



# RADIO TEST REPORT

Test Report No.: 28FE0108-YK-01-A

Applicant : Alps Electric Co., Ltd.  
Type of Equipment : Passive Entry System (Hand Unit)  
Model No. : TWB1J482  
FCC ID : CWTWBJ482  
Test regulation : FCC Part15 Subpart C: 2008  
Test result : Complied

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

Date of test: February 13 and 14, 2008

Tested by: G. Ishiwata & T. Arai  
Go Ishiwata & Tatsuya Arai

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

**UL Japan, Inc.**

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MF060b (09.01.08)

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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 Equipment under test (E.U.T.)

### 2.1 Identification of E.U.T.

Type of Equipment : Passive Entry System (Hand Unit)  
Model No. : TWB1J482  
Serial No. : Refer to 4.2 in this report.  
Rating : DC3V (Battery)  
Country of Manufacture : Japan  
Receipt Date of Sample : February 8, 2008  
Condition of EUT : Production model  
Modification of EUT : No modification by the test lab.

### 2.2 Product Description

Model: TWB1J482 (referred to as the EUT in this report) is a Hand unit, which is carried by the owner of the vehicle. The Passive Entry System is a system which locks, unlocks and can start engine only with the intelligent-key of the vehicle.

Equipment type : Transceiver  
Frequency of operation : Tx: 314.85MHz, Rx: 125kHz  
Clock frequency : CPU: 8MHz (CR), SAW Resonator: 314.89MHz  
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  
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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### 3 Test Specification, Procedures and Results

#### 3.1 Test specification

Test specification : FCC Part15 Subpart C: 2008 , final revised on January 30, 2008  
 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<br>7. AC powerline conducted emission measurements | FCC 15.207                                 | -        | N/A<br>*1) | -                                  | N/A      |
| Automatically Deactivate                        | ANSI C63.4:2003<br>13. Measurement of intentional radiators        | FCC 15.231(a)(1)                           | Radiated | N/A        | -                                  | Complied |
| Electric Field Strength of Fundamental Emission | ANSI C63.4: 2003<br>13. Measurement of intentional radiators       | FCC 15.231 (b)                             | Radiated | N/A        | 22.1dB (Horizontal, PK)            | Complied |
| Electric Field Strength of Spurious Emission    | ANSI C63.4: 2003<br>13. Measurement of intentional radiators       | FCC 15.205<br>FCC 15.209<br>FCC 15.231 (b) | Radiated | N/A        | 11.4dB (944.55MHz, Horizontal, PK) | Complied |
| -20dB Bandwidth                                 | ANSI C63.4: 2003<br>13. Measurement of intentional radiators       | FCC 15.231(c)                              | Radiated | N/A        | -                                  | Complied |

\*1) The test is not applicable since the EUT has no AC mains.

Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15.

#### 3.3 Addition to standard

| Item                     | Test Procedure   | Specification | Remarks  | Worst Margin | Results  |
|--------------------------|--|---------------|----------|--------------|----------|
| Occupied Bandwidth (99%) | ANSI C63.4:2003<br>13. Measurement of intentional radiators<br>RSS-Gen 4.6.1 | RSS-Gen 4.6.1 | Radiated | -            | Complied |

\* Other than above, no addition, exclusion nor deviation has been made from the standard.

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### 3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

|                               | No.1 open site (±) | No.2 open site (±) | No.1 anechoic chamber (±) |
|-------------------------------|--------------------|--------------------|---------------------------|
| <b>Radiated emission (3m)</b> |                    |                    |                           |
| 30-300MHz                     | 4.5 dB             | 4.4 dB             | 4.5 dB                    |
| 300-1000MHz                   | 4.3 dB             | 4.3 dB             | 4.3 dB                    |
| 1GHz<                         | 5.7 dB             | 5.7 dB             | 5.7 dB                    |

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

### 3.5 Test Location

UL Japan, Inc. 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. : 2973B-1

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. : 2973B-3

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. : 2973B-2

| 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<br>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            |                               |                            |

| Open test site      | Maximum measurement distance |
|---------------------|------------------------------|
| No.1 open test site | 30m                          |
| No.2 open test site | 10m                          |

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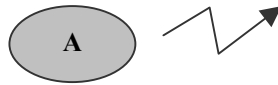
## 4 System Test Configuration

### 4.1 Justification

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

Test mode: Transmitting (314.85MHz)

### 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<br>*1) | Manufacturer            | Remarks |
|-----|-------------------------------------|--------------|----------------------|-------------------------|---------|
| A   | Passive Entry System<br>(Hand Unit) | TWB1J482     | No.1<br>No.2         | Alps Electric Co., Ltd. | EUT     |

\*1) Test of Automatically deactivate and Bandwidth: No.2, Other test: No.1

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## 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 : February 14, 2008

Test engineer : Tatsuya Arai

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## 6 Out of Band Emissions (Radiated)

### 6.1 Operating environment

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

### 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  
Test distance : 3m  
EUT operation mode : Transmitting

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<br>IF Bandwidth | PK: BW 120kHz | PK: RBW: 1MHz/VBW: 1MHz<br>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 | Y          | Y          |
| Vertical   | X          | X          |

### 6.4 Results

Summary of the test results : Pass

Date : February 13, 2008

Test engineer : Go Ishiwata

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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 : February 14, 2008

Test engineer : Tatsuya Arai

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### **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 - 17 : 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

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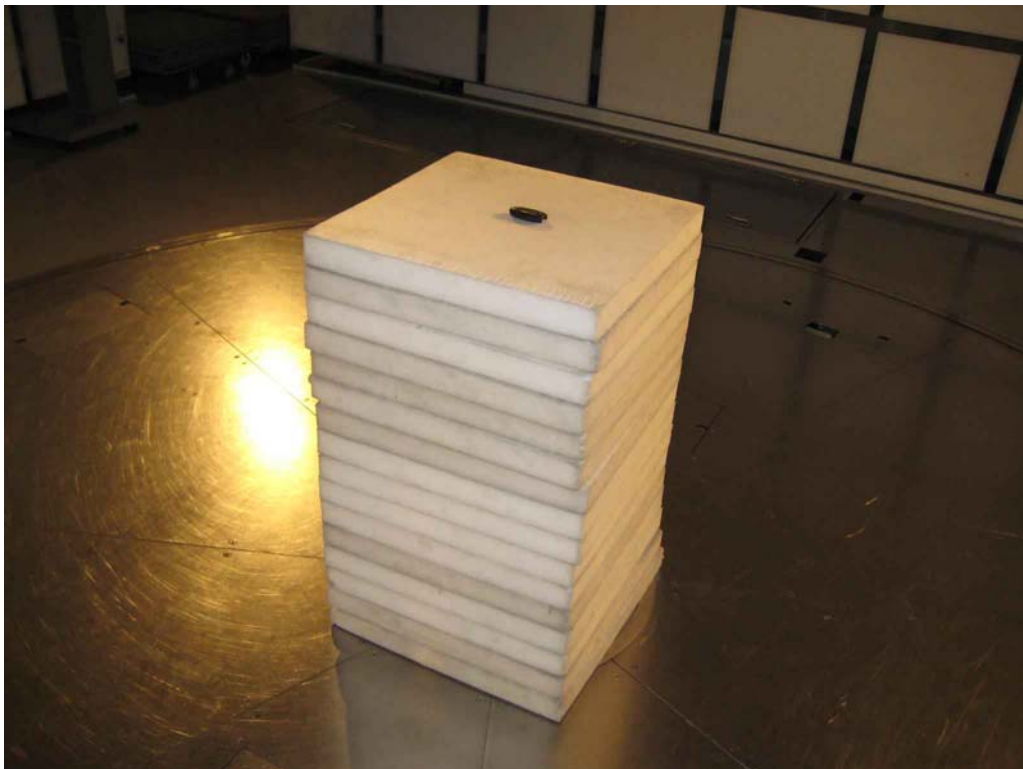
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**Radiated emission**



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**Pre-check of the worst position**

X-axis



Y-axis



Z-axis

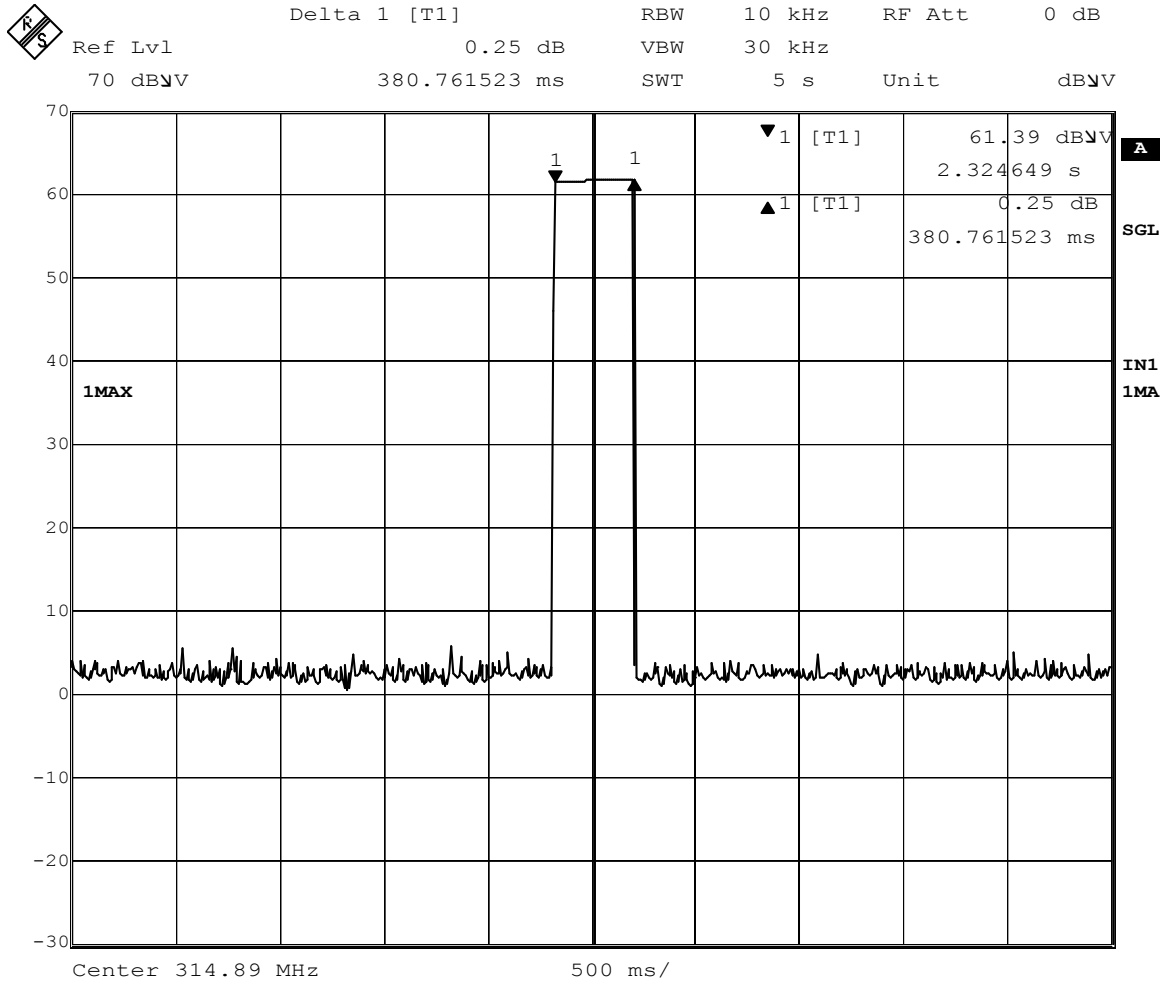


**Automatically deactivate: FCC 15.231(a)(1)**

**COMPANY** : Alps Electric Co., Ltd.  
**EQUIPMENT** : Passive Entry System(Hand Unit)  
**MODEL NUMBER**: TWB1J482  
**SERIAL NUMBER**: No.2  
**POWER** : DC3V

**UL Japan, Inc. Yamakita No.1 Anechoic Chamber**  
**REPORT NO** : 28FE0108-YK-01-A  
**REGULATION** : Fcc Part15SubpartC 231(a)(1)  
**DATE** : 2008/02/14  
**TEMP./HUMI** : 24°C/41%  
**TEST MODE** : Transmitting (314.89MHz)  
**ENGINEER** : Tatsuya Arai

| Time of Transmitting | Limit |
|----------------------|-------|
| [sec]                | [sec] |
| 0.381                | 5.00  |



Date: 14.FEB.2008 17:45:58

## Date of carrier emissions

UL Japan, Inc.  
 YAMAKITA NO.1 ANECHOIC CHAMBER  
 Report No. : 28FE0108-YK-01-A

|  |  |
|--|--|
| Company : Alps Electric Co.,Ltd.             | Regulation : FCC Part15C Section 15.231(b) |
| Equipment : Passive Entry System (Hand Unit) | Test Distance : 3m                         |
| Model : TWB1J482                             | Date : 2008/2/13                           |
| Sample No. : 1                               | Temperature : 21deg.C                      |
| Power : DC 3.0V                              | Humidity : 30%                             |
| Mode : Transmitting (314.85MHz)              |  |
| FCC ID : CWTWBJ482                           |  |

ENGINEER : Go Ishiwata

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

| No. | FREQ<br>[MHz] | READING       |      | ANT<br>Factor<br>[dB] | AMP<br>GAIN<br>[dB] | CABLE<br>LOSS<br>[dB] | ATTEN<br>[dB] | RESULT          |      | LIMIT<br>[dBuV/m] | MARGIN      |      |
|-----|---------------|---------------|------|-----------------------|---------------------|-----------------------|---------------|-----------------|------|-------------------|-------------|------|
|     |               | HOR<br>[dBuV] | VER  |                       |                     |                       |               | HOR<br>[dBuV/m] | VER  |                   | HOR<br>[dB] | VER  |
| 1   | 314.85        | 56.2          | 52.3 | 14.9                  | 27.5                | 4.0                   | 5.9           | 53.5            | 49.6 | 75.6              | 22.1        | 26.0 |

# DATA OF RADIATION TEST

UL Japan, Inc.  
YAMAKITA No.1 ANECHOIC CHAMBER  
Report No. : 28FE0108-YK-01-A

Applicant : Alps Electric Co., Ltd.  
 Kind of Equipment : Passive Entry System (Hand Unit)  
 Model No. : TWB1J482  
 Serial No. : No. 1  
 Power : DC3.0V  
 Mode : Transmitting (314.85MHz)  
 Remarks : PK Hor:Y Ver:X  
 Date : 2/13/2008  
 Test Distance : 3 m  
 Temperature : 21 °C  
 Humidity : 30 %  
 Regulation : FCC Part15C § 15.209

Engineer : Go Ishiwata

| No. | FREQ.<br>[MHz] | ANT<br>TYPE | READING         |                 | ANT<br>FACTOR<br>[dB/m] | AMP<br>GAIN<br>[dB] | CABLE<br>LOSS<br>[dB] | ATTEN.<br>[dB] | RESULT            |                   | LIMITS      |             | MARGIN |  |
|-----|----------------|-------------|-----------------|-----------------|-------------------------|---------------------|-----------------------|----------------|-------------------|-------------------|-------------|-------------|--------|--|
|     |                |             | HOR<br>[dB μ V] | VER<br>[dB μ V] |                         |                     |                       |                | HOR<br>[dB μ V/m] | VER<br>[dB μ V/m] | HOR<br>[dB] | VER<br>[dB] |        |  |
| 1.  | 629.70         | BB          | 27.0            | 27.3            | 20.2                    | 29.3                | 6.0                   | 5.9            | 29.8              | 30.1              | 46.0        | 16.2        | 15.9   |  |
| 2.  | 944.55         | BB          | 27.1            | 27.0            | 22.7                    | 28.6                | 7.4                   | 6.0            | 34.6              | 34.5              | 46.0        | 11.4        | 11.5   |  |

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

■ ANTENNA: KBA-03 (BBA9106) 30-299.99MHz/KLA-03 (USLP9143) 300-1000MHz  
 ■ CABLE: KCC-30/31/32/34 ■ PREAMP: KAF-05 (8447D) ■ EMI RECEIVER: KTR-04 (ESVS10)

# DATA OF RADIATION TEST

UL Japan, Inc.  
YAMAKITA No.1 ANECHOIC CHAMBER  
Report No. : 28FE0108-YK-01-A

Applicant : Alps Electric Co., Ltd.  
 Kind of Equipment : Passive Entry System (Hand Unit)  
 Model No. : TWB1J482  
 Serial No. : No. 1  
 Power : DC3.0V  
 Mode : Transmitting (314.85MHz)  
 Remarks : PK (RBW:1MHz, VBW:1MHz) Hor:Y Ver:X  
 Date : 2/13/2008  
 Test Distance : 3 m  
 Temperature : 21 °C Engineer : Go Ishiwata  
 Humidity : 30 %  
 Regulation : FCC Part15C § 15.209(PK Detection)

| No. | FREQ.<br>[MHz] | ANT<br>TYPE | READING         |      | ANT<br>FACTOR<br>[dB/m] | AMP<br>GAIN<br>[dB] | CABLE<br>LOSS<br>[dB] | ATTEN.<br>[dB] | RESULT            |      | LIMITS<br>[dB μ V/m] | MARGIN      |      |
|-----|----------------|-------------|-----------------|------|-------------------------|---------------------|-----------------------|----------------|-------------------|------|----------------------|-------------|------|
|     |                |             | HOR<br>[dB μ V] | VER  |                         |                     |                       |                | HOR<br>[dB μ V/m] | VER  |                      | HOR<br>[dB] | VER  |
| 1.  | 1259.40        | BB          | 48.2            | 47.9 | 24.2                    | 38.0                | 4.6                   | 0.0            | 39.0              | 38.7 | 74.0                 | 35.0        | 35.3 |
| 2.  | 1574.25        | BB          | 46.8            | 47.0 | 25.8                    | 37.5                | 4.9                   | 0.0            | 40.0              | 40.2 | 74.0                 | 34.0        | 33.8 |
| 3.  | 1889.10        | BB          | 46.8            | 47.2 | 28.4                    | 37.2                | 4.9                   | 0.0            | 42.9              | 43.3 | 74.0                 | 31.1        | 30.7 |
| 4.  | 2203.95        | BB          | 46.5            | 46.9 | 28.9                    | 37.3                | 4.9                   | 0.0            | 43.0              | 43.4 | 74.0                 | 31.0        | 30.6 |
| 5.  | 2518.80        | BB          | 46.3            | 46.6 | 28.4                    | 37.7                | 5.1                   | 0.0            | 42.1              | 42.4 | 74.0                 | 31.9        | 31.6 |
| 6.  | 2833.65        | BB          | 46.6            | 46.3 | 29.4                    | 38.4                | 5.0                   | 0.0            | 42.6              | 42.3 | 74.0                 | 31.4        | 31.7 |
| 7.  | 3148.50        | BB          | 46.5            | 46.3 | 30.0                    | 38.7                | 5.1                   | 0.0            | 42.9              | 42.7 | 74.0                 | 31.1        | 31.3 |

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

■ ANTENNA:KHA-01 (SAS-200 571)  
 ■ CABLE:KCC-D3/D7 ■ PREAMP:KAF-02 (8449B) ■ SPECTRUMANALYZER:KTR-01 (ES140)



# DATA OF RADIATION TEST

UL Japan, Inc.

YAMAKITA No.1 ANECHOIC CHAMBER

Report No. : 28FE0108-YK-01-A

Applicant : Alps Electric Co., Ltd.  
Kind of Equipment : Passive Entry System (Hand Unit)  
Model No. : TWB1J482  
Serial No. : No. 1  
Power : DC3.0V  
Mode : Transmitting(314.85MHz)  
Remarks : AV(RBW:1MHz, VBW:10Hz) Hor:Y Ver:X  
Date : 2/13/2008  
Test Distance : 3 m  
Temperature : 21 °C Engineer : Go Ishiwata  
Humidity : 30 %  
Regulation : FCC Part15C § 15.209(AV Detection)

| No. | FREQ.<br>[MHz] | ANT<br>TYPE | READING         |      | ANT<br>FACTOR<br>[dB/m] | AMP<br>GAIN<br>[dB] | CABLE<br>LOSS<br>[dB] | ATTEN.<br>[dB] | RESULT            |      | LIMITS<br>[dB μ V/m] | MARGIN      |      |
|-----|----------------|-------------|-----------------|------|-------------------------|---------------------|-----------------------|----------------|-------------------|------|----------------------|-------------|------|
|     |                |             | HOR<br>[dB μ V] | VER  |                         |                     |                       |                | HOR<br>[dB μ V/m] | VER  |                      | HOR<br>[dB] | VER  |
| 1.  | 1259.40        | BB          | 34.2            | 34.2 | 24.2                    | 38.0                | 4.6                   | 0.0            | 25.0              | 25.0 | 54.0                 | 29.0        | 29.0 |
| 2.  | 1574.25        | BB          | 33.6            | 33.8 | 25.8                    | 37.5                | 4.9                   | 0.0            | 26.8              | 27.0 | 54.0                 | 27.2        | 27.0 |
| 3.  | 1889.10        | BB          | 33.4            | 33.5 | 28.4                    | 37.2                | 4.9                   | 0.0            | 29.5              | 29.6 | 54.0                 | 24.5        | 24.4 |
| 4.  | 2203.95        | BB          | 33.3            | 33.2 | 28.9                    | 37.3                | 4.9                   | 0.0            | 29.8              | 29.7 | 54.0                 | 24.2        | 24.3 |
| 5.  | 2518.80        | BB          | 33.3            | 33.3 | 28.4                    | 37.7                | 5.1                   | 0.0            | 29.1              | 29.1 | 54.0                 | 24.9        | 24.9 |
| 6.  | 2833.65        | BB          | 33.3            | 33.4 | 29.4                    | 38.4                | 5.0                   | 0.0            | 29.3              | 29.4 | 54.0                 | 24.7        | 24.6 |
| 7.  | 3148.50        | BB          | 33.2            | 33.3 | 30.0                    | 38.7                | 5.1                   | 0.0            | 29.6              | 29.7 | 54.0                 | 24.4        | 24.3 |

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

■ ANTENNA:KHA-01 (SAS-200 571)

■ CABLE:KCC-D3/D7 ■ PREAMP:KAF-02 (8449B) ■ SPECTRUMANALYZER:KTR-01 (ES140)

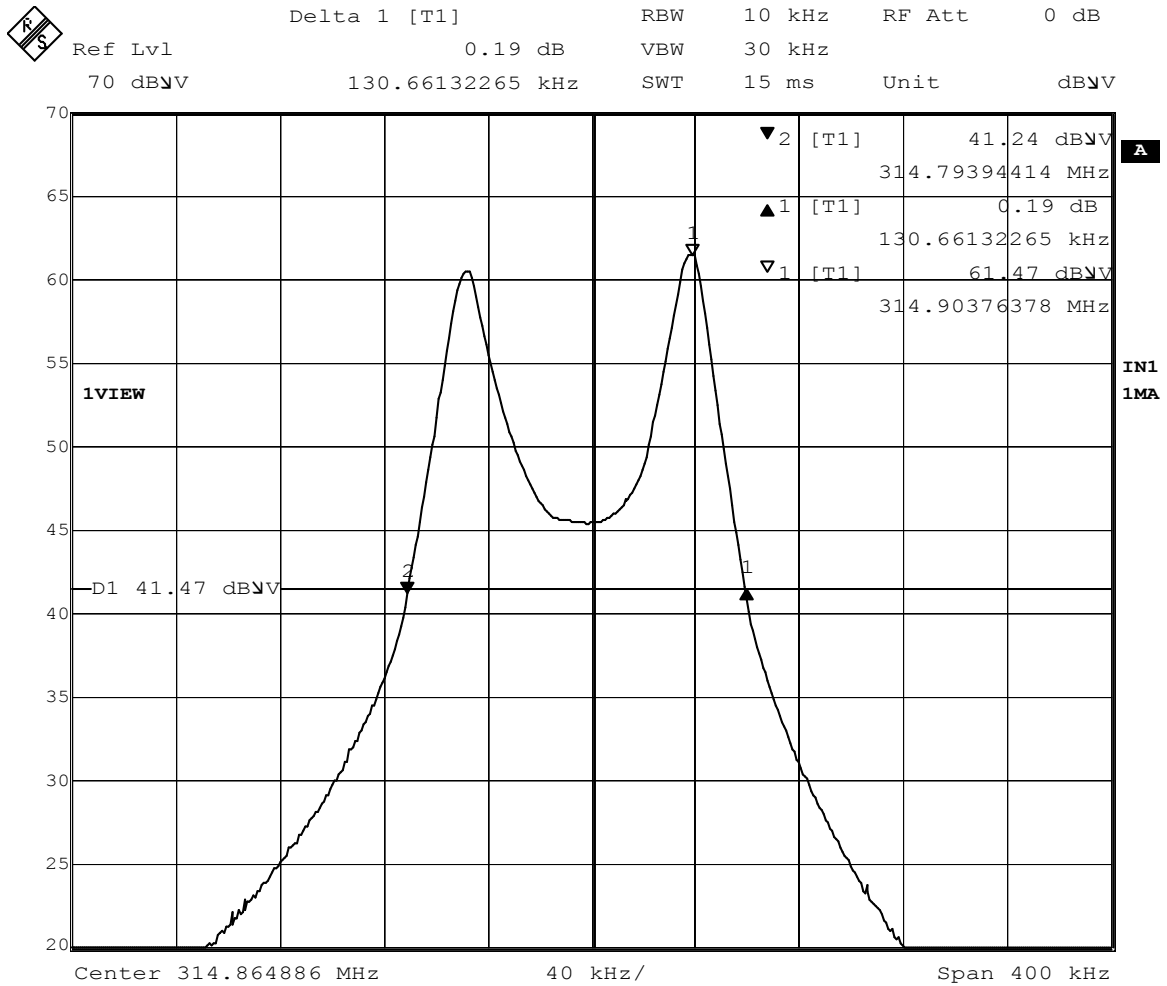
**-20dB Bandwidth: FCC 15.231(c)**

COMPANY : Alps Electric Co., Ltd.  
 EQUIPMENT : Passive Entry System(Hand Unit)  
 MODEL NUMBER: TWB1J482  
 SERIAL NUMBER: No.2  
 POWER : DC3V

UL Japan, Inc. Yamakita No.1 Anechoic Chamber  
 REPORT NO : 28FE0108-YK-01-A  
 REGULATION : Fcc Part15SubpartC 231(c)  
 DATE : 2008/02/14  
 TEMP./HUMI : 24°C/41%  
 TEST MODE : Transmitting (314.89MHz)  
 ENGINEER : Tatsuya Arai

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

| -20dB Bandwidth | Bandwidth Limit | Result |
|-----------------|-----------------|--------|
| [kHz]           | [kHz]           |        |
| 130.661         | 787.125         | Pass   |



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# Occupied Bandwidth(99%)

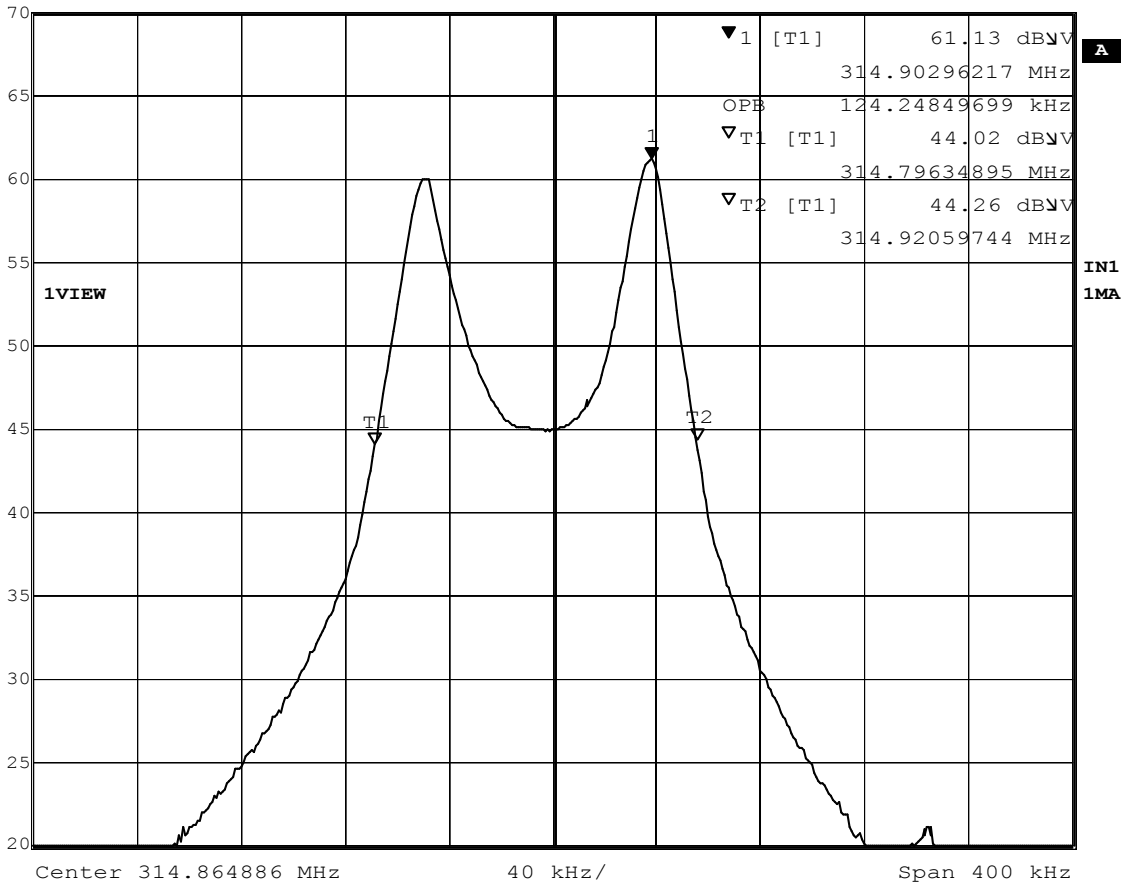
**COMPANY** : Alps Electrical Co., Ltd.  
**EQUIPMENT** : Passive Entry System(Hand Unit)  
**MODEL NUMBER**: TWB1J482  
**SERIAL NUMBER**: No.2  
**POWER** : DC3V

**UL Japan, Inc. Yamakita No.1 Anechoic Chamber**  
**REPORT NO** : 28FE0108-YK-01-A  
**DATE** : 2008/02/14  
**TEMP./HUMI** : 24°C/41%  
**TEST MODE** : Transmitting (314.85MHz)  
**ENGINEER** : Tatsuaya Arai

|                        |
|------------------------|
| 99% Occupied Bandwidth |
| [kHz]                  |
| 124.2kHz               |



|         |                  |     |        |        |      |
|---------|------------------|-----|--------|--------|------|
|         | Marker 1 [T1]    | RBW | 10 kHz | RF Att | 0 dB |
| Ref Lvl | 61.13 dBμV       | VBW | 30 kHz |        |      |
| 70 dBμV | 314.90296217 MHz | SWT | 15 ms  | Unit   | dBμV |



Date: 14.FEB.2008 17:44:23

**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 Japan              | RE(Ver.1.5)            | RE        | -                                  |
| KAEC-01(NSA)            | Anechoic Chamber              | JSE                   | Semi 3m                | RE        | 2007/08/26 * 12                    |
| KAF-05                  | Pre Amplifier                 | Agilent               | 8447D                  | RE        | 2007/04/13 * 12                    |
| KAT6-01                 | Attenuator                    | INMET                 | 18N-6dB                | RE        | 2007/03/28 * 12                    |
| KBA-03                  | Biconical Antenna             | Schwarzbeck           | BBA9106                | RE        | 2007/12/27 * 12                    |
| KCC-30/31/32 /34/KRM-03 | Coaxial Cable/RF Relay Matrix | Fujikura/Suhner/TSJ   | 5D-2W/S04272B/RFM-E421 | RE        | 2007/11/01 * 12                    |
| KLA-03                  | Logperiodic Antenna           | Schwarzbeck           | USLP9143               | RE        | 2007/12/27 * 12                    |
| KSA-04                  | Spectrum Analyzer             | Advantest             | R3271A                 | RE        | 2007/09/25 * 12                    |
| KOS-02                  | Humidity Indicator            | Custom                | CTH-190                | All       | 2006/07/10 * 24                    |
| KJM-01                  | Measure                       | TAJIMA                | GL19-55                | RE        | -                                  |
| KTR-04                  | Test Receiver                 | Rohde & Schwarz       | ESVS10                 | RE        | 2007/10/30 * 12                    |
| KAF-02                  | Pre Amplifier                 | Hewlett Packard       | 8449B                  | RE        | 2007/04/24 * 12                    |
| KCC-D3/D7               | Coaxial Cable                 | Rosenberger/Advantest | 2201/JUN-08-01-061     | RE        | 2007/04/11 * 12                    |
| KHA-01                  | Horn Antenna                  | A.H.Systems           | SAS-200/571            | RE        | 2007/08/14 * 12                    |
| KSCA-01                 | Search coil                   | TSJ                   | SC01                   | AD/BW     | Pre Check                          |
| KTR-01                  | Test Receiver                 | Rohde & Schwarz       | ESI40                  | AD/BW     | 2007/04/12 * 12                    |
| KCC-A7                  | Coaxial Cable                 | Fujikura              | 5D-2W                  | AD/BW     | 2007/11/01 * 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