EMI TEST REPORT

Test Report No. : 23CE0013-HO-1

Applicant	:	**CalsonicKansei Corp.**
Type of Equipment	:	**Immobilizer system for motorcycle**
Model No.	:	**CSSU53**
Test standard	:	**FCC Part 15 Subpart C Section 15.209**
FCC ID	:	**KBRCSSU53**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.

Date of test : October 22 and 23, 2002

Tested by : Y. Iwasa
Yoshiaki Iwasa
EMC Head Office Division

Approved by : H. Oshimoji
Hironobu Shimoji
Group Leader of Head Office EMC Division

A-Pex International Co., Ltd.
EMC Head Office Division.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

CONTENTS

A-Pex International Co., Ltd.
EMC Head Office Division.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

SECTION 1: Client information

Company name	:	CalsonicKansei Corp.
Address	:	540-7 Kyoei,Kodama-machi,Kodama-gun,Saitama-ken,367-0206,Japan
Telephone Number	:	+81-495-72-5149
Facsimile Number	:	+81-495-72-5142
Contact Person	:	Toshinori Matsumoto

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Immobilizer system for motorcycle
Model No.	:	CSSU53
Serial No.	:	1
Rating	:	5.0V DC
Country of Manufacture	:	JAPAN
Receipt Date of Sample	:	October 18, 2002
Condition of EUT	:	Engineering prototype

2.2 Product Description

CalsonicKansei Corp. Model: CSSU53 (referred to as the EUT in this report) is a Immobilizer system for motorcycle.

The specification is as following.

Frequency characteristics	:	125kHz
Type of modulation	:	ASK (Amplitude Shift Keying)
Channel	:	1
Antenna Type	:	Loop Coil Antenna

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.209 Radiated emission limits; general requirements

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2000	Section 15.207	Conducted	Excluded *1	N/A	N/A
2	Radiated emission	ANSI C63.4:2000	Section15.209	Radiated	N/A	15.8dB 800.00MHz Horizontal	Complied
*1 The test is not applicable since the EUT does not have AC Mains.							

*FCC Part 15.31 (e)
The host device CSSU53 provide the stable power supply (DC: 5.0V), and the Immobilizer System complies power supply regulation.
*FCC Part 15.203 Antenna requirement
The standard type of antenna connector is applied; however, the EUT complies this requirement since this radio equipment is for professional installation.

3.3 Confirmation

A-Pex International hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart C Section 15.209.

3.4 Uncertainty

Radiated Emission Test
The measurement uncertainty (with a 95% confidence level) for this test using Loop antenna is ±1.9dB.
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.

☐ The data listed in this test report may exceed the test limit because it does not have enough margin.
■ The data listed in this test report has enough margin.

3.5 Test location

A-Pex International Co., Ltd. Head Office EMC Division. No.1 semi Anechoic Chamber, 19.2 x 11.2 x 7.7m
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124
This site has been fully described in a report submitted to FCC office, and listed on February 01, 2002 (Registration number: 313583).
[Industry Canada Number : IC4247]
*NVLAP Lab. code: 200572-0

3.6 Test Setup, Data of EMI & Test instruments,

Refer to Appendix 1 to 3.

SECTION 4: Operation of E.U.T. during testing

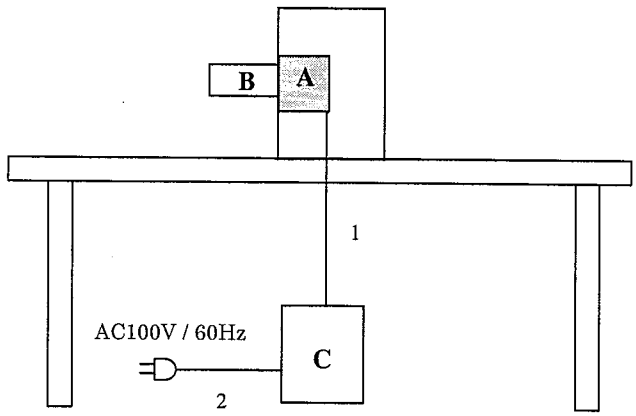
4.1 Operating Modes

The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

The sequence is used : Continuous Transmitting

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals



*Cabling was taken into consideration and test data was taken under worse cese conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Immobilizer system	CSSU53	1	Calsonic Kansei Corp.	KBRCSSU53

Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
B	Key	N/A	N/A	N/A	N/A
C	DC Power Supply	PMC35-2A	13090501	KIKUSUI	N/A

List of cables used

No.	Name	Length (m)	Shield	Remark
1	DC Power cable	1.4	N	Polyvinyl chloride
2	AC Power cable	1.5	N	Polyvinyl chloride

SECTION 5: Radiated emission

5.1 Operating environment

The test was carried out in a No.1 semi Anechoic Chamber, 19.2 x 11.2 x 7.7m.

Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The EUT was set on the center of the tabletop.
Test was made with the Loop antenna positioned to obtains the maximum signal strength.
The center of the Loop antenna was 1m height from the ground plane.
Test was made with the Biconical and Logperiodic antenna positioned in both the horizontal and vertical planes of polarization.
The Biconical and Logperiodic antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.
A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 9kHz-1000MHz
Test distance : 3m
EUT position : Tabletop
EUT operation mode : Transmitting

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi anechoic chamber with a ground plane and at a distance of 3m.
Measurements were performed with a quasi-peak detector or peak and average detectors.
The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity (30-1000MHz).
The measurements were performed for the antenna polarization of EUT with maximum signal strength. (9k-30MHz)
The measurements were performed for both vertical and horizontal antenna polarization. (30-1000MHz)
The radiated emission measurements were made with the following detector function of the test receiver.

	9-90kHz	90-110kHz	110-150kHz	150-490kHz	490k-30MHz	30-1000MHz
Detector Type	PK/AV	QP	PK/AV	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	200Hz	10kHz	10kHz	120kHz

The EUT was measured in the direction to be its worst level condition.

5.5 Results

Summary of the test results: Pass

Date: October 22 and 23, 2002 Tested by: Y. Iwasa

APPENDIX 1: Photographs of test setup

APPENDIX 2: Test instruments

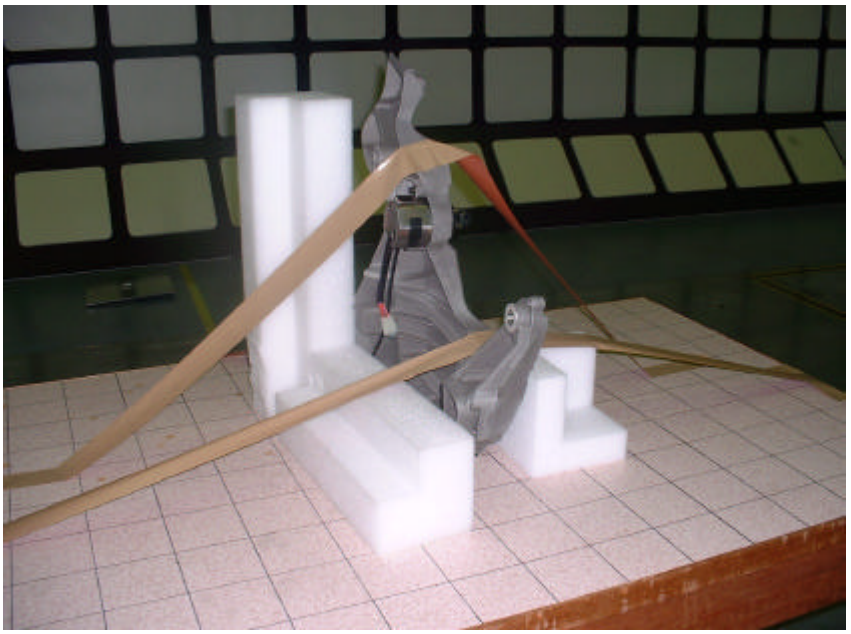
APPENDIX 3: Data of EMI test

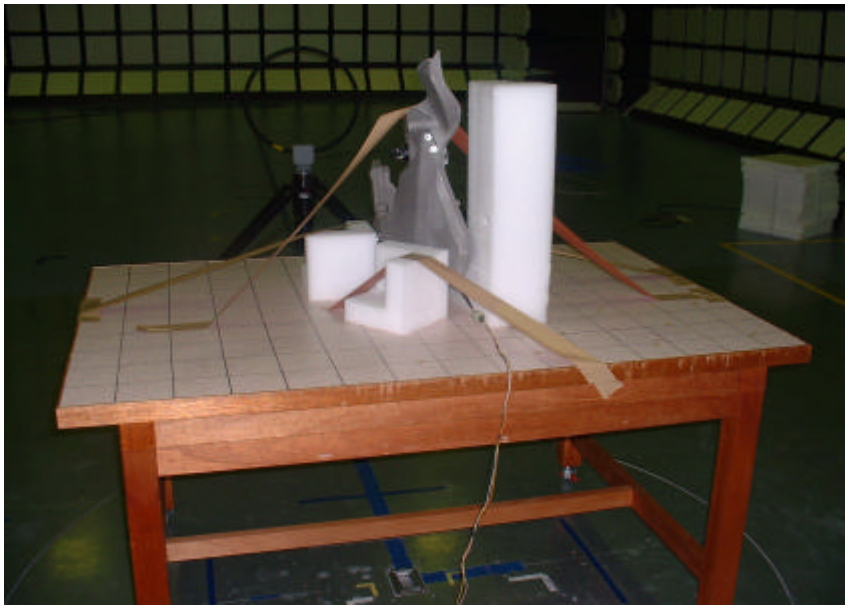
A-Pex International Co., Ltd.
EMC Head Office Division.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

APPENDIX 1: Photographs of test setup

Radiated emission





A-Pex International Co., Ltd.
EMC Head Office Division.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

Test Report No :23CE0013-HO-1

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechioc Chamber 10m	RE	2001/12/29 * 12
MCC-01	Coaxial Cable	Suhner/storm/Agilent/TSJ	MCC-01-01(421-014-10m) MCC-01-02(421-014-16m) MCC-01-03(421-014-7.5m) MCC-01-04(SFM86PE-15cm) MCC-01-05(8765C,RF SWITCHER SW1-A) MCC-01-06(SFM141-15cm) MCC-01-07(SFM141-15cm) MCC-01-08(8765C,RF SWITCHER SW2-A) MCC-01-09(8765C,RF SWITCHER SW3-A) MCC-01-10(421-010-1m)	RE	2001/12/27 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2001/11/13 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2002/10/16 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2002/10/16 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2001/12/27 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2002/03/13 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE	2001/12/18 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agilent/TSJ	MCC-03-01(5D-2W-20m) MCC-03-02(3D-2W-7.5m) MCC-03-03(8765C RF SWITCHER SW4-A) MCC-03-04(RG400/U-1.5m)	RE	2001/12/27 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2001/12/27 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	MCC-12-01(8D-2W-15m) MCC-12-02(5D-2W-0.7m) MCC-12-05(RF SW) MCC-12-03(5D-2W-0.8m) MCC-12-06(RF SW) MCC-12-04(5D-2W-1m)	RE	2002/05/10 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
Test Item:

Date of carrier and supurious emissions(9kHz to 30MHz)

A-Pex International Co., Ltd.
EMC Head office Division No.1 Semi Anechoic chamber

Company : CalsonicKansei Corp.
Equipment : Immobilizer system for motorcycle
Model : CSSU53
Sirial No : 1
Power : DC5.0V
Mode : Transmitting (125kHz)
Temperature : 25deg.C
Humidity : 52%

Report No. : 23CE0013-HO
Regulation : FCC 15.209(a)
Test Distance : 3m
Date : 2002/10/22
FCC ID : KBRCSSU53

ENGINEER : Yoshiaki Iwasa

Frequency Rage :9kHz-90kHz PK/AV DETECT(Test Receiver: BW 200Hz)
Frequency Rage :90kHz-110kHz QP DETECT(Test Receiver: BW 200Hz)
Frequency Rage :110kHz-150kHz PK/AV DETECT(Test Receiver: BW 200Hz)
Frequency Rage :150kHz-490kHz PK/AV DETECT(Test Receiver: BW 10kHz)
Frequency Rage :490kHz-30MHz QP DETECT(Test Receiver: BW 10kHz)

No.	FREQ [kHz]	Loop Max Angle [deg]	detector type	T/R READING [dBuV]	ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]
1	125.30	0	PK	70.2	19.8	0.0	0.2	26.8	63.4	105.6	42.2
1	125.30	90	PK	66.7	19.8	0.0	0.2	26.8	59.9	105.6	45.7
1	125.30	0	AV	70.2	19.8	0.0	0.2	26.8	63.4	105.6	42.2
2	250.60	0	PK	24.6	19.8	0.0	0.2	27.5	17.1	99.6	82.5
2	250.60	0	AV	17.0	19.8	0.0	0.2	27.5	9.5	99.6	90.1
3	375.72	0	PK	40.3	19.8	0.0	0.2	27.9	32.4	96.1	63.7
3	375.72	0	AV	39.3	19.8	0.0	0.2	27.9	31.4	96.1	64.7
4	501.20	0	QP	34.9	19.8	0.0	0.2	28.0	26.9	73.6	46.7
5	626.50	0	QP	34.0	19.7	0.0	0.2	28.0	25.9	71.7	45.8
6	751.80	0	QP	33.6	19.7	0.0	0.2	28.1	25.4	70.1	44.7
7	877.10	0	QP	33.2	19.7	0.0	0.2	28.1	25.0	68.7	43.7
8	1002.40	0	QP	33.0	19.7	0.0	0.3	28.1	24.9	67.6	42.7
9	1127.70	0	QP	32.9	19.7	0.0	0.3	28.1	24.8	66.6	41.8
10	1253.00	0	QP	32.7	19.7	0.0	0.4	28.1	24.7	65.6	40.9

REMARKS
ANTENNA TYPE : Loop Antenna
CALCULATION : READING + ANT Factor + ATTEN + Cable Loss - AMP Gain
Limits 9kHz to 490kHz : 300m limits + 40log(300/3)
490kHz to 30MHz : 30m limits + 40log(30/3)

All other spurious emissions are more than 20dB below the limits.

DATA OF RADIATED EMISSION TEST

A-Pex International EMC HEAD OFFICE DIVISION No.1 SEMI ANECHOIC CHAMBER
Date : 2002/10/29 10:11:04

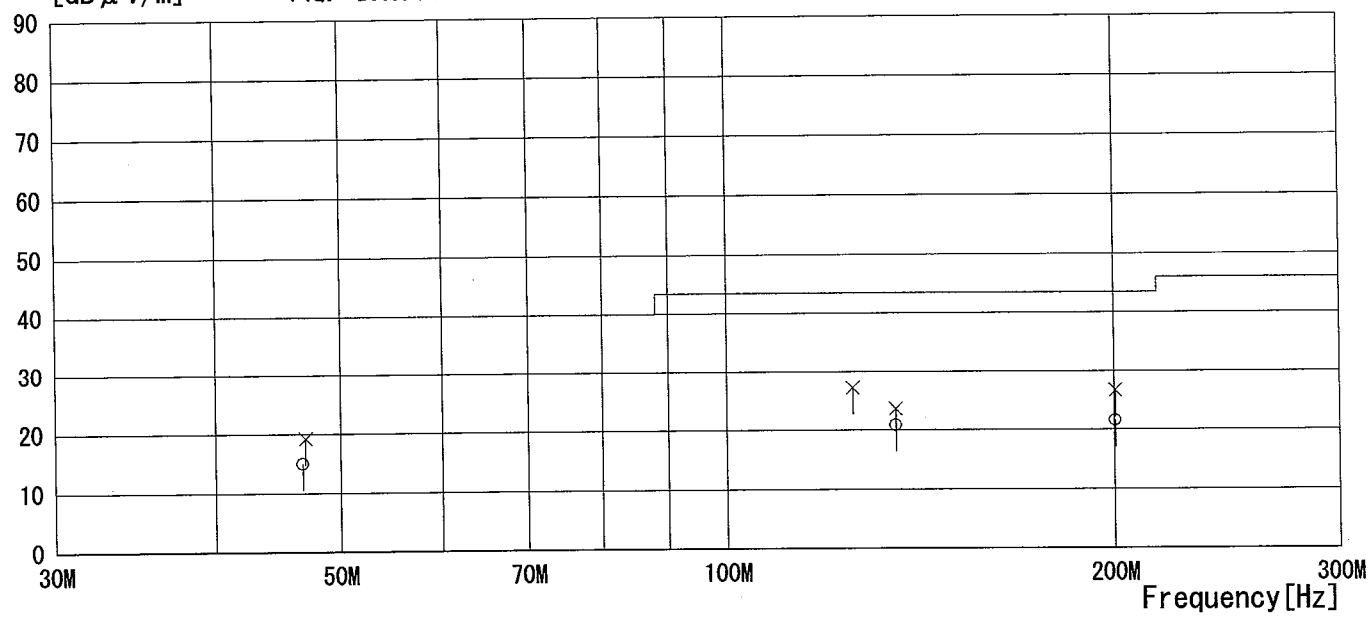
Applicant : CalsonicKansei Corp.
Kind of EUT : Immobilizer System
Model No. : CSSU53
Serial No. : 1

Report No. : 23CE0013-H0
Power : DC 5.0V
Temp℃/Humi% : 23 / 50
Operator : Yoshiaki Iwasa

Mode / Remarks : Transmitting(125kHz)

LIMIT : FCC 15C §15.209 3m
All other spurious emissions were less than 20dB for the limit.

×:Ver. (QP)
○:Hor. (QP)
HORIZONTAL : ○/VERTICAL : ×



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
——— Horizontal ———										
1	46.716	19.9	12.2	7.2	24.3	15.0	40.0	25.0	317	252
2	135.315	22.4	14.0	8.4	24.0	20.8	43.5	22.7	400	359
3	200.470	20.8	15.6	9.0	23.9	21.5	43.5	22.0	290	359
——— Vertical ———										
4	46.968	24.2	12.1	7.2	24.3	19.2	40.0	20.8	100	0
5	135.312	25.2	14.0	8.4	24.0	23.6	43.5	19.9	194	0
6	200.460	25.9	15.6	9.0	23.9	26.6	43.5	16.9	100	0
7	125.283	29.3	13.5	8.4	24.0	27.2	43.5	16.3	100	0

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP. GAIN

DATA OF RADIATED EMISSION TEST

A-Pex International EMC HEAD OFFICE DIVISION No.1 SEMI ANECHOIC CHAMBER
Date : 2002/10/29 10:36:19

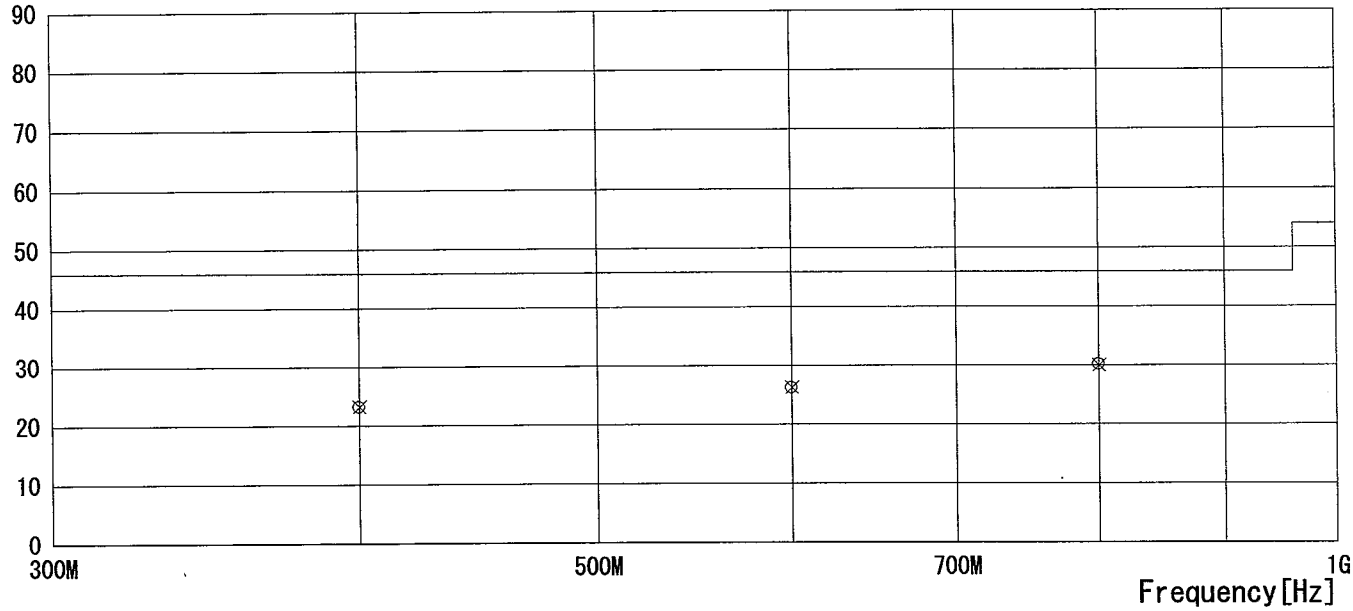
Applicant	: CalsonicKansei Corp.	Report No.	: 23CE0013-H0
Kind of EUT	: Immobilizer System	Power	: DC 5.0V
Model No.	: CSSU53	Temp℃/Humi%	: 23 / 50
Serial No.	: 1	Operator	: Yoshiaki Iwasa

Mode / Remarks : Transmitting(125kHz)

N. Iwasa

LIMIT : FCC 15C §15.209 3m
All other spurious emissions were less than 20dB for the limit.

×:Ver. (QP)
○:Hor. (QP)
HORIZONTAL : ○/VERTICAL : ×



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
——— Horizontal ———										
1	400.000	18.8	17.8	10.4	23.8	23.2	46.0	22.8	100	0
2	600.000	19.6	19.1	11.5	24.0	26.2	46.0	19.8	100	0
3	800.000	20.3	21.7	12.3	24.1	30.2	46.0	15.8	100	0
——— Vertical ———										
4	400.000	18.8	17.8	10.4	23.8	23.2	46.0	22.8	100	359
5	600.000	19.6	19.1	11.5	24.0	26.2	46.0	19.8	100	359
6	800.000	20.1	21.7	12.3	24.1	30.0	46.0	16.0	100	0

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN

20dB Band Width