



RADIO TEST REPORT

Test Report No. : 32BE0278-HO-E-R1

Applicant : SAMSUNG ELECTRONICS CO., LTD.
Type of Equipment : Cellular/PCS GSM/GPRS/EDGE Tablet with 802.11abgn, BT3.0
Model No. : SC-02D
Test standard : FCC Part 22 Subpart H: 2006
FCC ID : A3LSWDSC02D
Test Result : Complied

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3. This sample tested is in compliance with 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.
6. This report is a revised version of 32BE0278-HO-E. 32BE0278-HO-E is replaced with this report.

Date of test: September 27 to October 16, 2011

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

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*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>

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

13-EM-F0429

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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 : Cellular/PCS GSM/GPRS/EDGE Tablet with 802.11abgn, BT3.0
Model No. : SC-02D
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC4.0V
Receipt Date of Sample : September 27, 2011
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	PIFA
Antenna Gain	-0.63 dBi

WLAN (IEEE802.11a/b/g/n-20)

Equipment Type	Transceiver	
Frequency of Operation	2412-2462MHz	5180-5240MHz 5260-5320MHz 5500-5700MHz 5745-5825MHz
Type of Modulation	DSSS, OFDM	OFDM
Bandwidth & Channel spacing	20MHz & 5MHz	20MHz & 20MHz
Antenna Type	SEMI-PIFA	
Antenna Gain	2.4G: -0.4dBi	5G: -3.8dBi

WLAN (IEEE802.11n-40)

Equipment Type	Transceiver
Frequency of Operation	5190-5230MHz 5270-5310MHz 5510-5670MHz 5755-5795MHz
Type of Modulation	OFDM
Bandwidth & Channel spacing	40MHz & 40MHz
Antenna Type	SEMI-PIFA
Antenna Gain	-3.8dBi

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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Type of Modulation	GMSK , 8PSK
Emission Designator	GSM850: 249KGXW, 249KG7W PCS: 250KGXW, 249KG7W
Antenna Type	PIFA
Antenna Gain	GSM850: -5.0dBi PCS: -1.5dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 22 Subpart H: 2006, final revised on November 29, 2006
Title : FCC 47CFR Part 22 Subpart H
Cellular Radiotelephone Service

3.2 Procedures and results

Item	Test Specification & Procedure	Remarks	Deviation	Worst margin	Results
RF Output Power(Conducted/ Radiated) (Conducted Output Power / Effective radiated power(ERP))	FCC 2.1046 FCC 22.913(a)(2)	Conducted/ Radiated	N/A	-	Complied
Emission Bandwidth, 99% Occupied Bandwidth	FCC 2.1049 FCC 22.917	Conducted	N/A	-	Complied
Band-Edge	FCC 2.1051 FCC 2.1053 FCC 22.917	Conducted/ Radiated	N/A	GSM [Conducted] 2.43dB 849.021MHz [Radiated] 4.2dB 849.02MHz, Vertical	Complied
Spurious Emission(Conducted)	FCC 2.1051 FCC 22.917	Conducted	N/A	-	Complied
Spurious Emission(Radiated)	FCC 2.1053 FCC 22.917	Radiated	N/A	GSM 38.6dB 1673.20MHz, Horizontal	Complied
Frequency Stability (Temperature Variation)	FCC 2.1055(a)(1)(b) FCC 22.355	Conducted	N/A	-	Complied
Frequency Stability (Voltage Variation)	FCC 2.1055(d)(1)(2) FCC 22.355	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.

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

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

<GSM850>

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) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=5)	824.2MHz 836.6MHz 848.8MHz	128 190 251
RF output Power (Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=5)	824.2MHz 836.6MHz 848.8MHz	128 190 251
Emission Bandwidth, 99% Occupied bandwidth	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=5)	836.6MHz	190
Band Edge (Conducted)	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=5)	824.2MHz 848.8MHz	128 251
Band Edge (Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=5)	824.2MHz 848.8MHz	128 251
Spurious Emission (Conducted)	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=5)	824.2MHz 836.6MHz 848.8MHz	128 190 251
Spurious Emission (Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=5)	824.2MHz 848.8MHz	128 251
Frequency Stability (Temperature/Voltage Variation)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=5)	836.6MHz	190

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

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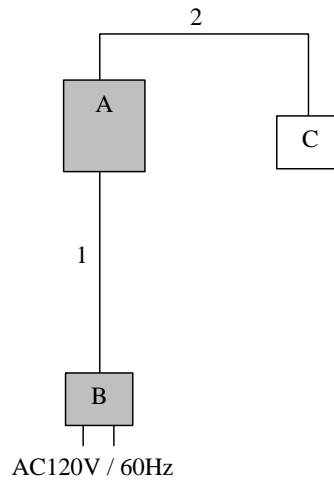
Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

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	Cellular/PCS GSM/GPRS/EDGE Tablet with 802.11abgn, BT3.0	SC-02D	R24B976666N	SAMSUNG	EUT
B	AC Adapter	SC02	-	SAMSUNG	EUT
C	Ear phone	-	-	SAMSUNG	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	1.0	Shielded	Shielded	-
2	Ear phone Cable	1.2	Unshielded	Unshielded	-

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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.

[Radiated: Effective radiated power(ERP)]

Test Procedure

- 1) EUT was placed on a platform of nominal size, 0.5 m 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 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, 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) Effective radiated power(ERP) 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 with Laptop and Tablet Styles 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 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 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) Effective 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).
For the usage of the antenna (Shorted dipole and Horn antenna) except for the Half wave dipole antenna (2.15dBi) for the Substitution antenna, the Effective radiated power was calculated by compensating the finite difference in the antenna gain of the Half wave dipole antenna, and Substitution antenna.

- The carrier level and noise levels were confirmed at each position of X, Y and Z axis of EUT with Laptop and Tablet styles 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 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 (DC3.7V to DC4.2V), and it is presented as the ppm unit.

Temperature : -30deg.C to +50deg.C (10 deg. C. step)
Voltage : Vnom:DC4.0V, Vmin:DC3.7V, Vmax:DC4.2V

As the operating input voltage of the EUT is between DC3.7V to 4.2V (nominal voltage: DC4.0V), 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 GSM850

Test place Head Office EMC Lab. No.6 and 11 Measurement Room
Report No. 32BE0278-HO-E
Date 09/27/2011 10/16/2011
Temperature/ Humidity 22deg.C / 52% RH 23deg. C / 65% RH
Engineer Yutaka Yoshida Katsunori Okai
Mode Tx GSM(GMSK), 1slot, PCL=5
Mode Tx GPRS(GMSK), 1slot, CS-1, PCL=5
Mode Tx EGPRS(8PSK), 1slot, MCS-5, PCL=5

Mode	Ch	Frequency [MHz]	Reading Average frame power [dBm]	Cable Loss [dB]	Result [dBm]
GSM	128	824.2	32.15	0.17	32.32
	190	836.6	32.20	0.17	32.37
	251	848.8	32.21	0.17	32.38
GPRS	128	824.2	32.15	0.17	32.32
	190	836.6	32.19	0.17	32.36
	251	848.8	32.21	0.17	32.38
EGPRS	128	824.2	26.65	0.17	26.82
	190	836.6	26.67	0.17	26.84
	251	848.8	26.66	0.17	26.83

Results = Reading + Cable Loss

RF Output Power (Radiated)
Effective radiated power(ERP)
GSM850

Report No. 32BE0278-HO-E
Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date 09/29/2011
Temperature / Humidity 24deg. C / 62% RH
Engineer Keisuke Kawamura
Mode Tx GSM(GMSK), 1slot, PCL=5

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.]
836.60	94.8	91.5	40.4	40.4	5.6	2.2	10.0	24.8	24.8	38.4	13.7	13.6	107	150	129	164			
848.80	94.5	91.1	41.2	40.3	5.7	2.2	10.1	25.5	24.6	38.4	12.9	13.8	104	152	129	160			

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)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : S/A PK (RBW: 3MHz , VBW: 8MHz)

Report No. 32BE0278-HO-E
Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date 10/14/2011
Temperature / Humidity 23deg. C / 69% RH
Engineer Katsunori Okai
Mode Tx EGPRS(8PSK), 1slot, MCS-5, PCL=5

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.]
836.60	88.3	85.7	35.2	35.5	4.7	2.2	10.0	20.5	20.8	38.4	17.9	17.6	107	280	135	250			
848.80	87.9	85.7	36.2	36.4	4.7	2.2	10.1	21.4	21.6	38.4	17.0	16.8	106	200	135	256			

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)
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 (Radiated)

Report No. 32BE0278-HO-E
Test place Head Office EMC Lab. No.6 Measurement Room and 7 Shielded Room
Date 10/06/2011 10/16/2011
Temperature / Humidity 24deg. C / 56% RH 23deg. C / 65% RH
Engineer Yutaka Yoshida Katsunori Okai
Mode Tx GSM(GMSK), 1slot, PCL=5
Mode Tx GPRS(GMSK), 1slot, CS-1, PCL=5
Mode Tx EGPRS(8PSK), 1slot, MCS-5, PCL=5

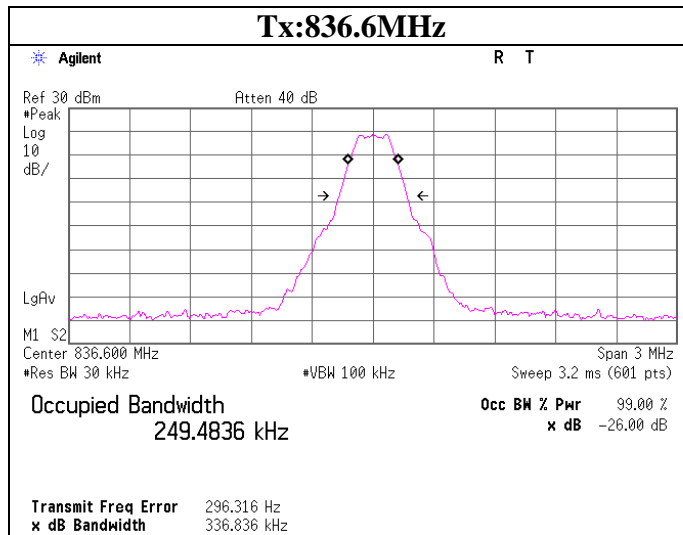
Mode	Channel	Frequency [MHz]	Peak to Average power Ratio [dB]
GSM	128	824.20	0.043
	190	836.60	0.022
	251	848.80	0.041
GPRS	128	824.20	0.086
	190	836.60	0.127
	251	848.80	0.058
EGPRS	128	824.20	5.711
	190	836.60	5.600
	251	848.80	5.940

*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)
GSM850

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32BE0278-HO-E
Date	10/06/2011
Temperature/ Humidity	24deg. C / 56% RH
Engineer	Yutaka Yoshida
Mode	Tx GSM(GMSK), 1slot, PCL=5

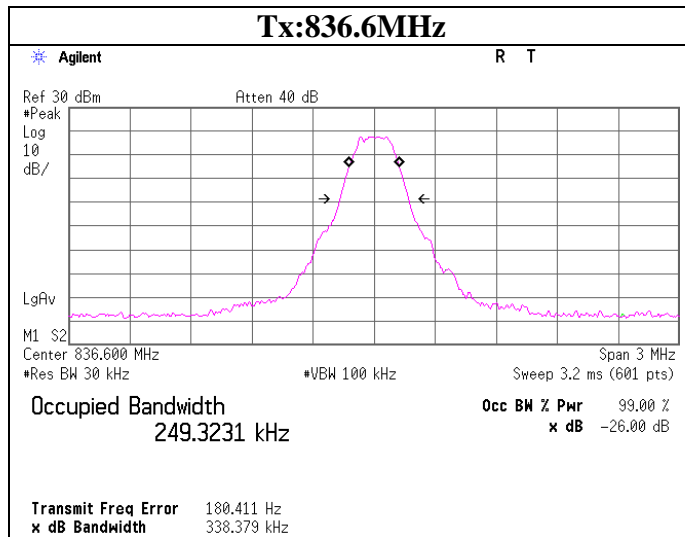
CH	FREQ [MHz]	26dB Bandwidth [kHz]	99% OBW [kHz]	Limit [kHz]
Mid	836.6	336.836	249.4836	-



Bandwidth(Conducted)
GSM850

Test place : Head Office EMC Lab. No.6 Measurement Room
 Report No. : 32BE0278-HO-E
 Date : 10/16/2011
 Temperature/ Humidity : 23deg. C / 65% RH
 Engineer : Katsunori Okai
 Mode : Tx EGPRS(8PSK), 1slot, MCS-5, PCL=5

CH	FREQ [MHz]	26dB Bandwidth [kHz]	99% OBW [kHz]	Limit [kHz]
Mid	836.6	338.379	249.3231	-



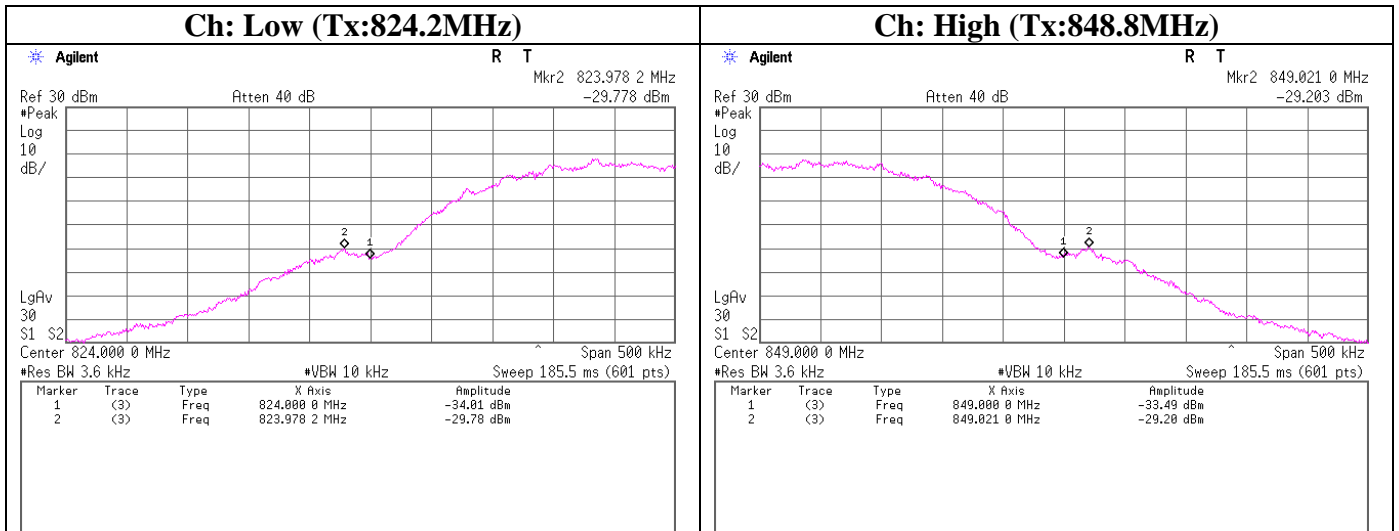
Band Edge (Conducted)
GSM850

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32BE0278-HO-E
Date	10/06/2011
Temperature/ Humidity	24deg. C / 56% RH
Engineer	Yutaka Yoshida
Mode	Tx GSM(GMSK), 1slot, PCL=5

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
823.970	-29.78	10.10	3.67	-16.01	-13.0	3.01
824.000	-34.01	10.10	3.67	-20.24	-13.0	7.24
849.000	-33.49	10.10	3.67	-19.72	-13.0	6.72
849.021	-29.20	10.10	3.67	-15.43	-13.0	2.43

VIDEO AV 30 times

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



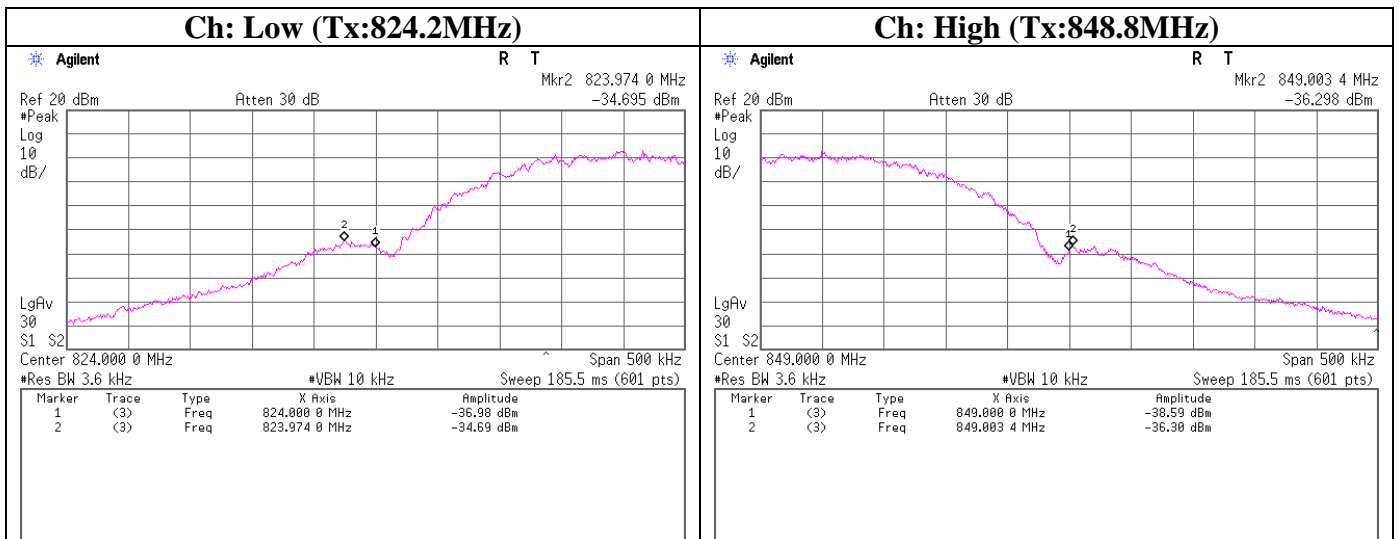
Band Edge (Conducted)
GSM850

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32BE0278-HO-E
Date	10/16/2011
Temperature/ Humidity	23deg. C / 65% RH
Engineer	Katsunori Okai
Mode	Tx EGPRS(8PSK), 1slot, MCS-5, PCL=5

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
823.974	-34.69	10.06	3.99	-20.64	-13.0	7.64
824.000	-36.98	10.06	3.99	-22.93	-13.0	9.93
849.000	-38.59	10.06	4.00	-24.53	-13.0	11.53
849.003	-36.30	10.06	4.00	-22.24	-13.0	9.24

VIDEO AV 30 times

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



Band Edge (Radiated)
GSM850

Report No. 32BE0278-HO-E
Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date 09/29/2011
Temperature / Humidity 24deg. C / 62% RH
Engineer Keisuke Kawamura
Mode Tx GSM(GMSK), 1slot, PCL=5

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	Turn Table		Rx Ant. Height	Turn Table
															[cm]	[deg.]		[cm]	[deg.]
823.98	42.9	37.7	-11.5	-12.7	5.6	2.2	10.0	-27.1	-28.3	-13.0	14.1	15.3	100	114	150	314			
824.00	38.6	33.6	-15.8	-16.8	5.6	2.2	10.0	-31.4	-32.4	-13.0	18.4	19.4	100	114	150	314			
849.00	37.4	42.0	-15.6	-8.2	5.7	2.2	10.1	-31.3	-23.9	-13.0	18.3	10.9	104	152	129	160			
849.02	46.3	48.7	-6.7	-1.5	5.7	2.2	10.1	-22.4	-17.2	-13.0	9.4	4.2	104	152	129	160			

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)

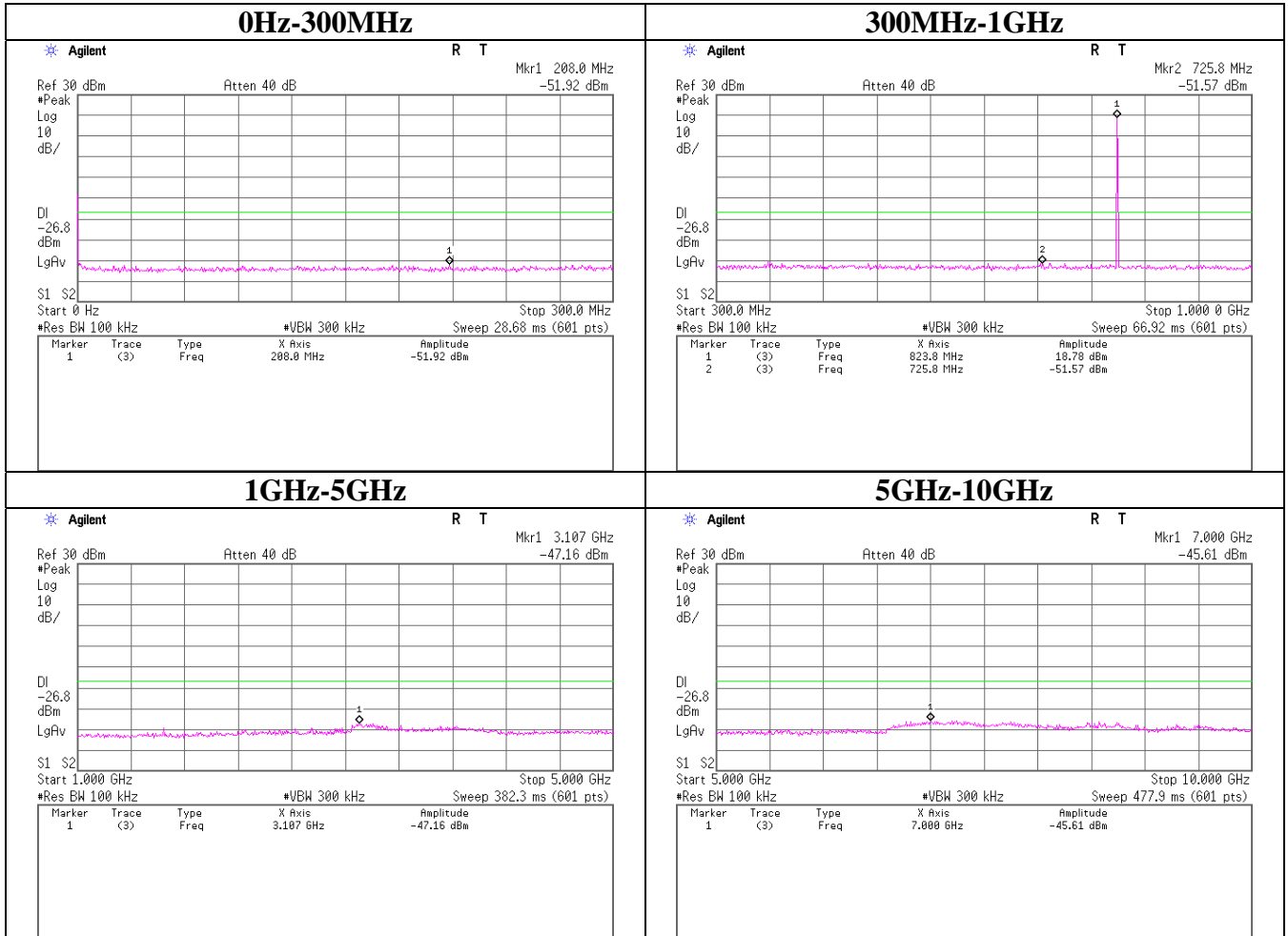
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

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

NS : No signal detect.

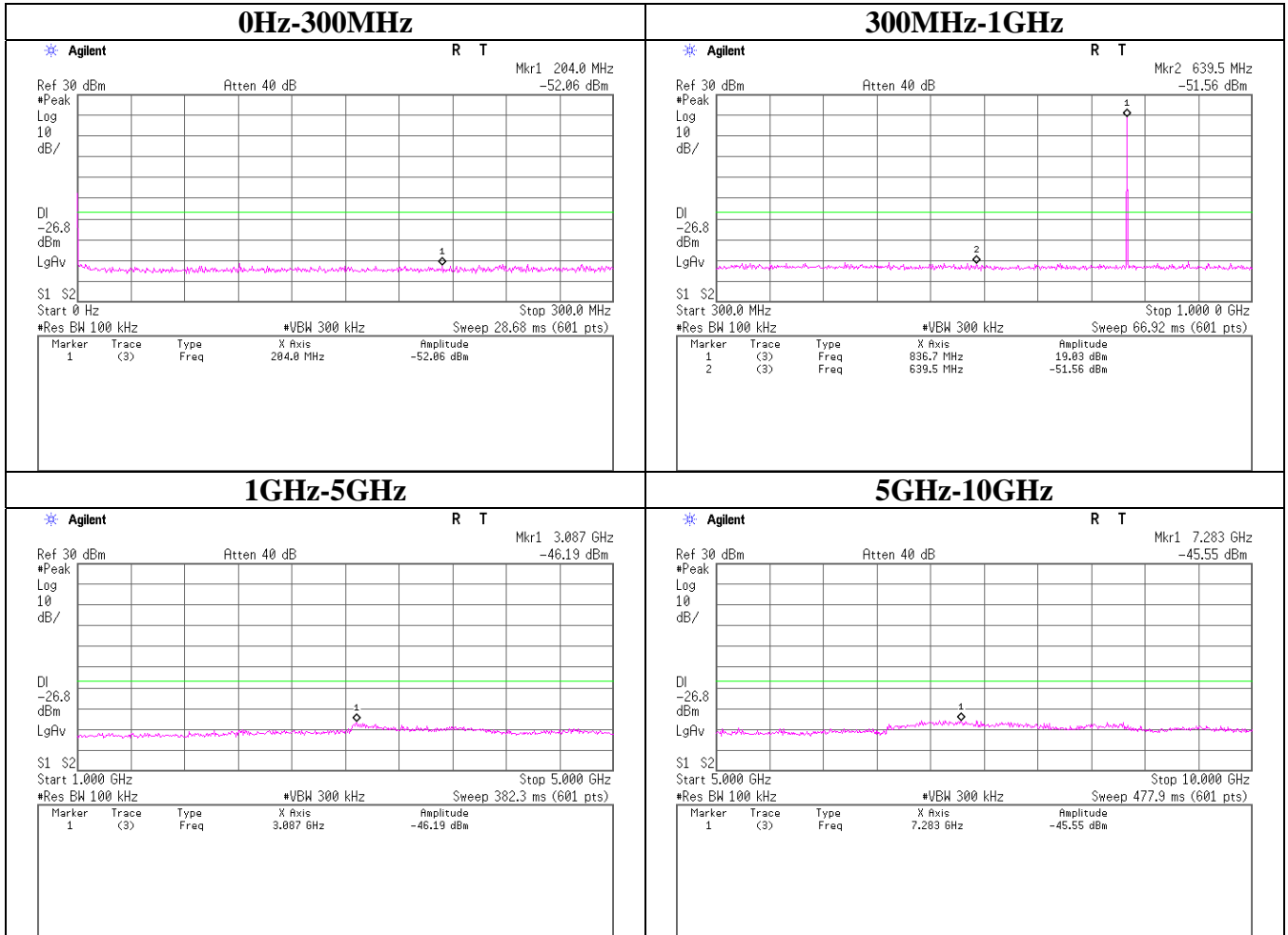
Detector : S/A PK (RBW: 3.6kHz , VBW: 10kHz)

Spurious Emission (Conducted)
GSM
Tx:824.2MHz

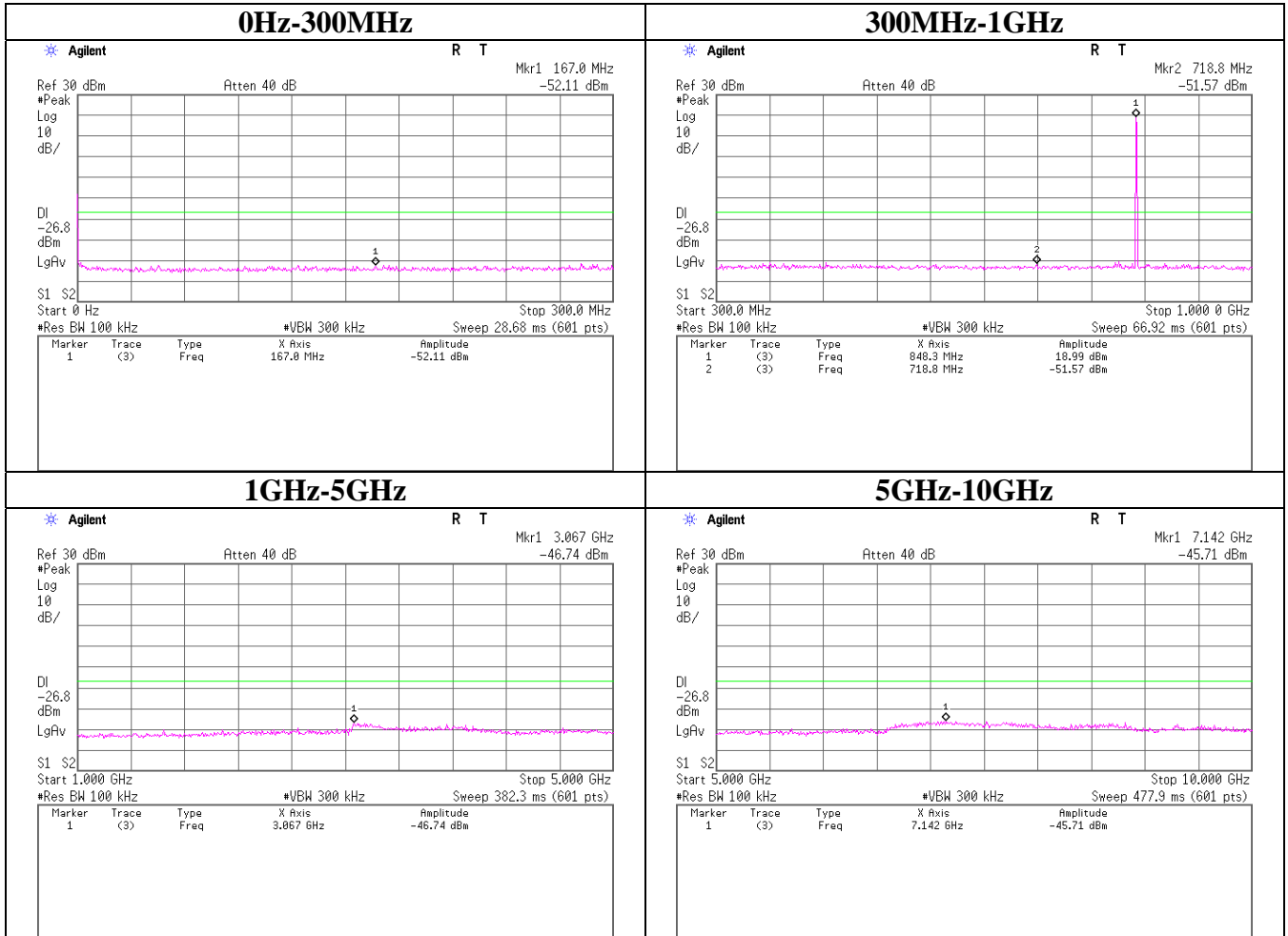


Spurious Emission (Conducted)

GSM
Tx:836.6MHz



Spurious Emission (Conducted)
GSM
Tx:848.8MHz



Spurious Emission (Conducted)
GSM850

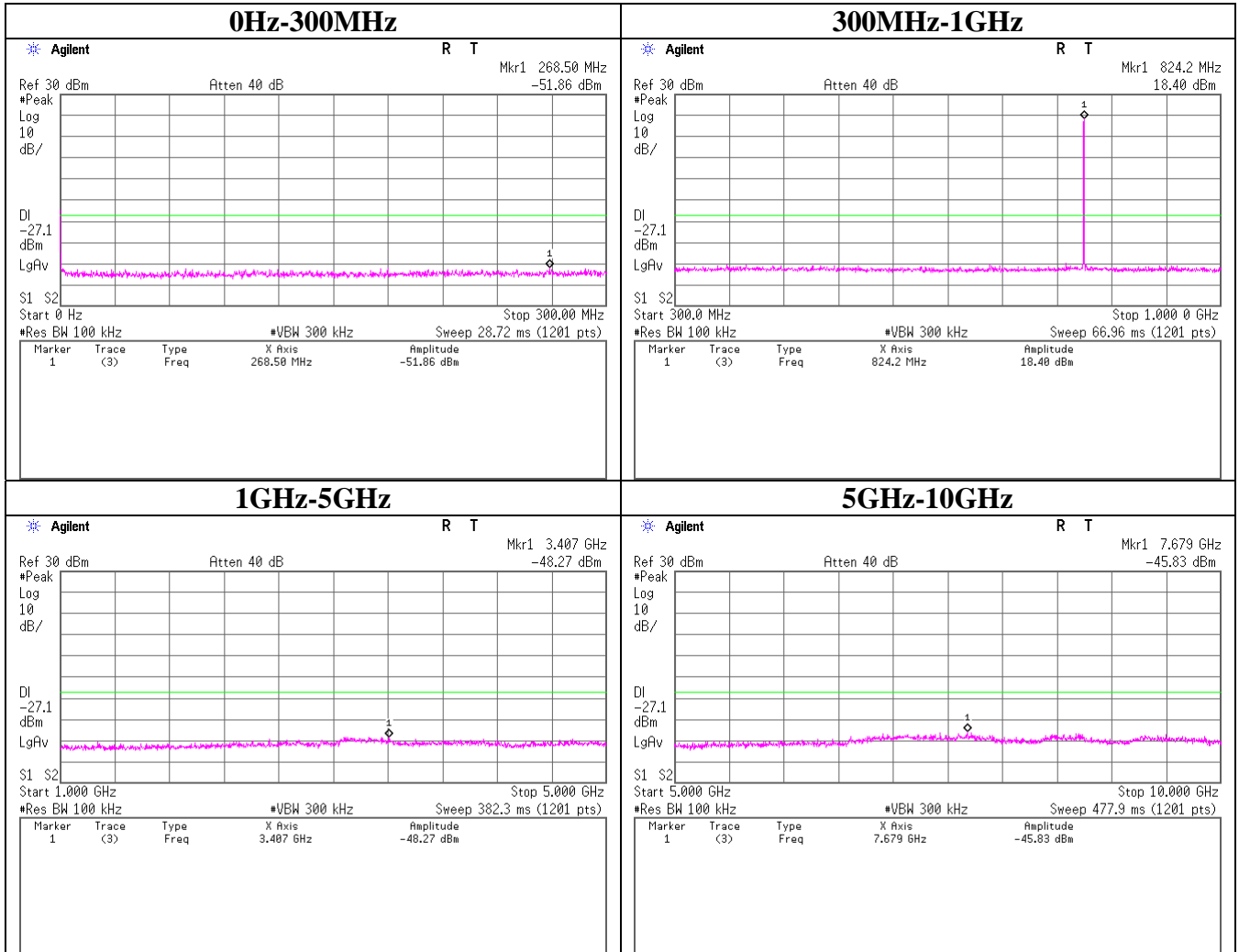
Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32BE0278-HO-E
Date 10/16/2011
Temperature/ Humidity 23deg. C / 65% RH
Engineer Katsunori Okai
Mode Tx EGPRS(8PSK), 1slot, MCS-5, PCL=5

Limit Line

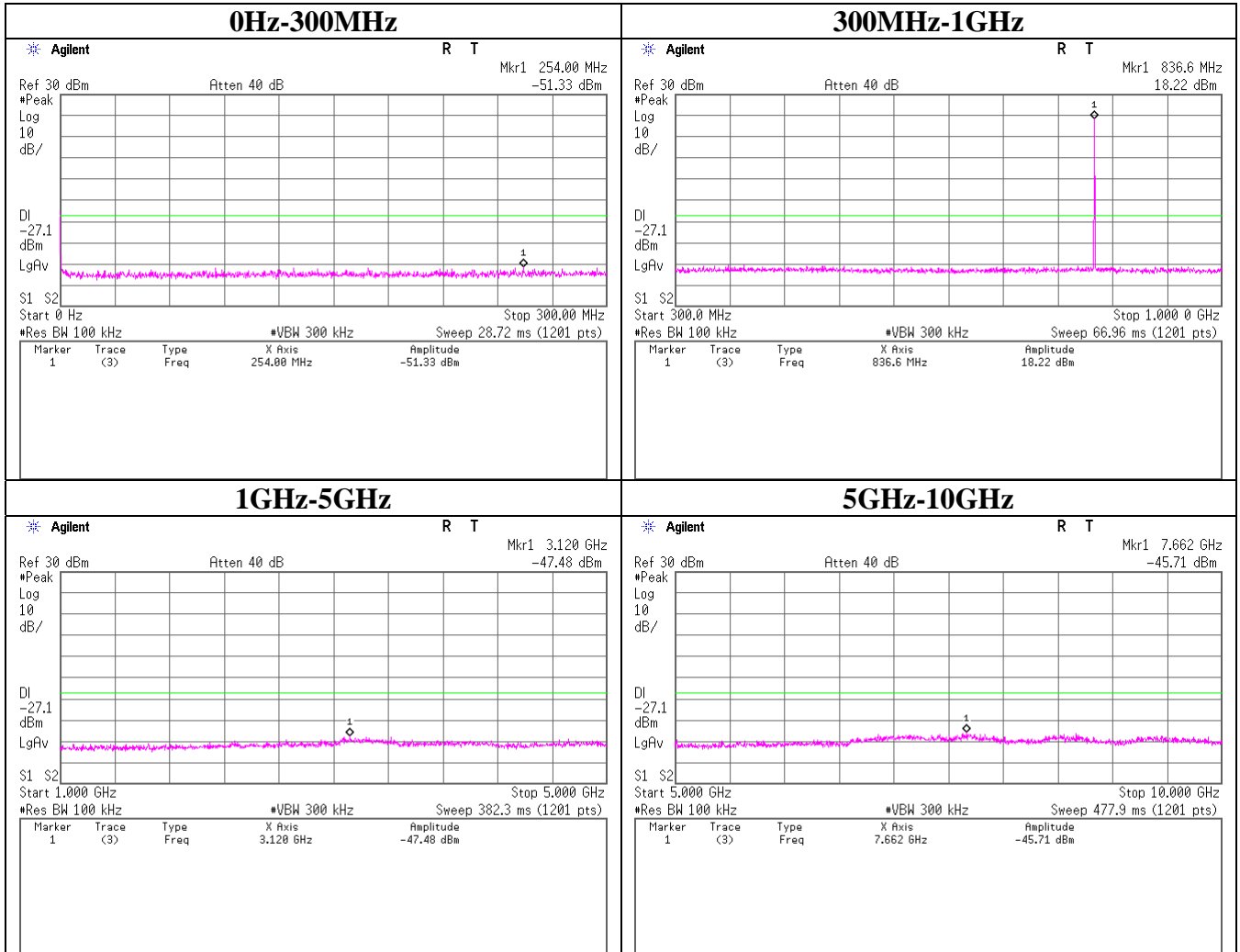
Tx Frequency [MHz]	Limit [dBm]	Atten. [dB]	Cable Loss [dB]	Limit Line [dBm]
824.2	-13.0	10.06	3.99	-27.1
836.6	-13.0	10.06	4.00	-27.1
848.8	-13.0	10.06	4.00	-27.1

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

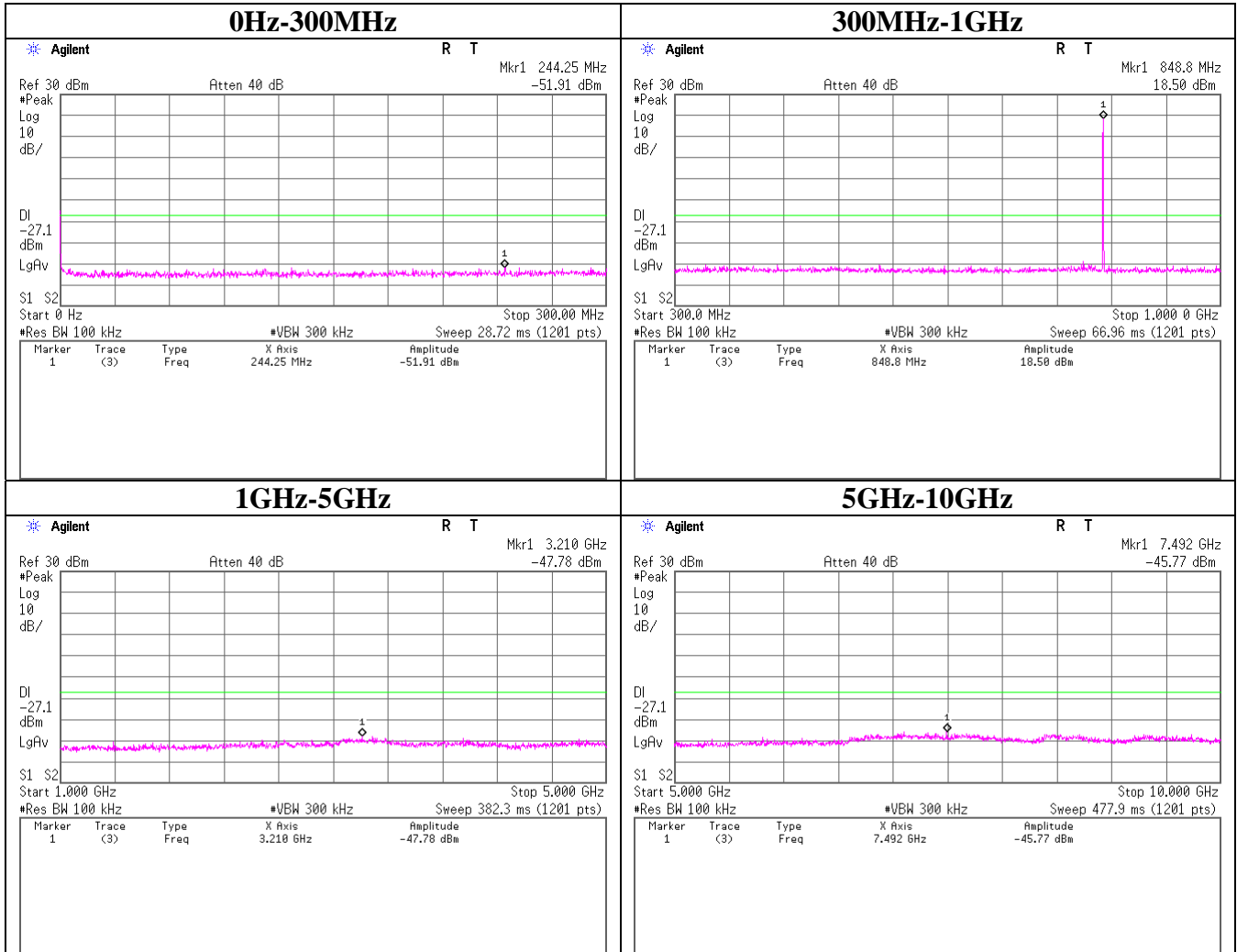
Spurious Emission (Conducted)
EGPRS
Tx:824.2MHz



Spurious Emission (Conducted)
EGPRS
Tx:836.6MHz



Spurious Emission (Conducted)
EGPRS
Tx:848.8MHz



Spurious Emission (Radiated)
GSM850

Report No. 32BE0278-HO-E
Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date 09/29/2011
Temperature / Humidity 24deg. C / 62% RH
Engineer Keisuke Kawamura
Mode Tx GSM(GMSK), 1slot, PCL=5

Tx 824.2MHz

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 (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	Table		Height	Table
1648.40	54.6	55.8	-56.7	-56.5	3.1	9.3	0.0	-52.7	-52.5	-13.0	39.7	39.5	134	163	100	301			
2472.60	50.3	51.8	-61.3	-57.9	3.8	11.0	0.0	-56.2	-52.8	-13.0	43.2	39.8	244	306	100	222			

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)

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

NS : No signal detect.

Detector : S/A PK (RBW: 100kHz , VBW: 300kHz)

Tx 836.6MHz

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	Table		Height	Table
1673.20	55.6	55.0	-55.7	-57.3	3.1	9.4	0.0	-51.6	-53.2	-13.0	38.6	40.2	128	171	100	207			
2509.80	50.7	49.1	-60.9	-60.6	3.8	11.1	0.0	-55.8	-55.5	-13.0	42.8	42.5	129	14	168	203			

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)

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

NS : No signal detect.

Detector : S/A PK (RBW: 100kHz , VBW: 300kHz)

Tx 848.8MHz

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 (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	Table		Height	Table
1697.60	53.8	54.2	-57.5	-58.1	3.2	9.5	0.0	-53.3	-53.9	-13.0	40.3	40.9	170	170	100	219			
2546.40	47.8	49.1	-63.8	-60.6	3.9	11.1	0.0	-58.7	-55.5	-13.0	45.7	42.5	100	193	135	180			

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)

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

NS : No signal detect.

Detector : S/A PK (RBW: 100kHz , VBW: 300kHz)

Frequency Stability(Temperature/Voltage Variation)

GSM

Tx:836.6MHz

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32BE0278-HO-E
Date	10/08/2011
Temperature/ Humidity	24deg. C / 41% RH
Engineer	Keisuke Kawamura
Mode	Tx GSM(GMSK), 1slot, PCL=5

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
-30.0	4.00	836.59999144	21.32	0.025	2.5
-20.0	4.00	836.60002131	8.55	0.010	2.5
-10.0	4.00	836.60001378	1.02	0.001	2.5
0.0	4.00	836.60001818	5.42	0.006	2.5
10.0	4.00	836.60001176	1.00	0.001	2.5
20.0	4.00	836.60001276	0.00	0.000	Reference
30.0	4.00	836.60001137	1.39	0.002	2.5
40.0	4.00	836.60001182	0.94	0.001	2.5
50.0	4.00	836.60001439	1.63	0.002	2.5

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
20.0	4.20	836.60001285	0.09	0.000	2.5
20.0	4.00	836.60001276	0.00	0.000	Reference
20.0	3.70	836.60001020	2.56	0.003	2.5

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

APPENDIX 2: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2011/06/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185820	RE	2011/06/30 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/09/10 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/09/10 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2011/02/18 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2010/11/05 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2011/09/26 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2011/01/16 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2011/09/21 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2011/09/06 * 12
MHF-03	High pass Filter 1.4-5.0GHz	Mini-Circuit	VHF-1320	10411	RE	2011/08/25 * 12
MSG-09	Signal Generator	Wiltron	68247B	674005	RE	2011/02/05 * 12
MDA-04	Dipole Antenna	Schwarzbeck	UHAP	992	RE	2010/10/16 * 12
MCC-125	Corexial Cable	UL Japan	-	-	RE	2011/07/04 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2011/05/23 * 12
MCC-129	Microwave Cable(1-33GHz)	HUBER+SUHNER	SF103/11PC3.5-31	54307/3	RE	2011/01/06 * 12
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	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/08/17 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2011/03/25 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2011/01/14 * 12
MURC-03	Radio Communication Analyzer	Anritsu	MT8815B	6200711471	RE	Pre Check

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)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2011/02/23 * 12
MCC-115	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	290211/4	AT	2011/08/24 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2010/11/30 * 12
MURC-02	Wireless Communication Test Set	Agilent	E5515C	GB47050683	AT	2009/10/20 * 36
MCC-97	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30818/2	AT	2011/05/27 * 12
MCC-98	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30819/2	AT	2011/05/27 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2011/03/14 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2011/03/14 * 12
MPSC-01	Power splitters/Combiners	Mini-Circuit	ZFSC-2-2500	0124	AT	2011/09/27 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	MOS04	AT	2011/02/23 * 12
KCH-01	Temperature and Humidity Chamber	Tabai Espec	PL-1KT	14007630	AT	2011/04/27 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2010/12/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2011/09/13 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2011/09/13 * 12
MAT-24	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71389	AT	2011/06/23 * 12
MCC-91	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30812/2	AT	2011/05/27 * 12
MCC-96	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30817/2	AT	2011/05/27 * 12
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	AT	2011/06/23 * 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.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124