ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test Report No.	**: W167R-D052**
AGR No.	**: A166A-002R**
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-AC1100RF**
Model Name	**: AC1100 RF**
Serial number	**: N/A**
Total page of Report	**: 15 pages (including this page)**
Date of Incoming	**: June 09, 2016**
Date of Issuing	**: July 13, 2016**

SUMMARY

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

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: Ki-Hong, Nam / Asst, Chief Engineer
ONETECH Corp.

Approved by: Sung-Ik, Han/ Managing Director
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

Issue Report No.	Issued Date	Revisions	Effect Section
W167R-D052	July 13, 2016	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : UNION COMMUNITY

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

-. CONTACT PERSON : KyungWook, Han / Manager

-. TELEPHONE NO : +82-2-6488-3027

-. FCC ID : XX2-AC1100RF

-. MODEL NO/NAME : AC1100 RF

-. SERIAL NUMBER : N/A

-. DATE : July 13, 2016

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.

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2. GENERAL INFORMATION

2.1 Product Description

The UNION COMMUNITY, Model AC1100 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	Fixed Device
MODULATION	ASK
TRANSMITTING FREQUENCY	126 kHz
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1 MHz)	2 480 MHz, 400 MHz, 24 MHz, 8 MHz, 32.768 kHz
ANTENNA TYPE	Copper Coil Antenna
USED AC/DC ADAPTER	Output: DC 12 V, 3.5 A Model No: DSA-42D-12 1 120350 Manufacturer: Dee Van Electronics(Longchuan)Co., Ltd.
EXTERNAL CONNECTOR	DC IN , LAN Port, Wiegand(1), Wiegand(2)

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 15.207and 15.209.

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.

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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-4617/ G-666/ T-1842

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

-. Site Accreditation:

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

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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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	PCMKC1MA01V10	N/A
CARD READERS BOARD	N/A	PCMKC1SC01V10	N/A
DISPLAY	N/A	N/A	N/A
SOUND BOARD	N/A	N/A	N/A
Bluetooth LE Module	PROCHILD INC.	PBLN51822m	2AEEY-PBLN51822m
ADAPTER	Dee Van Electronics (Longchuan)Co., Ltd.	DSA-42D-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
AC1100 RF	UNION COMMUNITY	Access controller (EUT)	-
DSA-42D-12 1 120350	Dee Van Electronics(Longchuan)Co., Ltd.	AC ADAPTER	EUT
N/A	N/A	Door Open Switch	-
N/A	N/A	Door lock	-
Pavilion dv3	HP	Notebook PC	EUT
LA65NS2-01	LITE-ON TECHNOLOGY CORPORATION	AC ADAPTER	-

3.3 Mode of operation during the test

-. The EUT has 126 kHz RF boards for reading card and program was used for making continuous transmission mode during the test.

3.4 Equipment Modifications

-. None

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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 Copper Coil 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)
Tx 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)
Tx Mode	X

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5. FINAL RESULT OF 125 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 : 46.1 % R.H. Temperature: 23.2 ℃

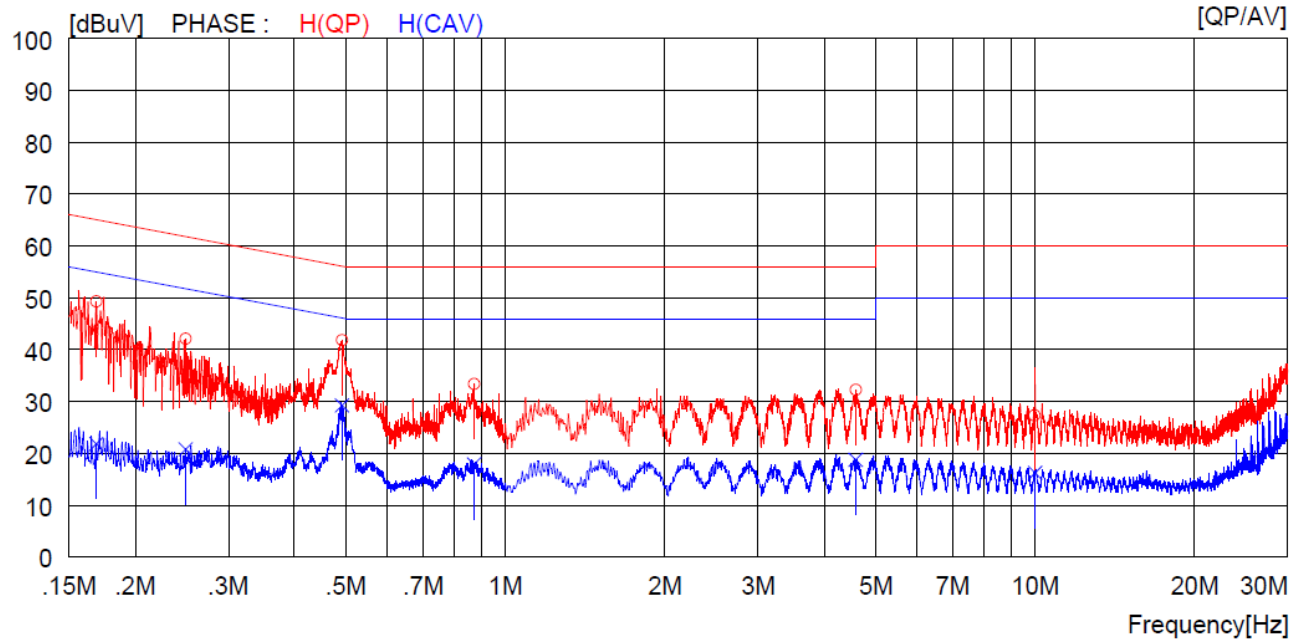
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)

Result : PASSED

EUT : Access controller Date: July 01, 2016

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

Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.16900	39.2	----	10.1	49.3	----	65.0	----	15.7	----	H(QP)
2	0.24900	31.9	----	10.1	42.0	----	61.8	----	19.8	----	H(QP)
3	0.49200	31.7	----	10.1	41.8	----	56.1	----	14.3	----	H(QP)
4	0.87300	23.3	----	10.1	33.4	----	56.0	----	22.6	----	H(QP)
5	4.58800	22.0	----	10.2	32.2	----	56.0	----	23.8	----	H(QP)
6	10.00000	16.9	----	10.4	27.3	----	60.0	----	32.7	----	H(QP)
7	0.16900	----	11.7	10.1	----	21.8	----	55.0	----	33.2	H(CAV)
8	0.24900	----	10.7	10.1	----	20.8	----	51.8	----	31.0	H(CAV)
9	0.49200	----	19.1	10.1	----	29.2	----	46.1	----	16.9	H(CAV)
10	0.87300	----	7.8	10.1	----	17.9	----	46.0	----	28.1	H(CAV)
11	4.58800	----	8.5	10.2	----	18.7	----	46.0	----	27.3	H(CAV)
12	10.00000	----	5.8	10.4	----	16.2	----	50.0	----	33.8	H(CAV)

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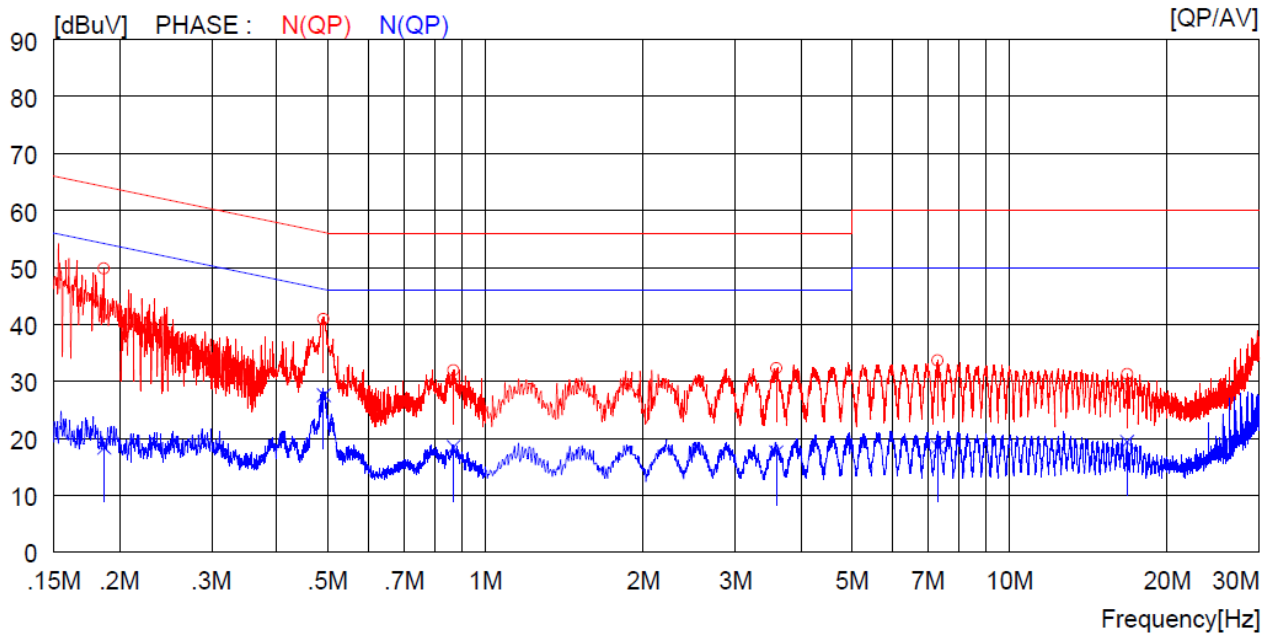
Tested Line : NEUTRAL LINE



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	0.18700	39.7	----	10.1	49.8	----	64.2	----	14.4	----	N(QP)
2	0.49100	30.8	----	10.1	40.9	----	56.2	----	15.3	----	N(QP)
3	0.86900	21.8	----	10.1	31.9	----	56.0	----	24.1	----	N(QP)
4	3.59200	22.2	----	10.1	32.3	----	56.0	----	23.7	----	N(QP)
5	7.30500	23.4	----	10.2	33.6	----	60.0	----	26.4	----	N(QP)
6	16.78000	20.8	----	10.5	31.3	----	60.0	----	28.7	----	N(QP)
7	0.18700	----	8.2	10.1	----	18.3	----	54.2	----	35.9	N(CAV)
8	0.49100	----	17.5	10.1	----	27.6	----	46.2	----	18.6	N(CAV)
9	0.86900	----	8.4	10.1	----	18.5	----	46.0	----	27.5	N(CAV)
10	3.59200	----	7.5	10.1	----	17.6	----	46.0	----	28.4	N(CAV)
11	7.30500	----	8.3	10.2	----	18.5	----	50.0	----	31.5	N(CAV)
12	16.78000	----	8.9	10.5	----	19.4	----	50.0	----	30.6	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.

Tested by: Seok-Jun, Lee / Engineer

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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 : 49.8 % R.H. Temperature : 24.2 ˚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: June 23, 2016

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)
0.014	40.84	H	1	180	21.54	0.12	62.5	124.7	62.20
0.033	43.53	H	1	360	19.43	0.12	63.08	117.2	54.12
0.046	42.28	H	1	360	18.95	0.14	61.37	114.3	52.93
0.126	72.94	H	1	360	19.03	0.19	92.16	105.6	13.44
0.253	51.38	H	1	180	19.01	0.21	70.6	99.5	28.90
0.431	48.44	H	1	180	18.94	0.23	67.61	94.9	27.29

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

Tested by: Seok-Jun, Lee / Engineer

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

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 : 46.1 % R.H. Temperature: 23.2 ℃

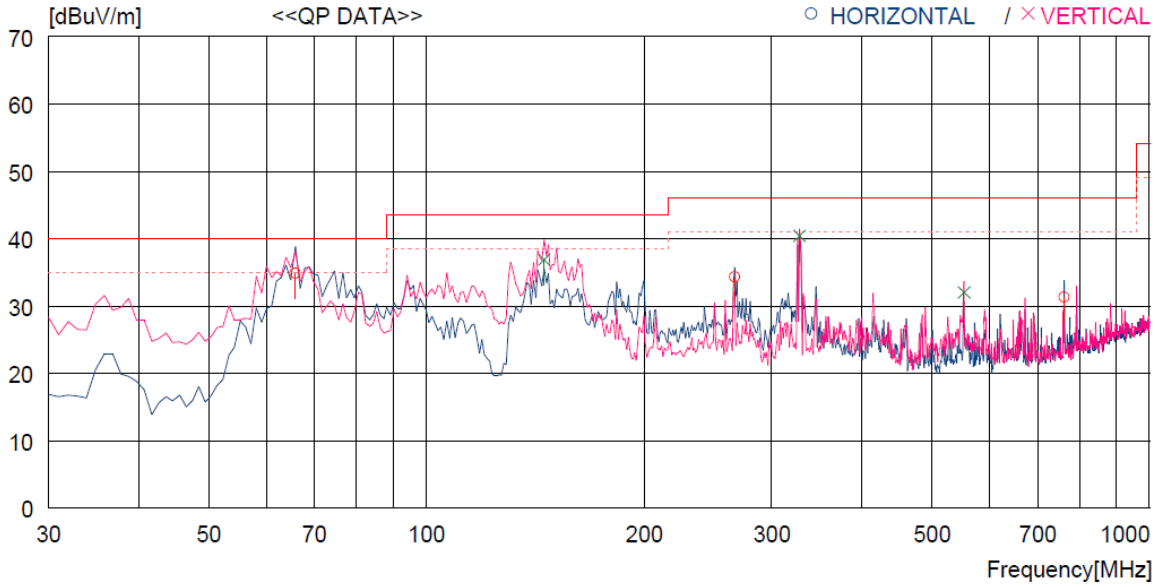
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

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

Type of Test : Low Power Transmitter below 1 705 kHz

EUT : Access controller Date: June 01, 2016

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	65.890	54.5	11.2	2.2	33.1	34.8	40.0	5.2	300	358
2	266.680	50.3	12.6	4.2	32.8	34.3	46.0	11.7	100	162
3	762.343	37.2	20.0	7.7	33.6	31.3	46.0	14.7	100	0
----- Vertical ------										
4	145.430	58.6	8.1	3.2	33.0	36.9	43.5	6.6	100	138
5	327.790	54.1	14.1	4.8	32.6	40.4	46.0	5.6	100	359
6	553.799	40.2	18.1	6.8	33.1	32.0	46.0	14.0	100	131

Tested by: Seok-Jun, Lee / Engineer

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

5.4 Bandwidth of the operating frequency

Humidity Level : 48.2 % R.H. Temperature: 23.8℃

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: June 23, 2016

Resolution Bandwidth : 0.3 kHz

Video Bandwidth : 1.0 kHz

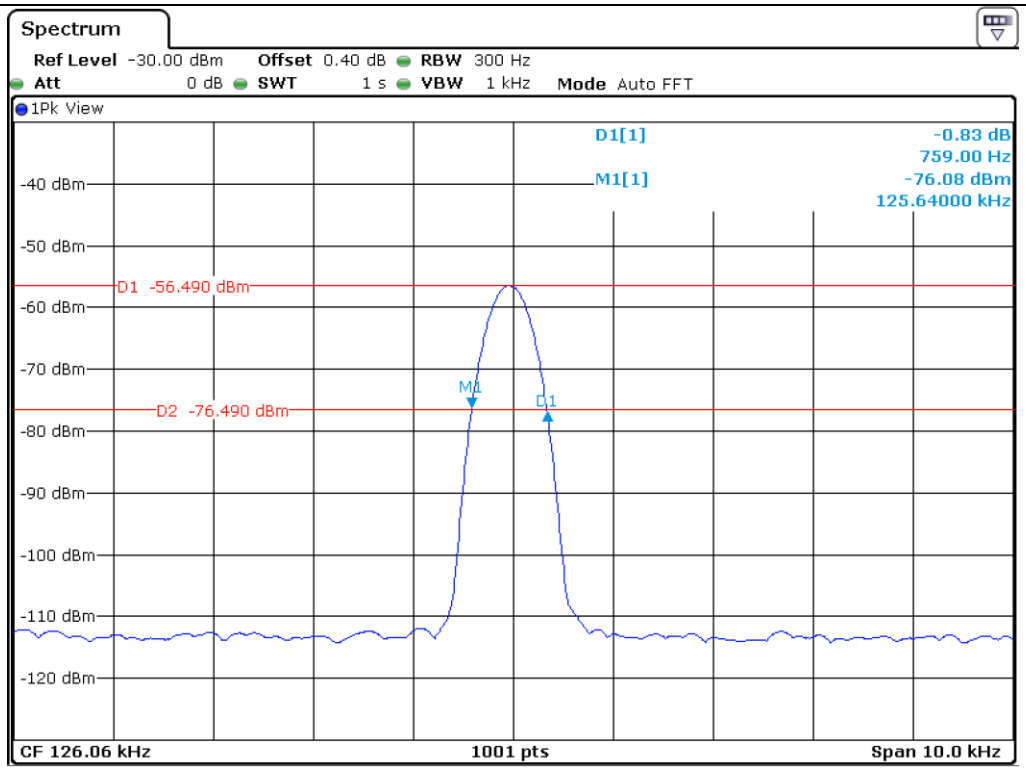
SPAN : 10.00 kHz

Carrier Freq. (kHz)	Bandwidth of the emission. (Hz)	Limit (kHz)	Remark
126	759	None	The point 20 dB down from the modulated carrier

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

Tested by: Seok-Jun, Lee / Engineer

Photo Data for bandwidth



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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)

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7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESCI	101012	Nov. 02, 2015	One Year	■
2.		R/S	ESU	100261	Apr. 06, 2016	One Year	■
3.		R/S	ESPI	101278	Nov. 02, 2015	One Year	■
4.	Spectrum analyzer	R/S	FSU	200319	Apr. 14, 2016	One Year	■
5.	Amplifier	Sonoma Instrument	310N	312544	Apr. 05, 2016	One Year	■
6.	Amplifier	Sonoma Instrument	310N	312545	Apr. 05, 2016	One Year	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-255	May 20, 2016	Two Year	■
8.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-421	Apr. 15, 2016	Two Year	■
9.	Controller	Innco System	CO2000	619/27030611/L	N/A	N/A	■
10.	LISN	EMCO	3825/2	9109-1867	Apr. 06, 2016	One Year	-
				9109-1869	Apr. 06, 2016	One Year	■
		Schwarzbeck	NSLK8126	8126-404	Apr. 05, 2016	One Year	-
		Schwarzbeck	NSLK8128	8128-216	Apr. 06, 2016	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	MA4000-EP	MA4000/335	N/A	N/A	■
14.	Loop Antenna	R/S	HFH2-Z2	879285/26	Dec. 09, 2014	Two Year	■
15.	Frequency Counter	HP	53152A	US39270295	Oct. 07, 2015	One Year	■
16.	Chamber	ESPEC	PSL-2KP	14009407	Feb. 04, 2016	One Year	■
17.	DC Power Supply	Digital Electronics	DRP-305DN	4030195	Sep. 03, 2015	One Year	■

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