EMI TEST REPORT

Test Report No.: 26LE0239-YK-A

Applicant	**:**	**ASAHI DENSO CO., LTD.**
Type of Equipment	**:**	**Immobilizer**
Model No.	**:**	**KM191**
FCC ID	**:**	**T8VKM191**
Test Standard	**:**	**FCC Part15 Subpart C, Section 15.209: 2006**
Test Result	**:**	**Complied**

1. This test report shall not be reproduced except in full, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above regulation.
4. The test results in this test report are traceable to the national or international standards.

Date of test: August 1, 2006

Tested by: Tatsuya Arai

Approved by: Osamu Watatani
Site Manager of Yamakita EMC Lab.

Table of Contents Page

1 Applicant Information

Company Name : ASAHI DENSO CO., LTD.

Brand Name : AD

Address : 1126 Nakajo, Hamamatsu-shi, Shizuoka-ken, 434-0043 Japan

Telephone Number : +81-53-587-2195

Facsimile Number : +81-53-584-1589

Contact Person : Michiyuki Suzuki

2 Product Description

Type of Equipment : Immobilizer

Model No. : KM191

Serial No. : 6721

Rating : DC12.0V, 1A

Country of Manufacture : Japan

Receipt Date of Sample : July 25, 2006

Condition of EUT : Production prototype
(Not for sale: This sample is equivalent to mass-produced items.)

Modification of EUT : No modification by the test lab.

Model: KM191 (referred to as the EUT in this report) is an Immobilizer for Motorcycle.
The clock frequency used in EUT: 16MHz

Equipment type	:	Transceiver
Frequency of operation	:	134.2 kHz
Type of modulation	:	ASK&FSK
Antenna type	:	Integral coil antenna
Antenna connector type	:	Soldering
Mode of operation	:	Simplex
Emission Designation	:	A1N
Operation temperature range	:	-10 ~ 60 deg. C.

*FCC Part 15.31 (e)
The module is provided stable power supply (DC 5V), and the power is not changed when voltage of the main unit is varied. Therefore, the equipment complies power supply regulation.

*FCC Part 15.203
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the vehicle. Therefore, the equipment complies with the requirement.

3 Test Specification, Procedures and Results

3.1 Test specification

Test specification : FCC Part15 Subpart C: 2006
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.209: Radiated emission limits, general requirements

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Section 15.207	AC Mains	N/A *1	N/A	N/A
Electric Field Strength of Fundamental Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.209	Radiated	N/A	38.7dB (AV, Horizontal)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section15.209	Radiated	N/A	16.7dB (QP, 36.84MHz, Horizontal)	Complied
20dB Bandwidth	ANSI C63.4: 2003 13. Measurement of intentional radiators	-	Radiated	N/A	-	Complied

*1) The test is not applicable since the EUT has no AC mains.
Note: UL Apex's EMI Work Procedures No.QPM05.

* No addition, exclusion nor deviation has been made from the standard.

3.3 Uncertainty

Radiated emission
The measurement uncertainty (with 95% confidence level) for this test using Loop antenna is ±2.3dB.
The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ±4.5dB.
The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ±4.3dB.
The data listed in this test report has enough margin, more than site margin.

3.4 Test Location

UL Apex Co., Ltd. Yamakita EMC Lab.
907, Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN
Telephone number : +81 465 77 1011
Facsimile number : +81 465 77 2112
NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on August 26, 2005 (Registration No.: 95486).
IC Registration No. : IC3489A

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005 (Registration No.: 466226).
IC Registration No. : IC3489A-2

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 2, 2005 (Registration No.: 95967).
IC Registration No. : IC3489A-B

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 EMS lab. (Semi-anechoic chamber)	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7		

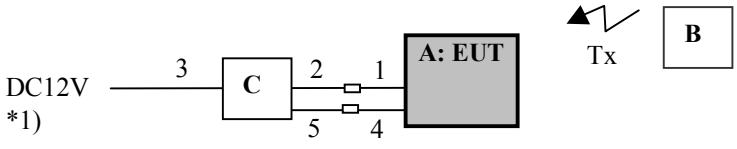
4 System Test Configuration

4.1 Justification

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

Operation: Transmitting (134.2kHz)

4.2 Configuration of Tested System



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remark)
A	Immobilizer	KM191	6721	ASAHI DENSO CO., LTD.	T8VKM191 (EUT)
B	Key chip	-	-	-	-
C	Jig	-	-	-	-

*1) DC Power Supply (Model: PAN35-10A) was used for DC 12V input.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC & Signal cable	0.5	Unshielded	Unshielded	-
2	DC & Signal cable	0.1	Unshielded	Unshielded	-
3	DC cable	1.5	Unshielded	Unshielded	-
4	DC & Signal cable	0.05	Unshielded	Unshielded	-
5	DC & Signal cable	0.2	Unshielded	Unshielded	-

5 Radiated Emissions (Fundamental & Spurious)

5.1 Operating environment

The test was carried out in No.1 anechoic chamber.

Temperature : See test data
Humidity : See test data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 9kHz - 1GHz
EUT position : Table top
EUT operation mode : Transmitting

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.

Frequency: From 9kHz to 30MHz
The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for each antenna angle 0deg., 45deg. and 90deg.

Frequency: From 30MHz to 1GHz
The measuring antenna height was varied between 1 and 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.

Measurements were performed with QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver.

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

The equipment was previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table and photographs in page 11. With the position, the noise levels of all the frequencies were measured.

* FCC Part 15 Section 15.31 (f)(2) (9kHz-30MHz)
9kHz – 490kHz [Limit at 3m]= [Limit at 300m]-40log (3[m]/300[m])
490kHz – 30MHz [Limit at 3m]= [Limit at 30m]-40log (3[m]/30[m])

5.5 Results

Summary of the test results : Pass Test data: APPENDIX 2 Page 12 to 14
Date : August 1, 2006 Test engineer : Tatsuya Arai

6 20dB Bandwidth and Occupied Bandwidth

6.1 Operating environment

The test was carried out in No.1 anechoic chamber.

6.2 Test procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

6.3 Results

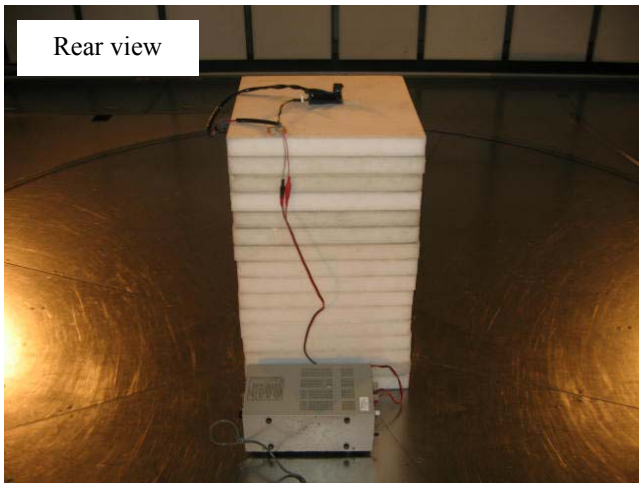
Summary of the test results: Pass Test data: APPENDIX 2 Page 15
Date : August 1, 2006 Test engineer : Tatsuya Arai

APPENDIX 1: Photographs of test setup

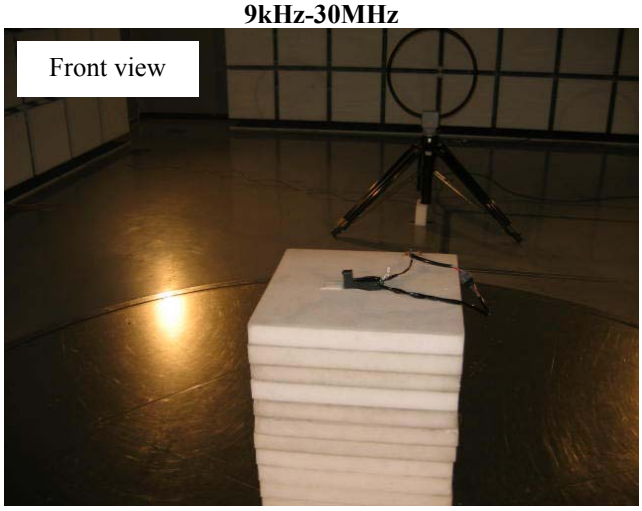
APPENDIX 2: Test Data

APPENDIX 3: Test instruments

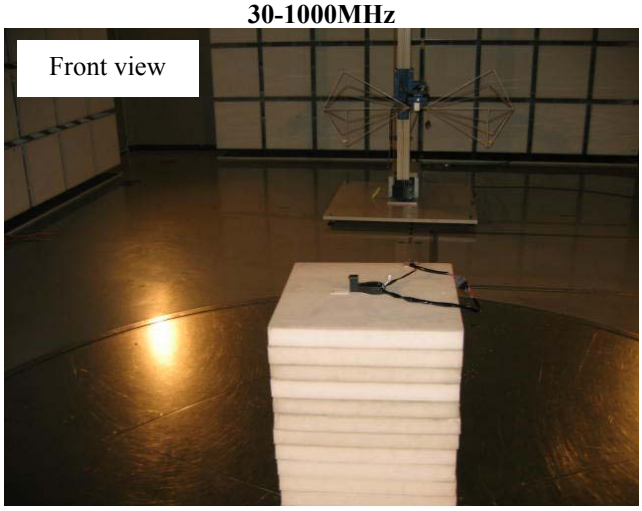
Radiated emission



9kHz-30MHz

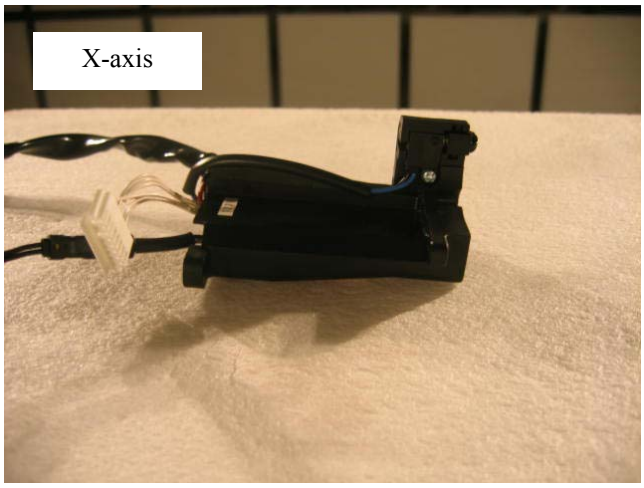


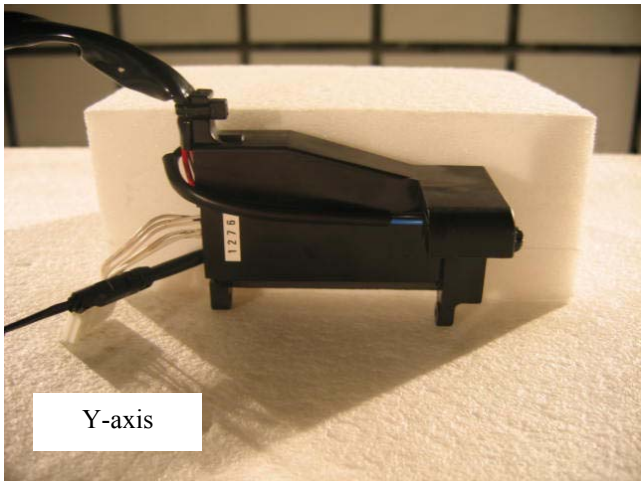
30-1000MHz

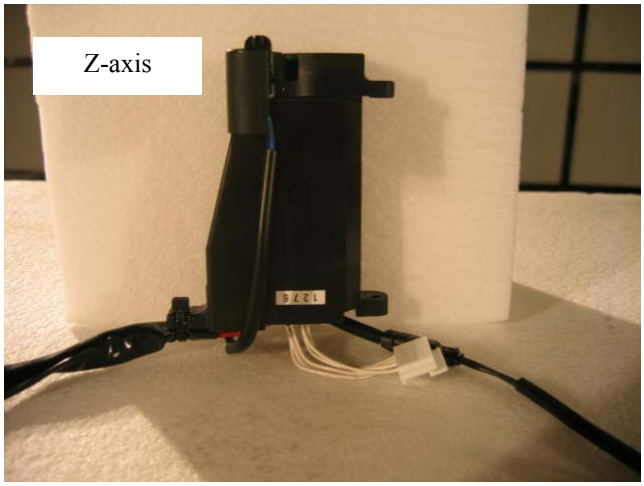


Pre-check of the worst position

Frequency	Below 30MHz	Above 30MHz
Antenna: Horizontal	X	X
Antenna: Vertical	X	X







DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 26LE0239-YK-A

Applicant	:	ASAHIDENSO CO., LTD	
Kind of Equipment	:	IMMOBILIZER for motorcycle	
Model No.	:	KM191	
Serial No.	:	6721	
Power	:	DC12V	
Mode	:	Transmitting mode	
Remarks	:	-	
Date	:	8/1/2006	
Test Distance	:	3 m	
Temperature	:	26 ℃	Engineer : Tatsuya Arai
Humidity	:	53 %	
Regulation	:	FCC Part15C § 15.209 9KHz-490kHz (3m) Pk	

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.	0.13	BB	70.2	66.5	19.3	26.7	0.1	5.2	68.1	64.4	125.3	57.2	60.9
2.	0.27	BB	46.3	43.8	19.3	27.7	0.1	6.0	44.0	41.5	119.0	75.0	77.5
3.	0.40	BB	38.8	37.9	19.4	28.2	0.1	6.0	36.1	35.2	115.6	79.5	80.4

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

- ANTENNA: KLP-01 (HFH2-Z2) 9kHz-30MHz
- AMP: KAF-05 (8447D) ■ RECEIVER: KTR-R1 ■ KCC-30/31/32/34 (RE)

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 26LE0239-YK-A

Applicant	:	ASAHIDENSO CO., LTD	
Kind of Equipment	:	IMMOBILIZER for motorcycle	
Model No.	:	KM191	
Serial No.	:	6721	
Power	:	DC12V	
Mode	:	Transmitting mode	
Remarks	:	-	
Date	:	8/1/2006	
Test Distance	:	3 m	
Temperature	:	26 ℃	Engineer : Tatsuya Arai
Humidity	:	53 %	
Regulation	:	FCC Part15C §15.209 9KHz-30MHz (3m)	

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.	0.13	BB	68.7	65.1	19.3	26.7	0.1	5.2	66.6	63.0	105.3	38.7	42.3
2.	0.27	BB	45.4	39.2	19.3	27.7	0.1	6.0	43.1	36.9	99.0	55.9	62.1
3.	0.40	BB	33.2	31.6	19.4	28.2	0.1	6.0	30.5	28.9	95.6	65.1	66.7
4.	0.54	BB	32.9	29.4	19.4	28.3	0.1	6.0	30.1	26.6	73.0	42.9	46.4
5.	0.67	BB	28.5	28.3	19.4	28.4	0.2	6.0	25.7	25.5	71.1	45.4	45.6
6.	0.81	BB	28.6	27.5	19.5	28.4	0.2	6.0	25.9	24.8	69.4	43.5	44.6
7.	0.94	BB	28.5	27.8	19.5	28.3	0.2	6.0	25.9	25.2	68.1	42.2	42.9
8.	1.07	BB	27.7	27.3	19.5	28.3	0.2	6.0	25.1	24.7	67.0	41.9	42.3
9.	1.21	BB	27.7	27.4	19.5	28.3	0.2	6.0	25.1	24.8	65.9	40.8	41.1
10.	1.34	BB	27.3	27.0	19.5	28.4	0.2	6.0	24.6	24.3	65.1	40.5	40.8

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

- ANTENNA: KLP-01 (HFH2-Z2) 9kHz-30MHz
- AMP: KAF-05 (8447D) ■ RECEIVER: KTR-R1 ■ KCC-30/31/32/34 (RE)

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 26LE0239-YK-A

Applicant	: ASAHIDENSO CO., LTD		
Kind of Equipment	: IMMOBILIZER for motorcycle		
Model No.	: KM191		
Serial No.	: 6721		
Power	: DC12V		
Mode	: Transmitting mode		
Remarks	: -		
Date	: 8/1/2006		
Test Distance	: 3 m		
Temperature	: 26 ℃	Engineer	: Tatsuya Arai
Humidity	: 53 %		
Regulation	: FCC Part15C §15.209		

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.	36.84	BB	28.2	22.3	16.4	28.5	1.2	6.0	23.3	17.4	40.0	16.7	22.6
2.	304.63	BB	27.5	22.8	14.9	27.7	3.8	6.0	24.5	19.8	46.0	21.5	26.2
3.	320.67	BB	28.8	23.2	15.4	27.8	4.0	6.0	26.4	20.8	46.0	19.6	25.2

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

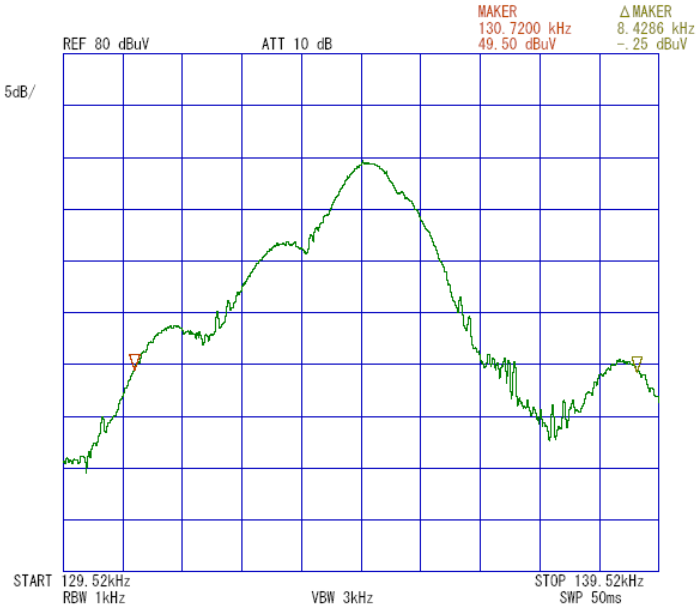
■ANTENNA:KBA-03 (BBA9106) 30-299MHz/KLA-03 (USLP9143) 300-1000MHz
■AMP:KAF-05 (8447D) ■RECEIVER:KTR-R1 ■KCC-30_31_32_34 (RE)

Bandwidth: FCC 15.215(c)

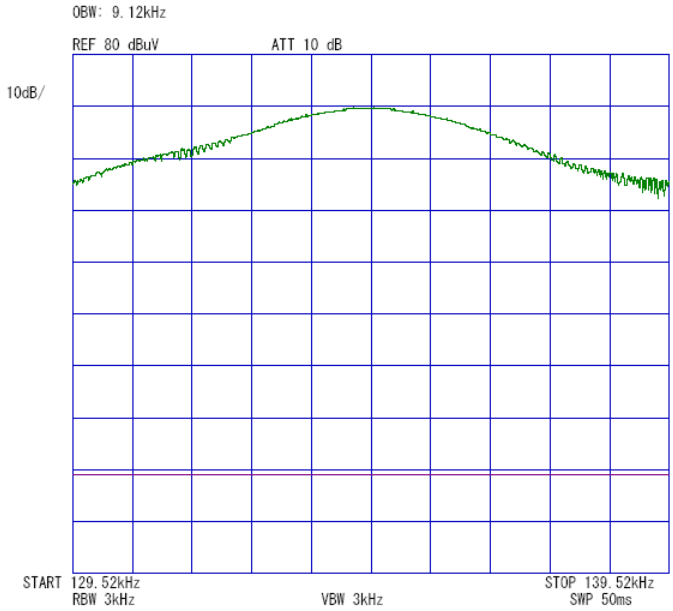
UL Apex Co.,Ltd. Yamakita No.1 Anechoic Chamber

COMPANY	: ASAHIDENSO CO., LTD	REPORT NO	: 26LE0239-YK-A
EQUIPMENT	: IMMOBILIZER for motorcycle	REGULATION	: Fcc Part15SubpartC 215(c)
MODEL NUMBER	: KM191	DATE	: 2006/08/01
SERIAL NUMBER	: 6721	TEMP./HUMI	: 26deg.C./53%
FCC ID	: T8VKM191	TEST MODE	: Transmitting
POWER	: DC12 V	ENGINEER	: Tatsuya Arai
Remarks	: -		

20dB Bandwidth: 8.43kHz



Occupied Bandwidth: 9.12kHz



Test Report No :26LE0239-YK-A

APPENDIX 3
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
KAEC-01	Anechoic Chamber	JSE	Semi 3m	RE/BW	2005/09/03 * 12
KAF-05	Pre Amplifier	Agilent	8447D	RE/BW	2006/04/21 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE/BW	2006/03/24 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/01/17 * 12
KCC-30/31/32 /34/KRM-03	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	5D-2W/S04272B/RFM-E421	RE/BW	2005/12/22 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2006/01/17 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	RE	2005/09/13 * 12
KOS-02	Digital Humidity Indicator	Custom	CTH-190	RE/BW	2006/07/10 * 24
KTR-R1	Test Receiver	Rohde & Schwarz	ESS	RE/BW	2006/07/15 * 12
KLP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE/BW	2006/06/01 * 12
YA-RE	Radiated emission(software)	UL-Apex	RE(Ver.1.5)	RE	-

The expiration date of the calibration is the end of the expired month .

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

Test Item :

RE: Radiated emission

BW: 20dB bandwidth