

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE / ME	2005/11/14 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2005/10/10 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/10/14 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	RE / ME	2004/11/25 * 24
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	ME	2005/12/06 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agilent/TSJ	-	ME	2005/12/18 * 12
MCC-31	coaxial cable	ULApex	-	ME	2006/05/29 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE / ME	2006/05/27 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2005/12/16 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE / ME	2005/11/10 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2006/01/09 * 12
MCC-18	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2006/02/02 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2006/02/09 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/Agilent/TSJ	-	RE	2006/02/20 * 12
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE/ME	-
MCC-16	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2006/02/02 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

ME: Spurious emission

RE: Spurious emission

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MF060b(24.05.06)

APPENDIX 3: Data of EMI test

Radiated Emission below 30MHz (Fundamental)
125kHz Transmitting

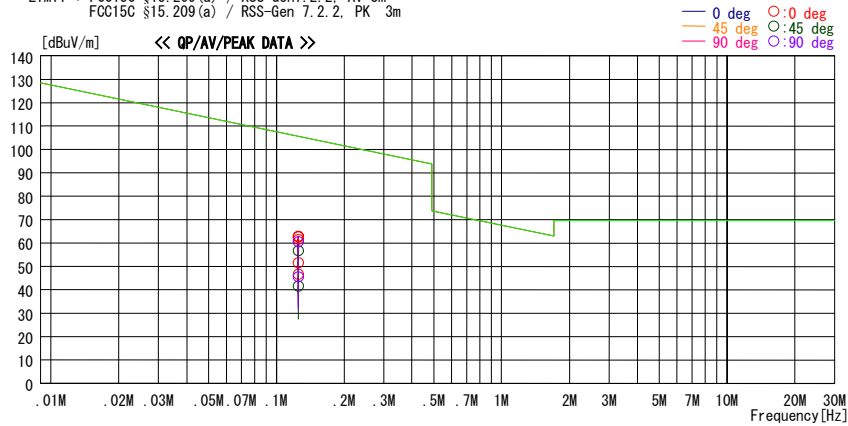
DATA OF MAGNETIC RADIATED EMISSION TEST

UL Apex Co., LTD. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2006/04/14 23:20:14

Applicant : OMRON Corporation Report No. : 26GE0265-HO
Kind of EUT : RAM Power : DC 12V (Car Battery)
Model No. : G8D-640M-RAM-N Temp./Humi. : 20deg.C / 44%
Serial No. : KRO002 Operator : Norihisa Hashimoto

Mode / Remarks : Transmitting 125kHz

LIMIT : FCC15C §15.209(a) / RSS-Gen7.2.2, AV 3m
FCC15C §15.209(a) / RSS-Gen 7.2.2, PK 3m



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]
0.12515	69.1	PEAK	19.5	0.2	26.2	62.6	105.7	43.1	0deg	181
0.12515	68.1	PEAK	19.5	0.2	26.2	61.6	105.7	44.1	0deg	181
0.12515	69.5	PEAK	19.5	0.2	26.2	63.0	105.7	42.7	0deg	181
0.12515	53.2	AV	19.5	0.2	26.2	46.7	85.7	39.0	0deg	181
0.12515	58.2	QP	19.5	0.2	26.2	51.7	105.7	54.0	0deg	181
0.12515	63.2	PEAK	19.5	0.2	26.2	56.7	105.7	49.0	45deg	250
0.12515	67.0	PEAK	19.5	0.2	26.2	60.5	105.7	45.2	90deg	27
0.12515	48.1	AV	19.5	0.2	26.2	41.6	85.7	44.1	45deg	250
0.12515	52.1	AV	19.5	0.2	26.2	45.6	85.7	40.1	90deg	27

CHART : WITH FACTOR ANT TYPE : LOOP
CALCULATION : READING + ANT FACTOR + LOSS (CABLE + ATTEN. -AMP.)

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Radiated Emission below 30MHz (Spurious Emission)
125kHz Transmitting

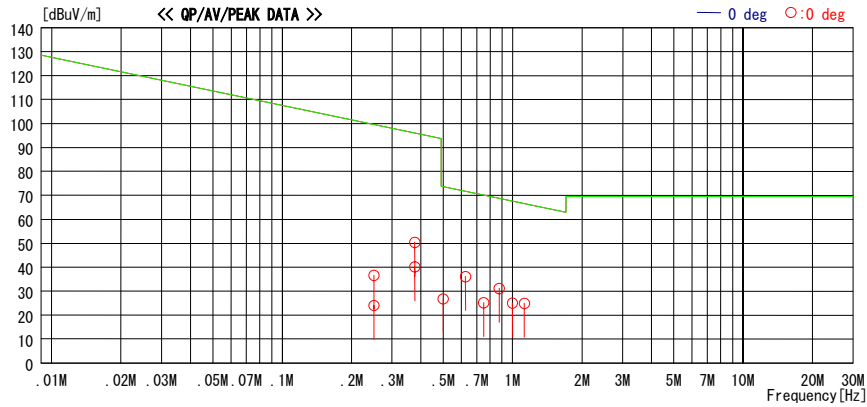
DATA OF MAGNETIC RADIATED EMISSION TEST

UL Apex Co.,LTD. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2006/04/14 23:20:14

Applicant : OMRON Corporation
Kind of EUT : RAM
Model No. : G8D-640M-RAM-N
Serial No. : KR0002
Report No. : 26GE0265-HO
Power : DC 12V (Car Battery)
Temp./Humi. : 20deg.C / 44%
Operator : Norihisa Hashimoto

Mode / Remarks : Transmitting 125kHz / Max-axis (Z)

LIMIT : FCC15C §15.209(a) / RSS-Gen 7.2.2.PK, 3m
FCC15C §15.209(a) / RSS-Gen 7.2.2.AV 3m



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]
0.25000	44.2	PEAK	19.5	0.3	27.3	36.7	99.6	62.9	Odeg	181
0.25000	31.6	AV	19.5	0.3	27.3	24.1	79.6	55.5	Odeg	181
0.37596	58.2	PEAK	19.5	0.3	27.7	50.3	96.1	45.8	Odeg	181
0.37596	48.1	AV	19.5	0.3	27.7	40.2	76.1	35.9	Odeg	181
0.50000	34.6	QP	19.5	0.4	27.8	26.7	73.6	46.9	Odeg	181
0.62500	44.2	QP	19.5	0.3	27.9	36.1	71.7	35.6	Odeg	181
0.75000	33.3	QP	19.5	0.3	27.9	25.2	70.1	44.9	Odeg	181
0.87500	39.1	QP	19.5	0.4	27.9	31.1	68.8	37.7	Odeg	181
1.00000	33.2	QP	19.5	0.2	27.9	25.0	67.6	42.6	Odeg	181
1.12500	33.0	QP	19.5	0.3	27.9	24.9	66.6	41.7	Odeg	181

CHART : WITH FACTOR ANT TYPE : LOOP
CALCULATION : READING + ANT FACTOR + LOSS (CABLE + ATTEN. -AMP.)

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Radiated Emission above 30MHz (Spurious Emission)
125kHz Transmitting

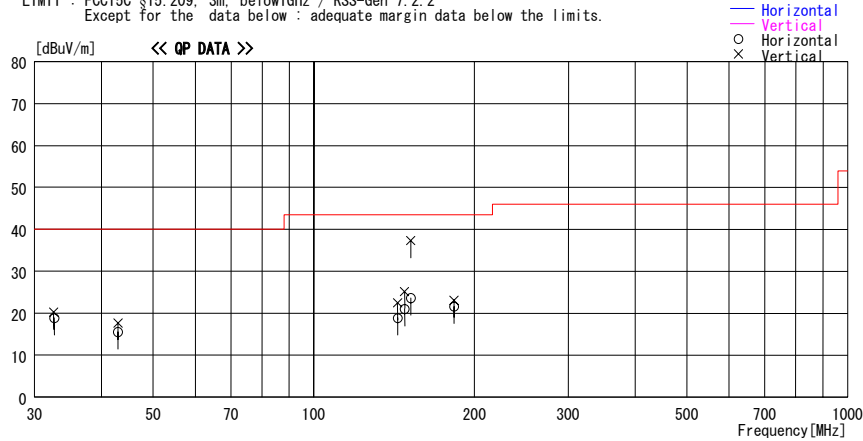
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2006/04/15 05:09:28

Company : OMRON Corporation Report No. : 26GE0265-HO
Kind of EUT : RAM Power : DC12V (Car Battery)
Model No. : G8D-640M-RAM-N Temp./Humi. : 20deg. C. / 44%
Serial No. : KR0002 Operator : Norihisa Hashimoto

Mode / Remarks : Transmitting 125kHz Max-axis(Z)

LIMIT : FCC15C §15.209, 3m, below1GHz / RSS-Gen 7.2.2
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]
32.660	22.1	QP	17.5	-20.8	18.8	135	300	Hori.	40.0	21.2
32.564	23.5	QP	17.5	-20.8	20.2	105	100	Vert.	40.0	19.8
42.989	25.2	QP	12.9	-20.4	17.7	357	100	Vert.	40.0	22.3
42.989	23.0	QP	12.9	-20.4	15.5	229	300	Hori.	40.0	24.5
143.627	26.1	QP	14.9	-18.5	22.5	23	100	Vert.	43.5	21.0
143.650	22.4	QP	14.9	-18.5	18.8	24	300	Hori.	43.5	24.7
147.956	24.2	QP	15.2	-18.4	21.0	315	300	Hori.	43.5	22.5
147.956	28.4	QP	15.2	-18.4	25.2	358	100	Vert.	43.5	18.3
151.938	26.5	QP	15.4	-18.3	23.6	185	300	Hori.	43.5	19.9
151.938	40.2	QP	15.4	-18.3	37.3	153	100	Vert.	43.5	6.2
183.126	22.7	QP	16.7	-17.8	21.6	84	300	Hori.	43.5	21.9
183.126	24.2	QP	16.7	-17.8	23.1	356	100	Vert.	43.5	20.4

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)

Radiated Emission (315MHz Receiving)

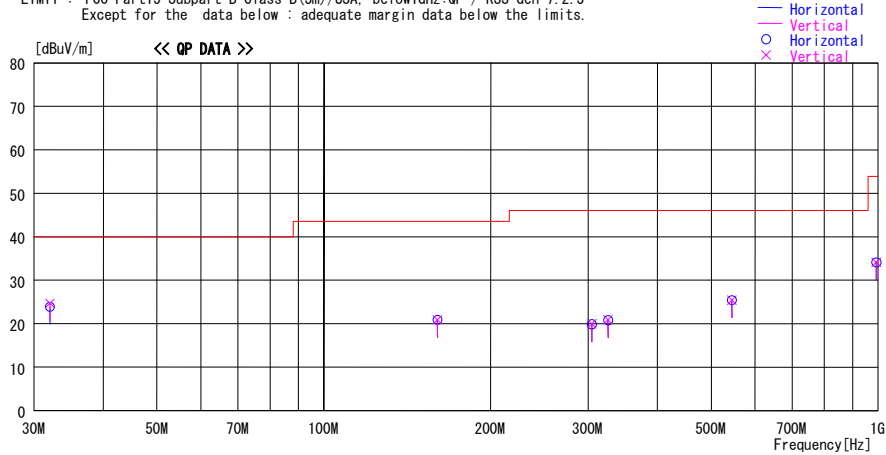
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2006/04/21 20:51:37

Company : OMRON Corporation
Kind of EUT : RAM
Model No. : G8D-640M-RAM-N
Serial No. : KR0001
Report No. : 26GE0265-HO
Power : DC12V (Car Battery)
Temp./Humi. : 20deg.C. / 31%
Operator : Mitsuru Fujimura

Mode / Remarks : RX-UHF (315MHz)

LIMIT : FCC Part15 Subpart B Class B (3m)/USA, below1GHz:QP / RSS-Gen 7.2.3
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Loss & Gain [dB]						
32.041	27.1	QP	17.8	-21.0	23.9	349	300	Hori.	40.0	16.1
32.042	27.9	QP	17.8	-21.0	24.7	8	100	Vert.	40.0	15.3
160.205	23.1	QP	15.9	-18.2	20.8	0	300	Hori.	43.5	22.7
160.205	23.1	QP	15.9	-18.2	20.8	0	100	Vert.	43.5	22.7
304.300	22.1	QP	14.3	-16.5	19.9	0	100	Hori.	46.0	26.2
304.300	22.2	QP	14.3	-16.5	20.0	0	100	Vert.	46.0	26.0
325.700	22.1	QP	15.1	-16.4	20.8	0	100	Hori.	46.0	25.3
325.700	22.2	QP	15.1	-16.4	20.9	0	100	Vert.	46.0	25.1
544.697	23.3	QP	18.4	-16.3	25.4	0	100	Hori.	46.0	20.6
544.697	23.3	QP	18.4	-16.3	25.4	0	100	Vert.	46.0	20.6
993.271	23.8	QP	23.7	-13.4	34.1	0	100	Vert.	53.9	19.8
993.271	23.8	QP	23.7	-13.4	34.1	0	100	Hori.	53.9	19.8

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)

Radiated Emission (315MHz Receiving)

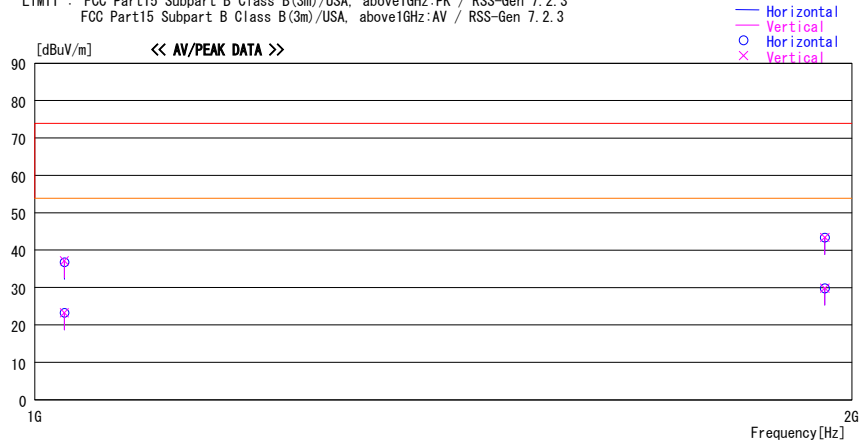
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2006/04/22 00:04:04

Company : OMRON Corporation Report No. : 26GE0265-HO
Kind of EUT : RAM Power : DC12V (Car Battery)
Model No. : G8D-640M-RAM-N Temp./Humi. : 20deg. C. / 31%
Serial No. : KR0001 Operator : Mitsuru Fujimura

Mode / Remarks : RX-UHF (315MHz)

LIMIT : FCC Part15 Subpart B Class B(3m)/USA, above1GHz:PK / RSS-Gen 7.2.3
FCC Part15 Subpart B Class B(3m)/USA, above1GHz:AV / RSS-Gen 7.2.3



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Loss & Gain [dB]						
1025.312	48.6	PK	23.3	-35.1	36.8	0	100	Hori.	73.9	37.1
1025.312	49.0	PK	23.3	-35.1	37.2	0	100	Vert.	73.9	36.7
1025.312	35.0	AV	23.3	-35.1	23.2	0	100	Vert.	53.9	30.7
1025.312	35.1	AV	23.3	-35.1	23.3	0	100	Hori.	53.9	30.7
1954.501	33.1	AV	30.8	-34.0	29.9	0	100	Hori.	53.9	24.0
1954.501	33.1	AV	30.8	-34.0	29.9	0	100	Vert.	53.9	24.0
1954.501	46.6	PK	30.8	-34.0	43.4	0	100	Vert.	73.9	30.5
1954.501	46.6	PK	30.8	-34.0	43.4	0	100	Hori.	73.9	30.5

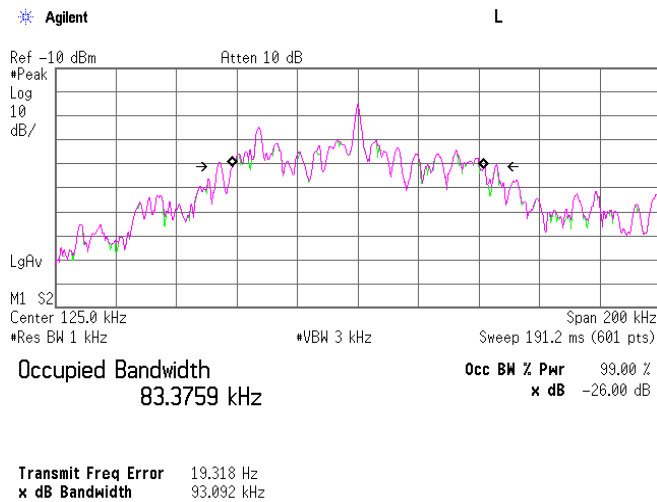
CHART: WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

-26dB Bandwidth

UL Apex Co., Ltd.
 Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : OMRON Corporation	REPORT NO : 26GE0265-HO
EQUIPMENT : RAM	REGULATION : Reference data
MODEL : G8D-640M-RAM-N	TEST DISTANCE : 3m
S/N : KR0002	DATE : 04/14/2006
POWER : DC 12V	TEMPERATURE : 22 deg.C
MODE : Tx	HUMIDITY : 32 %
: Ant-Max	Engineer : Norihisa Hashimoto

	FREQ	-26dB Bandwidth
	[kHz]	[kHz]
	125.0	93.092



99% Occupied Bandwidth

UL Apex Co., Ltd.
 Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : OMRON Corporation	REPORT NO : 26GE0265-HO
EQUIPMENT : RAM	REGULATION : RSS-Gen 4.4.1
MODEL : G8D-640M-RAM-N	TEST DISTANCE : 3m
S/N : KR0002	DATE : 04/14/2006
POWER : DC 12V	TEMPERATURE : 22 deg.C
MODE : Tx	HUMIDITY : 32 %
: Ant-Max	Engineer : Norihisa Hashimoto

	FREQ	99% Occupid Bandwidth
	[kHz]	[kHz]
	125.0	83.376

