

TEST REPORT

of

FCC Part 22 Subpart H, and Part 24 Subpart E
/ RSS-Section in RSS-132 issue 2, RSS-133 issue 5
FCC ID : A3LGTY3400X

Equipment Under Test : 850/1900 GSM/GPRS/EDGE/WCDMA/HSPA Module
Model Name : GT-Y3400
Serial No. : N/A
Applicant : Samsung Electronics Co., Ltd.
Manufacturer : Samsung Electronics Co., Ltd.
Date of Test(s) : 2011. 11. 30 ~ 2011. 12. 02
Date of Issue : 2011. 12. 02

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date

2011. 12. 02

Alvin Kim

Approved By:



Date

2011. 12. 02

Feel Jeong

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INDEX

<u>TABLE OF CONTENTS</u>	Page
1. General Information -----	3
2. RF radiated output power & spurious radiated emission -----	7
3. Conducted Output Power -----	16

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd.(Gunpo Laboratory)

- 705, Dongchun-Dong Sooji-Gu, Yongin-Shi, Kyungki-Do, South Korea.
- Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

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1.2. Details of applicant

Applicant : Samsung Electronics Co., Ltd.

Address : 416, Maetan-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, Korea

Contact Person : Lee, Sang-Cheong

Phone No. : +82 31 277 4784

1.3. Description of EUT

Host Name	Notebook PC (with HSPA)
Module Name	GT-Y3400
Host Model Name / Brand Name	XE500C21 / SAMSUNG
GSM & WCDMA Module ID	FCC ID: A2LGTY3400X IC ID:649E-GTY3400X
WLAN Module ID	FCC ID: PPD-AR5BHB116 IC ID: 4104A-AR5BHB116
Host Power Supply	AC 100 ~ 240 V (output: DC 19 V)
Rated Power	GSM850: 32.6 dB m GSM1900: 28.2 dB m WCDMA850: 22.8 dB m WCDMA1700: 22.4 dB m
Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1 850.2 MHz ~ 1 909.8 MHz WCDMA850: 826.4 MHz ~ 846.6 MHz WCDMA1900: 1 852.4 MHz ~ 1 907.6 MHz
Class of GPRS	Class 12, Class B
Emission Designator	252KGXW (GSM850), 242KG7W (GSM850 EDGE), 247KGXW (GSM1900), 250KG7W (GSM1900 EDGE), 4M14F9W (WCDMA850), 4M15F9W (WCDMA1900)

1.4. Declaration by the manufacturer

- Main port has Tx and Rx function.
- Aux port has only Rx function.

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1.5. Description of test mode

Band	Frequency (MHz)	GPRS Data			
		GPRS	GPRS	GPRS	GPRS
		1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)
GSM 850	824.2	32.6	28.5	26.4	25.3
	836.6	32.5	28.4	26.7	25.4
	848.8	32.4	28.7	26.3	25.2
GSM 1900	1 850.2	28.2	25.3	23.5	22.3
	1 880.0	27.9	25.4	23.6	22.1
	1 909.8	28.1	25.3	23.5	22.2

Band	Frequency (MHz)	EDGE Data			
		EDGE	EDGE	EDGE	EDGE
		1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)
GSM 850	824.2	26.8	23.3	21.1	19.3
	836.6	26.7	23.0	21.0	19.5
	848.8	26.8	23.1	21.2	19.6
GSM 1900	1 850.2	25.3	21.3	19.4	18.2
	1 880.0	25.2	21.4	19.3	18.2
	1 909.8	25.2	21.2	19.2	17.8

3GPP Release version	Mode	3GPP 34.121 Subtest	Cellular Band[dBm]			PCS Band[dBm]		
			4132	4183	4233	9262	9400	9538
99	WCDMA	12.2kbps RMC	22.8	22.8	22.3	22.2	22.4	22.0
5	HSDPA	Subtest1	22.3	22.0	22.3	22.1	22.2	22.0
5		Subtest2	22.5	21.9	22.4	22.3	22.1	22.0
5		Subtest3	22.0	21.4	22.0	22.0	21.7	21.5
5		Subtest4	22.0	21.8	21.8	21.7	21.3	21.3
5	HSUPA	Subtest1	20.7	20.0	20.8	20.4	19.5	20.4
5		Subtest2	19.9	20.3	20.3	20.3	19.8	20.2
5		Subtest3	21.1	21.0	21.1	21.2	21.1	21.0
5		Subtest4	20.3	20.3	20.2	20.4	20.0	20.0
5		Subtest5	21.2	20.5	21.1	21.3	21.3	20.4

- GSM (850 / 1900) & WCDMA (850 / 1900)

We found out the test mode with the highest power level after we analyze all the data rates. So we chose GSM850 / GSM1900 1 TX Slot and WCDMA850 and WCDMA1900 12.2 kbps RMC (worst case) as a representative.

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1.6. Test equipment list

Equipment	Manufacturer	Model	S/N	Cal Due.
Signal Generator	R&S	SMBV100A	255384	Jul. 20, 2012
Signal Generator	R&S	SMR40	100272	Jul. 15, 2012
Spectrum Analyzer	R&S	FSV30	100768	Mar. 31, 2012
Mobile Test Unit	R&S	CMU200	106190	May. 30, 2012
Directional Coupler	KRYTAR	152613	122661	May. 16, 2012
High Pass Filter	Wainwright	WHK3.0/18G-10SS	344	Jul. 07, 2012
High Pass Filter	Wainwright	WHK1.5/15G-6SS	4	Mar. 30, 2012
Preamplifier	H.P.	8447F	2944A03909	Jul. 04, 2012
Preamplifier	R&S	SCU 18	10117	Mar. 23, 2012
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Jul. 04, 2012
Test Receiver	R&S	ESU26	100109	Feb. 21, 2012
Bilog Antenna	SCHWARZBECK	VULB9163	396	Apr. 27, 2013
Horn Antenna	R&S	HF 906	100384	Oct. 10, 2012
Horn Antenna	SCHWARZBECK	BBHA9120D	183	Oct. 28, 2013
Dipole Antenna	SCHWARZBECK	VHA 9103/UHA 9105	9103-2817 9105-2514	May. 14, 2013
Antenna Master	INN-CO	MM4000	N.C.R.	N.C.R.
Turn Table	INN-CO	DS 1200 S	N.C.R.	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N.C.R.	N.C.R.

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1.7. Summary of test results

The EUT has been tested according to the following specifications:

APPLIED STANDARD : FCC Part 22, 24/RSS-132 issue 2, RSS-133 issue 5			
Section in FCC part 22, 24	Section in RSS-133 RSS-132	Test Item	Result
§22.913(a)(2) §24.232(c)	RSS-132(4.4) RSS -133 (6.4)	RF Radiated Output Power	Complied
§2.1053 §22.917(a) §24.238(a)	RSS -132 (4.5.1) RSS -133 (6.5.1)	Spurious Radiated Emission	Complied
§2.1046	RSS -132 (4.4) RSS -133 (4.1)	Conducted Output Power	Complied

1.8. Test report revision

Revision	Report number	Description
0	F690501/RF-RTL005152	Initial
1	F690501/RF-RTL005152-1	Re-tested conducted output power

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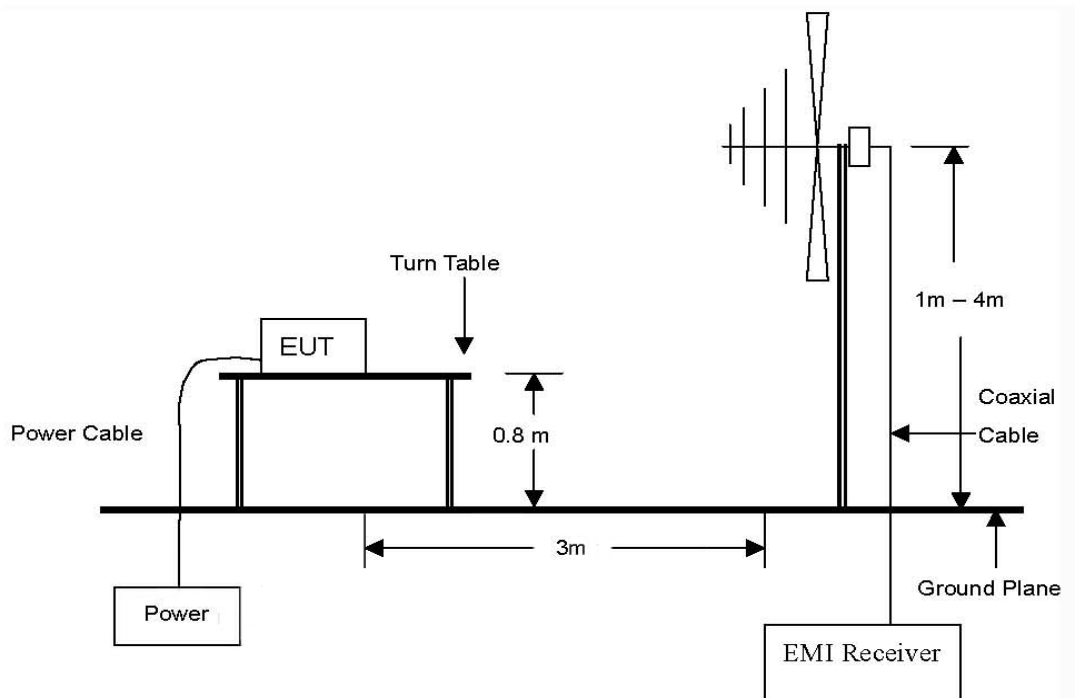
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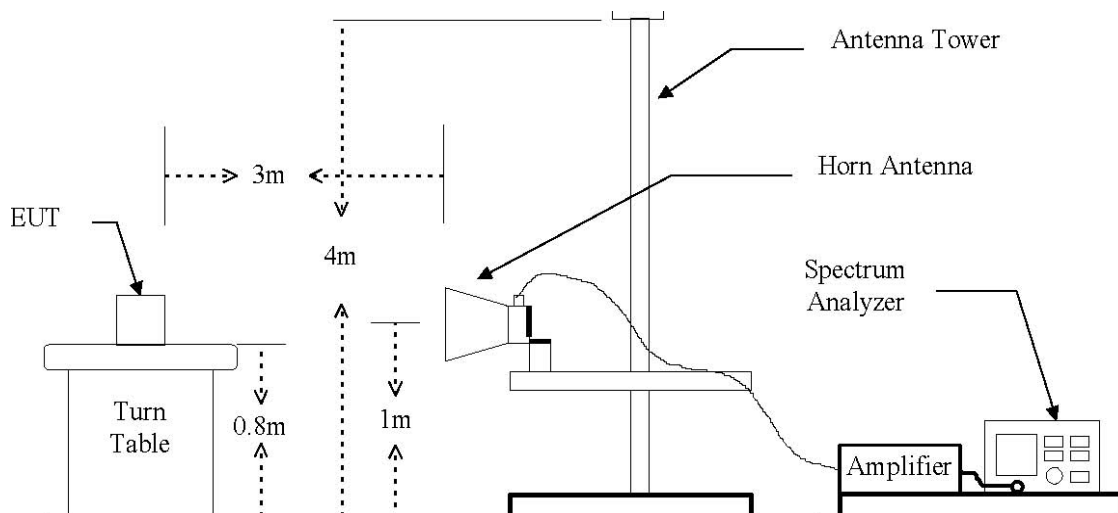
2. RF radiated output power & spurious radiated emission

2.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 18 GHz Emissions.



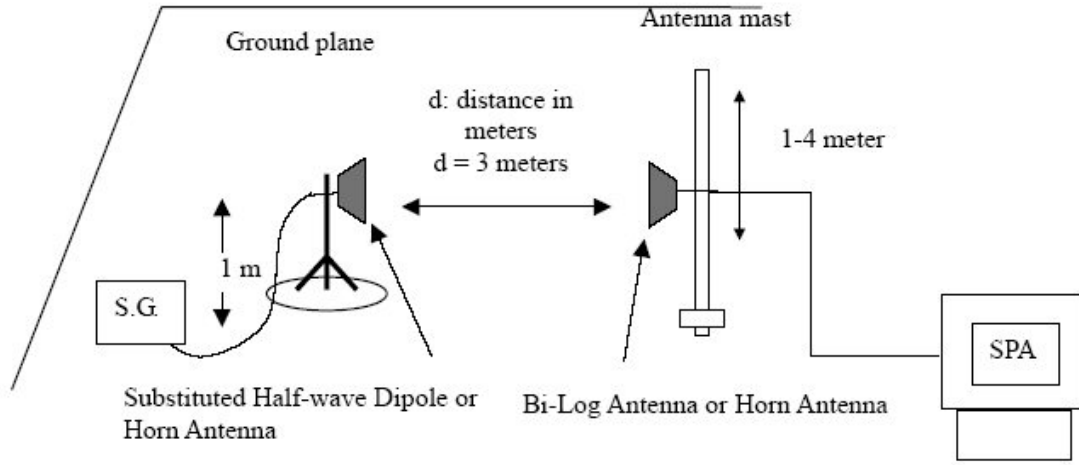
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The diagram below shows the test setup for substituted method



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2.2. Limit

2.2.1. RF Radiated output power

FCC §22.913(a)(2), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts. FCC §24.232(c), Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

2.2.2. Spurious Radiated emission

§ 22.917(a) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least $43 + 10\log(P)$ dB.

2.3. Test procedure: Based on ANSI/TIA 603C: 2004

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth was set to 1 MHz.
5. The transmitter shall be switched on; the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole (824 ~ 849 MHz) or horn antenna (1 850 ~ 1 910 MHz) connected to a signal generator.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
14. The input level to the substitution antenna shall be recorded as power level in dB m, corrected for any change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

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2.4. Test result for RF radiated output power

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

GSM850

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
824.20	V	34.34	3.42	-2.90	28.02	633.87
824.20	H	32.76	3.42	-2.90	26.44	440.55
836.60	V	33.40	3.38	-2.97	27.05	506.99
836.60	H	33.49	3.38	-2.97	27.14	517.61
848.80	V	32.12	3.33	-3.21	25.58	361.41
848.80	H	32.72	3.33	-3.21	26.18	414.95

GSM850 (EDGE)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P.	
					(dB m)	(mW)
824.20	V	28.94	3.42	-2.90	22.62	182.81
824.20	H	30.55	3.42	-2.90	24.23	264.85

GSM1900

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 850.20	V	21.13	4.87	9.12	25.38	345.14
1 850.20	H	21.71	4.87	9.12	25.96	394.46
1 880.00	V	19.01	4.91	9.20	23.30	213.80
1 880.00	H	20.48	4.91	9.20	24.77	299.92
1 909.80	V	20.79	4.94	9.27	25.12	325.09
1 909.80	H	20.72	4.94	9.27	25.05	319.89

GSM1900 (EDGE)

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 850.20	V	19.36	4.87	9.12	23.61	229.61
1 850.20	H	21.22	4.87	9.12	25.47	352.37

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WCDMA850

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
826.40	V	25.06	3.41	-2.88	18.77	75.34
826.40	H	23.19	3.41	-2.88	16.90	48.98
836.60	V	23.15	3.38	-2.97	16.80	47.86
836.60	H	24.07	3.38	-2.97	17.72	59.16
846.60	V	21.87	3.34	-3.16	15.37	34.43
846.60	H	24.30	3.34	-3.16	17.80	60.26

WCDMA1900

Frequency (MHz)	Ant. Pol. (H/V)	S.G level + Amp. (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P.	
					(dB m)	(mW)
1 852.40	V	15.47	4.87	9.12	19.72	93.76
1 852.40	H	17.82	4.87	9.12	22.07	161.06
1 880.00	V	14.21	4.91	9.20	18.50	70.79
1 880.00	H	16.36	4.91	9.20	20.65	116.14
1 907.60	V	14.58	4.94	9.27	18.91	77.80
1 907.60	H	15.17	4.94	9.27	19.50	89.13

Remark:

1. E.R.P. & E.I.R.P. = [S.G level + Amp.](dB m) - Cable loss(dB) + Ant. gain (dB d/dBi)
2. The E.R.P. & E.I.R.P. was measured in three orthogonal EUT position (x-axis and z-axis). Worst cases of all mode are z-axis.

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2.5. Spurious radiated emission

- Modulation Signal : GSM850
- Measured output Power : 28.02 dB m = 0.634 W
- Distance : 3 meters
- Limit : $-(43 + 10\log_{10}(W)) = -41.02$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level (dB m)	Cable loss (dB)	Ant. gain (dB d)	E.R.P (dB m)	dB c	Margin (dB)
Low Channel (824.2 MHz)							
1 648.50	V	-50.78	4.54	6.44	-48.88	-76.90	35.88
1 648.50	H	-50.22	4.54	6.44	-48.32	-76.34	35.32
Middle Channel (836.6 MHz)							
1 673.40	V	-48.96	4.58	6.51	-47.03	-75.05	34.03
1 673.40	H	-49.52	4.58	6.51	-47.59	-75.61	34.59
High Channel (848.8 MHz)							
1 697.60	V	-41.89	4.62	6.57	-39.94	-67.96	26.94
1 697.60	H	-46.71	4.62	6.57	-44.76	-72.78	31.76

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- Modulation Signal : GSM1900
- Measured output Power : 25.96 dB m = 0.394 5 W
- Distance : 3 meters
- Limit : $-(43 + 10\log_{10}(W)) = -38.96$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 850.2 MHz)							
3 703.39	V	-60.36	7.14	11.85	-55.65	-81.61	42.65
3 703.39	H	-61.38	7.14	11.85	-56.67	-82.63	43.67
Middle Channel(1 880.0 MHz)							
3 759.90	V	-54.84	7.23	11.85	-50.22	-76.18	37.22
3 759.90	H	-58.62	7.23	11.85	-54.00	-79.96	41.00
High Channel(1 909.8 MHz)							
3 819.66	V	-49.37	7.33	11.84	-44.86	-70.82	31.86
3 819.66	H	-55.73	7.33	11.84	-51.22	-77.18	38.22

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- Modulation Signal : WCDMA850
- Measured output Power : 18.77 dB m = 0.075 3 W
- Distance : 3 meters
- Limit : $-(43 + 10\log_{10}(W)) = -31.77$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel (826.4 MHz)							
1 650.20	V	-46.08	4.54	6.44	-44.18	-62.95	31.18
1 650.20	H	-44.17	4.54	6.44	-42.27	-61.04	29.27
Middle Channel (836.6 MHz)							
1 670.70	V	-44.16	4.57	6.50	-42.23	-61.00	29.23
1 670.73	H	-45.41	4.57	6.50	-43.48	-62.25	30.48
High Channel (846.6 MHz)							
1 695.82	V	-42.96	4.61	6.56	-41.01	-59.78	28.01
1 695.80	H	-46.32	4.61	6.56	-44.37	-63.14	31.37

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- Modulation Signal : WCDMA1900
- Measured output Power : 22.07 dB m = 0.161 W
- Distance : 3 meters
- Limit : $-(43 + 10\log_{10}(W)) = -35.07$ dB c

Frequency (MHz)	Ant. Pol. (H/V)	S.G level (dB m)	Cable loss (dB)	Ant. gain (dB i)	E.I.R.P. (dB m)	dB c	Margin (dB)
Low Channel(1 852.4 MHz)							
3 705.68	V	-47.91	7.14	11.85	-43.20	-65.27	30.20
3 705.68	H	-48.36	7.14	11.85	-43.65	-65.72	30.65
Middle Channel(1 880.0 MHz)							
3 760.94	V	-46.77	7.23	11.85	-42.15	-64.22	29.15
3 760.94	H	-53.15	7.23	11.85	-48.53	-70.60	35.53
High Channel(1 907.6 MHz)							
3 816.32	V	-41.02	7.33	11.84	-36.51	-58.58	23.51
3 816.32	H	-45.92	7.33	11.84	-41.41	-63.48	28.41

Remark:

1. $E.R.P. \ \& \ E.I.R.P. = S.G \ level \ (dB \ m) - Cable \ loss \ (dB) + Ant. \ gain \ (dB \ d/dB \ i)$
2. No more harmonic above 3rd harmonic for all channel.

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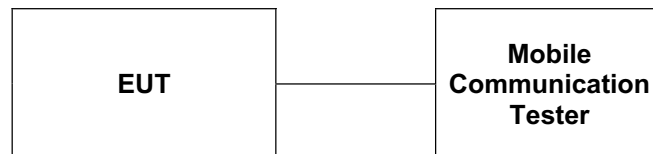
3. Conducted Output Power

3.1. Limit

Requirements: CFR 47, Section §2.1046

3.2. Test Procedure

1. The RF output of the transmitter was connected to the input of the Mobile Communication Test Unit through sufficient attenuation.
2. The mobile was set up for the max. output power with pseudo random data modulation.
- 3 The power was measured with



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3.3. Test Result

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

Band	Frequency (MHz)	GPRS Data			
		GPRS	GPRS	GPRS	GPRS
		1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)
GSM 850	824.2	32.6	28.5	26.4	25.3
	836.6	32.5	28.4	26.7	25.4
	848.8	32.4	28.7	26.3	25.2
GSM 1900	1 850.2	28.2	25.3	23.5	22.3
	1 880.0	27.9	25.4	23.6	22.1
	1 909.8	28.1	25.3	23.5	22.2

Band	Frequency (MHz)	EDGE Data			
		EDGE	EDGE	EDGE	EDGE
		1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
		(dBm)	(dBm)	(dBm)	(dBm)
GSM 850	824.2	26.8	23.3	21.1	19.3
	836.6	26.7	23.0	21.0	19.5
	848.8	26.8	23.1	21.2	19.6
GSM 1900	1 850.2	25.3	21.3	19.4	18.2
	1 880.0	25.2	21.4	19.3	18.2
	1 909.8	25.2	21.2	19.2	17.8

3GPP Release version	Mode	3GPP 34.121 Subtest	Cellular Band[dBm]			PCS Band[dBm]		
			4132	4183	4233	9262	9400	9538
99	WCDMA	12.2kbps RMC	22.8	22.8	22.3	22.2	22.4	22.0
5	HSDPA	Subtest1	22.3	22.0	22.3	22.1	22.2	22.0
5		Subtest2	22.5	21.9	22.4	22.3	22.1	22.0
5		Subtest3	22.0	21.4	22.0	22.0	21.7	21.5
5		Subtest4	22.0	21.8	21.8	21.7	21.3	21.3
5	HSUPA	Subtest1	20.7	20.0	20.8	20.4	19.5	20.4
5		Subtest2	19.9	20.3	20.3	20.3	19.8	20.2
5		Subtest3	21.1	21.0	21.1	21.2	21.1	21.0
5		Subtest4	20.3	20.3	20.2	20.4	20.0	20.0
5		Subtest5	21.2	20.5	21.1	21.3	21.3	20.4

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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