

EMISSION TEST REPORT

Test Report No. : **21BE0029YW-1**

Applicant: **CALSONIC KANSEI CORP.**

Type of Equipment: **Keyless Entry System (Transmitter)**

Model No.: **ASTU13**

Test standard: **FCC Part 15 Subpart C**

Test Result: **Complies**

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

Date of test: September 14, 2000

Tested by: _____

Naoki Sakamoto

Approved by: _____

Kazutoyo Nakanishi
Section Manager of EMC section

Issued date: October 5, 2000

Testing Laboratory

A-pex International Co., Ltd.

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1 GENERAL INFORMATION

APPLICANT : CALSONIC KANSEI CORP.
TRADE NAME : CALSONIC KANSEI
ADDRESS : 5-24-15 Minamidai, Nakano-ku, Tokyo
164-8602 Japan
Tel: +81-283-21-8136
Fax: +81-283-23-9191
REGULATION(S) : FCC Part 15 Subpart C
MODEL NUMBER : ASTU13
FCC ID : KBRASTU13
SERIAL NUMBER : -
KIND OF EQUIPMENT : Keyless Entry System (Transmitter)
TESTED DATE : September 14, 2000
RECEIPT DATE OF SAMPLE : September 14, 2000
REPORT FILE NUMBER : 21BE0029YW-1
TEST SITE : A-PEX Yokowa NO.3 Open Test Site

1.1 Product Description

Model: ASTU13 (referred to as the EUT in this report) is a Keyless Entry System (Transmitter).

The specification is as following :

Operation Frequency : 4 MHz
Carrier Frequency : 315 MHz
Operation Voltage : DC 3.2V

1.2 Tested Equipment Details

<u>Model</u>	<u>FCC ID</u>	<u>Description</u>	<u>Cable description</u>	<u>Backshell Material</u>
(1) CALSONIC KANSEI M/N: ASTU13 (EUT)	KBRASTU13	Keyless Entry System (Transmitter)	---	P.V.C

1.3 Tested Methodology

Radiated testing were performed according to the procedures in FCC/ANSI C63.4 (1992).

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on 108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 Japan.

This site has been fully described in a report submitted to FCC office, and listed on September 12, 2000 (Registration number: 90412).

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2 SYSTEM TEST CONFIGURATION

2.1 Operation Environment

Temperature : 23°C

Humidity : 60%

Power supply : DC 3.2V

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 : Transmitting

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.

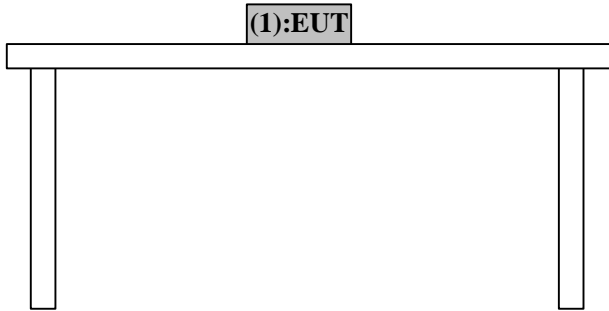
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

The measurement distance was 3m.

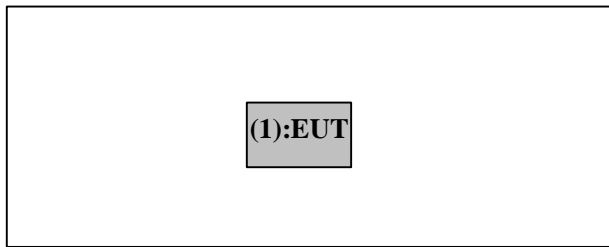
Figure2.1 Configuration of Tested System

Front View



* Test data was taken under worse case conditions.

Top View



* Test data was taken under worse case conditions.

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3 RADIATED MEASUREMENT PHOTOS

Figure 3.1 Radiated Measurement Photos

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3.1 Measurement Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was $\pm 3.3\text{dB}$.

- 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 3.3dB.

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4 RADIATED EMISSION DATA

The initial step in collecting radiated data was a spectrum analyzer peak scan of the measurement range (30MHz-3300MHz).

The final data was reported in the worst-case emissions.

The minimum margin to the limit is as follows :

Frequency (MHz)	Receiver Reading (dB μ V)	Correction Factor (dB μ V)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB μ V)
315.00	78.2	-3.8	74.4	75.6	1.2

* quasi-peak mode

The Fundamental Frequency of this equipment is 315MHz. The peak of output level of fundamental frequency was confirmed at the 315MHz by performing the measurement.

It was corroborated that equipment was within of the tolerance which is prescribed in the FCC regulation Part 15 Subpart C sec. 15.231 (c).

Since the fundamental frequency is 315MHz, the upper limit could be 315.8 MHz and lower limit could be 314.2MHz.

The measurement result was 315.2MHz when the limit was 315.8MHz and also another measurement result was 314.8 MHz when the limit was 314.2MHz.

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5.1 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 78.2 dB μ V is obtained. The antenna Factor of 14.0 dB, Cable Factor of 4.5 dB and Antenna Pad of 6.0 dB is added. The Amplifier Gain of 28.3 dB is subtracted, giving a field strength of 74.4 dB μ V/m.

$$FS = 78.2 + 14.0 + 4.5 + 6.0 - 28.3 = 74.4 \text{ dB } \mu \text{ V/m}$$

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6 TEST EQUIPMENT USED

INSTRUMENTS	Mfr.	MODEL	C/N	Calibrated Until
<input checked="" type="checkbox"/> Pre Amplifier	Hewlett Packard	8447D	AF1	November 16, 2000
<input type="checkbox"/> Pre Amplifier	Anritsu	MH648A	AF3	November 16, 2000
<input checked="" type="checkbox"/> Pre Amplifier	Hewlett Packard	8449B	AF4	November 16, 2000
<input type="checkbox"/> Attenuator	Anritsu	MP721B	AT6	June 8, 2001
<input type="checkbox"/> Biconical Antenna	Schwarzbeck	BBA9106	BA1	April 28, 2001
<input type="checkbox"/> Biconical Antenna	Schwarzbeck	BBA9106	BA3	April 28, 2001
<input checked="" type="checkbox"/> Biconical Antenna	Schwarzbeck	BBA9106	BA5	April 28, 2001
<input checked="" type="checkbox"/> Horn Antenna	A.H. Systems	SAS200/571	HA1	February 4, 2001
<input checked="" type="checkbox"/> Logperiodic Antenna	Schwarzbeck	UHAP9108-A	LA6	April 29, 2001
<input type="checkbox"/> Logperiodic Antenna	Schwarzbeck	UKLP9140-A	LA8	April 29, 2001
<input type="checkbox"/> Loop Antenna	Rohde & Schwarz	HFH2-Z2	LP1	November 3, 2000
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH2-Z5	LS1	November 15, 2000
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	LS2	November 15, 2000
<input type="checkbox"/> LISN	Schwarzbeck	NSLK8127	LS3	November 15, 2000
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	LS4	November 15, 2000
<input type="checkbox"/> LISN	Schwarzbeck	NNLK8121	LS5	November 15, 2000
<input type="checkbox"/> LISN	Rolf Heine	NNB-4/200	LS6	November 15, 2000
<input type="checkbox"/> LISN	Schwarzbeck	NNLK8126	LS7	November 15, 2000
<input type="checkbox"/> LISN	Schwarzbeck	NSLK8127	LS10	April 8, 2001
<input type="checkbox"/> Spectrum Analyzer	Hewlett Packard	8567A	SA3	December 13, 2000
<input checked="" type="checkbox"/> Spectrum Analyzer	Hewlett Packard	8567A	SA4	December 13, 2000
<input checked="" type="checkbox"/> Spectrum Analyzer	Advantest	R3271	SA5	September 27, 2000
<input type="checkbox"/> Test Receiver	Rohde & Schwarz	ESHS-20	TR1	March 30, 2001
<input checked="" type="checkbox"/> Test Receiver	Rohde & Schwarz	ESVS-30	TR2	July 13, 2001
<input type="checkbox"/> Test Receiver	Rohde & Schwarz	ESCS30	KTR1	August 7, 2001

indicates EMI Test Equipment used.

*All measurement equipment is traceable to national standard.

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APPENDIX

A : Test Data

Radiated emissions

_____ A1 – A3 _____

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