



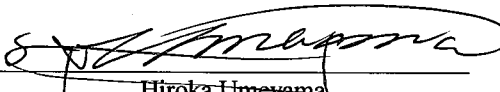
RADIO TEST REPORT

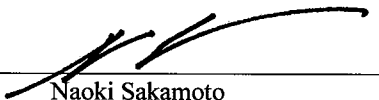
Test Report No. : 26BE0240-HO-3a

Applicant : Alps Electric Co., Ltd.
Type of Equipment : Passive Entry System (Control Unit)
Model No. : TWD1U630
Test standard : FCC Part 15 Subpart C Section 15.209: 2006
FCC ID : CWTWDU630
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 12, 2006

Tested by : 
Hiroka Umeyama
EMC Services

Approved by : 
Naoki Sakamoto
Group Leader of EMC Services

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SECTION 1: Client information

Company Name : Alps Electric Co., Ltd.
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 : Katsuhiro Seino

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

2.1 Identification of E.U.T.

Type of Equipment : Passive Entry System (Control Unit)
Model No. : TWD1U630
Serial No. : 967067
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

Model No: TWD1U630 is Passive Entry System (Control Unit).

Equipment type : Transmitter
Frequency of Operation : 125kHz
Modulation : Amplitude
Antenna : Bar antenna
Rating : DC 12.0V (Car battery)
Temperature of operation : -30 deg. C. -+80 deg. C.
Method of frequency generation : Crystal

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Head Office EMC Lab.

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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 15.209 Radiated emission limits, general requirements

FCC 15.31 (e)

The power supply of this EUT is transformed to DC 5.0V and provides stable voltage (DC 5.0V) constantly to Radio part. Therefore, this EUT complies with the requirement.

FCC15.203 Antenna requirement

It is impossible for users to replace the antenna, because the antenna is a set with EUT and installed outside of EUT inside the vehicle. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Worst margin	Result
1	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.209	Radiated	<PK> 27.7dB 124.99kHz, <AV> 29.6dB 124.99kHz,	Complied
2	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.205 FCC Section 15.209	Radiated	2.1dB 42.600MHz, QP Vertical	Complied
3	Conducted Emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC Section 15.207(a)	AC Mains only *1)	N/A	N/A

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

*1) This test is not applicable since the EUT does not have AC power port.

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

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3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	-26dB Bandwidth	ANSI C63.4:2003 Annex H.6 Occupied bandwidth measurements	Reference data	Radiated	N/A	N/A	N/A
2	99% Occupied Band Width	RSS-Gen 4.4.1	-	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 Loop antenna is $\pm 1.8\text{dB}$.
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is $\pm 4.5\text{dB}(3\text{m}) / 4.7\text{dB}(10\text{m})$.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is $\pm 5.2\text{dB}(3\text{m}) / 3.8\text{dB}(10\text{m})$.
The measurement uncertainty (with a 95% confidence level) for this test using Horn Antenna is $\pm 6.6\text{dB}$.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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.

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

4.1 Operating Modes

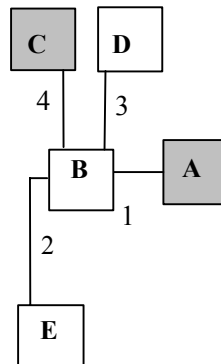
The sequence is used: Continuous Transmitting mode (125kHz)

[Remarks]

1. The EUT was set to have the maximum RF power supplied to Antenna.
2. 6 antennas can be connected to the EUT. Antenna type and radio specification of those antennas are identical, and they do not transmit simultaneously. Therefore, the test was performed with one antenna.
3. The length of the antenna cable and the power supplied to the antenna were set at the worst condition (actual usage) for testing.

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

4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support Equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Passive Entry System (Control Unit)	TWD1U630	967067	Alps Electric Co., Ltd.	CWTWDU630 (EUT)
B	Checker Box	-	-	Alps Electric Co., Ltd.	-
C	Bar Antenna	N/A	N/A	Alps Electric Co., Ltd.	EUT
D	Checker PWB	-	-	Alps Electric Co., Ltd.	-
E	Car Battery	40B19L	A030402	YUASA	-

List of cables used

No.	Name	Length (m)	Shield
1	Signal & DC Power Cable	1.0	N
2	DC Power Cable	0.6	N
3	Cable for Checker PWB	0.5	N
4	Antenna cable	2.0	N

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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

Test Procedure

The Radiated Electric Field Strength intensity has been measured at a distance of 10m and at a distance of 3m.

Frequency : From 9kHz to 30MHz at distance 10m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for each antenna angle 0deg. , 45deg. and 90deg.

Frequency : From 30MHz to 1GHz at distance 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 a QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

-The carrier level and noise levels were confirmed at each position of X, Y and Z axis of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

* Part 15 Section 15.31 (f)(2) (9kHz-30MHz)

9kHz – 490kHz [Limit at 10m]=[Limit at 300m]-40log (10[m]/300[m])

490kHz – 30MHz[Limit at 10m]=[Limit at 30m]-40log (10[m]/30[m])

5.2 Results

Summary of the test results: Pass

Date: February 12, 2006 Tested by: Hiroka Umeyama

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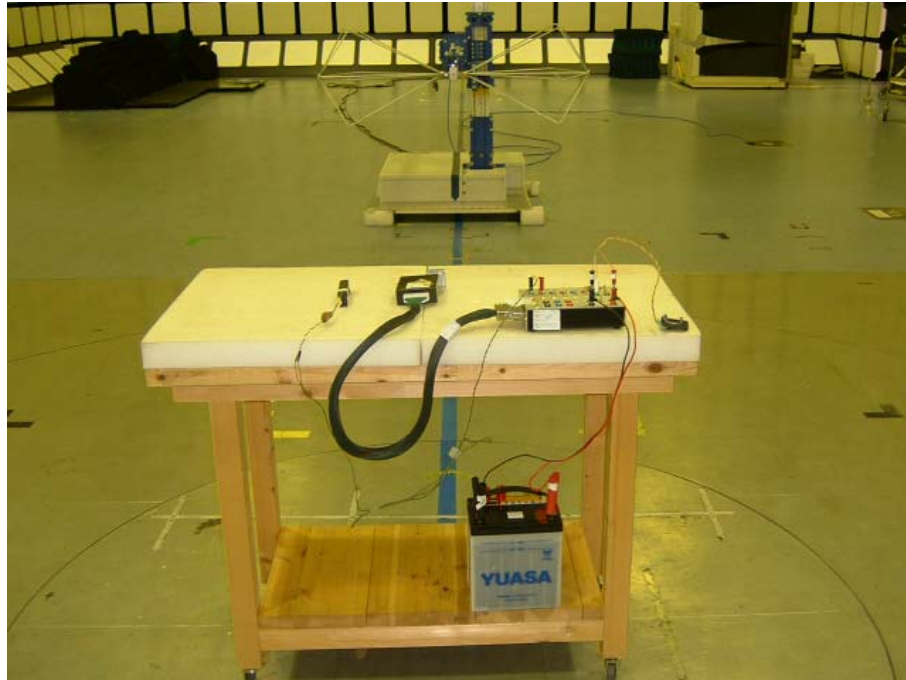
APPENDIX 1: Photographs of test setup

Radiated emission **(Transmitting)**

Front



Rear



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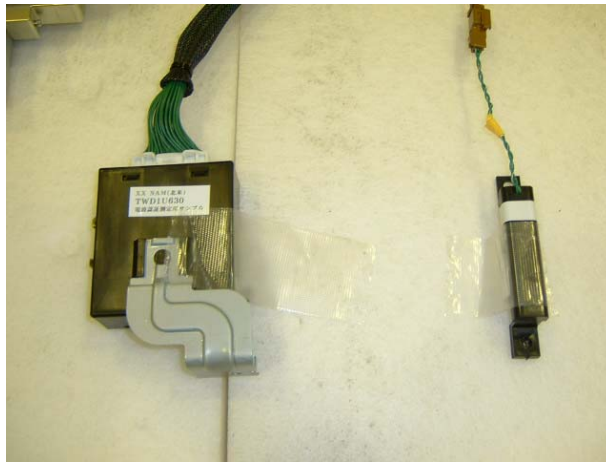
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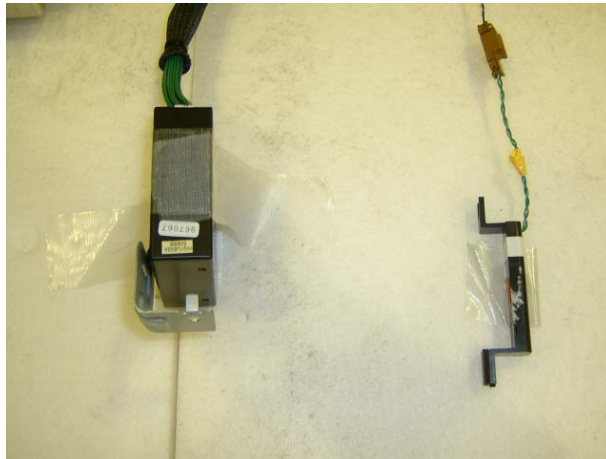
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Worst Case Position (Horizontal: X-axis/Vertical: X-axis)

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-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2005/11/14 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	RE	2004/11/25 * 24
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2005/10/10 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/10/14 * 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
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2005/12/16 * 12
MCC-31	coaxial cable	ULApex	-	RE	2005/06/02 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE	2005/12/06 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/ Agilent/TSJ	-	RE	2005/12/18 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2005/11/10 * 12

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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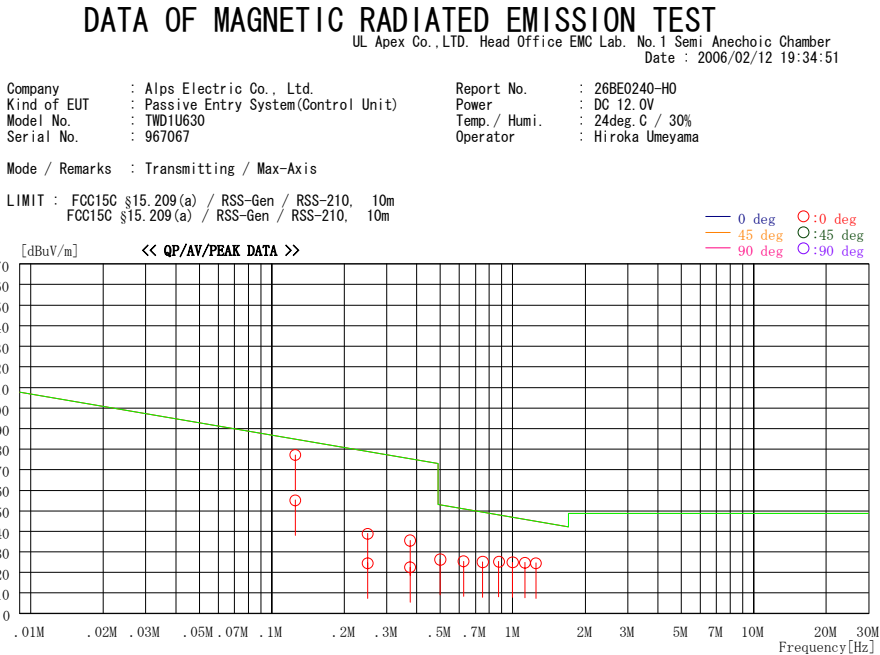
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APPENDIX 3: Data of EMI test

Radiated Emission (Transmitting)



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]
0.12499	77.8	PEAK	19.5	6.0	26.2	77.1	104.8	27.7
0.12499	55.9	AV	19.5	6.0	26.2	55.2	84.8	29.6
0.24990	40.5	PEAK	19.5	6.1	27.3	38.8	98.7	59.9
0.24990	26.3	AV	19.5	6.1	27.3	24.6	78.7	54.1
0.37497	37.5	PEAK	19.5	6.2	27.7	35.5	95.2	59.7
0.37497	24.5	AV	19.5	6.2	27.7	22.5	75.2	52.7
0.49990	28.3	QP	19.5	6.3	27.8	26.3	52.7	26.4
0.62495	27.7	QP	19.5	6.2	27.9	25.5	50.8	25.3
0.74990	27.3	QP	19.5	6.2	27.9	25.1	49.2	24.1
0.87493	27.3	QP	19.5	6.3	27.9	25.2	47.8	22.6
0.99990	27.1	QP	19.5	6.2	27.9	24.9	46.7	21.8
1.12490	26.9	QP	19.5	6.2	27.9	24.7	45.7	21.0
1.24990	26.5	QP	19.6	6.3	27.9	24.5	44.8	20.3

CHART : WITH FACTOR , ANT TYPE : LOOP , Except for the data below : adequate margin data below the limits.
CALCULATION : READING + ANT FACTOR + LOSS(CABLE + ATTEN.-AMP.)

Radiated Emission (Transmitting)

DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2006/02/12 11:56:47

Applicant : Alps Electric Co., Ltd
Kind of EUT : Passive Entry System (Control Unit)
Model No. : TWD1U630
Serial No. : 967067
Report No. : 26BE0240-HO
Power : DC 12V
Temp./Humi. : 24deg.C / 30%
Operator : Hiroka Uneyama

Mode / Remarks : Transmitting / Max-Axis

LIMIT : FCC15C §15.209 3m below 1GHz / RSS-Gen / RSS-210

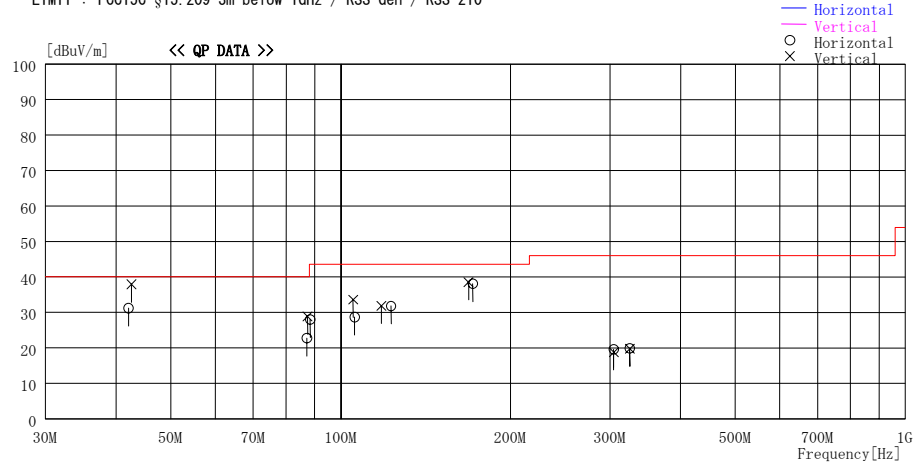


CHART:WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN

-26dB Bandwidth

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

COMPANY : Alps Electric Co.,Ltd.

EQUIPMENT : Passive Entry System (Control Unit)

MODEL : TWD1U630

S/ N : 967067

POWER : DC 12V

MODE : Transmitting

REPORT NO. : 26BE0240-HO

REGULATION : -

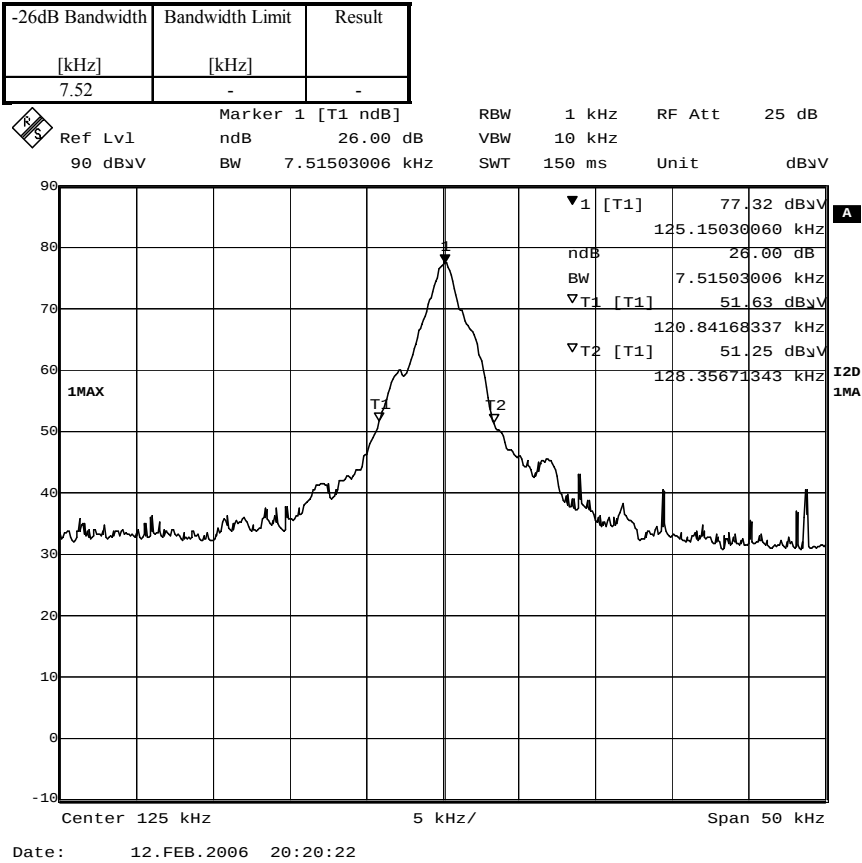
TEST DISTANCE : 10 m

DATE : 02/12/2006

TEMPERATURE : 24℃

HUMIDITY : 30%

Engineer : Hiroka Umeyama



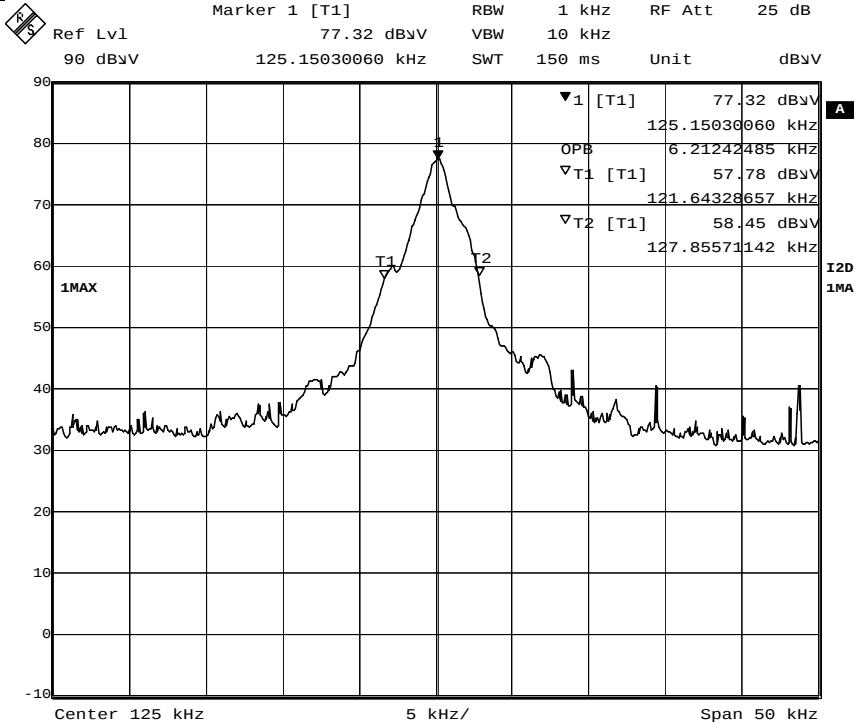
99% Occupied Bandwidth

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

COMPANY : Alps Electric Co.,Ltd.
EQUIPMENT : Passive Entry System (Control Unit)
MODEL : TWD1U630
S/ N : 967067
POWER : DC 12V
MODE : Transmitting

REPORT NO. : 26BE0240-HO
REGULATION : -
TEST DISTANCE : 10 m
DATE : 02/12/2006
TEMPERATURE : 24℃
HUMIDITY : 30%
Engineer : Hiroka Umeyama

99% Occpied Bandwidth	Bandwidth Limit	Result
[kHz]	[kHz]	
6.21	-	-



Date: 12.FEB.2006 20:21:10