EMISSION TEST REPORT

Test Report No. : 21LE0042-YW-2

Applicant:	**Calsonic Kansei Corporation**
Type of Equipment:	**Keyless Entry System (Receiver)**
Model No.:	**TSUB13**
FCC ID:	**KBRTSUB13**
Test standard:	**FCC Part 15 Subpart B Section 15.109(a)**
Test Result:	**Complies**

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

Date of test: August 28, 2001

Tested by: M. Kosaka

Makoto Kosaka

Approved by:

Kazutoyo Nakanishi

Site Operation Manager of EMC section

Issued date: October 18, 2001

Testing Laboratory

A-pex International Co., Ltd.

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN

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Testing Laboratory
A-pex International Co., Ltd.
108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN
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1 GENERAL INFORMATION

APPLICANT	: Calsonic Kansei Corporation
ADDRESS	: 5-24-15 Minamidai, Nakano-ku, Tokyo 164-8602 Japan
Telephon Number	: +81-3-5385-0111
Facsimile Number	: +81-3-3383-1171
REGULATION(S)	: FCC Part 15 Subpart B Section15.109(a)
MODEL NUMBER	: TSUB13
FCC ID	: KBRTSUB13
SERIAL NUMBER	: Sample No.1
CONDITION OF EUT	: Engineering Prototype
KIND OF EQUIPMENT	: Keyless Entry System (Receiver)
TESTED DATE	: August 28, 2001
RECEIPT DATE OF SAMPLE	: August 28, 2001
REPORT FILE NUMBER	: 21LE0042-YW-2
TEST SITE	: A-PEX Yokowa No.3 Open Test Site

1.1 Product Description

Model: TSUB13 (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	:	314.85MHz
Local Oscillator Frequency	:	304.15 MHz
Intermediate Frequency	:	10.7MHz
Other Clock Frequency	:	10MHz / 50.691MHz
Information antenna	:	Integral Copper Wire Antenna
Operation Voltage	:	DC 12V(Car Battery)

1.2 Test Specification

Test Specification : FCC Part 15 Subpart B Section 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	ANSI C63.4:1992	§15.107(a)	-
2	Radiated emission	ANSI C63.4:1992	§15.109(a)	Class B / 3m

1.4 Exclusion from standards

No.	Item	Test Procedure	Specification	Remarks
1	Conducted emission	ANSI C63.4:1992	§15.107(a)	-

* 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) .

*NVLAP Lab. code : 200109-0

2 SYSTEM TEST CONFIGURATION

2.1 Operation Environment

Temperature : See data
Humidity : See data

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

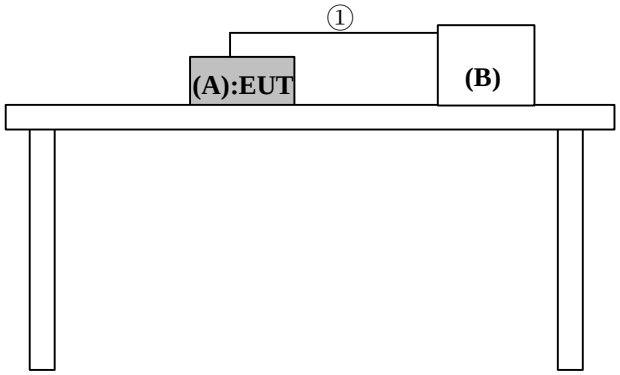
2.4 Test Procedure

Tabletop Equipment Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1m, 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.

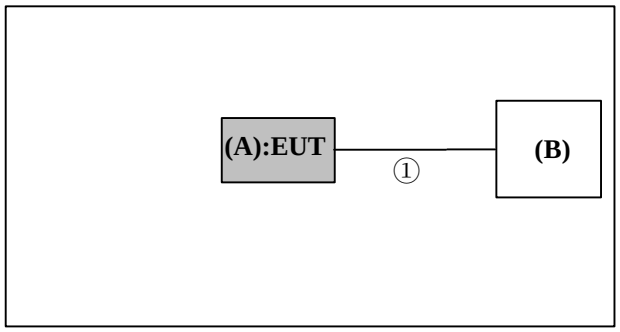
Figure2.1 Configuration of Tested System

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	FCC ID
A	Keyless Entry System (Receiver)	TSUB13	Sample No.1	Calsonic Kansei Corp	KBRTSUB13
B	Car Battery	50B24L	N/A	YUASA	-

List of cables used

No.	Name	Length (m)	Shield	Remark
①	DC Power Cable	0.7	N	–

3 RADIATED MEASUREMENT PHOTOS

Figure 3.1 Radiated Measurement Photos

3.1 Measurement Uncertainty

Radiated Emission Test

■ Measurement distance of 3m (30-1000MHz):
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.4dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±3.2dB.
☐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, more than site margin.

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 :

No	Ant Pol	Freq [MHz]	Reading [dBµV]	Antena Facter [dB]	Cable Loss [dB]	ATT [dB]	AMP Gain [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Remark
1	H	304.15	40.9	14.2	3.5	5.8	27.6	36.8	46.0	9.2	Local Oscillator

* The test receiver settings for radiated emissions measurement were as follows.
Detector Type : Quasi-Peak (CISPR)
IF 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 40.9 dBµV is obtained. The antenna Factor of 14.2 dB, Cable Factor of 3.5 dB and Antenna Pad of 5.8 dB is added. The Amplifier Gain of 27.6 dB is subtracted, giving a field strength of 36.8 dBµV/m.

FS = 40.9 + 14.2 + 3.5 + 5.8 – 27.6 = 36.8 dBµV/m

5 Test EQUIPMENT USED

Instrument	Mfr.	Model No.	Control No.	Test Item	Calibration Date / Interval
Pre Amplifier	Hewlett Packard	8447D	AF-01	RE	March 31, 2001 / 1 year
Attenuator	Anritsu	MP721B	AT-06	RE	March 31, 2001 / 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	RE	May 1, 2001 / 1 year
Logperiodic Antenna	Schwarzbeck	UHALP9108-A	LA-06	RE	May 1, 2001 / 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-04	RE	March 31, 2001 / 1 year
Test Receiver	Rohde & Schwarz	ESVS10	TR-06	RE	August 24, 2001 / 1 year
Yokowa No.3 Open Test Site	JSE	3m	YOATS-03	RE	May 1, 2001 / 1 year
Yokowa No.3 Open Coaxial (0.01-1000MHz)	A-PEX	CC-31~37, SW-31, 32	CC-3ORC	RE	March 31, 2001 / 1 year

* Test Item ; RE: Radiated emission

*All measurement equipment are traceable to national or international standard.

APPENDIX

A : Test Data

Radiated emissions (section 15.109) A1 – A2

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No.: 21LE0042-YW-2

Applicant	: CALSONIC KANSEI CORP
Kind of Equipment	: Keyless Entry System(Receiver)
Model No.	: TSUB13
Serial No.	: Sample No.1
Power	: DC 12V
Mode	: Receiving
Remarks	: FCC ID: KBRTSUB13
Date	: 8/28/2001
Test Distance	: 3 m
Temperature	: 33 ℃
Humidity	: 28 %
Regulation	: FCC Part15B CLASS B

Engineer : Makoto Kosaka

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.	152.07	BB	22.9	21.9	14.5	27.8	2.4	5.9	17.9	16.9	43.5	25.6	26.6
2.	202.76	BB	22.1	21.5	16.4	27.8	2.8	5.9	19.4	18.8	43.5	24.1	24.7
3.	253.45	BB	23.6	21.3	16.8	27.7	3.2	5.9	21.8	19.5	46.0	24.2	26.5
4.	304.15	BB	40.9	38.6	14.2	27.6	3.5	5.8	36.8	34.5	46.0	9.2	11.5
5.	608.30	BB	19.6	19.7	18.9	27.3	5.3	5.8	22.3	22.4	46.0	23.7	23.6
6.	912.45	BB	19.0	19.0	22.6	26.6	6.9	5.8	27.7	27.7	46.0	18.3	18.3

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

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

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