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

Lab Accreditation
VLAC-025

Test Report

Test Report No. IE1307-008T2
Date of Issue: 8th August, 2013

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-5000C-PMCL
Serial Number	:	β 2 000001
EUT Condition (s)	:	Pre-Production

Date of Test : 26th July, 2013

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

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

Table of Contents

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

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. 3.05
Radiated Emission	ANSI C63.4:2003 / Clause 8	IT04-P007 Rev. 2.04 IT04-P009 Rev. 3.05

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

2. Equipment under Test

2.1. EUT Information

No.	EUT	Manufacturer	Model No.	Serial No.	FCC ID / DoC
A	CMOS Camera	JAI CORPORATION	SP-5000C-PMCL	β 2 000001	N/A

Note : The EUT was tested as tabletop.

Internal Max. Frequency : 288 MHz

EUT Clock Frequency :	CPU Oscillator	Clock Frequency	Name of Board	Note
	19.2 MHz	72 MHz	I/F Board	—
	19.2 MHz	75 MHz	I/F Board	—
	19.2 MHz	288 MHz	Sensor Board	—
	19.2 MHz	48 MHz	I/F Board	—
	19.2 MHz	82.3 MHz	I/F Board	—
	19.2 MHz	61.7 MHz	I/F Board	—

Power Rating :
DC 12 V, 1 A

Port(s) :	Connector Type	Connector Pin	Note
DIGITAL I/O-1	HONDA-HDR	26 Pins	Camera Link
DIGITAL I/O-2	HONDA-HDR	26 Pins	Camera Link
DC IN/ TRIGGER	HIROSE-HR10	12 Pins	—

Dimensions of the EUT :	Width (mm)	Depth (mm)	Height (mm)
	62	48	62

Weight of the EUT :	Weight (g)
	215

2.2. Operating Mode

・Normal Mode

Normal Mode

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

3. Configuration of Equipment

3.1. Peripheral(s) used

No.	Equipment	Manufacturer	Model No.	Serial No.	FCC ID / DoC
B	LENS	PENTAX	B1214D-2	None	N/A
C	Conversion Box	JAI CORPORATION	None	None	N/A
D	Power Supply	TAKASAGO	TMO18-3	28387152	N/A
E	Personal Computer	DELL	T3500	7M1DTBX	DoC
F	Frame Grabber Board	AVAL DATA	APX-3323	5120028026	N/A
G	Keyboard	DELL	SK-8175	CN-0W213F-71616-13H-08Y2-A00	DoC
H	Mouse	DELL	K251D	None	DoC
I	LCD MONITOR	DELL	U2311Hb	J89C0121H	N/A

3.2. Cable(s) used

AC Power Cable

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

DC Power Cable

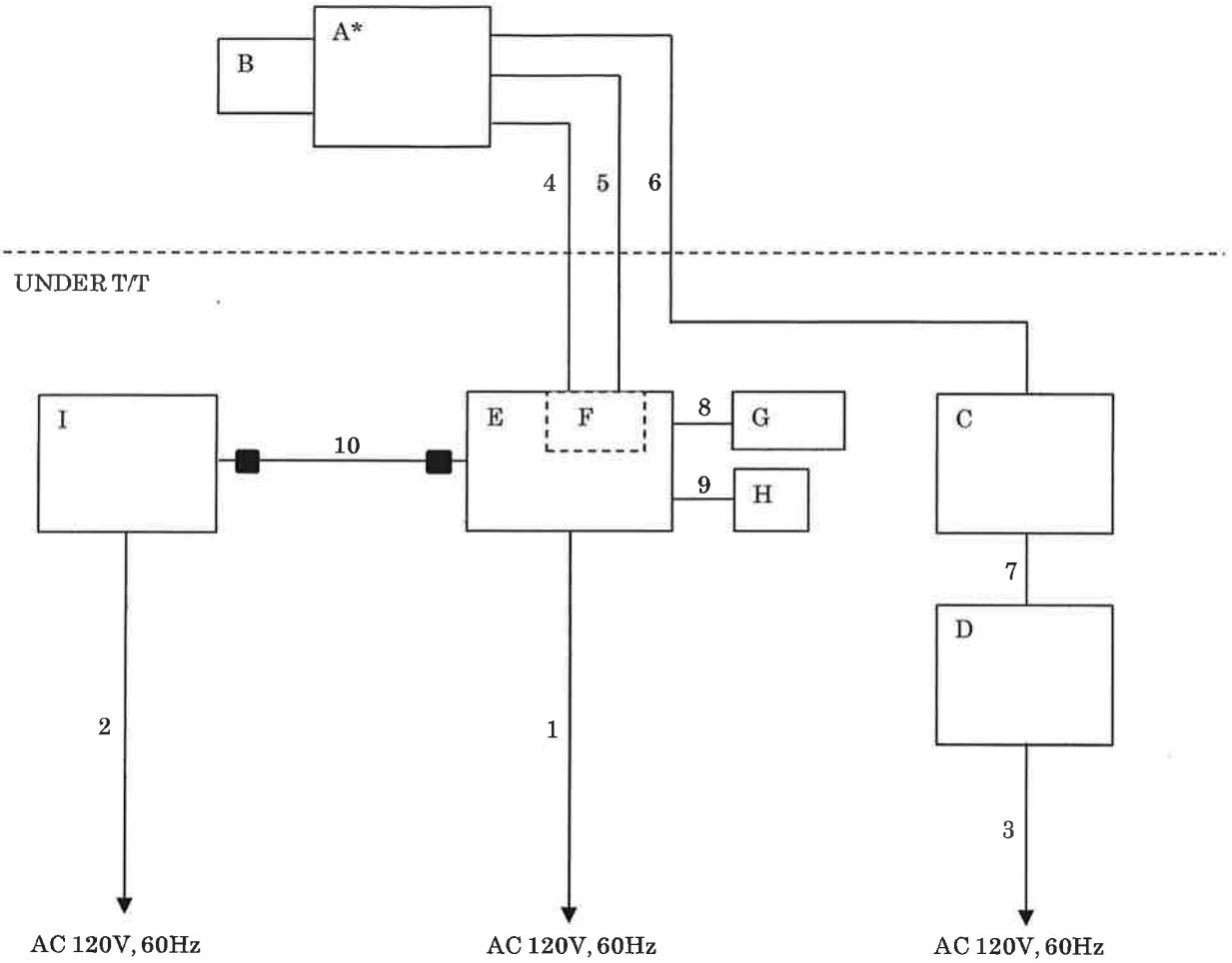
No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
7	DC Power Cable for Conversion Box	0.5	Unshielded	None	—

Interface Cable

No.	Cable(s) Name	Length (m)	Shielding	Ferrite Core	Comment
4	Camera Link Cable	7.0	Shielded	None	—
5	Camera Link Cable	7.0	Shielded	None	—
6	DC Power / Trigger Cable	10.0	Shielded	None	—
8	Keyboard Cable	2.1	Shielded	None	—
9	Mouse Cable	1.7	Shielded	None	—
10	DVI Cable	1.7	Shielded	Fixed ×2	Refer to Note

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.

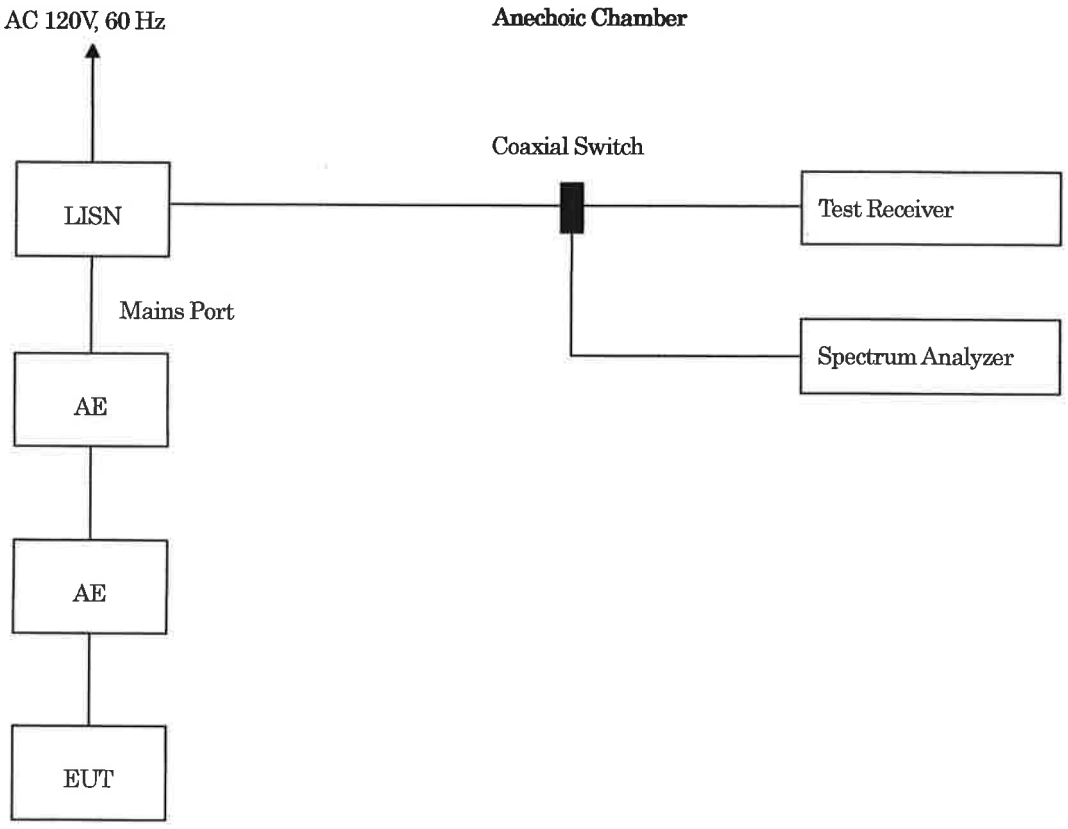
4.1.4. Line Impedance Stabilizing Network (LISN)

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-2014
Spectrum Analyzer	ADVANTEST	R3172	140800866	Apr-2014
RF RELAY MATRIX	tsj	RFMI2A2M	03153	Oct-2013
Transient Limiter	Agilent	11947A	3107A03746	Aug-2013
AMN for EUT	Kyoritsu	KNW-242C	8-1673-1	Feb-2014
AMN for peripheral(s)	Kyoritsu	KNW-407	8-901-12	N/A
Attenuator for AMN (KNW-242C)	Narda	755B-10	107	Feb-2014
Terminator for AMN	JFW	50T-001-BNC	151	Jun-2014
Coaxial Cable (1)	SUHNER	RG400	258	Oct-2013
Coaxial Cable (2)	SUHNER	S04272B	376	Oct-2013
Coaxial Cable (3)	Fujikura	5D-2W	377	Oct-2013
Coaxial Cable (4)	SUHNER	SF106	32552/6	Oct-2013
Controller PC	DELL	DELL8400	CZYPK1X	N/A
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.
Note 2: The spectrum analyzer is used to detect the frequency points to be measured. It is not used for measuring levels.

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

・Example @ 10.68900 MHz for Normal Mode

Disturbance Level	=	Reading		23.4	dBuV
	+	Correction Factor*	+	10.7	dB
			=	34.1	dBuV

Margin	=	Limit		50.0	dBuV
	−	Disturbance Level	−	34.1	dBuV
			=	15.9	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.

+2.67 dB / −2.79 dB

4.5. Test Data

Conducted Emission

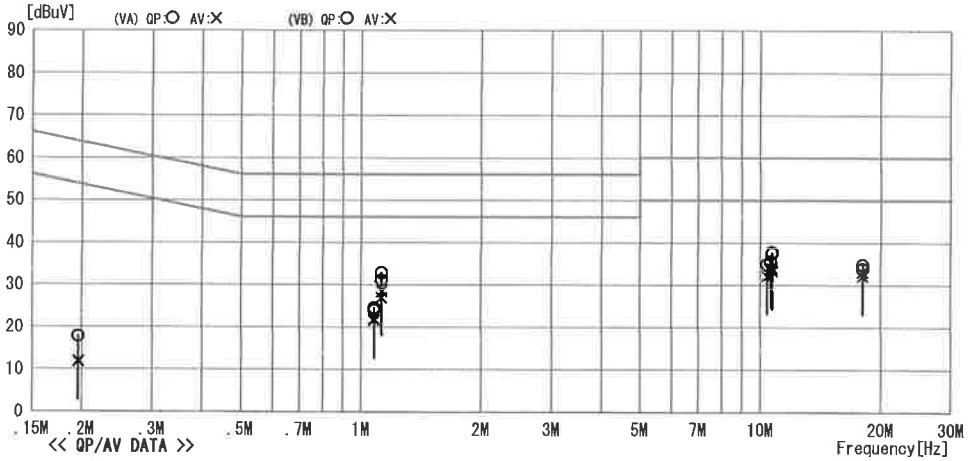
10m A/C
Date : 2013/07/26 17:26

Model Name : CMOS CAMERA
Model No. : SP-5000C-PMCL
Serial No. : β2 000001
Test Condition : Normal Mode

Data No. : IE1307-008A-16
Power Supply : AC 120V, 60Hz
Temp./Humi. : 23℃ / 64%
Operator : J.Takayama

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	0.19610	7.7	1.8	10.1	17.8	11.9	63.8	53.8	46.0	41.9	VA
2	0.19610	7.7	1.7	10.1	17.8	11.8	63.8	53.8	46.0	42.0	VB
3	1.07870	14.1	11.6	10.1	24.2	21.7	56.0	46.0	31.8	24.3	VB
4	1.07870	14.5	11.8	10.2	24.7	22.0	56.0	46.0	31.3	24.0	VA
5	1.12480	21.0	17.0	10.1	31.1	27.1	56.0	46.0	24.9	18.9	VB
6	1.12660	22.7	18.4	10.2	32.9	28.6	56.0	46.0	23.1	17.4	VA
7	10.39450	24.3	21.6	10.6	34.9	32.2	60.0	50.0	25.1	17.8	VB
8	10.59120	24.9	23.3	10.7	35.6	34.0	60.0	50.0	24.4	16.0	VA
9	10.68900	27.0	23.4	10.7	37.7	34.1	60.0	50.0	22.3	15.9	VA
10	10.69000	27.1	22.8	10.6	37.7	33.4	60.0	50.0	22.3	16.6	VB
11	18.04320	23.7	22.0	11.1	34.8	33.1	60.0	50.0	25.2	16.9	VA
12	18.04320	22.8	21.1	11.0	33.8	32.1	60.0	50.0	26.2	17.9	VB

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 – 2000 MHz

5.1.3. Measuring Distance

3 m

5.1.4. Turn Table

Rotated 0 to 360 degrees

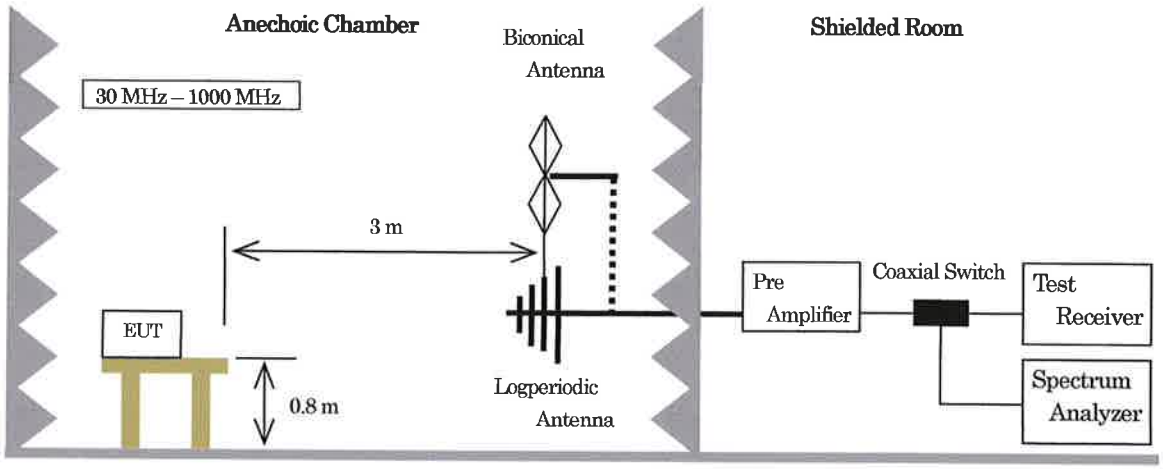
5.1.5. Antenna Position

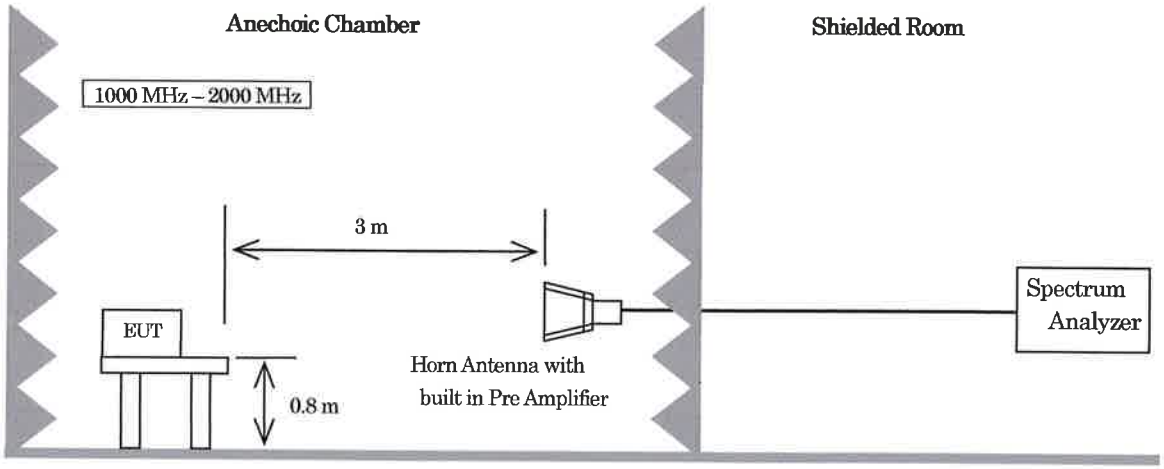
Antenna height:	1 m to 4 m
Polarization	Horizontal and Vertical

5.1.6. Reported Emissions

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

5.1.7. Test Configuration





5.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial or ID No.	Calibration Due
Test Receiver	Rohde & Schwarz	ESU26	100299	Apr-2014
Spectrum Analyzer	ADVANTEST	R3172	140800866	Apr-2014
Pre Amplifier	Sonoma	310N	243232	Aug-2013
RF RELAY MATRIX	tsj	RFMI2A2M	03153	Oct-2013
Biconical Antenna	Schwarzbeck	BBA-9106	91032277	Feb-2014
Logperiodic Antenna	Schwarzbeck	UHALP9108A	0720	Feb-2014
Horn Antenna	EMCO	3115	8912-3303	Dec-2013
Pre Amplifier for Horn Antenna	tsj	MLA0108AD-39	005	Aug-2013
Coaxial Cable (1)	SUHNER	RG400	259	Oct-2013
Coaxial Cable (2)	SUHNER	RG400	260	Oct-2013
Coaxial Cable (3)	SUHNER	RG400	261	Oct-2013
Coaxial Cable (4)	SUHNER	S04272B	376	Oct-2013
Coaxial Cable (5)	SUHNER	SF106	32550/6	Oct-2013
Coaxial Cable (6)	SUHNER	SF104EA	15250/4EA	Oct-2013
Coaxial Cable (7)	SUHNER	RG400	474	Aug-2013
Controller PC	DELL	DELL8400	CZYPK1X	N/A
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)
Note 3: The measurement of levels are carried out by the receiver below 1GHz and by the spectrum analyzer above 1GHz.

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 limit shall 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 @ 75.430 MHz for Normal Mode

Disturbance Level	=	Reading		46.7	dBuV
	+	Correction Factor*	+	−17.7	dB/m
			=	29.0	dBuV/m

Margin	=	Limit		40.0	dBuV/m
	−	Disturbance Level	−	29.0	dBuV/m
			=	11.0	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.

+ 3.48 dB / − 3.36 dB

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

5.5. Test Data

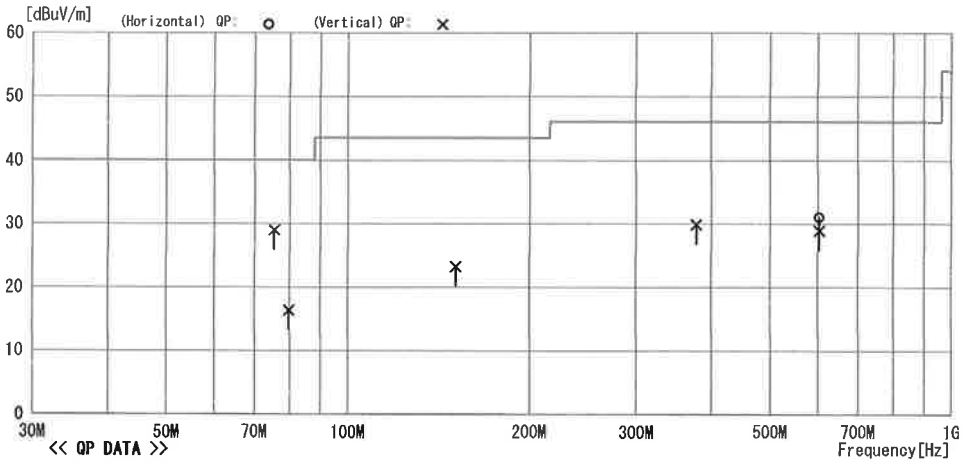
Radiated Emission

10m A/C
Date : 2013/07/26 11:42

Model Name	: CMOS CAMERA	Data No.	: IE1307-008A-04
Model No.	: SP-5000C-PMCL	Power Supply	: DC 12V
Serial No.	: β2 000001	Temp./Humi.	: 23℃ / 60%
Test Condition	: Normal Mode	Operator	: J. Takayama

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)



<< QP 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	75.430	46.7	6.3	7.8	31.8	29.0	40.0	11.0	Vert.	123	24	BIC
2	79.770	34.0	6.4	7.8	31.8	16.4	40.0	23.6	Vert.	100	144	BIC
3	150.850	31.6	14.8	8.6	31.7	23.3	43.5	20.2	Vert.	100	298	BIC
4	377.140	35.6	15.7	10.2	31.6	29.9	46.0	16.1	Vert.	153	183	LPD
5	603.420	32.6	19.1	11.2	31.9	31.0	46.0	15.0	Hori.	100	300	LPD
6	603.420	30.5	19.1	11.2	31.9	28.9	46.0	17.1	Vert.	100	147	LPD

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

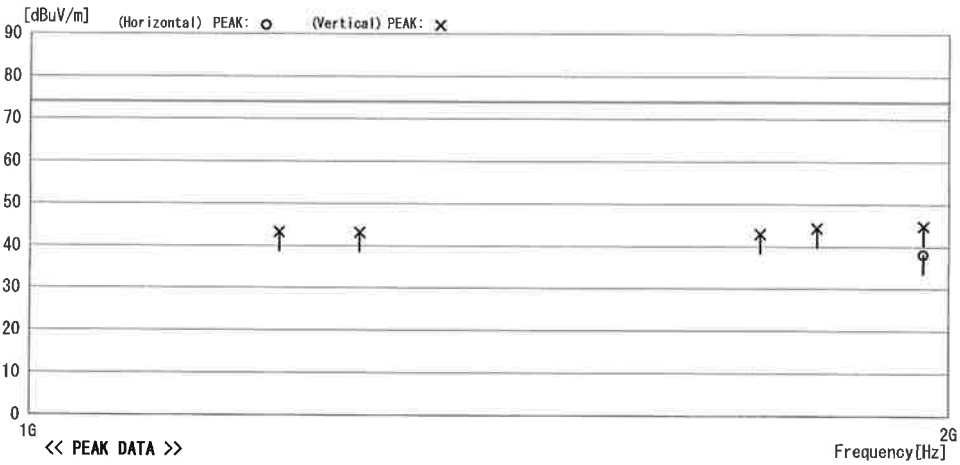
Radiated Emission

10m A/C
Date : 2013/07/26 13:04

Model Name	: CMOS CAMERA	Data No.	: IE1307-008A-05
Model No.	: SP-5000C-PMCL	Power Supply	: DC 12V
Serial No.	: β2 000001	Temp/Humi	: 23℃ / 60%
Test Condition	: Normal Mode	Operator	: J. Takayama

Memo :

LIMIT : FCC Part15 SubpartB ClassB(3m)Peak



<< PEAK 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	1206.860	52.4	25.6	6.7	41.5	43.2	74.0	30.8	Vert.	100	234	HOR
2	1282.260	52.2	25.6	6.9	41.6	43.1	74.0	30.9	Vert.	100	229	HOR
3	1734.830	50.3	26.6	8.0	42.0	42.9	74.0	31.1	Vert.	100	203	HOR
4	1810.260	50.9	27.3	8.1	42.0	44.3	74.0	29.7	Vert.	100	124	HOR
5	1961.000	49.9	27.8	8.6	41.5	44.8	74.0	29.2	Vert.	100	48	HOR
6	1961.000	43.2	27.8	8.6	41.5	38.1	74.0	35.9	Hori.	100	53	HOR

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

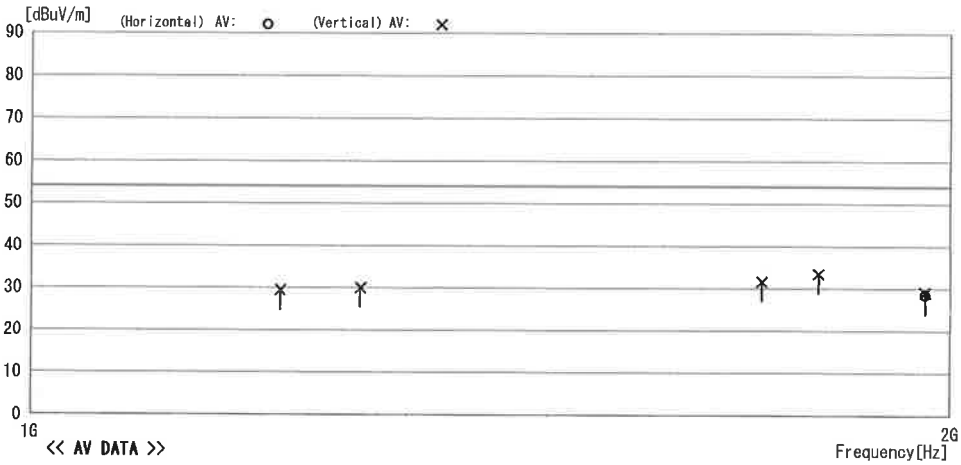
Radiated Emission

10m A/C
Date : 2013/07/26 13:04

Model Name	: CMOS CAMERA	Data No.	: IE1307-008A-06
Model No.	: SP-5000C-PMCL	Power Supply	: DC 12V
Serial No.	: β2 000001	Temp/Humi	: 23℃ / 60%
Test Condition	: Normal Mode	Operator	: J. Takayama

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	1206.860	38.6	25.6	6.7	41.5	29.4	54.0	24.6	Vert.	100	231	HOR
2	1282.260	39.1	25.6	6.9	41.6	30.0	54.0	24.0	Vert.	100	359	HOR
3	1734.830	39.0	26.6	8.0	42.0	31.6	54.0	22.4	Vert.	100	193	HOR
4	1810.260	40.1	27.3	8.1	42.0	33.5	54.0	20.5	Vert.	100	122	HOR
5	1961.000	34.2	27.8	8.6	41.5	29.1	54.0	24.9	Vert.	100	42	HOR
6	1961.000	33.6	27.8	8.6	41.5	28.5	54.0	25.5	Hori.	100	327	HOR

6. Photographs

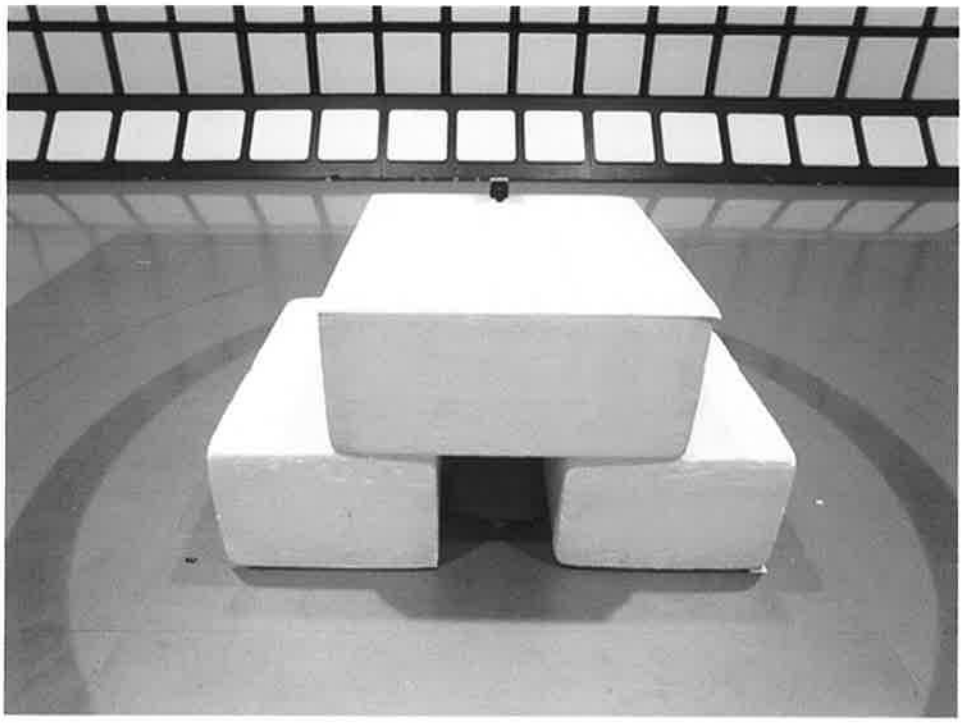
6.1. Conducted Emission at Mains Port

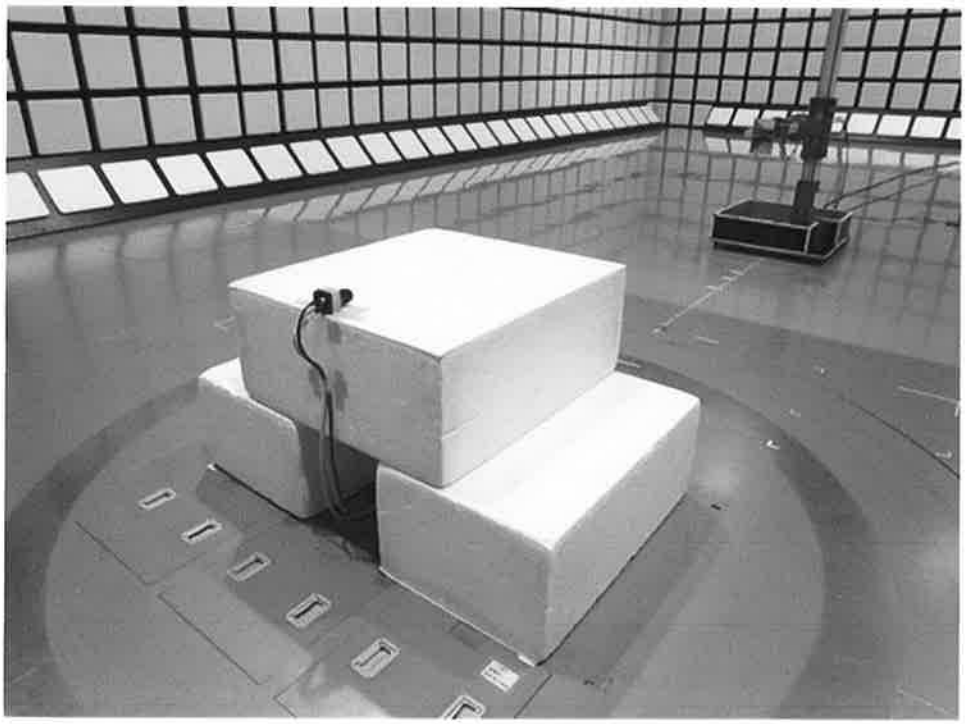
6.2. Radiated Emission

・30 MHz – 1000 MHz

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

・1000 MHz – 2000 MHz





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, 2015

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 10, 2015

7.3.3. VLAC Accreditation

Site Name	Accreditation No.	Expiry Date
ISHIKAWA Co., Ltd. EMC Laboratory	VLAC-025	July 14, 2015

7.3.4. TÜV Rheinland Certificate of Appointment Laboratory

Site Name	Registration No.	Expiry Date
ISHIKAWA Co., Ltd. EMC Laboratory	UA50060145-0009	June 11, 2014

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