RADIO TEST REPORT

Test Report No. : 26KE0229-HO-A

Applicant	:	**OMRON Corporation**
Type of Equipment	:	**Transmitter, KEYLESS OPERATION KEY(FOB)**
Model No.	:	**G8D-644M-KEY-N**
Test standard	:	**FCC Part 15 Subpart C Section 15.231:2006**
FCC ID	:	**OUC644M-KEY-N**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, 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 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 : July 13,2006

Tested by :
Makoto Kosaka
EMC Services

Approved by :
Naoki Sakamoto
Group Leader of EMC Services

NVLAP®
NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address, http://ulapex.jp/emc/nvlap.htm

UL Apex Co., Ltd.
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SECTION 1: Client information

Company Name	:	OMRON Corporation
Address	:	6368, NENJO-ZAKA, OKUSA KOMAKI, AICHI, 485-0802 JAPAN
Telephone Number	:	+81-568-78-6174
Facsimile Number	:	+81-568-78-6179
Contact Person	:	Daisuke Kurata

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Transmitter, KEYLESS OPERATION KEY(FOB)
Model No.	:	G8D-644M-KEY-N
Serial No.	:	1, 2
Country of Manufacture	:	Japan
Rating	:	DC3.0V(Lithium Battery (CR2032))
Receipt Date of Sample	:	July 13, 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

2.2 Product Description

Model No: G8D-644M-KEY-N (referred to as the EUT in this report) is the Transmitter, KEYLESS OPERATION KEY(FOB).

- KEYLESS OPERATION KEY(hereinafter referred to as FOB) is a component of “Keyless operation system” (hereafter referred to as KOS).

- FOB has a transponder built-in and performs UHF transmission when the button is pressed and it receives LF from KOS. It also has a mechanical key. The device performs mutual communication with KOS at IGON (engine start).

-KOS is a system to lock/unlock (door entry function) a door /trunk by pressing Lock/Unlock SW on each door with holding the registered KEYLESS OPERATION KEY and start up an engine (engine starter function) without using an existing mechanical key. These operations can be done without pulling FOB from a pocket or bag.

Tx section

Equipment Type	:	Transmitter
Clock frequnecy	:	2MHz and Xtal 9.84375MHz
Frequency of Operation	:	315MHz
Type of modulation	:	FSK
Antenna Type	:	Pattern Antenna

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C : 2006
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.231 Periodic operation in the band 40.66 - 40.70MHz and above 70MHz

FCC 15.31 (e)

This test was performed with the New Battery (DC 3.0V) and the constant voltage was supplied to the EUT during the tests. Therefore, the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	Automatically Deactivate	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Section 15.231(a)(1) <IC> RSS-210 A1.1.1	N/A	-	Complied
2	Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.6	<FCC> Section 15.231(b) <IC> RSS-210 A1.1.2	N/A	1.2dB 315.05MHz Horizontal, QP	Complied
3	Electric Field Strength of Spurious Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.7	<FCC> Section 15.205 Section 15.209 Section 15.231(b) <IC> RSS-210 A1.1.2, 2.6, 2.7	N/A	2.7dB 629.950MHz Horizontal, QP	Complied
4	-20dB Bandwidth	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Section 15.231(c) <IC> Reference data	N/A	-	Complied
5	Conducted emission	<FCC> ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC> RSS-Gen 7.2.2	<FCC> Section 15.207 <IC> RSS-Gen 7.2.2	-	N/A*1)	N/A
Note: UL Apex's EMI Work procedures No. QPM05 and QPM15 *1) The test is not applicable since the EUT does not have AC Mains.						

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	<IC> RSS-Gen 4.4.1	<IC> RSS-210 A1.1.3	Conducted	N/A	N/A	N/A

3.4 Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna (30MHz to 300MHz) is ±4.59dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna (300MHz to 1GHz) is ±4.62dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn Antenna (above 1GHz) is ±5.27dB.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	655103	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247A-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247A-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	-
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 shielded room	-	-	6.0 x 6.0 x 3.9m	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	N/A	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	N/A	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.7 shielded room.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

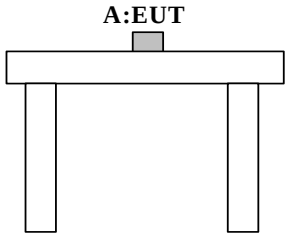
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : Transmitting (315MHz) mode

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

4.2 Configuration and peripherals



*Test data was taken under worse case conditions.

Description of EUT

No	Item	Model number	Serial number	Manufacturer	Remarks
A	Transmitter, KEYLESS OPERATION KEY (FOB)	G8D-644M-KEY-N	1 *1) 2 *2)	OMRON Corporation	EUT

*1) Used for Automatically deactivate and Duty cycle tests
*2) Used for the other tests

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

Test place : No.3 semi anechoic chamber
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0m by 0.5m, 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-3200MHz
Test distance : 3m
EUT position : Top of urethane
EUT operation mode : See Clause 4.1

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on No.3 semi anechoic chamber with a ground plane and at a distance of 3m.
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.
The radiated emission measurements were made with the following detector function of the test receiver.

	Below or equal to 1GHz	Above 1GHz
Detector Type	QP or AV (=Peak with Duty factor)	Peak and AV(=Peak with Duty factor)
IF Bandwidth	120kHz	PK: S/A:RBW 1MHz, VBW:1MHz, AV: S/A:RBW 1MHz, VBW:1MHz with Duty factor

- The carrier level (or noise levels) was (or were) measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.
With the position, the noise levels of all the frequencies were measured.

5.5 Results

Summary of the test results: Pass

Date: July 13, 2006 Tested by: Makoto Kosaka

APPENDIX 2: Data of EMI test

Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

UL Apex Co., Ltd. Head Office EMC Lab.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY	: OMRON Corporation	REPORT NO	: 26KE0229-HO
EQUIPMENT	: Transmitter, KEYLESS OPERATION KEY(FOB)	REGULATION	: FCC Part 15 Subpart C 15.209 & 231
MODEL	: G8D-644M-KEY-N	TEST DISTANCE	: 3m
SAMPLE No.	: 2	DATE	: 2006/07/13
POWER	: DC 3.0V(CR2032)	Temperature	: 24deg.C
Mode	: Transmitting (315MHz)	Humidity	: 68%
EUT Position	: X-axis(Hor) and Z-axis(Ver)	Engineer	: Makoto Kosaka

QP DETECT(T/R : IF BW 120kHz)

No.	FREQ	T/R READING		ANT	AMP	CABLE	ATTEN		RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		none	HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]		[dBuV/m]		[dBuV/m]	[dB]	
1	315.050	81.6	78.5	15.0	32.1	3.9	6.0	0.0	74.4	71.3	75.6	1.2	4.3
2	629.950	53.6	53.5	19.9	32.3	5.7	6.0	0.0	52.9	52.8	55.6	2.7	2.8
3	944.924	33.4	30.6	22.5	31.0	7.1	6.0	0.0	38.0	35.2	55.6	17.6	20.4

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	ATTEN		RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		none	HOR	VER	PK	HOR	VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]		[dBuV/m]		[dBuV/m]	[dB]	
4	1.25990	55.0	58.2	23.9	34.6	1.7	0.0	0.0	46.0	49.2	75.6	27.9	24.7
5	1.57488	58.5	55.5	25.6	33.8	1.9	0.0	0.0	52.2	49.2	73.9	21.7	24.7
6	1.88986	50.8	46.4	30.0	33.2	2.0	0.0	0.0	49.6	45.2	75.6	24.3	28.7
7	2.20535	53.9	52.1	30.9	32.9	2.1	0.0	0.0	54.0	52.2	73.9	19.9	21.7
8	2.51980	52.7	51.5	30.4	32.7	2.4	0.0	0.0	52.8	51.6	75.6	21.1	22.3
9	2.83478	51.5	49.0	31.4	32.6	2.5	0.0	0.0	52.8	50.3	73.9	21.1	23.6
10	3.15050	48.1	49.1	31.7	32.4	2.7	0.0	0.0	50.1	51.1	75.6	23.8	22.8

AV DETECAV MEASUREMENT Result = Reading (RBW: 1MHz , VBW: 1MHz) + Duty Factor

No.	FREQ	S/A READING		ANT	AMP	CABLE	ATTEN	Duty	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		Factor	HOR	VER	AV	HOR	VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
4	1.25990	55.0	58.2	23.9	34.6	1.7	0.0	-4.8	42.7	47.0	55.6	11.2	6.9
5	1.57488	58.5	55.5	25.6	33.8	1.9	0.0	-4.8	49.5	45.7	53.9	4.4	8.2
6	1.88986	50.8	46.4	30.0	33.2	2.0	0.0	-4.8	42.9	34.4	55.6	11.0	19.5
7	2.20535	53.9	52.1	30.9	32.9	2.1	0.0	-4.8	49.0	46.1	53.9	4.9	7.8
8	2.51980	52.7	51.5	30.4	32.7	2.4	0.0	-4.8	47.7	45.8	55.6	6.2	8.1
9	2.83478	51.5	49.0	31.4	32.6	2.5	0.0	-4.8	46.2	42.7	53.9	7.7	11.2
10	3.15050	48.1	49.1	31.7	32.4	2.7	0.0	-4.8	39.2	41.9	55.6	14.7	12.0

REMARKS
ANTENNA TYPE:30-300MHz Biconical / 300-1000MHz Logperiodic / 1-3.2GHz Horn
CALCULATION RESULT=Reading + ANT Factor - Amp Gain + LOSS (Cable+ ATTEN.)+Duty factor
*ATTEN was not used for Antenna Factor 0.0dB of the above table.
Duty cycle Factor Measurement : The duty cycle factor = 20 log (On time[sec.] / 1 cycle time[sec.]) :-4.8dB
* The result is rounded off to the second decimal place. Therefore, there may be 0.4 difference for the result.
*Except for the above table : All other spurious emissions were less than 20dB for the limit.
The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z,
and the position that has the maximum noise was determined.
With the position, the noise levels of all the frequencies was measured.
*The duty was not used in the data above 1GHz, and the test was made with AV detector which is severer for the limit.
The test result was applied to the limit in Section 15.209.

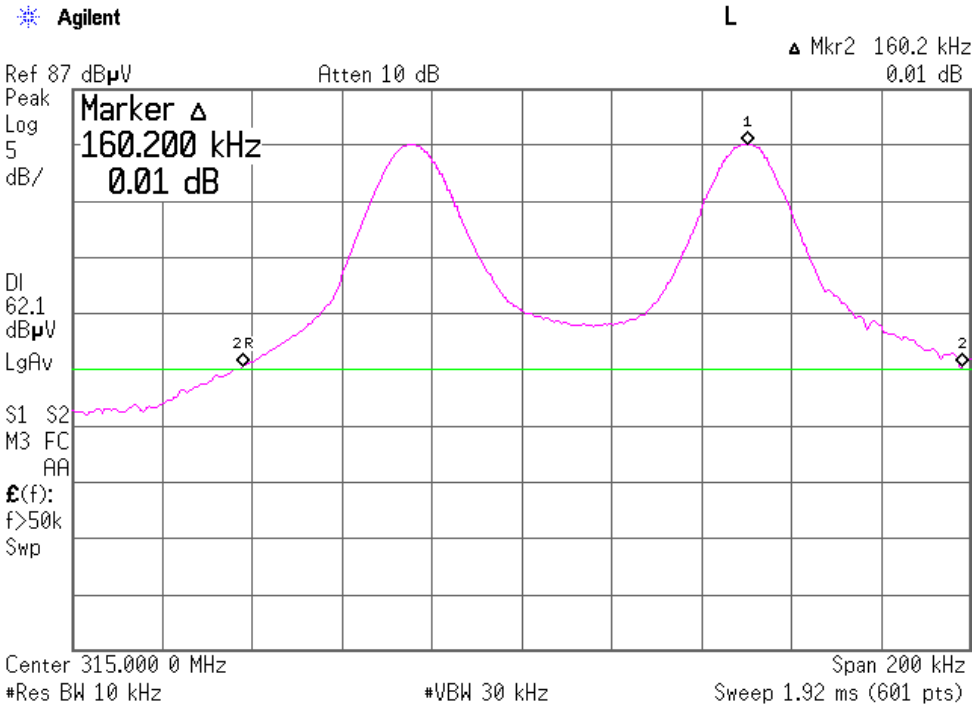
-20dB Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY	: OMRON Corporation	REPORT NO	: 26KE0229-HO
EQUIPMENT	: Transmitter, KEYLESS OPERATION KEY(FOB)	REGULATION	: FCC Part15 Subpart C 231(c)
MODEL	: G8D-644M-KEY-N	TEST DISTANCE	: 3m
S/N	: 2	DATE	: 2006/07/13
POWER	: DC 3.0V(CR2032)	TEMPERATURE	: 24deg.C
Mode	: Transmitting (315MHz)	HUMIDITY	: 68%
		ENGINEER	: Makoto Kosaka

Bandwidth Limit : Fundamental Frequency 315 MHz X 0.25% = 787.5 kHz

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result	Margin [kHz]
160.20	787.50	Pass	627.30

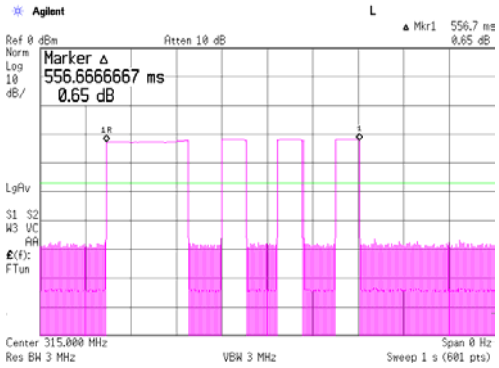


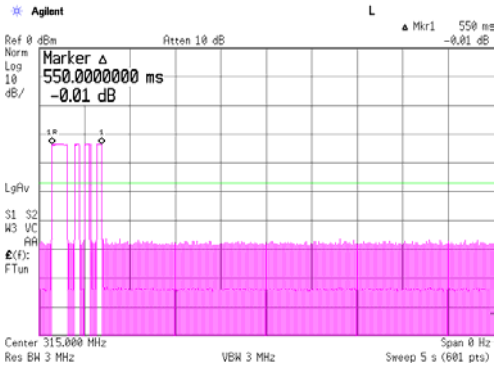
Automatically deactivate

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY	: OMRON Corporation	REPORT NO	: 26KE0229-HO
EQUIPMENT	: Transmitter, KEYLESS OPERATION KEY(FOB)	REGULATION	: FCC Part15 Subpart C 231(b) / 205
MODEL	: G8D-644M-KEY-N	TEST DISTANCE	: 3m
S/N	: 1	DATE	: 2006/07/13
POWER	: DC 3.0V(CR2032)	TEMPERATURE	: 24deg.C
Mode	: Transmitting (315MHz)	HUMIDITY	: 68%
		ENGINEER	: Makoto Kosaka

Time of Transmitting [sec]	Limit [sec]	Result	Margin [sec]
0.56	5.00	Pass	4.44



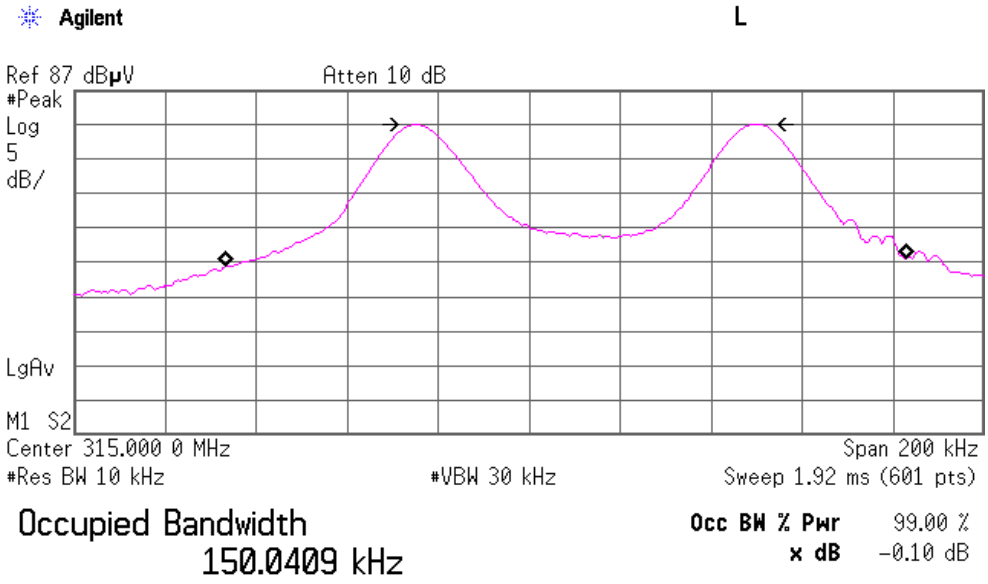


99% Occupied Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY	: OMRON Corporation	REPORT NO	: 26KE0229-HO
EQUIPMENT	: Transmitter, KEYLESS OPERATION KEY(FOB)	REGULATION	: RSS-Gen
MODEL	: G8D-644M-KEY-N	TEST DISTANCE	: 3m
S/N	: 2	DATE	: 07/13/2006
POWER	: DC 3.0V(CR2032)	TEMPERATURE	: 24 deg.C.
Mode	: Transmitting (315MHz)	HUMIDITY	: 68 %
		ENGINEER	: Makoto Koska

99% Occupied Bandwidth (RSS-Gen)



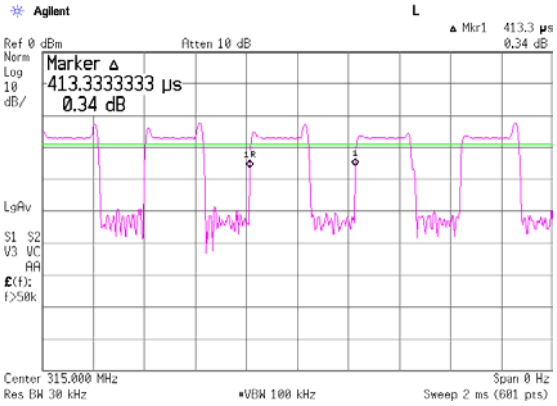
Transmit Freq Error	8.074 kHz
x dB Bandwidth	76.938 kHz

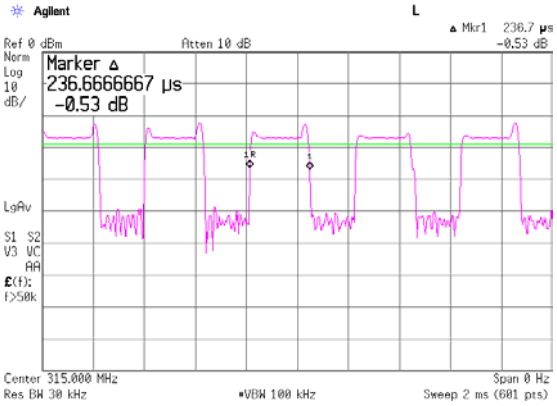
Duty Cycle

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY	: OMRON Corporation	REPORT NO	: 26KE0229-HO
EQUIPMENT	: Transmitter, KEYLESS OPERATION KEY(FOB)	REGULATION	: FCC Part15 Subpart C 231(b) / 205 / 209
MODEL	: G8D-644M-KEY-N	TEST DISTANCE	: 3m
S/N	: 1	DATE	: 07/13/2006
POWER	: DC 3.0V(CR2032)	TEMPERATURE	: 24 deg.C.
Mode	: Transmitting (315MHz)	HUMIDITY	: 68 %
		ENGINEER	: Makoto Koska

Time of Transmitting [us]	1 cycle time [us]	Duty cycle	Duty Factor [dB]
236.67	413.33	0.57	-4.84





APPENDIX 3:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-03	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2006/03/03 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/01/29 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2006/01/29 * 12
MAT-30	Attenuator(6dB)	TME	UFA-01	RE	2006/03/11 * 12
MCC-51	Coaxial cable	UL Apex	-	RE	2006/03/11 * 12
MPA-13	Pre Amplifier	SONOA INSTRUMENT	310	RE	2006/03/25 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2006/01/09 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	RE	2006/04/15 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	RE	2006/03/27 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	RE	2006/06/02 * 12
TR-07	Test Receiver	Rohde & Schwarz	ESCS30	RE	2005/09/14 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	RE	2006/01/19 * 24
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE	-

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

Test Item:

RE: Radiated emission