ISHIKAWA Co., Ltd. EMC Laboratory
2-3-18, Namamugi, Tsurumi-ku, Yokohama, Kanagawa 230-0052 Japan
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Lab Accreditation
VLAC-025

Test Report

Test Report No. IE1507-027T1
Date of Issue: 10th September, 2015

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 CAMERA**
Model Number	:	**SP-12000C-CXP4**
Serial Number	:	**6000004**
EUT Condition	:	**Pre-Production**

Date of Test : 10th, 17th August, 2015

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

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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 C63.4:2003	Applied
Radiated Emission	ANSI C63.4:2003	Applied

1.3. Test Procedure

Test Item	Test Procedure	Internal Test Procedure
Conducted Emission at Mains Port	ANSI C63.4:2003 / Clause 7	IT04-P005 Rev. 3.06
Radiated Emission	ANSI C63.4:2003 / Clause 8	IT04-P007 Rev. 2.07 IT04-P009 Rev. 3.08

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2. Equipment under Test

2.1. EUT Information

No.	EUT	Manufacturer	Model No.	Serial No.	FCC ID / DoC
A	CMOS CAMERA	JAI CORPORATION	SP-12000C-CXP4	8000004	None

Note : The EUT was tested as tabletop.

Internal Max. Frequency : 3125 MHz

EUT Clock Frequency :	CPU Oscillator	Clock Frequency	Name of Board	Note
	156.25 MHz	3125 MHz	Main Board	—

Power Rating :
DC 12 V – 24 V, 1.4 A

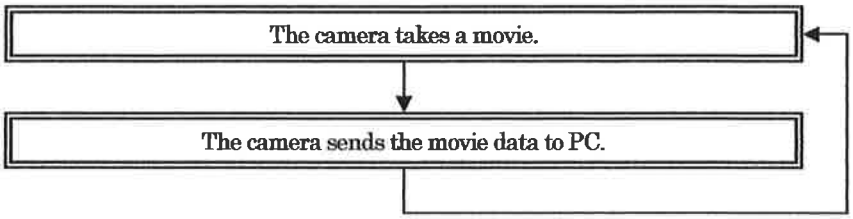
Port(s) :	Connector Type	Connector Pin
CoaXPress Connector	DIN	4 Pins

Dimensions of the EUT :	Width (mm)	Depth (mm)	Height (mm)
	62.0	127.5	62.0

Weight of the EUT :	Weight (g)
	510

2.2. 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	Nikon	AF Nikkor 35mm f/20	627348	None
C	LCD MONITOR	EIZO	0FTD1504	38807090	DoC
D	Personal Computer	DELL	Precision Tower 5810	GRCPB22	DoC
E	Frame Grabber Board	Active Silicon	AS-FBD-4XCXP6-2PE8	55800925	DoC
F	KEYBOARD	DELL	SK-8120	CN-0DH939-71616 -48C-0554-A00	DoC
G	MOUSE	DELL	MS111-L	CN-09RRC7-48729 -472-167M	DoC

3.2. Cables used

AC Power Cable

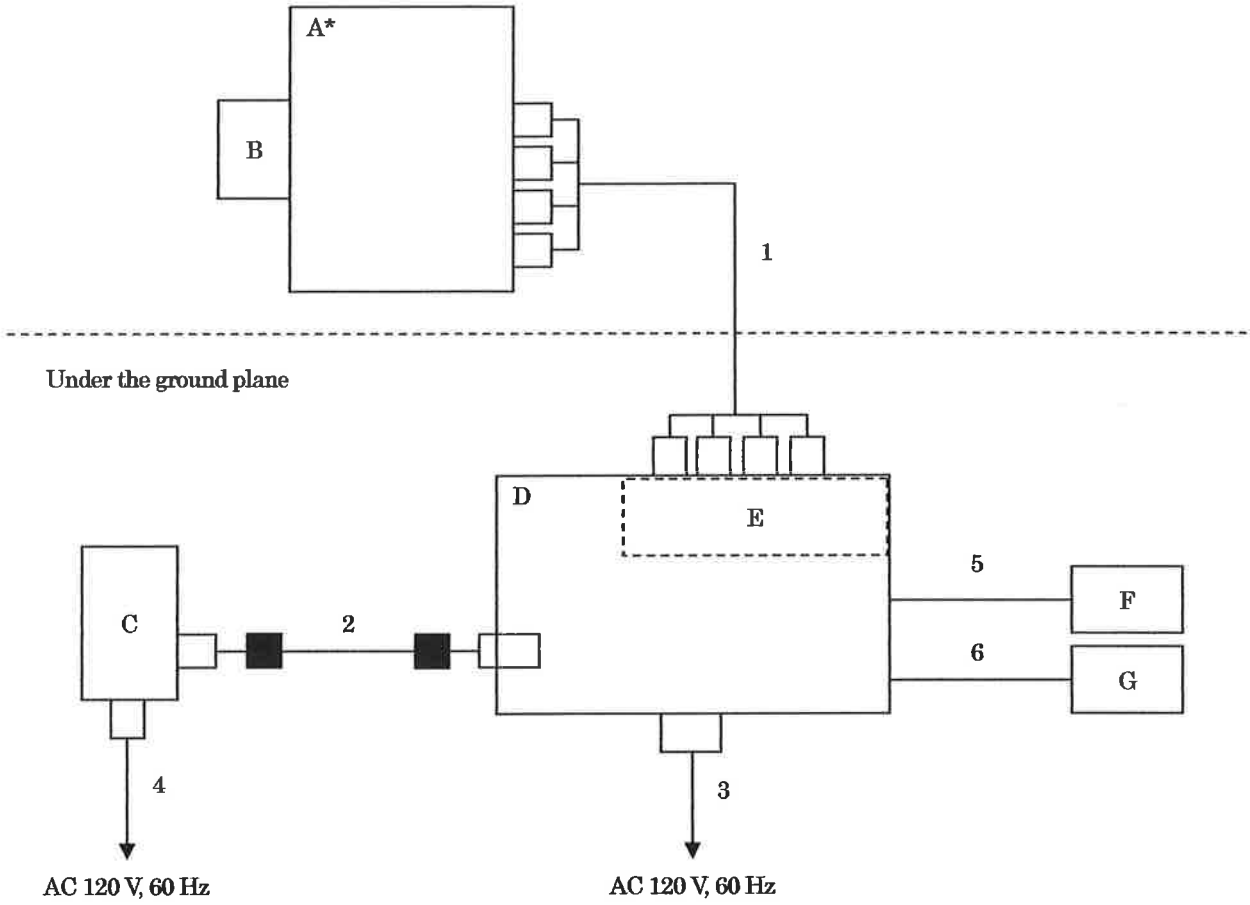
No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
3	AC Power Cable for Personal Computer	1.5	Unshielded	None	—
4	AC Power Cable for LCD MONITOR	1.5	Unshielded	None	—

Interface Cable

No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
1	CoaXPress Cable(CX-14-6-34-10M)	10.0	Shielded	None	—
2	LCD MONITOR Cable	1.0	Shielded	Fixed ×2	Refer to Note
5	KEYBOARD Cable	2.0	Shielded	None	—
6	MOUSE Cable	1.7	Shielded	None	—

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

3.3. System Configuration



*: EUT
■: Ferrite Core

4. Conducted Emission at Mains Port

4.1. Measurement Procedure

4.1.1. Test Receiver Condition

Detector: Quasi-peak and Average
Bandwidth: 9 kHz

4.1.2. Frequency range

0.15 MHz – 30 MHz

4.1.3. Vertical Metal Reference Plane

The plane was placed 0.4 m horizontally away from the EUT.

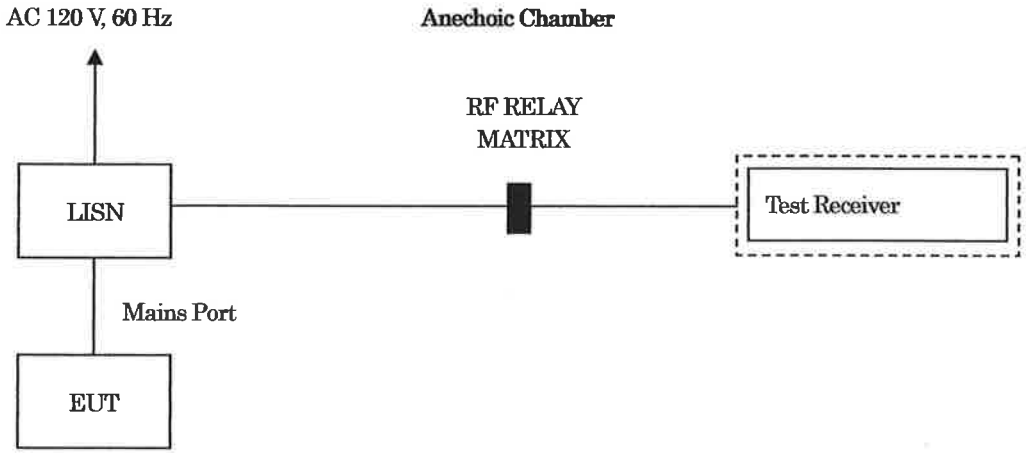
4.1.4. Line Impedance Stabilizing Network (LISN)

50 Ω / 50 uH
LISN for the EUT was placed 0.8 m away from the EUT.
LISN for the peripherals was terminated in 50 Ω.

4.1.5. Reported Emissions

At least the 6 points corresponding to the highest disturbance are reported.
A preliminary test was carried out while varying cable positions within typical arrangements to determine the maximum or near-maximum emission level.

4.1.6. Test Configuration



4.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial or ID No.	Calibration Due
Test Receiver	Rohde & Schwarz	ESU26	100299	Apr-2016
RF RELAY MATRIX	tsj	RFMI2A2M	03153	Aug-2015
LISN for EUT	Kyoritsu	KNW-242C	8-1673-1	Feb-2016
Attenuator for LISN (KNW-242C)	TAMAGAWA	CFA-01	2626	Feb-2016
LISN for peripherals	Kyoritsu	KNW-407	8-901-12	Jan-2016
Terminator for LISN	JFW	50T-001-BNC	151	Jun-2016
Coaxial Cable (1)	SUHNER	RG400	258	Aug-2015
Coaxial Cable (2)	SUHNER	S04272B	376	Aug-2015
Coaxial Cable (3)	SUHNER	RG214HF	615	Aug-2015
Coaxial Cable (4)	SUHNER	SF106	32551/6	Aug-2015
Software	tsj	TEPTO-DV/CE	v1.90.0098	N/A

Note 1: All testing equipment is calibrated with measuring equipment which are traceable to national or international standards.

4.3. Sample Calculation

Conducted Emission at Mains Port Class B Limit*

Frequency Range (MHz)	Limit (dBuV)	
	QP	AV
0.15 – 0.5	66 – 56**	56 – 46**
0.5 – 5	56	46
5 – 30	60	50

*: The lower limits apply at the transition frequency.
**: The limit decreases linearly with the logarithm of the frequency.

・Example @ 0.31835 MHz for Continuous Mode

Disturbance Level	=	Reading		26.2	dBuV
	+	Correction Factor*	+	10.2	dB
			=	36.4	dBuV

Margin	=	Limit		49.7	dBuV
	−	Disturbance Level	−	36.4	dBuV
			=	13.3	dB

*: Correction Factor = Cable Loss (dB) + LISN Factor (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 Conducted Emission.

+2.49 dB / −2.56 dB

4.5. Test Data

Conducted Emission

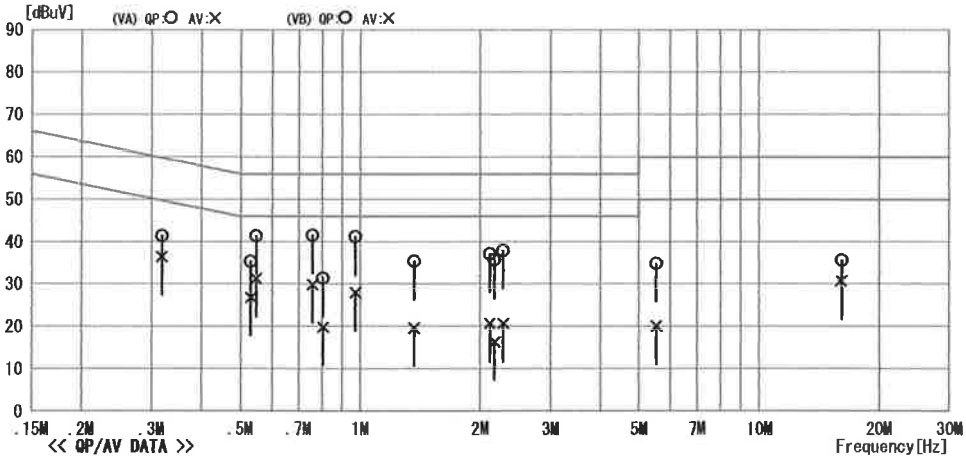
10m A/C
Date : 2015/08/10 17:47

Model Name : CMOS CAMERA
Model No. : SP-12000C-CXP4
Serial No. : β000004
Test Condition : Continuous Mode

Data No. : IE1507-027A-023
Power Supply : AC 120V / 60Hz
Temp/Humi : 25℃ / 62%
Operator : T.Kofudo

Memo :

LIMIT : FCC Part15 SubpartB ClassB (QP)
FCC Part15 SubpartB ClassB (AV)



No	Freq.	Reading Level		C.Fac	Results		Limit		Margin		Phase
		QP	AV		QP	AV	QP	AV	QP	AV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
1	0.31835	31.1	26.2	10.2	41.3	36.4	59.7	49.7	18.4	13.3	VB
2	0.53073	25.0	16.5	10.3	35.3	26.8	56.0	46.0	20.7	19.2	VA
3	0.54706	31.0	21.0	10.3	41.3	31.3	56.0	46.0	14.7	14.7	VB
4	0.75835	31.2	19.6	10.3	41.5	29.9	56.0	46.0	14.5	16.1	VB
5	0.80654	21.0	9.5	10.3	31.3	19.8	56.0	46.0	24.7	26.2	VA
6	0.97182	30.8	17.6	10.3	41.1	27.9	56.0	46.0	14.9	18.1	VB
7	1.36585	25.1	9.3	10.3	35.4	19.6	56.0	46.0	20.6	26.4	VA
8	2.11341	26.8	10.3	10.4	37.2	20.7	56.0	46.0	18.8	25.3	VB
9	2.17128	25.3	6.0	10.4	35.7	16.4	56.0	46.0	20.3	29.6	VA
10	2.28312	27.5	10.3	10.4	37.9	20.7	56.0	46.0	18.1	25.3	VB
11	5.53425	24.3	9.5	10.6	34.9	20.1	60.0	50.0	25.1	29.9	VA
12	16.06577	24.5	19.6	11.1	35.6	30.7	60.0	50.0	24.4	19.3	VA

5. Radiated Emission

5.1. Measurement Procedure

5.1.1. Test Receiver Condition

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

5.1.2. Frequency Range

30 MHz – 16000 MHz

5.1.3. Measuring Distance

3 m

5.1.4. Turn Table

Rotated 0 to 360 degrees

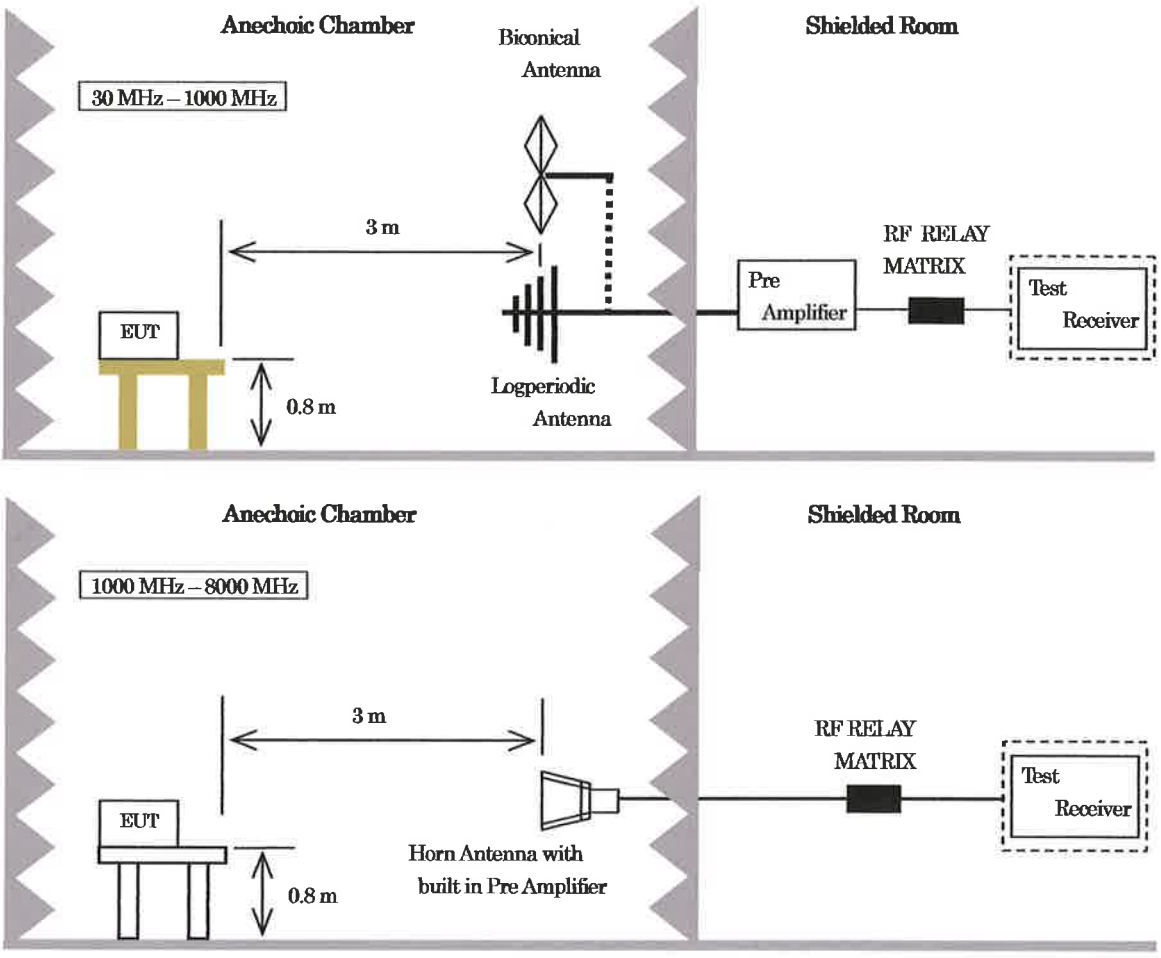
5.1.5. Antenna Position

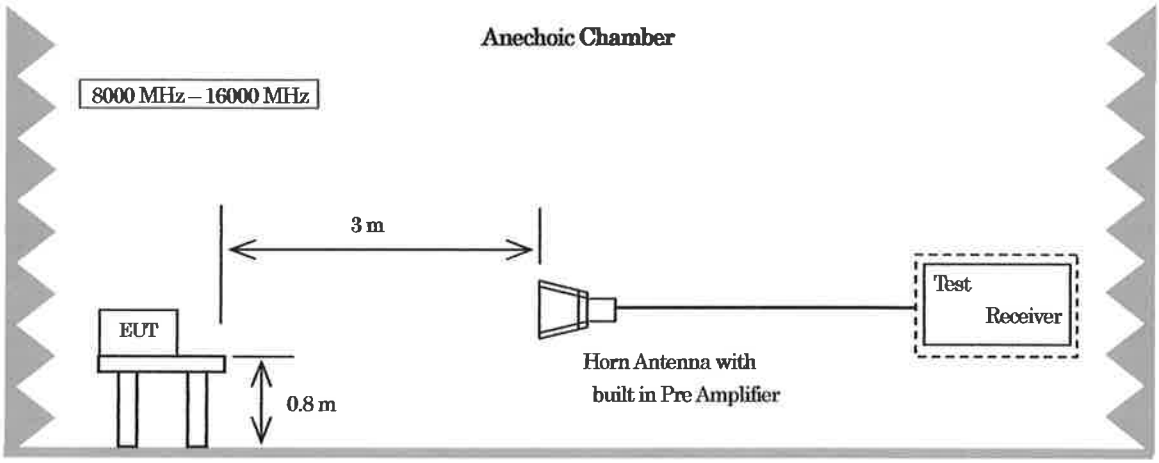
Antenna height:	1 m to 4 m
Polarization	Horizontal and Vertical

5.1.6. Reported Emissions

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

5.1.7. Test Configuration




Anechoic Chamber
8000 MHz – 16000 MHz
3 m
EUT
0.8 m
Test
Receiver
Horn Antenna with
built in Pre Amplifier

5.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial or ID No.	Calibration Due
Test Receiver	Rohde & Schwarz	ESU26	100299	Apr-2016
Pre Amplifier	Sonoma	310N	243232	Aug-2015
RF RELAY MATRIX	tsj	RFMI2A2M	03153	Aug-2015
Biconical Antenna	Schwarzbeck	BBA9106(VHA9103)	91032277	Feb-2016
Logperiodic Antenna	Schwarzbeck	UHALP9108A	0720	Feb-2016
Horn Antenna	EMCO	3115	8912-3303	Dec-2015
Pre Amplifier for Horn Antenna	tsj	MLA-0108AD-39	005	Dec-2015
Horn Antenna with built in Pre Amplifier	ETS-LINDGREN	3161-04EJ338	00040843	Jan-2017
Attenuator	JFW	50HF-003N	003	Aug-2015
Attenuator	JFW	50HF-003N	004	Aug-2015
Coaxial Cable (1)	SUHNER	RG400	259	Aug-2015
Coaxial Cable (2)	SUHNER	RG400	260	Aug-2015
Coaxial Cable (3)	SUHNER	S04272B	612	Aug-2015
Coaxial Cable (4)	SUHNER	S04272B	376	Aug-2015
Coaxial Cable (5)	SUHNER	SF106	32550/6	Aug-2015
Coaxial Cable (6)	SUHNER	SF104EA	15250/4EA	Aug-2015
Coaxial Cable (7)	SUHNER	SF104EA	10450/4EA	Aug-2015
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)

5.3. 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 @ 4140.520 MHz for Continuous Mode

Disturbance Level	=	Reading		44.0	dBuV
	+	Correction Factor*	+	3.1	dB/m
			=	47.1	dBuV/m

Margin	=	Limit		54.0	dBuV/m
	−	Disturbance Level	−	47.1	dBuV/m
			=	6.9	dB

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

5.4. Uncertainty

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

+3.81 dB / −3.34 dB

5.5. Test Data

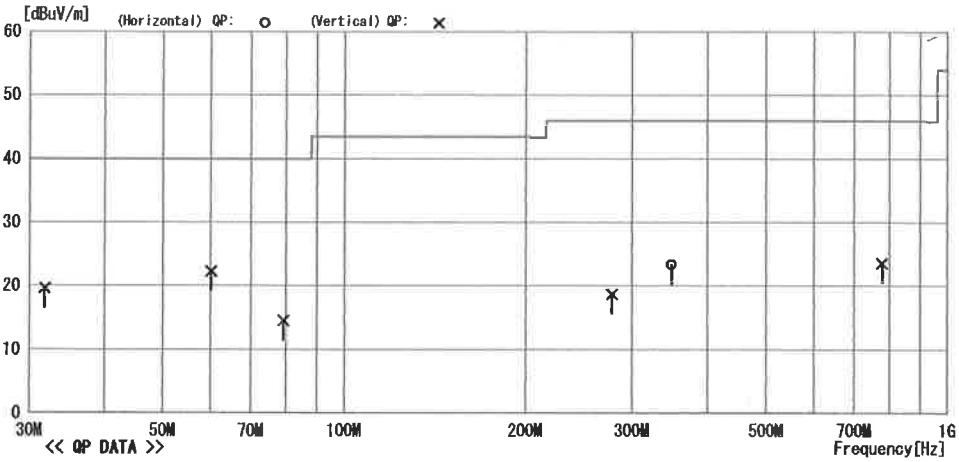
Radiated Emission

10m A/C
Date : 2015/08/10 11:15

Model Name	: CMOS CAMERA	Data No.	: IE1507-027A-11
Model No.	: SP-12000C-CXP4	Power Supply	: DC 12V
Serial No.	: β000004	Temp./Humi.	: 25℃/ 62%
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	31.851	26.7	18.0	6.7	31.8	19.6	40.0	20.4	Vert.	100	155	BIC
2	60.107	38.6	8.2	7.2	31.7	22.3	40.0	17.7	Vert.	100	230	BIC
3	79.259	32.3	6.5	7.4	31.7	14.5	40.0	25.5	Vert.	128	236	BIC
4	278.011	22.7	18.5	9.2	31.7	18.7	46.0	27.3	Vert.	100	359	BIC
5	348.878	30.2	15.2	9.6	31.7	23.3	46.0	22.7	Hori.	100	92	LPD
6	778.574	23.1	20.8	11.7	32.0	23.6	46.0	22.4	Vert.	100	186	LPD

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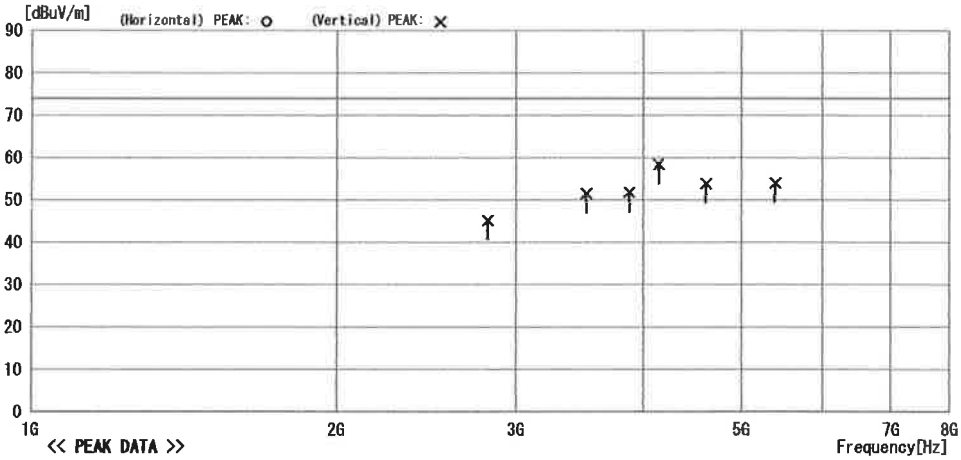
Radiated Emission

10m A/C
Date : 2015/08/10 15:35

Model Name	: CMOS CAMERA	Data No.	: IE1507-027A-17
Model No.	: SP-12000C-CXP4	Power Supply	: DC 12V
Serial No.	: β000004	Temp/Humi	: 25℃ / 62%
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	2812.440	47.2	29.4	10.0	41.4	45.2	74.0	28.8	Vert.	100	280	HOR
2	3515.527	50.6	31.3	11.5	41.9	51.5	74.0	22.5	Vert.	100	90	HOR
3	3875.211	49.5	32.2	12.1	42.0	51.8	74.0	22.2	Vert.	100	129	HOR
4	4140.520	55.3	32.2	12.5	41.6	58.4	74.0	15.6	Vert.	136	93	HOR
5	4609.279	49.2	32.5	13.3	41.1	53.9	74.0	20.1	Vert.	100	113	HOR
6	5390.512	45.8	34.1	14.6	40.5	54.0	74.0	20.0	Vert.	100	245	HOR

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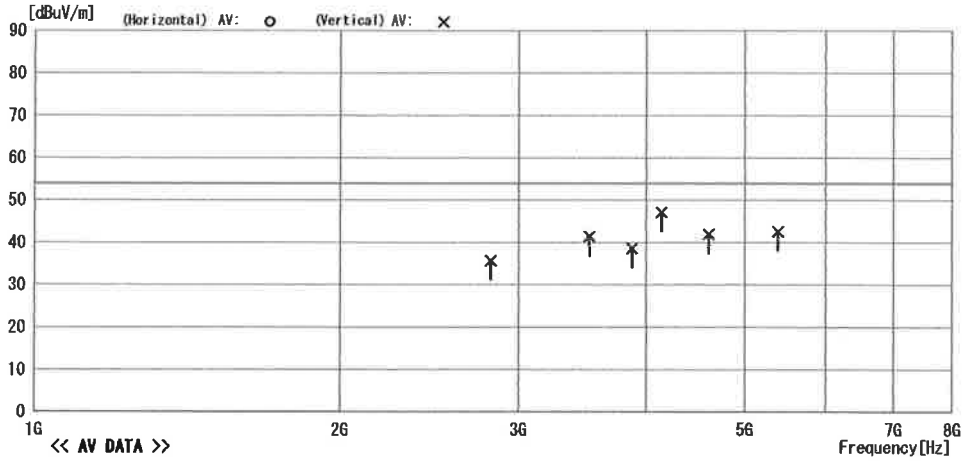
Radiated Emission

10m A/C
Date : 2015/08/10 15:35

Model Name	: CMOS CAMERA	Data No.	: IE1507-027A-18
Model No.	: SP-12000C-CXP4	Power Supply	: DC 12V
Serial No.	: β000004	Temp/Humi	: 25℃ / 62%
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	2812.440	37.7	29.4	10.0	41.4	35.7	54.0	18.3	Vert.	100	260	HOR
2	3515.527	40.5	31.3	11.5	41.9	41.4	54.0	12.6	Vert.	100	90	HOR
3	3875.211	36.3	32.2	12.1	42.0	38.6	54.0	15.4	Vert.	100	129	HOR
4	4140.520	44.0	32.2	12.5	41.6	47.1	54.0	6.9	Vert.	136	93	HOR
5	4609.279	37.2	32.5	13.3	41.1	41.9	54.0	12.1	Vert.	100	113	HOR
6	5390.512	34.4	34.1	14.6	40.5	42.6	54.0	11.4	Vert.	100	245	HOR

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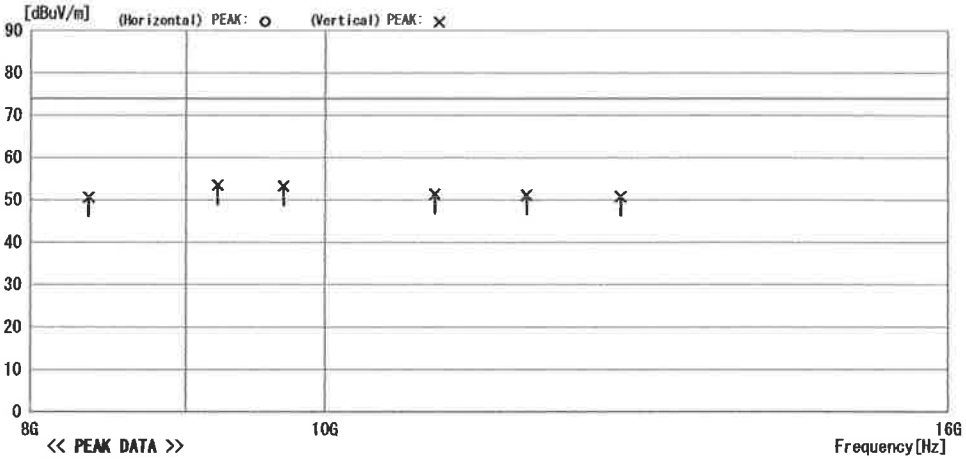
Radiated Emission

10m A/C
Date : 2015/08/17 16:20

Model Name	: CMOS CAMERA	Data No.	: IE1507-027A-27
Model No.	: SP-12000C-CXP4	Power Supply	: DC 12V
Serial No.	: β000004	Temp/Humi	: 26℃ / 44%
Test Condition	: Continuous Mode	Operator	: A. Piroddi

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	8359.189	47.9	-1.5	4.2	0.0	50.6	74.0	23.4	Vert.	102	259	HOR
2	9218.544	50.3	-1.2	4.4	0.0	53.5	74.0	20.5	Vert.	100	247	HOR
3	9688.728	49.8	-1.1	4.5	0.0	53.2	74.0	20.8	Vert.	112	136	HOR
4	10859.130	48.1	-1.7	4.9	0.0	51.3	74.0	22.7	Vert.	100	237	HOR
5	11640.360	47.8	-1.8	5.1	0.0	51.1	74.0	22.9	Vert.	100	244	HOR
6	12499.700	46.6	-1.1	5.3	0.0	50.8	74.0	23.2	Vert.	101	135	HOR

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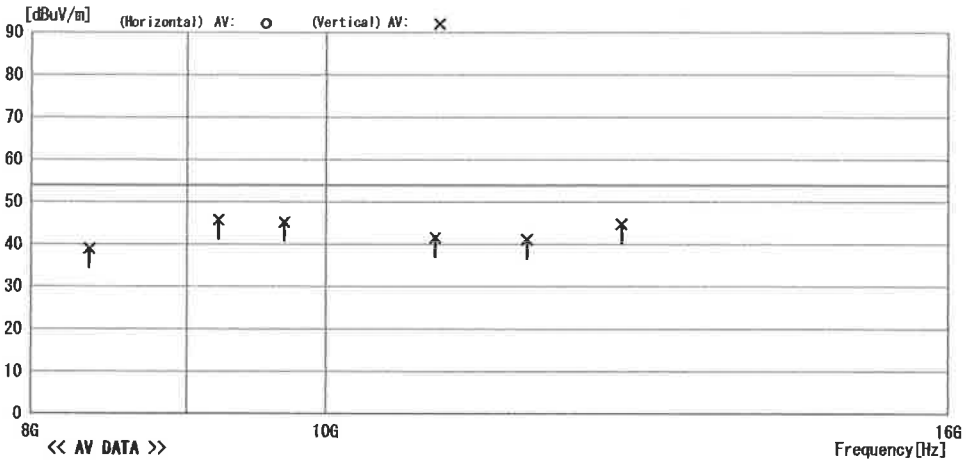
Radiated Emission

10m A/C
Date : 2015/08/17 16:20

Model Name	: CMOS CAMERA	Data No.	: IE1507-027A-28
Model No.	: SP-12000C-CXP4	Power Supply	: DC 12V
Serial No.	: β000004	Temp/Humi	: 26℃ / 44%
Test Condition	: Continuous Mode	Operator	: A. Piroddi

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)



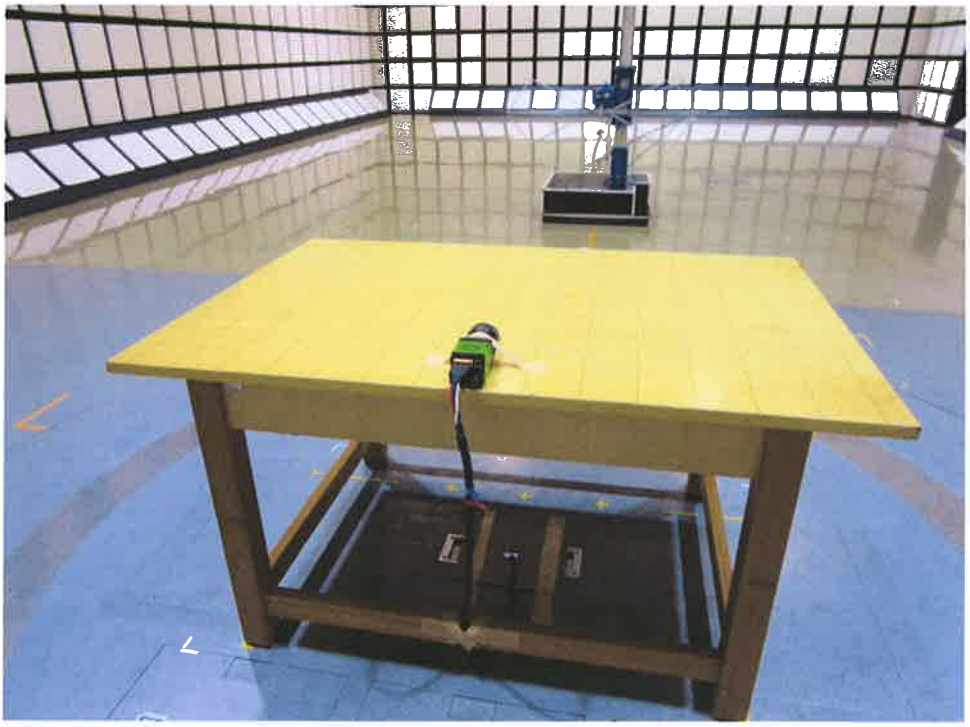
No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type
1	8359.189	36.2	-1.5	4.2	0.0	38.9	54.0	15.1	Vert.	102	259	HOR
2	9218.544	42.5	-1.2	4.4	0.0	45.7	54.0	8.3	Vert.	100	247	HOR
3	9688.728	41.8	-1.1	4.5	0.0	45.2	54.0	8.8	Vert.	112	136	HOR
4	10859.130	38.3	-1.7	4.9	0.0	41.5	54.0	12.5	Vert.	100	237	HOR
5	11640.360	37.8	-1.8	5.1	0.0	41.1	54.0	12.9	Vert.	100	244	HOR
6	12499.700	40.5	-1.1	5.3	0.0	44.7	54.0	9.3	Vert.	101	135	HOR

6. Photographs

6.1. Conducted Emission at Mains Port

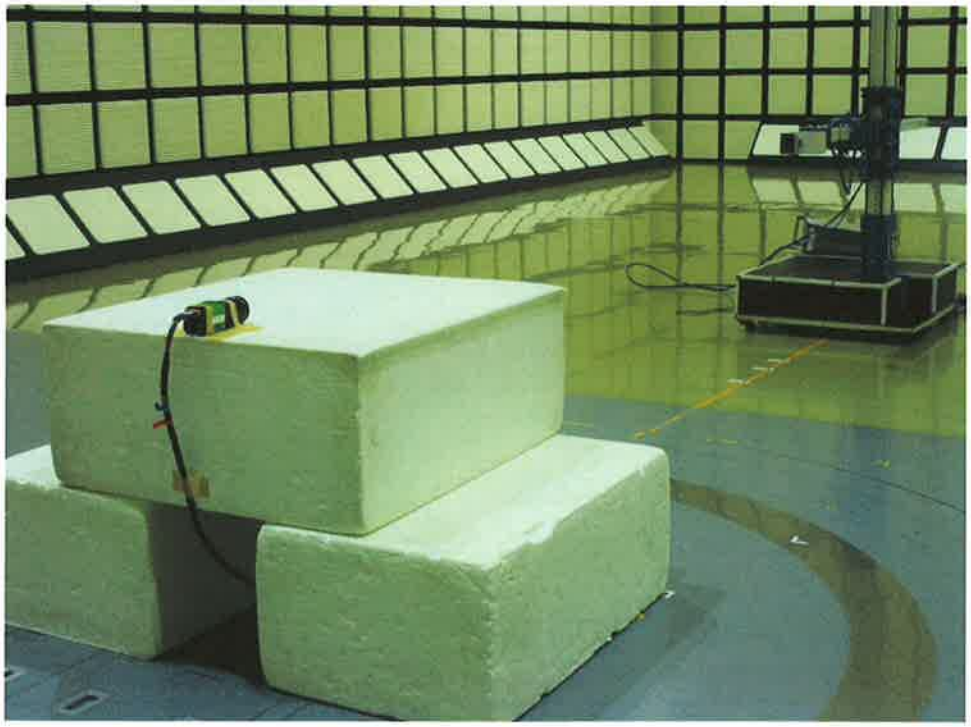
6.2. Radiated Emission

・30 MHz – 1000 MHz



・1000 MHz – 8000 MHz

・8000 MHz – 16000 MHz



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7. Laboratory Description

7.1. 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

7.2. 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

7.3. Laboratory Filing or Certificate Information

7.3.1. VCCI Site Registration pursuant to V-5

Site Name	Registration No.	Expiry Date
ISHIKAWA Co., Ltd.	A-0105	July 14, 2017

7.3.2. FCC Site Filing pursuant to CFR 47 § 2.948

Site Name	Test Firm Registration No.	Expiry Date
ISHIKAWA Co., Ltd.	743690	July 5, 2017

7.3.3. VLAC Accreditation

Site Name	Accreditation No.	Expiry Date
ISHIKAWA Co., Ltd. EMC Laboratory	VLAC-025	July 14, 2017

7.3.4. TÜV Rheinland Certificate of Appointment Laboratory

Site Name	Registration No.	Expiry Date
ISHIKAWA Co., Ltd. EMC Laboratory	UA50060145-0011	May 31, 2016

7.3.5. Industry Canada site filing pursuant to RSS-Gen

Site Name	File No.	Expiry Date
10m Anechoic chamber	5804A-1	September 07, 2015
3m Anechoic chamber	5804A-2	September 07, 2015