RADIO TEST REPORT

Test Report No.: 32JBE0278-HO-F-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 24 Subpart E: 2008**
FCC ID	:	**A3LSWDSC02D**
Test Result	:	**Complied**

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4. The test results in this report are traceable to the national or international standards.
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6. This report is a revised version of 32BE0278-HO-F. 32BE0278-HO-F is replaced with this report.

Date of test: September 28 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

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	:	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

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 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	**GSM** [Conducted] 5.58dB 1910.0168MHz [Radiated] 2.2dB 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	**GSM** 12.5dB 13160.00MHz, Horizontal 13368.60MHz, Horizontal	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

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

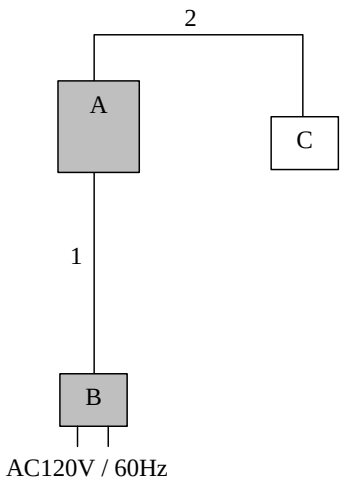
4.1 Operating Modes

<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) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=0)	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
RF output Power(Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=0)	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
Emission Bandwidth, 99% Occupied bandwidth,	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=0)	1880.0MHz	661
Band Edge(Conducted)	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=0)	1850.2MHz 1909.8MHz	512 810
Band Edge(Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=0)	1850.2MHz 1909.8MHz	512 810
Spurious Emission(Conducted)	Transmitting (Tx) (GSM, GMSK, 1slot) Transmitting (Tx) (EGPRS, 8PSK, 1slot, MCS-5)	Max (PCL=0)	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
Spurious Emission(Radiated)	Transmitting (Tx) (GSM, GMSK, 1slot)	Max (PCL=0)	1850.2MHz 1880.0MHz 1909.8MHz	512 661 810
Frequency Stability (Temperature/Voltage Variation)	Transmitting (Tx) (GSM, GMSK)	Max	1880.0MHz	661

*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	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	-

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 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 (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 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
PCS1900

Test place	Head Office EMC Lab. No.6 Measurement Room and 7 Shielded Room	
Report No.	32BE0278-HO-F	
Date	10/07/2011	10/16/2011
Temperature/ Humidity	24deg. C / 56% RH	23deg. C / 65% RH
Engineer	Yutaka Yoshida	Katsunori Okai
Mode	Tx GSM(GMSK), 1slot, PCL=0	
Mode	Tx GPRS(GMSK), 1slot, CS-1, PCL=0	
Mode	Tx EGPRS(8PSK), 1slot, MCS-5, PCL=0	

Mode	Ch	Frequency [MHz]	Reading Average frame power [dBm]	Cable Loss [dB]	Result [dBm]
GSM	512	1850.2	29.41	0.26	29.67
	661	1880.0	29.45	0.26	29.71
	810	1909.8	29.50	0.26	29.76
GPRS	512	1850.2	29.41	0.26	29.67
	661	1880.0	29.43	0.26	29.69
	810	1909.8	29.48	0.26	29.74
EGPRS	512	1850.2	25.33	0.26	25.59
	661	1880.0	25.36	0.26	25.62
	810	1909.8	25.39	0.26	25.65

Results = Reading + Cable Loss

RF Output Power (Radiated)

Equivalent Isotropically Radiated Power(EIRP)

PCS1900

Report No.	32BE0278-HO-F	
Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Date	09/28/2011	10/14/2011
Temperature / Humidity	23deg. C / 65% RH	23deg. C / 69% RH
Engineer	Keisuke Kawamura	Katsunori Okai
Mode	Tx GSM(GMSK), 1slot, PCL=0	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1850.20	98.7	100.8	23.8	23.5	3.3	10.2	0.0	30.7	30.4	33.0	**2.3**	**2.6**	106	355	114	111	
1880.00	98.5	100.8	23.9	23.8	3.3	10.3	0.0	30.9	30.8	33.0	**2.1**	**2.2**	108	351	113	117	
1909.80	98.1	100.5	23.3	23.8	3.3	10.4	0.0	30.4	30.9	33.0	**2.6**	**2.1**	112	358	115	115	

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(VBW:3MHz/VBW:8MHz)

Report No.	32BE0278-HO-F
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-0

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1850.20	98.6	100.8	23.7	23.5	3.3	10.2	0.0	30.6	30.4	33.0	2.4	2.6	106	353	113	112	
1880.00	98.5	100.7	23.9	23.7	3.3	10.3	0.0	30.9	30.7	33.0	2.1	2.3	107	356	114	113	
1909.80	98.1	100.5	23.3	23.8	3.3	10.4	0.0	30.4	30.9	33.0	2.6	2.1	110	350	112	113	

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.	32BE0278-HO-F	
Test place	Head Office EMC Lab. No.6 Measurement Room and 7 Shielded Room	
Date	10/07/2011	10/16/2011
Temperature / Humidity	24deg. C / 56% RH	23deg. C / 65% RH
Engineer	Yutaka Yoshida	Katsunori Okai
Mode	Tx GSM(GMSK), 1slot, PCL=0	
Mode	Tx GPRS(GMSK), 1slot, CS-1, PCL=0	
Mode	Tx EGPRS(8PSK), 1slot, MCS-5, PCL=0	

Mode	Channel	Frequency [MHz]	Peak to Average power Ratio [dB]	Limit [dB]
GSM	512	1850.20	0.051	13
	661	1880.00	0.03	13
	810	1909.80	0.07	13
GPRS	512	1850.20	0.052	13
	661	1880.00	0.052	13
	810	1909.80	0.062	13
EGPRS	512	1850.20	4.555	13
	661	1880.00	4.220	13
	810	1909.80	4.275	13

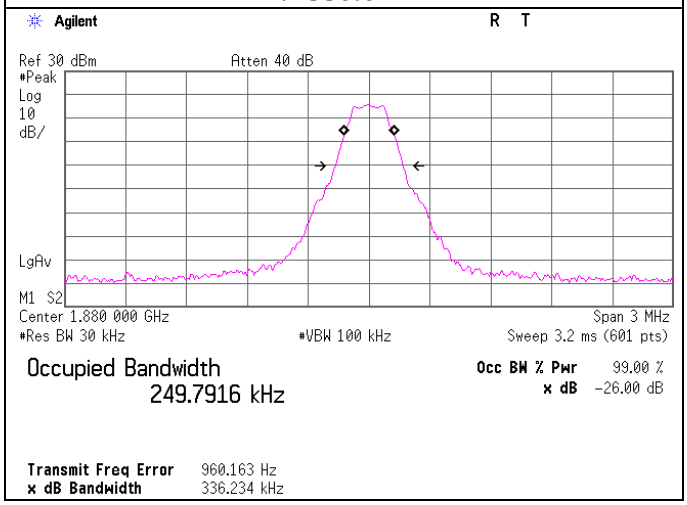
*In order to decide the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth, an average and a peak trace were used on a spectrum analyzer .

Bandwidth(Conducted)

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32BE0278-HO-F
Date	10/07/2011
Temperature/ Humidity	24 deg. C / 56% RH
Engineer	Yutaka Yoshida
Mode	Tx GSM(GMSK), 1slot, PCL=0

CH	FREQ [MHz]	26dB Bandwidth [kHz]	99% OBW [kHz]	Limit [kHz]
Mid	1880.0	336.234	249.7916	-

Tx:1880.0MHz

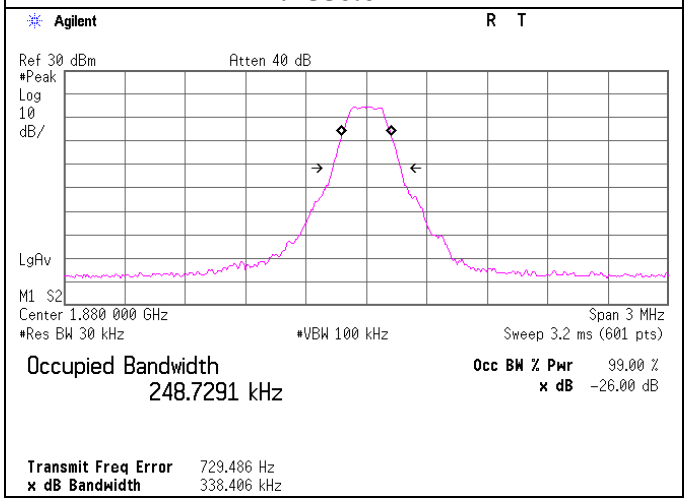


Bandwidth(Conducted)

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32BE0278-HO-F
Date	10/16/2011
Temperature/ Humidity	23deg. C / 65% RH
Engineer	Katsunori Okai
Mode	Tx EGPRS(8PSK), 1slot, MCS-5, PCL=0

CH	FREQ [MHz]	26dB Bandwidth [kHz]	99% OBW [kHz]	Limit [kHz]
Mid	1880.0	338.406	248.7291	-

Tx:1880.0MHz



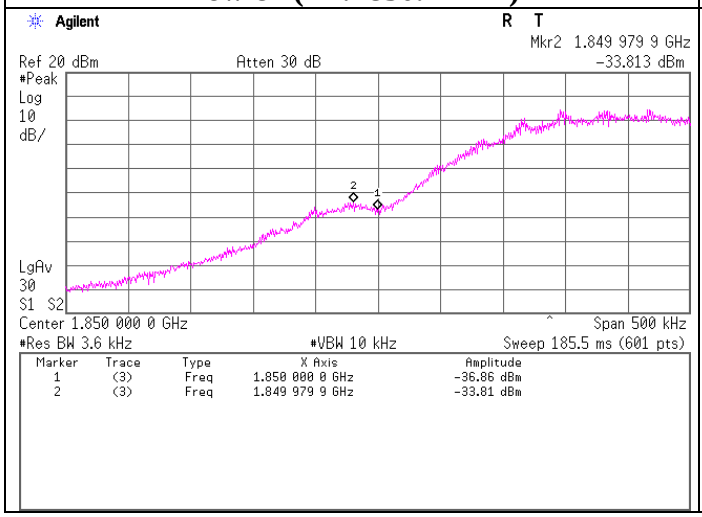
Band-Edge(Conducted)

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32BE0278-HO-F
Date	10/07/2011
Temperature/ Humidity	24deg. C / 56% RH
Engineer	Yutaka Yoshida
Mode	Tx GSM(GMSK), 1slot, PCL=0

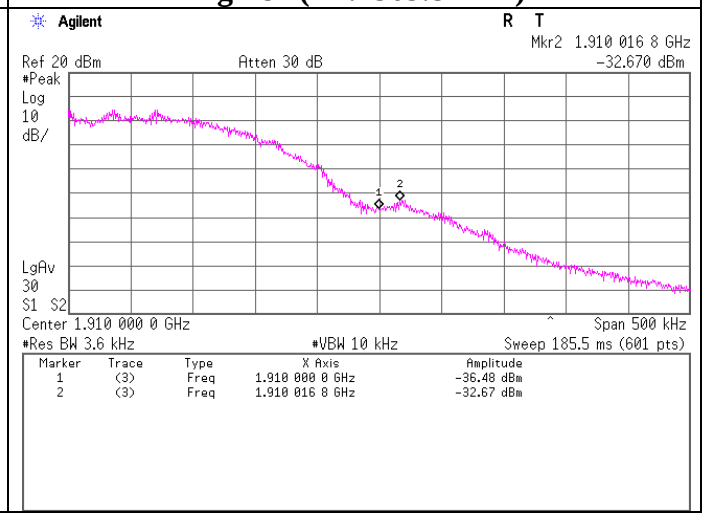
Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1849.9799	-33.81	10.07	4.02	-19.72	-13.0	6.72
1850.0000	-36.86	10.07	4.02	-22.77	-13.0	9.77
1910.0000	-36.48	10.07	4.02	-22.39	-13.0	9.39
1910.0168	-32.67	10.07	4.02	-18.58	-13.0	5.58

VIDEO AV 30 times
Sample Calculation : Result = Reading + Atten. + Cable Loss

Low ch (Tx:1850.2MHz)



High ch (Tx:1909.8MHz)



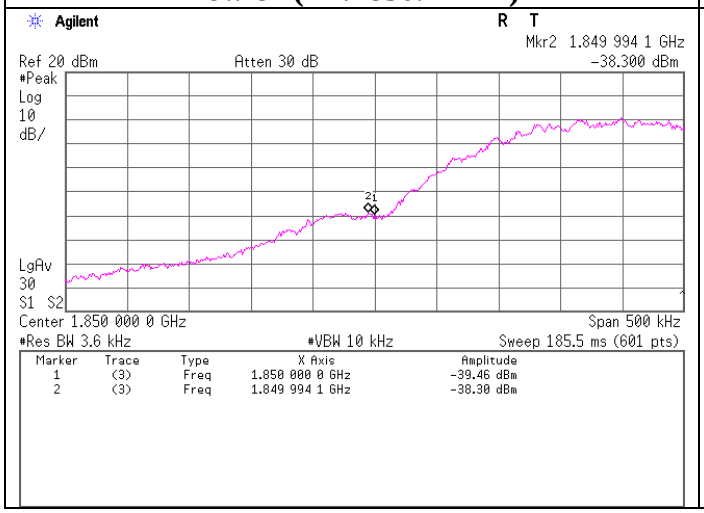
Band-Edge(Conducted)

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32BE0278-HO-F
Date	10/16/2011
Temperature/ Humidity	23deg. C / 65% RH
Engineer	Katsunori Okai
Mode	Tx EGPRS(8PSK), 1slot, MCS-5, PCL=0

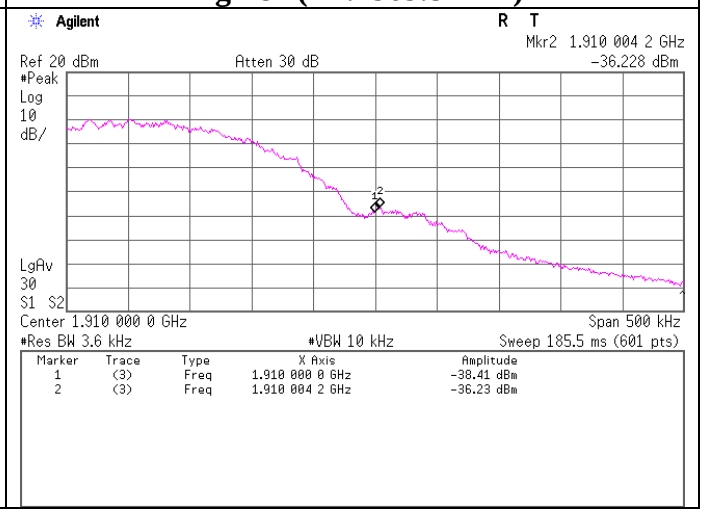
Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
1849.9941	-38.30	10.07	4.33	-23.90	-13.0	10.90
1850.0000	-39.46	10.07	4.33	-25.06	-13.0	12.06
1910.0000	-38.41	10.07	4.32	-24.02	-13.0	11.02
1910.0042	-36.23	10.07	4.32	-21.84	-13.0	8.84

VIDEO AV 30 times
Sample Calculation : Result = Reading + Atten. + Cable Loss

Low ch (Tx:1850.2MHz)



High ch (Tx:1909.8MHz)



Band-Edge (Radiated)

PCS1900

Report No.	32BE0278-HO-F
Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date	09/28/2011
Temperature / Humidity	23deg. C / 65% RH
Engineer	Keisuke Kawamura
Mode	Tx GSM(GMSK), 1slot, PCL=0

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1850.00	47.8	46.9	-27.6	-30.5	3.3	10.2	0.0	-20.7	-23.6	-13.0	7.7	10.6	100	10	118	78	
1910.00	43.4	42.9	-31.6	-33.2	3.3	10.4	0.0	-24.5	-26.1	-13.0	11.5	13.1	100	11	100	333	
1910.02	52.7	51.4	-22.3	-24.8	3.3	10.4	0.0	-15.2	-17.7	-13.0	2.2	4.7	100	11	100	333	

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).
NS : No signal detect.
Detector : Tx : S/A PK(RBW:3.6kHz/VBW:10kHz)

Spurious Emission (Conducted)

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32BE0278-HO-F
Date	10/07/2011
Temperature/ Humidity	24deg. C / 56% 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	10.07	4.02	-27.1
1880	-13.0	10.07	4.02	-27.1
1909.8	-13.0	10.07	4.02	-27.1

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

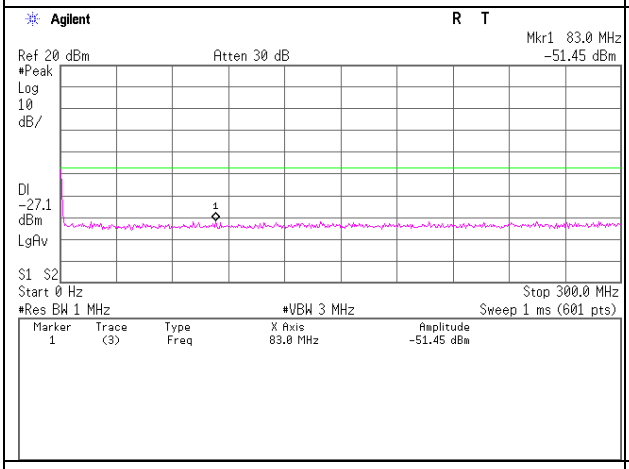
*All the spurious noises were below the above limit line.

Spurious Emission (Conducted)

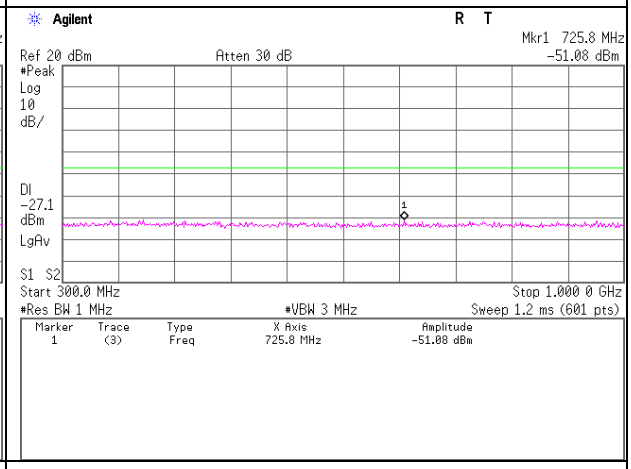
GSM

Tx:1850.2MHz

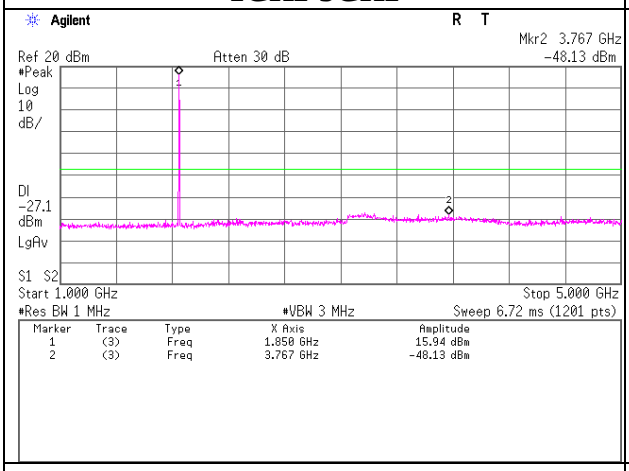
0Hz-300MHz



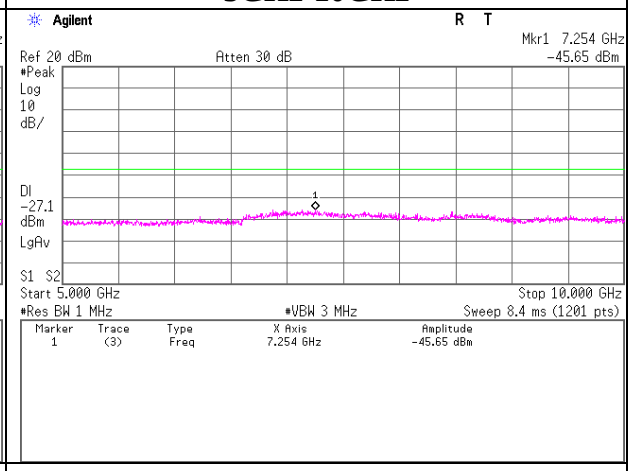
300MHz-1GHz



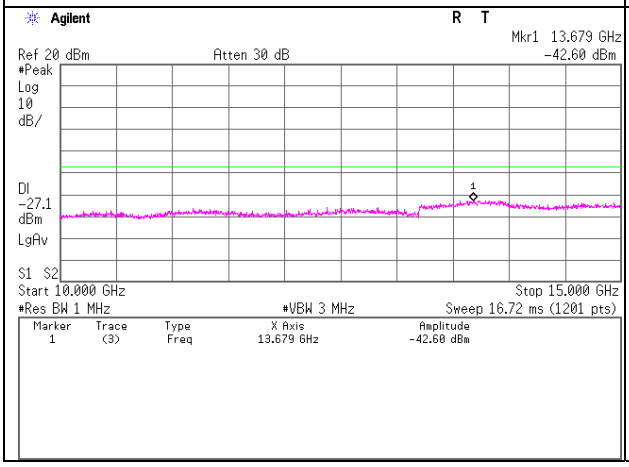
1GHz-5GHz



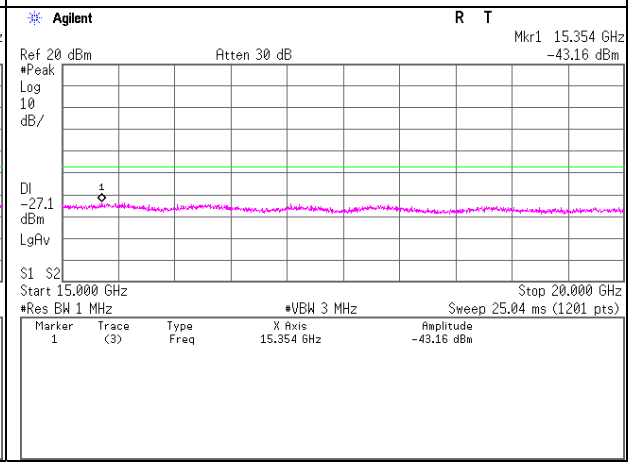
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz

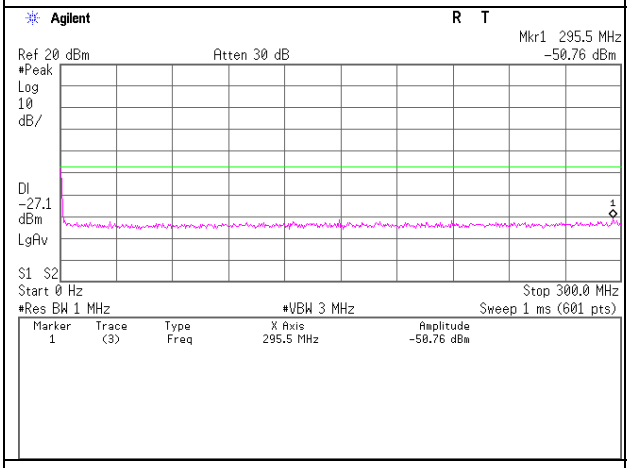


Spurious Emission (Conducted)

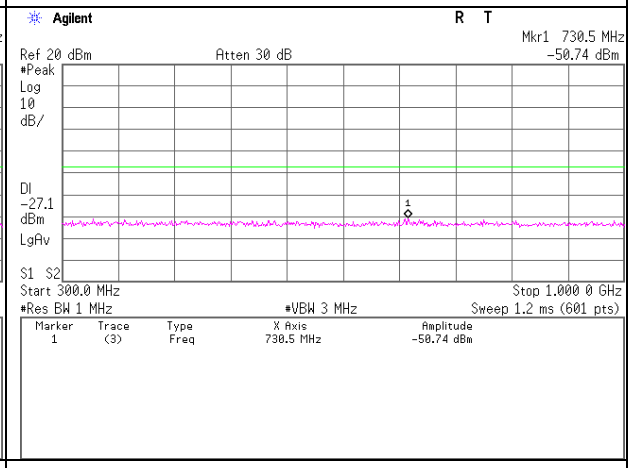
GSM

Tx:1880.0MHz

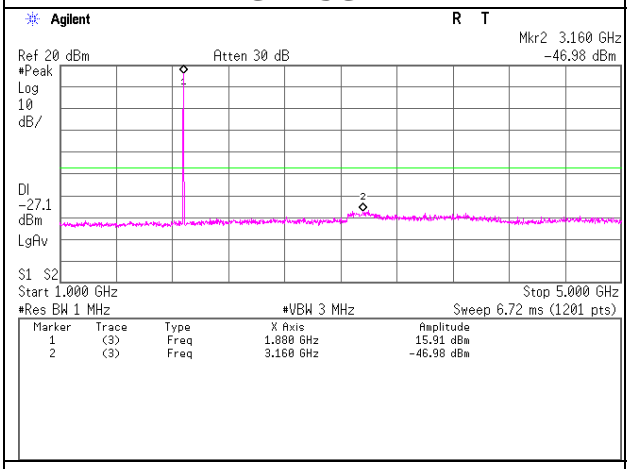
0Hz-300MHz



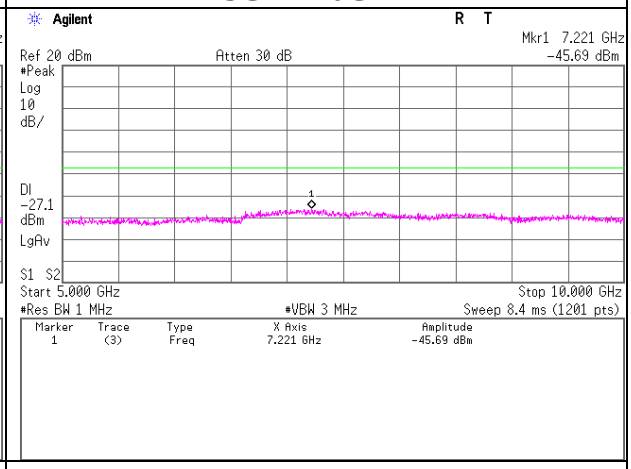
300MHz-1GHz



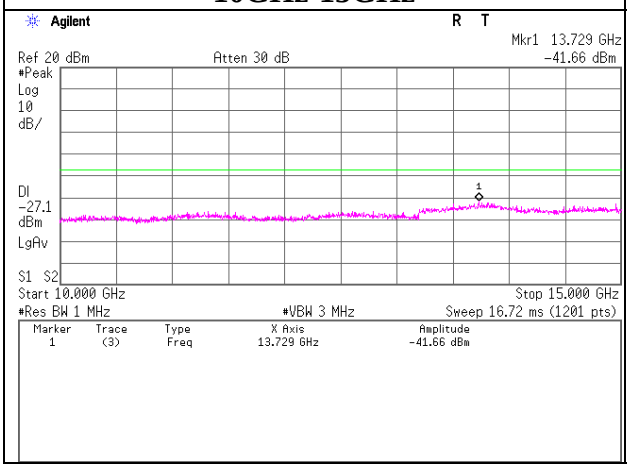
1GHz-5GHz



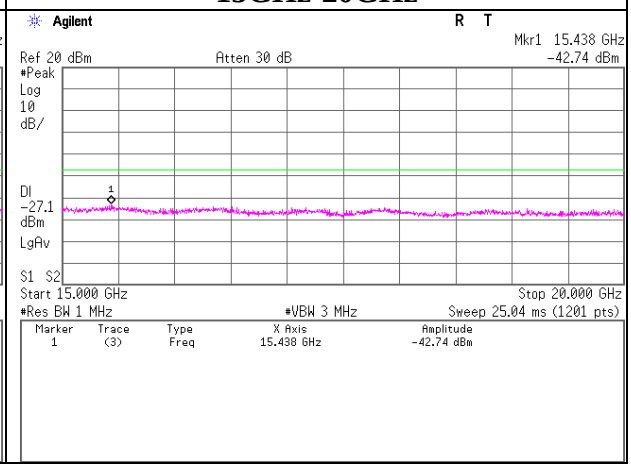
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz

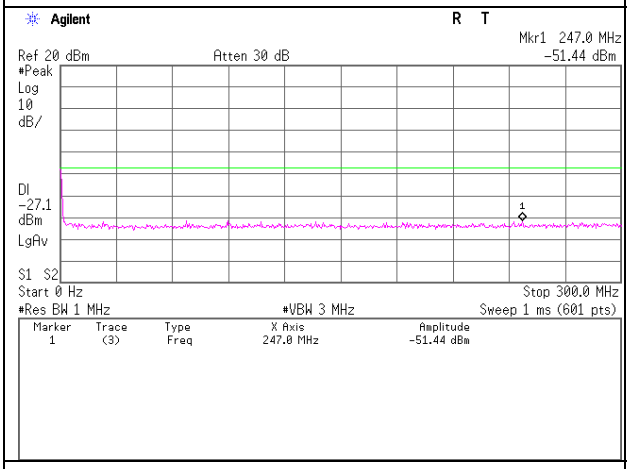


Spurious Emission (Conducted)

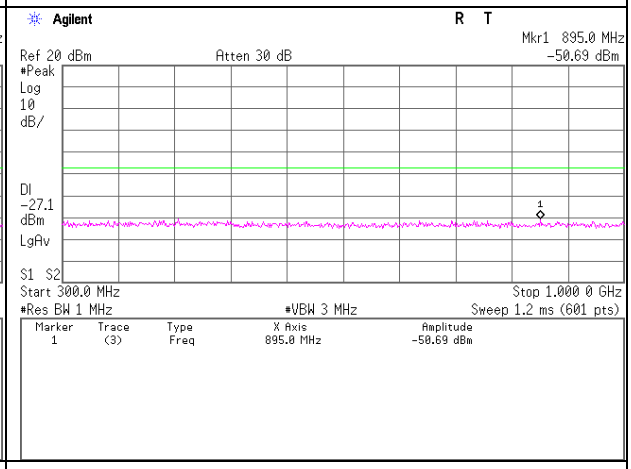
GSM

Tx:1909.8MHz

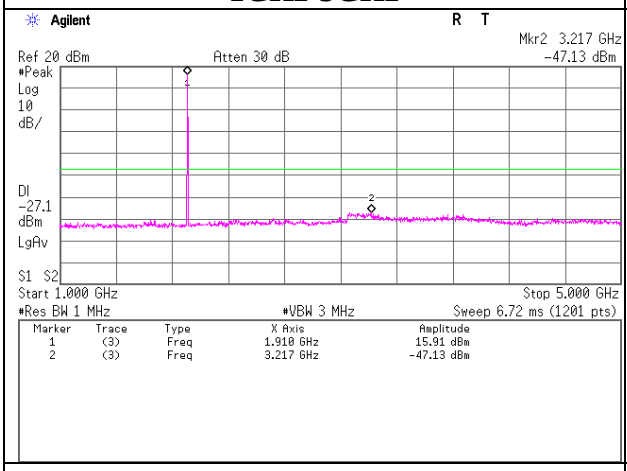
0Hz-300MHz



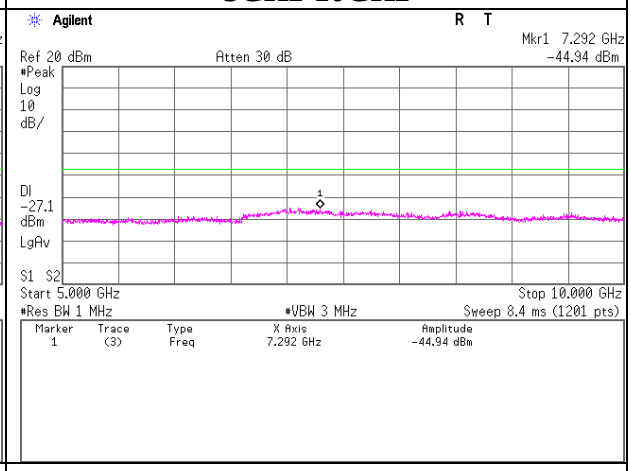
300MHz-1GHz



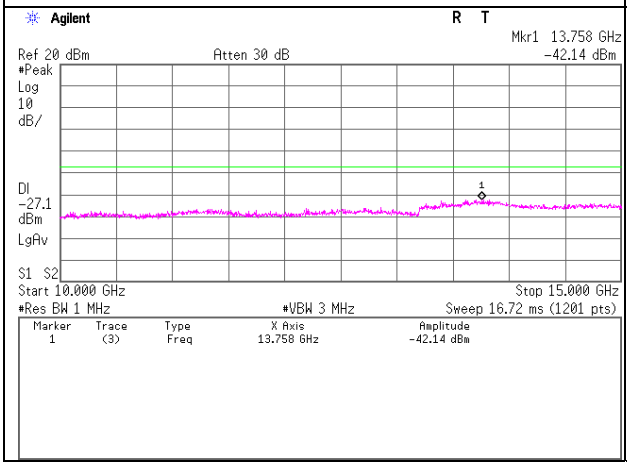
1GHz-5GHz



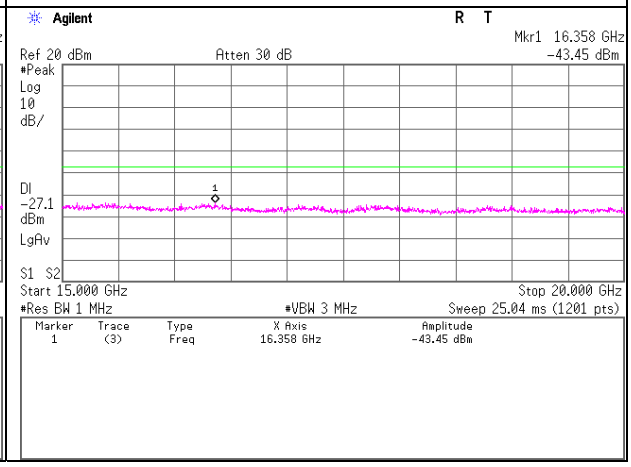
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz



Spurious Emission (Conducted)

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32BE0278-HO-F
Date	10/16/2011
Temperature/ Humidity	23deg. C / 65% RH
Engineer	Katsunori Okai
Mode	Tx EGPRS(8PSK), 1slot, MCS-5, PCL=0

Limit Line

Tx Frequency [MHz]	Limit [dBm]	Atten. [dB]	Cable Loss [dB]	Limit Line [dBm]
1850.2	-13.0	10.07	4.33	-27.4
1880	-13.0	10.07	4.33	-27.4
1909.8	-13.0	10.07	4.32	-27.4

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

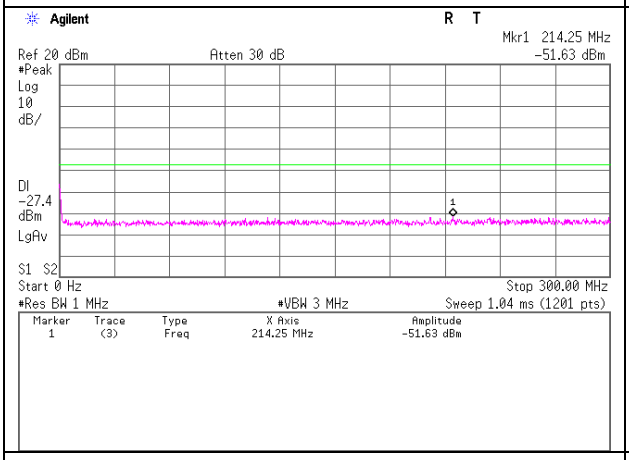
*All the spurious noises were below the above limit line.

Spurious Emission (Conducted)

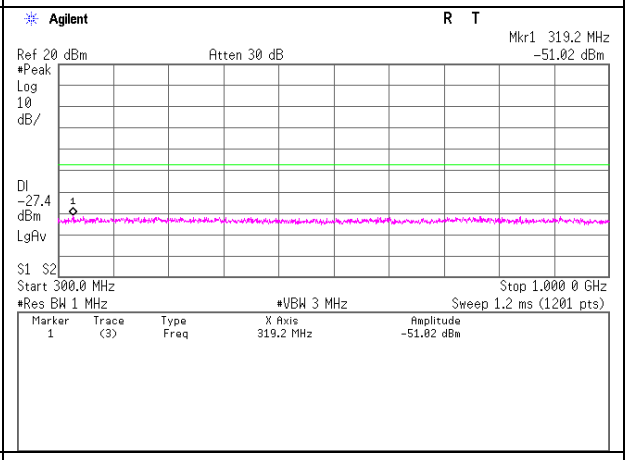
EGPRS

Tx:1850.2MHz

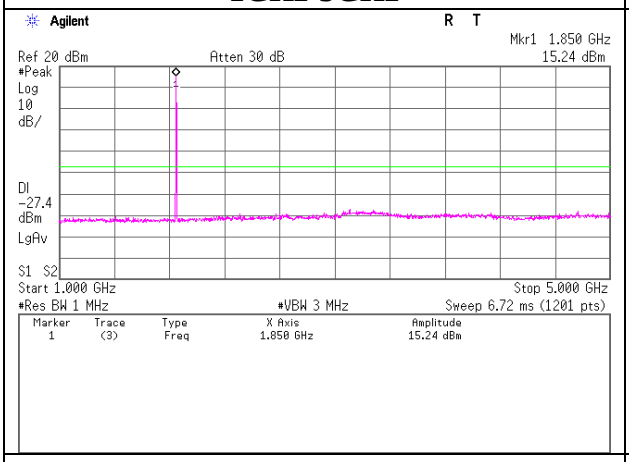
0Hz-300MHz



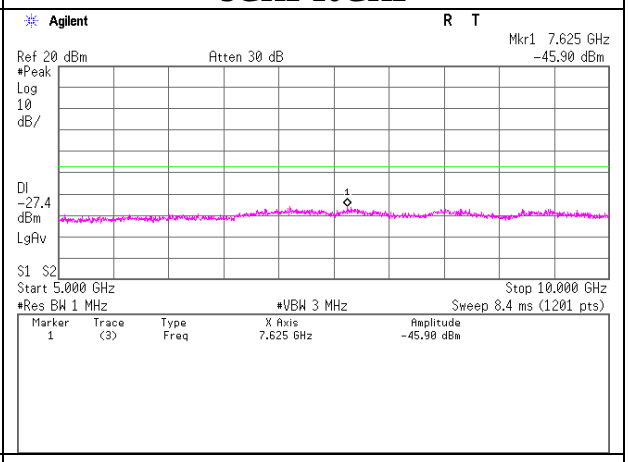
300MHz-1GHz



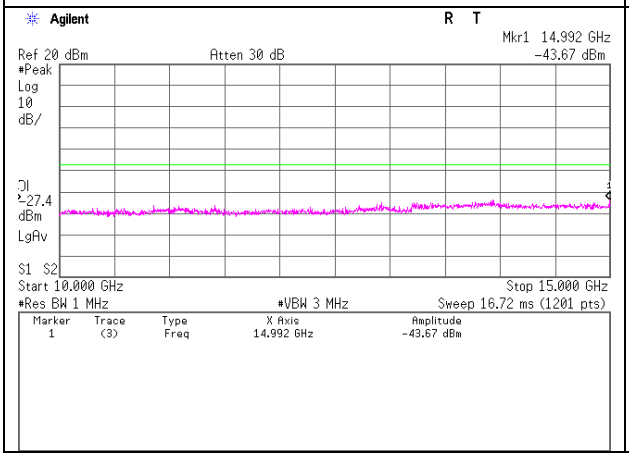
1GHz-5GHz



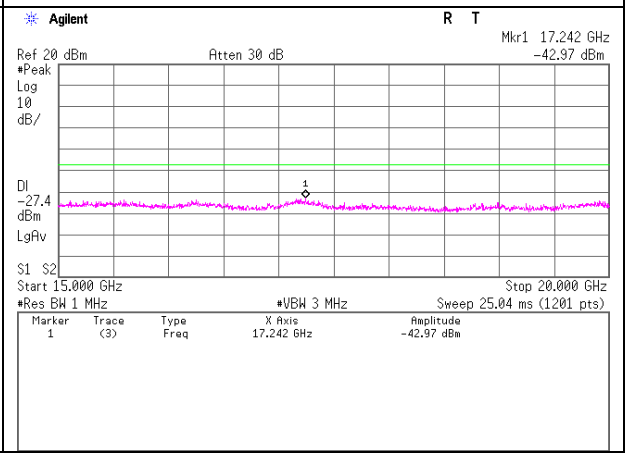
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz

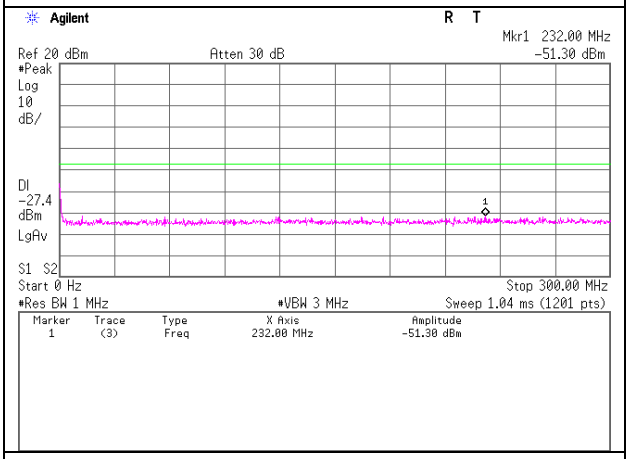


Spurious Emission (Conducted)

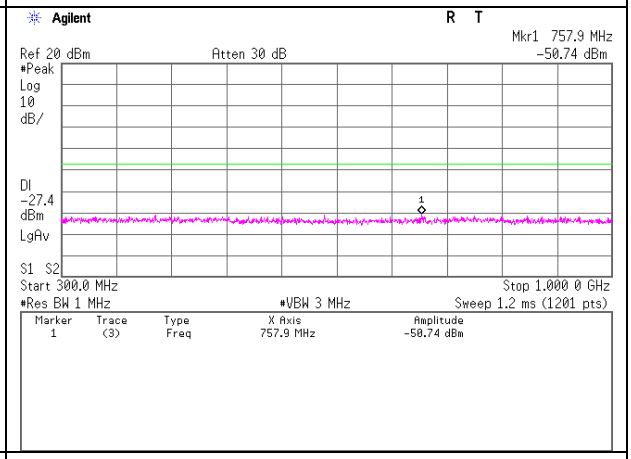
EGPRS

Tx:1880.0MHz

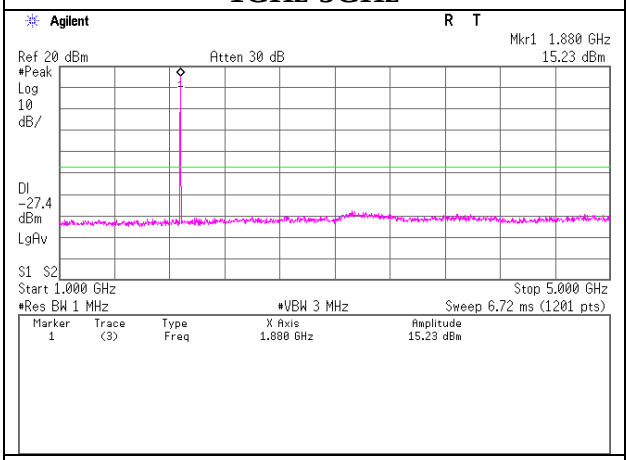
0Hz-300MHz



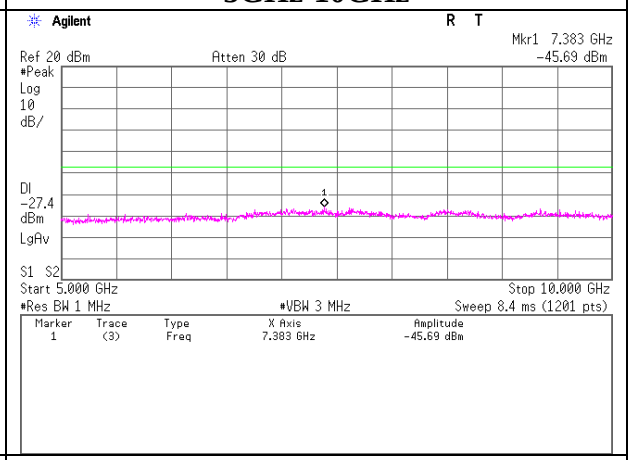
300MHz-1GHz



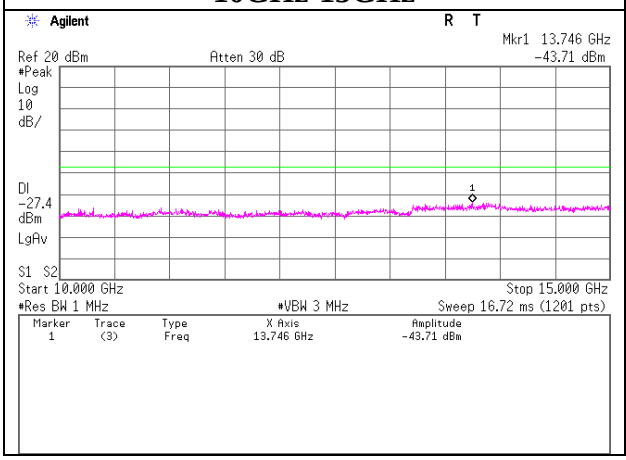
1GHz-5GHz



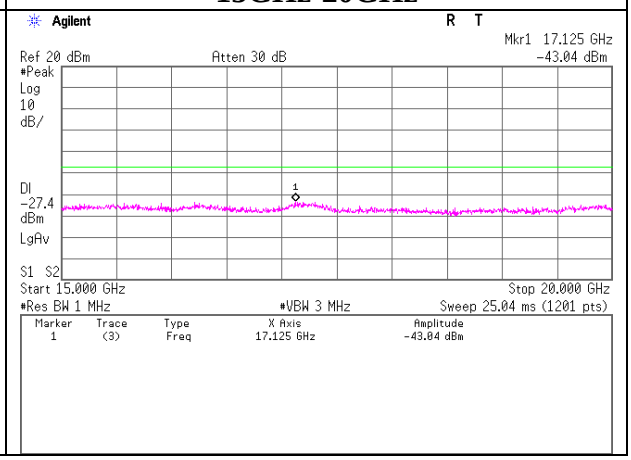
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz

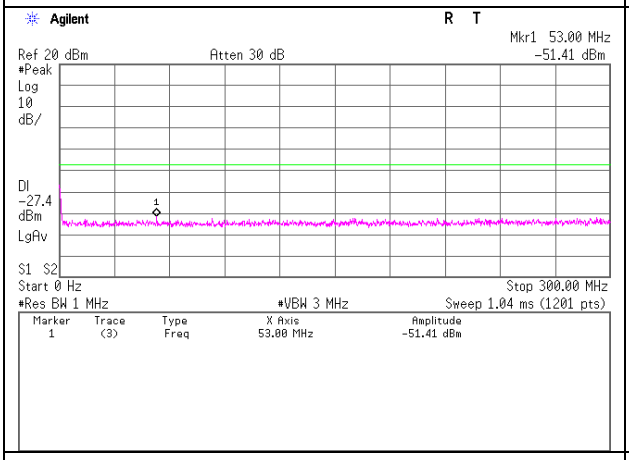


Spurious Emission (Conducted)

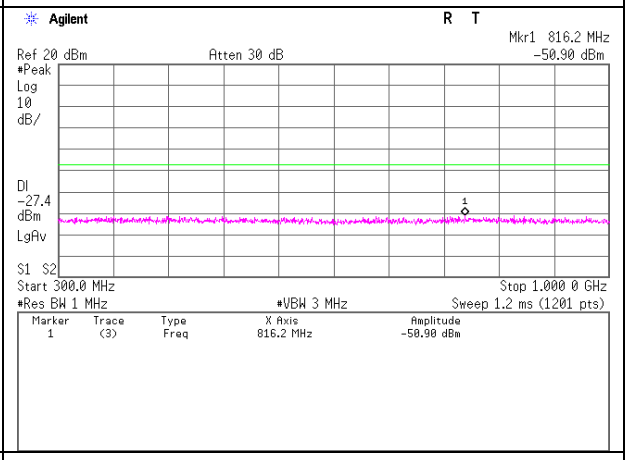
EGPRS

Tx:1909.8MHz

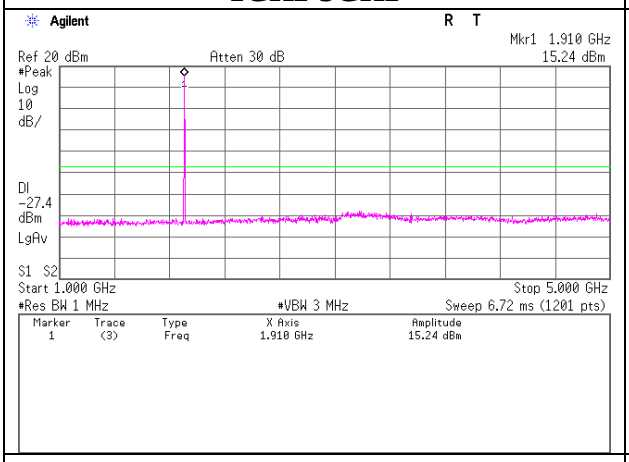
0Hz-300MHz



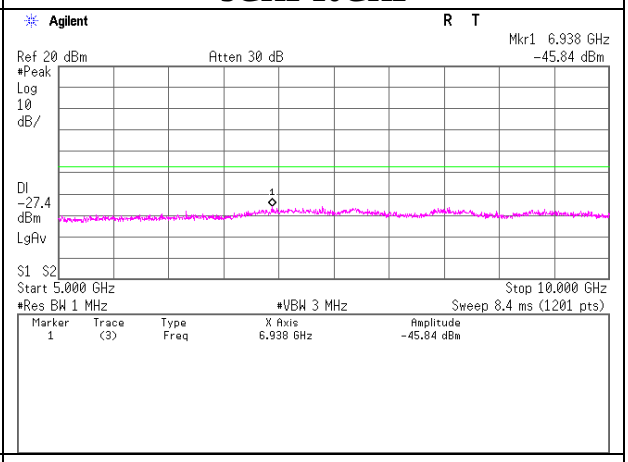
300MHz-1GHz



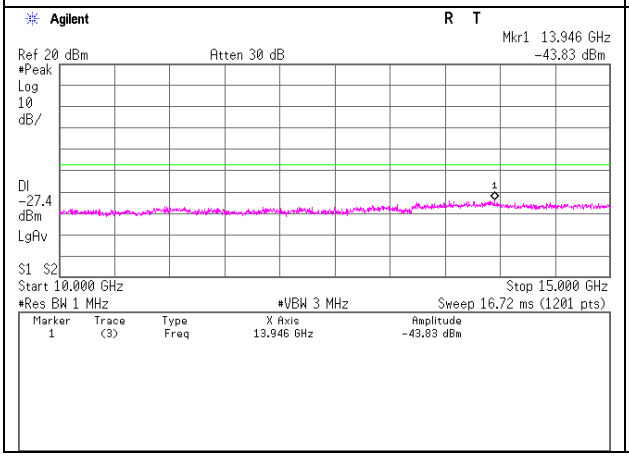
1GHz-5GHz



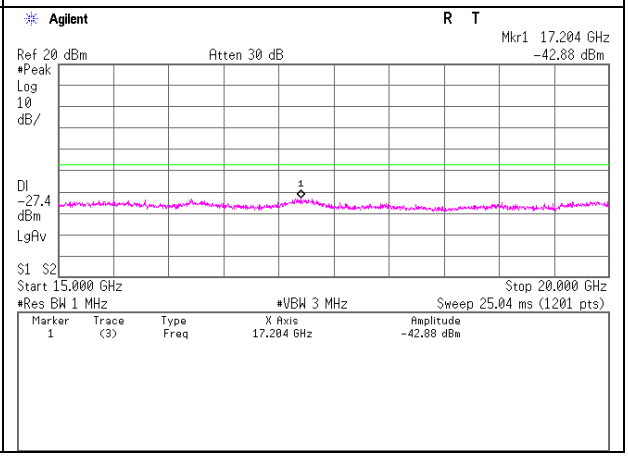
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz



Spurious Emission (Radiated)

PCS1900

Report No.	32BE0278-HO-F	
Test place	Head Office EMC Lab.	
Semi Anechoic Chamber	No.4	No.2
Date	09/28/2011	09/29/2011
Temperature / Humidity	23deg. C / 65% RH	24deg. C / 62% RH
Engineer	Keisuke Kawamura (Above 1GHz)	Keisuke Kawamura (Below 1GHz)
Mode	Tx GSM(GMSK), 1slot, PCL=0	

Tx 1850.2MHz

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
12951.40	59.7	59.0	-33.8	-37.0	9.2	13.6	0.0	-29.4	-32.6	-13.0	16.4	19.6	100	262	128	215	

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).
NS : No signal detect.
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Tx 1880.0MHz

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
13160.00	62.9	59.1	-29.6	-35.6	9.2	13.3	0.0	-25.5	-31.5	-13.0	12.5	18.5	100	277	125	228	

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).
NS : No signal detect.
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Tx 1909.8MHz

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (EIRP) [dBm]		Limit (EIRP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
13368.60	63.9	57.9	-29.1	-36.8	9.3	12.9	0.0	-25.5	-33.2	-13.0	12.5	20.2	120	244	100	251	

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).
NS : No signal detect.
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Frequency Stability (Temperature/Voltage Variation)

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	32BE0278-HO-F
Date	10/08/2011
Temperature/ Humidity	24deg.C / 41% RH
Engineer	Keisuke Kawamura
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	4.00	1879.99998844	29.09	0.015	2.5
-20.0	4.00	1880.00001595	1.58	0.001	2.5
-10.0	4.00	1880.00002132	3.79	0.002	2.5
0.0	4.00	1880.00001982	2.29	0.001	2.5
10.0	4.00	1880.00001188	5.65	0.003	2.5
20.0	4.00	1880.00001753	0.00	0.000	Reference
30.0	4.00	1880.00001553	2.00	0.001	2.5
40.0	4.00	1880.00001814	0.61	0.000	2.5
50.0	4.00	1880.00000940	8.13	0.004	2.5

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
20.0	4.20	1880.00001276	4.77	0.003	2.5
20.0	4.00	1880.00001753	0.00	0.000	Reference
20.0	3.70	1880.00001671	0.82	0.000	2.5

APPENDIX 2: Test instruments

EMI test equipment(1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2011/06/17 * 12
MHF-20	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCC	607	RE	2011/09/08 * 12
MCC-79	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278923/4	RE	2010/12/02 * 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
MSG-09	Signal Generator	Wiltron	68247B	674005	RE	2011/02/05 * 12
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	-
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
MURC-03	Radio Communication Analyzer	Anritsu	MT8815B	6200711471	RE	Pre Check

EMI test equipment(2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
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-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
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