

APPENDIX 2: Data of EMI test

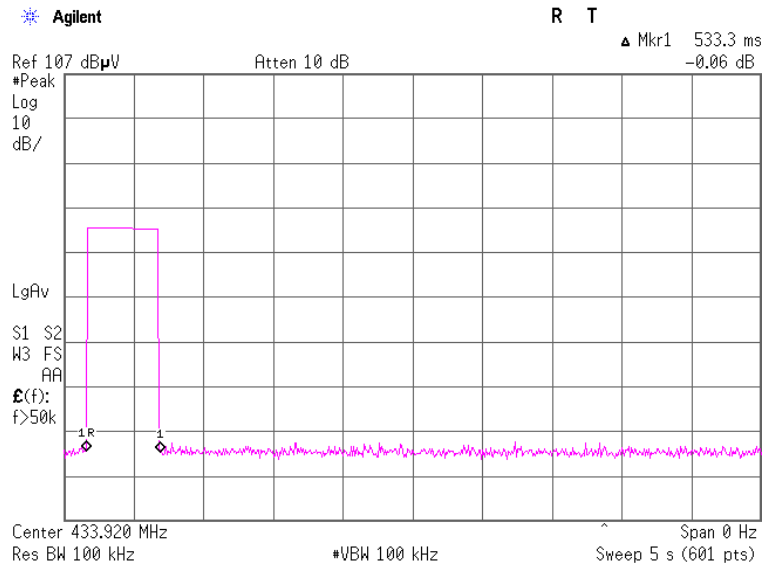
Automatically deactivate

UL Japan, Inc.
 Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.
 EQUIPMENT : Remote Keyless Entry System (Hand Unit)
 MODEL : TWBIU766
 S/N : 20080122-2
 POWER : DC 3.0V (CR1620)
 Mode : Normal use mode
 Axis : -

REPORT NO : 28FE0091-HO-01
 REGULATION : FCC Part 15 Subpart C 15.231(a)(1)
 TEST DISTANCE : -
 DATE : 01/24/2008
 TEMPERATURE : 20 deg.C.
 HUMIDITY : 36%
 ENGINEER : Akio Hayashi

Time of Transmitting [sec]	Limit [sec]	Result
0.53	5.00	Pass



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

UL Japan, Inc.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd. REPORT NO : 28FE0091-HO-01
EQUIPMENT : Remote Keyless Entry System (Hand Unit) REGULATION : FCC Part15 Subpart C 15.231(b) / 15.205 / 15.209
MODEL : TWBU766 TEST DISTANCE : 3m
S/N : 20080122-1 DATE : 01/24/2008
POWER : DC 3.0V (CR1620) TEMPERATURE : 20 deg.C.
Mode : Transmitting mode HUMIDITY : 36%
EUT Axis : Hor.: X-axis, Ver.: Z-axis ENGINEER : Akio Hayashi

Peak with Duty factor

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
1	433.97	81.6	80.8	17.6	31.9	10.8	-5.6	72.5	71.7	80.8	8.3	9.1
2	867.95	50.2	48.5	21.4	31.2	13.0	-5.6	47.8	46.1	60.8	13.0	14.7

PK DETECT (RBW: 1MHz, VBW: 1MHz) (Inside Restricted bands)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
3	1301.94	53.2	55.2	25.4	33.3	2.0	-	47.3	49.3	73.9	26.6	24.6
9	3905.68	45.2	46.3	29.6	30.9	3.6	-	47.5	48.6	73.9	26.4	25.3
10	4339.65	41.8	42.1	30.6	30.8	3.8	-	45.4	45.7	73.9	28.5	28.2

Peak with Duty factor Result = Reading (RBW: 1MHz, VBW: 1MHz) + Duty Factor (Inside Restricted bands)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
3	1301.94	53.2	55.2	25.4	33.3	2.0	-5.6	36.1	38.1	53.9	17.8	15.8
9	3905.68	45.2	46.3	29.6	30.9	3.6	-5.6	36.3	37.4	53.9	17.6	16.5
10	4339.65	41.8	42.1	30.6	30.8	3.8	-5.6	34.2	34.5	53.9	19.7	19.4

PK DETECT Result = Reading (RBW: 1MHz, VBW: 1MHz) (Outside Restricted bands)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
4	1735.90	44.5	44.4	26.3	32.2	2.4	-	41.0	40.9	80.8	39.8	39.9
5	2169.89	51.9	53.6	27.0	31.6	2.8	-	50.1	51.8	80.8	30.7	29.0
6	2603.80	54.6	54.4	27.7	31.4	3.2	-	54.1	53.9	80.8	26.7	26.9
7	3037.79	48.2	47.0	28.4	31.3	3.3	-	48.6	47.4	80.8	32.2	33.4
8	3471.80	42.8	42.8	28.9	31.1	3.5	-	44.1	44.1	80.8	36.7	36.7

Peak with Duty factor Result = Reading (RBW: 1MHz, VBW: 1MHz) + Duty Factor (Outside Restricted bands)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	LOSS [dB]	Duty Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
4	1735.90	44.5	44.4	26.3	32.2	2.4	-5.6	35.4	35.3	60.8	25.4	25.5
5	2169.89	51.9	53.6	27.0	31.6	2.8	-5.6	44.5	46.2	60.8	16.3	14.6
6	2603.80	54.6	54.4	27.7	31.4	3.2	-5.6	48.5	48.3	60.8	12.3	12.5
7	3037.79	48.2	47.0	28.4	31.3	3.3	-5.6	43.0	41.8	60.8	17.8	19.0
8	3471.80	42.8	42.8	28.9	31.1	3.5	-5.6	38.5	38.5	60.8	22.3	22.3

REMARKS ANTENNA TYPE:30-300MHz Biconical / 300-1000MHz Logperiodic / 1-4.5GHz Horn

CALCULATION RESULT=Reading + ANT Factor - Amp Gain + LOSS (Cable+ ATTEN.)+Duty factor

Duty cycle Factor Measurement :

-5.6 dB

- * The test above 1GHz was performed with PK DETECT. Average emission measurements were calculated with PK DETECT and Duty factor.
 - * Duty Factor was calculated with the assumption of the worst condition in 100msec.
 - * All the measured noise was pulse emission.
 - * The result is rounded off to the second decimal place, so some differences might be observed.
 - *The limit was converted from V to dBuV, and it is rounded off to the second decimal place.
 - *Except for the above table : All other spurious emissions were less than 20dB for the limit.
- 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.

99% Occupied Bandwidth

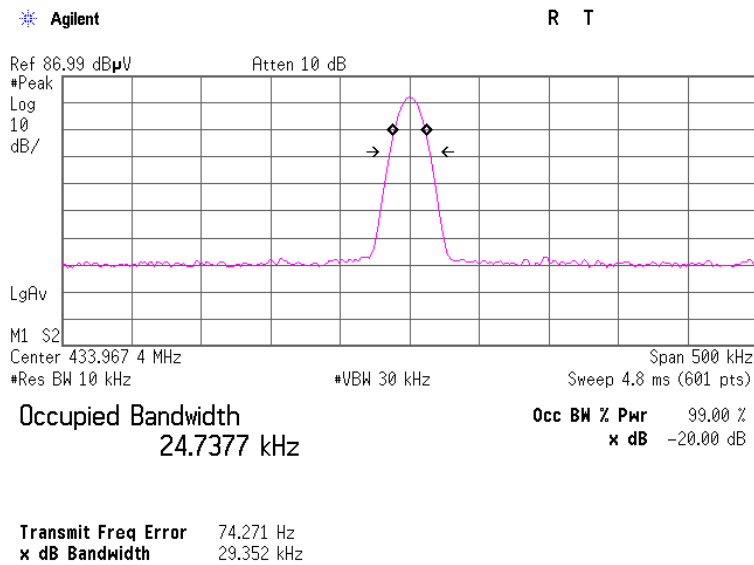
UL Japan, Inc.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.
EQUIPMENT : Remote Keyless Entry System (Hand Unit)
MODEL : TWB1U766
S/N : 20080122-1
POWER : DC 3.0V (CR1620)
Mode : Transmitting mode
Axis : Hor.: X-axis

REPORT NO : 28FE0091-HO-01
REGULATION : RSS-210 A1.1.3
TEST DISTANCE : 3m
DATE : 01/24/2008
TEMPERATURE : 20 deg.C.
HUMIDITY : 36%
ENGINEER : Akio Hayashi

Bandwidth Limit : Fundamental Frequency 433.92 MHz x 0.25% = 1084.8 kHz

99% Occupied Bandwidth	Bandwidth Limit	Result
[kHz]	[kHz]	
24.74	1084.80	Pass



Duty Cycle (Fundamental)

UL Japan, Inc.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.	REPORT NO : 28FE0091-HO-01
EQUIPMENT : Remote Keyless Entry System (Hand Unit)	REGULATION : FCC Part 15 Subpart C 15.231(b) / 15.35(c)
MODEL : TWB1U766	TEST DISTANCE : -
S/N : 20080122-2	DATE : 01/24/2008
POWER : DC 3.0V (CR1620)	TEMPERATURE : 20 deg.C.
Mode : Normal use mode	HUMIDITY : 36%
Axis : -	ENGINEER : Akio Hayashi

Times	ON time (One pulse) [ms]	ON time (in 100ms) [ms]
51	1.030	52.53

*1)ON time(in 100ms) = Times * ON time(One pulse)

*2)The train of pulses was exceeding 100msec, and that sampled 100msec was the worst case against the pulse train.

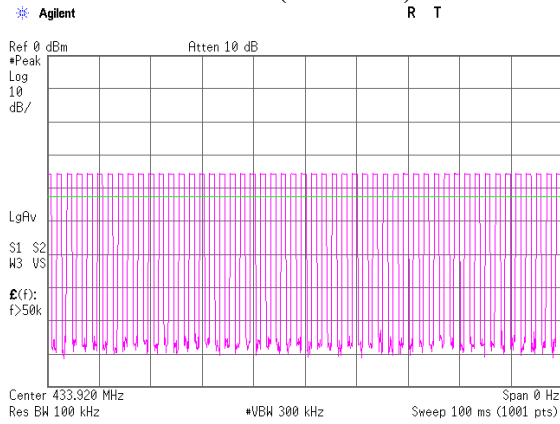
(Total)

ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
52.53	100.00	0.53	-5.6

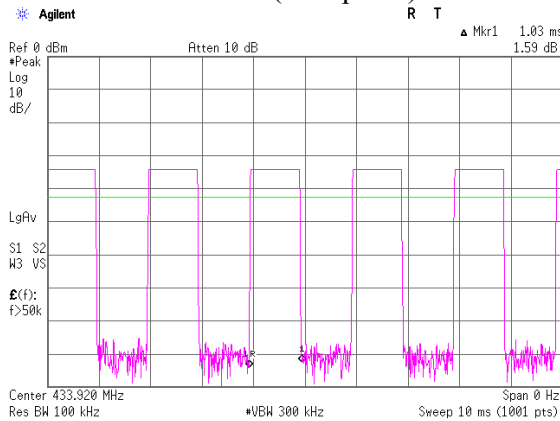
*3)Duty = $20\log_{10}(\text{ON time}/\text{Cycle})$

Duty Cycle (Fundamental)

ON Time(in 100ms)



ON Time(One pulse)



APPENDIX 3: Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-03	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2007/03/05 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	RE	2008/01/10 * 12
MJM-06	Measure	PROMART	SEN1955	RE	-
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE	-
MSA-09	Spectrum Analyzer	Advantest	R3273	RE	2007/12/21 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	RE	2007/09/05 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2007/02/03 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2008/01/12 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2008/01/12 * 12
MCC-51	Coaxial cable	UL Japan	-	RE	2007/07/26 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	RE	2007/03/16 * 12
MAT-30	Attenuator(6dB)	TME	UFA-01	RE	2007/03/05 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	RE	2007/04/14 * 12
MCC-65	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	RE	2007/04/03 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	RE	2007/03/02 * 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.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item:

RE: Radiated emission

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