



# Test Report

Test Report No. IE1807-005T2  
Date of Issue: 27<sup>th</sup> August, 2018

## FCC Part 15 Subpart B

Radio Frequency Devices

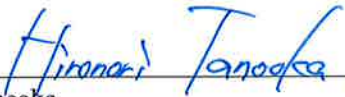
### Applicant Information

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)	:	CMOS AREA SCAN CAMERA
Model Number	:	SP-12400C-PMCL
Serial Number	:	ES0007
EUT Condition	:	Pre-Production

Date of Test : 11<sup>th</sup> July, 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:   
Hironori Tanooka  
Director



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## 1. Summary of Test

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### 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. 3.02 IT04-P009 Rev. 4.02

## 2. Equipment under Test

### 2.1. EUT Information

No.	EUT	Manufacturer	Model No.	Serial No.	FCC ID / DoC
A	CMOS AREA SCAN CAMERA	JAI CORPORATION	SP-12400C-PMCL	ES0007	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	DC 12-24 V, 650 mA

Port(s)	Connector Type	Connector Pin
Connector 1	Camera Link (SDR)	26 Pins
Connector 2	Camera Link (SDR)	26 Pins

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

Weight of the EUT	Weight (kg)
	0.135

### 2.2. Variation of the product family

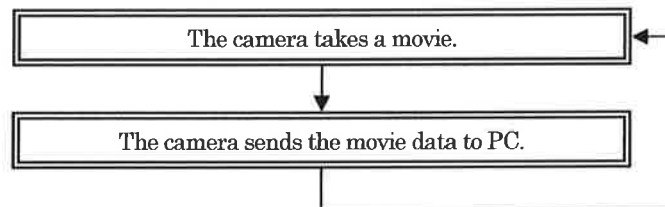
The model SP-12400C-PMCL has a variation of the product family.

The model SP-12400M-PMCL is one of the product families of SP-12400C-PMCL.

The model SP-12400C-PMCL and SP-12400M-PMCL are identical except for the image sensor type(Color or Monochrome). Therefore, only SP-12400C-PMCL has been tested.

### 2.3. Operating Mode

#### • Continuous Mode



### 3. Configuration of Equipment

#### 3.1. Peripherals used

No.	Equipment	Manufacturer	Model No.	Serial No.	FCC ID / DoC
B	LENS	Myutron	HF1618V-2	None	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	DELL	MS-111-L	CN-09RRC7-48729-54S-0RK M	DoC

#### 3.2. Cables used

##### AC Power Cable

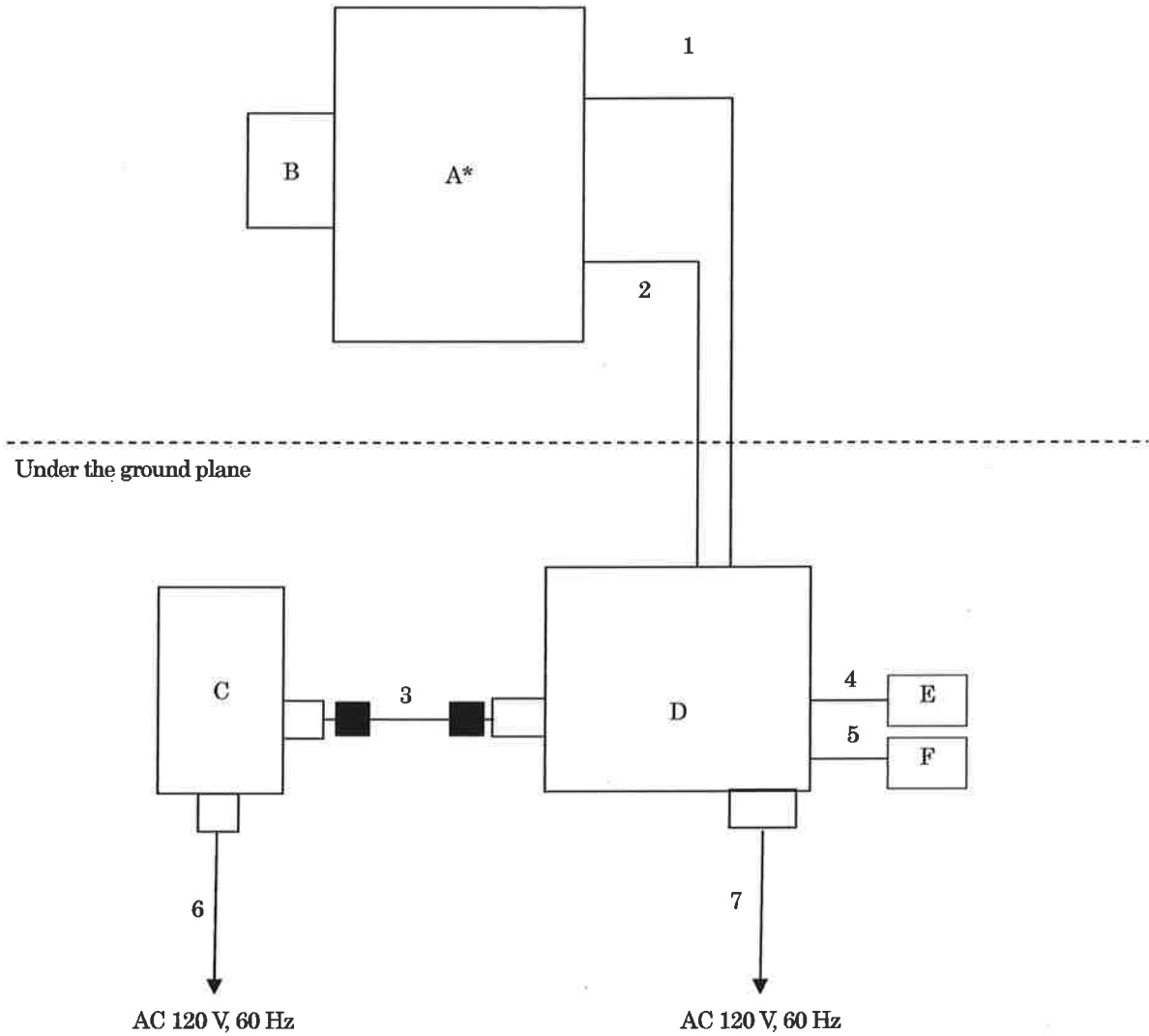
No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
6	AC Power Cable for LCD MONITOR	1.5	Unshielded	None	--
7	AC Power Cable for Personal Computer	1.5	Unshielded	None	--

##### Interface Cable

No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
1	Camera Link Cable	5.0	Shielded	None	--
2	Camera Link Cable	5.0	Shielded	None	--
3	LCD MONITOR Cable	1.5	Unshielded	Fixed × 2	Refer to Note
4	KEYBOARD Cable	2.0	Unshielded	None	--
5	MOUSE Cable	1.5	Unshielded	None	--

Note: The fixed ferrite core is attached to the peripheral.

### 3.3. System Configuration



\*: EUT  
■: Ferrite Core

## 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

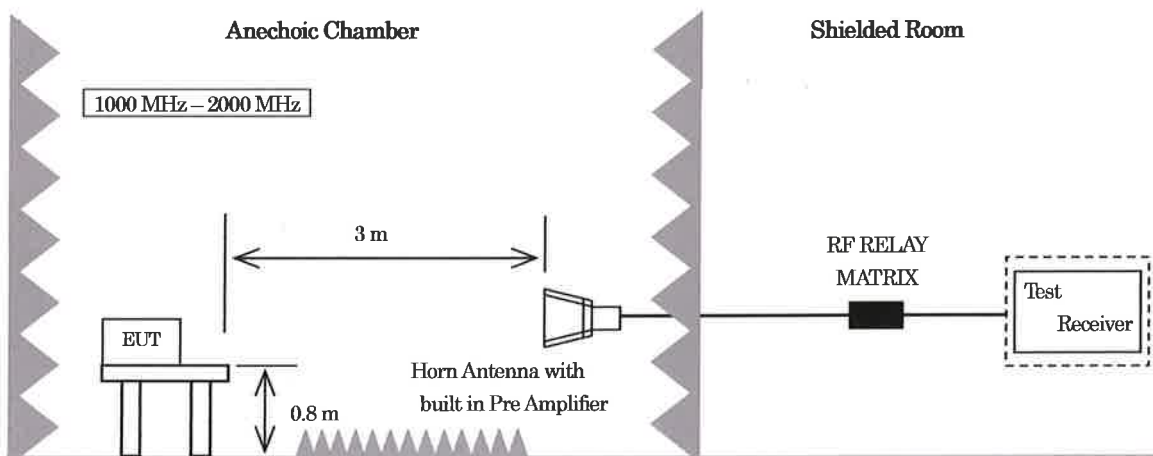
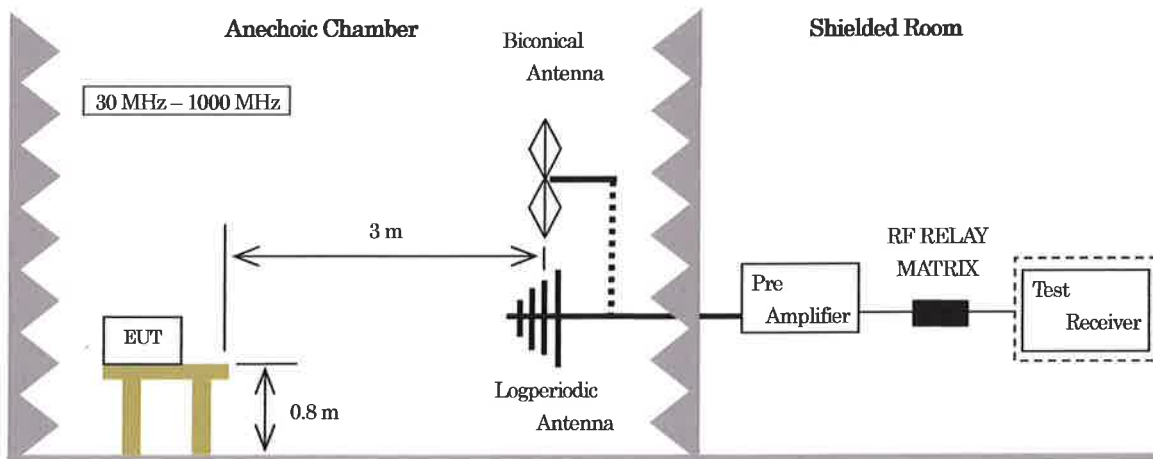
#### 4.1.5. Antenna Position

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



#### 4.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial or ID No.	Calibration Due
Test Receiver	Rohde & Schwarz	ESU26	100299	May-2019
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	8912-3301	Jul-2018
Pre Amplifier for Horn Antenna	tsj	MLA-0108-B02-42	1755220	Jul-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)



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 @ 933.428 MHz for Continuous Mode

$$\begin{array}{rcl}
 \text{Disturbance Level} & = & \text{Reading} & 34.3 & \text{dBuV} \\
 & + & \text{Correction Factor*} & + & 3.7 & \text{dB/m} \\
 & & & = & 38.0 & \text{dBuV/m}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} & 46.0 & \text{dBuV/m} \\
 & - & \text{Disturbance Level} & - & 38.0 & \text{dBuV/m} \\
 & & & = & 8.0 & \text{dB}
 \end{array}$$

\*: 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

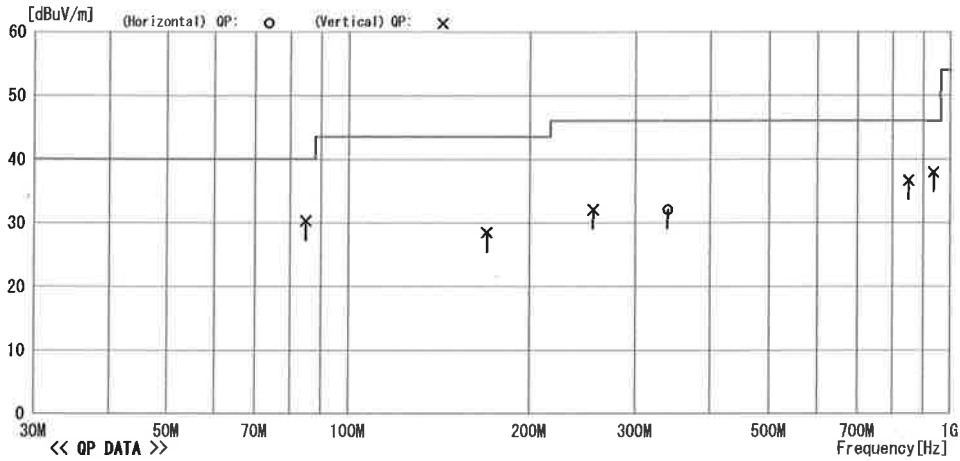
Radiated Emission

10m A/C  
Date : 2018/07/11 15:04

Model Name : CMOS AREA SCAN CAMERA  
Model No. : SP-12400C-PMCL  
Serial No. : ES0007  
Test Condition : Continuous Mode  
Data No. : IE1807-005A-13  
Power Supply : PoCL (DC 11V)  
Temp./Humi. : 23°C / 66%  
Operator : T. Kofudo

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)



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	84.857	46.4	7.3	8.2	31.6	30.3	40.0	9.7	Vert.	100	203	B1C
2	169.714	35.4	15.7	9.0	31.6	28.5	43.5	15.0	Vert.	100	2	B1C
3	254.571	36.5	17.4	9.7	31.5	32.1	46.0	13.9	Vert.	100	42	B1C
4	339.428	39.3	14.1	10.2	31.5	32.1	46.0	13.9	Hori.	100	86	LPD
5	848.571	34.3	21.2	12.7	31.5	36.7	46.0	9.3	Vert.	100	0	LPD
6	933.428	34.3	21.8	13.0	31.1	38.0	46.0	8.0	Vert.	100	359	LPD

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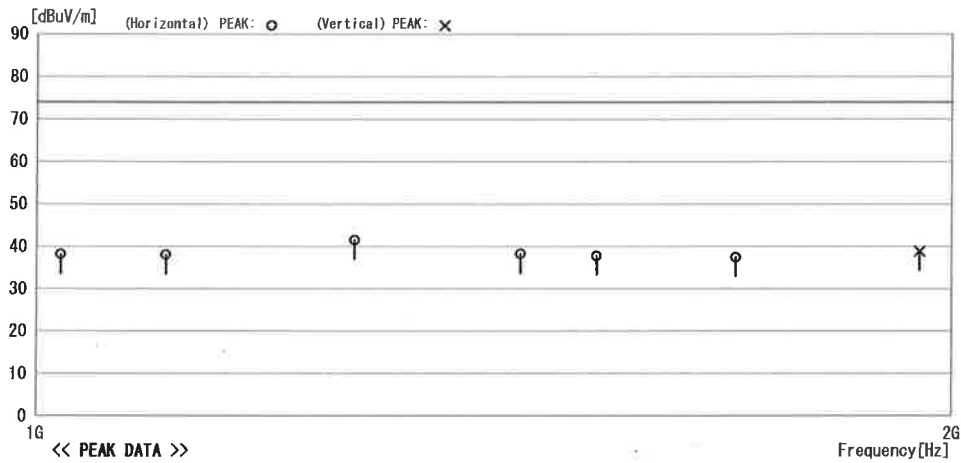
## Radiated Emission

10m A/C  
Date : 2018/07/11 10:56

Model Name : CMOS AREA SCAN CAMERA	Data No. : IE1807-005A-05
Model No. : SP-12400C-PMCL	Power Supply : PoCL (DC 11V)
Serial No. : ES0007	Temp/Humi : 23°C / 65%
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	48.8	25.3	6.0	42.0	38.1	74.0	35.9	Hori.	100	78	HOR
2	1103.142	47.8	25.9	6.2	41.9	38.0	74.0	36.0	Hori.	250	49	HOR
3	1272.857	50.0	26.4	6.7	41.6	41.5	74.0	32.5	Hori.	207	45	HOR
4	1442.569	46.2	26.3	7.2	41.5	38.2	74.0	35.8	Hori.	183	35	HOR
5	1527.424	45.6	26.2	7.4	41.5	37.7	74.0	36.3	Hori.	170	35	HOR
6	1697.142	44.7	26.4	7.8	41.5	37.4	74.0	36.6	Hori.	100	228	HOR
7	1951.713	44.6	27.5	8.3	41.6	38.8	74.0	35.2	Vert.	106	132	HOR

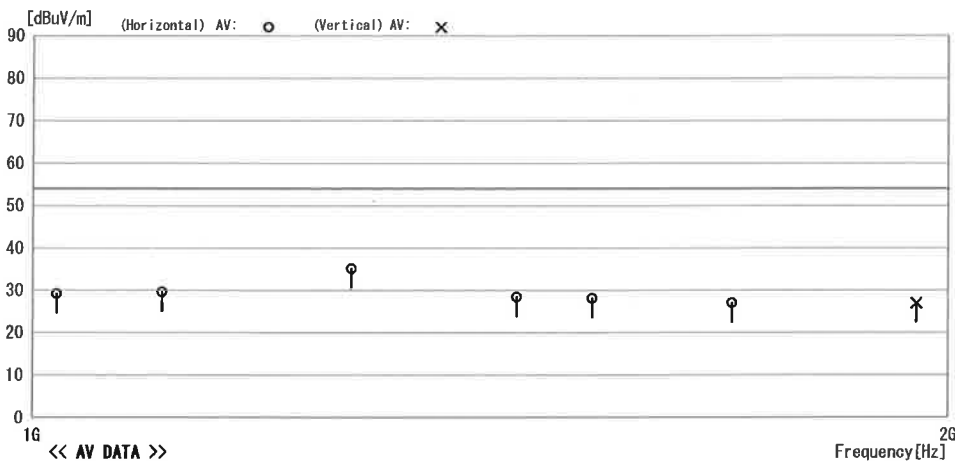
## Radiated Emission

Date : 2018/07/11 10:56 10m A/C

Model Name : CMOS AREA SCAN CAMERA	Data No. : IE1807-005A-06
Model No. : SP-12400C-PMCL	Power Supply : PoCL (DC 11V)
Serial No. : ES0007	Temp/Humi : 23°C / 65%
Test Condition : Continuous Mode	Operator : T. Kofudo

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)



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	39.9	25.3	6.0	42.0	29.2	54.0	24.8	Hori.	100	78	HOR
2	1103.142	39.4	25.9	6.2	41.9	29.6	54.0	24.4	Hori.	250	49	HOR
3	1272.857	43.6	26.4	6.7	41.6	35.1	54.0	18.9	Hori.	207	45	HOR
4	1442.569	36.4	26.3	7.2	41.5	28.4	54.0	25.6	Hori.	183	35	HOR
5	1527.424	36.0	26.2	7.4	41.5	28.1	54.0	25.9	Hori.	170	35	HOR
6	1697.142	34.3	26.4	7.6	41.5	27.0	54.0	27.0	Hori.	100	226	HOR
7	1951.713	32.8	27.5	8.3	41.6	27.0	54.0	27.0	Vert.	106	132	HOR



## 5. Photographs

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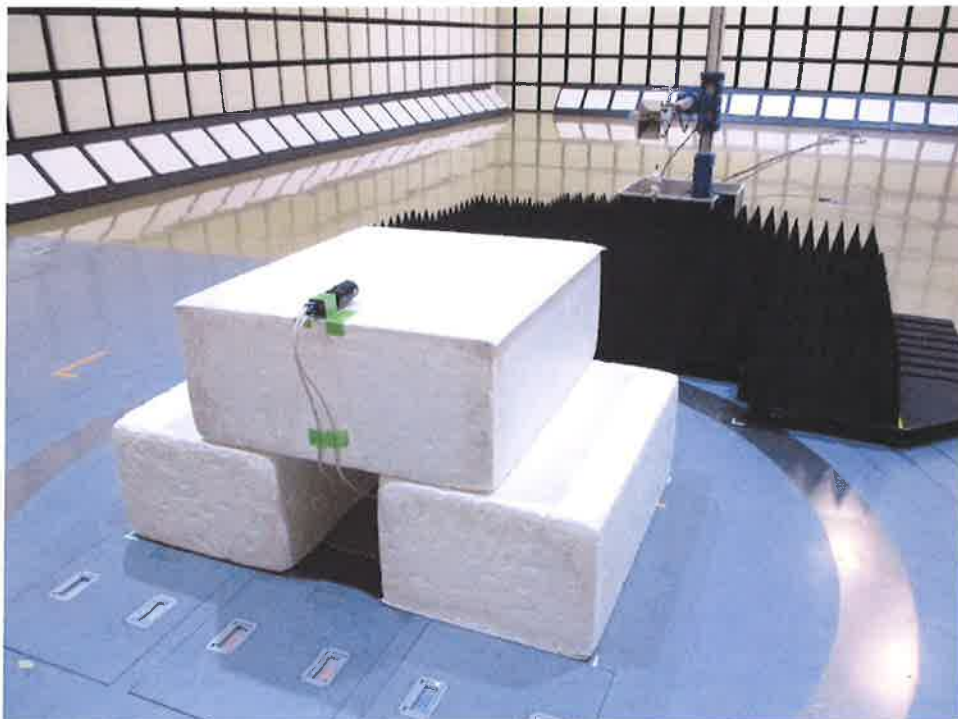
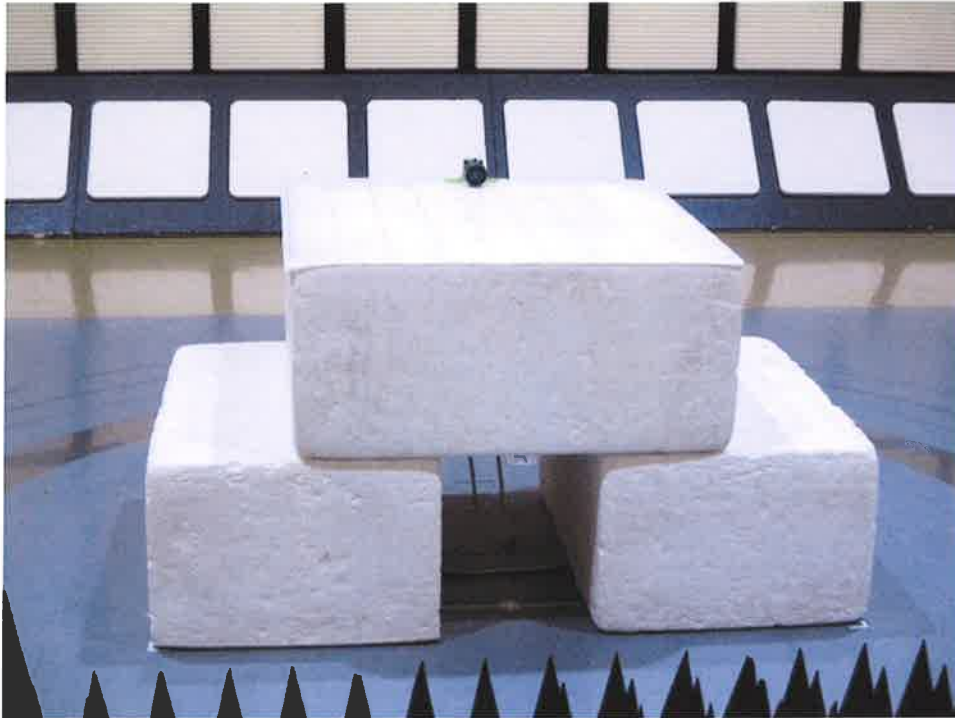
### 5.1. Radiated Emission

- 30 MHz – 1000 MHz





• 1000 MHz – 2000 MHz



## 6. Laboratory Description

### 6.1. Location

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

### 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	UA50060145-0014	June 1, 2019