

**APPENDIX 2: Data of EMI test**

**Radiated Emission below 30MHz (Fundamental and Spurious Emission)**

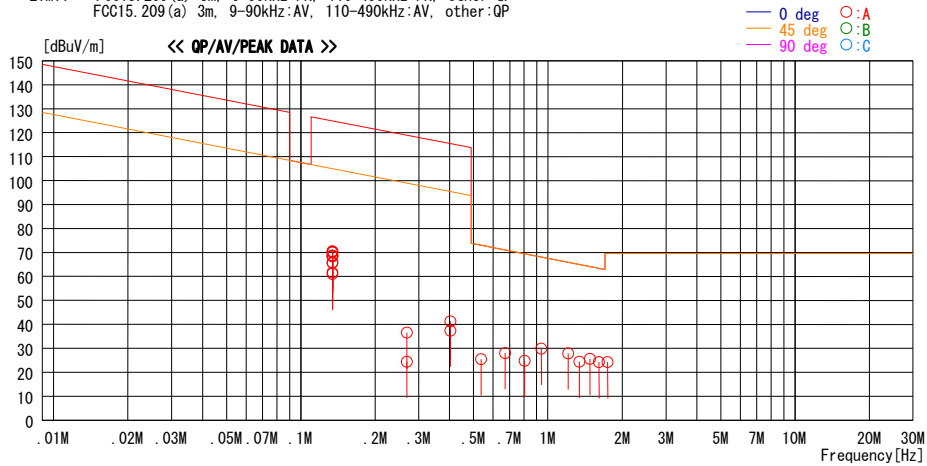
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber  
Date : 2009/06/11

Company : ASAHI DENSO CO., LTD. Report No. : 29JE0046-HO-01  
Kind of EUT : Immobilizer Power : DC 12V  
Model No. : KZ44 Temp./ Humi. : 23deg. C. / 56%  
Serial No. : 9604-15 Engineer : Tomohisa Nakagawa

Mode / Remarks : Transmitting 134.2kHz / EUT worst position : Ant X-axis , EUT X-axis

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.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
0.13420	82.8	PEAK	19.7	0.1	32.2	70.4	125.0	54.6	0	A	0
0.13420	82.7	AV	19.7	0.1	32.2	70.3	105.0	34.7	0	A	0
0.13420	81.2	PEAK	19.7	0.1	32.2	68.8	125.0	56.2	45	A	135
0.13420	81.0	AV	19.7	0.1	32.2	68.6	105.0	36.4	45	A	135
0.13420	78.2	PEAK	19.7	0.1	32.2	65.8	125.0	59.2	90	A	277
0.13420	78.1	AV	19.7	0.1	32.2	65.7	105.0	39.3	90	A	277
0.13420	80.9	PEAK	19.7	0.1	32.2	68.5	125.0	56.5	135	A	228
0.13420	80.8	AV	19.7	0.1	32.2	68.4	105.0	36.6	135	A	228
0.13420	74.1	PEAK	19.7	0.1	32.2	61.7	125.0	63.3	0	A	0 Loop Hor
0.13420	73.5	AV	19.7	0.1	32.2	61.1	105.0	43.9	0	A	0 Loop Hor
0.13420	82.6	PEAK	19.7	0.1	32.2	70.2	125.0	54.8	0	A	0 Without Key
0.13420	82.6	AV	19.7	0.1	32.2	70.2	105.0	34.8	0	A	0 Without Key
0.26840	48.9	PEAK	19.5	0.2	32.1	36.5	119.0	82.5	0	A	0
0.26840	36.8	AV	19.5	0.2	32.1	24.4	99.0	74.6	0	A	0
0.40260	53.7	PEAK	19.5	0.2	32.1	41.3	115.5	74.2	0	A	357
0.40260	49.9	AV	19.5	0.2	32.1	37.5	95.5	58.0	0	A	357
0.53680	38.0	QP	19.4	0.2	32.1	25.5	73.0	47.5	0	A	0 NS
0.67100	40.6	QP	19.4	0.2	32.1	28.1	71.1	43.0	0	A	6
0.80520	37.3	QP	19.4	0.2	32.1	24.8	69.5	44.7	0	A	0 NS
0.93940	42.4	QP	19.3	0.3	32.1	29.9	68.1	38.2	0	A	359
1.20780	40.4	QP	19.3	0.3	32.1	27.9	65.9	38.0	0	A	364
1.34200	36.8	QP	19.4	0.3	32.1	24.4	65.0	40.6	0	A	0 NS
1.47620	38.1	QP	19.4	0.3	32.1	25.7	64.2	38.5	0	A	168
1.61040	36.7	QP	19.4	0.3	32.1	24.3	63.4	39.1	0	A	0 NS
1.74460	36.6	QP	19.4	0.3	32.1	24.2	69.5	45.3	0	A	0 NS

CHART: WITH FACTOR, ANT TYPE: LOOP, Except for the data below: adequate margin data below the limits.  
CALCULATION: RESULT[dBuV] = READING[dBuV] + ANT FACTOR[dB] + LOSS[dB] (CABLE + ATTN. - AMP.)  
\* NS: Non Signal

\*The test result is rounded off to one or two decimal places, so some differences might be observed.

**Radiated Emission above 30MHz (Spurious Emission)**

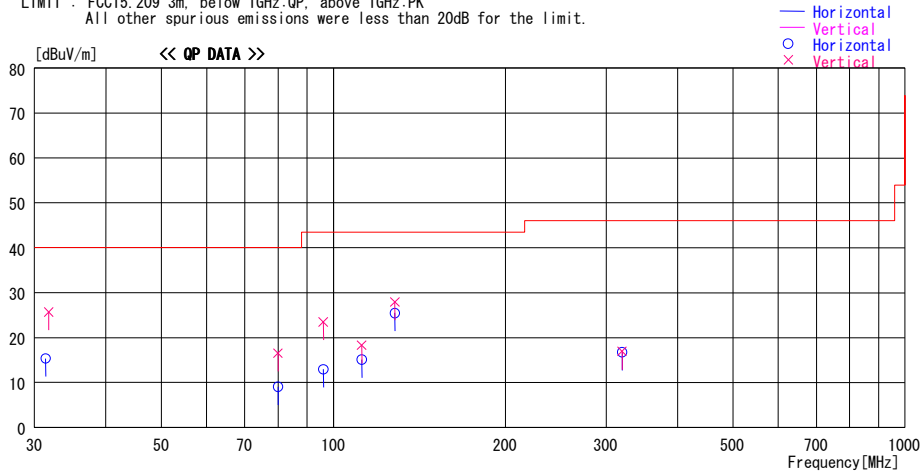
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2009/06/11

Company : ASAHI DENSO CO., LTD  
Kind of EUT : Immobilizer  
Model No. : KZ44  
Serial No. : 9604-15  
Report No. : 29JE0046-HO-01  
Power : DC 12V  
Temp./Humi. : 23 deg. C. / 56 %  
Engineer : Tomohisa Nakagawa

Mode / Remarks : Transmitting 134.2kHz / EUT worst position :Ant X-axis , EUT X-axis

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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
31.406	22.9	QP	17.5	-25.0	15.4	0	100	Hori.	40.0	24.6	
31.757	33.3	QP	17.4	-25.0	25.7	0	100	Vert.	40.0	14.3	
80.065	27.0	QP	6.2	-24.1	9.1	5	213	Hori.	40.0	30.9	
80.005	34.4	QP	6.2	-24.1	16.5	353	100	Vert.	40.0	23.5	
96.080	27.9	QP	9.0	-24.0	12.9	184	334	Hori.	43.5	30.6	
96.006	38.5	QP	9.0	-24.0	23.5	254	100	Vert.	43.5	20.0	
112.103	27.2	QP	11.7	-23.8	15.1	360	297	Hori.	43.5	28.4	
112.088	30.4	QP	11.7	-23.8	18.3	294	100	Vert.	43.5	25.2	
128.102	35.9	QP	13.2	-23.6	25.5	198	353	Hori.	43.5	18.0	
128.107	38.3	QP	13.2	-23.6	27.9	0	100	Vert.	43.5	15.6	
320.000	22.1	QP	16.6	-21.9	16.8	293	100	Hori.	46.0	29.2	
320.000	22.2	QP	16.6	-21.9	16.9	353	100	Vert.	46.0	29.1	

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)

\*The test result is rounded off to one or two decimal places, so some differences might be observed.

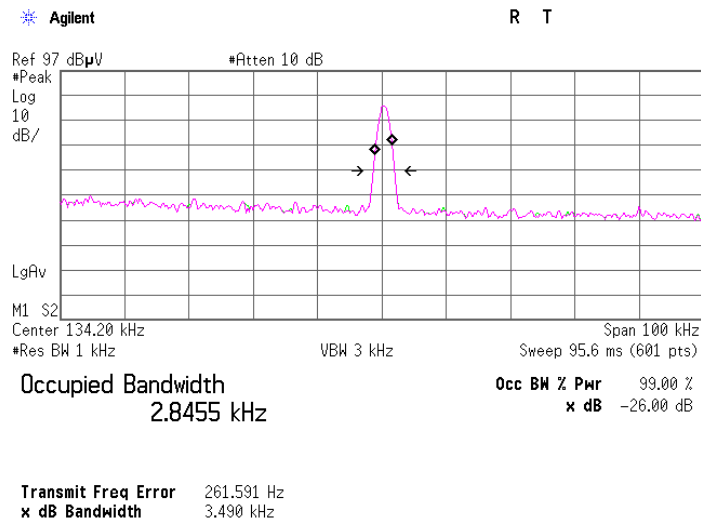
**-26dB Bandwidth and 99% Occupied Bandwidth**

UL Japan, Inc.  
Head Office EMC Lab. No.4 Semi Anechoic Chamber

COMPANY	: ASAHI DENSO CO., LTD	REPORT NO	: 29JE0046-HO-01
EQUIPMENT	: Immobilizer	REGULATION	: Reference data
MODEL	: KZ44	TEST DISTANCE	: 3m
S/N	: 9604-15	DATE	: 06/11/2009
POWER	: DC 12V	TEMPERATURE	: 23 deg.C
MODE	: Tx	HUMIDITY	: 56 %
		ENGINEER	: Tomohisa Nakagawa

FREQ	-26dB Bandwidth
[kHz]	[kHz]
134.2	3.490

FREQ	99% Occupied Bandwidth
[kHz]	[kHz]
134.2	2.846



### **APPENDIX 3: Test instruments**

#### **EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2009/02/03 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2009/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2009/02/25 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2008/10/03 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2009/01/10 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2009/01/10 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2009/03/18 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	-	RE	2009/03/03 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2009/03/18 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	836553/009	RE	2008/11/14 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	-	-	RE	2008/07/03 * 12
MCC-31	Coaxial cable	UL Japan	-	-	RE	2008/06/20 * 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: Spurious emission**

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