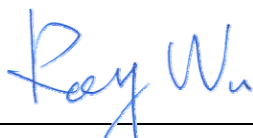


FCC Test Report

EQUIPMENT : GSM Dual-Band Digital Mobile Phone
BRAND NAME : Vodafone
MODEL NAME : VDF225FM
FCC ID : Q78-VDF225FM
STANDARD : 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)
Tx/Rx FREQUENCY RANGE : GSM850 : 824.2 ~ 848.8 / 869.2 ~ 893.8 MHz
GSM1900 : 1850.2 ~ 1909.8 / 1930.2 ~ 1989.8 MHz
MAX. ERP/EIRP POWER : GSM850(GSM) : 0.94 W
GSM1900(GSM) : 1.43 W
EMISSION DESIGNATOR : 300KGXW
APPLICANT : ZTE CORPORATION
ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

The product sample received on Sep. 03, 2008 and completely tested on Sep. 12, 2008. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Roy Wu / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

TABLE OF CONTENTS

SUMMARY OF TEST RESULT	3
REVISION HISTORY.....	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test.....	5
1.4 Testing Site	7
1.5 Applied Standards	7
1.6 Ancillary Equipment List.....	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Test Mode.....	8
2.2 Connection Diagram of Test System	8
3 TEST RESULT	9
3.1 Conducted Output Power Measurement.....	9
3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement	11
3.3 Occupied Bandwidth and Band Edge Measurement	13
3.4 Conducted Emission Measurement	18
3.5 Field Strength of Spurious Radiation Measurement	24
3.6 Frequency Stability Measurement.....	29
4 LIST OF MEASURING EQUIPMENTS	32
5 UNCERTAINTY OF EVALUATION	33
6 CERTIFICATION OF TAF ACCREDITATION	35
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result
3.1	§2.1046	N/A	Conducted Output Power	N/A	PASS
3.2	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts for FCC (<6.3 Watts for IC)	PASS
3.2	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS
3.3	§2.1049 §22.917(a) §24.238(a)	N/A	Occupied Bandwidth	N/A	PASS
3.3	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Band Edge Measurement	< 43+10log ₁₀ (P[Watts])	PASS
3.4	§2.1051 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Conducted Emission	< 43+10log ₁₀ (P[Watts])	PASS
3.5	§2.1053 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Field Strength of Spurious Radiation	< 43+10log ₁₀ (P[Watts])	PASS
3.6	§2.1055 §22.355 §24.235	RSS-132(4.3) RSS-133(6.3)	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG890310	Rev. 01	Initial Release	Oct. 02, 2008

1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM Dual-Band Digital Mobile Phone
Brand Name	Vodafone
Model Name	VDF225FM
Tx Frequency	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz
Rx Frequency	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz
Maximum Output Power to Antenna	GSM850 : 31.12 dBm GSM1900 : 28.75 dBm
Maximum ERP/EIRP	GSM850(GSM) : 0.94 W (29.72 dBm) GSM1900(GSM) : 1.43 W (31.54 dBm)
Antenna Type	Fixed Internal Antenna with gain 1.31 dBi
HW Version	g3dB
SW Version	SFR-P108A2FM(U)B01-FrEsPtl-FR01\ng3dBV2.0
Type of Modulation	GMSK
Type of Emission	300KGXW
EUT Stage	Production Unit

2nd component Source List

Component Model		
AC Adapter	Brand Name	ZTE CORPORATION
	Model Name	STC-A22O50U8-C
	Power Rating	I/P: 100-240Vac, 50-60Hz, 200mA; O/P: 5Vdc, 700mA
	AC Power Cord Type	1.2 meter non-shielded cable without ferrite core
Battery	Brand Name	ZTE CORPORATION
	Model Name	Li3706T42P3h383857
	Power Rating	3.7Vdc, 670mAh
	Type	Li-ion
Earphone	Brand Name	ZTE CORPORATION
	Model Name	TMD-600U//SF-880KM-1//DEM-1//GS-354M
LCD Panel	Brand Name	LEAD COMMUNICATIONS LTD
	Model Name	CMC-GG1P0087DTSW-W-E//P106B6F//TM128128-CKFWG48-9

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. For accessories equipped with this EUT, please refer to the appendix of the external photo.

1.4 Testing Site

Test Site	Sporton International (Kunshan) Inc.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: 86-0512-5790-0158 FAX: 86-0512-5790-0958	
Test Site No.	Sporton Site No.	
	TH01-KS	03CH01-KS

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI C63.4-2003
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ IC RSS-132, RSS-133

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Code
1.	GSM Base Station	R&S	CMU200	N/A	N/A	Unshielded, 1.8m

2 Test Configuration of Equipment Under Test

2.1 Test Mode

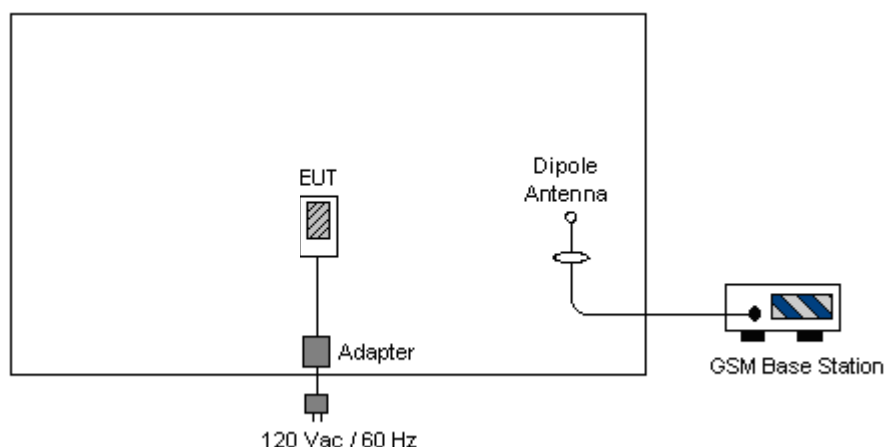
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V
2. 30MHz to 19000 MHz for GSM1900 and WCDMA Band II.

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	■ GSM Link	■ GSM Link
GSM 1900	■ GSM Link	■ GSM Link

2.2 Connection Diagram of Test System



3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

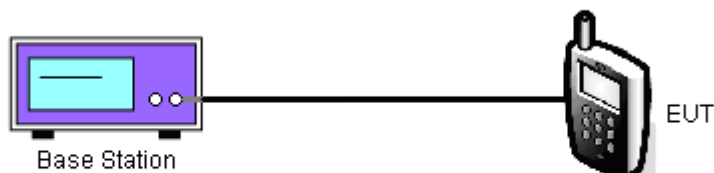
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular				
Modes	Channel	Frequency (MHz)	Conducted Power	
			(dBm)	(Watts)
GSM	128 (Low)	824.2	31.01	1.26
	189 (Mid)	836.4	31.12	1.29
	251 (High)	848.8	30.93	1.24

PCS				
Modes	Channel	Frequency (MHz)	Conducted Power	
			(dBm)	(Watts)
GSM	512 (Low)	1850.2	28.75	0.75
	661 (Mid)	1880.0	28.53	0.71
	810 (High)	1909.8	28.24	0.67

3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.2.1 Description of the ERP/EIRP Measurement

ERP/EIRP is measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

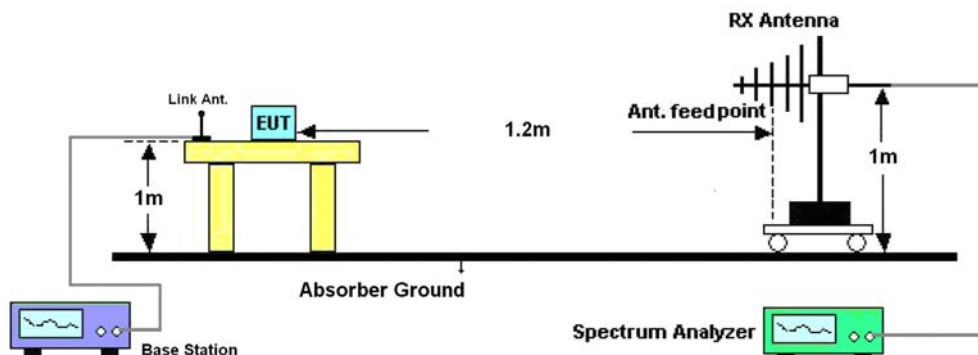
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The EUT was placed on a table with 1.0 meter height in a fully anechoic chamber.
2. The EUT was set at 1.2 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiated power.
4. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
5. Taking the record of maximum ERP/EIRP.
6. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the dipole antenna is measured.
8. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
9. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$
 P_s (dBm) : Input power to substitution antenna.
 G_s (dBi or dBd) : Substitution antenna Gain.
 $E_t = R_t + AF$
 $E_s = R_s + AF$
 AF (dB/m) : Receive antenna factor
 R_t : The highest received signal in spectrum analyzer for EUT.
 R_s : The highest received signal in spectrum analyzer for substitution antenna.

3.2.4 Test Setup



3.2.5 Test Result of ERP

GSM850 (GSM) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-37.37	-48.12	0.00	-1.08	9.67	0.01
836.40	-38.40	-48.28	0.00	-0.93	8.95	0.01
848.80	-37.91	-48.35	0.00	-0.76	9.68	0.01
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-17.17	-47.97	0.00	-1.08	29.72	0.94
836.40	-17.49	-48.01	0.00	-0.93	29.59	0.91
848.80	-17.71	-48.05	0.00	-0.76	29.58	0.91

3.2.6 Test Result of EIRP

GSM1900 (GSM) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-22.44	-51.88	0.00	1.96	31.40	1.38
1880.00	-24.25	-52.99	0.00	2.00	30.74	1.19
1909.80	-27.25	-54.28	0.00	1.98	29.01	0.80
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-22.55	-52.13	0.00	1.96	31.54	1.43
1880.00	-24.13	-53.17	0.00	2.00	31.04	1.27
1909.80	-26.45	-54.13	0.00	1.98	29.66	0.92

3.3 Occupied Bandwidth and Band Edge Measurement

3.3.1 Description of Occupied Bandwidth and Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

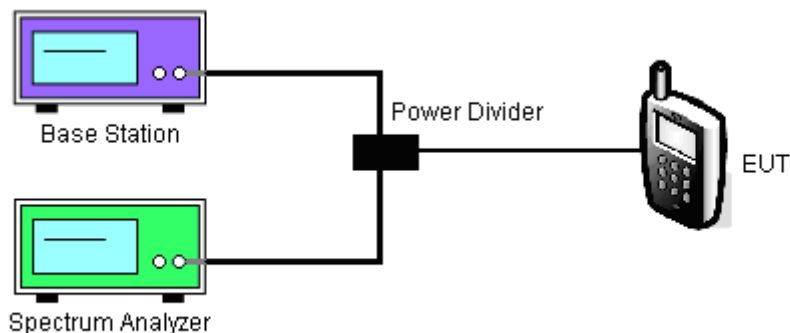
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the low, middle and high channels for the highest RF powers were measured.
3. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.
4. The RBW was replaced by 10 kHz, due to the spectrum analyzer IF-Filter including an excess of the limit. A worst case correction factor of $10 \log (1\% \text{ BW/measurement RBW})$ was implemented.

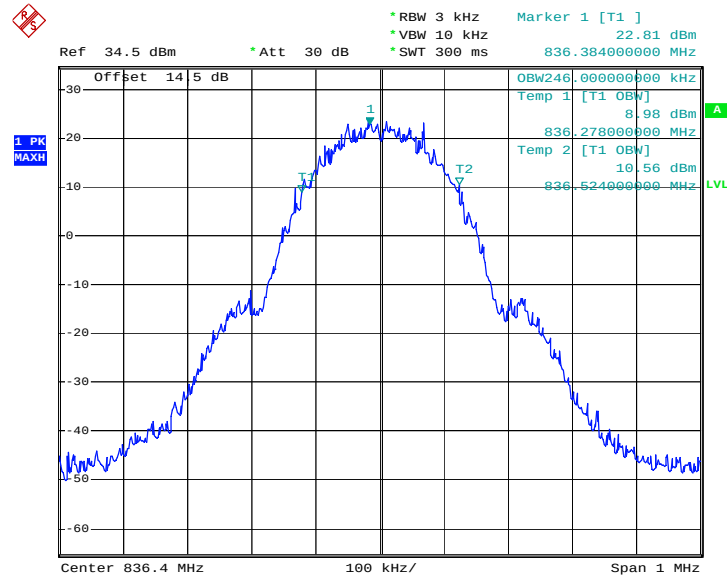
3.3.4 Test Setup



3.3.5 Test Result (Plots) of Occupied Bandwidth

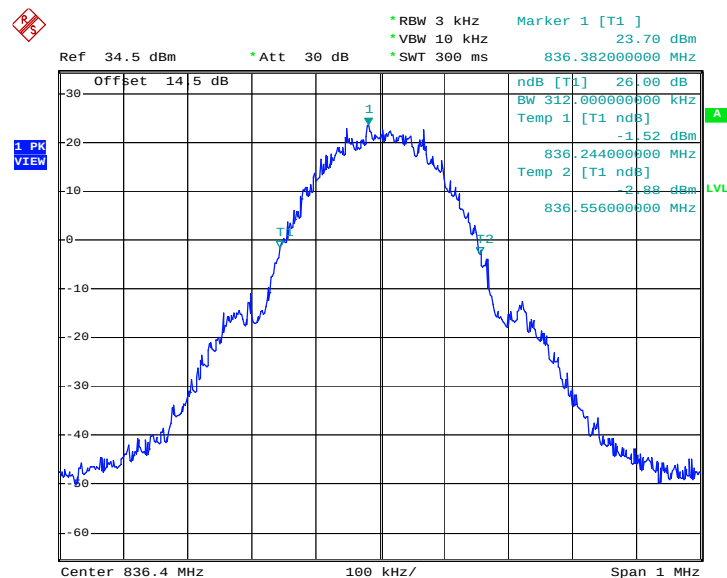
Band :	GSM 850	Power Stage :	High
Test Mode :	GSM Link		

99% Occupied Bandwidth Plot on Channel 189



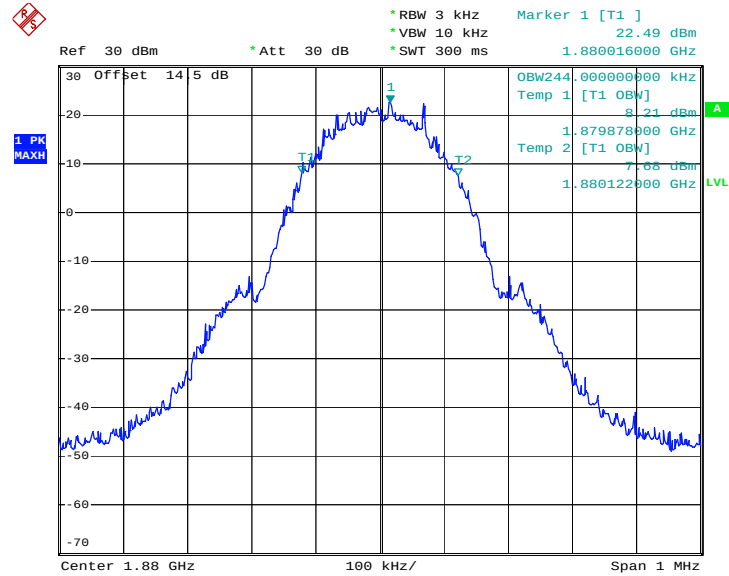
Date: 12.SEP.2008 13:05:01

26dB Bandwidth Plot on Channel 189

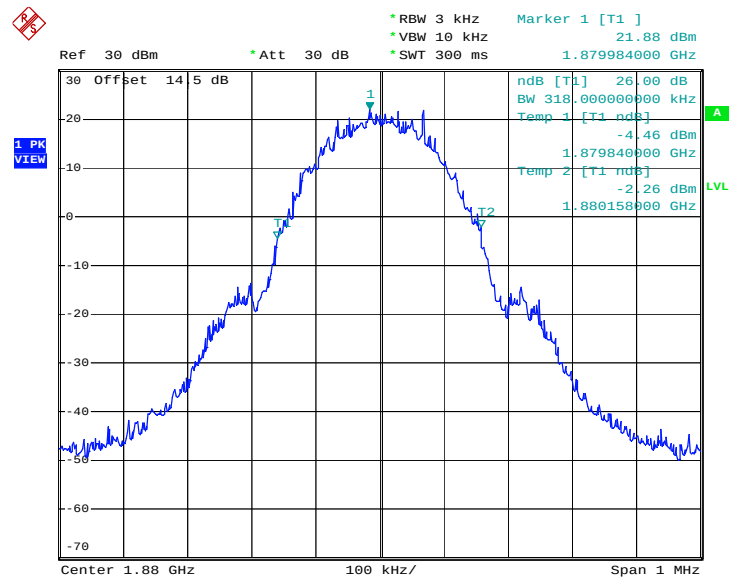


Date: 12.SEP.2008 12:59:35

Band :	GSM 1900	Power Stage :	High
Test Mode :	GSM Link		

99% Occupied Bandwidth Plot on Channel 661


Date: 12.SEP.2008 09:01:38

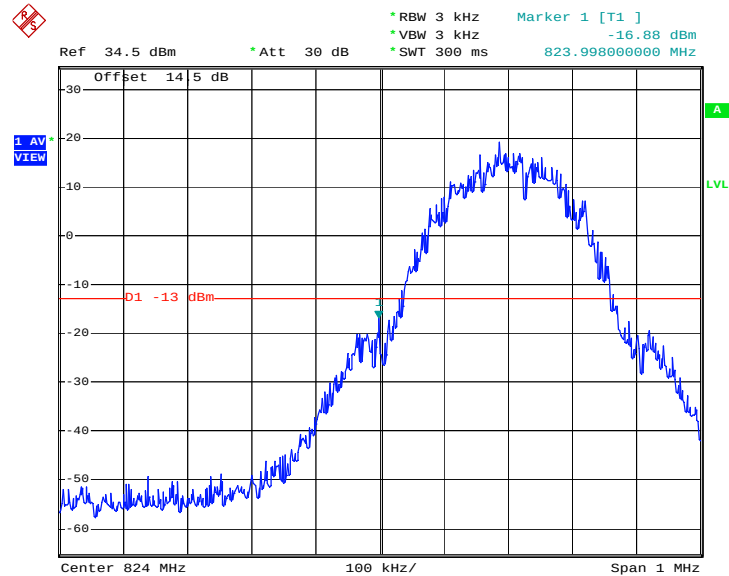
26dB Bandwidth Plot on Channel 661


Date: 12.SEP.2008 08:44:17

3.3.6 Test Result (Plots) of Conducted Band Edges

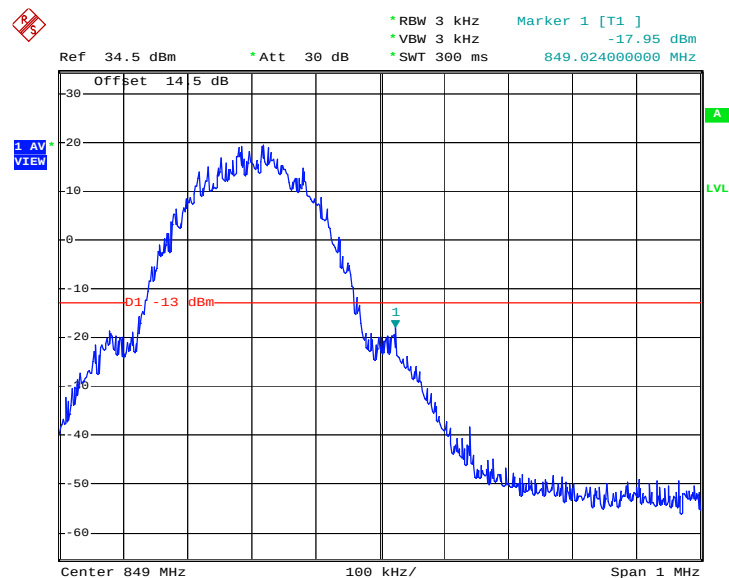
Band :	GSM850	Power Stage :	High
Test Mode :	GSM Link		

Lower Band Edge Plot on Channel 128



Date: 12.SEP.2008 13:01:51

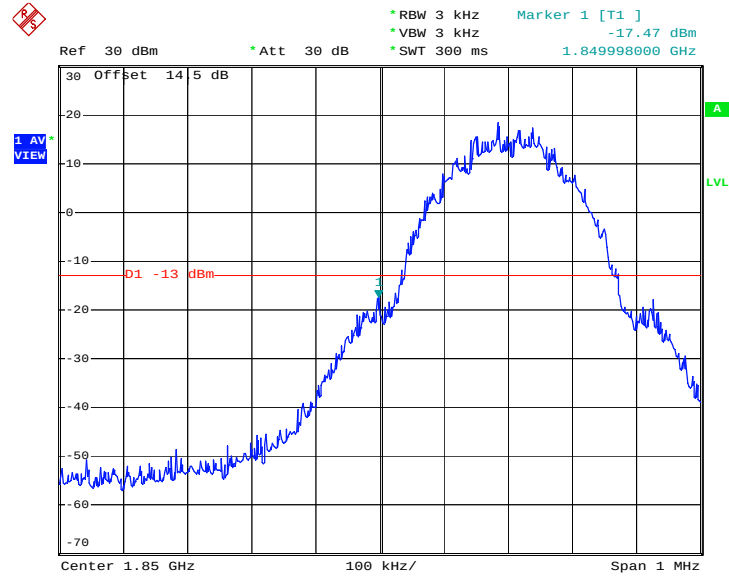
Higher Band Edge Plot on Channel 251



Date: 12.SEP.2008 13:02:43

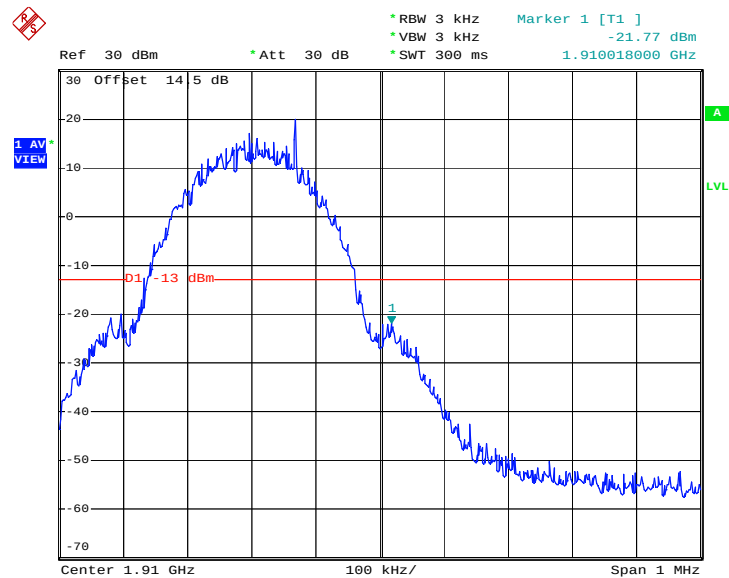
Band :	GSM1900	Power Stage :	High
Test Mode :	GSM Link		

Lower Band Edge Plot on Channel 512



Date: 12.SEP.2008 08:50:37

Higher Band Edge Plot on Channel 810



Date: 12.SEP.2008 08:56:44

3.4 Conducted Emission Measurement

3.4.1 Description of Conducted Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

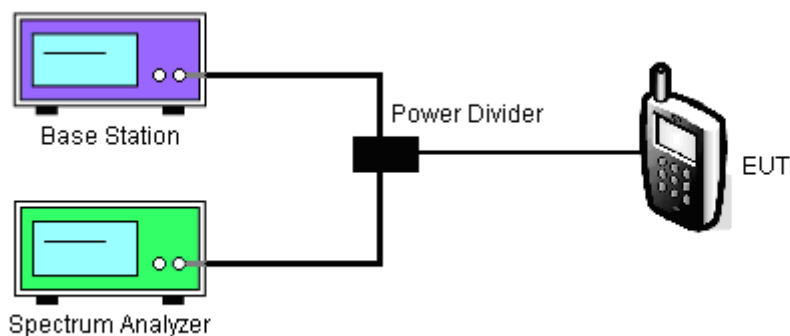
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

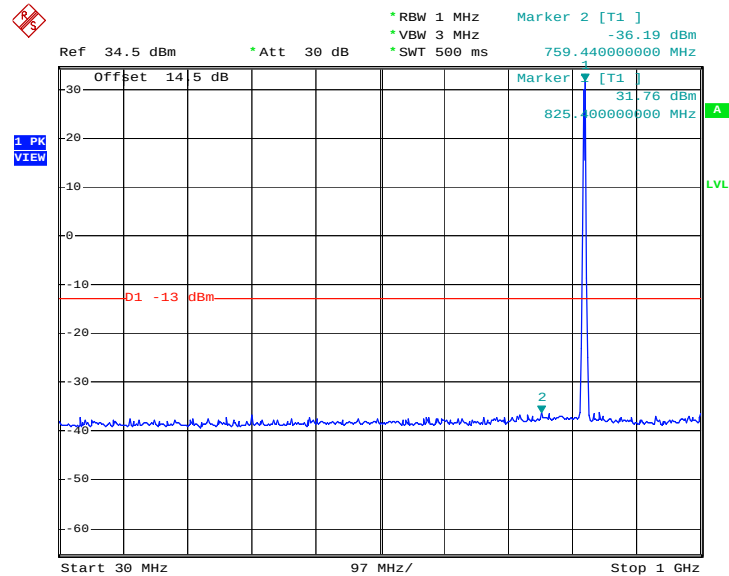
3.4.4 Test Setup



3.4.5 Test Result of Conducted Emission

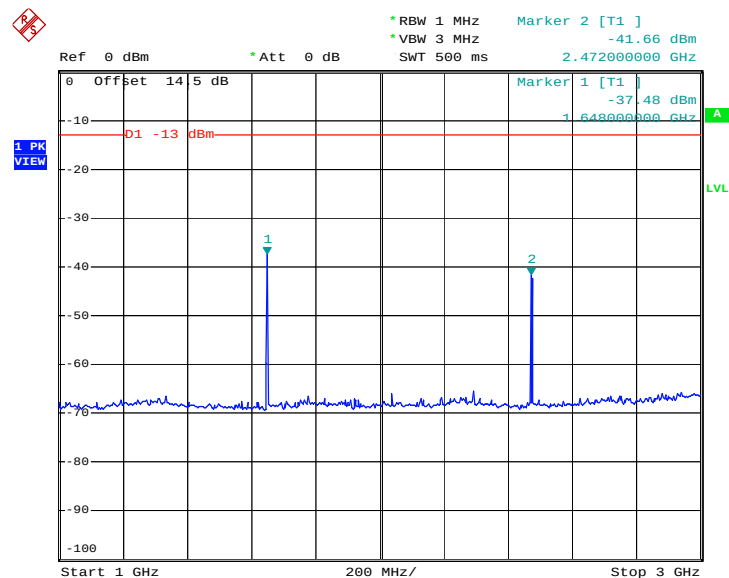
Band :	GSM850	Channel :	CH189
Test Mode :	GSM Link		

Conducted Emission Plot between 30M-1G



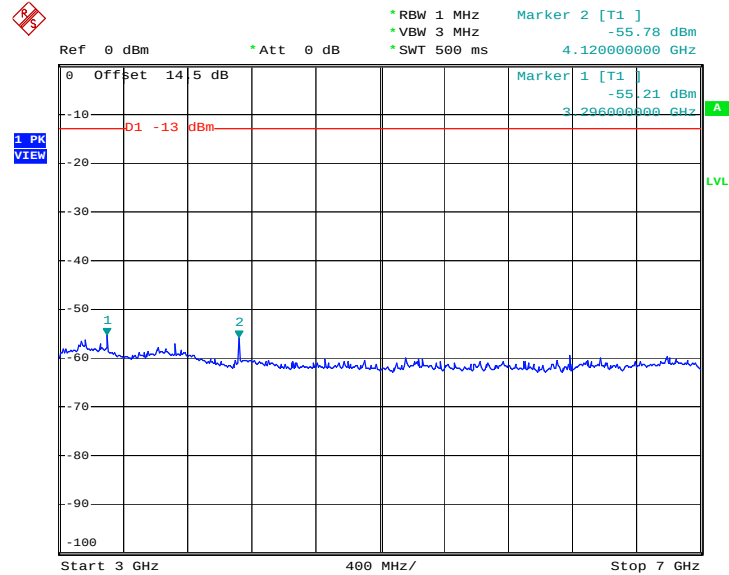
Date: 12.SEP.2008 12:43:10

Conducted Emission Plot between 1GHz ~ 3GHz



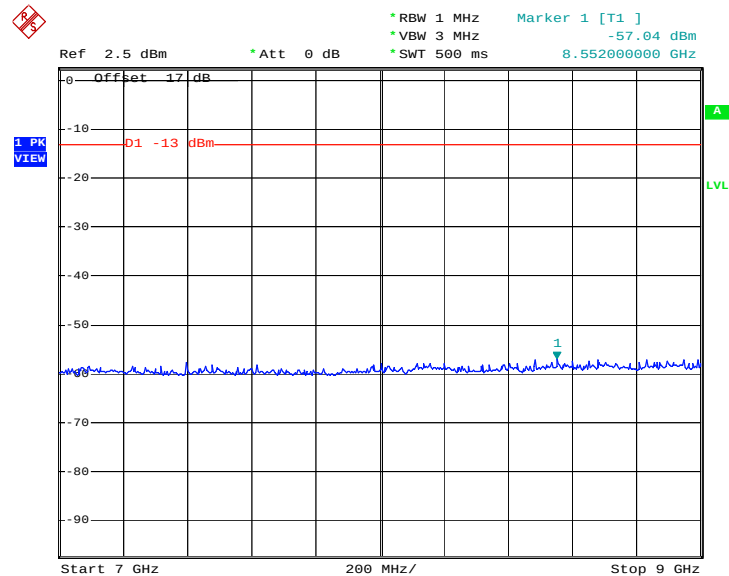
Date: 12.SEP.2008 12:45:10

Conducted Emission Plot between 3GHz ~ 7GHz



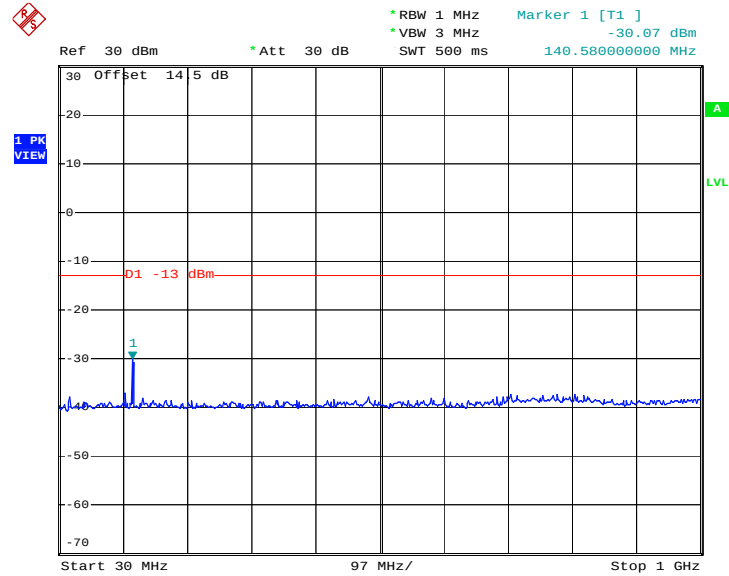
Date: 12.SEP.2008 12:46:30

Conducted Emission Plot between 7GHz ~ 9GHz

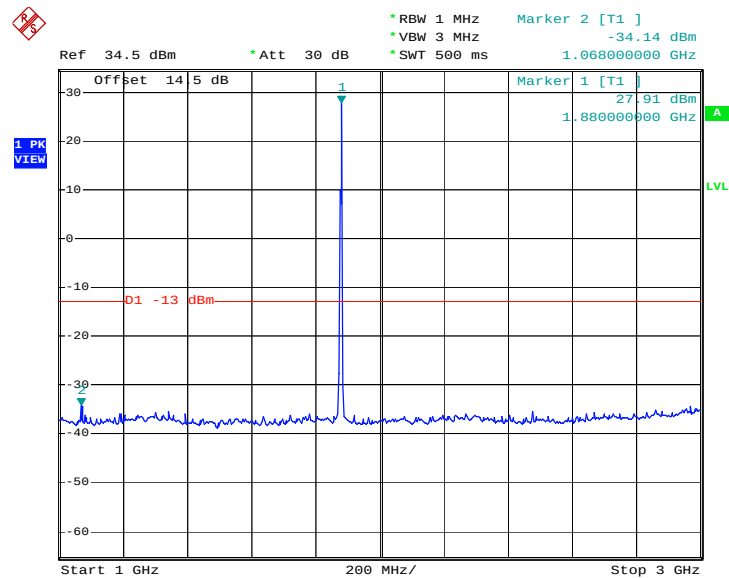


Date: 12.SEP.2008 12:47:33

Band :	GSM1900	Channel :	CH661
Test Mode :	GSM Link		

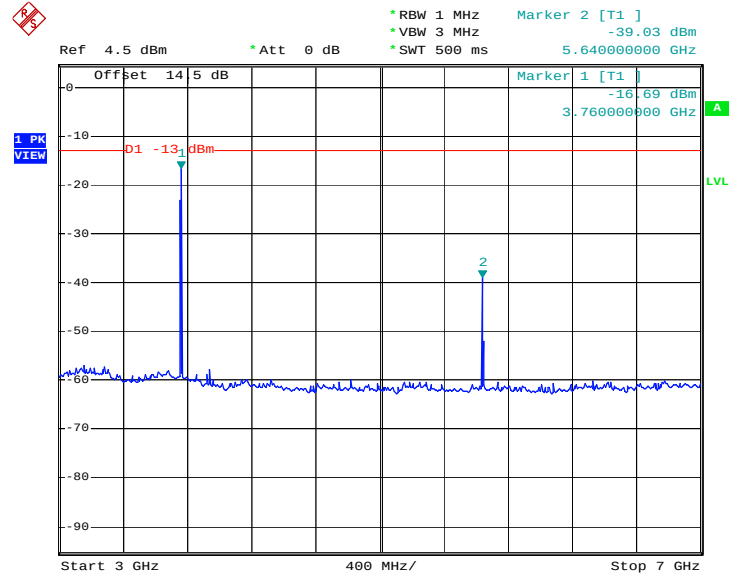
Conducted Emission Plot between 30M-1G


Date: 12.SEP.2008 10:48:02

Conducted Emission Plot between 1GHz ~ 3GHz


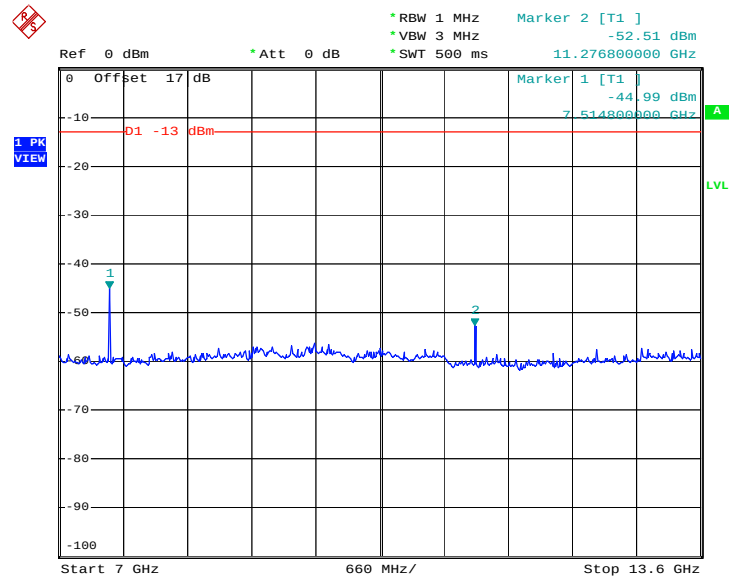
Date: 12.SEP.2008 10:44:45

Conducted Emission Plot between 3G-7G



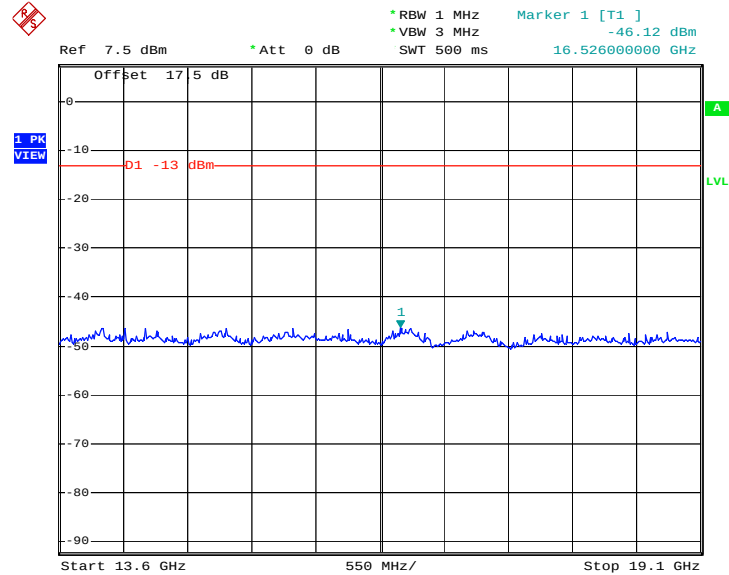
Date: 12.SEP.2008 10:43:22

Conducted Emission Plot between 7G-13.6G



Date: 12.SEP.2008 10:42:18

Conducted Emission Plot between 13.6G-19.1G



Date: 12.SEP.2008 10:46:28

3.5 Field Strength of Spurious Radiation Measurement

3.5.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

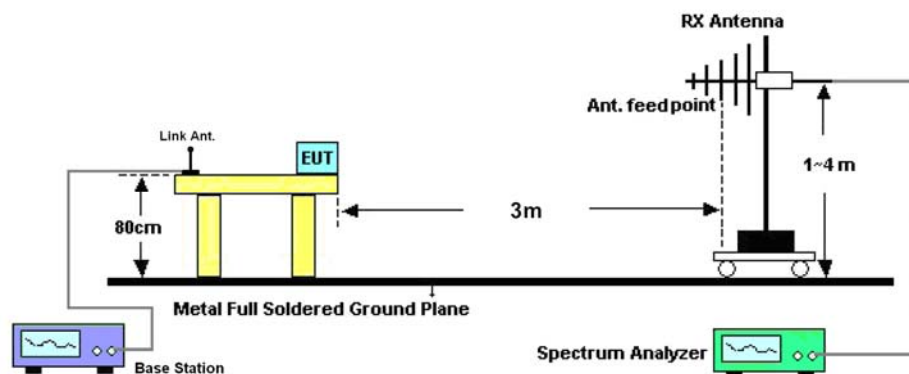
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

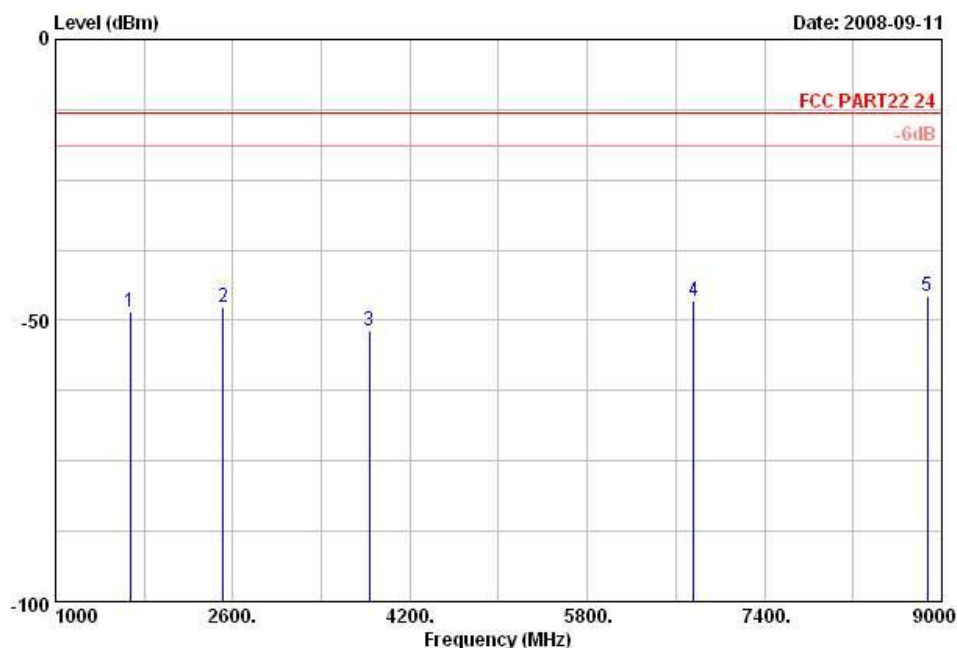
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Emission level (dBm) = output power + substitution Gain.

3.5.4 Test Setup



3.5.5 Test Result of Field Strength of Spurious Radiated

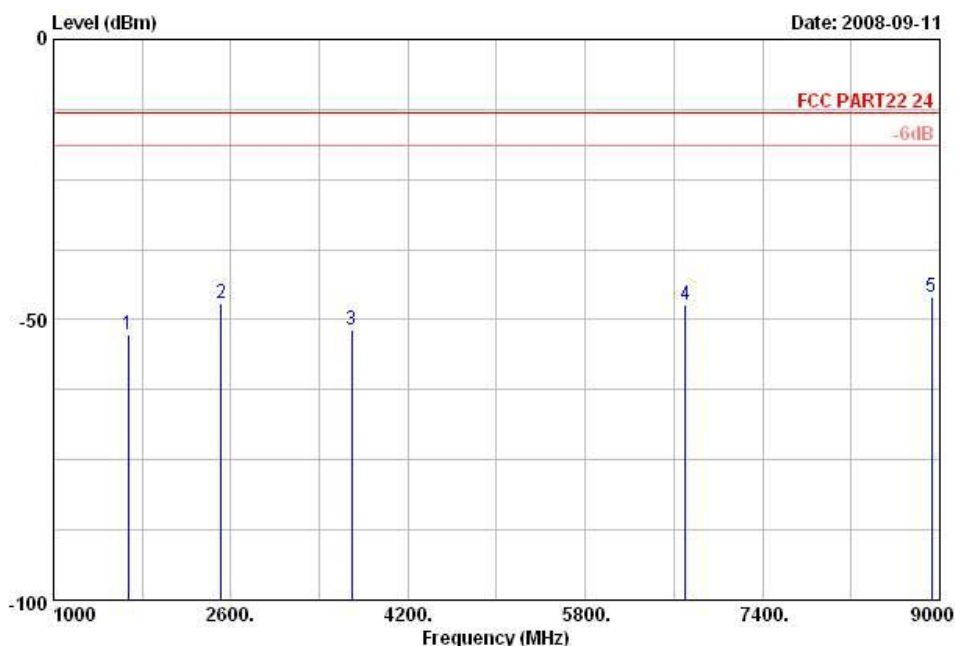
Band :	GSM850	Temperature :	25~26°C
Test Mode :	GSM Link + Adapter	Relative Humidity :	40~41%
Test Engineer :	James Huang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-07091 HORIZONTAL
Model : FG 890201
Memo : Mode 1

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1674.00	-50.48	-13	-37.48	-52.8	-54.59	2.68	8.94	H	Pass
2512.00	-49.83	-13	-36.83	-58.11	-60.30	-2.32	10.30	H	Pass
3834.00	-53.93	-13	-40.93	-63.71	-66.52	-4.16	10.58	H	Pass
6762.00	-48.66	-13	-35.66	-64.6	-68.48	-9.83	12.14	H	Pass
8868.00	-47.71	-13	-34.71	-64.87	-69.17	-10.76	12.85	H	Pass

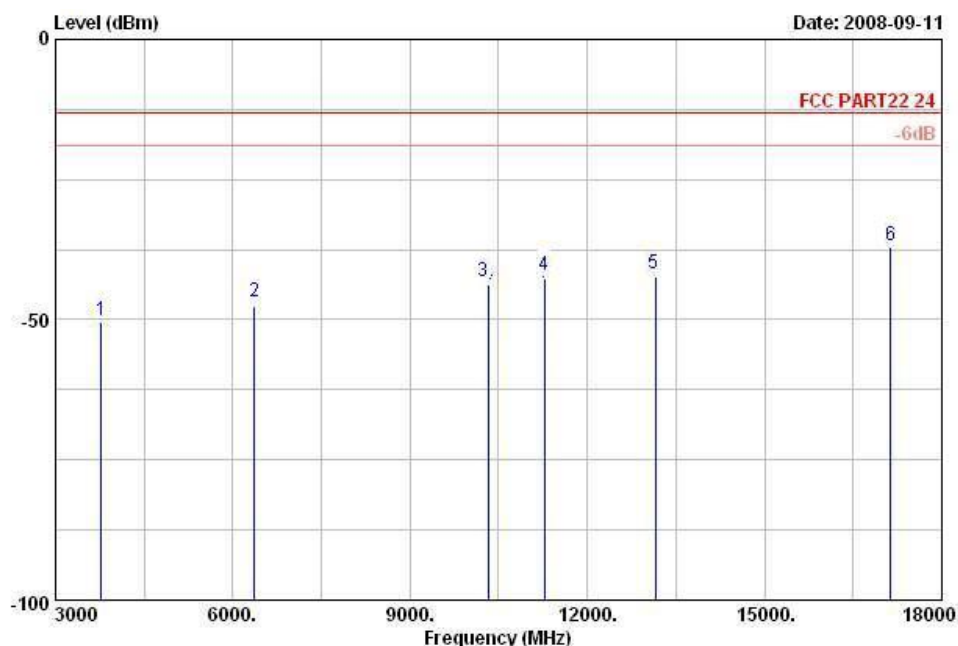
Band :	GSM850	Temperature :	25~26°C
Test Mode :	GSM Link + Adapter	Relative Humidity :	40~41%
Test Engineer :	James Huang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS
 Condition: FCC PART22 24 HF EIRP FACTOR-07091 VERTICAL
 Model : FG 890201
 Memo : Mode 1

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1674.00	-54.93	-13	-41.93	-57.25	-59.04	2.68	8.94	V	Pass
2512.00	-49.35	-13	-36.35	-57.63	-59.82	-2.32	10.30	V	Pass
3690.00	-54.00	-13	-41.00	-63.17	-65.83	-3.60	10.38	V	Pass
6706.00	-49.50	-13	-36.50	-65.43	-69.27	-9.74	12.18	V	Pass
8928.00	-48.03	-13	-35.03	-65.3	-69.62	-10.87	12.87	V	Pass

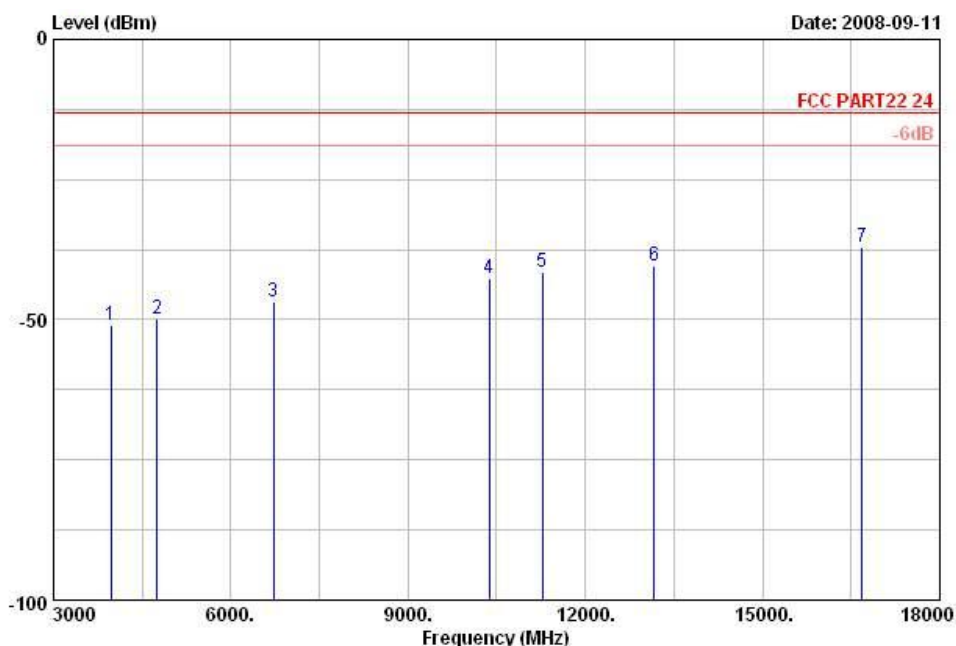
Band :	GSM1900	Temperature :	25~26°C
Test Mode :	GSM Link + Adapter	Relative Humidity :	40~41%
Test Engineer :	James Huang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS
 Condition: FCC PART22 24 HF EIRP FACTOR-07091 HORIZONTAL
 Model : FG 890201
 Memo : Mode 1

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760.00	-50.50	-13	-37.50	-62.09	-62.66	-3.84	10.47	H	Pass
6359.00	-47.53	-13	-34.53	-65.36	-66.87	-9.35	12.14	H	Pass
10334.00	-43.59	-13	-30.59	-65.62	-67.83	-12.94	13.45	H	Pass
11279.00	-42.72	-13	-29.72	-65.52	-68.79	-14.52	13.70	H	Pass
13163.00	-42.28	-13	-29.28	-65.64	-69.52	-16.01	13.38	H	Pass
17128.00	-36.91	-12	-24.91	-61.81	-65.18	-16.86	13.56	H	Pass

Band :	GSM1900	Temperature :	25~26°C
Test Mode :	GSM Link + Adapter	Relative Humidity :	40~41%
Test Engineer :	James Huang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS
 Condition: FCC PART22 24 HF EIRP FACTOR-07091 VERTICAL
 Model : FG 890201
 Memo : Mode 1

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3970.00	-51.06	-13	-38.06	-63.51	-72.61	-4.55	19.15	V	Pass
4756.00	-49.76	-13	-36.76	-63.67	-73.57	-5.81	20.15	V	Pass
6719.00	-46.79	-13	-33.79	-64.87	-75.53	-9.74	21.15	V	Pass
10379.00	-42.71	-13	-29.71	-64.83	-75.71	-13.00	22.15	V	Pass
11279.00	-41.51	-13	-28.51	-64.31	-77.03	-14.52	23.15	V	Pass
13160.00	-40.52	-12	-28.52	-63.88	-78.53	-16.01	24.15	V	Pass
16684.00	-37.16	-11	-26.16	-61.42	-75.83	-15.67	25.15	V	Pass

3.6 Frequency Stability Measurement

3.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

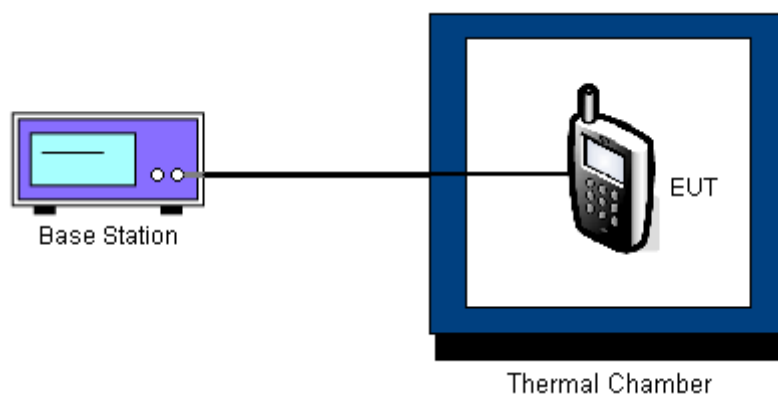
3.6.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at -30°C , the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

3.6.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.6.5 Test Setup



3.6.6 Test Result of Temperature Variation

Band :	GSM 850	Channel :	189
Limit (ppm) :	2.5		

Temperature (°C)	GSM		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	n/a	n/a	
-20	-19	-0.02	
-10	-16	-0.02	
0	13	0.02	
10	10	0.01	
20	9	0.01	
30	-10	-0.01	
40	-17	-0.02	
50	-18	-0.02	

Note: The EUT can not operated in -30°C.

Band :	GSM 1900	Channel :	661
Limit (ppm) :	2.5		

Temperature (°C)	GSM		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	n/a	n/a	
-20	37	0.02	
-10	59	0.03	
0	37	0.02	
10	31	0.02	
20	34	0.02	
30	29	0.02	
40	30	0.02	
50	-21	-0.01	

Note: The EUT can not operated in -30°C.

3.6.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 850 CH189	GSM	3.7	17.0	0.02	2.5	PASS
		BEP	-27.0	-0.03		
		4.2	23.0	0.03		
GSM 1900 CH661	GSM	3.7	29.0	0.02		
		BEP	24.0	0.01		
		4.2	32.0	0.02		

Remark:

1. Normal Voltage = 3.7V.
2. Battery End Point (BEP) = 3.4 V.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9K~40GHz	Mar. 13, 2008	Mar. 12, 2009	Radiation (03CH01-KS)
EMI Test Receiver	R&S	ESCI	100724	9KHz~2.75GHz	Feb. 06, 2008	Feb. 05, 2009	Radiation (03CH01-KS)
Bilog Antenna	Schaffner	CBL6112D	23182	25MHz~2000MHz	May 21, 2008	May 20, 2009	Radiation (03CH01-KS)
AC Power Source	APC	AFC-11001G	N/A	N/A	N/A	N/A	Radiation (03CH01-KS)
Preamplifier	Agilent	8449B	3008A02370	1G~26.5GHz	Jun. 03, 2008	Jun. 02, 2009	Radiation (03CH01-KS)
Preamplifier	Wireless	FPA6592G	60006	30M~2000MHz	Jul. 23, 2008	Jul. 22, 2009	Radiation (03CH01-KS)
DRG Horn(Medium)	EMCO	3117	75959	1GHz ~ 18GHz	Apr. 17, 2007	Aug. 16, 2009	Radiation (03CH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Jun. 18, 2007	Jun. 17, 2009	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	50MHz~18GHz	Jun. 12, 2007	Jun. 11, 2009	Conducted (TH01-KS)
Thermal Chamber	Rten Billion	TTC-B3S	TBN-960502	-40~150C	Jun. 27, 2007	Jun. 26, 2009	Conducted (TH01-KS)
POWER DIVIDER	ARRA	A3200-2	N/A	DC~18GHz	Sep. 01, 2007	Aug. 31, 2009	Conducted (TH01-KS)
DC Power Supply	Topward	3306D	N/A	30V6A	N/A	N/A	Conducted (TH01-KS)
DC Block	Mini-Circuits	BLK-18-S+	N/A	DC-18GHz	N/A	N/A	Conducted (TH01-KS)
Terminator	Mini-Circuits	ANNE-50+	N/A	DC~18000MHz	N/A	N/A	Conducted (TH01-KS)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 KHz ~ 30 MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
Combined standard uncertainty Uc(y)	1.13		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.26		

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
Combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	± 0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	± 1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	± 0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\log(1 - \Gamma_1 * \Gamma_2)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty $U_c(y)$	2.36				
Measuring uncertainty for a level of confidence of 95% $U = 2U_c(y)$	4.72				

6 Certification of TAF Accreditation



Certificate No. : L1190-070110

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	: ISO/IEC 17025:2005
Accreditation Number	: 1190
Originally Accredited	: December 15, 2003
Effective Period	: January 10, 2007 to January 09, 2010
Accredited Scope	: Testing Field, see described in the Appendix
Specific Accreditation Program	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory



Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

PI, total 9 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.



Appendix A. Photographs of EUT

Please refer to Sporton report number EP890310 as below.