EMI TEST REPORT

Test Report No. : 23CE0015-HO-1

Applicant	:	**Calsonic Kansei Corp.**
Type of Equipment	:	**Keyless Entry System (Receiver)**
Model No.	:	**TSTU50**
Test standard	:	**FCC Part 15 Subpart B Section 15.109(a)**
FCC ID	:	**KBRTSTU50**
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 11, 2002

Tested by :

Yoshiaki Iwasa
EMC Head Office Division

Approved by :

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
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SECTION 1: Client information

Company name	:	Calsonic Kansei 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	:	Keyless Entry System (Receiver)
Model No.	:	TSTU50
Serial No.	:	1
Rating	:	12V DC (Vehicle Battery)
Country of Manufacture	:	JAPAN
Receipt Date of Sample	:	October 10, 2002
Condition of EUT	:	Production prototype

2.2 Product Description

Calsonic Kansei Corp. Model: TSTU50 (referred to as the EUT in this report) is a Keyless Entry System (Receiver). This equipment constitutes a key-less entry system in combination with a control unit within receiver.

Type of receiver	: Super Heterodyne
Receiving Frequency	: 315MHz
Local Oscillator Frequency	: 5.089MHz
Intermediate Frequency	: 10.7MHz
Other Clock Frequency	: 16MHz
Information antenna	: Integral copper wire antenna
Operation Voltage	: DC 12V

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B

Title : FCC 47CFR Part15 Radio Frequency Devices
Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Specification	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4:2000	Section 15.107(a)	Excluded *1	N/A	N/A
Radiated emission	ANSI C63.4:2000	Section 15.109 (a) Class B	N/A	17.1dB 64.00MHz, Vertical	Complied
*1 The test is not applicable since the EUT does not have AC Mains.					

*****These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Confirmation

A-Pex INTERNATIONAL hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart B Section 15.109 (a).

3.4 Uncertainty

Radiated Emission Test
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.2 semi Anechoic Chamber, 7.5 x5.8 x 5.2 m
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 June 05, 2002
(Registration number: 846015).
[Industry Canada Number : IC4272-2]
*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

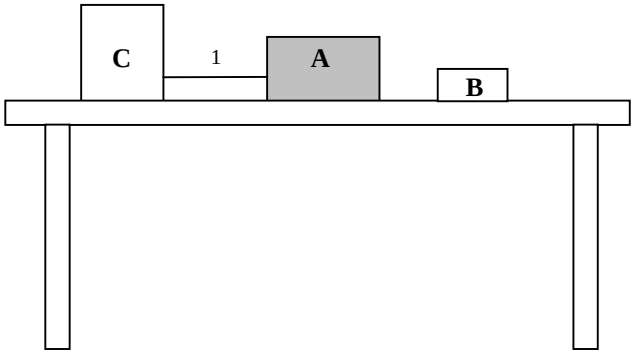
The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

The sequence used : Receiving

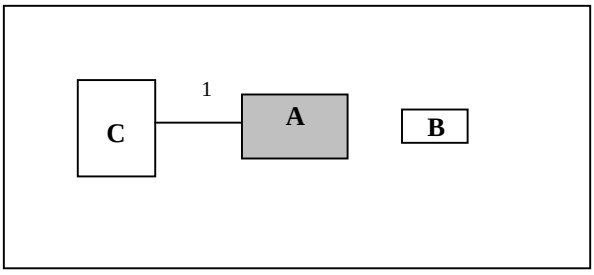
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Front view



Top view



Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Keyless Entry System (Receiver)	TSTU50	1	Calsonic Kansei Corp.	KBRTSTU50

Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
B	Keyless Entry System (Transmitter)	ASTU15	1	Calsonic Kansei Corp.	KBRASTU15
C	Car Battery	B19L	161001C	Panasonic	N/A

List of cables used

No.	Name	Length (m)	Shield	Remark
1	Power cable	0.6	N	Polyvinyl chloride

SECTION 5: Radiated emission

5.1 Operating environment

The test was carried out in a No.2 semi Anechoic Chamber, 7.5 x 5.8 x 5.2 m.

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 antenna positioned in both the horizontal and vertical planes of polarization.
The measurement 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 : 30MHz-1000MHz
Test distance : 3m
EUT position : Tabletop
EUT operation mode : Receiving

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.
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.
The measurements were performed for both vertical and horizontal antenna polarization.
The radiated emission measurements were made with the following detector function of the test receiver.

Detector Type : Quasi-Peak
IF Bandwidth : 120 kHz

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

5.5 Results

Summary of the test results: Pass

Date: October 11, 2002 Tested by: Y. Iwasa

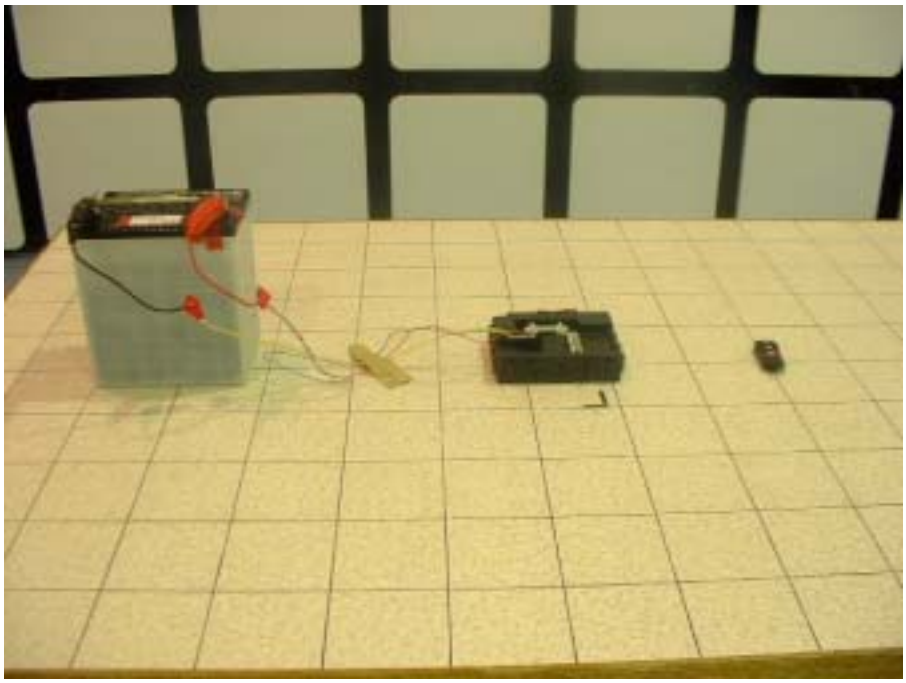
APPENDIX 1: Photographs of test setup

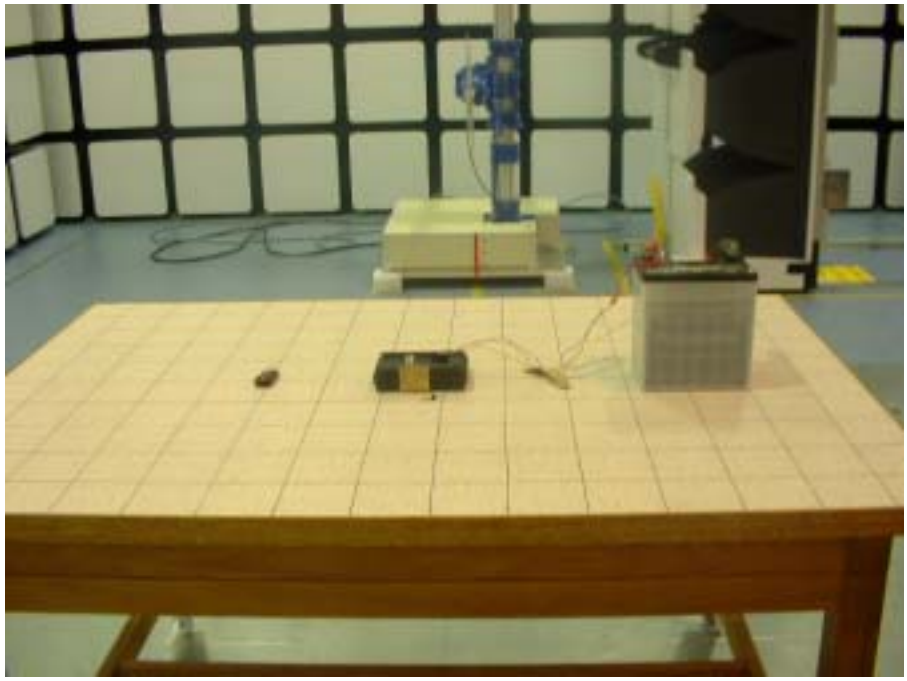
APPENDIX 2: Test instruments

APPENDIX 3: Data of EMI test

APPENDIX 1: Photographs of test setup

Radiated emission





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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2002/04/12 * 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
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2001/11/13 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2002/05/02 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2002/05/02 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2001/12/27 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2002/03/13 * 12

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

Test Item:

RE: Radiated emission,

DATA OF RADIATION TEST

A-Pex International Co., Ltd.
No.2 SEMI ANECHOIC CHAMBER
Report No.: 23CE0015-H0

Applicant : CalsonicKansei Corp.
Kind of Equipment : Keyless Entry System(Receiver)
Model No. : TSTU50
Serial No. : 1
Power : DC12V
Mode : Receive
Remarks :
Date : 10/11/2002
Test Distance : 1 m
Temperature : 25 ℃
Humidity : 47 %
Regulation : FCC Part15B. 109(a)

Engineer : Yoshiaki Iwasa

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	32.05	BB	23.7	22.2	18.1	27.5	0.7	5.8	20.8	19.3	40.0	19.2	20.7
2.	48.08	BB	27.7	27.1	12.7	27.4	0.8	5.8	19.6	19.0	40.0	20.4	21.0
3.	64.00	BB	24.9	34.9	8.5	27.2	0.9	5.8	12.9	22.9	40.0	27.1	17.1
4.	304.48	BB	21.2	21.2	14.5	26.2	2.0	5.7	17.2	17.2	46.0	28.8	28.8
5.	500.00	BB	22.6	23.2	18.5	27.6	2.6	5.8	21.9	22.5	46.0	24.1	23.5
6.	608.96	BB	22.7	22.7	19.1	27.7	3.2	5.8	23.1	23.1	46.0	22.9	22.9
7.	700.00	BB	23.1	23.1	19.2	27.5	3.5	5.8	24.1	24.1	46.0	21.9	21.9
8.	913.44	BB	22.9	22.9	22.7	27.1	4.0	5.7	28.2	28.2	46.0	17.8	17.8

CALCULATION: READING[dBμV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

All other spurious emissions were less than 20dB for the limit.
ANT.TYPE : 30-300MHz Biconical, 300-1000MHz Logperiodic, 1000MHz- Horn

DATA OF RADIATION TEST

A-Pex International Co., Ltd.
No.2 SEMI ANECHOIC CHAMBER
Report No. : 23CE0015-H0

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