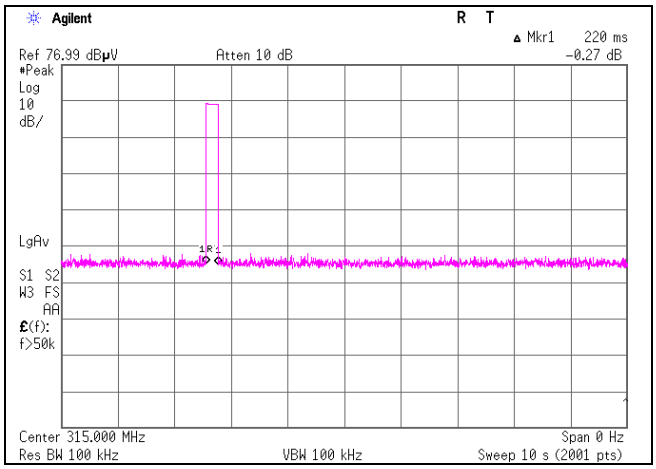
APPENDIX 2: Data of EMI test

Automatically deactivate

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	30CE0079-HO-01
Date	12/17/2009
Temperature/ Humidity	22 deg.C./ 33%
Engineer	Keisuke Kawamura
Mode	Normal use mode

Time of Transmitting [sec]	Limit [sec]	Result
0.22	5.00	Pass



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

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	30CE0079-HO-01
Date	12/17/2009
Temperature/ Humidity	22 deg.C./ 33%
Engineer	Keisuke Kawamura
Mode	Transmitting mode

PK

Frequency	Detector	Reading [dBuV]		Ant Factor	Loss	Gain	Duty Factor	Result [dBuV/m]		Limit	Margin [dB]		Remark Inside or Outside
[MHz]		Hor	Ver	[dB/m]	[dB]	[dB]	[dB]	Hor	Ver	[dBuV/m]	Hor	Ver	of Restricted Bands
315.000	PK	82.0	78.1	15.3	8.9	27.9	-	78.3	74.4	95.6	17.3	21.2	Carrier
630.000	PK	45.3	44.6	20.4	10.3	28.7	-	47.3	46.6	75.6	28.3	29.0	Outside
945.000	PK	41.7	39.3	23.4	11.5	27.9	-	48.7	46.3	75.6	26.9	29.3	Outside
1260.000	PK	45.6	46.2	25.1	2.1	33.3	-	39.5	40.1	75.6	36.1	35.5	Outside
1575.000	PK	44.1	46.8	25.7	2.3	32.9	-	39.2	41.9	73.9	34.7	32.0	Inside
1890.000	PK	57.1	59.0	26.1	2.5	32.5	-	53.2	55.1	75.6	22.4	20.5	Outside
2205.000	PK	59.2	58.0	26.7	2.6	32.4	-	56.1	54.9	73.9	17.8	19.0	Inside
2520.000	PK	56.1	56.3	27.4	2.8	32.4	-	53.9	54.1	75.6	21.7	21.5	Outside
2835.000	PK	48.6	48.7	28.1	3.0	32.3	-	47.4	47.5	73.9	26.5	26.4	Inside
3150.000	PK	50.9	51.7	28.5	3.1	32.1	-	50.4	51.2	75.6	25.2	24.4	Outside

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

PK with Duty factor

Frequency	Detector	Reading [dBuV]		Ant Factor	Loss	Gain	Duty Factor	Result [dBuV/m]		Limit	Margin [dB]		Remark
[MHz]		Hor	Ver	[dB/m]	[dB]	[dB]	[dB]	Hor	Ver	[dBuV/m]	Hor	Ver	
315.000	PK	82.0	78.1	15.3	8.9	27.9	-6.1	72.2	68.3	75.6	3.4	7.3	Carrier
630.000	PK	45.3	44.6	20.4	10.3	28.7	-6.1	41.2	40.5	55.6	14.4	15.1	Outside
945.000	PK	41.7	39.3	23.4	11.5	27.9	-6.1	42.6	40.2	55.6	13.0	15.4	Outside
1260.000	PK	45.6	46.2	25.1	2.1	33.3	-6.1	33.4	34.0	55.6	22.2	21.6	Outside
1575.000	PK	44.1	46.8	25.7	2.3	32.9	-6.1	33.1	35.8	53.9	20.8	18.1	Inside
1890.000	PK	57.1	59.0	26.1	2.5	32.5	-6.1	47.1	49.0	55.6	8.5	6.6	Outside
2205.000	PK	59.2	58.0	26.7	2.6	32.4	-6.1	50.0	48.8	53.9	3.9	5.1	Inside
2520.000	PK	56.1	56.3	27.4	2.8	32.4	-6.1	47.8	48.0	55.6	7.8	7.6	Outside
2835.000	PK	48.6	48.7	28.1	3.0	32.3	-6.1	41.3	41.4	53.9	12.6	12.5	Inside
3150.000	PK	50.9	51.7	28.5	3.1	32.1	-6.1	44.3	45.1	55.6	11.3	10.5	Outside

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

-20dB and 99% Occupied Bandwidth

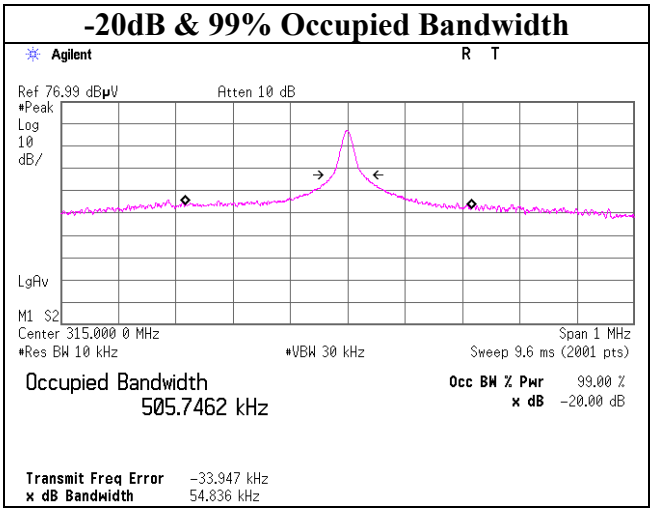
Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	30CE0079-HO-01
Date	12/17/2009
Temperature/ Humidity	22 deg.C./ 33%
Engineer	Keisuke Kawamura
Mode	Transmitting mode

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

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
54.84	787.50	Pass

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
505.75	787.50	Pass

-20dB & 99% Occupied Bandwidth



Duty Cycle

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	30CE0079-HO-01
Date	12/17/2009
Temperature/ Humidity	22 deg.C./ 33%
Engineer	Keisuke Kawamura
Mode	Transmitting mode

Type	Times	ON time(One pulse) [ms]	ON time(in 10ms) [ms]	ON time(in 100ms) [ms]
A	6	0.249	1.491	14.91
B	28	0.125	3.486	34.86

*1)ON time(in 10ms) = Times * ON time(One pulse)

*2)ON time(in 100ms)=ON time(in 10ms)*100/10

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

(Total)

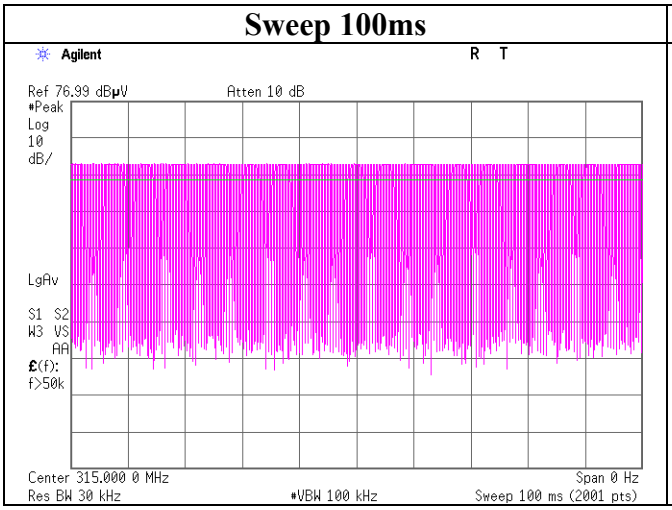
ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
49.77	100.00	0.50	-6.1

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

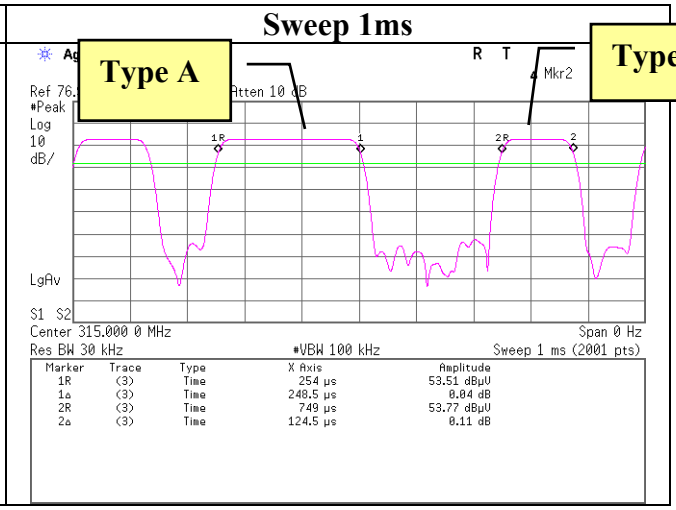
*5)Duty = $20\log_{10}$(ON time/Cycle)

Duty Cycle

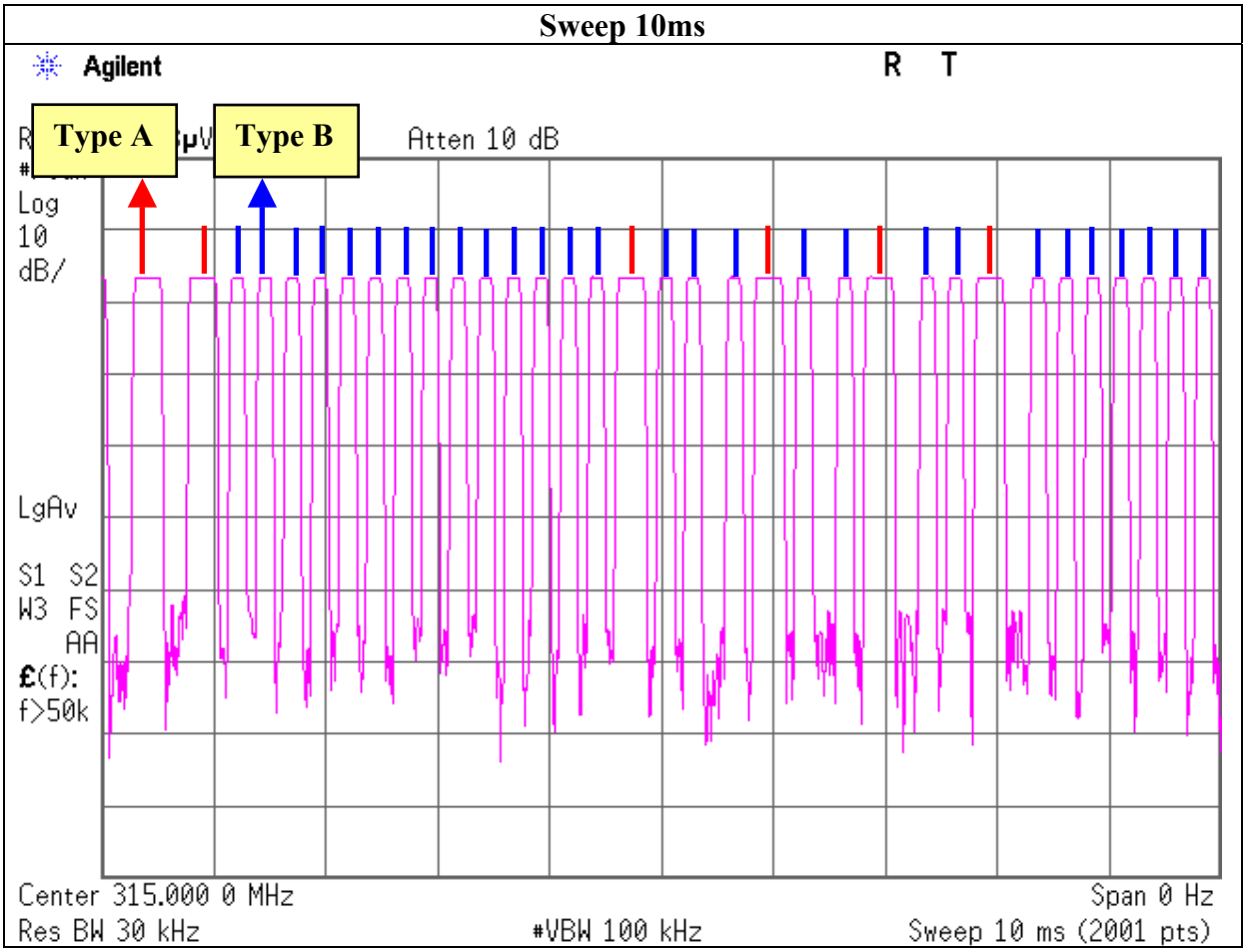
Sweep 100ms



Sweep 1ms



Sweep 10ms



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APPENDIX 3:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2009/08/17 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2009/02/05 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2009/11/20 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2009/04/14 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2009/10/05 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2009/10/05 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2009/02/16 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2009/11/12 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2009/09/02 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2009/01/31 * 12
MCC-47	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	295123(5m) / 287573(1m)	RE	2009/11/19 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2009/09/14 * 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