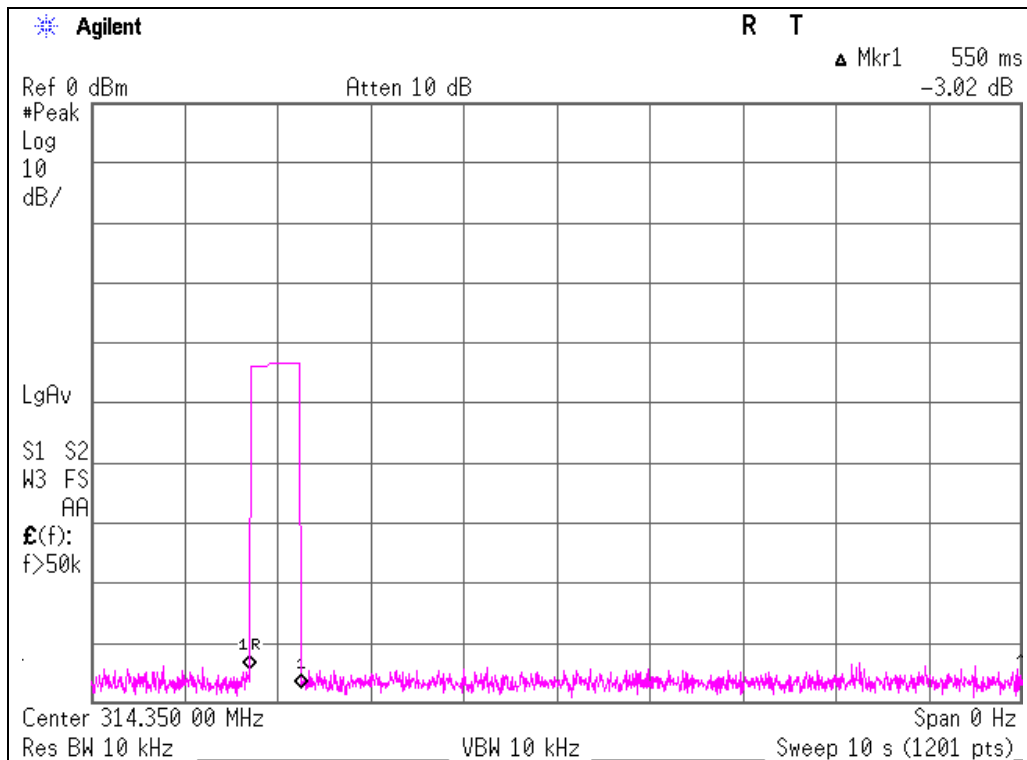


APPENDIX 2: Data of EMI test

Automatically deactivate

Test place	Head Office EMC Lab. No.1 Semi Anechoic Chamber
Report No.	31IE0226-HO-01
Date	04/28/2011
Temperature/ Humidity	21 deg.C / 53%RH
Engineer	Tomohisa Nakagawa
Mode	Normal Use mode

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



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

Test place	Head Office EMC Lab. No.1 Semi Anechoic Chamber
Report No.	31IE0226-HO-01
Date	04/28/2011
Temperature/ Humidity	21 deg.C / 53%RH
Engineer	Tomohisa Nakagawa
Mode	Transmitting mode

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	
314.350	PK	87.3	84.6	15.2	10.5	40.5	-	72.5	69.8	95.5	23.0	25.7	Carrier
628.700	PK	44.9	44.2	20.5	12.7	40.7	-	37.4	36.7	75.5	38.1	38.8	Outside
943.050	PK	43.0	42.9	23.0	14.4	40.2	-	40.2	40.1	75.5	35.3	35.4	Outside
1257.400	PK	47.2	47.1	24.7	1.9	37.0	-	36.8	36.7	75.5	38.7	38.8	Outside
1571.750	PK	46.8	47.4	25.5	2.1	36.6	-	37.8	38.4	73.9	36.1	35.5	Inside
1886.100	PK	46.5	46.7	26.5	2.3	36.3	-	39.0	39.2	75.5	36.5	36.3	Outside
2200.450	PK	46.5	46.6	26.9	2.5	36.2	-	39.7	39.8	73.9	34.2	34.1	Inside
2514.800	PK	46.1	45.8	27.0	2.7	36.3	-	39.5	39.2	75.5	36.0	36.3	Outside
2829.150	PK	48.0	46.0	27.2	2.8	36.4	-	41.6	39.6	73.9	32.3	34.3	Inside
3143.500	PK	47.6	47.2	27.7	3.0	36.4	-	41.9	41.5	75.5	33.6	34.0	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	
314.350	PK	87.3	84.6	15.2	10.5	40.5	-5.5	67.0	64.3	75.5	8.5	11.2	Carrier
628.700	PK	44.9	44.2	20.5	12.7	40.7	-5.5	31.9	31.2	55.5	23.6	24.3	Outside
943.050	PK	43.0	42.9	23.0	14.4	40.2	-5.5	34.7	34.6	55.5	20.8	20.9	Outside
1257.400	PK	47.2	47.1	24.7	1.9	37.0	-5.5	31.3	31.2	55.5	24.2	24.3	Outside
1571.750	PK	46.8	47.4	25.5	2.1	36.6	-5.5	32.3	32.9	53.9	21.6	21.0	Inside
1886.100	PK	46.5	46.7	26.5	2.3	36.3	-5.5	33.5	33.7	55.5	22.0	21.8	Outside
2200.450	PK	46.5	46.6	26.9	2.5	36.2	-5.5	34.2	34.3	53.9	19.7	19.6	Inside
2514.800	PK	46.1	45.8	27.0	2.7	36.3	-5.5	34.0	33.7	55.5	21.5	21.8	Outside
2829.150	PK	48.0	46.0	27.2	2.8	36.4	-5.5	36.1	34.1	53.9	17.8	19.8	Inside
3143.500	PK	47.6	47.2	27.7	3.0	36.4	-5.5	36.4	36.0	55.5	19.1	19.5	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.

* The noise measured with PK detect was pulse emission.

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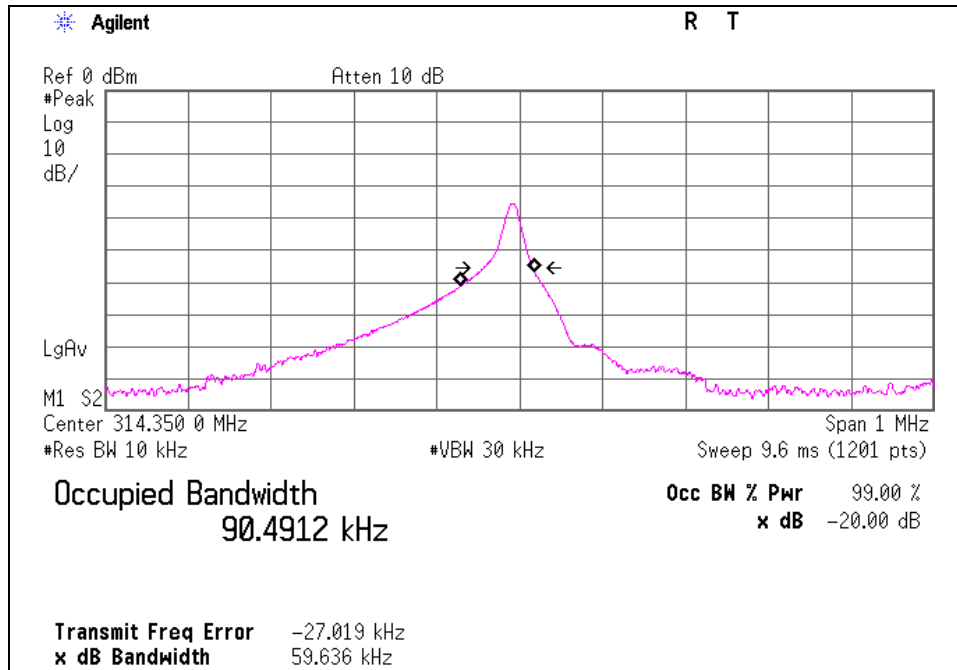
-20dB and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.1 Semi Anechoic Chamber
Report No.	31IE0226-HO-01
Date	04/28/2011
Temperature/ Humidity	21 deg.C / 53%RH
Engineer	Tomohisa Nakagawa
Mode	Transmitting mode

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

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
59.64	785.88	Pass

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
90.49	785.88	Pass



Duty Cycle

Test place	Head Office EMC Lab. No.1 Semi Anechoic Chamber
Report No.	31IE0226-HO-01
Date	04/28/2011
Temperature/ Humidity	21 deg.C / 53%RH
Engineer	Tomohisa Nakagawa
Mode	Transmitting mode

Type	Times	ON time(One pulse) [ms]	ON time(in 50ms) [ms]
A	4	1.425	5.70
B	29	0.717	20.79

*1)ON time(in 100ms) = Times * ON time(One pulse)*2

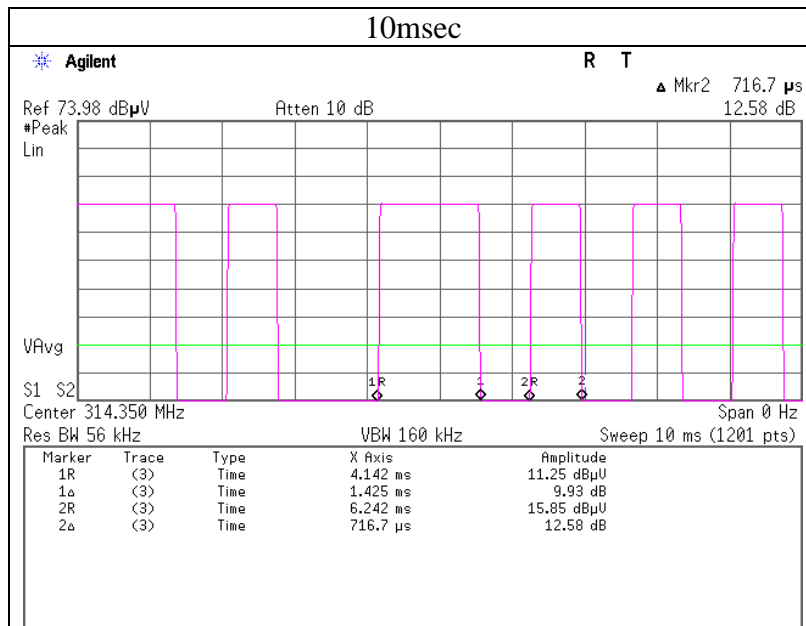
*2)The train of pulses was exceeding 100msec, and that sampled 100msec was the worst case against the pulse t

(Total)

ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
52.98	100.00	0.53	-5.5

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

*4)Duty = 20log₁₀(ON time/Cycle)



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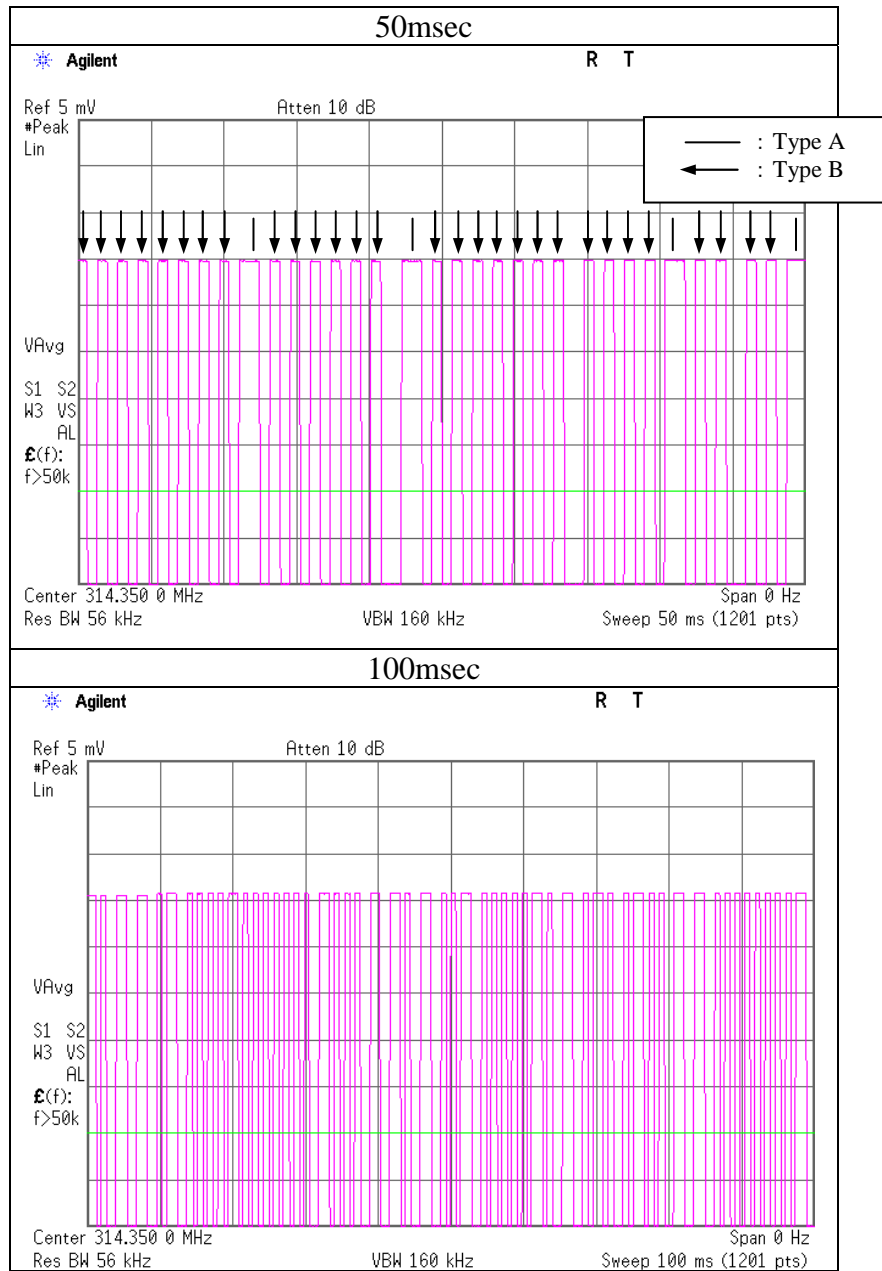
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Duty Cycle



Radiated Emission

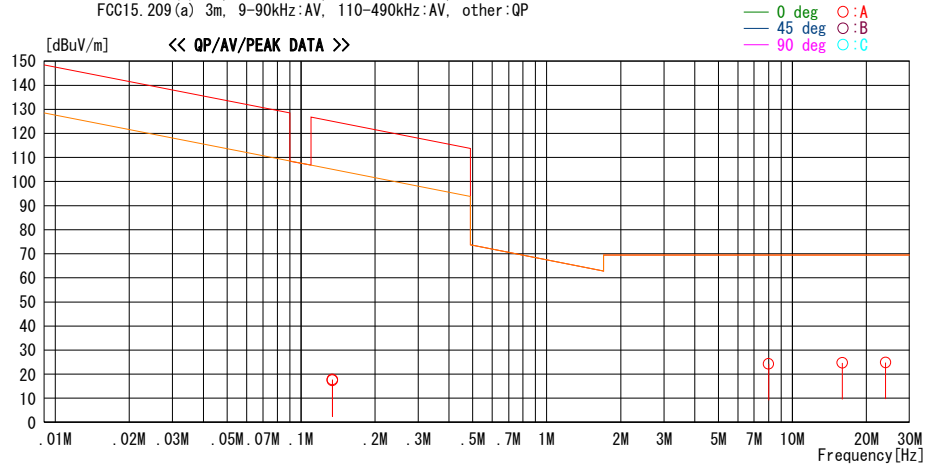
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 1 Semi Anechoic Chamber
Date : 2011/04/28

Report No. : 31IE0226-H0-01
Temp. / Humi. : 23deg. C / 32% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : Rx 134.2 kHz

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.209(a) 3m, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna [deg]	Table		Comment
										[deg]		
0.13420	24.0	PEAK	19.9	6.0	32.2	17.7	125.1	107.4	0	A	0	NS
0.13420	23.8	AV	19.9	6.0	32.2	17.5	105.1	87.6	0	A	0	NS
8.00000	30.0	QP	19.6	6.8	32.2	24.2	69.5	45.3	0	A	0	NS
16.00000	30.3	QP	19.4	7.2	32.2	24.7	69.5	44.8	0	A	0	NS
24.00000	29.0	QP	20.5	7.6	32.2	24.9	69.5	44.6	0	A	0	NS

CHART: WITH FACTOR ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTN.) - GAIN(AMP.)
NS : No signal detected

Radiated Emission

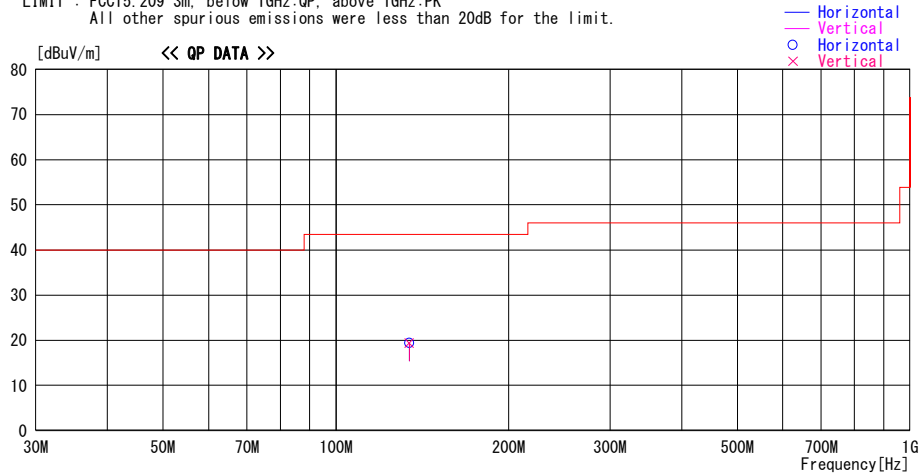
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2011/04/28

Report No. : 31IE0226-H0-01
Temp./Humi. : 21 deg.C / 53% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : Rx 134.2 kHz

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
134.200	37.9	QP	13.3	-31.8	19.4	0	100	Hori.	43.5	24.1	NS
134.200	37.9	QP	13.3	-31.8	19.4	0	100	Vert.	43.5	24.1	NS

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - GAIN(AMP)
NS : No signal detected

APPENDIX 3:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2010/07/02 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	MOS01	RE	2011/02/23 * 12
MJM-01	Measure	KDS	ES19-55	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-01	Test Receiver	Rohde & Schwarz	ES140	100084	RE	2010/12/07 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2010/10/15 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2010/10/16 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2010/11/05 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/Agilent/T SJ	-	-	RE	2010/10/14 * 12
MPA-20	Pre Amplifier	Elena	EPA-4020YA	030801	RE	2011/03/27 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2010/10/15 * 12
MCC-30	Coaxial cable	UL Japan	-	-	RE	2010/07/20 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFM-E421(Switcher)	-/01068(Switcher)	RE	2011/01/16 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2010/06/29 * 12
MCC-18	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	148048-143(1m) / 292410(5m)	RE	2010/09/30 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2011/02/24 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2010/11/18 * 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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