

APPENDIX 2: Data of EMI test

RF Output Power (Conducted)

Conducted Output Power GSM850

Test place Head Office EMC Lab. No.11 Measurement Room
Report No. 31HE0013-HO-01
Date 03/25/2011
Temperature/ Humidity 20 deg.C / 40% RH
Engineer Katsunori Okai
Mode Tx

Mode	Ch	Frequency [MHz]	Reading AVG [dBm]	Cable Loss [dB]	Result [dBm]
GPRS (GMSK)	128	824.2	28.60	4.63	33.23
	190	836.6	27.81	4.63	32.44
	251	848.8	27.14	4.63	31.77
EGPRS (8PSK)	128	824.2	23.15	4.63	27.78
	190	836.6	23.36	4.63	27.99
	251	848.8	21.65	4.63	26.28

Results = Reading + Cable Loss

RF Output Power (Conducted)

Conducted Output Power W-CDMA Band V

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	31HE0013-HO-01
Date	03/25/2011
Temperature/ Humidity	20 deg.C / 40% RH
Engineer	Katsunori Okai
Mode	Tx

Mode	Ch	Frequency [MHz]	Reading AVG [dBm]	Loss [dB]	Result [dBm]
RMC 12.2kbps	4132	826.4	0.51	24.01	24.52
	4183	836.6	0.43	24.01	24.44
	4233	846.6	0.64	24.01	24.65
HSDPA Subtest1	4132	826.4	-0.25	24.01	23.76
	4183	836.6	-0.37	24.01	23.64
	4233	846.6	-0.23	24.01	23.78
HSDPA Subtest2	4132	826.4	-0.32	24.01	23.69
	4183	836.6	-0.41	24.01	23.60
	4233	846.6	-0.29	24.01	23.72
HSDPA Subtest3	4132	826.4	-0.82	24.01	23.19
	4183	836.6	-0.94	24.01	23.07
	4233	846.6	-0.75	24.01	23.26
HSDPA Subtest4	4132	826.4	-0.83	24.01	23.18
	4183	836.6	-0.94	24.01	23.07
	4233	846.6	-0.76	24.01	23.25
HSUPA Subtest1	4132	826.4	-0.25	24.01	23.76
	4183	836.6	-0.36	24.01	23.65
	4233	846.6	-0.27	24.01	23.74
HSUPA Subtest2	4132	826.4	-2.24	24.01	21.77
	4183	836.6	-2.28	24.01	21.73
	4233	846.6	-2.26	24.01	21.75
HSUPA Subtest3	4132	826.4	-1.23	24.01	22.78
	4183	836.6	-1.40	24.01	22.61
	4233	846.6	-1.26	24.01	22.75
HSUPA Subtest4	4132	826.4	-2.27	24.01	21.74
	4183	836.6	-2.41	24.01	21.60
	4233	846.6	-2.28	24.01	21.73
HSUPA Subtest5	4132	826.4	-0.25	24.01	23.76
	4183	836.6	-0.35	24.01	23.66
	4233	846.6	-0.26	24.01	23.75

Results = Reading + Loss

RF Output Power (Radiated)

Effective radiated power(ERP)
GSM850

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.4
Date 04/18/2011
Temperature / Humidity 25 deg. C / 43 % RH
Engineer Hironobu Ohnishi
Mode Tx GPRS(GMSK)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
824.20	90.6	88.5	39.4	40.4	4.61	2.15	10.03	24.8	25.8	38.4	13.6	12.6	107	337	144	12	
836.60	90.8	87.7	39.8	39.3	4.65	2.15	10.04	25.1	24.6	38.4	13.3	13.8	107	337	144	14	
848.80	91.0	87.7	40.3	38.9	4.69	2.15	10.05	25.6	24.2	38.4	12.8	14.2	104	337	143	14	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 3MHz , VBW: 8MHz)

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

RF Output Power (Radiated)

Effective radiated power(ERP) GSM850

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.4
Date 04/18/2011
Temperature / Humidity 25 deg. C / 43 % RH
Engineer Hironobu Ohnishi
Mode Tx EGPRS(8PSK)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
824.20	88.0	85.4	36.8	37.3	4.61	2.15	10.03	22.2	22.7	38.4	16.2	15.7	107	339	143	13	
836.60	88.4	84.3	37.4	35.9	4.65	2.15	10.04	22.7	21.2	38.4	15.7	17.2	108	337	142	16	
848.80	88.7	84.7	38.0	35.9	4.69	2.15	10.05	23.3	21.2	38.4	15.1	17.2	103	337	143	14	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 3MHz , VBW: 8MHz)

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

RF Output Power (Radiated)
Effective radiated power(ERP)
W-CDMA Band V

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.4
Date 04/21/2011
Temperature / Humidity 26 deg. C / 29 % RH
Engineer Hironobu Ohnishi
Mode Tx W-CDMA(RMC12.2kbps)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
826.40	85.9	83.1	34.7	35.0	4.62	2.15	10.03	20.1	20.4	38.4	18.4	18.1	107	337	144	17			
836.60	88.2	85.2	37.2	36.8	4.65	2.15	10.04	22.5	22.1	38.4	15.9	16.3	110	339	144	17			
846.60	87.0	84.5	36.3	35.7	4.68	2.15	10.05	21.6	21.0	38.4	16.8	17.4	107	337	153	71			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 5MHz, VBW: 50MHz)

Peak to Average power Ratio (Radiated)

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.4 No.4
Date 04/18/2011 04/21/2011
Temperature / Humidity 25 deg. C / 43 % RH 26 deg. C / 29 % RH
Engineer Hironobu Ohnishi Hironobu Ohnishi
Mode Tx GPRS(GMSK), Tx W-CDMA(RMC12.2kbps)
EGPRS(8PSK)

Mode	Channel	Frequency [MHz]	Peak to Average power Ratio [dB]
GPRS (GMSK)	128	824.20	0.046
	190	836.60	0.112
	251	848.80	0.067
EGPRS (8PSK)	128	824.20	3.352
	190	836.60	2.820
	251	848.80	3.049
W-CDMA (RMC12.2kbps)	4132	826.40	3.443
	4183	836.60	3.769
	4233	846.60	3.514

Band Edge (Radiated)
GSM850

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.3
Date 05/03/2011
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Katsunori Okai
Mode Tx GPRS(GMSK)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
824.00	38.7	37.9	-14.0	-11.2	4.6	2.2	10.0	-28.6	-25.8	-13.0	15.6	12.8	112	0	147	73			
849.00	41.6	39.6	-9.7	-8.8	4.7	2.2	10.1	-24.4	-23.5	-13.0	11.4	10.5	107	180	140	43			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Detector : S/A AV (RBW: 3.6kHz , VBW: 10kHz)

Band Edge (Radiated)
GSM850

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.3
Date 05/03/2011
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Katsunori Okai
Mode Tx EGPRS(8PSK)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
824.00	34.7	31.7	-18.0	-17.4	4.6	2.2	10.0	-32.6	-32.0	-13.0	19.6	19.0	109	0	151	61	
849.00	36.2	33.7	-15.4	-14.8	4.7	2.2	10.1	-30.1	-29.5	-13.0	17.1	16.5	107	0	142	42	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Detector : S/A AV (RBW: 3.6kHz , VBW: 10kHz)

Band Edge (Radiated)
W-CDMA Band V

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.3
Date 05/03/2011
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Katsunori Okai
Mode Tx W-CDMA(RMC12.2kbps)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	824.00	43.1	40.8	-9.6				-8.2	4.6		2.2	10.0	-24.2	-22.8	-13.0	11.2	
849.00	43.0	40.8	-8.6	-7.6	4.7	2.2	10.1	-23.3	-22.3	-13.0	10.3	9.3	110	0	147	71	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A AV (RBW: 47kHz, VBW: 150kHz)

Spurious Emission (Radiated)
GSM850 / Tx:824.2MHz

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.4 No.4
Date 04/18/2011 04/19/2011
Temperature / Humidity 25 deg. C / 43 % RH 24 deg. C / 31 % RH
Engineer Hironobu Ohnishi Hironobu Ohnishi
(Below 1GHz) (Above 1GHz)
Mode Tx GPRS(GMSK)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant.	Turn		Rx Ant.	Turn
															Height [cm]	Table [deg.]		Height [cm]	Table [deg.]
1648.40	61.7	60.7	-46.5	-49.1	3.1	8.8	0.0	-43.0	-45.6	-13.0	30.0	32.6	100	329	117	21			
2472.60	64.6	51.9	-41.2	-55.1	3.8	9.6	0.0	-37.6	-51.5	-13.0	24.6	38.5	117	347	100	315			
3296.80	50.4	52.7	-56.1	-53.1	4.4	11.4	0.0	-51.2	-48.2	-13.0	38.2	35.2	103	252	113	354			
4121.00	49.9	49.8	-52.7	-53.0	5.0	11.7	0.0	-48.2	-48.5	-13.0	35.2	35.5	100	341	100	244			
4945.20	45.8	49.5	-54.8	-50.5	5.5	11.8	0.0	-50.7	-46.4	-13.0	37.7	33.4	100	350	104	163			
5769.40	44.7	49.0	-58.9	-51.8	6.0	13.0	0.0	-54.0	-46.9	-13.0	41.0	33.9	100	58	105	182			
6593.60	48.8	48.1	-48.1	-49.8	6.4	12.1	0.0	-44.6	-46.3	-13.0	31.6	33.3	107	36	128	168			
7417.80	45.9	47.5	-53.9	-50.2	6.8	11.4	0.0	-51.5	-47.8	-13.0	38.5	34.8	108	37	157	186			
8242.00	46.8	47.7	-52.6	-50.3	7.2	11.6	0.0	-50.4	-48.1	-13.0	37.4	35.1	100	102	100	142			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 1MHz , VBW: 3MHz)

Spurious Emission (Radiated)
GSM850 / Tx:836.6MHz

Report No.	31HE0013-HO-01	
Test place	Head Office EMC Lab.	
Semi Anechoic Chamber	No.4	No.4
Date	04/18/2011	04/19/2011
Temperature / Humidity	25 deg. C / 43 % RH	24 deg. C / 31 % RH
Engineer	Hironobu Ohnishi	Hironobu Ohnishi
	(Below 1GHz)	(Above 1GHz)
Mode	Tx GPRS(GMSK)	

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant.	Turn		Rx Ant.	Turn
															Height [cm]	Table [deg.]		Height [cm]	Table [deg.]
1673.20	60.1	61.2	-48.6	-49.1	3.1	9.0	0.0	-44.9	-45.4	-13.0	31.9	32.4	100	326	115	149			
2509.80	67.0	52.5	-38.7	-53.6	3.8	9.5	0.0	-35.2	-50.1	-13.0	22.2	37.1	114	356	121	184			
3346.40	49.5	47.5	-58.2	-61.0	4.5	11.6	0.0	-53.2	-56.0	-13.0	40.2	43.0	102	14	100	288			
4183.00	50.4	48.7	-51.9	-54.2	5.0	11.6	0.0	-47.5	-49.8	-13.0	34.5	36.8	100	338	104	246			
5019.60	48.2	50.2	-52.9	-51.1	5.5	11.9	0.0	-48.7	-46.9	-13.0	35.7	33.9	100	83	105	162			
5856.20	46.5	47.9	-55.4	-53.4	6.0	13.1	0.0	-50.5	-48.5	-13.0	37.5	35.5	100	36	105	195			
6692.80	50.7	49.6	-46.0	-49.0	6.5	12.2	0.0	-42.5	-45.5	-13.0	29.5	32.5	103	36	124	161			
7529.40	46.3	48.4	-54.7	-49.0	6.9	11.2	0.0	-52.5	-46.8	-13.0	39.5	33.8	100	120	167	195			
8366.00	46.7	48.2	-53.8	-50.1	7.2	11.8	0.0	-51.4	-47.7	-13.0	38.4	34.7	103	325	100	150			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 1MHz , VBW: 3MHz)

Spurious Emission (Radiated)
GSM850 / Tx:848.8MHz

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.4 No.4
Date 04/18/2011 04/19/2011
Temperature / Humidity 25 deg. C / 43 % RH 24 deg. C / 31 % RH
Engineer Hironobu Ohnishi Hironobu Ohnishi
(Below 1GHz) (Above 1GHz)
Mode Tx GPRS(GMSK)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant.	Turn		Rx Ant.	Turn
															Height [cm]	Table [deg.]		Height [cm]	Table [deg.]
1697.60	59.7	61.7	-49.2	-48.5	3.2	9.1	0.0	-45.4	-44.7	-13.0	32.4	31.7	100	343	119	34			
2546.40	50.9	61.8	-57.6	-43.2	3.9	9.6	0.0	-54.1	-39.7	-13.0	41.1	26.7	112	326	100	58			
3395.20	49.9	51.6	-57.4	-55.1	4.5	11.8	0.0	-52.2	-49.9	-13.0	39.2	36.9	100	11	112	303			
4244.00	51.5	50.1	-50.5	-53.3	5.1	11.5	0.0	-46.2	-49.0	-13.0	33.2	36.0	100	358	100	247			
5092.80	47.4	50.6	-53.6	-49.4	5.6	12.0	0.0	-49.3	-45.1	-13.0	36.3	32.1	100	49	149	155			
5941.60	47.7	47.7	-53.3	-53.3	6.1	13.1	0.0	-48.4	-48.4	-13.0	35.4	35.4	100	33	100	185			
6790.40	49.6	49.2	-48.2	-50.5	6.5	12.2	0.0	-44.7	-47.0	-13.0	31.7	34.0	100	36	131	165			
7639.20	47.0	48.1	-53.5	-51.4	6.9	11.2	0.0	-51.4	-49.3	-13.0	38.4	36.3	108	36	153	181			
8488.00	NS	46.9	-	-54.3	7.3	12.0	0.0	-	-51.8	-13.0	-	38.8	-	-	100	150			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 1MHz , VBW: 3MHz)

NS: No signal detect.

Spurious Emission (Radiated)
W-CDMA Band V / Tx: 826.4MHz

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date 04/21/2011 04/22/2011
Temperature / Humidity 26 deg. C / 29 % RH 26 deg. C / 37 % RH
Engineer Hironobu Ohnishi Hironobu Ohnishi
(Below 1GHz) (Above 1GHz)
Mode Tx W-CDMA(RMC12.2kbps)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
1652.80	62.8	63.3	-46.2	-47.4	3.1	9.3	0.0	-42.2	-43.4	-13.0	29.2	30.4	129	328	114	57			
2479.20	51.6	50.5	-58.3	-57.4	3.8	10.3	0.0	-54.0	-53.1	-13.0	41.0	40.1	114	100	144	143			
3305.60	53.5	56.7	-52.7	-49.6	4.4	11.8	0.0	-47.5	-44.4	-13.0	34.5	31.4	104	10	106	151			
4132.00	54.3	53.5	-48.3	-49.0	5.0	12.0	0.0	-43.4	-44.1	-13.0	30.4	31.1	100	336	108	179			
4958.40	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
5784.80	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
6611.20	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
7437.60	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
8264.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 1MHz , VBW: 3MHz)

NS: No signal detect.

Spurious Emission (Radiated)
W-CDMA Band V / Tx: 836.6MHz

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date 04/21/2011 04/22/2011
Temperature / Humidity 26 deg. C / 29 % RH 26 deg. C / 37 % RH
Engineer Hironobu Ohnishi Hironobu Ohnishi
(Below 1GHz) (Above 1GHz)
Mode Tx W-CDMA(RMC12.2kbps)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
1673.20	65.3	65.7	-43.5	-44.9	3.1	9.4	0.0	-39.4	-40.8	-13.0	26.4	27.8	123	322	112	56	
2509.80	56.3	54.3	-51.8	-52.3	3.8	10.3	0.0	-47.5	-48.0	-13.0	34.5	35.0	113	125	122	348	
3346.40	58.4	60.1	-47.5	-45.9	4.5	11.9	0.0	-42.3	-40.7	-13.0	29.3	27.7	106	22	103	166	
4183.00	56.4	57.5	-45.6	-44.5	5.0	12.0	0.0	-40.8	-39.7	-13.0	27.8	26.7	100	328	111	179	
5019.60	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
5856.20	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
6692.80	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
7529.40	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
8366.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 1MHz , VBW: 3MHz)

NS: No signal detect.

Spurious Emission (Radiated)
W-CDMA Band V / Tx: 846.6MHz

Report No. 31HE0013-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date 04/21/2011 04/22/2011
Temperature / Humidity 26 deg. C / 29 % RH 26 deg. C / 37 % RH
Engineer Hironobu Ohnishi Hironobu Ohnishi
(Below 1GHz) (Above 1GHz)
Mode Tx W-CDMA(RMC12.2kbps)

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
1693.20	60.0	61.6	-48.5	-49.2	3.2	9.5	0.0	-44.4	-45.1	-13.0	31.4	32.1	120	331	114	66	
2539.80	51.4	50.1	-58.0	-58.0	3.8	10.3	0.0	-53.7	-53.7	-13.0	40.7	40.7	117	138	122	359	
3386.40	50.7	51.6	-57.6	-56.1	4.5	12.0	0.0	-52.3	-50.8	-13.0	39.3	37.8	100	342	103	177	
4233.00	48.4	49.4	-55.6	-53.8	5.1	12.0	0.0	-50.8	-49.0	-13.0	37.8	36.0	100	337	110	166	
5079.60	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
5926.20	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
6772.80	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
7619.40	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
8466.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

Detector : S/A PK (RBW: 1MHz , VBW: 3MHz)

NS: No signal detect.

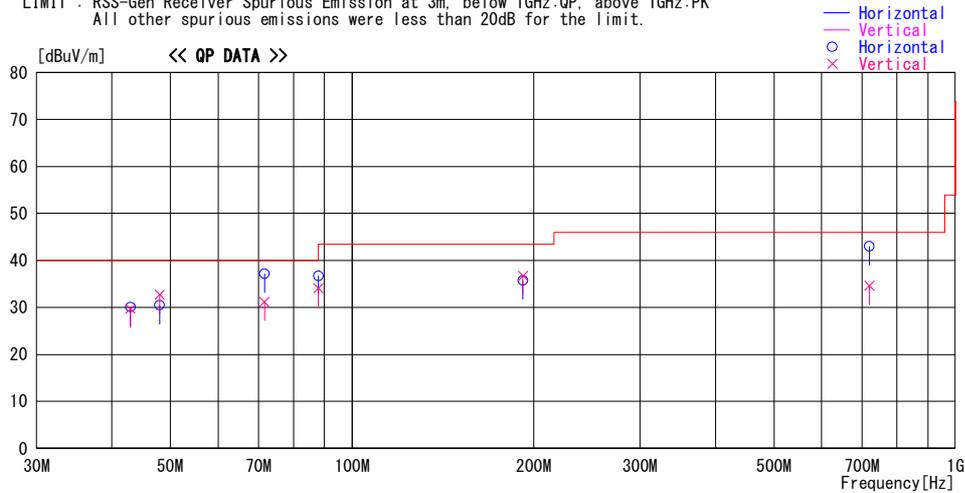
Radiated Spurious Emission
GSM850
GPRS Mode / Rx:836.6MHz

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2011/04/22

Report No. : 31HE0013-HO-01
Temp./Humi. : 25deg.C / 31% RH
Engineer : Hironobu Ohnishi

LIMIT : RSS-Gen Receiver Spurious Emission at 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
42.950	40.1	QP	14.9	-24.9	30.1	336	337	Hori.	40.0	9.9	
42.950	39.7	QP	14.9	-24.9	29.7	92	100	Vert.	40.0	10.3	
48.004	42.9	QP	12.4	-24.8	30.5	343	400	Hori.	40.0	9.5	
48.004	45.1	QP	12.4	-24.8	32.7	298	100	Vert.	40.0	7.3	
71.588	55.1	QP	6.5	-24.4	37.2	271	253	Hori.	40.0	2.8	
71.588	49.1	QP	6.5	-24.4	31.2	291	100	Vert.	40.0	8.8	
87.999	53.0	QP	7.8	-24.1	36.7	61	207	Hori.	40.0	3.3	
87.999	50.4	QP	7.8	-24.1	34.1	268	100	Vert.	40.0	5.9	
192.000	42.4	QP	16.3	-23.0	35.7	46	164	Hori.	43.5	7.8	
192.000	43.4	QP	16.3	-23.0	36.7	8	100	Vert.	43.5	6.8	
720.010	41.7	QP	20.7	-19.4	43.0	359	112	Hori.	46.0	3.0	
720.010	33.3	QP	20.7	-19.4	34.6	0	128	Vert.	46.0	11.4	

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)

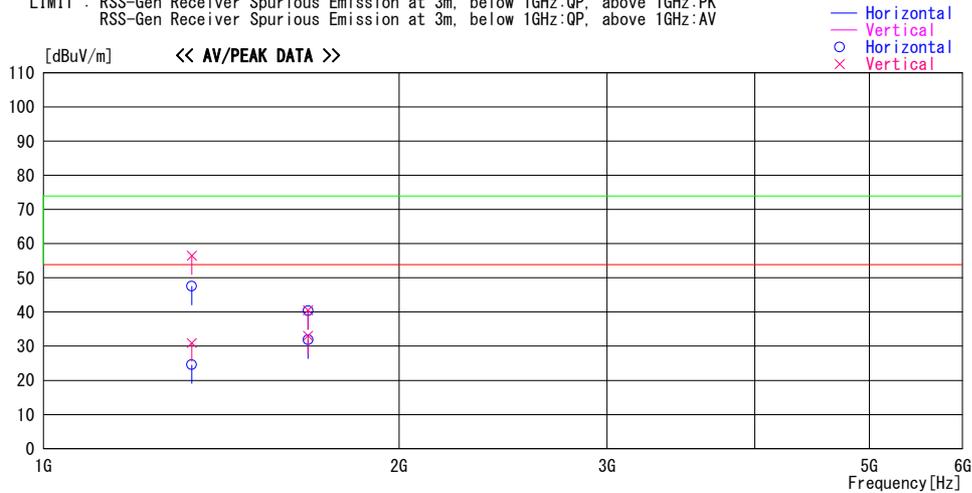
Radiated Spurious Emission
GSM850
GPRS Mode / Rx:836.6MHz

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/04/20

Report No. : 31HE0013-HO-01
 Temp./Humi. : 24deg.C / 31% RH
 Engineer : Hironobu Ohnishi

LIMIT : RSS-Gen Receiver Spurious Emission at 3m, below 1GHz:QP, above 1GHz:PK
 RSS-Gen Receiver Spurious Emission at 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
1334.830	54.3	PK	25.2	-31.9	47.6	60	100	Hori.	73.9	26.3	
1334.830	31.3	AV	25.2	-31.9	24.6	60	100	Hori.	53.9	29.3	
1334.830	63.2	PK	25.2	-31.9	56.5	343	100	Vert.	73.9	17.4	
1334.830	37.7	AV	25.2	-31.9	31.0	343	100	Vert.	53.9	22.9	
1674.000	45.0	PK	26.3	-30.9	40.4	249	137	Hori.	73.9	33.5	
1674.000	36.5	AV	26.3	-30.9	31.9	249	137	Hori.	53.9	22.0	
1674.000	45.1	PK	26.3	-30.9	40.5	358	100	Vert.	73.9	33.4	
1674.000	37.7	AV	26.3	-30.9	33.1	358	100	Vert.	53.9	20.8	

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)

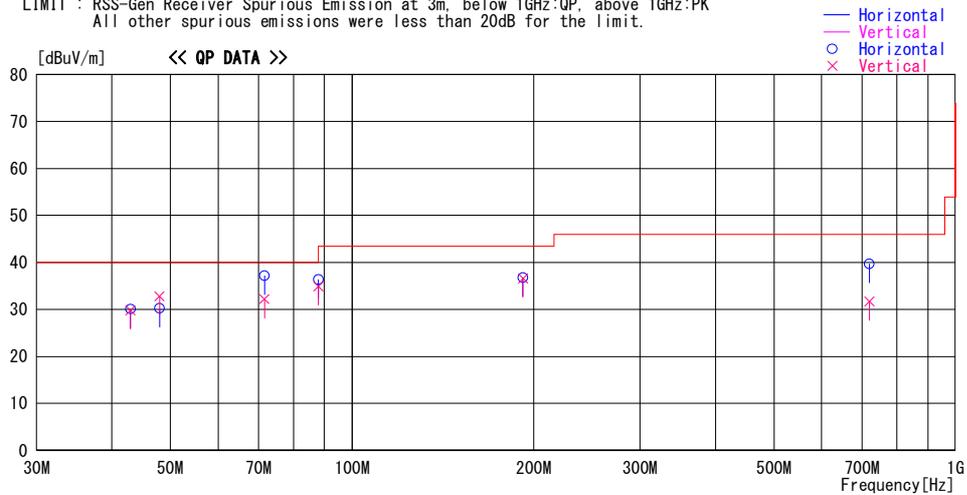
Radiated Spurious Emission
W-CDMA Band V
W-CDMA(RMC12.2kbps) Mode / Rx: 836.6MHz

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2011/04/22

Report No. : 31HE0013-HO-01
Temp./Humi. : 25deg.C / 31% RH
Engineer : Hironobu Ohnishi

LIMIT : RSS-Gen Receiver Spurious Emission at 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
42.950	40.1	QP	14.9	-24.9	30.1	351	335	Hori.	40.0	9.9	
42.950	39.8	QP	14.9	-24.9	29.8	89	100	Vert.	40.0	10.2	
47.998	42.6	QP	12.4	-24.8	30.2	345	388	Hori.	40.0	9.8	
47.998	45.2	QP	12.4	-24.8	32.8	299	100	Vert.	40.0	7.2	
71.589	55.1	QP	6.5	-24.4	37.2	278	256	Hori.	40.0	2.8	
71.589	50.1	QP	6.5	-24.4	32.2	293	100	Vert.	40.0	7.8	
87.999	52.7	QP	7.8	-24.1	36.4	63	210	Hori.	40.0	3.6	
87.999	51.2	QP	7.8	-24.1	34.9	274	100	Vert.	40.0	5.1	
191.996	43.5	QP	16.3	-23.0	36.8	49	169	Hori.	43.5	6.7	
191.996	43.3	QP	16.3	-23.0	36.6	15	100	Vert.	43.5	6.9	
720.010	38.4	QP	20.7	-19.4	39.7	34	113	Hori.	46.0	6.3	
720.010	30.4	QP	20.7	-19.4	31.7	9	135	Vert.	46.0	14.3	

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)

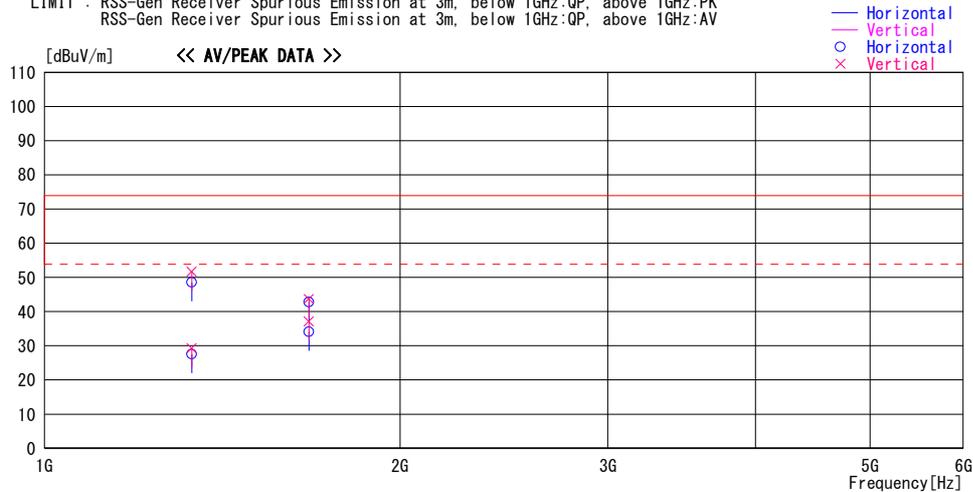
Radiated Spurious Emission
W-CDMA Band V
W-CDMA(RMC12.2kbps) Mode / Rx: 836.6MHz

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2011/04/21

Report No. : 31HE0013-H0-01
Temp./Humi. : 25deg.C / 31% RH
Engineer : Hironobu Ohnishi

LIMIT : RSS-Gen Receiver Spurious Emission at 3m, below 1GHz:QP, above 1GHz:PK
RSS-Gen Receiver Spurious Emission at 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]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
1332.500	54.9	PK	26.3	-32.6	48.6	298	100	Hori.	73.9	25.3	
1332.500	33.9	AV	26.3	-32.6	27.6	298	100	Hori.	53.9	26.3	
1332.500	58.0	PK	26.3	-32.6	51.7	350	100	Vert.	73.9	22.2	
1332.500	35.6	AV	26.3	-32.6	29.3	350	100	Vert.	53.9	24.6	
1674.000	47.0	PK	27.4	-31.6	42.8	252	122	Hori.	73.9	31.1	
1674.000	38.3	AV	27.4	-31.6	34.1	252	122	Hori.	53.9	19.8	
1674.000	47.9	PK	27.4	-31.6	43.7	335	100	Vert.	73.9	30.2	
1674.000	41.4	AV	27.4	-31.6	37.2	335	100	Vert.	53.9	16.7	

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)

APPENDIX 3: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2011/02/15 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2010/10/11 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2010/10/11 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2011/03/25 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2011/01/14 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2011/03/04 * 12
MSG-05	Signal Generator	Agilent	E4438C	MY45090353	RE	2010/08/19 * 12
MCC-127	Coaxial Cable	UL Japan	-	-	RE	2010/07/21 * 12
MDA-04	Dipole Antenna	Schwarzbeck	UHAP	992	RE	2010/10/16 * 12
MURC-01	Universal Radio communication Tester	Rohde & Schwarz	CMU200	106223	RE	Pre Check
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2010/08/08 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12
MHF-03	High pass Filter 1.4-5.0GHz	Mini-Circuit	VHF-1320	10411	RE	2010/08/17 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2010/05/19 * 12
MCC-129	Microwave Cable(1-33GHz)	HUBER+SUHNER	SF103/11PC3.5-31	54307/3	RE	2011/01/06 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2010/05/07 * 12
KSG-05	Signal Generator	Rohde & Schwarz	SMR40	100137	RE	2010/08/20 * 12
MURC-03	Radio Communication Analyzer	Anritsu	MT8815B	6200711471		Pre Check
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2010/11/18 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2010/08/23 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2010/10/11 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2010/10/11 * 12

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

EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2010/11/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12
MCC-58	Microwave Cable	Suhner	SUCOFLEX104	246770(1m) / 250655(5m)	RE	2011/03/02 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2010/07/06 * 12
MCC-116	Microwave Cable 1G- 26.5GHz	Suhner	SUCOFLEX104	290221/4	AT	2010/08/05 * 12
MAT-20	Attenuator(10dB)(abo ve1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2011/01/06 * 12
MAT-22	Attenuator(10dB) 1- 18GHz	Orient Microwave	BX10-0476-00	-	AT	2011/03/14 * 12
MPD-01	PowerDivider DC to 26.5GHz	Agilent	11636B	52258	AT	2011/03/17 * 12
MURC-02	Wireless Communication Test Set	Agilent	E5515C	GB47050683	RE/AT	2009/10/20 * 36

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

AT: Antenna Terminal Conducted test

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