



EMI TEST REPORT

Test Report No. : 24CE0189-HO-1

Applicant : ALPS ELECTRIC CO.,LTD.
Type of Equipment : Passive Entry System's Hand unit
Model No. : TFWB1U617
Test standard : FCC Part 15 Subpart C Section 15.209, Section 15.231
(December 8, 2003)
FCC ID : CWTWB1U617
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.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : December 22, 2003

Tested by : 
Kenichi Adachi
EMC Service

Approved by : 
Hironobu Shimoji
Group Leader of EMC Service

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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MF060b(10.04.03)

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SECTION 1: Client information

Company Name : ALPS ELECTRIC CO., LTD. AUTOMOTIVE PRODUCTS DIVISION
Address : 6-3-36 NAKAZATO FURUKAWA-CITY MIYAGI-PREF. 989-6181 JAPAN
Telephone Number : +81-229-23-5111
Facsimile Number : +81-229-23-3755
Contact Person : Toru Hayasaka

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

2.1 Identification of E.U.T.

Type of Equipment : Passive Entry System's Hand unit
Model No. : TFWB1U617
Serial No. : 1
Country of Manufacture : Japan
Receipt Date of Sample : December 1, 2003
Condition of EUT : Production model

2.2 Product Description

ALPS ELECTRIC CO.,LTD., Model No: TFWB1U617 is the Passive Entry System's Hand unit.
The hand unit of passive entry system is a transmitter of 315MHz and a receiver of 125kHz (only inductive, not intended).

Equipment Type : Transmitter
Frequency operation : 315MHz
Type of modulation : FSK modulation
Power Supply : DC 3V (Battery)
Temperature of operation : -20 deg. C. -+60 deg. C.

FCC 15.31 (e)

This EUT provides stable voltage(DC3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

Type of Equipment and its antenna comply with this requirement since they are built in host device Model No.TFWB1U617

When they are put up for sale and they are used with a particular antenna connector for this EUT.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C (December 8, 2003)
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.231 Periodic operation in the band 40.6640.70MHz
and above 70MHz

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	Automatically Deactivate	ANSI C63.4:2001	Section 15.231(a)(1)	N/A	-	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2001	Section 15.231(b)	N/A	14.7dB 314.97MHz Horizontal	Complied
3	Electric Field Strength of Spurious Emission	ANSI C63.4:2001	Section 15.205 Section 15.209 Section 15.231(b)	N/A	8.2dB 944.89MHz Horizontal	Complied
4	-20dB Bandwidth	ANSI C63.4:2001	Section 15.231(c)	N/A	-	Complied

Note: UL Apex's EMI Work procedures No. QPM05

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Additions to standards

No addition, deviation or exclusion has been made from standards.

3.4 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications
FCC Part 15 Subpart C Section 15.209, Section 15.231.

3.5 Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.5 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 5.2 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn Antenna is ± 6.6 dB.
The data listed in this test report has enough margin.

3.6 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. No.2 semi anechoic chamber.

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No.2 semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002. (Registration number: No.2:846015 Industry Canada: No.2: IC4247-2)

*NVLAP Lab. code: 200572-0

3.7 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

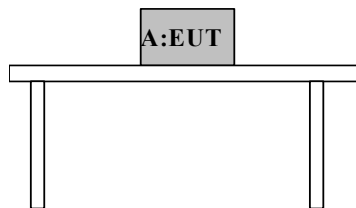
4.1 Operating Modes

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The sequence is used : Continuous transmitting 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	FCC ID
A	Passive Entry System's Hand unit (Transmitter)	TFWB1U617	1	ALPS ELECTRIC CO.,LTD.	CWTWB1U617

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SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

The test was carried out in No.2 semi anechoic chamber (7.5x5.8x5.2m).

Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, 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 : Tabletop
EUT operation mode : Transmitting

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on No.2 semi anechoic chamber with a ground plane and at a distance of 3m.

Measurements were performed with a QP, Peak, and Average detector.

The measuring antenna height was varied between 1 to 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	Peak/Average
IF Bandwidth	120kHz	1MHz

- 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.

5.5 Results

Summary of the test results: Pass

Date: December 22, 2003

Tested by: Kenichi Adachi

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APPENDIX 1: Photographs of test setup

Radiated emission(Worst case position)

Front



Rear



Worst Case Position (Horizontal : X-axis/ Vertical: Z-axis)

X-axis



Y-axis



Z-axis



APPENDIX 2:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE (1,2,3,4,5,6)	2003/04/11 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE (5,6)	2003/01/31 * 12
MRENT-06	Spectrum Analyzer	Advantest	R3273	RE (1,2,3,4,5,6)	2003/10/31 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE (1,2,3,4,5,6)	2003/05/08 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE (1,2,3,4,5,6)	2003/04/17 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE (1,2,3,4,5,6)	2003/12/16 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE (1,2,3,4,5,6)	2003/04/28 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE (1,2,3,4,5,6)	2003/04/28 * 12
MCC-25	Microwave Cable	Suhner	SUCOFLEX104	RE (6)	2003/06/30 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE (6)	2003/02/08 * 12
MCC-24	Microwave Cable	Storm	-	RE (6)	2003/04/30 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE (6)	2003/01/11 * 12

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

Test Item

RE: Radiated emission

- 1: Automatically Deactivate**
- 2: 20dB Bandwidth**
- 3: Automatically Deactivate**
- 4: 99% Occupied Bandwidth**
- 5: Fundamental Emission**
- 6: Spurious Emission**

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APPENDIX 3: Data of EMI test

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

DATA OF RADIATED EMISSIONS

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : ALPS ELECTRIC CO.,LTD.
EQUIPMENT : Passive Entry System
MODEL : TFWB1U617
S/N : 1
FCC ID :
IC No. :
POWER : DC3.0V
Mode : Continuous Transmitting
Axis : Hor.: X-axis , Ver.: Z-axis

REPORT NO : 24CE0189-HO
REGULATION : Fcc Part15 Subpart C 231(b) / 205
TEST DISTANCE : 3m
DATE : 12/22/2003
TEMPERATURE : 26℃
HUMIDITY : 35%
ENGINEER : Kenichi Adachi

No.	FREQ [MHz]	T/R READING		ANT Factor [dB]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN		
		HOR	VER					HOR	VER		HOR	VER	
1	314.97	61.2	56.9	14.8	23.2	8.5	0.0	61.3	57.0	75.6	14.3	18.6	PK
1	314.97	60.8	56.5	14.8	23.2	8.5	0.0	60.9	56.6	75.6	14.7	19.0	QP
1	314.97	57.7	53.2	14.8	23.2	8.5	0.0	57.8	53.3	75.6	17.8	22.3	AV

(below 1GHz)

No.	FREQ [MHz]	T/R READING : QP		ANT Factor [dB]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN		
		HOR	VER					HOR	VER		HOR	VER	
2	629.93	31.8	31.1	19.9	23.2	9.7	0.0	38.2	37.5	55.6	17.4	18.1	
3	944.89	37.1	33.9	22.4	22.9	10.8	0.0	47.4	44.2	55.6	8.2	11.4	

(above 1GHz)

PK DETECT (RBW: 1MHz, VBW: 1MHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN		
		HOR	VER					HOR	VER		HOR	VER	
4	1259.86	52.9	52.4	22.9	37.6	3.5	0.0	41.7	41.2	75.6	33.9	34.4	
5	1574.85	48.2	45.8	25.1	37.2	4.0	0.0	40.1	37.7	74.0	33.9	36.3	
6	1889.82	46.2	46.5	29.0	37.0	4.3	0.0	42.5	42.8	75.6	33.2	32.8	
7	2204.79	45.7	45.6	30.4	36.9	4.7	0.0	43.9	43.8	74.0	30.1	30.2	
8	2519.76	45.8	45.8	30.7	36.9	4.9	0.0	44.5	44.5	75.6	31.1	31.1	
9	2834.73	45.7	45.8	31.9	37.1	5.3	0.0	45.8	45.9	74.0	28.2	28.1	
10	3149.70	45.3	45.7	31.8	37.1	5.6	0.0	45.6	46.0	75.6	30.0	29.6	

AV DETECT (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN		
		HOR	VER					HOR	VER		HOR	VER	
4	1259.86	44.4	43.9	22.9	37.6	3.5	0.0	33.2	32.7	55.6	22.4	22.9	
5	1574.85	35.4	34.3	25.1	37.2	4.0	0.0	27.3	26.2	54.0	26.7	27.8	
6	1889.82	32.9	33.0	29.0	37.0	4.3	0.0	29.1	29.2	55.6	26.5	26.4	
7	2204.79	32.9	33.0	30.4	36.9	4.7	0.0	31.1	31.2	54.0	22.9	22.8	
8	2519.76	33.4	33.3	30.7	36.9	4.9	0.0	32.1	32.0	55.6	23.6	23.6	
9	2834.73	33.3	33.1	31.9	37.1	5.3	0.0	33.4	33.2	54.0	20.6	20.8	
10	3149.70	33.0	32.8	31.8	37.1	5.6	0.0	33.3	33.1	55.6	22.3	22.5	

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

*Except for the above table : All other spurious emissions were less than 20dB for the limit.

*EUT was placed in X axis when the measurement antenna was positioned horizontally.

*EUT was placed in Z axis when the measurement antenna was positioned vertically.

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 level. With the position, the noise levels of all the frequencies was measured.

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-20dB Bandwidth

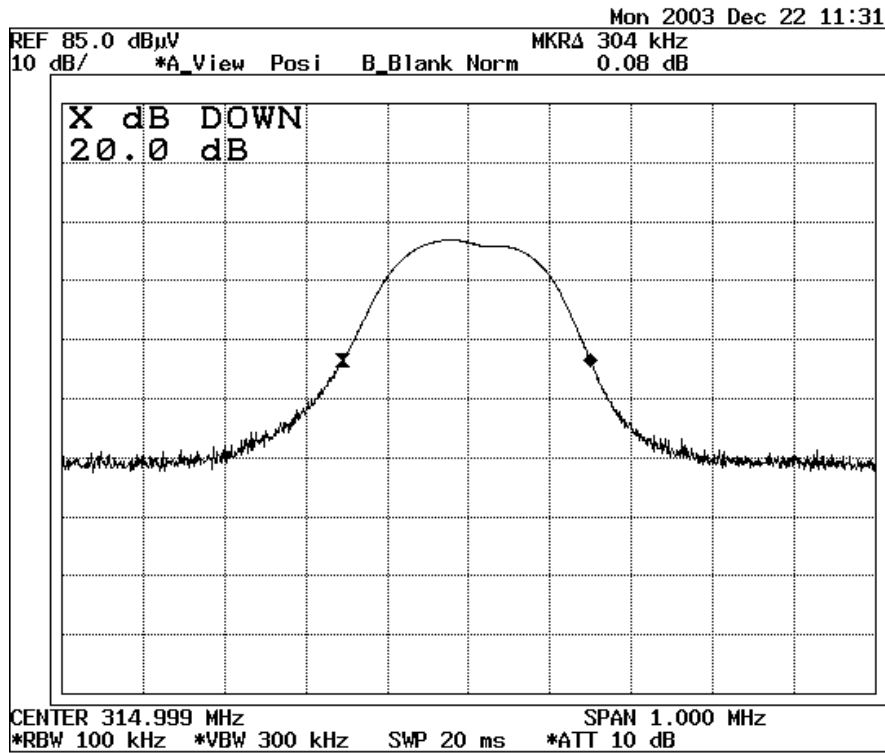
UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : ALPS ELECTRIC CO.,LTD.
EQUIPMENT : Passive Entry System's Hand unit
MODEL : TFWB1U617
S/N : 1
FCC ID : CWTWB1U617
IC No. : 1788A-WB1U617
POWER : DC3.0V
Mode : Transmitting

REPORT NO : 24CE0189-HO
REGULATION : FCC Part15 Subpart C 231(c)
TEST DISTANCE : 3m
DATE : 12/22/2003
TEMPERATURE : 26 deg.C.
HUMIDITY : 35%
ENGINEER : Kenichi Adachi

Bandwidth Limit : Fundamental Frequency 314.97MHz X 0.25% = 787.425 kHz

-20dB Bandwidth	Bandwidth Limit	Result
[kHz]	[kHz]	
304.00	787.43	Pass



Automatically deactivate

DATA OF AUTOMATICALLY DEACTIVATE

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY	: ALPS ELECTRIC CO.,LTD.	REPORT NO	: 24CE0189-HO
EQUIPMENT	: Passive Entry System's Hand unit	REGULATION	: FCC Part15 Subpart C 231(a)
MODEL	: TFWB1U617	TEST DISTANCE	: 3m
S/N	: 1	DATE	: 12/22/2003
FCC ID	: CWTWB1U617	TEMPERATURE	: 26 deg.C.
IC No.	: 1788A-WB1U617	HUMIDITY	: 35%
POWER	: DC3.0V	ENGINEER	: Kenichi Adachi
Mode	: Transmitting		

Time of Transmitting [sec]	Limit [sec]	Result
0.52	5.00	Pass

