ISHIKAWA Co., Ltd. EMC Laboratory
2-3-18, Namamugi, Tsurumi-ku, Yokohama, Kanagawa 230-0052 Japan
TEL: +81 45-500-2255 FAX: +81 45-500-2256

Test Report

Test Report No. IE1803-025T2
Date of Issue: 24th April, 2018

FCC Part 15 Subpart B

Radio Frequency Devices

Applicant Information		
Name of Applicant	:	**JAI CORPORATION**
Address	:	**10-35 Sakae-Chou, Kanagawa-Ku, Yokohama, Kanagawa, 221-0052 Japan**
Telephone	:	**+81 45-440-0165**
Facsimile	:	**+81 45-440-0167**
Equipment under Test (EUT)	:	**3 CMOS AREA SCAN CAMERA**
Model Number	:	**AP-1600T-PMCL**
Serial Number	:	**SX160303**
EUT Condition	:	**Pre-Production**

Date of Test : 3rd - 4th April, 2018

Test Result : PASS

- The results in this report are applicable only to the equipment tested.
- This report shall not be reproduced except in full without written acceptance of ISHIKAWA Co., Ltd.

Signature:
Kazuo Okada
Technical Group Manager

Rev. 0.01

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1. Summary of Test

1.1. Test Standard

FCC Part15 SubpartB (§ 15.107, § 15.109) ClassB

1.2. List of Applied Test to the EUT

Test Item	Test Method	Test
Conducted Emission at Mains Port	ANSI C63.4:2014	N/A*
Radiated Emission	ANSI C63.4:2014	Applied

*: This test is not applicable as per customer's request.

1.3. Test Procedure

Test Item	Test Procedure	Internal Test Procedure
Radiated Emission	ANSI C63.4:2014 / Clause 8	IT04-P007 Rev. 3.01 IT04-P009 Rev. 4.01

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2. Equipment under Test

2.1. EUT Information

No.	EUT	Manufacturer	Model No.	Serial No.	FCC ID / DoC
A	3 CMOS AREA SCAN CAMERA	JAI CORPORATION	AP-1600T-PMCL	SX160303	None

Note : The EUT was tested as tabletop.

Internal Max. Frequency : 400 MHz

EUT Clock Frequency :	Oscillator	Clock Frequency	Name of Board	Note
	50 MHz	400 MHz	Main Board	—
	74.25 MHz	297 MHz	Main Board	—

Power Rating :	
Input (PoCL)	DC 12 V, 0.7 A

Port(s) :	Connector Type	Connector Pin
Mini Camera Link Connector	SDR	26 Pins

Dimensions of the EUT :	Width (mm)	Depth (mm)	Height (mm)
	44	74	44

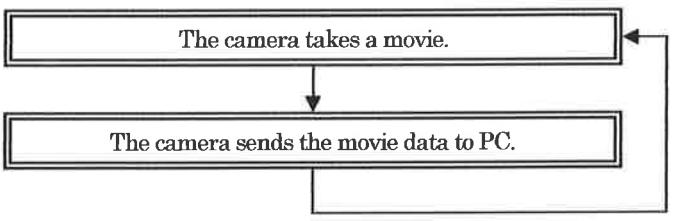
Weight of the EUT :	Weight (kg)
	0.17

2.2. Variation of the product family

The model AP-1600T-PMCL has a variation of the product family.
The model AP-3200T-PMCL is one of the product family of AP-1600T-PMCL.
The model AP-1600T-PMCL and AP-3200T-PMCL are identical except for the image sensor type.
The model AP-1600T-PMCL has a higher Frame Rate then AP-3200T-PMCL.
Therefore, only the AP-1600T-PMCL has been tested.

2.3. Operating Mode

・Continuous Mode



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3. Configuration of Equipment

3.1. Peripherals used

No.	Equipment	Manufacturer	Model No.	Serial No.	FCC ID / DoC
B	LENS	VS TECHNOLOGY CORP.	VS-1218H	V17009604	None
C	LCD MONITOR	DELL	E2417H	CN-0VJ9GK-74261-68M-1FTU-A00B0-120	DoC
D	Personal Computer	DELL	Precision Tower 5810	GRCPB22	DoC
E	KEYBOARD	DELL	KB212-B	CN-0N290F-71581-5A9-07J2-A01	DoC
F	MOUSE	HP Japan Inc.	M-U0034-O	672652-001	DoC
G	Frame Grabber Board	Teledyne DALSA	OR-Y4C0-XPX00	S0058007	None

3.2. Cables used

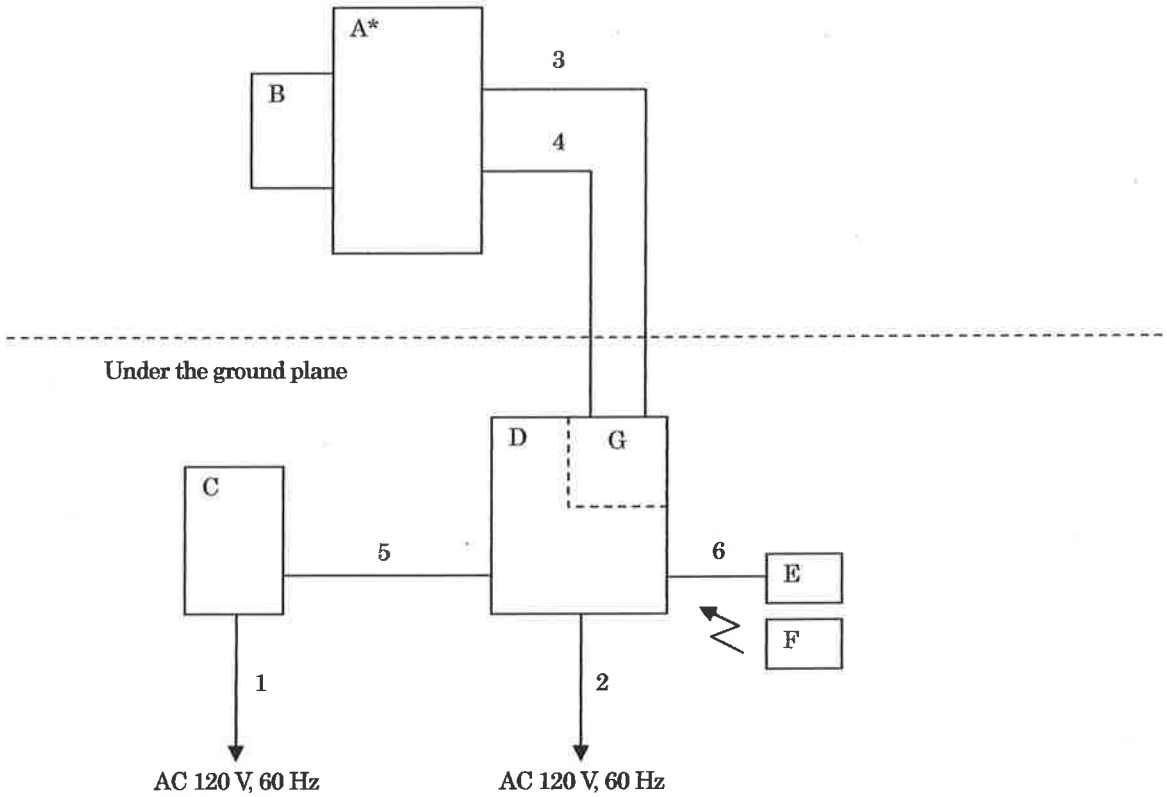
AC Power Cable

No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
1	AC Power Cable for LCD MONITOR	1.5	Unshielded	None	—
2	AC Power Cable for Personal Computer	1.5	Unshielded	None	—

Interface Cable

No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
3	Camera Link PoCL Mini Cable (1SB26-L120-00C-A00 120921K)	10.0	Shielded	None	—
4	Camera Link PoCL Mini Cable (1SB26-L120-00C-A00 120921K)	10.0	Shielded	None	—
5	LCD MONITOR Cable	1.7	Shielded	None	—
6	KEYBOARD Cable	2.0	Shielded	None	—

3.3. System Configuration



*: EUT

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4. Radiated Emission

4.1. Measurement Procedure

4.1.1. Test Receiver Condition

Below 1000 MHz:	Detector: Quasi-peak
	Bandwidth: 120 kHz
Above 1000 MHz:	Detector: Average, Peak
	Bandwidth: 1 MHz

4.1.2. Frequency Range

30 MHz – 2000 MHz

4.1.3. Measuring Distance

3 m

4.1.4. Turn Table

Rotated 0 to 360 degrees

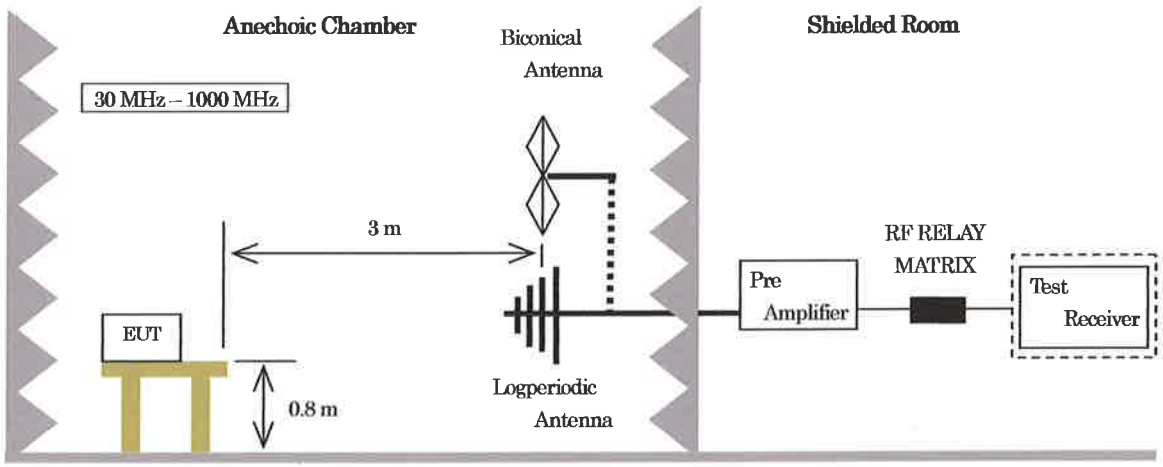
4.1.5. Antenna Position

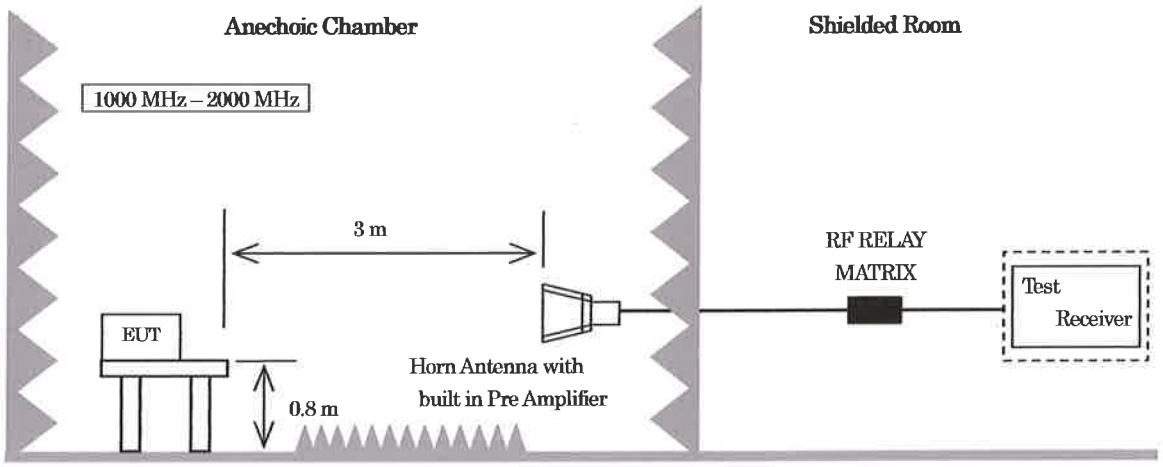
Antenna height:	1 m to 4 m
Polarization	Horizontal and Vertical

4.1.6. Reported Emissions

At least the 6 points corresponding to the highest disturbance are reported.

4.1.7. Test Configuration





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4.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial or ID No.	Calibration Due
Test Receiver	Rohde & Schwarz	ESU26	100299	Apr-2018
Pre Amplifier	Sonoma	310N	243232	Aug-2018
RF RELAY MATRIX	tsj	RFMI2A2M	03153	Aug-2018
Biconical Antenna	Schwarzbeck	BBA9106(VHA9103)	91032277	Feb-2019
Logperiodic Antenna	Schwarzbeck	UHALP9108A	0720	Feb-2019
Horn Antenna	EMCO	3115	8912-3303	Dec-2018
Pre Amplifier for Horn Antenna	tsj	MLA-0108AD-39	005	Dec-2018
Attenuator	SUHNER	6803.17.A	003	Aug-2018
Attenuator	SUHNER	6803.17.A	004	Aug-2018
Coaxial Cable (1)	SUHNER	RG400	259	Aug-2018
Coaxial Cable (2)	SUHNER	RG400	260	Aug-2018
Coaxial Cable (3)	SUHNER	S04272B	612	Aug-2018
Coaxial Cable (4)	SUHNER	S04272B	376	Aug-2018
Coaxial Cable (5)	SUHNER	SF106	32550/6	Aug-2018
Coaxial Cable (6)	SUHNER	SF104EA	MY4490/4EA	Aug-2018
Software	tsj	TEPTO-DV/RE	v1.90.0098	N/A

Note 1: All testing equipment is calibrated with measuring equipment which are traceable to national or international standards.
Note 2: The pre-amplifier is connected to the horn antenna. (3115)

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4.3. Sample Calculation

Radiated Emission Class B Limit*

Frequency Range (MHz)	Limit(dBuV/m)
	Quasi Peak
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
960 – 1000	54.0

*: The lower limits apply at the transition frequency.

Radiated Emission Class B Limit

Frequency range (MHz)	Limit(dBuV/m)	
	Average	Peak
Above 1000	54.0	74.0

・Example @ 169.713 MHz for Continuous Mode

Disturbance Level	=	Reading		43.2	dBuV
	+	Correction Factor*	+	−6.9	dB/m
			=	36.3	dBuV/m

Margin	=	Limit		43.5	dBuV/m
	−	Disturbance Level	−	36.3	dBuV/m
			=	7.2	dB

*: Correction Factor = Antenna Factor (dB/m) + Cable Loss (dB) [include 3dB attenuator×2] – Pre Amplifier Gain (dB)
Note: The sample calculation above is the minimum margin at the measuring frequency.

4.4. Uncertainty

Expanded uncertainties were calculated with a coverage factor k = 2 for Radiated Emission.

・30 MHz – 1000 MHz	+3.48 dB / −3.02 dB
・1000 MHz – 8000 MHz	+3.73 dB / −3.80 dB

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4.5. Test Data

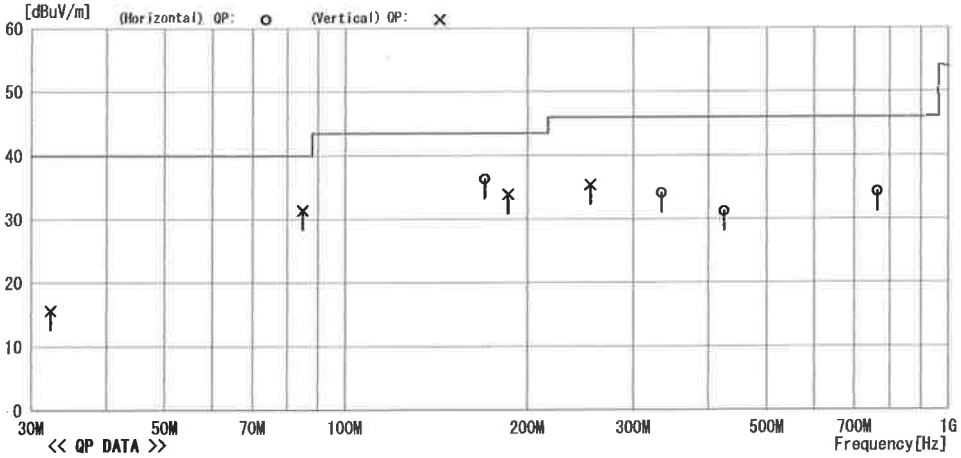
Radiated Emission

10m A/C
Date : 2018/04/03 09:19

Model Name	: 3 CMOS AREA SCAN CAMERA	Data No.	: IE1803-025A-11
Model No.	: AP-1600T-PMCL	Power Supply	: PoCL (DC 12V)
Serial No.	: SX160303	Temp./Humi.	: 22℃ / 48%
Test Condition	: Continuous Mode	Operator	: T. Kofudo

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)



No	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant Type
1	32.322	22.8	17.2	7.4	31.7	15.7	40.0	24.3	Vert.	100	70	BIC
2	84.857	47.5	7.3	8.2	31.6	31.4	40.0	8.6	Vert.	125	358	BIC
3	169.713	43.2	15.7	9.0	31.6	36.3	43.5	7.2	Hori.	200	62	BIC
4	185.624	40.2	16.1	9.1	31.5	33.9	43.5	9.6	Vert.	100	0	BIC
5	254.570	39.8	17.4	9.7	31.5	35.4	46.0	10.6	Vert.	100	312	BIC
6	334.123	41.3	14.1	10.2	31.5	34.1	46.0	11.9	Hori.	100	260	LPD
7	424.284	36.0	16.0	10.7	31.5	31.2	46.0	14.8	Hori.	100	106	LPD
8	763.711	33.6	20.1	12.3	31.7	34.3	46.0	11.7	Hori.	114	290	LPD

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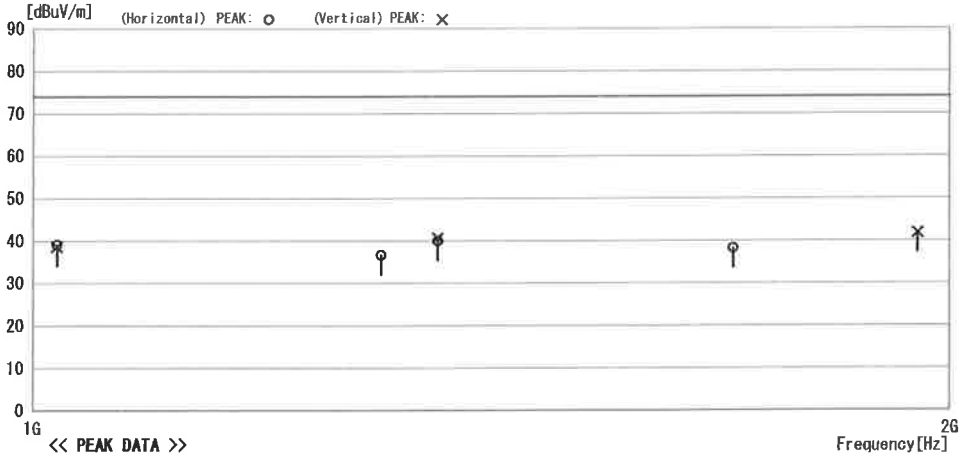
Radiated Emission

10m A/C
Date : 2018/04/04 10:34

Model Name	: 3 CMOS AREA SCAN CAMERA	Data No.	: IE1803-025A-35
Model No.	: AP-1600T-PMCL	Power Supply	: PoCL (DC 12V)
Serial No.	: SX160303	Temp/Humi	: 22℃ / 48%
Test Condition	: Continuous Mode	Operator	: T. Kofudo

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)Peak



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	1018.282	47.3	26.6	6.0	41.3	38.6	74.0	35.4	Vert.	100	222	HOR
2	1018.282	47.8	26.6	6.0	41.3	39.1	74.0	34.9	Hori.	100	72	HOR
3	1301.200	45.2	26.1	6.8	41.6	36.5	74.0	37.5	Hori.	130	52	HOR
4	1357.708	49.4	26.0	7.0	41.7	40.7	74.0	33.3	Vert.	240	112	HOR
5	1357.708	48.6	26.0	7.0	41.7	39.9	74.0	34.1	Hori.	100	359	HOR
6	1697.134	45.7	26.7	7.8	42.0	38.2	74.0	35.8	Hori.	100	315	HOR
7	1951.704	47.9	27.8	8.3	42.2	41.8	74.0	32.2	Vert.	100	136	HOR

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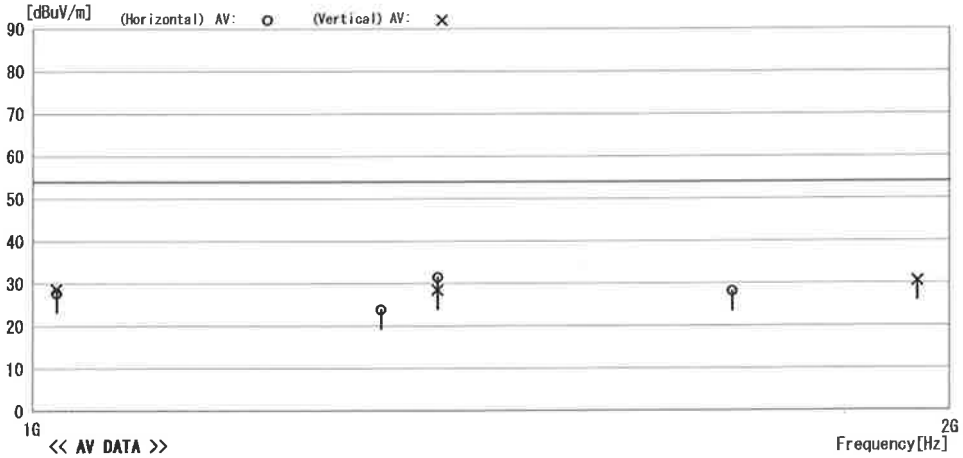
Radiated Emission

10m A/C
Date : 2018/04/04 10:34

Model Name	: 3 CMOS AREA SCAN CAMERA	Data No.	: IE1803-025A-36
Model No.	: AP-1600T-PMCL	Power Supply	: PoCL (DC 12V)
Serial No.	: SX160303	Temp/Humi	: 22℃ / 48%
Test Condition	: Continuous Mode	Operator	: T. Kofudo

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)



<< AV DATA >>

No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	1018.282	37.4	26.6	6.0	41.3	28.7	54.0	25.3	Vert.	100	222	HOR
2	1018.282	36.4	26.6	6.0	41.3	27.7	54.0	26.3	Hori.	100	72	HOR
3	1301.200	32.6	26.1	6.8	41.6	23.9	54.0	30.1	Hori.	130	52	HOR
4	1357.708	37.2	26.0	7.0	41.7	28.5	54.0	25.5	Vert.	240	112	HOR
5	1357.708	40.1	26.0	7.0	41.7	31.4	54.0	22.6	Hori.	100	359	HOR
6	1697.134	35.6	26.7	7.8	42.0	28.1	54.0	25.9	Hori.	100	315	HOR
7	1951.704	36.6	27.8	8.3	42.2	30.5	54.0	23.5	Vert.	100	136	HOR

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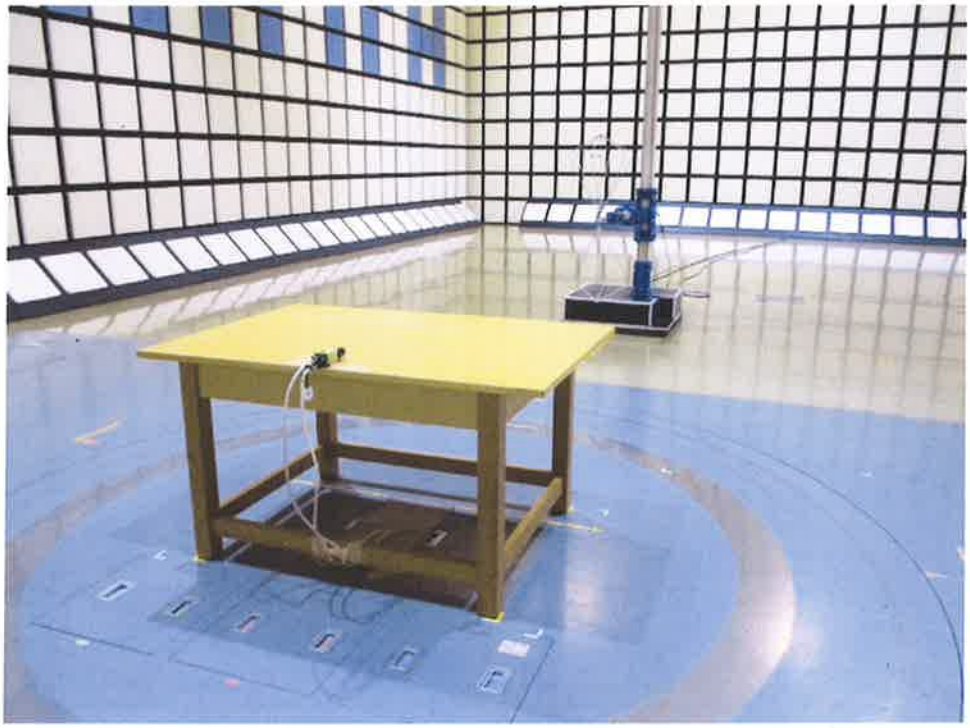
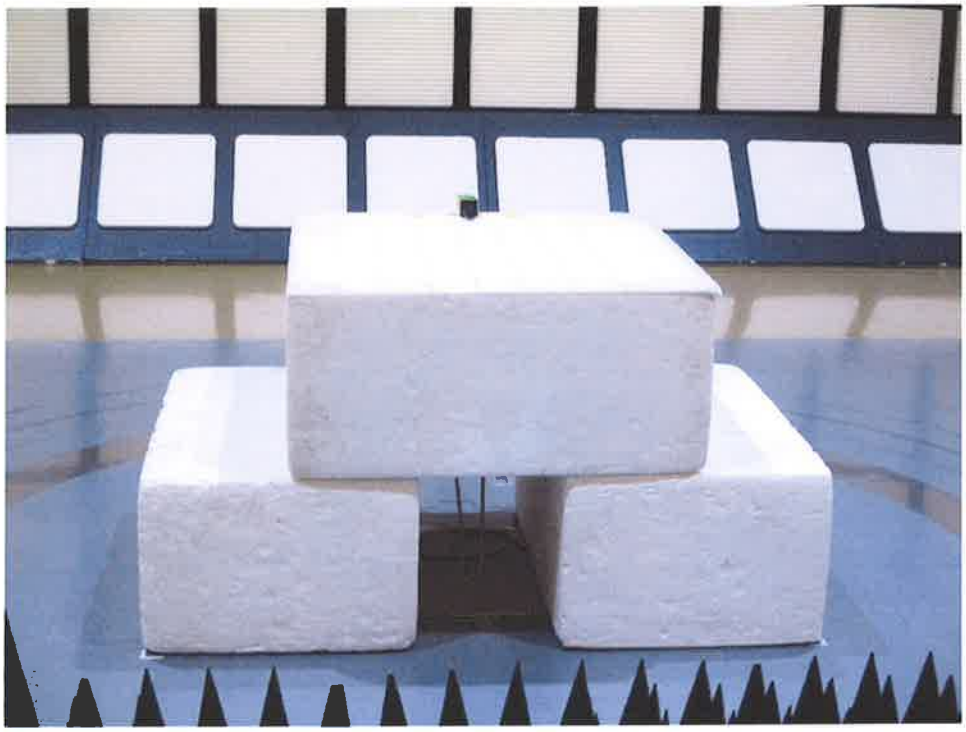
5. Photographs

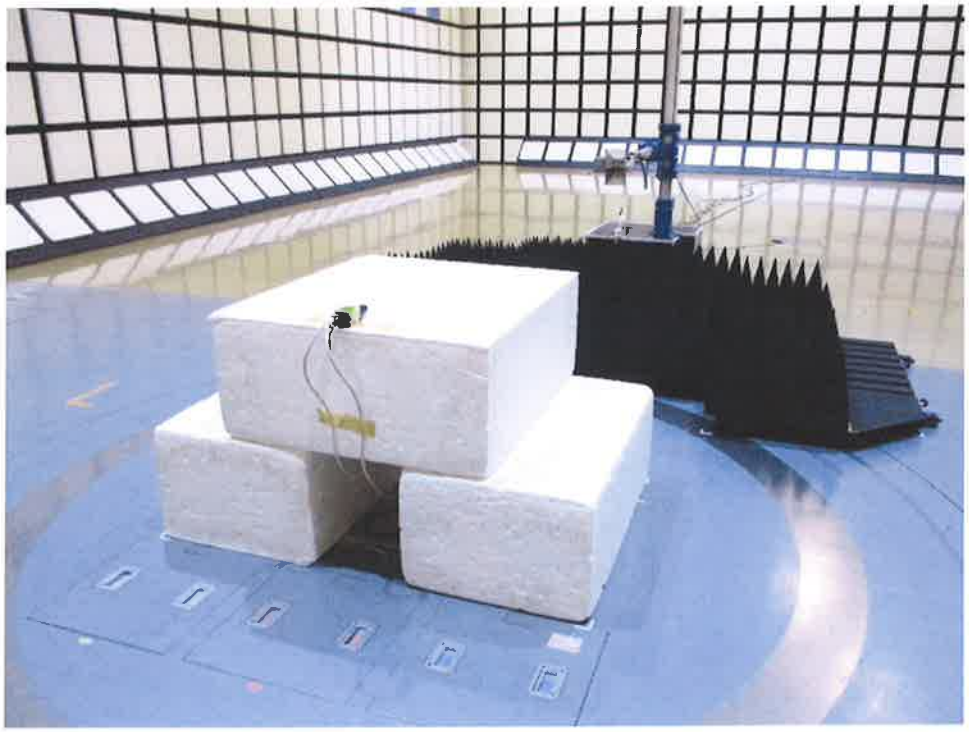
5.1. Radiated Emission

・30 MHz – 1000 MHz



・1000 MHz – 2000 MHz





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6. Laboratory Description

6.1. Location

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6.2. Laboratory Equipment

Site Name	Shielded room Volume	Turn table	Weight-proof
Shielded room No. 1	4.9m×2.9m×2.8m	----------	----------
Shielded room No. 2	8m×5m×2.8m	----------	----------
10m Anechoic chamber	21.5m×13.5m×8.9m	4m diameter	3,000 kg
3m Anechoic chamber	9m×6m×5.7m	2m diameter	500 kg

6.3. Laboratory Filing or Certificate Information

6.3.1. VCCI Site Registration pursuant to V-5 & VCCI 32-2

Site Name	Registration No.	Expiry Date
ISHIKAWA Co., Ltd.	A-0105	July 14, 2019

6.3.2. FCC Site Filing pursuant to CFR 47 § 2.948

Site Name	Test Firm Registration No.	Expiry Date
ISHIKAWA Co., Ltd.	743690	July 14, 2019

6.3.3. VLAC Accreditation

Site Name	Accreditation No.	Expiry Date
ISHIKAWA Co., Ltd. EMC Laboratory	VLAC-025	July 14, 2019

6.3.4. TÜV Rheinland Certificate of Appointment Laboratory

Site Name	Registration No.	Expiry Date
ISHIKAWA Co., Ltd. EMC Laboratory	UA50060145-0013	June 1, 2018

6.3.5. Industry Canada site filing pursuant to RSS-Gen

Site Name	File No.	Expiry Date
10m Anechoic chamber	5804A-1	August 19, 2018
3m Anechoic chamber	5804A-2	August 19, 2018