EMISSION TEST REPORT

Test Report No. : **21JE0068-YW-1**

Applicant:	**Calsonic Kansei Corp.**
Type of Equipment:	**Keyless Entry System (Receiver)**
Model No.:	**TSTC15**
FCC ID	**KBRTSTC15**
Test standard:	**FCC Part 15 Subpart B §15.109(a)**
Test Result:	**Complies**

The results in this report apply only to the sample tested.

Date of test: June 1, 2001

Tested by: Naoki Sakamoto

Approved by: Kazutoyo Nakanishi
Section Manager of EMC section

Issued date: June 4, 2001

Testing Laboratory
A-pex International Co., Ltd.
108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN
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Table of Contents Page

1 GENERAL INFORMATION 3
1.1 Product Description 4
1.2 Test Specification 4
1.3 Methods & Procedures 4
1.4 Exclusion from satndards 4
1.5 Test Location 4

2 SYSTEM TEST CONFIGURATION 5
2.1 Operation Environment 5
2.2 Justification 5
2.3 EUT Exercise Software 5
2.4 Test Procedure 5
Figure 2.1 Configuration of Tested System 6

3 MEASUREMENT PHOTOS 7
Figure 3.1 Radiated Measurment Photos 7

4 RADIATED EMISSION DATA 8
4.1 Field Strength Calculation 9
4.2 Measurement Uncertainty 9

5 TEST EQUIPMENT USED 10

APPENDIX 11
A:Test Data 12-13

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1 GENERAL INFORMATION

APPLICANT	: Calsonic Kansei Corp.
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REGULATION(S)	: FCC Part 15 Subpart B §15.109(a)
MODEL NUMBER	: TSTC15
FCC ID	: KBRTSTC15
SERIAL NUMBER	: PT1-32
KIND OF EQUIPMENT	: Keyless Entry System (Receiver)
TESTED DATE	: June 1, 2001
RECEIPT DATE OF SAMPLE	: May 24, 2001
REPORT FILE NUMBER	: 21JE0068-YW-1
TEST SITE	: A-PEX Yokowa No.3 Open Test Site

1.1 Product Description

Model: TSTC15 (referred to as the EUT in this report) is a Keyless Entry System (Receiver).

The specification is as following :

Type of receiver	:	Super heterodyne
Receiving Frequency	:	315MHz
Intermediate Frequency	:	10.7MHz
Antenna type	:	Integral copper wire antenna
Operation Voltage	:	DC 12V(Regulated lead-acid battery)

1.2 Test Specification

Test Specification : FCC Part 15 Subpart B § 15.109 Radiated emission limits

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

1.3 Methods & Procedures

No.	Item	Test Procedure	Specification	Remarks
1	Conducted emission	FCC/ANSI C63.4:1992	§15.107	-
2	Radiated emission	FCC/ANSI C63.4:1992	§15.109(a)	3m

1.4 Exclusion from standards

No.	Item	Test Procedure	Specification	Remarks
1	Conducted emission	FCC/ANSI C63.4:1992	§15.107	-

* This test was not performed since EUT dose not have AC power port.

1.5 Test Location

A-PEX International Co.,Ltd. Yokowa No.3 test site
108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 Japan
Telephone number : +81-596-39-1485
Facsimile number : +81-596-39-0232

This site has been fully described in a report submitted to FCC office, and listed on September 12, 2000(Registration number: 90412) and it was accepted Industry Canada on May,2001(IC2973-3).

*NVLAP Lab. code : 200109-0

2 SYSTEM TEST CONFIGURATION

2.1 Operation Environment

Temperature : See data
Humidity : See data
Power supply : DC 12V

2.2 Justification

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

2.3 EUT Exercise Software

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:

Operation Mode : Receiving

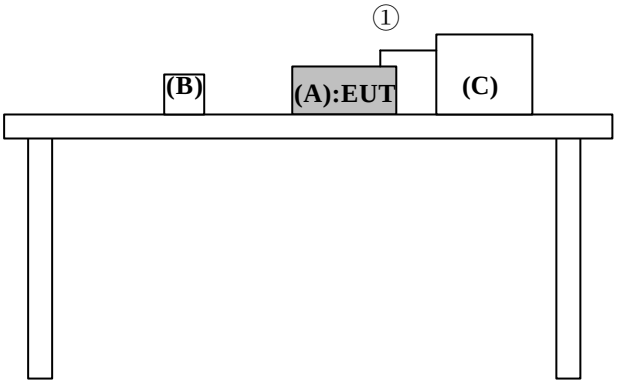
2.4 Test Procedure

Tabletop Equipment Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
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.
The measurement distance was 3m.

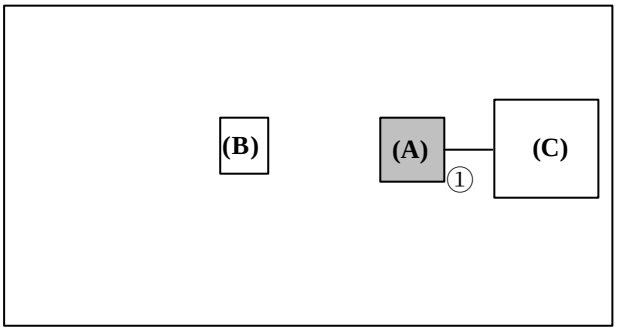
Figure2.1 Configuration of Tested System

Front View



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

Top View



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

Description of EUT and Support Equipment

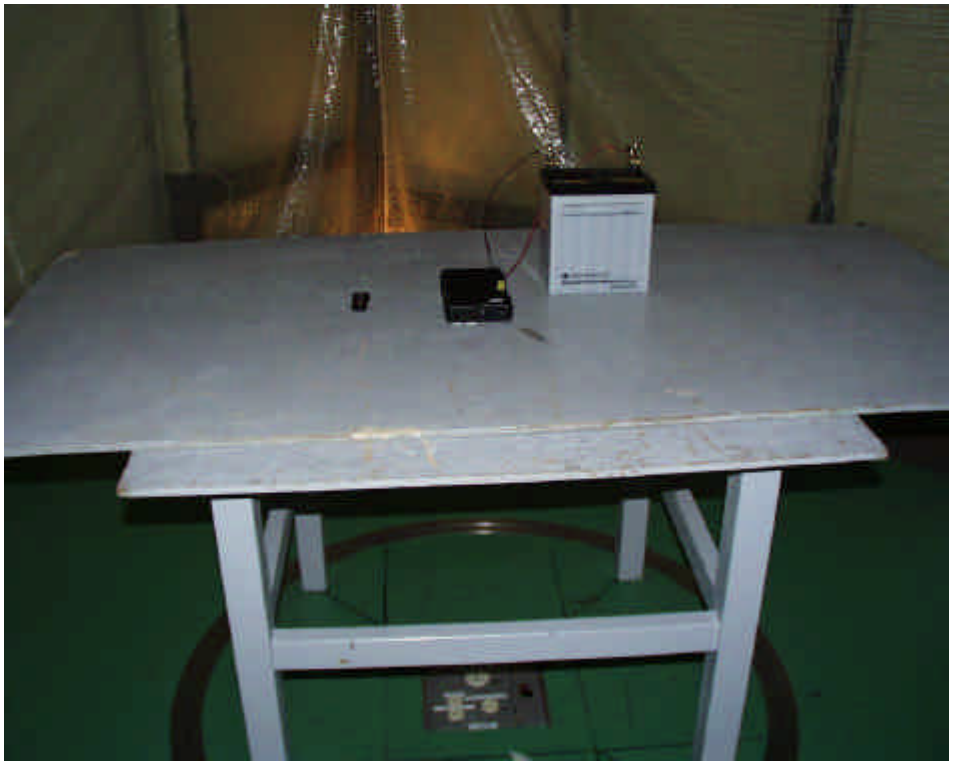
No.	Item	Model number	Serial number	Manufacturer	Remark
A	Keyless Entry System (Receiver)	TSTC15	PT1-32	Calsonic Kansei Corp.	EUT
B	Keyless Entry System (Transmitter)	174	N/A	Calsonic Kansei Corp.	-
C	Car Battery	38B19R	1301975	Shin-Kobe Electric Machinery Co.,Ltd.	-

List of cables used

No.	Name	Length (m)	Shield	Remark
①	DC Power Cable	0.5	N	–

3 MEASURMENT PHOTOS

Figure 3.1 Radiated Measurement Photos



4 RADIATED EMISSION DATA

The initial step in collecting radiated data was a spectrum analyzer peak scan of the measurement range (30MHz-1000MHz).
The final data was reported in the worst-case emissions.
The minimum margin to the limit is as follows :

Frequency (MHz)	Ant Pol	Receiver Reading (dBμV)	Correction Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
32.05	V	23.5	-3.9	19.6	40.0	20.4

* The test receiver settings for radiated emissions measurement were as follows.
Detector Type : CISPR Quasi-Peak
Bandwidth : 120kHz

4.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, Cable Factor and Antenna Pad, and subtracting the Amplifier Gain from the measured reading. The sample calculation is as follows :

FS = RA + AF + CF + AT - AG

where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AT = Antenna Pad
AG = Amplifier Gain

Assume a receiver reading of 23.5 dBμV is obtained. The antenna Factor of 17.2dB, Cable Factor of 1.0 dB and Antenna Pad of 6.0 dB is added. The Amplifier Gain of 28.1 dB is subtracted, giving a field strength of 19.6 dBμV/m.

FS = 23.5 + 17.2 + 1.0 + 6.0 – 28.1 = 19.6 dBμV/m

4.2 Measurement Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ±3.3dB.

☐ The data listed in this test report may exceed the test limit because it does not have enough margin (more than 3.3dB).

■ The data listed in this test report has enough margin, more than 3.3d

5 Test EQUIPMENT USED

Instrument	Mfr.	Model No.	Control No.	Calibration Until / / Interval
Pre Amplifier	Hewlett Packard	8447D	AF-01	March 30, 2002 / 1 year
Attenuator	Anritsu	MP721B	AT-04	June 8, 2001 / 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-05	April 30, 2002 / 1 year
Logperiodic Antenna	Schwarzbeck	UHAP9108-A	LA-05	November 3, 2001 / 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-04	March 30, 2002 / 1 year
Test Receiver	Rohde & Schwarz	ESVS10	TR-06	August 9, 2001 / 1 year

*All measurement equipment is traceable to national standard.

APPENDIX

A : Test Data

Radiated emissions (§15.109) 12 – 13

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No.: 21JE0068-YW-1

Applicant : Calsonic Kansei Corp.
Kind of Equipment : Key less Entry System(Receiver)
Model No. : TSTC15
Serial No. :
Power : DC12V
Mode : Receiving
Remarks : FCC ID : KBRTSTC15
Date : 6/1/2001
Test Distance : 3 m
Temperature : 22 ℃
Humidity : 38 %
Regulation : FCC Part15B. 109(a)

Engineer : Naoki Sakamoto

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	23.2	23.5	17.2	28.1	1.0	6.0	19.3	19.6	40.0	20.7	20.4
2.	64.09	BB	25.9	25.0	6.9	27.9	1.4	5.9	12.2	11.3	40.0	27.8	28.7
3.	96.17	BB	26.4	24.1	9.2	27.9	1.9	5.9	15.5	13.2	43.5	28.0	30.3
4.	128.05	BB	23.2	24.0	13.6	27.8	2.2	5.9	17.1	17.9	43.5	26.4	25.6
5.	325.69	BB	21.3	21.3	14.5	27.6	3.6	5.8	17.6	17.6	46.0	28.4	28.4
6.	651.40	BB	19.4	19.6	19.7	27.1	5.5	5.9	23.4	23.6	46.0	22.6	22.4

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.
ANT.TYPE:30-300MHz Biconical,300-1000MHz Logperiodic

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No.: 21JE0068-YW-1

Applicant	:	Calsonic Kansei Corp.
Kind of Equipment	:	Key less Entry System(Receiver)
Model No.	:	TSTC15
Serial No.	:	
Power	:	DC12V
Mode	:	Receiving
Remarks	:	FCC ID : KBRTSTC15
Date	:	6/1/2001
Test Distance	:	3 m
Temperature	:	22 ℃
Humidity	:	38 %
Regulation	:	FCC Part15B. 109(a)

Engineer : Naoki Sakamoto