



RADIO TEST REPORT

Test Report No.: 32GE0273-HO-01-B

Applicant : NEC Corporation of America
Type of Equipment : Digital Portable Cellular Telephone
Model No. : KMP7R4E1-2A
Test regulation : FCC Part 24 Subpart E: 2008
FCC ID : A98-ROV0164
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: March 30 to April 2, 2012

**Representative
test engineer:**

Yutaka Yoshida
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.
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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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SECTION 1: Customer information

Company Name : NEC Corporation of America
Address : Radio Communications Systems Division
6535N. State Highway 161, Irving, TX 75039-2402 USA
Telephone Number : +1 214 262 4241
Facsimile Number : +1 214 262 4225
Contact Person : Sanjay Wadhwa

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

2.1 Identification of E.U.T.

Type of Equipment : Digital Portable Cellular Telephone
Model No. : KMP7R4E1-2A
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 3.8V
Receipt Date of Sample : March 27, 2012
Country of Mass-production : Japan
Condition of EUT : Production prototype
Modification of EUT : No Modification by the test lab

2.2 Product description

Model No: KMP7R4E1-2A, (referred to as the EUT in this report), is the Digital Portable Cellular Telephone.

Radio Specification [1/2]

Bluetooth (Ver.2.1 + EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Other Clock Frequency	48MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Connector Type	Integrated antenna

Low Energy (Ver.4.0)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Other Clock Frequency	48MHz
Bandwidth & Channel spacing	1MHz & 2MHz
Antenna Connector Type	Integrated antenna

WLAN (IEEE802.11b/g/n (SISO/HT20))

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Other Clock Frequency	48MHz
Type of Modulation	DSSS, OFDM
Antenna Connector Type	Integrated antenna

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Other Clock Frequency	19.2MHz
Type of Modulation	GMSK
Channel spacing	200kHz
Antenna Connector Type	Integrated antenna

Radio Specification [2/2]

WCDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz [Down Link] Band V: 869 – 894MHz
Other Clock Frequency	19.2MHz
Type of Modulation	HPSK
Channel spacing	5MHz
Antenna Connector Type	Integrated antenna

GPS

Equipment Type	Receiver
Receiver Type	Direct Downconversion
Frequency of Operation	1575.42MHz
Other Clock Frequency	57.6MHz
Antenna Connector Type	Integrated antenna

RFID

Equipment Type	Transceiver
Frequency of Operation	13.56MHz
Type of Modulation	ASK
Antenna Connector Type	Integrated antenna

*This test report applies for GSM (PCS).

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] 2.57dB 1910.0025MHz [Radiated] 2.9dB 1910.02MHz, Horizontal (Chassis's color: Pink) 2.9dB 1910.02MHz, 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	13.7dB 15278.40MHz, Vertical (Chassis's color: Pink) 8.6dB 12951.40MHz, 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	
25MHz-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 instruments, Data of EMI, and Test set up

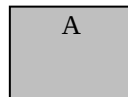
Refer to APPENDIX.

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

4.1 Operating Modes

Test	Operating mode	Power Control	Tested frequency	Channel
RF output Power(Conducted) Peak to Average power Ratio (Conducted)	Transmitting (Tx) (GSM, GMSK) Transmitting (Tx) (GPRS, GMSK)	Max	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
RF output Power(Radiated)	Transmitting (Tx) (GPRS, GMSK) *1)	Max	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
Spurious Emission (Conducted / Radiated)	Transmitting (Tx) (GSM, GMSK) *2)	Max	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
Band Edge (Conducted)	Transmitting (Tx) (GSM, GMSK) Transmitting (Tx) (GPRS, GMSK)	Max	1850.2MHz 1910.0MHz	512 810
Band Edge (Radiated)	Transmitting (Tx) (GSM, GMSK) *2)	Max	1850.2MHz 1910.0MHz	512 810
Bandwidth (Conducted)	Transmitting (Tx) (GPRS, GMSK) Transmitting (Tx) (GSM, GMSK)	Max	1880.0MHz	661
Frequency Stability (Temperature/Voltage Variation)	Transmitting (Tx) (GSM, GMSK)	Max	1880.0MHz	661
*1) The mode was used for testing as a representative, because it had the worst RF output Power (Conducted).				
*2) The mode was used for testing as a representative, because it had the worst Band Edge (Conducted).				

4.2 Configuration and peripherals



* Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Portable Cellular Telephone	KMP7R4E1-2A	004401200900013 *1) 004401200900047 *2) 004401200900062 *3)	NEC Corporation of America	EUT

*1) Used for Antenna Terminal Conducted test

*2) Used for Radiated Emission test

*3) Used for Radiated Emission test (Chassis's color: Pink)

UL Japan, Inc.

Head Office EMC Lab.

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SECTION 5: RF Output Power(Conducted/Radiated)

[Conducted : Conducted Output Power]

Test Procedure

The RF output power was measured with a Wireless Communication Test Set 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, 1.0 by 1.5m, 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.

Test data	:	APPENDIX 1
Test result	:	Pass

[Radiated]

Test Procedure

- 1) EUT was placed on a platform of nominal size, 1.0m by 1.5m, 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

UL Japan, Inc.

Head Office EMC Lab.

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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 Drift 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 Drift was measured with the normal temperature (20 deg. C.) and Voltage tolerance (DC3.4V to DC4.35V), and it is presented as the ppm unit.

Temperature : -30deg.C to +50deg.C (10 deg. C. step)
Voltage : Vnom:DC3.8V, Vmin:DC3.4V, Vmax:DC4.35V

In case of the voltage supply below DC 3.4V, the EUT stops operation by low battery detection function. Therefore, Frequency Stability test was performed under the above condition.

Test data : APPENDIX 1
Test result : Pass

APPENDIX 1: Data of EMI test

RF Output Power (Conducted) **Conducted Output Power**

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32GE0273-HO-01
Date 03/30/2012
Temperature/ Humidity 20deg. C / 40% RH
Engineer Yutaka Yoshida
Mode Tx

Mode	Ch	Frequency [MHz]	Reading Average frame power [dBm]	Cable Loss [dB]	Result [dBm]
GSM (GMSK)	Low	1850.2	22.67	7.32	29.99
	Mid	1880.0	22.93	7.33	30.26
	High	1909.8	23.02	7.34	30.36
GPRS (GMSK)	Low	1850.2	22.71	7.32	30.03
	Mid	1880.0	22.96	7.33	30.29
	High	1909.8	23.06	7.34	30.40

Results = Reading + Cable Loss

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

Report No. 32GE0273-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.2 No.2
Date 03/30/2012 03/31/2012
Temperature / Humidity 22 deg. C / 32 % RH 23 deg. C / 39 % RH
Engineer Tomohisa Nakagawa 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 (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.]	
1850.20	100.5	103.4	24.9	25.8	4.0	10.2	0.0	31.1	32.0	33.0	1.9	1.0	195	345	159	245	
1880.00	100.5	102.4	24.6	25.0	4.0	10.3	0.0	30.9	31.3	33.0	2.1	1.7	186	348	156	243	
1909.80	99.4	100.3	24.1	24.1	4.0	10.4	0.0	30.5	30.5	33.0	2.5	2.5	183	346	152	292	

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)

(Chassis's color: Pink)

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.]	
1850.20	100.9	103.2	25.3	25.6	4.0	10.2	0.0	31.5	31.8	33.0	1.5	1.2	190	175	159	249	
1880.00	100.8	102.6	24.8	25.2	4.0	10.3	0.0	31.1	31.5	33.0	1.9	1.5	182	176	155	294	
1909.80	99.8	100.6	24.5	24.4	4.0	10.4	0.0	30.9	30.8	33.0	2.1	2.2	180	176	155	296	

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)

Report No. 32GE0273-HO-01
Test place Head Office EMC Lab. No.6 Measurement Room
Date 03/30/2012
Temperature / Humidity 20deg. C / 40% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK)
Tx GPRS(GMSK)

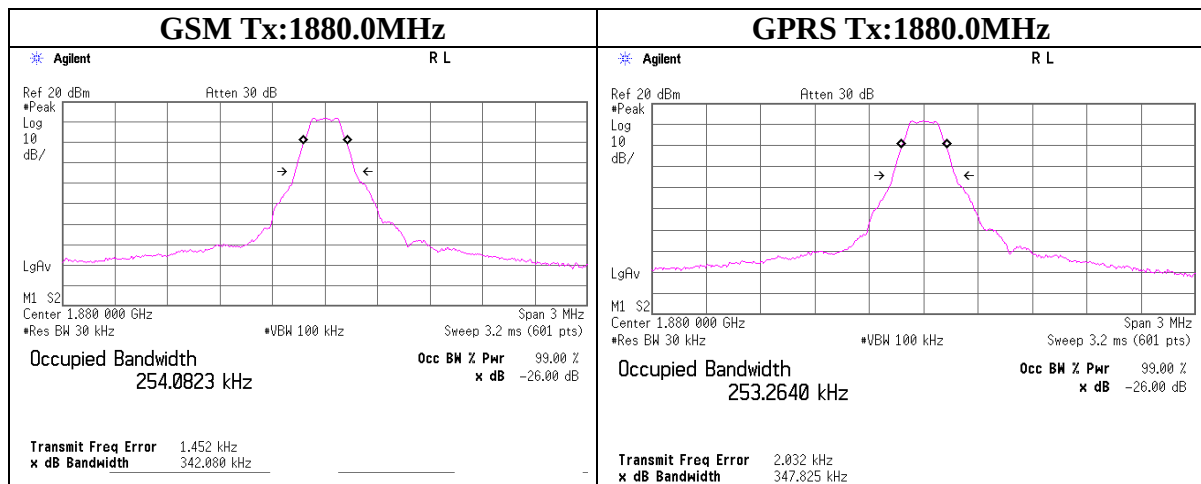
Mode	Channel	Frequency [MHz]	Peak to Average power Ratio [dB]	Limit [dB]
GSM (GMSK)	512	1850.20	0.129	13
	661	1880.00	0.221	13
	810	1909.80	0.179	13
GPRS (GMSK)	512	1850.20	0.153	13
	661	1880.00	0.224	13
	810	1909.80	0.200	13

*In order to decide the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth, an average and a peak trace were used on a spectrum analyzer .

Bandwidth(Conducted)

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32GE0273-HO-01
Date	03/30/2012
Temperature/ Humidity	20deg. C / 40% RH
Engineer	Yutaka Yoshida
Mode	Tx GSM(GMSK)
	Tx GPRS(GMSK)

Mode	FREQ	26dB Bandwidth	99% OBW	Limit
	[MHz]	[kHz]	[kHz]	[kHz]
GSM	1880.0	342.080	254.0800	-
GPRS	1880.0	347.825	253.2640	-



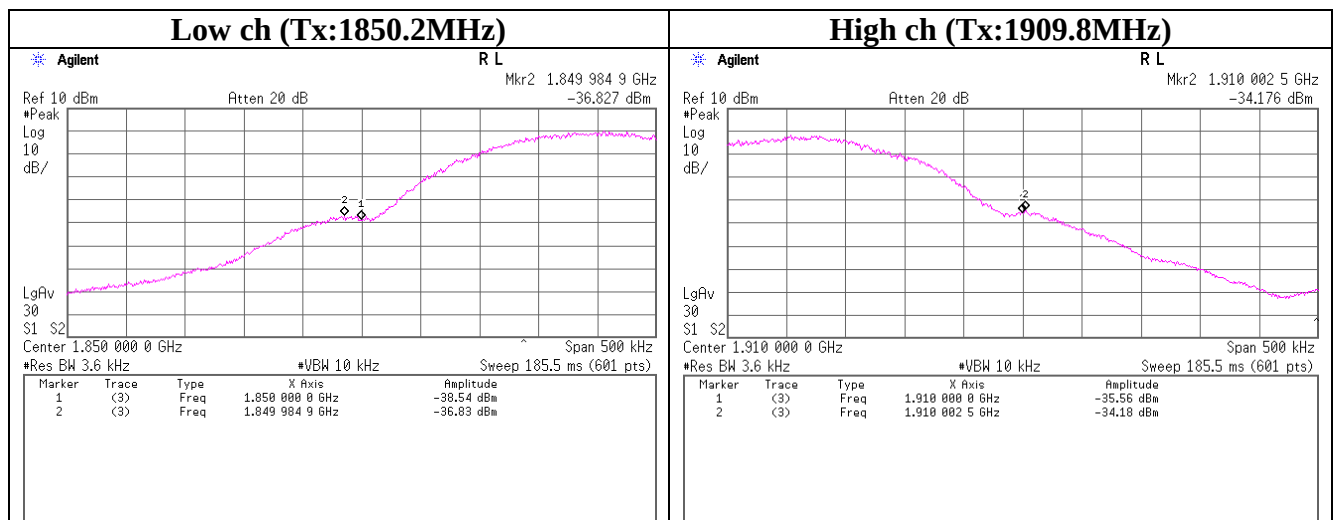
Band-Edge(Conducted)

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32GE0273-HO-01
Date 03/30/2012
Temperature/ Humidity 20deg. C / 40% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK)

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1849.9849	-36.83	10.07	8.51	-18.25	-13.0	5.25
1850.0000	-38.54	10.07	8.51	-19.96	-13.0	6.96
1910.0000	-35.56	10.07	8.54	-16.95	-13.0	3.95
1910.0025	-34.18	10.07	8.54	-15.57	-13.0	2.57

VIDEO AV 30 times

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



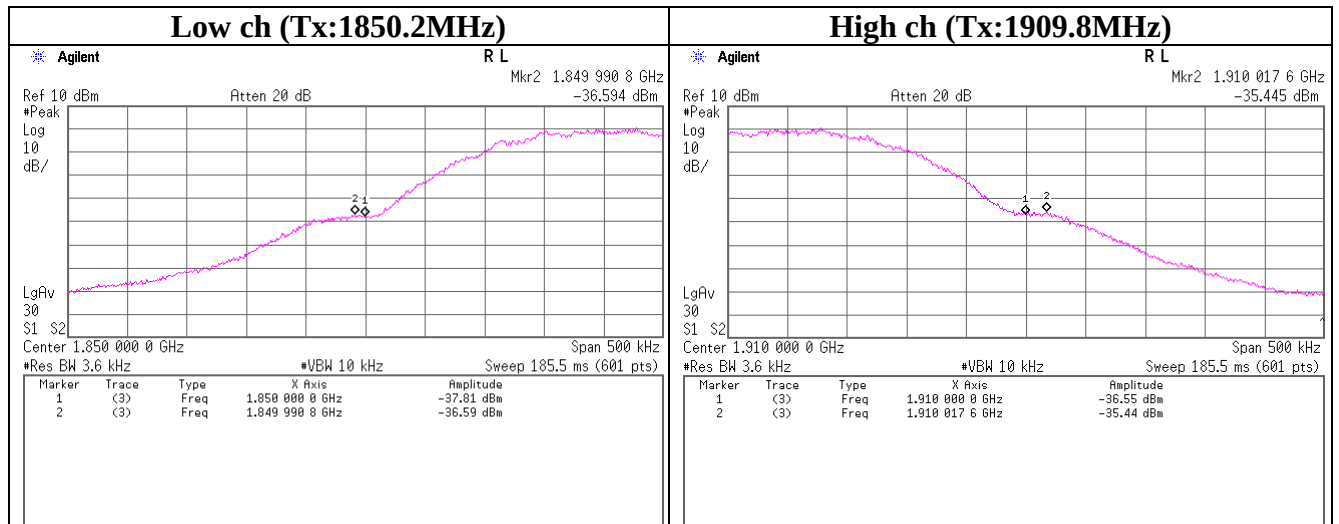
Band-Edge(Conducted)

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32GE0273-HO-01
Date 03/30/2012
Temperature/ Humidity 20deg. C / 40% RH
Engineer Yutaka Yoshida
Tx GPRS(GMSK)

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1849.9908	-36.59	10.07	8.51	-18.01	-13.0	5.01
1850.0000	-37.81	10.07	8.51	-19.23	-13.0	6.23
1910.0000	-36.55	10.07	8.54	-17.94	-13.0	4.94
1910.0176	-35.44	10.07	8.54	-16.83	-13.0	3.83

VIDEO AV 30 times

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



Band-Edge (Radiated)

Report No. 32GE0273-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.2
Date 03/30/2012
Temperature / Humidity 22 deg. C / 32 % RH
Engineer Tomohisa Nakagawa
Mode Tx GSM(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 (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal Rx Ant. Turn Height Table [cm] [deg.]		Vertical Rx Ant. Turn Height Table [cm] [deg.]		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER					
1849.98	53.1	54.8	-22.7	-22.7	4.0	10.2	0.0	-16.5	-16.5	-13.0	3.5	3.5	191	17	159	245	
1850.00	49.4	50.7	-26.4	-26.8	4.0	10.2	0.0	-20.2	-20.6	-13.0	7.2	7.6	191	17	159	245	
1910.00	47.7	49.1	-27.4	-27.1	4.0	10.4	0.0	-21.0	-20.7	-13.0	8.0	7.7	183	346	122	155	
1910.02	52.9	53.3	-22.3	-22.8	4.0	10.4	0.0	-15.9	-16.4	-13.0	2.9	3.4	180	315	152	292	

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

(Chassis's color: Pink)

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. Turn Height Table [cm] [deg.]		Vertical Rx Ant. Turn Height Table [cm] [deg.]		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER					
1849.98	51.7	54.2	-23.8	-23.3	4.0	10.2	0.0	-17.6	-17.1	-13.0	4.6	4.1	190	175	159	249	
1850.00	48.0	49.3	-27.5	-28.2	4.0	10.2	0.0	-21.3	-22.0	-13.0	8.3	9.0	190	175	159	249	
1910.00	48.3	46.7	-26.8	-29.4	4.0	10.4	0.0	-20.4	-23.0	-13.0	7.4	10.0	180	176	155	296	
1910.02	52.8	53.6	-22.3	-22.5	4.0	10.4	0.0	-15.9	-16.1	-13.0	2.9	3.1	180	176	155	296	

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

Spurious Emission (Conducted)

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32GE0273-HO-01
Date 03/30/2012
Temperature/ Humidity 20deg. C / 40% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK)

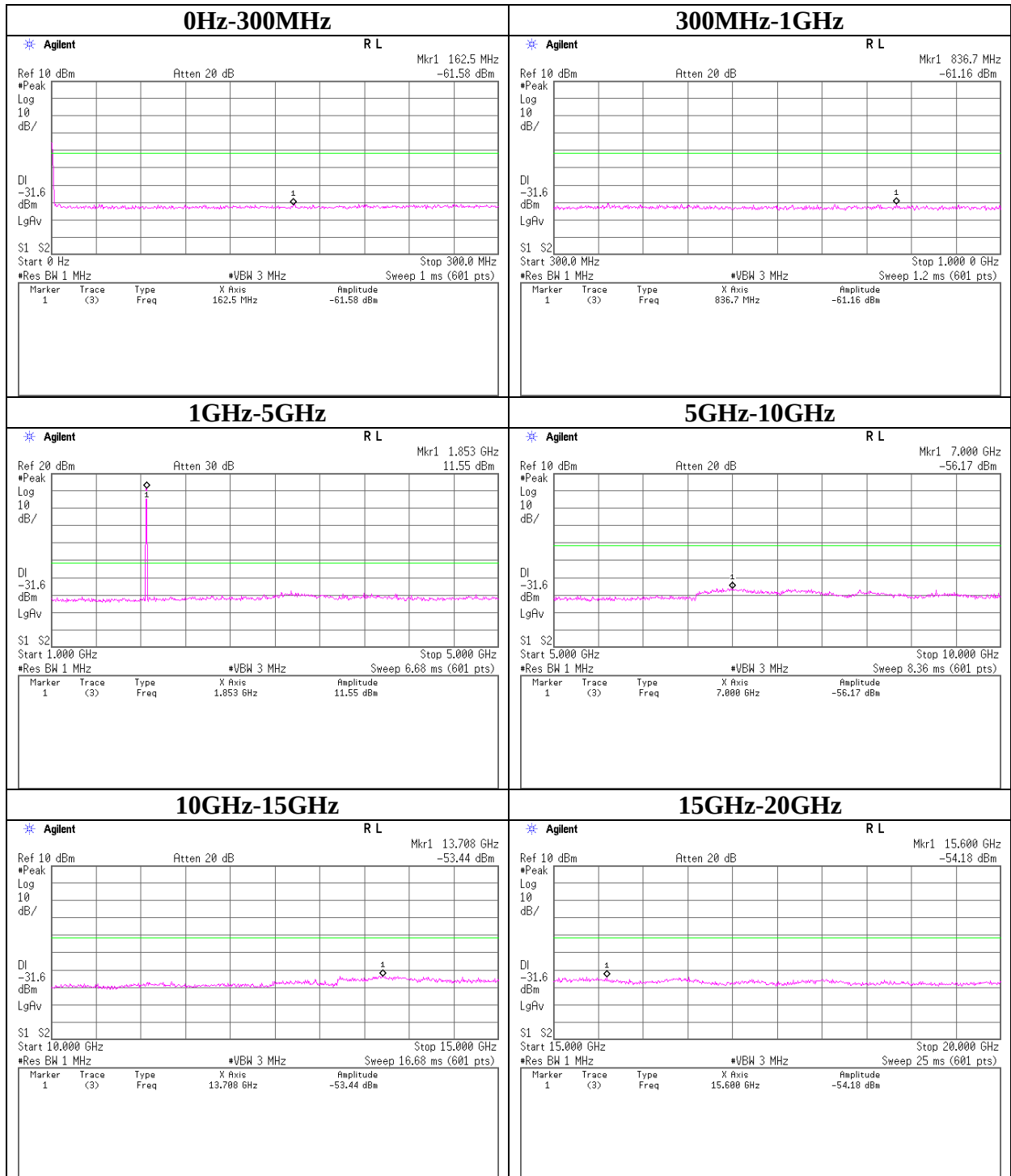
Limit Line

Tx Frequency [MHz]	Limit [dBm]	Atten. [dB]	Cable Loss [dB]	Limit Line [dBm]
1850.2	-13.0	10.07	8.51	-31.6
1880.0	-13.0	10.07	8.52	-31.6
1909.8	-13.0	10.07	8.54	-31.6

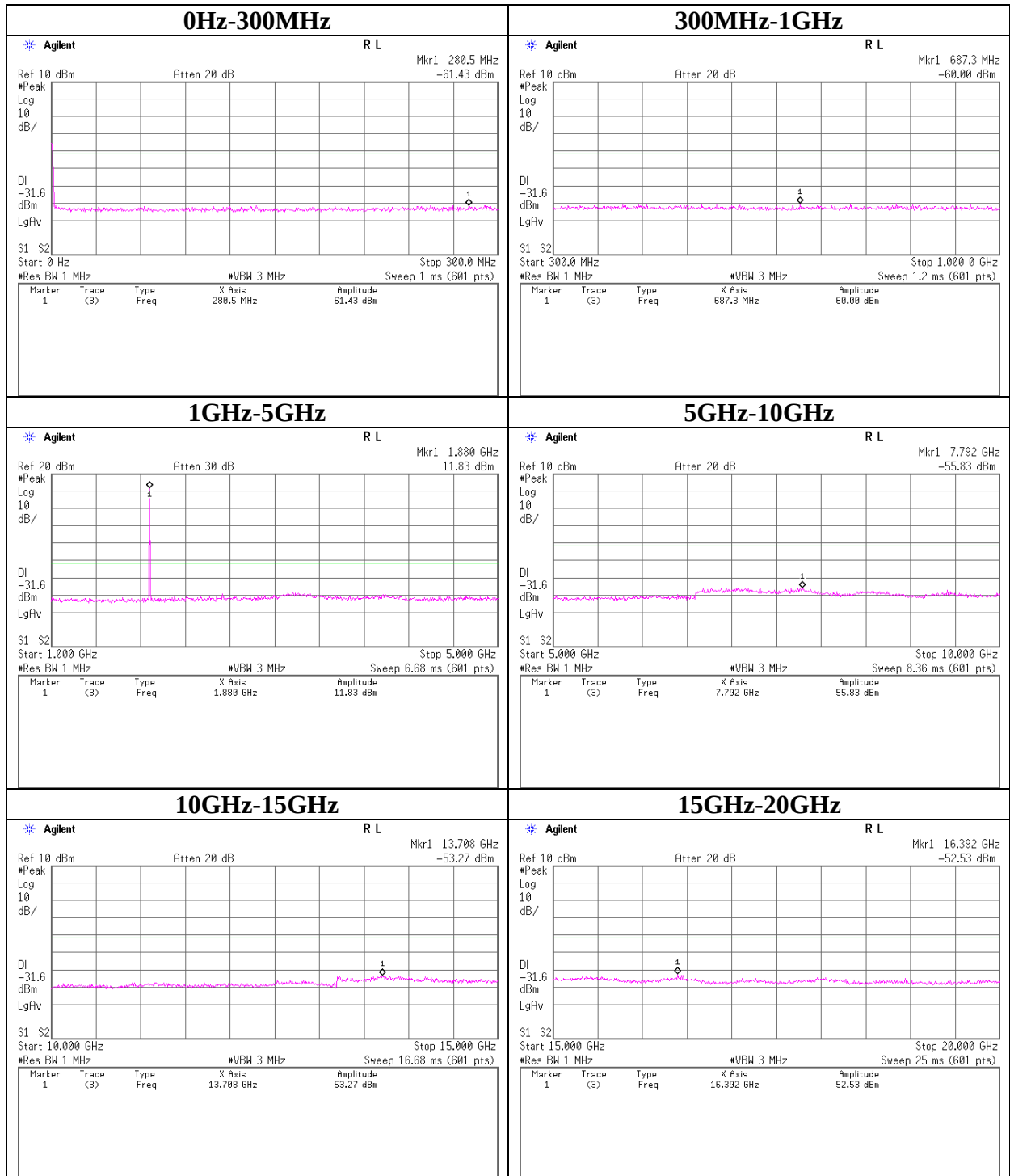
Sample Calculation : Limit Line = Limit - Atten. - Cable Loss

*All the spurious noises were below the above limit line.

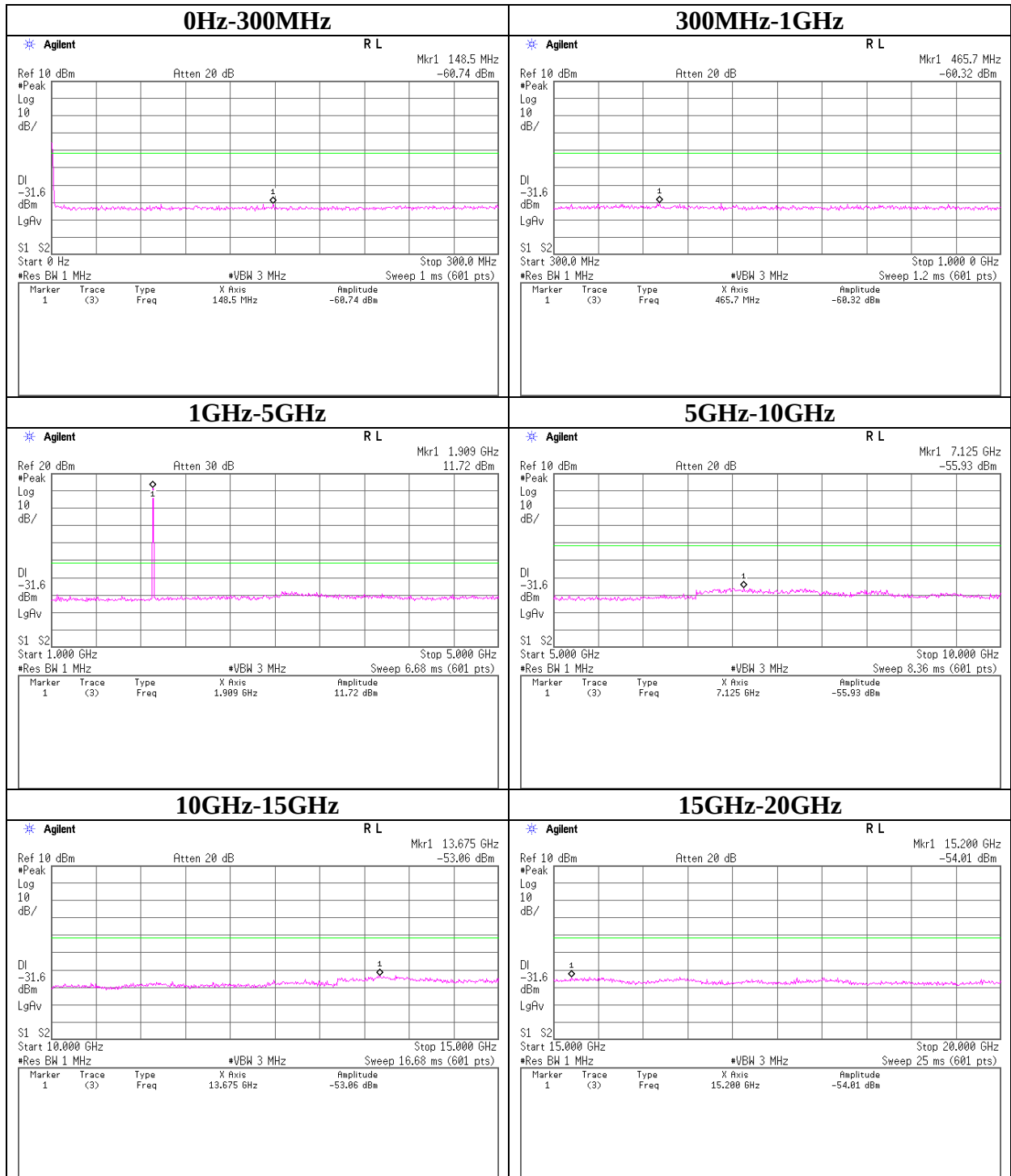
Spurious Emission (Conducted)
GSM Tx:1850.2MHz



Spurious Emission (Conducted)
GSM Tx:1880.0MHz



Spurious Emission (Conducted)
GSM Tx:1909.8MHz



Spurious Emission (Radiated)

Report No. 32GE0273-HO-01
Test place Head Office EMC Lab.
Semi Anechoic Chamber No.2
Date 03/30/2012 No.2
Temperature / Humidity 22 deg. C / 32 % RH 23 deg. C / 39 % RH 22 deg. C / 33 % RH
Engineer Tomohisa Nakagawa Katsunori Okai Tomohisa Nakagawa
Below 1GHz 1G-10GHz 10G-20GHz
Mode Tx GSM(GMSK)

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 Rx Ant. Turn Height Table [cm] [deg.]		Vertical Rx Ant. Turn Height Table [cm] [deg.]		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	HOR	VER	
3700.40	57.4	53.5	-47.2	-51.1	4.7	12.7	0.0	-39.2	-43.1	-13.0	26.2	30.1	100	226	112	187	
5550.60	57.1	59.6	-43.3	-42.6	5.7	13.8	0.0	-35.3	-34.6	-13.0	22.3	21.6	100	350	110	233	
7400.80	48.8	51.2	-46.3	-44.8	6.7	11.1	0.0	-41.9	-40.4	-13.0	28.9	27.4	100	112	105	195	
9251.00	49.2	50.9	-43.7	-44.3	7.5	11.2	0.0	-40.0	-40.6	-13.0	27.0	27.6	100	107	127	189	
11101.20	58.9	60.7	-35.6	-34.8	8.2	11.0	0.0	-32.9	-32.1	-13.0	19.9	19.1	100	205	100	167	
12951.40	50.1	54.8	-43.0	-40.3	8.9	13.6	0.0	-38.3	-35.6	-13.0	25.3	22.6	100	85	100	125	

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 1880.0MHz

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. Turn Height Table [cm] [deg.]		Vertical Rx Ant. Turn Height Table [cm] [deg.]		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	HOR	VER	
3760.00	56.7	53.2	-48.0	-52.0	4.7	12.7	0.0	-40.1	-44.1	-13.0	27.1	31.1	100	230	145	222	
5640.00	59.0	58.3	-41.3	-44.0	5.8	13.8	0.0	-33.3	-36.0	-13.0	20.3	23.0	100	356	108	226	
7520.00	49.4	51.5	-46.0	-44.3	6.8	11.0	0.0	-41.8	-40.1	-13.0	28.8	27.1	100	187	104	184	
9400.00	47.5	48.3	-44.2	-46.7	7.5	11.1	0.0	-40.6	-43.1	-13.0	27.6	30.1	100	74	129	194	
11280.00	57.0	58.6	-38.9	-36.7	8.3	11.0	0.0	-36.1	-33.9	-13.0	23.1	20.9	100	107	113	165	
13160.00	46.7	50.5	-47.9	-45.1	9.0	13.3	0.0	-43.6	-40.8	-13.0	30.6	27.8	111	195	100	195	

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 Rx Ant. Turn Height Table [cm] [deg.]		Vertical Rx Ant. Turn Height Table [cm] [deg.]		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	HOR	VER	
3819.60	55.0	52.7	-49.4	-52.0	4.8	12.6	0.0	-41.5	-44.1	-13.0	28.5	31.1	100	180	100	91	
5729.40	57.8	58.9	-42.6	-42.7	5.8	13.8	0.0	-34.6	-34.7	-13.0	21.6	21.7	100	355	102	225	
7639.20	47.0	48.9	-48.1	-46.5	6.8	11.2	0.0	-43.7	-42.1	-13.0	30.7	29.1	100	103	100	196	
9549.00	48.6	49.9	-43.5	-45.1	7.6	11.1	0.0	-40.0	-41.6	-13.0	27.0	28.6	100	340	129	147	
11458.80	52.1	51.1	-43.5	-44.1	8.4	11.1	0.0	-40.7	-41.3	-13.0	27.7	28.3	100	111	106	235	
13368.60	45.9	49.3	-49.2	-48.1	9.0	12.9	0.0	-45.4	-44.3	-13.0	32.4	31.3	111	195	100	180	
15278.40	54.5	59.1	-39.0	-31.3	10.3	15.0	0.0	-34.4	-26.7	-13.0	21.4	13.7	100	115	100	205	

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)

(Chassis's color: Pink)
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	57.2	53.8	-47.4	-50.8	4.7	12.7	0.0	-39.4	-42.8	-13.0	26.4	29.8	100	224	114	188	
5550.60	57.4	56.2	-43.0	-46.0	5.7	13.8	0.0	-35.0	-38.0	-13.0	22.0	25.0	100	306	107	355	
7400.80	49.8	48.4	-45.3	-47.6	6.7	11.1	0.0	-40.9	-43.2	-13.0	27.9	30.2	100	116	106	185	
9251.00	47.4	49.3	-45.5	-45.9	7.5	11.2	0.0	-41.8	-42.2	-13.0	28.8	29.2	100	75	100	201	
11101.20	64.5	67.1	-30.0	-28.4	8.2	11.0	0.0	-27.3	-25.7	-13.0	14.3	12.7	100	225	100	116	
12951.40	64.1	68.8	-29.0	-26.3	8.9	13.6	0.0	-24.3	-21.6	-13.0	11.3	8.6	111	229	100	209	
14801.60	60.6	62.4	-34.0	-27.5	10.0	13.6	0.0	-30.4	-23.9	-13.0	17.4	10.9	100	223	100	210	

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)

(Chassis's color: Pink)
Tx 1880.0MHz

Frequency	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
													Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	[MHz]	HOR	VER	HOR				VER	HOR		VER	HOR	VER	HOR	VER	HOR	
3760.00	57.8	56.1	-46.9	-49.1	4.7	12.7	0.0	-39.0	-41.2	-13.0	26.0	28.2	100	226	108	94	
5640.00	59.1	59.0	-41.2	-43.3	5.8	13.8	0.0	-33.2	-35.3	-13.0	20.2	22.3	100	346	108	215	
7520.00	48.9	49.9	-46.5	-45.9	6.8	11.0	0.0	-42.3	-41.7	-13.0	29.3	28.7	100	112	109	198	
9400.00	47.9	48.1	-43.8	-46.9	7.5	11.1	0.0	-40.2	-43.3	-13.0	27.2	30.3	100	35	110	225	
11280.00	67.9	69.5	-28.0	-25.8	8.3	11.0	0.0	-25.2	-23.0	-13.0	12.2	10.0	100	220	100	246	
13160.00	58.6	66.0	-36.0	-29.6	9.0	13.3	0.0	-31.7	-25.3	-13.0	18.7	12.3	111	251	100	210	
15040.00	61.6	63.3	-31.4	-26.1	10.2	14.2	0.0	-27.4	-22.1	-13.0	14.4	9.1	100	221	100	195	

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)

(Chassis's color: Pink)
Tx 1909.8MHz

Frequency	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
													Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	[MHz]	HOR	VER	HOR				VER	HOR		VER	HOR	VER	HOR	VER	HOR	
3819.60	57.6	54.8	-46.8	-49.9	4.8	12.6	0.0	-38.9	-42.0	-13.0	25.9	29.0	124	234	100	91	
5729.40	61.0	61.5	-39.4	-40.1	5.8	13.8	0.0	-31.4	-32.1	-13.0	18.4	19.1	105	350	104	348	
7639.20	48.9	49.9	-46.2	-45.5	6.8	11.2	0.0	-41.8	-41.1	-13.0	28.8	28.1	100	113	100	200	
9549.00	49.3	49.8	-42.8	-45.2	7.6	11.1	0.0	-39.3	-41.7	-13.0	26.3	28.7	100	355	130	175	
11458.80	67.6	68.3	-28.0	-26.9	8.4	11.1	0.0	-25.2	-24.1	-13.0	12.2	11.1	100	215	100	244	
13368.60	55.1	55.6	-40.0	-41.8	9.0	12.9	0.0	-36.2	-38.0	-13.0	23.2	25.0	107	236	100	246	
15278.40	54.5	61.8	-39.0	-28.6	10.3	15.0	0.0	-34.4	-24.0	-13.0	21.4	11.0	100	171	100	174	

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)

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32GE0273-HO
Date 04/02/2012
Temperature/ Humidity 16deg. C / 22% RH
Engineer Yutaka Yoshida
Mode Tx GSM(GMSK)

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Remark
-30	3.80	1880.00006820	40.91	0.022	-
-20	3.80	1880.00005730	30.01	0.016	-
-10	3.80	1880.00006593	38.64	0.021	-
0	3.80	1880.00005543	28.14	0.015	-
10	3.80	1880.00003579	8.50	0.005	-
20	3.80	1880.00002729	-	-	Reference
30	3.80	1880.00002570	-1.59	-0.001	-
40	3.80	1880.00003023	2.94	0.002	-
50	3.80	1880.00003526	7.97	0.004	-

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Remark
20	4.35	1880.00005336	26.07	0.014	-
20	3.80	1880.00002729	-	-	Reference
20	3.40	1880.00006291	35.62	0.019	Battery End Point

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date	Expiration date of the calibration
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2012/02/03	2013/02/28
MURC-02	Wireless Communication Test Set	Agilent	E5515C	GB47050683	AT/RE	2011/11/26	2012/11/30
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2011/08/09	2012/08/31
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2011/08/09	2012/08/31
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28	2012/10/31
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2011/04/22	2012/04/30
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27	2013/03/31
MPD-02	Power Divider DC-12.4GHz	SUHNER	4901.19.A	-	AT	2011/05/23	2012/05/31
MMM-10	DIGITAL HITESTER	Hioki	3805	051201148	AT	2012/01/13	2013/01/31
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06	2013/02/28
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	AT	2011/08/22	2012/08/31
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2011/06/21	2012/06/30
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06	2013/02/28
MJM-14	Measure	KOMELON	KMC-36	-	RE	-	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08	2012/04/30
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2011/04/15	2012/04/30
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/10/23	2012/10/31
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/10/23	2012/10/31
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2012/02/16	2013/02/28
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02	2012/11/30
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2011/09/26	2012/09/30
MCC-130	Microwave Cable (1-33GHz)	HUBER+SUHNER	SF103/11PC3.5-31/11PC3.5-31/8.0m	54308/3	RE	2012/01/05	2013/01/31
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2011/05/23	2012/05/31
KSG-05	Signal Generator	Rohde & Schwarz	SMR40	100137	RE	2011/08/30	2012/08/31
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2012/02/22	2013/02/28
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2012/01/25	2013/01/31
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07	2012/09/30
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16	2012/05/31
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2011/06/17	2012/06/30

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

UL Japan, Inc.

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