

APPENDIX 2: Data of EMI test

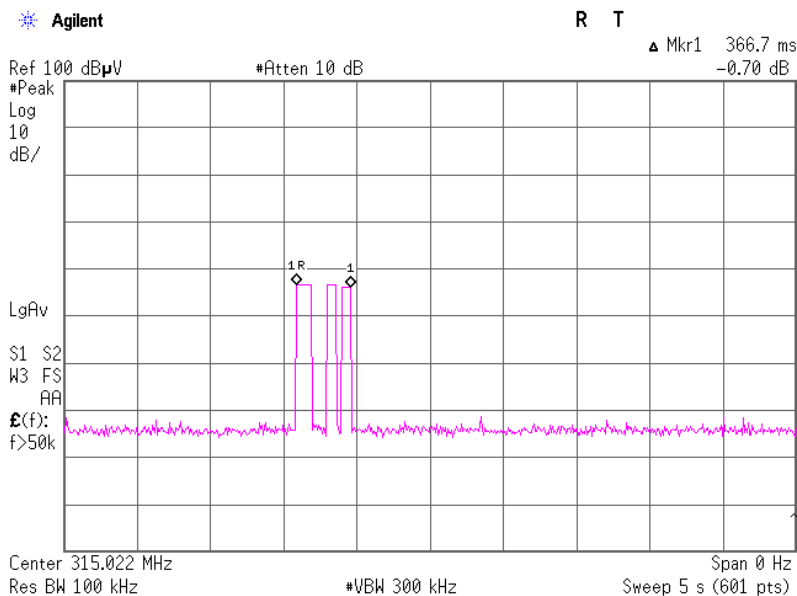
Automatically deactivate

UL Japan, Inc.
 Head Office EMC Lab. No.4 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.
 EQUIPMENT : Remote Keyless Entry
 MODEL : TWB1U751
 S/N : 13
 POWER : Battery (DC 3.0V)
 Mode : Normal use mode

REPORT NO : 28AE0239-HO
 REGULATION : FCC Part15 Subpart C 15.231(a)(1)
 TEST DISTANCE : -
 DATE : 08/30/2007
 TEMPERATURE : 26 deg.C.
 HUMIDITY : 66%
 ENGINEER : Takumi Shimada

Time of Transmitting [sec]	Limit [sec]	Result
0.37	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.4 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.
EQUIPMENT : Remote Keyless Entry
MODEL : TWB1U751
S/N : 11
POWER : Battery (DC 3.0V)
Mode : Transmitting mode
Axis : Hor.: X-axis, Ver.: Y-axis

REPORT NO : 28AE0239-HO
REGULATION : FCC Part15 Subpart C 15.231(b) / 15.205 / 15.209
TEST DISTANCE : 3m
DATE : 08/30/2007
TEMPERATURE : 26 deg.C.
HUMIDITY : 66%
ENGINEER : Takumi Shimada

Peak with Duty factor (BW 120kHz) (Outside Restricted bands)												
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	315.02	82.6	77.2	16.3	31.9	9.9	-9.9	67.0	61.6	75.6	8.6	14.0
2	630.04	54.2	53.6	20.3	32.1	11.8	-9.9	44.3	43.7	55.6	11.3	11.9
3	945.07	49.8	49.2	25.1	31.0	13.3	-9.9	47.3	46.7	55.6	8.3	8.9

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
5	1575.09	61.8	55.0	25.6	33.1	2.0	-	56.3	49.5	73.9	17.6	24.4
7	2205.19	49.7	45.4	26.5	32.2	2.4	-	46.4	42.1	73.9	27.5	31.8
9	2835.17	57.2	50.9	27.8	32.0	2.9	-	55.9	49.6	73.9	18.0	24.3

Peak with Duty factor (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
5	1575.09	61.8	55.0	25.6	33.1	2.0	-9.9	46.4	39.6	53.9	7.5	14.3
7	2205.19	49.7	45.4	26.5	32.2	2.4	-9.9	36.5	32.2	53.9	17.4	21.7
9	2835.17	57.2	50.9	27.8	32.0	2.9	-9.9	46.0	39.7	53.9	7.9	14.2

PK DETECT (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	1260.08	44.6	44.6	25.1	33.9	1.8	-	37.6	37.6	75.6	38.0	38.0
6	1890.08	54.2	51.0	25.9	32.4	2.2	-	49.9	46.7	75.6	25.7	28.9
8	2520.15	58.7	58.5	27.3	32.1	2.6	-	56.5	56.3	75.6	19.1	19.3
10	3150.25	59.7	52.7	28.2	31.8	3.0	-	59.1	52.1	75.6	16.5	23.5

Peak with Duty factor (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	1260.08	44.6	44.6	25.1	33.9	1.8	-9.9	27.7	27.7	55.6	27.9	27.9
6	1890.08	54.2	51.0	25.9	32.4	2.2	-9.9	40.0	36.8	55.6	15.6	18.8
8	2520.15	58.7	58.5	27.3	32.1	2.6	-9.9	46.6	46.4	55.6	9.0	9.2
10	3150.25	59.7	52.7	28.2	31.8	3.0	-9.9	49.2	42.2	55.6	6.4	13.4

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

Duty cycle Factor Measurement :

-9.9 dB

- * All the measured noise was pulse emissions.
 - * The test above 1GHz was performed with PK DETECT. Average emission measurements were calculated with PK DETECT and Duty cycle factor.
 - * Duty Factor was calculated with the assumption of the worst condition in 100msec.
 - * 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.

-20dB Bandwidth

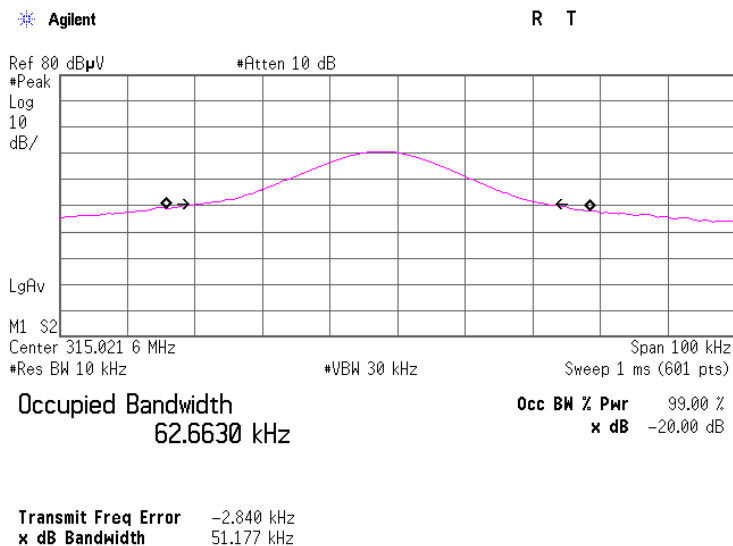
UL Japan, Inc.
 Head Office EMC Lab. No.4 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.
 EQUIPMENT : Remote Keyless Entry
 MODEL : TWB1U751
 S/N : 11
 POWER : Battery (DC 3.0V)
 Mode : Transmitting mode

REPORT NO : 28AE0239-HO
 REGULATION : FCC Part15 Subpart C 15.231(c)
 TEST DISTANCE : 3m
 DATE : 08/30/2007
 TEMPERATURE : 26 deg.C.
 HUMIDITY : 66%
 ENGINEER : Takumi Shimada

Bandwidth Limit : Fundamental Frequency 315.022 MHz X 0.25% = 787.56 kHz

-20dB Bandwidth	Bandwidth Limit	Result
[kHz]	[kHz]	
51.18	787.56	Pass



99% Occupied Bandwidth

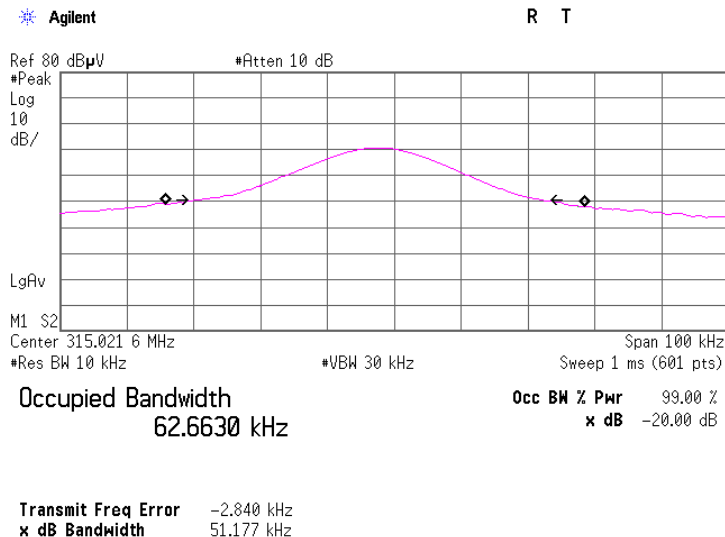
UL Japan, Inc.
 Head Office EMC Lab. No.4 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.
 EQUIPMENT : Remote Keyless Entry
 MODEL : TWB1U751
 S/N : 11
 POWER : Battery (DC 3.0V)
 Mode : Transmitting mode

REPORT NO : 28AE0239-HO
 REGULATION : RSS-210 A1.1.3
 TEST DISTANCE : 3m
 DATE : 08/30/2007
 TEMPERATURE : 26 deg.C.
 HUMIDITY : 66%
 ENGINEER : Takumi Shimada

Bandwidth Limit : Fundamental Frequency 315.022 MHz X 0.25% = 787.56 kHz

99% Occupied Bandwidth	Bandwidth Limit	Result
[kHz]	[kHz]	
62.66	787.56	Pass



Duty Cycle

UL Japan, Inc.
 Head Office EMC Lab. No.4 Semi Anechoic Chamber

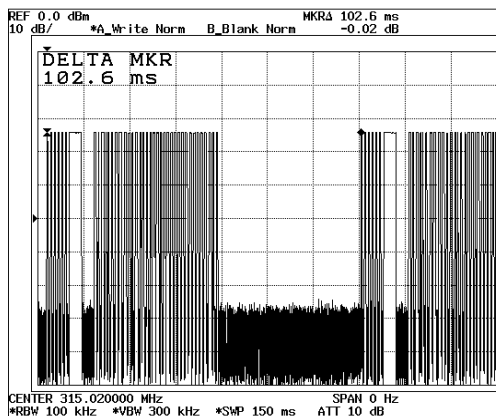
COMPANY : Alps Electric Co., Ltd.
 EQUIPMENT : Remote Keyless Entry
 MODEL : TWB1U751
 S/N : 11
 POWER : Battery (DC 3.0V)
 Mode : Transmitting mode

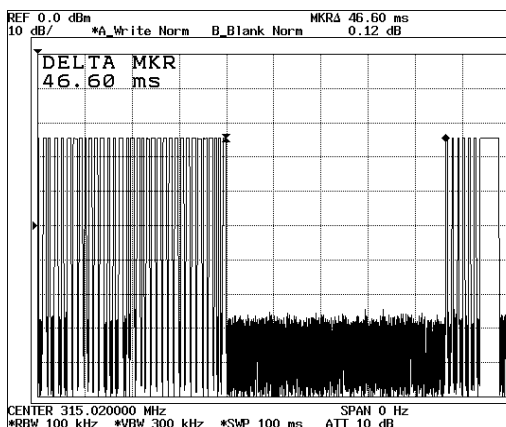
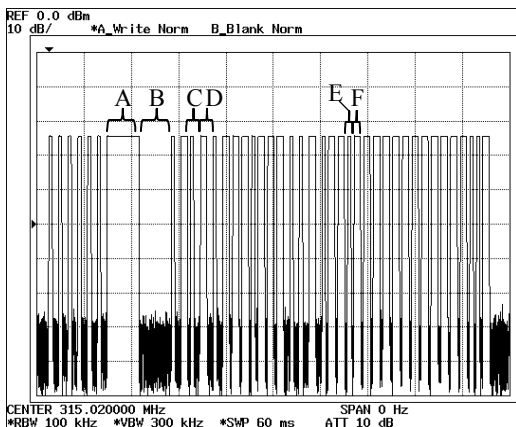
REPORT NO : 28AE0239-HO
 REGULATION : FCC Part15 Subpart C 15.231(b) / 15.209
 TEST DISTANCE : -
 DATE : 08/30/2007
 TEMPERATURE : 26 deg.C.
 HUMIDITY : 66%
 ENGINEER : Takumi Shimada

ON time	cycle	Duty cycle	Duty Factor
[ms]	[ms]		[dB]
32.13	100.00	0.32	-9.9

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

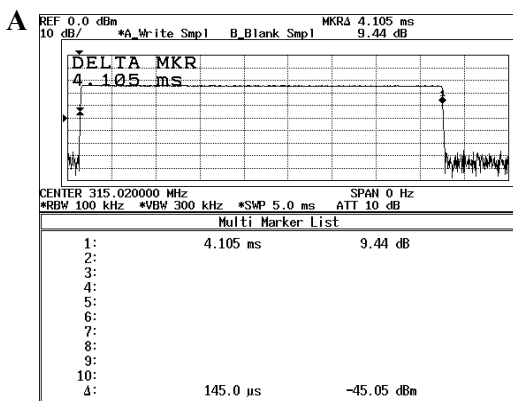
PULSE Train Cycle 102.6ms



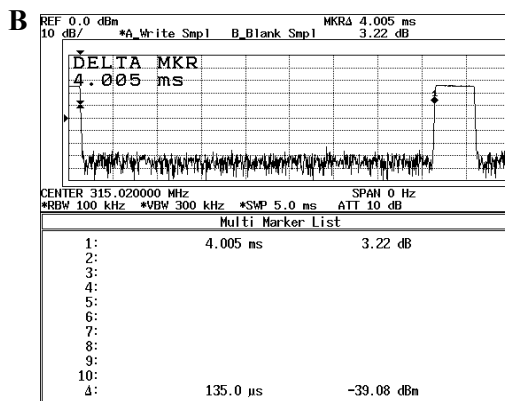


G

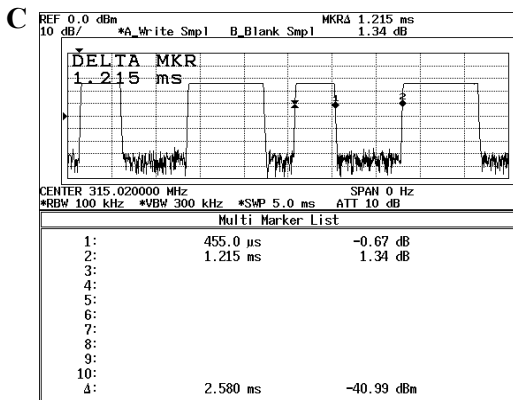
	1 PULSE Cycle		Cycle [Time]	Total PULSE Cycle	
	ON Time[ms]	OFF Time[ms]		ON Time[ms]	OFF Time[ms]
A	4.105	-	1	4.105	0
B	-	4.005	1	0	4.005
C	0.455	0.760	11	5.005	8.360
D	0.860	0.765	3	2.580	2.295
E	0.455	0.355	5	2.275	1.775
F	0.865	0.355	21	18.165	7.455
G	-	46.6	1	0	46.6
Total Time [ms]				32.130	70.49



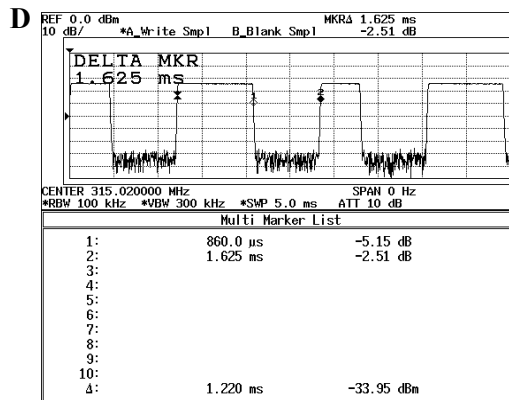
ON Time: 4.105ms
 OFF Time: -



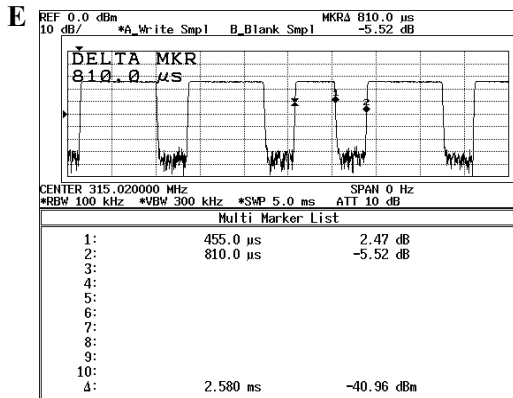
ON Time: -
 OFF Time: 4.005ms



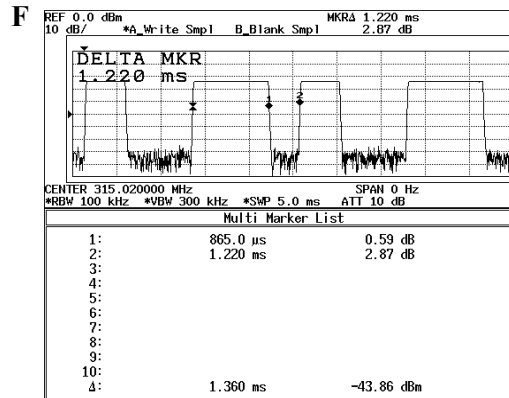
ON Time: 0.455ms
OFF Time: 1.215-0.455=0.760ms



ON Time: 0.860ms
OFF Time: 1.625-0.860=0.765ms



ON Time: 0.455ms
OFF Time: 0.810-0.455=0.355ms



ON Time: 0.865ms
OFF Time: 1.220-0.865=0.355ms

APPENDIX 3: Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-04	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2007/03/03 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/01/19 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	RE	2007/01/19 * 12
MCC-50	Coaxial cable	UL Japan	-	RE	2007/03/06 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	RE	2007/03/05 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	RE	2007/03/12 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	RE	2007/07/04 * 12
MTR-06	Test Receiver	Rohde & Schwarz	ESCS30	RE	2006/09/12 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	RE	2007/08/16 * 12
MCC-57	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2007/03/30 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	RE	2007/03/12 * 12
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE	-
MOS-15	Thermo-Hygrometer	Custom	CTH-180	RE	2006/01/19 * 24
MJM-07	Measure	PROMART	SEN1955	RE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	RE	2007/06/01 * 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.

Test Item:

RE: Radiated emission

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