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

Test Report No. : **OT-20N-RWD-055**

Reception No. : **2010004182**

Applicant : **Westcom Wireless Inc.**

Address : **2773 Leechburg Road, Lower Burrell, Pennsylvania, 15068, United States**

Manufacturer : **Westcom Wireless Inc.**

Address : **2773 Leechburg Road, Lower Burrell, Pennsylvania, 15068, United States**

Type of Equipment : **ProCom**

FCC ID. : **2AO37X12LM**

Model Name : **X12LM**

Multiple Model Name : **N/A**

Serial number : **N/A**

Total page of Report : **46 pages (including this page)**

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

Date of issue : **November 19, 2020**

SUMMARY

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

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

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

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)

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-20N-RWD-055	November 19, 2020	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

Applicant : Westcom Wireless Inc.

Address : 2773 Leechburg Road, Lower Burrell, Pennsylvania, 15068, United States

Manufacturer : Westcom Wireless Inc.

Address : 2773 Leechburg Road, Lower Burrell, Pennsylvania, 15068, United States

Contact Person : Frank Dominick Girardi / President

Telephone No. : +724-337-1400

FCC ID : 2AO37X12LM

Model Name : X12LM

Brand Name : -

Serial Number : N/A

Date : November 19, 2020

EQUIPMENT CLASS	DSS – PART 15 SPREAD SPECTRUM TRANSMITTER
E.U.T. DESCRIPTION	ProCom
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 558074 D01 15.247 Meas Guidance v05r02
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)(1)(i)	20 dB Bandwidth	Met the Limit / PASS
15.247(b)(2)	Conducted Maximum Peak Output Power	Met the Limit / PASS
15.247(a)(1)	Carrier Frequency Separation	Met the Limit / PASS
15.247(a)(1)(i)	Number of Hopping Frequencies	Met the Limit / PASS
15.247(a)(1)(i)	Time of Occupancy	Met the Limit / PASS
15.247(d)	Conducted Spurious Emissions	Met the Limit / PASS
15.247(d)	Band Edge(Out of Band Emissions)	Met the Limit / PASS
15.207(a)	AC Power line Conducted Emissions	Met the Limit / PASS
15.247(d), 15.205(a), 15.209(a)	Radiated Spurious Emissions	Met the Limit / PASS
15.247(d), 15.205(a), 15.209(a)	Radiated Restricted Band Edge	Met the Limit / 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-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 Westcom Wireless Inc., Model X12LM (referred to as the EUT in this report) is a ProCom. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	ProCom
Temperature Range	-10 °C ~ 50 °C
OPERATING FREQUENCY	903 MHz ~ 926.5 MHz
MODULATION TYPE	GFSK
RF OUTPUT POWER	22.35 dBm
ANTENNA TYPE	Metal Antenna
ANTENNA GAIN	1.85 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	16 MHz, 30 MHz, 48 MHz

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

-. None

4. EUT MODIFICATIONS

-. None

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5. SYSTEM TEST CONFIGURATION

5.1 Justification

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

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	Westcom Wireless Inc.	X12LM	N/A
Battery	Mirim Technology	MS35E-M	N/A
Button	N/A	N/A	N/A
Speaker	N/A	N/A	N/A
Mic	N/A	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
X12LM	Westcom Wireless Inc.	ProCom (EUT)	-
HP Pavilion g series	HP	Notebook PC	-
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 903 MHz, 915 MHz, and 926.5 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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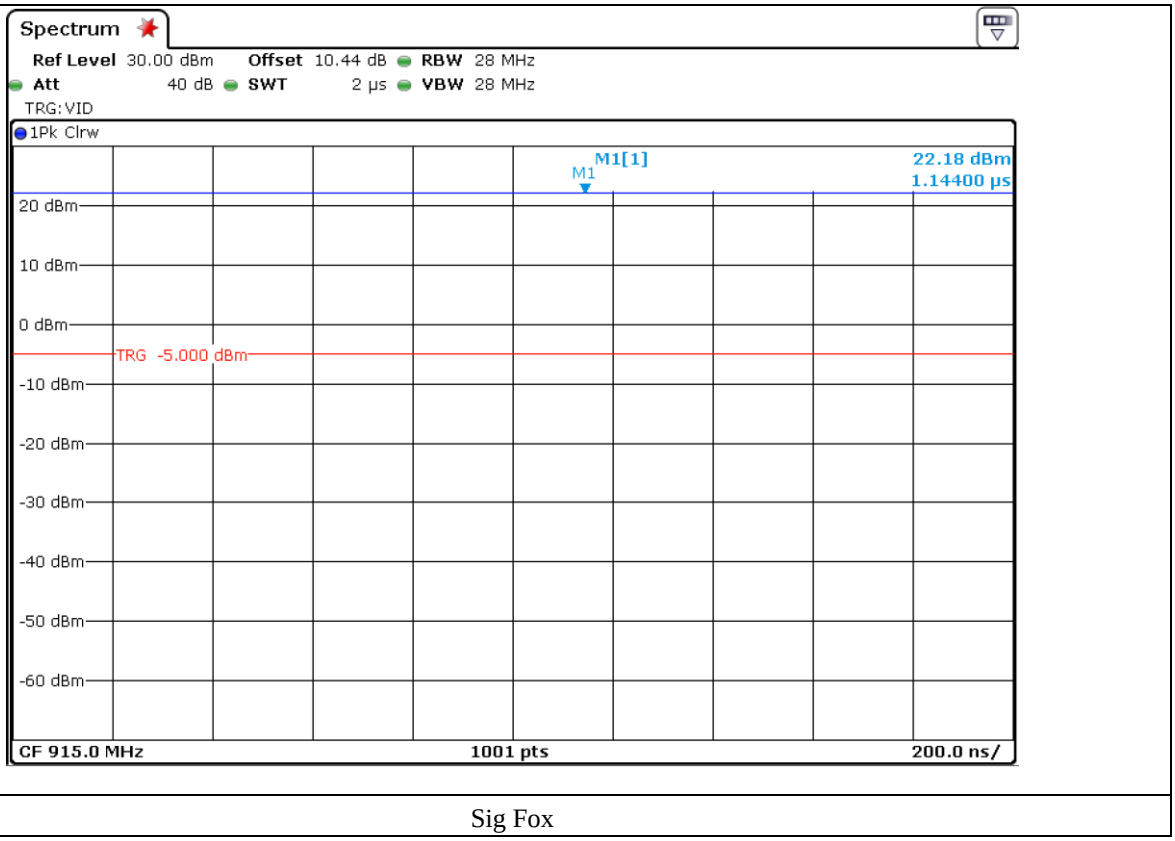
-. Duty Cycle

Mode	Tx On Time [ms]	Tx Off Time [ms]	Duty Cycle [%]	Correction Factor [dB]
GFSK	-	-	100.00	-

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

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

-. Test Plot



Sig Fox

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-. Channel List

Channel	Frequency[MHz]	Channel	Frequency[MHz]	Channel	Frequency[MHz]
24	903.00	92	911.50	160	920.00
28	903.50	96	912.00	164	920.50
32	904.00	100	912.50	168	921.00
36	904.50	104	913.00	172	921.50
40	905.00	108	913.50	176	922.00
44	905.50	112	914.00	180	922.50
48	906.00	116	914.50	184	923.00
52	906.50	120	915.00	188	923.50
56	907.00	124	915.50	192	924.00
60	907.50	128	916.00	196	924.50
64	908.00	132	916.50	200	925.00
68	908.50	136	917.00	204	925.50
72	909.00	140	917.50	208	926.00
76	909.50	144	918.00	212	926.50
80	910.00	148	918.50	216	927.00
84	910.50	152	919.00		
88	911.00	156	919.50		

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5.4 Configuration of Test System

Line Conducted Test: The EUT was tested in a Charging mode. The EUT was connected to USB and the Power of USB was Connected to DC Adaptor. 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 Metal 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)
Charging 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 & Charging Mode	X

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7. MAXIMUM PEAK OUTPUT POWER

7.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

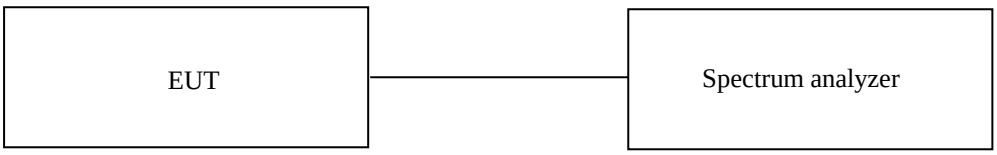
7.2 Test set-up

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For frequency hopping systems operating in the 902-928 MHz band: 1 watt (30 dBm) for systems employing at least 50 hopping channels; and, 0.25 watts (24 dBm) for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

2. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

3. The e.i.r.p of this module not exceed 4 W because the antenna gain not exceed not 6 dBi.



7.3 Test Date

November 12, 2020 ~ November 18, 2020

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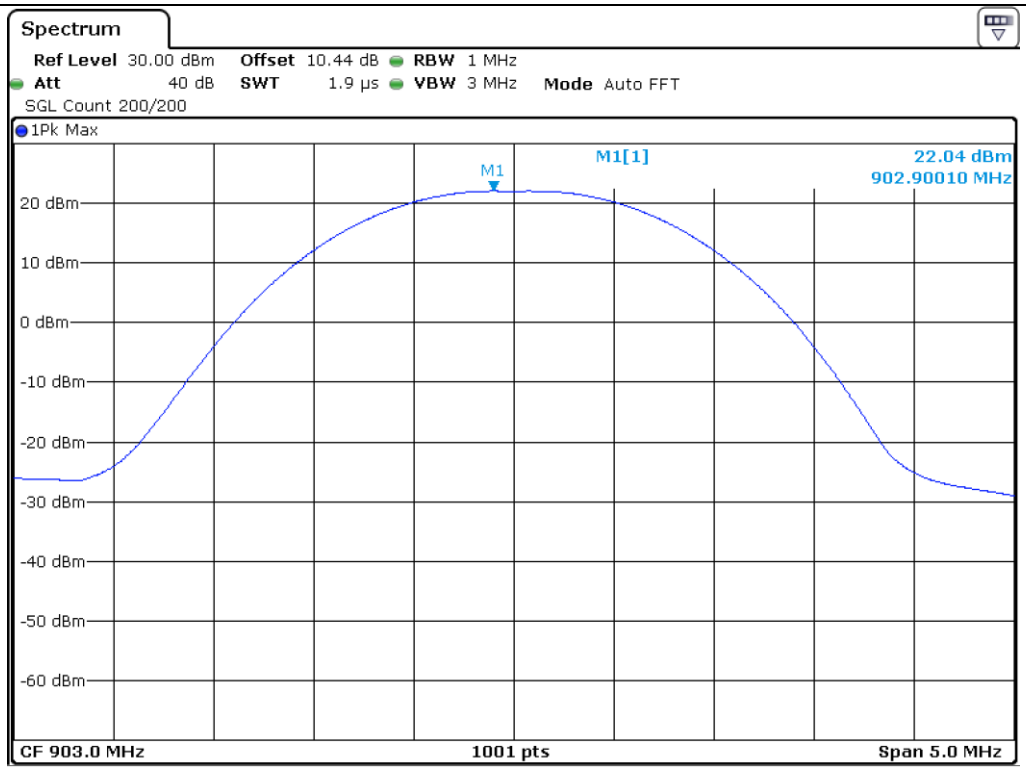
7.4 Test data

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE		LIMIT (mW)	MARGIN (dB)
		(dBm)	(mW)		
LOW	903.00	22.04	159.96	250.00	90.04
MIDDLE	915.00	22.35	171.79	250.00	78.21
HIGH	926.50	22.20	165.96	250.00	84.04



Low Channel

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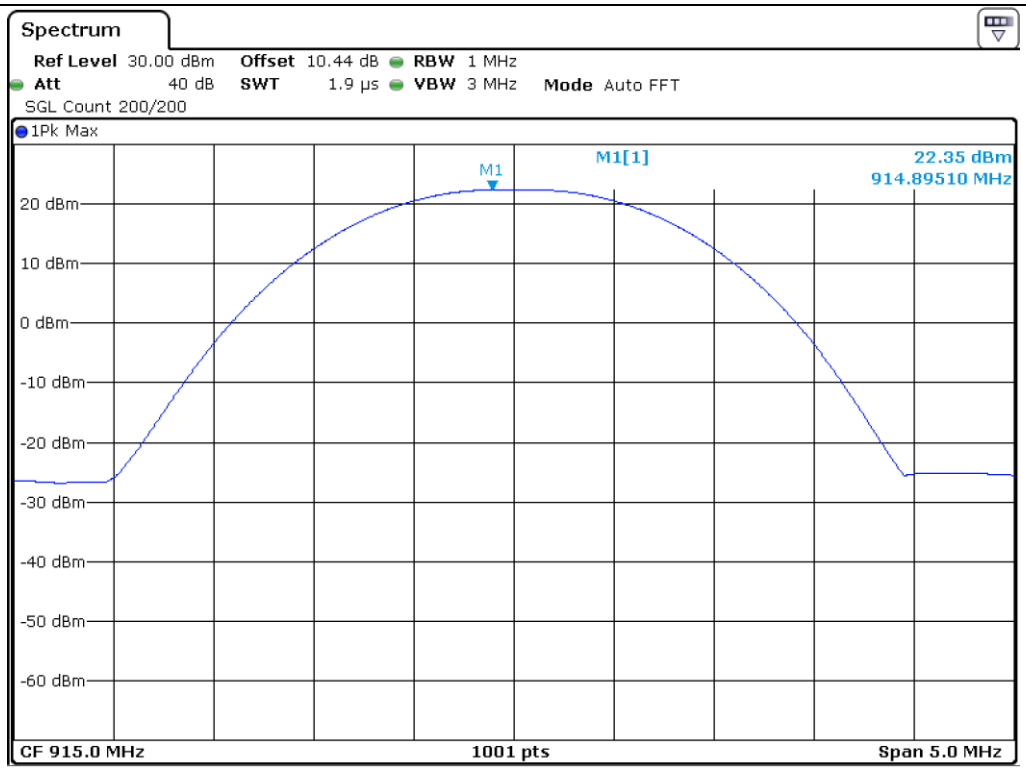
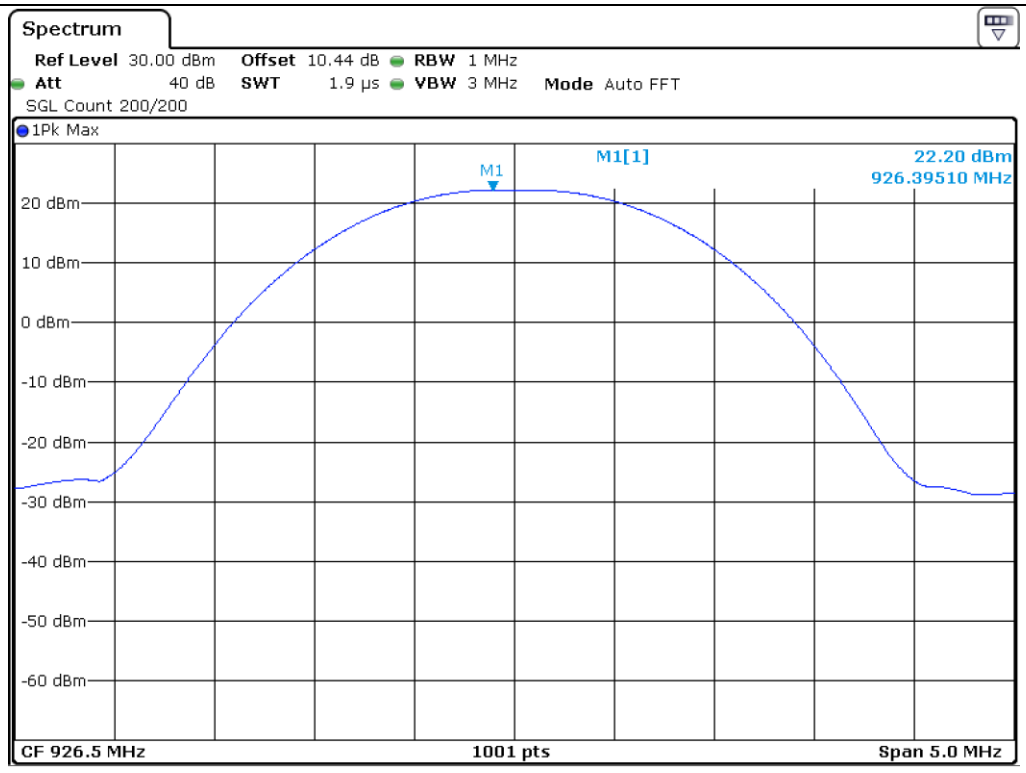


Middle Channel



High Channel

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8. BAND EDGES

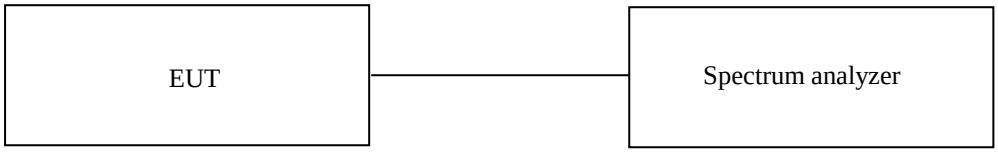
8.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

8.2 Test set-up

According to §15.247(d) in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.



8.3 Test Date

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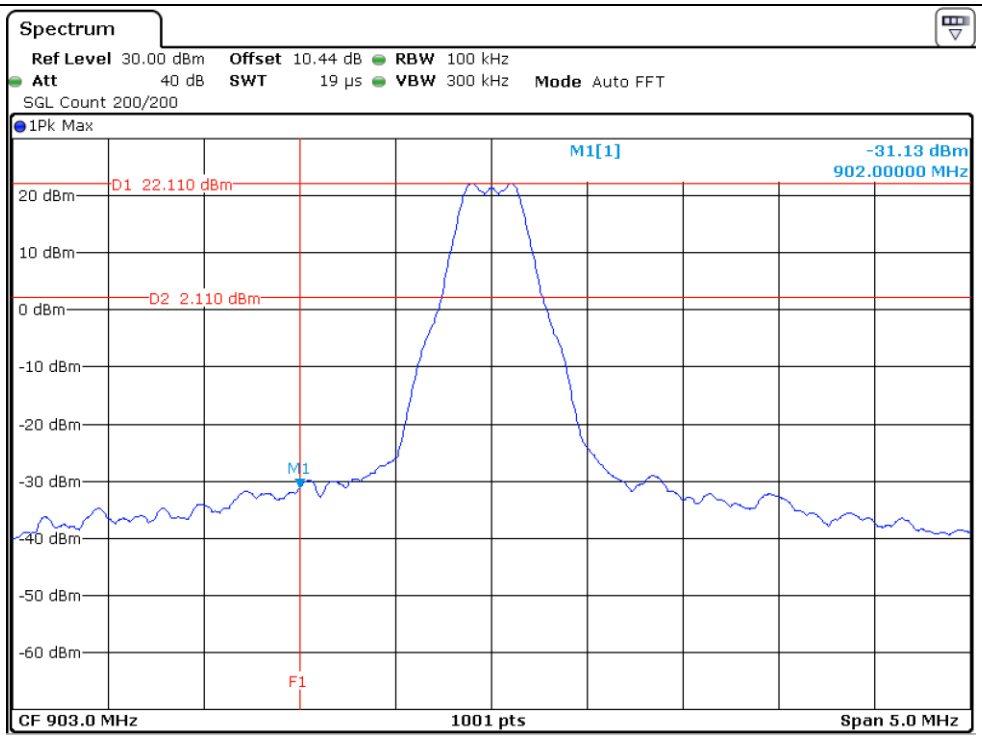
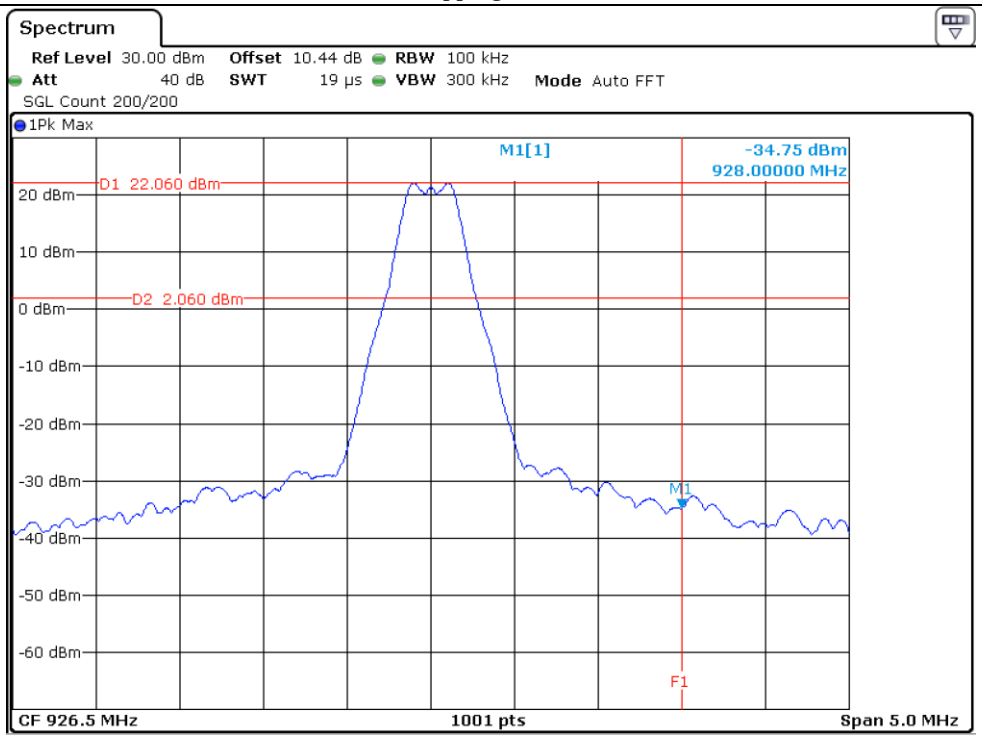
8.4 Test data

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dB)	LIMIT (dBc)	MARGIN (dB)
Without hopping				
LOW	902.00	53.24 (22.11+31.13)	20.00	33.24
HIGH	928.00	56.81 (22.06+34.75)	20.00	36.81
With Hopping				
LOW	902.00	39.15 (22.89+16.26)	20.00	19.15
HIGH	928.00	55.35 (22.89+32.46)	20.00	35.35



Without hopping_Low Channel



Without hopping_High Channel

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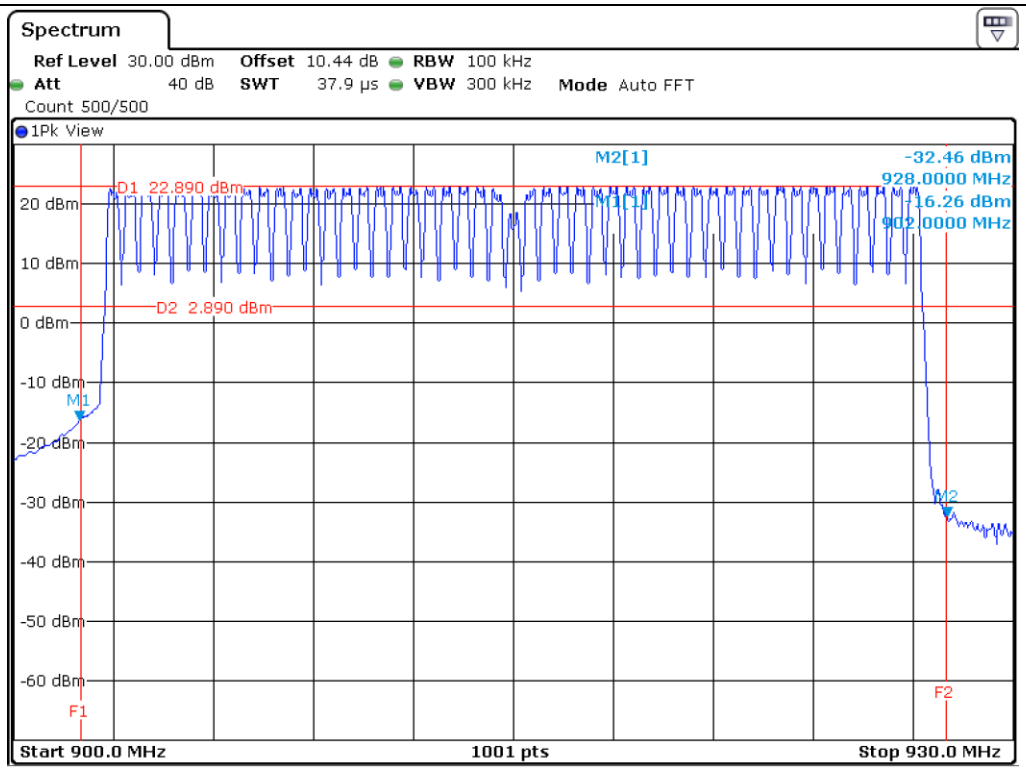

With Hopping

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9. FREQUENCY SEPARATION / OCCUPIED BANDWIDTH (20 dB BANDWIDTH)

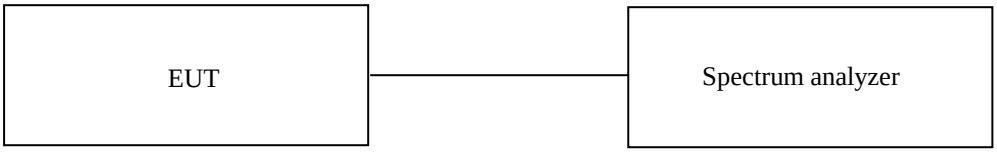
9.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

9.2 Test set-up

According to §15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.



9.3 Test Date

November 12, 2020 ~ November 18, 2020

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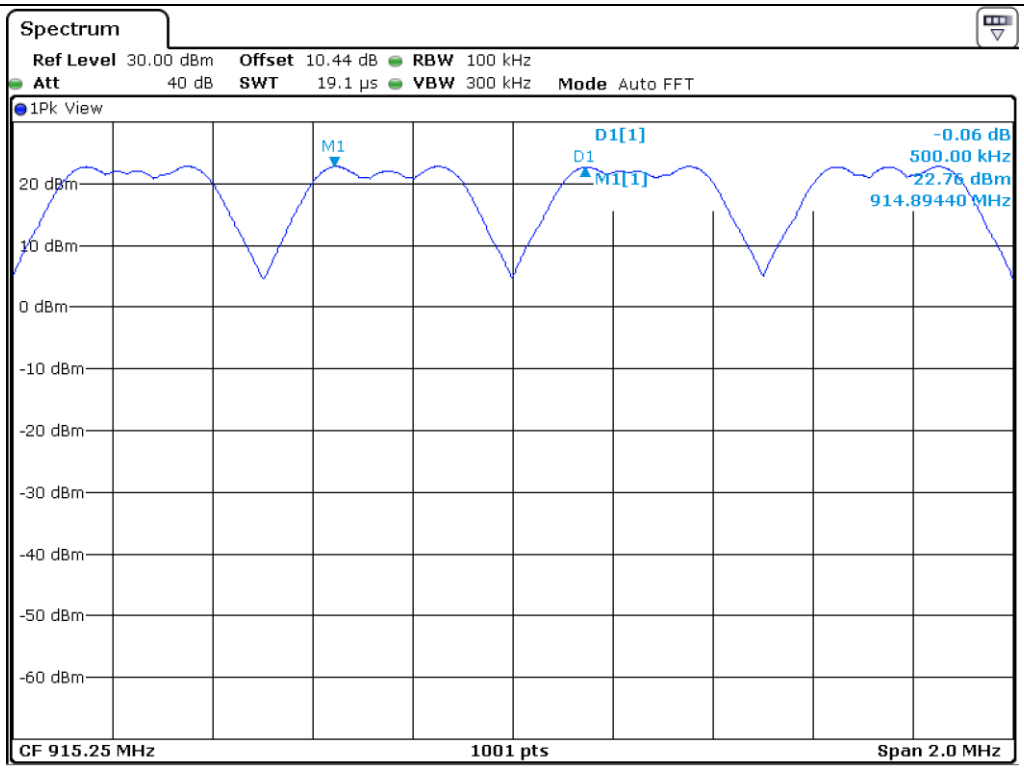
9.4 Test data

-. Test Result : Pass

Channel Separation (kHz)	20 dB Bandwidth		Limit (kHz)	Result
	Channel	Measured Value (kHz)		
500.00	LOW	375.60	> 25 Or **> 20 dB B.W. of Hopping Channel**	Pass
	MIDDLE	377.60		
	HIGH	377.60		



Channel Separation

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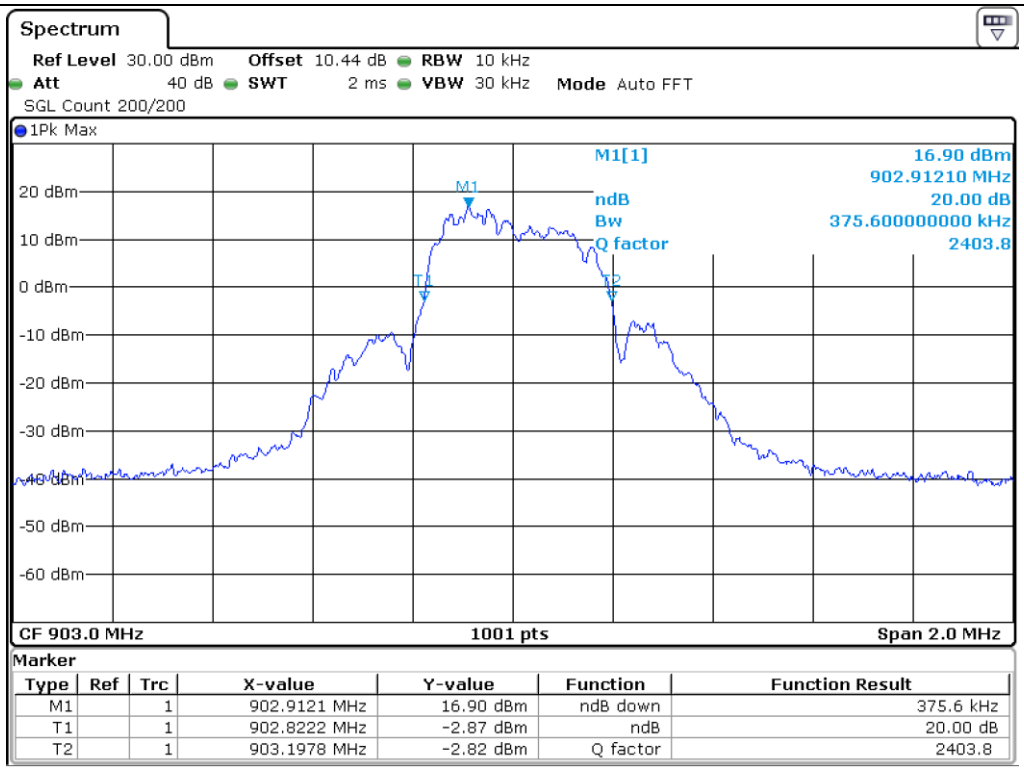
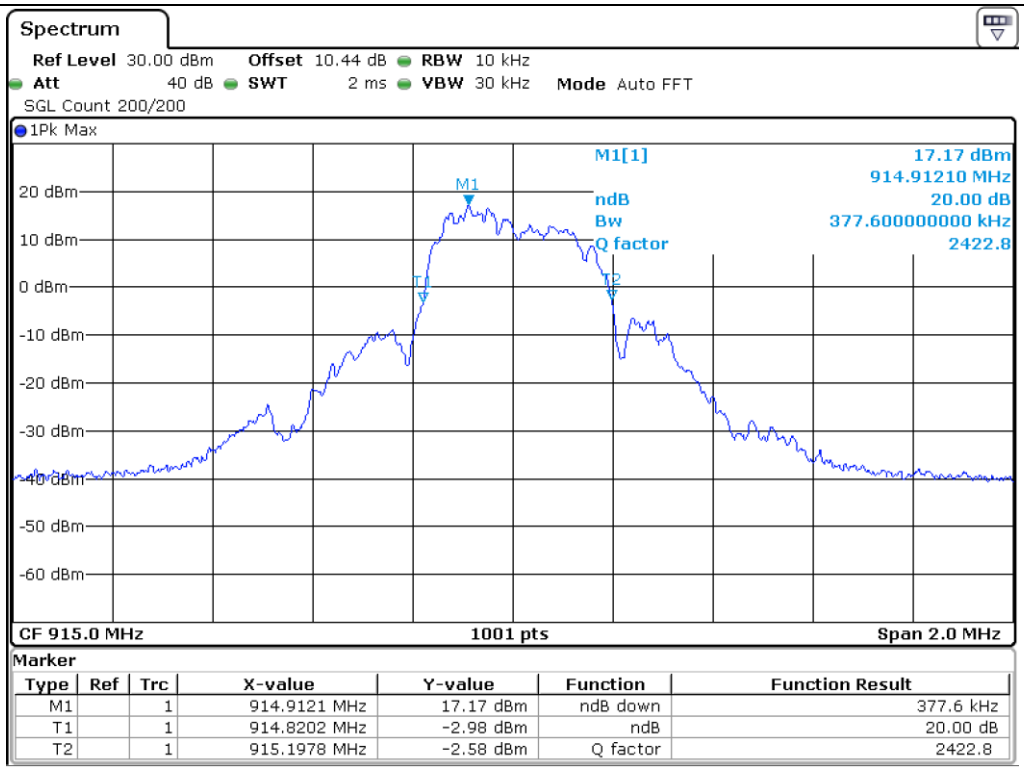


Low Channel



Middle Channel

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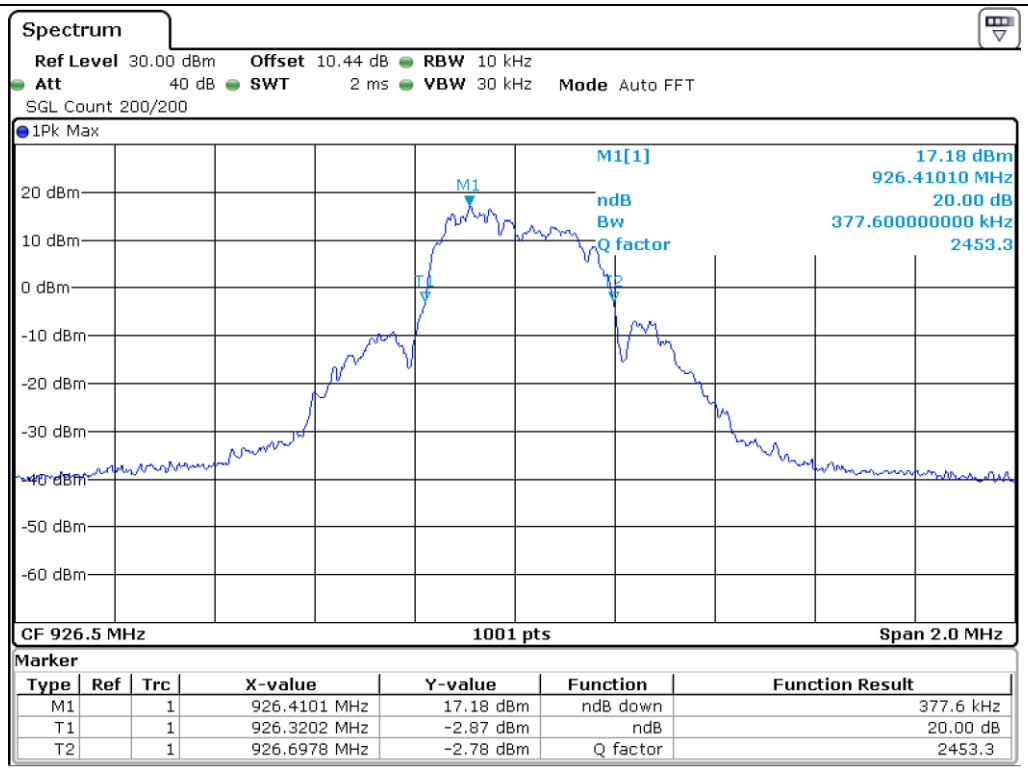

High Channel

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10. NUMBER OF HOPPING FREQUENCY

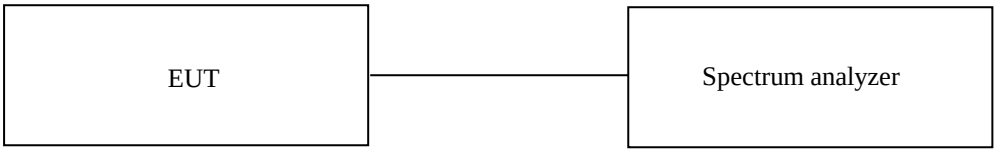
10.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

10.2 Test set-up

According to §15.247(a)(1)(i) if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.



10.3 Test Date

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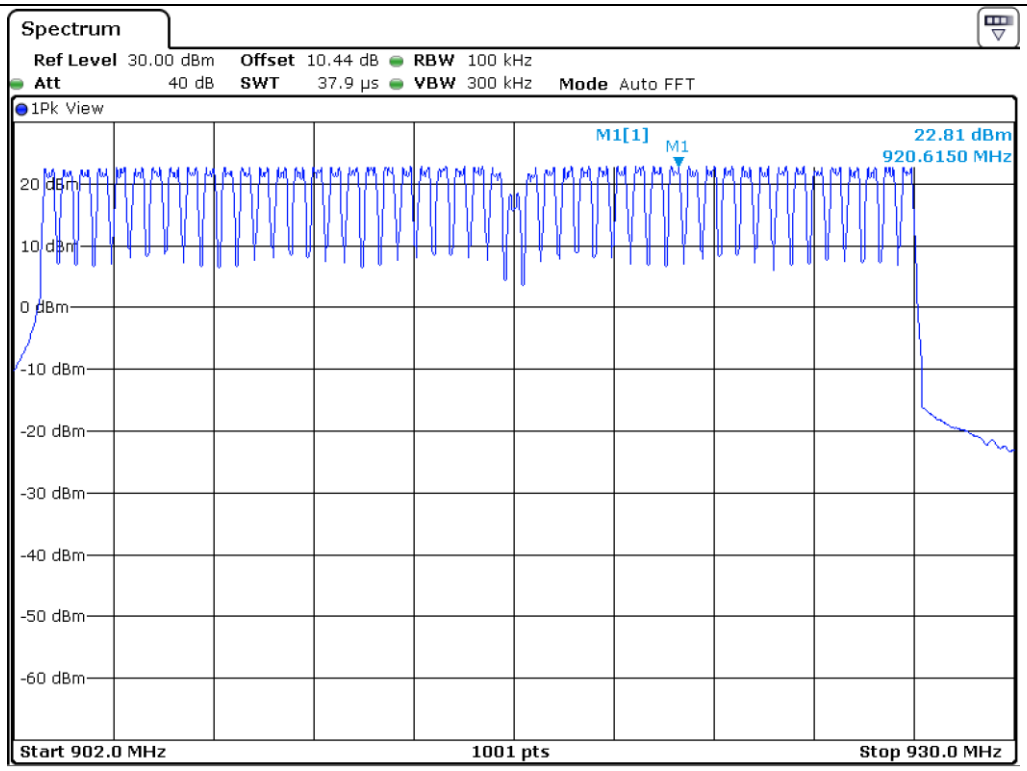
10.4 Test data

-. Test Result : Pass

Number of Hopping Frequencies	Limit (EA)
48.00	25.00



Number of Hopping Channels

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11. TIME OF OCCUPANCY (DWELL TIME)

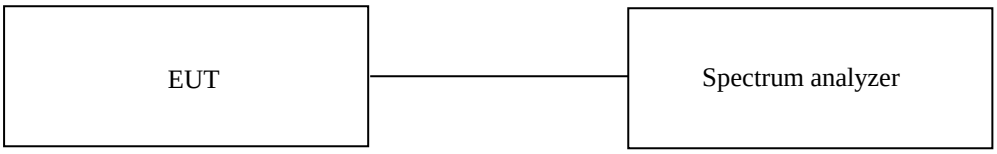
11.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

11.2 Test set-up

According to §15.247(a)(1)(i) / RSS-247 5.1.3, Frequency hopping systems operating in the 902 MHz ~ 928 MHz bands. if the 20 dB bandwidth of the hopping channel is less than 250 kHz, thesystem shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.



11.3 Test Date

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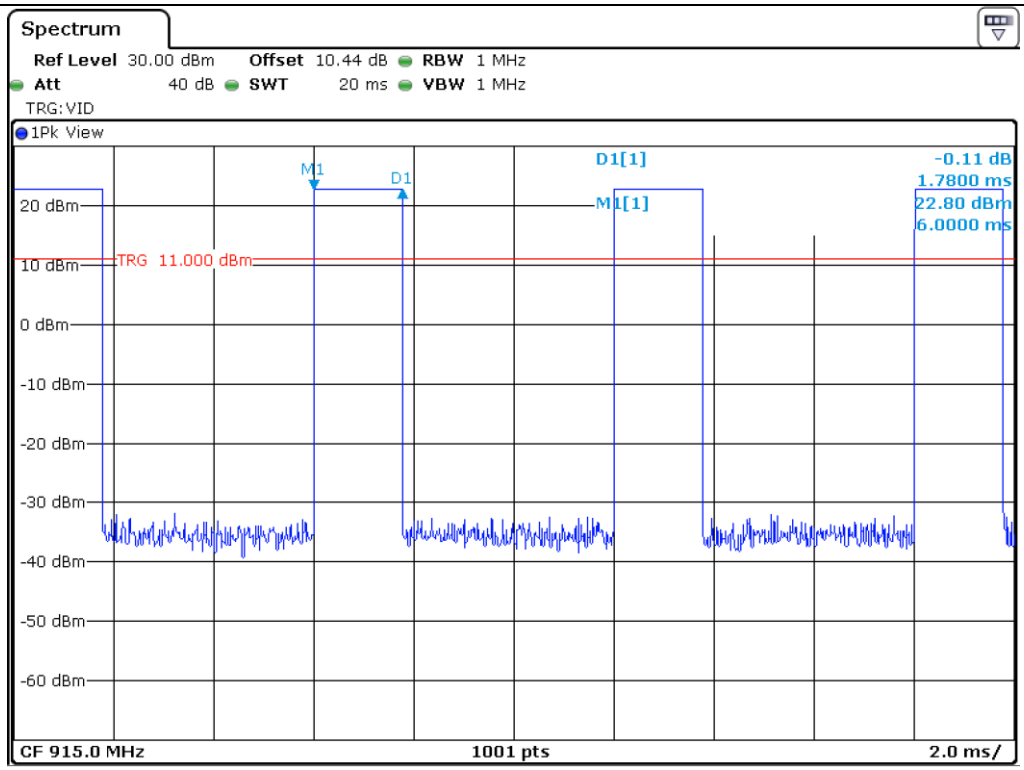
11.4 Test data

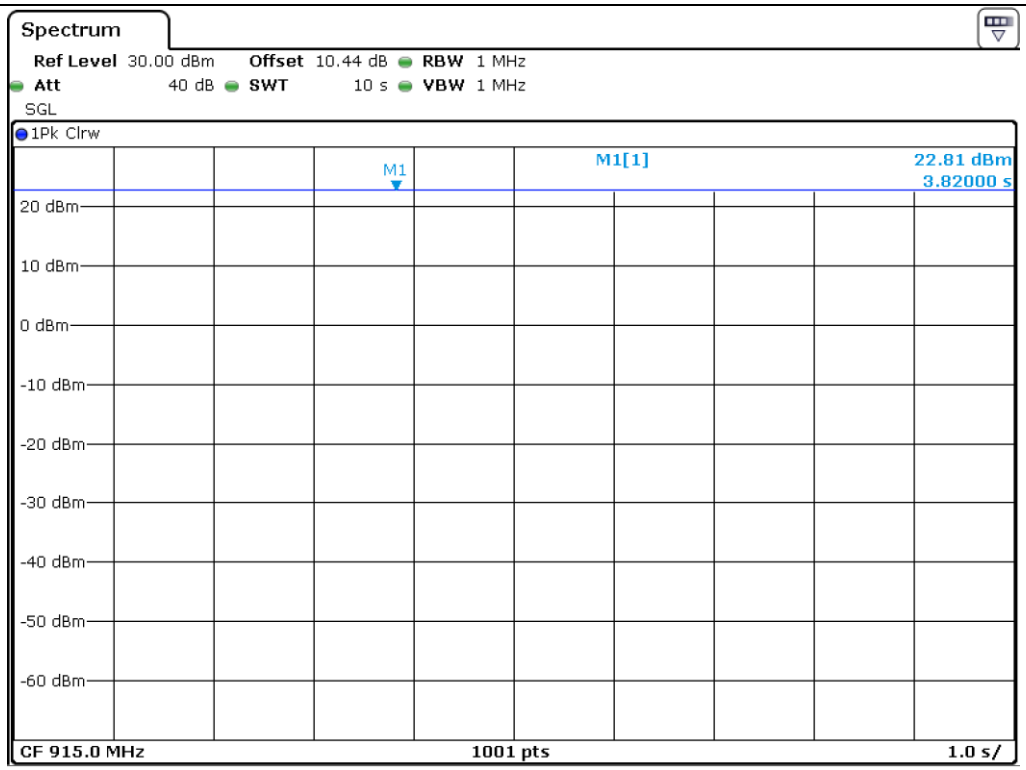
-. Test Result : Pass

Channel	Average Time of Occupancy(ms)	Number of Pulse in 10 seconds	Total(ms)	Limit(ms)
MIDDLE	1.78	1.0	1.78	400.00

Note : Tatal : Average Time of Occupancy * Number of Pulse in 10 seconds.



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)

12. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

12.1 Operating environment

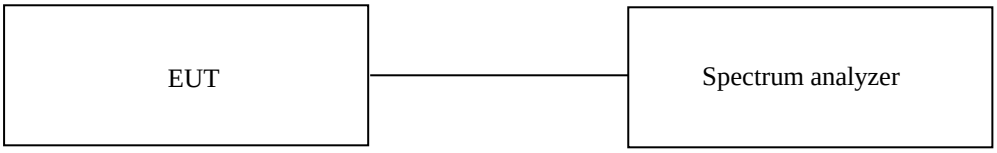
Temperature : 23 °C

Relative humidity : 45 % R.H.

12.2 Test set-up for conducted / radiated measurement

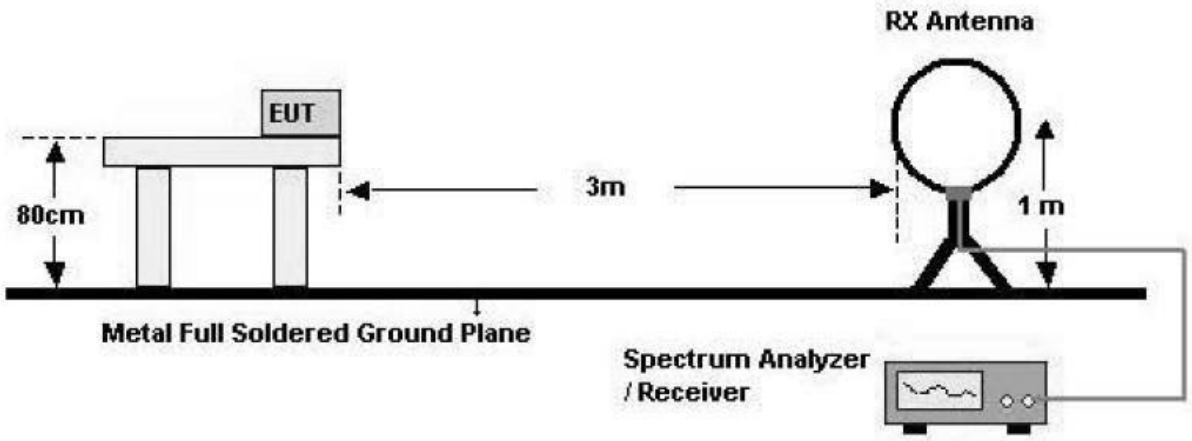
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

- Conducted Configuration



- Radiated Configuration

1. Below 30 MHz



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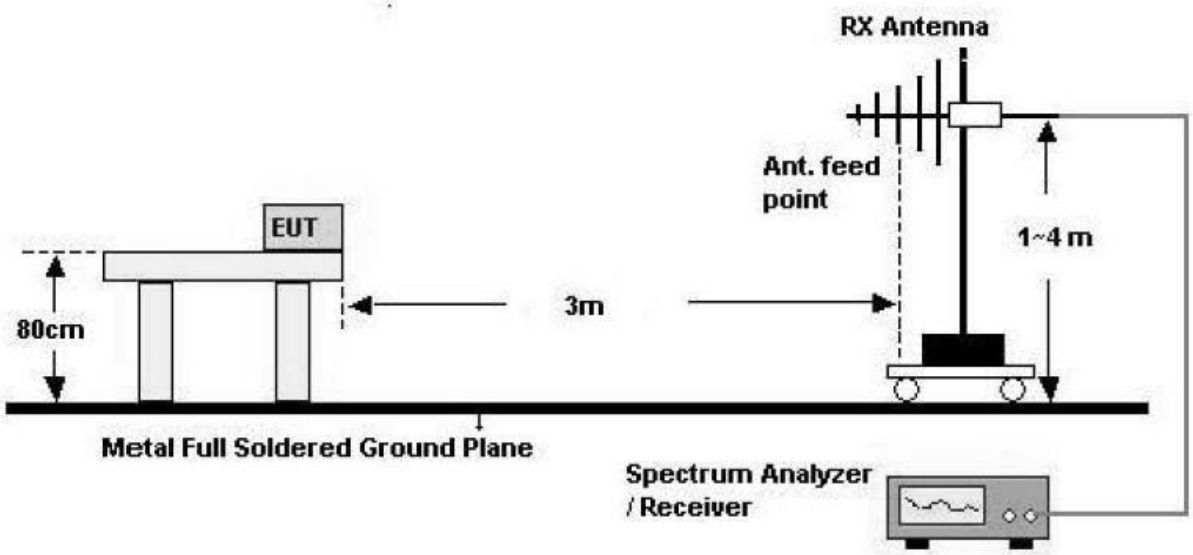
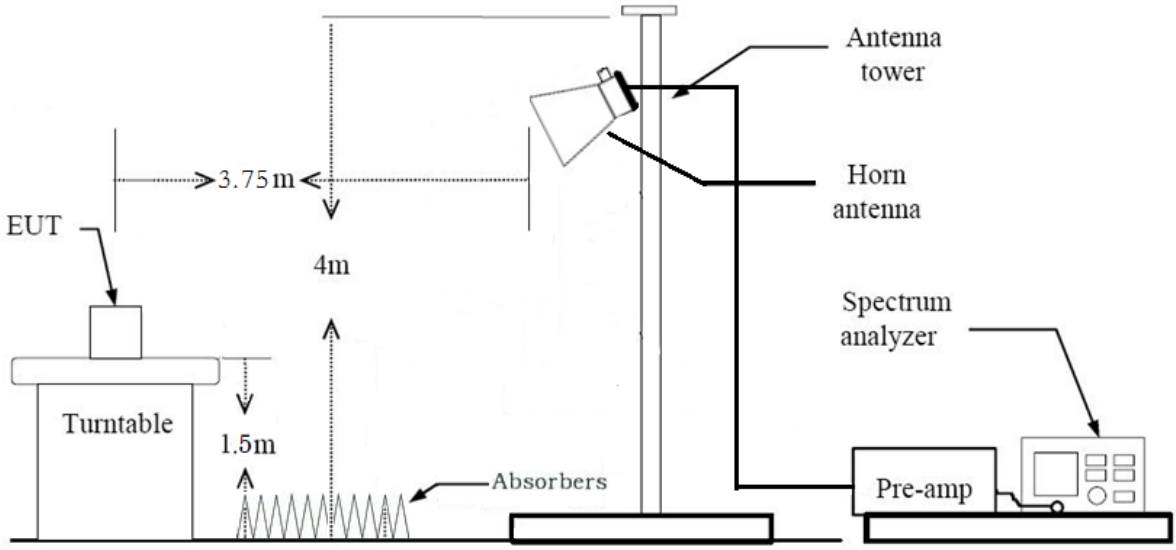
2. 30 MHz - 1 GHz



3. Above 1 GHz



12.3 Test Date

November 12, 2020 ~ November 18, 2020

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12.4 Test data for conducted emission

-. Resolution bandwidth : 100 kHz

-. Video bandwidth : 300 kHz

-. Detector : Peak

-. Result : PASSED

Channel	Frequency Range	Measured Value(dBm)	Limit(dBm)	Margin(dB)
Low	Fundamental	22.11	2.11	-
	30 M ~ 1 GHz	-39.34	2.11	41.45
	1 GHz ~ 10 GHz	-17.22	2.11	19.33
Middle	Fundamental	22.70	2.70	-
	30 M ~ 1 GHz	-39.22	2.70	41.92
	1 GHz ~ 10 GHz	-17.96	2.70	20.66
High	Fundamental	22.06	2.06	-
	30 M ~ 1 GHz	-39.73	2.06	41.79
	1 GHz ~ 10 GHz	-19.29	2.06	21.35

Tabulated test data for Restricted Band

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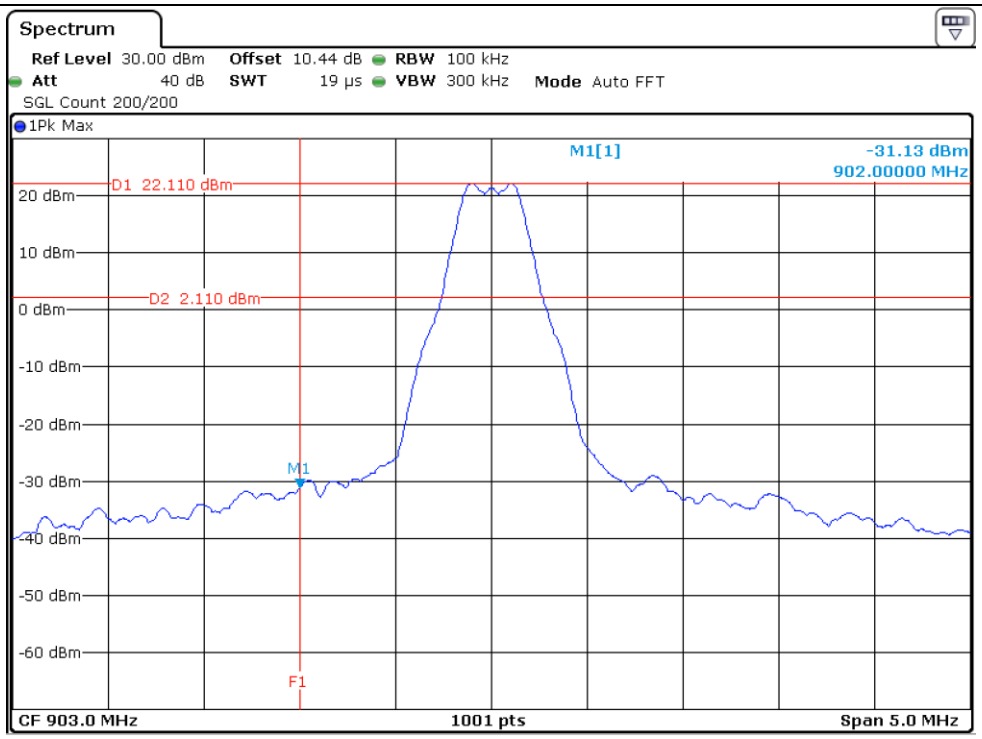
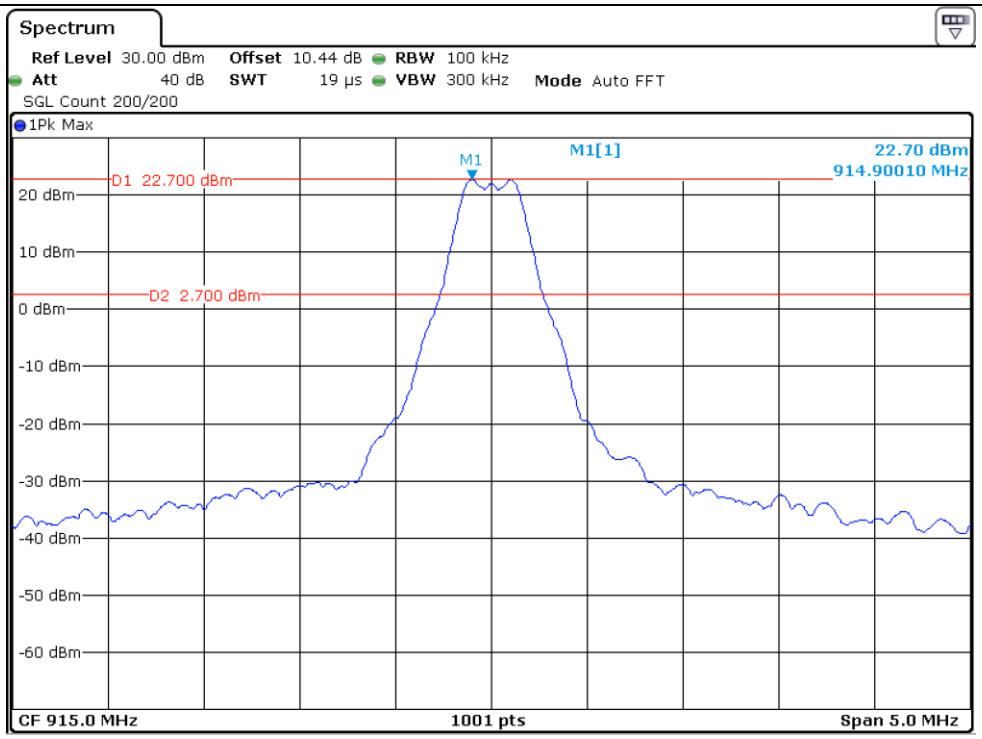
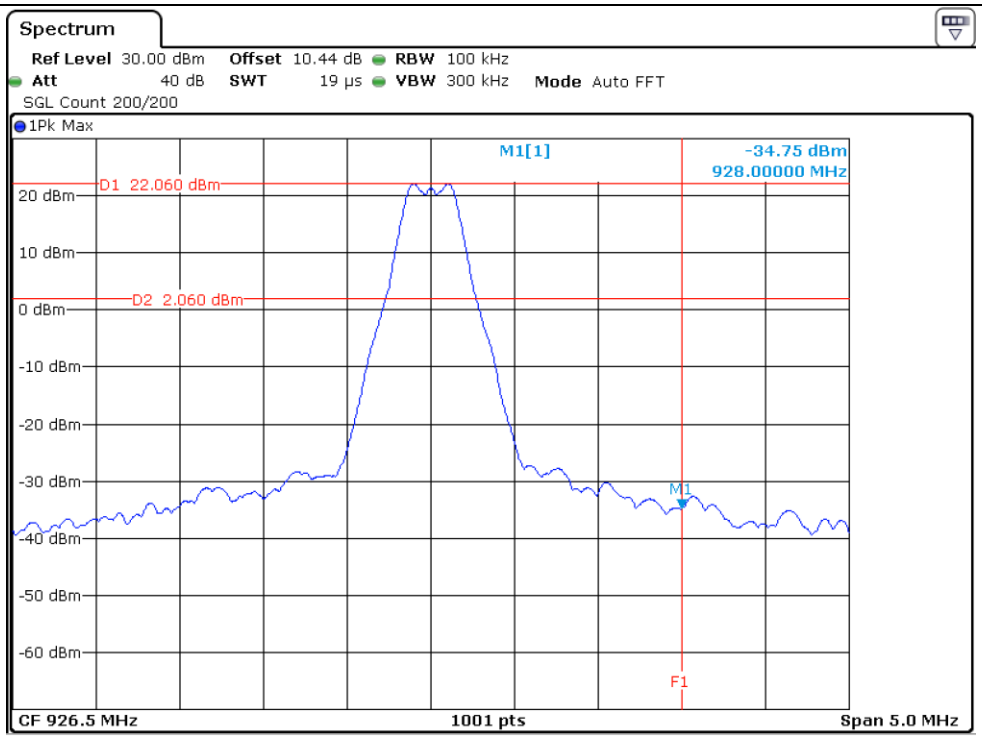


Low Channel



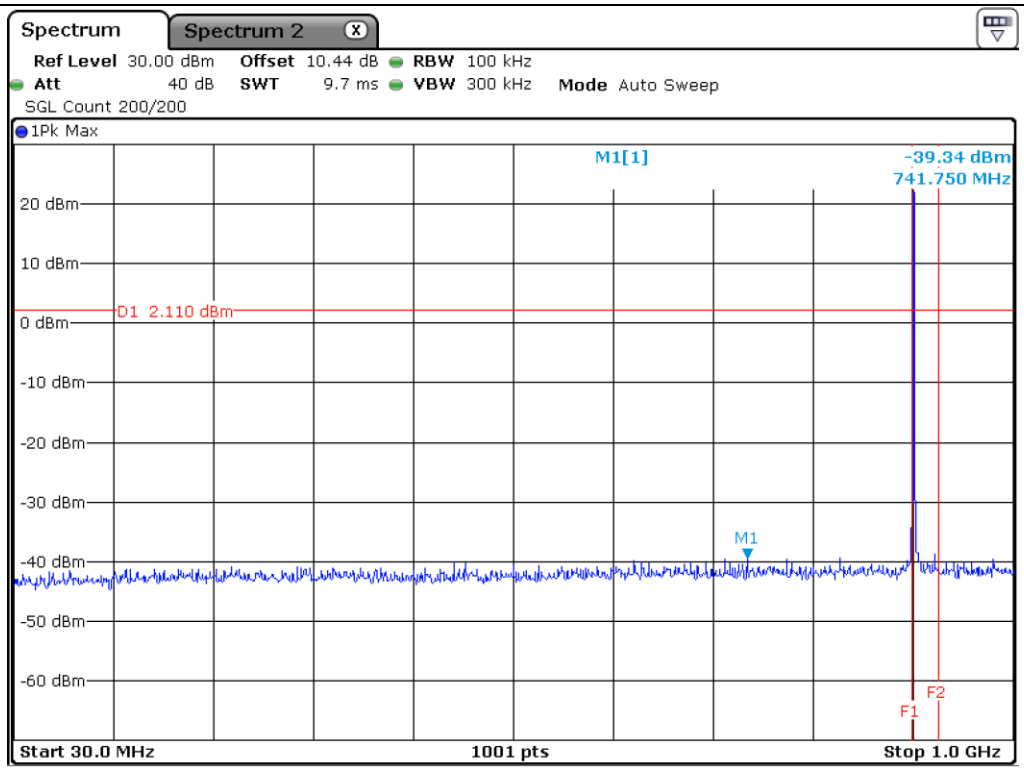
Middle Channel

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

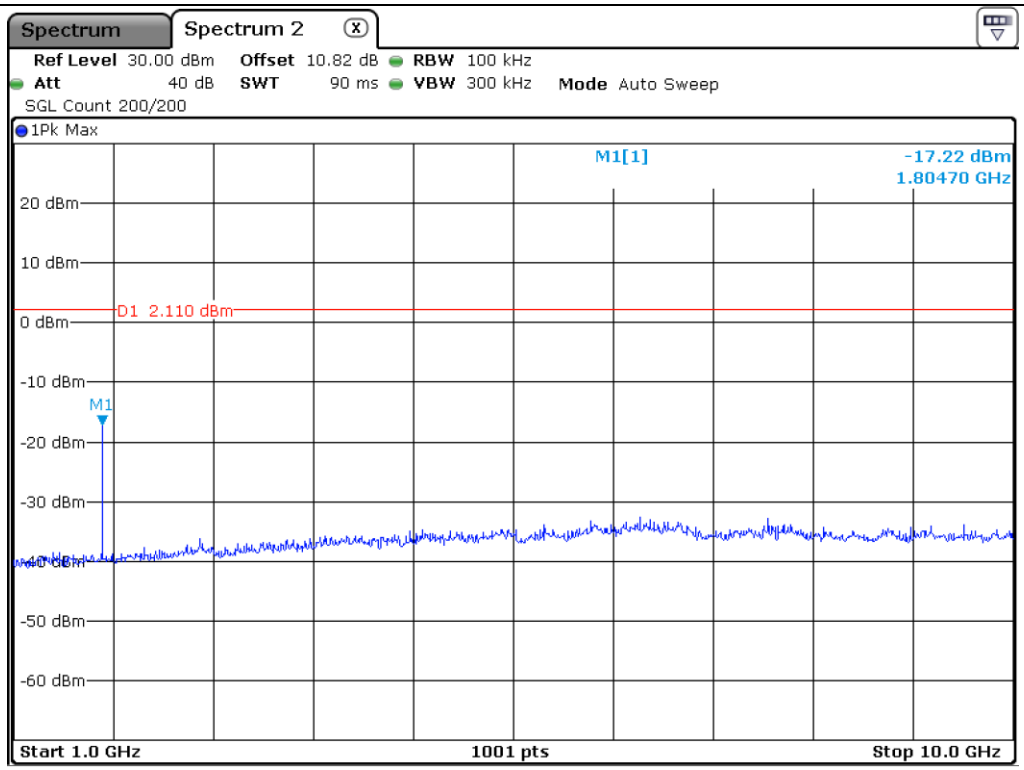


High Channel

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

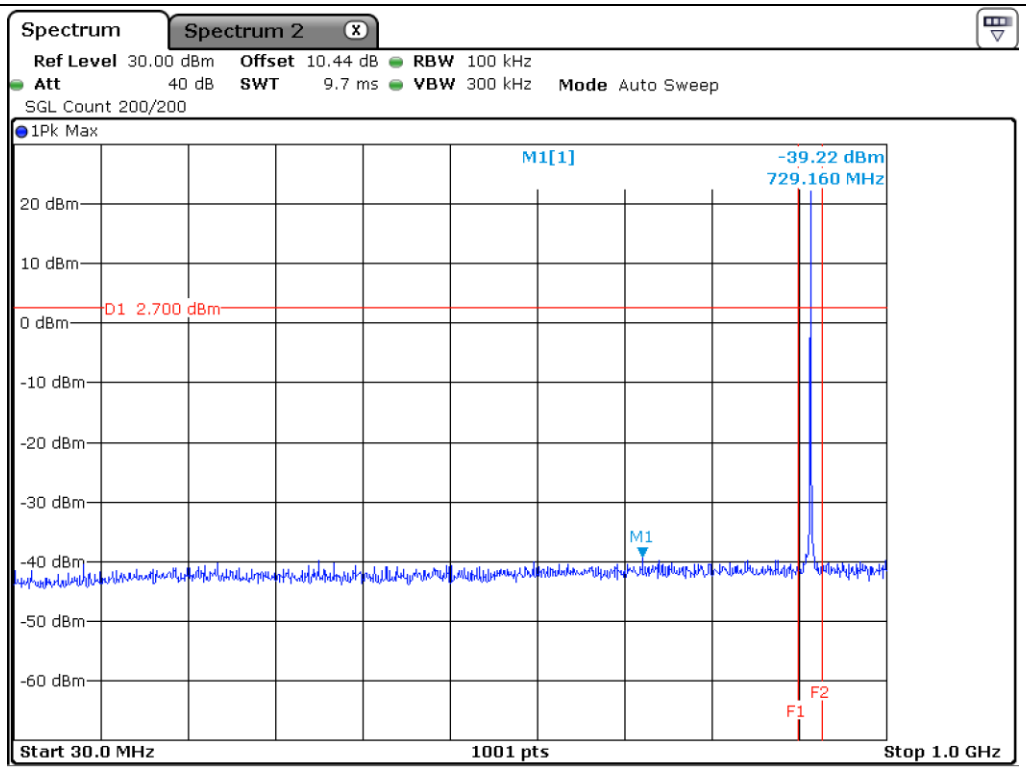


Low Channel

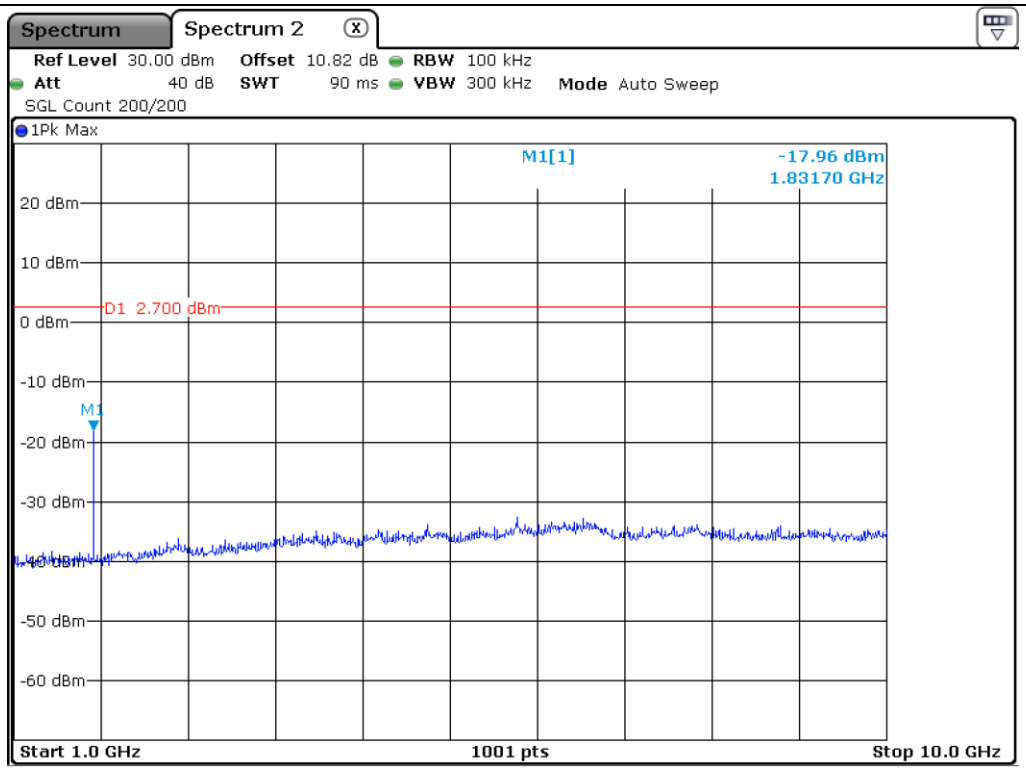


Low Channel

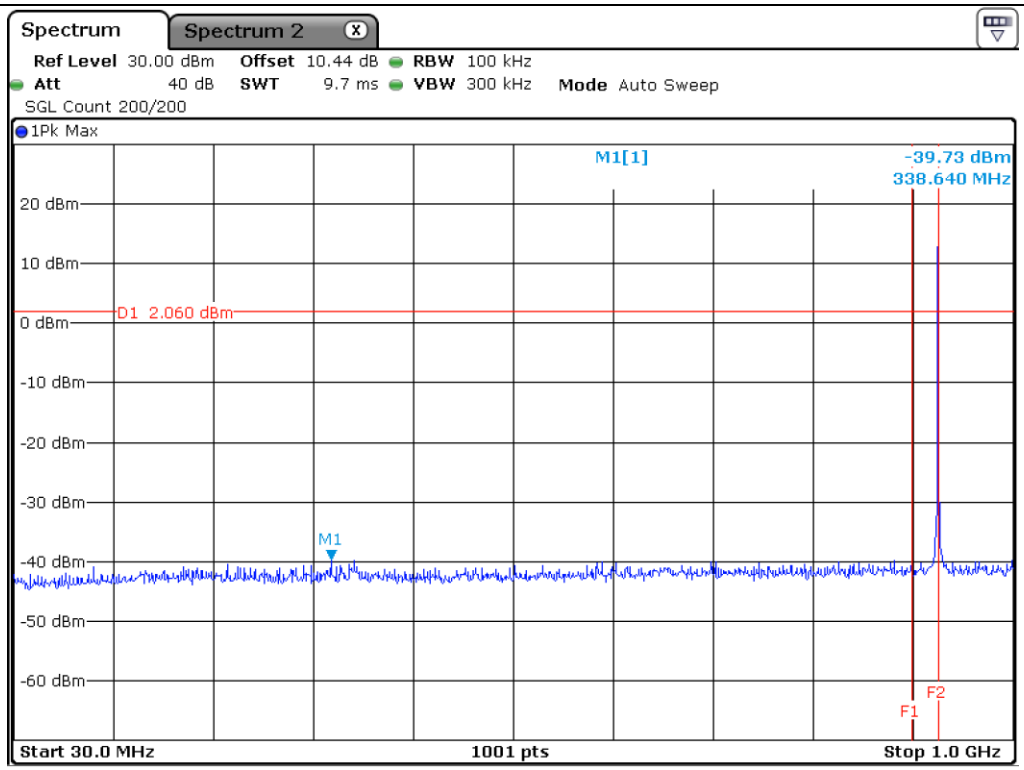
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



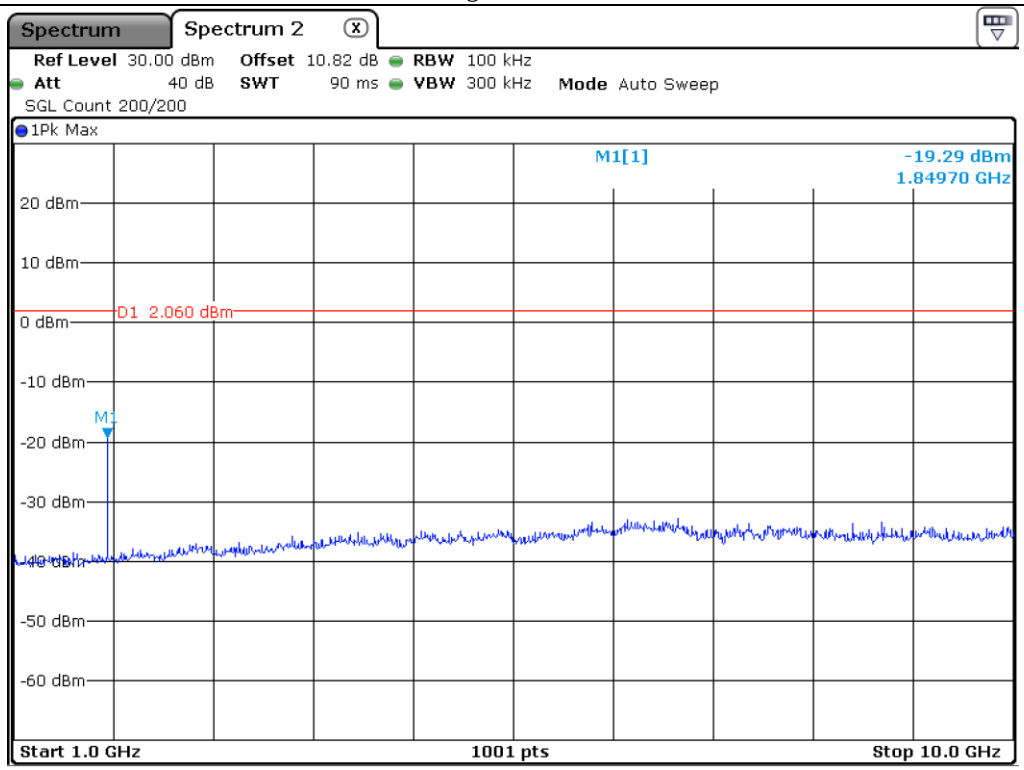
Middle Channel



Middle Channel



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)

12.5 Test data for Transmitting mode radiated emission

12.5.1 Spurious & Harmonic Radiated Emission above 1 GHz

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

-. Video bandwidth : 3 MHz for Peak Mode(Peak Detector), 3 MHz for Average Mode(RMS Detector)

-. Frequency range : 1 GHz ~ 10.0 GHz

-. Measurement distance : 3 m

-. Result : PASSED

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Correction Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low	1 806.000	32.59	Peak	H	24.90	1.11	-	58.60	Harmonic subject to 30 dBc criteria only.	
		30.95	Peak	V			-	56.96		
	2 709.000	15.40	Peak	H	28.00	1.08	-	44.48	74.00	29.52
		4.08	Average	H			-	33.16	54.00	20.84
		15.32	Peak	V			-	44.40	74.00	29.60
		4.10	Average	V			-	33.18	54.00	20.82
Middle	1 830.000	32.37	Peak	H	24.90	1.11	-	58.38	Harmonic subject to 30 dBc criteria only.	
		30.84	Peak	V			-	56.85		
	2 745.000	15.52	Peak	H	28.00	1.08	-	44.60	74.00	29.40
		4.05	Average	H			-	33.13	54.00	20.87
		15.36	Peak	V			-	44.44	74.00	29.56
		4.14	Average	V			-	33.22	54.00	20.78
High	1 853.000	32.63	Peak	H	24.90	1.11	-	58.64	Harmonic subject to 30 dBc criteria only.	
		30.91	Peak	V			-	56.92		
	2 779.500	15.43	Peak	H	28.00	1.08	-	44.51	74.00	29.49
		4.12	Average	H			-	33.20	54.00	20.80
		15.36	Peak	V			-	44.44	74.00	29.56
		4.11	Average	V			-	33.19	54.00	20.81

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical, “*” Frequency fall in restricted band

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13. RADIATED EMISSION TEST

13.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

13.2 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 9 kHz to 10.0 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.

13.3 Test Date

November 12, 2020 ~ November 18, 2020

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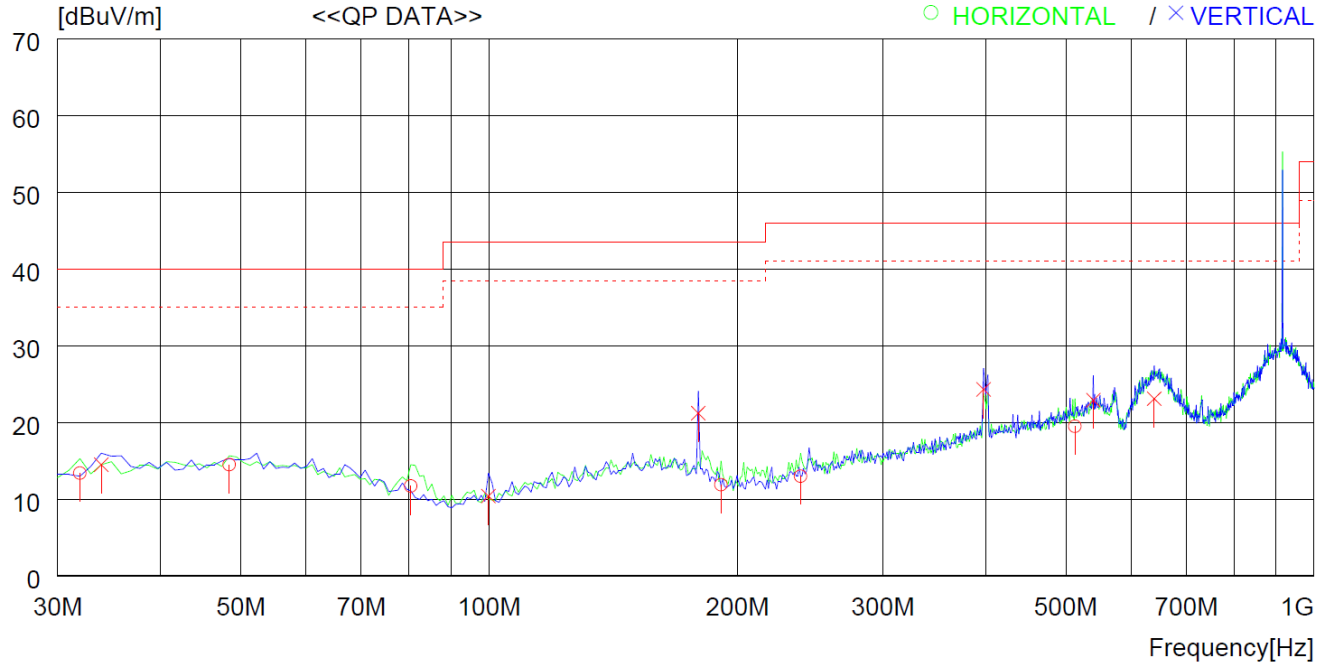
13.4 Test data for Transmitting Mode

13.4.1 Test data for 30 MHz ~ 1 000 MHz

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 3 m



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	31.940	34.6	10.9	0.5	32.6	13.4	40.0	26.6	300	0
2	48.430	36.6	10.0	0.6	32.7	14.5	40.0	25.5	200	359
3	80.440	35.9	7.7	0.8	32.7	11.7	40.0	28.3	100	137
4	191.020	30.4	12.8	1.3	32.6	11.9	43.5	31.6	200	359
5	238.550	33.5	10.6	1.5	32.6	13.0	46.0	33.0	300	0
6	513.061	32.2	18.0	2.2	32.9	19.5	46.0	26.5	200	359
----- Vertical ------										
7	33.880	35.6	11.0	0.5	32.6	14.5	40.0	25.5	400	320
8	99.840	32.8	9.4	0.9	32.7	10.4	43.5	33.1	100	45
9	179.380	39.4	13.1	1.3	32.6	21.2	43.5	22.3	100	153
10	397.630	38.7	16.4	1.9	32.7	24.3	46.0	21.7	100	359
11	540.220	34.9	18.6	2.3	32.9	22.9	46.0	23.1	100	359
12	640.127	33.3	20.3	2.5	33.0	23.1	46.0	22.9	100	137

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13.4.2 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

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.								

13.4.3 Test data for above 1 GHz

-. 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 ~ 10.0 GHz

-. Measurement distance : 3 m

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.								

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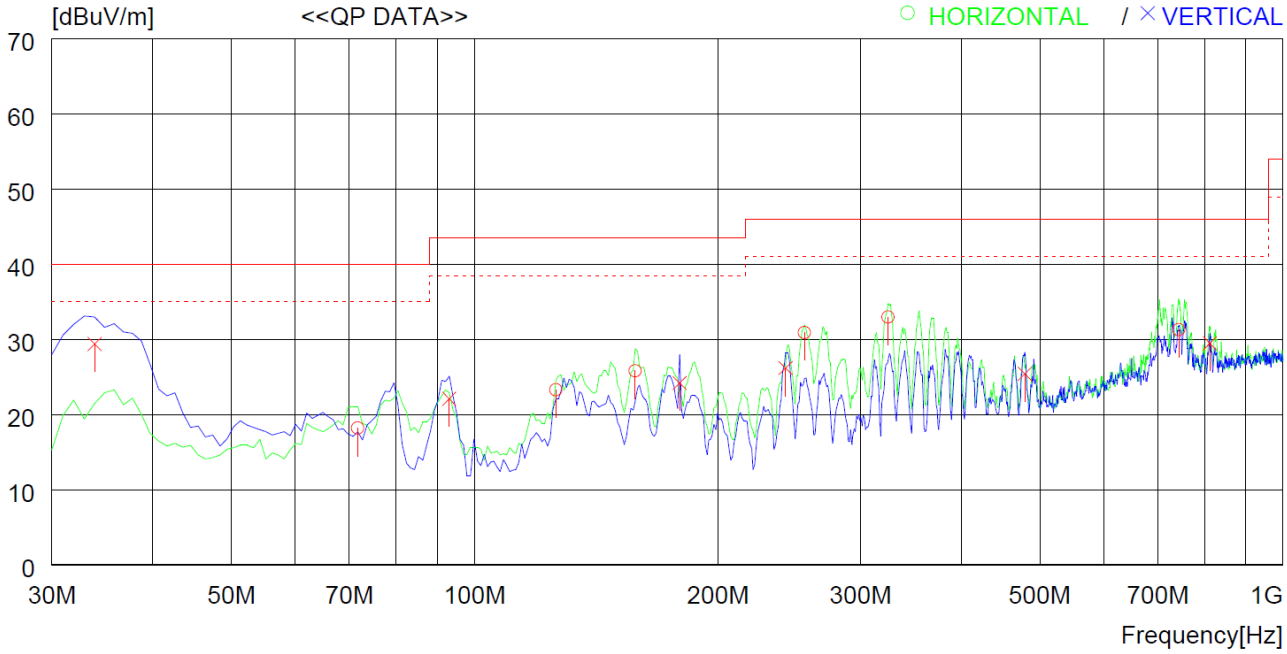
13.5 Test data for Charging Mode

13.5.1 Test data for 30 MHz ~ 1 000 MHz

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 3 m



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	71.710	41.4	8.7	0.8	32.7	18.2	40.0	21.8	300	172
2	126.030	44.1	10.8	1.1	32.7	23.3	43.5	20.2	300	0
3	158.040	44.7	12.5	1.2	32.6	25.8	43.5	17.7	200	140
4	256.010	51.6	10.5	1.5	32.7	30.9	46.0	15.1	100	108
5	324.880	49.7	14.3	1.7	32.7	33.0	46.0	13.0	100	99
6	742.944	40.4	21.4	2.3	32.8	31.3	46.0	14.7	100	117
----- Vertical ------										
7	33.880	50.5	11.0	0.5	32.6	29.4	40.0	10.6	100	138
8	93.050	45.6	8.3	0.9	32.7	22.1	43.5	21.4	200	220
9	179.380	42.4	13.1	1.3	32.6	24.2	43.5	19.3	100	359
10	242.430	46.9	10.4	1.5	32.6	26.2	46.0	19.8	100	138
11	479.111	38.7	17.5	2.1	32.9	25.4	46.0	20.6	100	359
12	811.812	37.8	22.1	2.1	32.5	29.5	46.0	16.5	100	198

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13.5.2 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

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.								

13.5.3 Test data for above 1 GHz

-. 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 ~ 10.0 GHz

-. Measurement distance : 3 m

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.								

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14. CONDUCTED EMISSION TEST

14.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

14.2 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.

14.3 Test Date

November 03, 2020 ~ November 06, 2020

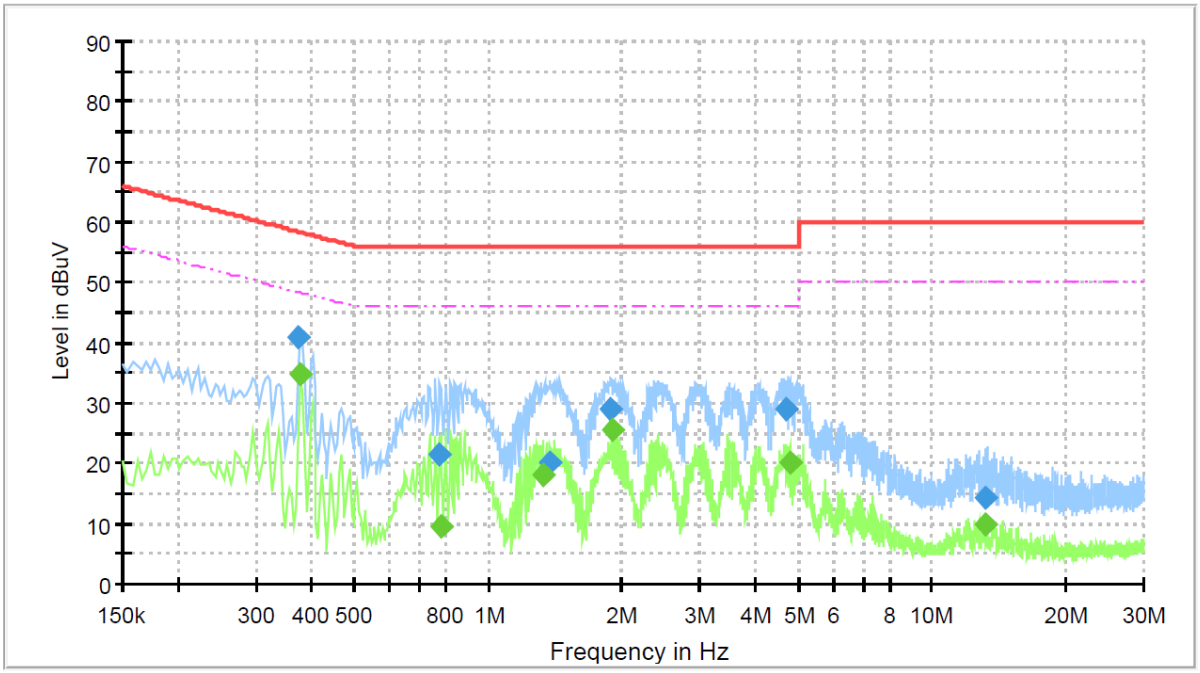
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

14.4 Test data

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

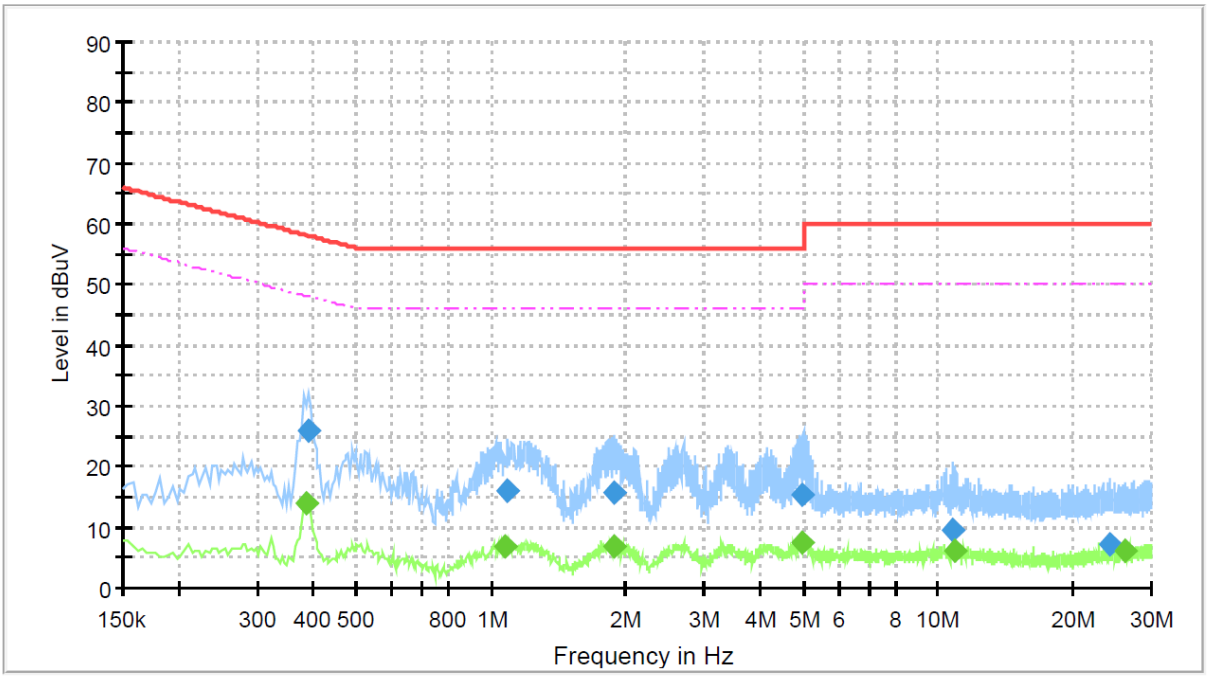
-. Tested Line : HOT LINE



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.374	41.00	---	58.42	17.43	3000.0	9.0	L1	9.93
0.378	---	34.71	48.33	13.63	3000.0	9.0	L1	9.93
0.773	21.55	---	56.00	34.45	3000.0	9.0	L1	9.96
0.781	---	9.62	46.00	36.38	3000.0	9.0	L1	9.96
1.331	---	18.15	46.00	27.85	3000.0	9.0	L1	10.00
1.371	19.95	---	56.00	36.05	3000.0	9.0	L1	10.00
1.889	28.92	---	56.00	27.08	3000.0	9.0	L1	10.01
1.905	---	25.69	46.00	20.31	3000.0	9.0	L1	10.01
4.702	28.92	---	56.00	27.08	3000.0	9.0	L1	10.07
4.770	---	20.04	46.00	25.96	3000.0	9.0	L1	10.07
13.228	---	9.80	50.00	40.20	3000.0	9.0	L1	10.42
13.268	14.39	---	60.00	45.61	3000.0	9.0	L1	10.42

-. Tested Line : NEUTRAL LINE



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.385	---	14.01	48.16	34.15	3000.0	9.0	N	9.94
0.389	25.89	---	58.07	32.18	3000.0	9.0	N	9.94
1.069	---	6.77	46.00	39.23	3000.0	9.0	N	9.99
1.089	15.98	---	56.00	40.02	3000.0	9.0	N	9.99
1.889	---	6.87	46.00	39.13	3000.0	9.0	N	10.03
1.889	15.61	---	56.00	40.39	3000.0	9.0	N	10.03
4.981	15.48	---	56.00	40.52	3000.0	9.0	N	10.10
4.985	---	7.52	46.00	38.48	3000.0	9.0	N	10.10
10.824	9.41	---	60.00	50.59	3000.0	9.0	N	10.43
10.860	---	6.10	50.00	43.90	3000.0	9.0	N	10.43
24.309	7.21	---	60.00	52.79	3000.0	9.0	N	10.75
26.282	---	6.23	50.00	43.77	3000.0	9.0	N	10.77

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.

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15. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40	Rohde & Schwarz	Signal Analyzer	101009	Feb. 21, 2020 (1Y)
ESU	Rohde & Schwarz	EMI Test Receiver	100261	Mar. 16, 2020 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	312545	Mar. 16, 2020 (1Y)
BBV 9718 B	Schwarzbeck	Broadband Preamplifier	00009	Mar. 16, 2020 (1Y)
SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Feb. 20, 2020 (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. 08, 2020 (2Y)
BBHA 9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 23, 2020 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 07, 2020(1Y)
ESCI	Rohde & Schwarz	Test Receiver	101420	Mar. 23, 2020 (1Y)
NSLK8126	SCHWARZ BECK	LISN	8126480	Oct. 15, 2020 (1Y)
3825/2	EMCO	AMN	9109-1867	Mar. 23, 2020 (1Y)

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