



RADIO TEST REPORT

Test Report No. : 26BE0240-HO-1a

Applicant : Alps Electric Co.,Ltd.
Type of Equipment : Passive Entry System (Hand Unit)
Model No. : TWB1U735
Test standard : FCC Part 15 Subpart C Section 15.231:2006
FCC ID : CWTWBU735
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.

Date of test : February 8, 2006

Tested by : 
Makoto Kosaka
EMC Services

Approved by : 
Tetsuo Maeno
Site manager of EMC Services

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SECTION 1: Client information

Company Name : Alps Electric Co., Ltd.
Brand or Trade Name : NISSAN
Address : 6-3-36 Nakazato, Furukawa-city, Miyagi-pref., 989-6181 Japan
Telephone Number : +81-229-23-5111
Facsimile Number : +81-229-22-3755
Contact Person : Tomosuke Takata

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

2.1 Identification of E.U.T.

Type of Equipment : Passive Entry System (Hand Unit)
Model No. : TWB1U735
Serial No. : 20060131-1
Country of Manufacture : Japan
Receipt Date of Sample : February 1, 2006
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

TWB1U735 is Passive Entry System (Hand Unit).

Operating voltage : DC3.0V(CR2025)
Temperature of operation : -10 to +60deg.C.

Tx section

Frequency Characteristics : 315MHz
Frequency band : Lower limit: 314.95MHz
Upper limit: 315.05MHz
Type of Modulation : FSK
Information antenna : Internal /PCB Pattern Antenna (Loop)
Method of frequency generation : SAW Resonator

Rx section

Receiving Frequency : 125kHz
Information antenna : 3-axis Internal / (Loop coil and bar antenna)

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C : 2006
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.231 Periodic operation in the band 40.66 - 40.70MHz
and above 70MHz

FCC 15.31 (e)

This test was performed with the New Battery (DC 3.0V) and the constant voltage was supplied to this EUT during the tests. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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 antenna requirement of Section 15.203.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	Automatically Deactivate	ANSI C63.4:2003	Section 15.231(a)(1)	N/A	-	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003	Section 15.231(b)	N/A	4.3dB 315.037MHz Horizontal, QP	Complied
3	Electric Field Strength of Spurious Emission	ANSI C63.4:2003	Section 15.205 Section 15.209 Section 15.231(b) *1)	N/A	6.3dB 629.917MHz Horizontal, QP	Complied
4	-20dB Bandwidth	ANSI C63.4:2003	Section 15.231(c)	N/A	-	Complied

Note: UL Apex's EMI Work procedures No. QPM05 and QPM15.

*1) The limit for the Harmonics was applied with Section 15.209 which has the lower limit.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.4.1	A1.1.3	Radiated	N/A	N/A	N/A

3.4 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 report meets the limits unless the uncertainty is taken into consideration.

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3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
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	FCC Registration Number	IC Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	846015	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

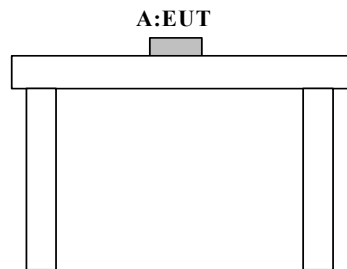
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : 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	Remarks
A	Passive Entry System (Hand Unit)	TWB1U735	20060131-1	Alps Electric Co., Ltd.	CWTWBU735 (EUT)

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SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

Test place : No.1 semi anechoic chamber
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 0.5m by 1.0m, 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 : Top of Polyurethane
EUT operation mode : Transmitting

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi anechoic chamber 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.
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	PK and AV
IF Bandwidth	120kHz	PK: S/A:RBW 1MHz, VBW:1MHz AV: S/A:RBW 1MHz, VBW:10Hz

- 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: February 8, 2006 Tested by: Makoto Kosaka

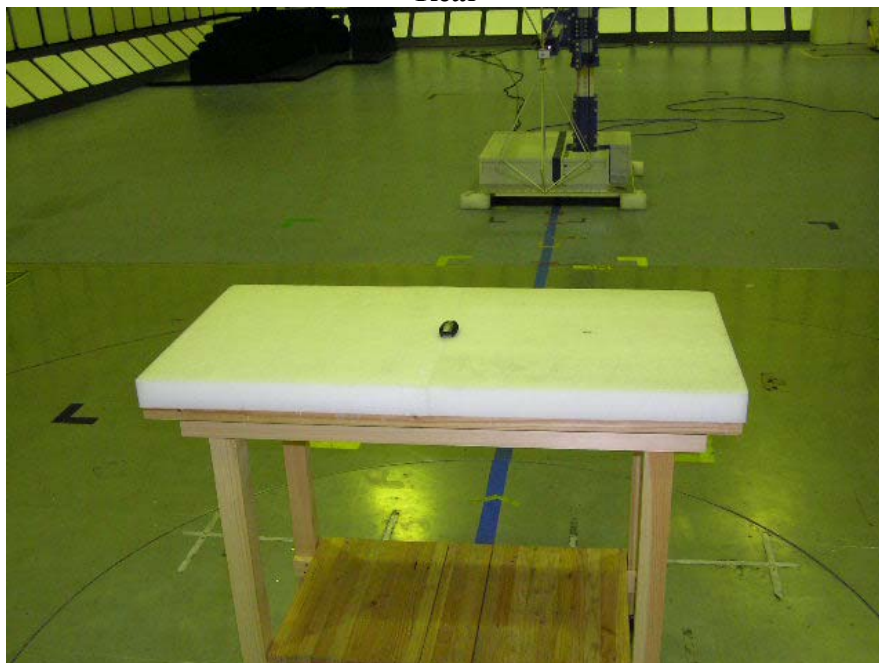
APPENDIX 1: Photographs of test setup

Radiated emission

Front

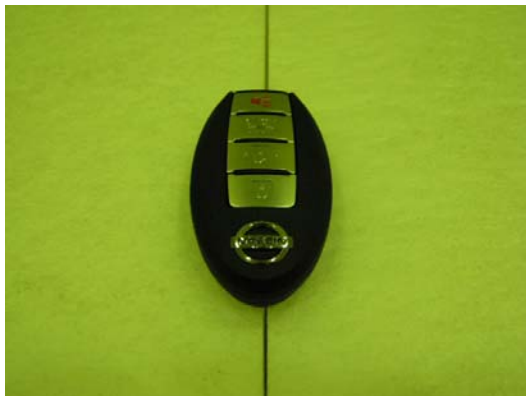


Rear

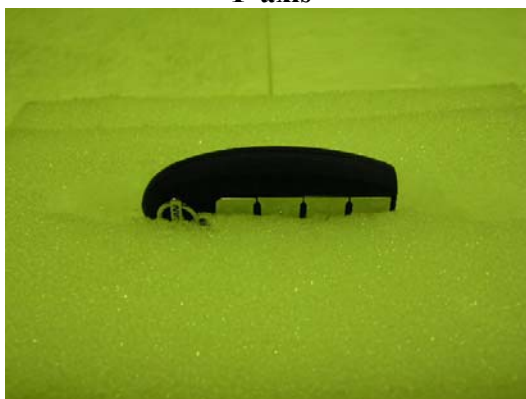


Worst case position (X-axis: Horizontal/ Z-axis: Vertical)

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-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2005/11/14 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2005/10/10 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/10/14 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2005/12/16 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2005/05/24 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/ Agilent/TSJ	-	RE	2005/12/18 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2006/01/09 * 12
MCC-18	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2006/02/02 * 12
MCC-25	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2005/08/30 * 12
MPA-10	Pre Amplifier	Agilent	8449B	RE	2005/09/07 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2005/11/10 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	RE	2004/11/25 * 24

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

Test Item:

RE: Radiated emission

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APPENDIX 3: Data of EMI test

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

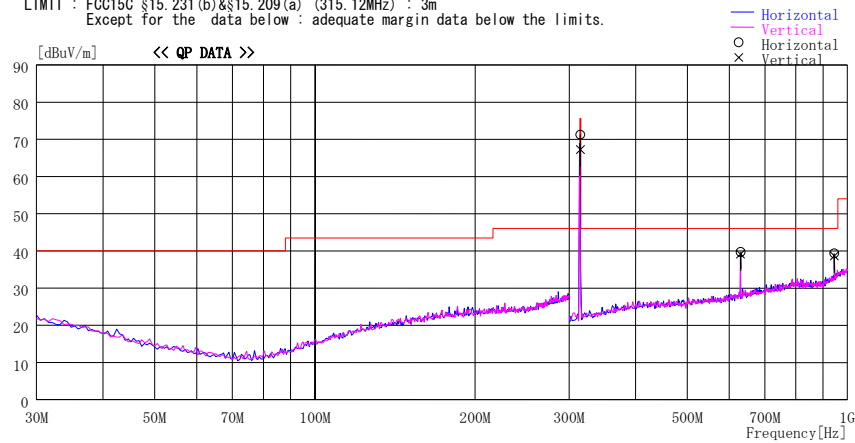
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company : Alps Electric Co., Ltd. Report No. : 26BE0240-HO
Kind of EUT : Passive Entry System (Hand Unit) Power : DC 3.0V (CR2025)
Model No. : TWB1U735 Temp./Humi. : 26deg. C. / 25%
Serial No. : 20060131-1 Operator : Makoto Kosaka

Mode / Remarks : Tx 315MHz worst position Hor X-axis Ver Z-axis

LIMIT : FCC15C §15.231(b)&§15.209(a) (315.12MHz) : 3m
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin
			Factor [dB/m]	Loss& Gain					[dBuV/m]	[dB]
315.037	73.6	QP	14.7	-17.0	71.3	130	100	Hori.	75.6	4.3
315.037	69.5	QP	14.7	-17.0	67.2	95	164	Vert.	75.6	8.4
629.917	36.8	QP	19.5	-16.6	39.7	270	138	Hori.	46.0	6.3
629.917	36.2	QP	19.5	-16.6	39.1	144	100	Vert.	46.0	6.9
944.888	31.9	QP	22.3	-14.8	39.4	73	100	Hori.	46.0	6.6
944.888	31.1	QP	22.3	-14.8	38.6	200	116	Vert.	46.0	7.4

CHART: WITH FACTOR ANT TYPE : 30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

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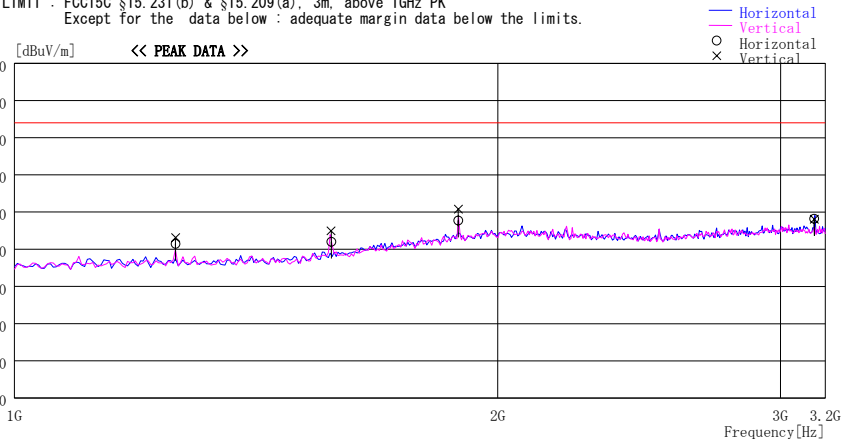
DATA OF RADIATED EMISSION TEST

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Company : Alps Electric Co., Ltd. Report No. : 26BE0240-HO
Kind of EUT : Passive Entry System (Hand Unit) Power : DC 3.0V (CR2025)
Model No. : TWB1U735 Temp./Humi. : 26deg. C. / 25%
Serial No. : 20060131-1 Operator : Makoto Kosaka

Mode / Remarks : Tx 315MHz worst position Hor X-axis Ver Z-axis

LIMIT : FCC15C §15.231(b) & §15.209(a), 3m, above 1GHz PK
Except for the data below : adequate margin data below the limits.



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		Factor	Gain	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
1260.000	48.1	PK	23.9	-30.5	41.5	0	100	Hori.	74.0	32.5
1260.000	49.7	PK	23.9	-30.5	43.1	0	100	Vert.	74.0	30.9
1574.889	46.3	PK	25.6	-29.9	42.0	0	100	Hori.	74.0	32.0
1574.889	49.3	PK	25.6	-29.9	45.0	0	100	Vert.	74.0	29.0
1889.889	47.0	PK	30.0	-29.2	47.8	0	100	Hori.	74.0	26.2
1889.889	49.9	PK	30.0	-29.2	50.7	0	100	Vert.	74.0	23.3
3149.790	44.9	PK	31.7	-28.4	48.2	0	100	Hori.	74.0	25.8
3149.790	44.8	PK	31.7	-28.4	48.1	0	100	Vert.	74.0	25.9

CHART:WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

-20dB Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : Alps Electric Co.,Ltd.

EQUIPMENT: Passive Entry System (Hand Unit)

MODEL : TWB1U735

S/N : 20060131-1

POWER : DC 3.0V(CR2025)

Mode : Tx 315MHz

REPORT NO : 26BE0240-HO

REGULATION : FCC Part15 Subpart C 231(c)

TEST DISTANCE : -

DATE : 02/08/2006

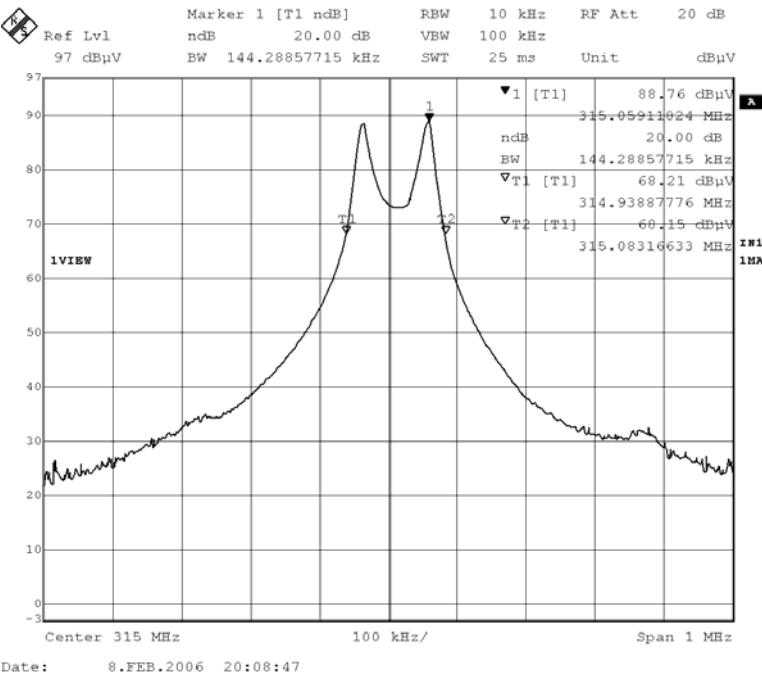
TEMPERATURE : 26 deg.C.

HUMIDITY : 25 %

ENGINEER : Makoto Kosaka

Bandwidth Limit : Fundamental Frequency 315 MHz X 0.25% = 787.5 kHz

-20dB Bandwidth	Bandwidth Limit	Result	Margin
[kHz]	[kHz]		[kHz]
144.29	787.50	Pass	643.21



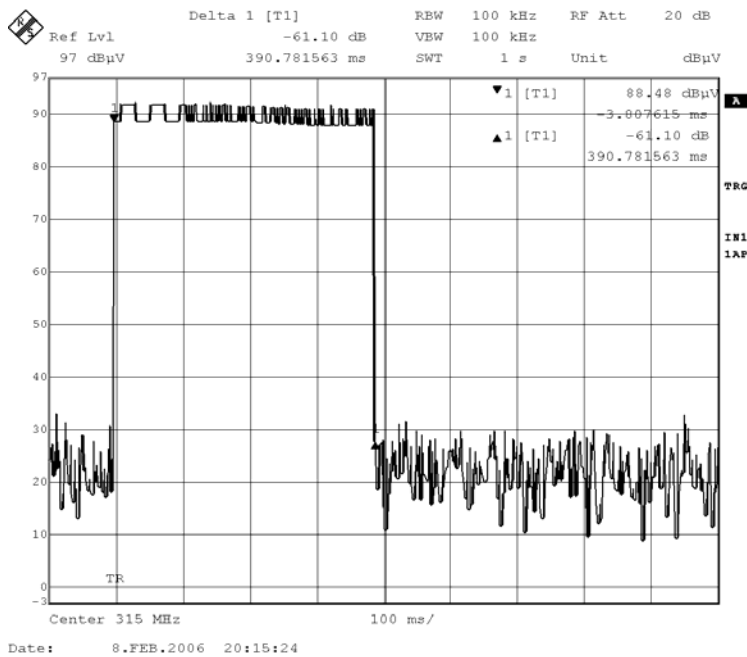
Automatically deactivate

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COMPANY : Alps Electric Co.,Ltd.
EQUIPMENT : Passive Entry System
MODEL : TWB1U735
S/N : 20060131-1
POWER : DC 3.0V(CR2025)
Mode : Tx 315MHz

REPORT NO : 26BE0240-HO
REGULATION : FCC Part15 Subpart C 231(a)
TEST DISTANCE : -
DATE : 02/08/2006
TEMPERATURE : 26 deg.C.
HUMIDITY : 25 %
ENGINEER : Makoto Kosaka

Time of Transmitting [sec]	Limit [sec]	Result	Margin [sec]
0.391	5.00	Pass	4.61



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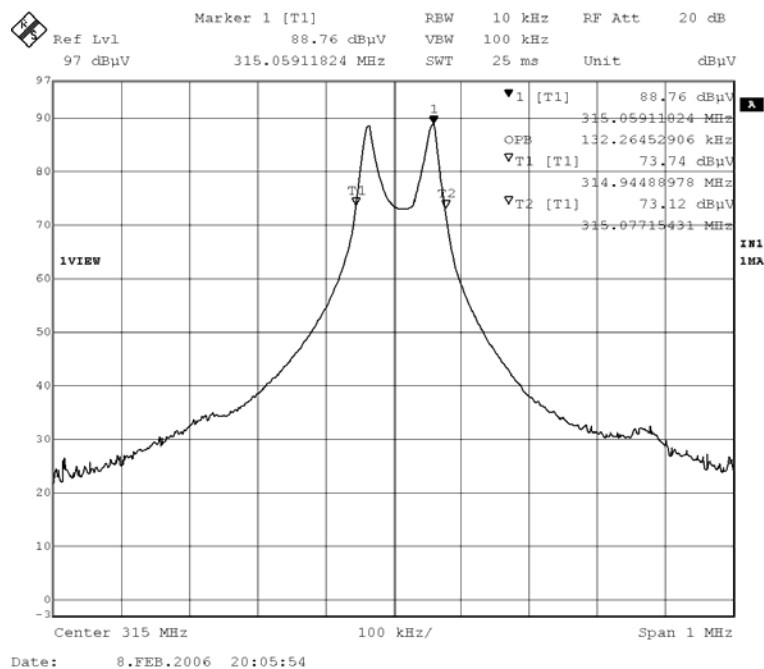
99% Occupied Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : Alps Electric Co.,Ltd.
EQUIPMENT : Passive Entry System (Hand Unit)
MODEL : TWB1U735
S/N : 20060131-1
POWER : DC 3.0V(CR2025)
Mode : Tx 315MHz

REPORT NO : 26BE0240-HO
REGULATION : RSS-210
TEST DISTANCE : -
DATE : 02/08/2006
TEMPERATURE : 26 deg.C.
HUMIDITY : 25 %
ENGINEER : Makoto Kosaka

99% Occupied Bandwidth (RSS-210)



* 99% Occupied Bandwidth : 132.26 kHz