EMI TEST REPORT

Test Report No. : 23FE0038-HO-1

Applicant	:	**TOHOKU ALPS CO., LTD.**
Type of Equipment	:	**Keyless Entry System (Transmitter)**
Model No.	:	**88036AG000**
Test standard	:	**FCC Part 15 Subpart C Section 15.209, Section 15.231**
FCC ID	:	**NHVWB1U711**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International 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 : February 4, 2003

Tested by :
Hiroka Umeyama
EMC Head Office Division

Approved by :
Hironobu Shimoji
Group Leader of EMC Head Office Division

A-Pex International Co., Ltd. EMC Head Office Division.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8116 Facsimile: +81 596 24 8124

CONTENTS

PAGE

SECTION 1: Client information

Company name	:	TOHOKU ALPS CO., LTD.
Brand name	:	ALPS
Address	:	6-3-36, NAKAZATO, FURUKAWA-CITY, MIYAGI-PREF., JAPAN
Telephone Number	:	+81-229-23-5111
Facsimile Number	:	+81-229-22-3755
Contact Person	:	Akira Miyazawa

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

2.1 Identification of E.U.T.

Type of Equipment	:	Keyless Entry System (Transmitter)
Model No.	:	88036AG000
Serial No.	:	1
Rating	:	DC 3V
Country of Manufacture	:	Mexico
Receipt Date of Sample	:	January 31, 2003
Condition of EUT	:	Production prototype

2.2 Product Description

TOHOKU ALPS CO., LTD. Model: 88036AG000 (referred to as the EUT in this report) is the Keyless Entry System (Transmitter).

Frequency Operation	: 433.92MHz
Frequency band	: from 433.82 MHz to 434.02 MHz
Type of Modulation	: Amplitude Modulation
Antenna Type	: Inner Antenna
Operating Temperature Range	: -20 degree C. to 70 degree C.
Emission Designation	: A1D

SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
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	11.6dB 433.935MHz Vertical	Complied
3	Electric Field Strength of Spurious Emission	ANSI C63.4:2001	Section 15.205 Section 15.209 Section 15.231(b)	N/A	6.7dB 4339.200MHz Horizontal	Complied
4	-20dB Bandwidth	ANSI C63.4:2001	Section 15.231(c)	N/A	-	Complied

3.3 Additions to standards

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

3.4 Confirmation

A-Pex International Co., Ltd. hereby confirms that E.U.T. , in the configuration tested, complies with the specifications FCC Part15 Subpart C Section 15.231.

3.5 Uncertainty

Radiated Emission Test
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn Antenna is ±6.6dB.
□The data listed in this test report may exceed the test limit because it does not have enough margin.
■The data listed in this test report has enough margin.

3.6 Test Location

A-Pex International Co., Ltd. EMC Head Office Division, No. 2 semi anechoic chamber, 7.5 x 5.8 x 5.2 m
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: + 81 596 24 8116 Facsimile : +81 596 24 8124
This site has been fully described in a report submitted to FCC office, and listed on June 05, 2002
(Registration number: 846015)
Industry Canada: IC4247-2
*NVLAP Lab. Code:200572-0

3.7 Test setup, Data of EMI and Test instruments

Refer to Appendix 1 to 3.

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

4.1 Operating Modes

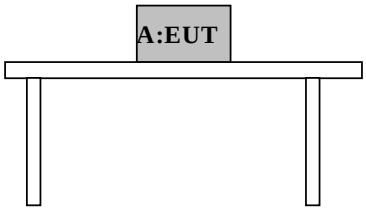
The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.
The operating mode/system was as follows:

Operation mode : Transmitting

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

4.2 Configuration and peripherals

Front View



***** Test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Keyless Entry System (Transmitter)	88036AG000	1	TOHOKU ALPS CO., LTD.	NHVWB1U711

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

The test was carried out in No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m.

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-4500MHz
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 Peak 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 1GHz	Above 1GHz
Detector Type	Peak	Peak
IF Bandwidth	120kHz	1MHz

-The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise level was recorded.

5.5 Results

Summary of the test results: Pass

Date: February 4, 2003 Tested by: Hiroka Umeyama

APPENDIX 1: Photographs of test setup

APPENDIX 2: Test instruments

APPENDIX 3: Data of EMI test

APPENDIX 1: Photographs of test setup

Radiated emission(Worst case position)

Test Report No :23FE0038-HO- 1

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2002/11/01 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2002/04/12 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2002/12/24 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2002/05/02 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2002/05/09 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2002/05/02 * 12
MOS-02	Digital Humidity Indicator	N.T	NT-1800	RE	2002/12/10 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2002/03/13 * 12
MSA-02	Spectrum Analyzer	Advantest	R3265A	RE	2002/09/20 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2003/01/31 * 12
MCC-04	Microwave Cable	Storm	421-011	RE	2003/01/14 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2003/01/11 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2003/02/08 * 12
MCC-06	Microwave Cable	Storm	421-011	RE	2003/01/14 * 12
MSA-01	Spectrum Analyzer	Advantest	R3131A	RE	2002/06/17 * 12

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

Test Item:

RE: Radiated emission,

Data of Radiated Emission

A-PEX INTERNATIONAL CO., LTD.
EMC HEAD OFFICE DIVISON No.2 SEMI ANECHOIC CHAMBER

Company	: TOHOKU ALPS CO., LTD.	Report No.	: 23FE0038-HO - 1
Equipment	: Keyless Entry System(Transmitter)	Regulation	: FCC Part15C Section 15.231
Model	: 88036AG000(Transmitter)	Test Distance	: 3m
Sample No.	: 1	Date	: 2003/02/04
Power	: DC 3.0V	Temperature	: 23deg.C
Mode	: Transmitter Mode (433.92MHz)	Humidity	: 30%
EUT Position	: Worse case		
FCC ID	: NHVWB1U711		
IC No.	: 3495A-WB1U711		

ENGINEER : Hiroka Umeyama

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

No.	FREQ	READING		ANT	AMP	CABLE	ATTEN	Duty	RESULT		LIMIT	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		Factor	HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
1	433.935	68.2	70.0	17.7	27.2	2.5	6.2	0.0	67.4	69.2	80.8	13.4	11.6
2	867.870	46.6	49.7	22.5	27.1	3.8	6.1	0.0	51.8	54.9	60.8	9.0	5.9
3	1301.810	51.6	52.4	23.6	37.2	4.8	0.0	0.0	42.7	43.5	54.0	11.3	10.5
4	1735.680	47.0	48.8	27.4	36.9	5.5	0.0	0.0	43.0	44.7	60.8	17.8	16.1
5	2169.600	45.4	45.8	30.7	36.8	6.1	0.0	0.0	45.4	45.8	60.8	15.4	15.0
6	2603.520	44.9	44.9	31.1	36.7	6.5	0.0	0.0	45.8	45.8	60.8	15.0	15.0
7	3037.440	44.9	44.4	32.5	36.8	7.0	0.0	0.0	47.5	47.1	60.8	13.3	13.7
8	3471.360	44.3	44.2	31.3	36.7	7.4	0.0	0.0	46.3	46.2	60.8	14.5	14.6
9	3905.280	42.7	42.6	33.1	36.4	7.9	0.0	0.0	47.2	47.1	54.0	6.8	6.9
10	4339.200	41.9	41.8	33.4	36.3	8.3	0.0	0.0	47.3	47.2	54.0	6.7	6.8

REMARKS
ANTENNA TYPE: 30-300MHz Biconical / 300-1000MHz Logperiodic / 1-5GHz DRG Horn
CALCULATION(30MHz to 1000MHz) : READING + ANT Factor - AMP Gain + ATTEN + Cable Loss + Duty Factor
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

-20dB BW / Automatically deactivate

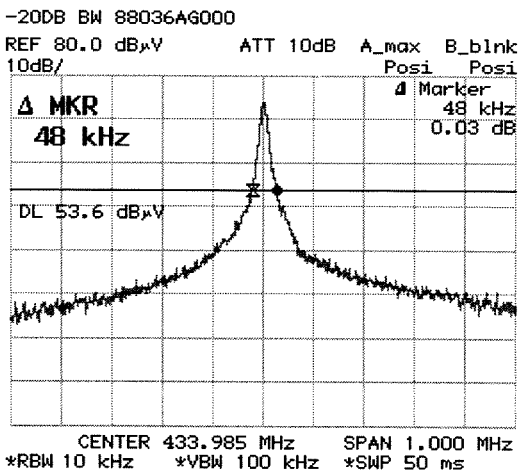
A-PEX INTERNATIONAL CO., LTD.
EMC HEAD OFFICE DIVISON No.2 SEMI ANECHOIC CHAMBER

Company	: TOHOKU ALPS CO., LTD.
Equipment	: Keyless Entry System(Transmitter)
Model	: 88036AG000(Transmitter)
Sample No.	: 1
Power	: DC 3.0V
Mode	: Transmitter Mode (433.92MHz)
EUT Position	: -
FCC ID	: NHVWB1U711
IC No.	: 3495A-WB1U711

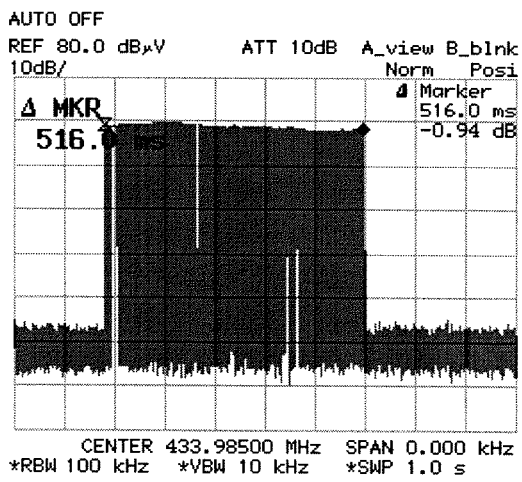
Report No.	: 23FE0038-HO-1
Regulation	: FCC Part15C Section 15.231
Test Distance	: 3m
Date	: 2003/02/04
Temperature	: 23deg.C
Humidity	: 30%

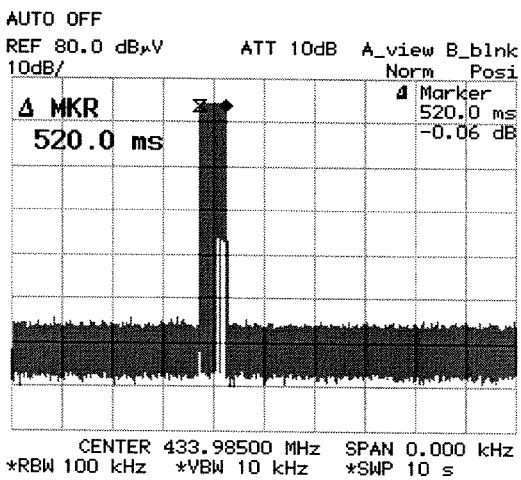
ENGINEER : Hiroka Umeyama

-20 dBBandwidth (15.231(c))



Automatically deactivate (15.231(a)(1))





* Bandwidth Limit: Fundamental Frequency 433.92MHz × 0.25% = 1084.8kHz
* Automatically deactivate Limit: A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.