APPENDIX 2: Data of EMI test

Radiated Emission

DATA OF RADIATED EMISSION TEST

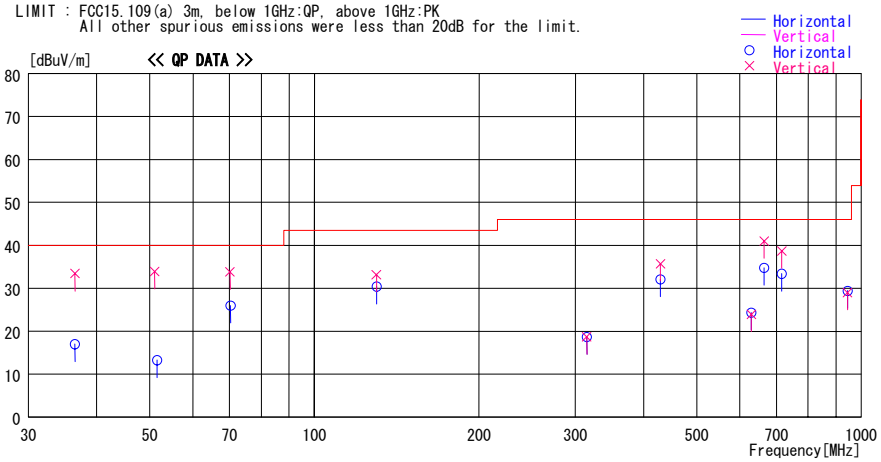
UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2009/10/22

Company : Alps Electric Co., Ltd.
Kind of EUT : TPMS Tuner
Model No. : TWC1U293
Serial No. : 20091014-1

Report No. : 30BE0039-HO-01-A
Power : DC 12.0V
Temp./Humi. : 23deg.C. / 52%
Engineer : Tomotaka Sasagawa

Mode / Remarks : Receiving mode , Worst-axis(H:X-axis / V:X-axis)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
36.480	26.7	QP	15.3	-25.0	17.0	269	100	Hori.	40.0	23.0	
36.480	43.1	QP	15.3	-25.0	33.4	120	100	Vert.	40.0	6.6	
51.060	48.6	QP	10.0	-24.7	33.9	300	100	Vert.	40.0	6.1	
51.600	28.2	QP	9.8	-24.7	13.3	109	100	Hori.	40.0	26.7	
70.134	52.0	QP	6.2	-24.4	33.8	237	100	Vert.	40.0	6.2	
70.230	44.1	QP	6.2	-24.4	25.9	301	278	Hori.	40.0	14.1	
129.899	40.4	QP	13.6	-23.6	30.4	340	172	Hori.	43.5	13.1	
129.951	43.2	QP	13.6	-23.6	33.2	221	100	Vert.	43.5	10.3	
314.755	25.6	QP	15.1	-22.0	18.7	205	103	Hori.	46.0	27.3	
314.755	25.6	QP	15.1	-22.0	18.7	232	100	Vert.	46.0	27.3	
429.511	35.6	QP	17.7	-21.2	32.1	191	100	Hori.	46.0	13.9	
429.521	39.2	QP	17.7	-21.2	35.7	232	100	Vert.	46.0	10.3	
629.510	24.1	QP	19.8	-20.0	23.9	232	100	Vert.	46.0	22.1	
629.510	24.5	QP	19.8	-20.0	24.3	205	100	Hori.	46.0	21.7	
664.583	34.5	QP	20.0	-19.8	34.7	162	100	Hori.	46.0	11.3	
664.610	40.8	QP	20.0	-19.8	41.0	301	100	Vert.	46.0	5.0	
715.882	32.5	QP	20.4	-19.5	33.4	155	100	Hori.	46.0	12.6	
715.885	37.8	QP	20.4	-19.5	38.7	300	100	Vert.	46.0	7.3	
944.265	23.9	QP	22.8	-17.3	29.4	205	100	Hori.	46.0	16.6	
944.265	23.5	QP	22.8	-17.3	29.0	232	100	Vert.	46.0	17.0	

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

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

Radiated Emission

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DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2009/10/22

Company : Alps Electric Co., Ltd.
Kind of EUT : TPMS Tuner
Model No. : TWC1U293
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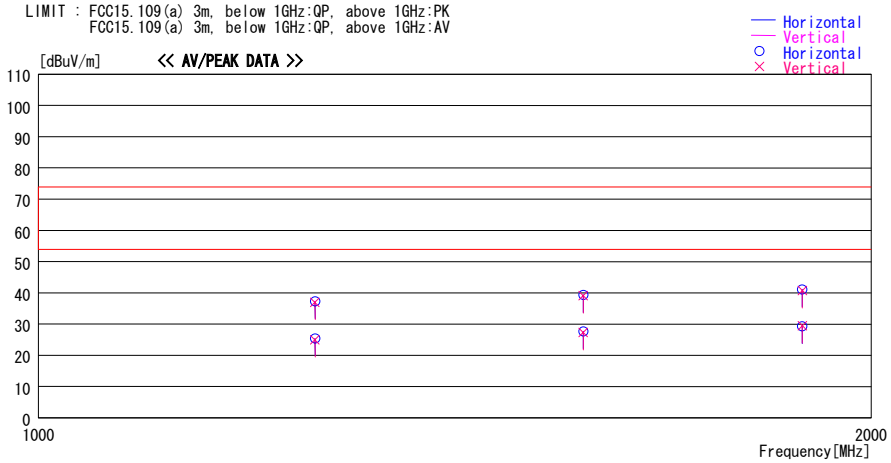
Power : DC 12.0V
Temp./Humi. : 23deg.C. / 52%
Engineer : Tomotaka Sasagawa

Mode / Remarks : Receiving mode , Worst-axis(H:X-axis / V:X-axis)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
1259.020	44.4	PK	25.0	-32.1	37.3	0	100	Hori.	73.9	36.6	
1259.020	44.1	PK	25.0	-32.1	37.0	0	100	Vert.	73.9	36.9	
1259.020	32.6	AV	25.0	-32.1	25.5	0	100	Hori.	53.9	28.4	
1259.020	32.1	AV	25.0	-32.1	25.0	0	100	Vert.	53.9	28.9	
1573.775	44.8	PK	25.7	-31.1	39.4	0	100	Hori.	73.9	34.5	
1573.775	33.1	AV	25.7	-31.1	27.7	0	100	Hori.	53.9	26.2	
1573.775	44.5	PK	25.7	-31.1	39.1	0	100	Vert.	73.9	34.8	
1573.775	32.7	AV	25.7	-31.1	27.3	0	100	Vert.	53.9	26.6	
1888.530	44.7	AV	26.7	-30.3	41.1	0	100	Hori.	53.9	12.8	
1888.530	32.9	PK	26.7	-30.3	29.3	0	100	Hori.	73.9	44.6	
1888.530	44.3	PK	26.7	-30.3	40.7	0	100	Vert.	73.9	33.2	
1888.530	33.1	AV	26.7	-30.3	29.5	0	100	Vert.	53.9	24.4	

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

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

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	2009/02/02 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2009/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-09	Spectrum Analyzer	Advantest	R3273	95090115	RE	2008/12/24 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2009/06/30 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2009/01/19 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2009/01/10 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2009/07/02 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2008/11/14 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2009/03/18 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2009/04/30 * 12
MCC-56	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	174410(1m) / 284655(5m)	RE	2009/01/07 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2009/03/19 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2009/08/25 * 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