

APPENDIX 2: Data of EMI test

Radiated Emission below 30MHz (Fundamental and Spurious Emission)

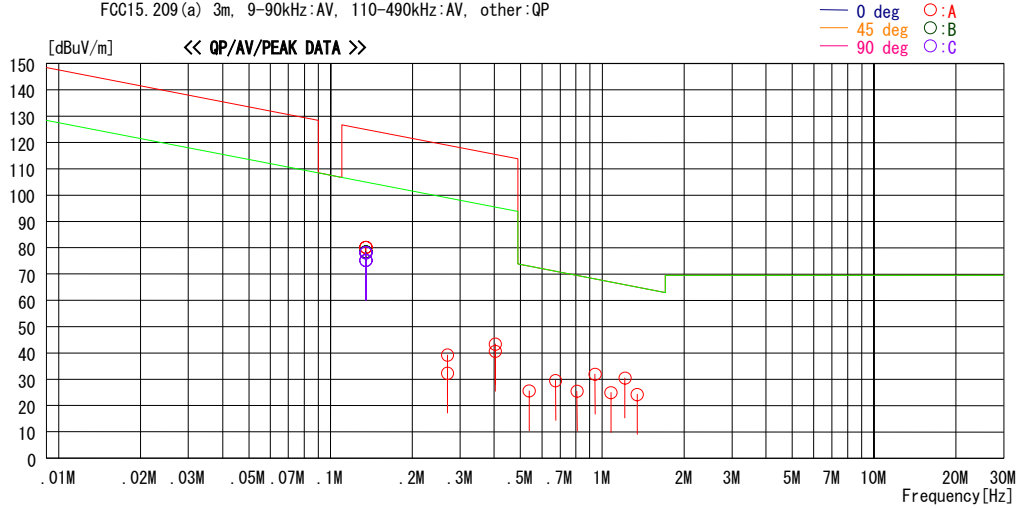
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2008/12/09

Company : Mitsubishi Electric Corporation Himeji Works
Kind of EUT : Integrated unit (Incorporated with Immobilizer module)
Model No. : IMB521-04
Serial No. : 20081208-01
Report No. : 29CE0137-HO-01
Power : DC 12.0V
Temp./ Humi. : 20deg. C. / 36%
Engineer : Takumi Shimada

Mode / Remarks : Transmitting 134.45KHz / Worst-axis: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]	
0.13456	92.7	PEAK	19.7	0.1	32.3	80.2	125.0	44.8	0	A	359
0.13456	91.0	PEAK	19.7	0.1	32.3	78.5	125.0	46.5	45	B	328
0.13456	87.6	PEAK	19.7	0.1	32.3	75.1	125.0	49.9	90	C	80
0.13456	90.6	PEAK	19.7	0.1	32.3	78.1	125.0	46.9	135	C	30
0.13456	92.7	AV	19.7	0.1	32.3	80.2	105.0	24.8	0	A	359
0.13456	91.0	AV	19.7	0.1	32.3	78.5	105.0	26.5	45	B	328
0.13456	87.6	AV	19.7	0.1	32.3	75.1	105.0	29.9	90	C	80
0.13456	90.6	AV	19.7	0.1	32.3	78.1	105.0	26.9	135	C	30
0.26890	51.6	PEAK	19.6	0.2	32.2	39.2	119.0	79.8	0	A	183
0.26890	44.8	AV	19.6	0.2	32.2	32.4	99.0	66.6	0	A	183
0.40335	55.7	PEAK	19.6	0.2	32.2	43.3	115.5	72.2	0	A	359
0.40335	53.1	AV	19.6	0.2	32.2	40.7	95.5	54.8	0	A	359
0.53780	38.2	QP	19.5	0.2	32.2	25.7	73.0	47.3	0	A	359
0.67225	42.0	QP	19.5	0.2	32.2	29.5	71.0	41.5	0	A	359
0.80670	38.0	QP	19.5	0.2	32.2	25.5	69.4	43.9	0	A	359
0.94115	44.5	QP	19.5	0.2	32.2	32.0	68.1	36.1	0	A	359
1.07560	37.5	QP	19.5	0.2	32.2	25.0	66.9	41.9	0	A	359
1.21005	42.8	QP	19.5	0.3	32.2	30.4	65.9	35.5	0	A	359
1.34450	36.6	QP	19.5	0.3	32.2	24.2	65.0	40.8	0	A	359

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 + ATTEN. - AMP.)

*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

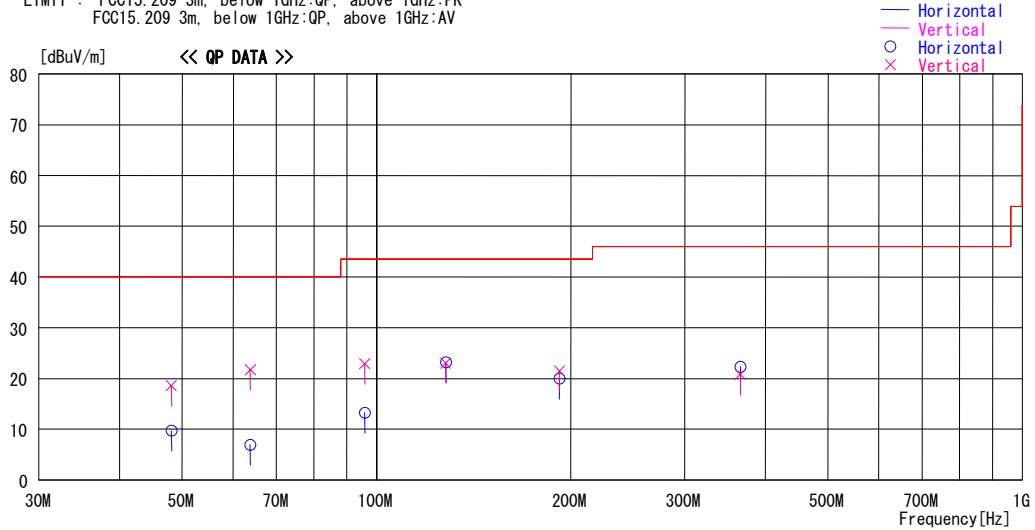
UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2008/12/09

Company : Mitsubishi Electric Corporation Himeji Works
Kind of EUT : Integrated unit (Incorporated with Immobilizer module)
Model No. : 1MB521-04
Serial No. : 20081208-01

Report No. : 29CE0137-HO-01
Power : DC12.0V
Temp./Humi. : 20deg. C / 36%
Engineer : Takumi Shimada

Mode / Remarks : Transmitting 134.45KHz Worst-axis:X-axis

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
FCC15.209 3m, below 1GHz:QP, above 1GHz:AV



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]						
48.139	23.8	QP	10.6	-24.7	9.7	169	377	Hori.	40.0	30.3
48.140	32.7	QP	10.6	-24.7	18.6	167	100	Vert.	40.0	21.4
63.736	38.8	QP	7.3	-24.4	21.7	117	100	Vert.	40.0	18.3
63.732	24.1	QP	7.3	-24.4	7.0	241	385	Hori.	40.0	33.0
95.869	28.0	QP	9.2	-23.9	13.3	181	182	Hori.	43.5	30.2
95.871	37.6	QP	9.2	-23.9	22.9	250	100	Vert.	43.5	20.6
128.008	33.5	QP	13.3	-23.6	23.2	0	153	Hori.	43.5	20.3
128.008	33.3	QP	13.3	-23.6	23.0	53	100	Vert.	43.5	20.5
192.007	28.3	QP	16.3	-23.1	21.5	317	100	Vert.	43.5	22.0
192.010	26.8	QP	16.3	-23.1	20.0	79	161	Hori.	43.5	23.5
366.017	27.3	QP	16.5	-21.5	22.3	280	100	Hori.	46.0	23.7
366.019	25.8	QP	16.5	-21.5	20.8	85	146	Vert.	46.0	25.2

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)

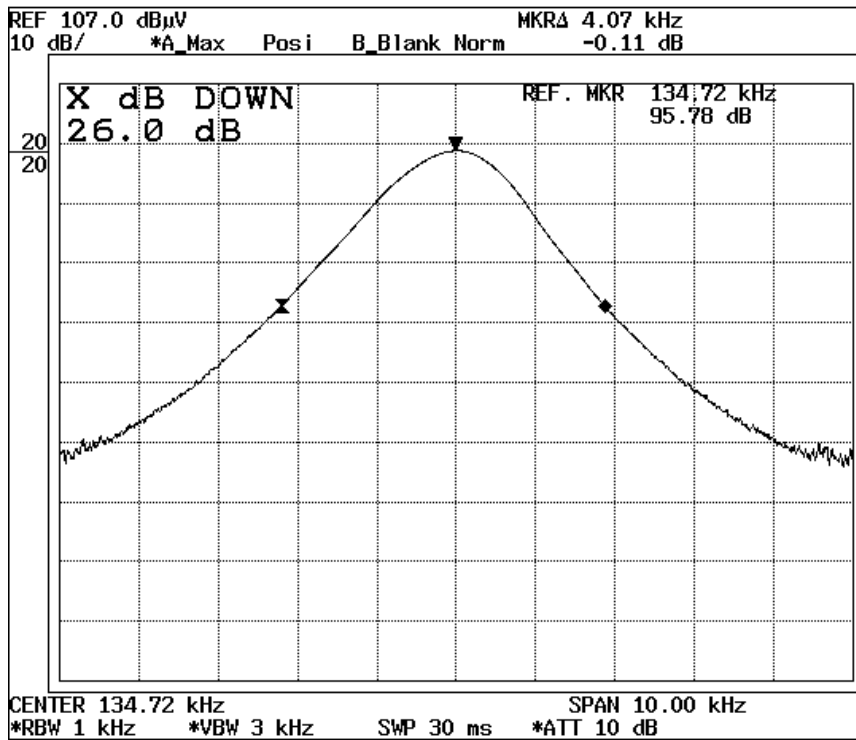
*The test result is rounded off to one or two decimal places, so some differences might be observed.

-26dB Bandwidth

UL Japan, Inc.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY	: Mitsubishi Electric Corporation Himeji Works	REPORT NO	: 29CE0137-HO-01
EQUIPMENT	: Integrated unit (Incorporated with Immobilizer module)	REGULATION	: Reference data
MODEL	: IMB521-04	TEST DISTANCE	: 3m
S/N	: 20081208-01	DATE	: 12/09/2008
POWER	: DC 12.0V	TEMPERATURE	: 20 deg.C
MODE	: Transmitting	HUMIDITY	: 36 %
		ENGINEER	: Takumi Shimada

FREQ	-26dB Bandwidth
[kHz]	[kHz]
134.7	4.070

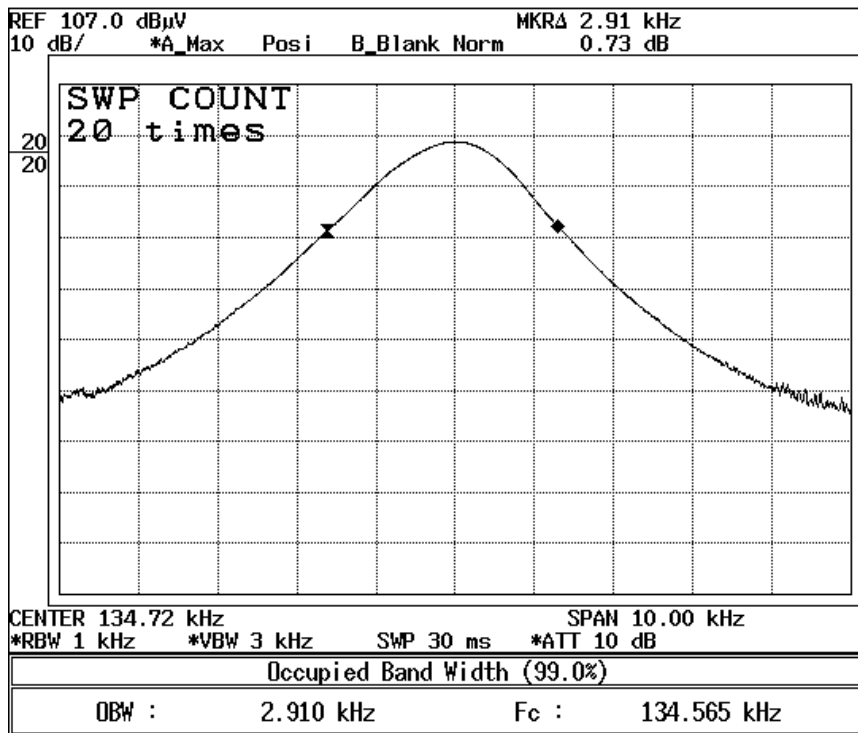


99% Occupied Bandwidth

UL Japan, Inc.
Head Office EMC Lab. No.3 Semi Anechoic Chamber

COMPANY	: Mitsubishi Electric Corporation Himeji Works	REPORT NO	: 29CE0137-HO-01
EQUIPMENT	: Integrated unit (Incorporated with Immobilizer module)	REGULATION	: Reference data
MODEL	: IMB521-04	TEST DISTANCE	: 3m
S/N	: 20081208-01	DATE	: 12/09/2008
POWER	: DC 12.0V	TEMPERATURE	: 20 deg.C
MODE	: Transmitting	HUMIDITY	: 36 %
		ENGINEER	: Takumi Shimada

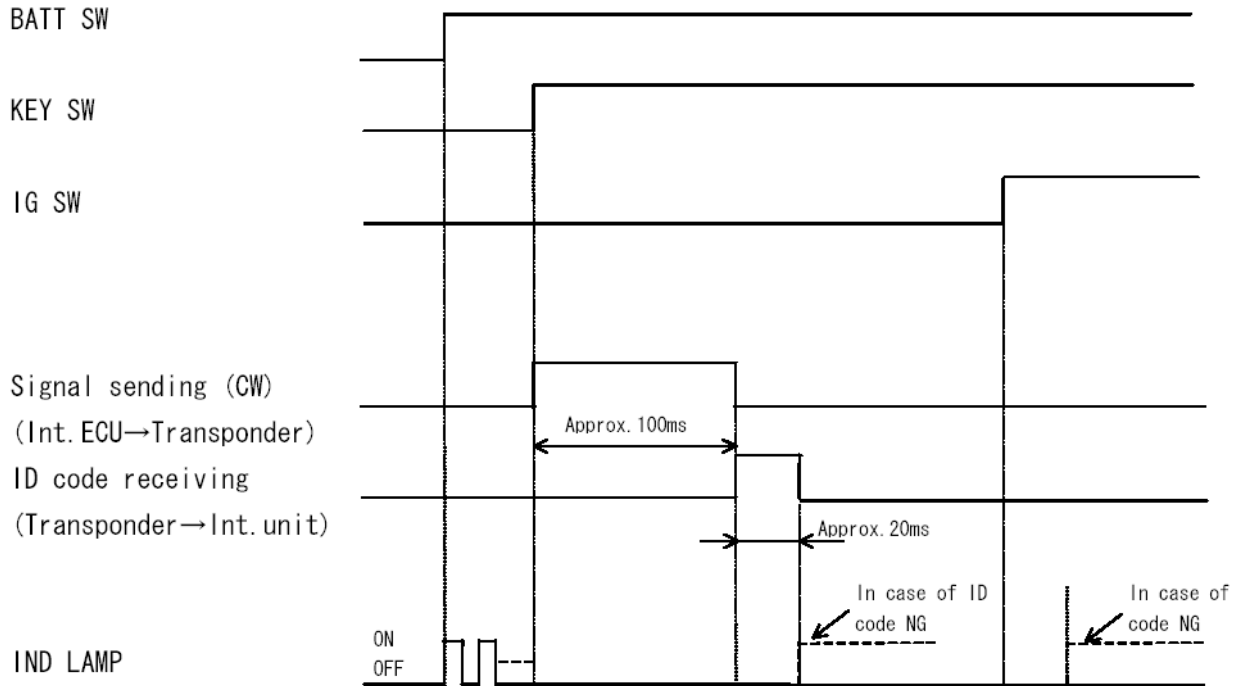
FREQ	99% Occupied Bandwidth
[kHz]	[kHz]
134.7	2.910



APPENDIX 3: The tested pulse train

<Timing chart>

- This describes the action of integrated ECU used for radio wave confirmation.



APPENDIX 4: Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2008/03/25 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2008/01/10 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-09	Spectrum Analyzer	Advantest	R3273	95090115	RE	2007/12/21 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2008/06/12 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2008/10/31 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	-	-	RE	2008/07/03 * 12
MCC-30	Coaxial cable	UL Japan	-	-	RE	2008/06/20 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2008/03/06 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2008/01/12 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2008/01/12 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2008/07/18 * 12
MAT-30	Attenuator(6dB)	TME	UFA-01	-	RE	2008/03/10 * 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

UL Japan, Inc.

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