




RADIO TEST REPORT

Test Report No.: 27FE0157-YK

Applicant : Alps Electric Co., Ltd.
Type of Equipment : Remote Keyless Entry
Model No. : TWB1J667
FCC ID : CWTWB1J667
Test Standard : FCC Part15 Subpart C: 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: March 5, 2007

Tested by: 
Toyokazu Imamura


Approved by: 
Osamu Watatani
Manager of Yamakita EMC Lab.

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1 Applicant Information

Company Name : Alps Electric Co., Ltd.
Address : 6-3-36 Furukawanakazato, Osaki-shi, Miyagi-ken, 989-6181 JAPAN
Telephone Number : +81 229 23 5111
Facsimile Number : +81 229 23 3755
Contact Person : Soichi Sato

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

2.1 Identification of E.U.T.

Type of Equipment : Remote Keyless Entry
Model No. : TWB1J667
Serial No. : Automatically deactivate: #3, Other test: #1
Rating : DC3V (Battery)
Country of Manufacture : Japan
Receipt Date of Sample : February 21, 2007
Condition of EUT : Engineering 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: TWB1J667 (referred to as the EUT in this report) is a Remote Keyless Entry, which is carried by the owner of the vehicle. It performs transmission through RF antenna to tuner, vehicle performs actions according to the signal (Door lock or unlock, Trunk open).

Equipment type : Transmitter
Frequency of operation : 314.85MHz
Clock frequency : CPU: 4MHz
Type of modulation : FSK
Antenna type : Internal/PCB Pattern
Antenna connector type : None
ITU code : F1D
Operation temperature range : -10 to +60 deg.C.

*FCC Part15.31 (e)

This test was performed with the new battery (DC 3V); therefore, this EUT complies with the requirement.

*FCC Part15.203

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 requirement.

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YAMAKITA EMC LAB.

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MF060b (14.06.06)

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
 Section 15.231 Periodic operation in the band 40.66 - 40.70 MHz and above 70 MHz

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(a)	-	N/A *1	-	N/A
Automatically Deactivate	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.231(a)(1)	Radiated	N/A	-	Complied
Electric Field Strength of Fundamental Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.231 (b)	Radiated	N/A	21.3dB (Horizontal, PK)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.205 Section 15.209 Section 15.231 (b)	Radiated	N/A	12.5dB (629.70MHz, Horizontal, QP)	Complied
-20dB Bandwidth	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.231(c)	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.

* Other than mentioned in 3.3, no addition, exclusion nor deviation has been made from the standard.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators RSS-Gen 4.4.1	RSS-Gen 4.4.1	Conducted	*See data.	Complied

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3.4 Uncertainty

Radiated emission test

The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ± 4.5 dB.

The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ± 4.3 dB.

The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is ± 5.2 dB.

The data listed in this test report has enough margin, more than site margin.

3.5 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	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5	Semi-anechoic chamber	
No.3 shielded room	4.0 x 5.0 x 2.7		

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4 System Test Configuration

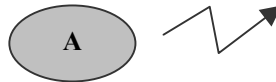
4.1 Justification

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

Test mode: Transmitting (314.85MHz)

* The test was performed with the operation of continuous transmitting to be set as the maximum data rate.

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 *1)	Manufacturer	FCC ID (Remarks)
A	Remote Keyless Entry	TWB1J667	#1 #3	Alps Electric Co., Ltd.	CWTWB1J667 (EUT)

*1) Automatically deactivate: #3, Other test: #1

5 Automatically Deactivate

5.1 Operating environment

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

5.2 Test procedure

The measurement was performed with a spectrum analyzer and an antenna placed by the EUT.

Limit: A manually transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

5.3 Results

Summary of the test results : Pass

Date : March 5, 2007

Test engineer : Toyokazu Imamura

6 Radiated Emissions (Fundamental & Spurious)

6.1 Operating environment

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

Temperature : See test data
Humidity : See test data

6.2 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.

6.3 Test conditions

Frequency range : 30MHz - 4GHz
EUT position : Table top
EUT operation mode : Transmitting

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured 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.

Measurements were performed with QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector	PK: BW 120kHz (Fundamental)	PK: RBW: 1MHz/VBW: 1MHz
IF Bandwidth	QP: BW 120kHz (Spurious)	AV: RBW: 1MHz/VBW: 10Hz

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

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 below and photographs in page 12. With the position, the noise levels of all the frequencies were measured.

	Below 1GHz	Above 1GHz
Horizontal	X	Y
Vertical	Y	X

6.5 Results

Summary of the test results : Pass

Date : March 5, 2007

Test engineer : Toyokazu Imamura

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7 Bandwidth

7.1 Operating environment

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

7.2 Test procedure

The bandwidth was measured with a spectrum analyzer and an antenna which is placed by the EUT.

7.3 Results

Summary of the test results: Pass

Date : March 5, 2007

Test engineer : Toyokazu Imamura

APPENDIX 1: Photographs of test setup

Page 11 : Radiated emission
Page 12 : Pre-check of the worst position

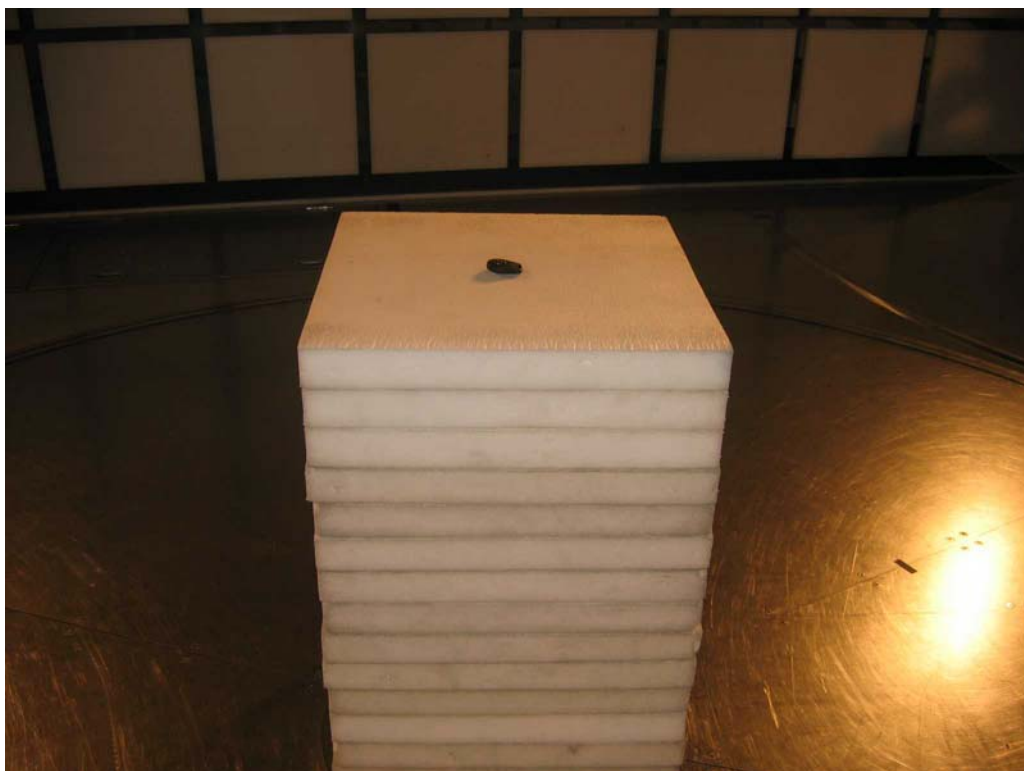
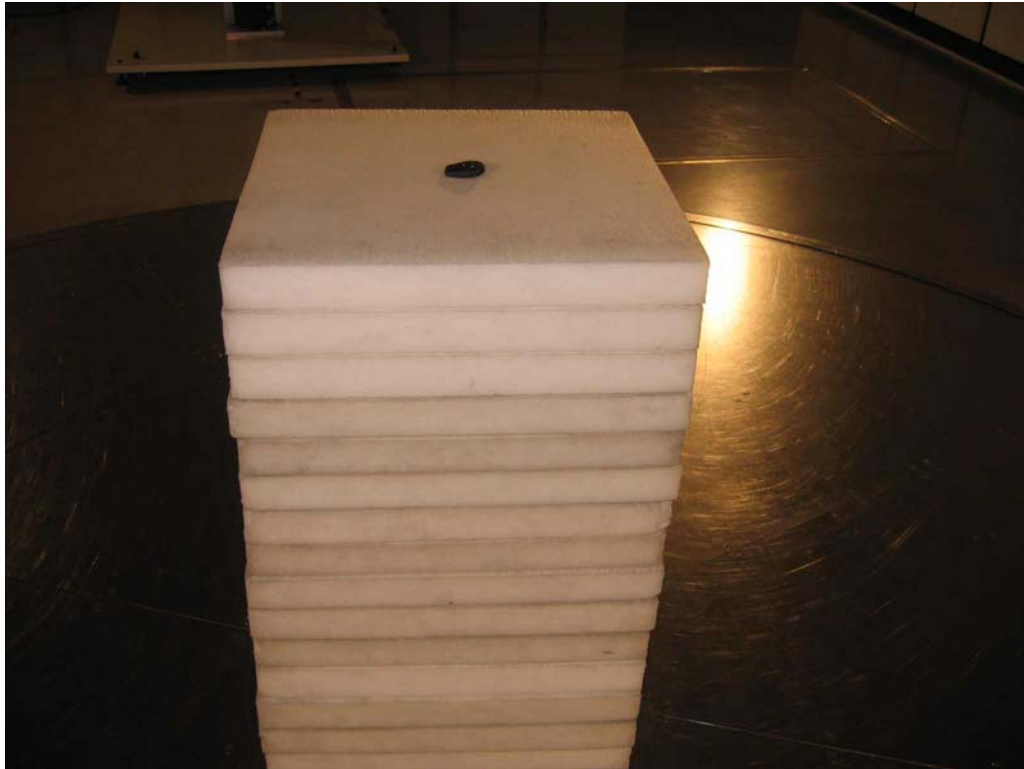
APPENDIX 2: Test Data

Page 13 : Automatically Deactivate
Page 14 - 16 : Radiated Emission
 14 : Fundamental
 15 : Harmonics
 16-17 : Other
Page 18 - 19 : -20dB Bandwidth and Occupied Bandwidth

APPENDIX 3: Test instruments

Page 20 : Test instruments

Radiated emission



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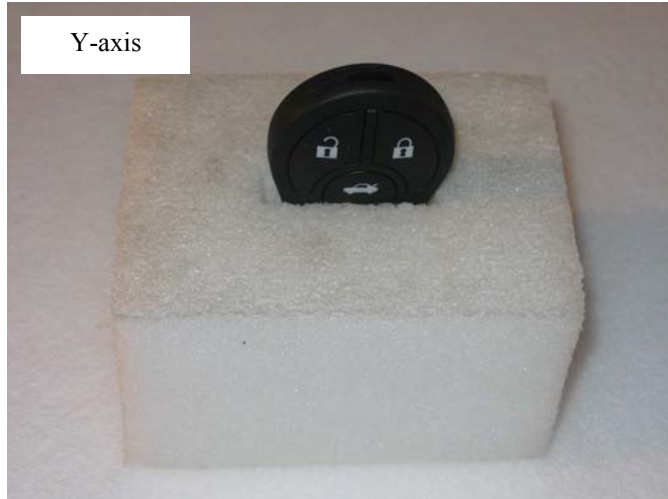
MF060b (14.06.06)

Pre-check of the worst position

X-axis



Y-axis



Z-axis

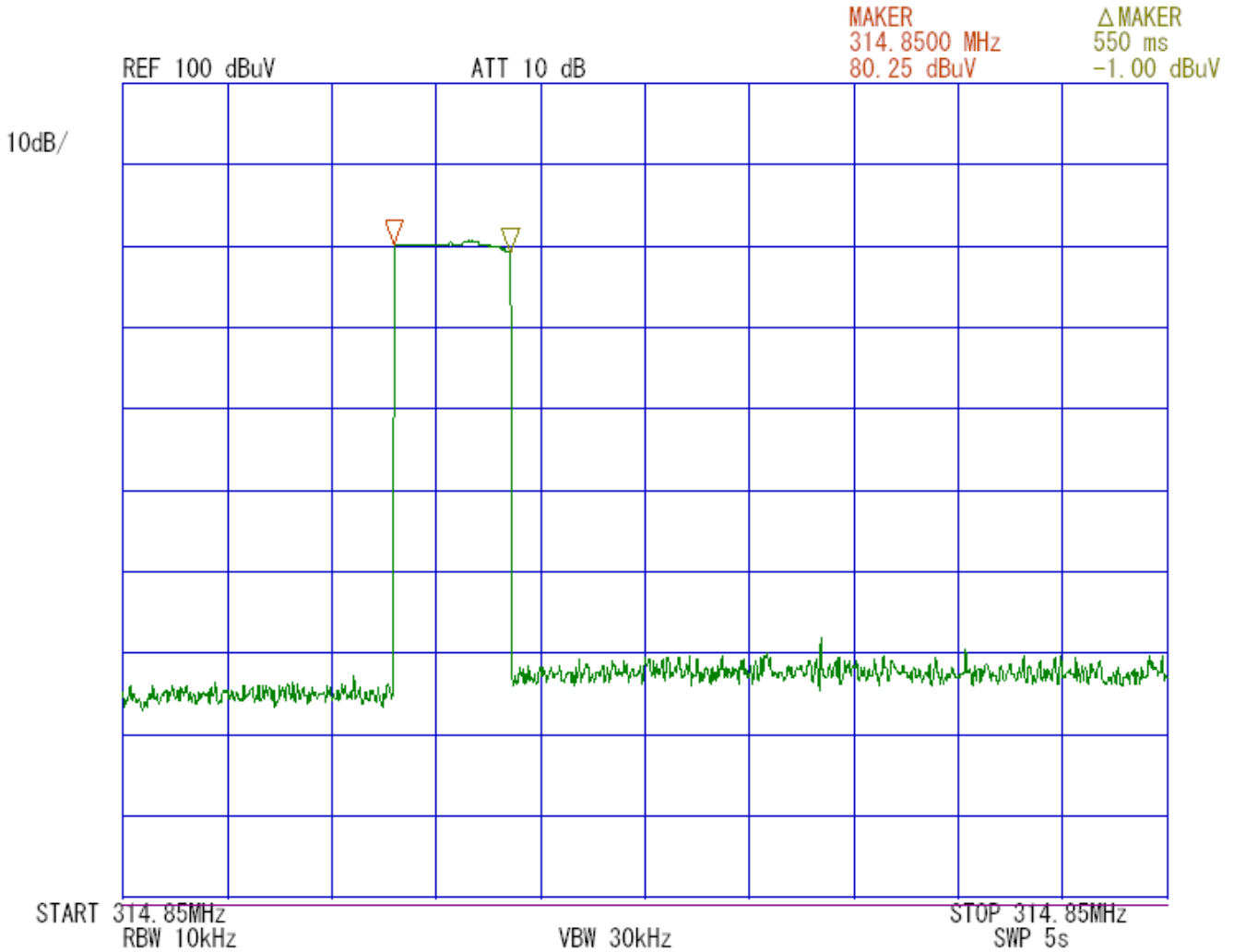


Automatically deactivate: FCC 15.231(a)(1)

COMPANY : Alps Electric Co., Ltd.
 EQUIPMENT : Remote Keyless Entry
 MODEL NUMBER: TWB1J667
 SERIAL NUMBER: #3
 FCC ID : CWTWB1J667
 POWER : DC3V(Battery)

UL Apex Co.,Ltd. Yamakita No.1 Anechoic Chamber
 REPORT NO : 27FE0157-YK
 REGULATION : Fcc Part15SubpartC 231(a)(1)
 DATE : 2007/03/05
 TEMP./HUMI : 25°C/49%
 TEST MODE : Transmitting (314.85MHz)
 ENGINEER : Toyokazu Imamura

Time of Transmitting	Limit
[sec]	[sec]
0.55	5.00



Date of carrier emissions

UL Apex Co.,Ltd.
YAMAKITA NO.1 ANECHOIC CHAMBER
Report No. : 27FE0157-YK

Company : Alps Electric Co.,Ltd.
Equipment : Remote keyless Entry
Model : TWB1J667
Sample No. : #1
Power : DC 3.0V (Battery)
Mode : Transmitting (314.85MHz)
FCC ID : CWTWB1J667

Regulation : FCC Part15C Section 15.231(b)
Test Distance : 3m
Date : 2007/3/5
Temperature : 25deg.C
Humidity : 49%

ENGINEER : Toyokazu Imamura

Below 1GHz PK DETECT(Test Receiver: BW 120kHz)

No.	FREQ [MHz]	READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN [dB]	RESULT		LIMIT [dBuV/m]	MARGIN	
		HOR [dBuV]	VER					HOR [dBuV/m]	VER		HOR [dB]	VER
1	314.85	57.4	54.5	14.7	27.7	3.9	6.0	54.3	51.4	75.6	21.3	24.2

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 27FE0157-YK

Applicant : Alps Electric Co., Ltd.
Kind of Equipment : Remote Keyless Entry
Model No. : TWB1J667
Serial No. : #1
Power : DC3V (Battery)
Mode : Transmitting (314.85MHz)
Remarks : QP
Date : 3/5/2007
Test Distance : 3 m
Temperature : 25 °C
Humidity : 49 %
Regulation : FCC Part15C § 15.209

Engineer : Toyokazu Imamura

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	629.70	BB	31.2	30.4	19.9	29.2	5.6	6.0	33.5	32.7	46.0	12.5	13.3
2.	944.50	BB	23.3	20.7	22.8	28.8	7.0	6.1	30.4	27.8	46.0	15.6	18.2

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

■ ANTENNA: KBA-03 (BBA9106) 30-300MHz/KLA-03 (USLP9143) 300-1000MHz
■ AMP: KAF-05 (8447D) ■ RECEIVER: KTR-02 (ESCS30) ■ CABLE: KCC-30_31_32_34 (RE)

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 27FE0157-YK

Applicant : Alps Electric Co., Ltd.
Kind of Equipment : Remote Keyless Entry
Model No. : TWB1J667
Serial No. : #1
Power : DC3V (Battery)
Mode : Transmitting (314.85MHz)
Remarks : PK
Date : 3/5/2007
Test Distance : 3 m
Temperature : 25 °C Engineer : Toyokazu Imamura
Humidity : 49 %
Regulation : FCC Part15C § 15.209 (PK Detection)

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER		HOR [dB]	VER
1.	1259.40	BB	50.1	52.0	24.8	35.5	3.4	0.0	42.8	44.7	74.0	31.2	29.3
2.	1574.25	BB	42.5	45.0	25.4	35.0	3.7	0.0	36.6	39.1	74.0	37.4	34.9
3.	1889.10	BB	41.0	42.6	25.9	34.8	3.9	0.0	36.0	37.6	74.0	38.0	36.4
4.	2203.95	BB	44.0	42.9	26.6	34.8	4.4	0.0	40.2	39.1	74.0	33.8	34.9
5.	2518.80	BB	45.5	43.2	27.4	34.9	5.1	0.0	43.1	40.8	74.0	30.9	33.2
6.	2833.65	BB	40.2	40.7	27.9	35.1	5.3	0.0	38.3	38.8	74.0	35.7	35.2
7.	3148.50	BB	39.3	39.3	28.3	35.0	5.5	0.0	38.1	38.1	74.0	35.9	35.9

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

■ ANTENNA: KHA-02 (1-18GHz)

■ AMP: KAF-04 (8449B) ■ SPECTRUMANALYZER: R3271A (KSA-04) ■ CABLE: KCC-D14/D15

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 27FE0157-YK

Applicant : Alps Electric Co., Ltd.
Kind of Equipment : Remote Keyless Entry
Model No. : TWB1J667
Serial No. : #1
Power : DC3V (Battery)
Mode : Transmitting (314.85MHz)
Remarks : AV
Date : 3/5/2007
Test Distance : 3 m
Temperature : 25 °C Engineer : Toyokazu Imamura
Humidity : 49 %
Regulation : FCC Part15C § 15.209 (AV Detection)

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER		HOR [dB]	VER
1.	1259.40	BB	43.2	45.5	24.8	35.5	3.4	0.0	35.9	38.2	54.0	18.1	15.8
2.	1574.25	BB	31.3	33.1	25.4	35.0	3.7	0.0	25.4	27.2	54.0	28.6	26.8
3.	1889.10	BB	30.3	31.9	25.9	34.8	3.9	0.0	25.3	26.9	54.0	28.7	27.1
4.	2203.95	BB	33.2	31.7	26.6	34.8	4.4	0.0	29.4	27.9	54.0	24.6	26.1
5.	2518.80	BB	35.1	31.5	27.4	34.9	5.1	0.0	32.7	29.1	54.0	21.3	24.9
6.	2833.65	BB	30.1	29.7	27.9	35.1	5.3	0.0	28.2	27.8	54.0	25.8	26.2
7.	3148.50	BB	29.2	29.2	28.3	35.0	5.5	0.0	28.0	28.0	54.0	26.0	26.0

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

■ ANTENNA: KHA-02 (1-18GHz)

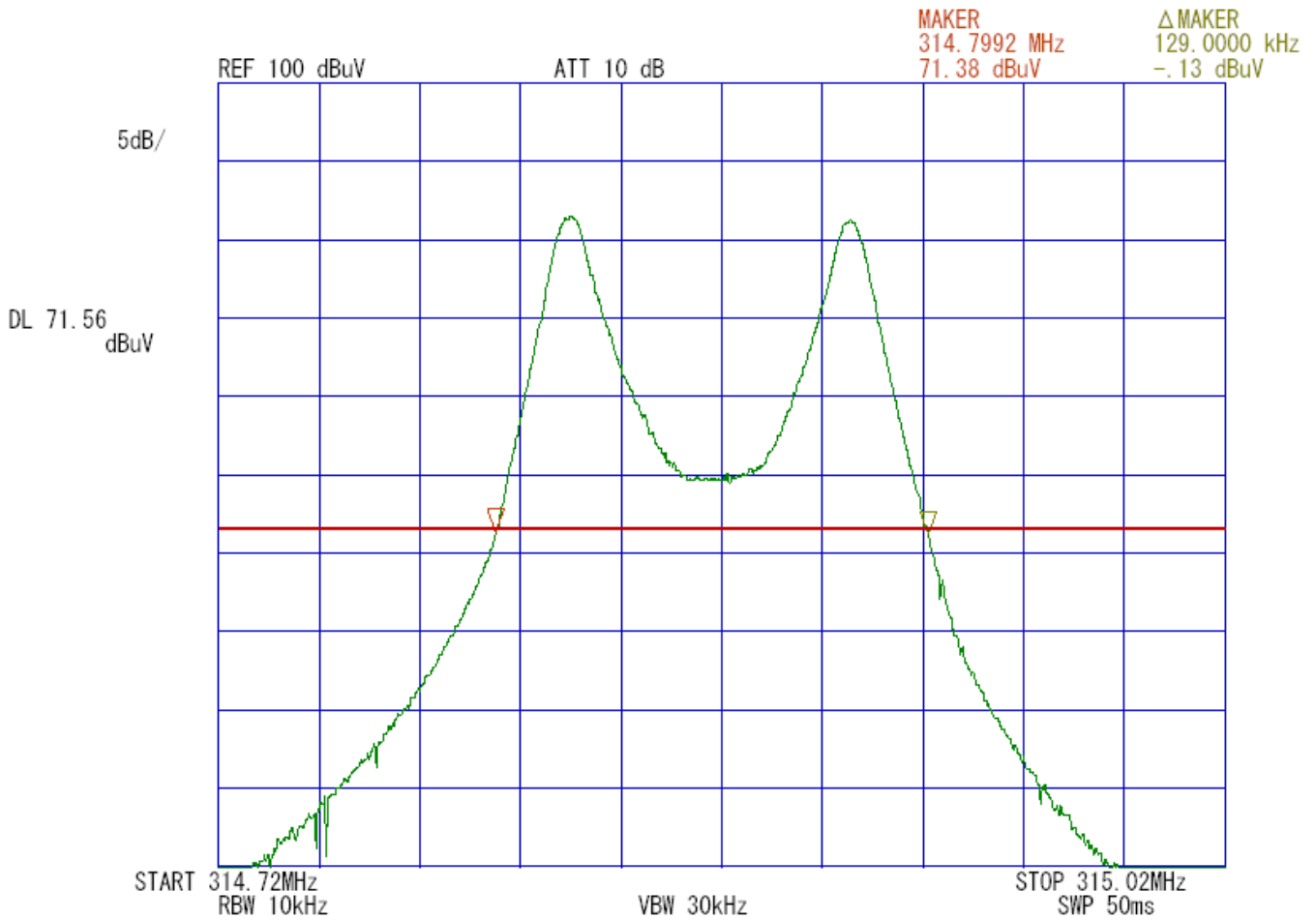
■ AMP: KAF-04 (8449B) ■ SPECTRUMANALYZER: R3271A (KSA-04) ■ CABLE: KCC-D14/D15

-20dB Bandwidth: FCC 15.231(c)

COMPANY	: Alps Electric Co., Ltd.	UL Apex Co.,Ltd. Yamakita No.1 Anechoic Chamber	
EQUIPMENT	: Remote Keyless Entry	REPORT NO	: 27FE0157-YK
MODEL NUMBER	: TWB1J667	REGULATION	: Fcc Part15SubpartC 231(c)
SERIAL NUMBER	: #1	DATE	: 2007/03/05
FCC ID	: CWTWB1J667	TEMP./HUMI	: 25°C/49%
POWER	: DC3V(Battery)	TEST MODE	: Transmitting (314.85MHz)
		ENGINEER	: Toyokazu Imamura

Bandwidth Limit : fundamental Frequency 314.85 X 0.25%= 787.125 kHz

-20dB Bandwidth	Bandwidth Limit	Result
[kHz]	[kHz]	
129	787.125	Pass



Occupied Bandwidth(99%)

COMPANY : Alps Electrical Co., Ltd.
EQUIPMENT : Remote Keyless Entry
MODEL NUMBER: TWB1J667
SERIAL NUMBER: #1
FCC ID : CWTWB1J667
POWER : DC3V(Battery)

UL Apex Co.,Ltd. Yamakita No.1 Anechoic Chamber
REPORT NO : 27FE0157-YK
DATE : 2007/3/5
TEMP./HUMI : 25°C/49%
TEST MODE : Transmitting (314.85MHz)
ENGINEER : Toyokazu Imamura

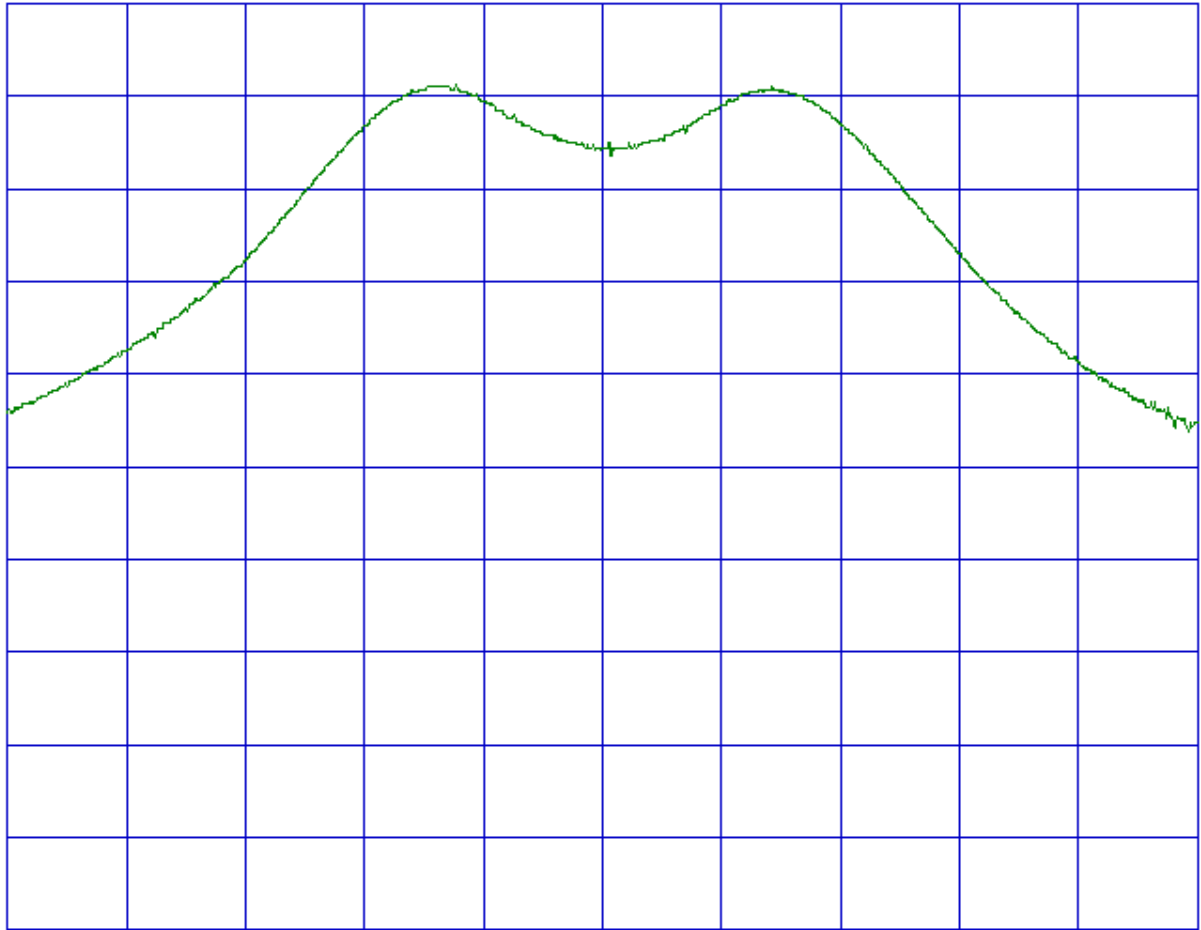
99% Occupied Bandwidth
[kHz]
163kHz

OBW (99%) : 163kHz

REF 100 dBuV

ATT 10 dB

10dB/



START 314.71MHz
RBW 30kHz

VBW 30kHz

STOP 315.01MHz
SWP 50ms

**APPENDIX 3
Test Instruments**

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
YA-RE	Radiated emission(software)	UL-Apex	RE(Ver.1.5)	RE/AD/BW	-
KAEC-01(NSA)	Anechoic Chamber	JSE	Semi 3m	RE/BW	2006/08/31 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE/BW	2006/03/24 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/01/06 * 12
KCC-30/31/32 /34/KRM-03	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	5D-2W/S04272B/RFM-E421	RE/BW/AD	2006/11/27 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE/BW/AD	2007/01/06 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	RE/AD/BW	2006/09/05 * 12
KOS-02	Humidity Indicator	Custom	CTH-190	RE/AD/BW	2006/07/10 * 24
KTR-04	Test Receiver	Rohde & Schwarz	ESVS10	RE	2006/10/26 * 12
KAF-04	Pre Amplifier	Agilent	8449B	RE/BW	2006/04/24 * 12
KJM-01	Measure	TAJIMA	GL19-55	RE/BW	-
KCC-D14/D15	Coaxial cable	Suhner	SUCOFLEX 104	RE	2006/12/13 * 12
KHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2006/04/10 * 12

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,
- AD: Automatically disactivate
- BW: Bandwidth