



RADIO TEST REPORT

Test Report No.: 32IE0169-HO-B

Applicant : SAMSUNG ELECTRONICS CO., LTD.
Type of Equipment : GSM/GPRS1900 Phone with bluetooth
Model No. : SHW-A350K
Test standard : FCC Part 24 Subpart E: 2008
FCC ID : A3LSHWA350K
Test Result : **Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: April 16 to 19, 2012

Representative test engineer:


Katsunori Okai
Engineer of WiSE Japan,
UL Verification Service

Approved by:


Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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SECTION 1: Customer information

Company Name : SAMSUNG ELECTRONICS CO., LTD.
Address : 416, MAETAN 3-DONG, YEONGTONG-GU SUWON-CITY,
GYEONGGI-DO 443-742, SOUTH KOREA

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : GSM/GPRS1900 Phone with bluetooth
Model No. : SHW-A350K
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC3.7V
Receipt Date of Sample : April 11, 2012
Modification of EUT : No Modification by the test lab

2.2 Product Description

Radio Specification

Bluetooth

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Type	FPCB type
Antenna Gain	-6.8dBi

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] PCS: 1850 – 1910MHz [Down Link] PCS: 1930 – 1990MHz
Type of Modulation	GMSK
Emission Designator	PCS: 250KGWX
Antenna Type	Cap type
Antenna Gain	-4.54dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 24 Subpart E: 2008, final revised on May 2, 2008
Title : FCC 47CFR Part 24 Subpart E
Broadband PCS

3.2 Procedures and results

Item	Test Specification & Procedure	Remarks	Deviation	Worst margin	Results
RF Output Power(Conducted/ Radiated) (Conducted Output Power / Equivalent isotropic radiated power(EIRP))	FCC 2.1046 FCC 24.232(c)	Conducted/ Radiated	N/A	-	Complied
Peak to Average power Ratio	FCC 24.232(d)	Conducted	N/A	-	Complied
Emission Bandwidth, 99% Occupied Bandwidth	FCC 2.1049 FCC 24.238	Conducted	N/A	-	Complied
Band-Edge	FCC 2.1051 FCC 2.1053 FCC 24.238	Conducted/ Radiated	N/A	[Conducted] 5.20dB 1849.9773MHz [Radiated] 3.7dB 1849.98MHz, Horizontal	Complied
Spurious Emission(Conducted)	FCC 2.1051 FCC 24.238	Conducted	N/A	-	Complied
Spurious Emission(Radiated)	FCC 2.1053 FCC 24.238	Radiated	N/A	8.6dB 11458.80MHz, Vertical	Complied
Frequency Stability (Temperature Variation)	FCC 2.1055(a)(1)(b) FCC 24.235	Conducted	N/A	-	Complied
Frequency Stability (Voltage Variation)	FCC 2.1055(d)(1)(2) FCC 24.235	Conducted	N/A	-	Complied

Note: UL Japan's EMI Work Procedures No. 13-EM-W0420

*These tests were also referred to ANSI/TIA 603-C-2004 " Land Mobile FM or PM Communications Equipment Measurement and Performance Standards."

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Uncertainty

EMI

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Radiated Emission (EUT height: 0.8m) (±dB)	
Measurement Distance 3m	
30MHz-300MHz	5.4dB
300MHz-1000MHz	4.0dB
1GHz-12.75GHz	4.4dB

Power meter (±dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

Antenna terminal conducted emission and Power density (±dB)			Antenna terminal conducted emission (±dB)		Channel power (±dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

Antenna Terminal Conducted emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test(3m)

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.4 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.5 Test set up, Test instruments and Data of EMI

Refer to APPENDIX.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

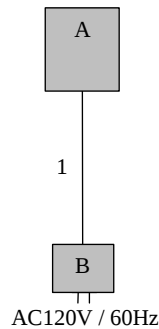
<PCS1900>

Test	Operating mode	Power Control	Tested frequency	Channel
RF output Power(Conducted), Peak to Average power Ratio (Conducted)	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (GPRS, GMSK, 1slot, CS-1)	Max (PCL=0)	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
RF output Power(Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=0)	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
Bandwidth (Conducted), Frequency Stability (Temperature/Voltage Variation)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=0)	1880.0MHz	661
Band Edge(Conducted/Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=0)	1850.2MHz 1909.8MHz	512 810
Spurious Emission (Conducted/Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=0)	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810

[GSM, GPRS]

*Single slot (1 slot) which had the highest frame power was tested as a representative.

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	GSM/GPRS1900 Phone with bluetooth	SHW-A350K	FJ-111-C	SAMSUNG	EUT
B	AC Adapter	ETA0K01KBK	DKIC3I3TS/94	SAMSUNG	EUT

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.5	Shielded	Shielded	-

SECTION 5: RF Output Power(Conducted/Radiated)

[Conducted: Conducted Output Power]

Test Procedure

The RF output power (conducted) was measured with Wireless Communication Test Set and an attenuator at the antenna port.

Test data	:	APPENDIX 1
Test result	:	Pass

[Radiated : Equivalent isotropic radiated power(EIRP)]

Test Procedure

- 1) EUT was placed on a platform of nominal size, 0.5 by 1.0m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in a semi anechoic chamber with a ground plane and at a distance of 3m.
The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
- 2) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height as the EUT. The frequency above 1GHz of the Substitution antenna was used with Horn antenna calibrated with the Half wave dipole antenna, which is harmonized with the measured frequency in 1).
The Substitution Antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1).
The measuring antenna height varied between 1 and 4m to obtain the maximum receiving level.
Its Output power of Signal Generator was recorded.
- 3) Equivalent isotropic radiated power(EIRP) was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).

- The carrier level and noise levels were confirmed at each position of X, Y and Z axis of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test data	:	APPENDIX 1
Test result	:	Pass

SECTION 6: Bandwidth (Conducted)

Test Procedure

The Emission Bandwidth and 99% Occupied Bandwidth was measured with a spectrum analyzer and attenuator connected to the antenna port.

Test data	:	APPENDIX 1
Test result	:	Pass

SECTION 7: Spurious Emission and Band-Edge (Conducted/Radiated)

[Conducted]

Test Procedure

The Spurious Emission and Band-Edge was measured with a spectrum analyzer and attenuator connected to the antenna port.

[Radiated]

Test Procedure

- 1) EUT was placed on a platform of nominal size, 0.5m by 1.0m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in a semi anechoic chamber with a ground plane and at a distance of 3m.
The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
- 2) Exchanged the EUT to the Substitution Antenna, the antenna was set for the same height as EUT on the table.
The frequency below 1GHz of the Substitution antenna was used as the Half wave dipole antenna and Shorted dipole antenna calibrated with the Half wave dipole antenna, which is harmonized with the measured frequency in 1). The frequency above 1GHz of the Substitution antenna was used with Horn antenna calibrated with the Half wave dipole antenna.
The Substitution antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution antenna was matched with the one of the measuring antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1).
The measuring antenna height varied between 1 and 4m to obtain the maximum receiving level.
Its Output power of Signal Generator was recorded.
- 3) Equivalent isotropic radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).

- The carrier level and noise levels were confirmed at each position of X, Y and Z axis of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test data	:	APPENDIX 1
Test result	:	Pass

SECTION 8: Frequency Stability(Temperature/Voltage Variation)

Test Procedure

The Frequency Stability was measured with a Wireless Communication Test Set and attenuator connected to the antenna port.

The Frequency Stability was measured with the 10 deg. C. steps from -30 deg. C. to 50 deg. C., and it is presented as the ppm unit. The Frequency Stability was measured with the normal temperature (20 deg. C.) and Voltage tolerance (DC 3.310V(Battery Operating End Point) to DC 4.255V), and it is presented as the ppm unit.

Temperature	:	-30deg.C to +50deg.C (10 deg. C. step)
Voltage	:	Normal Voltage DC 3.700V
		Maximum Voltage DC 4.255V(DC 3.7V +15%)
		Minimum Voltage DC 3.310V (Battery Operating End Point)

Test data	:	APPENDIX 1
Test result	:	Pass

APPENDIX 1: Data of EMI test

RF Output Power (Conducted)

Conducted Output Power PCS1900

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0169-HO
Date 04/16/2012
Temperature/ Humidity 23deg.C / 48% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK), 1slot, PCL=0
 Tx GPRS(GMSK), 1slot, CS-1, PCL=0

Mode	Ch	Frequency [MHz]	Reading Average frame power [dBm]	Cable Loss [dB]	Result [dBm]
GSM (GMSK)	512	1850.2	22.34	8.19	30.53
	661	1880.0	21.27	8.19	29.46
	810	1909.8	21.07	8.19	29.26
GPRS (GMSK)	512	1850.2	22.32	8.19	30.51
	661	1880.0	21.26	8.19	29.45
	810	1909.8	21.04	8.19	29.23

Results = Reading + Cable Loss

RF Output Power (Radiated)
Equivalent Isotropically Radiated Power(EIRP)
PCS1900

Report No. 32IE0169-HO
Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date 04/18/2012
Temperature / Humidity 22deg. C / 39% RH
Engineer Katsunori Okai
Mode Tx GSM(GMSK), 1slot, PCL=0

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 (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal Rx Ant. Height [cm]		Turn Table [deg.]		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER					
1850.20	101.6	99.3	26.5	21.8	4.0	9.8	0.0	32.3	27.6	33.0	0.7	5.4	117	205	124	270	
1880.00	100.9	98.6	25.8	21.4	4.0	9.8	0.0	31.6	27.2	33.0	1.4	5.8	116	204	125	267	
1909.80	100.2	97.9	25.2	21.1	4.0	9.8	0.0	31.0	26.9	33.0	2.0	6.1	111	205	123	258	

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

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)

Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

Peak to Average power Ratio (Conducted)

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0169-HO
Date 04/16/2012
Temperature/ Humidity 23deg. C / 48% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK), 1slot, PCL=0
Tx GPRS(GMSK), 1slot, CS-1, PCL=0

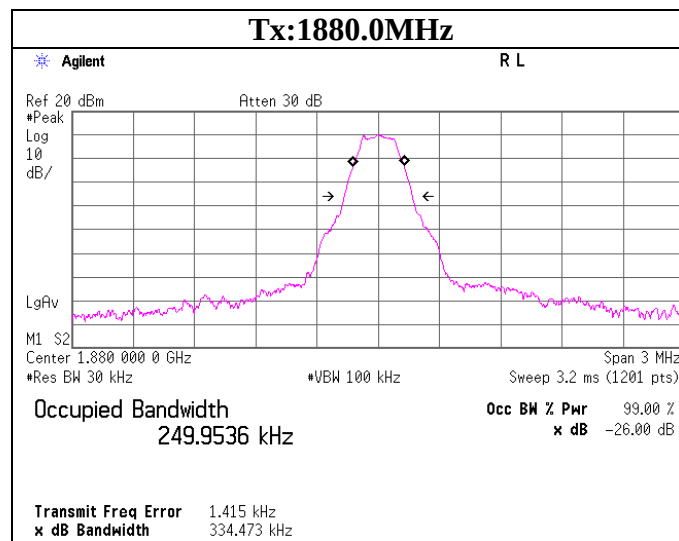
Mode	Channel	Frequency [MHz]	Peak to Average Power Ratio [dB]	Limit [dB]
GSM (GMSK)	512	1850.20	0.049	13
	661	1880.00	0.021	13
	810	1909.80	0.018	13
GPRS (GMSK)	512	1850.20	0.036	13
	661	1880.00	0.030	13
	810	1909.80	0.064	13

*In order to decide the largest deviation between the average and the peak power of the EUT in a bandwidth,
An average and a peak trace of the spectrum analyzer was used for GSM Signals.

Bandwidth(Conducted) PCS1900

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32IE0169-HO
Date	04/16/2012
Temperature/ Humidity	23deg. C / 48% RH
Engineer	Yutaka Yoshida
Mode	Tx GSM(GMSK), 1slot, PCL=0

Mode	FREQ	26dB Bandwidth	99% OBW	Limit
	[MHz]	[kHz]	[kHz]	[kHz]
GSM(GMSK)	1880.0	334.473	249.9536	-



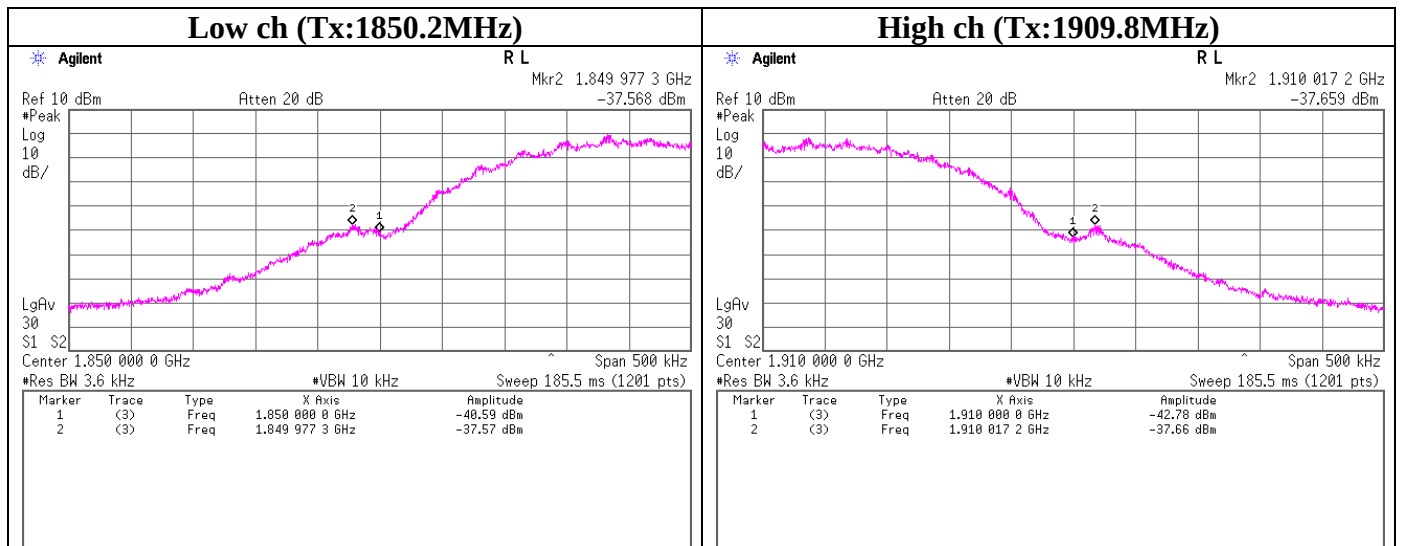
Band-Edge(Conducted) PCS1900

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32IE0169-HO
Date	04/16/2012
Temperature/ Humidity	23deg. C / 48% RH
Engineer	Yutaka Yoshida
Mode	Tx GSM(GMSK), 1slot, PCL=0

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1849.9773	-37.57	9.99	9.38	-18.20	-13.0	5.20
1850.0000	-40.59	9.99	9.38	-21.22	-13.0	8.22
1910.0000	-42.78	9.99	9.39	-23.40	-13.0	10.40
1910.0172	-37.66	9.99	9.39	-18.28	-13.0	5.28

VIDEO AV 30 times

Sample Calculation : Result = Reading + Atten. + Cable Loss



Band-Edge (Radiated)
PCS1900

Report No. 32IE0169-HO
Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date 04/18/2012
Temperature / Humidity 22deg. C / 39% RH
Engineer Katsunori Okai
Mode Tx GSM(GMSK), 1slot, PCL=0

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 (EIRP) [dBm]		Limit (EIRP) [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.]	
1849.98	52.6	51.1	-22.5	-26.3	4.0	9.8	0.0	-16.7	-20.5	-13.0	3.7	7.5	117	205	124	270	
1850.00	43.0	45.0	-32.1	-32.4	4.0	9.8	0.0	-26.3	-26.6	-13.0	13.3	13.6	117	205	124	270	
1910.00	45.8	44.5	-29.1	-32.1	4.0	9.8	0.0	-23.3	-26.3	-13.0	10.3	13.3	111	205	123	258	
1910.02	51.7	49.7	-23.2	-26.9	4.0	9.8	0.0	-17.4	-21.1	-13.0	4.4	8.1	111	205	123	258	

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

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)

Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Detector : S/A AV(RBW:3.6kHz/VBW:10kHz)

Spurious Emission (Conducted)

PCS1900

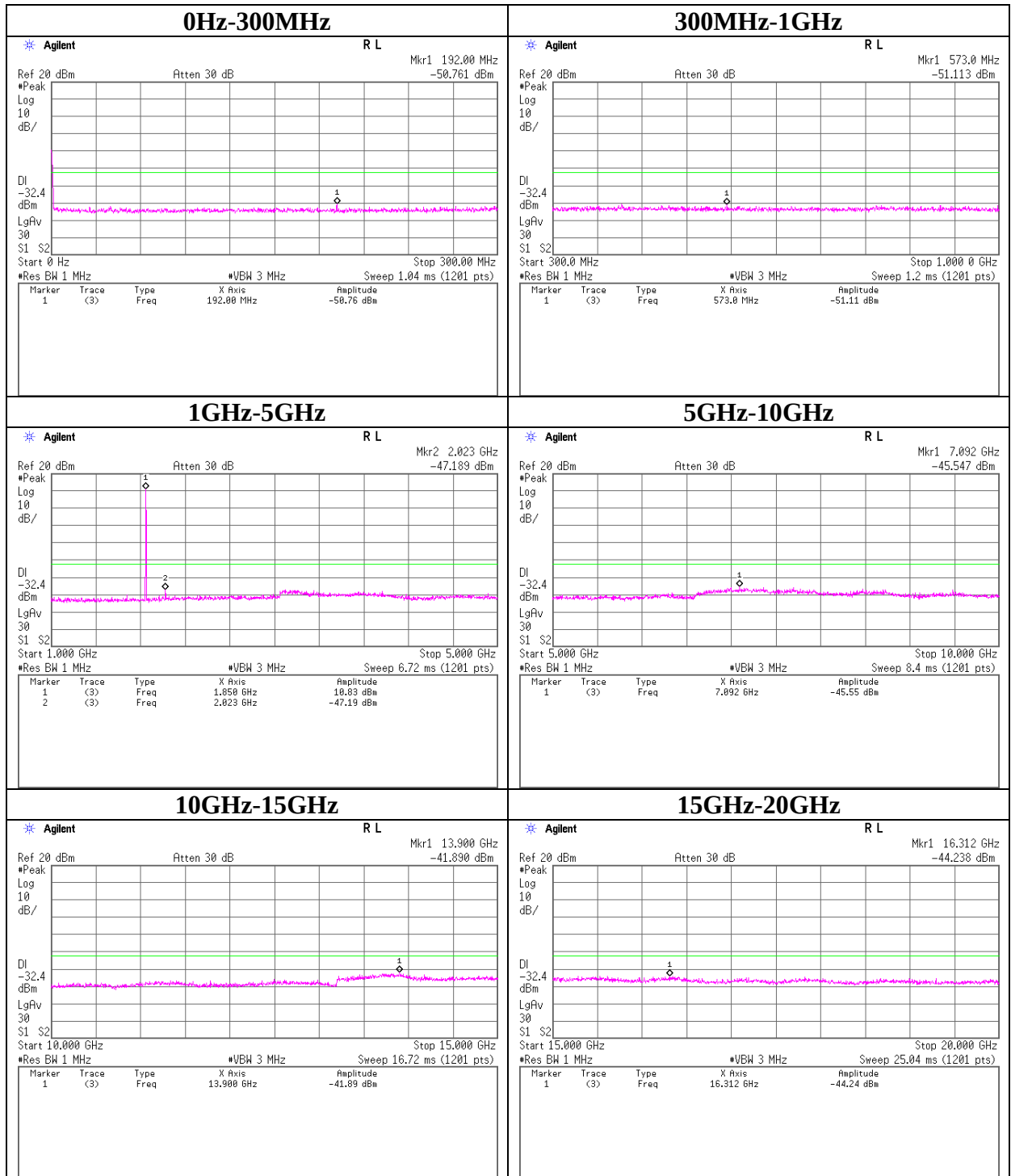
Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0169-HO
Date 04/16/2012
Temperature/ Humidity 23deg. C / 48% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK), 1slot, PCL=0

Limit Line

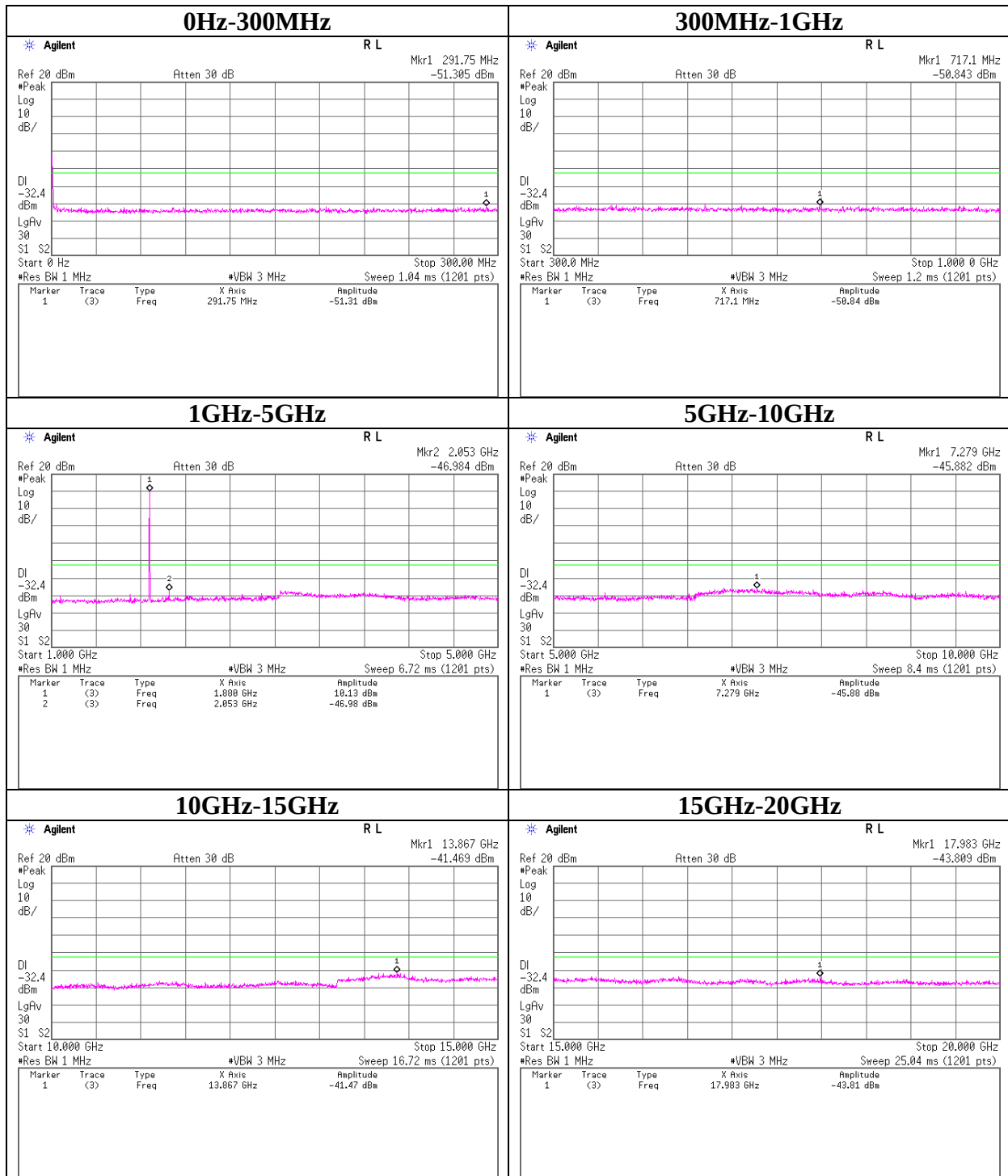
Tx Frequency [MHz]	Limit [dBm]	Atten. [dB]	Cable Loss [dB]	Limit Line [dBm]
1850.2	-13.0	9.99	9.38	-32.4
1880.0	-13.0	9.99	9.38	-32.4
1909.8	-13.0	9.99	9.39	-32.4

Sample Calculation : Limit Line = Limit - Atten. - Cable Loss

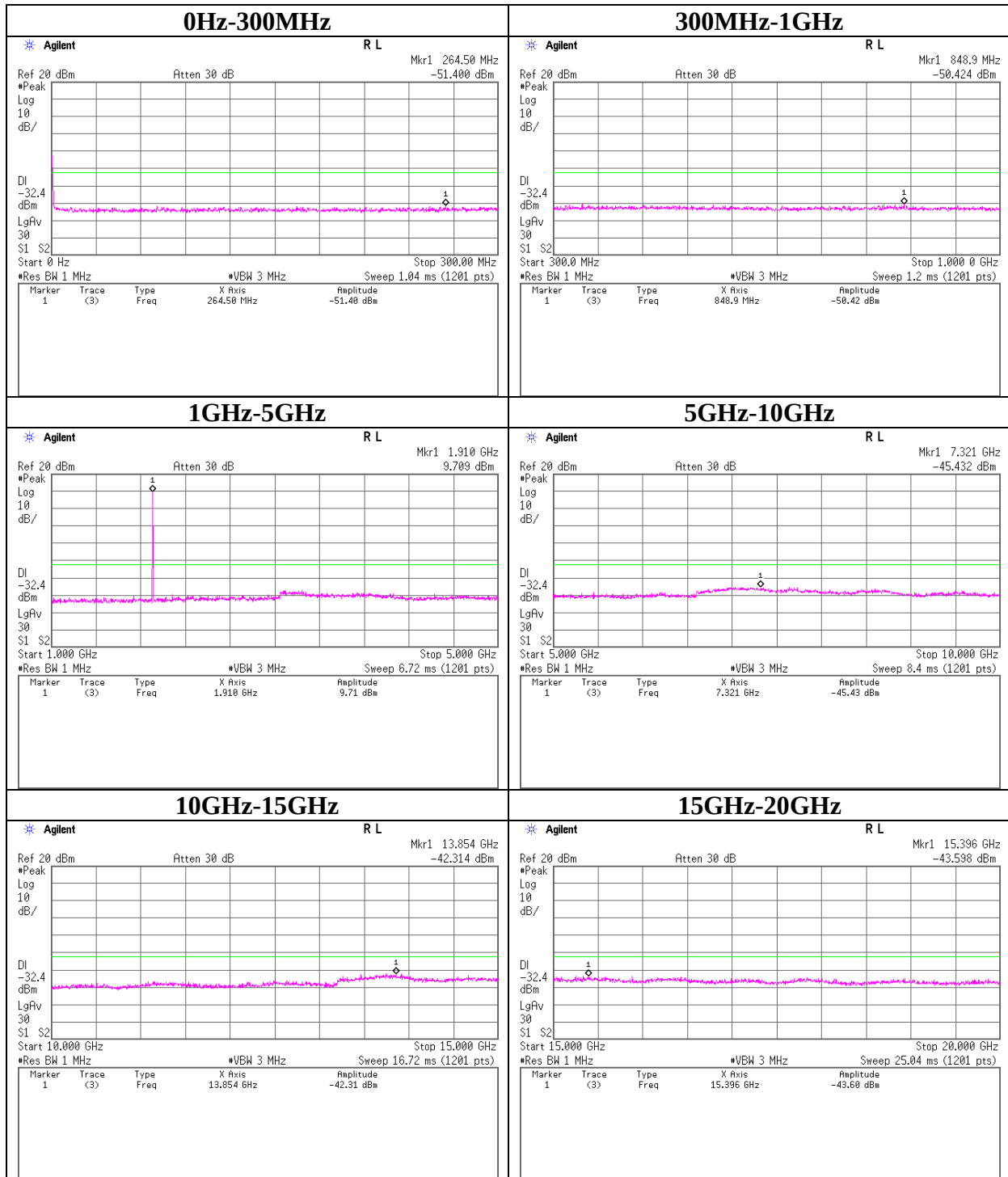
Spurious Emission (Conducted)
GSM
Tx:1850.2MHz



Spurious Emission (Conducted)
GSM
Tx:1880.0MHz



Spurious Emission (Conducted)
GSM
Tx:1909.8MHz



Spurious Emission (Radiated)

PCS1900

Report No. 32IE0169-HO
Test place Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber
Date 04/18/2012 04/19/2012
Temperature / Humidity 22deg. C / 39% RH 23deg. C / 37% RH
Engineer Katsunori Okai Katsunori Okai
(1-10GHz) (the other frequency)
Mode Tx GSM(GMSK), 1slot, PCL=0

Tx 1850.2MHz

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 (EIRP) [dBm]		Limit (EIRP) [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.]	
3700.40	59.5	59.5	-41.7	-42.2	4.7	11.9	0.0	-34.5	-35.0	-13.0	21.5	22.0	135	7	100	202	
5550.60	56.8	53.8	-40.4	-44.9	5.7	12.2	0.0	-34.0	-38.5	-13.0	21.0	25.5	100	34	117	131	
7400.80	45.5	46.6	-46.5	-46.6	6.7	10.2	0.0	-43.0	-43.1	-13.0	30.0	30.1	100	0	100	334	
9251.00	45.3	44.8	-44.0	-47.2	7.5	11.8	0.0	-39.7	-42.9	-13.0	26.7	29.9	100	0	100	0	
11101.20	61.2	67.5	-36.7	-29.0	8.2	11.2	0.0	-33.7	-26.0	-13.0	20.7	13.0	100	318	100	241	
12951.40	58.7	65.6	-34.0	-29.2	8.9	13.1	0.0	-29.7	-24.9	-13.0	16.7	11.9	113	349	118	207	
14801.60	50.5	52.5	-44.3	-37.7	10.0	12.6	0.0	-41.8	-35.2	-13.0	28.8	22.2	100	0	100	95	
16651.80	50.0	51.2	-37.7	-32.4	10.6	15.1	0.0	-33.2	-27.9	-13.0	20.2	14.9	100	0	100	171	

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

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)

Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

Tx 1880MHz

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 (EIRP) [dBm]		Limit (EIRP) [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.]	
3760.00	61.2	63.2	-39.8	-38.6	4.7	11.8	0.0	-32.7	-31.5	-13.0	19.7	18.5	130	21	105	63	
5640.00	57.3	53.2	-40.1	-45.8	5.8	12.2	0.0	-33.7	-39.4	-13.0	20.7	26.4	100	42	100	147	
7520.00	46.2	45.1	-46.6	-48.8	6.8	10.0	0.0	-43.4	-45.6	-13.0	30.4	32.6	100	120	100	0	
9400.00	45.6	49.5	-43.2	-42.5	7.5	11.8	0.0	-39.0	-38.3	-13.0	26.0	25.3	100	0	100	172	
11280.00	63.1	68.4	-33.4	-27.3	8.3	11.4	0.0	-30.3	-24.2	-13.0	17.3	11.2	100	341	100	333	
13160.00	58.2	62.4	-35.7	-32.9	9.0	12.9	0.0	-31.8	-29.0	-13.0	18.8	16.0	100	249	107	144	
15040.00	51.0	52.1	-43.5	-37.6	10.2	12.9	0.0	-40.8	-34.9	-13.0	27.8	21.9	100	159	100	248	
16920.00	50.9	50.6	-37.2	-29.4	10.6	14.7	0.0	-33.1	-25.3	-13.0	20.1	12.3	100	343	100	182	

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

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)

Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

Tx 1909.8MHz

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 (EIRP) [dBm]		Limit (EIRP) [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.]	
3819.60	63.0	62.7	-37.6	-38.9	4.8	11.8	0.0	-30.6	-31.9	-13.0	17.6	18.9	129	0	105	53	
5729.40	57.2	54.5	-39.7	-44.4	5.8	12.2	0.0	-33.3	-38.0	-13.0	20.3	25.0	100	49	124	153	
7639.20	46.1	46.5	-46.7	-46.9	6.8	10.2	0.0	-43.3	-43.5	-13.0	30.3	30.5	100	135	100	0	
9549.00	47.0	51.4	-41.5	-40.2	7.6	11.7	0.0	-37.4	-36.1	-13.0	24.4	23.1	100	0	100	205	
11458.80	67.4	70.7	-28.7	-24.7	8.4	11.5	0.0	-25.6	-21.6	-13.0	12.6	8.6	100	318	100	330	
13368.60	64.2	64.5	-30.6	-31.3	9.0	12.6	0.0	-27.1	-27.8	-13.0	14.1	14.8	106	206	100	311	
15278.40	50.5	52.1	-42.4	-37.4	10.3	13.7	0.0	-39.0	-34.0	-13.0	26.0	21.0	100	350	100	245	
17188.20	51.4	50.4	-37.5	-29.4	10.7	13.4	0.0	-34.8	-26.7	-13.0	21.8	13.7	100	352	100	74	

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

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)

Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

Frequency Stability (Temperature/Voltage Variation)

PCS1900

Tx:1880.0MHz

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32IE0169-HO
Date 04/17/2012
Temperature/ Humidity 22deg. C / 54% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK), 1slot, PCL=0

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
-30.0	3.700	1880.00002212	22.12	0.012	2.5
-20.0	3.700	1879.99998211	-17.89	-0.010	2.5
-10.0	3.700	1879.99995362	-46.38	-0.025	2.5
0.0	3.700	1879.99995882	-41.18	-0.022	2.5
10.0	3.700	1879.99996342	-36.58	-0.019	2.5
20.0	3.700	1880.00003239	32.39	0.017	2.5
30.0	3.700	1879.99996941	-30.59	-0.016	2.5
40.0	3.700	1879.99996545	-34.55	-0.018	2.5
50.0	3.700	1880.00003102	31.02	0.017	2.5

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
20.0	4.255	1880.00003830	38.30	0.020	2.5
20.0	3.700	1880.00003239	32.39	0.017	2.5
20.0	3.310	1879.99997263	-27.37	-0.015	2.5

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2012/02/03 * 12
MURC-03	Radio Communication Analyzer	Anritsu	MT8815B	6200711471	AT	2011/11/26 * 12
MURC-02	Wireless Communication Test Set	Agilent	E5515C	GB47050683	AT	2011/11/26 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MPD-02	Power Divider DC-12.4GHz	SUHNER	4901.19.A	-	AT	2011/05/23 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2011/09/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2011/09/13 * 12
MMM-12	DIGITAL HiTESTER	Hioki	3805	060500120	AT	2012/03/23 * 12
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	AT	2011/08/22 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2012/02/03 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2011/05/23 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2012/03/29 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-130	Microwave Cable(1-33GHz)	HUBER+SUHNER	SF103/11PC3.5-31/11PC3.5-31/8.0m	54308/3	RE	2012/01/05 * 12
KSG-05	Signal Generator	Rohde & Schwarz	SMR40	100137	RE	2011/08/30 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2011/05/23 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/29 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2012/03/28 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2011/11/16 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/11/16 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2012/03/15 * 12
AT-38	Attenuator	Anritsu	MP721B	6200961025	RE	2011/12/08 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2012/03/05 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data 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.

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