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

Test Report No. : **OT-212-RWD-023**

Reception No. : **2101000175**

Applicant : **LG Electronics USA**

Address : **111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States**

Manufacturer : **LG Electronics Inc**

Address : **10, Magokjungang 10-ro, Gangseo-gu, Seoul, Republic of Korea**

Type of Equipment : **NAVIGATION RADIO**

FCC ID. : **BEJLANR22**

Model Name : **LANR22**

Serial number : **N/A**

Total page of Report : **102 pages (including this page)**

Date of Incoming : **January 28, 2021**

Date of issue : **February 08, 2021**

SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART E Section 15.407***

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
Hyung-Kwon, Oh / Manager	Tae-Ho, Kim / Senior 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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ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-212-RWD-023	February 08, 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, 07632, United States

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

Telephone No. : 201-266-2215

FCC ID : BEJLANR22

Model Name : LANR22

Brand Name : -

Serial Number : N/A

Date : February 08, 2021

EQUIPMENT CLASS	Unlicensed National Information infrastructure(UNII)
E.U.T. DESCRIPTION	NAVIGATION RADIO
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 E Section 15.407 789033 D02 General UNII Test Procedures New Rules 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.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.407(a)	26 dB Bandwidth	PASS
15.407(a)	Maximum Conducted Output Power	Met the Limit / PASS
15.407(a)	Peak Power Spectral Density	Met the Limit / PASS
15.407(e)	6 dB Bandwidth	Met the Limit / PASS
15.407(g)	Frequency Stability	Met the Limit / PASS
15.407(b)	Undesirable Emissions	Met the Limit / PASS
15.205, 15.407(b)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Met the Limit / PASS
15.207	Conducted Limits	N/A (See Note)

Note: This test is not performed because the EUT is operated by DC Power.

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 E Section 15.407

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 LANR22 (referred to as the EUT in this report) is a NAVIGATION RADIO. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	NAVIGATION RADIO	
Temperature Range	-40 °C ~ 80 °C	
OPERATING FREQUENCY	Bluetooth LE	2 402 MHz ~ 2 480 MHz
	Bluetooth	2 402 MHz ~ 2 480 MHz
	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))
	5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 805 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	Bluetooth LE	GFSK for 1 Mbps / 2 Mbps
	Bluetooth	GFSK for 1 Mbps, π/4-DQPSK for 2 Mbps, 8-DPSK for 3 Mbps
	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)

RF OUTPUT POWER	Bluetooth LE	1 Mbps	-2.62 dBm
		2 Mbps	-2.89 dBm
	Bluetooth	1 Mbps	-3.01 dBm
		2 Mbps	-4.21 dBm
		3 Mbps	-3.73 dBm
	WLAN 2.4 GHz	16.35 dBm(802.11b) 16.52 dBm(802.11g) 15.47 dBm(802.11n_HT20)	
	5 150 MHz ~ 5 250 MHz Band	13.44 dBm(802.11a) 9.37 dBm(802.11n_HT20) 8.70 dBm(802.11n_HT40) 6.72 dBm(802.11ac_VHT80)	
	5 725 MHz ~ 5 850 MHz Band	11.70 dBm(802.11a) 11.60 dBm(802.11n_HT20) 12.44 dBm(802.11n_HT40) 9.47 dBm(802.11ac_VHT80)	
ANTENNA TYPE	Bluetooth LE	Chip Antenna	
	Bluetooth	Chip Antenna	
	WLAN 2.4 GHz	PCB Antenna	
	WLAN 5 GHz	Chip Antenna	
ANTENNA GAIN	Bluetooth LE	2.49 dBi	
	Bluetooth	2.49 dBi	
	WLAN 2.4 GHz	-2.91 dBi	
	5 150 MHz ~ 5 250 MHz Band	2.89 dBi	
	5 725 MHz ~ 5 850 MHz Band	2.53 dBi	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		32.768 kHz, 20 MHz, 25 MHz, 28.636 36 MHz, 38.4 MHz, 55.466 67 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	N/A	N/A
Audio Board	LG Electronics Inc	N/A	N/A
Antenna Board	LG Electronics Inc	N/A	N/A

5.2 Peripheral equipment

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

Model	Manufacturer	Description	Connected to
LANR22	LG Electronics Inc	NAVIGATION RADIO (EUT)	
PWS-3003D	Protek	DC Power Supply (DC 30 V 3 A)	

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.

UNII 1

Modulation	DATA RATE	OUTPUT POWER[dBm]
802.11 a (Middle Channel)	6 Mbps	13.39
	9 Mbps	1262
	12 Mbps	12.18
	18 Mbps	11.49
	24 Mbps	10.95
	36 Mbps	10.44
	48 Mbps	9.87
	54 Mbps	9.35
HT 20 (Middle Channel)	6.5 Mbps	9.37
	13 Mbps	8.70
	19.5 Mbps	8.21
	26 Mbps	7.24
	39 Mbps	6.20
	52 Mbps	5.43
	58.5 Mbps	4.31
	65 Mbps	3.05
HT 40 (Low Channel)	13.5 Mbps	8.70
	27 Mbps	8.05
	40.5 Mbps	7.37
	54 Mbps	6.75
	81 Mbps	5.40
	108 Mbps	4.68
	121.5 Mbps	3.50
	135 Mbps	2.76

VHT80 (Middle Channel)	29.3 Mbps	6.72
	58.5 Mbps	6.15
	87.8 Mbps	5.37
	117 Mbps	4.63
	175.5 Mbps	3.95
	234 Mbps	3.01
	263.3 Mbps	2.27
	292.5 Mbps	1.12
	351 Mbps	-0.88
	390 Mbps	-1.43

-. The worse case data rate for each modulation is determined 6 Mbps for IEEE 802.11a, 6.5 Mbps for HT20, 13.5 Mbps for HT40, 29.3 Mbps for VHT80.

-. 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.

UNII 3

Modulation	DATA RATE	OUTPUT POWER[dBm]
802.11 a (Middle Channel)	6 Mbps	11.31
	9 Mbps	11.12
	12 Mbps	10.82
	18 Mbps	10.42
	24 Mbps	9.70
	36 Mbps	9.23
	48 Mbps	8.77
	54 Mbps	8.50
HT 20 (Middle Channel)	6.5 Mbps	11.06
	13 Mbps	10.73
	19.5 Mbps	10.35
	26 Mbps	9.59
	39 Mbps	9.42
	52 Mbps	9.05
	58.5 Mbps	8.55
	65 Mbps	8.16
HT 40 (Low Channel)	13.5 Mbps	12.44
	27 Mbps	11.89
	40.5 Mbps	11.60
	54 Mbps	11.24
	81 Mbps	10.72
	108 Mbps	10.35
	121.5 Mbps	9.65
	135 Mbps	9.03

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VHT80 (Middle Channel)	29.3 Mbps	9.47
	58.5 Mbps	8.69
	87.8 Mbps	8.15
	117 Mbps	7.73
	175.5 Mbps	6.82
	234 Mbps	6.12
	263.3 Mbps	5.50
	292.5 Mbps	4.77
	351 Mbps	4.12
	390 Mbps	3.28

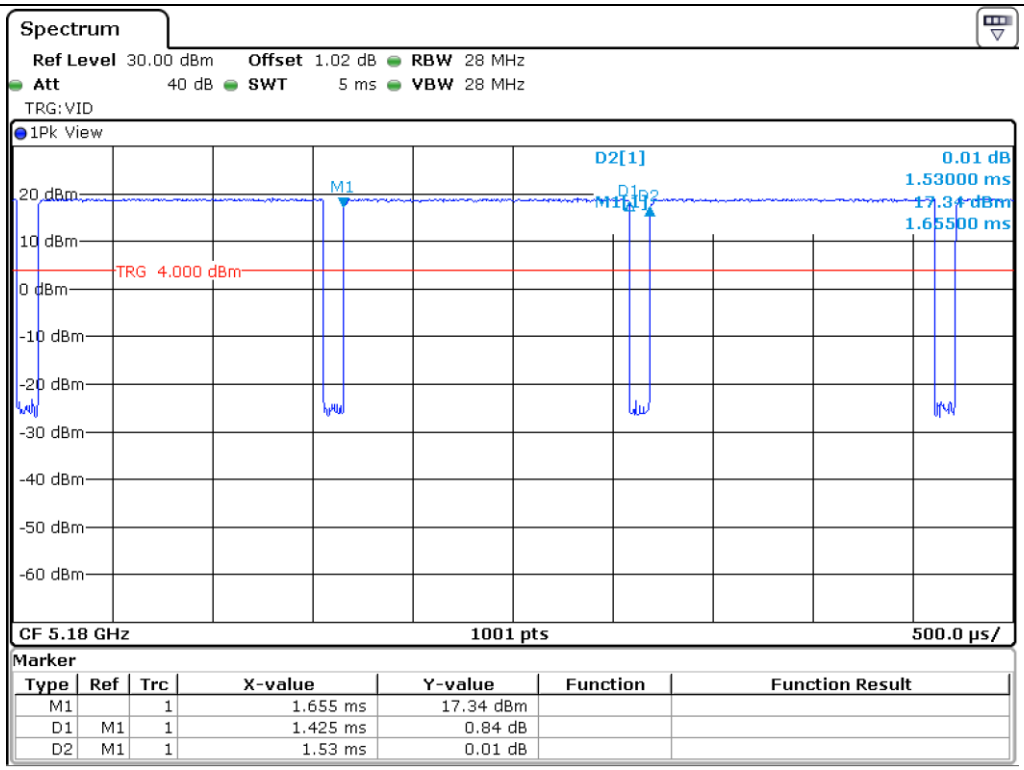
-. The worse case data rate for each modulation is determined 6 Mbps for IEEE 802.11a, 6.5 Mbps for HT20, 13.5 Mbps for HT40, 29.3 Mbps for VHT80.

-. 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.

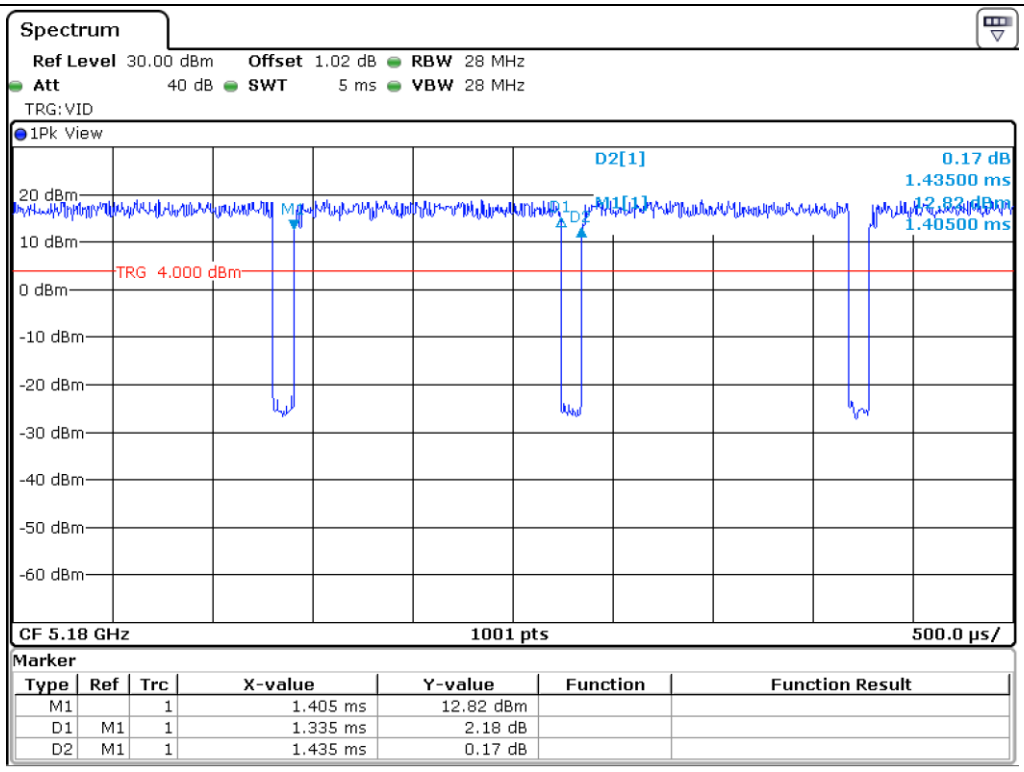
-. Duty Cycle

Band	Mode	Tx On Time [ms]	Tx Off Time [ms]	Duty Cycle [%]	Correction Factor [dB]
UNII 1	802.11 a	1.425	0.105	93.14	0.31
	802.11 HT 20	1.335	0.100	93.03	0.31
	802.11 HT 40	0.665	0.105	86.36	0.64
	802.11 VHT 80	0.332	0.102	76.50	1.16
UNII 3	802.11 a	1.425	0.105	93.14	0.31
	802.11 HT 20	1.335	0.100	93.03	0.31
	802.11 HT 40	0.665	0.105	86.36	0.64
	802.11 VHT 80	0.332	0.102	76.50	1.16

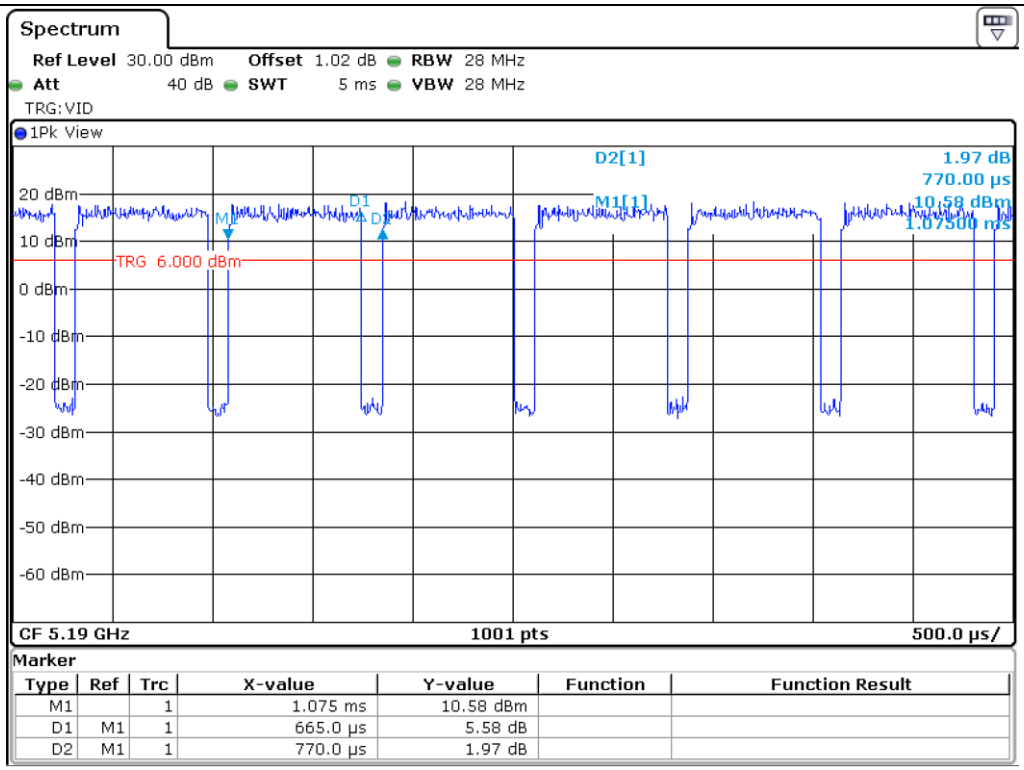
-. Test Plot



UNII 1_802.11 a



UNII 1_802.11 HT 20



UNII 1_802.11 HT40

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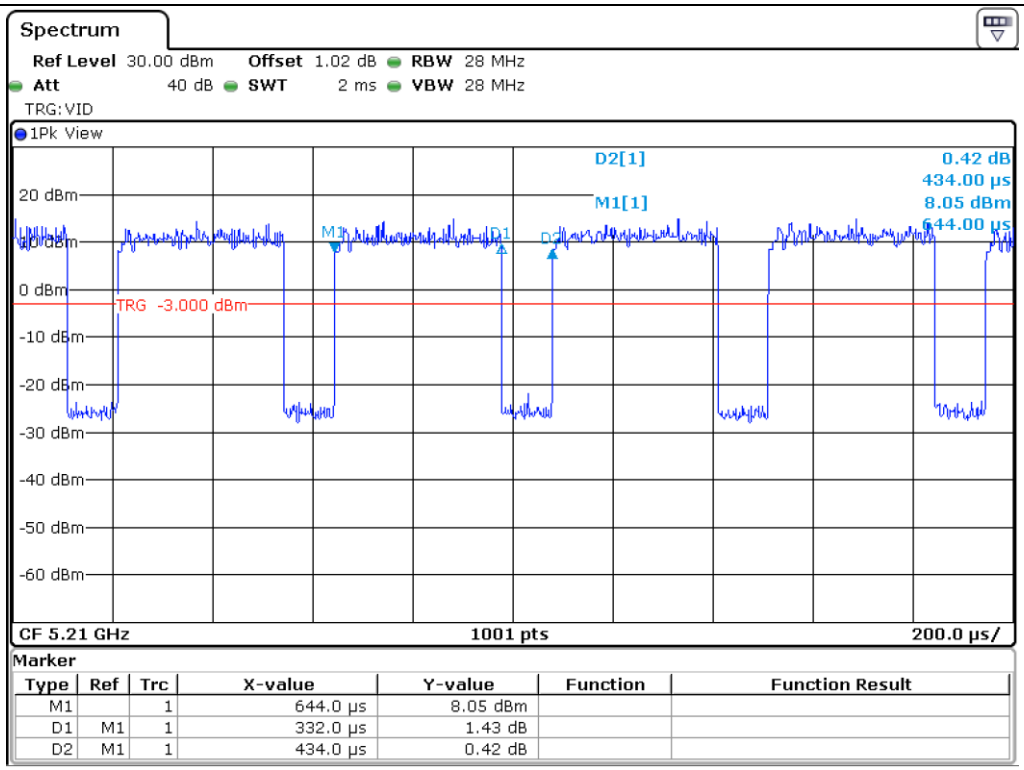

UNII 1_802.11 VHT 80

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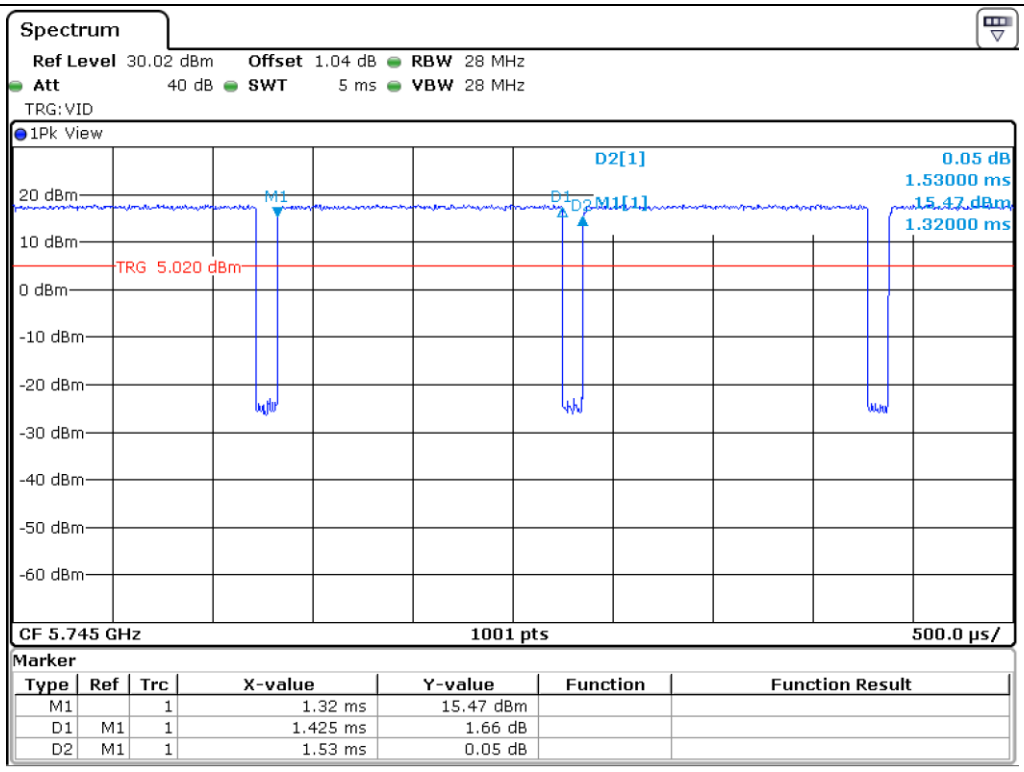
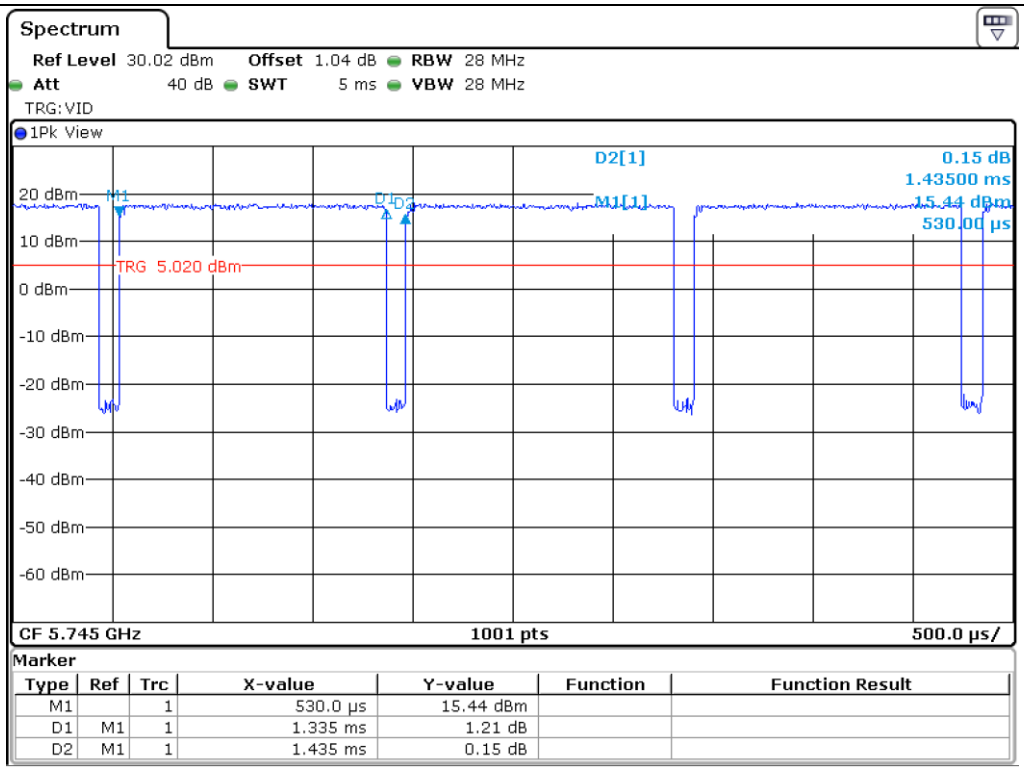


UNII 3_802.11 a



UNII 3_802.11 HT 20

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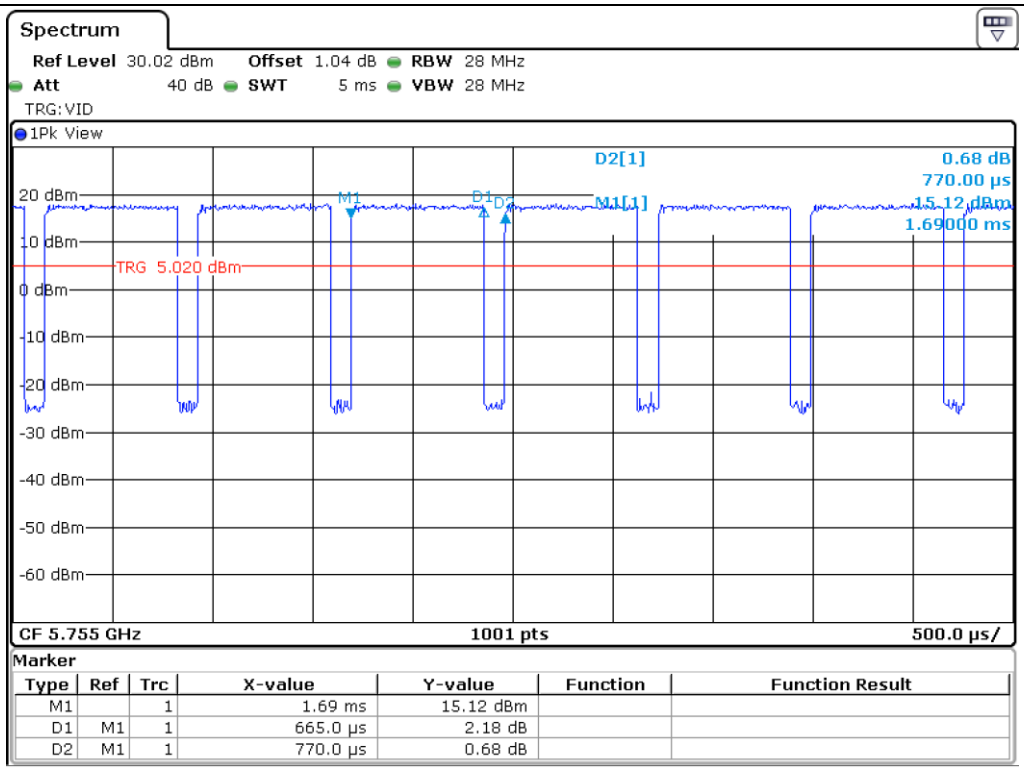
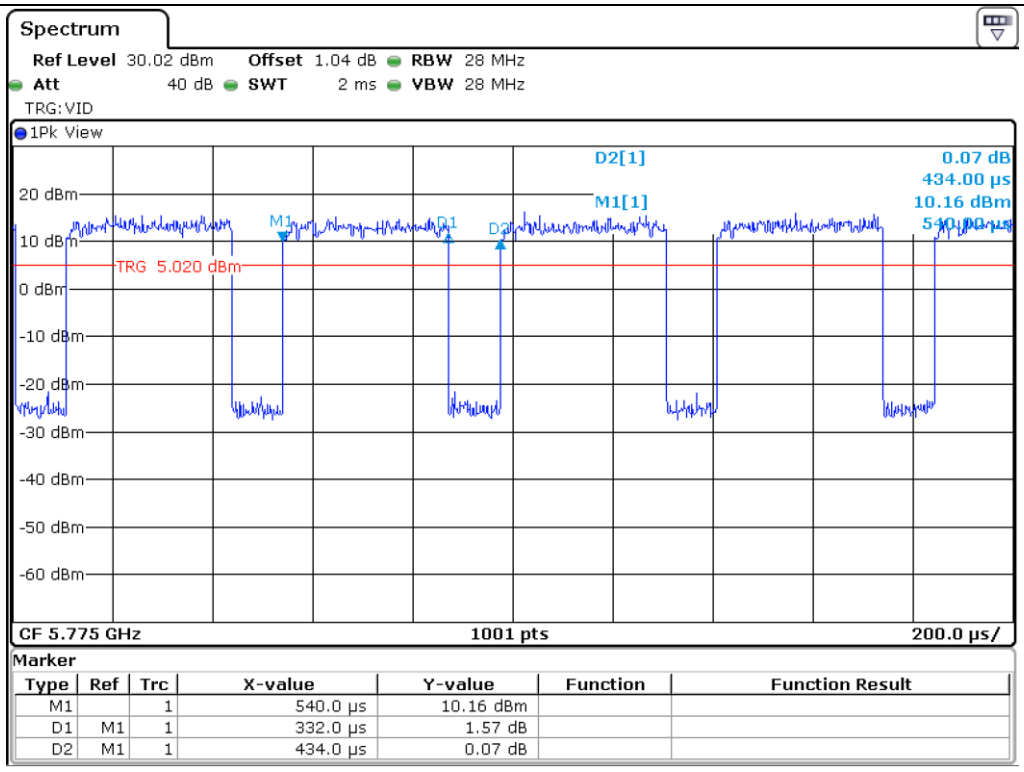


UNII 3_802.11 HT40



UNII 3_802.11 VHT 80

-. Channel List (5 150 MHz ~ 5 250 MHz Band)

802.11a / n_HT20 / ac_VHT20		802.11n_HT40 / ac_VHT40		802.11ac_VHT80	
Channel	Frequency[MHz]	Channel	Frequency[MHz]	Channel	Frequency[MHz]
36	5 180.00	38	5 190.00	42	5 210.00
40	5 200.00	46	5 230.00		
44	5 220.00				
48	5 240.00				

-. Channel List (5 725 MHz ~ 5 850 MHz Band)

802.11a / n_HT20 / ac_VHT20		802.11n_HT40 / ac_VHT40		802.11ac_VHT80	
Channel	Frequency[MHz]	Channel	Frequency[MHz]	Channel	Frequency[MHz]
149	5 745.00	151	5 755.00	155	5 775.00
153	5 765.00	159	5 795.00		
157	5 785.00				
161	5 805.00				

5.4 Configuration of Test System

Line Conducted Test: It is not need to test this requirement, because the EUT shall be operated by DC Power.

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 a Chip 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)
It is not need to test this requirement, because the power of the EUT is supplied by DC Power.	

6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

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

7. MIMIMUM 26 dB BANDWIDTH

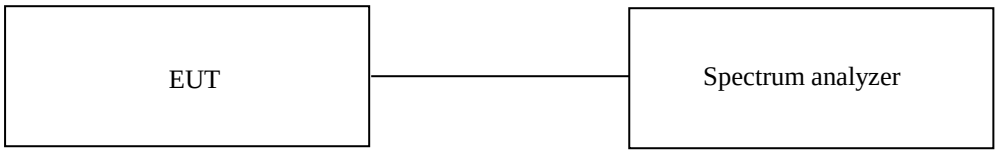
7.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % 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 approximately 1% of the emission bandwidth, and peak detection was used. The 26 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 26 dB.



7.3 Test Date

January 28, 2021 ~ February 04, 2021

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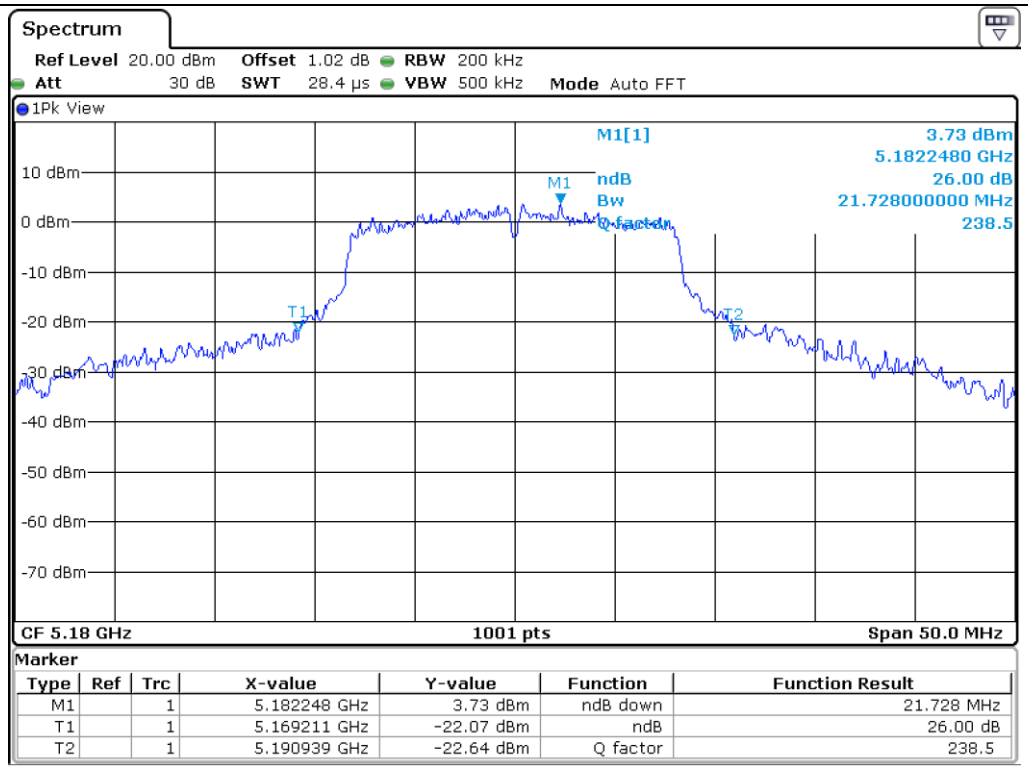
7.4 Test data for 802.11a RLAN Mode

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180.00	21.73
	Middle	5 220.00	22.23
	High	5 240.00	21.63
5 725 ~ 5 850	Low	5 745.00	21.63
	Middle	5 785.00	21.88
	High	5 805.00	21.68



Low Channel (5 180 MHz)

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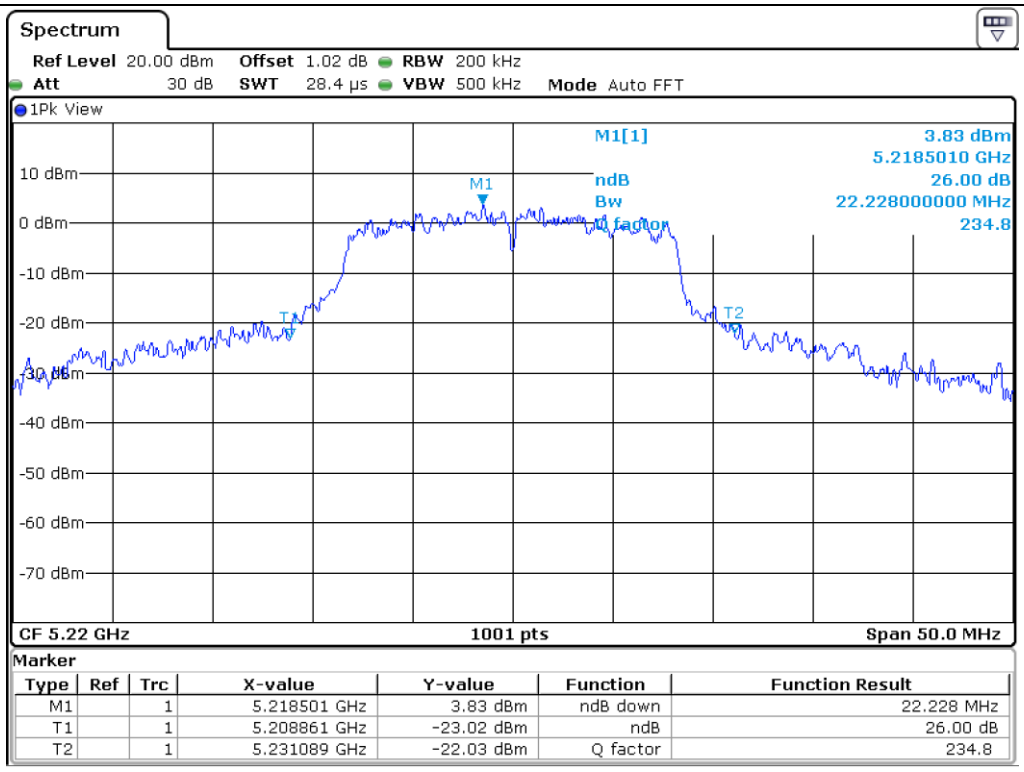
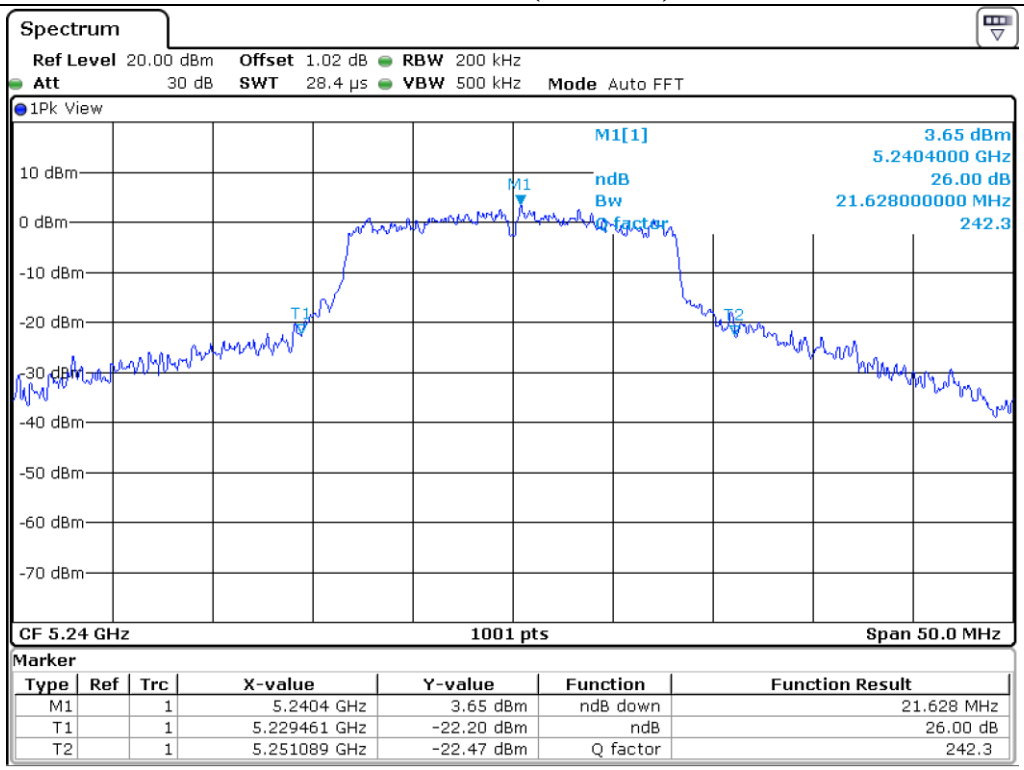


Middle Channel (5 220 MHz)



High Channel (5 240 MHz)

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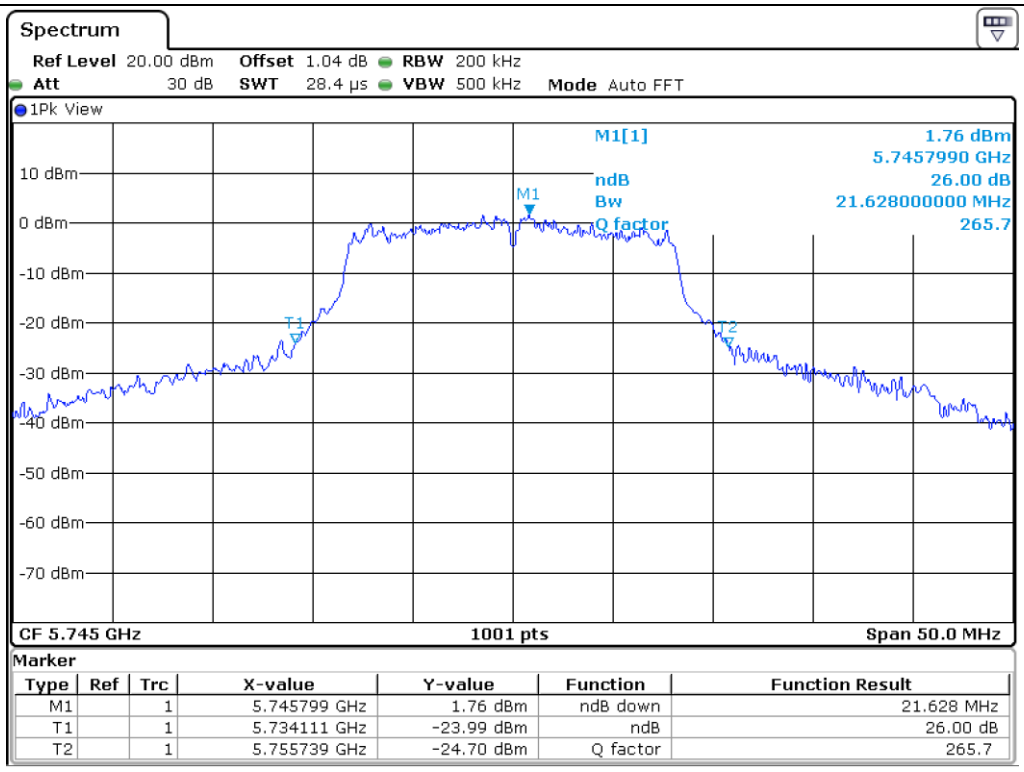
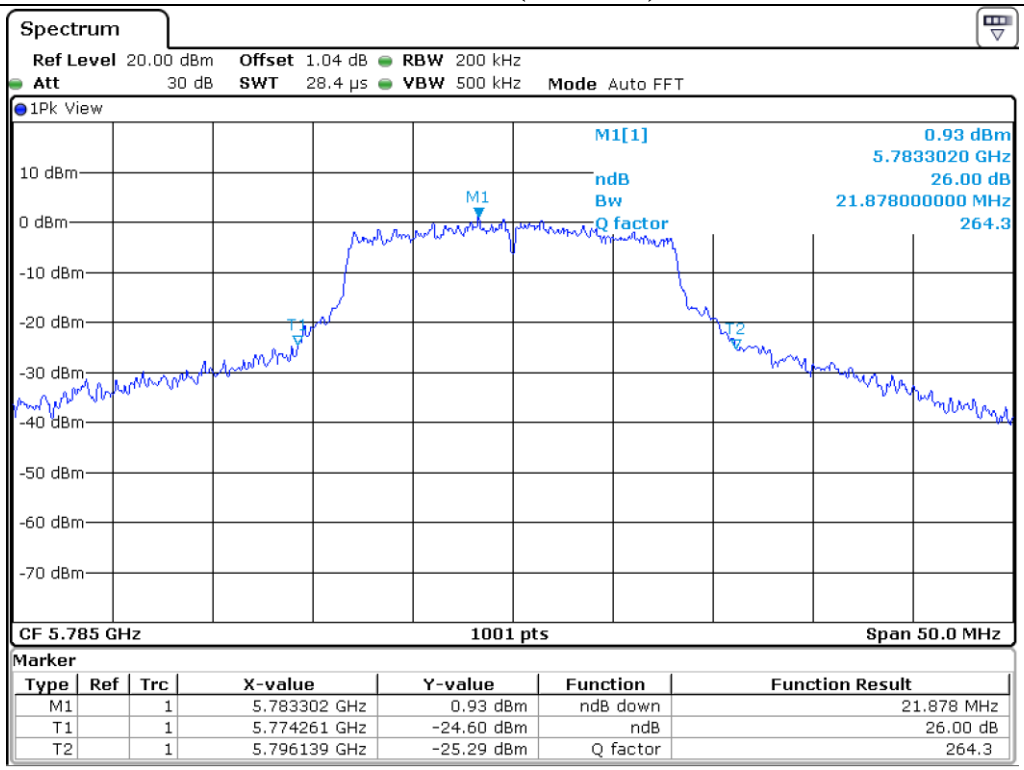


Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)

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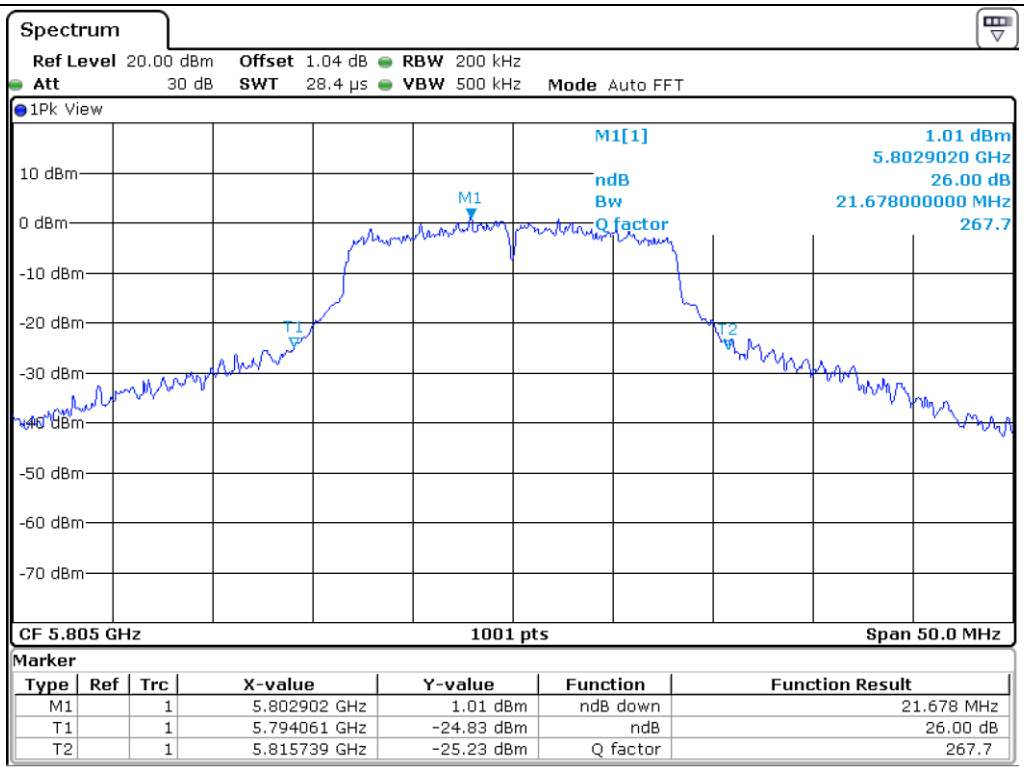

High Channel (5 805 MHz)

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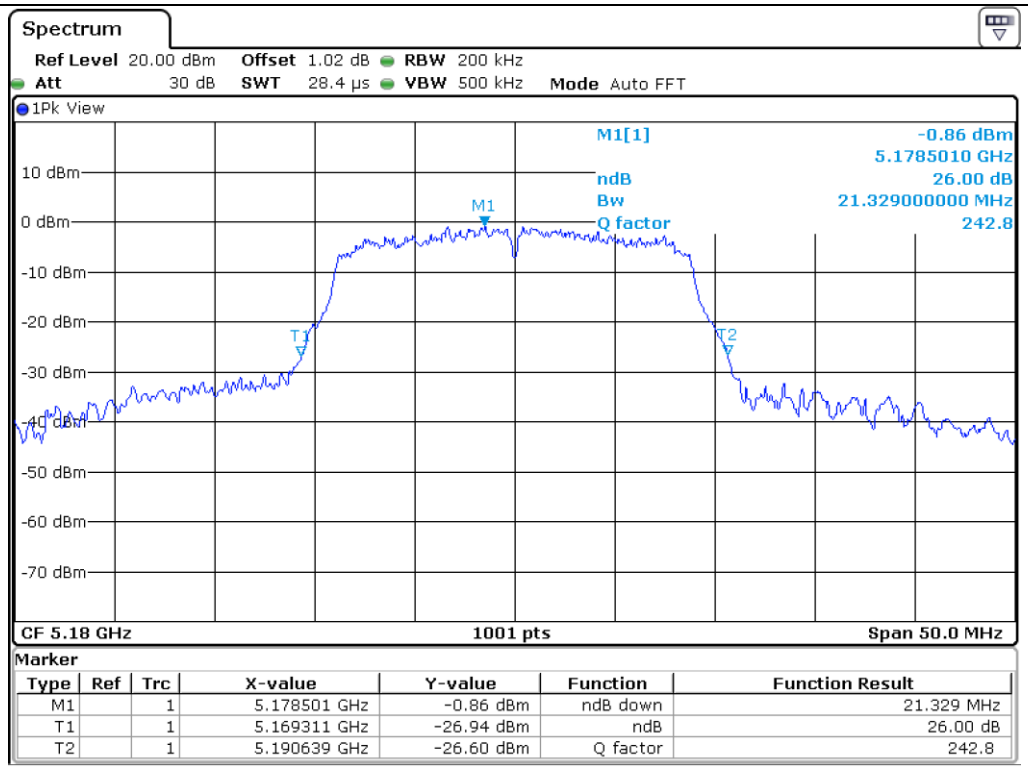
7.5 Test data for 802.11n_HT20 RLAN Mode

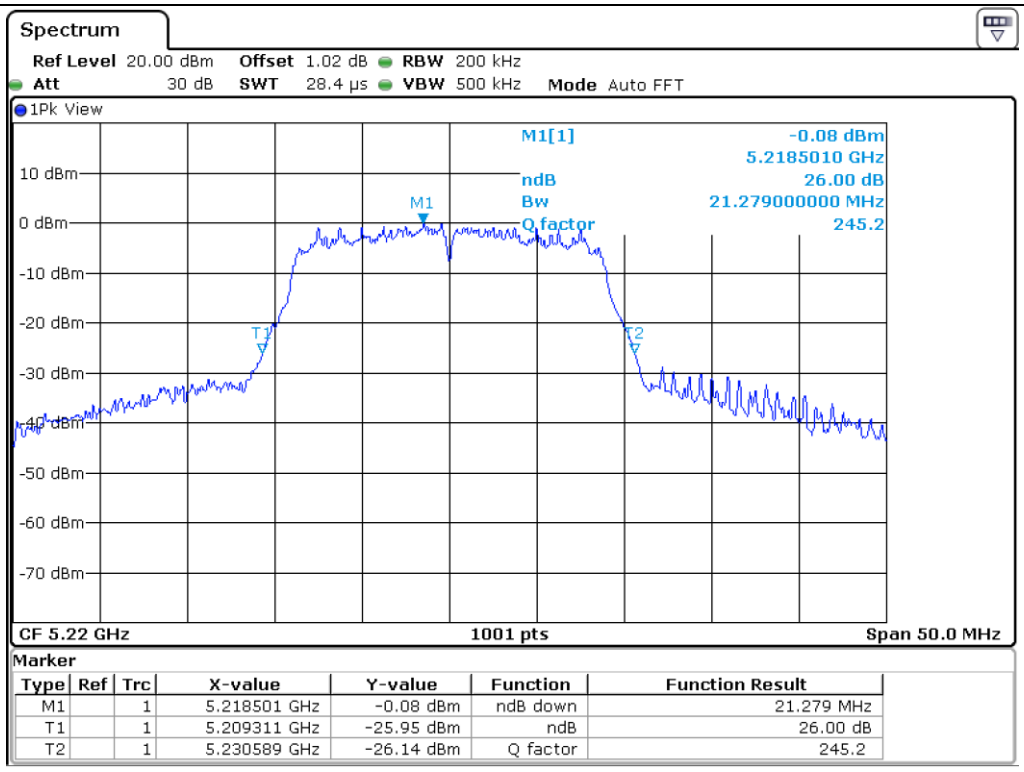
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 150 ~ 5 250	Low	5 180.00	21.33
	Middle	5 220.00	21.28
	High	5 240.00	21.58
5 725 ~ 5 850	Low	5 745.00	21.53
	Middle	5 785.00	22.18
	High	5 805.00	21.78

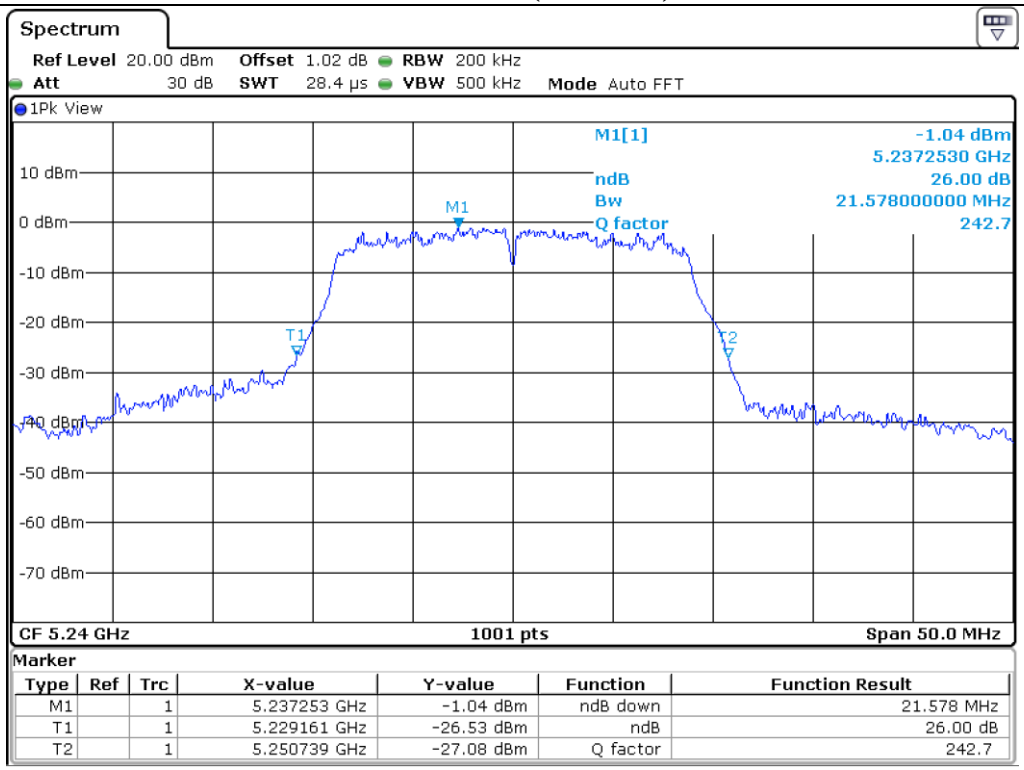


Low Channel (5 180 MHz)

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

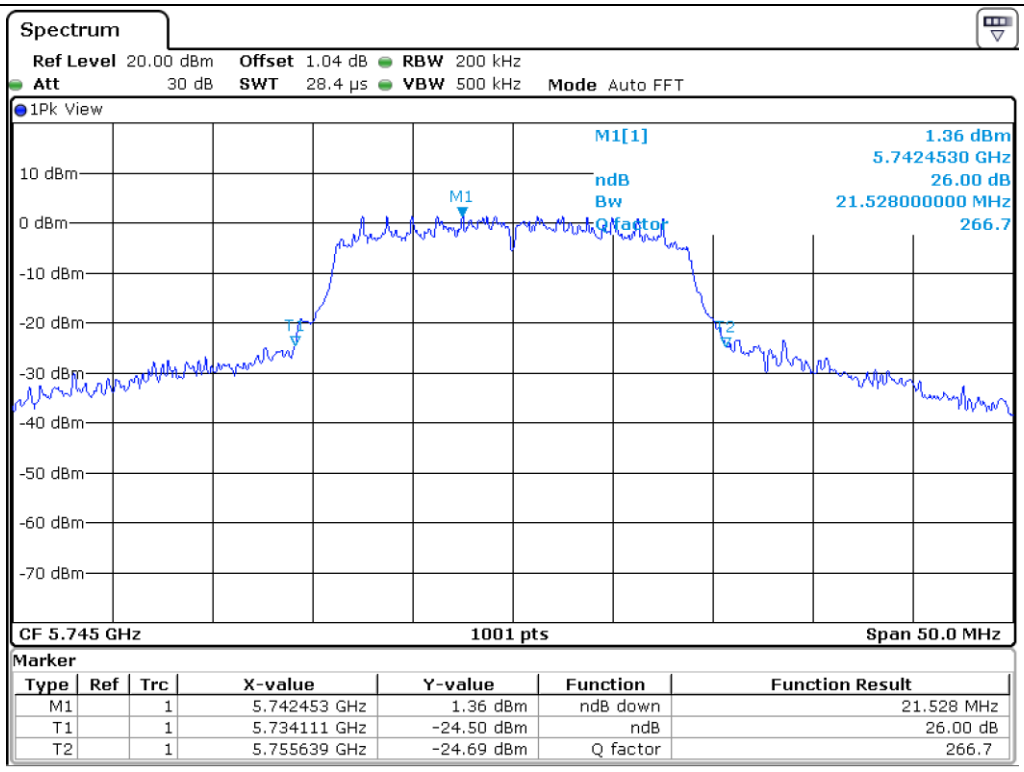


Middle Channel (5 220 MHz)

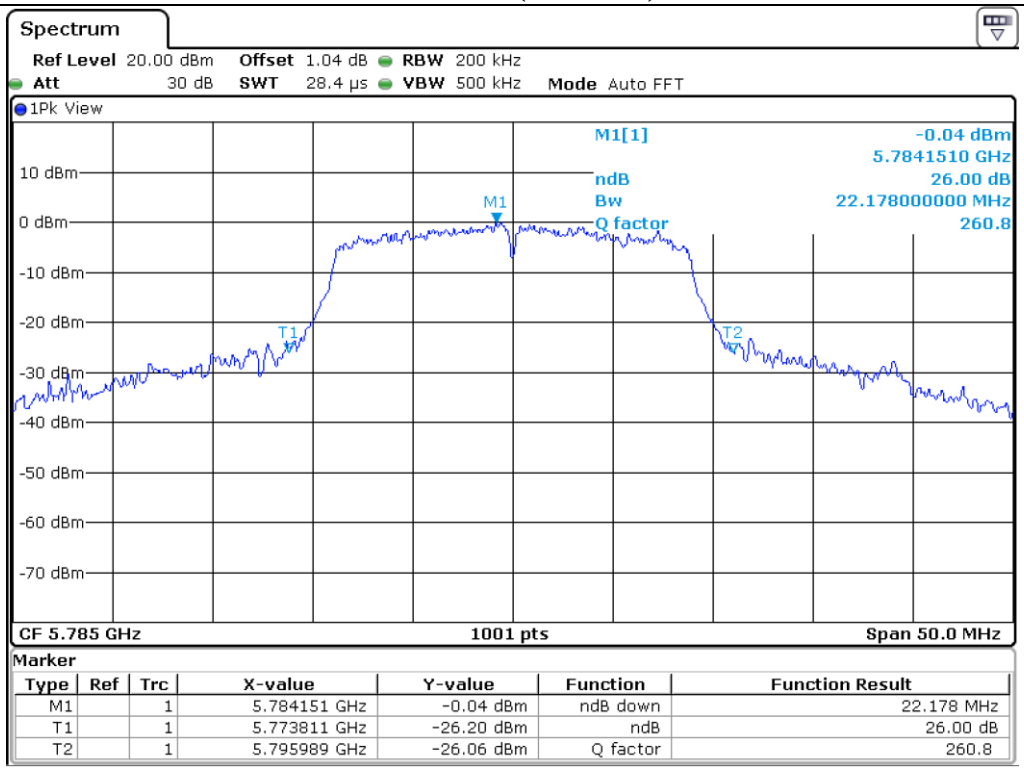


High Channel (5 240 MHz)

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

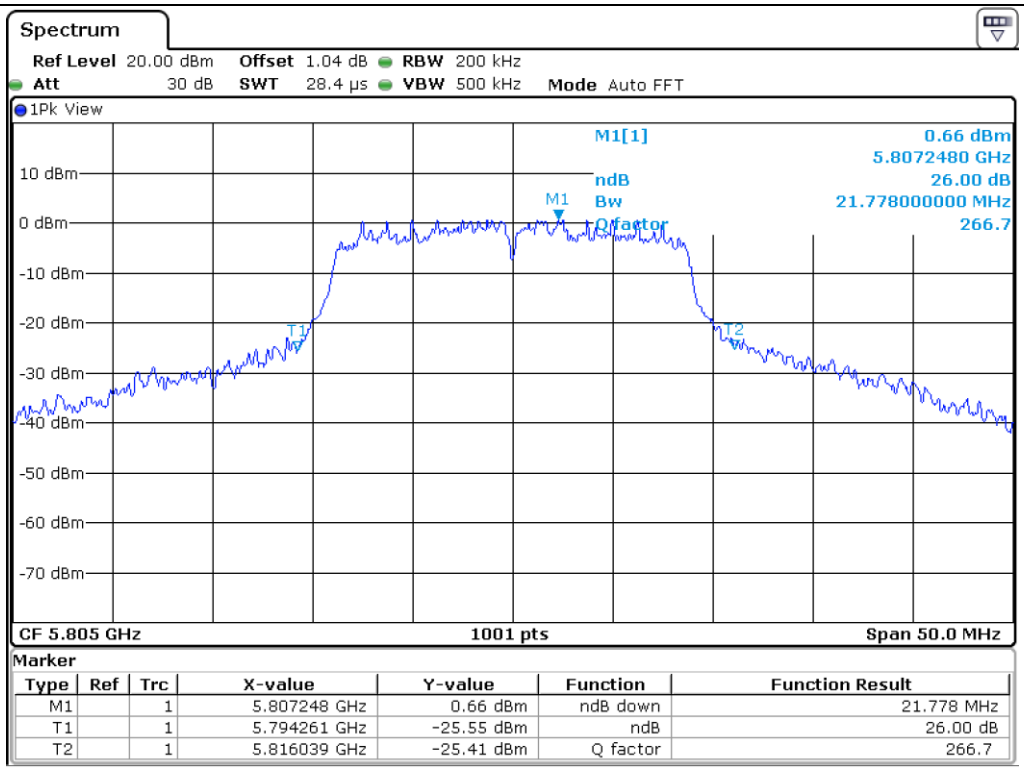


Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)

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



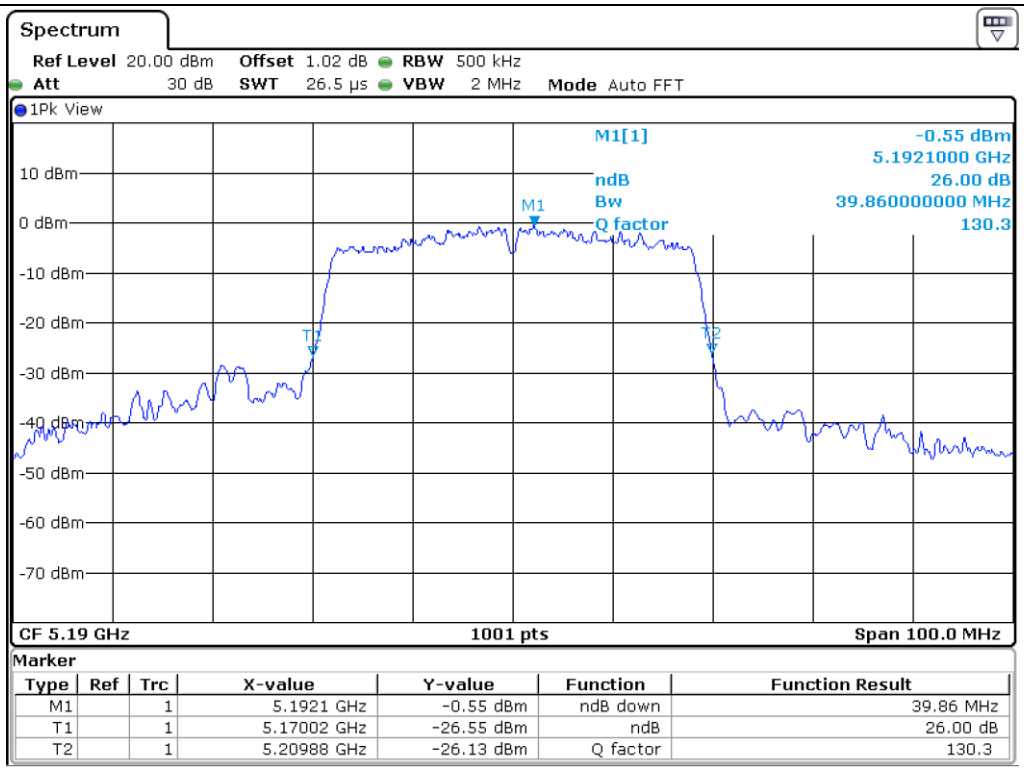
High Channel (5 805 MHz)

7.6 Test data for 802.11n_HT40 RLAN Mode

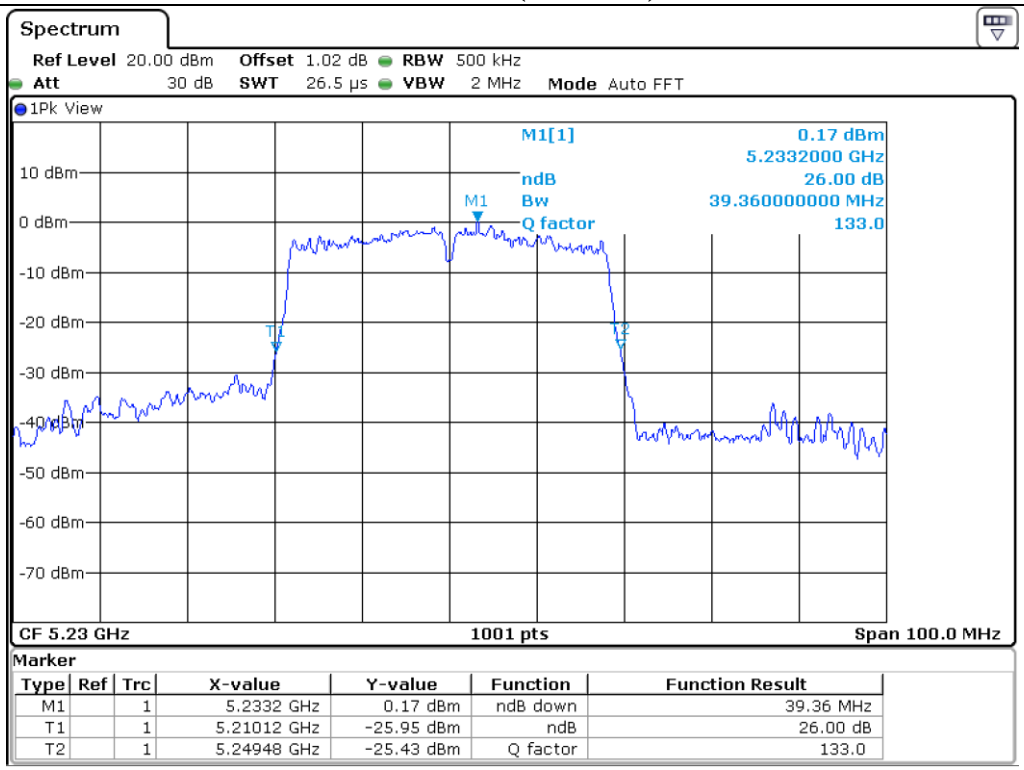
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 150 ~ 5 250	Low	5 190.00	39.86
	High	5 230.00	39.36
5 725 ~ 5 850	Low	5 755.00	41.76
	High	5 795.00	40.76

Remark: See next page for measurement data.

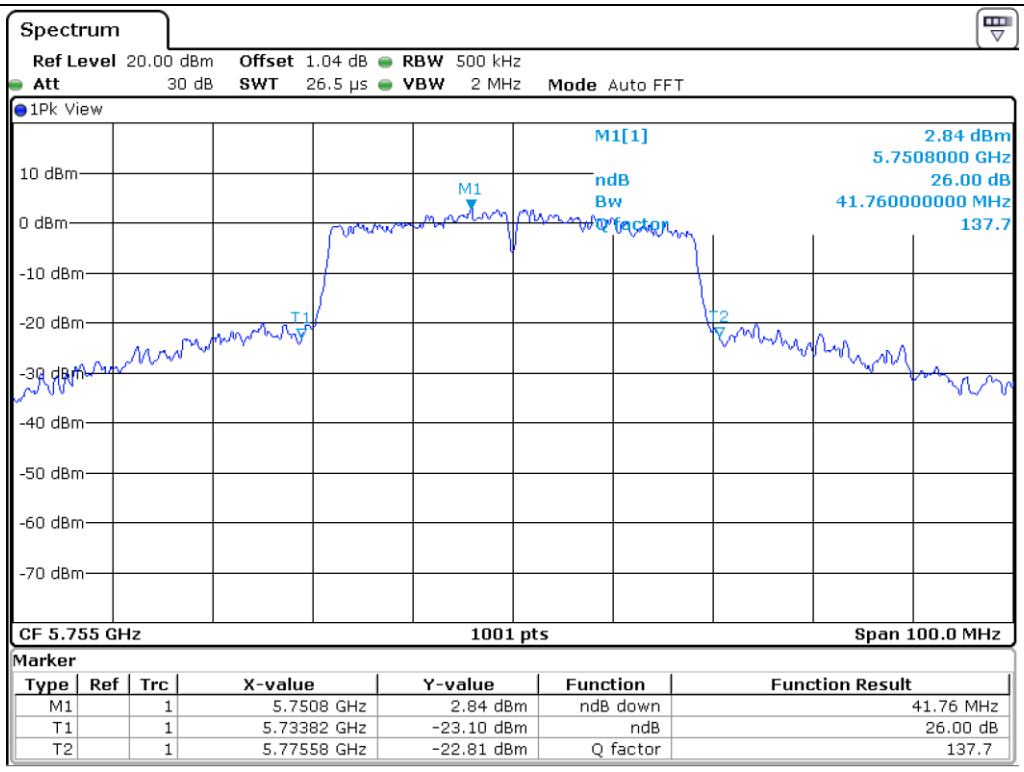


Low Channel (5 190 MHz)

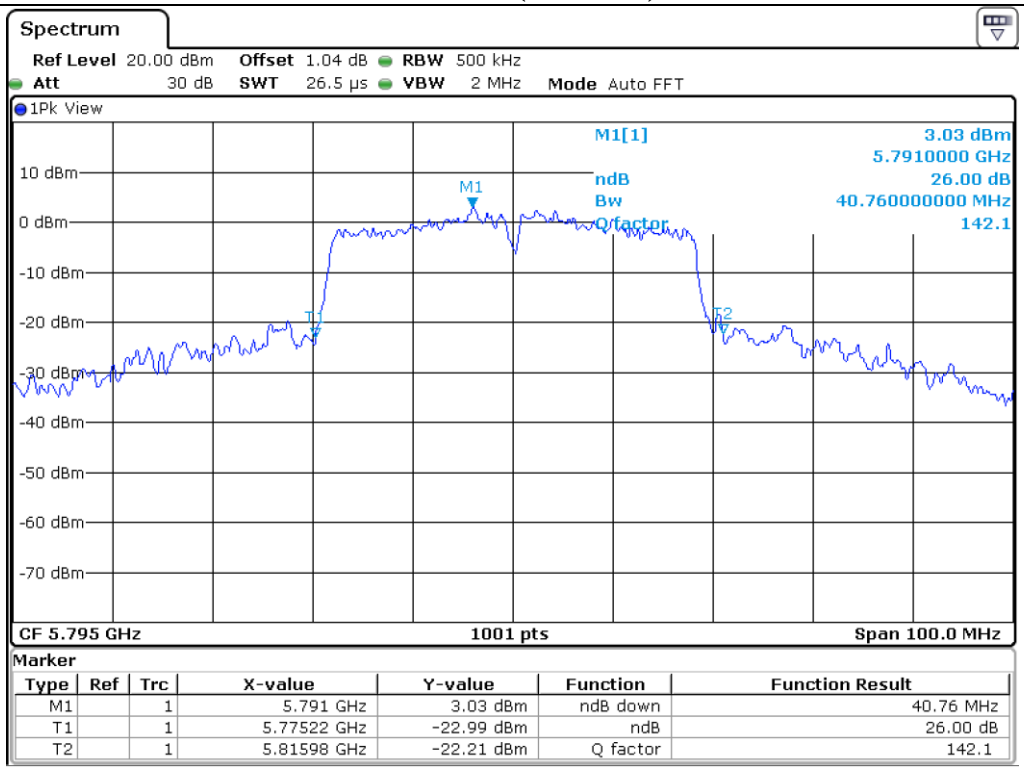


High Channel (5 230 MHz)

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



Low Channel (5 755 MHz)



High Channel (5 795 MHz)

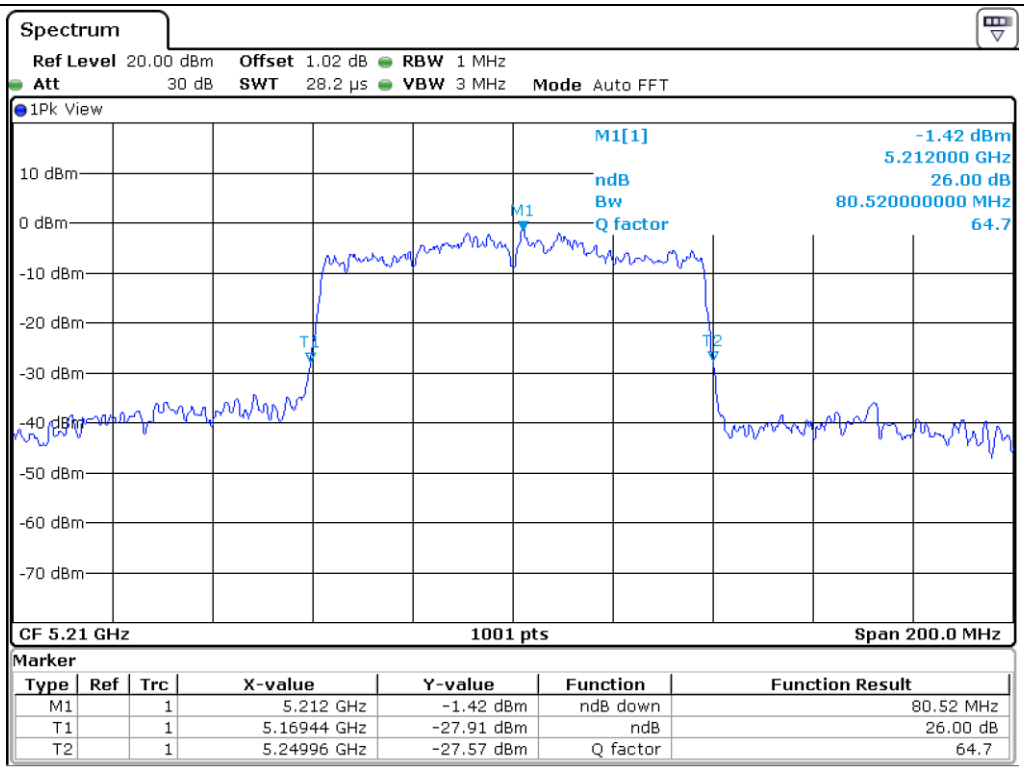
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

7.7 Test data for 802.11ac_VHT80 RLAN Mode

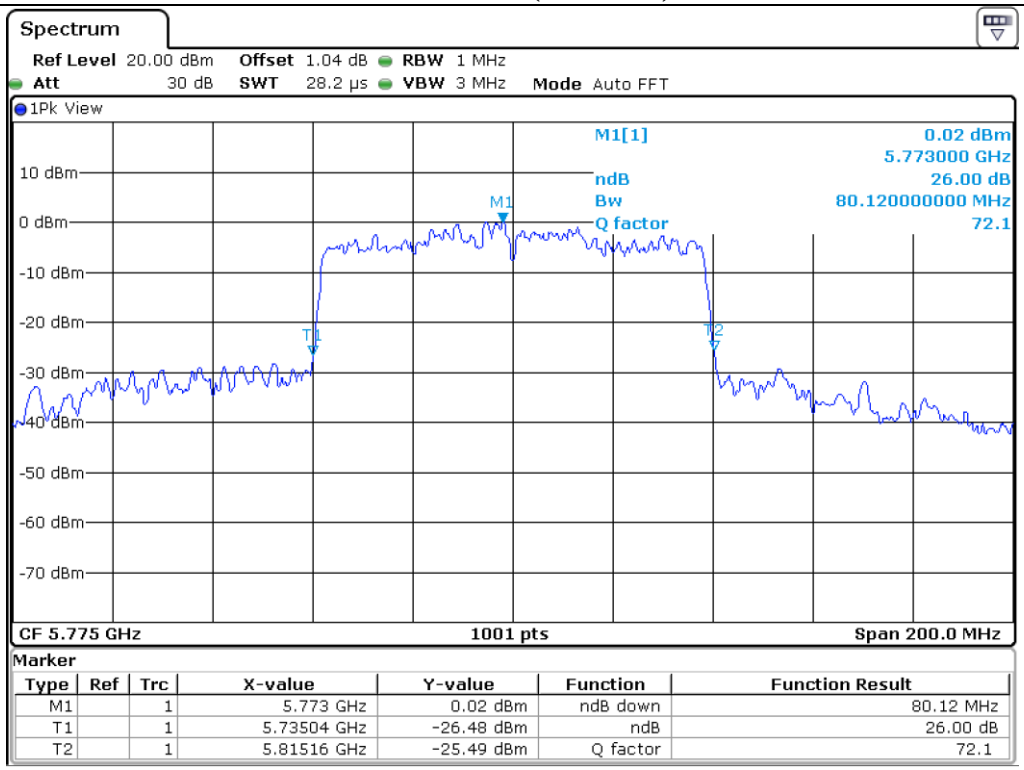
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 150 ~ 5 250	Middle	5 210.00	80.52
5 725 ~ 5 850	Middle	5 775.00	80.12

Remark: See next page for measurement data.



Middle Channel (5 210 MHz)



Middle Channel (5 775 MHz)

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 dB BANDWIDTH

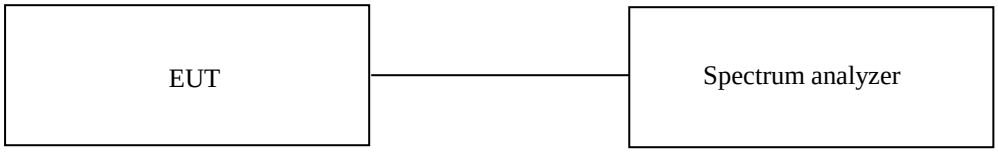
8.1 Operating environment

Temperature : 23 °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 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.



8.3 Test Date

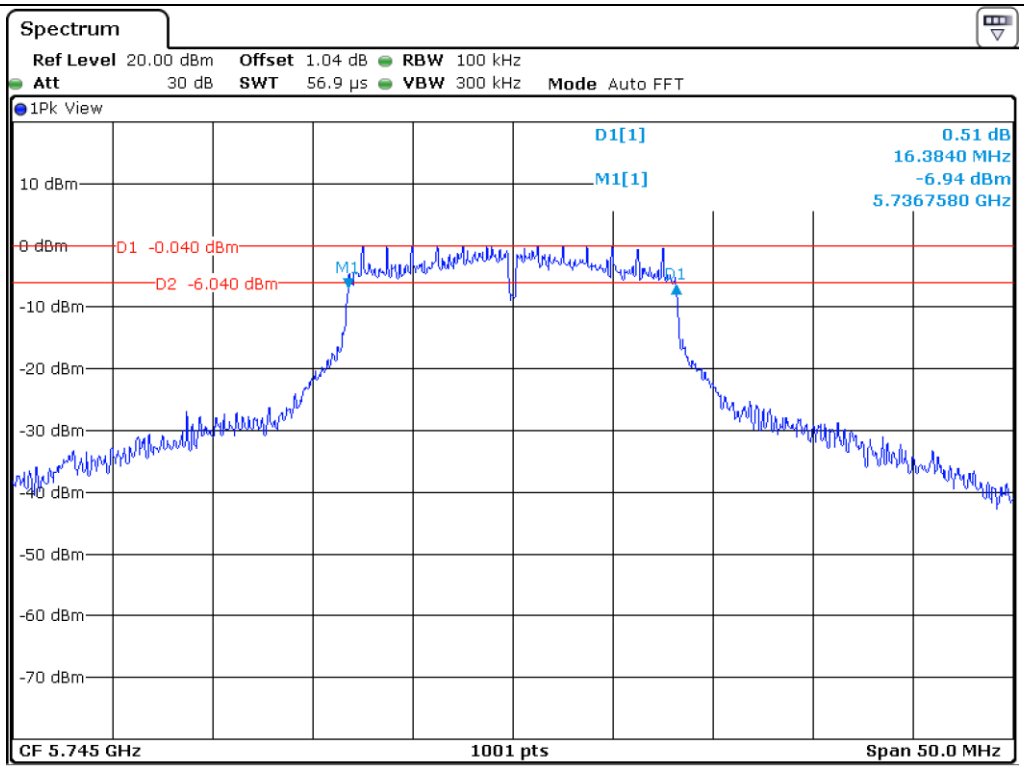
January 28, 2021 ~ February 04, 2021

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 802.11a RLAN Mode

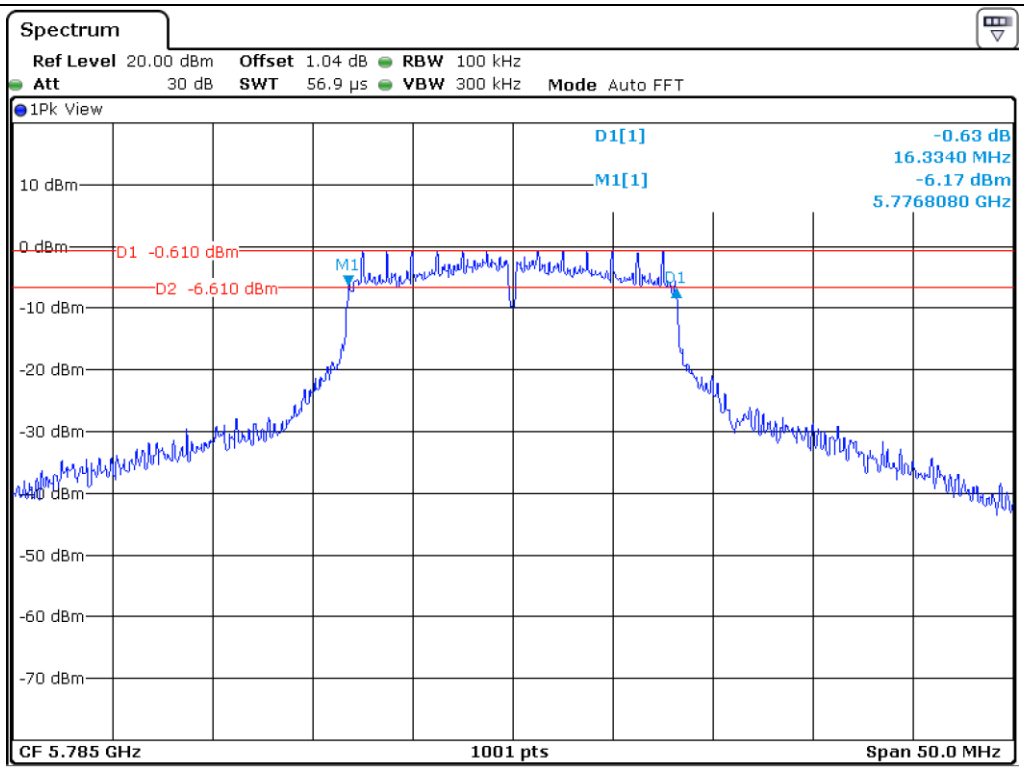
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 745.00	16.38
	Middle	5 785.00	16.33
	High	5 805.00	16.33

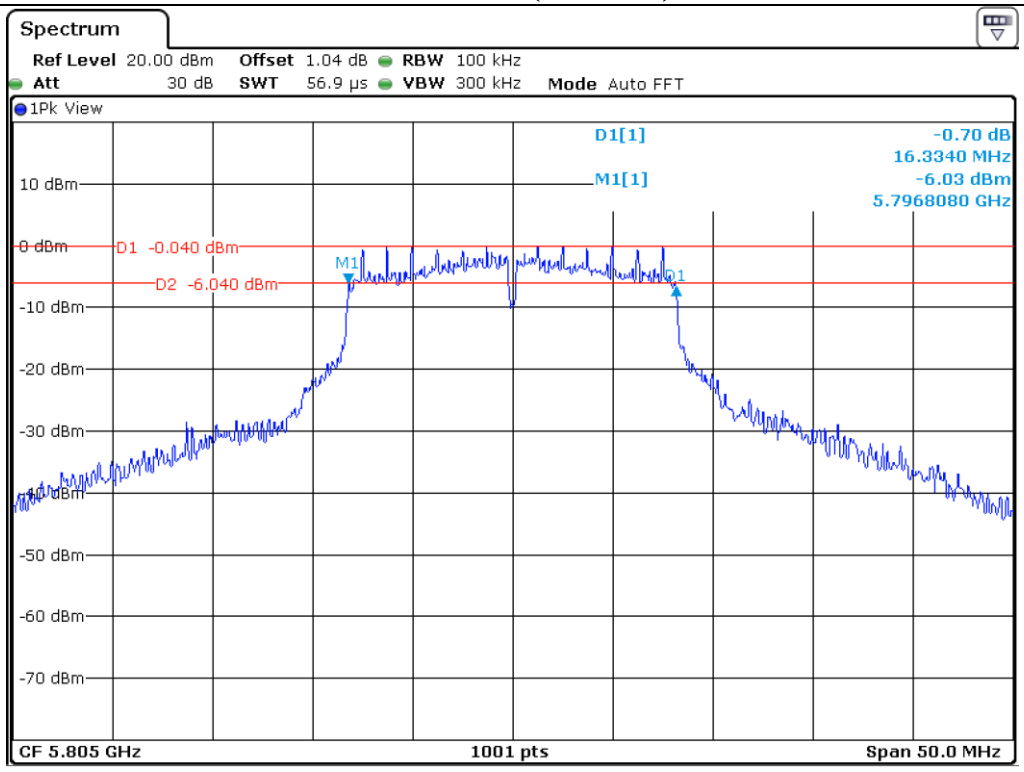


Low Channel (5 745 MHz)

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 (5 785 MHz)



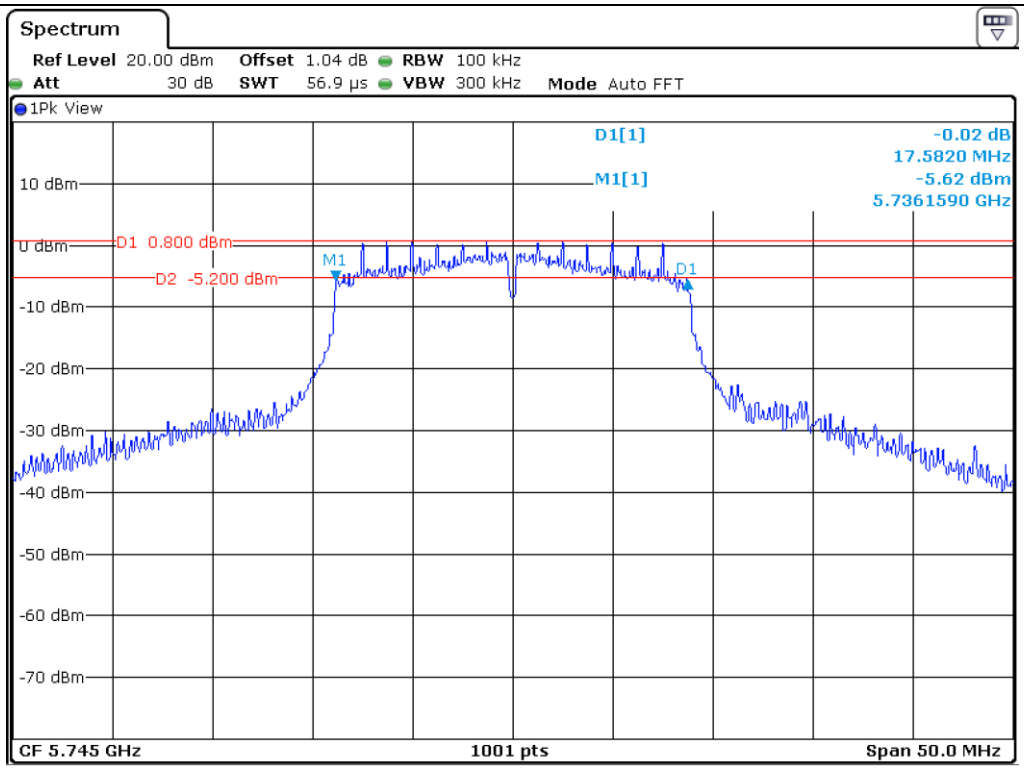
High Channel (5 805 MHz)

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 802.11n_HT20 RLAN Mode

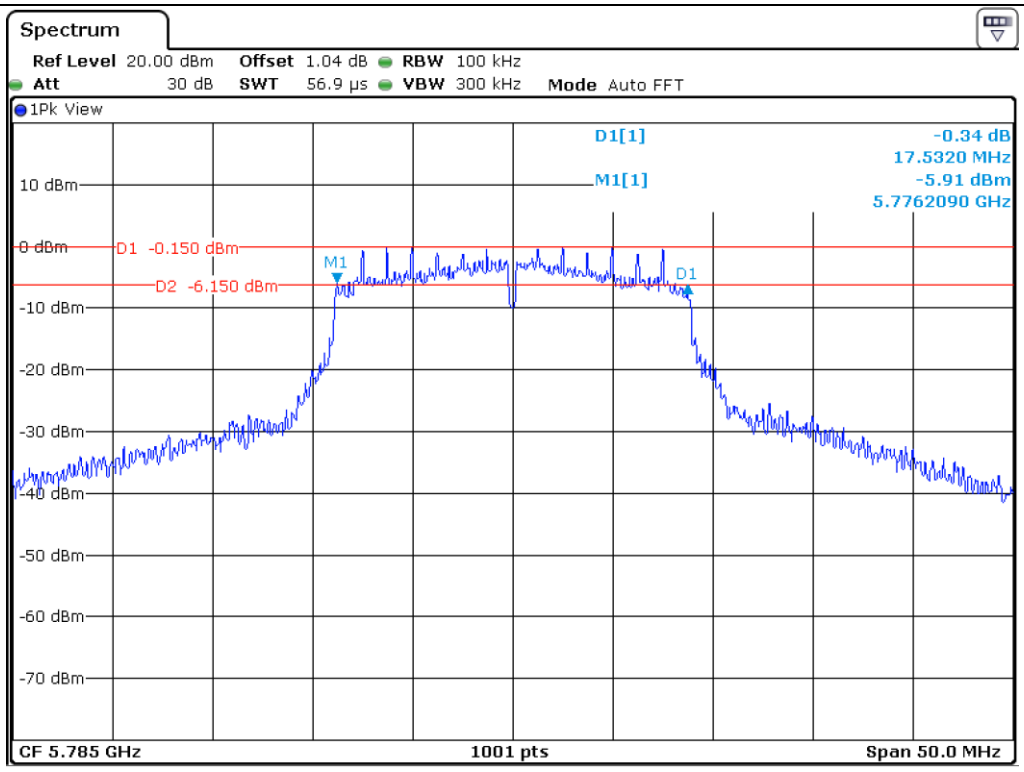
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 745.00	17.58
	Middle	5 785.00	17.53
	High	5 805.00	17.53

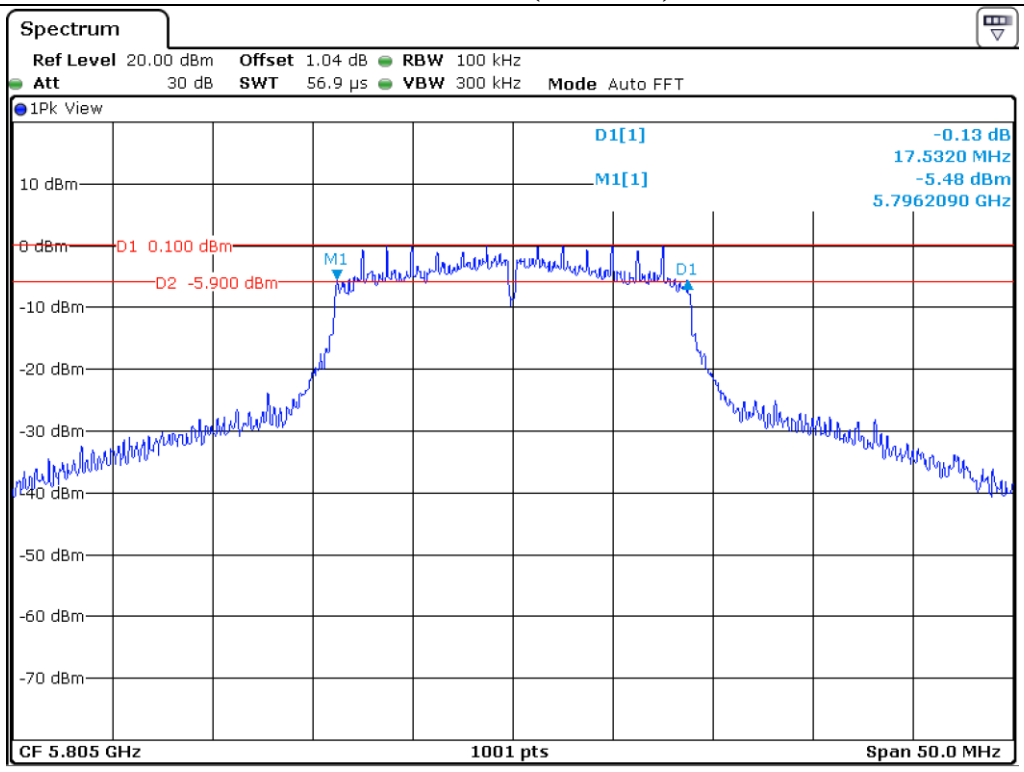


Low Channel (5 745 MHz)

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 (5 785 MHz)



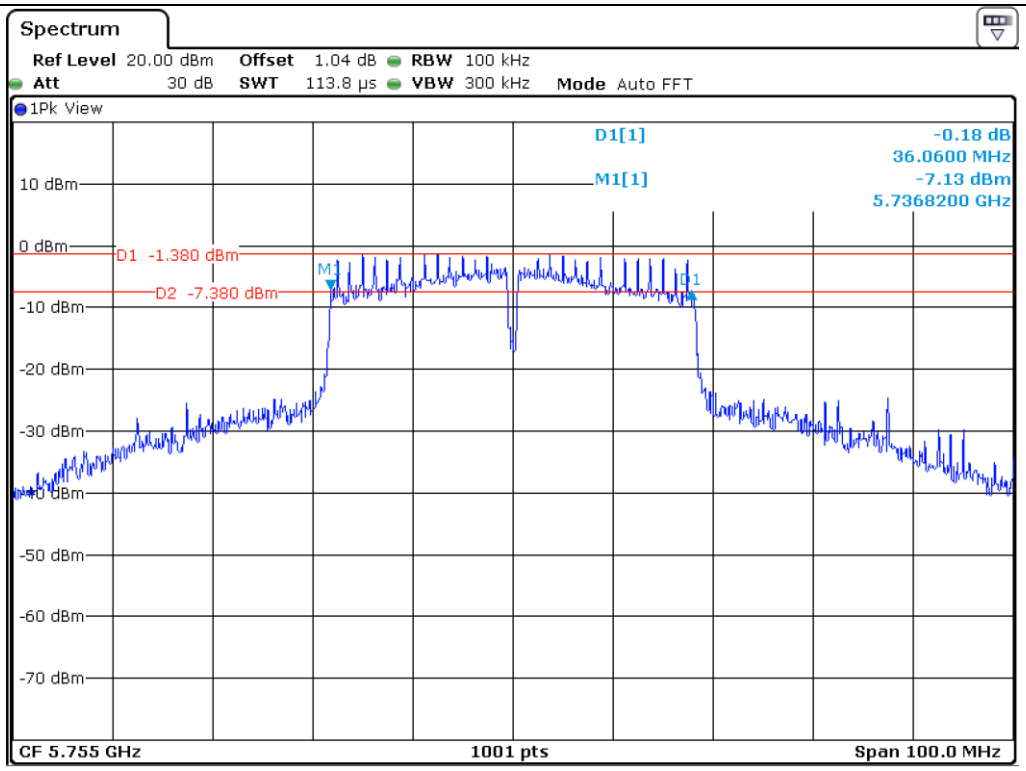
High Channel (5 805 MHz)

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

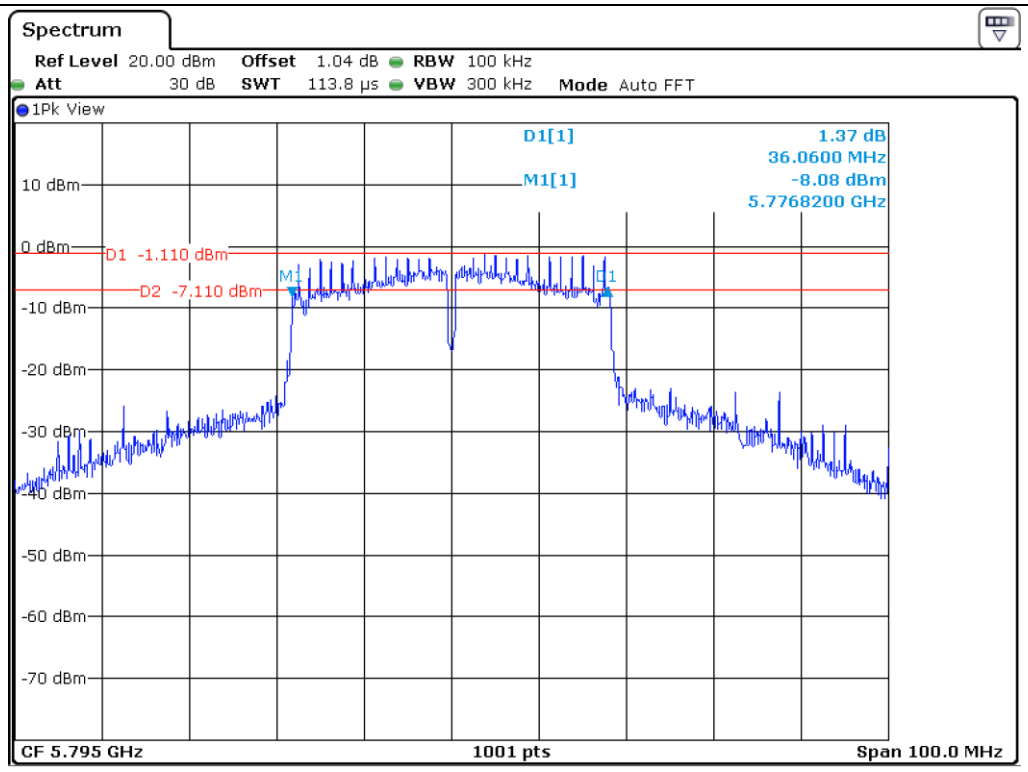
8.6 Test data for 802.11n_HT40 RLAN Mode

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 755.00	36.06
	High	5 795.00	36.06



Low Channel (5 755 MHz)



High Channel (5 795 MHz)

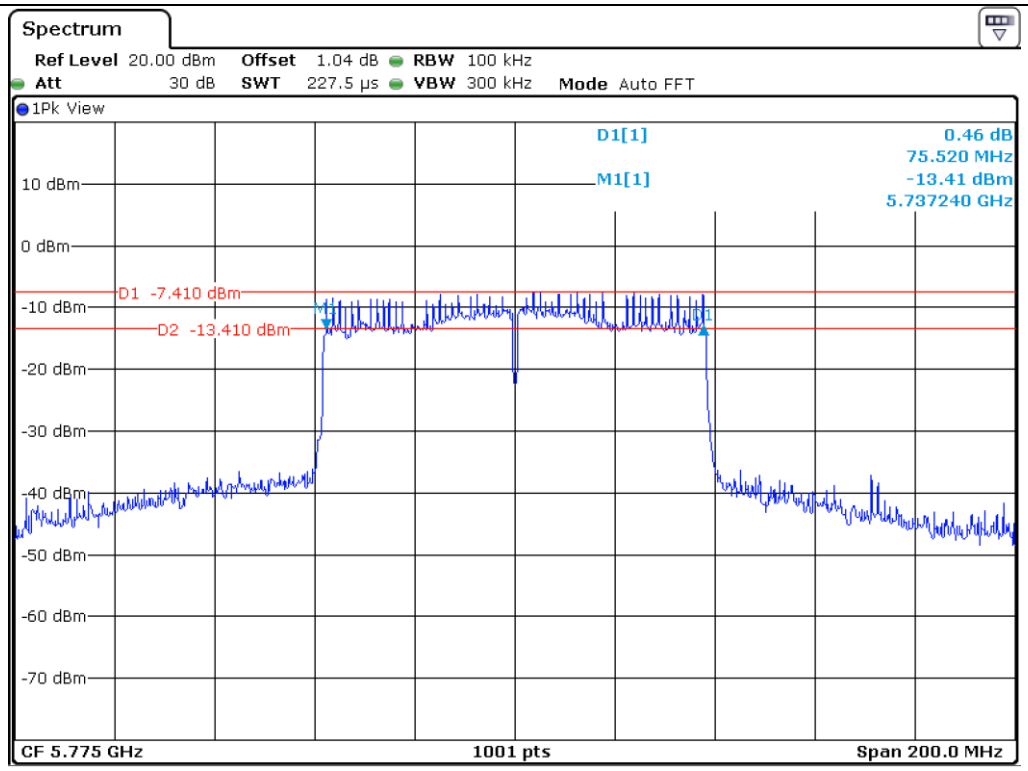
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

8.7 Test data for 802.11ac_VHT80 RLAN Mode

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Middle	5 775.00	75.52

Remark: See next page for measurement data.



Middle Channel (5 775 MHz)

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. MAXIMUM CONDUCTED OUTPUT POWER

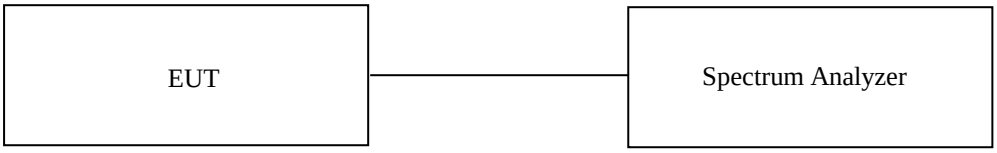
9.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

9.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 26 dB & 6 dB bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



9.3 Test Date

January 28, 2021 ~ February 04, 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)

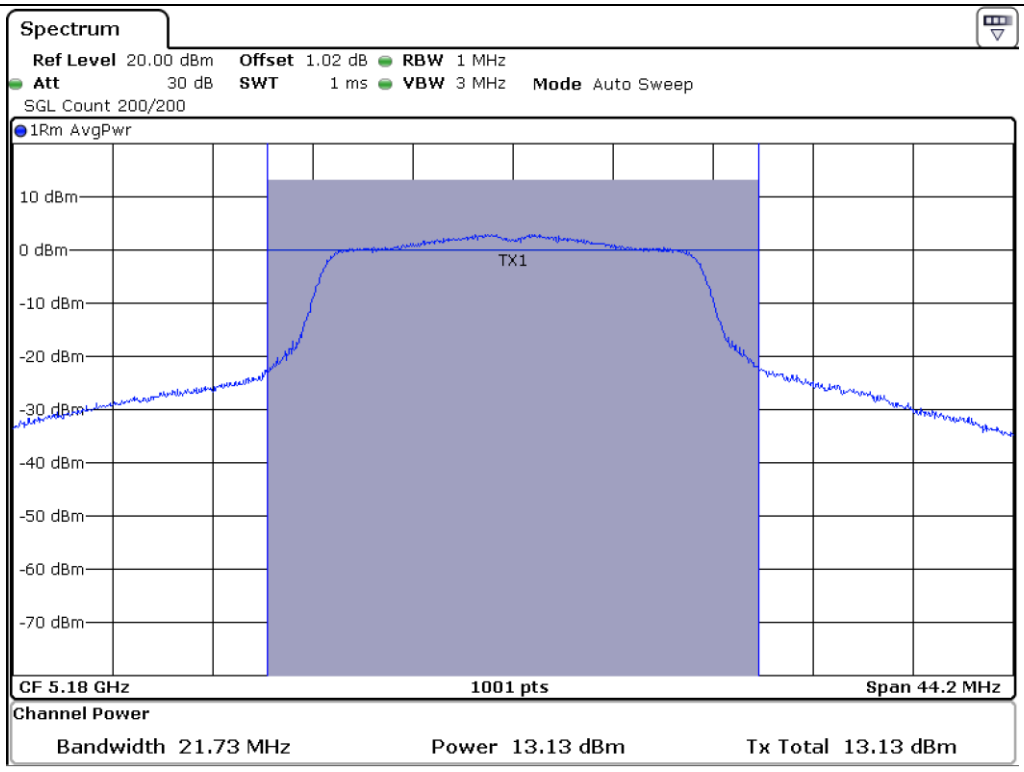
9.4 Test data for 802.11a RLAN Mode

-. Test Result : Pass

-. Duty Cycle : 93.14 %(UNII 1), 93.14 %(UNII 3)

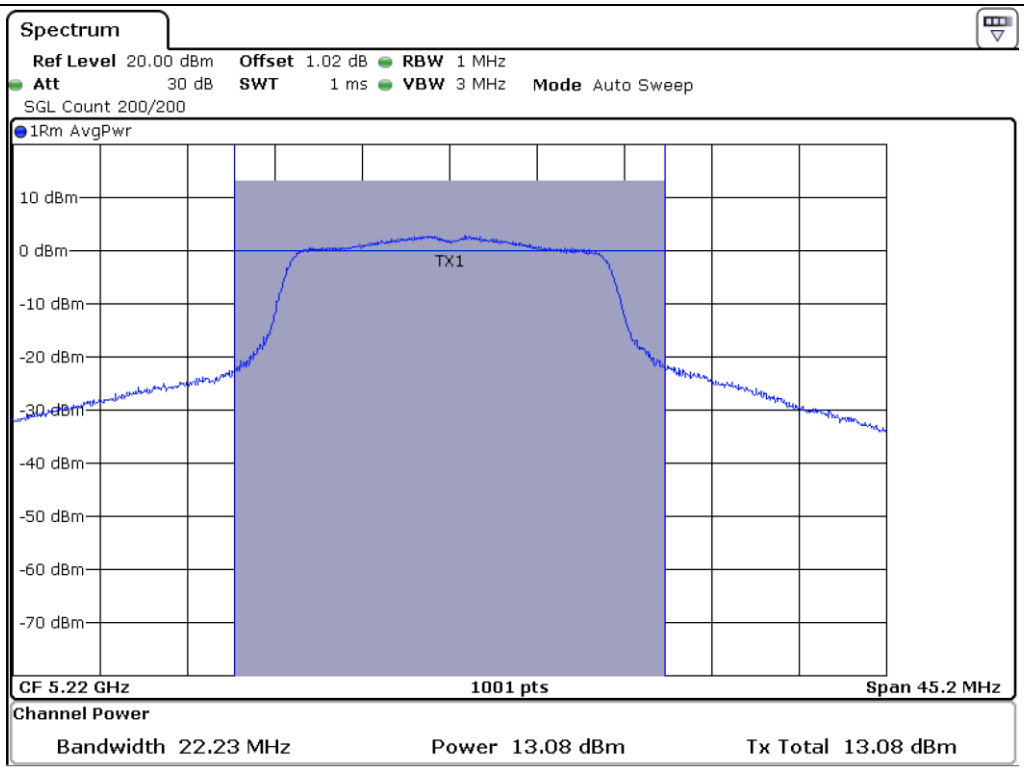
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	C.F. (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	13.13	0.31	13.44	24.00	10.56
	Middle	5 220.00	13.08	0.31	13.39	24.00	10.61
	High	5 240.00	12.87	0.31	13.18	24.00	10.82
5 725 ~ 5 850	Low	5 745.00	11.39	0.31	11.70	30.00	18.30
	Middle	5 785.00	11.00	0.31	11.31	30.00	18.69
	High	5 805.00	11.31	0.31	11.62	30.00	18.38

Remark. Margin = Limit – Result (=Measured Value + C.F.)

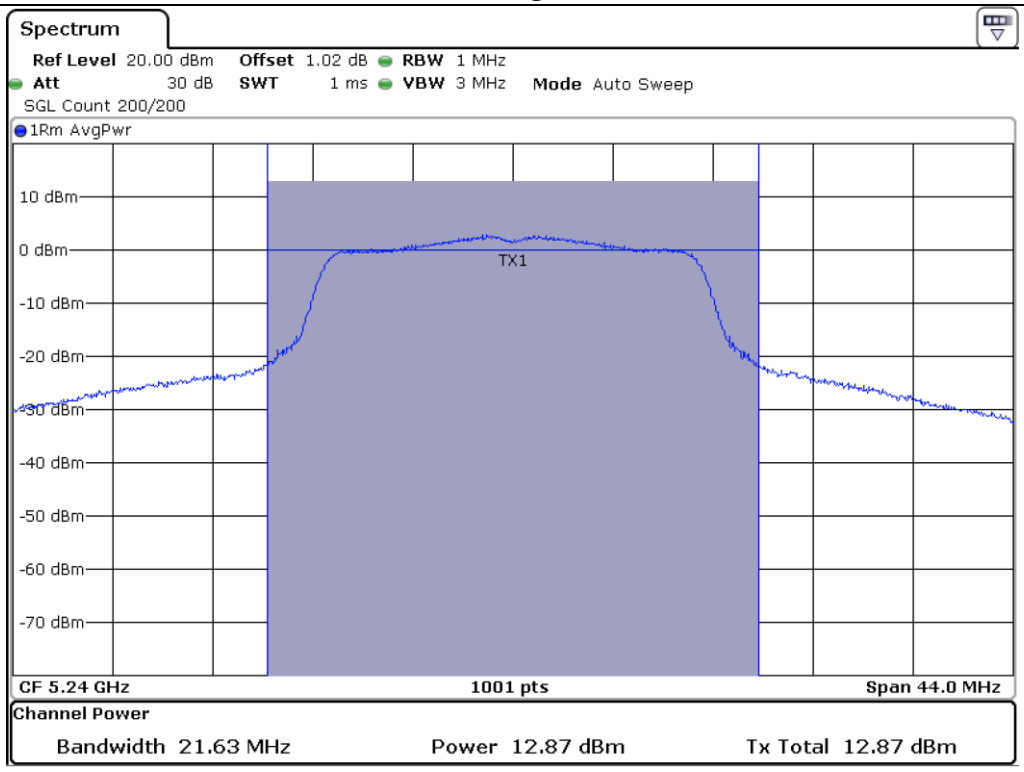


Low Channel @ 5 180 MHz

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

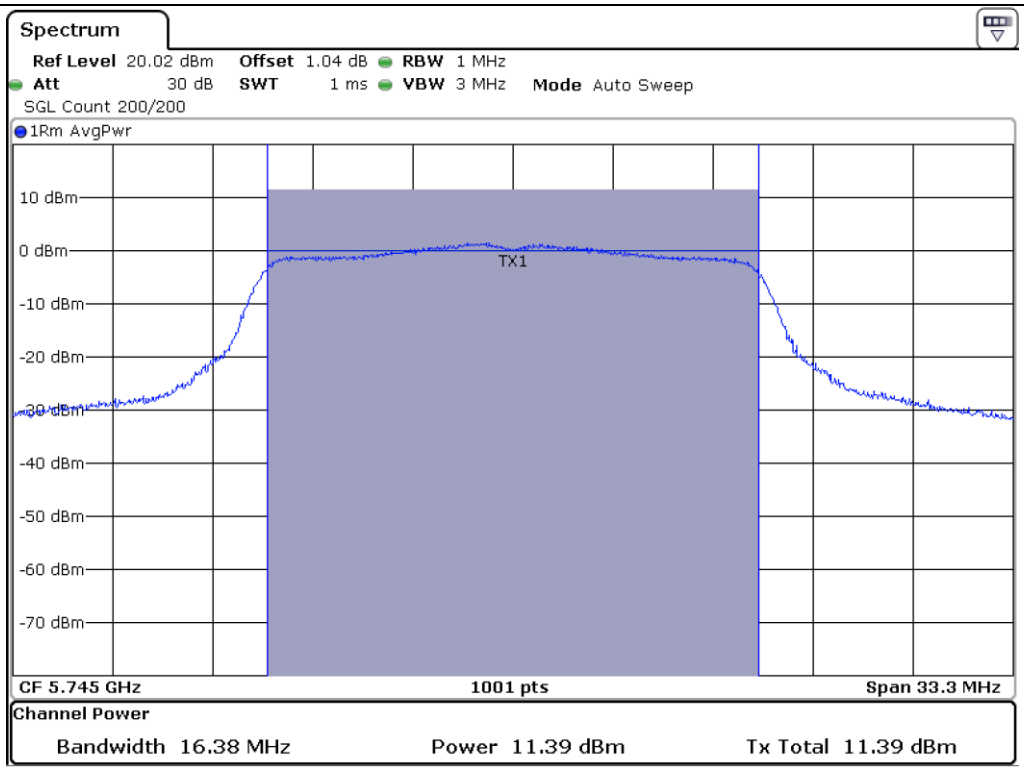


Middle Channel @ 5 220 MHz

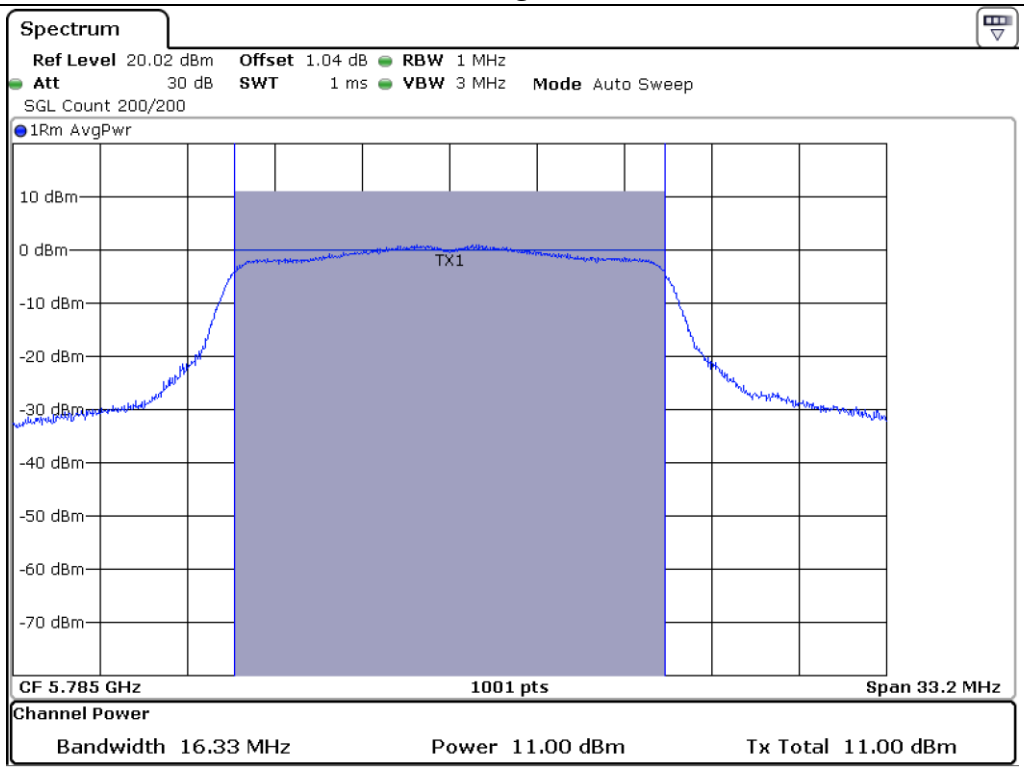


High Channel @ 5 240 MHz

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

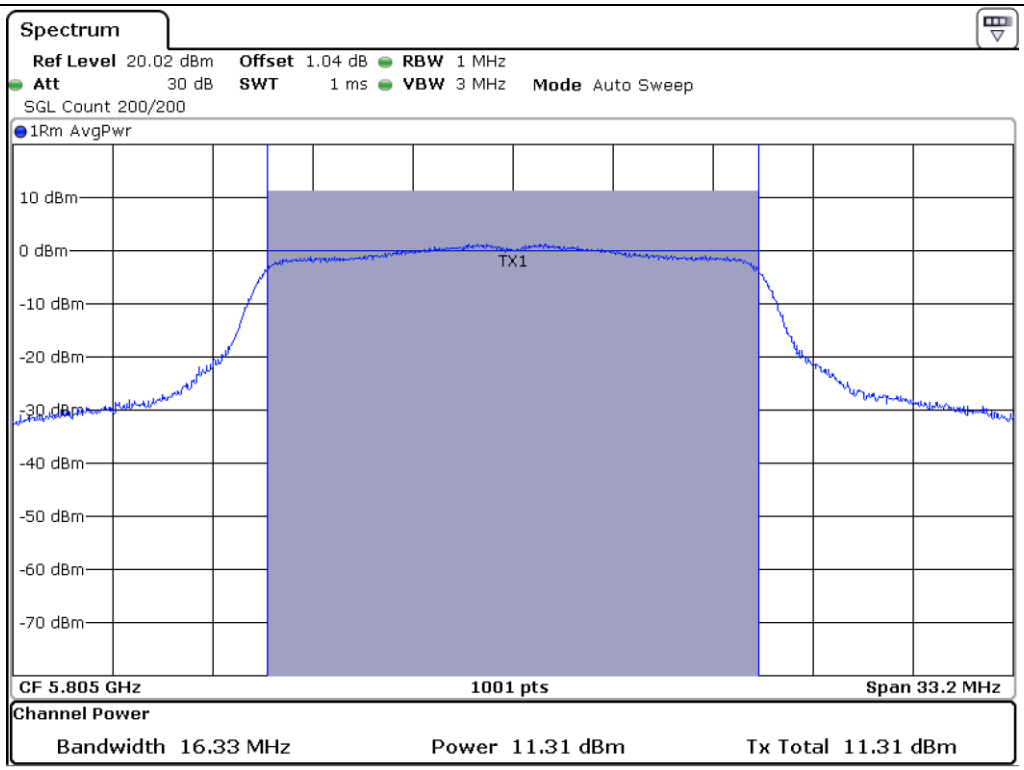


Low Channel @ 5 745 MHz



Middle Channel @ 5 785 MHz

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 @ 5 805 MHz

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

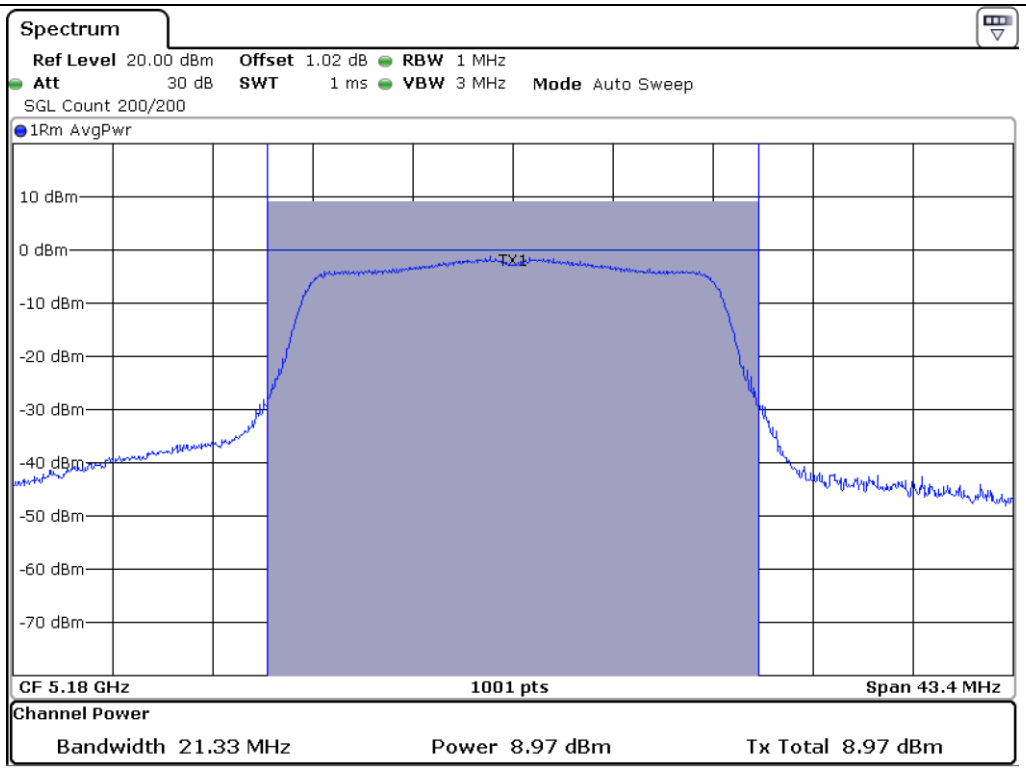
9.5 Test data for 802.11n_HT20 RLAN Mode

-. Test Result : Pass

-. Duty Cycle : 93.03 %(UNII 1), 93.03 %(UNII 3)

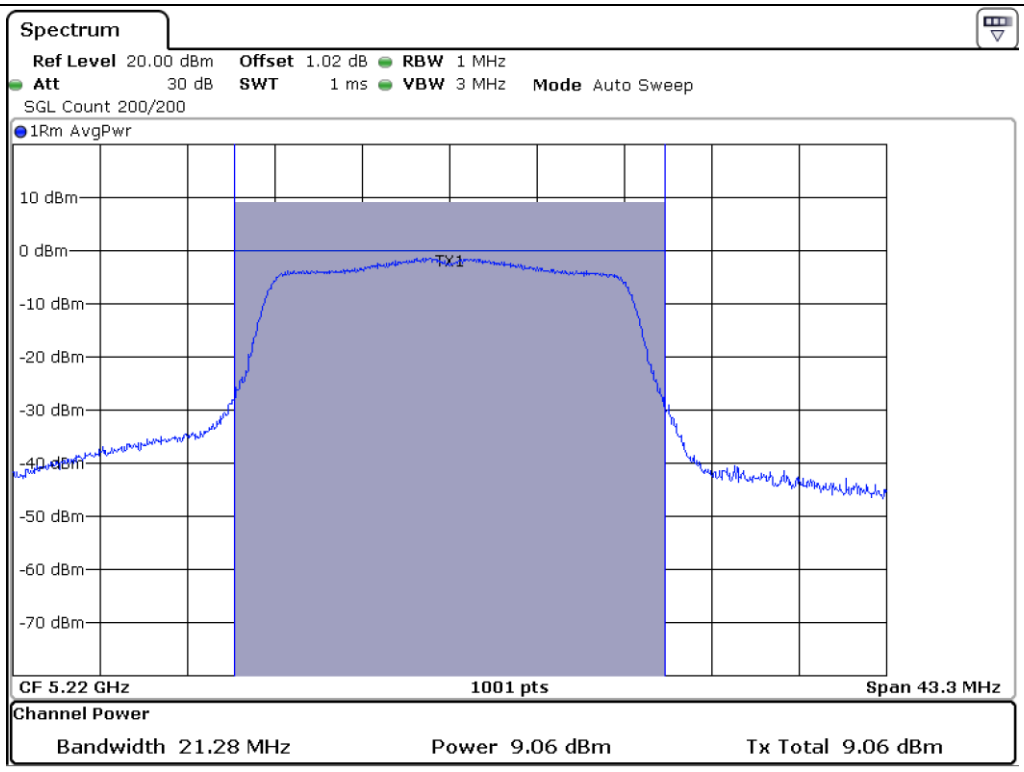
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	C.F (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	8.97	0.31	9.28	24.00	14.72
	Middle	5 220.00	9.06	0.31	9.37	24.00	14.63
	High	5 240.00	8.88	0.31	9.19	24.00	14.81
5 725 ~ 5 850	Low	5 745.00	11.23	0.31	11.54	30.00	18.46
	Middle	5 785.00	10.75	0.31	11.06	30.00	18.94
	High	5 805.00	11.29	0.31	11.60	30.00	18.40

Remark. Margin = Limit – Result (=Measured Value + C.F.)

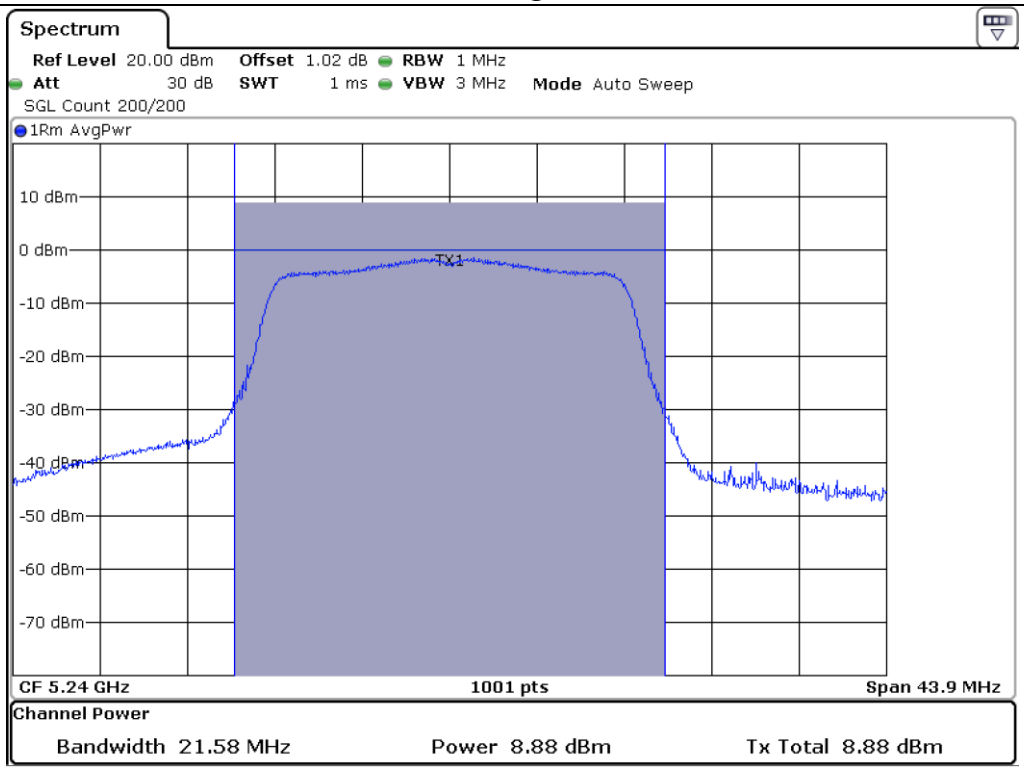


Low Channel @ 5 180 MHz

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

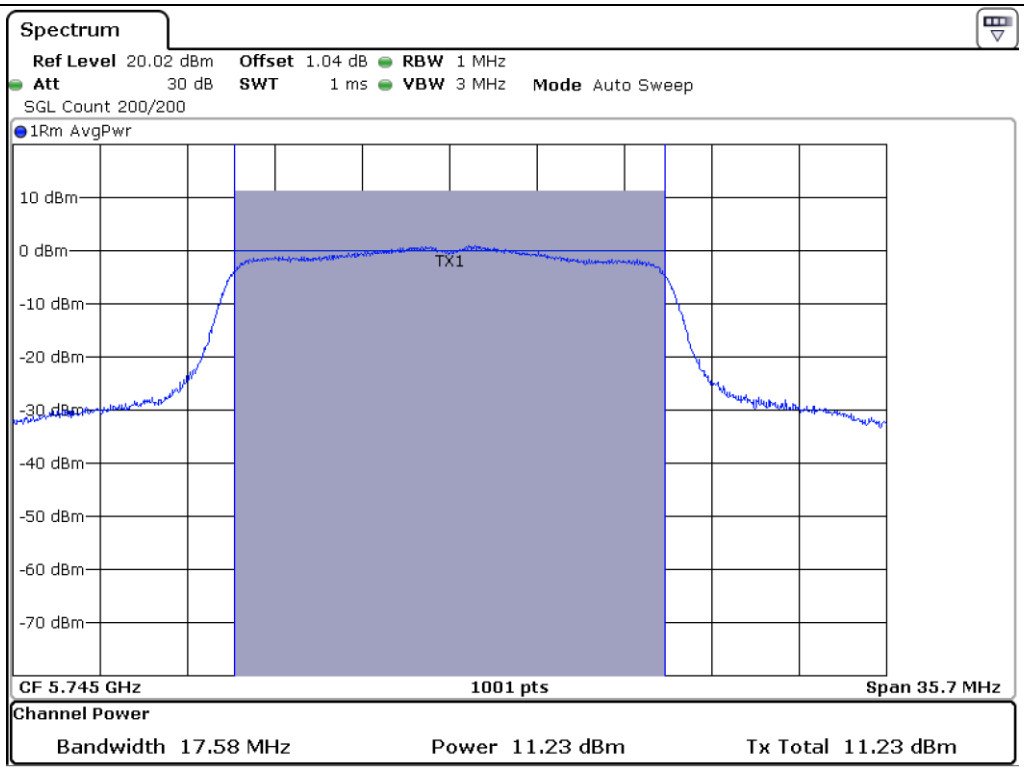


Middle Channel @ 5 220 MHz

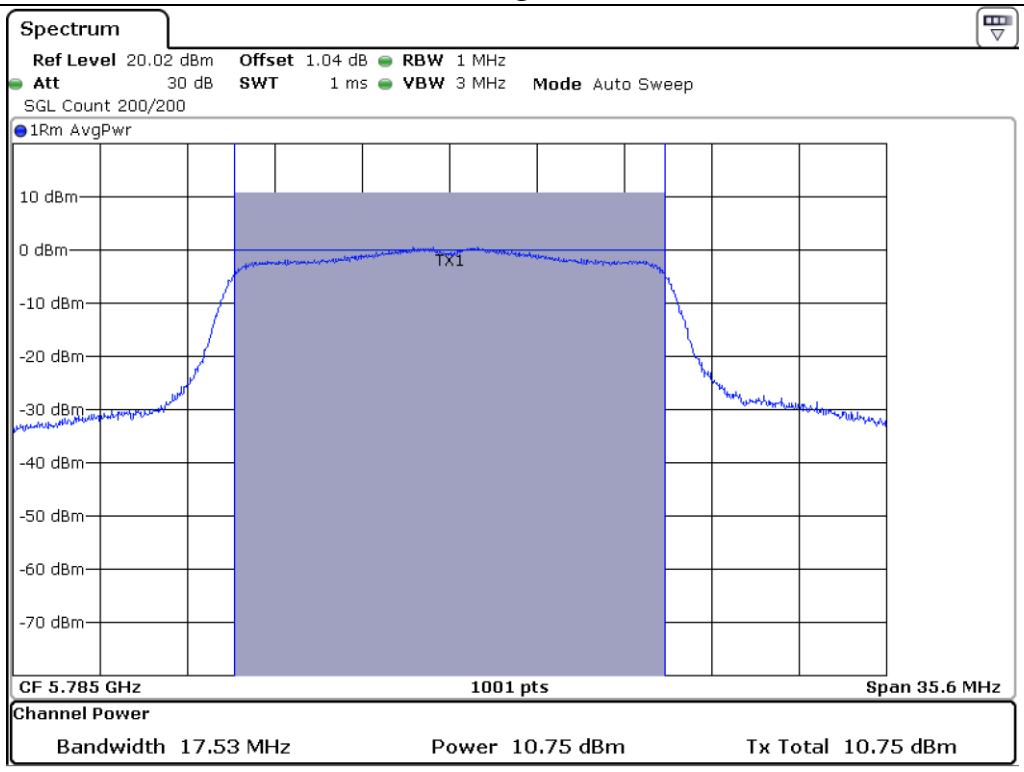


High Channel @ 5 240 MHz

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

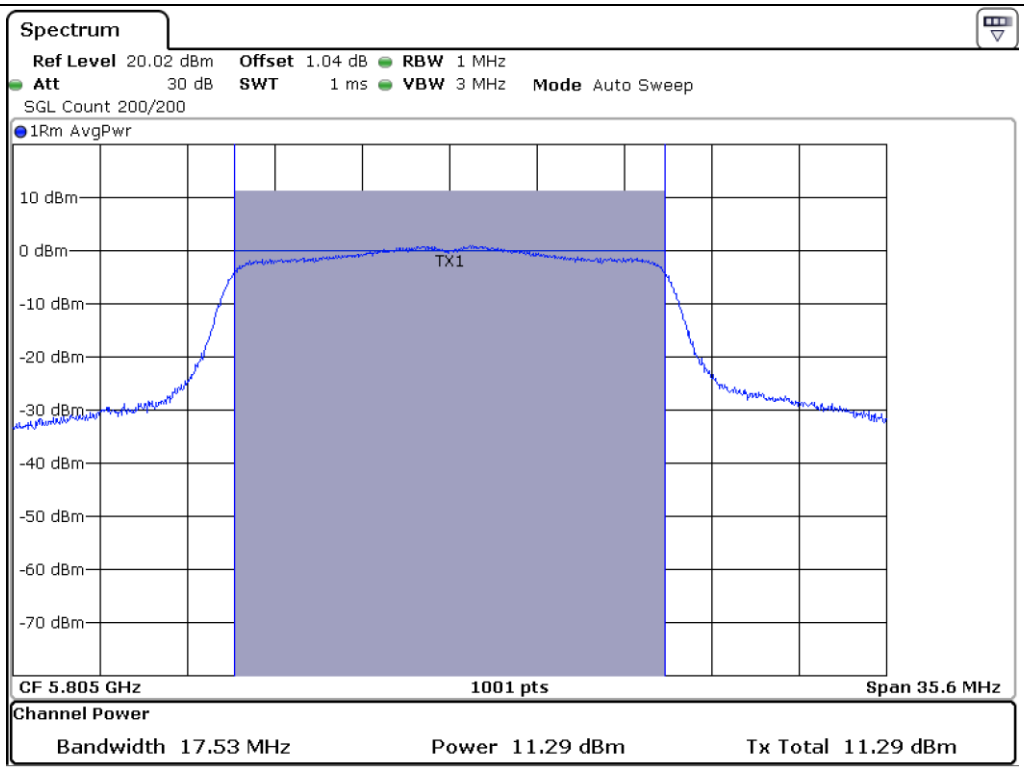


Low Channel @ 5 745 MHz



Middle Channel @ 5 785 MHz

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 @ 5 805 MHz

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 802.11n_HT40 RLAN Mode

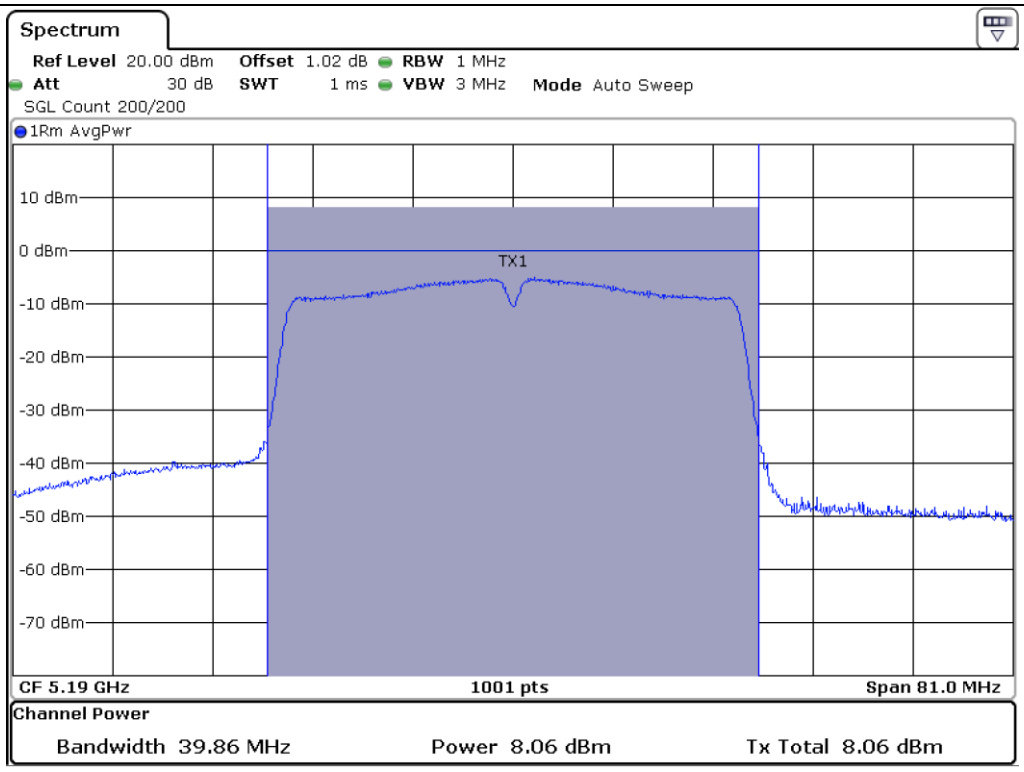
-. Test Result : Pass

-. Duty Cycle : 86.36 %(UNII 1), 86.36 %(UNII 3)

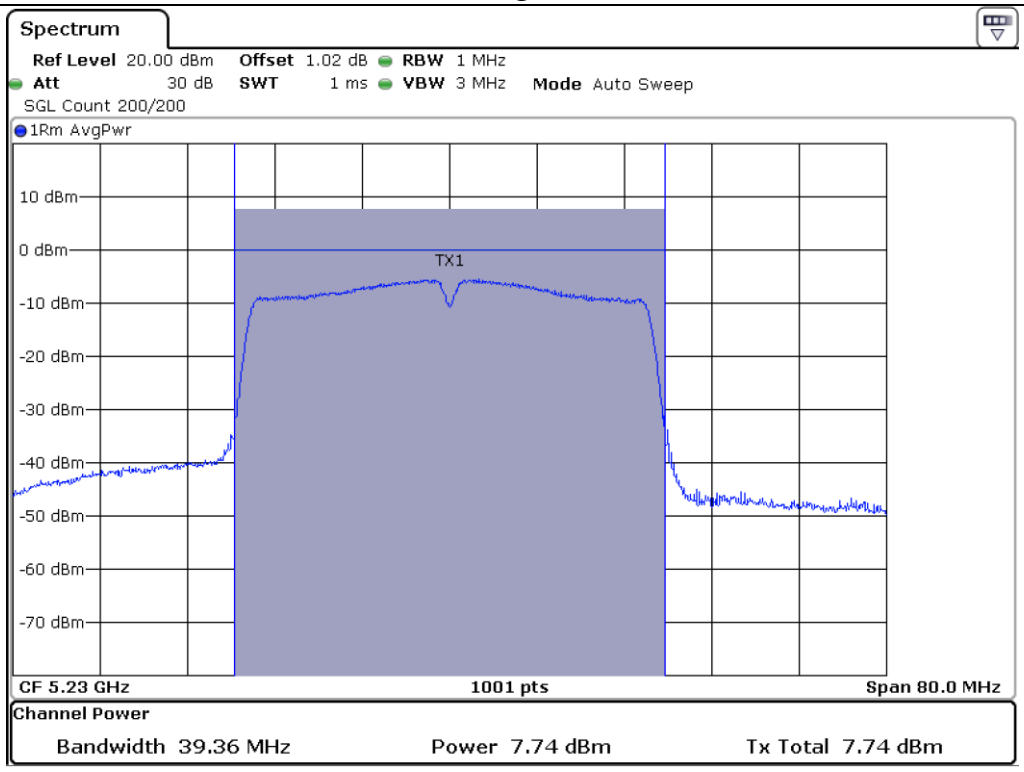
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	C.F. (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	8.06	0.64	8.70	24.00	15.30
	High	5 230.00	7.74	0.64	8.38	24.00	15.62
5 725 ~ 5 850	Low	5 755.00	11.80	0.64	12.44	30.00	17.56
	High	5 795.00	11.75	0.64	12.39	30.00	17.61

Remark. Margin = Limit – Result (=Measured Value + C.F.)

Remark: See next page for measurement data.

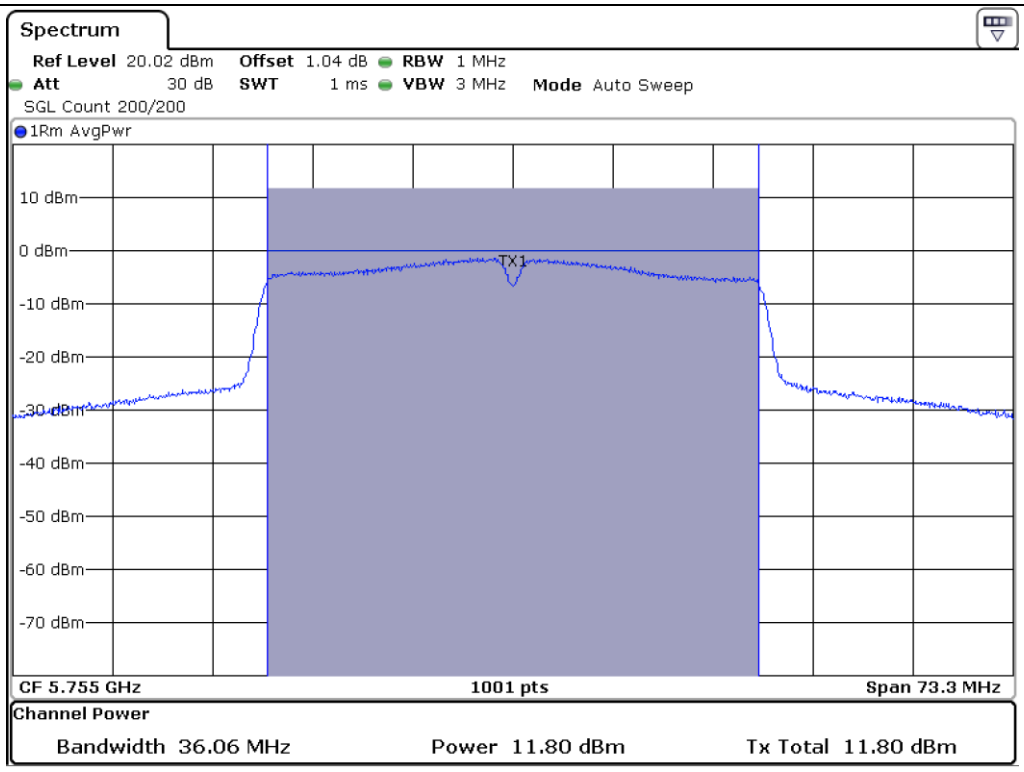


Low Channel @ 5 190 MHz

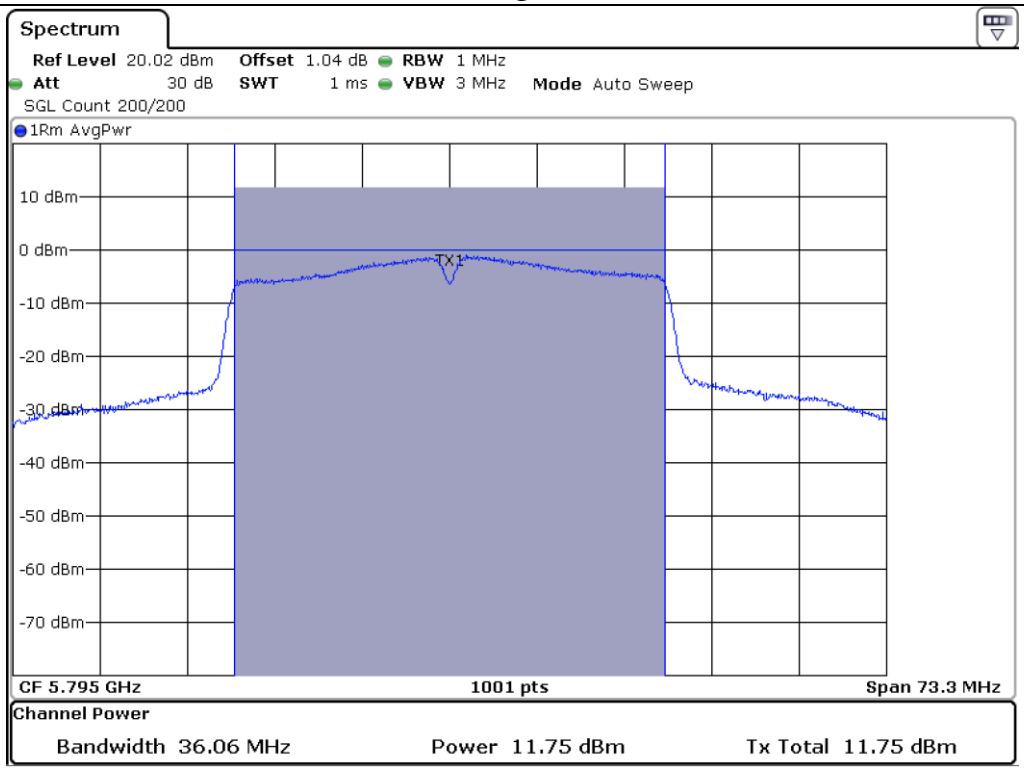


High Channel @ 5 230 MHz

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



Low Channel @ 5 755 MHz



High Channel @ 5 795 MHz

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

9.7 Test data for 802.11ac_HT80 RLAN Mode

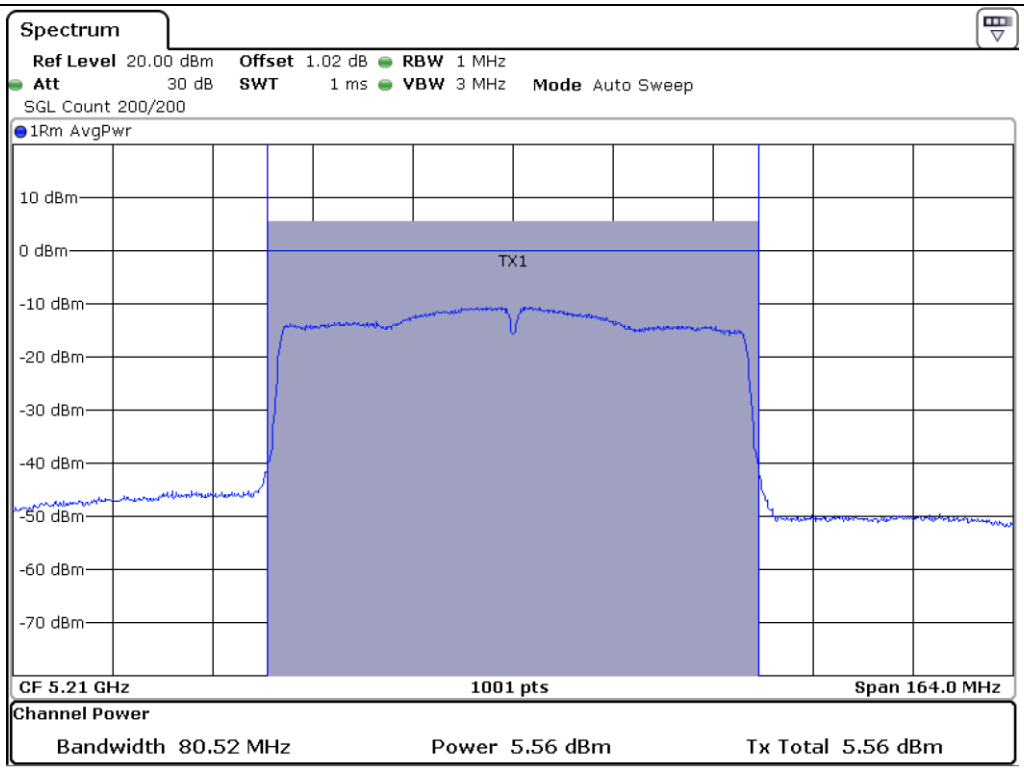
-. Test Result : Pass

-. Duty Cycle : 76.50 %(UNII 1), 76.50 %(UNII 3)

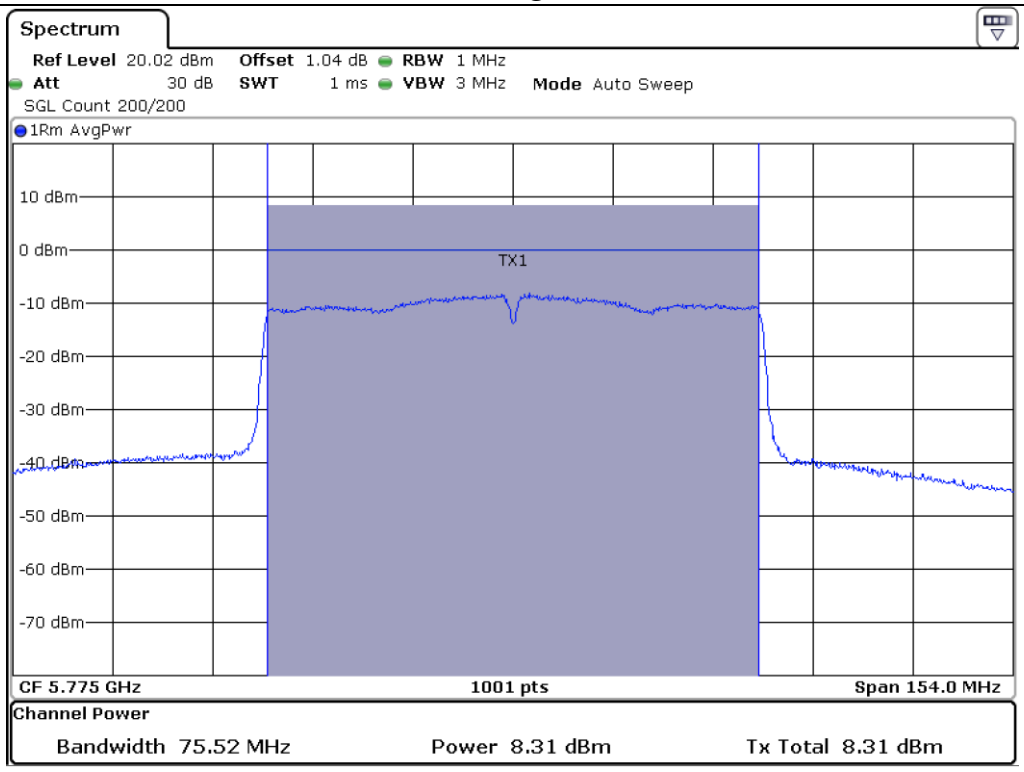
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	C.F (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Middle	5 210.00	5.56	1.16	6.72	24.00	17.28
5 725 ~ 5 850	Middle	5 775.00	8.31	1.16	9.47	30.00	20.53

Remark. Margin = Limit – Result (=Measured Value + C.F.)

Remark: See next page for measurement data.



Middle Channel @ 5 210 MHz



Middle Channel @ 5 775 MHz

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

10. PEAK POWER SPECTRUL DENSITY

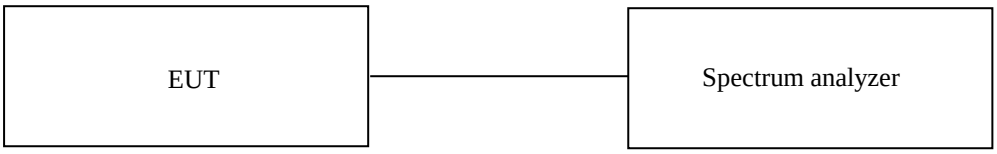
10.1 Operating environment

Temperature : 23 °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 1 MHz(500 kHz for frequency range 5 725 MHz ~ 5 850 MHz), the video bandwidth is set to 3 times the resolution bandwidth. The maximum level form the EUT in 1 MHz bandwidth was measured with above condition.



10.3 Test Date

January 28, 2021 ~ February 04, 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)

10.4 Test data for 802.11a RLAN Mode

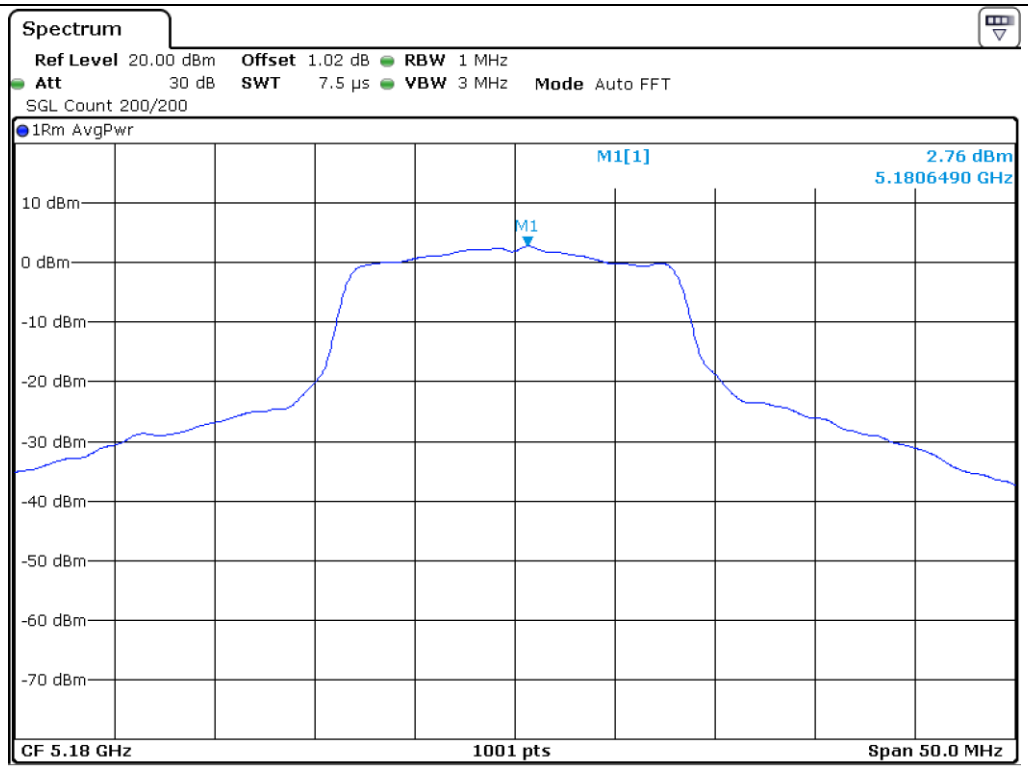
-. Operating condition : Highest Output Power Transmitting Mode

-. Duty Cycle : 93.14 %(UNII 1), 93.14 %(UNII 3)

-. Test Result : Pass

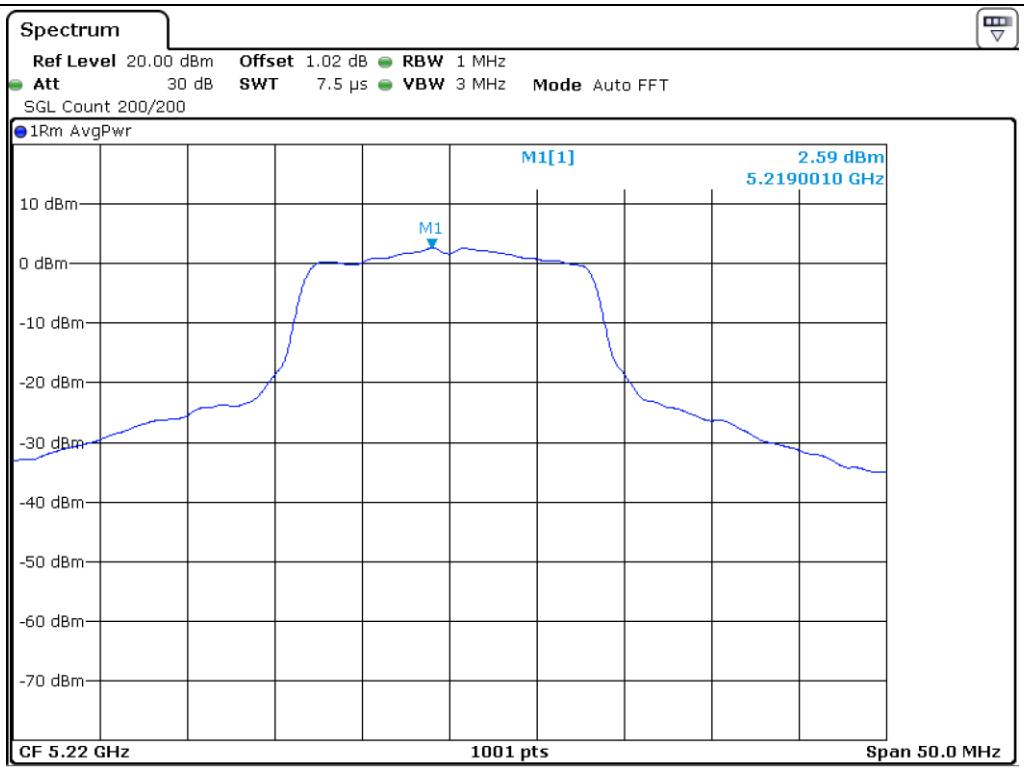
FREQUENCY RANGE (MHz)	CHANNEL	MEASURED VALUE (dBm)	C.F. (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	2.76	0.31	3.07	11.00	7.93
	Middle	2.59	0.31	2.90	11.00	8.10
	High	2.77	0.31	3.08	11.00	7.92
5 725 ~ 5 850	Low	-1.61	0.31	-1.30	30.00	31.30
	Middle	-2.05	0.31	-1.74	30.00	31.74
	High	-2.11	0.31	-1.80	30.00	31.80

Remark. Margin = Limit – Result (=Measured Value + C.F.)

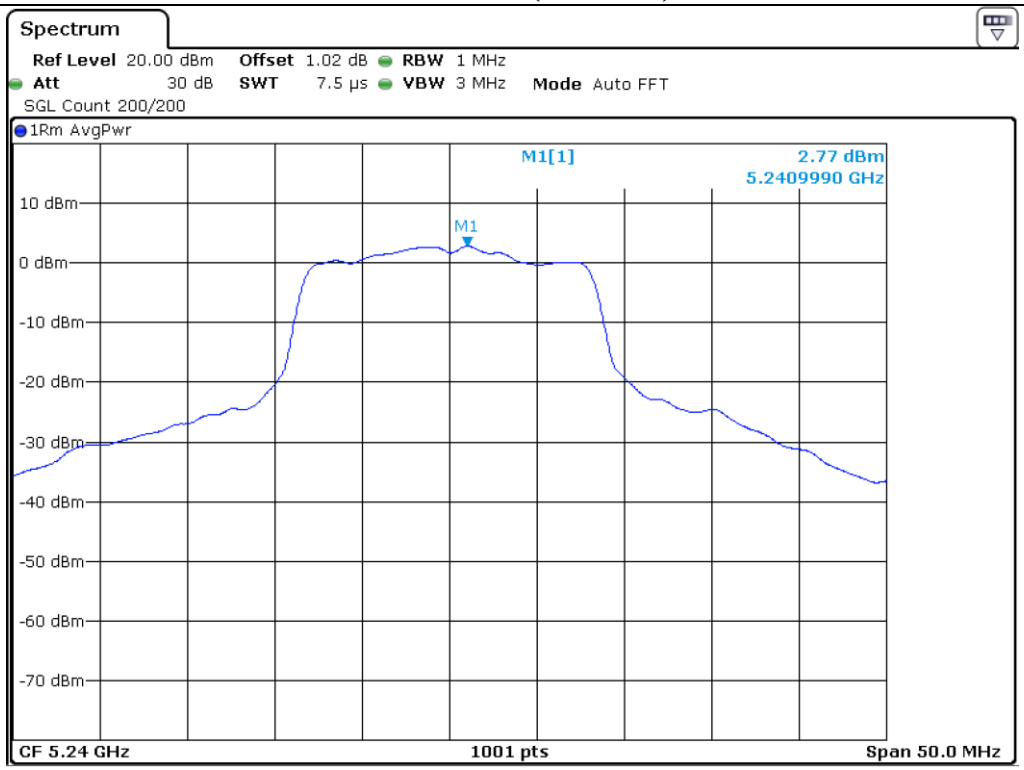


Low Channel (5 180 MHz)

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

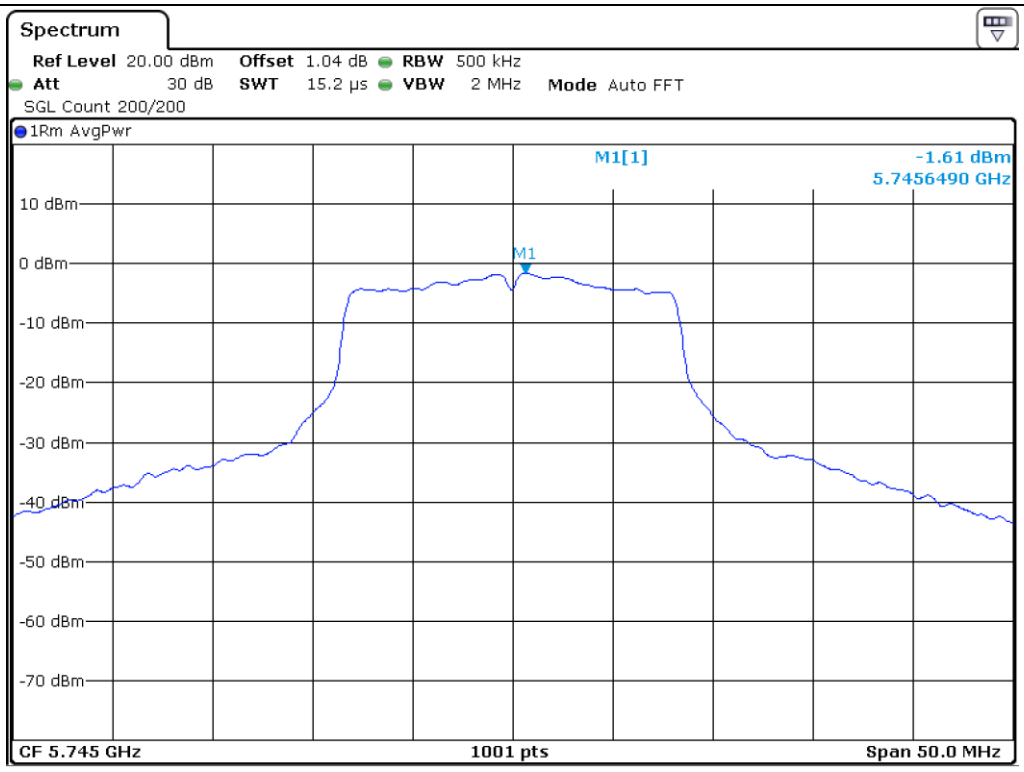


Middle Channel (5 220 MHz)

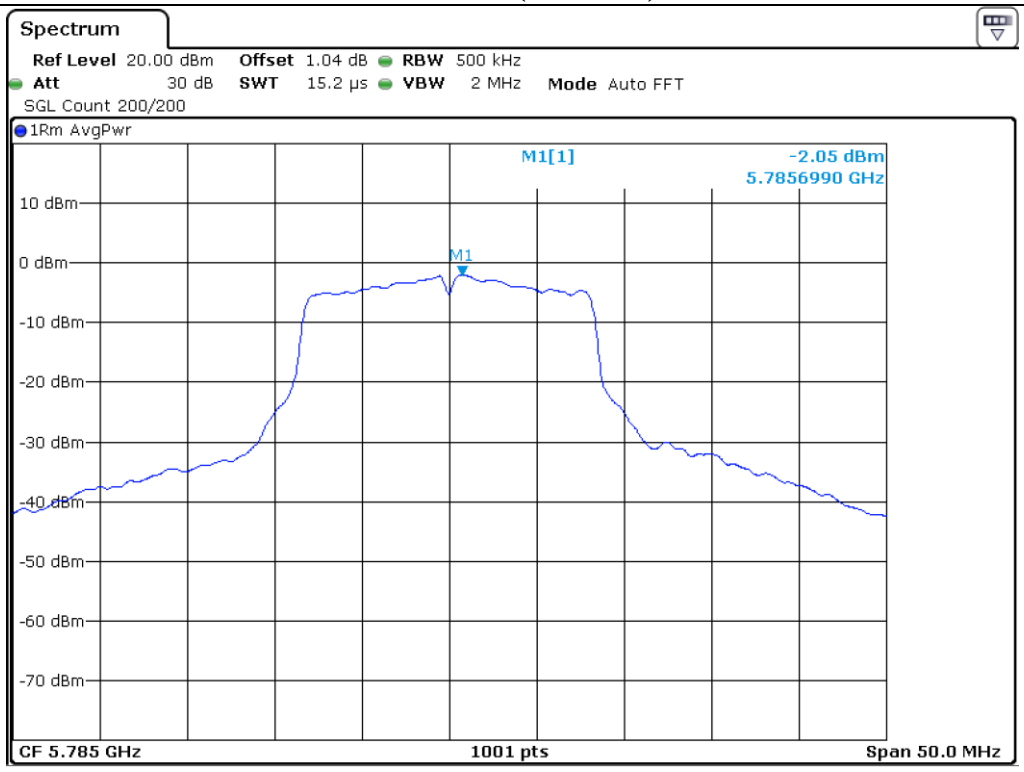


High Channel (5 240 MHz)

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

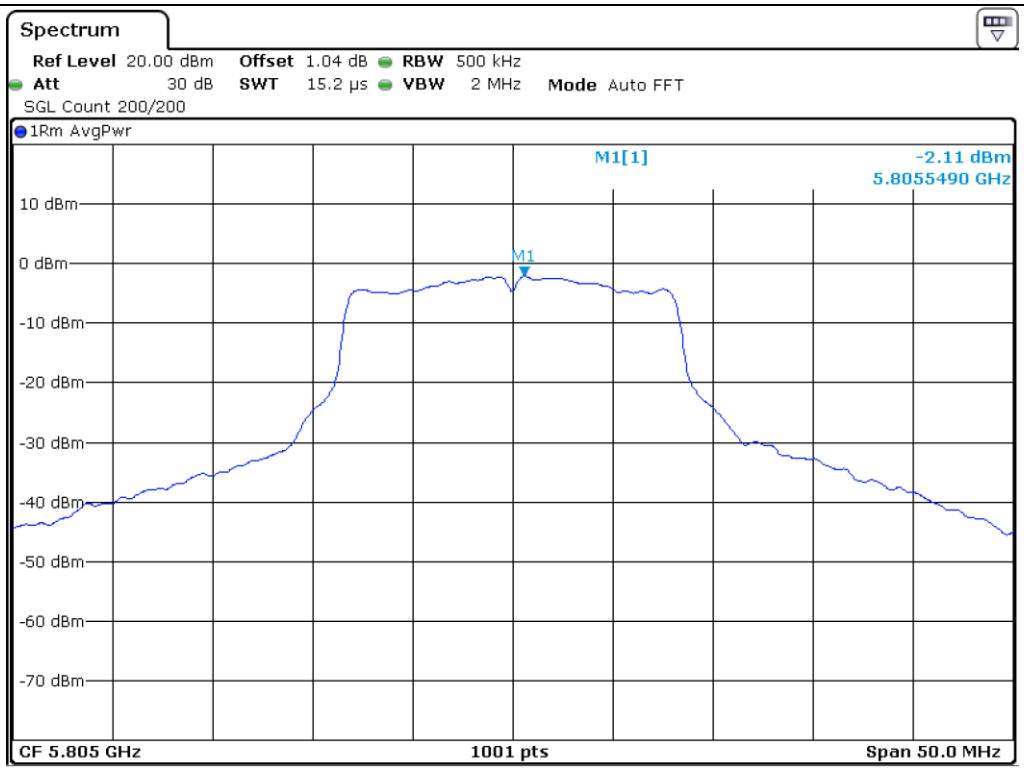


Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)

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 (5 805 MHz)

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

10.5 Test data for 802.11n_HT20 RLAN Mode

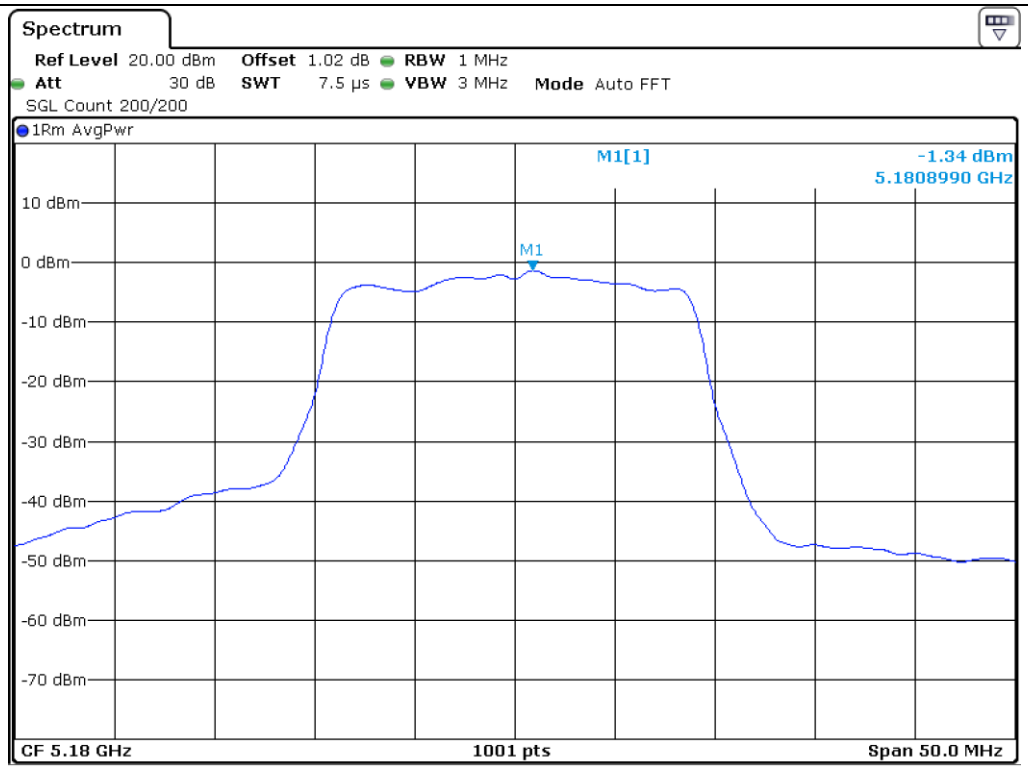
-. Operating condition : Highest Output Power Transmitting Mode

-. Duty Cycle : 93.03 %(UNII 1), 93.03 %(UNII 3)

-. Test Result : Pass

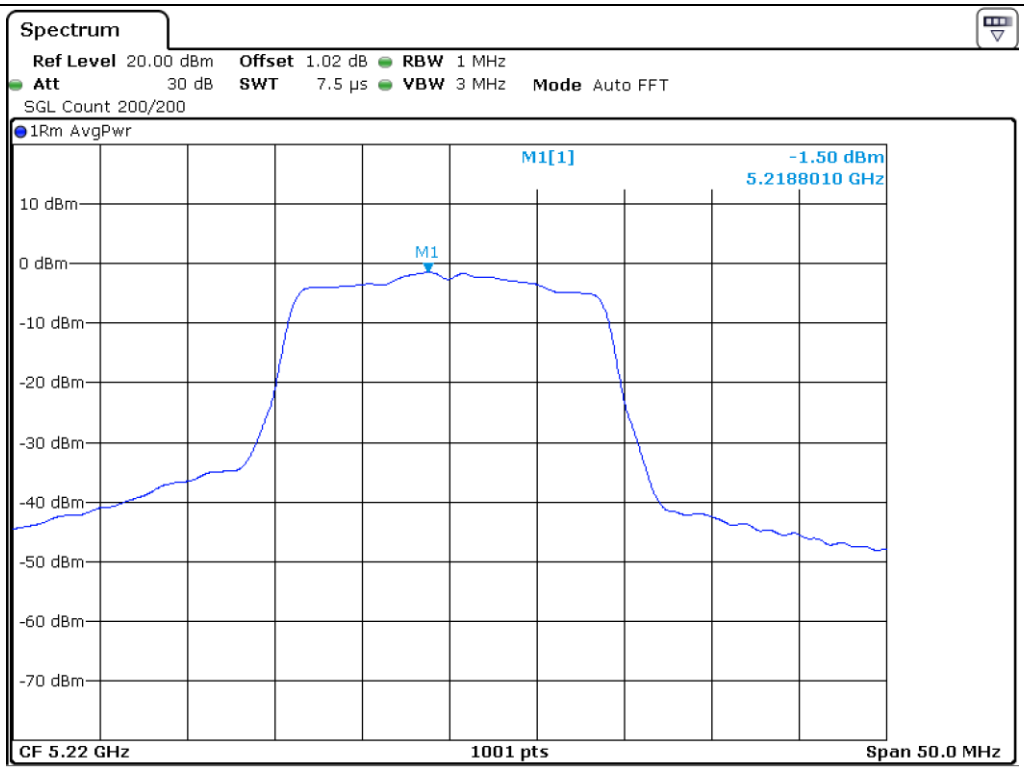
FREQUENCY RANGE (MHz)	CHANNEL	MEASURED VALUE (dBm)	C.F (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	-1.34	0.31	-1.03	11.00	12.03
	Middle	-1.50	0.31	-1.19	11.00	12.19
	High	-1.31	0.31	-1.00	11.00	12.00
5 725 ~ 5 850	Low	-2.01	0.31	-1.70	30.00	31.70
	Middle	-2.26	0.31	-1.95	30.00	31.95
	High	-2.18	0.31	-1.87	30.00	31.87

Remark. Margin = Limit – Result (=Measured Value + C.F.)

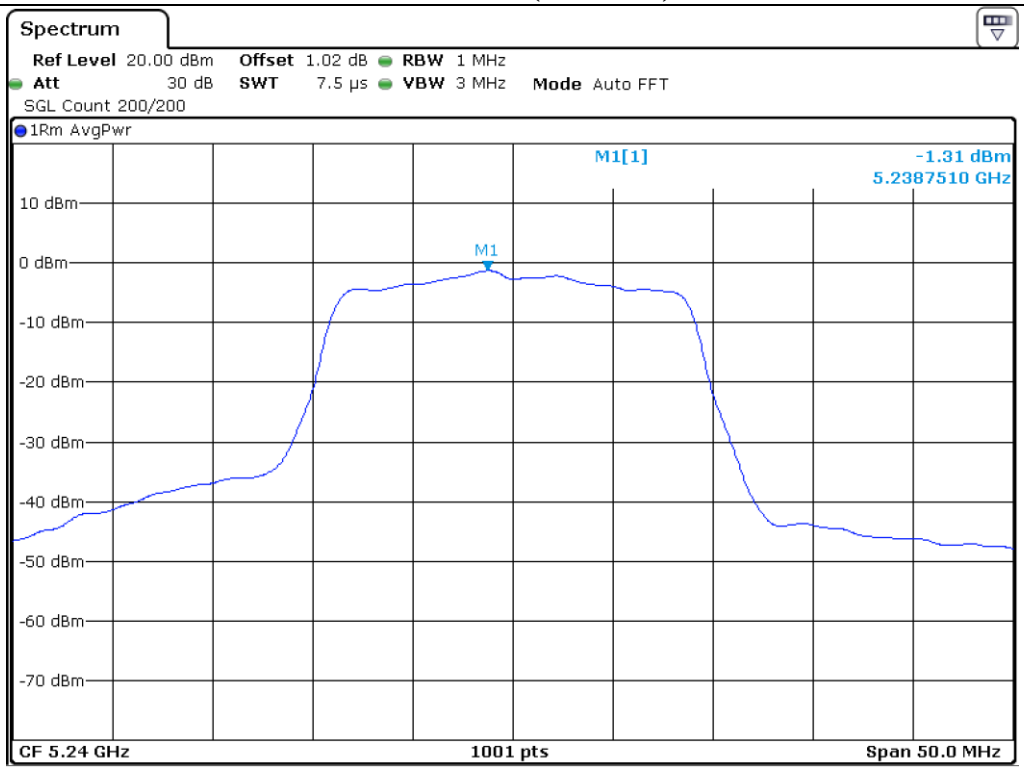


Low Channel (5 180 MHz)

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

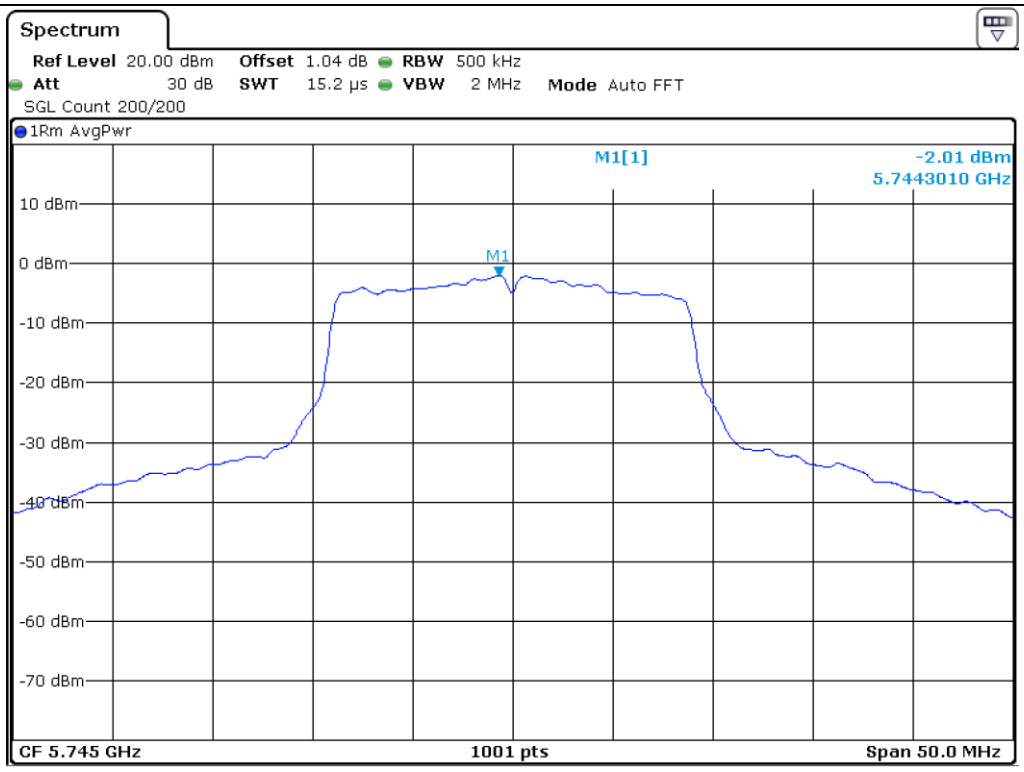


Middle Channel (5 220 MHz)

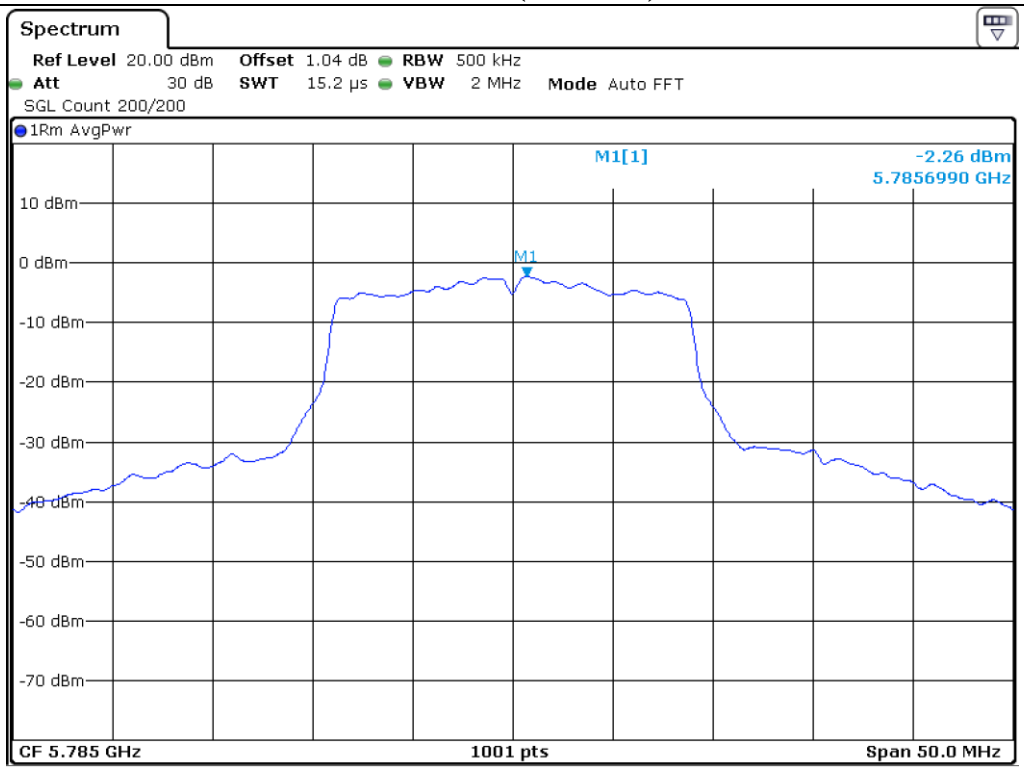


High Channel (5 240 MHz)

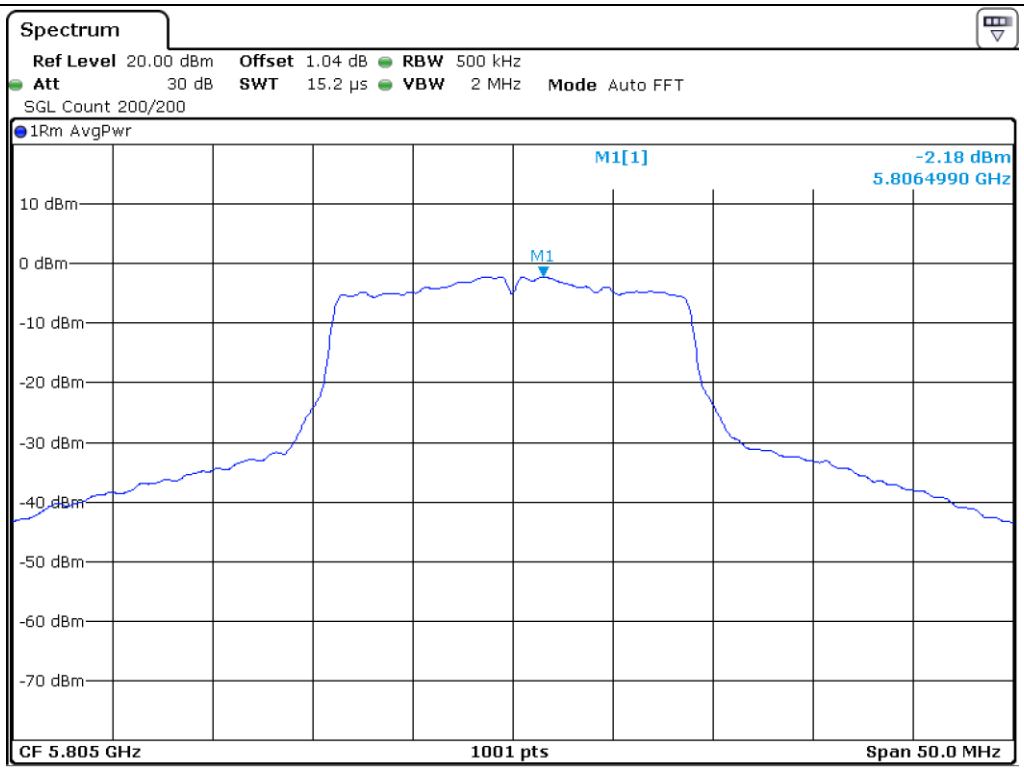
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



High Channel (5 805 MHz)

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

10.6 Test data for 802.11n_HT40 RLAN Mode

-. Operating condition : Highest Output Power Transmitting Mode

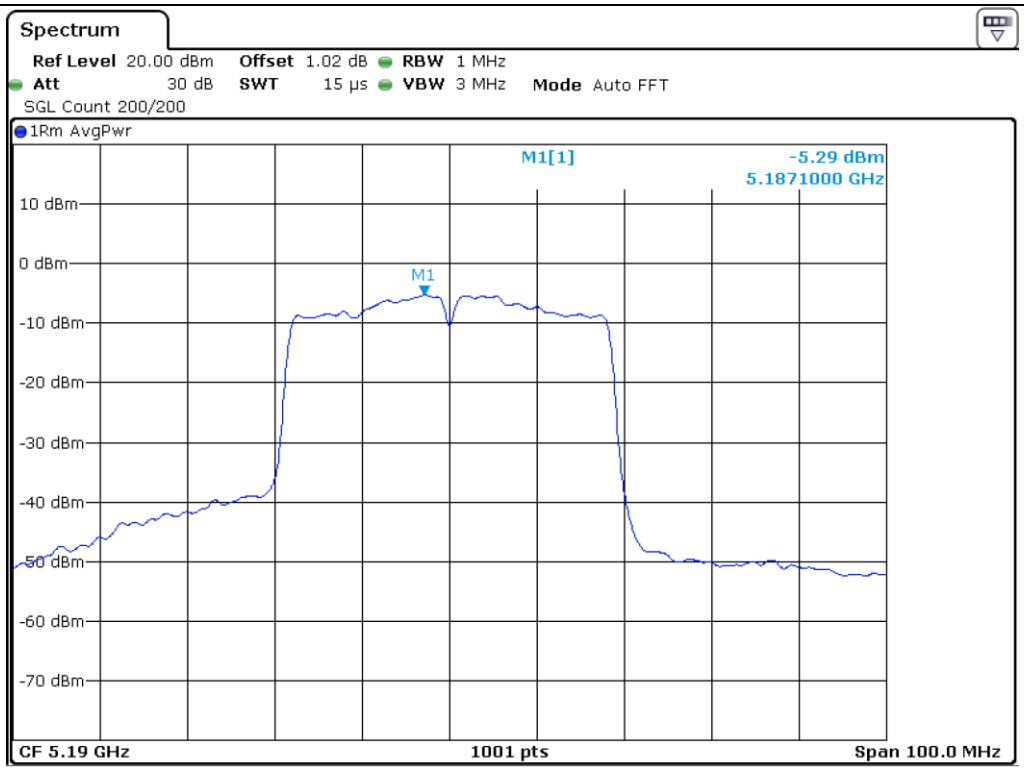
-. Duty Cycle : 86.36 %(UNII 1), 86.36 %(UNII 3)

-. Test Result : Pass

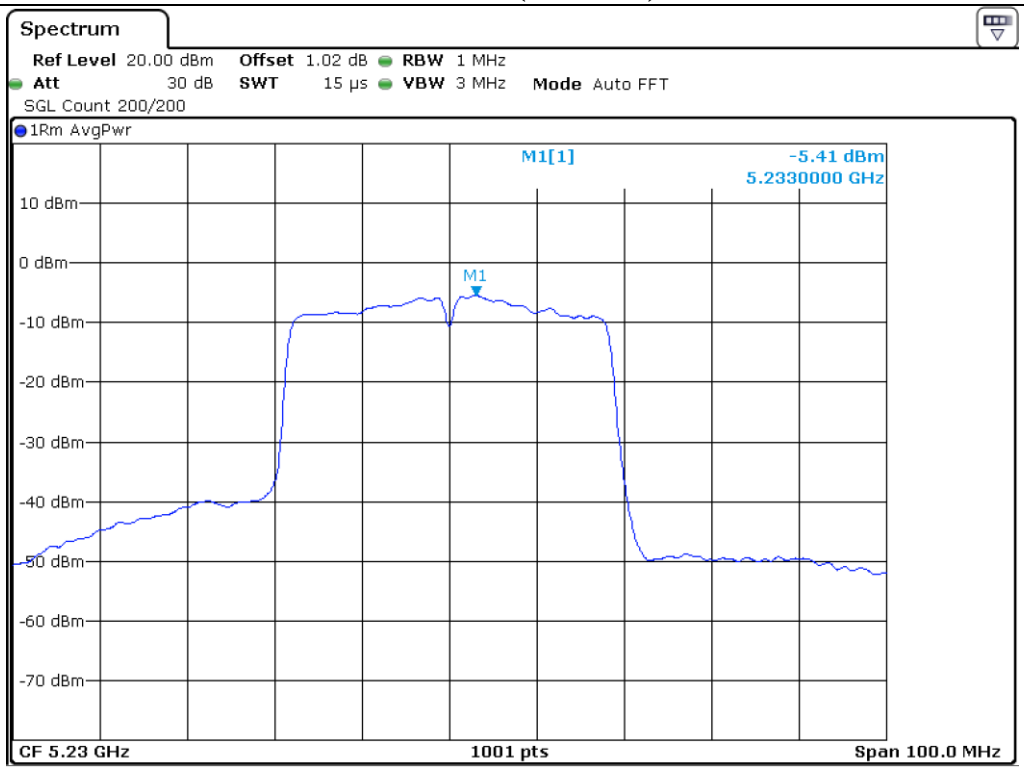
FREQUENCY RANGE (MHz)	CHANNEL	MEASURED VALUE (dBm)	C.F (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	-5.29	0.64	-4.65	11.00	15.65
	High	-5.41	0.64	-4.77	11.00	15.77
5 725 ~ 5 850	Low	-4.23	0.64	-3.59	30.00	33.59
	High	-4.39	0.64	-3.75	30.00	33.75

Remark. Margin = Limit – Result (=Measured Value + C.F.)

Remark: See next page for measurement data.

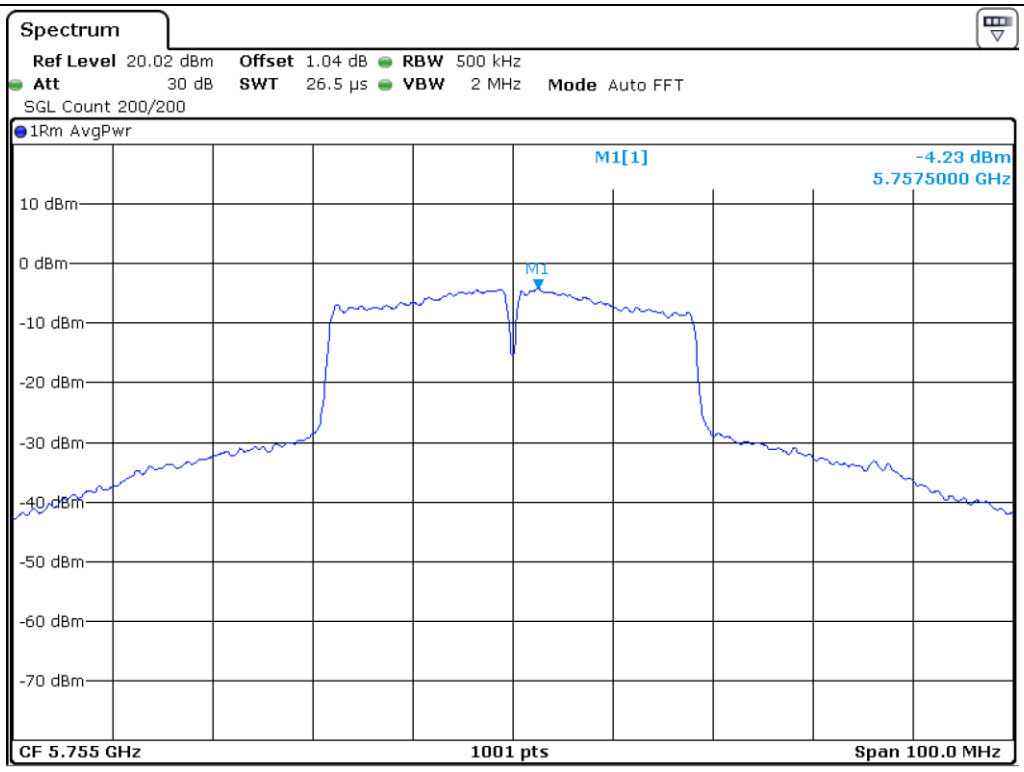


Low Channel (5 190 MHz)

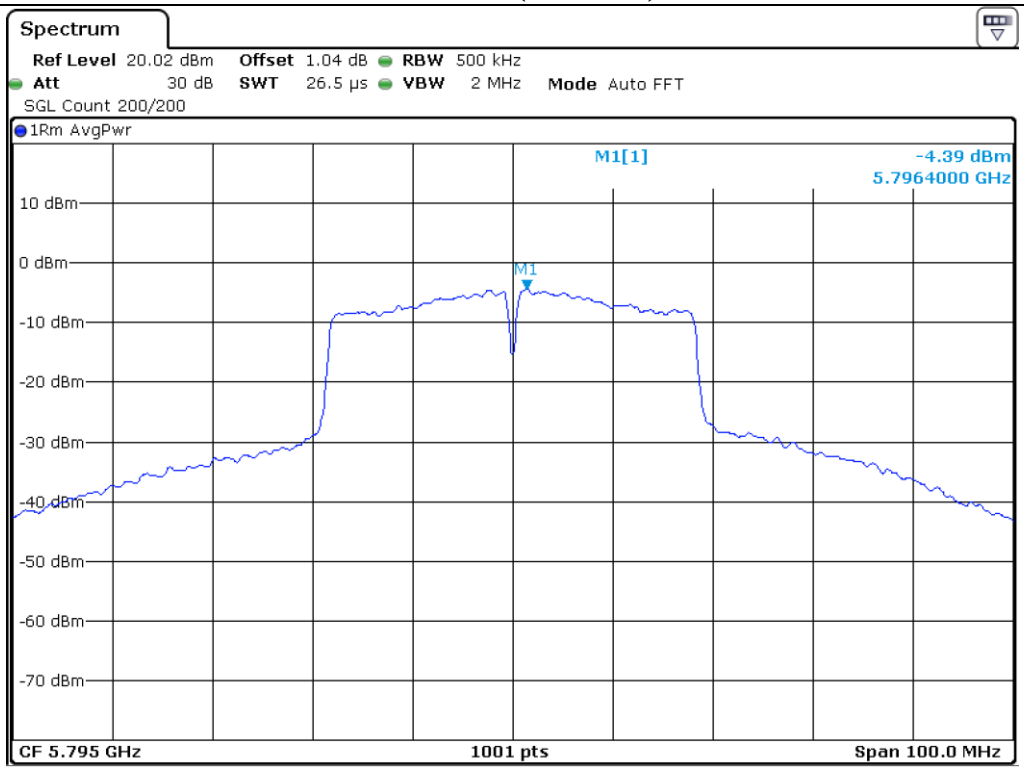


High Channel (5 230 MHz)

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



Low Channel (5 755 MHz)



High Channel (5 795 MHz)

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

10.7 Test data for 802.11ac_HT80 RLAN Mode

-. Operating condition : Highest Output Power Transmitting Mode

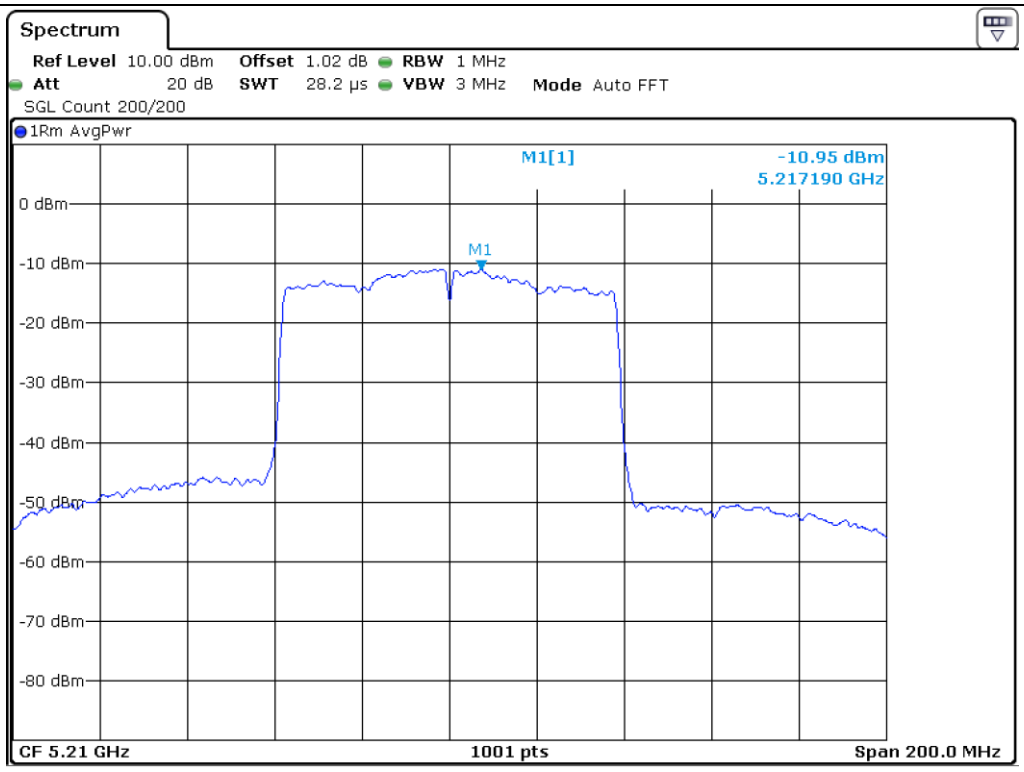
-. Duty Cycle : 76.50 %(UNII 1), 76.50 %(UNII 3)

-. Test Result : Pass

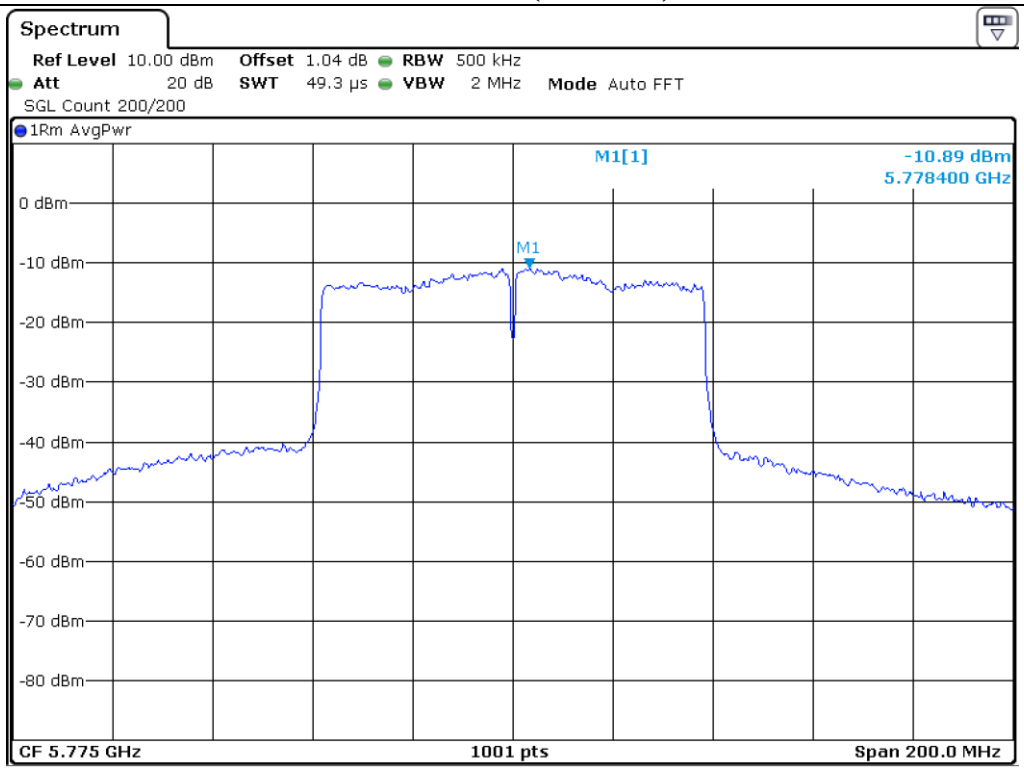
FREQUENCY RANGE (MHz)	CHANNEL	MEASURED VALUE (dBm)	C.F (dB)	RESULT (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	-10.95	1.16	-9.79	11.00	20.79
5 725 ~ 5 850	Low	-10.89	1.16	-9.73	30.00	39.73

Remark. Margin = Limit – Result (=Measured Value + C.F.)

Remark: See next page for measurement data.



Middle Channel (5 210 MHz)



Middle Channel (5 775 MHz)

11. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

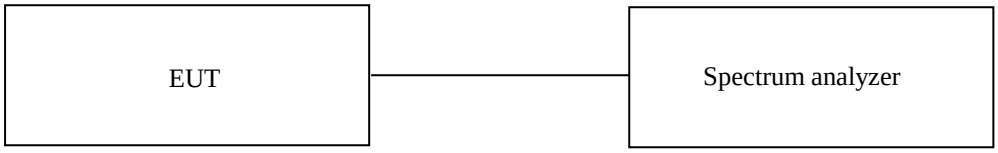
11.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

11.2 Test set-up

Turn EUT off and set chamber temperature to -40 °C and then allow sufficient time (approximately 20 min to 30 min after chamber reach the assigned temperature) for EUT to stabilize. Turn on the EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10 °C step from -40 °C to +80 °C. Repeat above method for frequency measurements every 10 °C step and then record all measured frequencies on each temperature step.



11.3 Test Date

January 28, 2021 ~ February 04, 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)

11.4 Test Data for U-NII-1

-. Result : Pass

Temperature (˚C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (Hz)
-40	5 180 000 000	5 179 986 327	-13 673
-30		5 179 986 388	-13 612
-20		5 179 986 452	-13 548
-10		5 179 986 512	-13 488
0		5 179 986 569	-13 431
10		5 179 986 630	-13 370
20		5 179 986 675	-13 325
30		5 179 986 759	-13 241
40		5 179 986 852	-13 148
50		5 179 986 975	-13 025
60		5 179 986 973	-13 027
70		5 179 986 980	-13 020
80		5 179 986 982	-13 018
-40	5 220 000 000	5 219 979 665	-20 335
-30		5 219 979 761	-20 239
-20		5 219 979 821	-20 179
-10		5 219 979 911	-20 089
0		5 219 979 935	-20 065
10		5 219 980 025	-19 975
20		5 219 980 155	-19 845
30		5 219 980 184	-19 816
40		5 219 980 267	-19 733
50		5 219 980 341	-19 659
60		5 219 980 380	-19 620
70		5 219 980 465	-19 535
80		5 219 980 523	-19 477

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

-40	5 240 000 000	5 239 979 889	-20 111
-30		5 239 979 931	-20 069
-20		5 239 980 085	-19 915
-10		5 239 980 153	-19 847
0		5 239 980 195	-19 805
10		5 239 980 240	-19 760
20		5 239 980 373	-19 627
30		5 239 980 411	-19 589
40		5 239 980 456	-19 544
50		5 239 980 548	-19 452
60		5 239 980 665	-19 335
70		5 239 980 760	-19 240
80		5 239 980 865	-19 135

11.5 Test Data for U-NII-3

-. Result : Pass

Temperature (˚C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (Hz)
-40	5 745 000 000	5 744 976 771	-23 229
-30		5 744 976 850	-23 150
-20		5 744 976 924	-23 076
-10		5 744 976 962	-23 038
0		5 744 976 149	-23 851
10		5 744 976 251	-23 749
20		5 744 977 363	-22 637
30		5 744 977 400	-22 600
40		5 744 977 470	-22 530
50		5 744 977 593	-22 407
60		5 744 977 686	-22 314
70		5 744 977 767	-22 233
80		5 744 978 850	-21 150
-40	5 785 000 000	5 784 978 322	-21 678
-30		5 784 978 385	-21 615
-20		5 784 978 442	-21 558
-10		5 784 978 597	-21 403
0		5 784 978 682	-21 318
10		5 784 978 761	-21 239
20		5 784 978 872	-21 128
30		5 784 978 898	-21 102
40		5 784 978 941	-21 059
50		5 784 978 042	-21 958
60		5 784 978 122	-21 878
70		5 784 978 181	-21 819
80		5 784 979 267	-20 733

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

-40	5 805 000 000	5 804 976 285	-23 715
-30		5 804 976 352	-23 648
-20		5 804 976 487	-23 513
-10		5 804 976 580	-23 420
0		5 804 976 669	-23 331
10		5 804 976 773	-23 227
20		5 804 976 911	-23 089
30		5 804 976 953	-23 047
40		5 804 977 018	-22 982
50		5 804 977 044	-22 956
60		5 804 977 186	-22 814
70		5 804 977 264	-22 736
80		5 804 977 392	-22 608

12. FREQUENCY STABILITY WITH VOLTAGE VARIATION

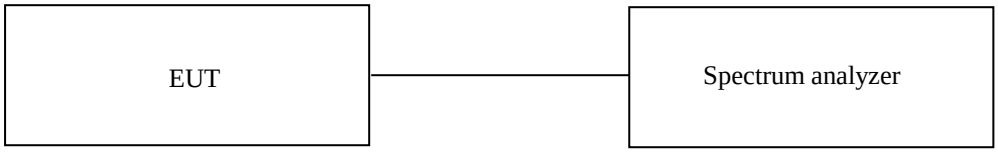
12.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

12.2 Test set-up

An external DC power supply was connected to the input of the EUT. The voltage of EUT set to 110 % of the nominal value and then was reduced to 90 % of nominal voltage. The output frequency was recorded at each step.



12.3 Test Date

January 28, 2021 ~ February 04, 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 U-NII-1

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (Hz)
12.0	5 180 000 000	5 179 986 671	-13 329
10.8		5 179 986 353	-13 647
13.2		5 179 986 623	-13 377
12.0	5 220 000 000	5 219 980 196	-19 804
10.8		5 219 980 124	-19 876
13.2		5 219 980 075	-19 925
12.0	5 240 000 000	5 239 980 353	-19 647
10.8		5 239 980 327	-19 673
13.2		5 239 980 311	-19 689

12.5 Test Data for U-NII-3

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (Hz)
12.0	5 745 000 000	5 744 977 382	-22 618
10.8		5 744 977 335	-22 665
13.2		5 744 977 311	-22 689
12.0	5 785 000 000	5 784 978 880	-21 120
10.8		5 784 978 855	-21 145
13.2		5 784 978 837	-21 163
12.0	5 805 000 000	5 804 976 911	-23 089
10.8		5 804 976 867	-23 133
13.2		5 804 978 846	-21 154

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13. RADIATED SPURIOUS EMISSIONS

13.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

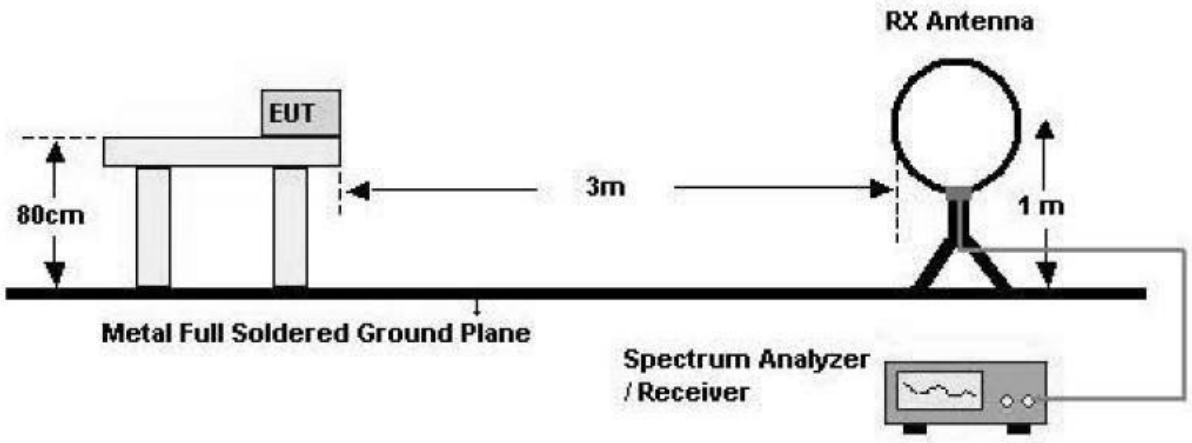
13.2 Test set-up for conducted measurement

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

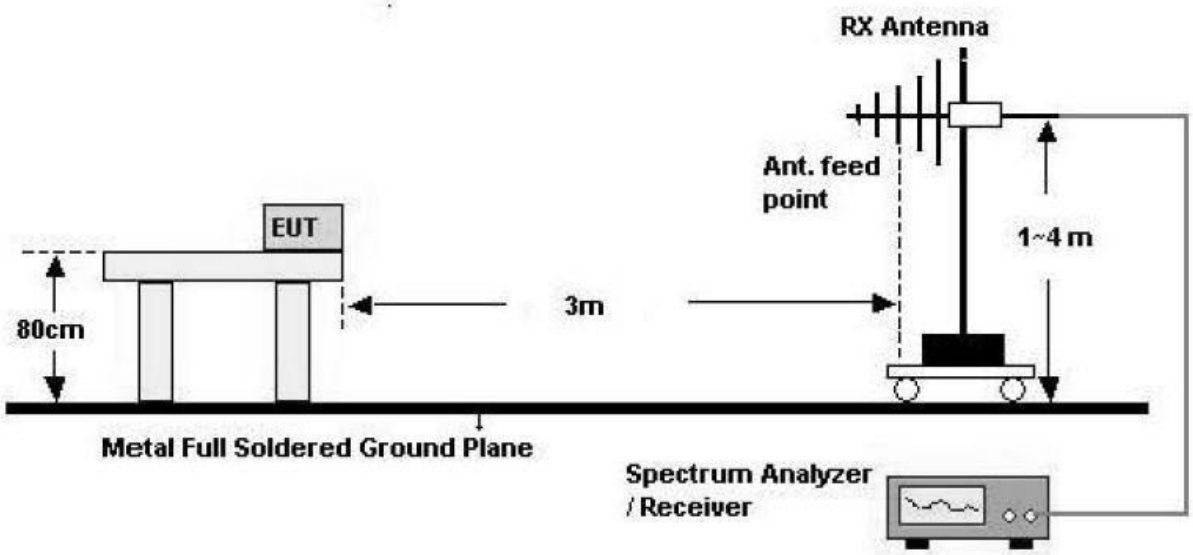
The frequency spectrum from 30 MHz to 40 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

- Test Configuration

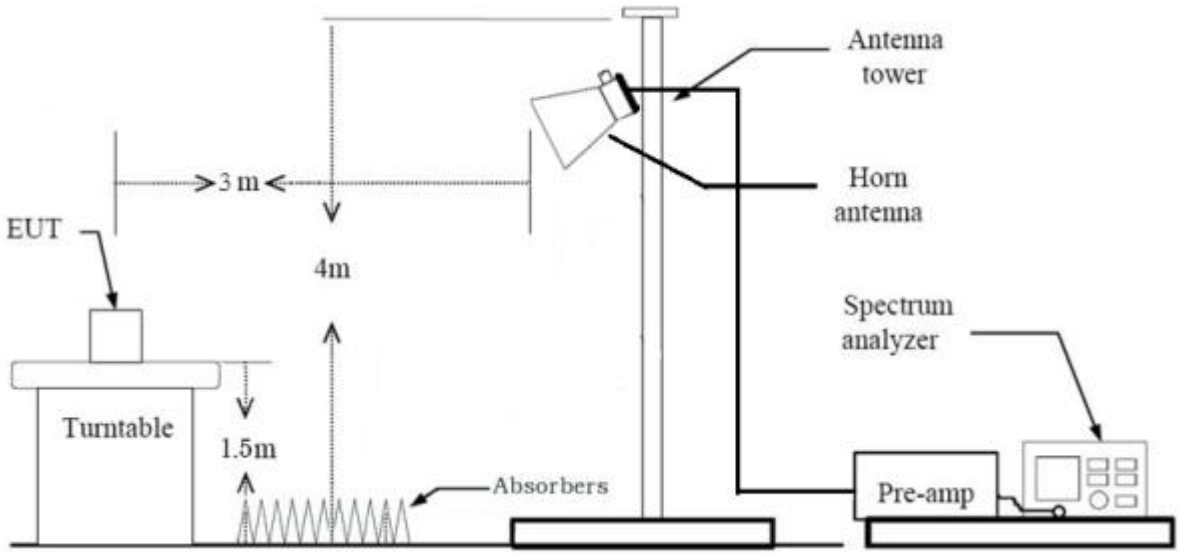
1. Below 30 MHz



2. 30 MHz - 1 GHz



3. Above 1 GHz



13.3 Test Date

January 28, 2021 ~ February 04, 2021

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13.4 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.									

13.5 Test data for 30 MHz ~ 1 000 MHz

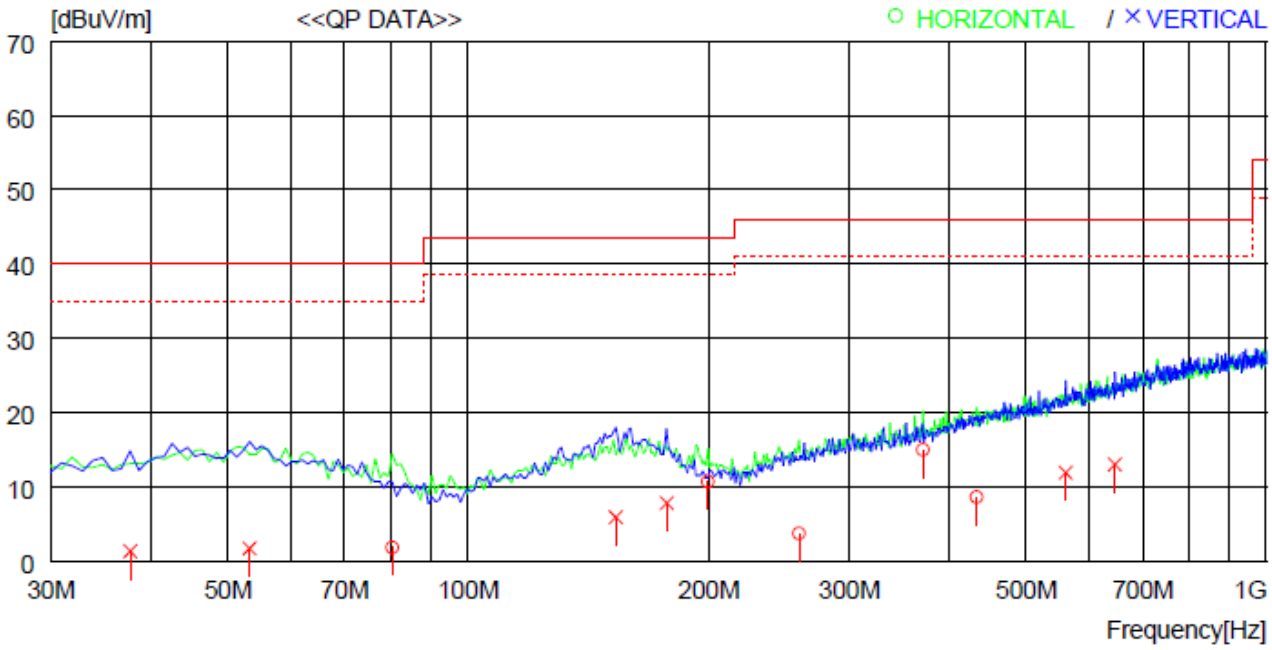
13.5.1 Test data for WLAN 5 GHz

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

Result : PASSED

EUT : NAVIGATION RADIO

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



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	59.100	22.3	9.4	0.7	32.7	-0.3	40.0	40.3	100	232
2	80.440	26.0	7.7	0.8	32.7	1.8	40.0	38.2	100	155
3	199.750	29.4	12.6	1.3	32.6	10.7	43.5	32.8	100	357
4	259.890	24.1	10.8	1.5	32.7	3.7	46.0	42.3	100	39
5	371.440	30.2	15.6	1.9	32.7	15.0	46.0	31.0	100	357
6	433.521	22.5	16.9	2.0	32.8	8.6	46.0	37.4	100	357
----- Vertical ------										
7	37.760	22.6	10.9	0.5	32.7	1.3	40.0	38.7	100	227
8	53.280	24.2	9.6	0.6	32.7	1.7	40.0	38.3	100	260
9	153.190	25.3	12.0	1.2	32.6	5.9	43.5	37.6	100	357
10	177.440	26.1	13.0	1.3	32.6	7.8	43.5	35.7	100	357
11	560.589	23.6	19.0	2.3	33.0	11.9	46.0	34.1	100	357
12	645.947	23.2	20.3	2.5	33.0	13.0	46.0	33.0	100	176

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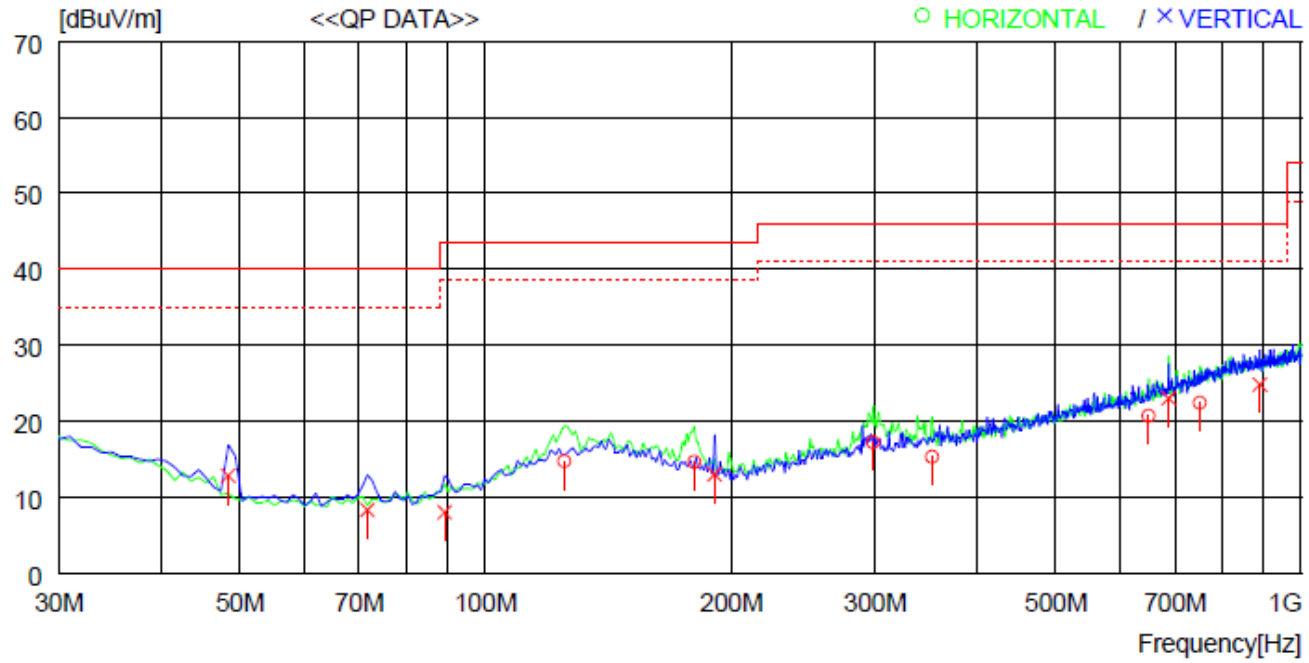
13.5.2 Test data for Intermodulation Mode(Bluetooth LE + WLAN 5 GHz)

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

Result : PASSED

EUT : NAVIGATION RADIO

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



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	125.060	35.5	10.8	1.1	32.7	14.7	43.5	28.8	300	359
2	180.350	32.8	13.1	1.3	32.6	14.6	43.5	28.9	200	0
3	298.690	34.7	13.5	1.7	32.7	17.2	46.0	28.8	100	359
4	353.010	31.1	15.1	1.8	32.7	15.3	46.0	30.7	100	106
5	649.826	30.8	20.4	2.5	33.0	20.7	46.0	25.3	400	0
6	750.703	31.4	21.4	2.3	32.7	22.4	46.0	23.6	200	209
----- Vertical ------										
7	48.430	34.9	10.0	0.6	32.7	12.8	40.0	27.2	400	359
8	71.710	31.5	8.7	0.8	32.7	8.3	40.0	31.7	100	53
9	89.170	31.9	7.9	0.9	32.7	8.0	43.5	35.5	100	0
10	191.020	31.5	12.8	1.3	32.6	13.0	43.5	30.5	100	0
11	687.655	32.6	20.8	2.5	32.9	23.0	46.0	23.0	300	0
12	889.409	30.9	23.2	2.8	32.1	24.8	46.0	21.2	200	76

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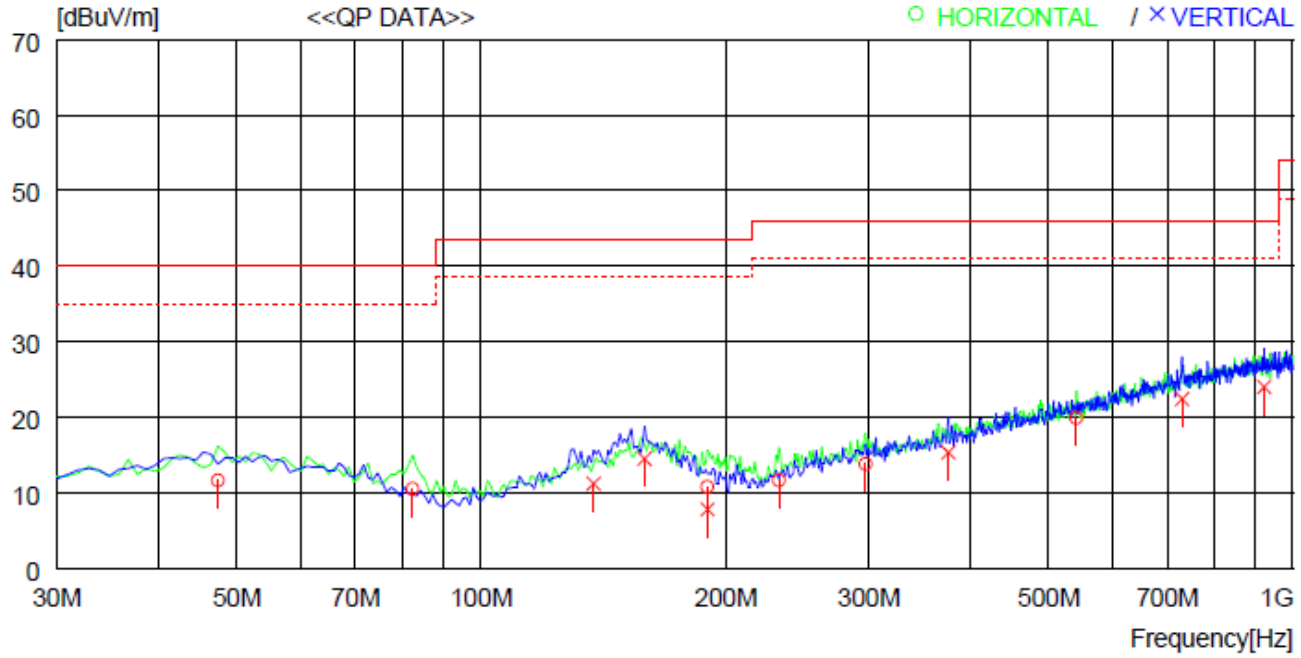
13.5.3 Test data for Intermodulation Mode(Bluetooth + WLAN 5 GHz)

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

Result : PASSED

EUT : NAVIGATION RADIO

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



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	47.460	23.6	19.6	1.1	32.7	11.6	40.0	28.4	100	62
2	82.380	26.9	14.7	1.5	32.6	10.5	40.0	29.5	100	13
3	190.050	24.8	16.3	2.3	32.6	10.8	43.5	32.7	100	242
4	232.730	24.8	16.7	2.6	32.5	11.6	46.0	34.4	100	7
5	297.720	23.9	19.3	3.0	32.4	13.8	46.0	32.2	100	358
6	541.190	23.9	24.4	4.0	32.4	19.9	46.0	26.1	100	358
----- Vertical ------										
7	137.670	23.6	18.2	2.0	32.6	11.2	43.5	32.3	100	309
8	159.010	25.9	19.1	2.1	32.6	14.5	43.5	29.0	100	4
9	190.050	21.8	16.3	2.3	32.6	7.8	43.5	35.7	100	4
10	376.290	23.4	21.0	3.3	32.4	15.3	46.0	30.7	100	4
11	730.334	22.9	27.2	4.7	32.4	22.4	46.0	23.6	100	208
12	921.418	21.5	29.2	5.3	32.0	24.0	46.0	22.0	100	4

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13.6 Test data for Above 1 GHz

13.6.1 Test data for Frequency UNII I

13.6.1.1 Test data for 802.11a RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 93.14 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Low Channel									
10 360.00	44.00	Peak	H	39.20	18.07	46.00	55.27	68.20	12.93
10 360.00	43.43	Peak	V	39.20	18.07	46.00	54.70	68.20	13.50
Middle Channel									
10 440.00	43.84	Peak	H	39.30	18.07	46.10	55.11	68.20	13.09
10 440.00	42.81	Peak	V	39.30	18.07	46.10	54.08	68.20	14.12
High Channel									
10 480.00	43.53	Peak	H	39.40	18.07	46.20	54.80	68.20	13.40
10 480.00	42.73	Peak	V	39.40	18.07	46.20	54.00	68.20	14.20

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

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

13.6.1.2 Test data for 802.11n_HT20 RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 93.03 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Low Channel									
10 360.00	43.21	Peak	H	39.20	18.07	46.00	54.48	68.20	13.72
10 360.00	43.19	Peak	V	39.20	18.07	46.00	54.46	68.20	13.74
Middle Channel									
10 440.00	44.37	Peak	H	39.30	18.07	46.10	55.64	68.20	12.56
10 440.00	43.01	Peak	V	39.30	18.07	46.10	54.28	68.20	13.92
High Channel									
10 480.00	43.83	Peak	H	39.40	18.07	46.20	55.10	68.20	13.10
10 480.00	43.58	Peak	V	39.40	18.07	46.20	54.85	68.20	13.35

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

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

13.6.1.3 Test data for 802.11n_HT40 RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 86.36 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Low Channel									
10 380.00	43.34	Peak	H	39.20	18.07	46.00	54.61	68.20	13.59
10 380.00	42.80	Peak	V	39.20	18.07	46.00	54.07	68.20	14.13
High Channel									
10 460.00	43.37	Peak	H	39.30	18.07	46.20	54.54	68.20	13.66
10 460.00	43.25	Peak	V	39.30	18.07	46.20	54.42	68.20	13.78

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

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

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13.6.1.4 Test data for 802.11ac_HT80 RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 76.50 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Middle Channel									
10 420.00	43.73	Peak	H	39.30	18.07	46.10	55.00	68.20	13.20
10 420.00	43.67	Peak	V	39.30	18.07	46.10	54.94	68.20	13.26

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

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

13.6.2 Test data for Frequency UNII 3

13.6.2.1 Test data for 802.11a RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 93.14 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Low Channel										
11 490.00	43.87	Peak	H	39.30	18.65	46.50	-	55.32	74.00	18.68
11 490.00	36.88	Average	H	39.30	18.65	46.50	0.31	48.64	54.00	5.36
11 490.00	44.16	Peak	V	39.30	18.65	46.50	-	55.61	74.00	18.39
11 490.00	37.54	Average	V	39.30	18.65	46.50	0.31	49.30	54.00	4.70
Middle Channel										
11 570.00	43.91	Peak	H	39.40	18.67	46.40	-	55.58	74.00	18.42
11 570.00	37.87	Average	H	39.40	18.67	46.40	0.31	49.85	54.00	4.15
11 570.00	42.74	Peak	V	39.40	18.67	46.40	-	54.41	74.00	19.59
11 570.00	37.91	Average	V	39.40	18.67	46.40	0.31	49.89	54.00	4.11
High Channel										
11 610.00	43.44	Peak	H	39.70	18.71	46.30	-	55.55	74.00	18.45
11 610.00	36.44	Average	H	39.70	18.71	46.30	0.31	48.86	54.00	5.14
11 610.00	43.74	Peak	V	39.70	18.71	46.30	-	55.85	74.00	18.15
11 610.00	37.42	Average	V	39.70	18.71	46.30	0.31	49.84	54.00	4.16

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

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

13.6.2.2 Test data for 802.11n_HT20 RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 93.03 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	C.F (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel										
11 490.00	43.34	Peak	H	39.30	18.65	46.50	-	54.79	74.00	19.21
11 490.00	37.42	Average	H	39.30	18.65	46.50	0.31	49.18	54.00	4.82
11 490.00	44.19	Peak	V	39.30	18.65	46.50	-	55.64	74.00	18.36
11 490.00	37.51	Average	V	39.30	18.65	46.50	0.31	49.27	54.00	4.73
Middle Channel										
11 570.00	44.44	Peak	H	39.40	18.67	46.40	-	56.11	74.00	17.89
11 570.00	36.77	Average	H	39.40	18.67	46.40	0.31	48.75	54.00	5.25
11 570.00	43.34	Peak	V	39.40	18.67	46.40	-	55.01	74.00	18.99
11 570.00	37.63	Average	V	39.40	18.67	46.40	0.31	49.61	54.00	4.39
High Channel										
11 610.00	43.28	Peak	H	39.70	18.71	46.30	-	55.39	74.00	18.61
11 610.00	37.63	Average	H	39.70	18.71	46.30	0.31	50.05	54.00	3.95
11 610.00	43.92	Peak	V	39.70	18.71	46.30	-	56.03	74.00	17.97
11 610.00	37.25	Average	V	39.70	18.71	46.30	0.31	49.67	54.00	4.33

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

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

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13.6.2.3 Test data for 802.11n_HT40 RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 86.36 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Low Channel										
11 510.00	43.77	Peak	H	39.30	18.65	46.50	-	55.22	74.00	18.78
11 510.00	37.14	Average	H	39.30	18.65	46.50	0.64	49.23	54.00	4.77
11 510.00	44.24	Peak	V	39.30	18.65	46.50	-	55.69	74.00	18.31
11 510.00	36.55	Average	V	39.30	18.65	46.50	0.64	48.64	54.00	5.36
High Channel										
11 590.00	44.04	Peak	H	39.40	18.67	46.30	-	55.81	74.00	18.19
11 590.00	37.38	Average	H	39.40	18.67	46.30	0.64	49.79	54.00	4.21
11 590.00	42.59	Peak	V	39.40	18.67	46.30	-	54.36	74.00	19.64
11 590.00	37.72	Average	V	39.40	18.67	46.30	0.64	50.13	54.00	3.87

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

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

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13.6.2.4 Test data for 802.11ac_HT80 RLAN Mode

-. 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 ~ 40 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 76.50 %

-. Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Middle Channel										
11 550.00	43.60	Peak	H	39.40	18.67	46.40	-	55.27	68.20	12.93
11 550.00	43.84	Peak	V	39.40	18.67	46.40	-	55.51	68.20	12.69

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

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

14. RADIATED RESTRICTED BAND EDGE MEASUREMENTS

14.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

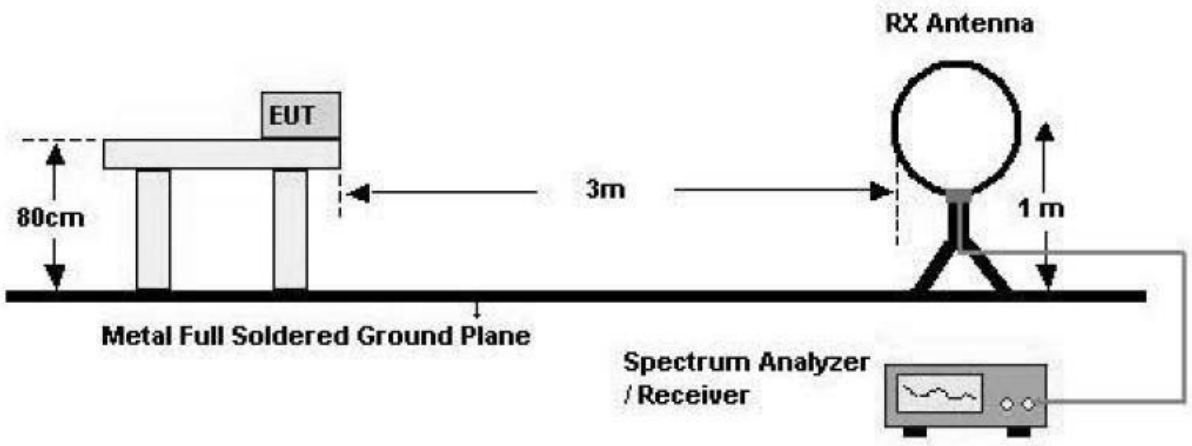
14.2 Test set-up for conducted measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable above the ground plane.

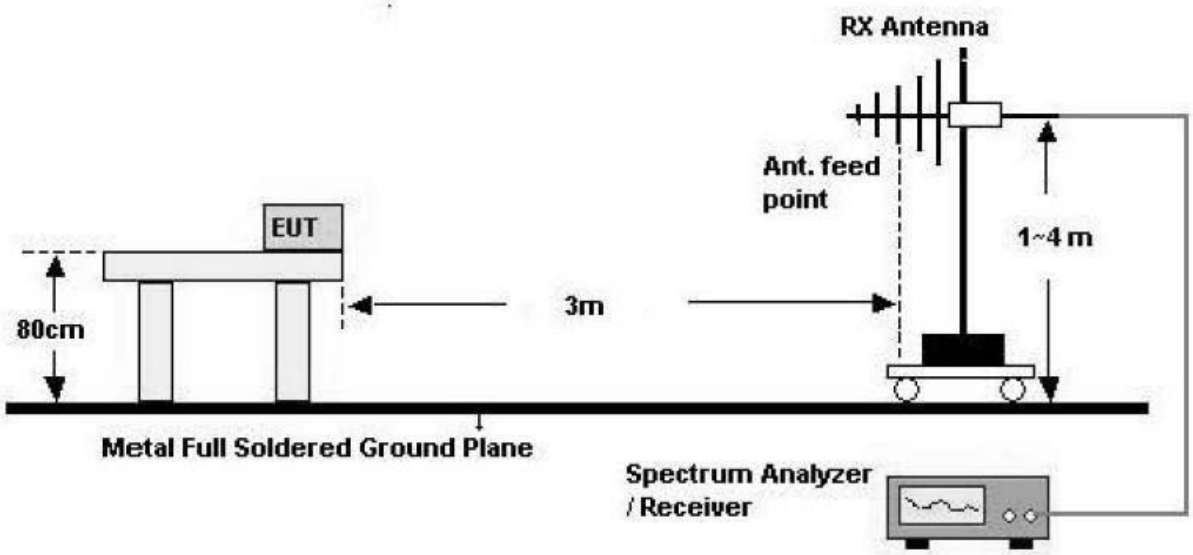
The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

- Test Configuration

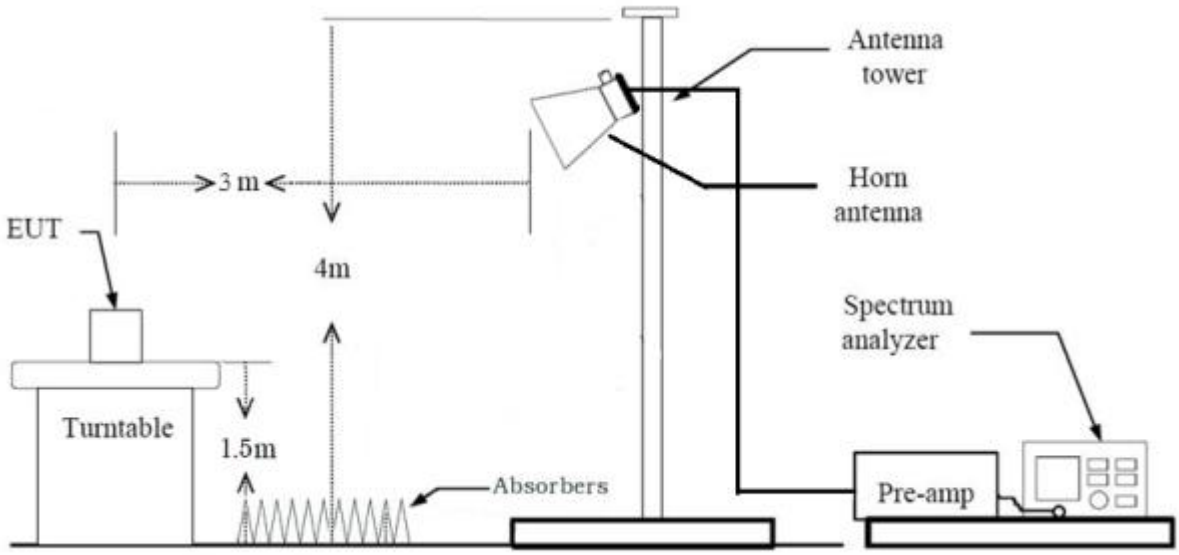
1. Below 30 MHz



2. 30 MHz - 1 GHz



3. Above 1 GHz



14.3 Test Date

January 28, 2021 ~ February 04, 2021

14.4 Test data for Frequency UNII I

14.4.1 Test data for 802.11a RLAN Mode

-. 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 : 93.14 %

-. Result : Pass

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
5 149.632	54.77	Peak	H	34.20	12.50	46.30	-	55.17	74.00	18.83
5 148.330	46.80	Average	H	34.20	12.50	46.30	0.31	47.51	54.00	6.49
5 141.237	60.12	Peak	V	34.20	12.50	46.30	-	60.52	74.00	13.48
5 148.350	50.76	Average	V	34.20	12.50	46.30	0.31	51.47	54.00	2.53

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBµV/m) – Total (dBµV/m)

14.4.2 Test data for 802.11n_HT20 RLAN Mode

-. 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 : 93.03 %

-. Result : Pass

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
5 147.056	60.76	Peak	H	34.20	12.50	46.30	-	61.16	74.00	12.84
5 149.680	51.47	Average	H	34.20	12.50	46.30	0.31	52.18	54.00	1.82
5 145.784	59.14	Peak	V	34.20	12.50	46.30	-	59.54	74.00	14.46
5 148.350	47.90	Average	V	34.20	12.50	46.30	0.31	48.61	54.00	5.39

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBµV/m) – Total (dBµV/m)

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14.4.3 Test data for 802.11n_HT40 RLAN Mode

-. 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 : 86.36 %

-. Result : Pass

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
5 149.450	62.12	Peak	H	34.20	12.50	46.30	-	62.52	74.00	11.48
5 414.125	51.18	Average	H	34.20	12.50	46.30	0.64	52.22	54.00	1.78
5 148.370	57.39	Peak	V	34.20	12.50	46.30	-	57.79	74.00	16.21
5 149.037	49.03	Average	V	34.20	12.50	46.30	0.64	50.07	54.00	3.93

Tabulated test data for Restricted Band

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

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

14.4.4 Test data for 802.11ac_HT80 RLAN Mode

-. 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 : 76.50 %

-. Result : Pass

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
5 149.673	58.25	Peak	H	34.20	12.50	46.30	-	58.65	74.00	15.35
5 149.037	50.17	Average	H	34.20	12.50	46.30	1.16	51.73	54.00	2.27
5 149.069	55.69	Peak	V	34.20	12.50	46.30	-	56.09	74.00	17.91
5 140.570	47.76	Average	V	34.20	12.50	46.30	1.16	49.32	54.00	4.68

Tabulated test data for Restricted Band

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

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

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14.5 Test data for Frequency U-NII-3

14.5.1 Test data for 802.11a RLAN Mode

-. 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 : 93.14 %

-. Result : Pass

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Low Channel									
5 650.000	50.52	Peak	H	34.10	15.39	46.30	53.71	68.20	14.49
5 700.000	56.61	Peak	H	34.10	15.39	46.30	59.80	105.20	45.40
5 720.000	63.74	Peak	H	34.10	15.39	46.30	66.93	110.80	43.87
5 725.000	70.24	Peak	H	34.10	15.39	46.30	73.43	122.20	48.77
5 650.000	50.30	Peak	V	34.10	15.39	46.30	53.49	68.20	14.71
5 700.000	54.28	Peak	V	34.10	15.39	46.30	57.47	105.20	47.73
5 720.000	63.17	Peak	V	34.10	15.39	46.30	66.36	110.80	44.44
5 725.000	67.92	Peak	V	34.10	15.39	46.30	71.11	122.20	51.09
High Channel									
5 850.000	55.85	Peak	H	34.80	15.55	46.10	60.10	122.20	62.10
5 855.000	53.89	Peak	H	34.80	15.55	46.10	58.14	110.80	52.66
5 875.000	51.11	Peak	H	34.80	15.55	46.10	55.36	105.20	49.84
5 925.000	48.82	Peak	H	34.80	15.55	46.10	53.07	68.20	15.13
5 850.000	52.32	Peak	V	34.80	15.55	46.10	56.57	122.20	65.63
5 855.000	54.09	Peak	V	34.80	15.55	46.10	58.34	110.80	52.46
5 875.000	49.60	Peak	V	34.80	15.55	46.10	53.85	105.20	51.35
5 925.000	48.39	Peak	V	34.80	15.55	46.10	52.64	68.20	15.56

Tabulated test data for Restricted Band

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

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

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14.5.2 Test data for 802.11n_HT20 RLAN Mode

-. 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 : 93.03 %

-. Result : Pass

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel									
5 650.000	49.48	Peak	H	34.10	15.39	46.30	52.67	68.20	15.53
5 700.000	58.11	Peak	H	34.10	15.39	46.30	61.30	105.20	43.90
5 720.000	66.40	Peak	H	34.10	15.39	46.30	69.59	110.80	41.21
5 725.000	73.38	Peak	H	34.10	15.39	46.30	76.57	122.20	45.63
5 650.000	49.78	Peak	V	34.10	15.39	46.30	52.97	68.20	15.23
5 700.000	55.04	Peak	V	34.10	15.39	46.30	58.23	105.20	46.97
5 720.000	65.65	Peak	V	34.10	15.39	46.30	68.84	110.80	41.96
5 725.000	69.98	Peak	V	34.10	15.39	46.30	73.17	122.20	49.03
High Channel									
5 850.000	55.85	Peak	H	34.80	15.55	46.10	60.10	122.20	62.10
5 855.000	54.05	Peak	H	34.80	15.55	46.10	58.30	110.80	52.50
5 875.000	51.43	Peak	H	34.80	15.55	46.10	55.68	105.20	49.52
5 925.000	49.02	Peak	H	34.80	15.55	46.10	53.27	68.20	14.93
5 850.000	52.89	Peak	V	34.80	15.55	46.10	57.14	122.20	65.06
5 855.000	52.51	Peak	V	34.80	15.55	46.10	56.76	110.80	54.04
5 875.000	49.07	Peak	V	34.80	15.55	46.10	53.32	105.20	51.88
5 925.000	48.81	Peak	V	34.80	15.55	46.10	53.06	68.20	15.14

Tabulated test data for Restricted Band

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

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

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14.5.3 Test data for 802.11n_HT40 RLAN Mode

-. 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 : 86.93 %

-. Result : Pass

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Low Channel									
5 650.000	53.91	Peak	H	34.10	15.39	46.30	57.10	68.20	11.10
5 700.000	65.02	Peak	H	34.10	15.39	46.30	68.21	105.20	36.99
5 720.000	73.26	Peak	H	34.10	15.39	46.30	76.45	110.80	34.35
5 725.000	76.79	Peak	H	34.10	15.39	46.30	79.98	122.20	42.22
5 650.000	53.89	Peak	V	34.10	15.39	46.30	57.08	68.20	11.12
5 700.000	64.22	Peak	V	34.10	15.39	46.30	67.41	105.20	37.79
5 720.000	70.76	Peak	V	34.10	15.39	46.30	73.95	110.80	36.85
5 725.000	74.51	Peak	V	34.10	15.39	46.30	77.70	122.20	44.50
High Channel									
5 850.000	62.90	Peak	H	34.80	15.55	46.10	67.15	122.20	55.05
5 855.000	62.54	Peak	H	34.80	15.55	46.10	66.79	110.80	44.01
5 875.000	56.98	Peak	H	34.80	15.55	46.10	61.23	105.20	43.97
5 925.000	49.88	Peak	H	34.80	15.55	46.10	54.13	68.20	14.07
5 850.000	60.07	Peak	V	34.80	15.55	46.10	64.32	122.20	57.88
5 855.000	58.96	Peak	V	34.80	15.55	46.10	63.21	110.80	47.59
5 875.000	53.75	Peak	V	34.80	15.55	46.10	58.00	105.20	47.20
5 925.000	48.87	Peak	V	34.80	15.55	46.10	53.12	68.20	15.08

Tabulated test data for Restricted Band

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

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

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14.5.4 Test data for 802.11ac_HT80 RLAN Mode

-. 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 : 76.50 %

-. Result : Pass

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP FACTOR	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Middle Channel									
5 650.000	56.08	Peak	H	34.10	15.39	46.30	59.27	68.20	8.93
5 700.000	66.48	Peak	H	34.10	15.39	46.30	69.67	105.20	35.53
5 720.000	66.62	Peak	H	34.10	15.39	46.30	69.81	110.80	40.99
5 725.000	67.34	Peak	H	34.10	15.39	46.30	70.53	122.20	51.67
5 650.000	54.57	Peak	V	34.10	15.39	46.30	57.76	68.20	10.44
5 700.000	64.26	Peak	V	34.10	15.39	46.30	67.45	105.20	37.75
5 720.000	64.17	Peak	V	34.10	15.39	46.30	67.36	110.80	43.44
5 725.000	64.36	Peak	V	34.10	15.39	46.30	67.55	122.20	54.65
Middle Channel									
5 850.000	61.82	Peak	H	34.80	15.55	46.10	66.07	122.20	56.13
5 855.000	61.33	Peak	H	34.80	15.55	46.10	65.58	110.80	45.22
5 875.000	62.55	Peak	H	34.80	15.55	46.10	66.80	105.20	38.40
5 925.000	51.58	Peak	H	34.80	15.55	46.10	55.83	68.20	12.37
5 850.000	58.30	Peak	V	34.80	15.55	46.10	62.55	122.20	59.65
5 855.000	58.21	Peak	V	34.80	15.55	46.10	62.46	110.80	48.34
5 875.000	59.35	Peak	V	34.80	15.55	46.10	63.60	105.20	41.60
5 925.000	49.58	Peak	V	34.80	15.55	46.10	53.83	68.20	14.37

Tabulated test data for Restricted Band

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

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

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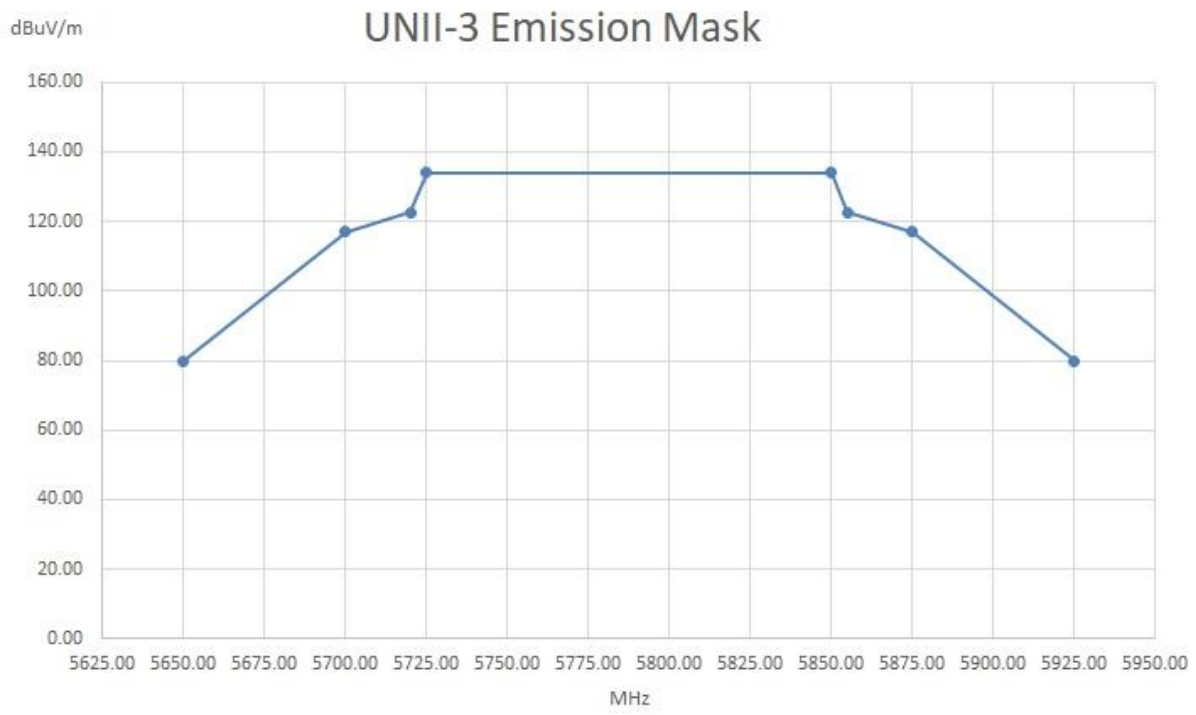
14.6.5 U-NII-3 Emission Limits

14.6.5.1 Emission Mask Plots



Remark.

-. Title 47 → Part 15 → Subpart E—UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES

§ 15.407 General technical requirements.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

15. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102177	Apr. 20, 2020 (1Y)
FSW43	Rohde & Schwarz	Signal Analyzer	104544	Jul. 15, 2020 (1Y)
ESW	Rohde & Schwarz	EMI Test Receiver	101851	Mar. 27, 2020 (1Y)
SSE-43CI-A	Samkun Tech	Humidity Chamber	60712	Feb. 21, 2020 (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, 2020(1Y)
ESR	Rohde & Schwarz	EMI TEST RECEIVER	102602	Mar. 17, 2020 (1Y)

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