v05r02 662911 D01 Multiple Transmitter Output v02r01
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	Met requirement / PASS

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.247.

2.5 Test Methodology

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

2.6 Test Facility

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

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

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-14617/ G-10666 / T-1842

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

-. Site Accreditation:

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

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. GENERAL INFORMATION

3.1 Product Description

The Homecast CO., LTD., Model NUI-7050 (referred to as the EUT in this report) is a OTT BOX. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	OTT BOX	
Operating Frequency	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20)) 2 422 MHz ~ 2 452 MHz (802.11n(HT40))	
RF Output Power	Antenna 0	Wi-Fi 802.11b (12.91 dBm) Wi-Fi 802.11g (11.46 dBm) Wi-Fi 802.11n(HT20) (5.62 dBm) Wi-Fi 802.11n(HT40) (2.85 dBm)
	Antenna 1	Wi-Fi 802.11b (13.10 dBm) Wi-Fi 802.11g (11.83 dBm) Wi-Fi 802.11n(HT20) (5.75 dBm) Wi-Fi 802.11n(HT40) (3.74 dBm)
	Antenna 0 + Antenna 1	Wi-Fi 802.11n(HT20) (8.70 dBm) Wi-Fi 802.11n(HT40) (6.33 dBm)
Modulation Type	DSSS Modulation(DBPSK/DQPSK/CCK) OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
Temperature Range	0 °C ~ 50 °C	
Antenna Type	PCB Antenna	
Antenna Gain	3.50 dBi	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	40 MHz, 54 MHz	

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

-. None

4. EUT MODIFICATIONS

-. None

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5. SYSTEM TEST CONFIGURATION

5.1 Justification

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

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	Homecast CO., LTD.	UI-7050 Rev1.0	-

5.2 Peripheral equipment

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

Model	Manufacturer	Description	Connected to
NUI-7050	Homecast CO., LTD.	OTT BOX (EUT)	-
N/A	N/A	Jig Board	EUT
HP ProtechSmart	HP	Notebook PC	-
PPP009C	HP	AC Adatper	
NBS18C120150HU	ChungKwangTech inc.	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.

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 0	Antenna 1
802.11 b (Middle Channel)	1 Mbps	12.27	12.96
	2 Mbps	12.25	12.93
	5.5 Mbps	12.19	12.86
	11 Mbps	12.11	12.80
802.11g (Middle Channel)	6 Mbps	10.93	11.79
	9 Mbps	10.90	11.76
	12 Mbps	10.84	11.72
	18 Mbps	10.80	11.69
	24 Mbps	10.77	11.61
	36 Mbps	10.72	11.59
	48 Mbps	10.70	10.55
	54 Mbps	10.66	10.52
HT 20 (Middle Channel)	6.5 Mbps	5.09	5.70
	13 Mbps	5.05	5.64
	19.5 Mbps	4.97	5.60
	26 Mbps	4.93	5.57
	39 Mbps	4.90	5.51
	52 Mbps	4.85	5.47
	58.5 Mbps	4.82	5.42
	65 Mbps	4.79	5.37
HT 40 (Middle Channel)	13.5 Mbps	2.81	3.54
	27 Mbps	2.79	3.51
	40.5 Mbps	2.72	3.47
	54 Mbps	2.70	3.43
	81 Mbps	2.67	3.40
	108 Mbps	2.65	3.46
	121.5 Mbps	2.60	3.44
	135 Mbps	2.56	3.39

-. 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, 13.5 Mbps(Ant.0/Ant.1) for HT40.

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

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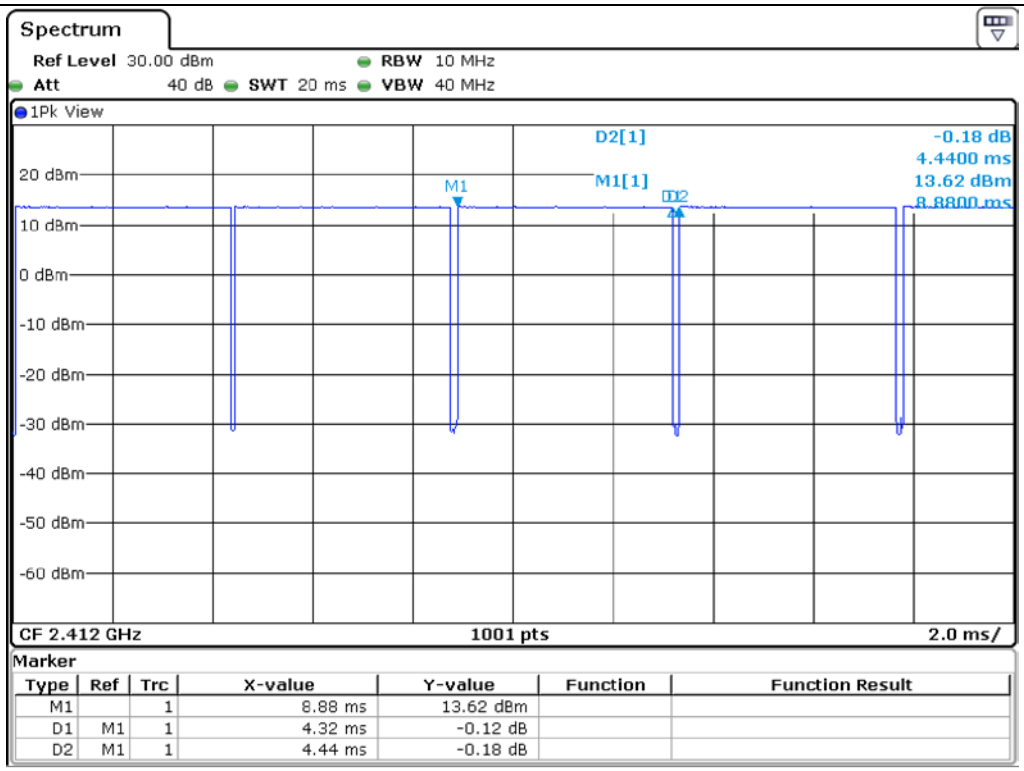
-. Duty Cycle

Mode	Duty Cycle [%]	Correction Factor [dB]
802.11 b	97.30	0.12
802.11 g	95.55	0.20
802.11 n(HT20)	88.51	0.53
802.11 n(HT40)	93.48	0.29

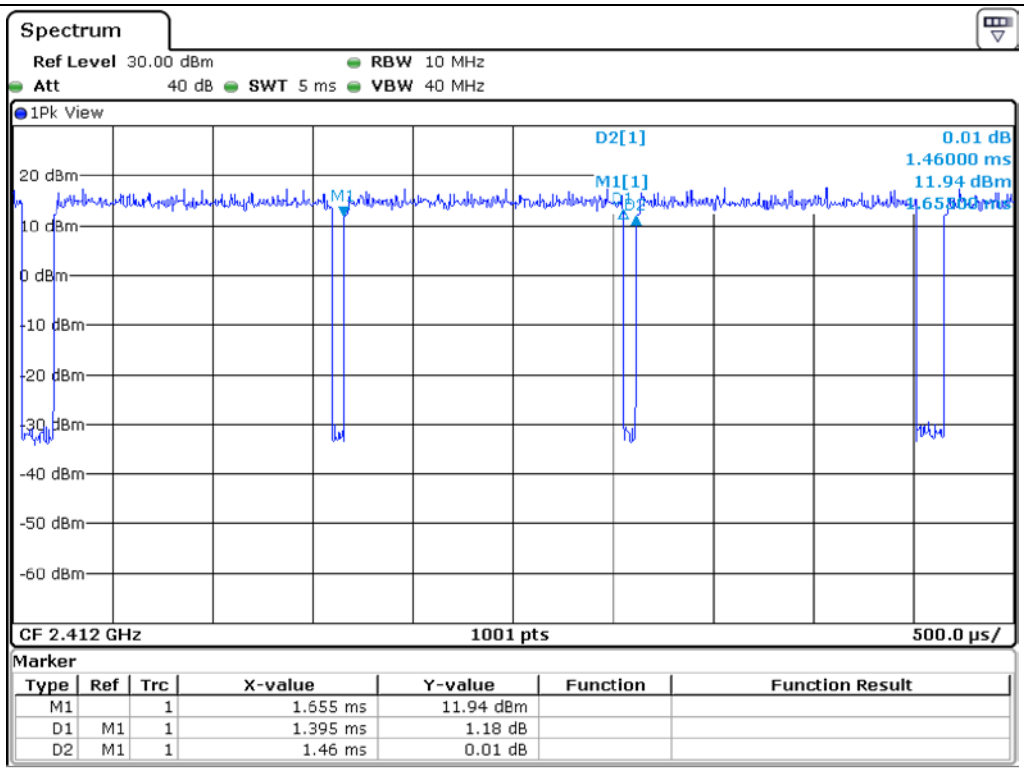
Note – Duty Cycle : (Tx On Time / (Tx On Time + Tx Off Time)) * 100

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

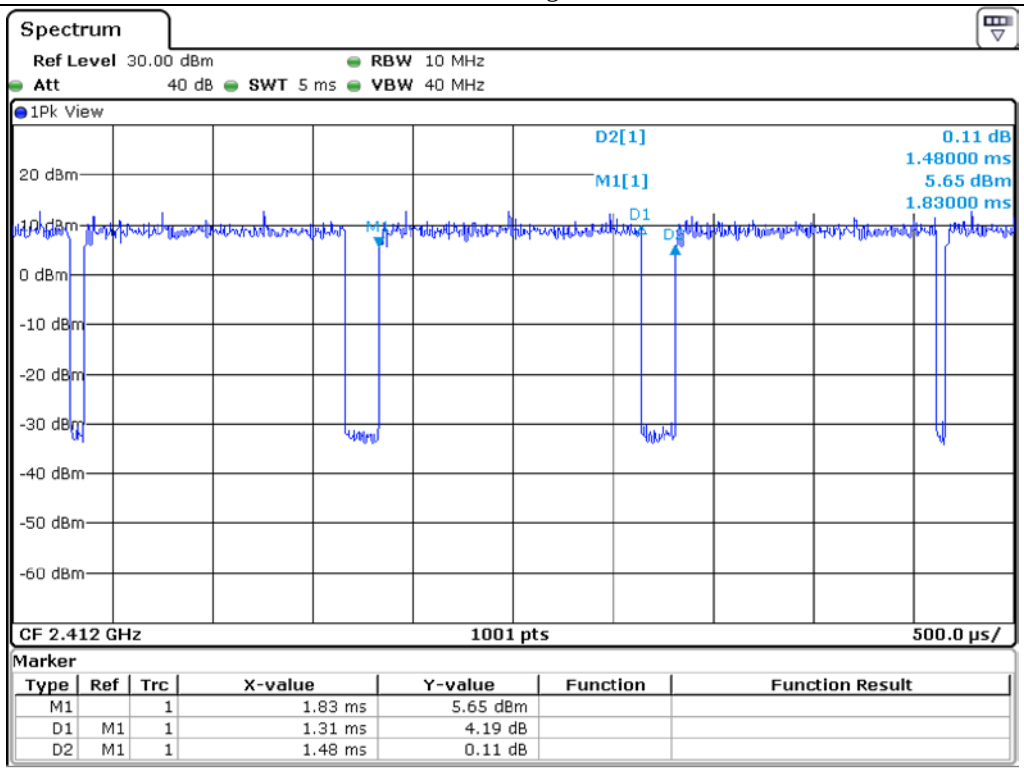
-. Test Plot



802.11 b



802.11 g



802.11 n(HT20)

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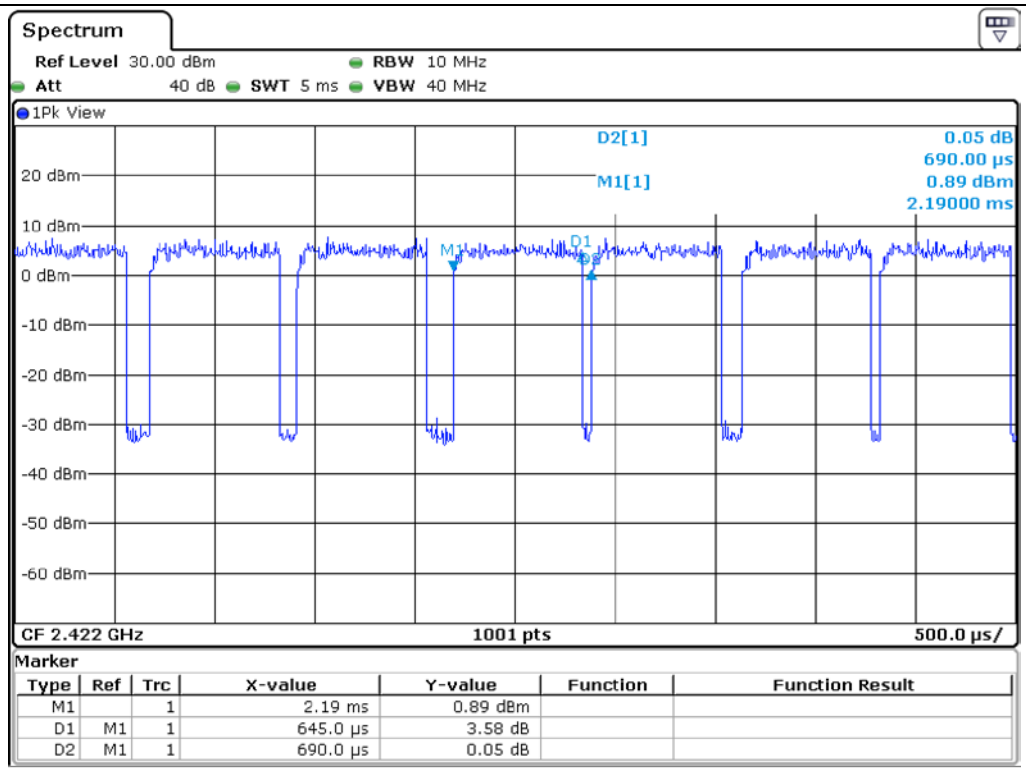
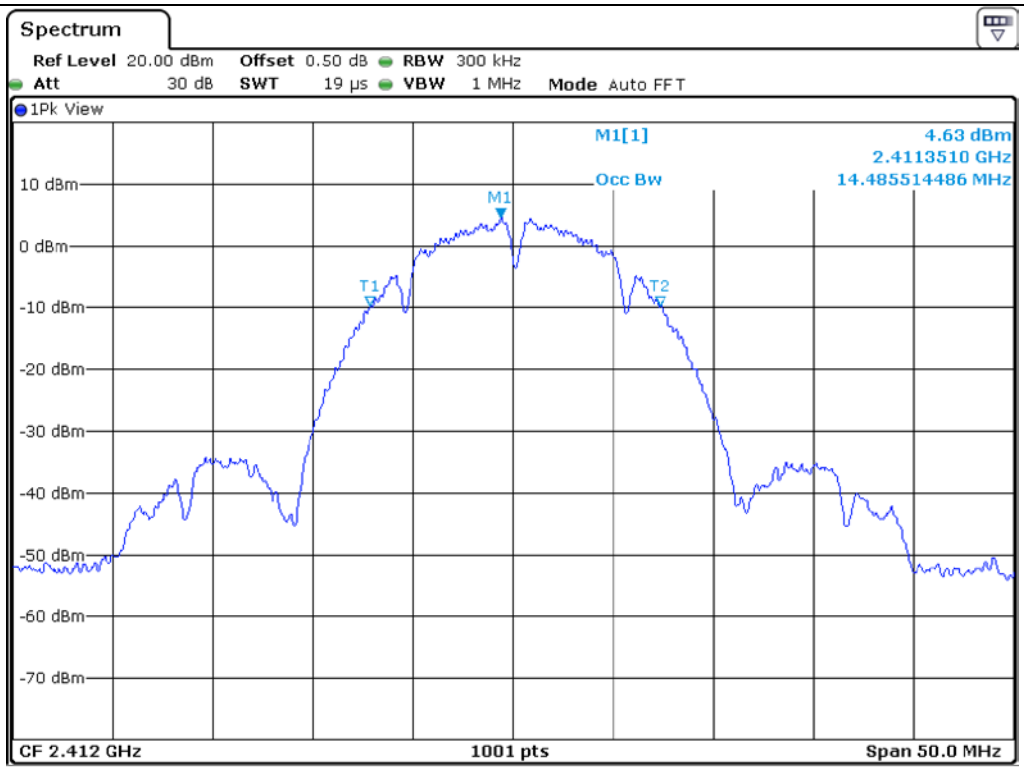

Spectrum
Ref Level 30.00 dBm
RBW 10 MHz
Att 40 dB
SWT 5 ms
VBW 40 MHz
1Pk View
D2[1]
0.05 dB
690.00 µs
M1[1]
0.89 dBm
2.19000 ms
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.422 GHz
1001 pts
500.0 µs/
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.19 ms 0.89 dBm
D1 M1 1 645.0 µs 3.58 dB
D2 M1 1 690.0 µs 0.05 dB

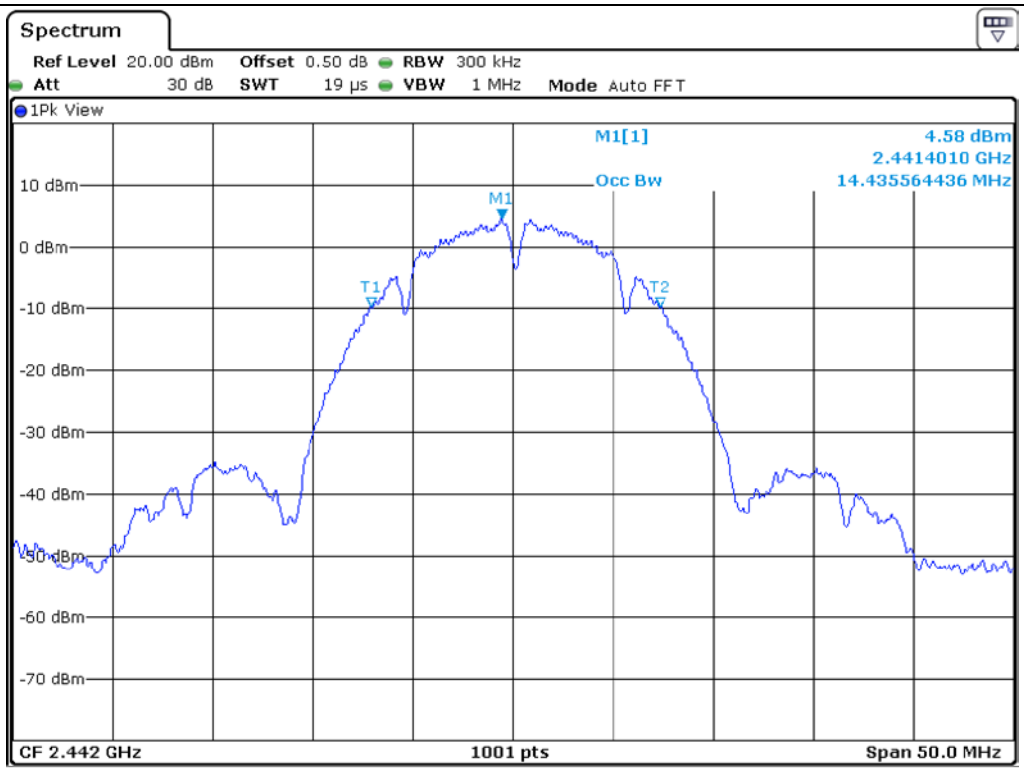
802.11 n(HT40)

-. Occupied Bandwidth(99 %) for Antenna 0

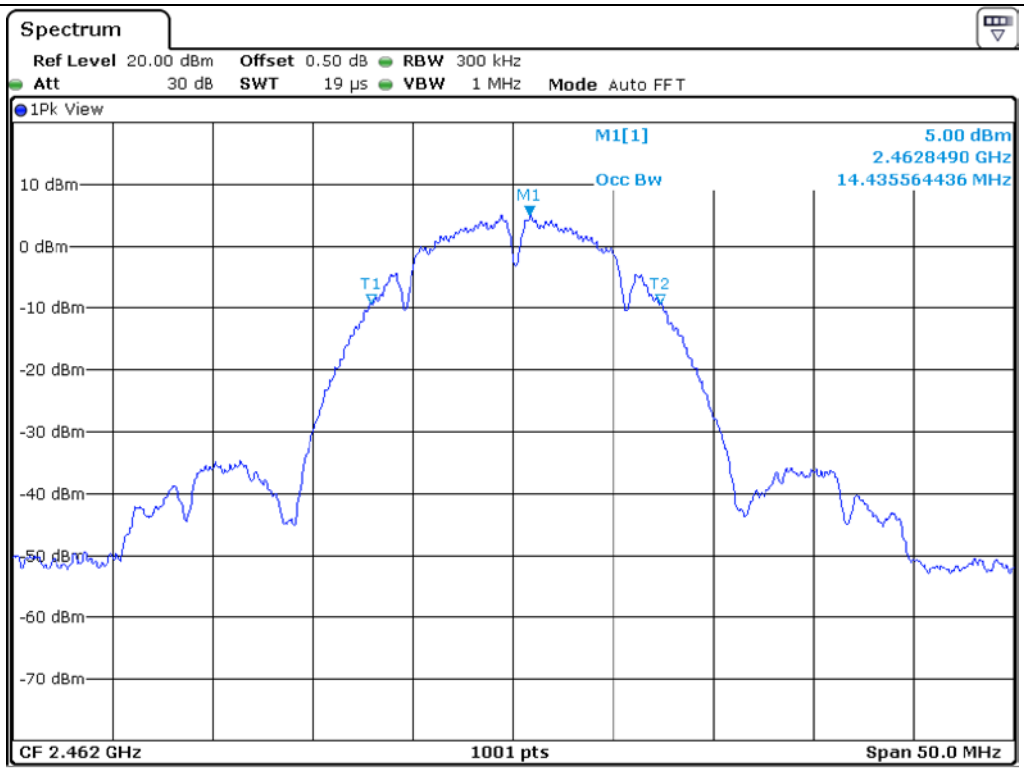
Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 b	Low	2 412	9.54
	Middle	2 442	9.54
	High	2 462	9.54



Low Channel

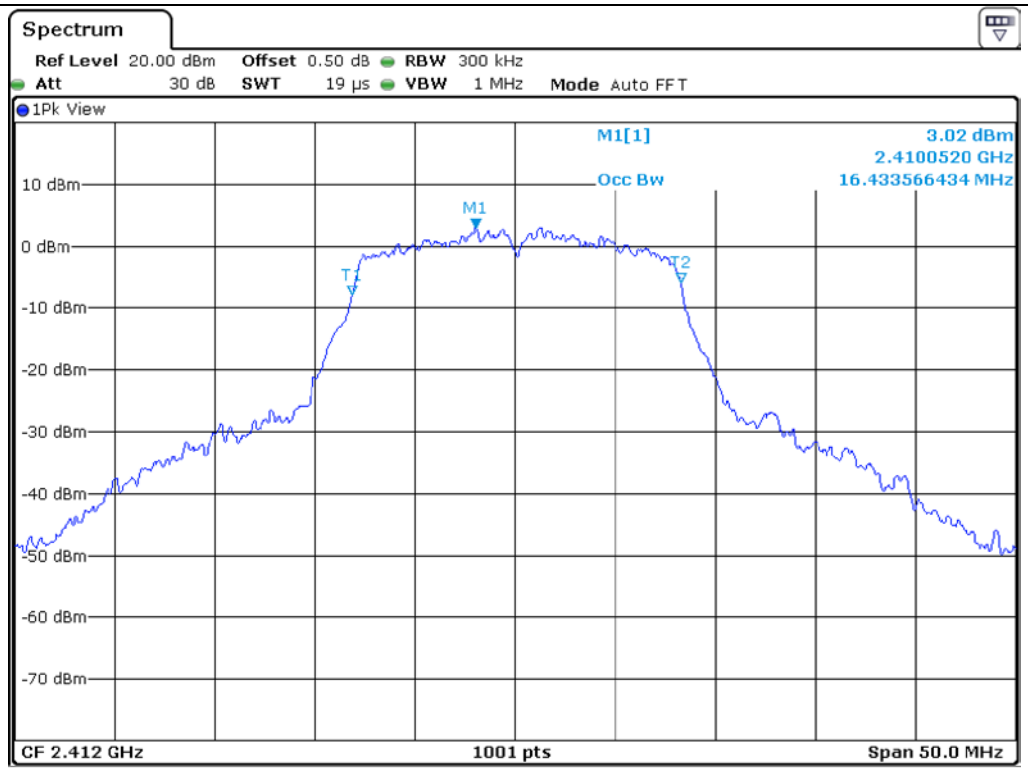


Middle Channel

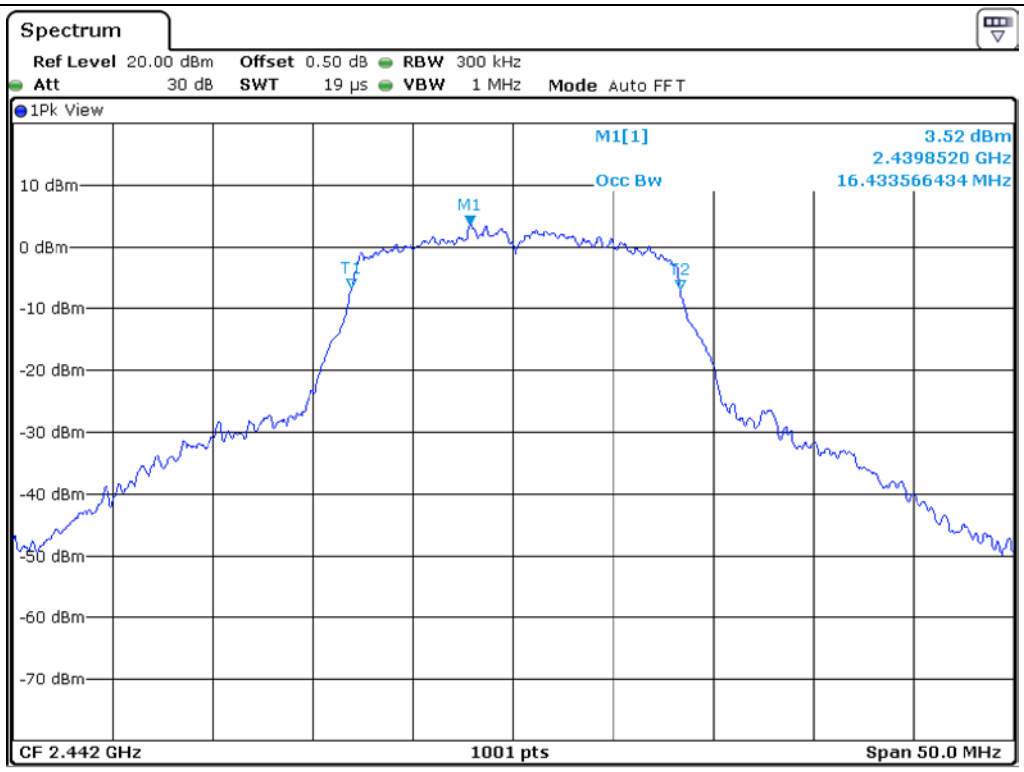


High Channel

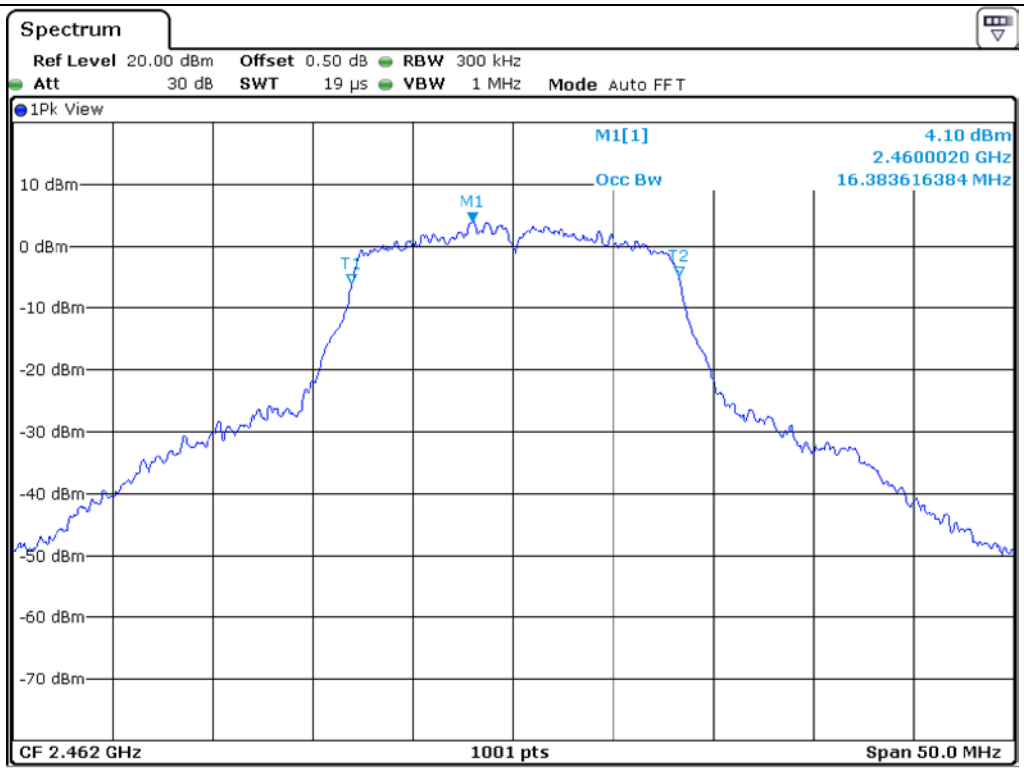
Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 g	Low	2 412	14.64
	Middle	2 442	14.64
	High	2 462	14.64



Low Channel

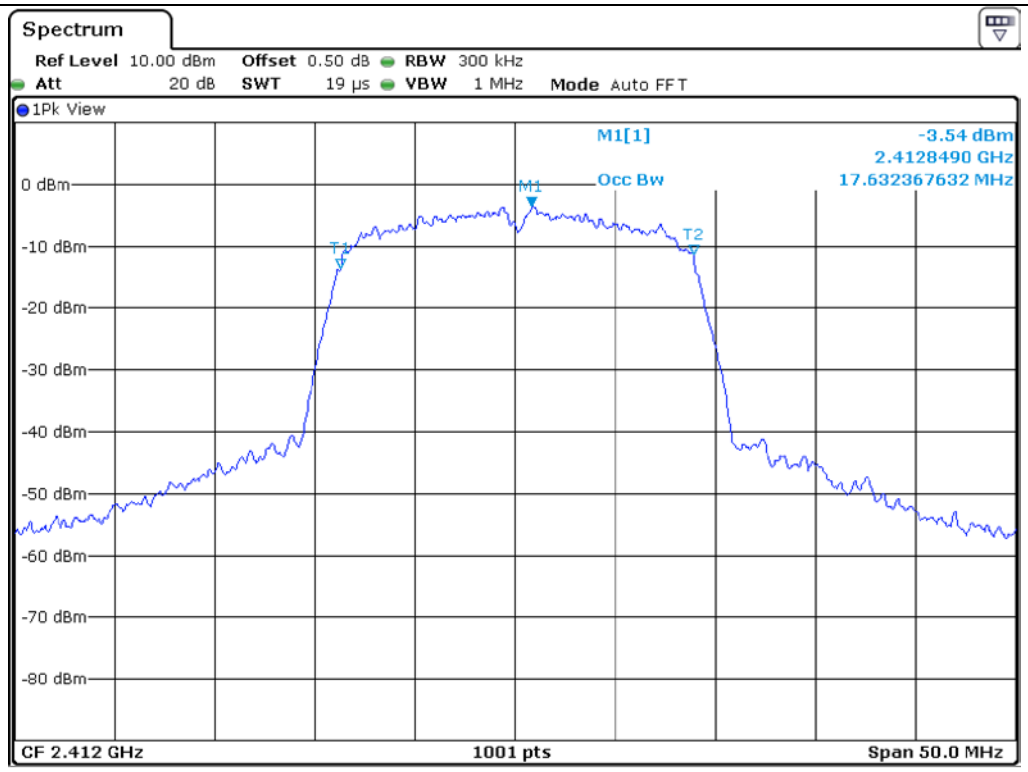


Middle Channel



High Channel

Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 n(HT 20)	Low	2 412	14.54
	Middle	2 442	14.64
	High	2 462	14.64



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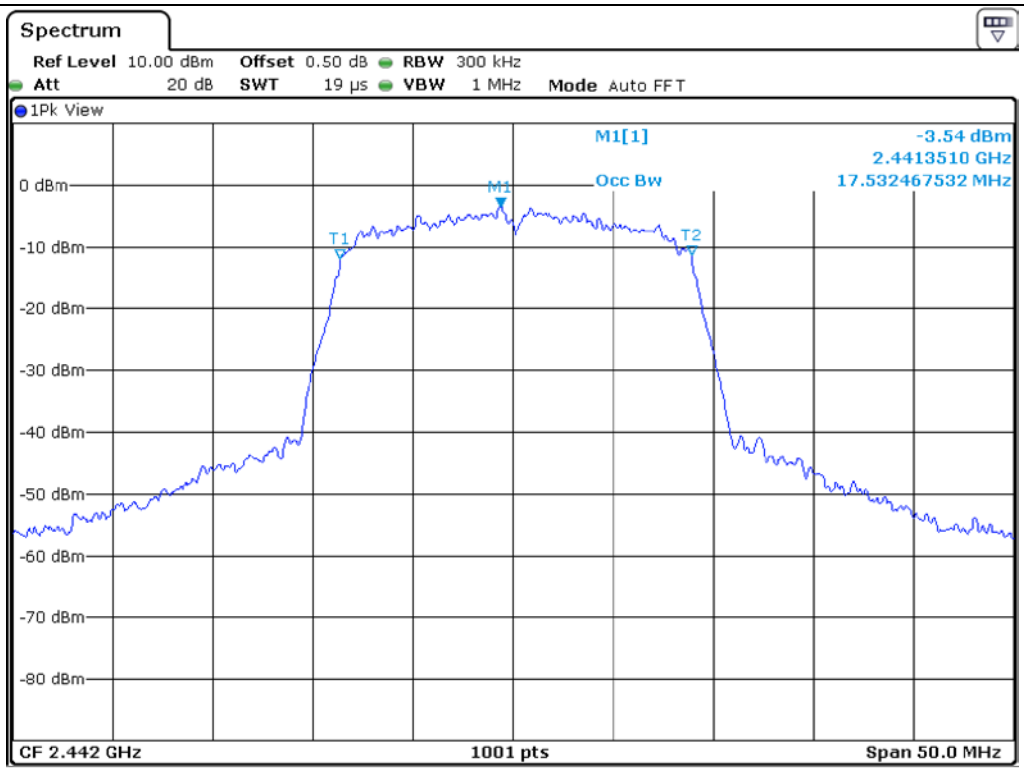

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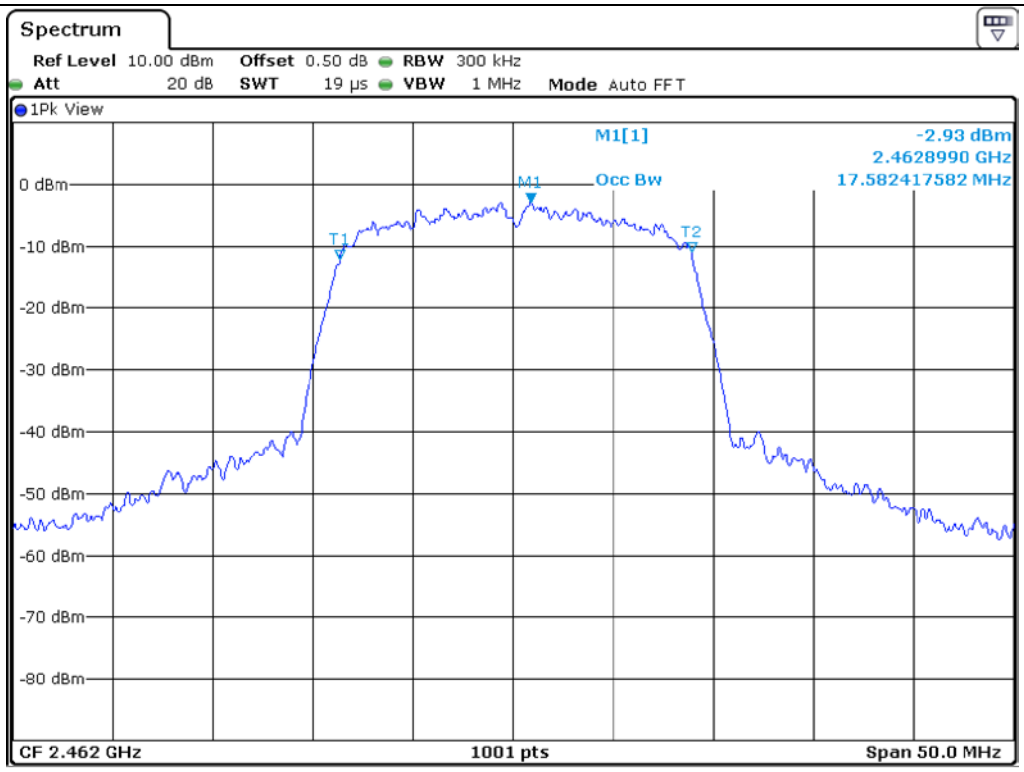
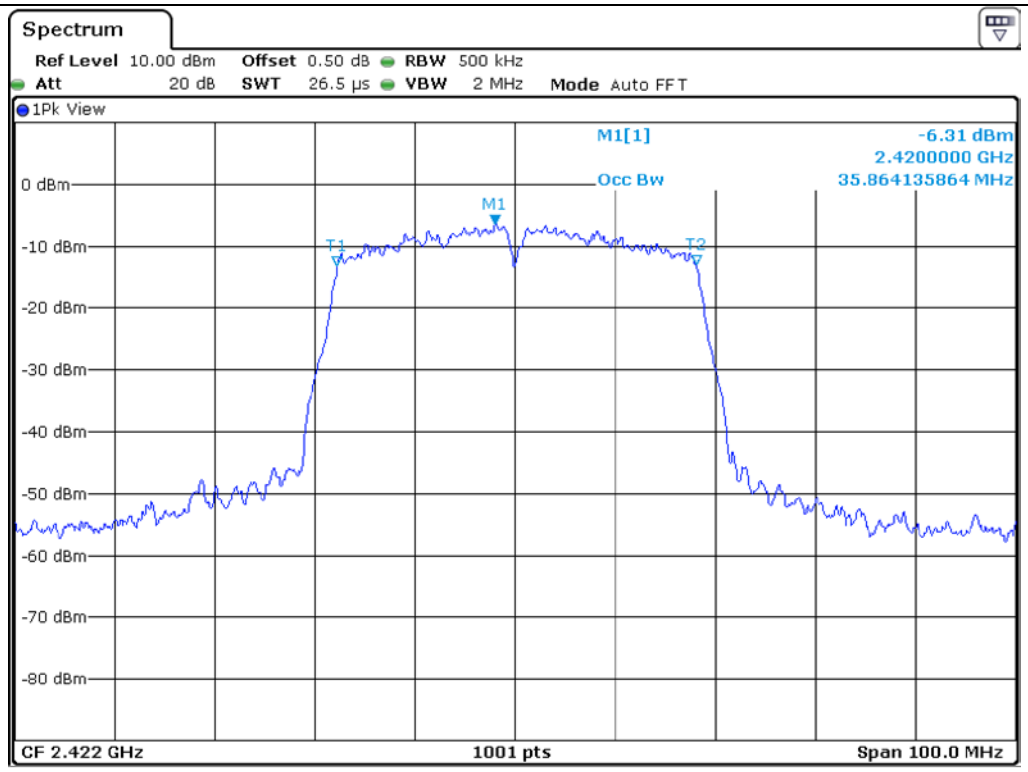


High Channel

Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 n(HT 40)	Low	2 422	34.56
	Middle	2 442	34.56
	High	2 452	34.56



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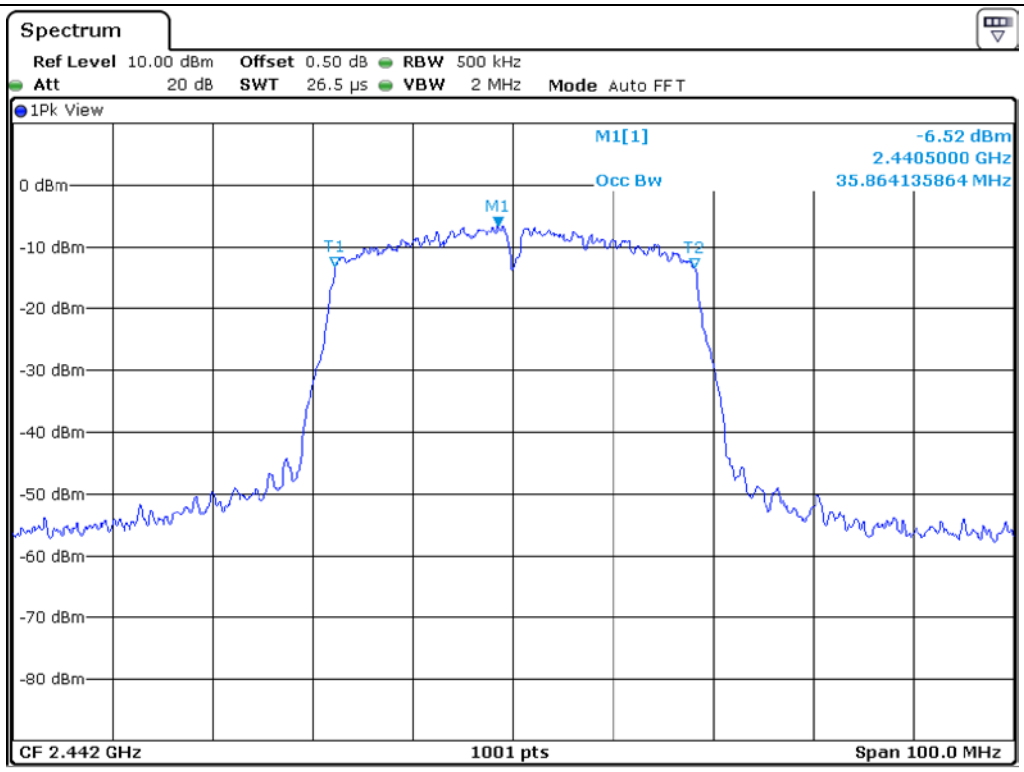
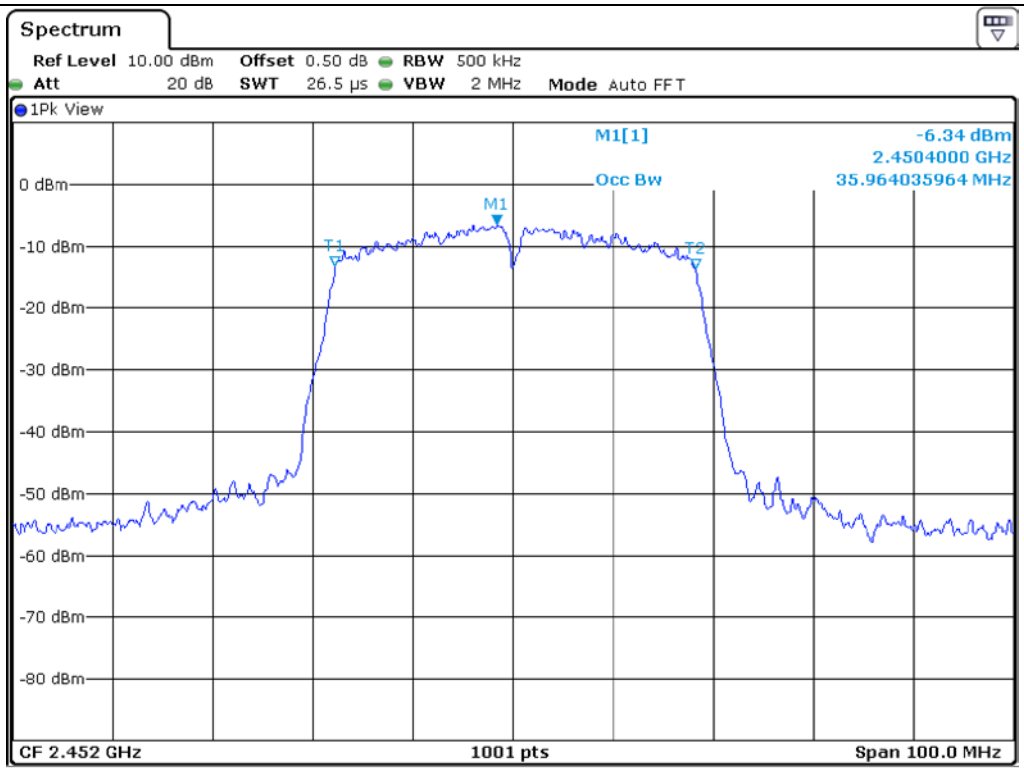


Middle Channel



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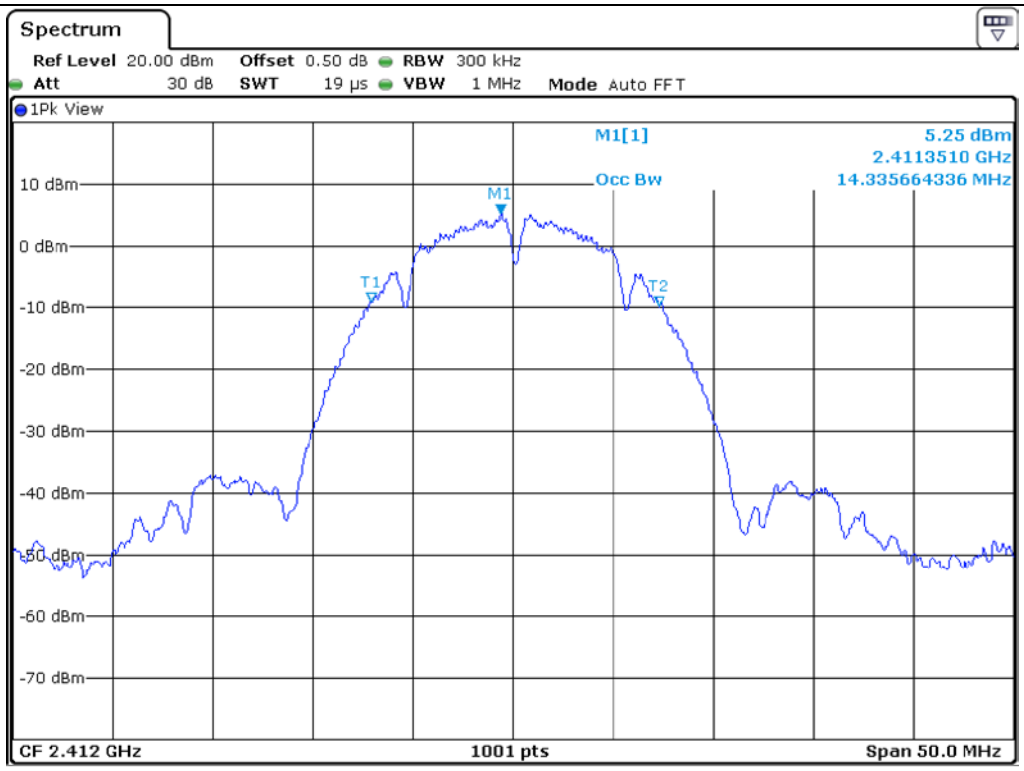
-. Occupied Bandwidth(99 %) for Antenna 1

Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 b	Low	2 412	9.54
	Middle	2 442	9.54
	High	2 462	9.54



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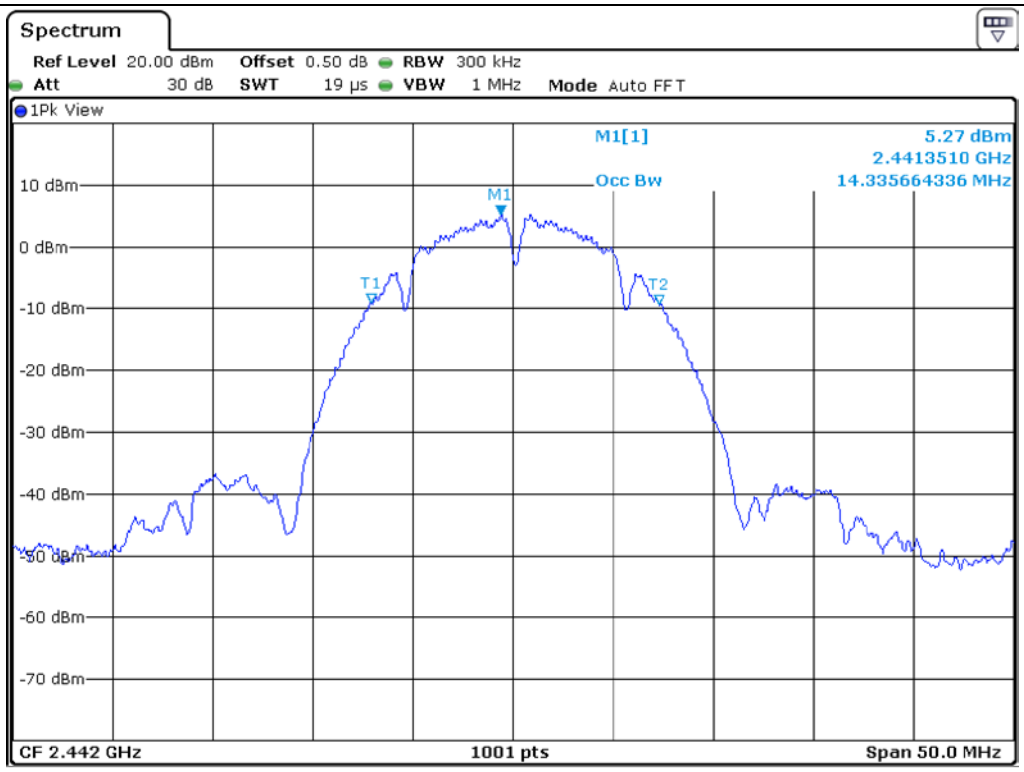
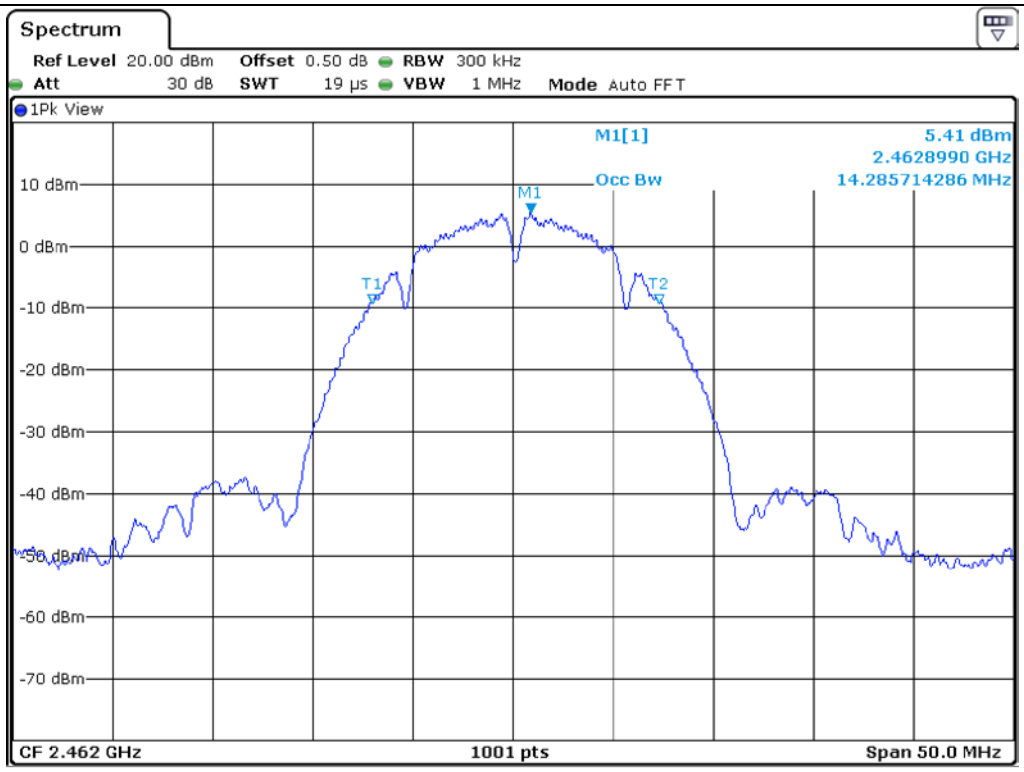
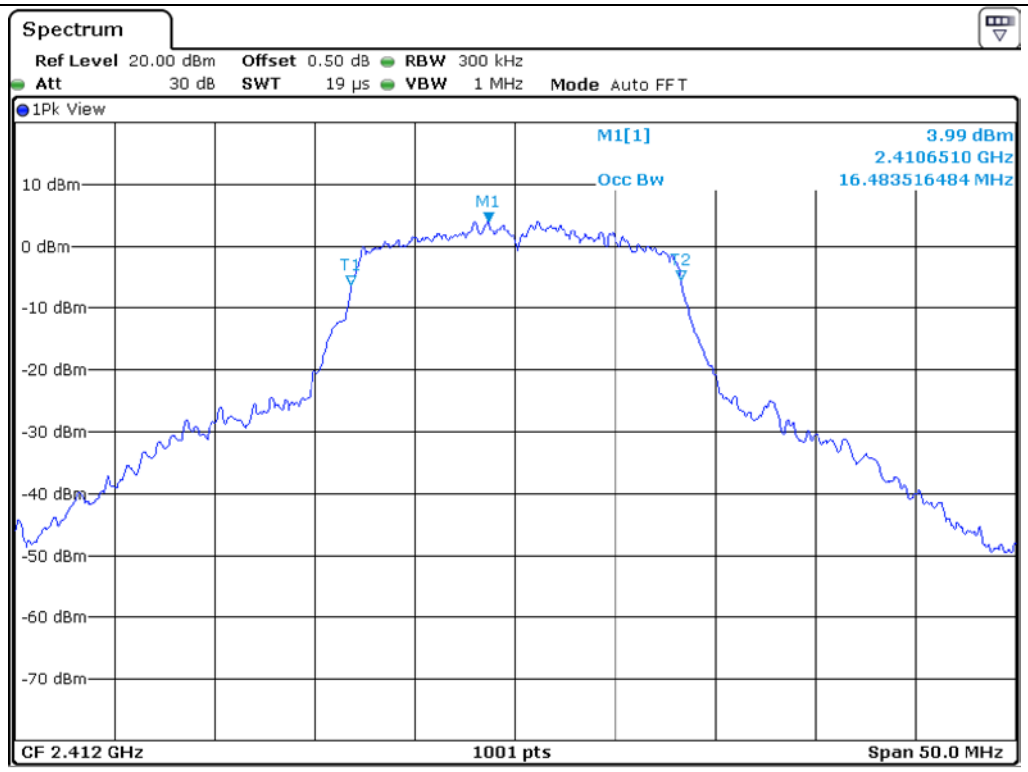


Middle Channel



High Channel

Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 g	Low	2 412	14.64
	Middle	2 442	14.64
	High	2 462	14.64



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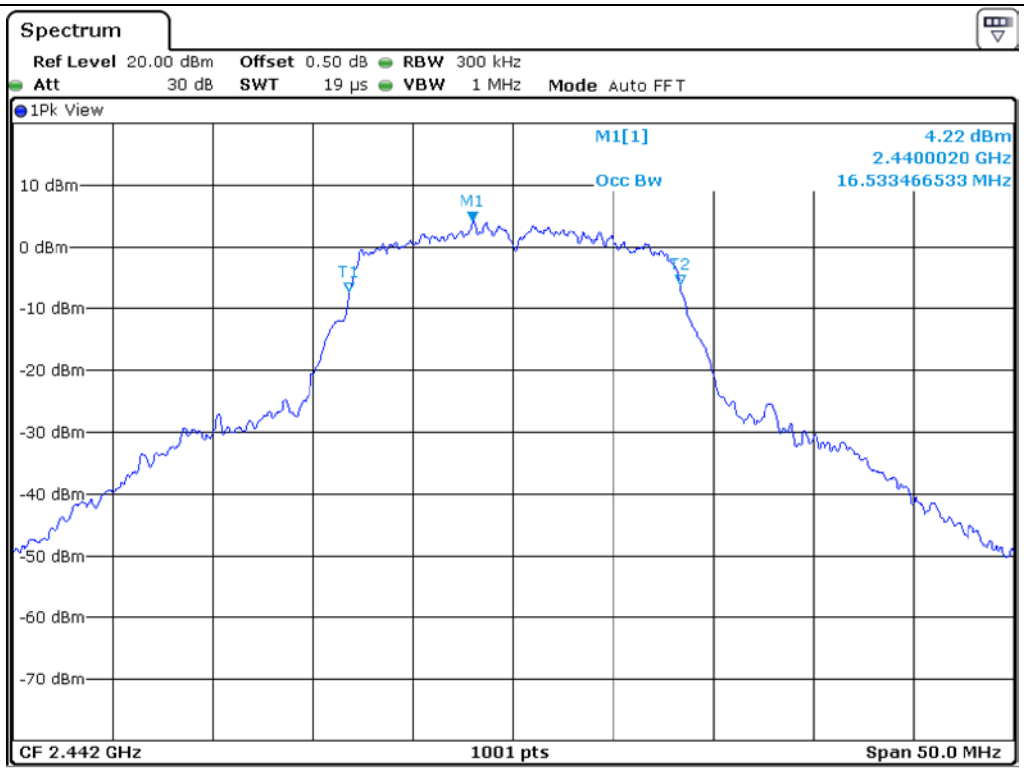

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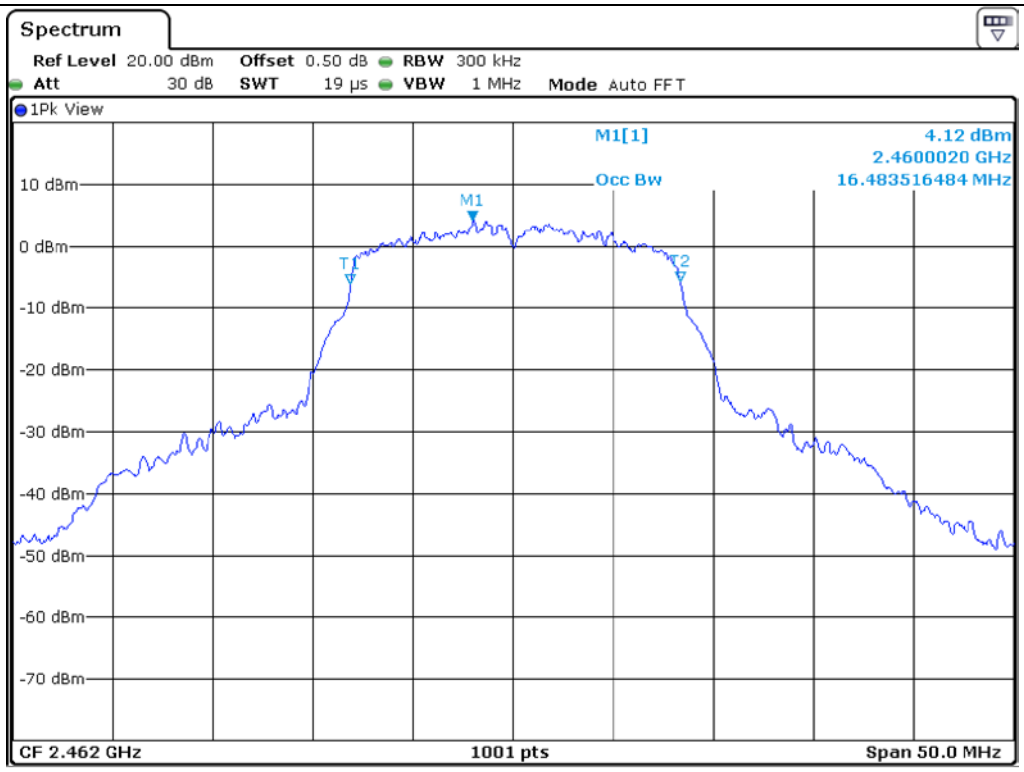
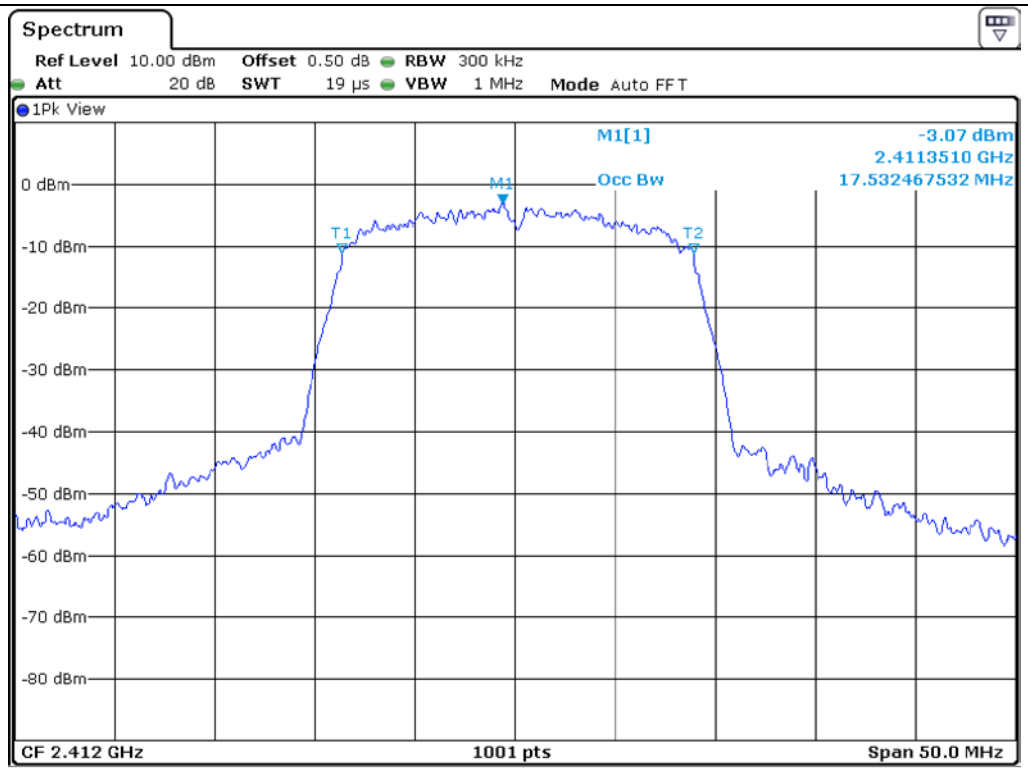
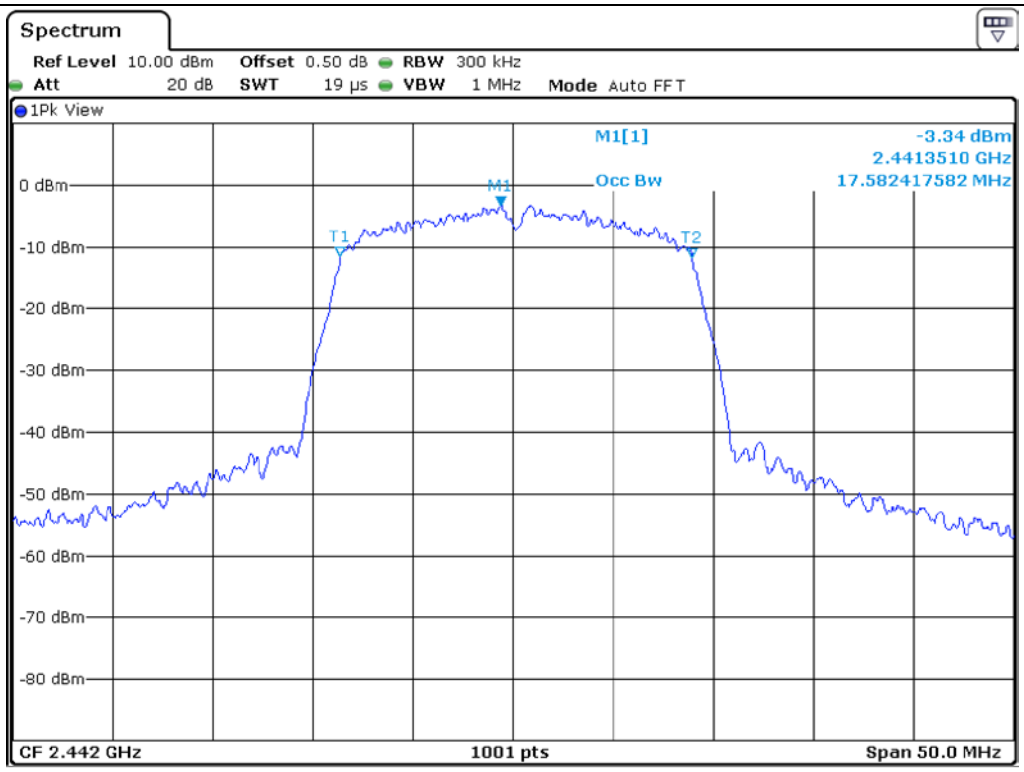


High Channel

Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 n(HT 20)	Low	2 412	14.59
	Middle	2 442	14.64
	High	2 462	14.64



Low Channel



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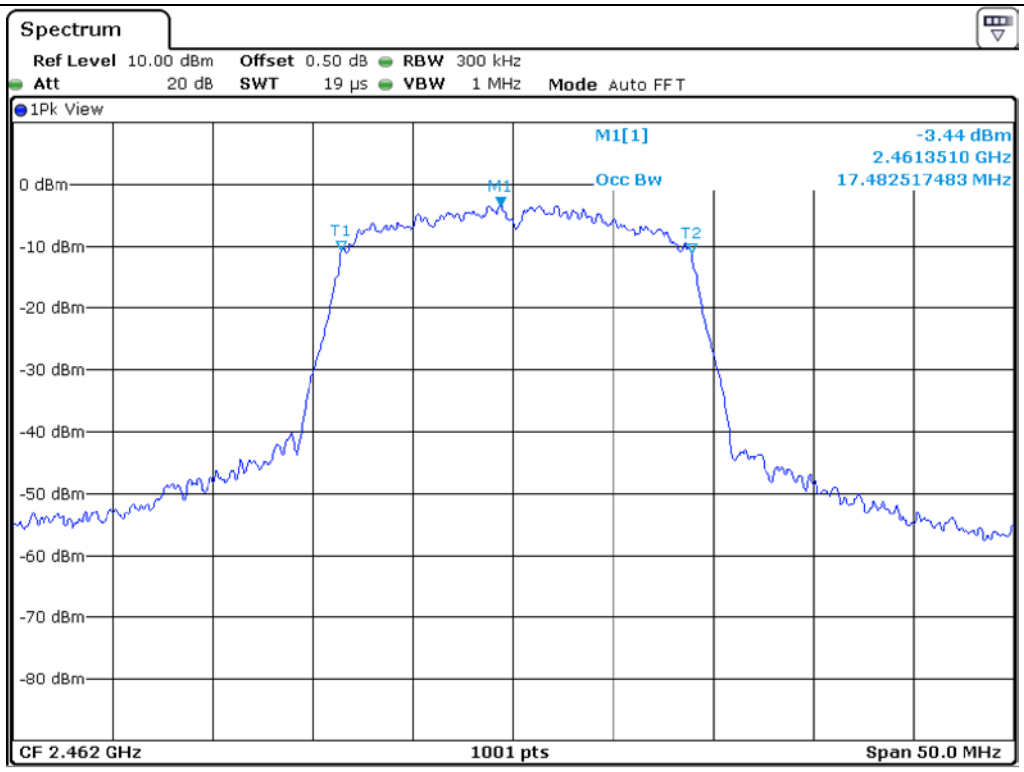
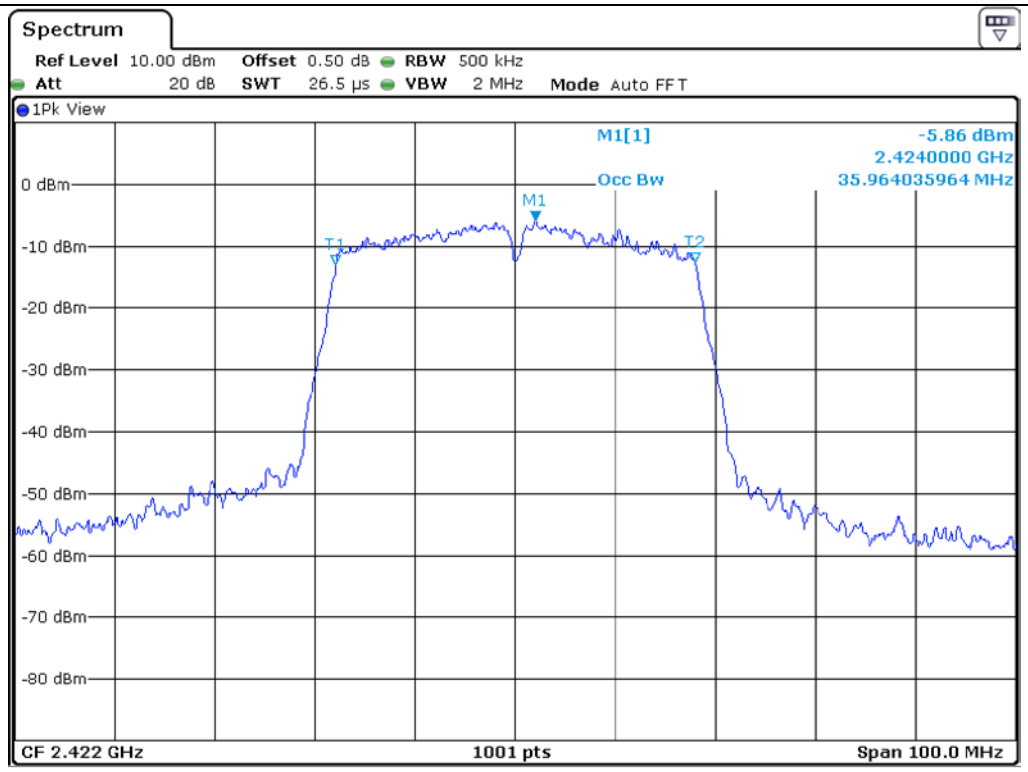


High Channel

Modulation	CHANNEL	FREQUENCY (MHz)	Occupied Bandwidth(MHz)
802.11 n(HT 40)	Low	2 422	34.56
	Middle	2 442	34.56
	High	2 452	34.56



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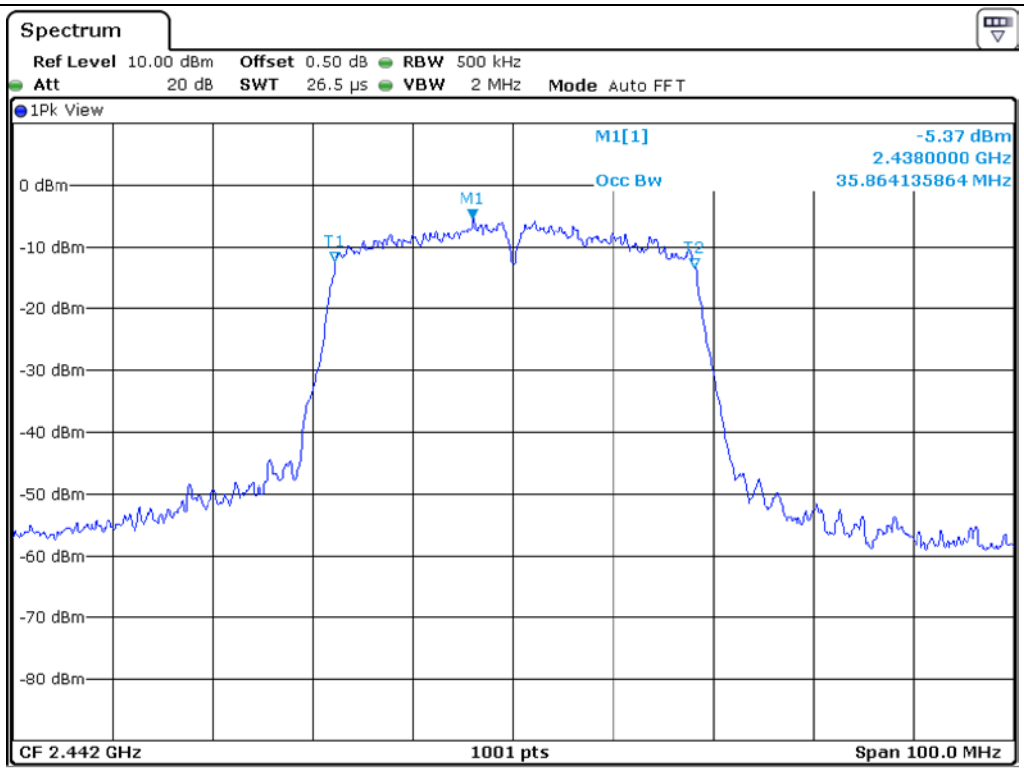

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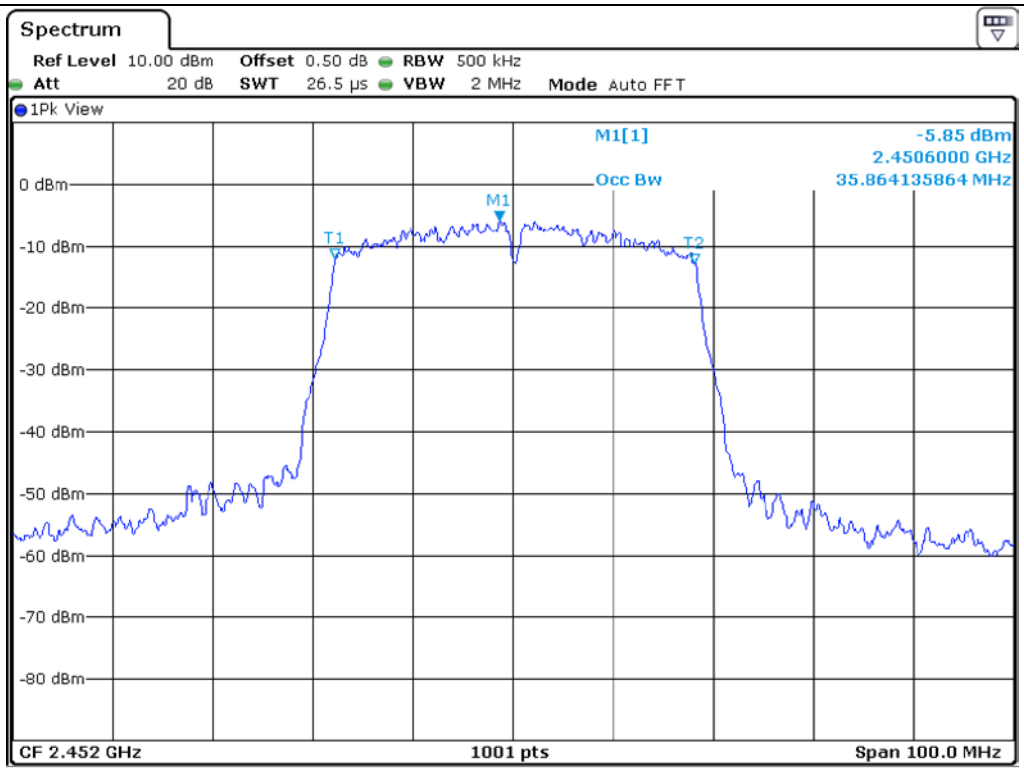

High Channel

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5.4 Configuration of Test System

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

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 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(Antenna 0, Antenna 1) on the main board in the EUT, so no consideration of replacement by the user.

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6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

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

6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

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

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7. MIMIMUM 6 dB BANDWIDTH

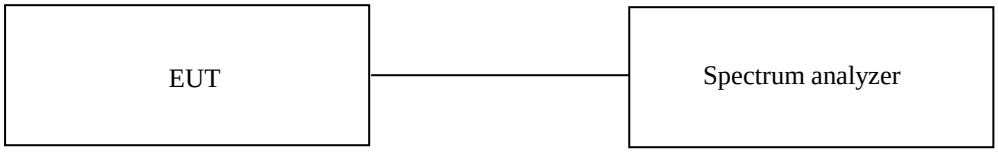
7.1 Operating environment

Temperature : 23 °C

Relative humidity : 41 % R.H.

7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

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

7.4 Test data for 802.11b WLAN Mode

7.4.1 Test data for Antenna 0

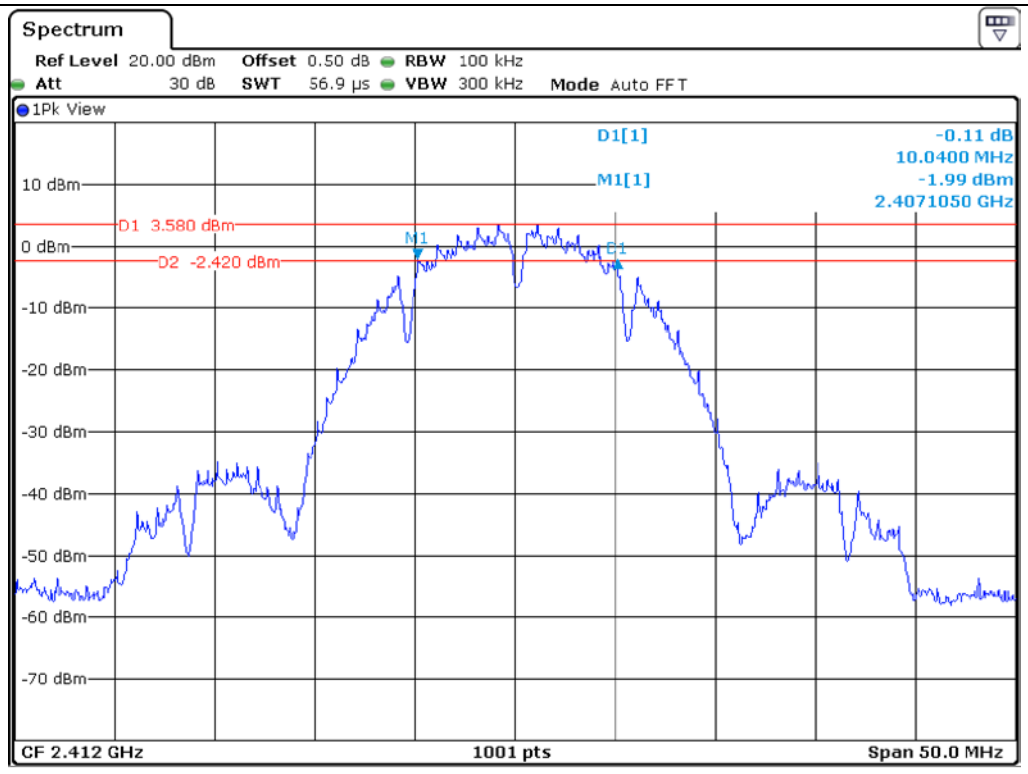
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

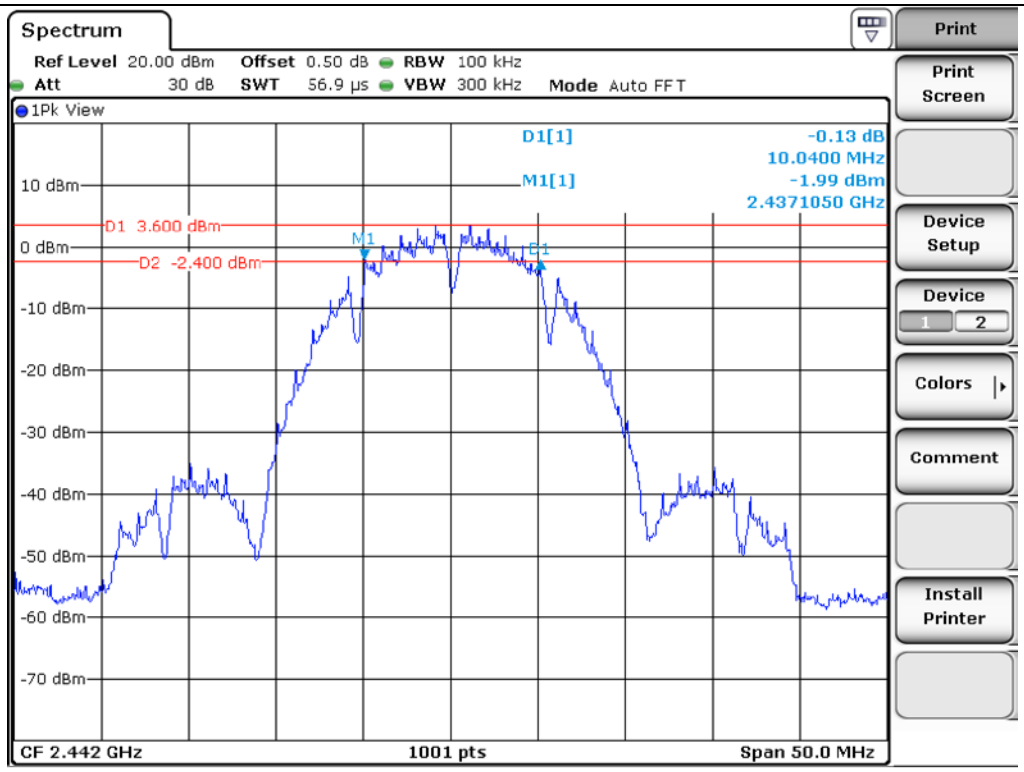
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	10.04	0.50	9.54
Middle	2 442.00	10.04	0.50	9.54
High	2 462.00	10.04	0.50	9.54

Remark. Margin = Measured Value - Limit

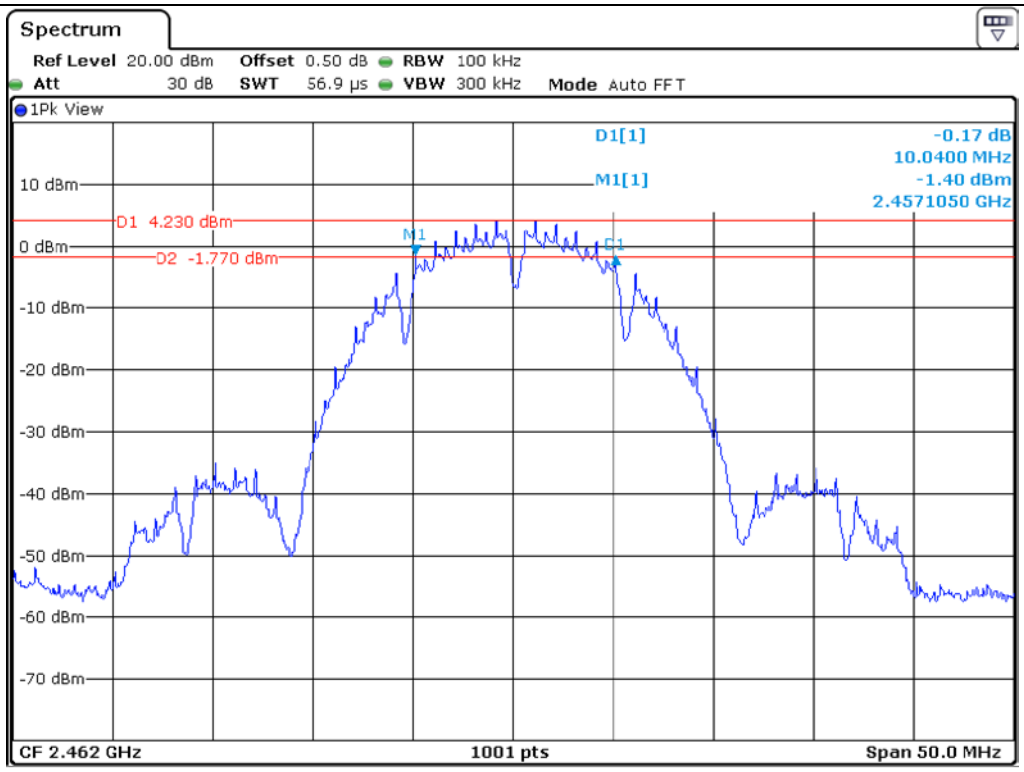
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

7.4.2 Test data for Antenna 1

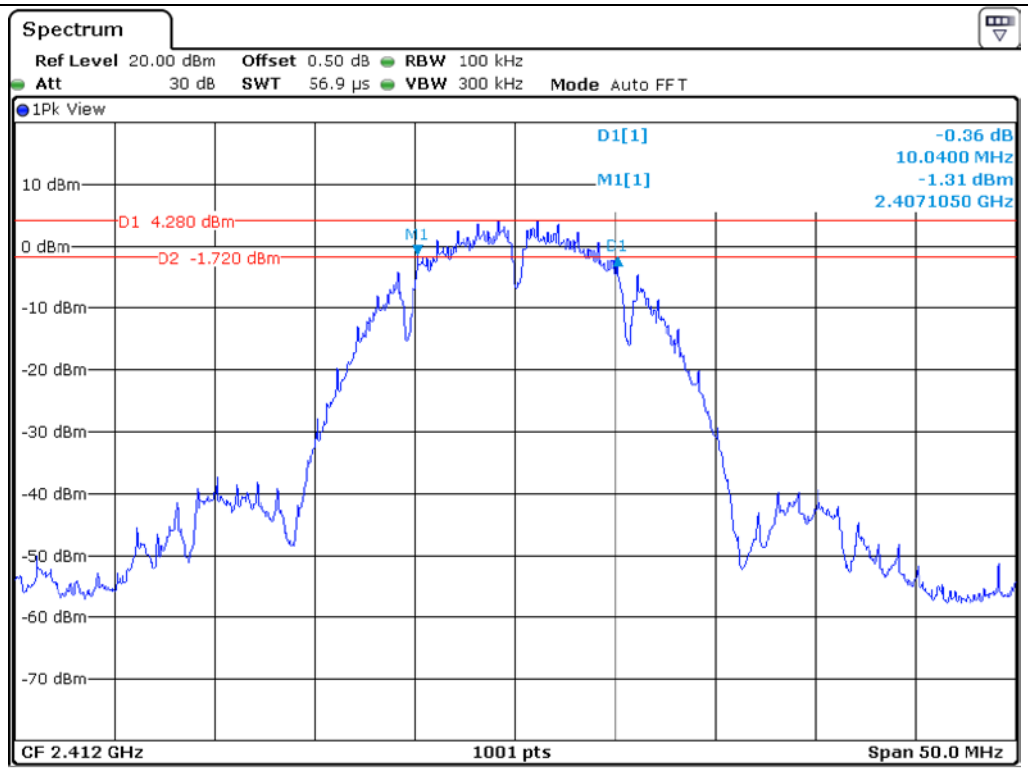
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

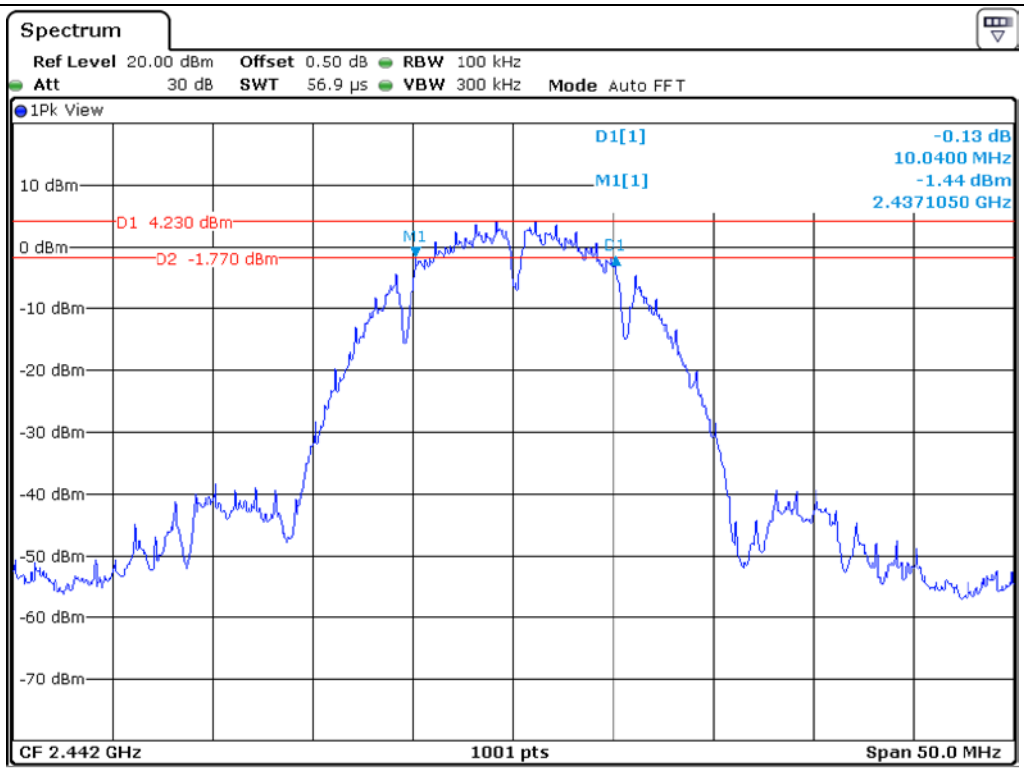
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	10.04	0.50	9.54
Middle	2 442.00	10.04	0.50	9.54
High	2 462.00	10.04	0.50	9.54

Remark. Margin = Measured Value - Limit

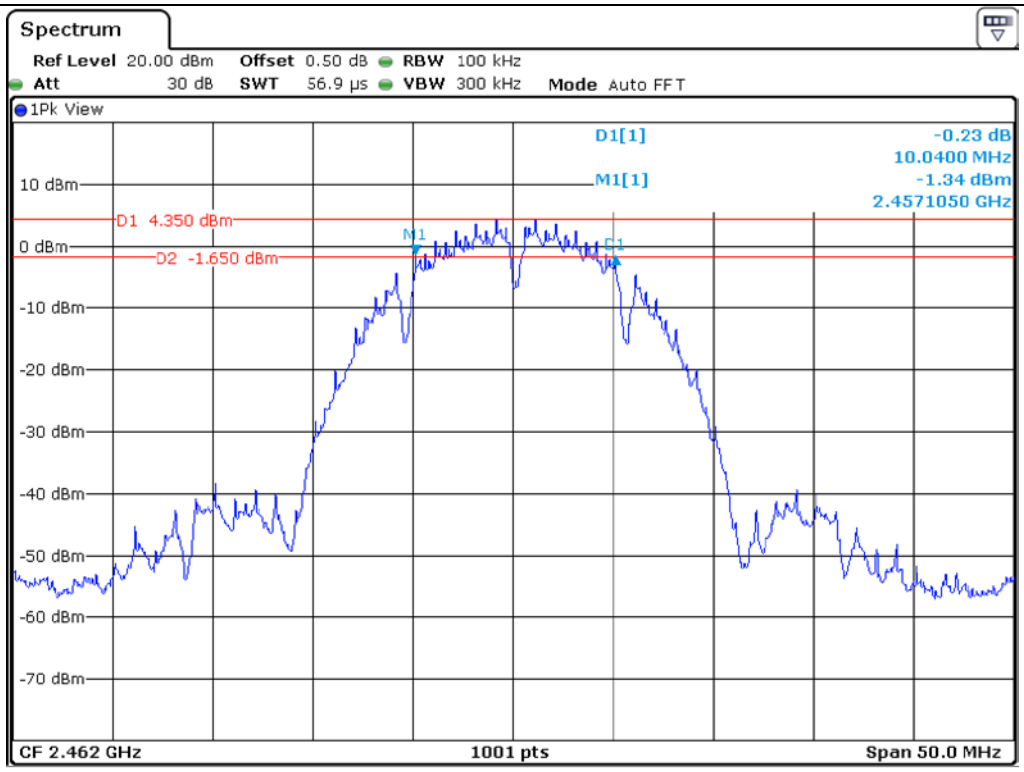
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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7.5 Test data for 802.11g WLAN Mode

7.5.1 Test data for Antenna 0

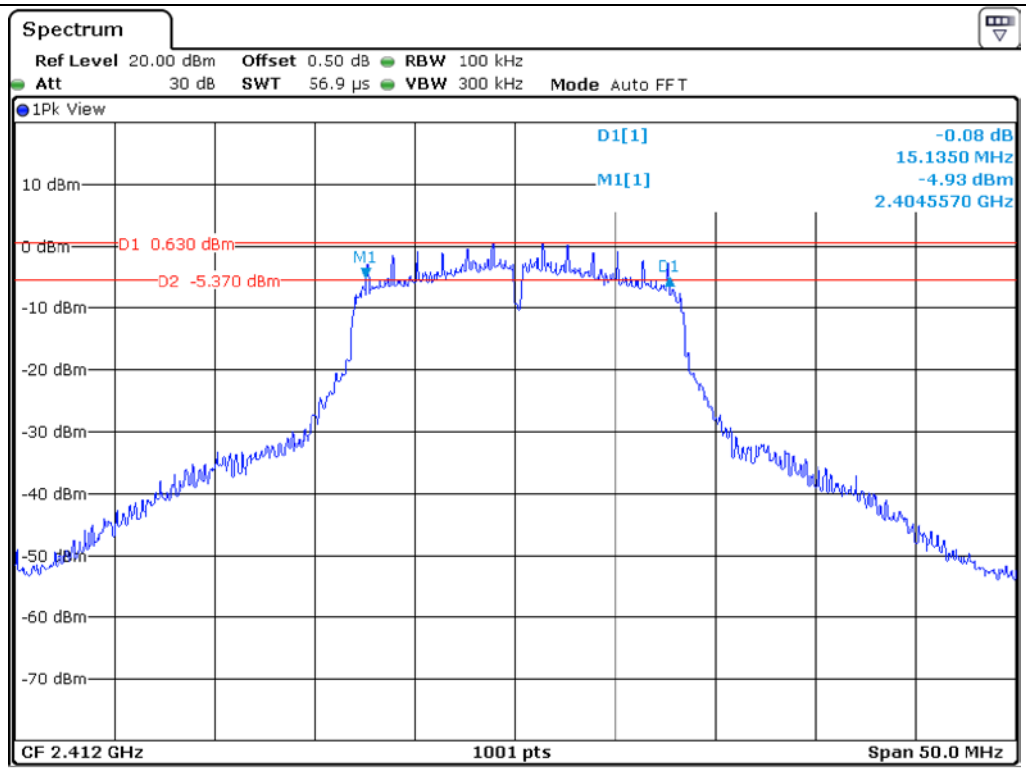
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

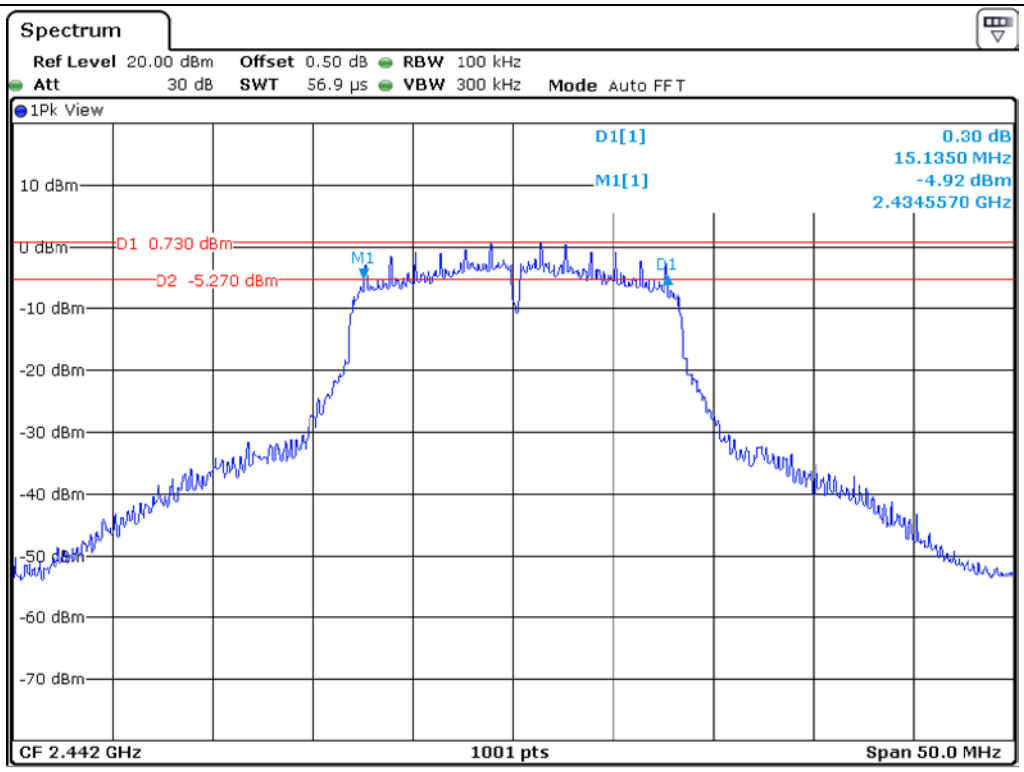
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.14	0.50	14.64
Middle	2 442.00	15.14	0.50	14.64
High	2 462.00	15.14	0.50	14.64

Remark. Margin = Measured Value - Limit

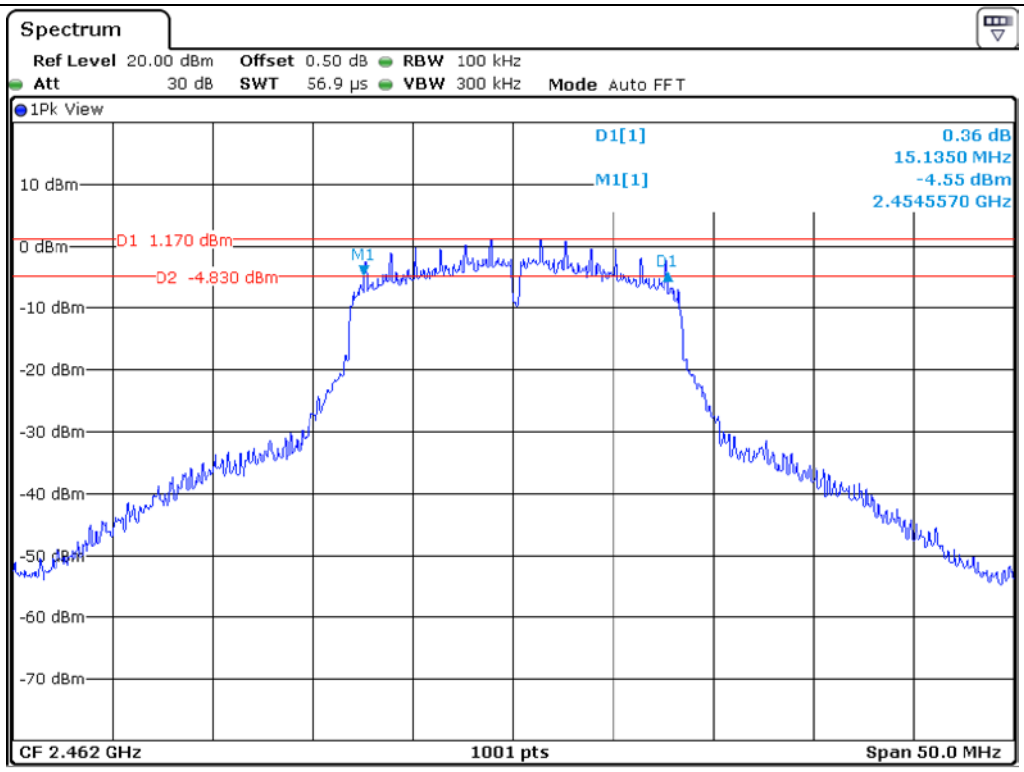
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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

7.5.2 Test data for Antenna 1

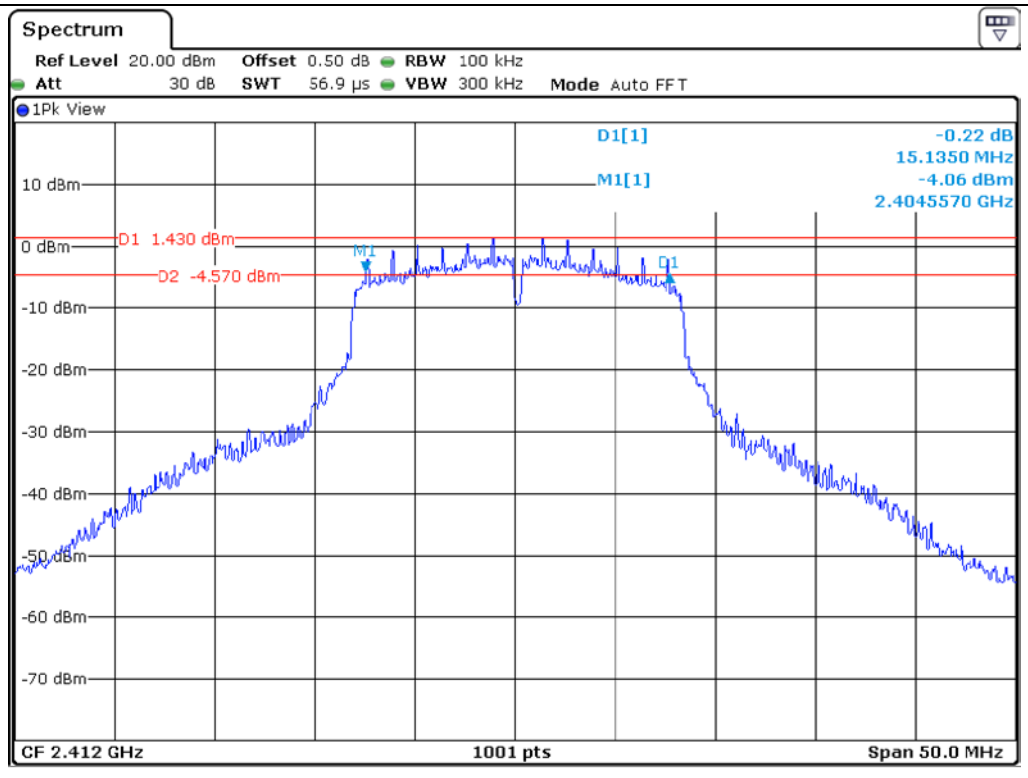
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

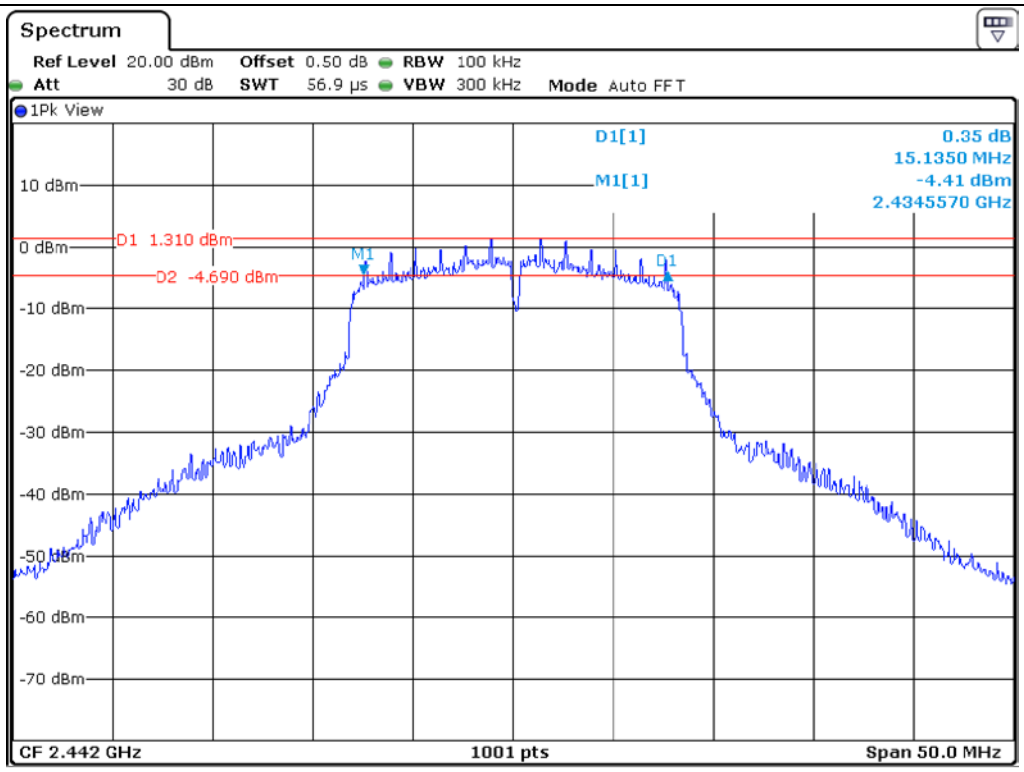
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.14	0.50	14.64
Middle	2 442.00	15.14	0.50	14.64
High	2 462.00	15.14	0.50	14.64

Remark. Margin = Measured Value - Limit

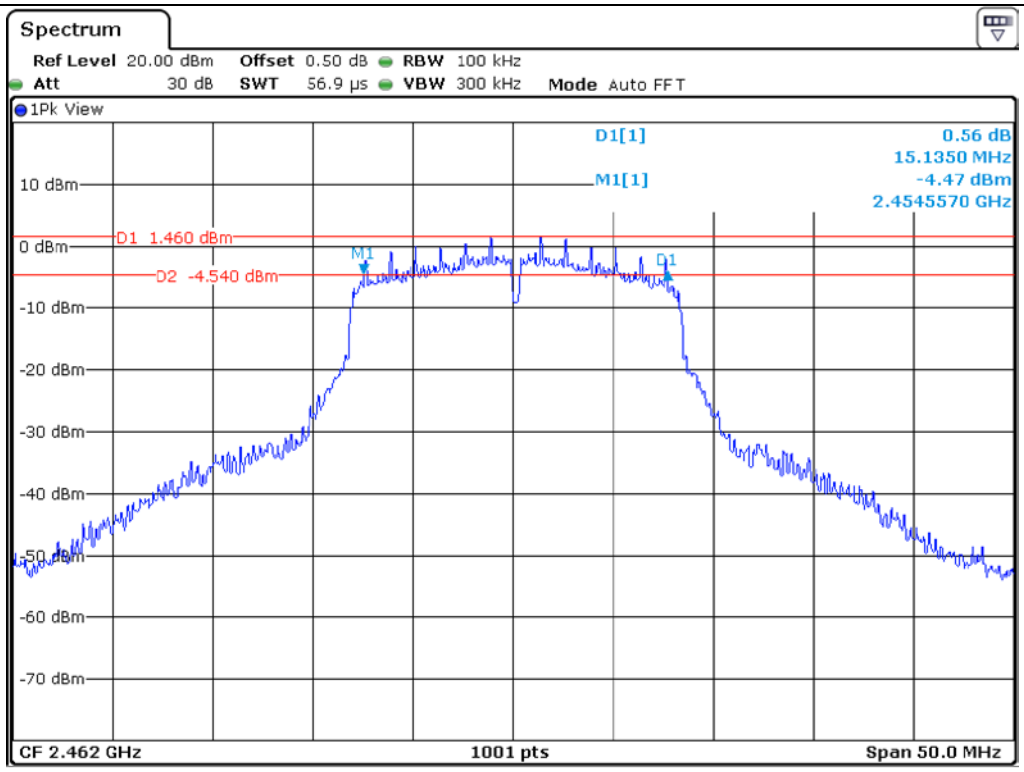
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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7.6 Test data for 802.11n_HT20 WLAN Mode

7.6.1 Test data for Antenna 0

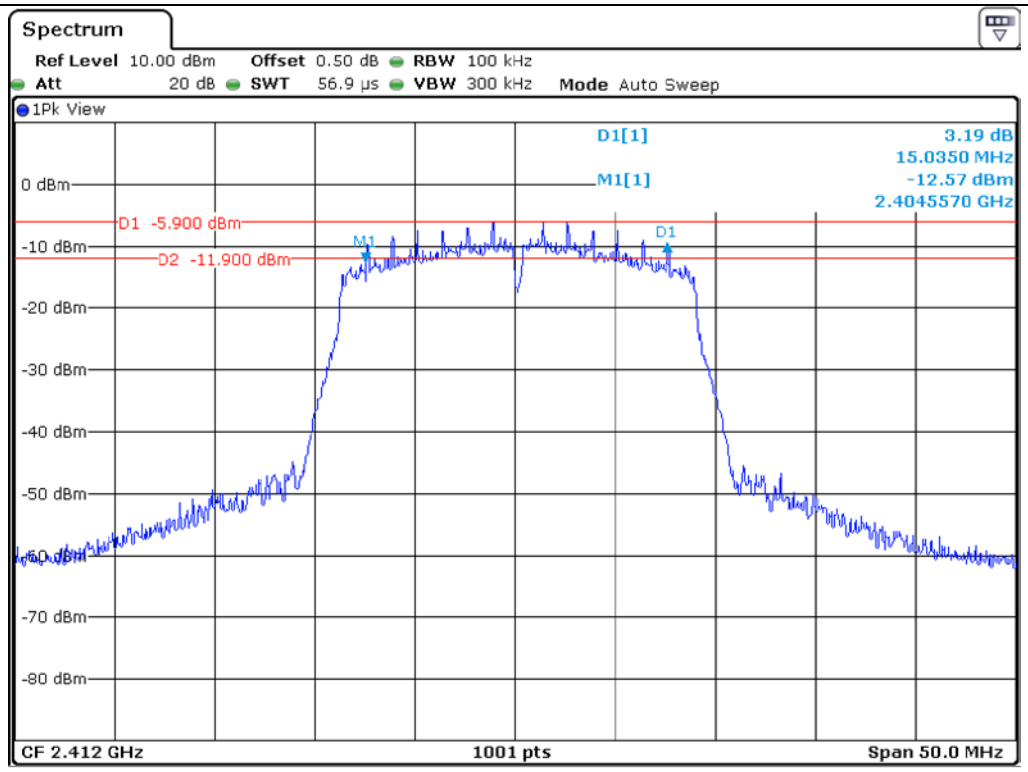
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

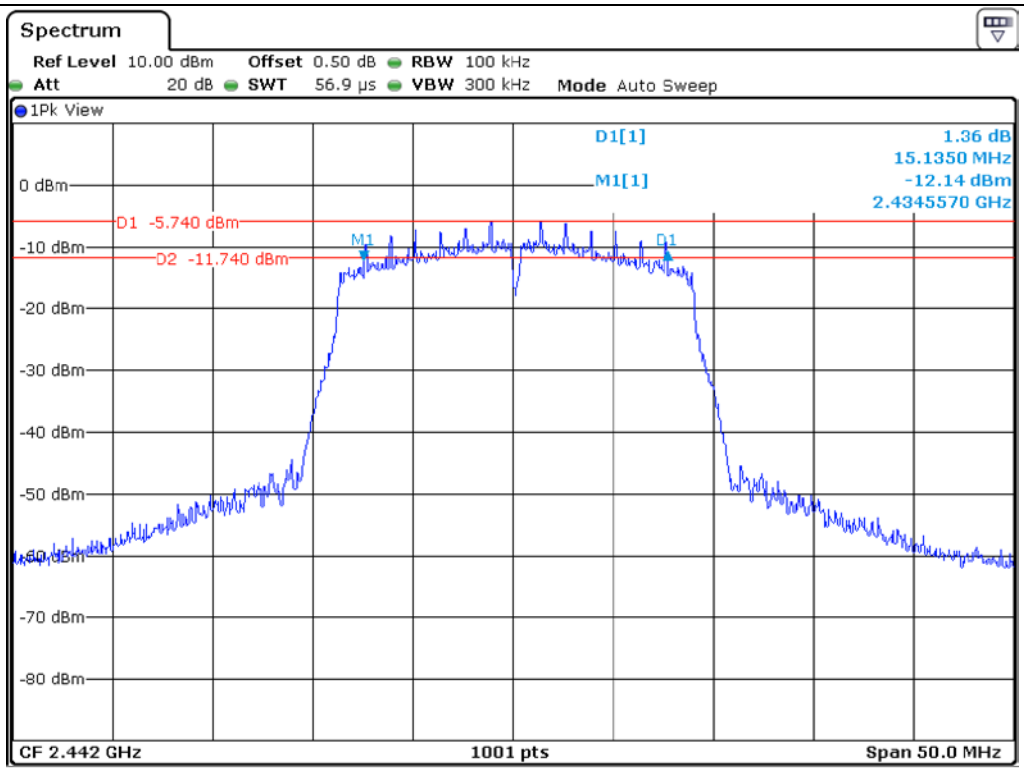
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.04	0.50	14.54
Middle	2 442.00	15.14	0.50	14.64
High	2 462.00	15.14	0.50	14.64

Remark. Margin = Measured Value - Limit

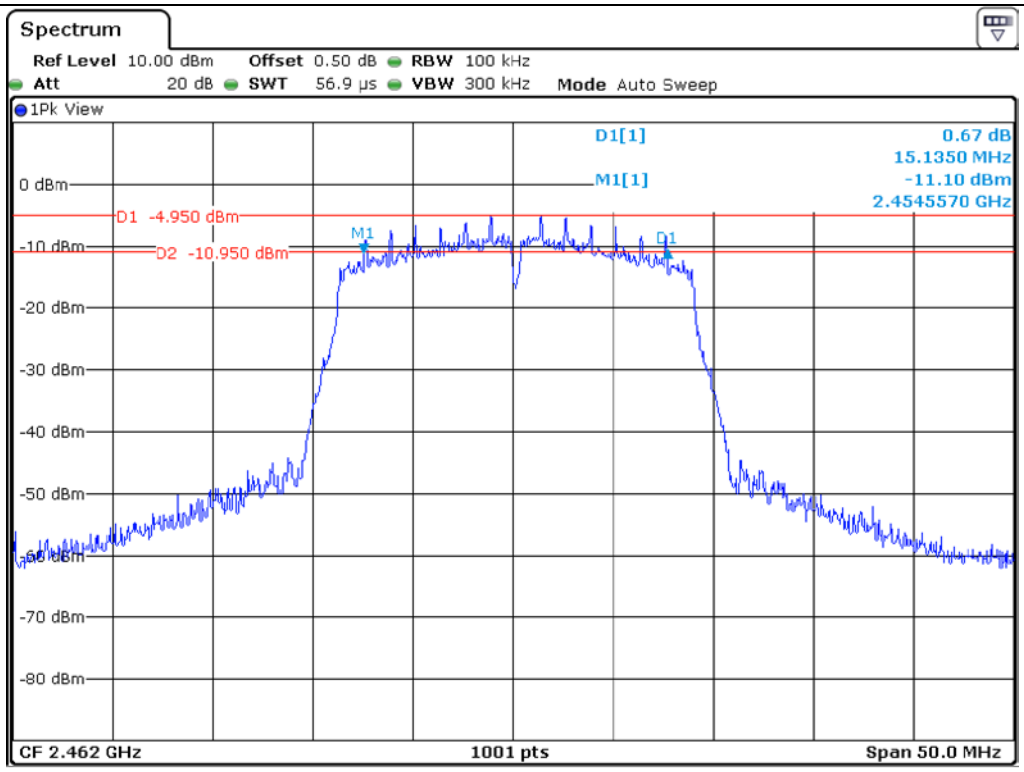
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

7.6.2 Test data for Antenna 1

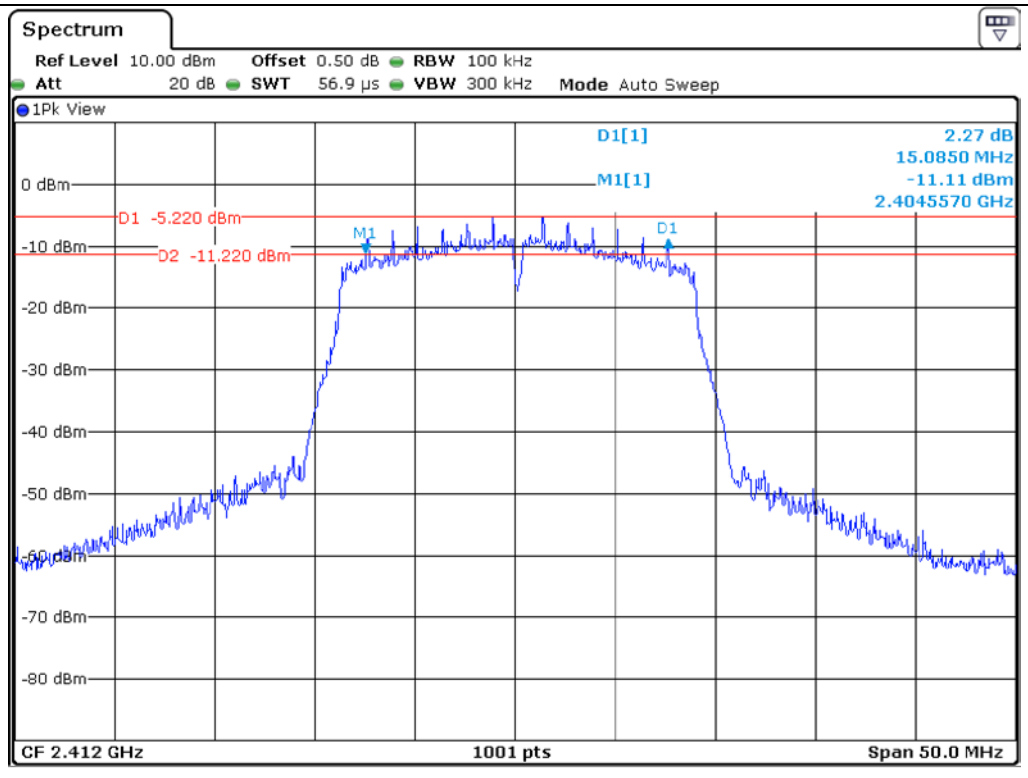
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

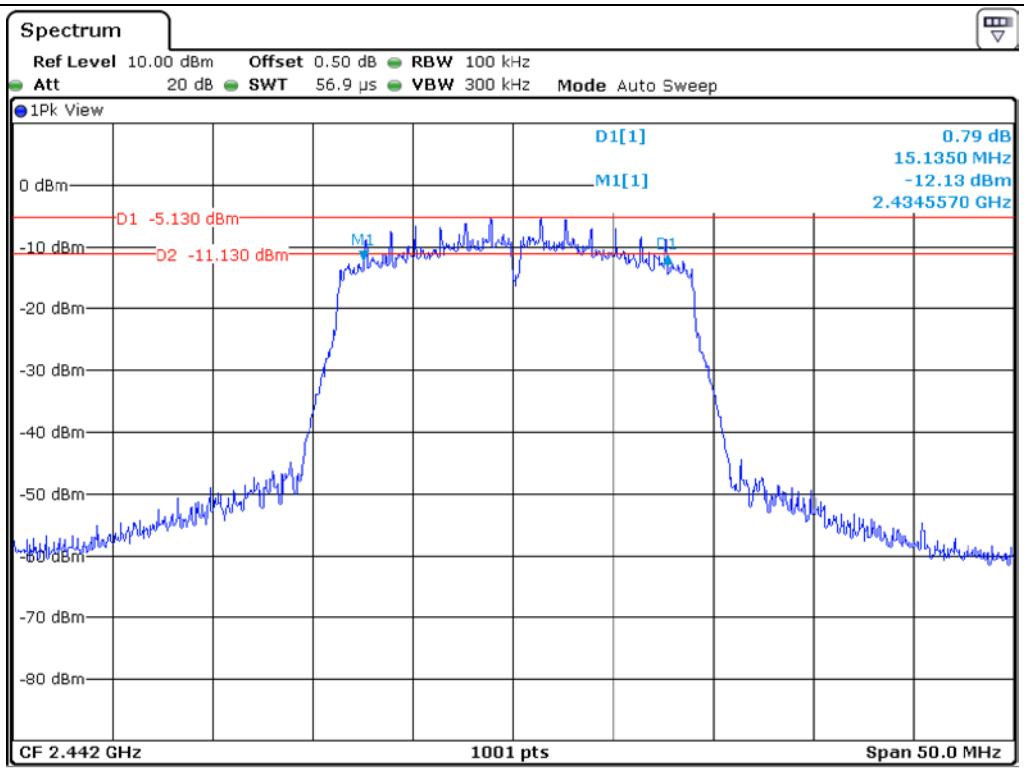
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.09	0.50	14.59
Middle	2 442.00	15.14	0.50	14.64
High	2 462.00	15.14	0.50	14.64

Remark. Margin = Measured Value - Limit

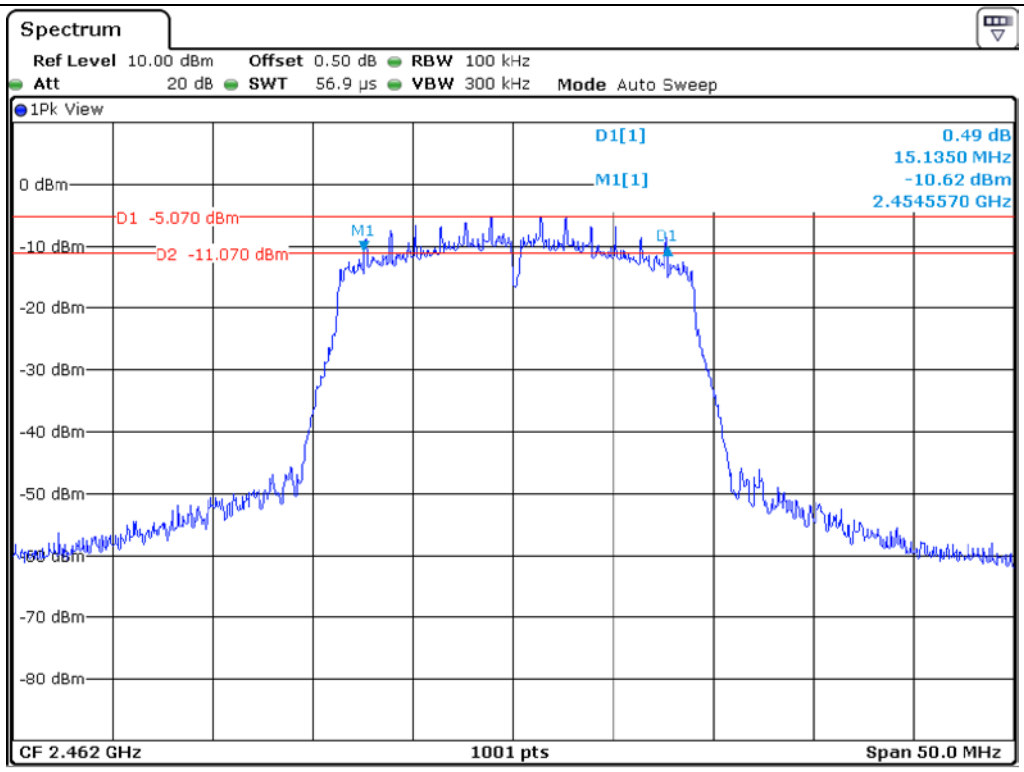
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

7.7 Test data for 802.11n_HT40 WLAN Mode

7.7.1 Test data for Antenna 0

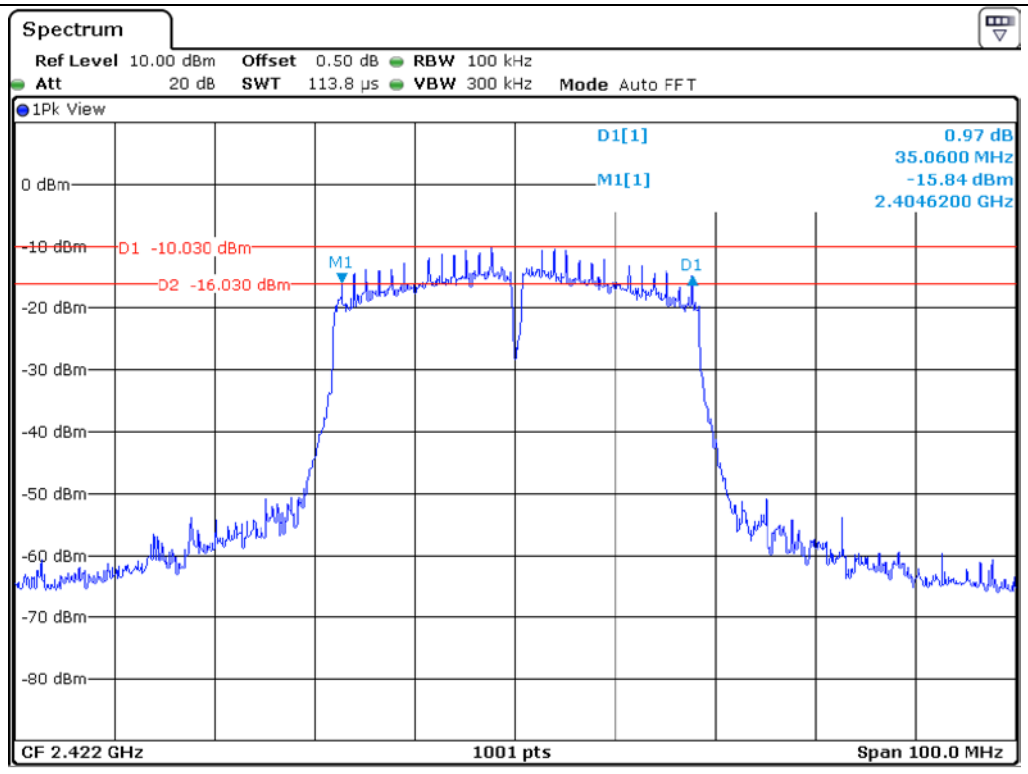
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

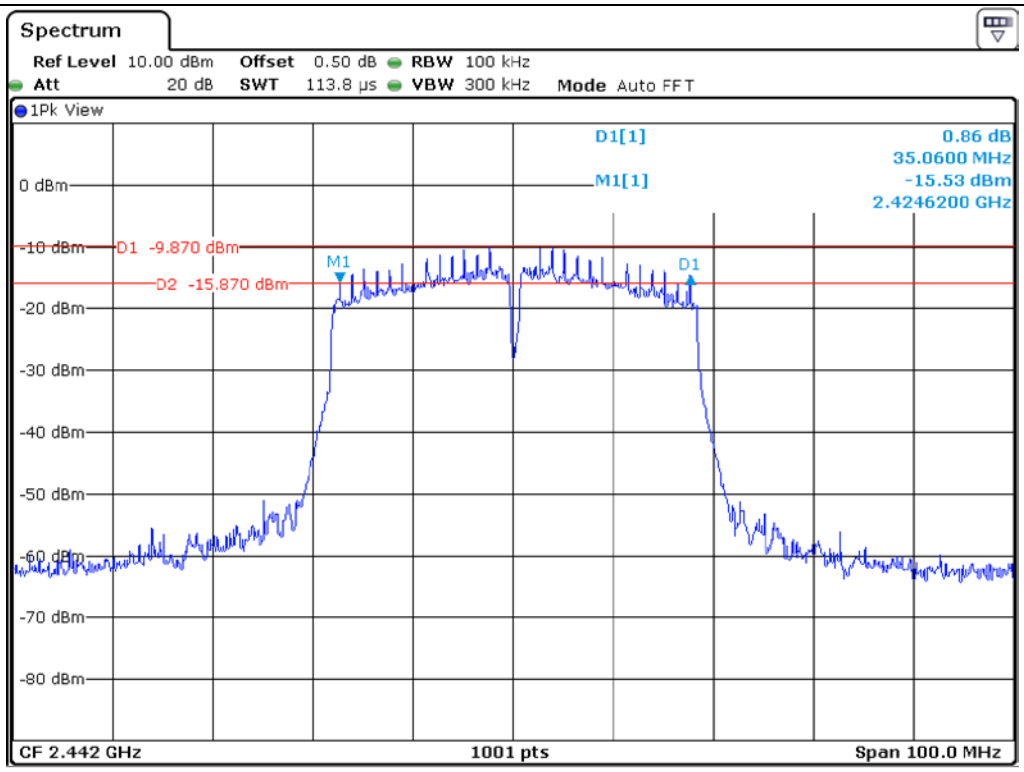
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 422.00	35.06	0.50	34.56
Middle	2 442.00	35.06	0.50	34.56
High	2 452.00	35.06	0.50	34.56

Remark. Margin = Measured Value - Limit

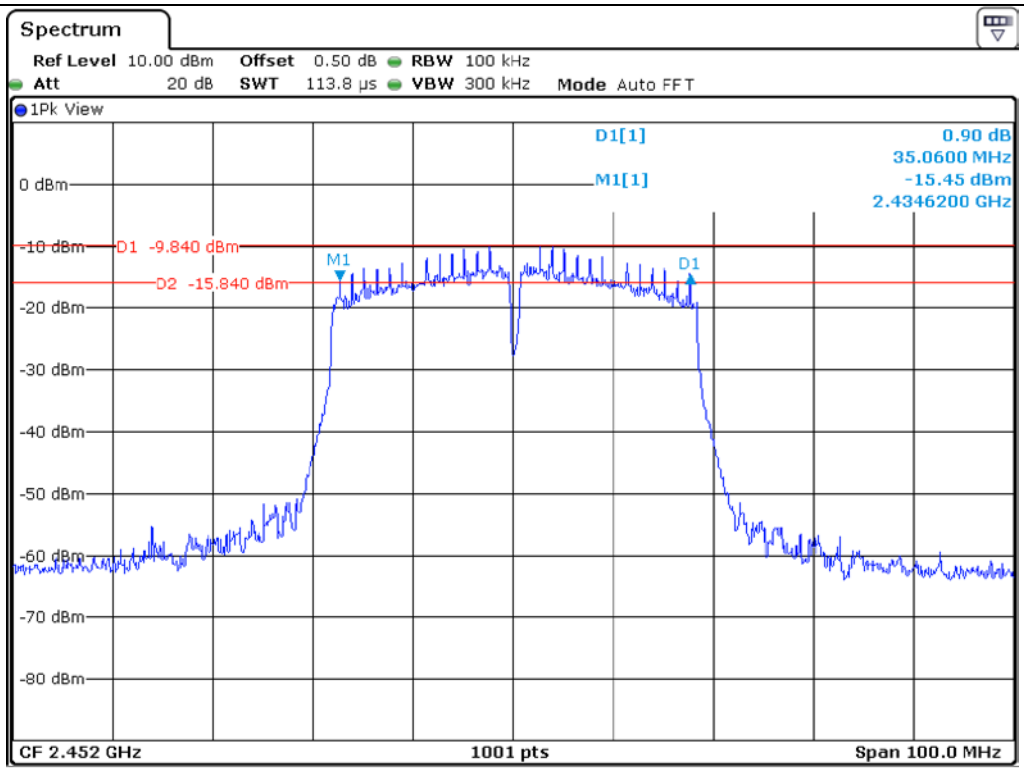
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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7.7.2 Test data for Antenna 1

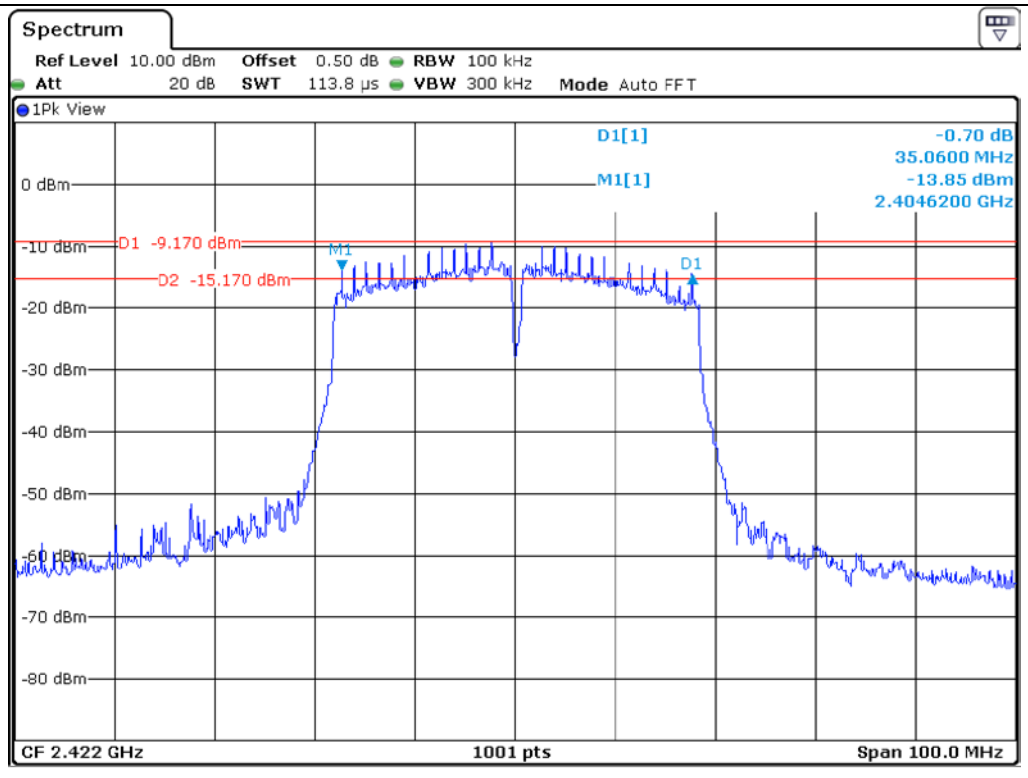
-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

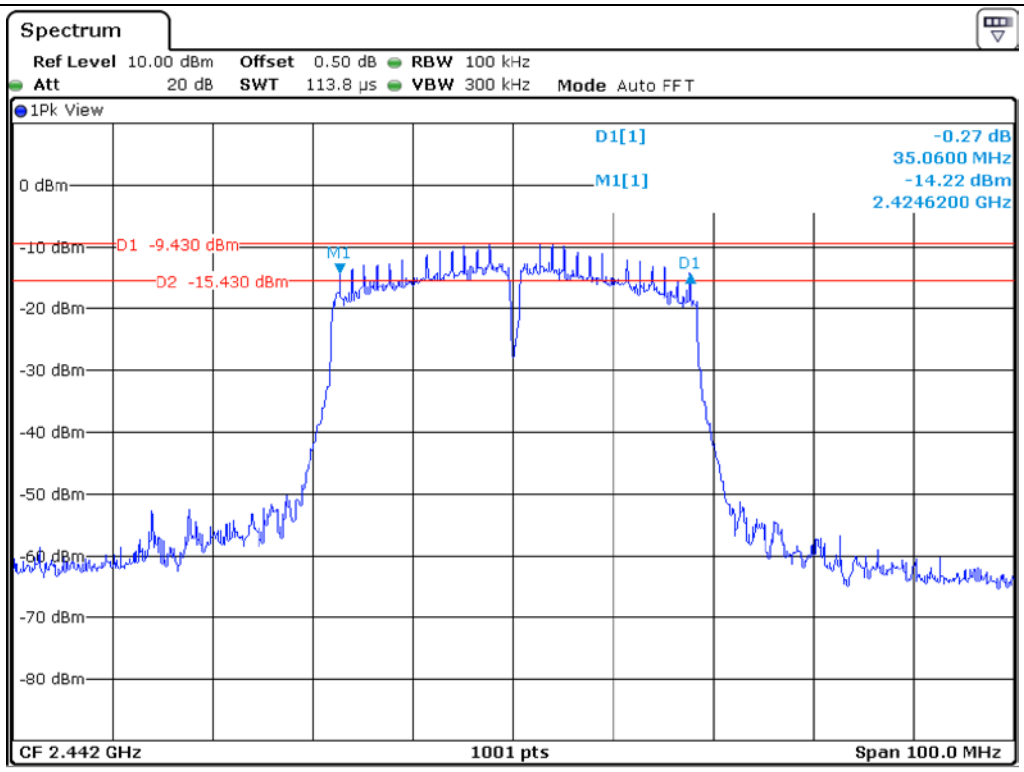
CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 422.00	35.06	0.50	34.56
Middle	2 442.00	35.06	0.50	34.56
High	2 452.00	35.06	0.50	34.56

Remark. Margin = Measured Value - Limit

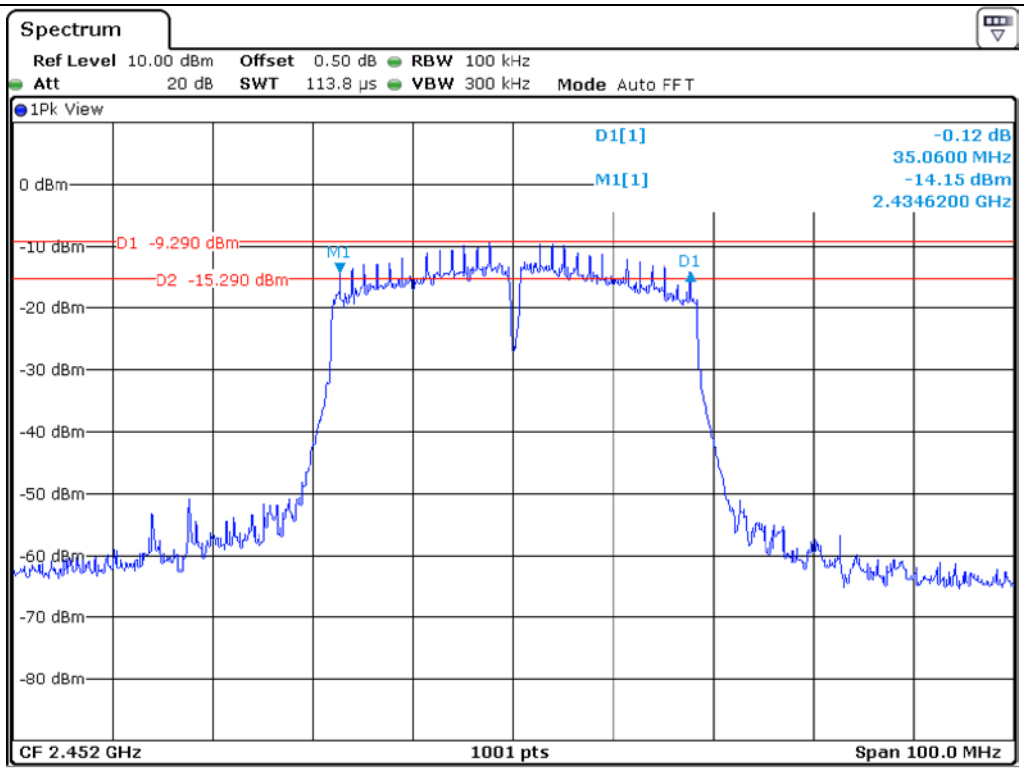
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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8. MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

8.1 Operating environment

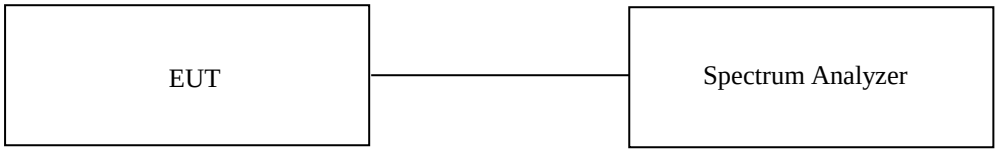
Temperature : 23 °C

Relative humidity : 41 % R.H.

8.2 Test set-up

The maximum Conducted (Average) output power was measured with the Spectrum Analyzer connected to the antenna output of the EUT.

Section 15.247 permits the maximum conducted (average) output power to be measured as an alternative to the maximum peak conducted output power for demonstrating compliance to the limit. When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth (see ANSI C63.10 for measurement guidance).



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

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

8.4 Test data for 802.11b WLAN Mode

8.4.1 Test data for Antenna 0

-. Test Date : January 06, 2020 ~ January 16, 2020

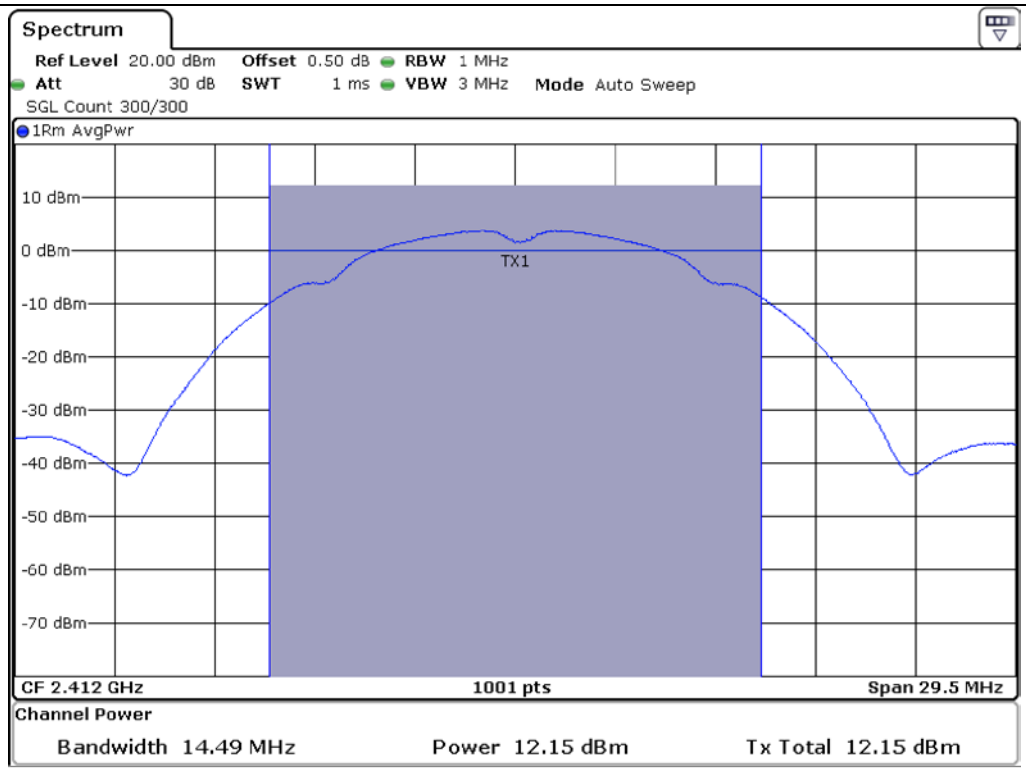
-. Test Result : Pass

-. Duty Cycle : 97.30 %

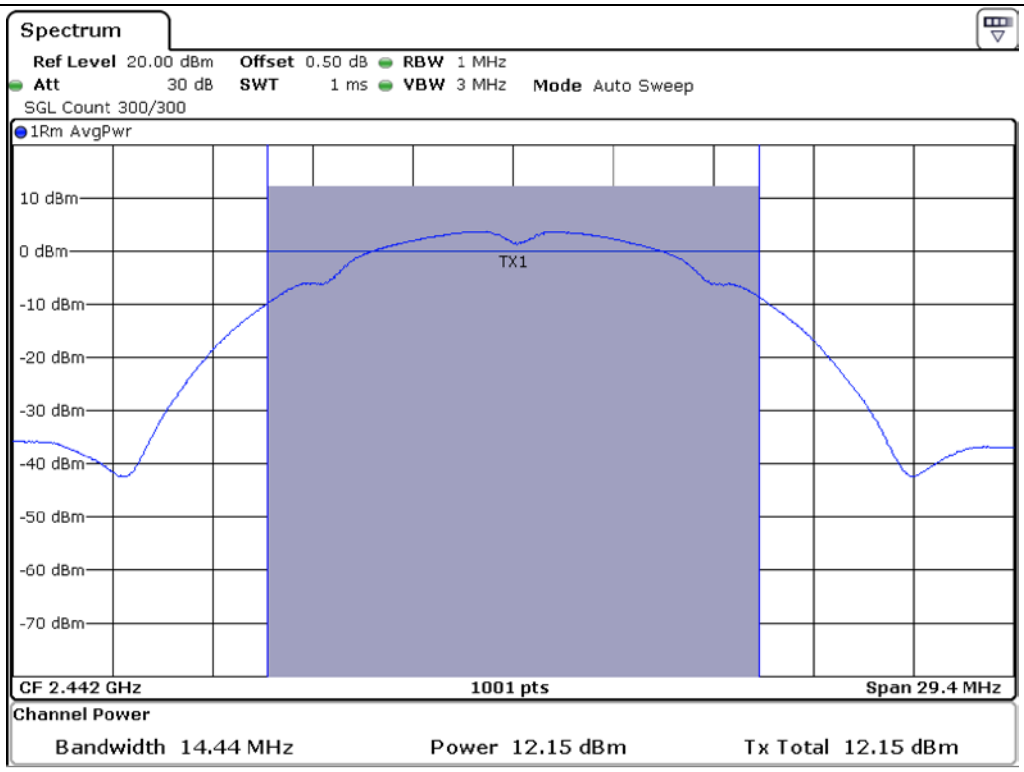
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	12.15	0.12	12.27	30.00	17.73
MIDDLE	2 442.00	12.15	0.12	12.27	30.00	17.73
HIGH	2 462.00	12.79	0.12	12.91	30.00	17.09

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

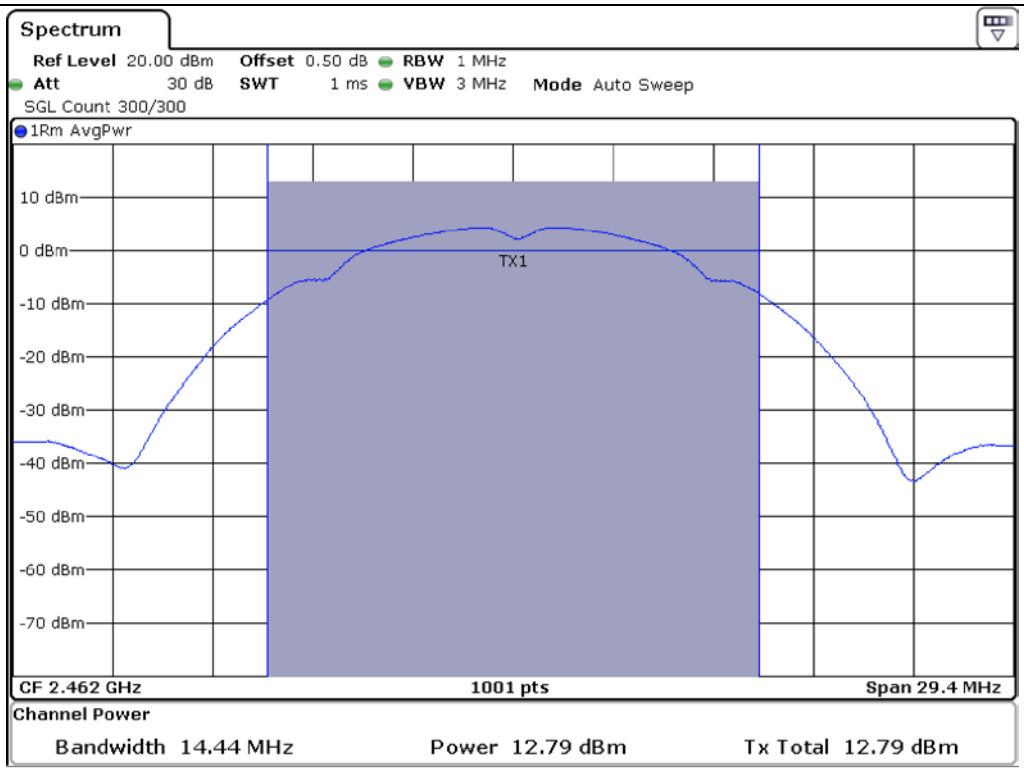
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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

8.4.2 Test data for Antenna 1

-. Test Date : January 06, 2020 ~ January 16, 2020

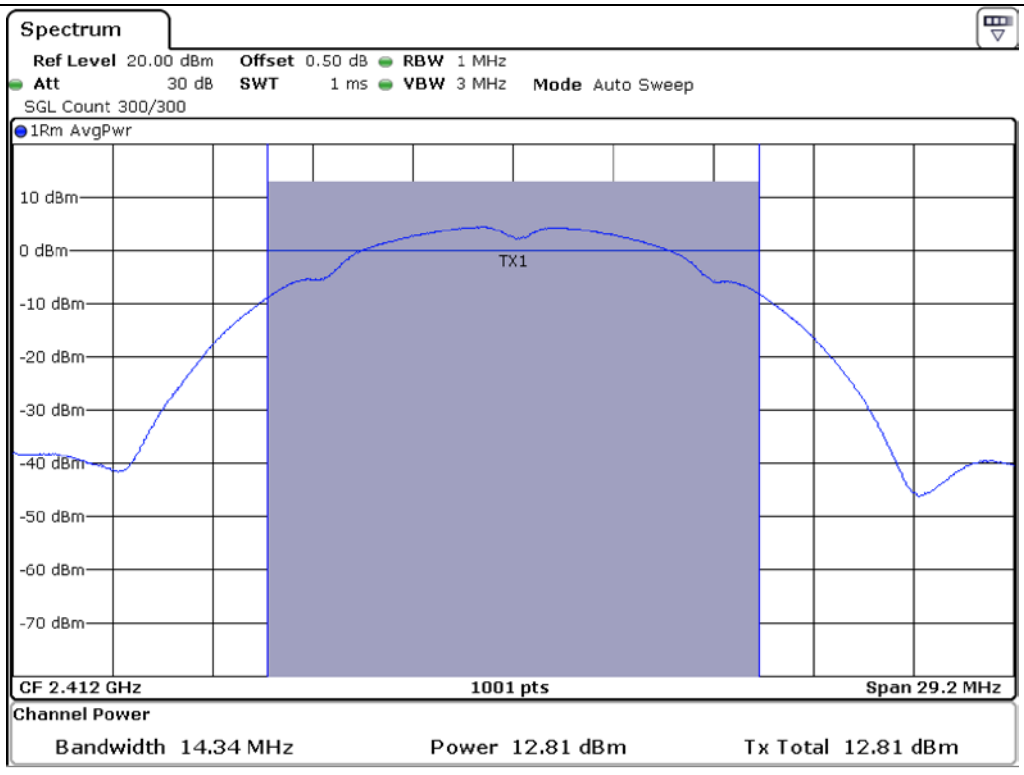
-. Test Result : Pass

-. Duty Cycle : 97.30 %

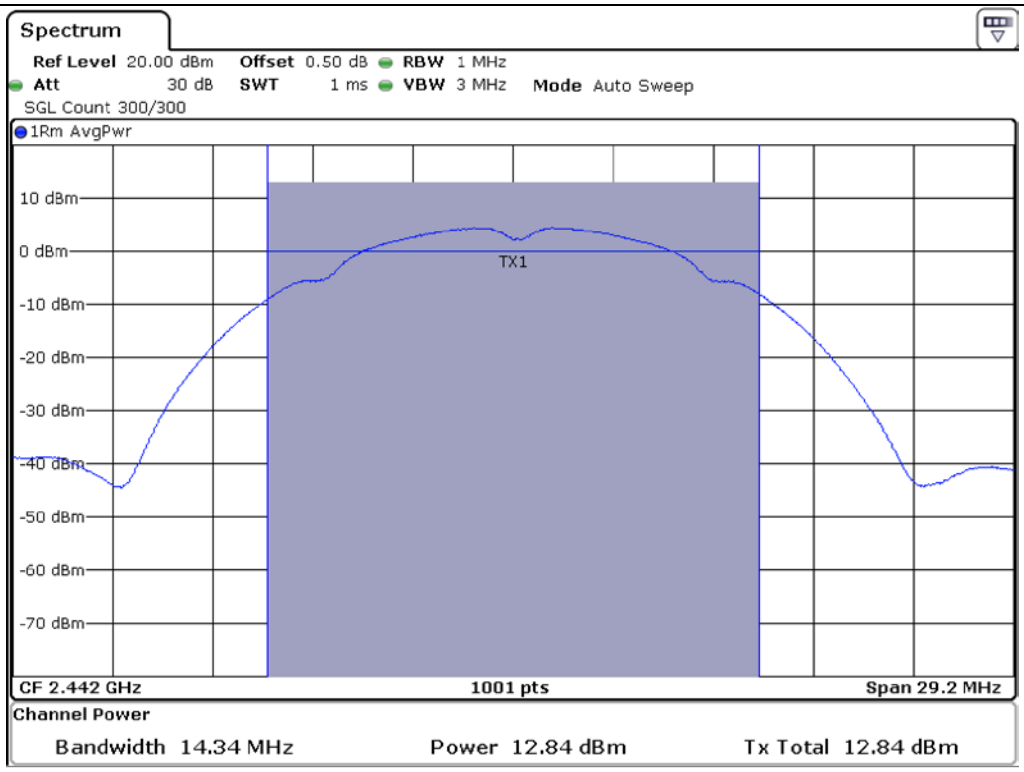
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	12.81	0.12	12.93	30.00	17.07
MIDDLE	2 442.00	12.84	0.12	12.96	30.00	17.04
HIGH	2 462.00	12.98	0.12	13.10	30.00	16.90

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

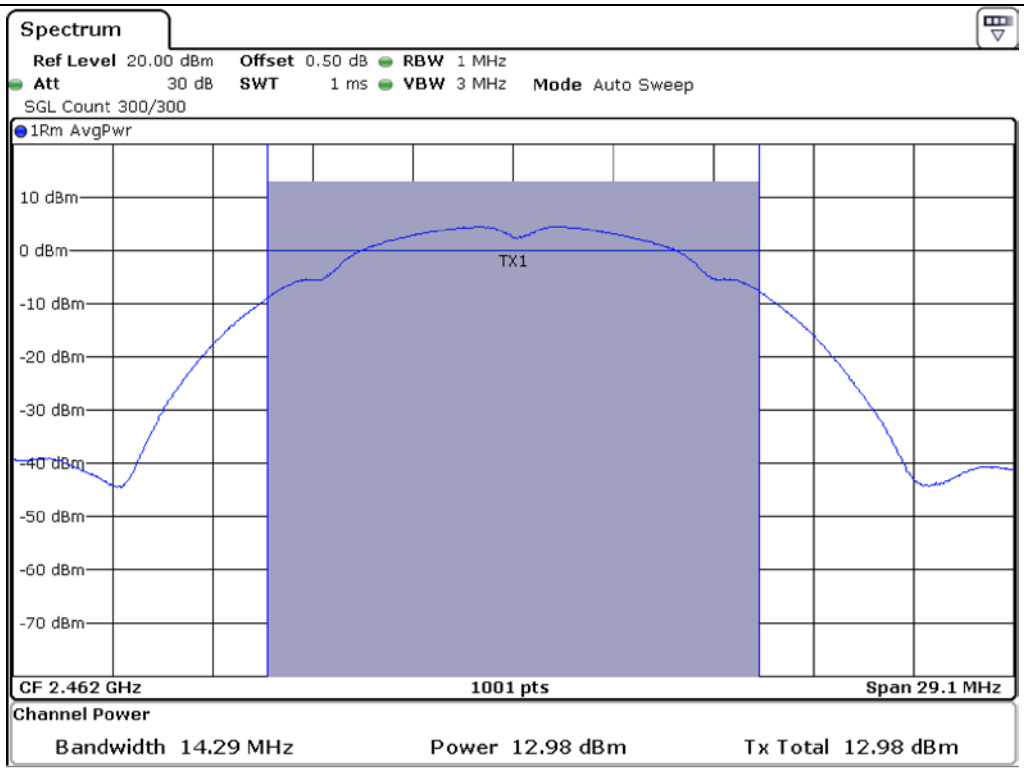
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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

8.5 Test data for 802.11g WLAN Mode

8.5.1 Test data for Antenna 0

-. Test Date : January 06, 2020 ~ January 16, 2020

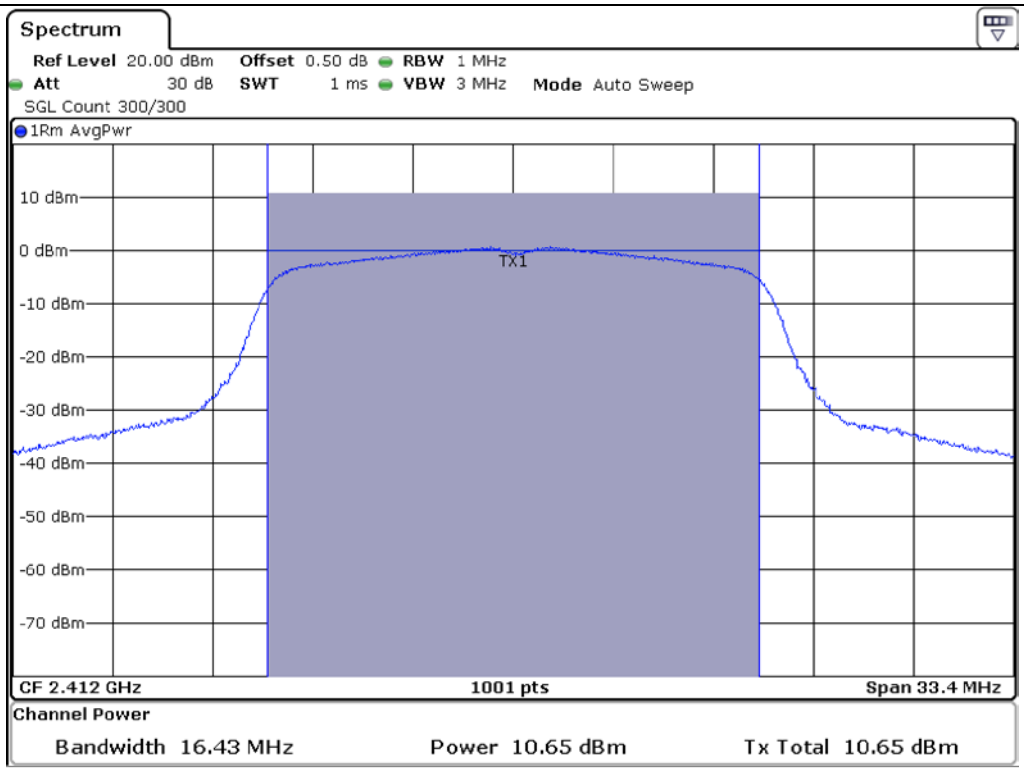
-. Test Result : Pass

-. Duty Cycle : 95.55 %

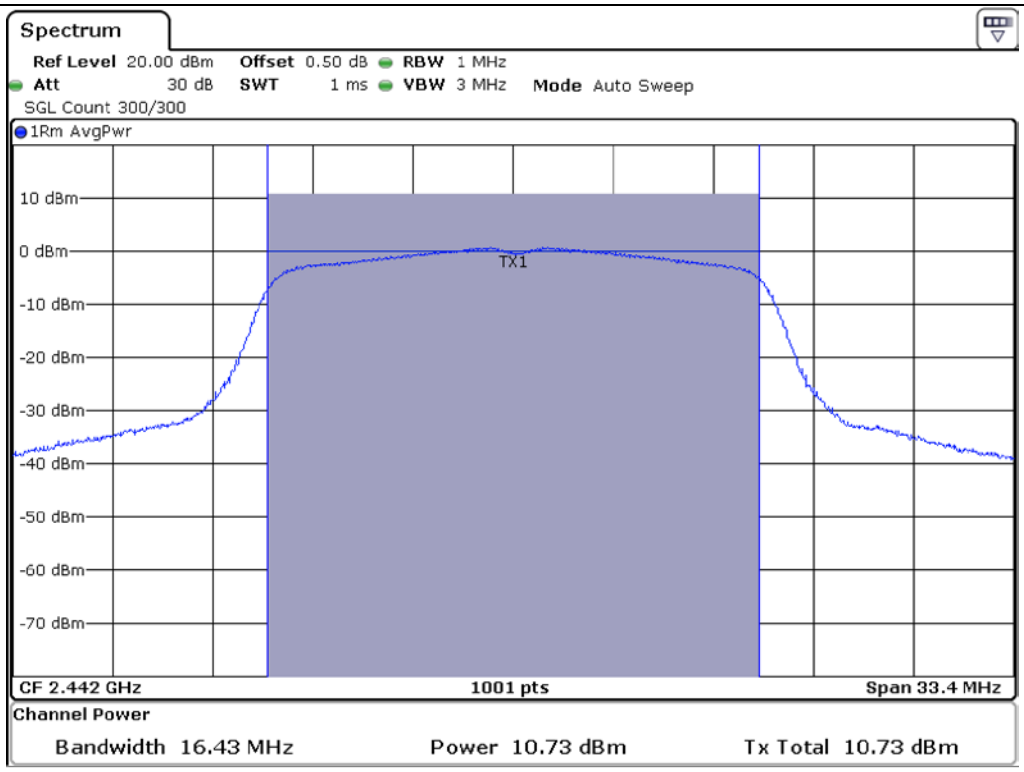
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	10.65	0.20	10.85	30.00	19.15
MIDDLE	2 442.00	10.73	0.20	10.93	30.00	19.07
HIGH	2 462.00	11.26	0.20	11.46	30.00	18.54

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

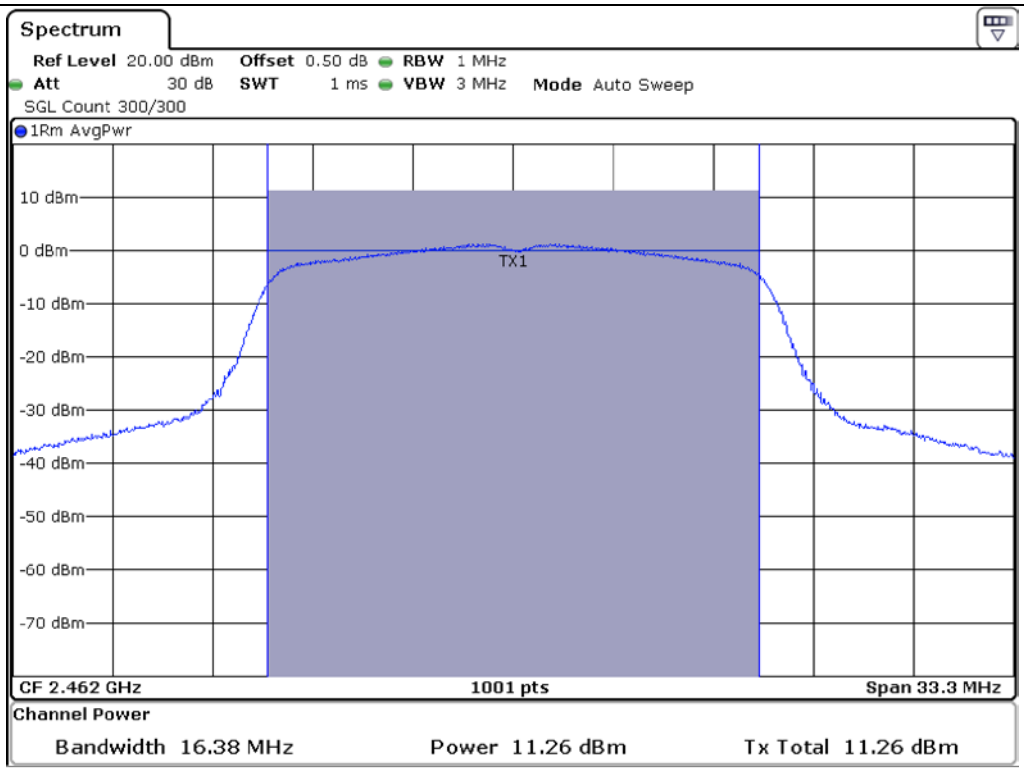
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

8.5.2 Test data for Antenna 1

-. Test Date : January 06, 2020 ~ January 16, 2020

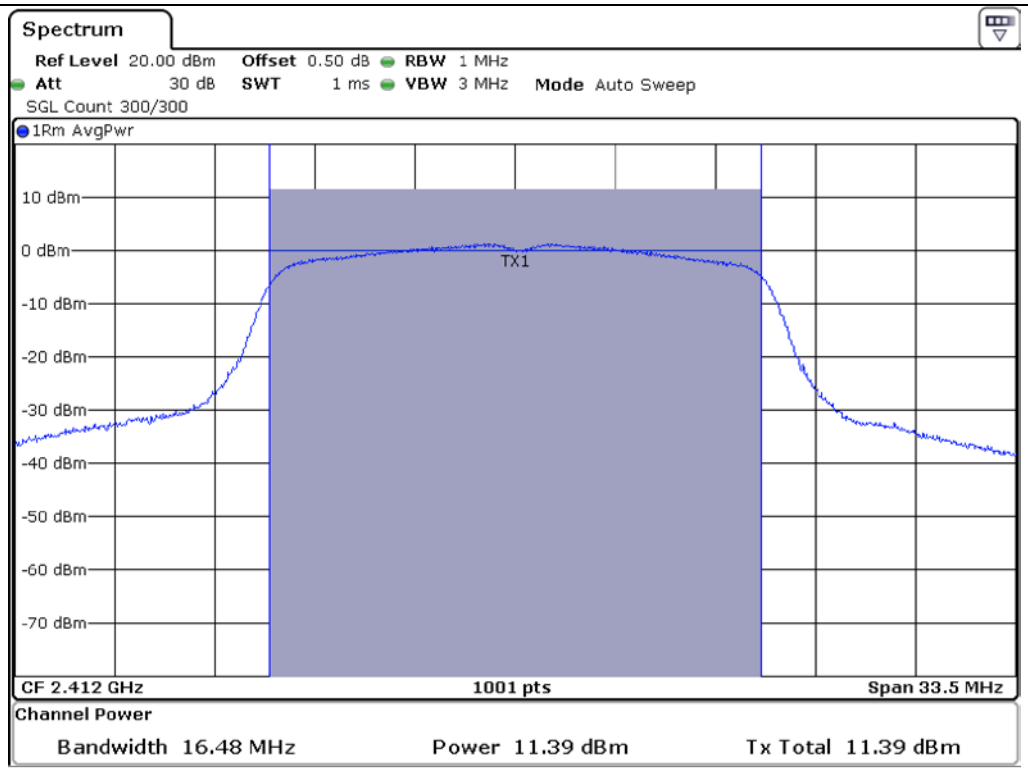
-. Test Result : Pass

-. Duty Cycle : 95.55 %

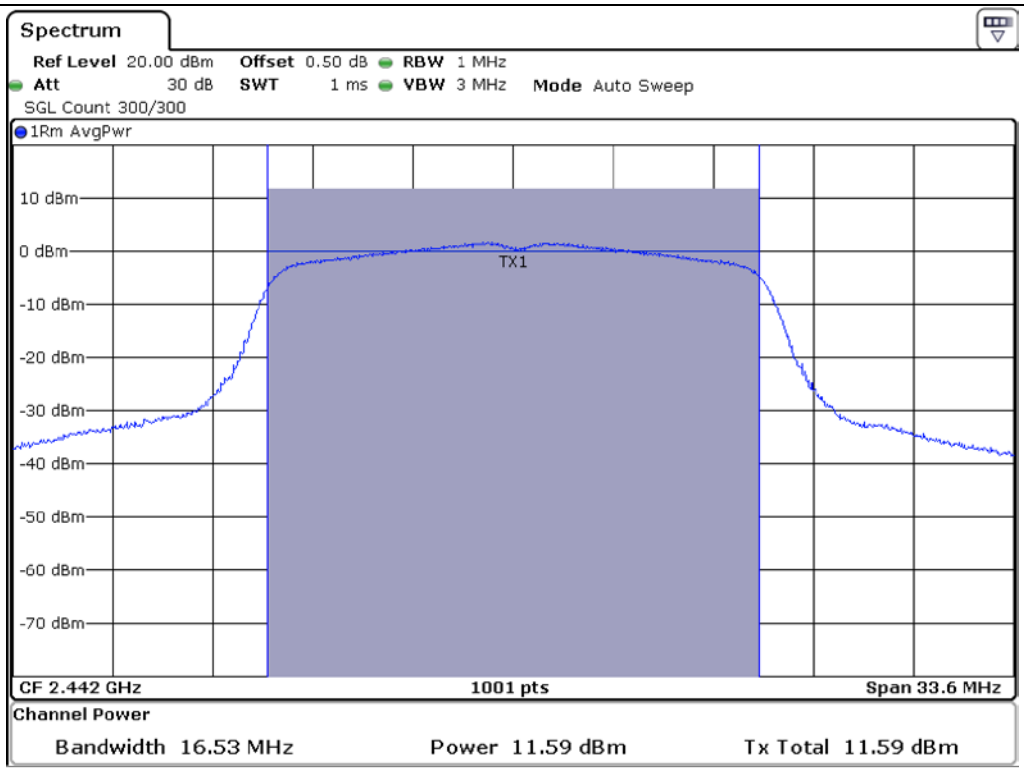
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	11.39	0.20	11.59	30.00	18.41
MIDDLE	2 442.00	11.59	0.20	11.79	30.00	18.21
HIGH	2 462.00	11.63	0.20	11.83	30.00	18.17

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

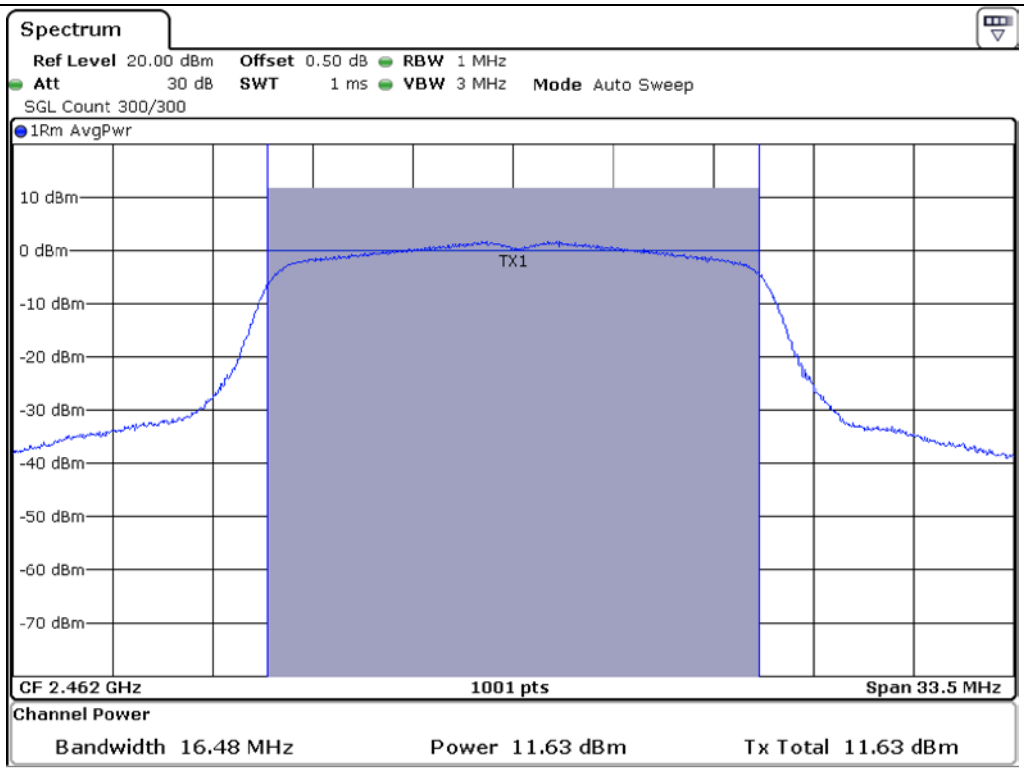
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

8.6 Test data for 802.11n_HT20 WLAN Mode

8.6.1 Test data for Antenna 0

-. Test Date : January 06, 2020 ~ January 16, 2020

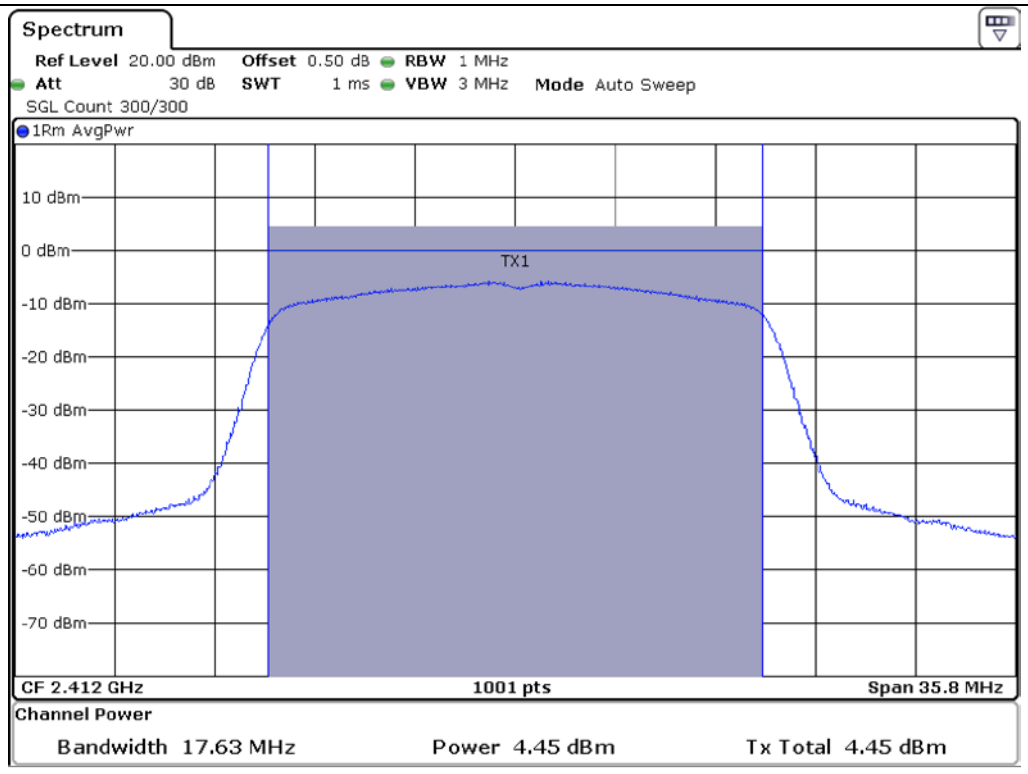
-. Test Result : Pass

-. Duty Cycle : 88.51 %

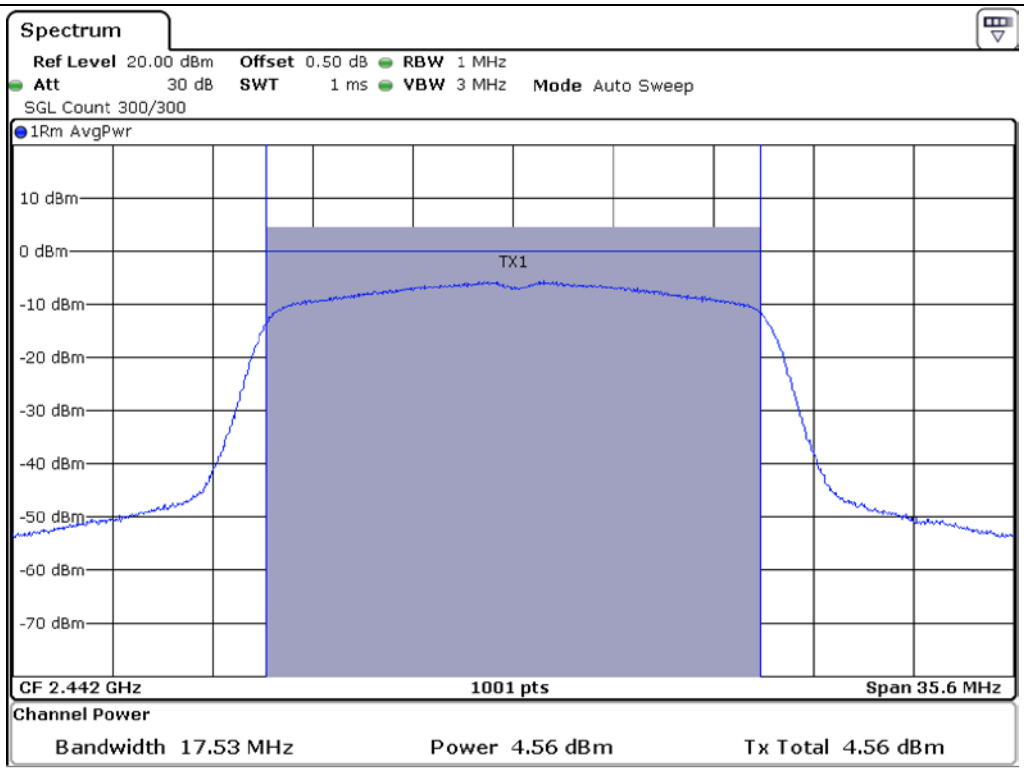
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	4.45	0.53	4.98	30.00	25.02
MIDDLE	2 442.00	4.56	0.53	5.09	30.00	24.91
HIGH	2 462.00	5.09	0.53	5.62	30.00	24.38

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

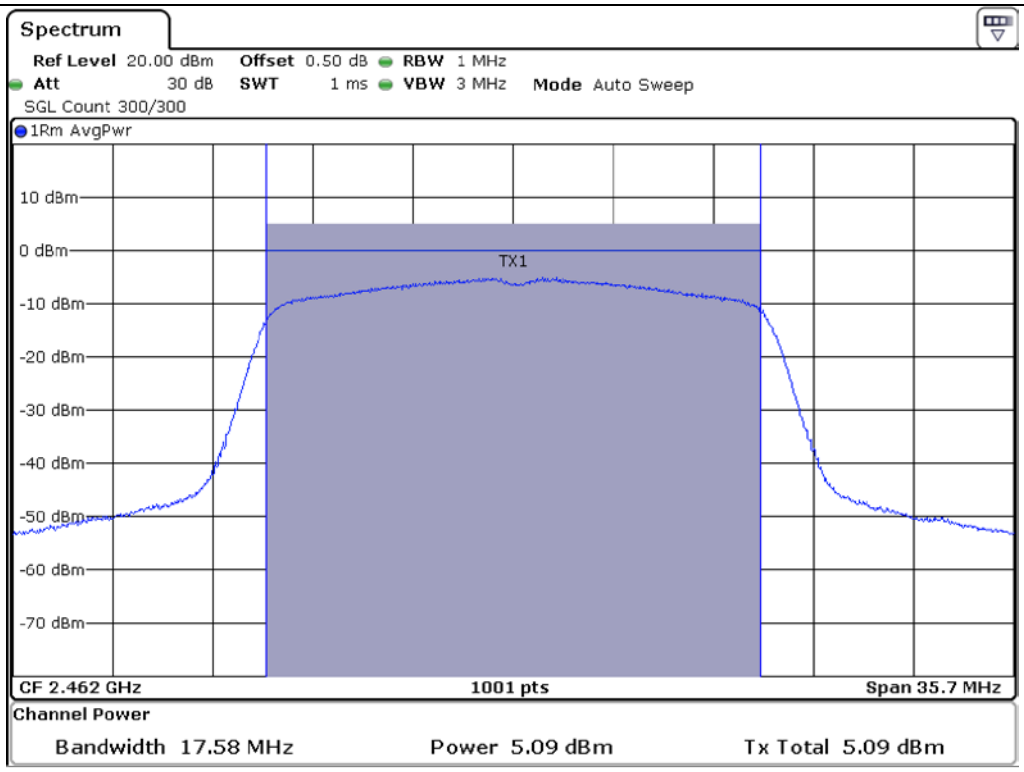
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

8.6.2 Test data for Antenna 1

-. Test Date : January 06, 2020 ~ January 16, 2020

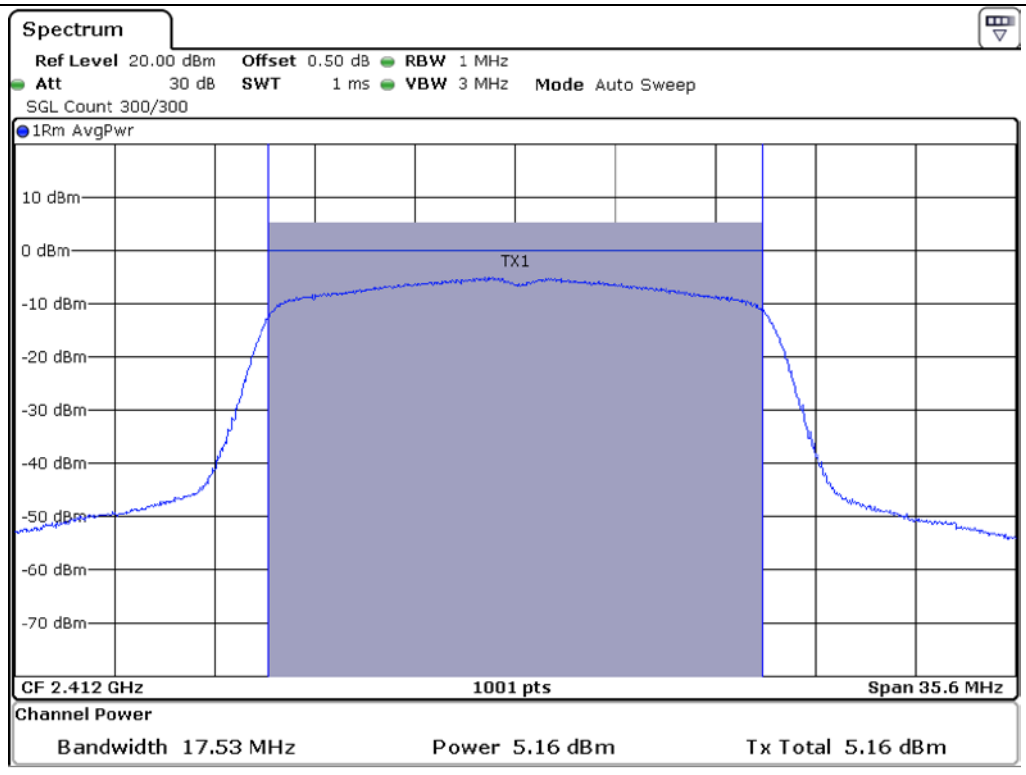
-. Test Result : Pass

-. Duty Cycle : 88.51 %

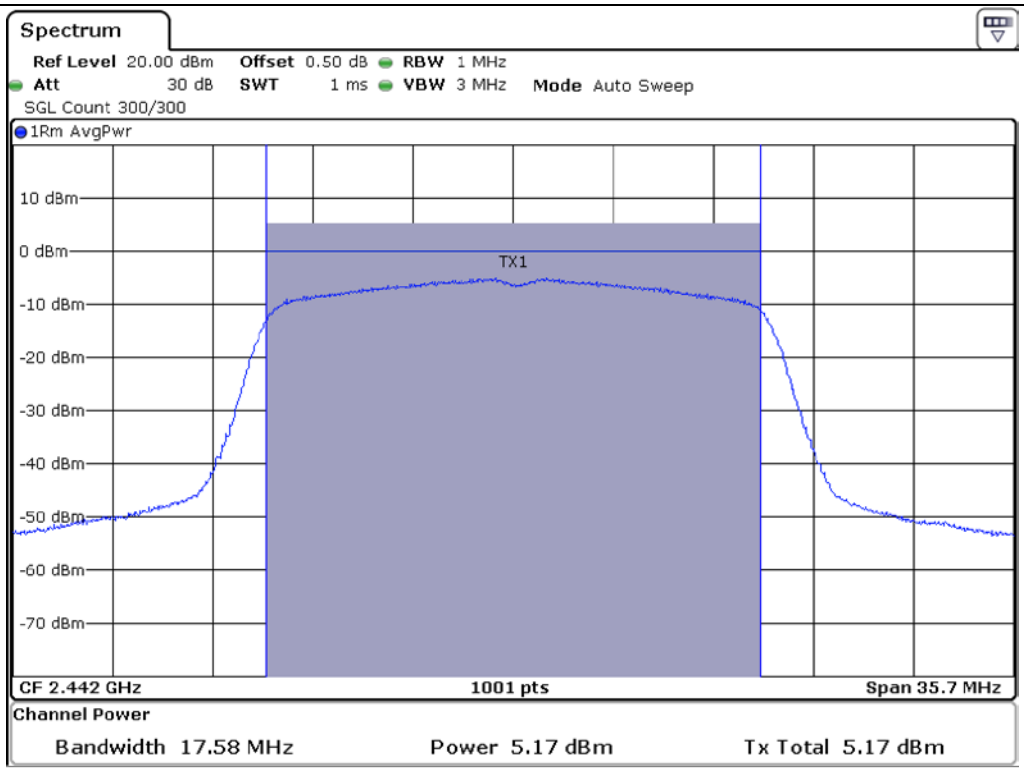
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	5.16	0.53	5.69	30.00	24.31
MIDDLE	2 442.00	5.17	0.53	5.70	30.00	24.30
HIGH	2 462.00	5.22	0.53	5.75	30.00	24.25

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

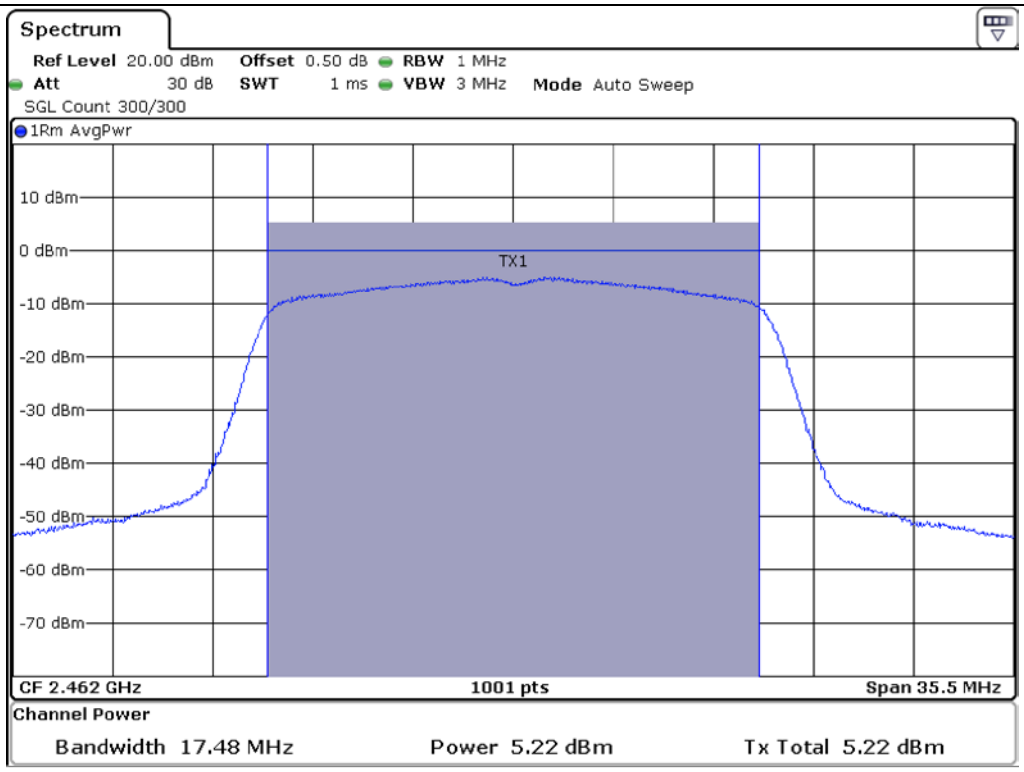
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

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

8.6.3 Test data for Multiple Transmit

-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

-. Duty Cycle : 88.51 %

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	7.83	0.53	8.36	30.00	21.64
MIDDLE	2 442.00	7.89	0.53	8.42	30.00	21.58
HIGH	2 462.00	8.17	0.53	8.70	30.00	21.30

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

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

Tested by: Hyung-Kwon, Oh / Manager

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

8.7 Test data for 802.11n_HT40 WLAN Mode

8.7.1 Test data for Antenna 0

-. Test Date : January 06, 2020 ~ January 16, 2020

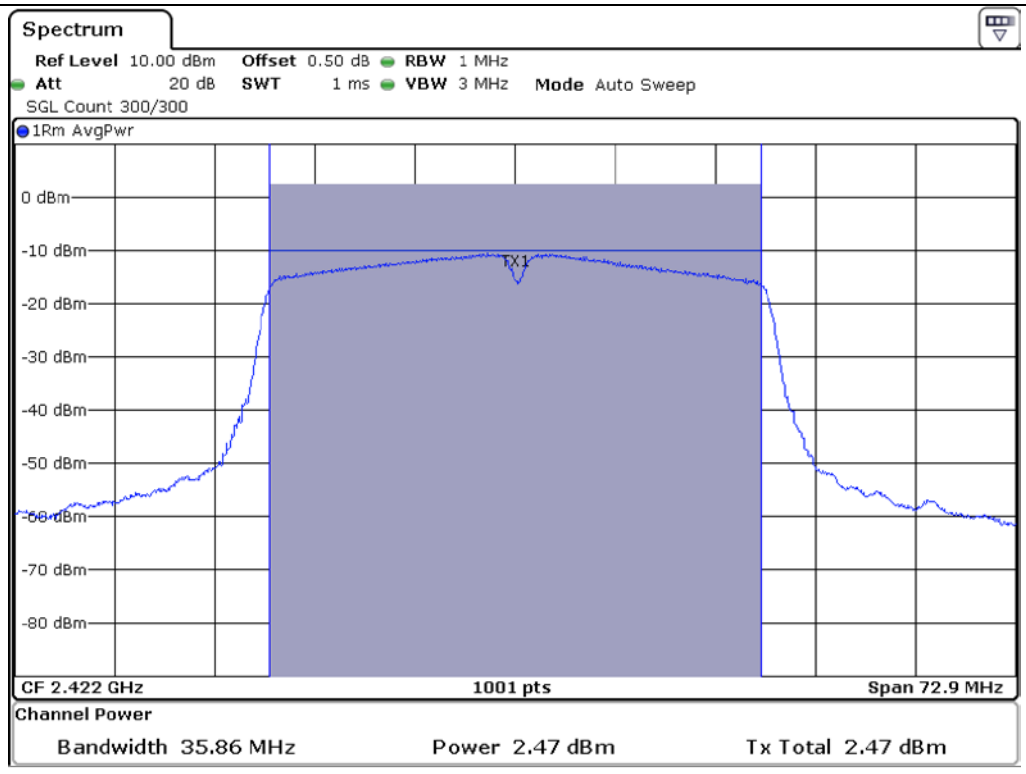
-. Test Result : Pass

-. Duty Cycle : 93.48 %

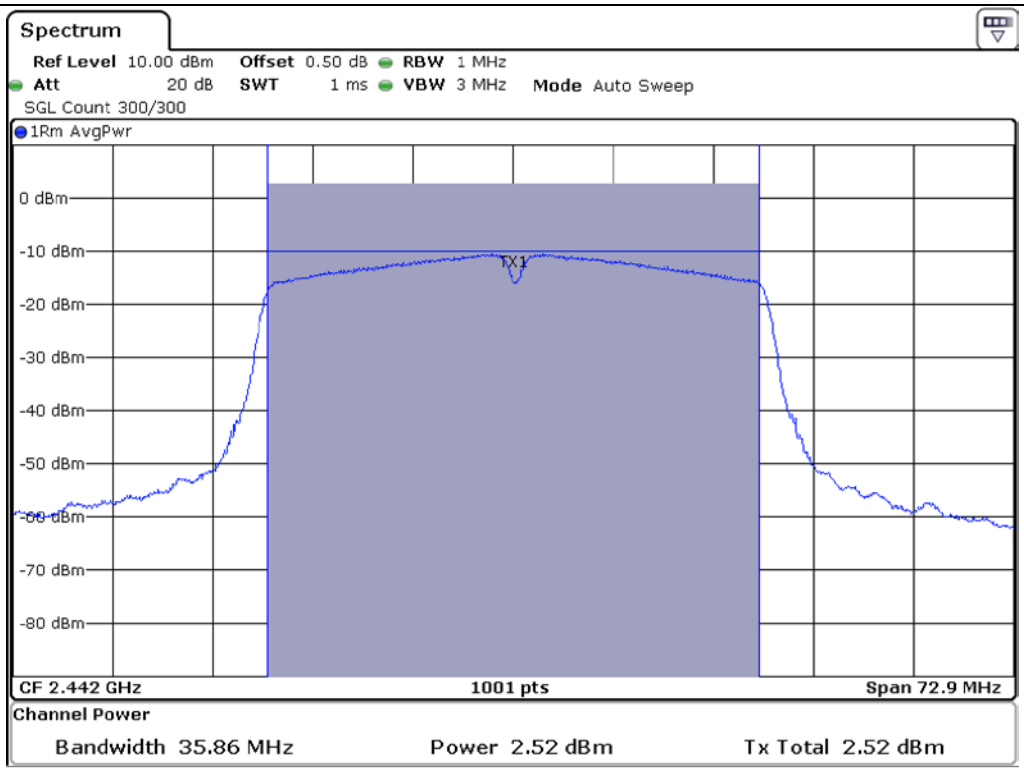
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	2.47	0.29	2.76	30.00	27.24
MIDDLE	2 442.00	2.52	0.29	2.81	30.00	27.19
HIGH	2 452.00	2.56	0.29	2.85	30.00	27.15

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

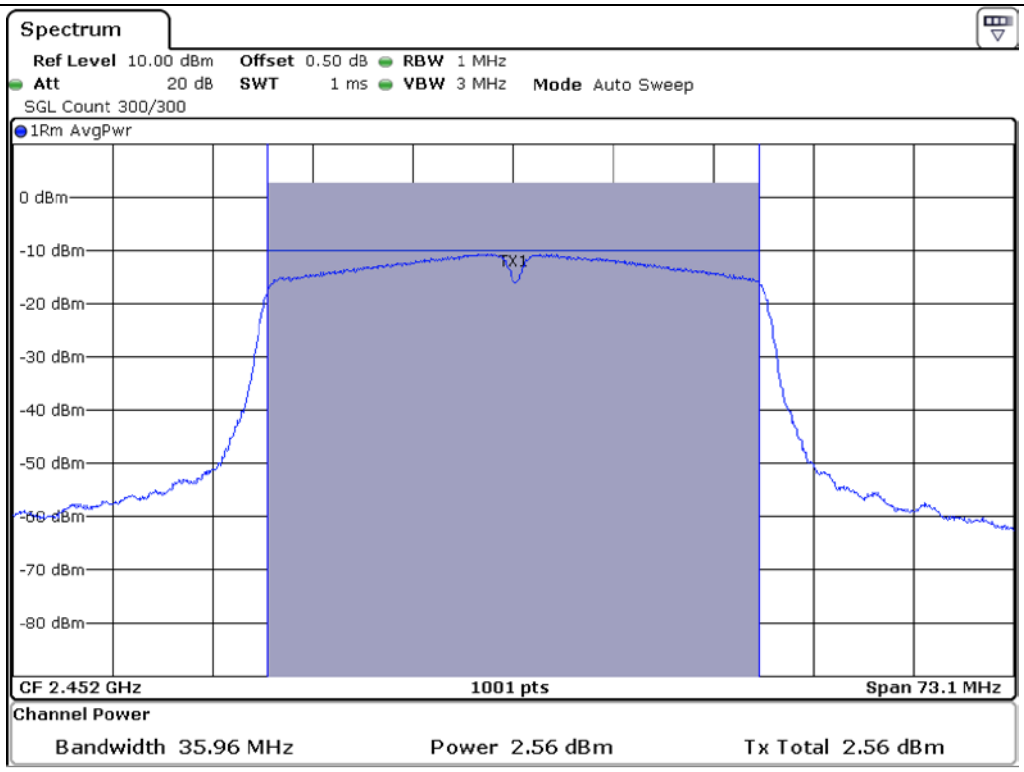
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

8.7.2 Test data for Antenna 1

-. Test Date : January 06, 2020 ~ January 16, 2020

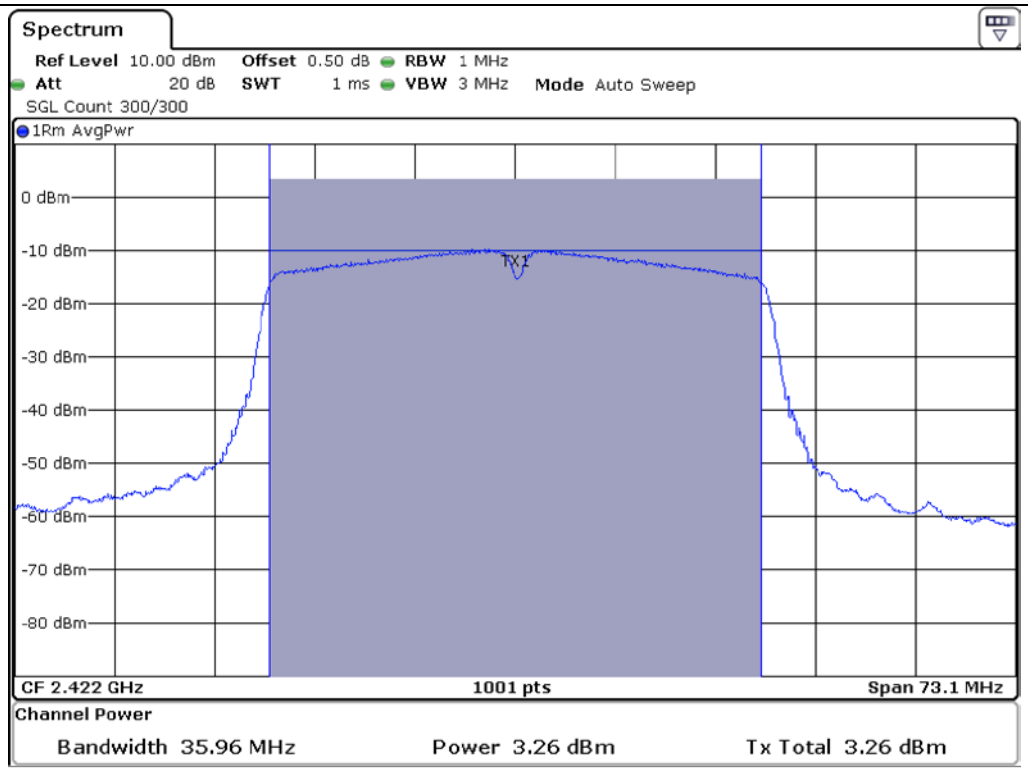
-. Test Result : Pass

-. Duty Cycle : 93.48 %

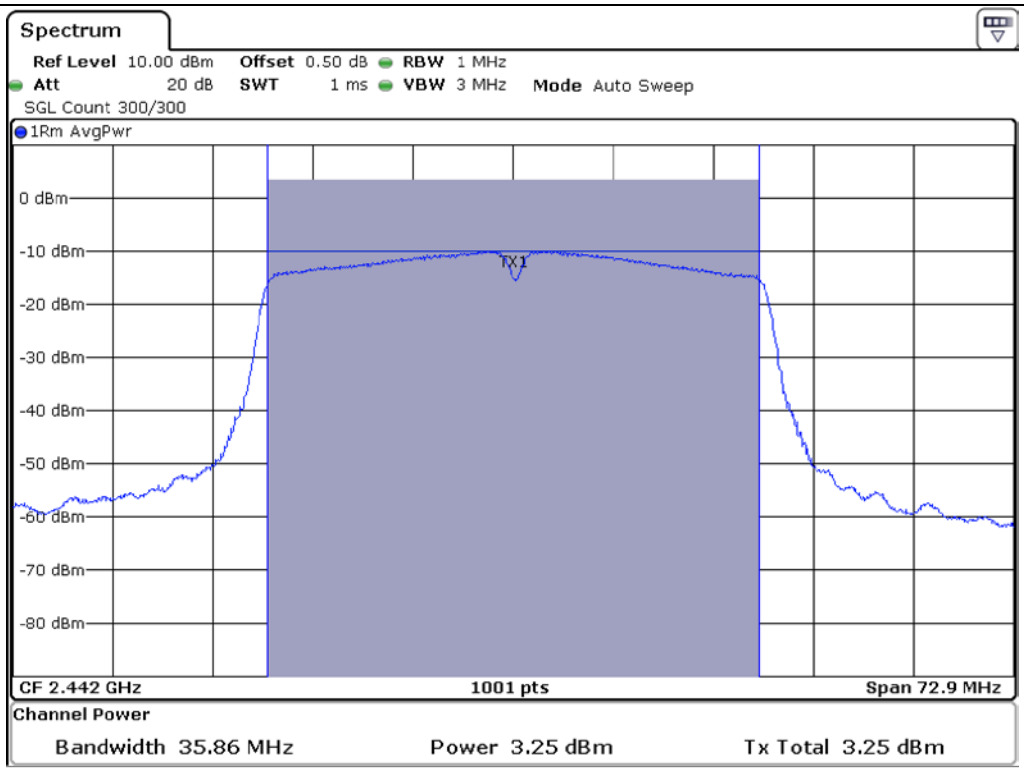
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	3.26	0.29	3.55	30.00	26.45
MIDDLE	2 442.00	3.25	0.29	3.54	30.00	26.46
HIGH	2 452.00	3.45	0.29	3.74	30.00	26.26

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

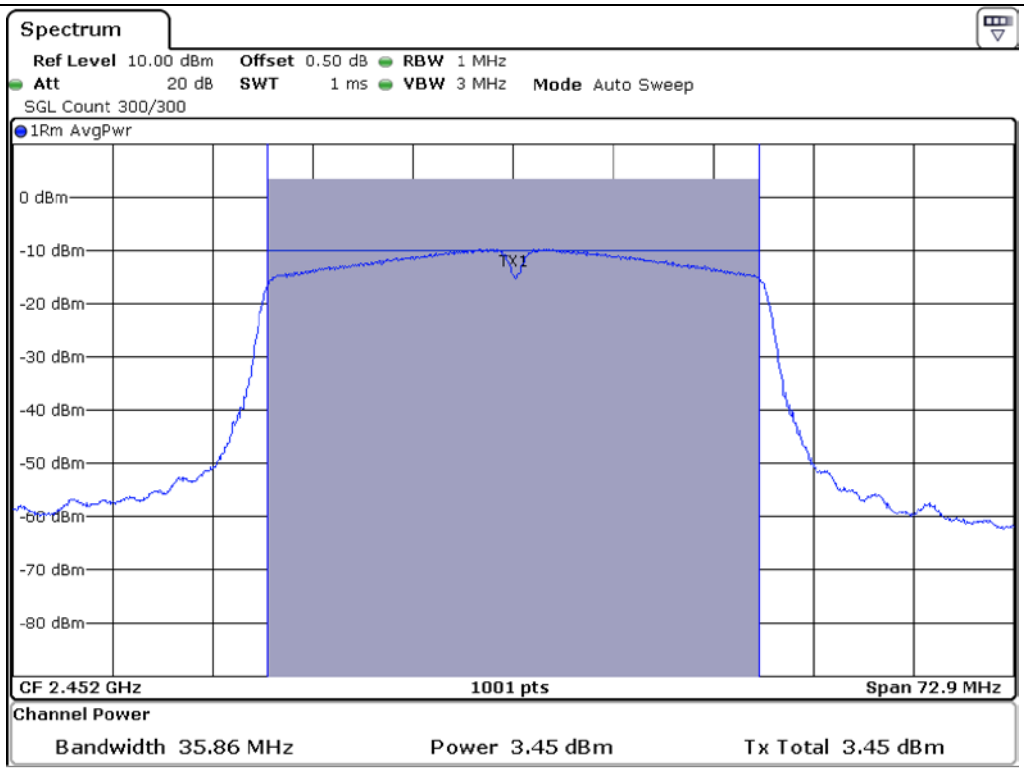
Tested by: Hyung-Kwon, Oh / Manager



Low Channel



Middle Channel



High Channel

8.7.3 Test data for Multiple Transmit

-. Test Date : January 06, 2020 ~ January 16, 2020

-. Test Result : Pass

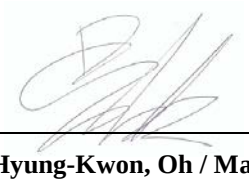
-. Duty Cycle : 93.48 %

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	Correction Factor (dB)	Result (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	5.89	0.29	6.18	30.00	23.82
MIDDLE	2 442.00	5.91	0.29	6.20	30.00	23.80
HIGH	2 452.00	6.04	0.29	6.33	30.00	23.67

Remark : Margin = Limit – Result (= Measured Vlaue + Correction Factor)

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



Tested by: Hyung-Kwon, Oh / Manager

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