

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-24N-RWD-047

Reception No. : 2410003622

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-UBIOFACEPRMR

Model Name : UBio-X Face Premium

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 14 pages (including this page)

Date of Incoming : October 17, 2024

Date of Issuing : November 28, 2024

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.

한동연



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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-24N-RWD-047	November 28, 2024	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-UBIOFACEPRMR

Model Name : UBio-X Face Premium

Brand Name : -

Serial Number : N/A

Date : November 28, 2024

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 Premium (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	127.04 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)	32.768 kHz, 24 MHz, 48 MHz

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	PUBXFPMA01_V20	N/A
SUB Board 1	N/A	PUBXFUSB01_V20	N/A
SUB Board 2	N/A	PFacelCammera01_V20	N/A
SUB Board 3	N/A	PUBXFPLD01_V20	N/A
SUB Board 4	N/A	PFacelRLED01_V20	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	PC10SR01	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 Premium	UNION COMMUNITY	Access controller (EUT)	-
DC Power Supply	TDK-Lambda	DC Power Supply	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 DC Power Supply and the power of DC Power Supply 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 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 : 56 % R.H.

Temperature: 23 °C

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

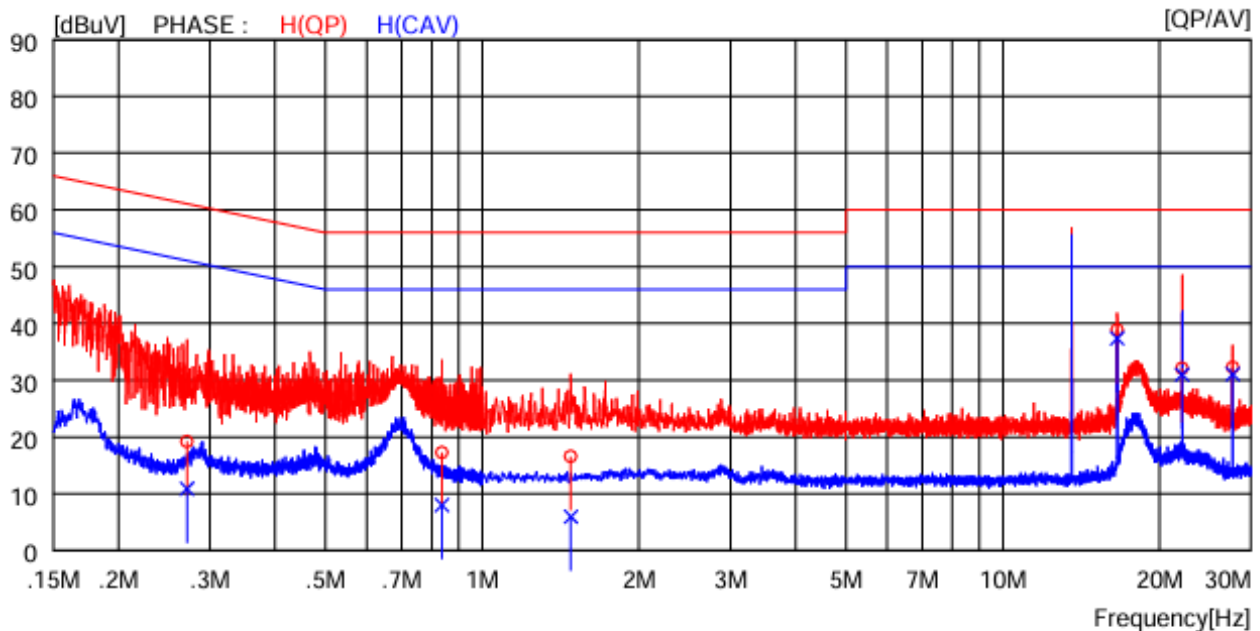
Result : PASSED

EUT : Access controller

Date: November 05, 2024 ~ November 08, 2024

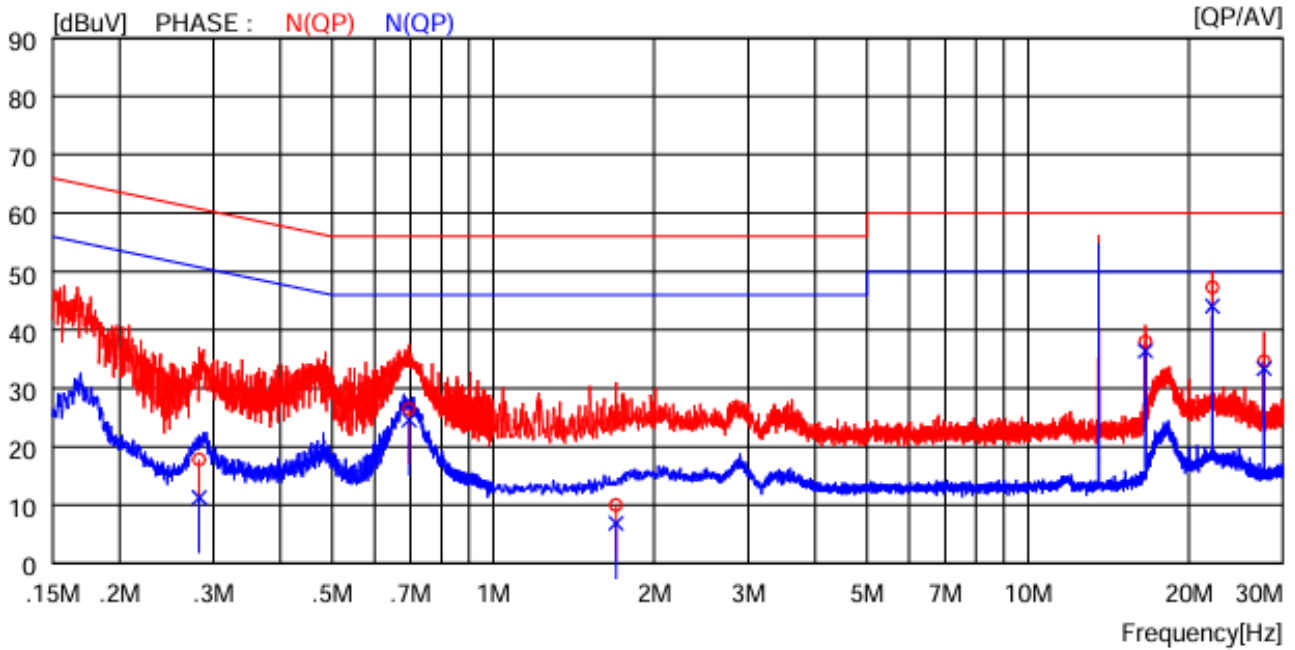
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Tested Line : HOT LINE



NO	FREQ		READING		C.FACTOR		RESULT		LIMIT		MARGIN		PHASE
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.27100	9.2	----	10.0	19.2	----	61.1	----	41.9	----	H(QP)		
2	0.83700	7.2	----	10.1	17.3	----	56.0	----	38.7	----	H(QP)		
3	1.48000	6.5	----	10.1	16.6	----	56.0	----	39.4	----	H(QP)		
4	16.59000	28.3	----	10.6	38.9	----	60.0	----	21.1	----	H(QP)		
5	22.11000	21.4	----	10.7	32.1	----	60.0	----	27.9	----	H(QP)		
6	27.65000	21.5	----	10.8	32.3	----	60.0	----	27.7	----	H(QP)		
7	0.27100	----	0.9	10.0	----	10.9	----	51.1	----	40.2	H(CAV)		
8	0.83700	----	-2.1	10.1	----	8.0	----	46.0	----	38.0	H(CAV)		
9	1.48000	----	-4.1	10.1	----	6.0	----	46.0	----	40.0	H(CAV)		
10	16.59000	----	26.8	10.6	----	37.4	----	50.0	----	12.6	H(CAV)		
11	22.11000	----	20.3	10.7	----	31.0	----	50.0	----	19.0	H(CAV)		
12	27.65000	----	20.3	10.8	----	31.1	----	50.0	----	18.9	H(CAV)		

Tested Line : NEUTRAL LINE



NO	FREQ		READING		C.FACTOR		RESULT		LIMIT		MARGIN	PHASE
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]		
1	0.28200	7.8	----	10.0	17.8	----	60.8	----	43.0	----	N(QP)	
2	0.69600	16.4	----	10.1	26.5	----	56.0	----	29.5	----	N(QP)	
3	1.69600	-0.1	----	10.1	10.0	----	56.0	----	46.0	----	N(QP)	
4	16.59000	27.4	----	10.6	38.0	----	60.0	----	22.0	----	N(QP)	
5	22.12000	36.6	----	10.7	47.3	----	60.0	----	12.7	----	N(QP)	
6	27.65000	23.8	----	10.8	34.6	----	60.0	----	25.4	----	N(QP)	
7	0.28200	----	1.3	10.0	----	11.3	----	50.8	----	39.5	N(CAV)	
8	0.69600	----	14.5	10.1	----	24.6	----	46.0	----	21.4	N(CAV)	
9	1.69600	----	-3.2	10.1	----	6.9	----	46.0	----	39.1	N(CAV)	
10	16.59000	----	25.8	10.6	----	36.4	----	50.0	----	13.6	N(CAV)	
11	22.12000	----	33.4	10.7	----	44.1	----	50.0	----	5.9	N(CAV)	
12	27.65000	----	22.6	10.8	----	33.4	----	50.0	----	16.6	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	: <u>56 % R.H.</u>	Temperature: <u>23 °C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.209</u>	
Type of Test	: <u>Low Power Transmitter below 1 705 kHz</u>	
Result	: <u>PASSED</u>	

EUT	: Access controller	Date: November 05, 2024 ~ November 08, 2024
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	58.04	V	0	19.7	0.06	77.80	122.5	44.70	PK
0.127	62.19	H	0	20	0.1	82.29	105.53	23.24	PK
0.2	39.39	V	180	20	0.1	59.49	101.58	42.09	PK
0.381	28.91	H	0	19.9	0.12	48.93	95.99	47.06	PK
26.712	19.69	H	245	20.2	0.23	40.12	59.5	19.42	PK

Radiated Emission Tabulated Data below 30 MHz

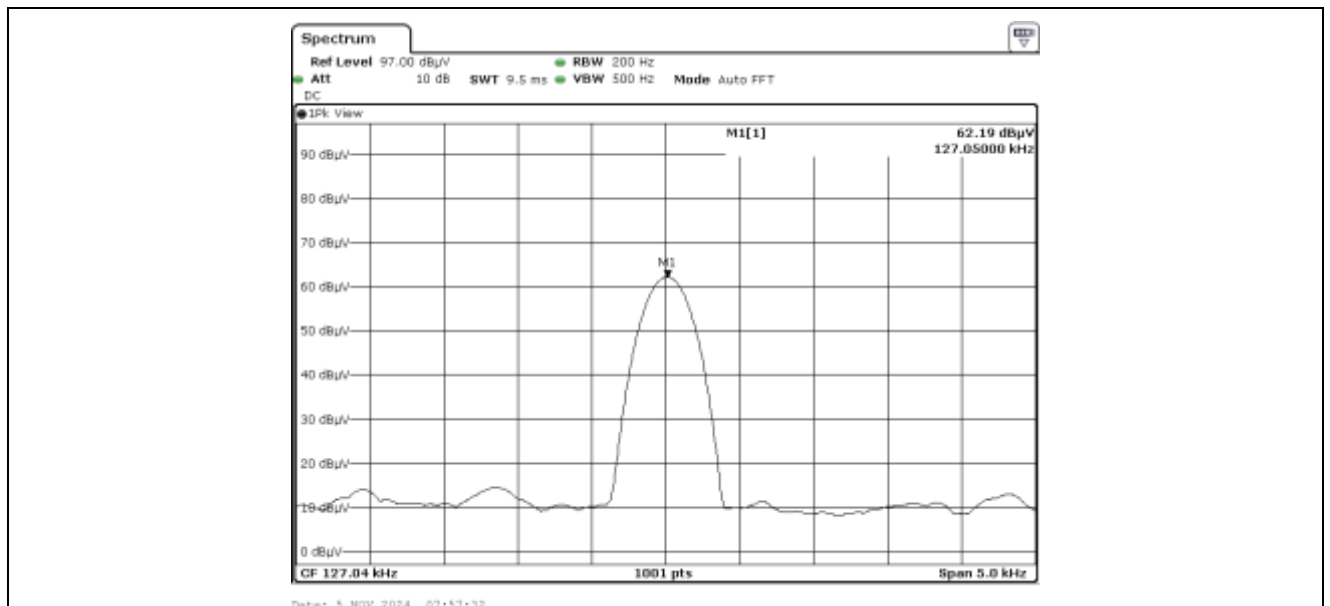
Note: According to the distance of measurements was reduced to 3 m, the limit was extrapolated by using the square of an inverse linear distance extrapolation factor (40 dB/decade) as follows.

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 127.04 kHz

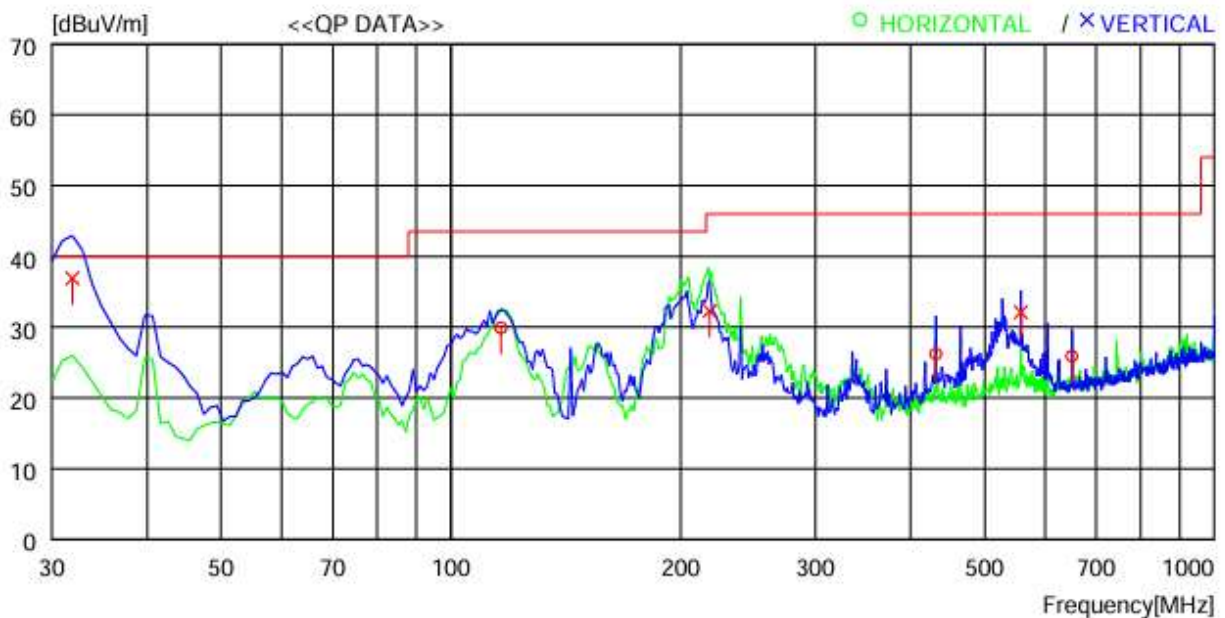


5.3 Radiated Emission Test above 30 MHz

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

Humidity Level : 56 % 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
Result : PASSED

EUT : Access controller Date: November 05, 2024 ~ November 08, 2024
Distance : 3 m



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	116.330	43.3	18.2	1.4	33.0	29.9	43.5	13.6	200	359
2	431.581	34.7	22.0	2.6	33.1	26.2	46.0	19.8	100	0
3	650.796	30.8	25.1	3.3	33.3	25.9	46.0	20.1	200	359
----- Vertical -----										
4	31.940	48.6	20.6	0.7	33.0	36.9	40.0	3.1	100	359
5	218.180	47.2	16.2	1.9	33.0	32.3	46.0	13.7	100	222
6	557.679	38.4	23.9	3.0	33.2	32.1	46.0	13.9	100	359

5.4 Bandwidth of the operating frequency

Humidity Level : 56 % 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 05, 2024 ~ November 08, 2024

Resolution Bandwidth : 0.3 kHz

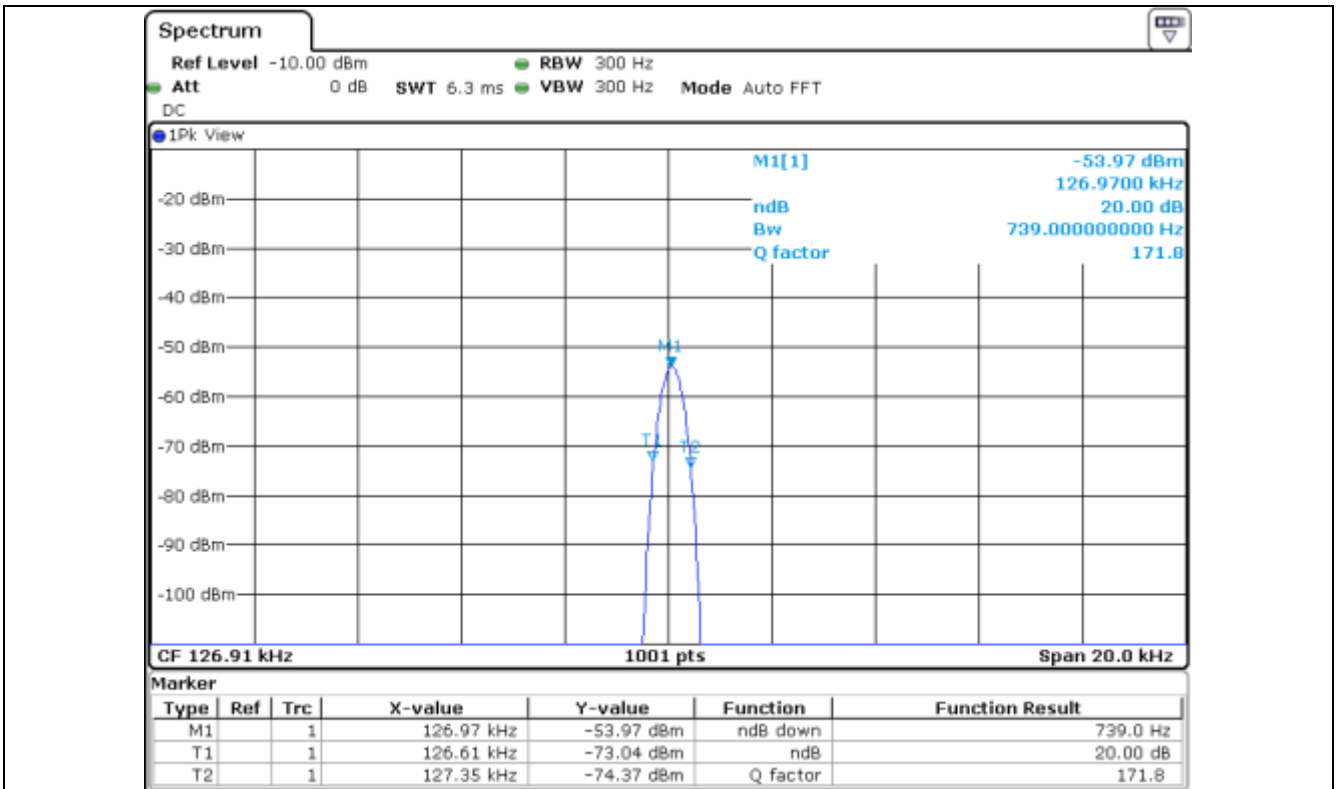
Video Bandwidth : 0.3 kHz

SPAN : 20.0 kHz

Carrier Freq. (kHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
127.04	0.739	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	(dBuV/m)
-	Corrected Result	(dBuV/m)
=	dB Relative to Spec	($\pm$ dB)

7. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
FSV30	Rohde & Schwarz	SIGNAL ANALYZER	101372	Jul. 04, 2024 (1Y)
ESCI	Rohde & Schwarz	Test Receiver	101013	Mar. 12, 2024 (1Y)
310N	Sonoma Instrument	AMPLIFIER	312544	Mar. 11, 2024 (1Y)
HLP-2008	TDK	Hybrid Antenna	131313	Apr. 05, 2023 (2Y)
DT3000	Innco System	Turn Table	DT3000/093	N/A
CO3000	Innco Systems GmbH	Controller	CO3000/904	N/A
MA4000-EP	Innco Systems GmbH	Antenna Master	MA4000/332	N/A
AFC-3030	AC POWER KOREA CO., LTD	AC POWER SOURCE	150121	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 20, 2024 (2Y)
ESCI	Rohde & Schwarz	Test Receiver	101012	Sep. 26, 2024 (1Y)
NSLK8128	Schwarzbeck	V - LISN (4*32/50A)	8128216	Mar. 12, 2024 (1Y)
ESH3-Z2	Rohde & Schwarz	Pulse Limiter	100655	Mar. 12, 2024 (1Y)
SH-242	ESPEC	Environmental Test chamber	0093011138	Jan. 16, 2024 (1Y)
ZUP36-6	TDK-Lambda	DC Power Supply	6MJ-850Z16-0014	Jan. 16, 2024 (1Y)
OPM-303D	ODA	DC Power Supply	oda-01-0923-07199	Jan. 16, 2024 (1Y)