

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test Report No. : OT-20D-RWD-040

Reception No. : 2011004660

Applicant : UNION COMMUNITY

Address : 12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu, Seoul, South Korea

Manufacturer : UNION COMMUNITY

Address : 12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu, Seoul, South Korea

Type of Equipment : Access controller

FCC ID : XX2-UBIO-XFACERF

Model Name : UBio-X Face RF

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 13 pages (including this page)

Date of Incoming : November 19, 2020

Date of Issuing : December 09, 2020

SUMMARY

The equipment complies with the requirements of *FCC CFR 47 PART 15 Subpart C Section 15.209 and 15.207*.

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

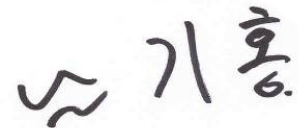
It is not a generally valid assessment of the features of the respective products of the mass-production.



Tested by
Soon-Ki, Choi / Engineer
ONETECH Corp.



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



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

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-20D-RWD-040	December 09, 2020	Initial Release	All

1. VERIFICATION OF COMPLIANCE

- . APPLICANT : UNION COMMUNITY
- . ADDRESS : 12F, Munjeong Daemyeong Valeon bldg, 127 Beobwon-ro Songpa-gu, Seoul, South Korea
- . CONTACT PERSON : KW, HAN / Manager
- . TELEPHONE NO : +82-2-6488-3052
- . FCC ID : XX2-UBIO-XFACERF
- . MODEL NO/NAME : UBio-X Face RF
- . SERIAL NUMBER : N/A
- . DATE : December 09, 2020

DEVICE TYPE	DCD – Part 15, Low Power Transmitter below 1 705 kHz
E.U.T. DESCRIPTION	Access controller
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 CFR47 Part 15 Subpart C Section 15.207 and 15.209
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	10 m, Semi Anechoic Chamber

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

2. GENERAL INFORMATION

2.1 Product Description

The UNION COMMUNITY, Model UBio-X Face RF (referred to as the EUT in this report) is an Access controller, Product specification information described herein was obtained from product data sheet or user’s manual.

DEVICE TYPE	Access controller
TRANSMITTING FREQUENCY	125 kHz, 2 402 MHz ~ 2 480 MHz
MODULATION	ASK
ANTENNA TYPE	Coil Antenna, Chip Antenna
LIST OF EACH OSC. or CRY. FREQ.(FREQ. >= 1 MHz)	121.45 kHz
USED AC/DC ADAPTER	Output : DC 15 V, 4 A Model No : KPL-060H-VI Manufacturer : Channel Well Technology(Guangzhou) Co.,Ltd.

2.2 Model Differences:

-. None.

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 15.209 and 15.207.

2.5 Test Methodology

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

2.6 Test Facility

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

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

-. Site Filing:

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

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

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

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

3. SYSTEM TEST CONFIGURATION

3.1 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	N/A	PFR910BMA01 V11	N/A
SUB BOARD	N/A	PUBXFRF01 V10	N/A
CAMERA BOARD	N/A	M20_MB_V3	N/A
LED BOARD	N/A	PFR910BLD01 V10	N/A
DISPLAY	N/A	N/A	N/A
AI CAMERA	N/A	M20	N/A
Bluetooth LE Module	PROCHILD INC.	PBLN51822m	2AEEY-PBLN51822M
125 MHz ANTENNA BOARD	N/A	N/A	N/A
ADAPTER	Channel Well Technology (Guangzhou)Co., LTd.	KPL-060H-VI	N/A

3.2 Peripheral equipment

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

Model	Manufacturer	Description	Connected to
UBio-X Face RF	UNION COMMUNITY	Access controller (EUT)	-
KPL-060H-VI	Channel Well Technology (Guangzhou)Co., LTd.	ADAPTER	EUT
N/A	N/A	Door Open Switch	EUT
N/A	N/A	Door lock	EUT
N/A	N/A	SD Card	EUT
N/A	N/A	125 kHz Card	EUT

3.3 Mode of operation during the test

-. The EUT has 125 kHz RF boards for reading Card and program was used for making continuous transmission mode during the test.

3.4 Equipment Modifications

-. None

3.5 Configuration of Test System

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

Radiated Emission Test : Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. The radiated emissions measurements were performed on the 10 m Semi Anechoic Chamber.
 For frequencies from 150 kHz to 30 MHz measurements were made of the magnetic H field. The measuring antenna is an electrically screened loop antenna.
 The frequency spectrum from 30 MHz to 1 000 MHz was scanned and maximum emission levels maximized 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 both horizontal and vertical polarization of the receiving antenna.

3.6 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 transmitter antenna of the EUT is a Coil Antenna and PCB Antenna so there is no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

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

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

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

5. FINAL RESULT OF 124.19 kHz MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Emission Test

Humidity Level : 47 % R.H. Temperature: 23 °C

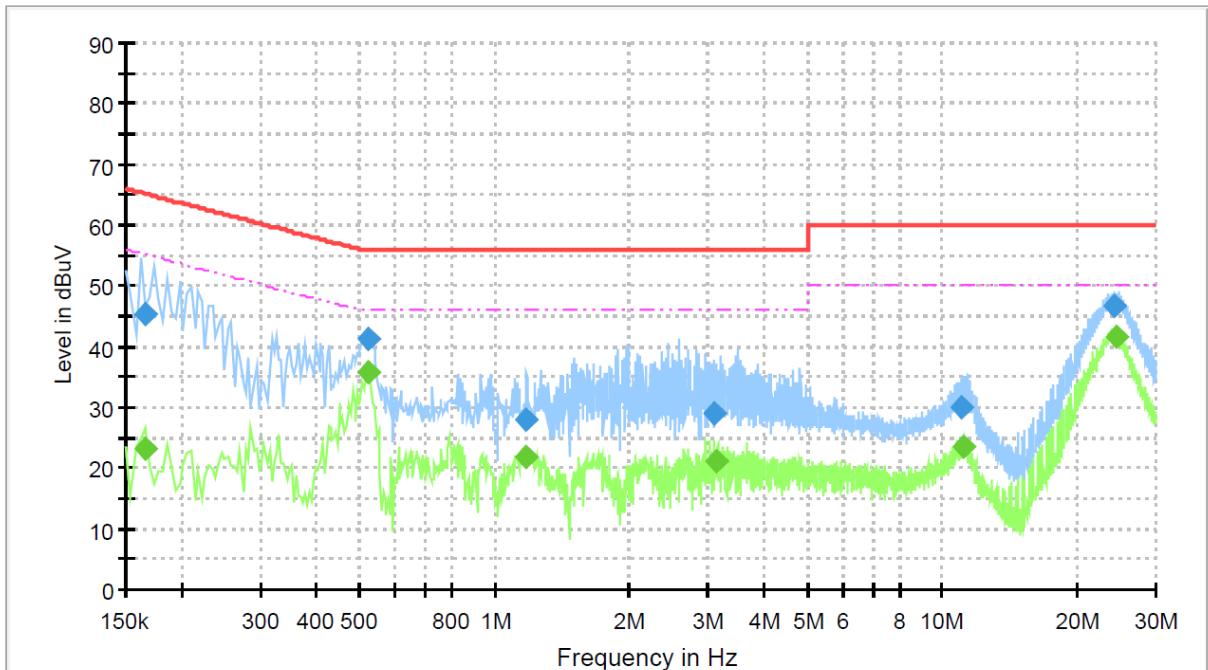
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)

Result : PASSED

EUT : Access controller Date: November 19, 2020 ~ November 25, 2020

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

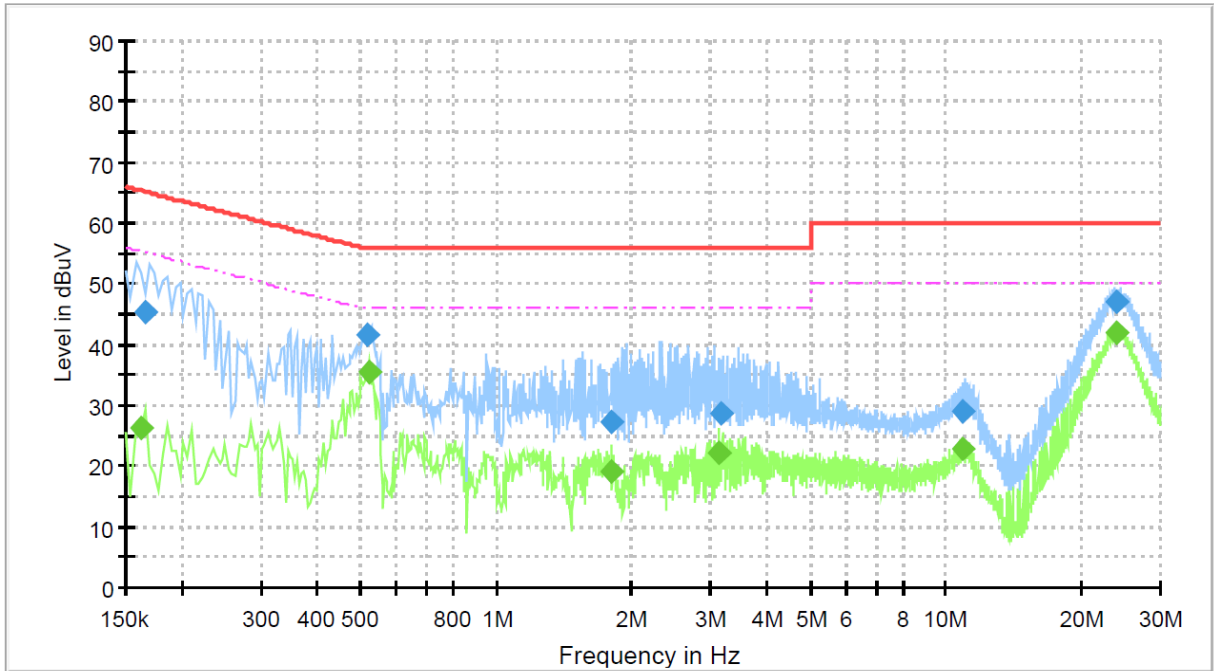
Tested Line : HOT LINE



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.167	45.41	---	65.18	19.77	3000.0	9.0	N	9.94
0.167	---	23.31	55.13	31.82	3000.0	9.0	N	9.94
0.526	---	35.69	46.00	10.31	3000.0	9.0	N	9.94
0.526	41.38	---	56.00	14.62	3000.0	9.0	N	9.94
1.180	---	21.86	46.00	24.14	3000.0	9.0	N	9.99
1.180	27.93	---	56.00	28.07	3000.0	9.0	N	9.99
3.090	28.88	---	56.00	27.12	3000.0	9.0	N	10.06
3.090	---	21.26	46.00	24.74	3000.0	9.0	N	10.06
11.130	29.83	---	60.00	30.17	3000.0	9.0	N	10.44
11.130	---	23.60	50.00	26.40	3000.0	9.0	N	10.44
24.436	46.56	---	60.00	13.44	3000.0	9.0	N	10.75
24.436	---	41.74	50.00	8.26	3000.0	9.0	N	10.76

Tested Line : NEUTRAL LINE



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.161	---	26.11	55.39	29.28	3000.0	9.0	N	9.94
0.161	45.42	---	65.18	19.77	3000.0	9.0	N	9.94
0.522	41.74	---	56.00	14.26	3000.0	9.0	N	9.94
0.522	---	35.62	46.00	10.38	3000.0	9.0	N	9.94
1.809	---	19.17	46.00	26.83	3000.0	9.0	N	10.03
1.809	27.11	---	56.00	28.89	3000.0	9.0	N	10.03
3.150	---	22.22	46.00	23.78	3000.0	9.0	N	10.06
3.150	28.80	---	56.00	27.20	3000.0	9.0	N	10.06
10.916	---	22.72	50.00	27.28	3000.0	9.0	N	10.43
10.916	29.09	---	60.00	30.91	3000.0	9.0	N	10.43
24.090	---	42.06	50.00	7.94	3000.0	9.0	N	10.75
24.090	47.12	---	60.00	12.88	3000.0	9.0	N	10.75

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.

5.2 Radiated Emission Test below 30 MHz

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 47 % R.H. Temperature: 23 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
 Type of Test : Low Power Transmitter below 1 705 kHz
 Result : PASSED

EUT : Access controller Date: November 19, 2020 ~ November 25, 2020
 Distance : 3 m

Frequency (MHz)	Reading (dBµV)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.015	15.55	1	85	18.6	0.1	34.25	124.1	89.85
0.031	31.19	1	278	18.6	0.1	49.89	119.2	69.31
0.046	30.93	1	204	18.6	0.1	49.63	110.9	61.27
0.121 48	56.78	1	165	18.9	0.1	75.78	136.8	61.02
21.85	19.97	1	177	18.8	0.1	38.87	60	21.13

Radiated Emission Tabulated Data below 30 MHz

Note: According to the distance of measurements was reduced to 3 m, the limit was extrapolated by using the square of an inverse linear distance extrapolation factor (40 dB/decade) as follows.

Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

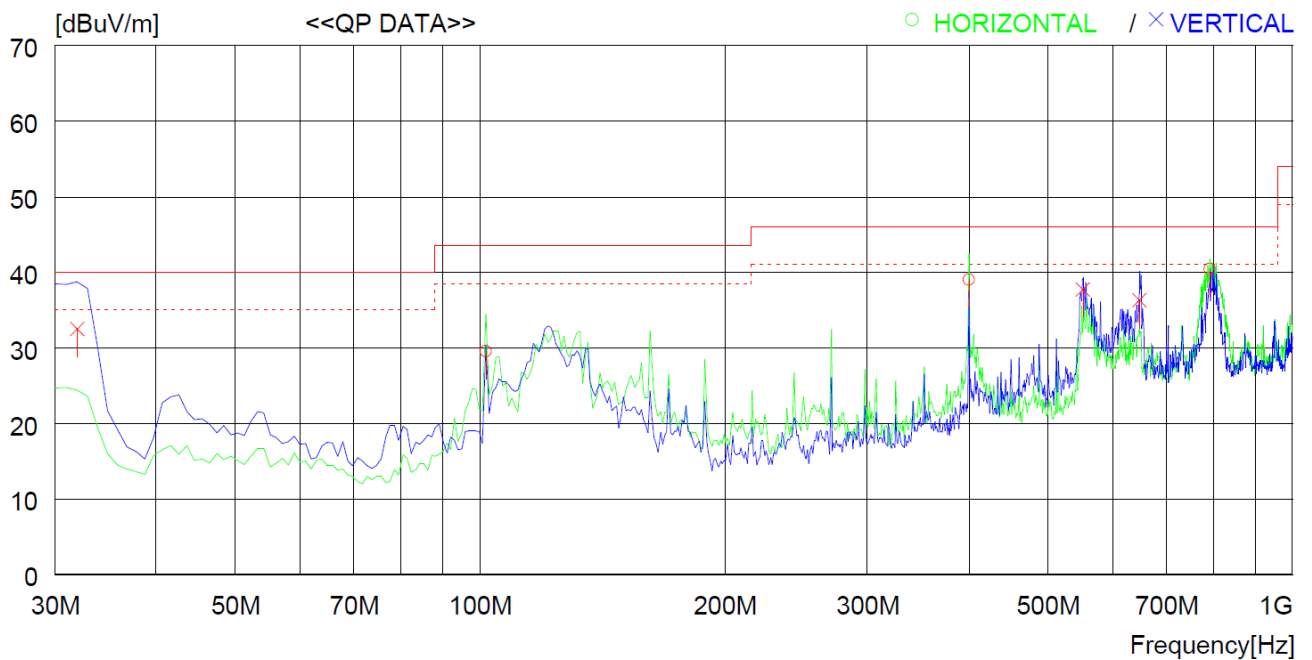
Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz

5.3 Radiated Emission Test above 30 MHz

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 47 % R.H. Temperature: 23 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Type of Test : Low Power Transmitter below 1 705 kHz

EUT : Access controller Date: November 19, 2020 ~ November 25, 2020
 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	101.780	45.7	14.7	1.7	32.6	29.5	43.5	14.0	200	284
2	399.570	46.5	21.5	3.4	32.4	39.0	46.0	7.0	100	246
3	790.472	39.8	28.1	4.9	32.4	40.4	46.0	5.6	100	359
----- Vertical -----										
4	31.940	46.3	17.9	0.9	32.6	32.5	40.0	7.5	100	232
5	551.859	41.3	24.6	4.1	32.3	37.7	46.0	8.3	100	0
6	647.887	38.2	26.2	4.4	32.5	36.3	46.0	9.7	100	0

5.4 FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses.

+	Meter reading	(dB μ V)
-	Amplifier Gain	(dB)
+	Cable Loss	(dB)
-	Antenna Factor	(dB/m)
<hr/>		
=	Corrected Result	(dB μ V/m)
Margin (dB)		
	Specification Limit	(dBuV/m)
-	Corrected Result	(dBuV/m)
<hr/>		
=	dB Relative to Spec	(\pm dB)

6. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
ESR	Rohde & Schwarz	EMI Test Receiver	101470	Oct. 20, 2020 (1Y)
ESCI	Rohde & Schwarz	EMI Test Receiver	101013	Mar. 17, 2020 (1Y)
FSV30	R/S	SIGNAL ANALYZER	101372	Jul. 15, 2020 (1Y)
310N	Sonoma Instrument	AMPLIFIER	312544	Mar. 16, 2020 (1Y)
VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-255	Sep. 24, 2019 (2Y)
NNLK 8121	Schwarzbeck	V-LISN	804	Oct. 19, 2020 (1Y)
NSLK8128	Schwarzbeck	V-LISN (4 * 32/50A)	8128-216	Mar. 16, 2020 (1Y)
DT3000	Innco System	Turn Table	930611	N/A
MA-4000XPET	Innco Systems GmbH	Antenna Master (10 m SAC 2)	MA4640/592/ 40700517/-	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 24, 2020 (2Y)
53152A	HP	CW Microwave Frequency Counter	US39270295	Jul. 20, 2020 (1Y)
PSL-2KP	ESPEC	Environmental Test Chamber	14009407	Feb. 21, 2020 (1Y)
CO3000	Innco Systems GmbH	Controller (3 m SAC)	1026/40960617/P	N/A
DT2000-2t	Innco Systems GmbH	Turn Table (3 m SAC)	N/A	N/A
HLP-2008	TDK	Hybrid Antenna	131316	Feb. 27, 2020 (2Y)
310N	Sonoma Instrument	Amplifier	392756	Oct. 16, 2020 (1Y)
PWS-3003D	Protek	DC Power Supply (DC 30 V 3 A)	4020409	Jul. 15, 2020 (1Y)