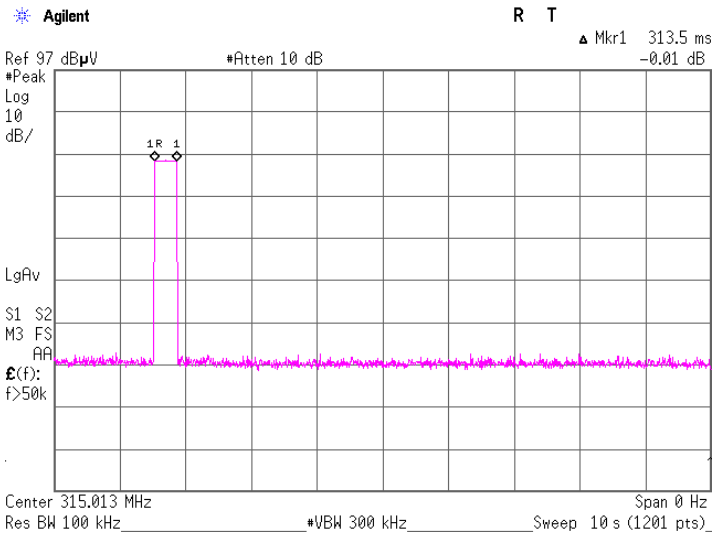
APPENDIX 2: Data of EMI test

Automatically deactivate

UL Japan, Inc.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY	: Alps Electric Co., Ltd.	REPORT NO	: 28IE0128-HO-01
EQUIPMENT	: Transmitter	REGULATION	: FCC15.231(a)(1)
MODEL	: TWB1U443	TEST DISTANCE	: -
S/N	: 001	DATE	: 07/08/2008
POWER	: DC 3.0V	TEMPERATURE	: 24 deg.C.
Mode	: Normal use mode	HUMIDITY	: 59%
Axis	: -	ENGINEER	: Tomotaka Sasagawa

Time of Transmitting [sec]	Limit [sec]	Result
0.31	5.00	Pass



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

UL Japan, Inc.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY	: Alps Electric Co., Ltd.	REPORT NO	: 28IE0128-HO-01
EQUIPMENT	: Transmitter	REGULATION	: Fcc Part15 Subpart C 15.231(b) / 15.205 / 15.209
MODEL	: TWB1U443	TEST DISTANCE	: 3m
S/N	: 002	DATE	: 07/08/2008
POWER	: DC 3.0V	TEMPERATURE	: 24 deg.C.
Mode	: Transmitting mode	HUMIDITY	: 59%
Axis	: Hor.: X-axis , Ver.: Z-axis	ENGINEER	: Tomotaka Sasagawa

PK DETECT

No.	FREQ	T/R READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
1	315.03	74.9	71.5	14.9	27.9	8.8	-	70.7	67.3	75.5	4.8	8.2
2	630.06	46.9	46.5	19.7	28.9	10.3	-	48.0	47.6	55.5	7.5	7.9
3	945.09	37.5	33.9	22.4	27.8	11.4	-	43.5	39.9	55.5	12.0	15.6

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

No.	FREQ	S/A READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
5	1575.14	45.8	45.2	25.2	32.8	2.2	-	40.4	39.8	53.9	13.5	14.1
7	2205.19	44.5	43.7	26.4	32.4	2.5	-	41.0	40.2	53.9	12.9	13.7
9	2835.24	45.0	44.2	27.8	32.2	2.9	-	43.5	42.7	53.9	10.4	11.2

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

No.	FREQ	S/A READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
4	1260.11	49.9	47.6	24.8	33.3	2.1	-	43.5	41.2	55.6	12.1	14.4
6	1890.16	45.2	44.4	25.7	32.5	2.4	-	40.8	40.0	55.6	14.8	15.6
8	2520.22	44.8	43.9	27.1	32.5	2.7	-	42.1	41.2	55.6	13.5	14.4
10	3150.27	44.0	43.2	28.3	32.0	3.0	-	43.3	42.5	55.6	12.3	13.1

REMARKS ANTENNA TYPE:30-300MHz Biconical / 300-1000MHz Logperiodic / 1-4.4GHz Horn
CALCULATION RESULT=Reading + ANT Factor - Amp Gain + LOSS (Cable+ ATTEN.)+Duty factor

* The test below 1GHz and above 1GHz were performed with PK DETECT.
* Applying the limit of AV to the PK data, there were some margin and it was adopted.
* 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.

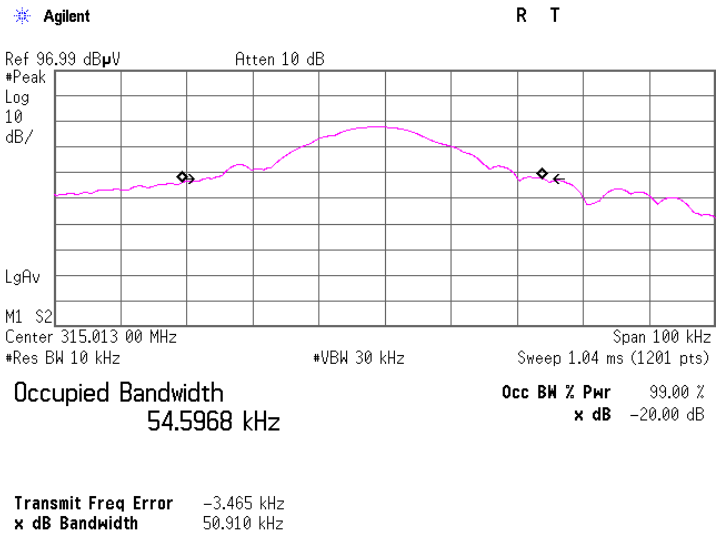
-20dB Bandwidth

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

COMPANY	: Alps Electric Co., Ltd.	REPORT NO	: 28IE0128-HO-01
EQUIPMENT	: Transmitter	REGULATION	: FCC15.231(c)
MODEL	: TWB1U443	TEST DISTANCE	: 3m
S/N	: 001	DATE	: 08/08/2008
POWER	: DC 3.0V	TEMPERATURE	: 26 deg.C.
Mode	: Normal use mode	HUMIDITY	: 58%
Axis	: Hor.: X-axis	ENGINEER	: Tomotaka Sasagawa

Bandwidth Limit : Fundamental Frequency 315 MHz X 0.25% = 787.50 kHz

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
50.91	787.50	Pass



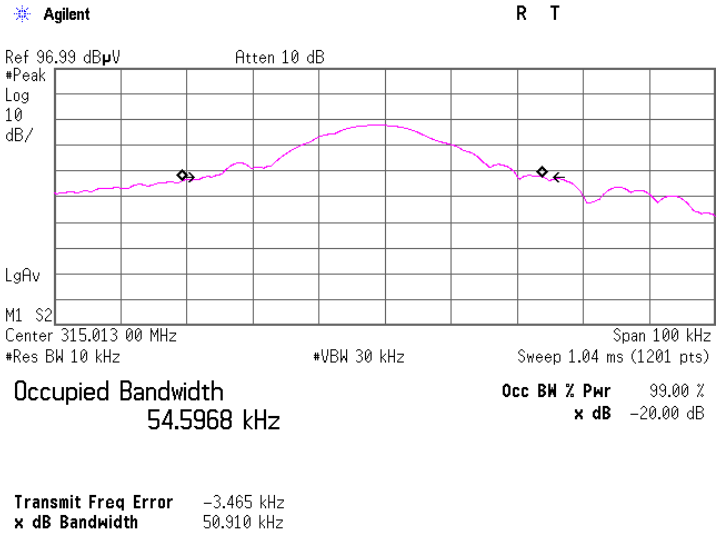
99% Occupied Bandwidth

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

COMPANY	: Alps Electric Co., Ltd.	REPORT NO	: 28IE0128-HO-01
EQUIPMENT	: Transmitter	REGULATION	: RSS-210 A1.1.3
MODEL	: TWB1U443	TEST DISTANCE	: 3m
S/N	: 001	DATE	: 08/08/2008
POWER	: DC 3.0V	TEMPERATURE	: 26 deg.C.
Mode	: Normal use mode	HUMIDITY	: 58%
Axis	: Hor.: X-axis	ENGINEER	: Tomotaka Sasagawa

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

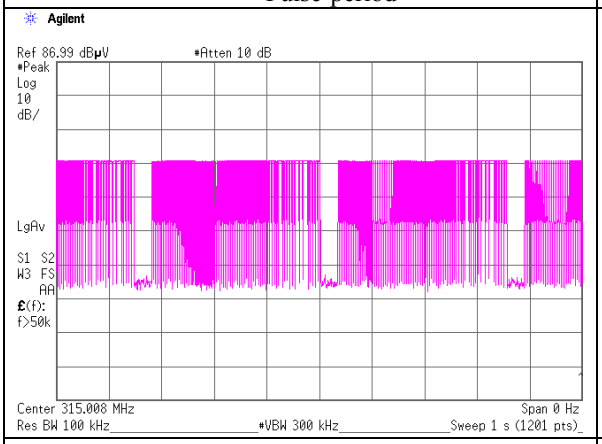
99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
54.60	787.50	Pass



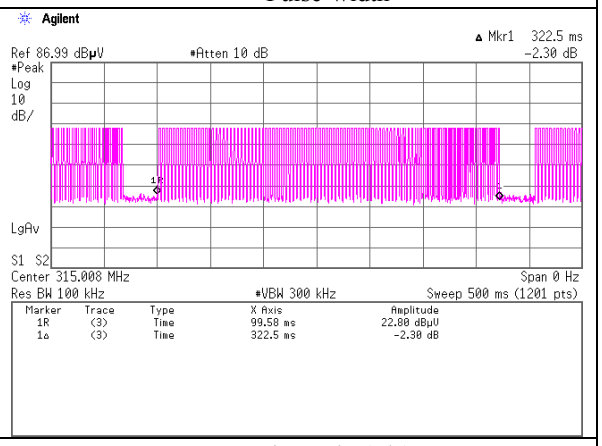
UL Japan, Inc.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

APPENDIX 3:The tested pulse train

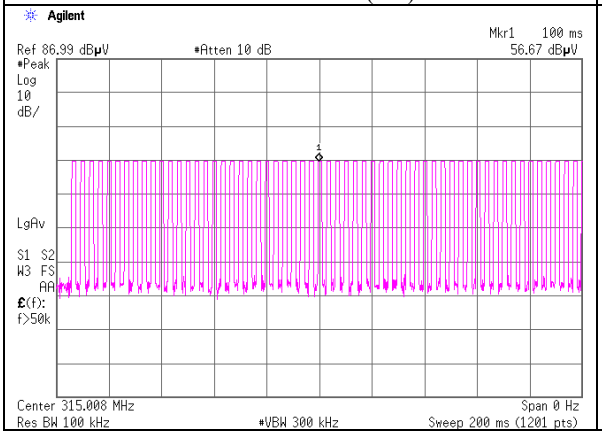
Pulse-period



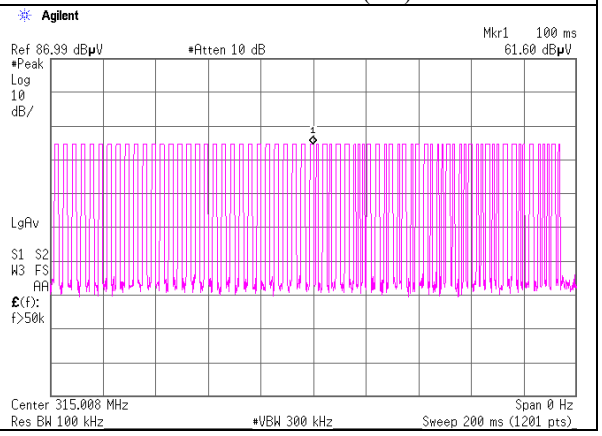
Pulse-width



Pulse-train (1/2)



Pulse-train (2/2)



UL Japan, Inc.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
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APPENDIX 4:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2008/04/17 * 12
MOS-02	Digital Humidity Indicator	N.T	NT-1800	RE	
MJM-05	Measure	PROMART	SEN1955	RE	-
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE	-
MRENT-62	Spectrum Analyzer	Agilent	E4448A	RE	2007/11/27 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	RE	2008/04/02 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/10/21 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2007/10/21 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2008/02/15 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2007/11/13 * 12
MPA-09	Pre Amplifier	Agilent	8447D	RE	2007/09/13 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2008/01/19 * 12
MCC-47	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2008/05/12 * 12
MPA-10	Pre Amplifier	Agilent	8449B	RE	2007/09/27 * 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