EMI TEST REPORT

Test Report No.: 27BE0279-YK-A

Applicant	:	**Alps Electric Co., Ltd.**
Type of Equipment	:	**Passive Entry System (Hand Unit)**
Model No.	:	**TWB1U624**
FCC ID	:	**CWTWBU624**
Test Standard	:	**FCC Part15 Subpart C** **Section 15.209, Section 15.231: 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: October 5, 6 and 12, 2006

Tested by: Fumiaki Matsuo & Toyokazu Imamura

Approved by: Osamu Watatani
Site 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	:	Tomosuke Takata

2 Product Description

Type of Equipment	:	Passive Entry System (Hand Unit)
Model No.	:	TWB1U624
Serial No.	:	TWB1U624-2 (Automatically deactivate test) / TWB1U624-1 (other test)
Rating :	:	DC3V (Battery)
Country of Manufacture	:	Japan
Receipt Date of Sample	:	October 4, 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: TWB1U624 (referred to as the EUT in this report) is a Hand unit, which is carried by the owner of the vehicle. It performs transmission through RF antenna to tuner (I-KEY unit), processes LF signal from I-KEY unit, and performs actions according to the signal.

Equipment type	:	Transceiver
Frequency of operation	:	Tx: 315MHz, Rx: 125kHz
Other clock frequency	:	8MHz (IC)
Type of modulation	:	FSK (Tx)
Antenna type	:	Tx: Internal/PCB Pattern (Loop) Rx: 3-axis Internal / (Loop coil and bar antenna)
Antenna connector type	:	None
Method of Frequency generation	:	Simplex
Emission designation	:	F1D
Operation temperature range	:	-10 ~ +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.

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	-	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	4.1dB (Horizontal, QP)	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	15.2dB (944.86MHz, Horizontal)	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.

* 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 Biconical antenna is ±4.5dB.
The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ±4.3dB.
The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is ±5.2dB.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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

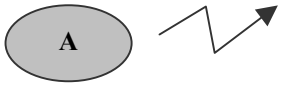
4.1 Justification

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

Operation: Transmitting

* 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	Passive Entry System (Hand Unit)	TWB1U624	TWB1U624-1 TWB1U624-2	Alps Electric Co., Ltd.	CWTWBU624 (EUT)

*1) TWB1U624-2 was used for the test of automatically deactivate and TWB1U624-1 was used for other tests.

5 Automatically deactivate

5.1 Operating environment

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

5.2 Test procedure

The bandwidth was measured with a spectrum analyzer and a search coil 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 : October 12, 2006 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 IF Bandwidth	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 1MHz 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 and photographs in page 12. With the position, the noise levels of all the frequencies were measured.

6.5 Results

Summary of the test results : Pass
Date : October 5 and 6, 2006 Test engineer : Fumiaki Matsuo

7 -20dB Bandwidth and Occupied 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 a search coil placed by the EUT.

7.3 Results

Summary of the test results: Pass
Date : October 12, 2006 Test engineer : Toyokazu Imamura

APPENDIX 1: Photographs of test setup

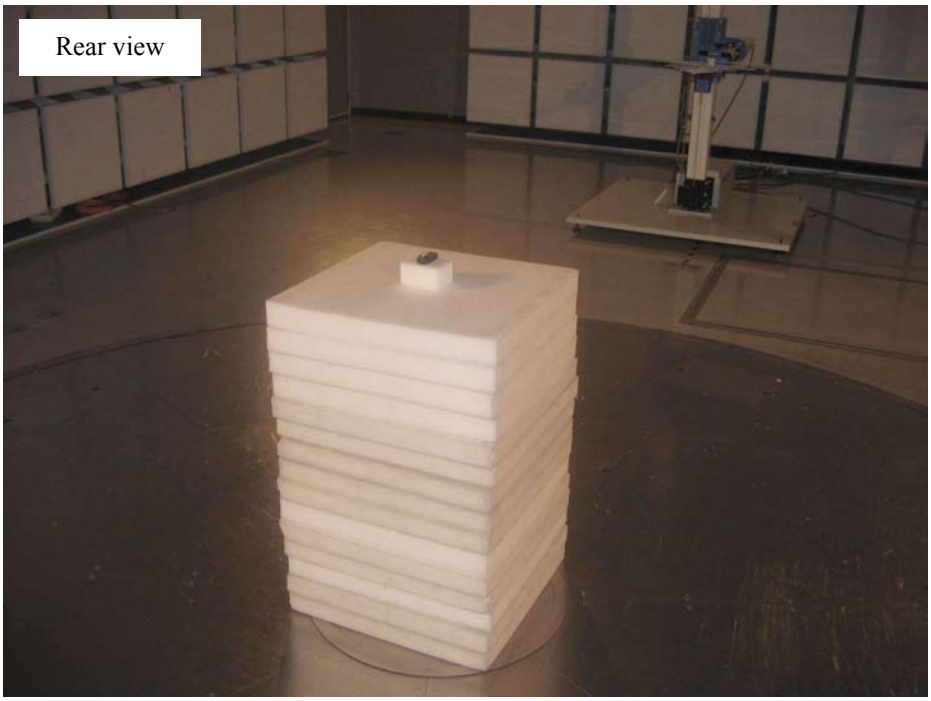
APPENDIX 2: Test Data

APPENDIX 3: Test instruments

Radiated emission

Front view

Rear view



Pre-check of the worst position

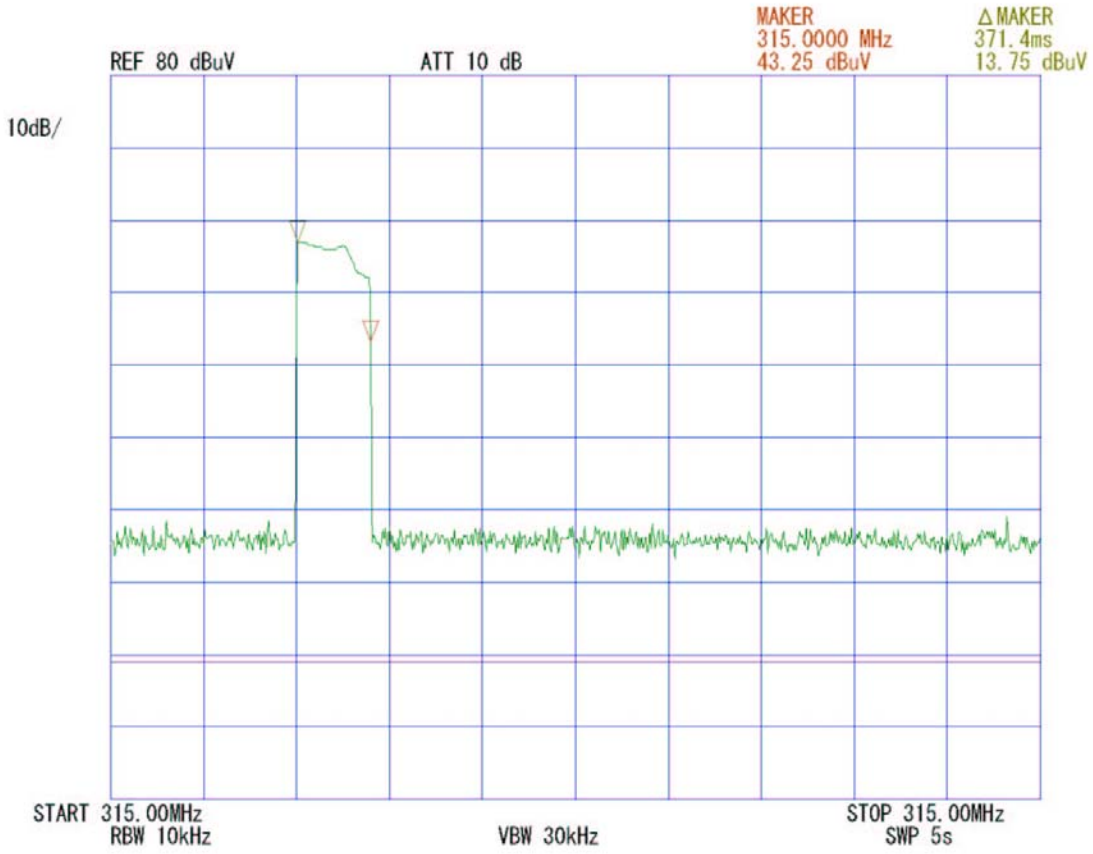
Frequency	Below 30MHz	Above 30MHz
Antenna: Horizontal	Y	Y
Antenna: Vertical	X	X

Automatically deactivate: FCC 15.231(a)(1)

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

COMPANY	: Alps Electric Co ., Ltd.	REPORT NO	: 27BE0279-YK-A
EQUIPMENT	: Passive Entry System (Hand Unit)	REGULATION	: FCC Part15 SubpartC 231 (a)(1)
MODEL NUMBER	: TWB1U624	DATE	: 2006/10/12
SERIAL NUMBER	: TWB1U624-2	TEMP./HUMI	: 20deg.C./52%
FCC ID	: CWTWBU624	TEST MODE	: Transmitting
POWER	: DC3V	ENGINEER	: Toyokazu Imamura

Time of Transmitting [sec]	Limit [sec]
0.371	5.00



Date of Fundamental emissions

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 27BE0279-YK-A

Company : Alps Electric Co.,Ltd.
Equipment : Passive Entry System (Hand Unit)
Model : TWB1U624
Sample No. : TWB1U624-1
Power : DC 3.0V
Mode : Transmitting (315.00MHz)
FCC ID : CWTWBU624

Regulation : FCC Part15C Section 15.231
Test Distance : 3m
Date : 2006/10/05
Temperature : 22deg.C
Humidity : 60%

ENGINEER : Fumiaki Matsuo

QP DETECT(Test Receiver: BW 120kHz)

X

No.	FREQ	READING		ANT	AMP	CABLE	ATTEN	RESULT		LIMIT	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
1	315.00	67.3	69.9	15.3	27.7	3.9	6.0	64.8	67.4	75.6	10.8	8.2

Y

No.	FREQ	READING		ANT	AMP	CABLE	ATTEN	RESULT		LIMIT	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
1	315.00	74.0	56.9	15.3	27.7	3.9	6.0	71.5	54.4	75.6	4.1	21.2

Z

No.	FREQ	READING		ANT	AMP	CABLE	ATTEN	RESULT		LIMIT	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
1	315.00	67.8	68.8	15.3	27.7	3.9	6.0	65.3	66.3	75.6	10.3	9.3

Worst:HOR:Y/VER:X

No.	FREQ	READING		ANT	AMP	CABLE	ATTEN	RESULT		LIMIT	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
1	315.00	74.0	69.9	15.3	27.7	3.9	6.0	71.5	67.4	75.6	4.1	8.2

DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 27BE0279-YK-A

Applicant : Alps Electric Co., Ltd.
Kind of Equipment : Passive Entry System (Hand Unit)
Model No. : TWB1U624
Serial No. : TWB1U624-1
Power : DC3V
Mode : Transmitting (315.00MHz)
Remarks : Hor:Y/ Ver:X
Date : 10/5/2006
Test Distance : 3 m
Temperature : 22 ℃ Engineer : Fumiaki Matsuo
Humidity : 60 %
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.	96.03	BB	22.3	29.2	10.3	28.6	2.0	6.1	12.1	19.0	43.5	31.4	24.5
2.	629.90	BB	25.4	27.3	19.8	29.2	5.5	6.0	27.5	29.4	46.0	18.5	16.6
3.	944.86	BB	23.5	22.8	23.2	28.8	6.8	6.1	30.8	30.1	46.0	15.2	15.9

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

■ANTENNA:KBA-03(BBA9106)30-299.99MHz/KLA-03(USLP9143)300-1000MHz
■AMP:KAF-05(8447D) ■CABLE:KCC-30/31/32/34■RECEIVER:APRCV05(ESS)

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 27BE0279-YK-A

Applicant	:	Alps Electric Co., Ltd.	
Kind of Equipment	:	Passive Entry System (Hand Unit)	
Model No.	:	TWB1U624	
Serial No.	:	TWB1U624-1	
Power	:	DC3V	
Mode	:	Transmitting (315.00MHz)	
Remarks	:	Hor:X Ver:Z Peak(RBW:1MHz/VBW:1MHz)	
Date	:	10/6/2006	
Test Distance	:	3 m	
Temperature	:	23 ℃	Engineer : Fumiaki Matsuo
Humidity	:	61 %	
Regulation	:	FCC Part15C §15.209(PK Detection)	

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.	1259.80	BB	49.4	48.6	24.6	37.3	4.8	0.0	41.5	40.7	74.0	32.5	33.3
2.	1574.75	BB	45.6	47.0	26.3	36.9	5.3	0.0	40.3	41.7	74.0	33.7	32.3
3.	1889.70	BB	45.3	45.2	29.1	36.7	5.9	0.0	43.6	43.5	74.0	30.4	30.5
4.	2204.65	BB	43.8	42.9	29.9	36.7	6.3	0.0	43.3	42.4	74.0	30.7	31.6
5.	2519.60	BB	45.1	44.8	29.8	36.8	6.6	0.0	44.7	44.4	74.0	29.3	29.6
6.	2834.55	BB	46.5	45.7	31.0	37.2	7.2	0.0	47.5	46.7	74.0	26.5	27.3
7.	3149.50	BB	45.4	45.6	31.4	37.3	7.6	0.0	47.1	47.3	74.0	26.9	26.7

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz
■AMP:KAF-02(8449B) ■CABLE:KCC-D11/12 ■SPECTRUMANALYZER: R3271A(KSA-04)

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DATA OF RADIATION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No.: 27BE0279-YK-A

Applicant	:	Alps Electric Co., Ltd.	
Kind of Equipment	:	Passive Entry System (Hand Unit)	
Model No.	:	TWB1U624	
Serial No.	:	TWB1U624-1	
Power	:	DC3V	
Mode	:	Transmitting (315.00MHz)	
Remarks	:	Hor:X Ver:Z AV(RBW:1MHz/VBW:10Hz)	
Date	:	10/6/2006	
Test Distance	:	3 m	
Temperature	:	23 ℃	Engineer : Fumiaki Matsuo
Humidity	:	61 %	
Regulation	:	FCC Part15C §15.209(AV Detection)	

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.	1259.80	BB	39.5	38.3	24.6	37.3	4.8	0.0	31.6	30.4	54.0	22.4	23.6
2.	1574.75	BB	34.9	35.4	26.3	36.9	5.3	0.0	29.6	30.1	54.0	24.4	23.9
3.	1889.70	BB	32.8	33.0	29.1	36.7	5.9	0.0	31.1	31.3	54.0	22.9	22.7
4.	2204.65	BB	31.6	31.2	29.9	36.7	6.3	0.0	31.1	30.7	54.0	22.9	23.3
5.	2519.60	BB	32.9	32.7	29.8	36.8	6.6	0.0	32.5	32.3	54.0	21.5	21.7
6.	2834.55	BB	33.9	33.6	31.0	37.2	7.2	0.0	34.9	34.6	54.0	19.1	19.4
7.	3149.50	BB	33.5	33.5	31.4	37.3	7.6	0.0	35.2	35.2	54.0	18.8	18.8

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

■ANTENNA:KHA-01(SAS-200 571)1-18GHz
■AMP:KAF-02(8449B) ■CABLE:KCC-D11/12■SPECTRUMANALYZER: R3271A(KSA-04)

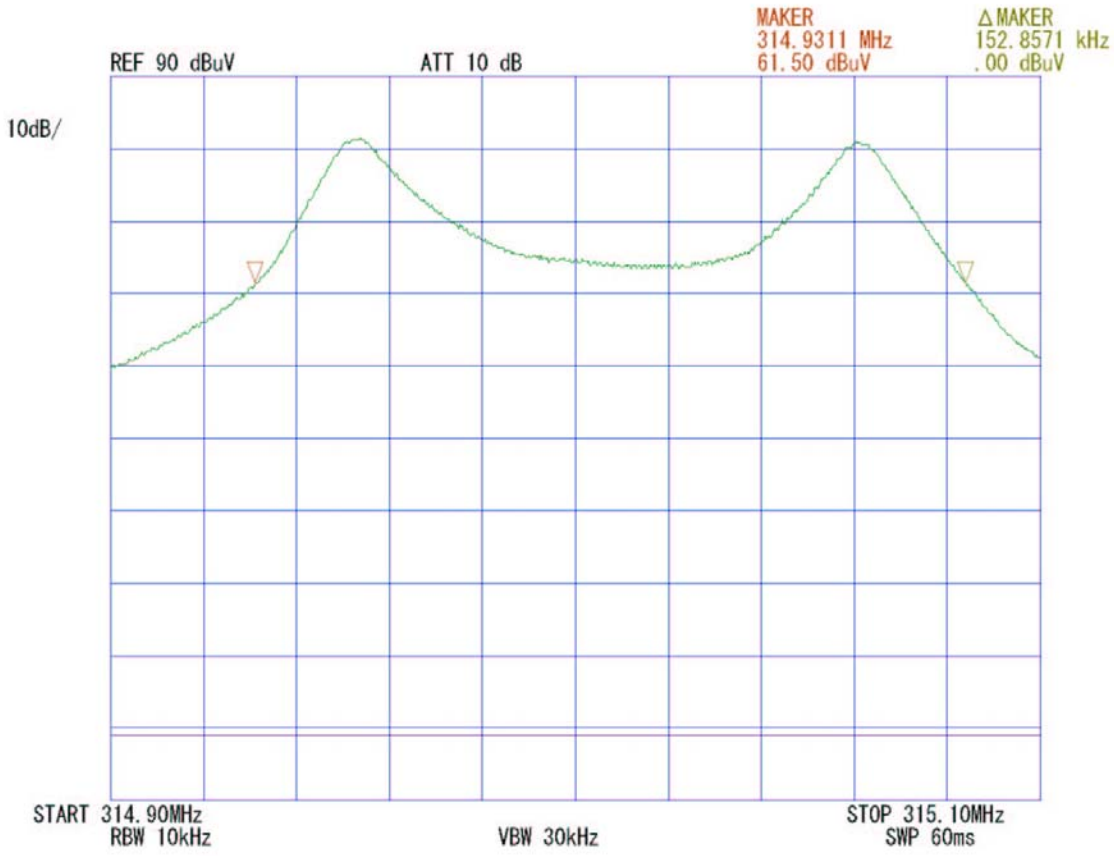
-20dB Bandwidth: FCC 15.231(c)

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

COMPANY	**: Alps Electric Co ., Ltd.**	**REPORT NO**	**: 27BE0279-YK-A**
EQUIPMENT	**: Passive Entry System (Hand Unit)**	**REGULATION**	**: FCC part15 SubpartC 231(c)**
MODEL NUMBER	**: TWB1U624**	**DATE**	**: 2006/10/12**
SERIAL NUMBER	**: TWB1U624-1**	**TEMP./HUMI**	**: 20deg.C./52%**
FCC ID	**: CWTWBU624**	**TEST MODE**	**: Transmitting**
POWER	**: DC3V**	**ENGINEER**	**: Toyokazu Imamura**

Bandwidth Limit : fundamental Frequency 315.00 * 0.25%= 787.500 kHz

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
152.86	787.500	Pass

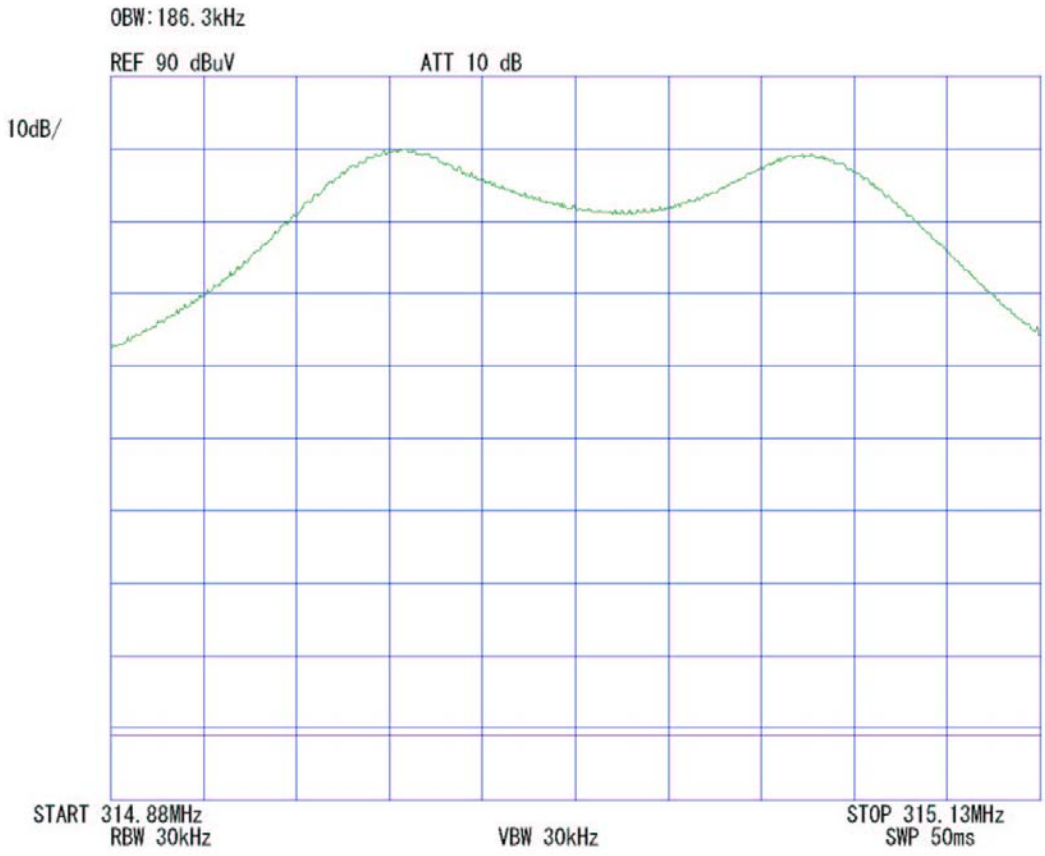


Occupied Bandwidth(99%)

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

COMPANY	**: Alps Electric Co ., Ltd.**	**REPORT NO**	**: 27BE0279-YK-A**
EQUIPMENT	**: Passive Entry System (Hand Unit)**		
MODEL NUMBER	**: TWB1U624**	**DATE**	**: 2006/10/12**
SERIAL NUMBER	**: TWB1U624-1**	**TEMP./HUMI**	**: 20deg.C./52%**
FCC ID	**: CWTWBU624**	**TEST MODE**	**: Transmitting**
POWER	**: DC3V**	**ENGINEER**	**: Toyokazu Imamura**

99% Occupied Bandwidth [kHz]
186.3



Test Report No :27BE0279-YK-A

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	-
KCC-B1	Coaxial Cable/Pulse Limitter/RF Relay Matrix	Fujikura/Suhner/PMM/TSJ	5D-2W/S04272B/12D-SFA/S04272B/PL01/-	AD/BW	2006/05/16 * 12
KAEC-01(NSA)	Anechoic Chamber	JSE	Semi 3m	RE	2006/08/31 * 12
KAF-05	Pre Amplifier	Agilent	8447D	RE	2006/04/21 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE	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	2005/12/22 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2006/01/17 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	RE/AD/BW	2006/09/05 * 12
KOS-02	Digital Humidity Indicator	Custom	CTH-190	RE/AD/BW	2006/07/10 * 24
APRCV05	Test Receiver	Rohde & Schwarz	ESS	RE	2006/09/02 * 12
KSCA-01	Search coil	TSJ	SC01	AD/BW	Pre Check
KAF-02	Pre Amplifier	Hewlett Packard	8449B	RE	2006/04/24 * 12
KCC-D11/D12	Coaxial cable	Suhner/storm	SCOFLEX103/90-388-020	RE	2006/08/28 * 12
KHA-01	Horn Antenna	A.H.Systems	SAS-200/571	RE	2006/08/17 * 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