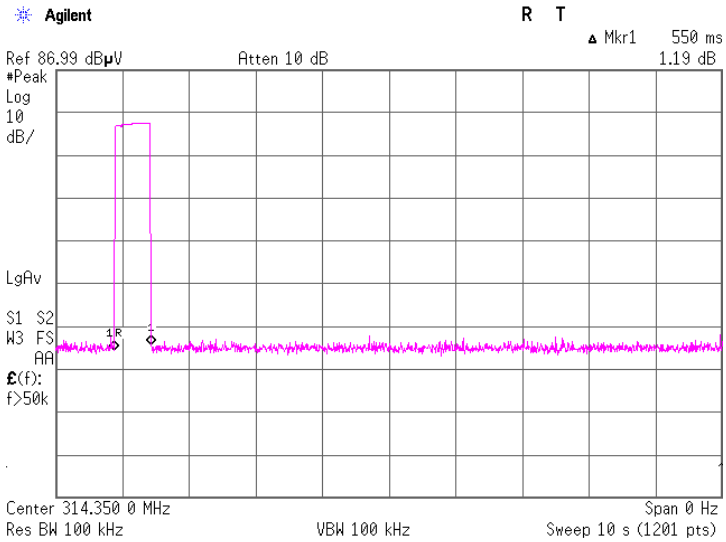
APPENDIX 2: Data of EMI test

Automatically deactivate

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

Company	DENSO CORPORATION	Report No.	29DE0063-HO-01
Equipment	Electronic Key	Regulation	FCC15.231(a)(1)/RSS-210 A1.1.1
Model No.	14ADR	Test Distance	3m
Serial No.	002	Date	11/28/2008
Power	DC 3.0V	Temperature	23 deg.C.
Mode	Normal use mode	Humidity	40 %
EUT-Position	-	Engineer	Kazufumi Nakai

Time of Transmitting [sec]	Limit [sec]	Result
0.55	5.00	Pass



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

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

Company	DENSO CORPORATION	Report No.	29DE0063-HO-01
Equipment	Electronic Key	Regulation	FCC15.231(b)/15.205/15.209/RSS-210 A1.1.2/2.6/2.7
Model No.	14ADR	Test Distance	3m
Serial No.	001	Date	11/28/2008
Power	DC 3.0V	Temperature	23 deg.C.
Mode	Transmitting mode	Humidity	40 %
EUT-Position	H: X-axis / V: Y-axis	Engineer	Kazufumi Nakai

QP Detect (BW: 120kHz)

No.	FREQ	T/R READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN		REMARK
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER	Inside or Outside
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]		of Restricted Bands
1	314.35	76.8	73.0	15.0	32.0	10.1	-	69.9	66.1	75.5	5.6	9.4	Carrier
2	628.70	31.8	33.5	19.4	32.0	12.0	-	31.2	32.9	55.5	24.3	22.6	Outside
3	943.05	33.9	30.8	22.1	30.8	13.5	-	38.7	35.6	55.5	16.8	19.9	Outside

PK Detect (RBW: 1MHz , VBW: 1MHz)

No.	FREQ	S/A READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN		REMARK
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER	Inside or Outside
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]		of Restricted Bands
4	1257.40	45.6	46.7	25.0	34.7	2.0	-	37.9	39.0	75.5	37.6	36.5	Outside
5	1571.75	47.4	49.7	25.7	33.8	2.3	-	41.6	43.9	73.9	32.3	30.0	Inside
6	1886.10	49.0	49.0	25.8	33.2	2.4	-	44.0	44.0	75.5	31.5	31.5	Outside
7	2200.45	47.2	46.0	26.3	32.9	2.6	-	43.2	42.0	73.9	30.7	31.9	Inside
8	2514.80	46.9	46.2	27.0	32.8	2.7	-	43.8	43.1	75.5	31.7	32.4	Outside
9	2829.15	43.8	42.1	27.6	32.6	2.9	-	41.7	40.0	73.9	32.2	33.9	Inside
10	3143.50	41.3	41.2	28.2	32.4	3.0	-	40.1	40.0	75.5	35.4	35.5	Outside

PK with Duty Factor (RBW: 1MHz , VBW: 1MHz) + Duty Factor

No.	FREQ	S/A READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN		REMARK
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER	Inside or Outside
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]		of Restricted Bands
4	1257.40	45.6	46.7	25.0	34.7	2.0	-5.7	32.2	33.3	55.5	23.3	22.2	Outside
5	1571.75	47.4	49.7	25.7	33.8	2.3	-5.7	35.9	38.2	53.9	18.0	15.7	Inside
6	1886.10	49.0	49.0	25.8	33.2	2.4	-5.7	38.3	38.3	55.5	17.2	17.2	Outside
7	2200.45	47.2	46.0	26.3	32.9	2.6	-5.7	37.5	36.3	53.9	16.4	17.6	Inside
8	2514.80	46.9	46.2	27.0	32.8	2.7	-5.7	38.1	37.4	55.5	17.4	18.1	Outside
9	2829.15	43.8	42.1	27.6	32.6	2.9	-5.7	36.0	34.3	53.9	17.9	19.6	Inside
10	3143.50	41.3	41.2	28.2	32.4	3.0	-5.7	34.4	34.3	55.5	21.1	21.2	Outside

REMARKS ANTENNA TYPE:30-300MHz Biconical / 300-1000MHz Logperiodic / above 1GHz Horn
CALCULATION RESULT=Reading + ANT Factor - Amp Gain + LOSS (Cable+ ATTEN.)+Duty factor
Duty cycle Factor : -5.7 dB

* 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.

-20dB Bandwidth and 99% Occupied Bandwidth

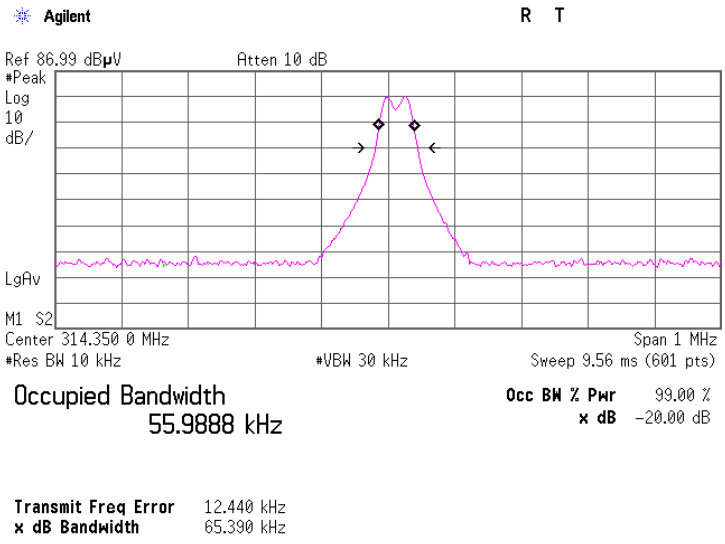
UL Japan, Inc.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

Company	DENSO CORPORATION	Report No.	29DE0063-HO-01
Equipment	Electronic Key	Regulation	FCC15.231(c)/RSS-210 A1.1.3
Model No.	14ADR	Test Distance	3m
Serial No.	001	Date	11/28/2008
Power	DC 3.0V	Temperature	23 deg.C.
Mode	Transmitting mode	Humidity	40 %
EUT-Position	Max-axis	Engineer	Kazufumi Nakai

Bandwidth Limit : Fundamental Frequency **314.35** MHz X 0.25% = 785.88 kHz

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
65.39	785.88	Pass

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
55.99	785.88	Pass



Duty Cycle

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

Company	DENSO CORPORATION	Report No.	29DE0063-HO-01
Equipment	Electronic Key	Regulation	FCC15.231(b)/15.35(c)/RSS-Gen 4.5
Model No.	14ADR	Test Distance	-
Serial No.	002	Date	11/28/2008
Power	DC 3.0V	Temperature	23 deg.C.
Mode	Transmitting mode	Humidity	40 %
EUT-Position	-	Engineer	Kazufumi Nakai

Type	Times	ON time(One pulse) [ms]	ON time(in 100ms) [ms]
A	14	1.440	20.160
B	44	0.720	31.680

*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.

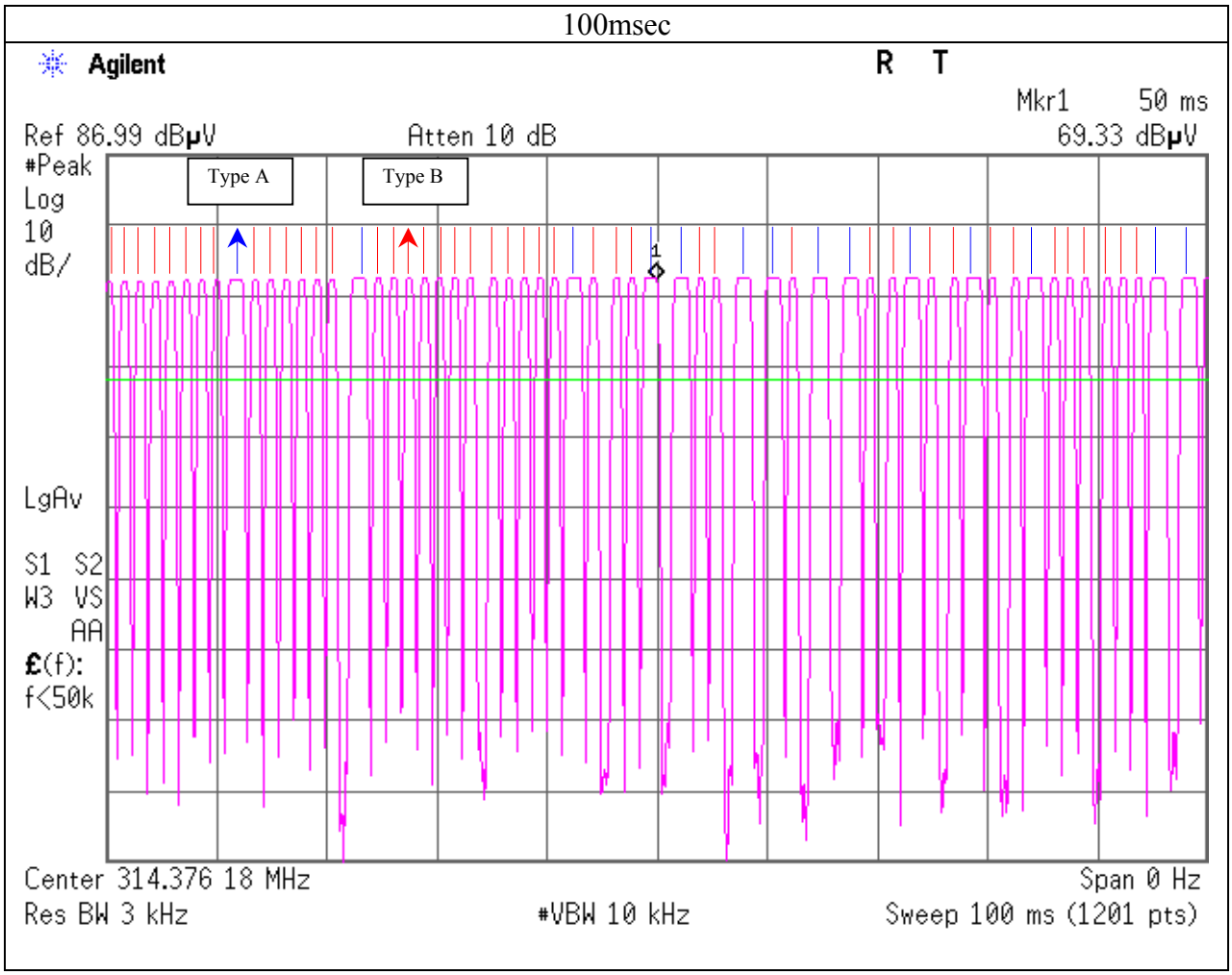
(Total)

ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
51.84	100.00	0.52	-5.7

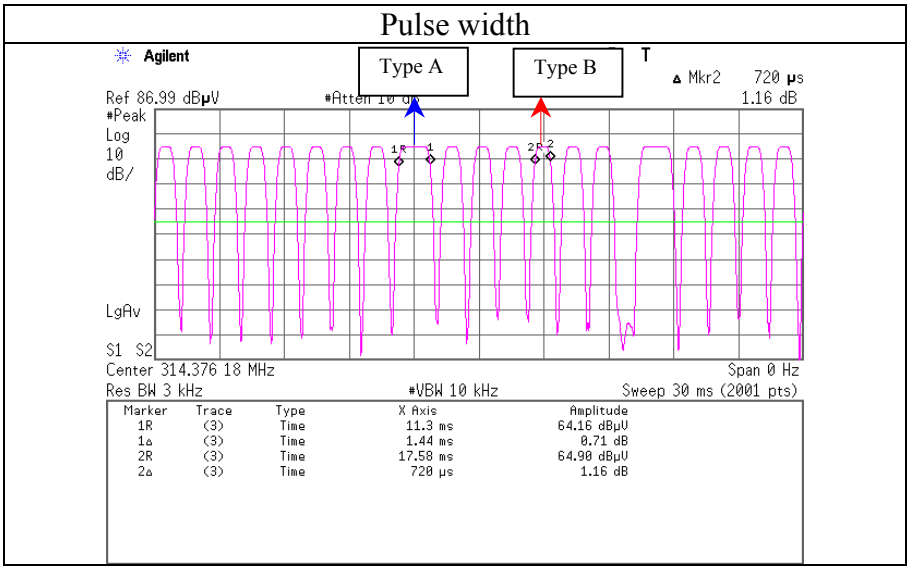
*3)Duty = $20\log_{10}$(ON time/Cycle)

Duty Cycle

100msec



Pulse width



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: Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2008/03/13 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2008/11/07 * 12
MCC-56	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	287602(1m) / 284655(5m)	RE	2008/03/12 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2008/04/23 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2008/01/10 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2008/06/12 * 12
MSA-09	Spectrum Analyzer	Advantest	R3273	95090115	RE	2007/12/21 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2008/03/06 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2008/07/18 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2008/01/12 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2008/01/12 * 12
MAT-30	Attenuator(6dB)	TME	UFA-01	-	RE	2008/03/10 * 12
MAEC-03	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2008/03/25 * 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