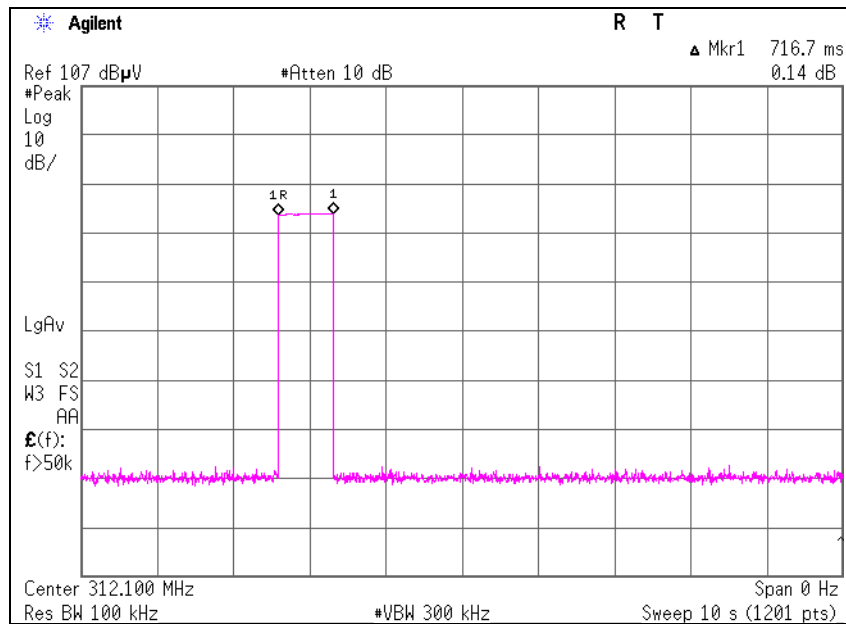


APPENDIX 2: Data of EMI test

Automatically deactivate

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Report No. 30KE0044-HO-01
 Date 07/11/2010
 Temperature/ Humidity 25 deg.C./ 59%
 Engineer Kazuya Yoshioka
 Mode Normal use mode 312.10MHz

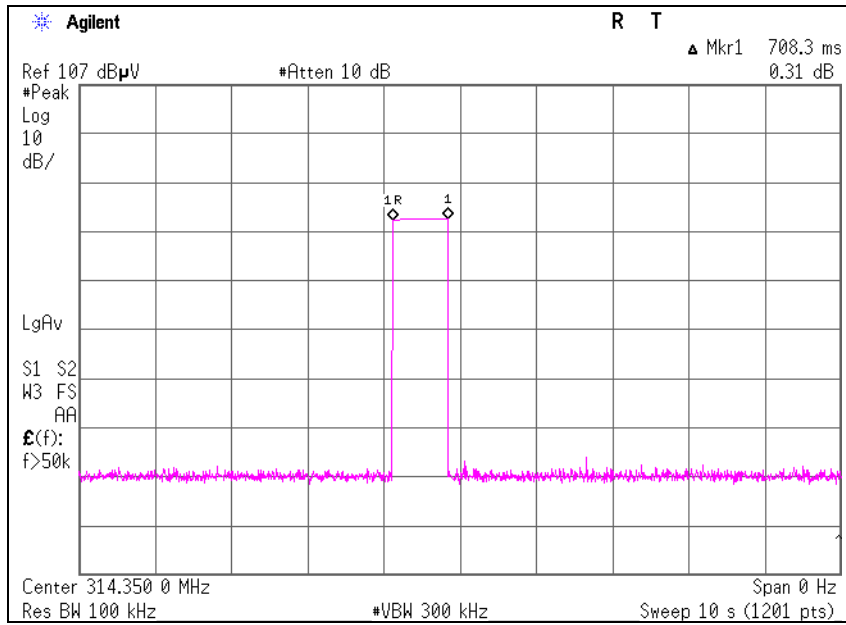
Time of Transmitting [sec]	Limit [sec]	Result
0.7167	5.00	Pass



Automatically deactivate

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	30KE0044-HO-01
Date	07/11/2010
Temperature/ Humidity	25 deg.C./ 59%
Engineer	Kazuya Yoshioka
Mode	Normal use mode 314.35MHz

Time of Transmitting [sec]	Limit [sec]	Result
0.7083	5.00	Pass



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

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 30KE0044-HO-01
Date 07/11/2010
Temperature/ Humidity 25 deg.C./ 59%
Engineer Kazuya Yoshioka
Mode Transmitting mode 312.10MHz

PK

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit dBuV/m	Margin [dB]		Remark Inside or Outside of Restricted Bands
		Hor	Ver					Hor	Ver		Hor	Ver	
312.100	PK	77.4	73.6	14.7	10.1	31.8	-	70.4	66.6	95.4	25.0	28.8	Carrier
624.200	PK	29.3	30.2	19.7	12.0	32.0	-	29.0	29.9	75.4	46.4	45.5	Outside
936.300	PK	30.7	29.6	22.7	13.5	30.8	-	36.1	35.0	75.4	39.3	40.4	Outside
1248.400	PK	56.9	58.7	26.0	1.9	34.4	-	50.4	52.2	75.4	25.0	23.2	Outside
1560.500	PK	48.4	47.3	27.1	2.1	33.6	-	44.0	42.9	73.9	29.9	31.0	Inside
1872.600	PK	55.1	50.4	27.9	2.3	33.0	-	52.3	47.6	75.4	23.1	27.8	Outside
2184.700	PK	52.2	49.6	28.0	2.5	32.6	-	50.1	47.5	75.4	25.3	27.9	Outside
2496.800	PK	52.1	47.7	27.6	2.7	32.4	-	50.0	45.6	73.9	23.9	28.3	Inside
2808.900	PK	51.3	48.0	28.6	2.9	32.2	-	50.6	47.3	73.9	23.3	26.6	Inside
3121.000	PK	43.7	42.7	29.3	3.1	32.1	-	44.0	43.0	75.4	31.4	32.4	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

PK with Duty factor

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit dBuV/m	Margin [dB]		Remark
		Hor	Ver					Hor	Ver		Hor	Ver	
312.100	PK	77.4	73.6	14.7	10.1	31.8	-6.8	63.6	59.8	75.4	11.8	15.6	Carrier
624.200	PK	29.3	30.2	19.7	12.0	32.0	-6.8	22.2	23.1	55.4	33.2	32.3	Outside
936.300	PK	30.7	29.6	22.7	13.5	30.8	-6.8	29.3	28.2	55.4	26.1	27.2	Outside
1248.400	PK	56.9	58.7	26.0	1.9	34.4	-6.8	43.6	45.4	55.4	11.8	10.0	Outside
1560.500	PK	48.4	47.3	27.1	2.1	33.6	-6.8	37.2	36.1	53.9	16.7	17.8	Inside
1872.600	PK	55.1	50.4	27.9	2.3	33.0	-6.8	45.5	40.8	55.4	9.9	14.6	Outside
2184.700	PK	52.2	49.6	28.0	2.5	32.6	-6.8	43.3	40.7	55.4	12.1	14.7	Outside
2496.800	PK	52.1	47.7	27.6	2.7	32.4	-6.8	43.2	38.8	53.9	10.7	15.1	Inside
2808.900	PK	51.3	48.0	28.6	2.9	32.2	-6.8	43.8	40.5	53.9	10.1	13.4	Inside
3121.000	PK	43.7	42.7	29.3	3.1	32.1	-6.8	37.2	36.2	55.4	18.2	19.2	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Duty factor (Refer to Duty factor data sheet)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

* 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.

* All the measured noise was pulse emission.

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-20dB and 99% Occupied Bandwidth

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 30KE0044-HO-01
Date 07/11/2010
Temperature/ Humidity 25 deg.C./ 59%
Engineer Kazuya Yoshioka
Mode Transmitting mode 312.10MHz / 314.35MHz

Bandwidth Limit : Fundamental Frequency **312.1 MHz** x 0.25% = 780.25 kHz

312.1MHz	314.35MHz
-20dB Bandwidth [kHz]	-20dB Bandwidth [kHz]
70.02	69.97

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
70.02+69.97=139.99	780.25	Pass

The worst case limit was applied as Bandwidth limit.

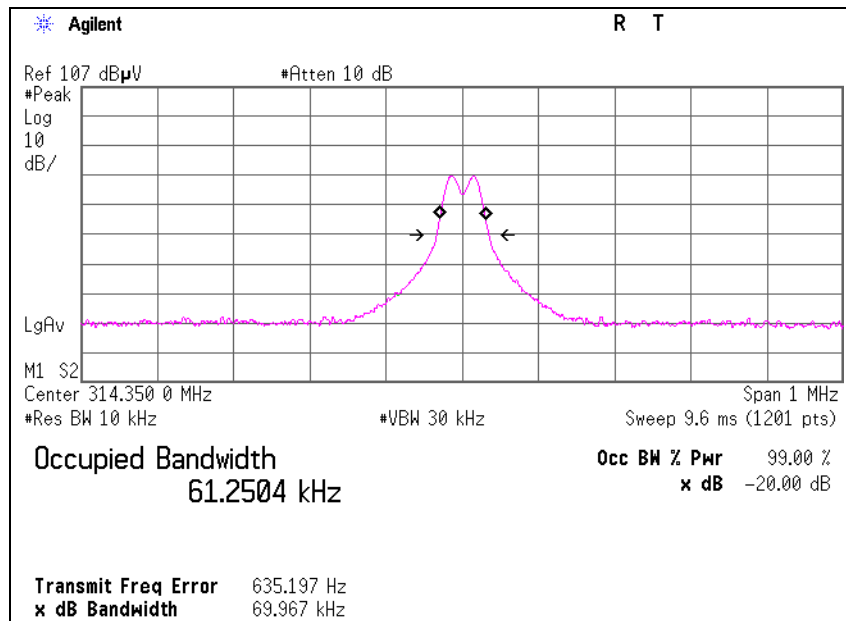
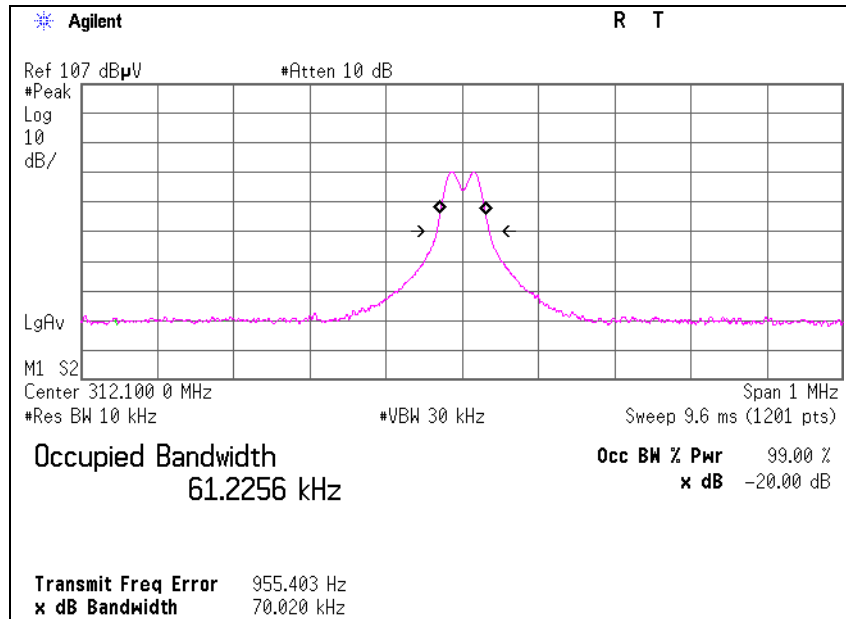
Bandwidth Limit : Fundamental Frequency **312.1 MHz** x 0.25% = 780.25 kHz

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
61.23	780.25	Pass

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

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
61.25	785.88	Pass

-20dB and 99% Occupied Bandwidth



Duty Cycle

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 30KE0044-HO-01
Date 07/11/2010
Temperature/ Humidity 25 deg.C./ 59%
Engineer Kazuya Yoshioka
Mode Normal use mode 312.10MHz

Type	Times	ON time(One pulse) [ms]	ON time(in 30ms) [ms]	ON time(in 100ms) [ms]
A	14	0.6533	9.147	30.489
B	15	0.3033	4.550	15.167

*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.

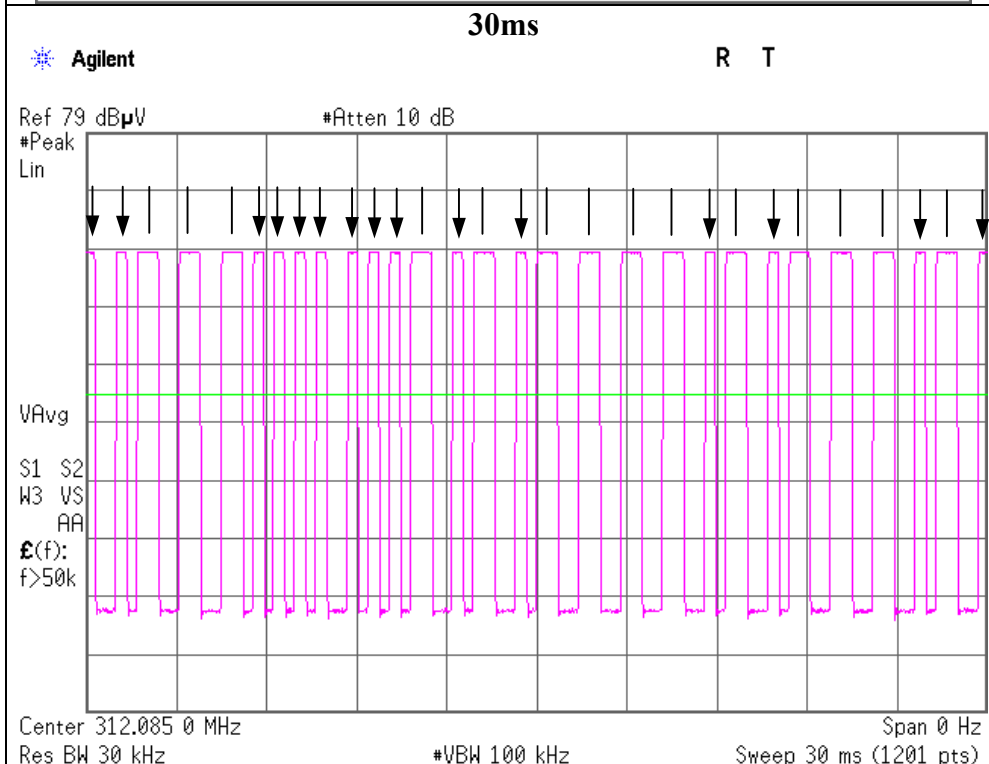
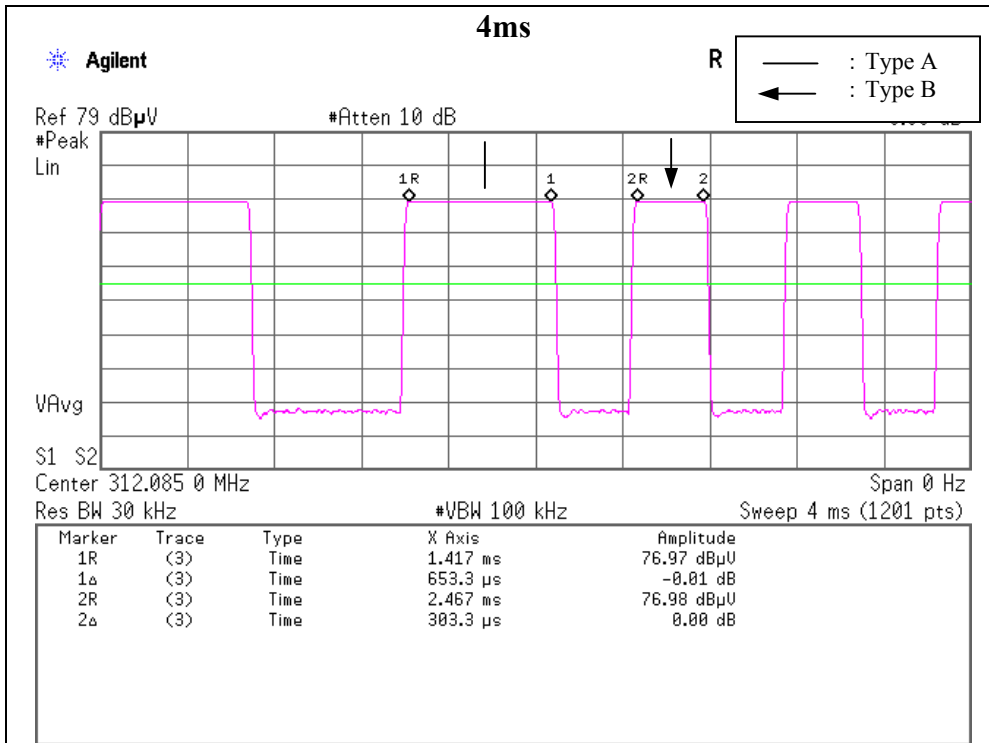
(Total)

ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
45.6552	100.0000	0.4565	-6.8

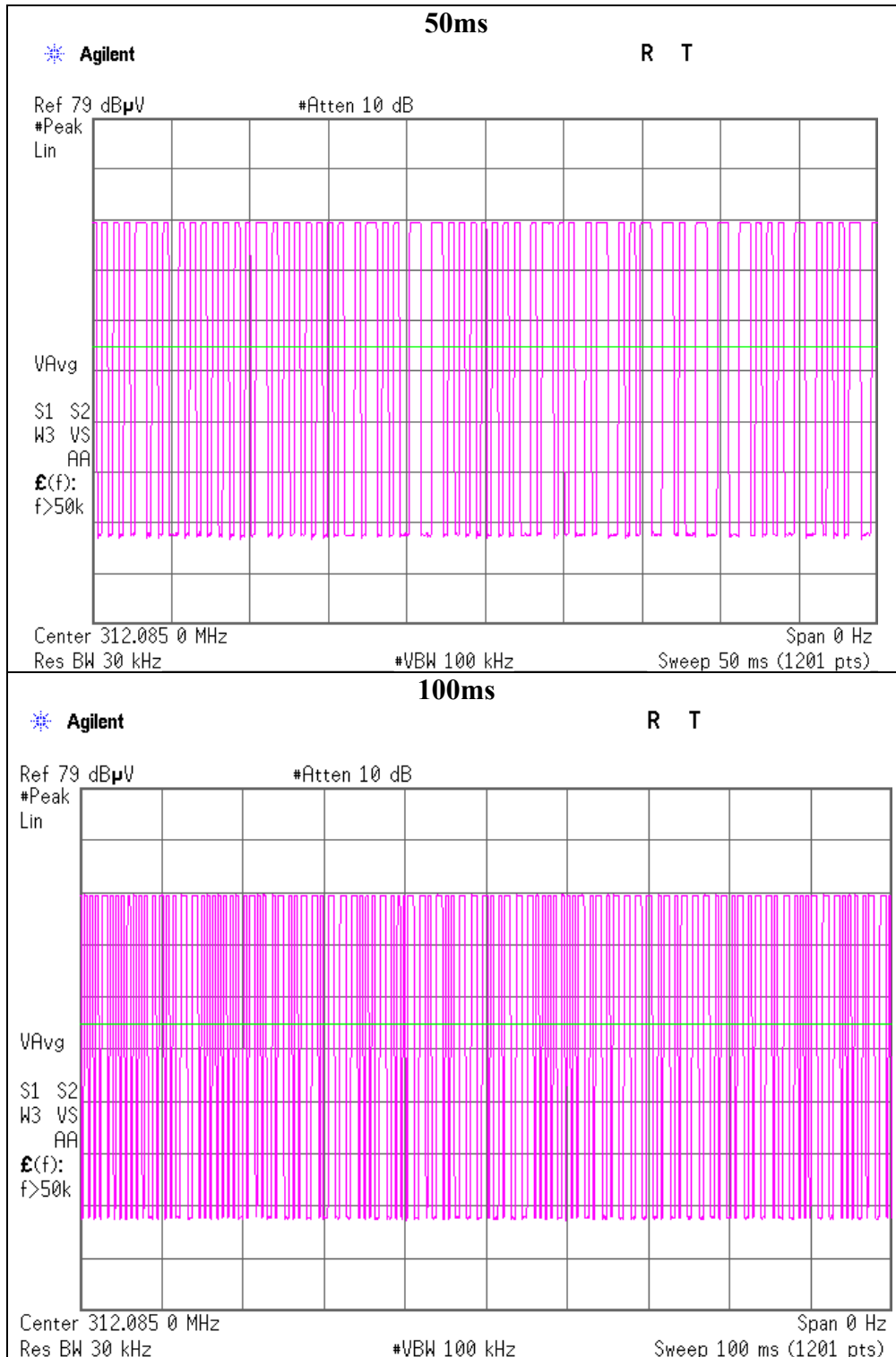
*3)ON time = Type A's ON time (in 100ms) + Type B's ON time (in 100ms)

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

Duty Cycle



Duty Cycle



Duty Cycle

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 30KE0044-HO-01
Date 07/11/2010
Temperature/ Humidity 25 deg.C./ 59%
Engineer Kazuya Yoshioka
Mode Normal use mode 314.35MHz

Type	Times	ON time(One pulse) [ms]	ON time(in 30ms) [ms]	ON time(in 100ms) [ms]
A	13	0.6533	8.493	28.310
B	17	0.3067	5.214	17.380

*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]
45.69	100.00	0.4569	-6.8

*3)ON time = Type A's ON time (in 100ms) + Type B's ON time (in 100ms)

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

UL Japan, Inc.

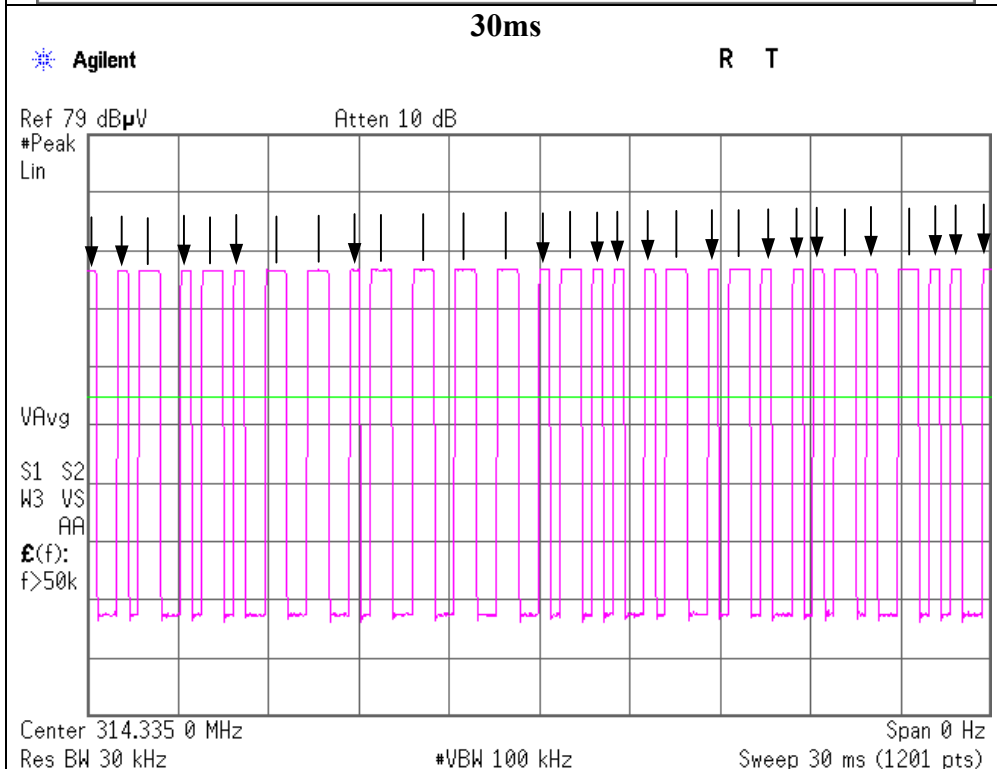
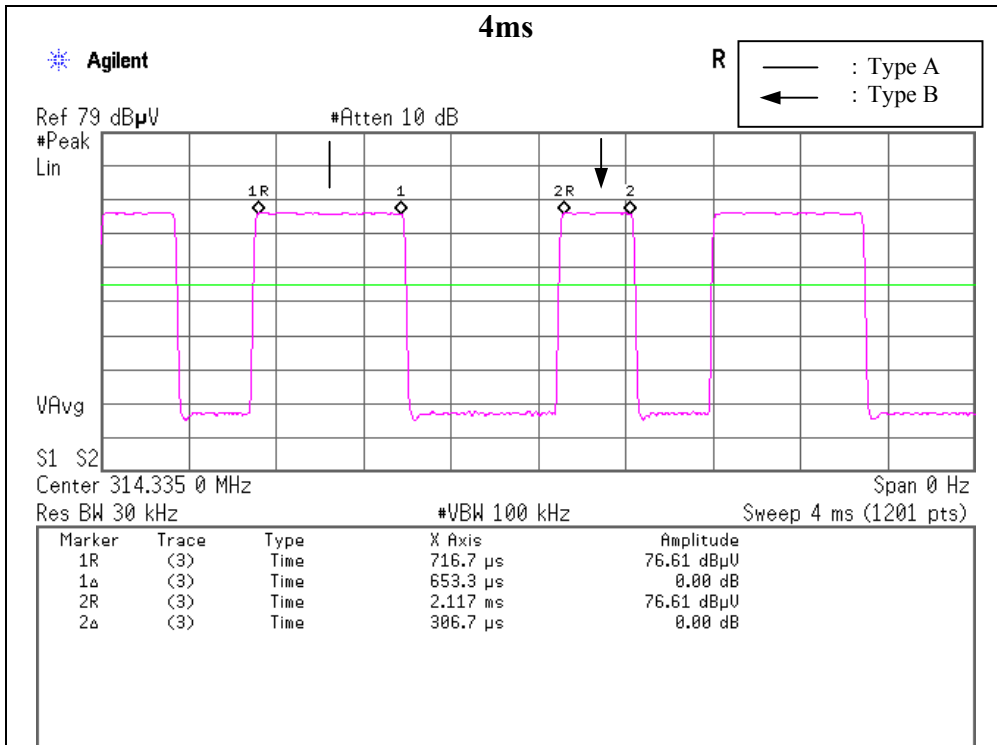
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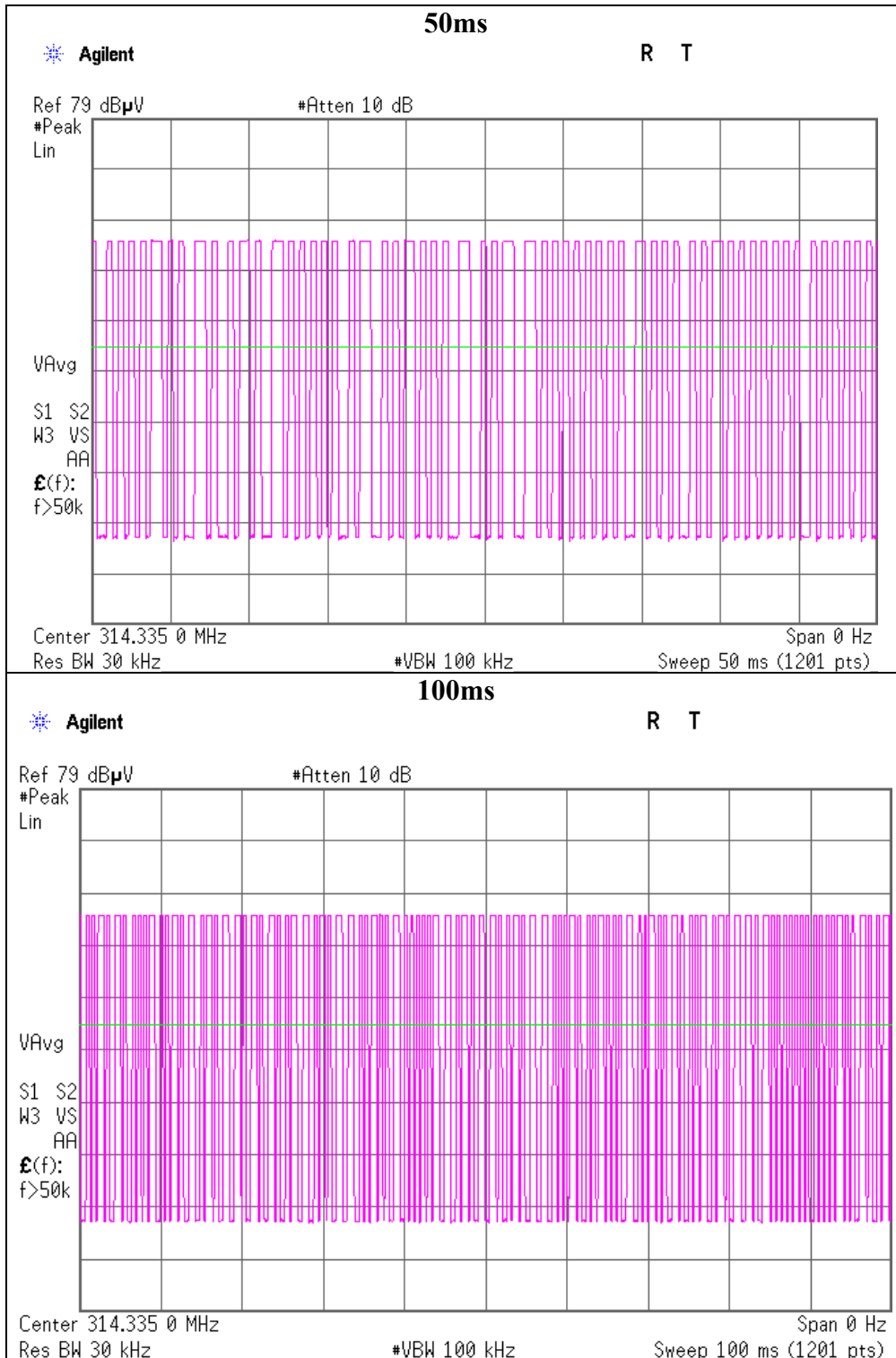
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Duty Cycle



Duty Cycle



APPENDIX 3:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2010/02/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2010/02/09 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2009/08/25 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2009/06/30 * 24
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2010/01/23 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2010/01/23 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2010/07/06 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2009/11/12 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2010/03/23 * 12
MSA-09	Spectrum Analyzer	Advantest	R3273	95090115	RE	2009/12/11 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2010/05/07 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	174410(1m) / 284655(5m)	RE	2010/01/25 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2010/03/03 * 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, 99% Occupied Bandwidth, -20dB bandwidth, Automatically deactivate and Duty cycle tests

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