

APPENDIX 2: Data of EMI test

Radiated Emission ANT 1 : Built in Antenna

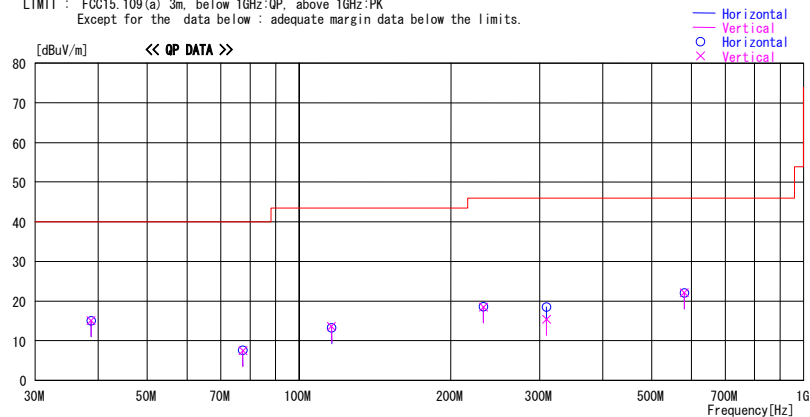
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2008/11/12

Company : TOYOTA MOTOR CORPORATION
Kind of EUT : Remote Keyless Entry System (Receiver)
Model No. : TMRF-001
Serial No. : 1
Report No. : 29CE0196-HO-01
Power : DC 5.0V
Temp./Humi. : 21deg. C / 43%
Engineer : Norihisa Hashimoto

Mode / Remarks : Receiving 312.15MHz Worst-axis(Hor:X Ver:X) / ANT1 (Built in Antenna)

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
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]						
38.706	22.4	QP	14.5	-21.8	15.1	10	305	Hori.	40.0	25.0
38.706	22.4	QP	14.5	-21.8	15.1	257	100	Vert.	40.0	24.9
77.413	22.3	QP	6.7	-21.4	7.6	329	219	Hori.	40.0	32.4
77.413	22.2	QP	6.7	-21.4	7.5	37	117	Vert.	40.0	32.5
116.119	21.6	QP	12.5	-20.8	13.3	5	355	Hori.	43.5	30.2
116.119	21.9	QP	12.5	-20.8	13.6	265	239	Vert.	43.5	29.9
232.238	21.1	QP	17.0	-19.6	18.5	10	100	Vert.	46.0	27.5
232.238	21.2	QP	17.0	-19.6	18.6	357	174	Hori.	46.0	27.4
309.670	21.0	QP	13.3	-18.9	15.4	254	100	Vert.	46.0	30.6
309.670	24.1	QP	13.3	-18.9	18.5	30	100	Hori.	46.0	27.5
580.594	21.9	QP	19.1	-18.9	22.1	143	100	Vert.	46.0	23.9
580.594	21.9	QP	19.1	-18.9	22.1	288	100	Hori.	46.0	23.9

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 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.

*Second and third harmonics at local oscillator were not detected.

Radiated Emission ANT 2 : Glass Antenna

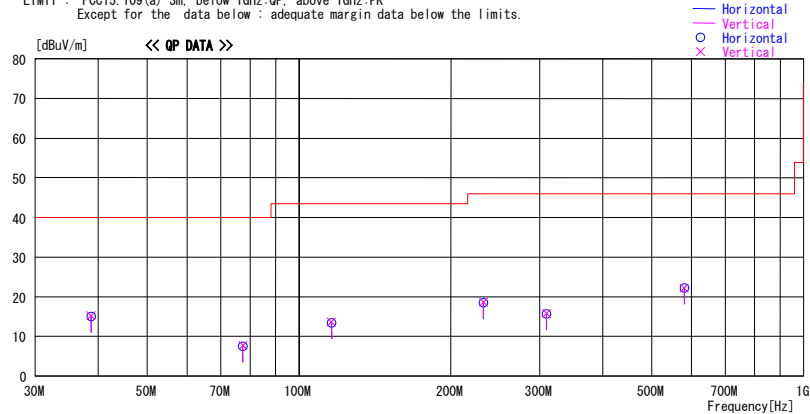
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2008/11/12

Company : TOYOTA MOTOR CORPORATION Report No. : 29CE0196-HO-01
Kind of EUT : Remote Keyless Entry System (Receiver) Power : DC 5.0V
Model No. : TMRF-001 Temp./Humi. : 21deg. C / 43%
Serial No. : 1 Engineer : Norihisa Hashimoto

Mode / Remarks : Receiving 312.15MHz Worst-axis (Hor:X Ver:X) / ANT2 (Glass Antenna)

LIMIT : FCC15, 109(a) 3m, below 1GHz:QP, above 1GHz:PK
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]	Gain [dB]						
38.706	22.4	QP	14.5	-21.8	15.1	72	115	Hori.	40.0	24.9
38.706	22.6	QP	14.5	-21.8	15.3	256	100	Vert.	40.0	24.8
77.413	22.2	QP	6.7	-21.4	7.5	16	100	Hori.	40.0	32.5
77.413	22.4	QP	6.7	-21.4	7.7	16	100	Vert.	40.0	32.3
116.119	21.7	QP	12.5	-20.8	13.4	89	108	Hori.	43.5	30.1
116.119	22.0	QP	12.5	-20.8	13.7	260	100	Vert.	43.5	29.8
232.238	21.2	QP	17.0	-19.6	18.6	10	100	Vert.	46.0	27.4
232.238	21.2	QP	17.0	-19.6	18.6	63	100	Hori.	46.0	27.5
309.670	21.3	QP	13.3	-18.9	15.7	357	100	Hori.	46.0	30.3
309.670	21.4	QP	13.3	-18.9	15.8	110	100	Vert.	46.0	30.2
580.594	22.0	QP	19.1	-18.9	22.2	82	256	Hori.	46.0	23.8
580.594	22.0	QP	19.1	-18.9	22.2	58	100	Vert.	46.0	23.8

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)

*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.

*Second and third harmonics at local oscillator were not detected.

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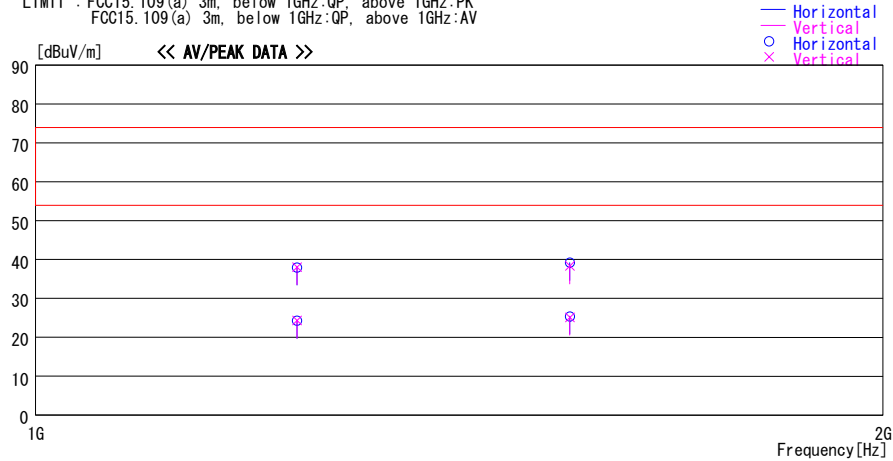
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Report No. : 29CE0196-HO-01
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Temp./Humi. : 21deg. C / 43%
Engineer : Norihisa Hashimoto

Mode / Remarks : Receiving 312.15MHz Worst-axis(Hor:X Ver:X) / ANT1 (Built in Antenna)

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



Frequency	Reading	DET	Antenna Factor	Loss & Gain	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg.]	[cm]		[dBuV/m]	[dB]
1238.600	44.9	PK	24.8	-31.8	37.9	359	100	Hori.	73.9	36.0
1238.600	45.1	PK	24.8	-31.8	38.1	359	100	Vert.	73.9	35.8
1238.600	31.3	AV	24.8	-31.8	24.3	359	100	Hori.	53.9	29.6
1238.600	31.3	AV	24.8	-31.8	24.3	359	100	Vert.	53.9	29.6
1548.250	45.1	PK	25.2	-31.1	39.2	359	100	Hori.	73.9	34.7
1548.250	44.2	PK	25.2	-31.1	38.3	359	100	Vert.	73.9	35.6
1548.250	31.3	AV	25.2	-31.1	25.4	359	100	Hori.	53.9	28.5
1548.250	31.0	AV	25.2	-31.1	25.1	359	100	Vert.	53.9	28.8

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)

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Radiated Emission ANT 2 : Glass Antenna

DATA OF RADIATED EMISSION TEST

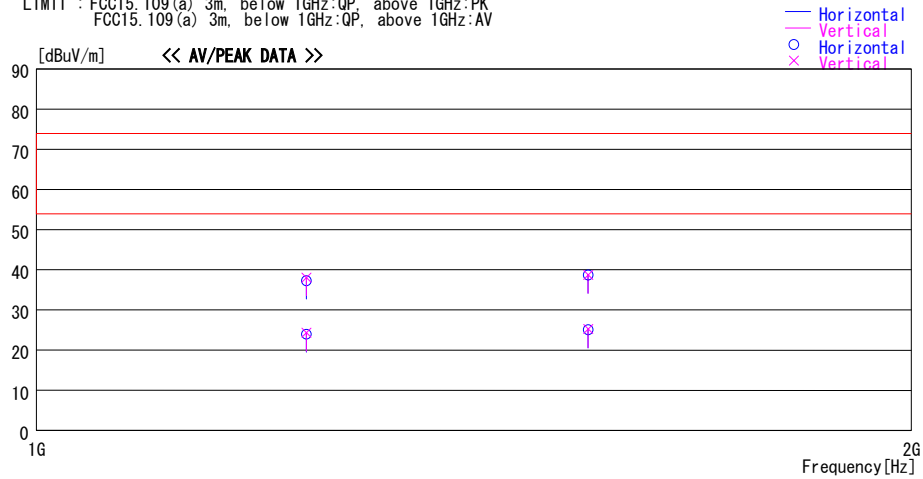
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Engineer : Norihisa Hashimoto

Mode / Remarks : Receiving 312.15MHz Worst-axis(Hor:X Ver:X) / ANT2 (Glass Antenna)

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	Loss &	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]
1238.600	44.3	PK	24.8	-31.8	37.3	359	100	Hori.	73.9	36.6
1238.600	45.1	PK	24.8	-31.8	38.1	359	100	Vert.	73.9	35.8
1238.600	31.0	AV	24.8	-31.8	24.0	359	100	Hori.	53.9	29.9
1238.600	31.3	AV	24.8	-31.8	24.3	359	100	Vert.	53.9	29.6
1548.250	44.6	PK	25.2	-31.1	38.7	359	100	Hori.	73.9	35.2
1548.250	44.6	PK	25.2	-31.1	38.7	359	100	Vert.	73.9	35.2
1548.250	31.0	AV	25.2	-31.1	25.1	359	100	Hori.	53.9	28.8
1548.250	31.1	AV	25.2	-31.1	25.2	359	100	Vert.	53.9	28.7

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 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-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2008/04/17 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2007/12/27 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE	-
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MRENT-62	Spectrum Analyzer	Agilent	E4448A	MY46180653	RE	2007/11/27 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2008/04/02 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2008/10/18 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2008/10/18 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2008/02/15 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2007/11/13 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2008/09/04 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2008/01/19 * 12
MCC-47	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	284646(5m) / 287573(1m)	RE	2008/05/12 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2008/09/17 * 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

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124