RADIO PERFORMANCE TEST REPORT

Test Report No. : **OT-23N-RWD-003**

Reception No. : **2309003183**

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. : **A3LWCD730M**

Model Name : **WCD730M**

Multiple Model Name : **N/A**

Serial number : **N/A**

Total page of Report : **63 pages (including this page)**

Date of Incoming : **October 04, 2023**

Date of issue : **November 01, 2023**

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.

This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.

Tested by	Reviewed by	Approved by
Ju-Yun, Park / Sr. Engineer	Tae-Ho, Kim / Chief Engineer	Jae-Ho, Lee / Chief Engineer
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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※ Please refer to the Annex section for All test plots

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-23N-RWD-003	November 01, 2023	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 : Youngjoong, Noh / Principal Engineer

Telephone No. : +82-31-277-0598

FCC ID : A3LWCD730M

Model Name : WCD730M

Brand Name :

Serial Number : N/A

Date : November 01, 2023

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 Conducted(average) Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	Met requirement / PASS

2.2 Additions, deviations, exclusions from standards

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

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

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

2.5 Test Methodology

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

2.6 Test Facility

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

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

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

-. Lab Accreditation:

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

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

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 WCD730M (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 °C ~ 50 °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 ~ 2 472 MHz (802.11b/g/n(HT20))
	WLAN 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))
	WLAN 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))
	WLAN 5 470 MHz ~ 5 725 MHz Band	5 500 MHz ~ 5 720 MHz (802.11a/n(HT20)/ac(VHT20))
		5 510 MHz ~ 5 710 MHz (802.11n(HT40)/ac(VHT40))
		5 530 MHz ~ 5 690 MHz (802.11ac(VHT80))
	WLAN 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): 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	9.98 dBm
		2 Mbps	9.89 dBm
	Bluetooth	1 Mbps	10.97 dBm
		2 Mbps	10.51 dBm
		3 Mbps	10.53 dBm
	WLAN 2.4 GHz	Antenna 1	18.08 dBm(802.11b) 15.61 dBm(802.11g) 15.01 dBm(802.11n_HT20)
		Antenna 2	20.59 dBm(802.11b) 16.75 dBm(802.11g) 16.61 dBm(802.11n_HT20)
		Multiple Antenna	18.77 dBm(802.11g) 18.72 dBm(802.11n_HT20)
	WLAN 5 150 MHz ~ 5 250 MHz Band	Antenna 1	12.31 dBm(802.11a) 12.38 dBm(802.11n_HT20) 14.12 dBm(802.11n_HT40) 12.73 dBm(802.11ac_VHT80)
		Antenna 2	12.08 dBm(802.11a) 12.08 dBm(802.11n_HT20) 14.21 dBm(802.11n_HT40) 13.14 dBm(802.11ac_VHT80)
		Multiple Antenna	15.16 dBm(802.11a) 15.24 dBm(802.11n_HT20) 17.08 dBm(802.11n_HT40) 15.95 dBm(802.11ac_VHT80)
	WLAN 5 250 MHz ~ 5 350 MHz Band	Antenna 1	15.75 dBm(802.11a) 15.56 dBm(802.11n_HT20) 14.73 dBm(802.11n_HT40) 12.16 dBm(802.11ac_VHT80)
		Antenna 2	15.75 dBm(802.11a) 15.55 dBm(802.11n_HT20) 14.61 dBm(802.11n_HT40) 12.08 dBm(802.11ac_VHT80)
		Multiple Antenna	18.76 dBm(802.11a) 18.57 dBm(802.11n_HT20) 17.60 dBm(802.11n_HT40) 15.13 dBm(802.11ac_VHT80)

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RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Antenna 1	14.38 dBm(802.11a) 14.81 dBm(802.11n_HT20) 14.26 dBm(802.11n_HT40) 10.22 dBm(802.11ac_VHT80)
		Antenna 1_Straddle	8.30 dBm(802.11a) 9.04 dBm(802.11n_HT20) 8.64 dBm(802.11n_HT40) 9.43 dBm(802.11ac_VHT80)
		Antenna 2	15.71 dBm(802.11a) 16.41 dBm(802.11n_HT20) 15.71 dBm(802.11n_HT40) 12.03 dBm(802.11ac_VHT80)
		Antenna 2_Straddle	10.51 dBm(802.11a) 11.10 dBm(802.11n_HT20) 10.86 dBm(802.11n_HT40) 11.96 dBm(802.11ac_VHT80)
		Multiple Antenna	18.11 dBm(802.11a) 18.69 dBm(802.11n_HT20) 17.97 dBm(802.11n_HT40) 14.23 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	12.55 dBm(802.11a) 13.20 dBm(802.11n_HT20) 12.90 dBm(802.11n_HT40) 13.89 dBm(802.11ac_VHT80)

RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 1	11.65 dBm(802.11a) 12.51 dBm(802.11n_HT20) 12.85 dBm(802.11n_HT40) 11.75 dBm(802.11ac_VHT80)
		Antenna 1_Straddle	0.48 dBm(802.11a) 1.71 dBm(802.11n_HT20) -3.17 dBm(802.11n_HT40) -4.98 dBm(802.11ac_VHT80)
		Antenna 2	14.18 dBm(802.11a) 15.01 dBm(802.11n_HT20) 15.55 dBm(802.11n_HT40) 14.25 dBm(802.11ac_VHT80)
		Antenna 2_Straddle	2.76 dBm(802.11a) 3.73 dBm(802.11n_HT20) -1.00 dBm(802.11n_HT40) -2.61 dBm(802.11ac_VHT80)
		Multiple Antenna	16.11 dBm(802.11a) 16.95 dBm(802.11n_HT20) 17.42 dBm(802.11n_HT40) 16.19 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	4.78 dBm(802.11a) 5.85 dBm(802.11n_HT20) 1.06 dBm(802.11n_HT40) -0.62 dBm(802.11ac_VHT80)

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ANTENNA TYPE	Chip Antenna		
ANTENNA GAIN	Bluetooth LE	-1.82 dBi	
	Bluetooth	-1.82 dBi	
	WLAN 2.4 GHz	Antenna 1	0.71 dBi
		Antenna 2	1.38 dBi
		Multiple Antenna	4.07 dBi
	5 150 MHz ~ 5 250 MHz Band	Antenna 1	1.39 dBi
		Antenna 2	1.43 dBi
		Multiple Antenna	4.42 dBi
	5 250 MHz ~ 5 350 MHz Band	Antenna 1	1.43 dBi
		Antenna 2	1.43 dBi
		Multiple Antenna	4.44 dBi
	5 470 MHz ~ 5 725 MHz Band	Antenna 1	1.40 dBi
		Antenna 2	1.43 dBi
		Multiple Antenna	4.43 dBi
	5 725 MHz ~ 5 850 MHz Band	Antenna 1	1.32 dBi
		Antenna 2	1.41 dBi
		Multiple Antenna	4.38 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.

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
WCD730M	Basic: MIC and Accelation sensor at the top side.	☑
	Option 1: This model is identical to the basic model except for the removal MIC.	☐
	Option 2: This model is identical to the basic model except for the removal MIC and Accelation sensor at the top side.	☐

Note: 1. Applicant consigns only basic model to test, therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

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	Samsung Electronics Co Ltd	HDWB-2470 V1.0	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
WCD730M	Samsung Electronics Co Ltd	Wi-Fi/BT Transceiver (EUT)	
Ideapad320	LENOVO	Notebook PC	EUT
ADL45WCE	CHICONY POWER TECHNOLOGY(SUZHOU) CO.,LTD.	AC Adapter	

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5.3 Mode of operation during the test

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

-. Frequency / Channel Operations

Channel	Frequency
1	2 412
2	2 417
3	2 422
4	2 427
5	2 432
6	2 437
7	2 442
8	2 447
9	2 452
10	2 457
11	2 462
12	2 467
13	2 472

-. Power Level Setting(Dec)

Operating Frequency / Modulation			Power Level Setting(Dec)	
			Ant 1	Ant 2
WLAN 2.4 GHz (2 412 MHz ~ 2 472 MHz)	802.11 b	2 412 MHz	17	14
		2 437 MHz	17	16
		2 462 MHz	17	16
		2 467 MHz	14	15
		2 472 MHz	12	11
	802.11 g	2 412 MHz	16	16
		2 437 MHz	16	16
		2 462 MHz	16	16
		2 467 MHz	12	12
		2 472 MHz	10	10
	802.11 n(HT20)	2 412 MHz	16	16
		2 437 MHz	16	16
		2 462 MHz	14	14
		2 467 MHz	11	11
		2 472 MHz	10	10

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-. Low Channel

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 1	Antenna 2
802.11 b	1 Mbps	17.64	17.08
	2 Mbps	17.58	16.94
	5.5 Mbps	17.54	16.91
	11 Mbps	16.56	16.95
802.11 g	6 Mbps	15.16	16.05
	9 Mbps	14.91	15.76
	12 Mbps	14.97	15.73
	18 Mbps	14.87	15.71
	24 Mbps	14.83	15.68
	36 Mbps	14.43	15.14
	48 Mbps	13.56	14.28
	54 Mbps	13.48	14.23
802.11 HT 20	6.5 Mbps	15.01	15.90
	13 Mbps	14.85	15.71
	19.5 Mbps	14.78	15.61
	26 Mbps	14.74	15.60
	39 Mbps	14.31	15.02
	52 Mbps	14.37	15.07
	58.5 Mbps	13.46	14.15
	65 Mbps	13.45	14.18

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

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

-. Middle Channel

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 1	Antenna 2
802.11 b	1 Mbps	17.18	20.59
	2 Mbps	17.09	20.49
	5.5 Mbps	16.98	20.48
	11 Mbps	17.01	20.46
802.11 g	6 Mbps	14.48	16.75
	9 Mbps	14.29	16.56
	12 Mbps	14.28	16.54
	18 Mbps	14.36	16.62
	24 Mbps	14.32	16.61
	36 Mbps	13.88	16.07
	48 Mbps	12.95	15.13
	54 Mbps	12.94	15.13
802.11 HT 20	6.5 Mbps	14.56	16.61
	13 Mbps	14.25	16.54
	19.5 Mbps	14.18	16.46
	26 Mbps	14.16	16.44
	39 Mbps	13.76	15.94
	52 Mbps	13.84	16.05
	58.5 Mbps	12.91	15.13
	65 Mbps	12.88	15.09

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

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

-. High 11 Channel

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 1	Antenna 2
802.11 b	1 Mbps	18.08	19.95
	2 Mbps	18.04	19.85
	5.5 Mbps	18.01	19.91
	11 Mbps	17.91	19.88
802.11 g	6 Mbps	15.61	15.62
	9 Mbps	15.49	15.52
	12 Mbps	15.41	15.45
	18 Mbps	15.35	15.41
	24 Mbps	15.43	15.47
	36 Mbps	14.90	14.78
	48 Mbps	13.94	13.83
	54 Mbps	13.94	13.85
802.11 HT 20	6.5 Mbps	13.51	13.74
	13 Mbps	13.41	13.62
	19.5 Mbps	13.31	13.52
	26 Mbps	13.35	13.58
	39 Mbps	12.85	12.89
	52 Mbps	12.87	12.94
	58.5 Mbps	12.08	12.01
	65 Mbps	12.07	11.98

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

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

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-. High 12 Channel

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 1	Antenna 2
802.11 b	1 Mbps	15.51	19.15
	2 Mbps	15.41	18.85
	5.5 Mbps	15.35	18.84
	11 Mbps	15.36	18.85
802.11 g	6 Mbps	12.12	11.99
	9 Mbps	11.95	11.77
	12 Mbps	11.87	11.7
	18 Mbps	11.79	11.62
	24 Mbps	11.73	11.56
	36 Mbps	11.26	10.92
	48 Mbps	10.19	9.96
	54 Mbps	10.15	9.94
802.11 HT 20	6.5 Mbps	10.75	10.66
	13 Mbps	10.61	10.62
	19.5 Mbps	10.56	10.58
	26 Mbps	10.49	10.48
	39 Mbps	10.06	9.85
	52 Mbps	10.01	9.8
	58.5 Mbps	9.06	8.88
	65 Mbps	9.05	8.86

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

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

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-. High 13 Channel

Modulation	DATA RATE	OUTPUT POWER[dBm]	
		Antenna 1	Antenna 2
802.11 b	1 Mbps	13.36	15.48
	2 Mbps	13.36	15.35
	5.5 Mbps	13.32	15.37
	11 Mbps	13.31	15.32
802.11 g	6 Mbps	10.09	9.71
	9 Mbps	9.74	9.57
	12 Mbps	9.68	9.51
	18 Mbps	9.65	9.46
	24 Mbps	9.71	9.5
	36 Mbps	9.18	8.83
	48 Mbps	8.21	7.9
	54 Mbps	8.12	7.79
802.11 HT 20	6.5 Mbps	9.7	9.53
	13 Mbps	9.55	9.38
	19.5 Mbps	9.5	9.37
	26 Mbps	9.58	9.41
	39 Mbps	9.04	8.71
	52 Mbps	8.97	8.64
	58.5 Mbps	8.04	7.75
	65 Mbps	7.98	7.68

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

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

-. Duty Cycle

Mode	Tx On Time [ms]	Tx Off Time [ms]	Duty Cycle [%]	Correction Factor [dB]
802.11 b_Antenna 1	-	-	100.00	-
802.11 g _Antenna 1	-	-	100.00	-
802.11 HT 20_Antenna 1	-	-	100.00	-
802.11 HT 40_ Antenna 1	-	-	100.00	-
802.11 b_Antenna 2	-	-	100.00	-
802.11 g _Antenna 2	-	-	100.00	-
802.11 HT 20_Antenna 2	-	-	100.00	-
802.11 HT 40_ Antenna 2	-	-	100.00	-

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

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

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 Chip Antenna on the main board in the EUT, so no consideration of replacement by the user.

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Output Power	0.68
Conducted Spurious Emission < 26.5 GHz	1.60
Power Spectral Density	1.55
Line Conducted Disturbance (150 kHz ~ 30 MHz)	2.00
Radiated Disturbance (9 kHz ~ 30 MHz)	4.09
Radiated Disturbance (30 MHz ~ 1 GHz)	3.98
Radiated Disturbance (1 GHz ~ 18 GHz)	5.56
Radiated Disturbance (18 GHz ~ 40 GHz)	5.65

7. PRELIMINARY TEST

7.1 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

7.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

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

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8. MIMIMUM 6 dB BANDWIDTH

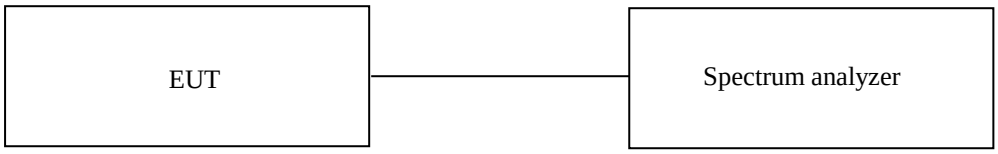
8.1 Operating environment

Temperature : 22 °C

Relative humidity : 41 % 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

October 04, 2023 ~ October 20, 2023

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8.4 Test data for 802.11b WLAN Mode

8.4.1 Test data for Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	9.09	0.50	8.59
Middle	2 437.00	8.14	0.50	7.64
High 11	2 462.00	9.04	0.50	8.54
High 12	2 467.00	9.04	0.50	8.54
High 13	2 472.00	8.09	0.50	7.59

Remark. Margin = Measured Value - Limit

8.4.2 Test data for Antenna 2

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	9.09	0.50	8.59
Middle	2 437.00	9.09	0.50	8.59
High 11	2 462.00	9.04	0.50	8.54
High 12	2 467.00	9.04	0.50	8.54
High 13	2 472.00	9.04	0.50	8.54

Remark. Margin = Measured Value - Limit

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8.5 Test data for 802.11g WLAN Mode

8.5.1 Test data for Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.08	0.50	15.58
Middle	2 437.00	16.33	0.50	15.83
High 11	2 462.00	16.33	0.50	15.83
High 12	2 467.00	16.33	0.50	15.83
High 13	2 472.00	16.28	0.50	15.78

Remark. Margin = Measured Value - Limit

8.5.2 Test data for Antenna 2

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.28	0.50	15.78
Middle	2 437.00	16.28	0.50	15.78
High 11	2 462.00	16.28	0.50	15.78
High 12	2 467.00	16.28	0.50	15.78
High 13	2 472.00	16.33	0.50	15.83

Remark. Margin = Measured Value – Limit

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8.6 Test data for 802.11n_HT20 WLAN Mode

8.6.1 Test data for Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	17.58	0.50	17.08
Middle	2 437.00	17.58	0.50	17.08
High 11	2 462.00	17.28	0.50	16.78
High 12	2 467.00	17.53	0.50	17.03
High 13	2 472.00	17.53	0.50	17.03

Remark. Margin = Measured Value - Limit

8.6.2 Test data for Antenna 2

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.93	0.50	16.43
Middle	2 437.00	16.93	0.50	16.43
High 11	2 462.00	16.33	0.50	15.83
High 12	2 467.00	17.53	0.50	17.03
High 13	2 472.00	16.28	0.50	15.78

Remark. Margin = Measured Value - Limit

9. MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

9.1 Operating environment

Temperature : 22 °C

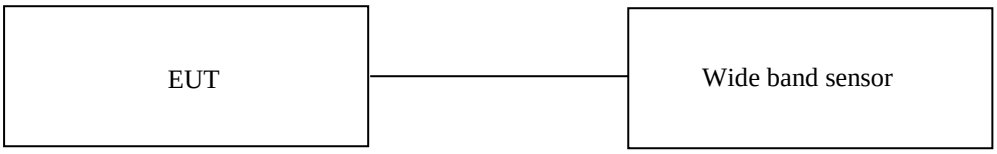
Relative humidity : 41 % R.H.

9.2 Test set-up

The maximum peak output power was measured with the wide band sensor connected to the antenna output of the EUT.

The Wide Band Sensor is measured when the EUT is transmitting at the appropriate center frequency its maximum power control level as described in Section 8.3(558074 D01 15.247 Meas Guidance v05r02).

Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.



9.3 Test Date

October 04, 2023 ~ October 20, 2023

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9.4 Test data for 802.11b WLAN Mode

9.4.1 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	17.64	30.00	12.36
MIDDLE	2 437.00	17.18	30.00	12.82
HIGH 11	2 462.00	18.08	30.00	11.92
HIGH 12	2 467.00	15.51	30.00	14.49
HIGH 13	2 472.00	13.36	30.00	16.64

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

9.4.2 Test data for Antenna 2

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	17.08	30.00	12.92
MIDDLE	2 442.00	20.59	30.00	9.41
HIGH 11	2 462.00	19.95	30.00	10.05
HIGH 12	2 467.00	19.15	30.00	10.85
HIGH 13	2 472.00	15.48	30.00	14.52

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

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9.5 Test data for 802.11g WLAN Mode

9.5.1 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	15.16	30.00	14.84
MIDDLE	2 442.00	14.48	30.00	15.52
HIGH 11	2 462.00	15.61	30.00	14.39
HIGH 12	2 467.00	12.12	30.00	17.88
HIGH 13	2 472.00	10.09	30.00	19.91

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

9.5.2 Test data for Antenna 2

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	16.05	30.00	13.95
MIDDLE	2 442.00	16.75	30.00	13.25
HIGH 11	2 462.00	15.62	30.00	14.38
HIGH 12	2 467.00	11.99	30.00	18.01
HIGH 13	2 472.00	9.71	30.00	20.29

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

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9.5.3 Test data for Multiple Transmit

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	18.64	30.00	11.36
MIDDLE	2 437.00	18.77	30.00	11.23
HIGH 11	2 462.00	18.63	30.00	11.37
HIGH 12	2 467.00	15.07	30.00	14.93
HIGH 13	2 472.00	12.91	30.00	17.09

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

Remark 2 : Calculated Output Power= 10log (10(Antenna0 Output Power/10)+10(Antenna1 Output Power/10))

9.6 Test data for 802.11n_HT20 WLAN Mode

9.6.1 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	15.01	30.00	14.99
MIDDLE	2 442.00	14.56	30.00	15.44
HIGH 11	2 462.00	13.51	30.00	16.49
HIGH 12	2 467.00	10.75	30.00	19.25
HIGH 13	2 472.00	9.70	30.00	20.30

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

9.6.2 Test data for Antenna 2

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	15.90	30.00	14.10
MIDDLE	2 437.00	16.61	30.00	13.39
HIGH 11	2 462.00	13.74	30.00	16.26
HIGH 12	2 467.00	10.66	30.00	19.34
HIGH 13	2 472.00	9.53	30.00	20.47

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

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9.6.3 Test data for Multiple Transmit

-. Test Result : Pass

-. Duty Cycle : > 98 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	18.49	30.00	11.51
MIDDLE	2 437.00	18.72	30.00	11.28
HIGH 11	2 462.00	16.64	30.00	13.36
HIGH 12	2 467.00	13.72	30.00	16.28
HIGH 13	2 472.00	12.63	30.00	17.37

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

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

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10. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

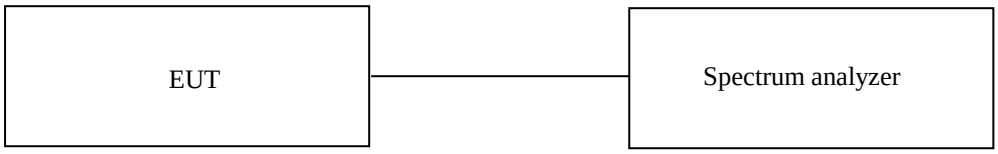
10.1 Operating environment

Temperature : 22 °C

Relative humidity : 41 % R.H.

10.2 Test set-up for conducted measurement

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



10.3 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.

10.4 Test Date

October 04, 2023 ~ October 20, 2023

10.5 Test data

For Test data for Annex. Section

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10.6 Test data for radiated emission

10.6.1 Radiated Emission which fall in the Restricted Band

10.6.1.1 Test data for 802.11b WLAN Mode

10.6.1.1.1 Test data for Antenna 1

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

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

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel											
2 322.48	52.73	Peak	H	27.77	6.73	42.57	10.44	-	55.10	74.00	18.90
2 378.53	41.00	Average	H	27.54	6.96	42.55	10.42	-	43.37	54.00	10.63
2 380.77	52.55	Peak	V	27.54	6.96	42.55	10.42	-	54.92	74.00	19.08
2 376.69	40.81	Average	V	27.55	6.96	42.55	10.42	-	43.19	54.00	10.81
Test Data for High 11 Channel											
2 498.35	52.94	Peak	H	27.50	6.99	42.50	10.44	-	55.37	74.00	18.63
2 484.49	41.66	Average	H	27.53	6.98	42.51	10.45	-	44.11	54.00	9.89
2 484.83	52.81	Peak	V	27.53	6.98	42.51	10.45	-	55.26	74.00	18.74
2 485.06	41.11	Average	V	27.53	6.98	42.51	10.45	-	43.56	54.00	10.44
Test Data for High 12 Channel											
2 483.86	56.00	Peak	H	27.53	6.98	42.51	10.45	-	58.45	74.00	15.55
2 483.50	47.12	Average	H	27.53	6.98	42.51	10.45	-	49.57	54.00	4.43
2 495.43	53.02	Peak	V	27.51	6.99	42.50	10.44	-	55.46	74.00	18.54
2 483.60	42.15	Average	V	27.53	6.98	42.51	10.45	-	44.60	54.00	9.40

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Test Data for High 13 Channel											
2 484.04	57.07	Peak	H	27.53	6.98	42.51	10.45	-	59.52	74.00	14.48
2 487.18	49.33	Average	H	27.53	7.07	42.51	10.44	-	51.86	54.00	2.14
2 484.43	53.31	Peak	V	27.53	6.98	42.51	10.45	-	55.76	74.00	18.24
2 487.20	43.14	Average	V	27.53	7.07	42.51	10.44	-	45.67	54.00	8.33

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 – AMP Gain + ATT + Duty Factor

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10.6.1.1.2 Test data for Antenna 2

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

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

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 387.19	53.72	Peak	H	27.53	7.04	42.55	10.43	-	56.17	74.00	17.83
2 385.15	42.09	Average	H	27.53	7.04	42.55	10.43	-	44.54	54.00	9.46
2 321.97	53.25	Peak	V	27.77	6.73	42.57	10.44	-	55.62	74.00	18.38
2 386.88	41.19	Average	V	27.53	7.04	42.55	10.43	-	43.64	54.00	10.36
Test Data for High 11 Channel											
2 489.81	54.41	Peak	H	27.52	7.07	42.50	10.44	-	56.94	74.00	17.06
2 487.91	43.34	Average	H	27.52	7.07	42.50	10.44	-	45.87	54.00	8.13
2 488.44	53.19	Peak	V	27.52	7.07	42.50	10.44	-	55.72	74.00	18.28
2 483.73	42.21	Average	V	27.53	6.98	42.51	10.45	-	44.66	54.00	9.34
Test Data for High 12 Channel											
2 483.73	56.02	Peak	H	27.53	6.98	42.51	10.45	-	58.47	74.00	15.53
2 483.50	48.17	Average	H	27.53	6.98	42.51	10.45	-	50.62	54.00	3.38
2 486.17	53.70	Peak	V	27.53	6.98	42.51	10.45	-	56.15	74.00	17.85
2 486.60	43.35	Average	V	27.53	6.98	42.51	10.45	-	45.80	54.00	8.20
Test Data for High 13 Channel											
2 484.13	56.42	Peak	H	27.53	6.98	42.51	10.45	-	58.87	74.00	15.13
2 484.35	49.00	Average	H	27.53	6.98	42.51	10.45	-	51.45	54.00	2.55
2 486.39	53.39	Peak	V	27.53	6.98	42.51	10.45	-	55.84	74.00	18.16
2 483.99	44.12	Average	V	27.53	6.98	42.51	10.45	-	46.57	54.00	7.43

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 – AMP Gain + ATT + Duty Factor

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10.6.1.2 Test data for 802.11g WLAN Mode

10.6.1.2.1 Test data for Multiple Transmit

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

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

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel											
2 390.04	61.99	Peak	H	27.52	7.04	42.54	10.43	-	64.44	74.00	9.56
2 390.04	47.35	Average	H	27.52	7.04	42.54	10.43	-	49.80	54.00	4.20
2 387.60	54.51	Peak	V	27.52	7.04	42.54	10.43	-	56.96	74.00	17.04
2 389.12	41.39	Average	V	27.52	7.04	42.54	10.43	-	43.84	54.00	10.16
Test Data for High 11 Channel											
2 483.81	66.81	Peak	H	27.53	6.98	42.51	10.45	-	69.26	74.00	4.74
2 483.96	45.24	Average	H	27.53	6.98	42.51	10.45	-	47.69	54.00	6.31
2 483.51	62.60	Peak	V	27.53	6.98	42.51	10.45	-	65.05	74.00	8.95
2 483.51	44.50	Average	V	27.53	6.98	42.51	10.45	-	46.95	54.00	7.05
Test Data for High 12 Channel											
2 483.57	64.55	Peak	H	27.53	6.98	42.51	10.45	-	67.00	74.00	7.00
2 483.50	48.47	Average	H	27.53	6.98	42.51	10.45	-	50.92	54.00	3.08
2 483.53	58.02	Peak	V	27.53	6.98	42.51	10.45	-	60.47	74.00	13.53
2 484.65	43.21	Average	V	27.53	6.98	42.51	10.45	-	45.66	54.00	8.34
Test Data for High 13 Channel											
2 484.74	65.10	Peak	H	27.53	6.98	42.51	10.45	-	67.55	74.00	6.45
2 483.96	47.93	Average	H	27.53	6.98	42.51	10.45	-	50.38	54.00	3.62
2 483.65	64.08	Peak	V	27.53	6.98	42.51	10.45	-	66.53	74.00	7.47
2 484.32	46.22	Average	V	27.53	6.98	42.51	10.45	-	48.67	54.00	5.33

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 – AMP Gain + ATT + Duty Factor

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10.6.1.3 Test data for 802.11n_HT20 WLAN Mode

10.6.1.3.1 Test data for Multiple Transmit

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

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

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel											
2 390.04	64.26	Peak	H	27.52	7.04	42.54	10.43	-	66.71	74.00	7.29
2 390.04	48.37	Average	H	27.52	7.04	42.54	10.43	-	50.82	54.00	3.18
2 389.84	58.14	Peak	V	27.52	7.04	42.54	10.43	-	60.59	74.00	13.41
2 389.43	42.66	Average	V	27.52	7.04	42.54	10.43	-	45.11	54.00	8.89
Test Data for High 11 Channel											
2 483.62	64.04	Peak	H	27.53	6.98	42.51	10.45	-	66.49	74.00	15.97
2 483.66	49.84	Average	H	27.53	6.98	42.51	10.45	-	52.29	54.00	3.05
2 483.51	59.59	Peak	V	27.53	6.98	42.51	10.45	-	62.04	74.00	15.88
2 483.73	42.80	Average	V	27.53	6.98	42.51	10.45	-	45.25	54.00	3.34
Test Data for High 12 Channel											
2 483.70	63.84	Peak	H	27.53	6.98	42.51	10.45	-	66.29	74.00	15.97
2 483.53	47.14	Average	H	27.53	6.98	42.51	10.45	-	49.59	54.00	3.05
2 483.67	59.46	Peak	V	27.53	6.98	42.51	10.45	-	61.91	74.00	15.88
2 483.96	43.76	Average	V	27.53	6.98	42.51	10.45	-	46.21	54.00	3.34
Test Data for High 13 Channel											
2 484.43	66.30	Peak	H	27.53	6.98	42.51	10.45	-	68.75	74.00	15.97
2 483.51	49.18	Average	H	27.53	6.98	42.51	10.45	-	51.63	54.00	3.05
2 484.27	65.97	Peak	V	27.53	6.98	42.51	10.45	-	68.42	74.00	15.88
2 483.51	45.44	Average	V	27.53	6.98	42.51	10.45	-	47.89	54.00	3.34

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 – AMP Gain + ATT + Duty Factor

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10.6.2 Spurious & Harmonic Radiated Emission

10.6.2.1 Test data for 802.11b WLAN Mode

10.6.2.1.1 Test data for Antenna 1

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 823.93	50.62	Peak	H	31.25	10.40	41.84	-	50.43	74.00	23.57
4 823.97	44.30	Average	H	31.25	10.40	41.84	-	44.11	54.00	9.89
4 824.35	48.72	Peak	V	31.25	10.40	41.84	-	48.53	74.00	25.47
4 823.97	39.63	Average	V	31.25	10.40	41.84	-	39.44	54.00	14.56
Test Data for Middle Channel										
4 873.97	50.81	Peak	H	31.30	10.45	41.83	-	50.73	74.00	23.27
4 873.96	43.71	Average	H	31.30	10.45	41.83	-	43.63	54.00	10.37
4 873.71	49.94	Peak	V	31.30	10.45	41.83	-	49.86	74.00	24.14
4 874.00	43.05	Average	V	31.30	10.45	41.83	-	42.97	54.00	11.03
Test Data for High 11 Channel										
4 924.02	50.71	Peak	H	31.25	10.31	41.82	-	50.45	74.00	23.55
4 924.02	44.44	Average	H	31.25	10.31	41.82	-	44.18	54.00	9.82
4 923.94	50.78	Peak	V	31.25	10.31	41.82	-	50.52	74.00	23.48
4 923.96	42.52	Average	V	31.25	10.31	41.82	-	42.26	54.00	11.74
Test Data for High 12 Channel										
4 933.76	47.64	Peak	H	31.23	10.41	41.81	-	47.47	74.00	26.53
4 933.94	39.19	Average	H	31.23	10.41	41.81	-	39.02	54.00	14.98
4 933.64	48.59	Peak	V	31.23	10.41	41.81	-	48.42	74.00	25.58
4 933.91	36.19	Average	V	31.23	10.41	41.81	-	36.02	54.00	17.98

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Test Data for High 13 Channel										
4 946.37	47.18	Peak	H	31.21	10.41	41.81	-	46.99	74.00	27.01
4 943.92	36.16	Average	H	31.21	10.41	41.81	-	35.97	54.00	18.03
4 944.28	47.08	Peak	V	31.21	10.41	41.81	-	46.89	74.00	27.11
4 943.98	35.30	Average	V	31.21	10.41	41.81	-	35.11	54.00	18.89

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

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

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.1.2 Test data for Antenna 2

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 823.87	56.20	Peak	H	31.25	10.40	41.84	-	56.01	74.00	17.99
4 824.02	51.95	Average	H	31.25	10.40	41.84	-	51.76	54.00	2.24
4 824.01	51.59	Peak	V	31.25	10.40	41.84	-	51.40	74.00	22.60
4 824.09	44.14	Average	V	31.25	10.40	41.84	-	43.95	54.00	10.05
Test Data for Middle Channel										
4 874.04	55.70	Peak	H	31.30	10.45	41.83	-	55.62	74.00	18.38
4 873.99	51.31	Average	H	31.30	10.45	41.83	-	51.23	54.00	2.77
4 874.21	52.71	Peak	V	31.30	10.45	41.83	-	52.63	74.00	21.37
4 873.98	46.89	Average	V	31.30	10.45	41.83	-	46.81	54.00	7.19
Test Data for High 11 Channel										
4 924.07	52.71	Peak	H	31.25	10.31	41.82	-	52.45	74.00	21.55
4 924.01	46.96	Average	H	31.25	10.31	41.82	-	46.70	54.00	7.30
4 923.99	52.11	Peak	V	31.25	10.31	41.82	-	51.85	74.00	22.15
4 923.90	44.51	Average	V	31.25	10.31	41.82	-	44.25	54.00	9.75
Test Data for High 12 Channel										
4 933.58	51.28	Peak	H	31.23	10.41	41.81	-	51.11	74.00	22.89
4 933.96	43.52	Average	H	31.23	10.41	41.81	-	43.35	54.00	10.65
4 934.17	51.22	Peak	V	31.23	10.41	41.81	-	51.05	74.00	22.95
4 933.95	44.11	Average	V	31.23	10.41	41.81	-	43.94	54.00	10.06

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Test Data for High 13 Channel										
4 944.29	49.70	Peak	H	31.21	10.41	41.81	-	49.51	74.00	24.49
4 944.01	40.59	Average	H	31.21	10.41	41.81	-	40.40	54.00	13.60
4 944.30	49.30	Peak	V	31.21	10.41	41.81	-	49.11	74.00	24.89
4 944.08	37.75	Average	V	31.21	10.41	41.81	-	37.56	54.00	16.44

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

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

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.2 Test data for 802.11g WLAN Mode

10.6.2.2.1 Test data for Multiple Transmit

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel										
4 821.71	57.30	Peak	H	31.24	10.40	41.84	-	57.10	74.00	16.90
4 821.60	44.84	Average	H	31.24	10.40	41.84	-	44.64	54.00	9.36
4 825.24	51.89	Peak	V	31.25	10.45	41.83	-	51.76	74.00	22.24
4 826.24	39.49	Average	V	31.25	10.45	41.83	-	39.36	54.00	14.64
Test Data for Middle Channel										
4 876.50	54.30	Peak	H	31.30	10.31	41.82	-	54.09	74.00	19.91
4 871.61	42.36	Average	H	31.30	10.45	41.83	-	42.28	54.00	11.72
4 876.36	51.93	Peak	V	31.30	10.31	41.82	-	51.72	74.00	22.28
4 875.89	39.65	Average	V	31.30	10.31	41.82	-	39.44	54.00	14.56
Test Data for High 11 Channel										
4 925.74	52.85	Peak	H	31.25	10.41	41.81	-	52.70	74.00	21.30
4 925.84	40.06	Average	H	31.25	10.41	41.81	-	39.91	54.00	14.09
4 925.35	50.12	Peak	V	31.25	10.41	41.81	-	49.97	74.00	24.03
4 921.72	37.91	Average	V	31.26	10.31	41.82	-	37.66	54.00	16.34
Test Data for High 12 Channel										
4 936.32	49.08	Peak	H	31.23	10.41	41.81	-	48.91	74.00	25.09
4 934.61	37.27	Average	H	31.23	10.41	41.81	-	37.10	54.00	16.90
4 936.39	49.24	Peak	V	31.23	10.41	41.81	-	49.07	74.00	24.93
4 932.36	36.88	Average	V	31.24	10.41	41.81	-	36.72	54.00	17.28

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Test Data for High 13 Channel										
4 945.85	49.13	Peak	H	31.21	10.41	41.81	-	48.94	74.00	25.06
4 942.17	37.14	Average	H	31.22	10.41	41.81	-	36.96	54.00	17.04
4 944.42	49.18	Peak	V	31.21	10.41	41.81	-	48.99	74.00	25.01
4 945.99	37.04	Average	V	31.21	10.41	41.81	-	36.85	54.00	17.15

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

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

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.3 Test data for 802.11n_HT20 WLAN Mode

10.6.2.3.1 Test data for Multiple Transmit

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Duty Cycle : > 98 %

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel										
4 823.78	56.43	Peak	H	31.25	10.40	41.84	-	56.24	74.00	17.76
4 824.52	43.34	Average	H	31.25	10.40	41.84	-	43.15	54.00	10.85
4 821.92	53.58	Peak	V	31.24	10.40	41.84	-	53.38	74.00	20.62
4 823.47	40.47	Average	V	31.25	10.40	41.84	-	40.28	54.00	13.72
Test Data for Middle Channel										
4 873.85	55.06	Peak	H	31.30	10.45	41.83	-	54.98	74.00	19.02
4 873.98	42.32	Average	H	31.30	10.45	41.83	-	42.24	54.00	11.76
4 876.26	50.80	Peak	V	31.30	10.31	41.82	-	50.59	74.00	23.41
4 872.06	38.26	Average	V	31.30	10.45	41.83	-	38.18	54.00	15.82
Test Data for High 11 Channel										
4 924.10	49.62	Peak	H	31.25	10.31	41.82	-	49.36	74.00	24.64
4 926.40	37.85	Average	H	31.25	10.41	41.81	-	37.70	54.00	16.30
4 925.69	49.57	Peak	V	31.25	10.41	41.81	-	49.42	74.00	24.58
4 925.88	37.55	Average	V	31.25	10.41	41.81	-	37.40	54.00	16.60
Test Data for High 12 Channel										
4 933.95	48.19	Peak	H	31.23	10.41	41.81	-	48.02	74.00	25.98
4 934.14	36.54	Average	H	31.23	10.41	41.81	-	36.37	54.00	17.63
4 933.57	50.07	Peak	V	31.23	10.41	41.81	-	49.90	74.00	24.10
4 932.99	37.99	Average	V	31.23	10.41	41.81	-	37.82	54.00	16.18

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Test Data for High 13 Channel										
4 942.53	48.04	Peak	H	31.21	10.41	41.81	-	47.85	74.00	26.15
4 945.62	36.01	Average	H	31.21	10.41	41.81	-	35.82	54.00	18.18
4 942.85	50.38	Peak	V	31.21	10.41	41.81	-	50.19	74.00	23.81
4 942.00	38.32	Average	V	31.22	10.41	41.81	-	38.14	54.00	15.86

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

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

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

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11. PEAK POWER SPECTRUL DENSITY

11.1 Operating environment

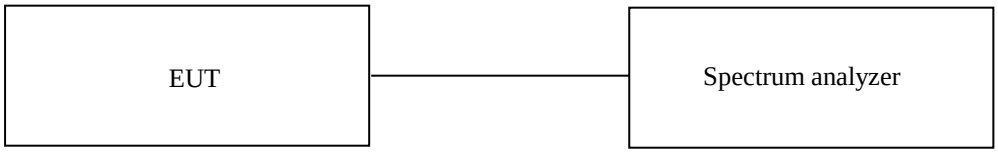
Temperature : 22 °C

Relative humidity : 41 % R.H.

11.2 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.



11.3 Test Date

October 04, 2023 ~ October 20, 2023

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11.4 Test data for 802.11b WLAN Mode

11.4.1 Test data for Antenna 1

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-16.85	8.00	24.85
Middle	2 437.00	-16.88	8.00	24.88
High 11	2 462.00	-16.21	8.00	24.21
High 12	2 467.00	-18.98	8.00	26.98
High 13	2 472.00	-21.20	8.00	29.20

Remark. Margin = Limit – Measured value

11.4.2 Test data for Antenna 2

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-17.23	8.00	25.23
Middle	2 437.00	-14.32	8.00	22.32
High 11	2 462.00	-14.47	8.00	22.47
High 12	2 467.00	-15.43	8.00	23.43
High 13	2 472.00	-19.10	8.00	27.10

Remark. Margin = Limit – Measured value

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11.5 Test data for 802.11g WLAN Mode

11.5.1 Test data for Antenna 1

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-21.40	8.00	29.40
Middle	2 437.00	-21.70	8.00	29.70
High 11	2 462.00	-20.65	8.00	28.65
High 12	2 467.00	-24.47	8.00	32.47
High 13	2 472.00	-26.80	8.00	34.80

Remark. Margin = Limit – Measured value

11.5.2 Test data for Antenna 2

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-20.62	8.00	28.62
Middle	2 437.00	-20.00	8.00	28.00
High 11	2 462.00	-21.02	8.00	29.02
High 12	2 467.00	-25.03	8.00	33.03
High 13	2 472.00	-26.98	8.00	34.98

Remark. Margin = Limit – Measured value

11.5.3 Test data for Multiple Transmit

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-17.98	8.00	25.98
Middle	2 437.00	-17.76	8.00	25.76
High 11	2 462.00	-17.82	8.00	25.82
High 12	2 467.00	-21.73	8.00	29.73
High 13	2 472.00	-23.88	8.00	31.88

Remark 1 : Margin = Limit – Measured value

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

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11.6 Test data for 802.11n_HT20 WLAN Mode

11.6.1 Test data for Antenna 1

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-21.74	8.00	29.74
Middle	2 437.00	-21.93	8.00	29.93
High 11	2 462.00	-23.13	8.00	31.13
High 12	2 467.00	-26.13	8.00	34.13
High 13	2 472.00	-27.14	8.00	35.14

Remark. Margin = Limit – Measured value

11.6.2 Test data for Antenna 2

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-21.26	8.00	29.26
Middle	2 437.00	-20.41	8.00	28.41
High 11	2 462.00	-23.24	8.00	31.24
High 12	2 467.00	-26.31	8.00	34.31
High 13	2 472.00	-27.41	8.00	35.41

Remark. Margin = Limit – Measured value

11.6.3 Test data for Multiple Transmit

-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-18.48	8.00	26.48
Middle	2 437.00	-18.09	8.00	26.09
High 11	2 462.00	-20.17	8.00	28.17
High 12	2 467.00	-23.21	8.00	31.21
High 13	2 472.00	-24.26	8.00	32.26

Remark 1 : Margin = Limit – Measured value

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

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12. RADIATED EMISSION TEST

12.1 Operating environment

Temperature : 22 °C

Relative humidity : 41 % R.H.

12.2 Test set-up

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

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

12.3 Test Date

October 04, 2023 ~ October 20, 2023

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 30 MHz ~ 1 000 MHz

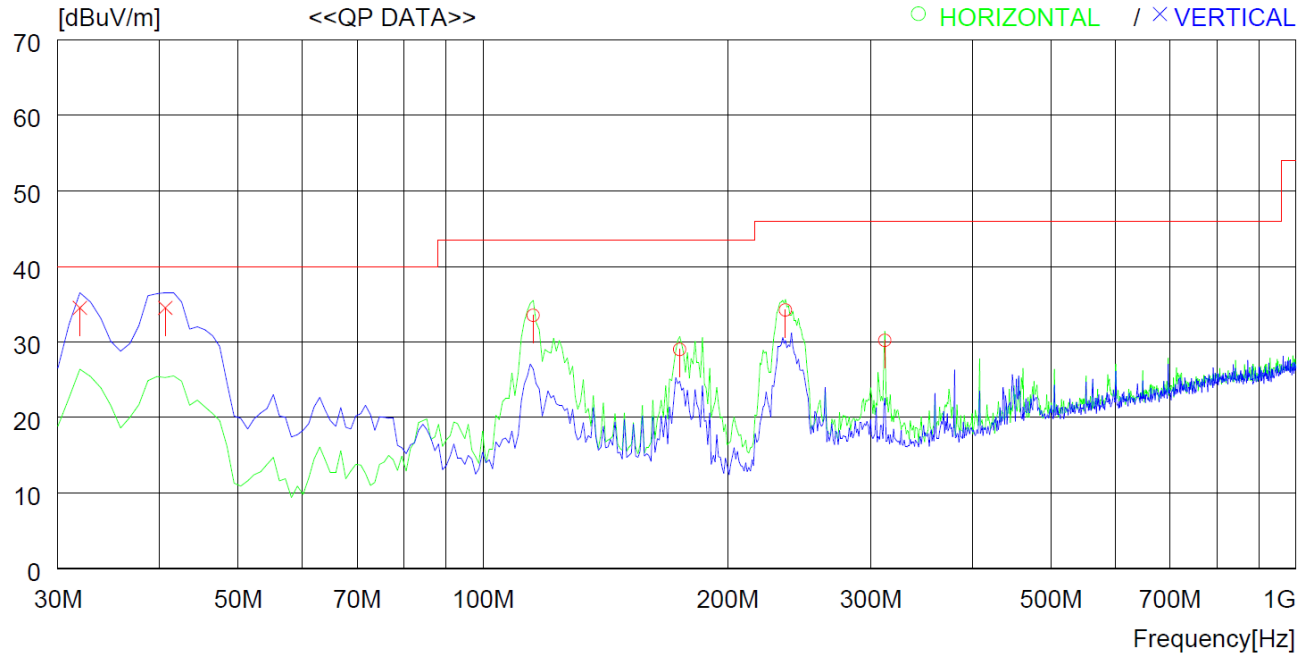
12.4.1 Test data for WLAN 2.4 GHz

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

Result : PASSED

EUT : Wi-Fi/BT Transceiver

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	115.360	46.1	17.8	1.6	32.0	33.5	43.5	10.0	300	359
2	174.530	42.3	16.8	1.9	32.0	29.0	43.5	14.5	200	263
3	235.640	46.9	17.0	2.3	32.0	34.2	46.0	11.8	200	0
4	312.270	40.1	19.4	2.7	32.0	30.2	46.0	15.8	100	359
----- Vertical ------										
5	31.940	45.3	20.6	0.9	32.3	34.5	40.0	5.5	300	0
6	40.670	49.0	16.7	0.9	32.1	34.5	40.0	5.5	300	148

-. Antenna 1, Antenna 2 and Multiple transmit tested, but the worst data were recorded.

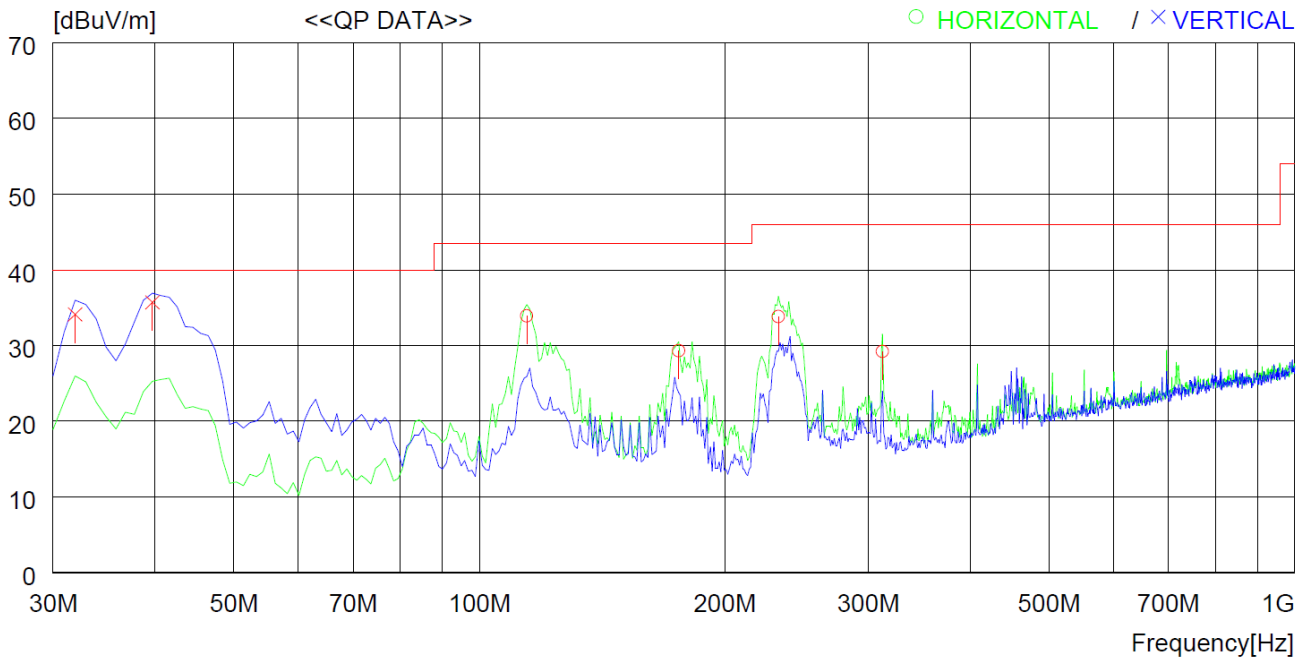
12.4.2 Test data for Intermodulation Mode(Bluetooth LE + WLAN 2.4 GHz + WLAN 5 GHz)

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

Result : PASSED

EUT : Wi-Fi/BT Transceiver

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	114.390	46.6	17.7	1.6	32.0	33.9	43.5	9.6	300	0
2	175.500	42.5	16.8	2.0	32.0	29.3	43.5	14.2	200	263
3	232.730	46.7	16.8	2.3	32.0	33.8	46.0	12.2	200	359
4	312.270	39.1	19.4	2.7	32.0	29.2	46.0	16.8	100	0
----- Vertical ------										
5	31.940	44.9	20.6	0.9	32.3	34.1	40.0	5.9	300	152
6	39.700	49.8	17.1	0.9	32.1	35.7	40.0	4.3	300	112

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

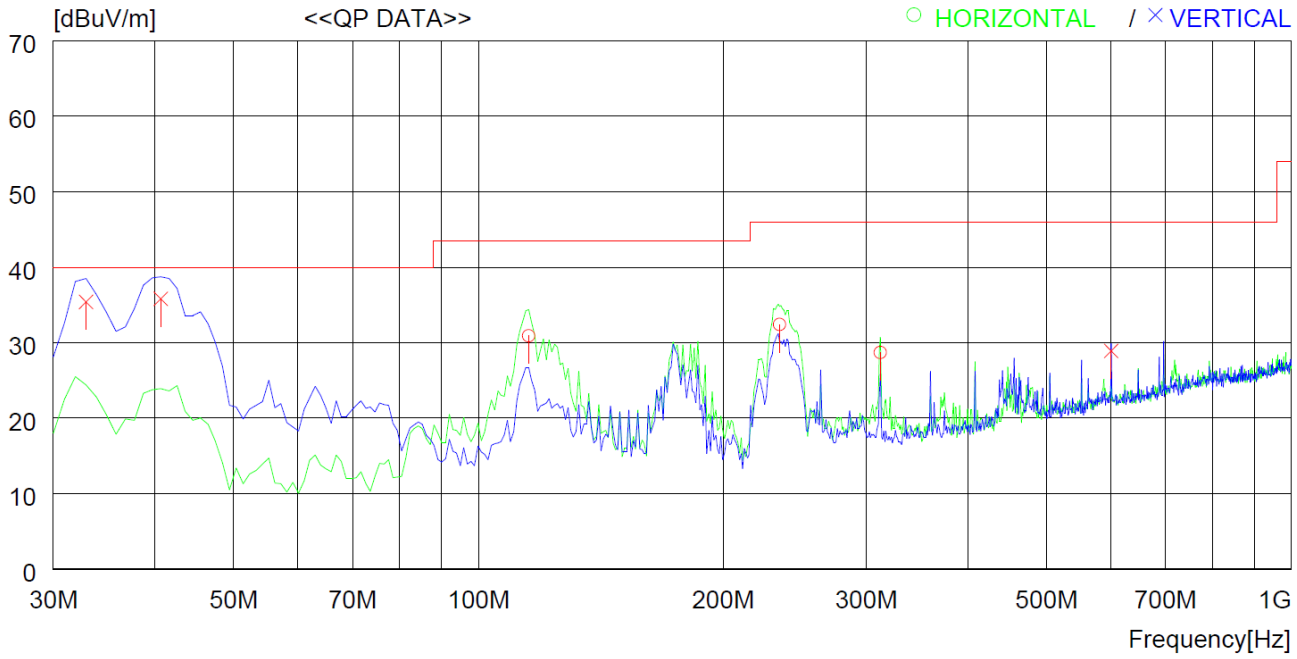
12.4.3 Test data for Intermodulation Mode(Bluetooth + WLAN 2.4 GHz + WLAN 5 GHz)

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

Result : PASSED

EUT : Wi-Fi/BT Transceiver

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	115.360	43.5	17.8	1.6	32.0	30.9	43.5	12.6	300	102
2	234.670	45.2	16.9	2.3	32.0	32.4	46.0	13.6	200	116
3	312.270	38.6	19.4	2.7	32.0	28.7	46.0	17.3	100	0
----- Vertical ------										
4	32.910	46.5	20.2	0.9	32.2	35.4	40.0	4.6	200	359
5	40.670	50.3	16.7	0.9	32.1	35.8	40.0	4.2	200	359
6	600.358	33.2	24.1	3.8	32.2	28.9	46.0	17.1	200	359

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 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.									

12.6 Test data for above 1 GHz

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

1 MHz and RMS Detector for Average Mode

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Operating mode : Transmitting mode

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

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

13. CONDUCTED EMISSION TEST

13.1 Operating environment

Temperature : 22 °C

Relative humidity : 41 % R.H.

13.2 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.

13.3 Test Date

October 04, 2023 ~ October 20, 2023

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

13.4 Test data

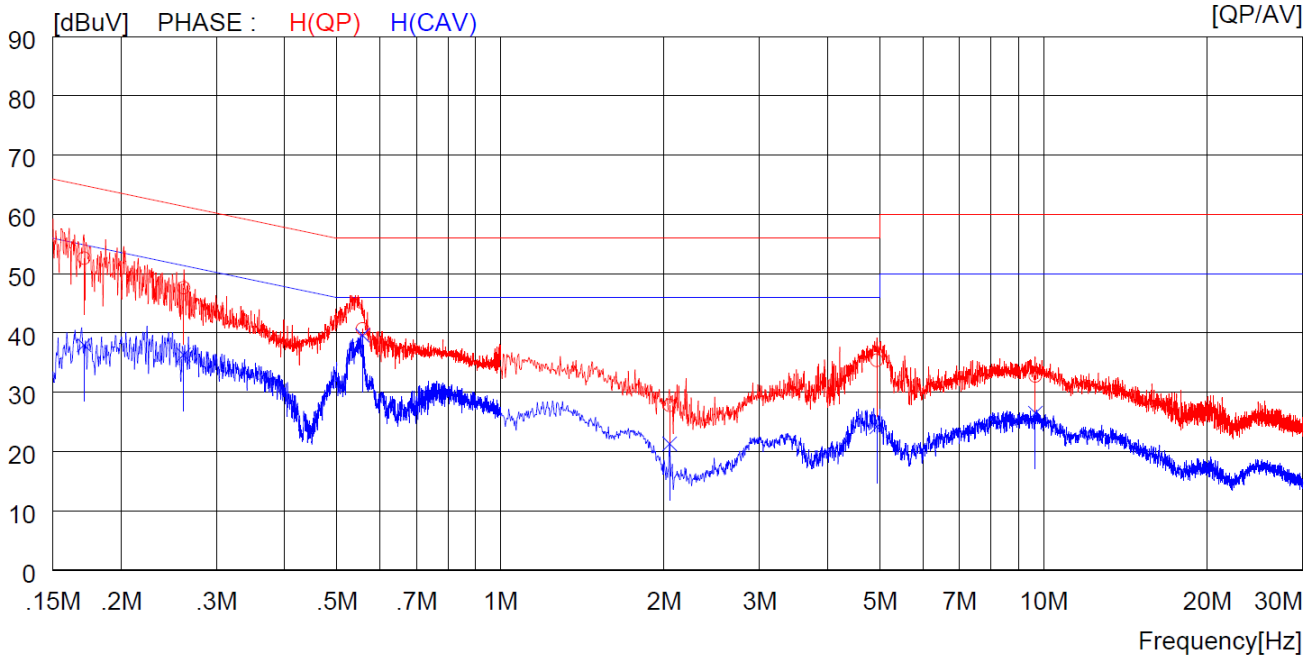
13.4.1 Test data for WLAN 2.4 GHz

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Antenna 1, Antenna 2 and Multiple transmit tested, but the worst data were recorded

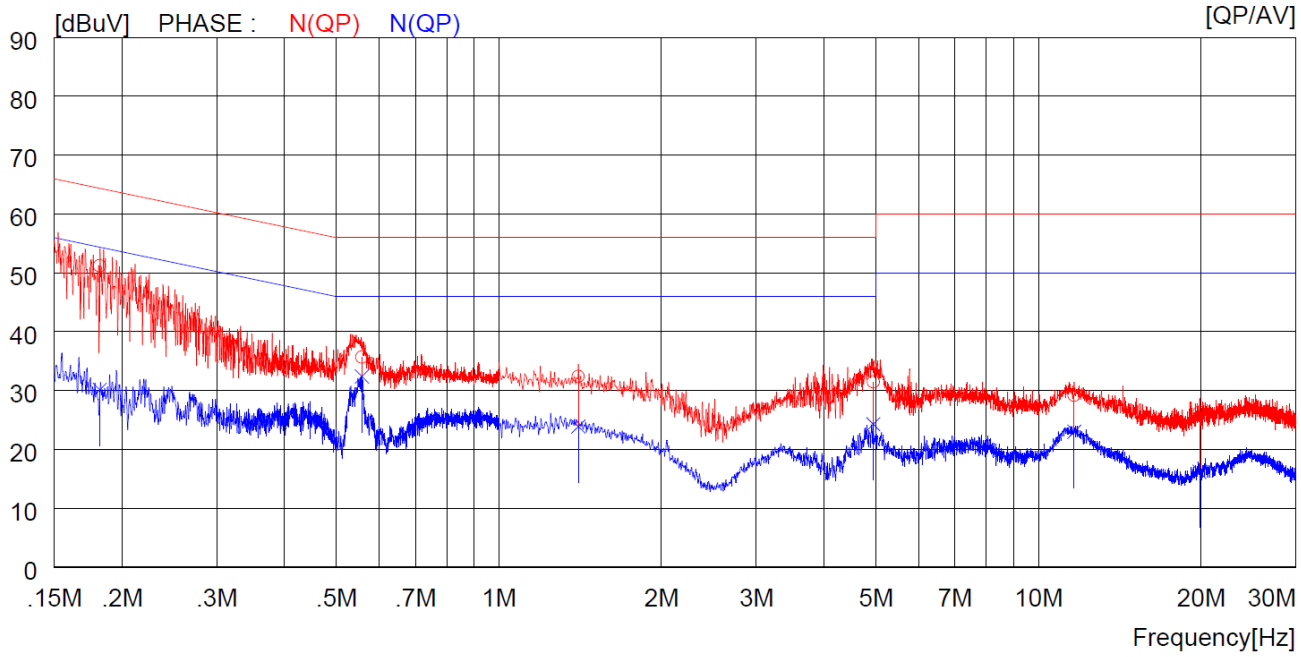
.-. Tested Line : HOT LINE



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	0.17100	42.5	----	10.1	52.6	----	64.9	----	12.3	----	H(QP)
2	0.26100	37.5	----	10.1	47.6	----	61.4	----	13.8	----	H(QP)
3	0.55700	30.6	----	10.1	40.7	----	56.0	----	15.3	----	H(QP)
4	2.04800	17.5	----	10.3	27.8	----	56.0	----	28.2	----	H(QP)
5	4.92800	25.1	----	10.3	35.4	----	56.0	----	20.6	----	H(QP)
6	9.65000	22.2	----	10.5	32.7	----	60.0	----	27.3	----	H(QP)
7	0.17100	----	27.9	10.1	----	38.0	----	54.9	----	16.9	H(CAV)
8	0.26100	----	26.2	10.1	----	36.3	----	51.4	----	15.1	H(CAV)
9	0.55700	----	29.5	10.1	----	39.6	----	46.0	----	6.4	H(CAV)
10	2.04800	----	11.0	10.3	----	21.3	----	46.0	----	24.7	H(CAV)
11	4.92800	----	13.9	10.3	----	24.2	----	46.0	----	21.8	H(CAV)
12	9.65000	----	16.0	10.5	----	26.5	----	50.0	----	23.5	H(CAV)

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

-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.18200	41.1	----	10.1	51.2	----	64.4	----	13.2	----	N(QP)
2	0.55700	25.6	----	10.1	35.7	----	56.0	----	20.3	----	N(QP)
3	1.40400	22.3	----	10.1	32.4	----	56.0	----	23.6	----	N(QP)
4	4.94000	21.2	----	10.3	31.5	----	56.0	----	24.5	----	N(QP)
5	11.65000	18.7	----	10.5	29.2	----	60.0	----	30.8	----	N(QP)
6	19.87000	15.8	----	10.5	26.3	----	60.0	----	33.7	----	N(QP)
7	0.18200	----	20.0	10.1	----	30.1	----	54.4	----	24.3	NCAV)
8	0.55700	----	22.3	10.1	----	32.4	----	46.0	----	13.6	NCAV)
9	1.40400	----	13.8	10.1	----	23.9	----	46.0	----	22.1	NCAV)
10	4.94000	----	14.0	10.3	----	24.3	----	46.0	----	21.7	NCAV)
11	11.65000	----	12.5	10.5	----	23.0	----	50.0	----	27.0	NCAV)
12	19.87000	----	5.7	10.5	----	16.2	----	50.0	----	33.8	NCAV)

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.

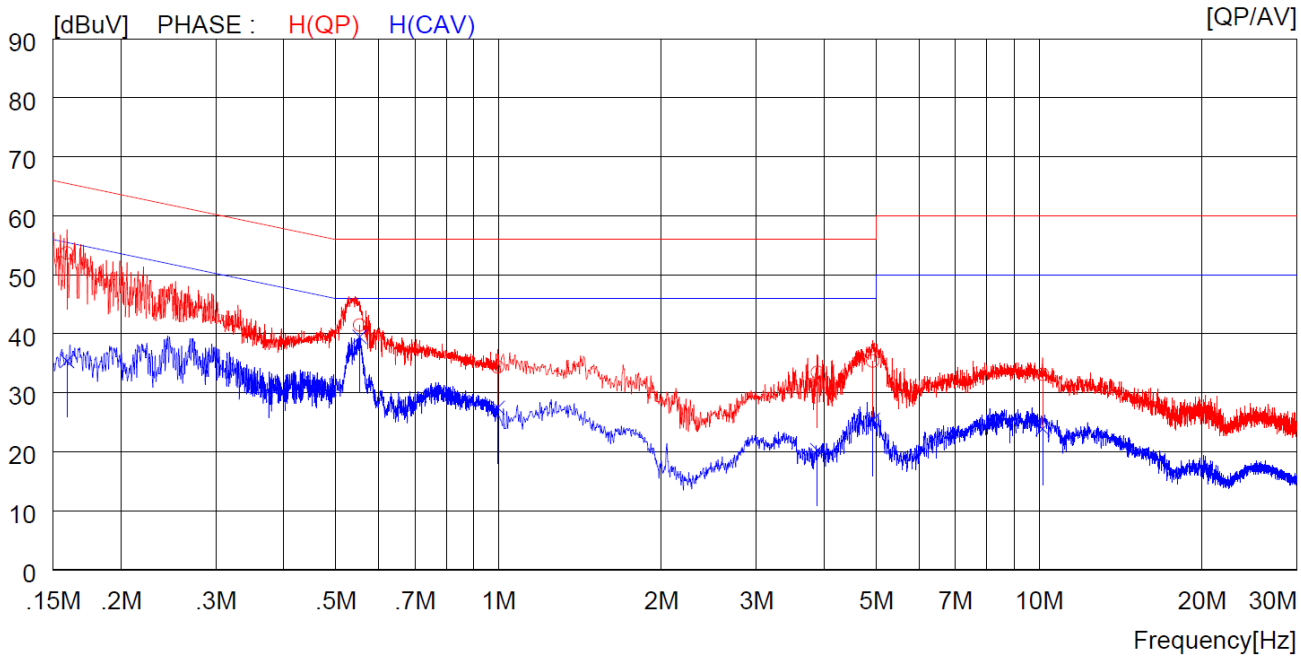
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

13.4.2 Test data for Intermodulation Mode(Bluetooth LE + WLAN 2.4 GHz + WLAN 5 GHz)

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

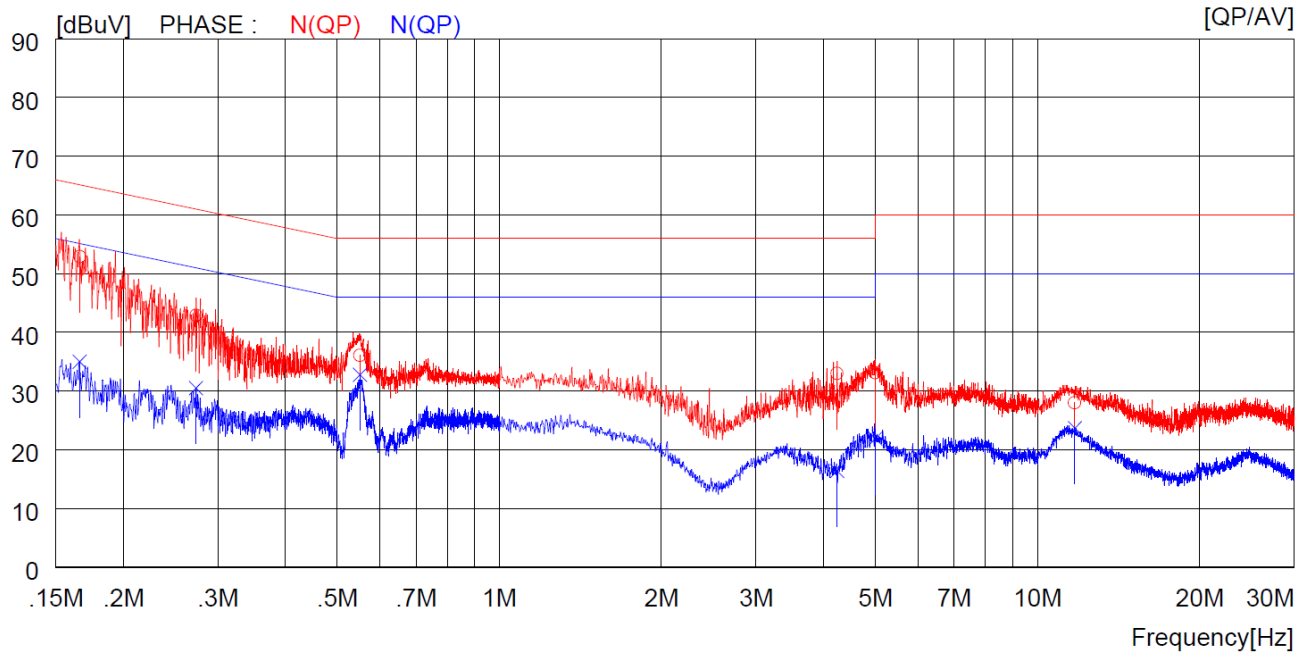
-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.15900	43.6	----	10.1	53.7	----	65.5	----	11.8	----	H(QP)
2	0.55300	31.4	----	10.1	41.5	----	56.0	----	14.5	----	H(QP)
3	0.99600	24.3	----	10.1	34.4	----	56.0	----	21.6	----	H(QP)
4	3.88800	23.2	----	10.3	33.5	----	56.0	----	22.5	----	H(QP)
5	4.92400	25.1	----	10.3	35.4	----	56.0	----	20.6	----	H(QP)
6	10.15000	22.6	----	10.5	33.1	----	60.0	----	26.9	----	H(QP)
7	0.15900	----	25.3	10.1	----	35.4	----	55.5	----	20.1	H(CAV)
8	0.55300	----	29.4	10.1	----	39.5	----	46.0	----	6.5	H(CAV)
9	0.99600	----	17.4	10.1	----	27.5	----	46.0	----	18.5	H(CAV)
10	3.88800	----	10.0	10.3	----	20.3	----	46.0	----	25.7	H(CAV)
11	4.92400	----	15.1	10.3	----	25.4	----	46.0	----	20.6	H(CAV)
12	10.15000	----	13.4	10.5	----	23.9	----	50.0	----	26.1	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	0.16600	42.8	----	10.1	52.9	----	65.2	----	12.3	----	N(QP)
2	0.27300	32.8	----	10.1	42.9	----	61.0	----	18.1	----	N(QP)
3	0.55100	26.0	----	10.1	36.1	----	56.0	----	19.9	----	N(QP)
4	4.24400	22.7	----	10.3	33.0	----	56.0	----	23.0	----	N(QP)
5	4.99600	22.8	----	10.3	33.1	----	56.0	----	22.9	----	N(QP)
6	11.73000	17.5	----	10.5	28.0	----	60.0	----	32.0	----	N(QP)
7	0.16600	----	24.9	10.1	----	35.0	----	55.2	----	20.2	NCAV)
8	0.27300	----	20.4	10.1	----	30.5	----	51.0	----	20.5	NCAV)
9	0.55100	----	22.7	10.1	----	32.8	----	46.0	----	13.2	NCAV)
10	4.24400	----	6.1	10.3	----	16.4	----	46.0	----	29.6	NCAV)
11	4.99600	----	11.6	10.3	----	21.9	----	46.0	----	24.1	NCAV)
12	11.73000	----	13.2	10.5	----	23.7	----	50.0	----	26.3	NCAV)

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.

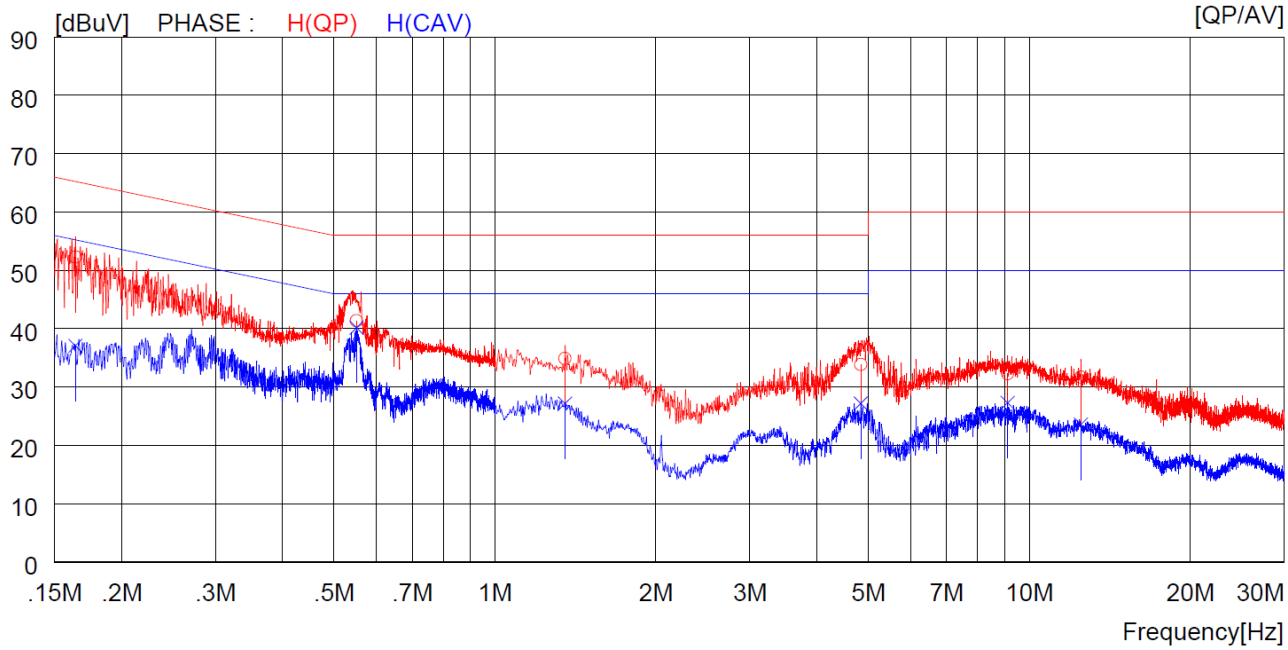
ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

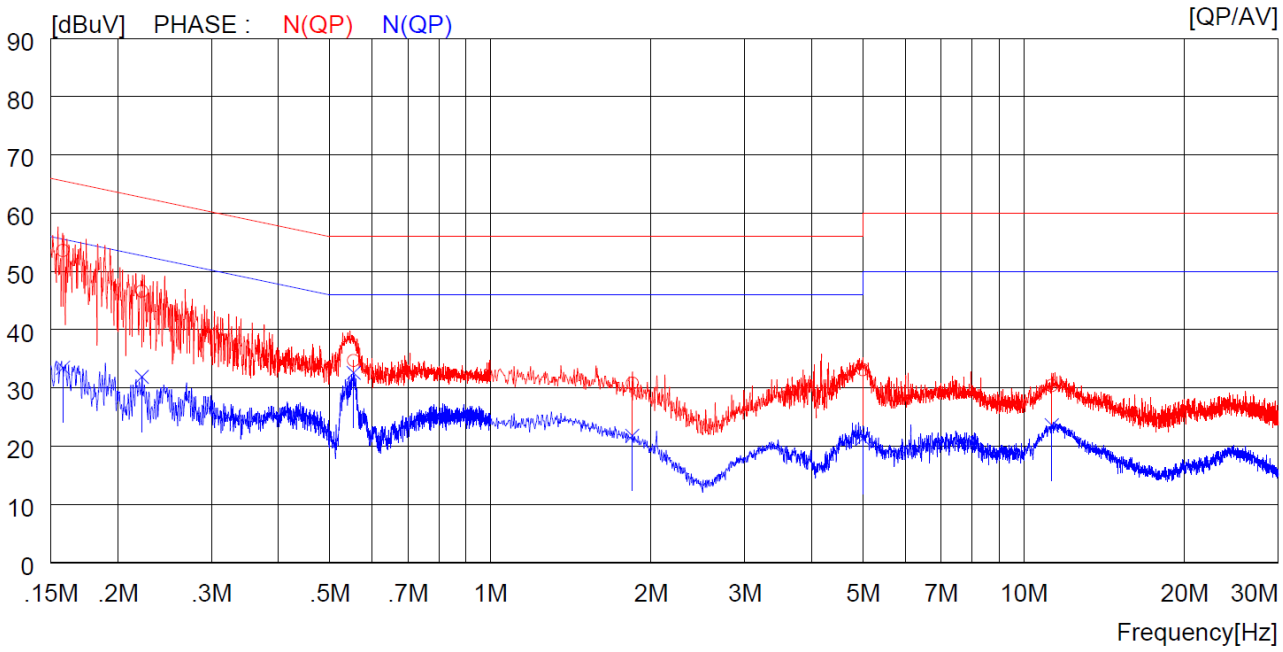
-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.16400	42.2	----	10.1	52.3	----	65.3	----	13.0	----	H(QP)
2	0.55100	31.3	----	10.1	41.4	----	56.0	----	14.6	----	H(QP)
3	1.35200	24.8	----	10.1	34.9	----	56.0	----	21.1	----	H(QP)
4	4.83600	23.6	----	10.3	33.9	----	56.0	----	22.1	----	H(QP)
5	9.11000	21.8	----	10.5	32.3	----	60.0	----	27.7	----	H(QP)
6	12.49000	21.2	----	10.5	31.7	----	60.0	----	28.3	----	H(QP)
7	0.16400	----	27.0	10.1	----	37.1	----	55.3	----	18.2	H(CAV)
8	0.55100	----	30.1	10.1	----	40.2	----	46.0	----	5.8	H(CAV)
9	1.35200	----	17.1	10.1	----	27.2	----	46.0	----	18.8	H(CAV)
10	4.83600	----	16.9	10.3	----	27.2	----	46.0	----	18.8	H(CAV)
11	9.11000	----	16.8	10.5	----	27.3	----	50.0	----	22.7	H(CAV)
12	12.49000	----	13.1	10.5	----	23.6	----	50.0	----	26.4	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	43.5	----	10.1	53.6	----	65.6	----	12.0	----	N(QP)
2	0.22200	36.5	----	10.1	46.6	----	62.7	----	16.1	----	N(QP)
3	0.55400	24.6	----	10.1	34.7	----	56.0	----	21.3	----	N(QP)
4	1.84400	20.7	----	10.1	30.8	----	56.0	----	25.2	----	N(QP)
5	4.99200	22.8	----	10.3	33.1	----	56.0	----	22.9	----	N(QP)
6	11.28000	19.9	----	10.5	30.4	----	60.0	----	29.6	----	N(QP)
7	0.15800	----	23.4	10.1	----	33.5	----	55.6	----	22.1	NCAV)
8	0.22200	----	21.8	10.1	----	31.9	----	52.7	----	20.8	NCAV)
9	0.55400	----	22.5	10.1	----	32.6	----	46.0	----	13.4	NCAV)
10	1.84400	----	11.7	10.1	----	21.8	----	46.0	----	24.2	NCAV)
11	4.99200	----	11.0	10.3	----	21.3	----	46.0	----	24.7	NCAV)
12	11.28000	----	13.1	10.5	----	23.6	----	50.0	----	26.4	NCAV)

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.

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. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102196	Apr. 03, 2023 (1Y)
FSVA40	Rohde & Schwarz	Signal Analyzer	101598	Apr. 03, 2023 (1Y)
ESU	Rohde & Schwarz	EMI Test Receiver	100261	Mar. 06, 2023 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 16, 2023 (1Y)
SCU18	Rohde & Schwarz	Pre-Amplifer	102266	Jul. 11, 2023 (1Y)
SCU40A	Rohde & Schwarz	Pre-Amplifer	100436	Jan. 18, 2023 (1Y)
DT2000-2t	Innco System	Turn Table	N/A	N/A
MA-4640-XPET	Innco System	Antenna Master	MA4640/652/43100318/P	N/A
CO3000	Innco System	Controller	1026/40960617/P	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 24, 2022 (2Y)
HLP-2008	TDK	Hybrid Antenna	131316	Mar. 07, 2022 (2Y)
BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jun. 22, 2023 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 04, 2023 (1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Jan. 16, 2023 (1Y)
10 dB Attenuator	Rohde & Schwarz	10 dB Attenuator	14100882-4	Jul. 11, 2023 (1Y)
NRP-Z91	Rohde & Schwarz	Wideband Power Sensor	103780	Jul. 11, 2023 (1Y)
NRP-Z81	Rohde & Schwarz	Wideband Power Sensor	104811	Jan. 16, 2023 (1Y)
ESCI	Rohde & Schwarz	EMI TEST RECEIVER	101012	Sep. 26, 2023 (1Y)
NSLK8128	Schwarzbeck	AMN	8128216	Mar. 14, 2023 (1Y)
ESH3-Z2	Rohde & Schwarz	PULSE LIMITER	100655	Mar. 13, 2023 (1Y)

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