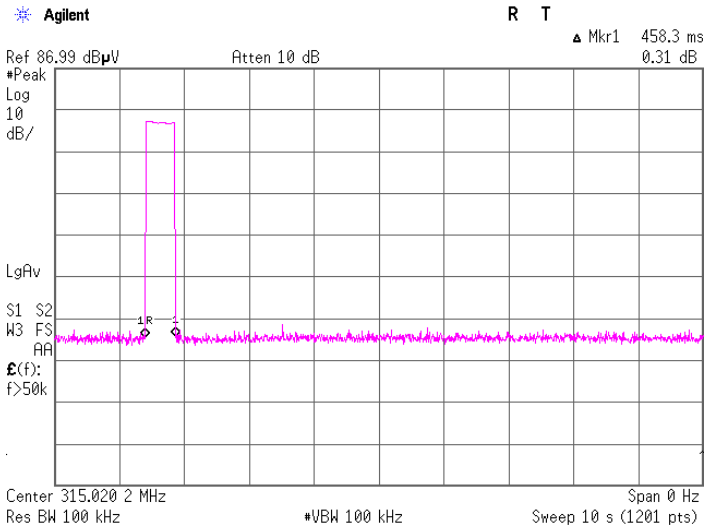
APPENDIX 2: Data of EMI test

Automatically deactivate

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

Company	Calsonic Kansei Corporation	Report No.	29BE0206-HO-03
Equipment	RF Transmitter for Passive Keyless	Regulation	FCC15.231(a)(1)/RSS-210 A1.1.1
Model No.	TS009	Test Distance	-
Serial No.	242C	Date	12/18/2008
Power	DC 3.0V	Temperature	23 deg.C.
Mode	Normal use mode	Humidity	36 %
EUT-Position	-	Engineer	Hironobu Ohnishi

Time of Transmitting [sec]	Limit [sec]	Result
0.46	5.00	Pass



Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

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

Company	Calsonic Kansei Corporation	Report No.	29BE0206-HO-03
Equipment	RF Transmitter for Passive Keyless	Regulation	FCC15.231(b)/15.205/15.209/
Model No.	TS009		RSS-210 A1.1.2/2.6/2.7
Serial No.	242C	Test Distance	3m
Power	DC 3.0V	Date	12/18/2008
Mode	Transmitting mode Mechanical key inserted	Temperature	23 deg.C.
EUT-Position	H: X-axis / V: Y-axis	Humidity	36 %
		Engineer	Hironobu Ohnishi

PK with Duty Factor (BW: 120kHz)

No.	FREQ	T/R READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN		REMARK
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER	Inside or Outside
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]		of Restricted Bands
1	315.01	61.6	57.3	16.9	32.0	10.0	-6.0	50.5	46.2	75.6	25.1	29.4	Carrier
2	630.02	47.4	47.0	20.5	32.1	12.0	-6.0	41.8	41.4	55.6	13.8	14.2	Outside
3	945.03	41.9	41.7	25.1	31.0	13.5	-6.0	43.5	43.3	55.6	12.1	12.3	Outside

PK Detect (RBW: 1MHz , VBW: 1MHz)

No.	FREQ	S/A READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN		REMARK
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER	Inside or Outside
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]		of Restricted Bands
4	1260.04	44.8	47.3	25.0	33.9	2.1	-	38.0	40.5	75.6	37.6	35.1	Outside
5	1575.05	44.3	44.1	25.8	33.2	2.3	-	39.2	39.0	73.9	34.7	34.9	Inside
6	1890.06	47.0	52.7	26.4	32.7	2.5	-	43.2	48.9	75.6	32.4	26.7	Outside
7	2205.07	42.2	42.8	26.9	32.3	2.7	-	39.5	40.1	73.9	34.4	33.8	Inside
8	2520.08	42.0	42.1	27.4	32.1	2.8	-	40.1	40.2	75.6	35.5	35.4	Outside
9	2835.09	41.4	41.4	28.2	31.9	3.0	-	40.7	40.7	73.9	33.2	33.2	Inside
10	3150.10	40.8	41.4	28.8	31.7	3.2	-	41.1	41.7	75.6	34.5	33.9	Outside

PK with Duty Factor (RBW: 1MHz , VBW: 1MHz) + Duty Factor

No.	FREQ	S/A READING		ANT	AMP	LOSS	Duty	RESULT		Limit	MARGIN		REMARK
		HOR	VER	Factor	GAIN		Factor	HOR	VER		HOR	VER	Inside or Outside
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]		of Restricted Bands
4	1260.04	44.8	47.3	25.0	33.9	2.1	-6.0	32.0	34.5	55.6	23.6	21.1	Outside
5	1575.05	44.3	44.1	25.8	33.2	2.3	-6.0	33.2	33.0	53.9	20.7	20.9	Inside
6	1890.06	47.0	52.7	26.4	32.7	2.5	-6.0	37.2	42.9	55.6	18.4	12.7	Outside
7	2205.07	42.2	42.8	26.9	32.3	2.7	-6.0	33.5	34.1	53.9	20.4	19.8	Inside
8	2520.08	42.0	42.1	27.4	32.1	2.8	-6.0	34.1	34.2	55.6	21.5	21.4	Outside
9	2835.09	41.4	41.4	28.2	31.9	3.0	-6.0	34.7	34.7	53.9	19.2	19.2	Inside
10	3150.10	40.8	41.4	28.8	31.7	3.2	-6.0	35.1	35.7	55.6	20.5	19.9	Outside

REMARKS ANTENNA TYPE:30-300MHz Biconical / 300-1000MHz Logperiodic / above 1GHz Horn
CALCULATION RESULT=Reading + ANT Factor - Amp Gain + LOSS (Cable+ ATTEN.)+Duty factor
Duty cycle Factor : -6 dB

* The test below and above 1GHz was performed with PK DETECT. Average emission measurements were calculated with PK DETECT and Duty cycle factor.
* Duty Factor was calculated with the assumption of the worst condition in 100msec.
* The result is rounded off to the second decimal place, so some differences might be observed.
*The limit was converted from V to dBuV, and it is rounded off to the second decimal place.
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

-20dB Bandwidth and 99% Occupied Bandwidth

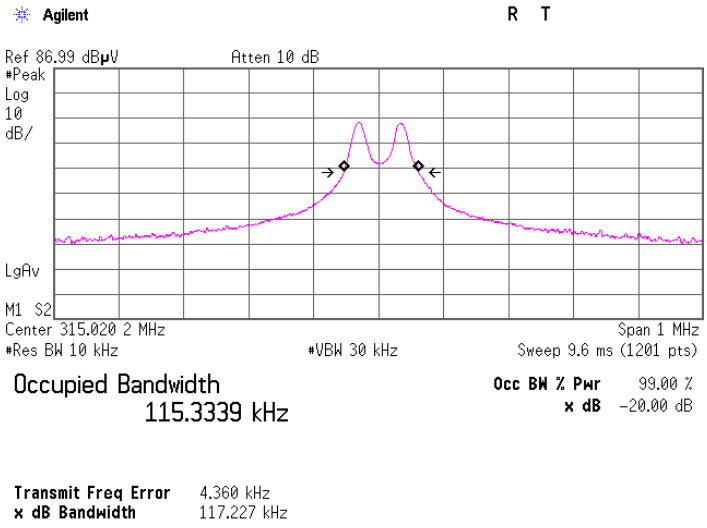
UL Japan, Inc.
Head Office EMC Lab. No.4 Semi Anechoic Chamber

Company	Calsonic Kansei Corporation	Report No.	29BE0206-HO-03
Equipment	RF Transmitter for Passive Keyless	Regulation	FCC15.231(c)/RSS210 A1.1.3
Model No.	TS009	Test Distance	-
Serial No.	242C	Date	12/18/2008
Power	DC 3.0V	Temperature	23 deg.C.
Mode	Transmitting mode	Humidity	36 %
EUT-Position	-	Engineer	Hironobu Ohnishi

Bandwidth Limit : Fundamental Frequency **315.00** MHz X 0.25% = 787.50 kHz

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
117.23	787.50	Pass

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
115.33	787.50	Pass



Duty Cycle

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

Company	Calsonic Kansei Corporation	Report No.	29BE0206-HO-03
Equipment	RF Transmitter for Passive Keyless	Regulation	FCC15.231(b)/15.35(c)/RSS-Gen 4.5
Model No.	TS009	Test Distance	-
Serial No.	242C	Date	12/18/2008
Power	DC 3.0V	Temperature	23 deg.C.
Mode	Transmitting mode	Humidity	36 %
EUT-Position	-	Engineer	Hironobu Ohnishi

Type	Times	ON time(One pulse) [ms]	ON time(in 15.07ms) [ms]	ON Time(in 100ms) [ms]
A	11	0.206	2.2605	15.0000
B	49	0.107	5.2577	34.8885

*1)ON time(in 15.07ms) = Times * ON time(One pulse)
*2)ON time(in 100ms) = On time(in 15.07ms) * 100 / 15.07
*3)The train of pulses was exceeding 100msec, and that sampled 100msec was the worst case against the pulse train.

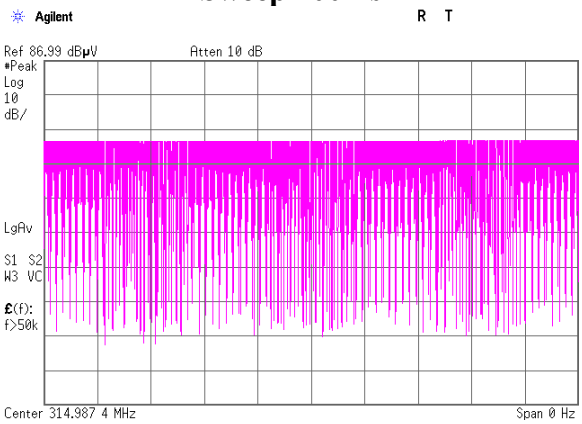
(Total)

ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
49.89	100.00	0.50	-6.0

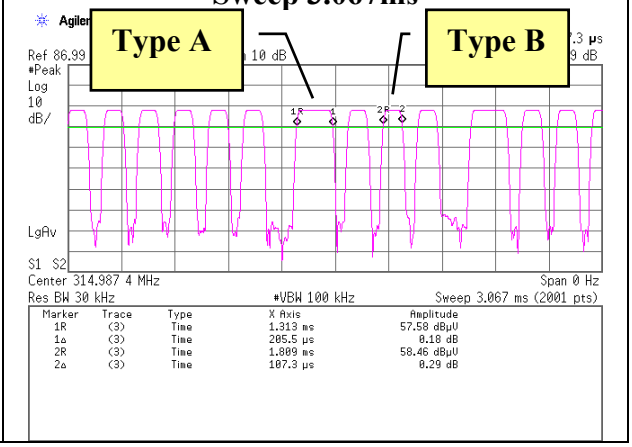
*4)Duty = $20\log_{10}$(ON time/Cycle)

Duty Cycle

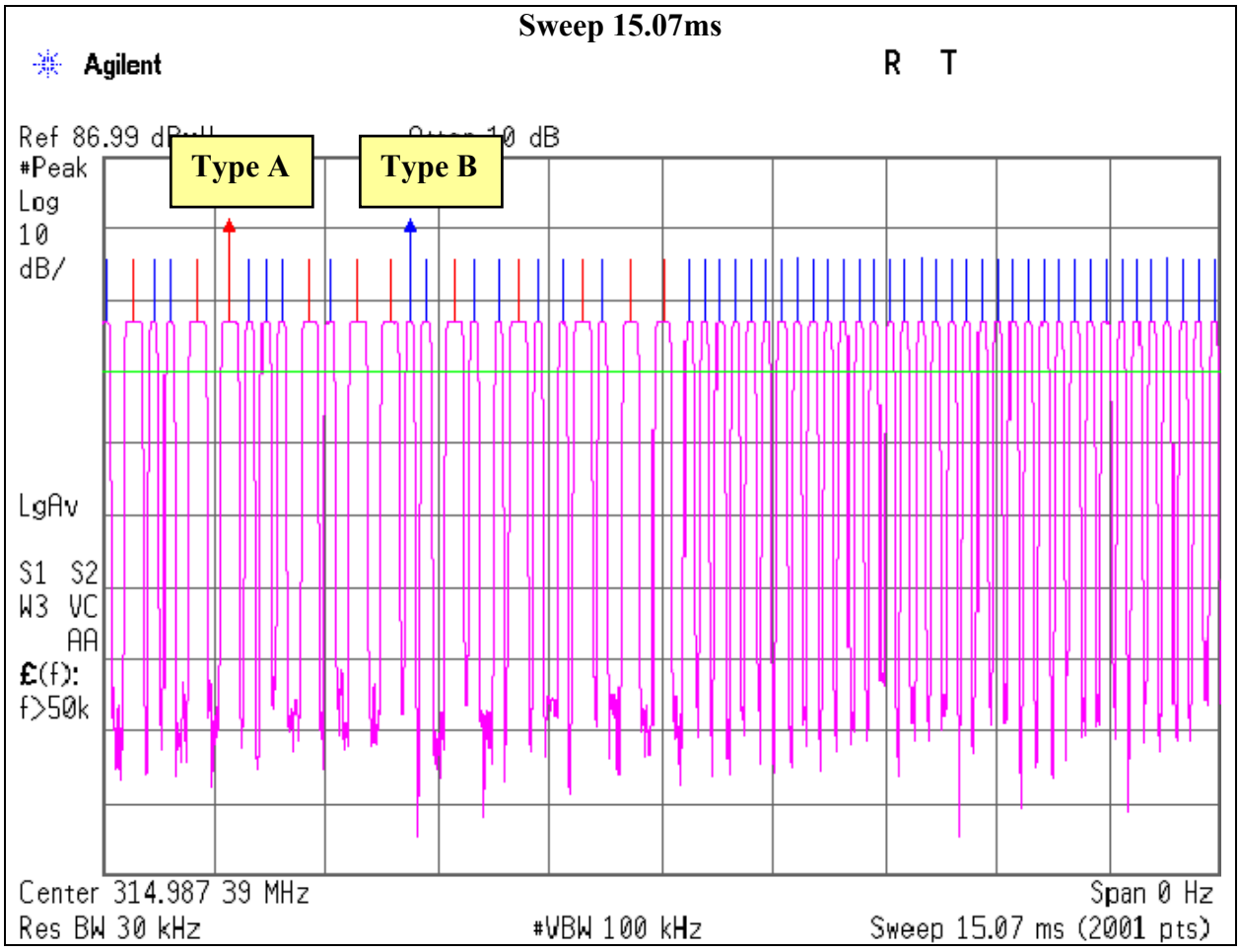
Sweep 100ms



Sweep 3.067ms



Sweep 15.07ms



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Receiver Spurious Emission

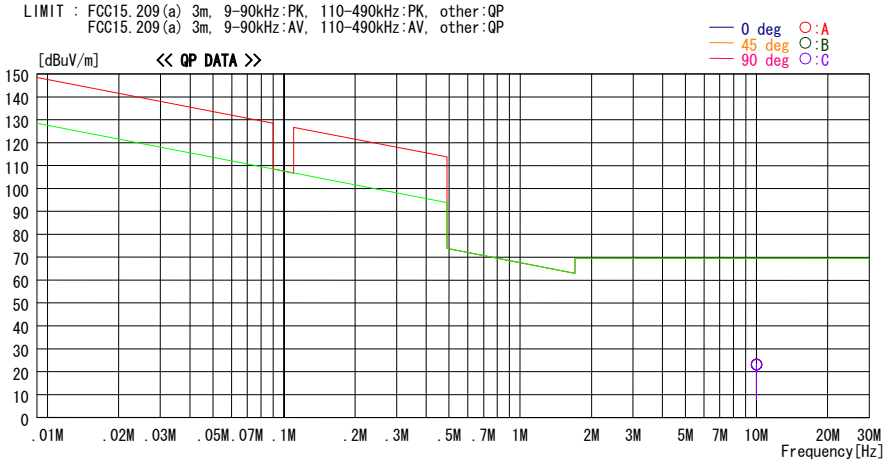
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2008/12/22

Company : Calsonic Kansei Corporation
Kind of EUT : RF Transmitter for Passive Keyless
Model No. : TS009
Serial No. : 235E
Report No. : 29BE0206-HO-03
Power : DC 3.0V
Temp. / Humi. : 22deg.C / 34%
Engineer : Kazufumi Nakai

Mode / Remarks : Rx 125kHz, Mechanical key inserted, Worst axis (H:X-axis, V:Y-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. [MHz]	Reading [dBuV]	DET	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna [deg]		Table [deg]	Comment
10.00000	35.1	QP	19.7	0.6	32.2	23.2	69.5	46.3	0	A	0	
10.00000	35.1	QP	19.7	0.6	32.2	23.2	69.5	46.3	45	B	0	
10.00000	35.1	QP	19.7	0.6	32.2	23.2	69.5	46.3	90	C	0	
10.00000	35.1	QP	19.7	0.6	32.2	23.2	69.5	46.3	135	C	0	

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.

Receiver Spurious Emission

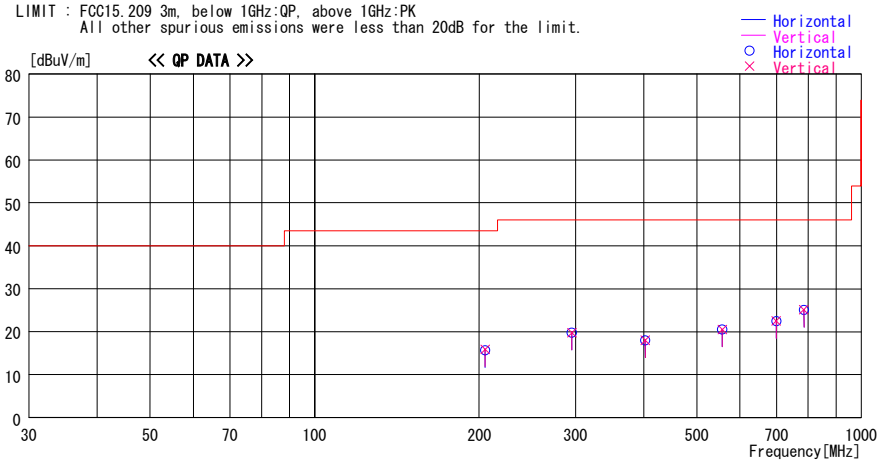
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2008/12/22

Company : Calsonic Kansei Corporation
Kind of EUT : RF Transmitter for Passive Keyless
Model No. : TS009
Serial No. : 235E
Report No. : 29BE0206-HO-03
Power : DC 3.0V
Temp./Humi. : 22deg.C / 34%
Engineer : Kazufumi Nakai

Mode / Remarks : Rx 125kHz, Mechanical key inserted, Worst axis (H:X-axis, V:Y-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 Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
205.049	22.4	QP	16.2	-22.9	15.7	Hori.	43.5	27.8	
205.049	22.6	QP	16.2	-22.9	15.9	Vert.	43.5	27.6	
295.500	22.1	QP	19.7	-22.0	19.8	Hori.	46.0	26.2	
295.500	22.1	QP	19.7	-22.0	19.8	Vert.	46.0	26.2	
402.666	21.9	QP	17.4	-21.3	18.0	Hori.	46.0	28.0	
402.666	21.9	QP	17.4	-21.3	18.0	Vert.	46.0	28.0	
556.666	22.1	QP	18.8	-20.4	20.5	Vert.	46.0	25.5	
556.666	22.1	QP	18.8	-20.4	20.5	Hori.	46.0	25.5	
699.001	22.3	QP	19.8	-19.6	22.5	Hori.	46.0	23.5	
699.001	22.3	QP	19.8	-19.6	22.5	Vert.	46.0	23.5	
785.336	22.2	QP	21.6	-18.7	25.1	Hori.	46.0	20.9	
785.336	22.2	QP	21.6	-18.7	25.1	Vert.	46.0	20.9	

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 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-04	Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2008/03/27 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2008/01/10 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2008/02/27 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2008/10/03 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2008/01/12 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2008/01/12 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2008/03/17 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	-	RE	2008/03/10 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2008/03/06 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2008/08/11 * 12
MCC-57	Microwave Cable 1G-26.5GHz (6.0m)	Suhner	SUCOFLEX104	246769(1m) / 292411(5m)	RE	2008/11/05 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2008/03/13 * 12
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	-
MRENT-62	Spectrum Analyzer	Agilent	E4448A	MY46180856	RE	2008/11/25 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2008/06/12 * 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
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2008/03/06 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	836553/009	RE	2008/11/14 * 12
MCC-112	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: Radiated emission