RADIO PERFORMANCE TEST REPORT

Test Report No.	**: OT-222-RWD-054**
Reception No.	**: 2109004351**
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-XFACEPRM**
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	**: February 16, 2022**
Date of Issuing	**: February 25, 2022**

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	Reviewed by	Approved by
Soon-Ki, Choi / Engineer	Tae-Ho, Kim / Senior Manager	Ki-Hong, Nam / General Manager
ONETECH Corp.	ONETECH Corp.	ONETECH Corp.

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

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-222-RWD-054	February 25, 2022	Initial Release	All

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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-XFACEPRM

-. MODEL NO/NAME : UBio-X Face Premium

-. SERIAL NUMBER : N/A

-. DATE : February 25, 2022

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: 2020
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.

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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	125 kHz, 13.56 MHz, 2 402 MHz ~ 2 480 MHz
MODULATION	ASK
ANTENNA TYPE	Coil Antenna, PCB Antenna, Wire Antenna
LIST OF EACH OSC. or CRY. FREQ.(FREQ. >= 1 MHz)	115.709 kHz, 13.558 9 MHz
USED AC/DC ADAPTER	Output : DC 15 V, 4.0 A Model No : KPL-060H-VI Manufacturer : Channel Well Technology (Guangzhow)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: 2020. 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 V10	N/A
Sub Board	N/A	PFaceCPU01 V10	N/A
Wireless Board	N/A	PC10SR01 V10	N/A
LED Board	N/A	PUBXFPLD01 V10	N/A
Connector Board	N/A	PUBXFPUSB01_V10	N/A
Camera Board	N/A	PFaceCamera01 V10	N/A
Display	N/A	N/A	N/A
Camera	N/A	N/A	N/A
Speaker	N/A	N/A	N/A
Wi-Fi & Bluetooth Internet of Things Module	ESPRESSIF SYSTEMS (SHANGHAI) CO., LTD	ESP32-WROOM-32UE	2AC7Z-ESPWROOM32UE
13.56 MHz ANTENNA BOARD	N/A	PC10SA01 V1.0	N/A
125 kHz ANTENNA BOARD	N/A	N/A	N/A
ADAPTER	Channel Well Technology (Guangzhow)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 Premium	UNION COMMUNITY	Access controller (EUT)	-
KPL-060H-VI	Channel Well Technology (Guangzhow)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: 2020 to determine the worse operating conditions.

Radiated Emission Test : Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2020 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, PCB Antenna and Wire 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 : 48 % R.H. Temperature: 22 ºC

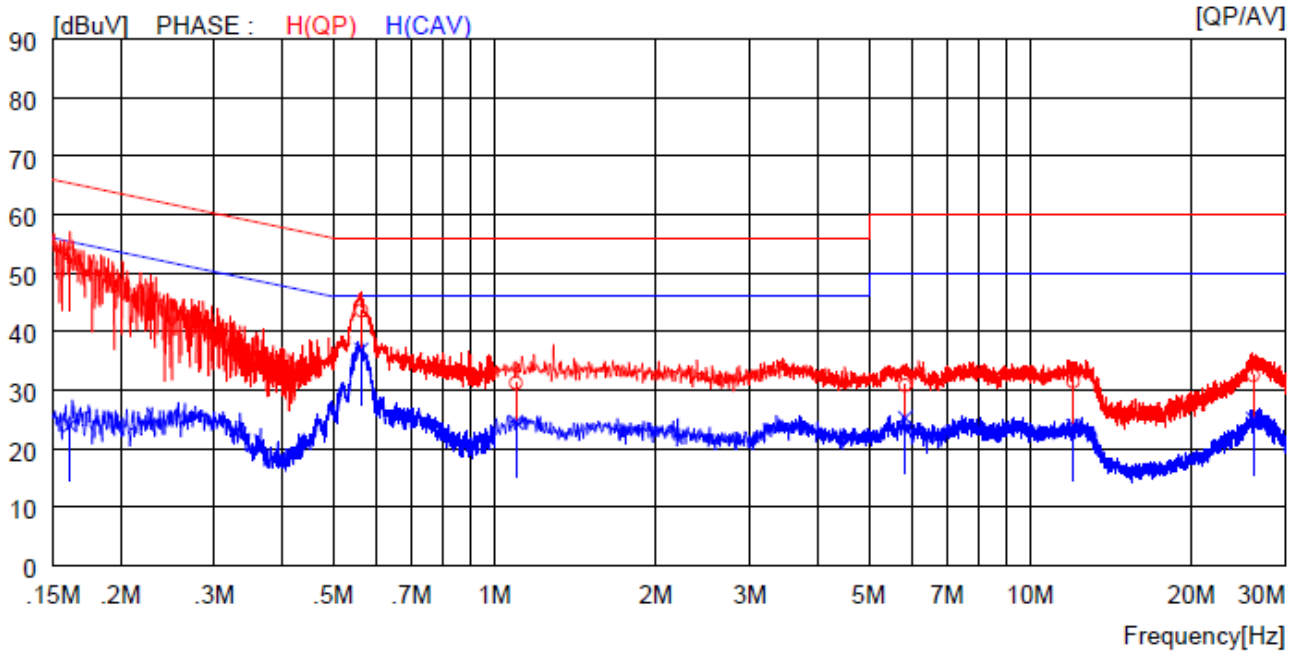
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)

Result : PASSED

EUT : Access controller Date: February 16, 2022 ~ February 22, 2022

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

Tested Line : HOT 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	0.16100	43.2	----	10.0	53.2	----	65.4	----	12.2	----	H(QP)
2	0.56400	33.6	----	10.0	43.6	----	56.0	----	12.4	----	H(QP)
3	1.09600	21.1	----	10.1	31.2	----	56.0	----	24.8	----	H(QP)
4	5.84000	20.6	----	10.2	30.8	----	60.0	----	29.2	----	H(QP)
5	12.03000	21.1	----	10.3	31.4	----	60.0	----	28.6	----	H(QP)
6	26.10000	22.0	----	10.5	32.5	----	60.0	----	27.5	----	H(QP)
7	0.16100	----	14.0	10.0	----	24.0	----	55.4	----	31.4	H(CAV)
8	0.56400	----	26.9	10.0	----	36.9	----	46.0	----	9.1	H(CAV)
9	1.09600	----	14.4	10.1	----	24.5	----	46.0	----	21.5	H(CAV)
10	5.84000	----	15.0	10.2	----	25.2	----	50.0	----	24.8	H(CAV)
11	12.03000	----	13.6	10.3	----	23.9	----	50.0	----	26.1	H(CAV)
12	26.10000	----	14.5	10.5	----	25.0	----	50.0	----	25.0	H(CAV)

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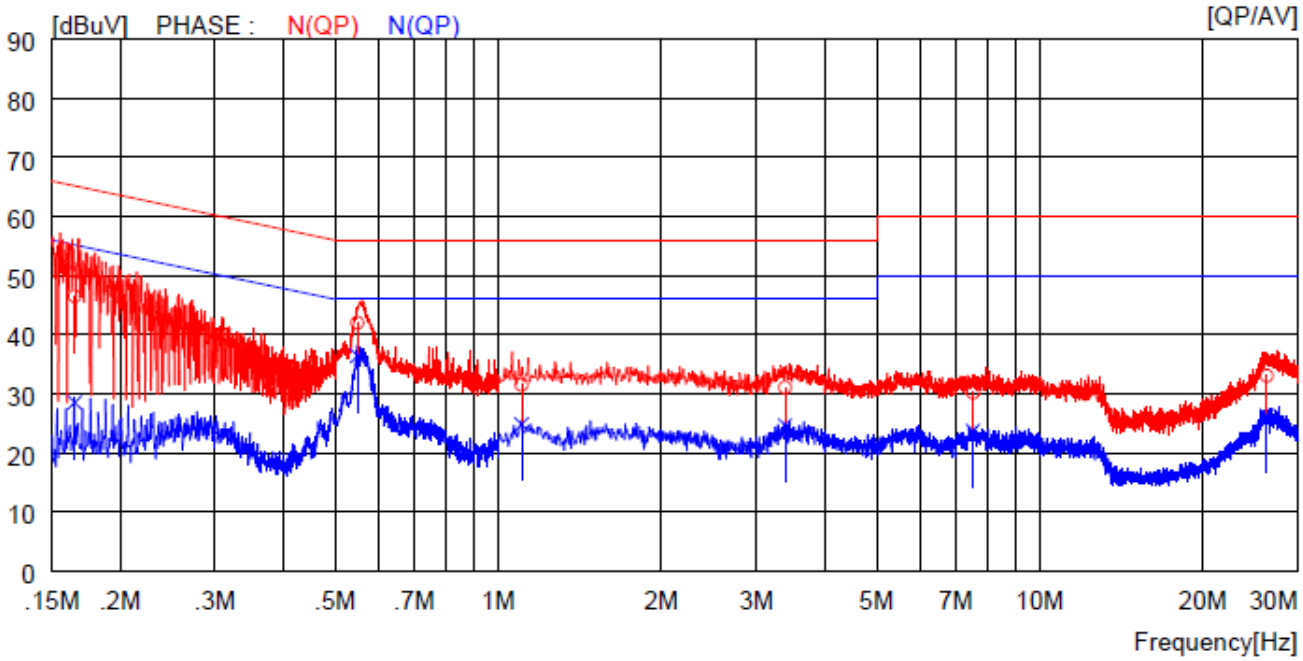
Tested Line : NEUTRAL LINE



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	0.16500	36.5	----	10.0	46.5	----	65.2	----	18.7	----	N(QP)
2	0.54900	32.0	----	10.0	42.0	----	56.0	----	14.0	----	N(QP)
3	1.10400	21.4	----	10.1	31.5	----	56.0	----	24.5	----	N(QP)
4	3.38400	20.9	----	10.1	31.0	----	56.0	----	25.0	----	N(QP)
5	7.52500	20.0	----	10.2	30.2	----	60.0	----	29.8	----	N(QP)
6	26.27000	22.5	----	10.5	33.0	----	60.0	----	27.0	----	N(QP)
7	0.16500	----	18.5	10.0	----	28.5	----	55.2	----	26.7	N(CAV)
8	0.54900	----	26.4	10.0	----	36.4	----	46.0	----	9.6	N(CAV)
9	1.10400	----	14.7	10.1	----	24.8	----	46.0	----	21.2	N(CAV)
10	3.38400	----	14.5	10.1	----	24.6	----	46.0	----	21.4	N(CAV)
11	7.52500	----	13.5	10.2	----	23.7	----	50.0	----	26.3	N(CAV)
12	26.27000	----	15.7	10.5	----	26.2	----	50.0	----	23.8	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 : 48 % R.H. Temperature: 22 ºC

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: February 16, 2022 ~ February 22, 2022

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
0.009	31.11	H	15	18.6	0.1	49.81	346.6	296.79
0.02	32.00	V	45	18.6	0.1	50.70	200	149.30
0.115 7	45.30	H	0	18.9	0.1	64.3	100.74	36.44
0.348	28.57	H	115	18.9	0.1	47.57	86.8	39.23
0.737	28.24	H	145	18.8	0.1	47.14	72.5	25.36
25.814	17.50	H	30	18.8	0.1	36.4	70.0	33.60

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 : 48 % R.H. Temperature: 22 ºC

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

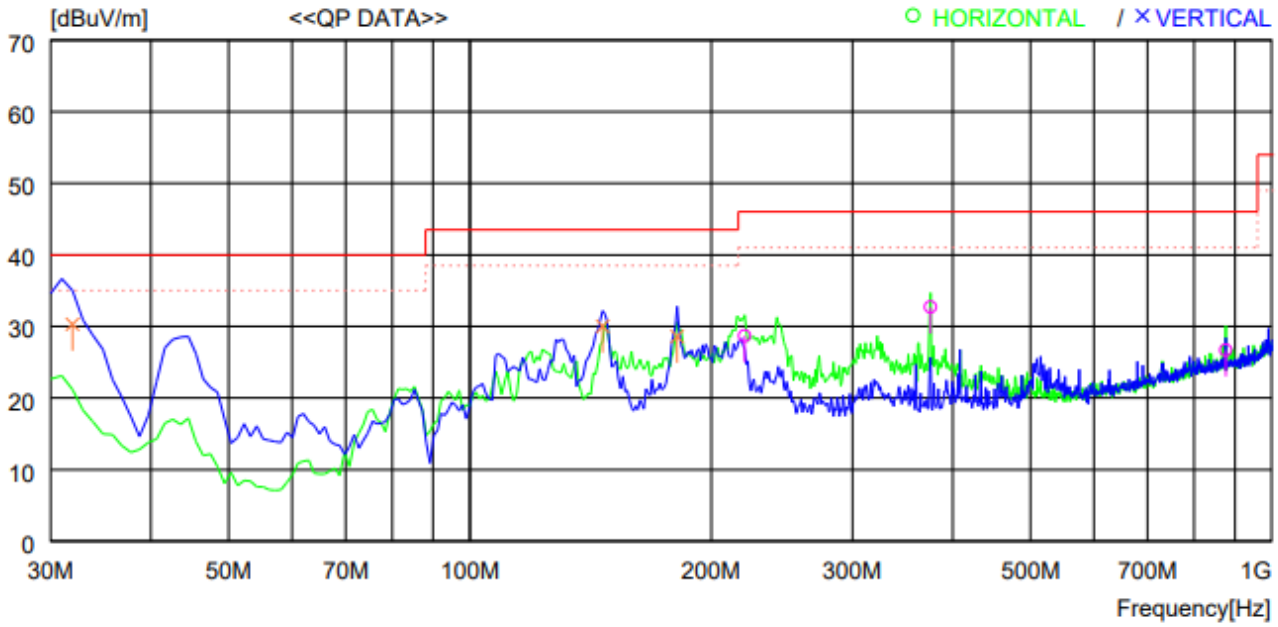
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Type of Test : Low Power Transmitter below 1 705 kHz

Result : PASSED

EUT : Access controller Date: February 16, 2022 ~ February 22, 2022

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	220.120	43.3	**15.6**	2.8	33.0	28.7	46.0	17.3	100	111
2	375.320	41.5	**20.4**	3.8	33.0	32.7	46.0	13.3	100	255
3	875.830	26.2	**27.4**	5.8	32.7	26.7	46.0	19.3	100	0
----- Vertical ------										
4	31.940	42.1	**20.3**	1.0	33.1	30.3	40.0	9.7	100	324
5	146.400	41.8	**18.9**	2.3	33.0	30.0	43.5	13.5	100	187
6	181.320	42.6	**16.5**	2.5	33.0	28.6	43.5	14.9	100	359

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5.4 Bandwidth of the operating frequency

Humidity Level : 48 % R.H. Temperature: 22 ºC

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: February 16, 2022 ~ February 22, 2022

Resolution Bandwidth : 0.3 kHz

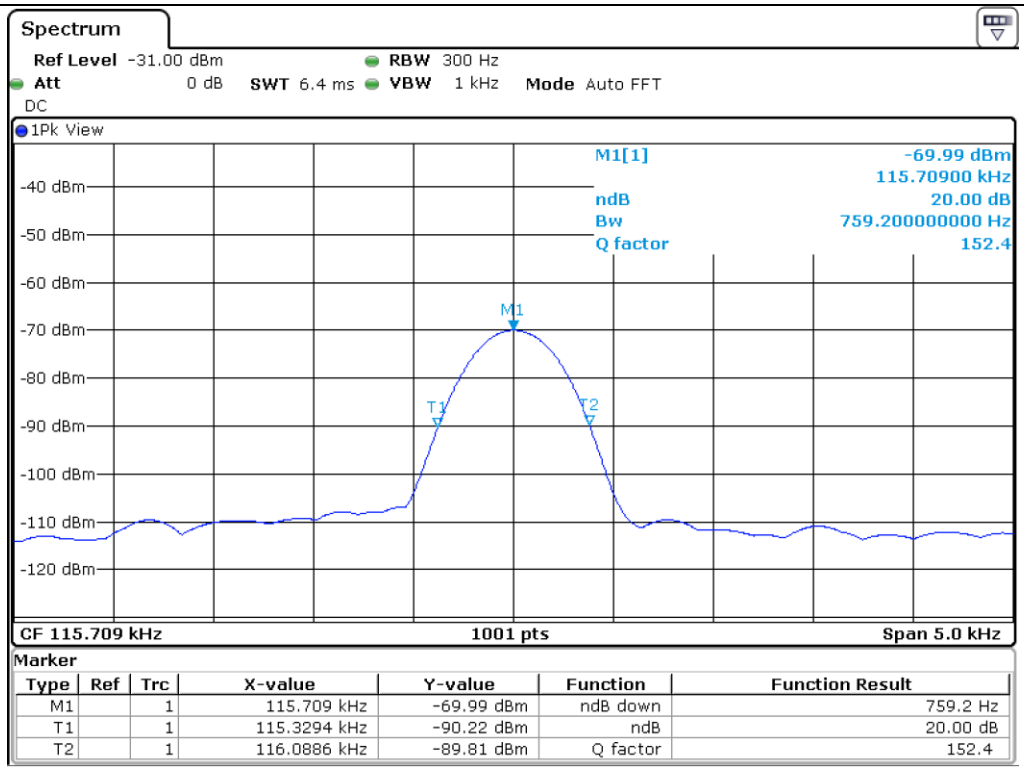
Video Bandwidth : 1.0 kHz

SPAN : 5.00 kHz

Carrier Freq. (kHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
115.709	0.759 2	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	(dBμV)
-	Amplifier Gain	(dB)
+	Cable Loss	(dB)
-	Antenna Factor	(dB/m)
=	Corrected Result	(dBμV/m)

Margin (dB)

	Specification Limit	(dBuV/m)
-	Corrected Result	(dBuV/m)
=	dB Relative to Spec	(± dB)

7. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
ESR	Rohde & Schwarz	EMI Test Receiver	101470	Oct. 18, 2021 (1Y)
ESR	Rohde & Schwarz	EMI Test Receiver	102602	Mar. 15, 2021 (1Y)
FSV30	Rohde & Schwarz	SIGNAL ANALYZER	101372	Jul. 14, 2021 (1Y)
310N	Sonoma Instrument	AMPLIFIER	312544	Mar. 16, 2021 (1Y)
HLP-2008	TDK	Hybrid Antenna	131313	Feb. 27, 2020 (2Y)
NSLK8128	Schwarzbeck	V-LISN (4 * 16/25A)	8126404	Mar. 16, 2021 (1Y)
ESH3-Z2	Rohde & Schwarz	Pulse Limiter	100655	Mar. 15, 2021 (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. 6, 2020 (2Y)
PSL-2KP	ESPEC	Environmental Test Chamber	14009407	Jan. 18, 2022 (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. 03, 2022 (1Y)

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