

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-238-RWD-002
Reception No. : 2307002275
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-XFACEPRO
Model Name : UBio-X Face Pro
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 14 pages (including this page)
Date of Incoming : July 21, 2023
Date of Issuing : August 02, 2023

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.

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





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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-238-RWD-002	August 02, 2023	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 : Dong Ho, Lee
-. TELEPHONE NO : +82-2-6488-3054
-. FCC ID : XX2-UBIO-XFACEPRO
-. MODEL NO/NAME : UBio-X Face Pro
-. SERIAL NUMBER : N/A
-. DATE : August 02, 2023

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 Pro (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	124.755 kHz, 13.56 MHz 2 412 MHz ~ 2 462 MHz, 2 402 MHz ~ 2 480 MHz
MODULATION	ASK
ANTENNA TYPE	Coil Antenna, PCB Antenna
LIST OF EACH OSC. or CRY. FREQ.(FREQ. >= 1 MHz)	124.755 kHz, 13.560 0 MHz
USED AC/DC ADAPTER	Output : DC 15 V, 4.0 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

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OTC-TRF-RF-001(0)

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	PFR915BMA01 V1.1	N/A
Wireless Board	N/A	PRCOMBMO_V10	N/A
LED Board	N/A	PFR915BIRLD01_V10	N/A
Connector Board	N/A	PFR915USB01_V1.1	N/A
Camera Board	N/A	PFP915BCM01_V1.1	N/A
Wi-Fi & Bluetooth Module	FN-LINK TECHNOLOGY LIMITED	H158A-SM	2AATL-H158ASM
125 kHz Antenna Board	N/A	N/A	N/A
13.56 MHz Antenna Board	N/A	PC10SA01 V1.0	N/A
Bluetooth LE/WLAN 2.4 GHz Antenna Board	N/A	SGT-2400S_120	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 Pro	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	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 equipment 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 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 : 49 % R.H.

Temperature: 24 °C

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

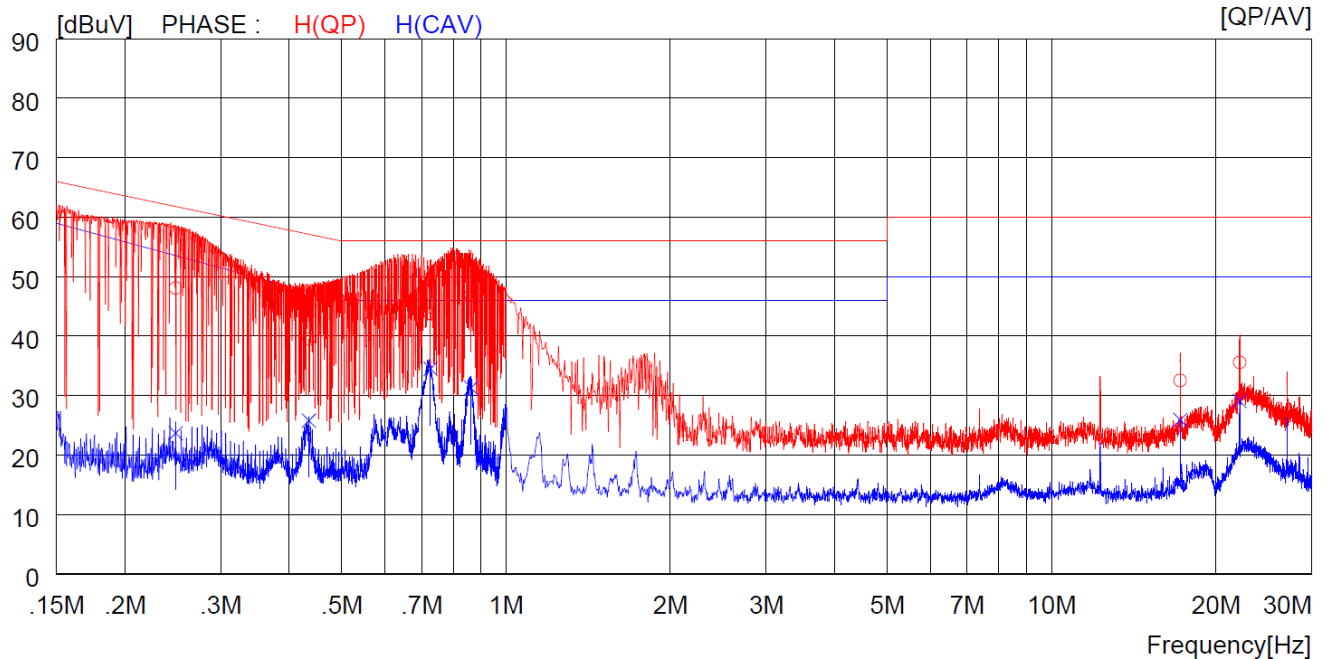
Result : PASSED

EUT : Access controller

Date: July 21, 2023 ~ July 28, 2023

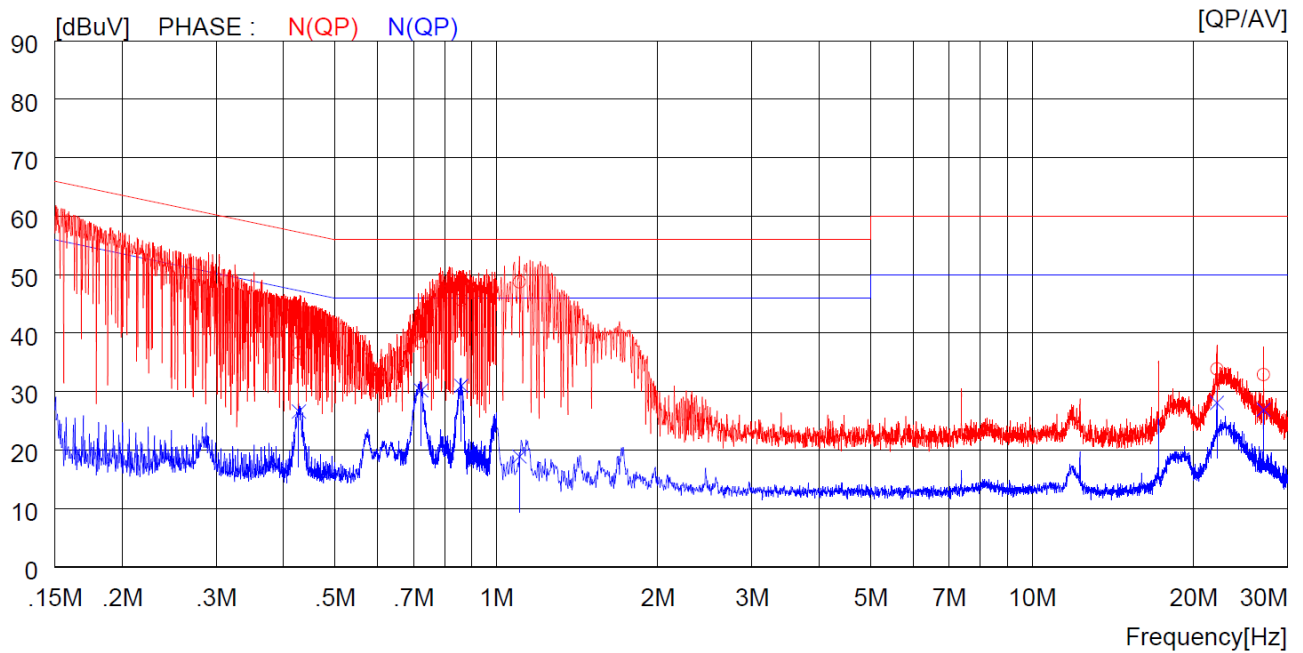
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Tested Line : HOT LINE



NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.24800	38.0	----	10.1	48.1	----	61.8	----	13.7	----	H (QP)
2	0.43500	29.4	----	10.1	39.5	----	57.2	----	17.7	----	H (QP)
3	0.72700	33.7	----	10.1	43.8	----	56.0	----	12.2	----	H (QP)
4	0.86300	36.8	----	10.1	46.9	----	56.0	----	9.1	----	H (QP)
5	17.21000	22.1	----	10.5	32.6	----	60.0	----	27.4	----	H (QP)
6	22.12000	25.0	----	10.6	35.6	----	60.0	----	24.4	----	H (QP)
7	0.24800	----	13.6	10.1	----	23.7	----	53.6	----	29.9	H (CAV)
8	0.43500	----	15.7	10.1	----	25.8	----	47.5	----	21.7	H (CAV)
9	0.72700	----	24.4	10.1	----	34.5	----	46.0	----	11.5	H (CAV)
10	0.86300	----	21.2	10.1	----	31.3	----	46.0	----	14.7	H (CAV)
11	17.21000	----	15.4	10.5	----	25.9	----	50.0	----	24.1	H (CAV)
12	22.12000	----	18.5	10.6	----	29.1	----	50.0	----	20.9	H (CAV)

Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.42800	26.5	----	10.1	36.6	----	57.3	----	20.7	----	N (QP)
2	0.72300	28.4	----	10.1	38.5	----	56.0	----	17.5	----	N (QP)
3	0.85900	35.6	----	10.1	45.7	----	56.0	----	10.3	----	N (QP)
4	1.10400	38.7	----	10.1	48.8	----	56.0	----	7.2	----	N (QP)
5	22.12000	23.3	----	10.6	33.9	----	60.0	----	26.1	----	N (QP)
6	27.04000	22.2	----	10.7	32.9	----	60.0	----	27.1	----	N (QP)
7	0.42800	----	16.5	10.1	----	26.6	----	47.3	----	20.7	N (CAV)
8	0.72300	----	20.1	10.1	----	30.2	----	46.0	----	15.8	N (CAV)
9	0.85900	----	20.9	10.1	----	31.0	----	46.0	----	15.0	N (CAV)
10	1.10400	----	8.8	10.1	----	18.9	----	46.0	----	27.1	N (CAV)
11	22.12000	----	17.5	10.6	----	28.1	----	50.0	----	21.9	N (CAV)
12	27.04000	----	16.2	10.7	----	26.9	----	50.0	----	23.1	N (CAV)

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

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

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 : 49 % R.H. Temperature: 24 °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: July 21, 2023 ~ July 28, 2023

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits for 3m (dBμV/m)	Margin (dB)	Detector
0.018	55.43	V	1	19	0.1	74.53	122.50	37.97	PK
0.034	46.76	H	1	19	0.1	65.86	116.97	51.11	PK
0.124 7	60.52	H	1	19	0.1	79.62	105.69	26.07	PK
0.816	38.84	V	1	18.9	0.1	57.84	69.37	11.53	PK
1.014	29.65	H	1	18.8	0.2	48.65	67.48	18.83	PK

Radiated Emission Tabulated Data below 30 MHz

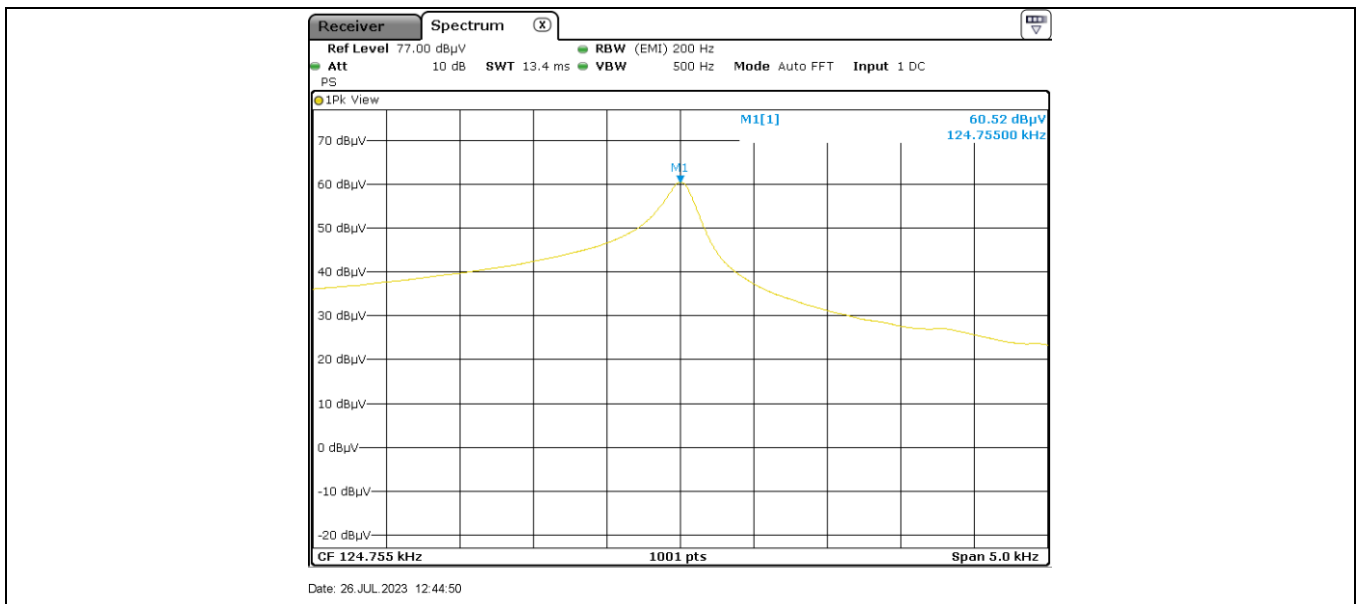
Note: According to the distance of measurements was reduced to 3 m, the limit was extrapolated by using the square of an inverse linear distance extrapolation factor (40 dB/decade) as follows.

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

Limit at specified distance + $40\log(30/3) = \text{Limit} + 40 \text{ dB}$ for above 0.49 MHz

Remark: Please refer to Photo Data for 124.755 kHz fundamental for test data. (Test in worst case)

Photo Data for 124.755 kHz

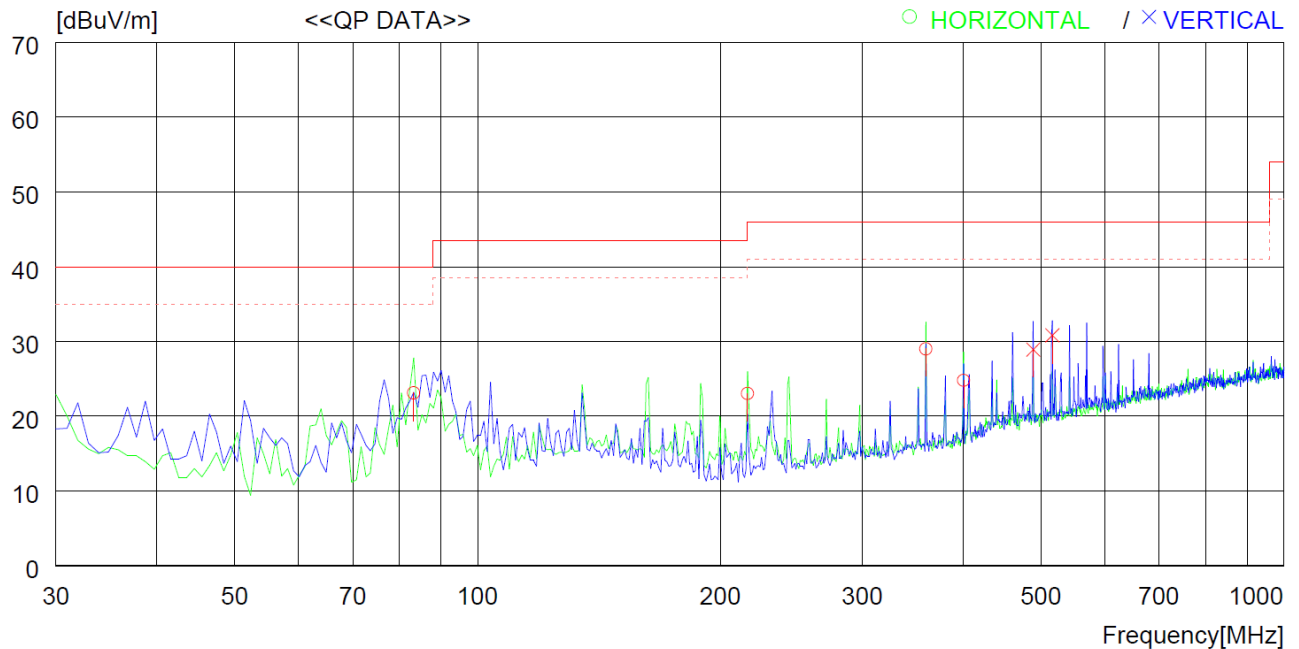


5.3 Radiated Emission Test above 30 MHz

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

Humidity Level : 49 % R.H. Temperature: 24 °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
Result : PASSED

EUT : Access controller Date: July 21, 2023 ~ July 28, 2023
Distance : 3 m



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	83.350	41.2	13.2	1.8	33.1	23.1	40.0	16.9	400	359
2	216.240	37.3	16.1	2.8	33.2	23.0	46.0	23.0	100	0
3	359.800	38.4	20.0	3.7	33.1	29.0	46.0	17.0	100	0
4	400.540	33.3	20.7	3.9	33.1	24.8	46.0	21.2	100	135
----- Vertical -----										
5	488.811	34.7	23.0	4.3	33.1	28.9	46.0	17.1	100	175
6	515.971	36.1	23.3	4.5	33.1	30.8	46.0	15.2	100	359

5.4 Bandwidth of the operating frequency

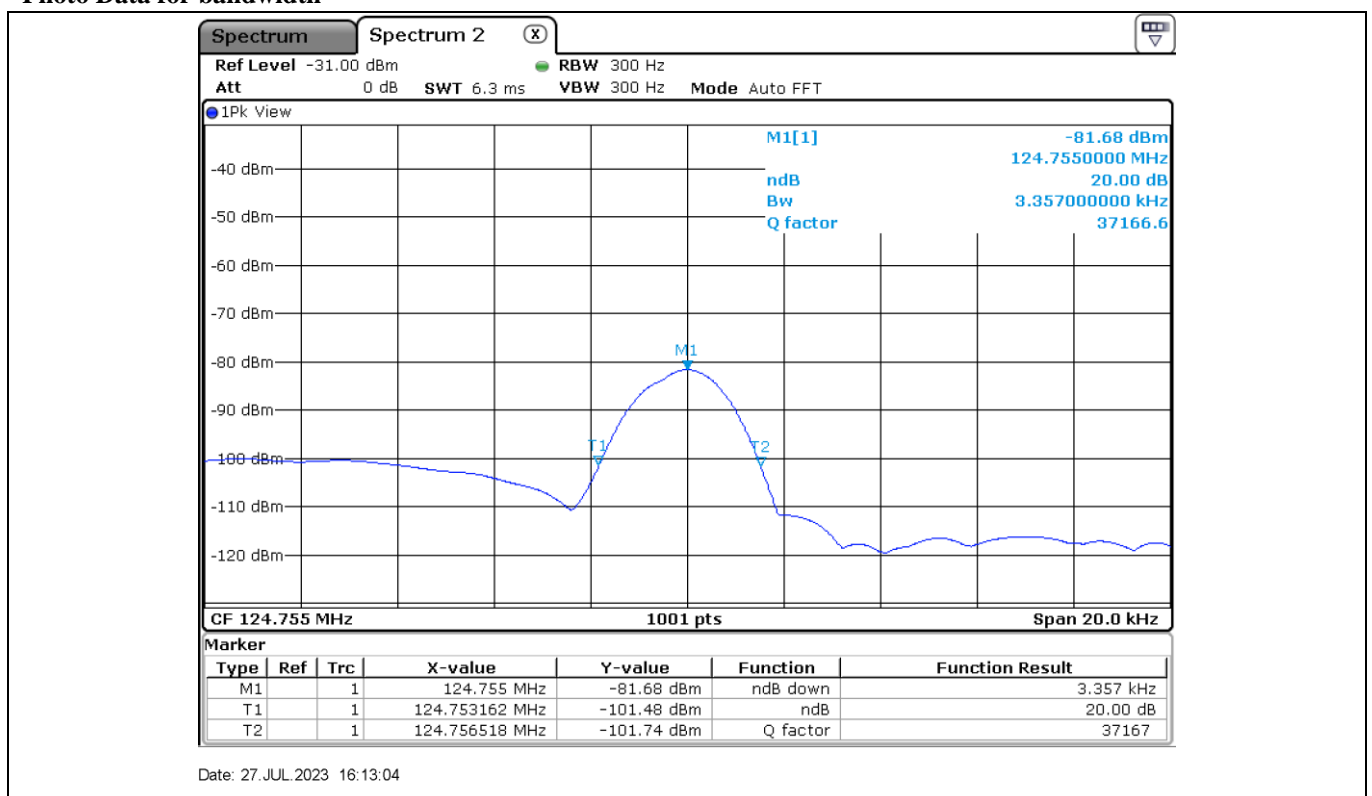
Humidity Level : 49 % R.H. Temperature: 24 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
Type of Test : Low Power Transmitter below 1 705 kHz
Result : PASSED

EUT : Access controller Date: July 21, 2023 ~ July 28, 2023
Resolution Bandwidth : 0.3 kHz
Video Bandwidth : 0.3 kHz
SPAN : 20.0 kHz

Carrier Freq. (kHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
124.755	3.357	None	The point 20 dB down from the modulated carrier

Remark: Please refer to Photo Data for bandwidth for test data.

Photo Data for bandwidth



6. 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)
=	Corrected Result	(dB μ V/m)

Margin (dB)

	Specification Limit	(dB μ V/m)
-	Corrected Result	(dB μ V/m)
=	dB Relative to Spec	(\pm dB)

7. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
ESR	Rohde & Schwarz	EMI Test Receiver	101470	Jun. 16, 2023 (1Y)
ESR	Rohde & Schwarz	EMI Test Receiver	102602	Mar. 15, 2023 (1Y)
FSV30	Rohde & Schwarz	SIGNAL ANALYZER	101372	Jul. 10, 2023 (1Y)
310N	Sonoma Instrument	AMPLIFIER	312544	Mar. 14, 2023 (1Y)
HLP-2008	TDK	Hybrid Antenna	131313	Apr. 05, 2023 (2Y)
NSLK8128	Schwarzbeck	V-LISN (4 * 16/25A)	8126404	Mar. 14, 2023 (1Y)
ESH3-Z2	Rohde & Schwarz	Pulse Limiter	100655	Mar. 13, 2023 (1Y)
DT3000	Innco System	Turn Table	930611	N/A
MA-4000XPET	Innco Systems GmbH	Antenna Master	MA4640/592/ 40700517/-	N/A
HLA 6121	TESEQ	Loop Antenna	50841	Apr. 13, 2022 (2Y)
PSL-2KP	ESPEC	Environmental Test Chamber	14009407	Jan. 18, 2023 (1Y)
CO3000	Innco Systems GmbH	Controller	1026/40960617/P	N/A
DT2000-2t	Innco Systems GmbH	Turn Table	N/A	N/A
GP-4303D	LG Precision Co.,Ltd	DC Power Supply	5071069	Jan. 04, 2023 (1Y)