

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test Report No. : OT-196-RWD-001

AGR No. : A194A-151R

Applicant : UNION COMMUNITY

Address : Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, South Korea

Manufacturer : UNION COMMUNITY

Address : Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, South Korea

Type of Equipment : Access controller

FCC ID : XX2-UBIO-XSLIM-RF

Model Name : UBio-X Slim RF

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 15 pages (including this page)

Date of Incoming : May 10, 2019

Date of Issuing : June 04, 2019

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.

Reviewed by: 

 Tae-Ho, Kim / Senior Manager
 ONETECH Corp.

Approved by: 

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 ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-196-RWD-001	June 04, 2019	Initial Release	All

1. VERIFICATION OF COMPLIANCE

- . APPLICANT : UNION COMMUNITY
- . ADDRESS : Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, South Korea
- . CONTACT PERSON : KyungWook, Han
- . TELEPHONE NO : +82-2-6488-3027
- . FCC ID : XX2-UBIO-XSLIM-RF
- . MODEL NO/NAME : UBio-X Slim RF
- . SERIAL NUMBER : N/A
- . DATE : June 04, 2019

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	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.

2. GENERAL INFORMATION

2.1 Product Description

The UNION COMMUNITY, Model UBio-X Slim 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	132.5 kHz, 2 402 MHz ~ 2 480 MHz
MODULATION	ASK
ANTENNA TYPE	Coil Antenna
LIST OF EACH OSC. OR CRY. FREQ.(FREQ .>= 1 MHz)	1.4 MHz, 1.5 MHz, 32.768 kHz, 24 MHz, 25 MHz, 7.327 28 MHz, 8 MHz, 27.12 MHz, 1.4 GHz,
USED AC/DC ADAPTER	OUTPUT: DC 12 V, 3.5 A Model No : DSA-42PFB-12 1 120350 Manufacturer : Dee Van Electronics(Longchuan)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-4112/ C-14617/ G-10666 / T-1842

IC (Industry Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

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	PFXSMA01 V1.0 RSE20	N/A
SUB BOARD	N/A	PFXSRF01 V1.0 RSE20	N/A
FINGERPRINT BOARD	N/A	PFNSSESMA01 V10 RJL16	N/A
LED BOARD	N/A	PFXSLD01 V10 RSE20	N/A
DISPLAY	KJC Display Corp	FPC-RT050T101-G2 V1	N/A
SPEAKER	N/A	N/A	N/A
CAMERA MODULE	N/A	N/A	N/A
Bluetooth LE Module	PROCHILD INC.	PBLN51822m	2AEEY-PBLN51822M
ANTENNA	N/A	N/A	N/A
ADAPTER	Dee Van Electronics (Longchuan) Co., Ltd	DSA-42PFB-12 1 120350	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 Slim RF	UNION COMMUNITY	Access controller (EUT)	-
DSA-42PFB-12 1 120350	Dee Van Electronics (Longchuan) Co., Ltd	ADAPTER	EUT
Ideapad330	LENOVO	Notebook PC	EUT
PA-1450-55LR	LITE-ON TECHNOLOGY	ADAPTER	-
N/A	N/A	Door Open Switch	EUT
N/A	N/A	Door lock	EUT
N/A	N/A	Card	-

3.3 Mode of operation during the test

-. The EUT has 132.5 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 Chip 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

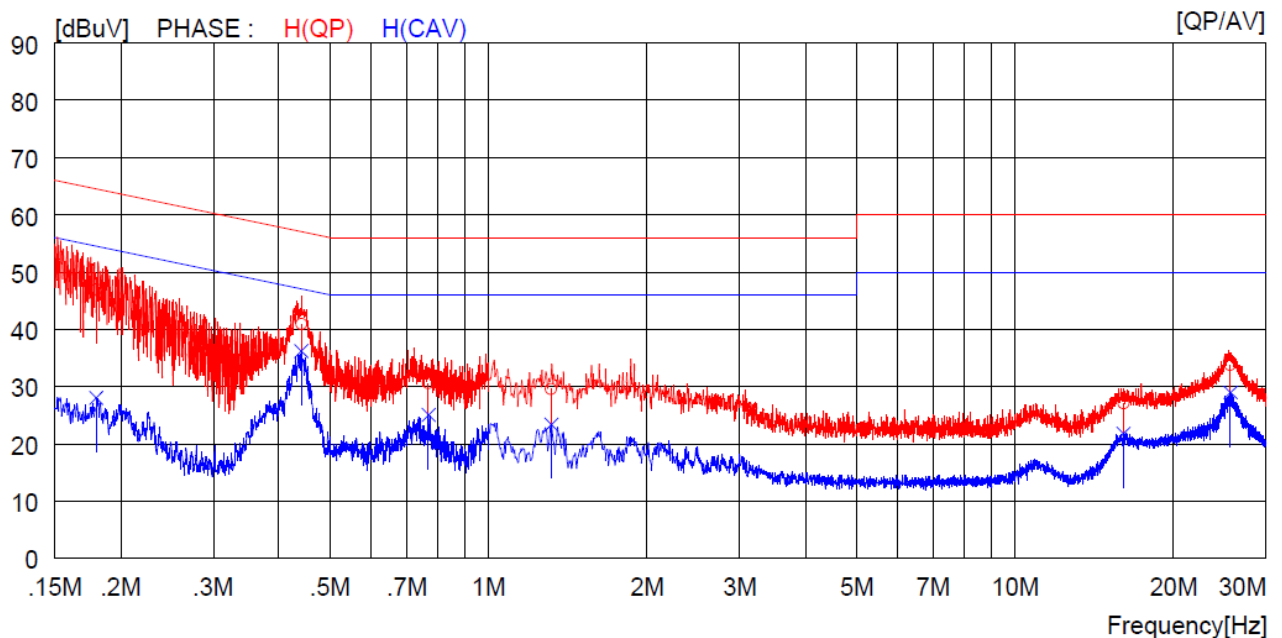
5. FINAL RESULT OF 132.5 kHz MEASUREMENT

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

5.1 Conducted Emission Test

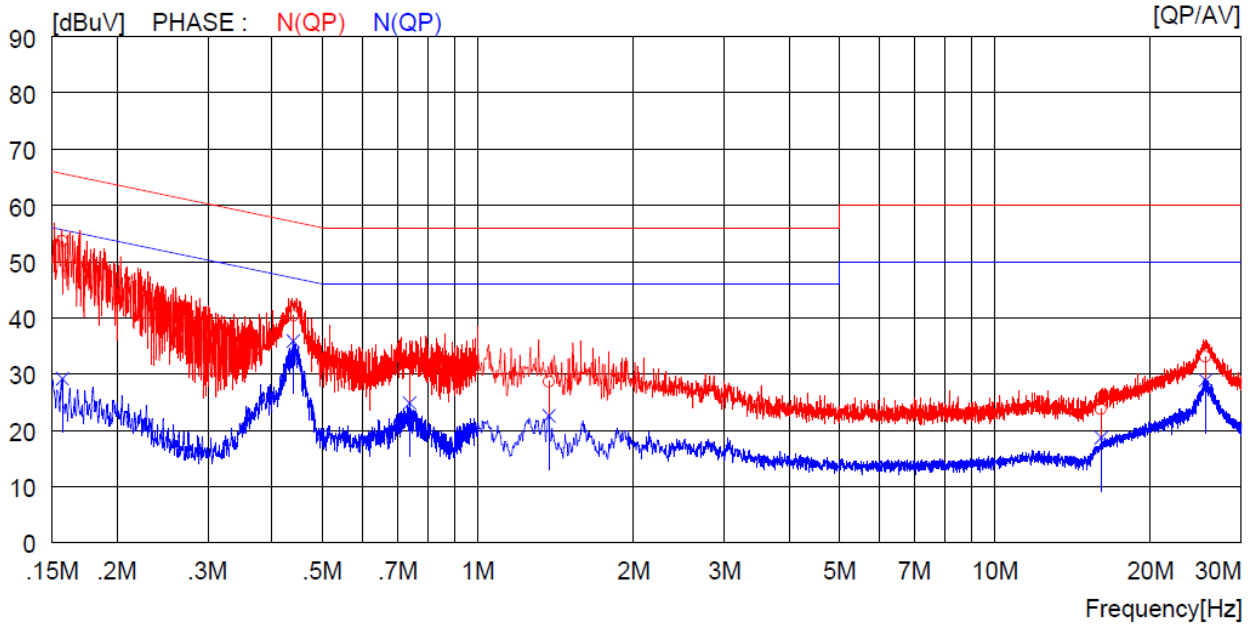
Humidity Level : (49 ~ 50) % R.H. Temperature: (22 ~ 23) °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)
 Result : PASSED

EUT : Access controller Date: May 15, 2019
 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]			
1	0.18000	36.9	----	10.1	47.0	----	64.5	----	17.5	----	H (QP)
2	0.44100	30.8	----	10.1	40.9	----	57.0	----	16.1	----	H (QP)
3	0.76900	20.5	----	10.1	30.6	----	56.0	----	25.4	----	H (QP)
4	1.31600	19.5	----	10.1	29.6	----	56.0	----	26.4	----	H (QP)
5	16.08000	16.6	----	10.4	27.0	----	60.0	----	33.0	----	H (QP)
6	25.65000	23.3	----	10.4	33.7	----	60.0	----	26.3	----	H (QP)
7	0.18000	----	17.9	10.1	----	28.0	----	54.5	----	26.5	H (CAV)
8	0.44100	----	26.1	10.1	----	36.2	----	47.0	----	10.8	H (CAV)
9	0.76900	----	15.0	10.1	----	25.1	----	46.0	----	20.9	H (CAV)
10	1.31600	----	13.3	10.1	----	23.4	----	46.0	----	22.6	H (CAV)
11	16.08000	----	11.4	10.4	----	21.8	----	50.0	----	28.2	H (CAV)
12	25.65000	----	18.6	10.4	----	29.0	----	50.0	----	21.0	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	0.15700	43.6	----	10.1	53.7	----	65.6	----	11.9	----	N (QP)
2	0.43900	30.3	----	10.1	40.4	----	57.1	----	16.7	----	N (QP)
3	0.73700	21.9	----	10.1	32.0	----	56.0	----	24.0	----	N (QP)
4	1.37200	18.5	----	10.1	28.6	----	56.0	----	27.4	----	N (QP)
5	16.07000	13.3	----	10.4	23.7	----	60.0	----	36.3	----	N (QP)
6	25.58000	22.7	----	10.4	33.1	----	60.0	----	26.9	----	N (QP)
7	0.15700	----	19.0	10.1	----	29.1	----	55.6	----	26.5	N (CAV)
8	0.43900	----	25.8	10.1	----	35.9	----	47.1	----	11.2	N (CAV)
9	0.73700	----	14.7	10.1	----	24.8	----	46.0	----	21.2	N (CAV)
10	1.37200	----	12.5	10.1	----	22.6	----	46.0	----	23.4	N (CAV)
11	16.07000	----	8.3	10.4	----	18.7	----	50.0	----	31.3	N (CAV)
12	25.58000	----	18.5	10.4	----	28.9	----	50.0	----	21.1	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.

이태선

Tested by: Tae Sun, Lee / Engineer

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: May 23, 2019 ~ May 27, 2019
 Distance : 3 m

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)
0.015	43.26	H	1	180	20.01	0.05	63.32	183.5	120.18
0.033	40.24	H	1	180	20.11	0.06	60.41	177.8	117.39
0.064	36.58	H	1	180	20.15	0.05	56.78	171.6	114.82
0.132 5	68.36	H	1	360	20.23	0.05	88.64	165.7	77.06
0.248	44.62	H	1	360	20.23	0.06	64.91	159.6	94.69
0.663	35.28	H	1	180	20.25	0.07	55.6	110.9	55.30

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

이태선

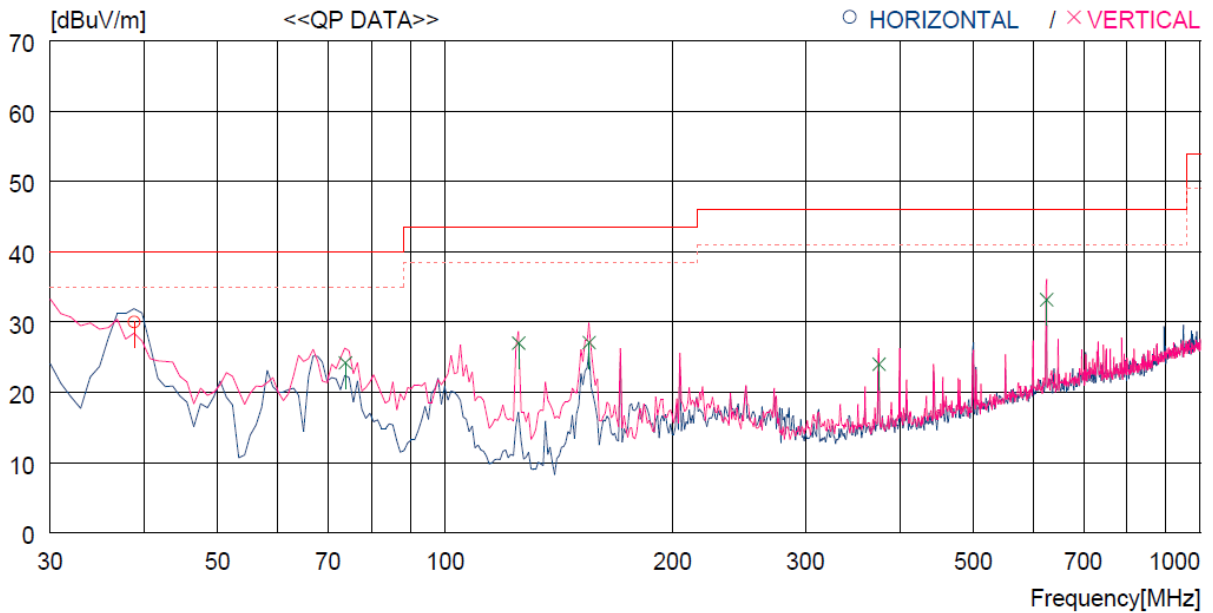
Tested by: Tae Sun, Lee / Engineer

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 ~ 50) % R.H. Temperature: (22 ~ 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: May 15, 2019
 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	38.750	47.4	14.0	1.7	33.1	30.0	40.0	10.0	200	124
----- Vertical -----										
2	73.750	46.3	8.7	2.3	33.1	24.2	40.0	15.8	200	359
3	125.100	47.4	9.7	2.9	33.0	27.0	43.5	16.5	200	231
4	155.150	48.2	8.6	3.3	33.0	27.1	43.5	16.4	200	359
5	375.310	36.9	15.3	5.0	33.2	24.0	46.0	22.0	400	359
6	625.580	40.4	19.6	6.6	33.4	33.2	46.0	12.8	200	359

이태선

Tested by: Tae Sun, Lee / Engineer

5.4 Bandwidth of the operating frequency

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

EUT : Access controller Date: May 23, 2019 ~ May 27, 2019
 Resolution Bandwidth : 1.0 kHz
 Video Bandwidth : 3.0 kHz
 SPAN : 10.00 kHz

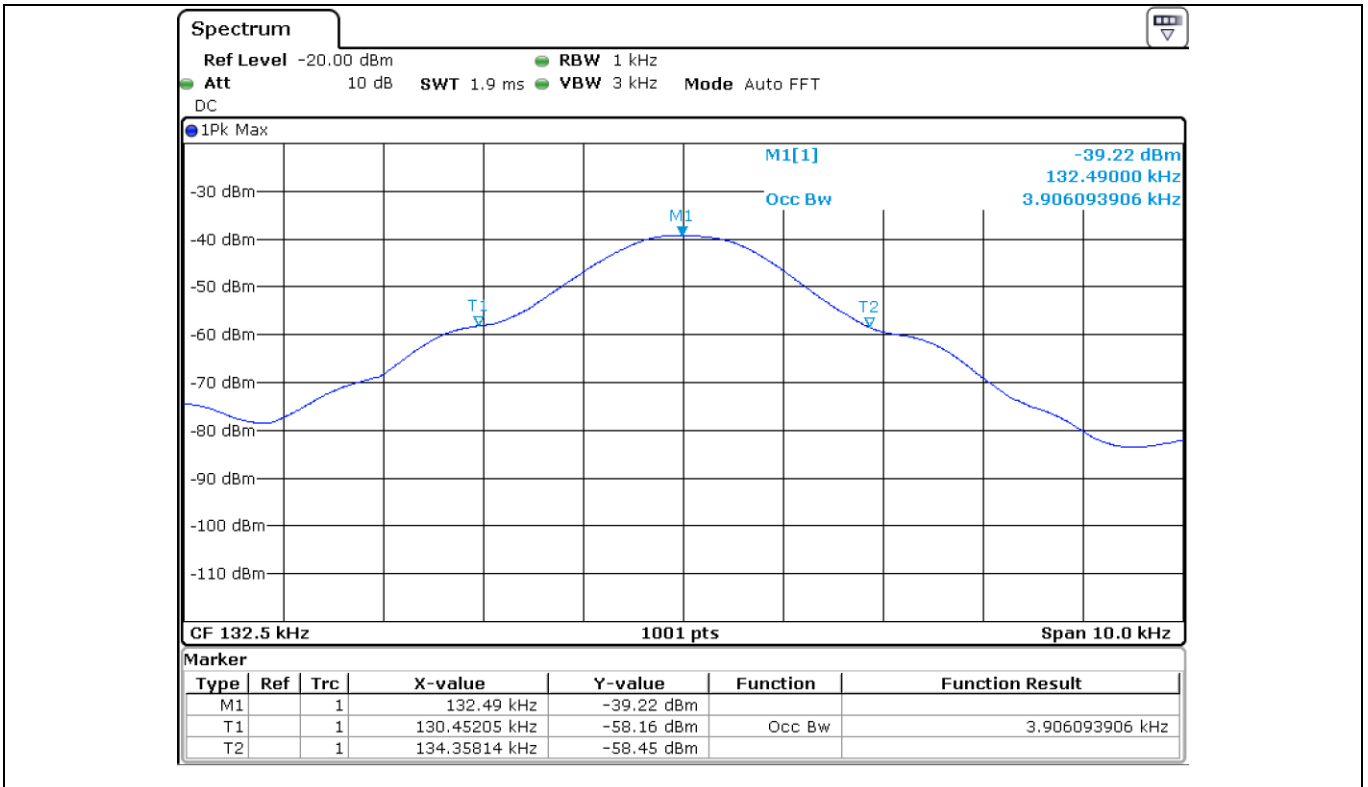
Carrier Freq. (kHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
132.5	3.906	None	<u>The point 20 dB down from the modulated carrier</u>

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

이태선

Tested by: Tae Sun, Lee / Engineer

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)
<hr/>		
=	Corrected Result	(dB μ V/m)
Margin (dB)		
	Specification Limit	(dBuV/m)
-	Corrected Result	(dBuV/m)
<hr/>		
=	dB Relative to Spec	(\pm dB)

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESCI	101012	Oct. 22, 2018	One Year	-
2.		R/S	ESR	101470	Oct. 22, 2018	One Year	■
3.		R/S	ESPI	101278	Oct. 20, 2018	One Year	■
4.	Spectrum analyzer	R/S	FSV30	101372	Aug. 23, 2018	One Year	■
5.	Amplifier	Sonoma Instrument	310N	312544	Mar. 18, 2019	One Year	■
6.	Amplifier	Sonoma Instrument	310N	312545	Mar. 18, 2019	One Year	-
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-255	Jun. 05, 2018	Two Year	■
8.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-419	Aug. 09, 2018	Two Year	-
9.	Controller	Innco System	CO3000	CO3000/904/ 37211215/L	N/A	N/A	■
10.	LISN	EMCO	3825/2	9109-1867	Mar. 27, 2019	One Year	-
				9109-1869	Mar. 19, 2019	One Year	■
		Schwarzbeck	NNLK8121	804	Oct. 22, 2018	One Year	■
		Schwarzbeck	NSLK8128	8128-216	Mar. 20, 2019	One Year	■
11.	Turn Table	Innco System	DT3000	930611	N/A	N/A	■
12.	Antenna Master	Innco System	MA4000-EP	MA4000/332	N/A	N/A	-
13.	Antenna Master	Innco System	MA-4000XPET	MA4000/509	N/A	N/A	■
14.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-235	May 13, 2018	Two Year	■
15.	Frequency Counter	HP	53152A	US39270295	Aug. 23, 2018	One Year	■
16.	Environmental Test Chamber	ESPEC	PSL-2KP	14009407	Feb. 22, 2019	One Year	■
17.	DC Power Supply	Protek	PWS-3003D	4020409	Aug. 24, 2018	One Year	■