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

Test Report No.	**: OT-19D-RWD-029**
AGR No.	**: A19NA-284**
Applicant	**: Samsung Electronics Co Ltd**
Address	**: 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058, United States**
Manufacturer	**: Samsung Electronics Co Ltd**
Address	**: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677, Korea**
Type of Equipment	**: Wi-Fi/BT Transceiver**
FCC ID.	**: A3LWCT731M**
Model Name	**: WCT731M**
Serial number	**: N/A**
Total page of Report	**: 55 pages (including this page)**
Date of Incoming	**: November 18, 2019**
Date of issue	**: December 11, 2019**

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 / Chief Engineer, 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)

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-19D-RWD-029	December 11, 2019	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

Applicant : Samsung Electronics Co Ltd

Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058, United States

Contact Person : minhyung, cho / Senior Engineer

Telephone No. : +82-31-277-2688

FCC ID : A3LWCT731M

Model Name : WCT731M

Brand Name :

Serial Number : N/A

Date : December 11, 2019

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Modular Transmitter, Wi-Fi/BT Transceiver
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

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

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum 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 Samsung Electronics Co Ltd, Model WCT731M (referred to as the EUT in this report) is a Wi-Fi/BT Transceiver. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Wi-Fi/BT Transceiver	
Temperature Range	-20 ℃ ~ 50 ℃	
OPERATING FREQUENCY	Bluetooth LE	2 402 MHz ~ 2 480 MHz
	Bluetooth	2 402 MHz ~ 2 480 MHz
	WLAN 2.4 GHz	2 412 MHz ~ 2 472 MHz (802.11b/g/n(HT20))
		2 422 MHz ~ 2 462 MHz (802.11n(HT40))
	5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11a/n(HT20)/ac(VHT20))
		5 190 MHz ~ 5 230 MHz (802.11n(HT40)/ac(VHT40))
		5 210 MHz (802.11ac(VHT80))
	5 250 MHz ~ 5 350 MHz Band	5 260 MHz ~ 5 320 MHz (802.11a/n(HT20)/ac(VHT20))
		5 270 MHz ~ 5 310 MHz (802.11n(HT40)/ac(VHT40))
		5 290 MHz (802.11ac(VHT80))
	5 470 MHz ~ 5 725 MHz Band	5 500 MHz ~ 5 700 MHz (802.11a/n(HT20)/ac(VHT20))
		5 510 MHz ~ 5 670 MHz (802.11n(HT40)/ac(VHT40))
		5 530 MHz (802.11ac(VHT80))
	5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20))
		5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40))
		5 775 MHz (802.11ac(VHT80))
MODULATION TYPE	Bluetooth LE	GFSK for 1 Mbps / 2 Mbps
	Bluetooth	GFSK for 1Mbps, π/4-DQPSK for 2Mbps, 8-DPSK for 3Mbps
	WLAN 2.4 GHz	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11g/n(HT20)/n(HT40): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
	WLAN 5 GHz	802.11a/n(HT20)/n(HT40)/ac(VHT80): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)

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RF OUTPUT POWER	Bluetooth LE	1 Mbps	11.59 dBm
		2 Mbps	11.46 dBm
	Bluetooth	1 Mbps	11.63 dBm
		2 Mbps	11.27 dBm
		3 Mbps	11.22 dBm
	WLAN 2.4 GHz	Antenna 0	19.34 dBm(802.11b) 14.98 dBm(802.11g) 13.70 dBm(802.11n_HT20) 11.96 dBm(802.11n_HT40)
		Antenna 1	20.59 dBm(802.11b) 16.00 dBm(802.11g) 14.72 dBm(802.11n_HT20) 13.37 dBm(802.11n_HT40)
		Multiple Antenna	18.51 dBm(802.11g) 17.24 dBm(802.11n_HT20) 15.71 dBm(802.11n_HT40)

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RF OUTPUT POWER	5 150 MHz ~ 5 250 MHz Band	Antenna 0	12.93 dBm(802.11a) 12.23 dBm(802.11n_HT20) 10.63 dBm(802.11n_HT40) 9.95 dBm(802.11ac_VHT80)
		Antenna 1	11.35 dBm(802.11a) 10.03 dBm(802.11n_HT20) 8.64 dBm(802.11n_HT40) 7.58 dBm(802.11ac_VHT80)
		Multiple Antenna	15.22 dBm(802.11a) 14.28 dBm(802.11n_HT20) 12.76 dBm(802.11n_HT40) 11.94 dBm(802.11ac_VHT80)
	5 250 MHz ~ 5 350 MHz Band	Antenna 0	12.76 dBm(802.11a) 12.10 dBm(802.11n_HT20) 10.62 dBm(802.11n_HT40) 9.94 dBm(802.11ac_VHT80)
		Antenna 1	11.34 dBm(802.11a) 10.01 dBm(802.11n_HT20) 8.40 dBm(802.11n_HT40) 7.85 dBm(802.11ac_VHT80)
		Multiple Antenna	15.12 dBm(802.11a) 14.19 dBm(802.11n_HT20) 12.66 dBm(802.11n_HT40) 12.03 dBm(802.11ac_VHT80)

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RF OUTPUT POWER	5 470 MHz ~ 5 725 MHz Band	Antenna 0	11.93 dBm(802.11a) 11.51 dBm(802.11n_HT20) 9.97 dBm(802.11n_HT40) 9.47 dBm(802.11ac_VHT80)
		Antenna 0_Straddle	11.45 dBm(802.11a) 11.15 dBm(802.11n_HT20) 9.52 dBm(802.11n_HT40) 9.92 dBm(802.11ac_VHT80)
		Antenna 1	11.64 dBm(802.11a) 11.29 dBm(802.11n_HT20) 9.64 dBm(802.11n_HT40) 9.21 dBm(802.11ac_VHT80)
		Antenna 1_Straddle	10.98 dBm(802.11a) 10.41 dBm(802.11n_HT20) 8.73 dBm(802.11n_HT40) 8.90 dBm(802.11ac_VHT80)
		Multiple Antenna	14.80 dBm(802.11a) 14.38 dBm(802.11n_HT20) 12.80 dBm(802.11n_HT40) 12.35 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	14.23 dBm(802.11a) 13.81 dBm(802.11n_HT20) 12.15 dBm(802.11n_HT40) 12.45 dBm(802.11ac_VHT80)

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RF OUTPUT POWER	5 725 MHz ~ 5 850 MHz Band	Antenna 0	11.37 dBm(802.11a) 11.15 dBm(802.11n_HT20) 9.41 dBm(802.11n_HT40) 9.45 dBm(802.11ac_VHT80)
		Antenna 0_Straddle	3.47 dBm(802.11a) 3.43 dBm(802.11n_HT20) -1.78 dBm(802.11n_HT40) -3.70 dBm(802.11ac_VHT80)
		Antenna 1	11.11 dBm(802.11a) 10.93 dBm(802.11n_HT20) 8.95 dBm(802.11n_HT40) 9.06 dBm(802.11ac_VHT80)
		Antenna 1_Straddle	3.30 dBm(802.11a) 3.07 dBm(802.11n_HT20) -2.09 dBm(802.11n_HT40) -5.87 dBm(802.11ac_VHT80)
		Multiple Antenna	14.25 dBm(802.11a) 14.05 dBm(802.11n_HT20) 12.20 dBm(802.11n_HT40) 12.27 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	6.40 dBm(802.11a) 6.26 dBm(802.11n_HT20) 1.08 dBm(802.11n_HT40) -1.64 dBm(802.11ac_VHT80)

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ANTENNA TYPE	Chip Antenna		
ANTENNA GAIN	Bluetooth LE	-0.25 dBi	
	Bluetooth	-0.25 dBi	
	WLAN 2.4 GHz	Antenna 0	2.89 dBi
		Antenna 1	2.07 dBi
		Multiple Antenna	5.51 dBi
	5 150 MHz ~ 5 250 MHz Band	Antenna 0	-0.32 dBi
		Antenna 1	2.12 dBi
		Multiple Antenna	4.08 dBi
	5 250 MHz ~ 5 350 MHz Band	Antenna 0	0.52 dBi
		Antenna 1	2.48 dBi
		Multiple Antenna	4.62 dBi
	5 470 MHz ~ 5 725 MHz Band	Antenna 0	1.57 dBi
		Antenna 1	3.86 dBi
		Multiple Antenna	5.87 dBi
	5 725 MHz ~ 5 850 MHz Band	Antenna 0	-1.42 dBi
		Antenna 1	1.99 dBi
		Multiple Antenna	3.63 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	40 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	Samsung Electronics Co Ltd	WCP730M	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
WCT731M	Samsung Electronics Co Ltd	Wi-Fi/BT Transceiver (EUT)	
HP Probook	HP	Notebook PC	EUT
PPP009C	LIE-ON TECHNOLOGY (CHANGZHOU)CO.,LTD.	AC Adapter	

5.3 Mode of operation during the test

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

For final testing, the EUT was set at 2 402 MHz, 2 440 MHz, and 2 480 MHz 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 “XZ” axis, but the worst data was recorded in this report.

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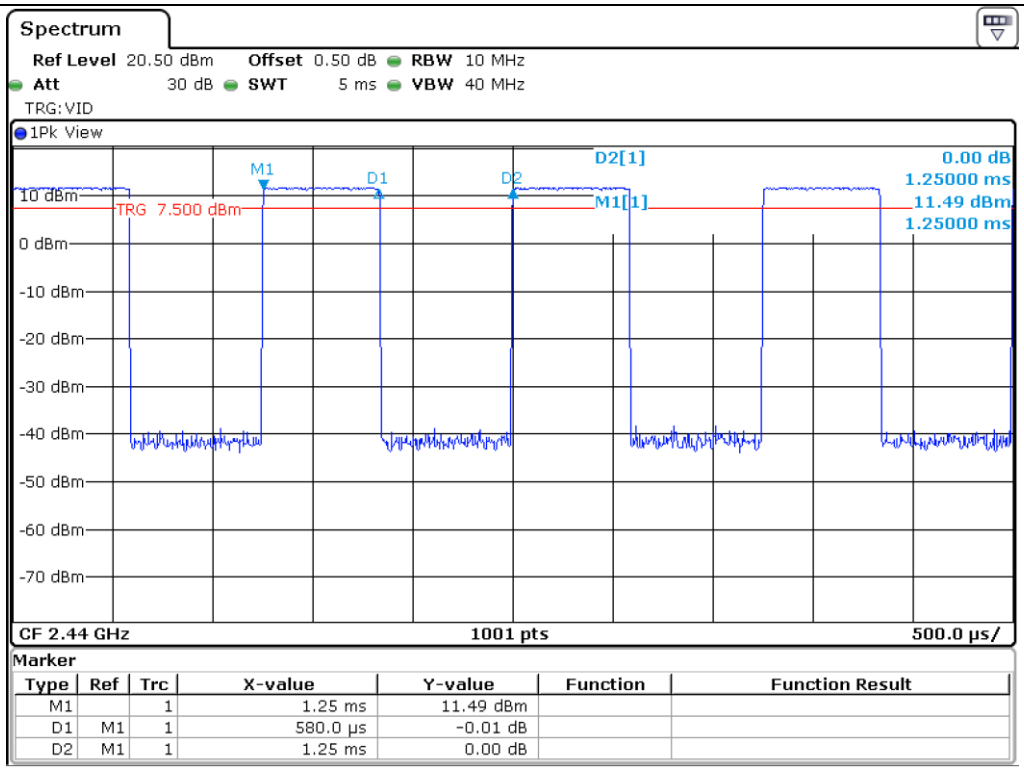
-. Duty Cycle

Mode	Tx On Time [ms]	Tx Off Time [ms]	Duty Cycle [%]	Correction Factor [dB]
Bluetooth LE [1 Mbps]	0.580	0.670	46.40	3.33
Bluetooth LE [2 Mbps]	0.296	0.328	47.44	3.24

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

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

-. Test Plot



Bluetooth LE_1 Mbps

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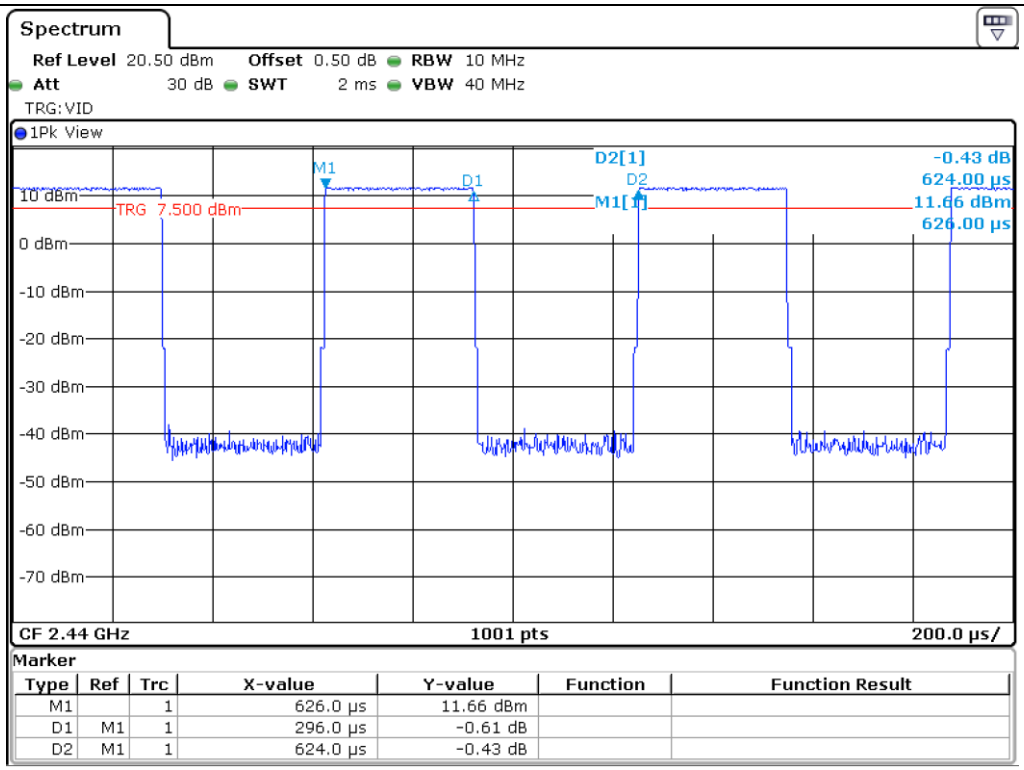

Bluetooth LE_2 Mbps

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5.4 Configuration of Test System

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

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The antenna of the EUT is a Chip Antenna 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

7. MINIMUM 6 dB BANDWIDTH

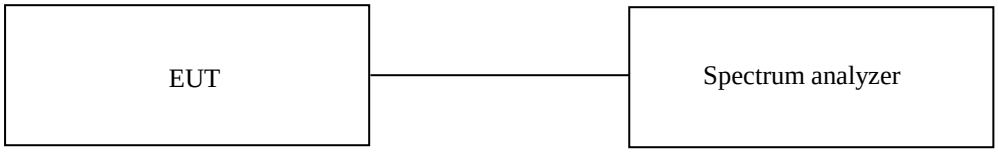
7.1 Operating environment

Temperature : 23 ℃

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 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.

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7.4 Test data for 1 Mbps

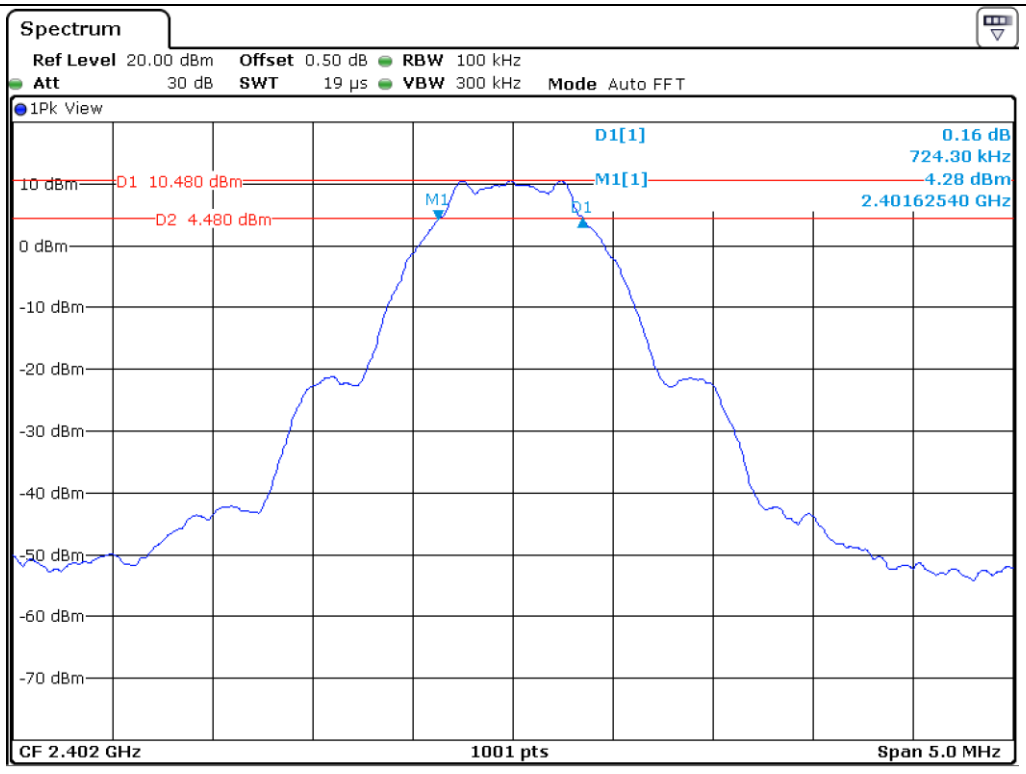
-. Test Date : November 20, 2019 ~ December 02, 2019

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 402.00	724.30	500.00	224.30
Middle	2 440.00	719.30	500.00	219.30
High	2 480.00	719.30	500.00	219.30

Remark. Margin = Measured Value - Limit

Tested by: Tae-Ho, Kim / Senior Manager



Low Channel

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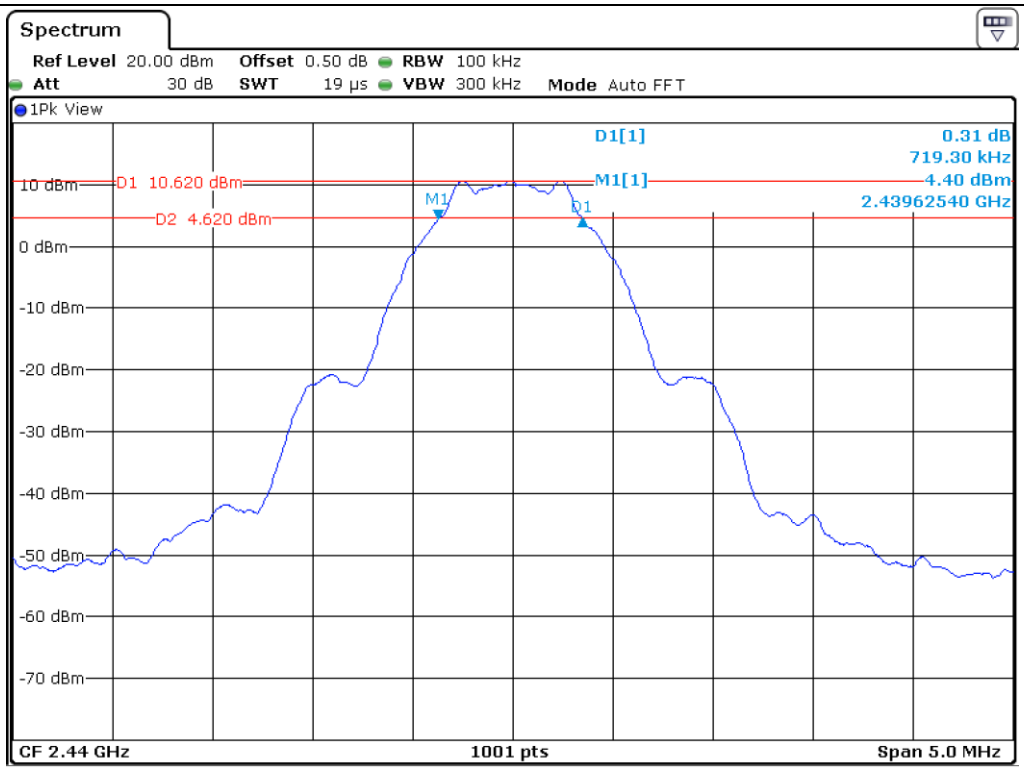
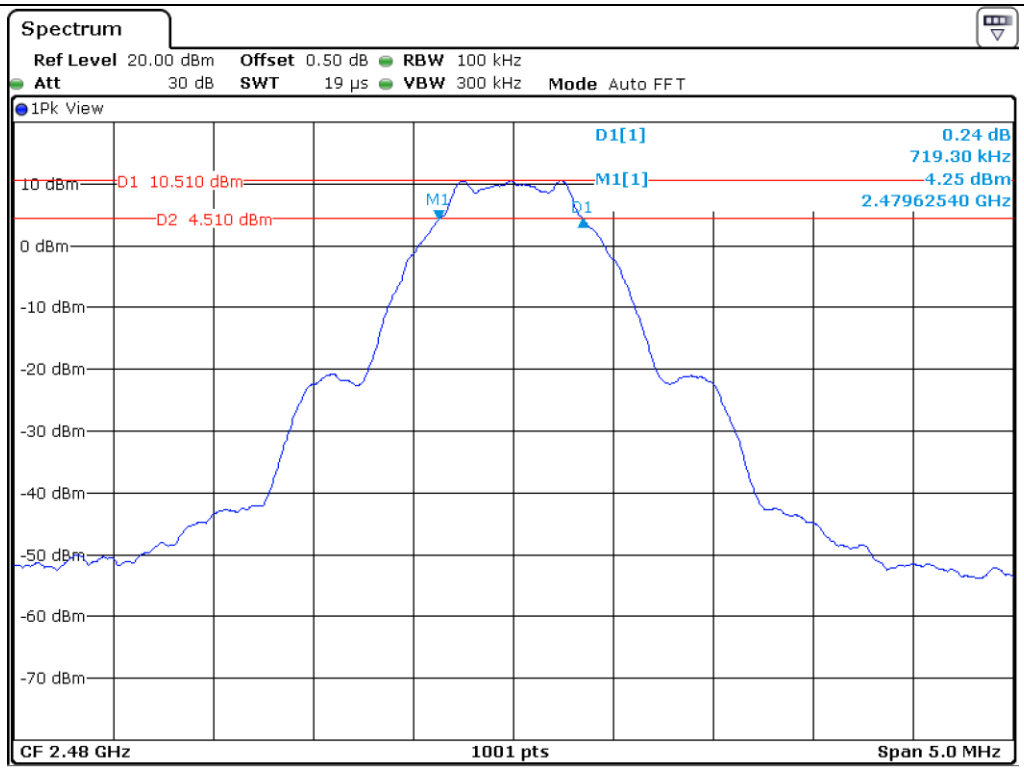


Middle Channel



High Channel

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7.5 Test data for 2 Mbps

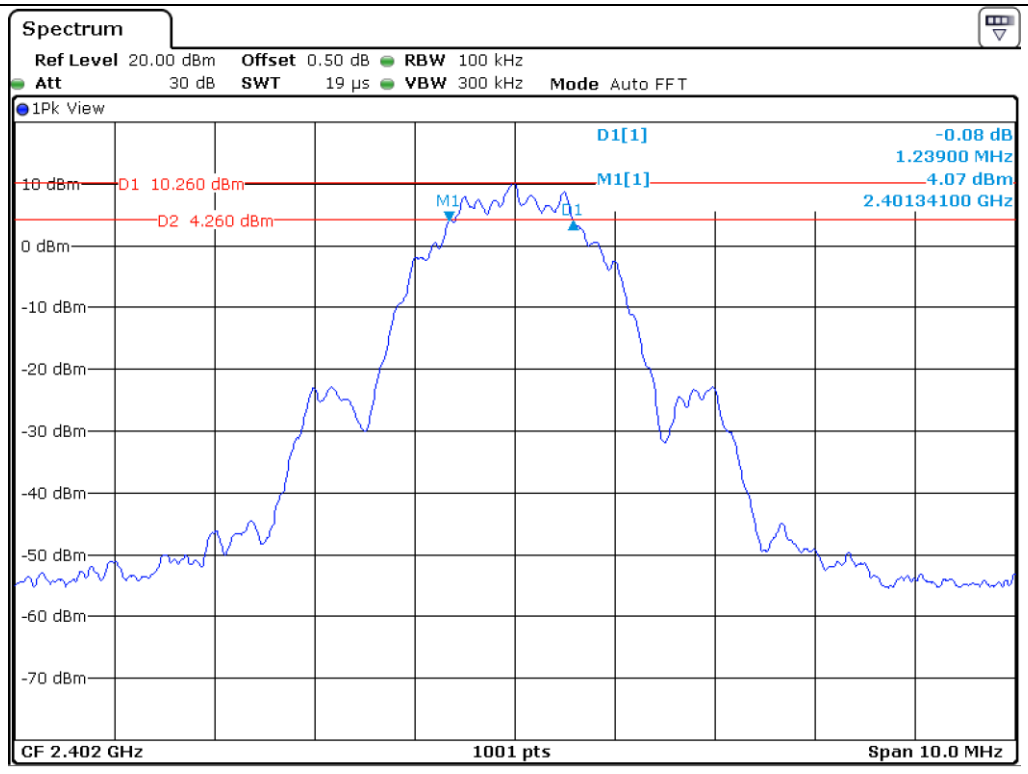
-. Test Date : November 20, 2019 ~ December 02, 2019

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 402.00	1 239.00	500.00	739.00
Middle	2 440.00	1 229.00	500.00	729.00
High	2 480.00	1 229.00	500.00	729.00

Remark. Margin = Measured Value - Limit

Tested by: Tae-Ho, Kim / Senior Manager



Low Channel

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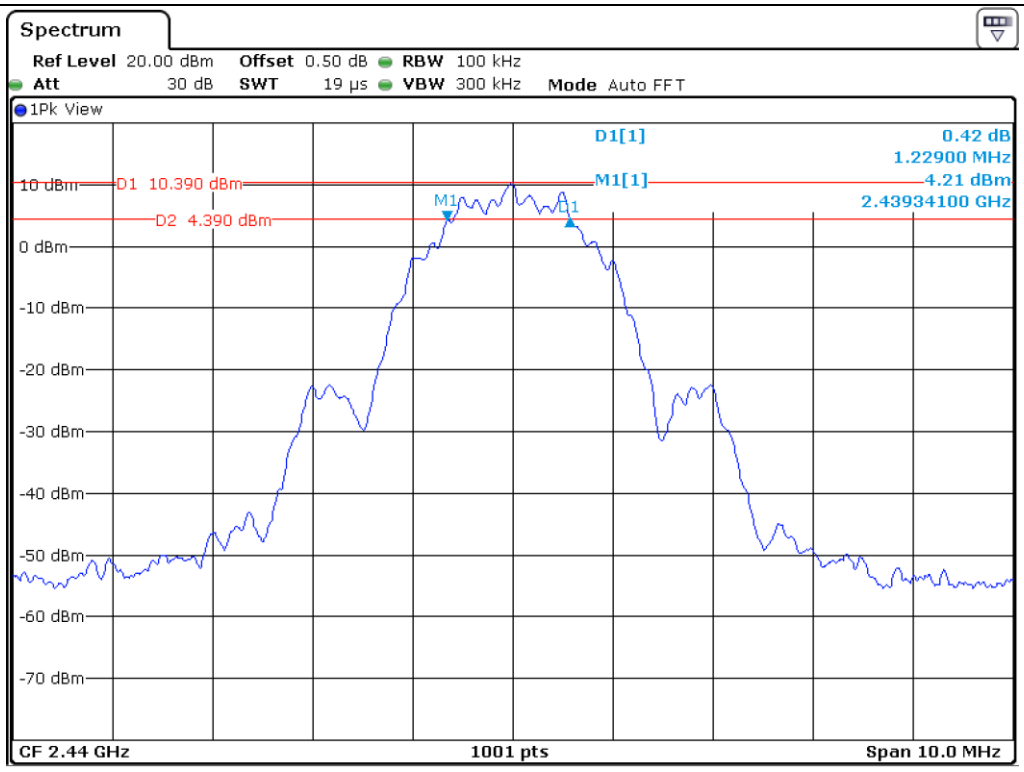
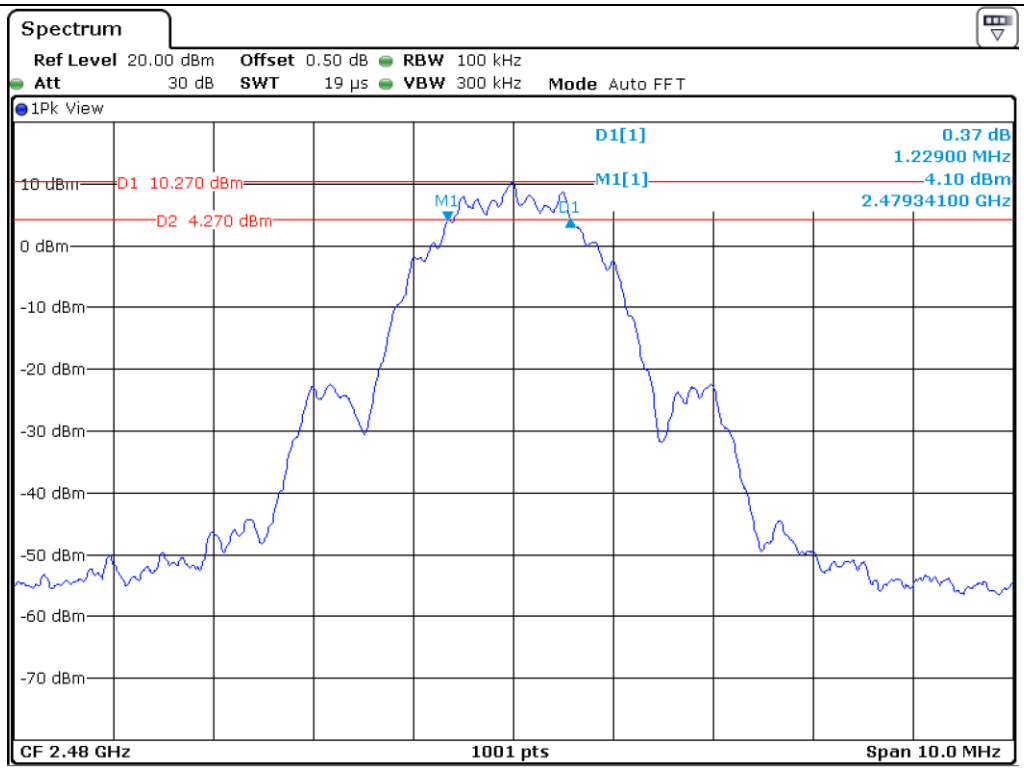


Middle Channel



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8. MAXIMUM PEAK OUTPUT POWER

8.1 Operating environment

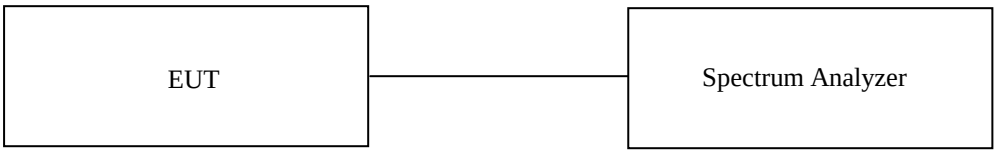
Temperature : 23 ℃

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 ≥ DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



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.

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8.4 Test data for 1 Mbps

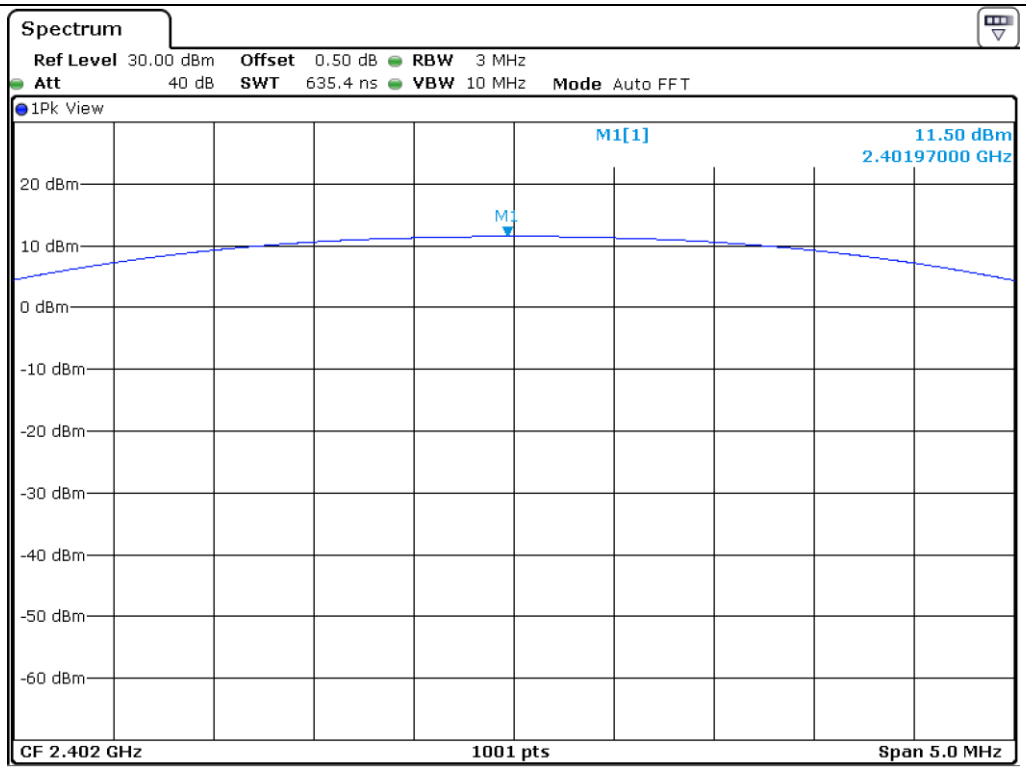
-. Test Date : November 20, 2019 ~ December 02, 2019

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	11.50	30.00	18.50
MIDDLE	2 440.00	11.59	30.00	18.41
HIGH	2 480.00	11.55	30.00	18.45

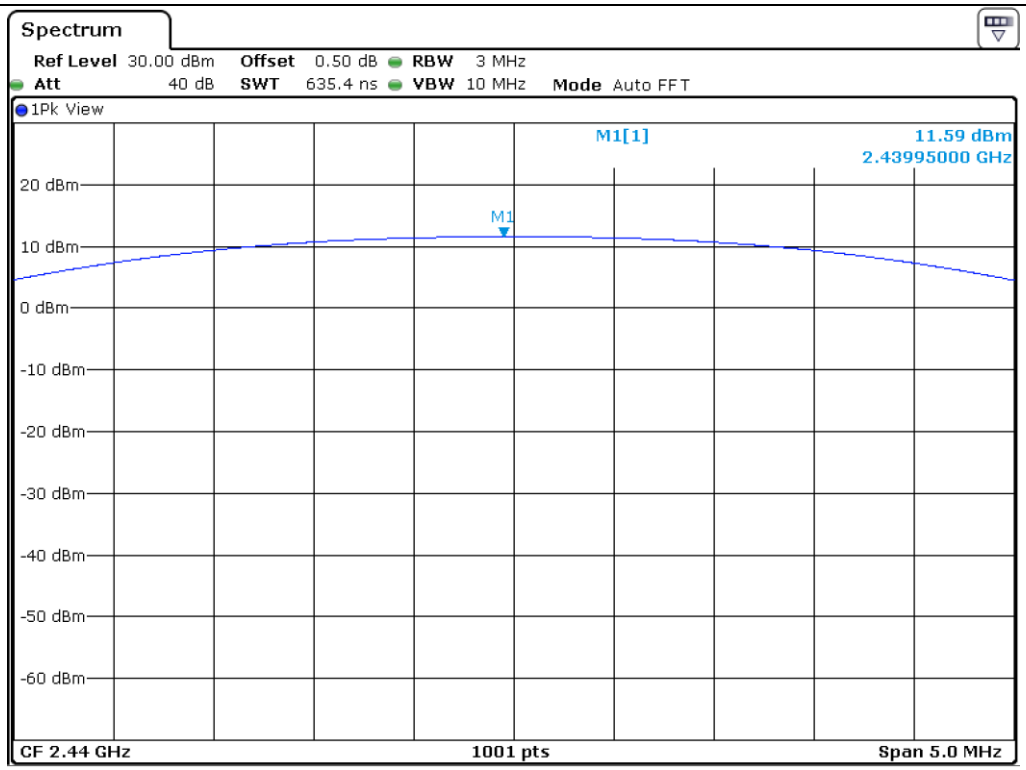
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Tested by: Tae-Ho, Kim / Senior Manager

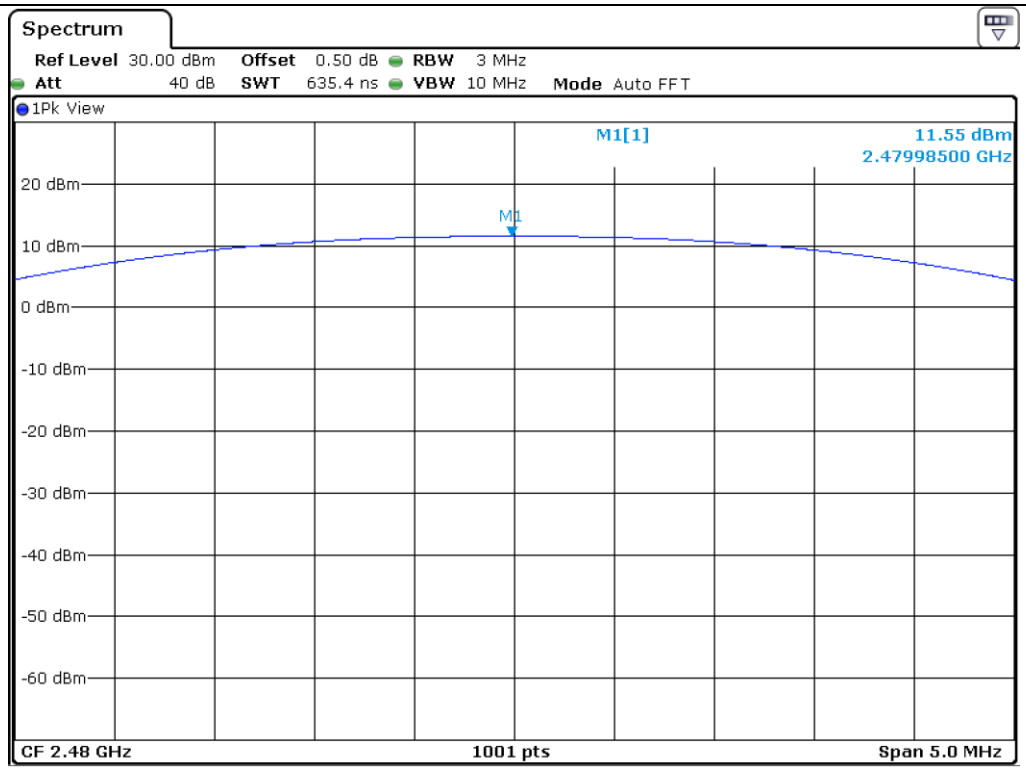


Low Channel

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



Middle Channel



High Channel

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

8.5 Test data for 2 Mbps

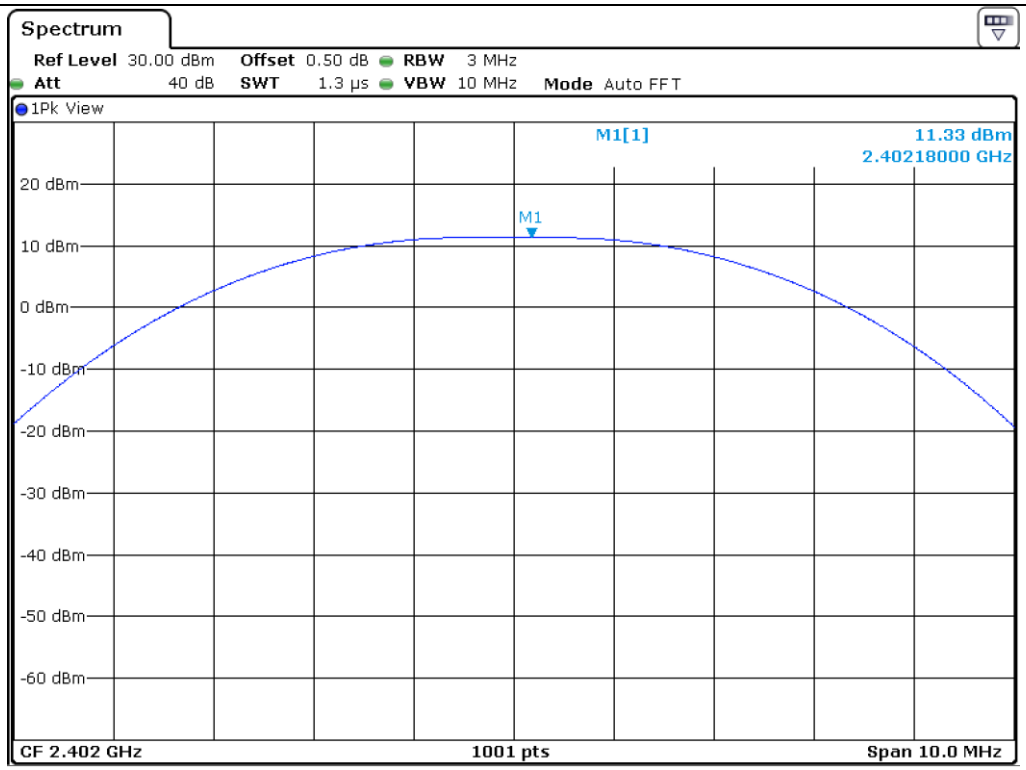
-. Test Date : November 20, 2019 ~ December 02, 2019

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	11.33	30.00	18.67
MIDDLE	2 440.00	11.46	30.00	18.54
HIGH	2 480.00	11.46	30.00	18.54

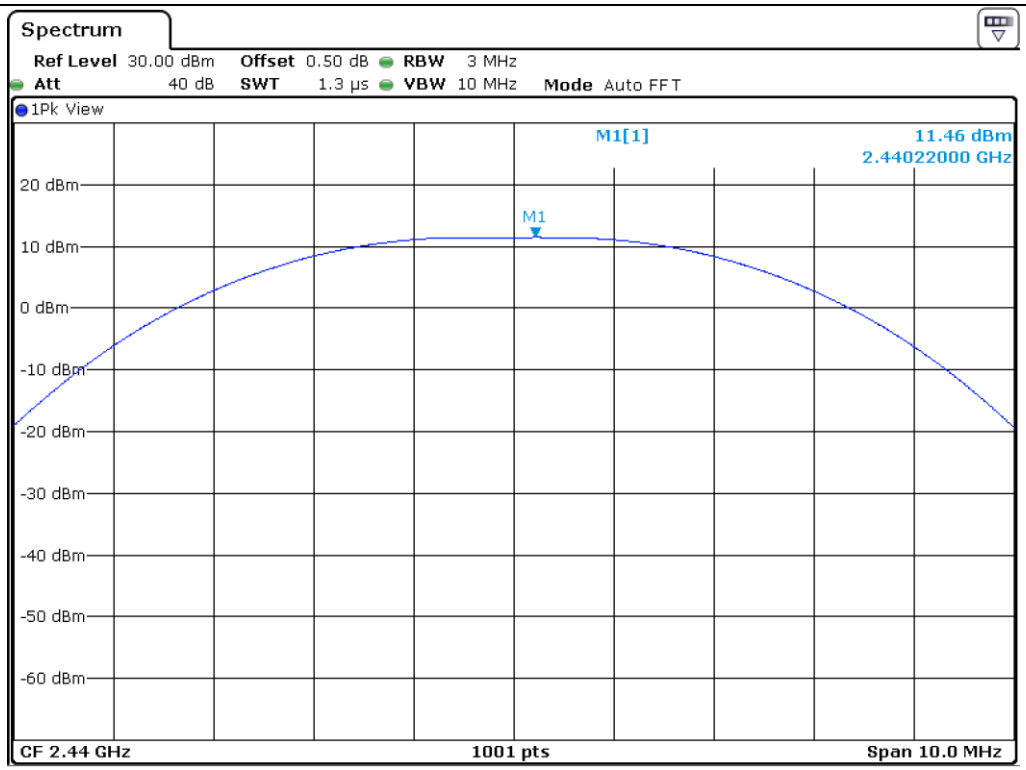
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Tested by: Tae-Ho, Kim / Senior Manager

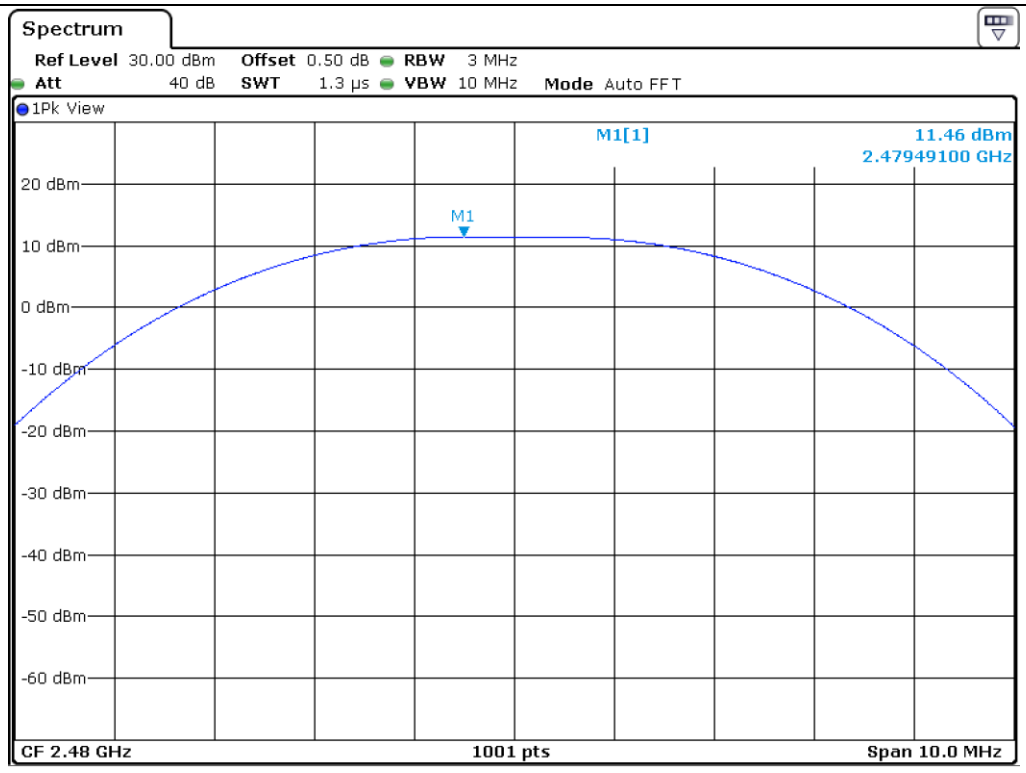


Low Channel

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



Middle Channel



High Channel

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

9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

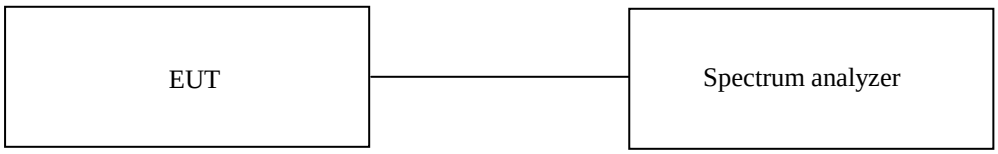
9.1 Operating environment

Temperature : 23 ℃

Relative humidity : 45 % R.H.

9.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, the video bandwidth is set to 3 times the resolution bandwidth and peak detection was used.



9.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

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

9.4 Test equipment used

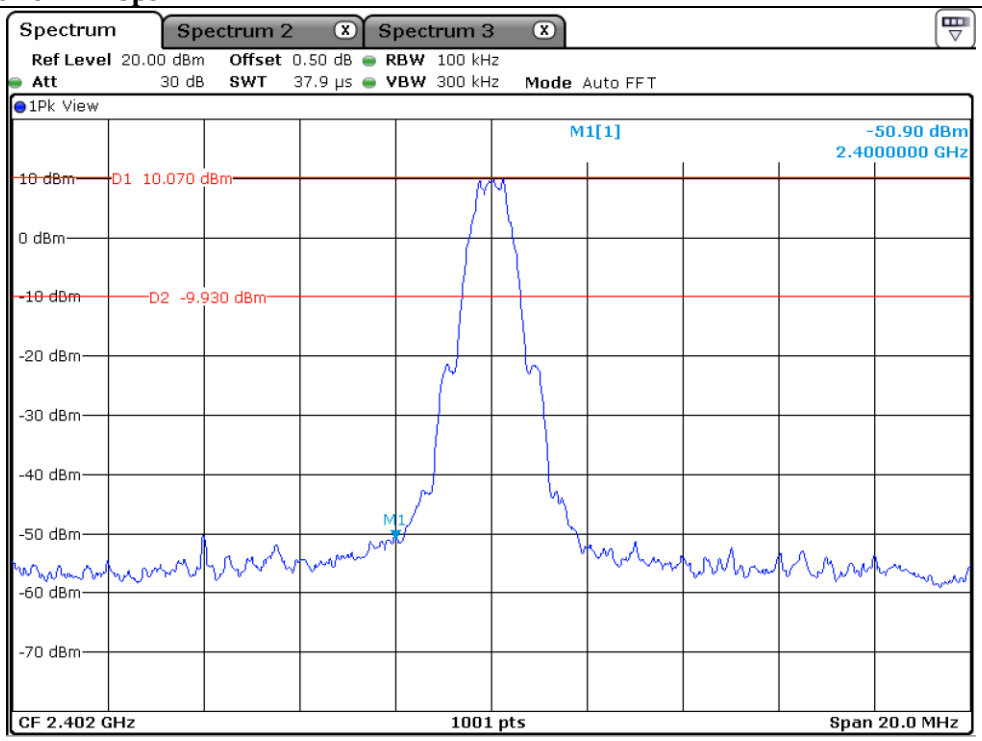
	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ -	ESW	Rohde & Schwarz	EMI Test Receiver	101851	Aug. 07, 2019 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Mar. 18, 2019 (1Y)
□ -	BBV 9718B	Schwarzbeck	Amplifier	009	Mar. 20, 2019 (1Y)
■	SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Mar. 11, 2019 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	777	Apr. 13, 2018 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 16, 2019 (1Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170179	Jan. 16, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

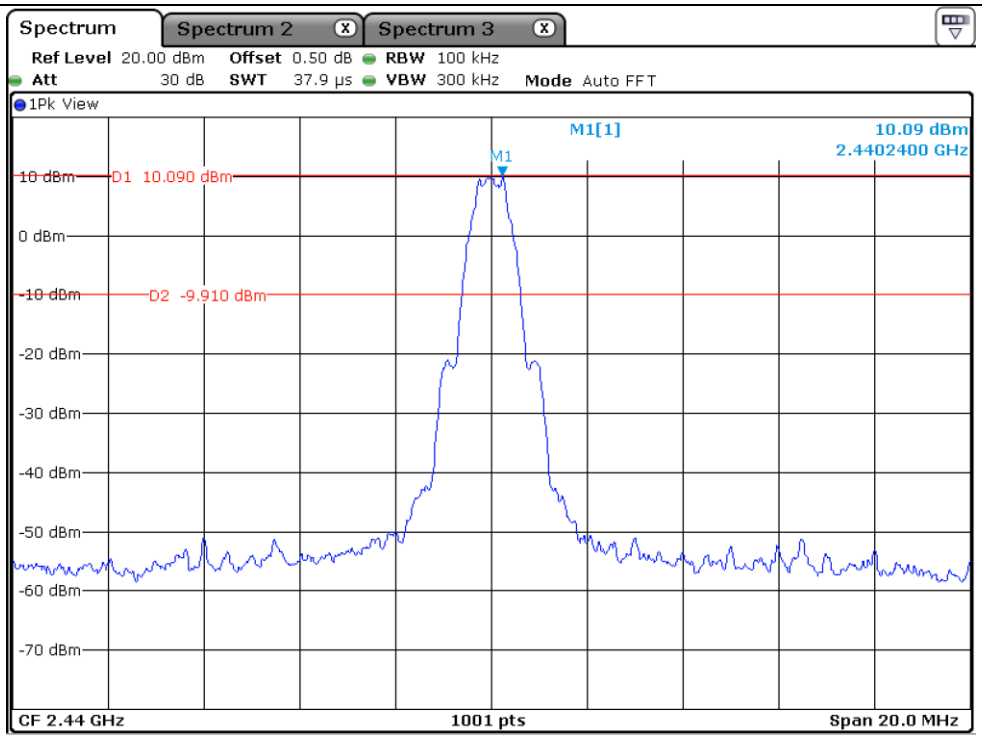
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9.5 Test data for conducted emission

9.5.1 Test data for 1 Mbps

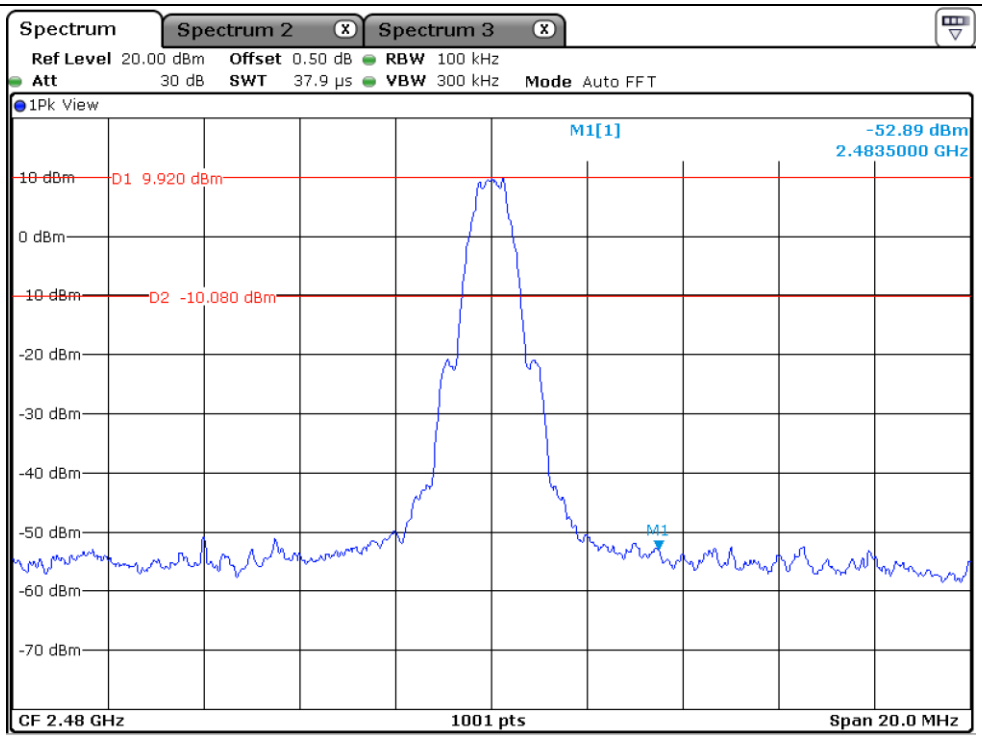


Low Channel



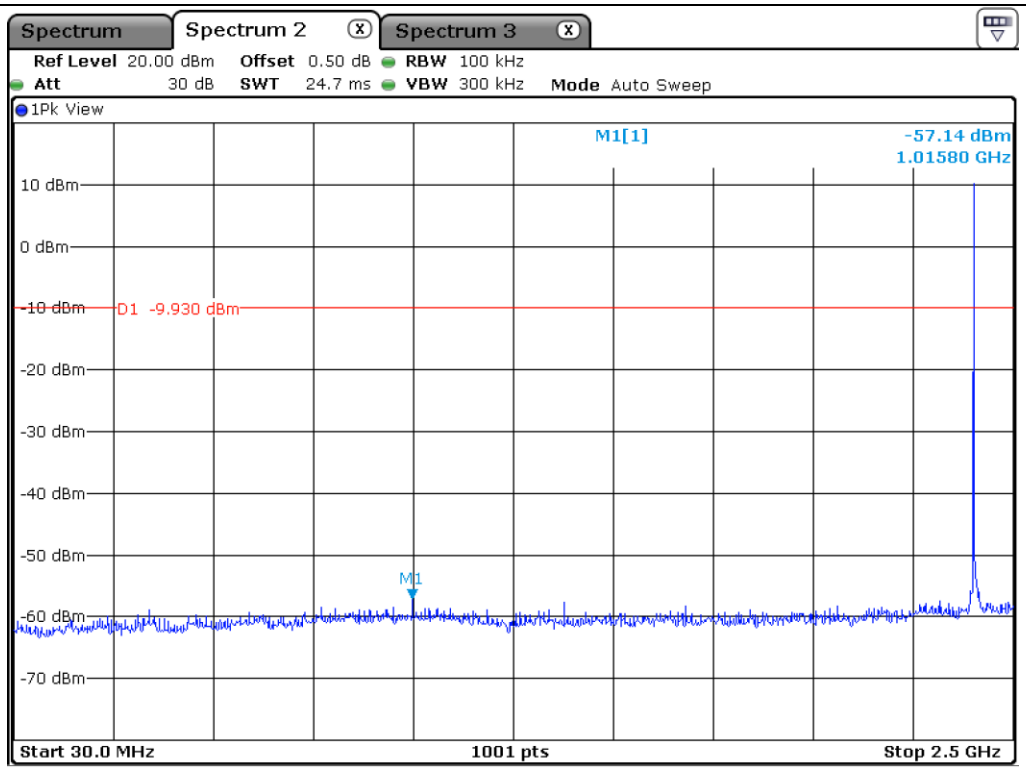
Middle Channel

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

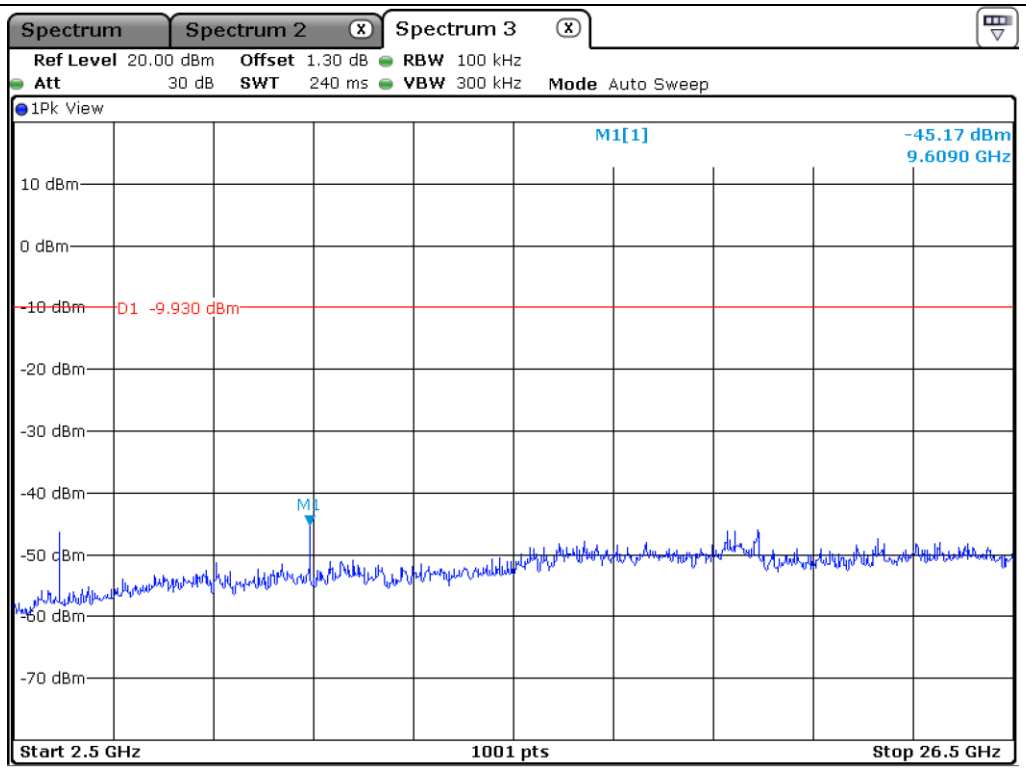


High Channel

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

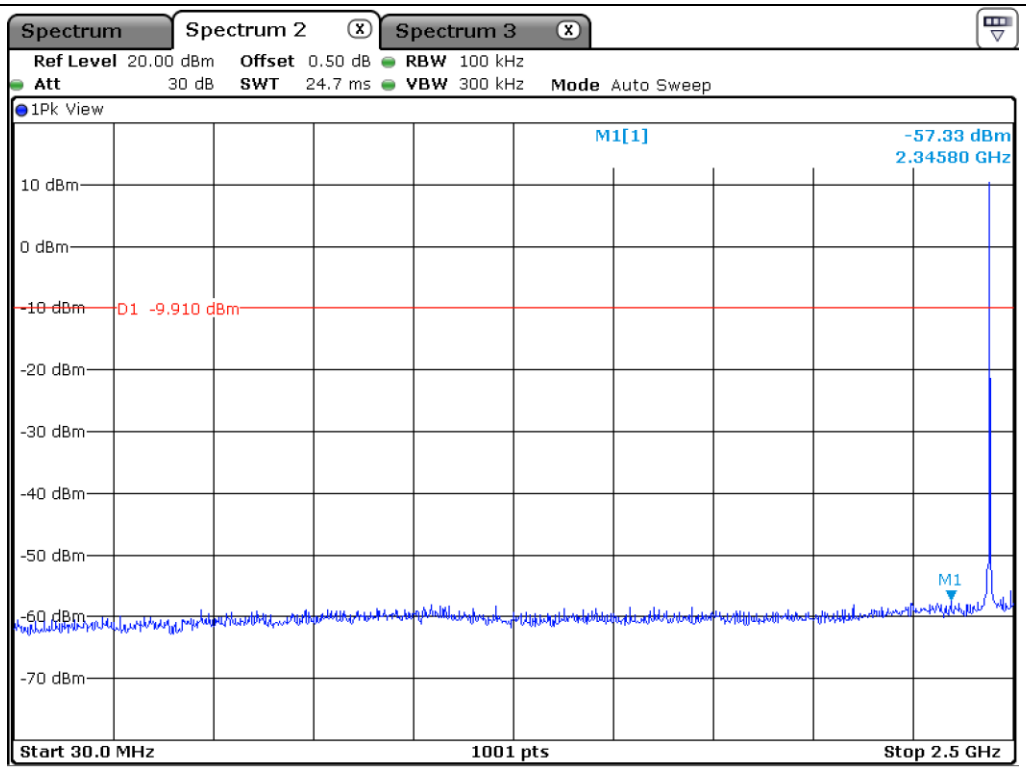


Low Channel

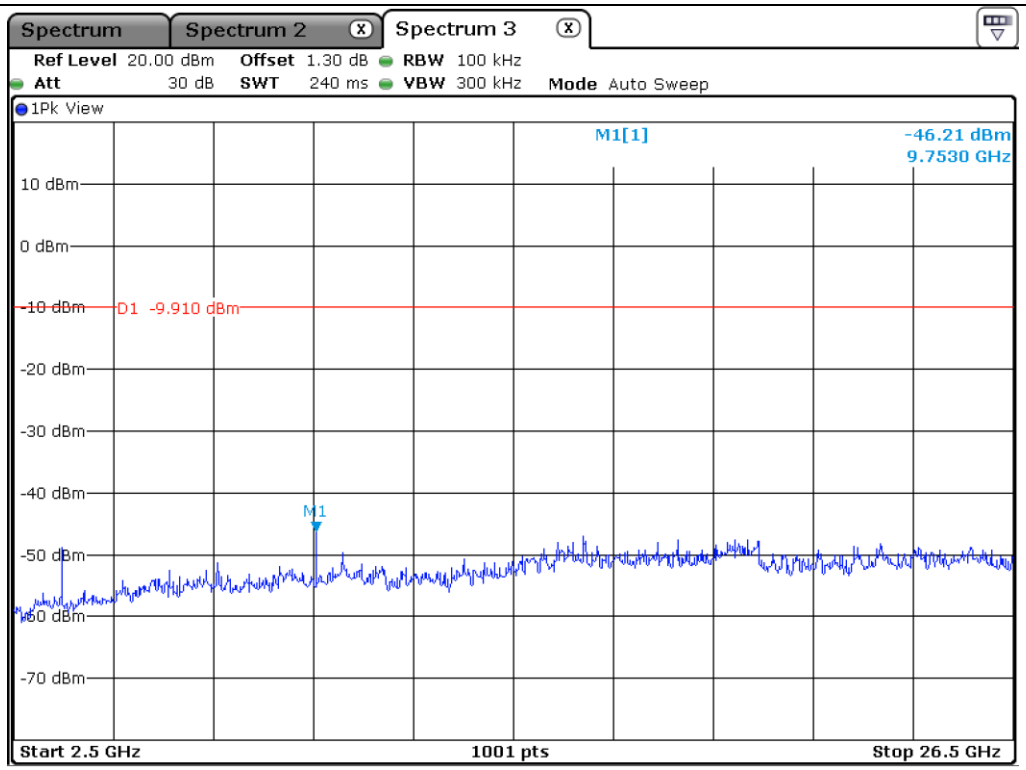


Low Channel

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

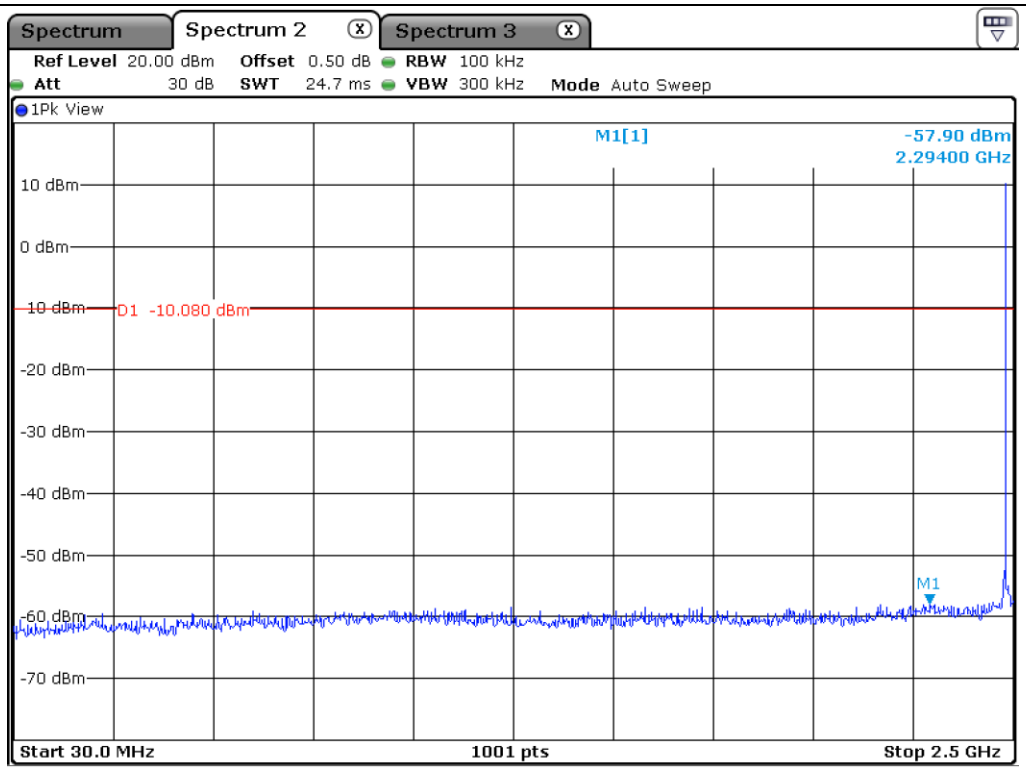


Middle Channel

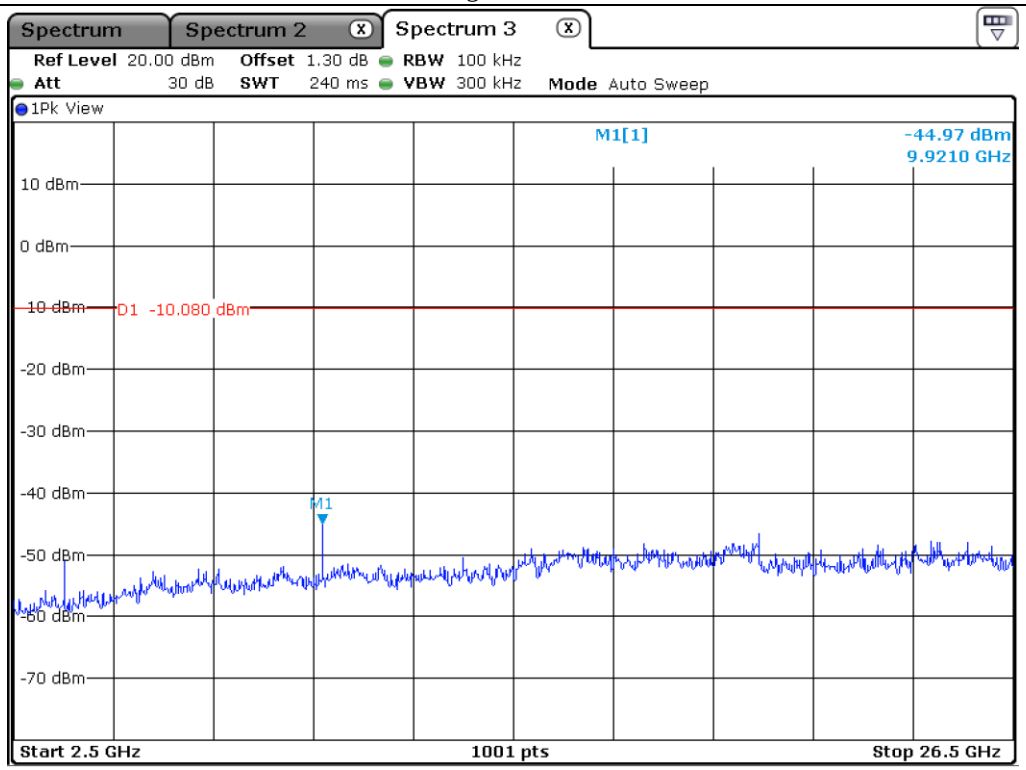


Middle Channel

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



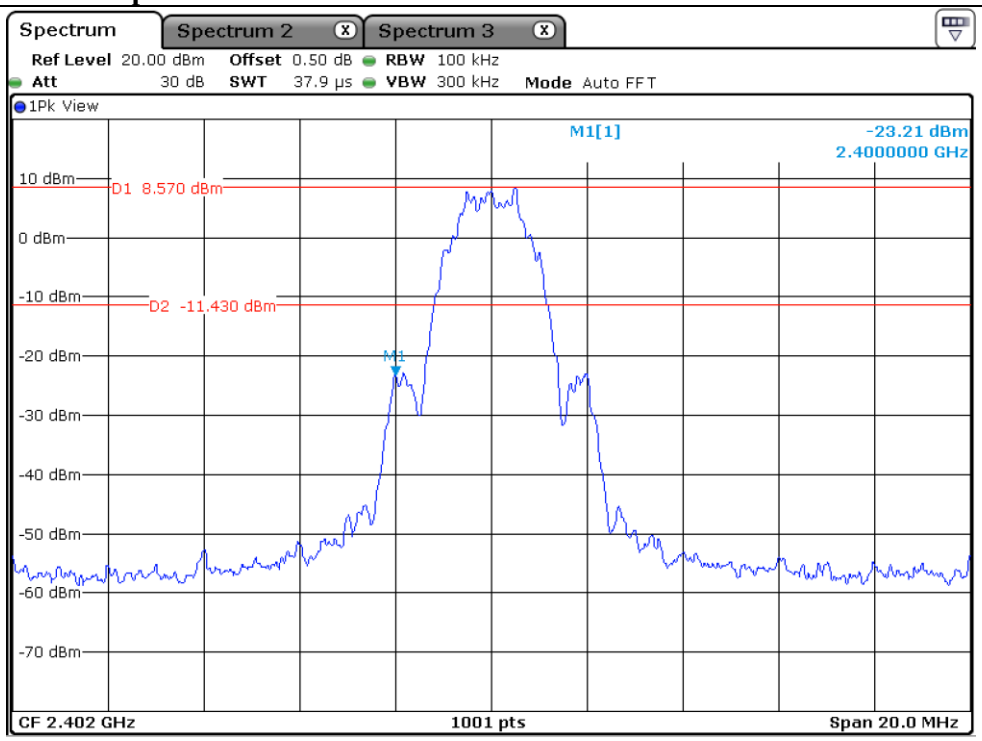
High Channel



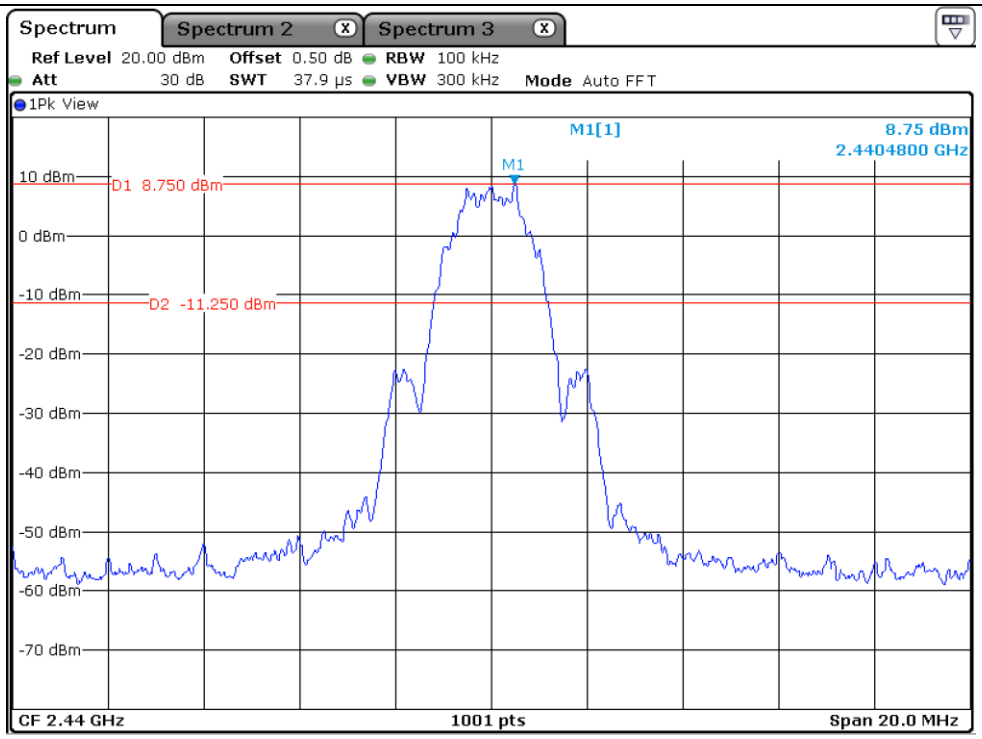
High Channel

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

9.5.2 Test data for 2 Mbps

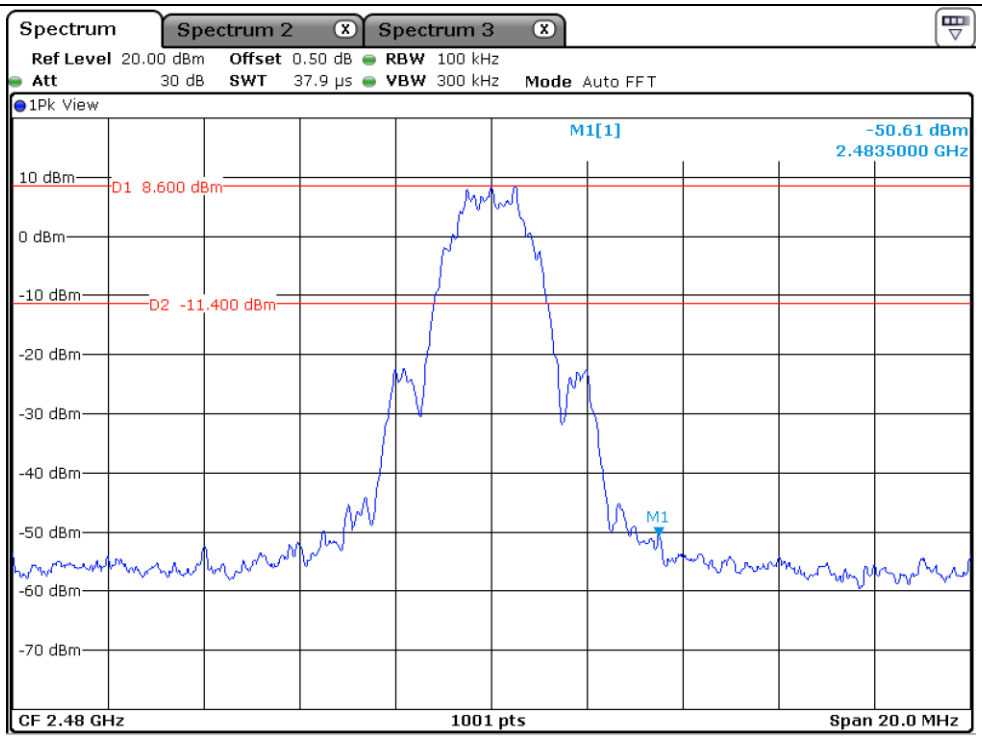


Low Channel



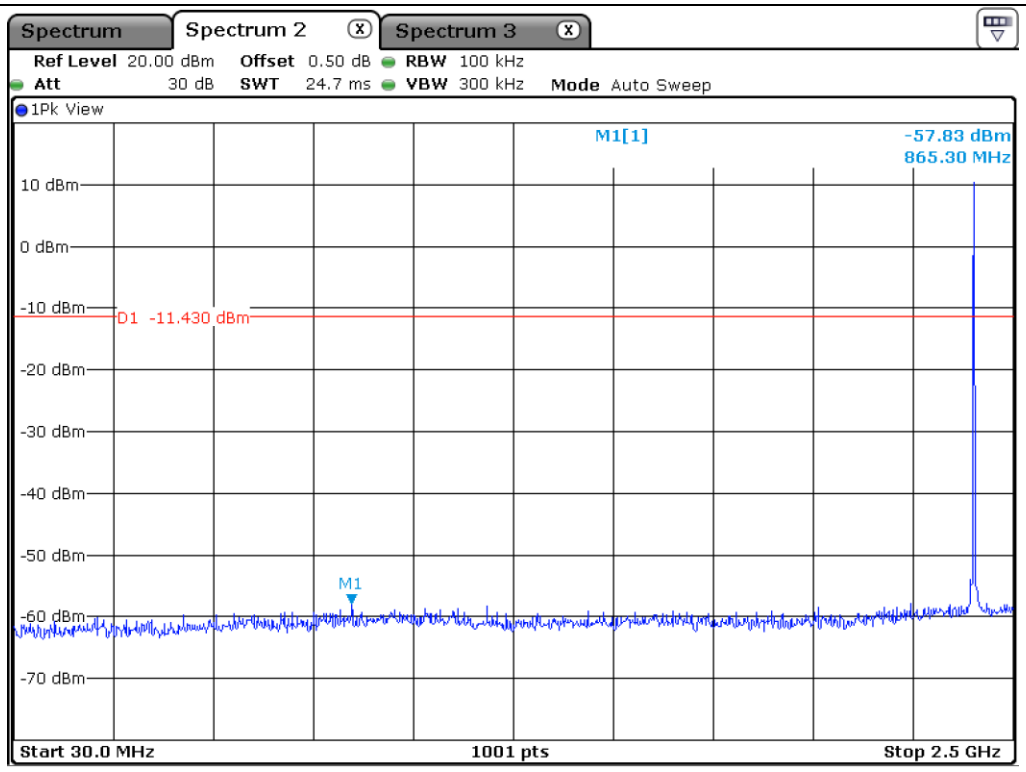
Middle Channel

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

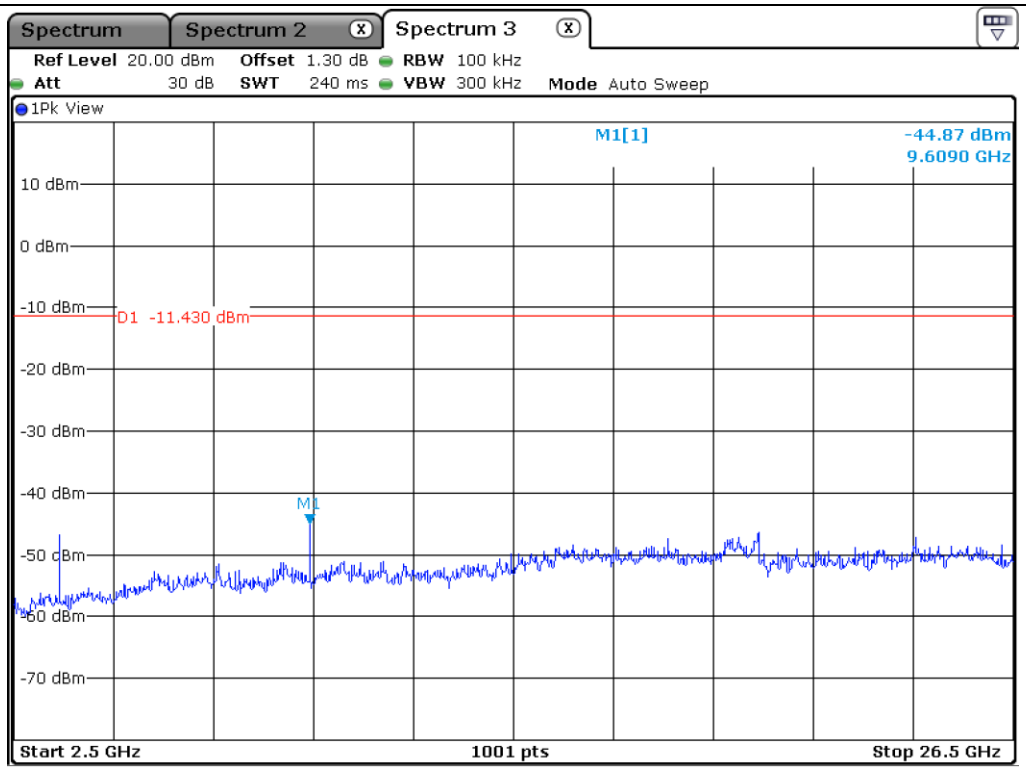


High Channel

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

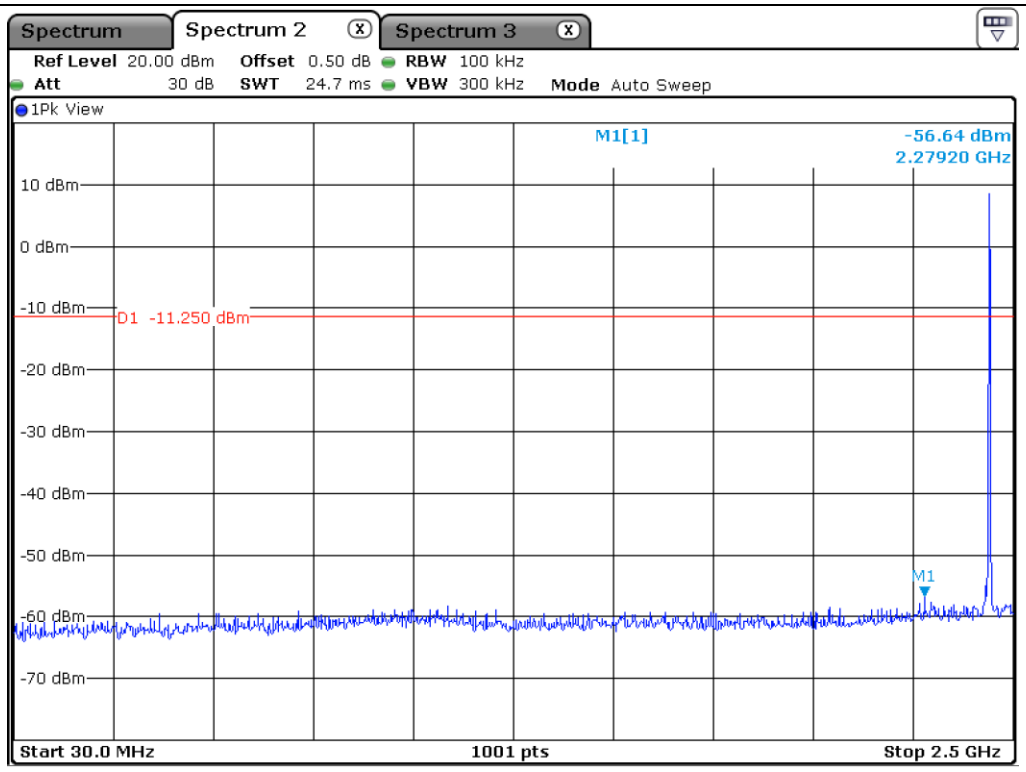


Low Channel

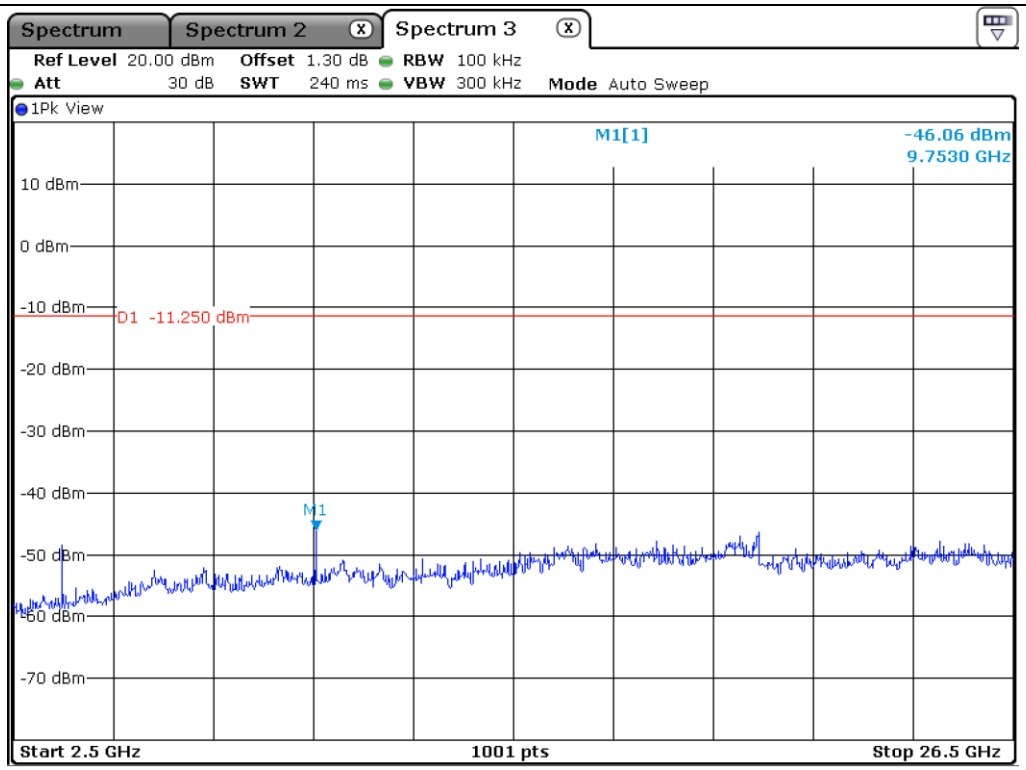


Low Channel

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

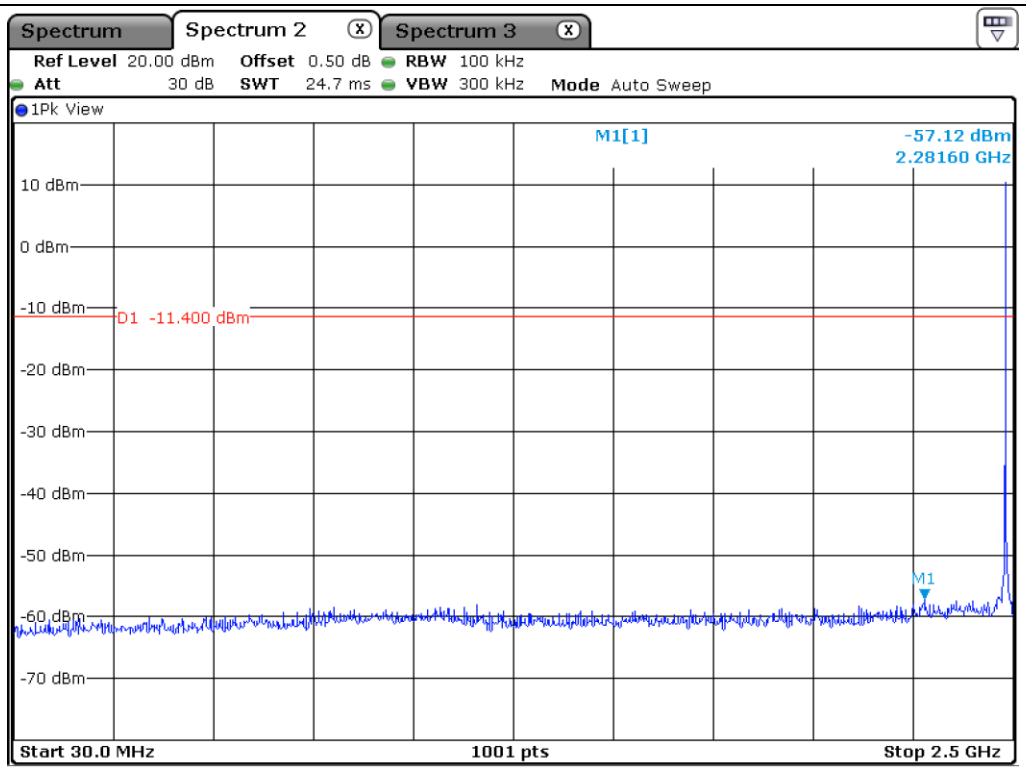


Middle Channel

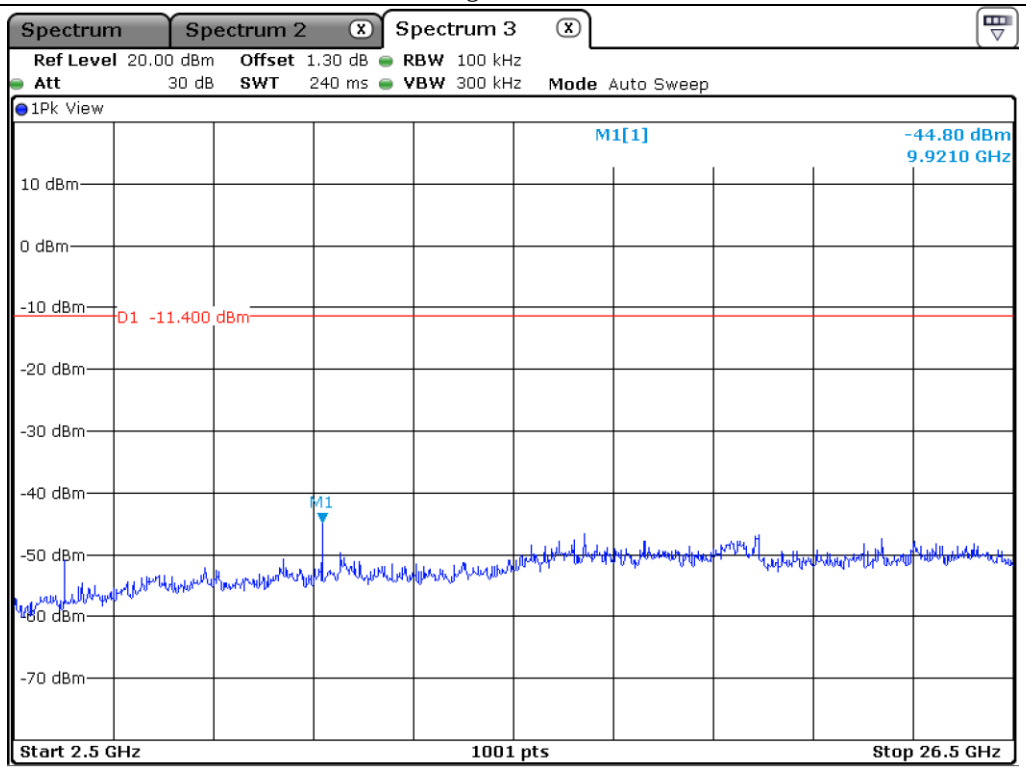


Middle Channel

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



High Channel



High Channel

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

9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

9.6.1.1 Test data for 1 Mbps

-. Test Date : November 20, 2019 ~ December 02, 2019

-. 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 : 46.40 %

-. Result : PASSED

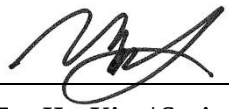
Frequency (GHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 343.606	17.30	Peak	H	26.90	3.07	-	47.27	74.00	26.73
2 340.729	6.22	Average	H	26.90	3.07	3.33	39.52	54.00	14.48
2 343.447	17.36	Peak	V	26.90	3.07	-	47.33	74.00	26.67
2 338.092	6.31	Average	V	26.90	3.07	3.33	39.61	54.00	14.39
Test Data for High Channel									
2 483.508	19.89	Peak	H	26.60	3.16	-	49.65	74.00	24.35
2 484.547	9.93	Average	H	26.60	3.16	3.33	43.02	54.00	10.98
2 494.387	16.80	Peak	V	26.60	3.16	-	46.56	74.00	27.44
2 484.794	5.36	Average	V	26.60	3.16	3.33	38.45	54.00	15.55

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Correction Factor



Tested by: Tae-Ho, Kim / Senior Manager

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

9.6.1.2 Test data for 2 Mbps

-. Test Date : November 20, 2019 ~ December 02, 2019

-. 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 : 47.44 %

-. Result : PASSED

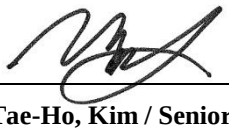
Frequency (GHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 344.166	17.00	Peak	H	26.90	3.07	-	46.97	74.00	27.03
2 340.569	6.23	Average	H	26.90	3.07	3.24	39.44	54.00	14.56
2 337.772	18.28	Peak	V	26.90	3.07	-	48.25	74.00	25.75
2 337.373	6.31	Average	V	26.90	3.07	3.24	39.52	54.00	14.48
Test Data for High Channel									
2 483.508	23.94	Peak	H	26.60	3.16	-	53.70	74.00	20.30
2 483.508	13.92	Average	H	26.60	3.16	3.24	46.92	54.00	7.08
2 483.673	17.57	Peak	V	26.60	3.16	-	47.33	74.00	26.67
2 483.508	5.67	Average	V	26.60	3.16	3.24	38.67	54.00	15.33

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Correction Factor



Tested by: Tae-Ho, Kim / Senior Manager

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

9.6.2 Spurious & Harmonic Radiated Emission

9.6.2.1 Test data for 1 Mbps

-. Test Date : November 20, 2019 ~ December 02, 2019

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 46.40 %

-. Result : PASSED

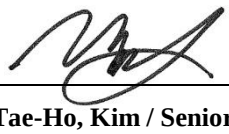
Frequency (GHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
4 804.000	18.30	Peak	H	28.20	4.85	-	51.35	74.00	22.65
4 804.000	7.20	Average	H	28.20	4.85	3.33	43.58	54.00	10.42
4 804.000	18.09	Peak	V	28.20	4.85	-	51.14	74.00	22.86
4 804.000	6.68	Average	V	28.20	4.85	3.33	43.06	54.00	10.94
Test Data for Middle Channel									
4 880.000	18.29	Peak	H	28.30	4.91	-	51.50	74.00	22.50
4 880.000	7.98	Average	H	28.30	4.91	3.33	44.52	54.00	9.48
4 880.000	18.79	Peak	V	28.30	4.91	-	52.00	74.00	22.00
4 880.000	6.49	Average	V	28.30	4.91	3.33	43.03	54.00	10.97
Test Data for High Channel									
4 960.000	18.05	Peak	H	28.60	5.04	-	51.69	74.00	22.31
4 960.000	7.26	Average	H	28.60	5.04	3.33	44.23	54.00	9.77
4 960.000	18.23	Peak	V	28.60	5.04	-	51.87	74.00	22.13
4 960.000	6.49	Average	V	28.60	5.04	3.33	43.46	54.00	10.54

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Correction Factor



Tested by: Tae-Ho, Kim / Senior Manager

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

9.6.2.2 Test data for 2 Mbps

-. Test Date : November 20, 2019 ~ December 02, 2019

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : 47.44 %

-. Result : PASSED

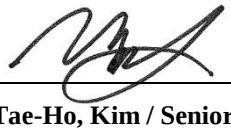
Frequency (GHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	C.F (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
4 804.000	18.64	Peak	H	28.20	4.85	-	51.69	74.00	22.31
4 804.000	7.58	Average	H	28.20	4.85	3.24	43.87	54.00	10.13
4 804.000	18.48	Peak	V	28.20	4.85	-	51.53	74.00	22.47
4 804.000	6.08	Average	V	28.20	4.85	3.24	42.37	54.00	11.63
Test Data for Middle Channel									
4 880.000	18.32	Peak	H	28.30	4.91	-	51.53	74.00	22.47
4 880.000	7.69	Average	H	28.30	4.91	3.24	44.14	54.00	9.86
4 880.000	18.07	Peak	V	28.30	4.91	-	51.28	74.00	22.72
4 880.000	6.45	Average	V	28.30	4.91	3.24	42.90	54.00	11.10
Test Data for High Channel									
4 960.000	18.08	Peak	H	28.60	5.04	-	51.72	74.00	22.28
4 960.000	7.59	Average	H	28.60	5.04	3.24	44.47	54.00	9.53
4 960.000	18.48	Peak	V	28.60	5.04	-	52.12	74.00	21.88
4 960.000	6.25	Average	V	28.60	5.04	3.24	43.13	54.00	10.87

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Correction Factor



Tested by: Tae-Ho, Kim / Senior Manager

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

10. PEAK POWER SPECTRAL DENSITY

10.1 Operating environment

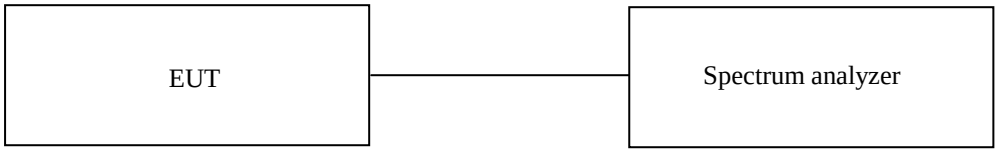
Temperature : 23 ℃

Relative humidity : 45 % R.H.

10.2 Test set-up

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

The resolution bandwidth is set to 3 kHz ≤ RBW ≤100 kHz, the video bandwidth is set to 3 times the resolution bandwidth.



10.3 Test 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)

10.4 Test data for 1 Mbps

-. Test Date : November 20, 2019 ~ December 02, 2019

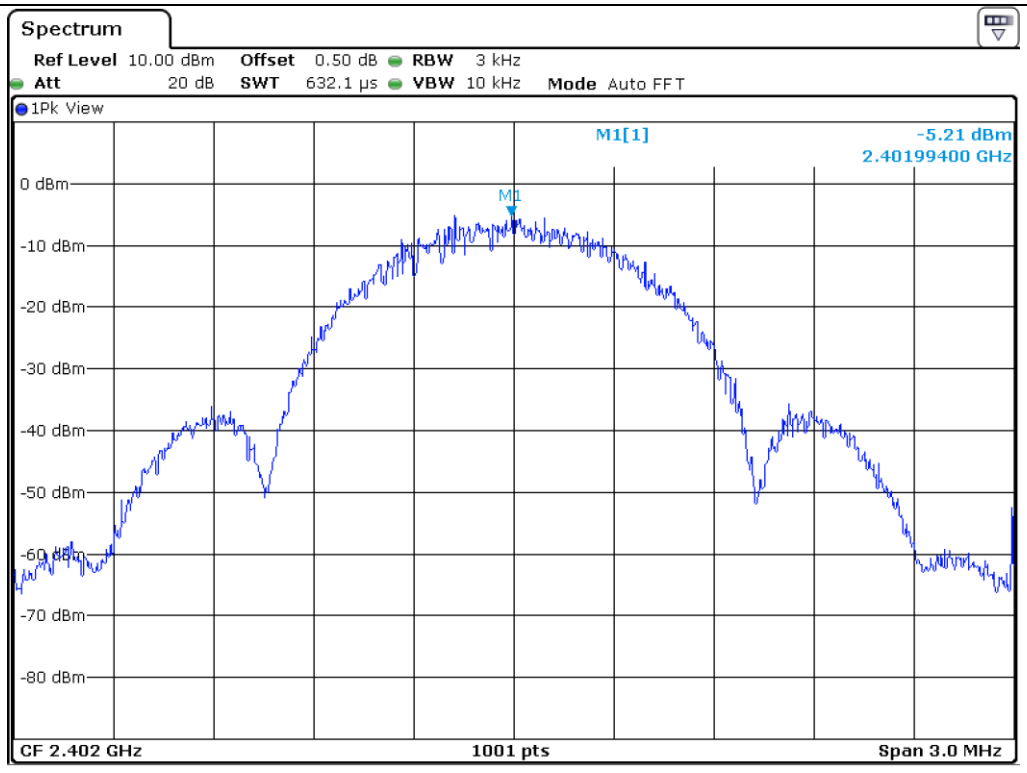
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

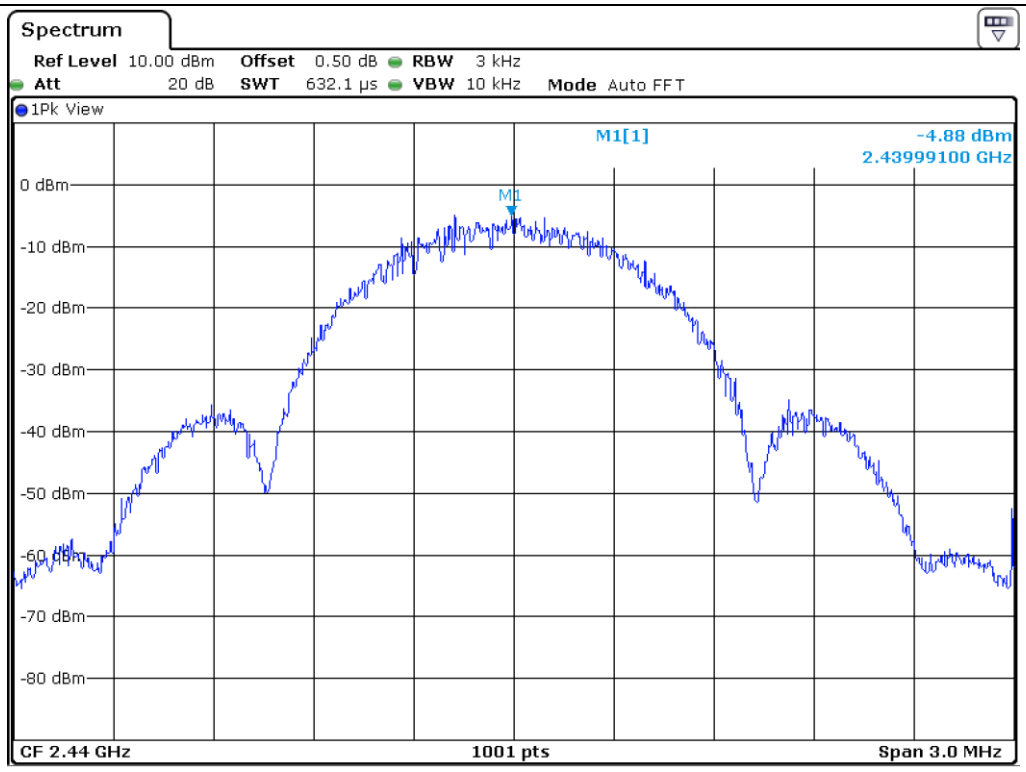
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402.00	-5.21	8.00	13.21
Middle	2 440.00	-4.88	8.00	12.88
High	2 480.00	-4.94	8.00	12.94

Remark. Margin = Limit – Measured value

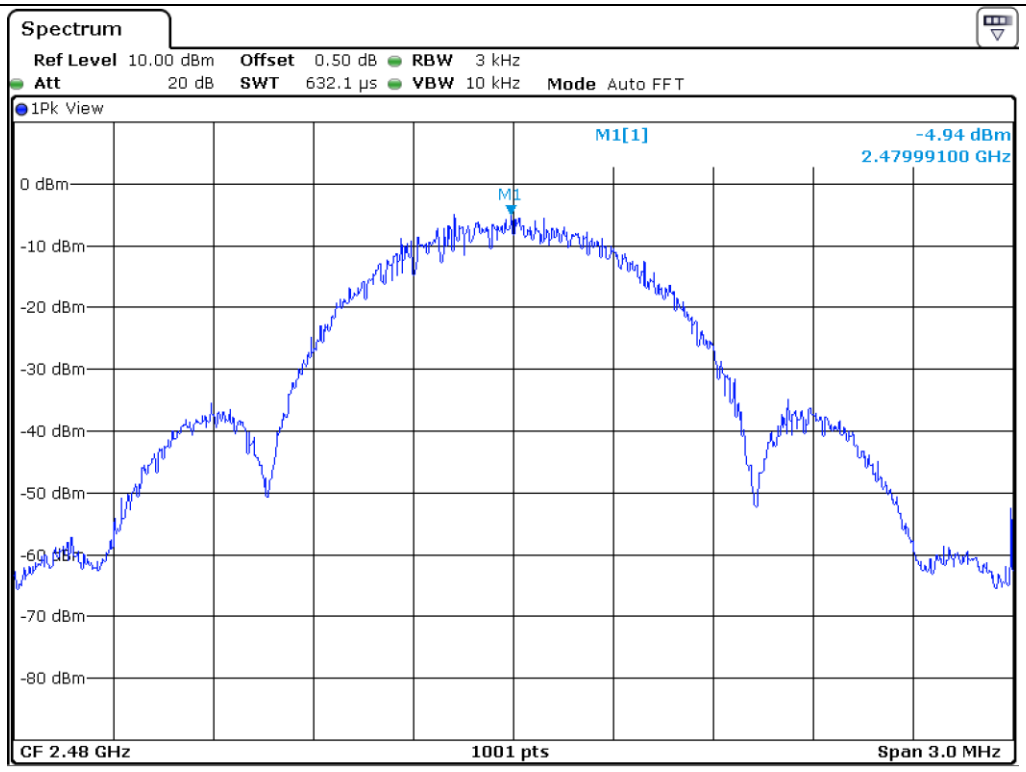
Tested by: Tae-Ho, Kim / Senior Manager



Low Channel



Middle Channel



High Channel

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

10.5 Test data for 2 Mbps

-. Test Date : November 20, 2019 ~ December 02, 2019

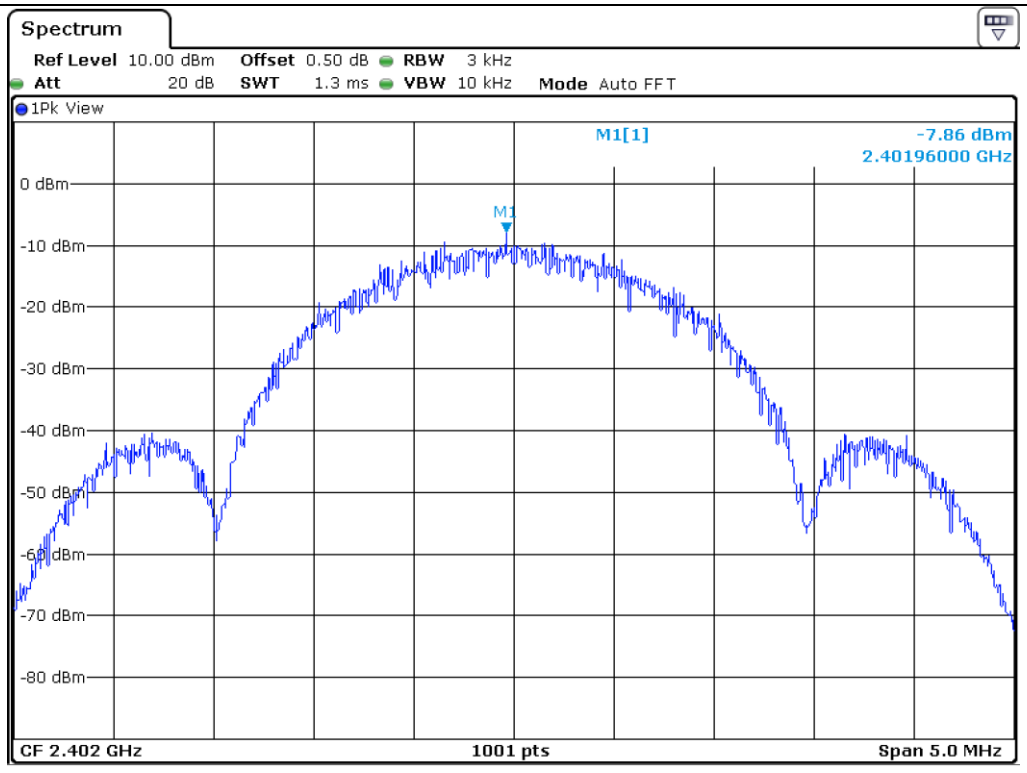
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402.00	-7.86	8.00	15.86
Middle	2 440.00	-7.59	8.00	15.59
High	2 480.00	-7.69	8.00	15.69

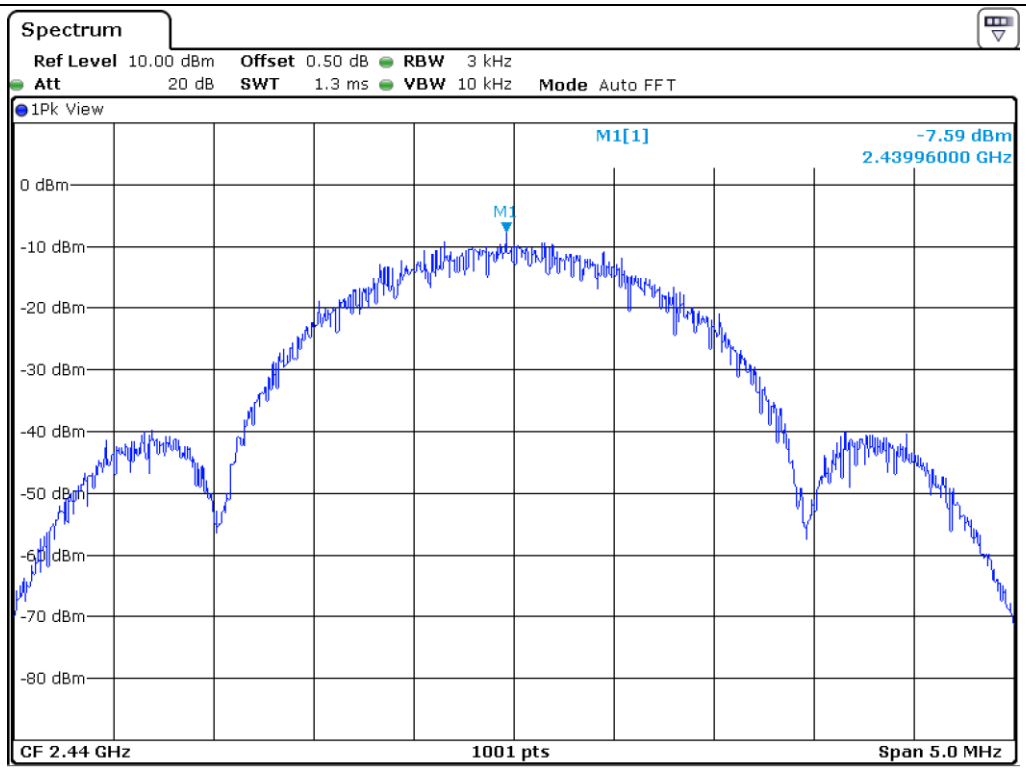
Remark. Margin = Limit – Measured value

Tested by: Tae-Ho, Kim / Senior Manager

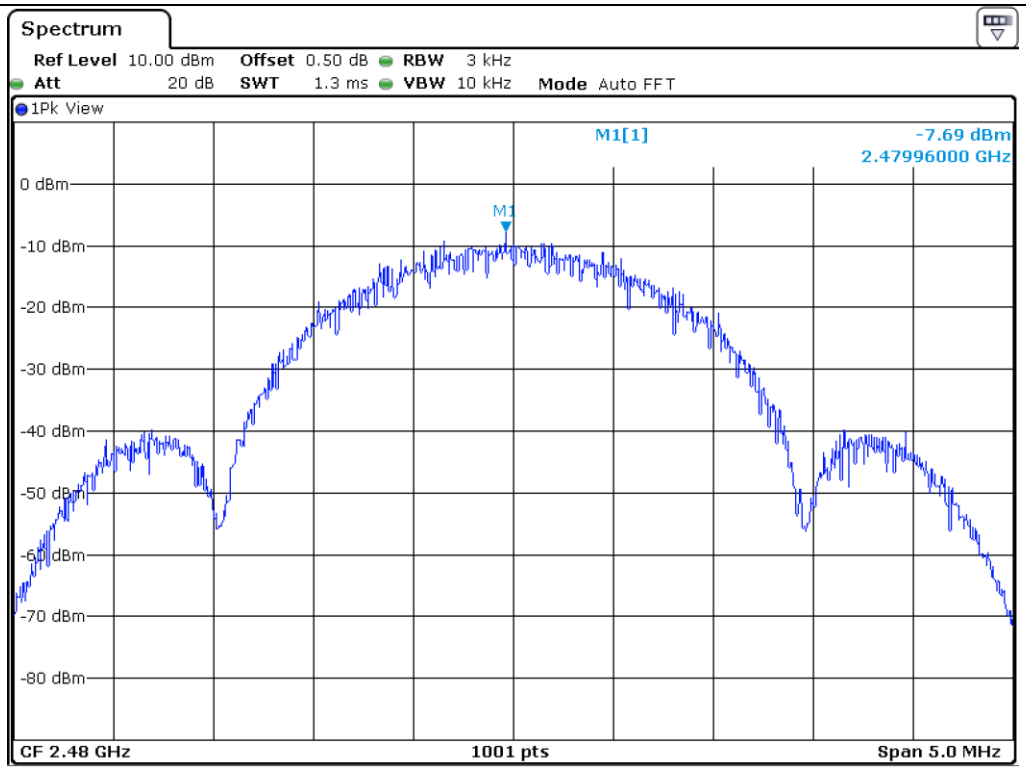


Low Channel

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



Middle Channel



High Channel

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

11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : 23 ℃

Relative humidity : 45 % R.H.

11.2 Test set-up

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

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

11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ -	ESW	Rohde & Schwarz	EMI Test Receiver	101851	Aug. 07, 2019 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Mar. 18, 2019 (1Y)
■ -	BBV 9718B	Schwarzbeck	Amplifier	009	Mar. 20, 2019 (1Y)
■	SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Mar. 11, 2019 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	777	Apr. 13, 2018 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 16, 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)

11.4 Test data for 30 MHz ~ 960 MHz

11.4.1 Test data for Bluetooth LE

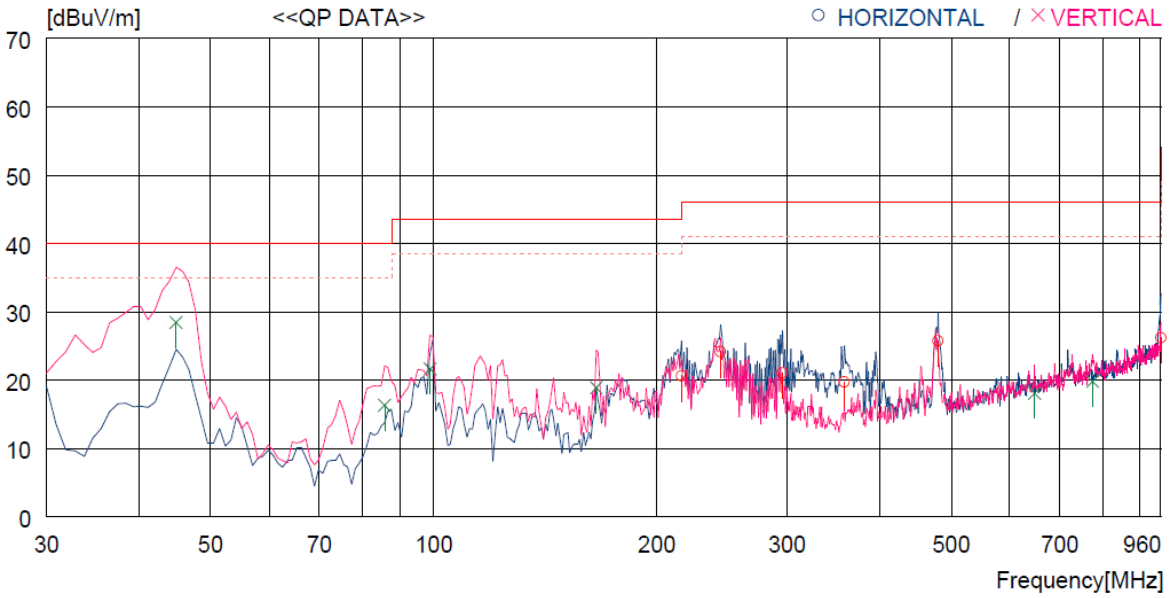
Humidity Level : 45 % R.H. Temperature: 23 ℃

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

Result : PASSED

EUT : Wi-Fi/BT Transceiver Date: November 20, 2019 ~ December 02, 2019

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	215.999	38.9	11.3	3.4	33.0	20.6	43.5	22.9	100	359
2	243.899	41.0	12.4	3.6	32.9	24.1	46.0	21.9	100	101
3	295.979	36.7	13.3	4.0	33.0	21.0	46.0	25.0	100	359
4	358.288	33.3	15.0	4.4	33.0	19.7	46.0	26.3	100	359
5	480.117	36.8	17.0	5.1	33.2	25.7	46.0	20.3	100	359
6	960.000	27.4	23.3	7.3	31.8	26.2	46.0	19.8	100	288
----- Vertical ------										
7	44.880	45.5	14.5	1.5	33.1	28.4	40.0	11.6	100	0
8	85.800	37.6	9.6	2.1	33.0	16.3	40.0	23.7	100	0
9	98.820	39.9	12.4	2.3	33.0	21.6	43.5	21.9	100	0
10	165.780	40.0	8.9	3.0	33.0	18.9	43.5	24.6	100	0
11	647.516	25.9	19.7	5.8	33.3	18.1	46.0	27.9	100	0
12	775.855	25.4	21.0	6.5	33.1	19.8	46.0	26.2	100	0

Tested by: Tae-Ho, Kim / Senior Manager

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

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

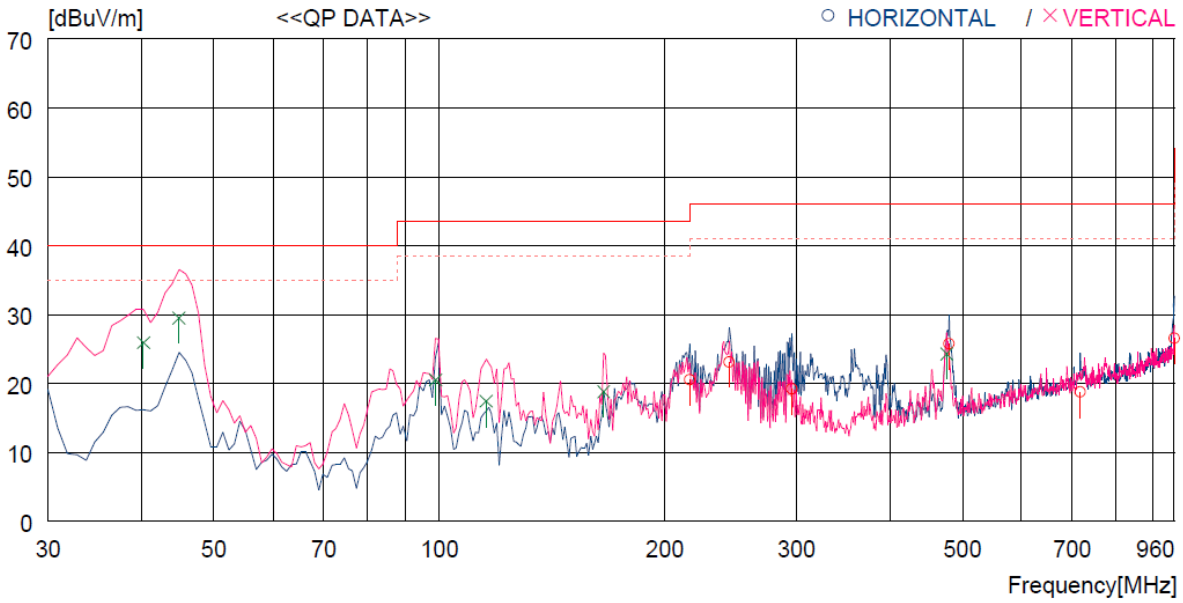
Humidity Level : 45 % R.H. Temperature: 23 ℃

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

Result : PASSED

EUT : Wi-Fi/BT Transceiver Date: November 20, 2019 ~ December 02, 2019

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	215.999	38.8	11.3	3.4	33.0	20.5	43.5	23.0	100	359
2	243.899	40.0	12.4	3.6	32.9	23.1	46.0	22.9	100	101
3	295.979	34.9	13.3	4.0	33.0	19.2	46.0	26.8	100	359
4	480.117	36.8	17.0	5.1	33.2	25.7	46.0	20.3	100	359
5	719.125	25.5	20.3	6.2	33.3	18.7	46.0	27.3	100	211
6	960.000	27.7	23.3	7.3	31.8	26.5	46.0	19.5	100	288
----- Vertical ------										
7	40.230	43.3	14.2	1.5	33.1	25.9	40.0	14.1	100	0
8	44.880	46.6	14.5	1.5	33.1	29.5	40.0	10.5	100	0
9	98.820	38.8	12.4	2.3	33.0	20.5	43.5	23.0	100	0
10	115.560	37.0	10.9	2.5	33.0	17.4	43.5	26.1	100	0
11	165.780	39.9	8.9	3.0	33.0	18.8	43.5	24.7	100	0
12	476.397	35.5	16.9	5.1	33.2	24.3	46.0	21.7	100	156

Tested by: Tae-Ho, Kim / Senior Manager

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

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

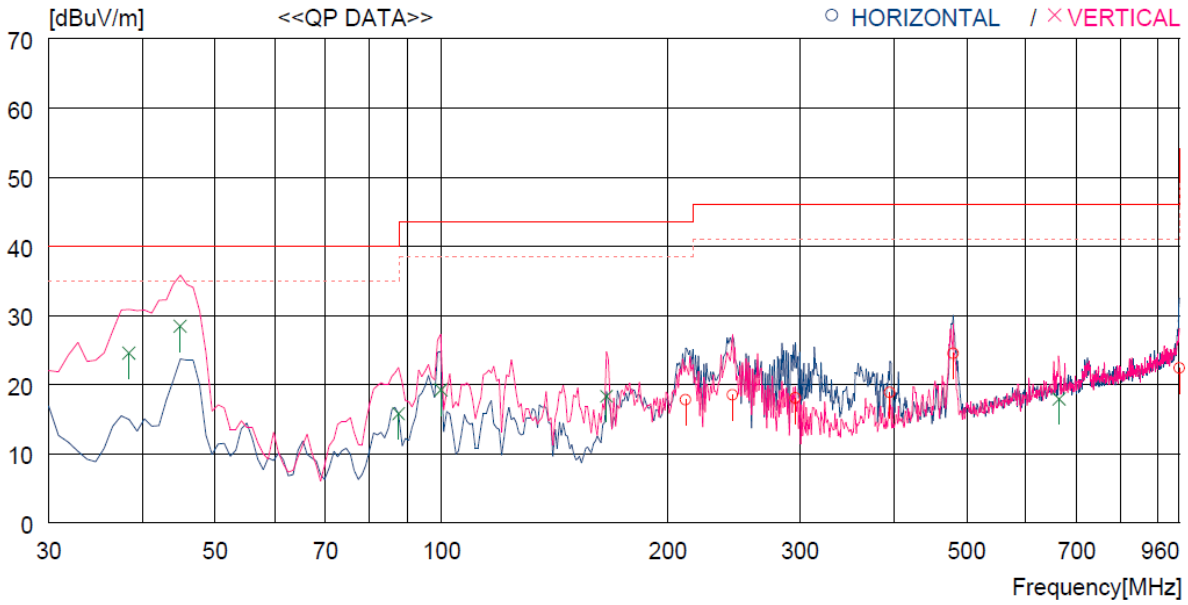
Humidity Level : 45 % R.H. Temperature: 23 ℃

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

Result : PASSED

EUT : Wi-Fi/BT Transceiver Date: November 20, 2019 ~ December 02, 2019

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	211.349	37.0	11.1	2.8	33.1	17.8	43.5	25.7	100	278
2	243.899	36.1	12.4	3.0	33.0	18.5	46.0	27.5	100	1
3	295.979	34.4	13.3	3.3	33.0	18.0	46.0	28.0	100	1
4	395.488	32.5	15.8	3.7	33.2	18.8	46.0	27.2	100	1
5	480.117	36.6	17.0	4.2	33.3	24.5	46.0	21.5	100	204
6	960.000	24.6	23.3	6.4	31.9	22.4	46.0	23.6	100	278
----- Vertical ------										
7	38.370	42.3	13.9	1.4	33.1	24.5	40.0	15.5	100	7
8	44.880	45.5	14.5	1.5	33.1	28.4	40.0	11.6	100	7
9	87.660	36.6	10.3	2.0	33.1	15.8	40.0	24.2	100	177
10	99.750	37.8	12.5	2.0	33.1	19.2	43.5	24.3	100	337
11	165.780	39.9	8.9	2.5	33.0	18.3	43.5	25.2	100	359
12	663.326	26.4	19.8	5.1	33.4	17.9	46.0	28.1	100	359

Tested by: Tae-Ho, Kim / Senior Manager

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

11.5 Test data for Below 30 MHz

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

-. Frequency range : 9 kHz ~ 30 MHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
It was not observed any emissions from the EUT.									

11.6 Test data for above 1 GHz

-. Test Date : November 20, 2019 ~ December 02, 2019

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
It was not observed any emissions from the EUT.									

Tested by: Tae-Ho, Kim / Senior Manager

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

12. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature : 23 ℃

Relative humidity : 45 % R.H.

12.2 Test set-up

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

12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESCI	Rohde & Schwarz	Test Receiver	101012	Oct. 22, 2019 (1Y)
☐ -	ESU	Rohde & Schwarz	Test Receiver	100261	Mar. 28, 2019 (1Y)
☐ -	NSLK8128	Schwarzbeck	AMN	8128-216	Mar. 20, 2019 (1Y)
■ -	NSLK8126	Schwarzbeck	AMN	8126-404	Mar. 19, 2019 (1Y)
☐ -	3825/2	EMCO	AMN	9109-1869	Mar. 19, 2019 (1Y)
■ -	3825/2	EMCO	AMN	9109-1867	Mar. 27, 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)

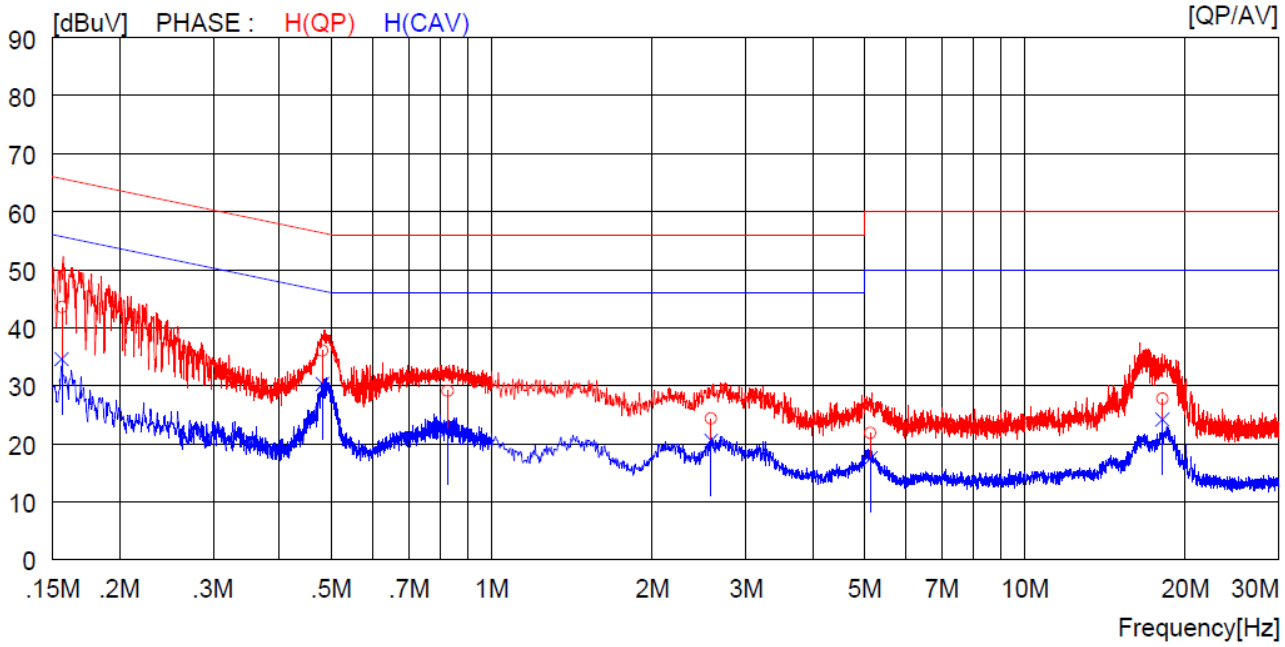
12.4 Test data

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

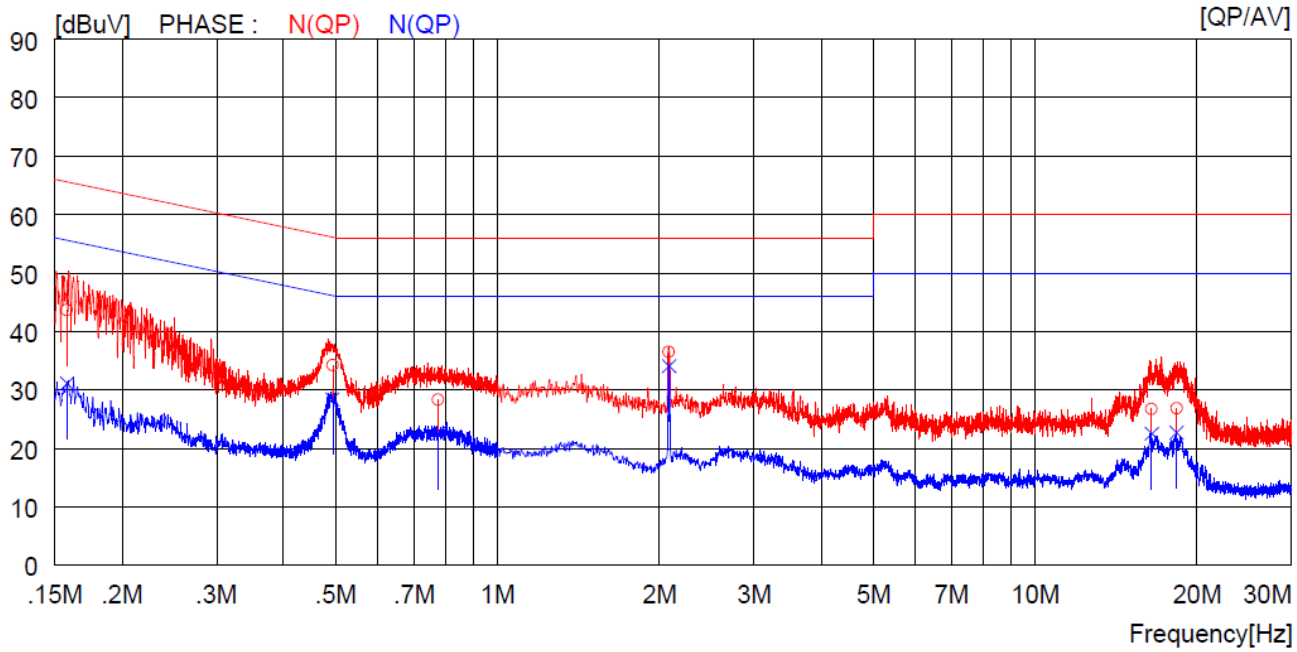
-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.15600	33.4	----	10.1	43.5	----	65.7	----	22.2	----	H(QP)
2	0.48100	25.9	----	10.1	36.0	----	56.3	----	20.3	----	H(QP)
3	0.82800	19.0	----	10.1	29.1	----	56.0	----	26.9	----	H(QP)
4	2.58000	14.2	----	10.1	24.3	----	56.0	----	31.7	----	H(QP)
5	5.13500	11.7	----	10.1	21.8	----	60.0	----	38.2	----	H(QP)
6	18.13000	17.4	----	10.3	27.7	----	60.0	----	32.3	----	H(QP)
7	0.15600	----	24.5	10.1	----	34.6	----	55.7	----	21.1	H(CAV)
8	0.48100	----	20.2	10.1	----	30.3	----	46.3	----	16.0	H(CAV)
9	0.82800	----	12.3	10.1	----	22.4	----	46.0	----	23.6	H(CAV)
10	2.58000	----	10.4	10.1	----	20.5	----	46.0	----	25.5	H(CAV)
11	5.13500	----	7.5	10.1	----	17.6	----	50.0	----	32.4	H(CAV)
12	18.13000	----	13.8	10.3	----	24.1	----	50.0	----	25.9	H(CAV)

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

-. Tested Line : NEUTRAL LINE



NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15800	33.5	----	10.1	43.6	----	65.6	----	22.0	----	N(QP)
2	0.49300	24.1	----	10.1	34.2	----	56.1	----	21.9	----	N(QP)
3	0.77500	18.2	----	10.1	28.3	----	56.0	----	27.7	----	N(QP)
4	2.08400	26.4	----	10.1	36.5	----	56.0	----	19.5	----	N(QP)
5	16.48000	16.4	----	10.3	26.7	----	60.0	----	33.3	----	N(QP)
6	18.34000	16.5	----	10.3	26.8	----	60.0	----	33.2	----	N(QP)
7	0.15800	----	21.0	10.1	----	31.1	----	55.6	----	24.5	N(CAV)
8	0.49300	----	18.3	10.1	----	28.4	----	46.1	----	17.7	N(CAV)
9	0.77500	----	12.4	10.1	----	22.5	----	46.0	----	23.5	N(CAV)
10	2.08400	----	24.0	10.1	----	34.1	----	46.0	----	11.9	N(CAV)
11	16.48000	----	12.2	10.3	----	22.5	----	50.0	----	27.5	N(CAV)
12	18.34000	----	12.4	10.3	----	22.7	----	50.0	----	27.3	N(CAV)

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

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

Tested by: Tae-Ho, Kim / Senior Manager

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