D-PL-12111-01-01

CNAS L0447

Registration No.910917

TEST REPORT

Report No.: SRTC2011-H024-E0010

Product Name: GSM/GPRS/EDGE/WCDMA Digital Mobile Phone with Bluetooth

Marketing Name: one touch 905A

Product Model: MINI3G A

Applicant: TCT Mobile Limited

Manufacture: TCT Mobile Limited

Specification: FCC Part 24E, Part 22H, Part 2 (October 1, 2009 edition)

FCC ID: RAD153

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

Tel: 86-10-68009202 Fax: 86-10-68009205

CONTENTS

1. General information

1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company: The State Radio_monitoring_center Testing Center (SRTC)
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Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

1.3 Applicant's details

Company: TCT Mobile Limited
Address: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area
City: Shanghai
Country or Region: P.R.China
Grantee Code: RAD
Contacted Person: Gong Zhizhou
Tel: +86-21-61460890
Fax: +86-21-61460602
Email: zhizhou.gong@jrdcom.com

1.4 Manufacturer's details

Company: TCT Mobile Limited
Address: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area
City: Shanghai
Country or Region: P.R.China
Contacted Person: Gong Zhizhou
Tel: +86-21-61460890
Fax: +86-21-61460602
Email: zhizhou.gong@jrdcom.com

1.5 Application details

Date of reception of test sample: 16th Feb 2011
Date of test: 24th Feb 2011 to 6th May 2011

1.6 Reference specification

FCC Part 24E, Part22H, Part 2 (October 1, 2009 edition)

1.7 Information of EUT

1.7.1 General information

Name of EUT	GSM/GPRS/EDGE/WCDMA Digital Mobile Phone with Bluetooth
FCC ID	RAD153
Frequency range	GSM850: Tx:824~849MHz Rx:869~894MHz PCS1900: Tx:1850~1910MHz Rx:1930~1990MHz
Rated output power	GSM850:33.0dBm PCS1900:30.0dBm
Modulation type	GMSK/8PSK
Emission Designator	GSM:300KGXW GPRS/EDGE:300KG7W
Duplex mode	FDD
Duplex spacing	GSM850:45MHz PCS1900:80MHz
Antenna type	Integral
Power Supply	Battery or charger
Rated Power Supply Voltage	3.8V
Extreme Temperature	Lowest: -30°C Highest: +50°C
Extreme Voltage	Minimum: 3.5V Maximum: 4.2V
HW Version	PIO
SW Version	sw132

1.7.2 EUT details

Product Name	Marketing Name	Product Model	IMEI
GSM/GPRS/EDGE/WCDMA Digital Mobile Phone with Bluetooth	one touch 905A	MINI3G A	012525000006769

1.7.3 Auxiliary equipment details

Equipment	Charger
Manufacturer	Ten Pao International Ltd.
Model Number	CBA3120AG0C2
Input Voltage	100V-240V a.c.
Output Voltage	5.0V d.c.
Frequency	50/60Hz

Equipment	Charger
Manufacturer	HUIZHOU BYD ELECTRONIC CO., LTD.
Model Number	CBA3001AG0C1
Input Voltage	100V-240V a.c.
Output Voltage	5.0V d.c.
Frequency	50/60Hz

Equipment	Battery
Manufacturer	BYD LITHIUM BATTERY CO., LTD
Model Number	CAB3120000C1
Capacity	850mAh
Rated Voltage	3.7V d.c.

Equipment	Battery
Manufacturer	TIANJIN LISHEN BATTERY JOINT-STOCK CO.,LTD
Model Number	CAB3120000C2
Capacity	850mAh
Rated Voltage	3.7V d.c.

Equipment	Data Cable
Manufacturer	Shen Zhen Ju Wei Electronic Co.,LTD
Model Number	CDA3122001C1

Equipment	Data Cable
Manufacturer	Huizhou Shenghua Industry Co.,Ltd
Model Number	CDA3122001C2

Note: As the information described above, there are two different models of charger manufactured by two different companies, and two different models of battery manufactured by two different companies.

The relevant tests have been performed in order to verify in which combination case (EUT exercised by only one model of battery and one model of charger) the EUT would have the worst features. So all the tests shown in this test report are performed when the EUT exercised by the charger CBA3120AG0C2 and the battery CAB3120000C1.

2. Test information

2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	RF Power Output	2.1046	Pass
2	Effective Isotropic Radiated Power	22.913(a)/24.232(c)	Pass
3	Occupied Bandwidth	2.1049	Pass
4	Spurious Emissions at antenna terminals	2.1051/22.917(a)/24.238(a)	Pass
5	Band Edges Compliance	2.1051/22.917(a)/24.238(a)	Pass
6	Frequency Stability	2.1055/24.235/22.355	Pass
7	Radiated Spurious Emissions	2.1053/22.917(a)/24.238(a)	Pass

This Test Report Is Issued by: Mr. Song Qizhu Director of the test lab	Checked by: Mr. Wang Junfeng Deputy director of the test lab
Tested by: Mr. Li Boyu Test engineer	Issued date: **2011.05.06**

2.2 Test result

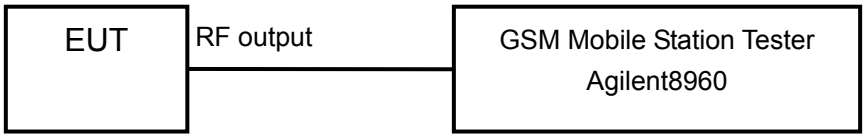
2.2.1 GSM850

2.2.1.1 RF Power Output-FCC Part2.1046

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.
The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits	≤33dBm

Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	32.5
836.4	189	32.1
848.8	251	32.1

EDGE MODE:

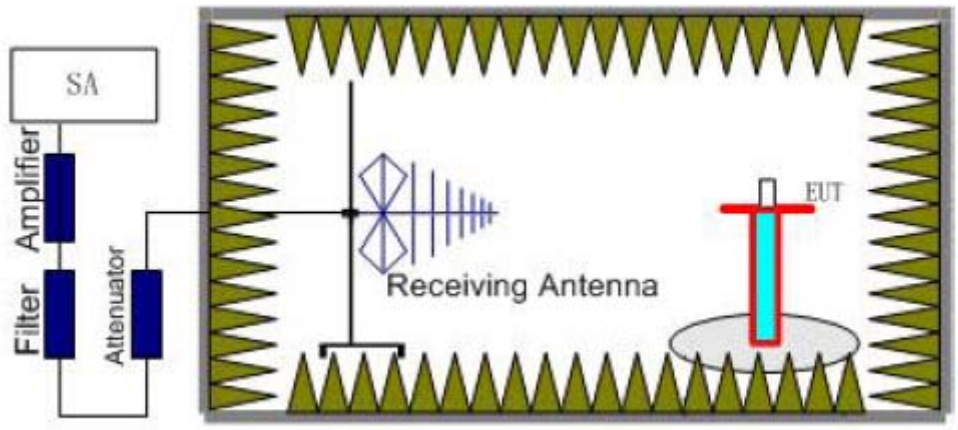
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	21.4
836.4	189	21.4
848.8	251	21.5

2.2.1.2 Effective Radiated Power-FCC Part22.913(a)

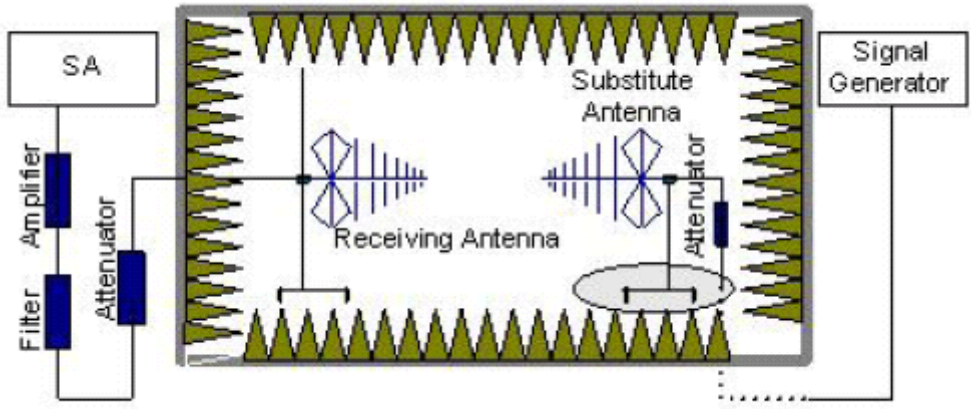
Ambient condition:

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna

mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 3MHz.Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. And the maximum value of the receiver should be recorded as (Pr).

Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator. To repeat the same procedure as step1 and the level of signal generator will be adjusted till the same power value on the spectrum analyzer or receiver. The ERP/EIRP of the EUT can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

A power (Pmea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (Pmea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna (Pca) and the Substitution Antenna Gain (Ga).

The measurement results are obtained as described below:

Power (EIRP) = Pmea+ Pca+ Ga

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).

The measurement will be done at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits:

Operation Mode	Power Step	E.R.P. (dBm)
GSM	5	≤38.45
GPRS	3	≤38.45
EDGE	6	≤38.45

Test result:

GSM/GPRS MODE:

Frequency (MHz)	Power step	Peak ERP (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
824.2	5	29.1	-3.8	8.6	2.15	26.45	Vertical
836.6	5	30.2	-3.8	8.6	2.15	27.55	Horizontal
848.8	5	29.2	-3.8	8.6	2.15	26.55	Vertical

EDGE MODE:

Frequency (MHz)	Power step	Peak ERP (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
824.2	6	20.5	-3.8	8.6	2.15	17.85	Vertical
836.6	6	20.8	-3.8	8.6	2.15	18.15	Vertical
848.8	6	20.1	-3.8	8.6	2.15	17.45	Vertical

Frequency: 836.6MHz

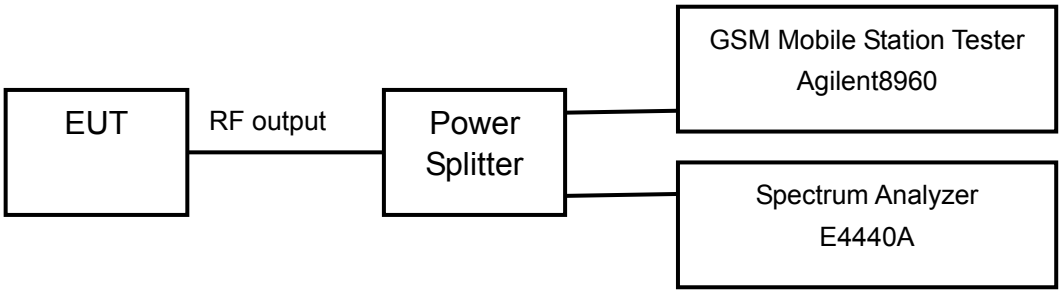
Peak ERP(dBm) =Pmea (27.55dBm)+Pca (-3.8dB)+Ga(8.6dB)–2.15dB=30.2dBm

2.2.1.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer.
The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits: No specific occupied bandwidth requirements in part 2.1049

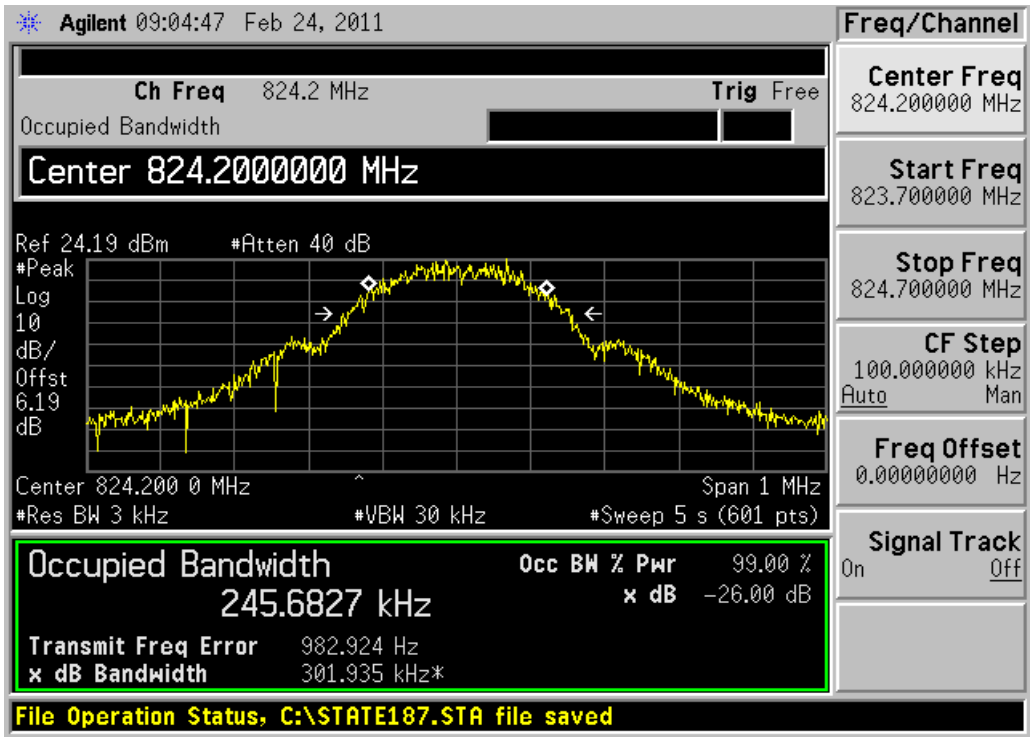
Test result:
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	245.68
836.4	189	248.89
848.8	251	244.29

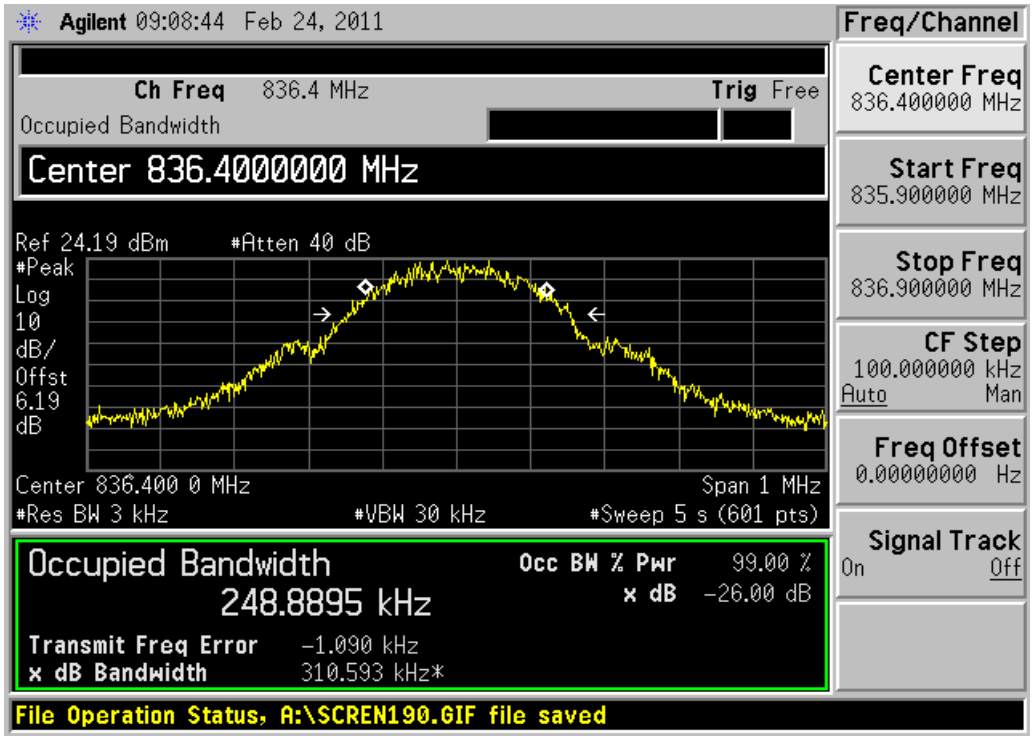
EDGE MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	242.26
836.4	189	238.20
848.8	251	240.01

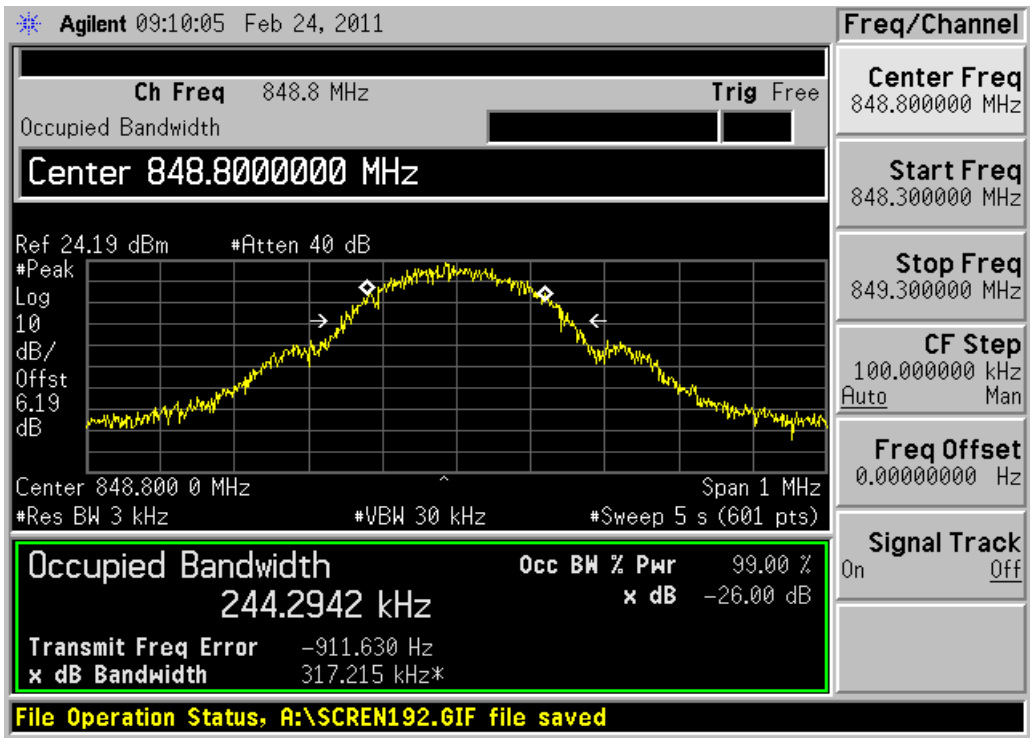
GSM/GPRS MODE:



Channel 128

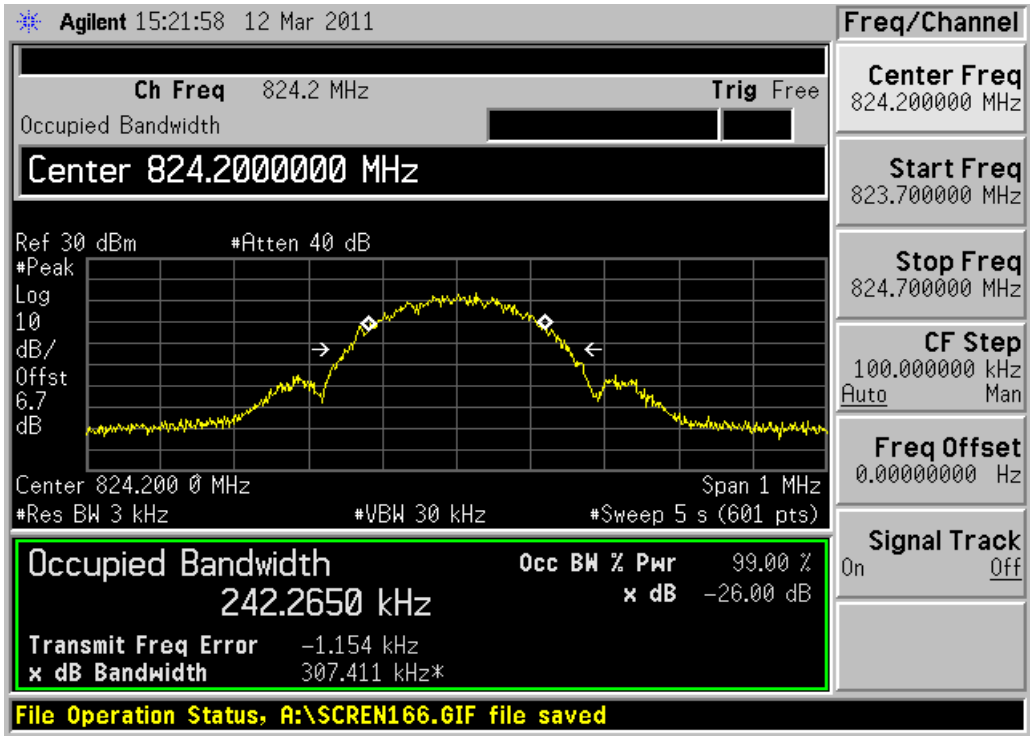


Channel 189

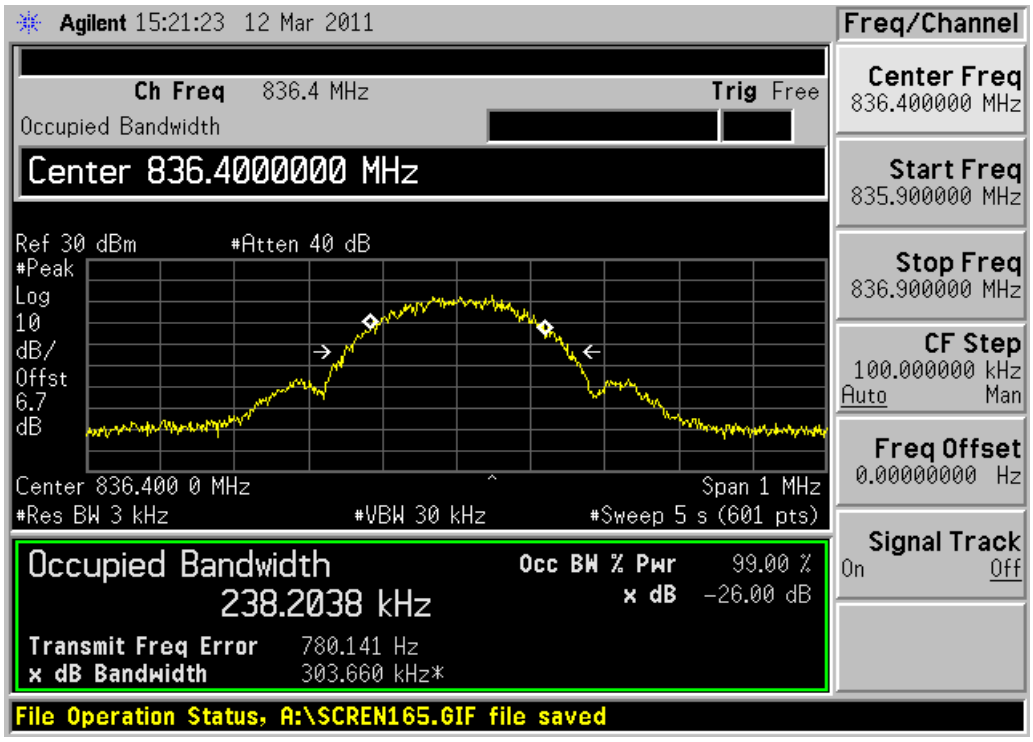


Channel 251

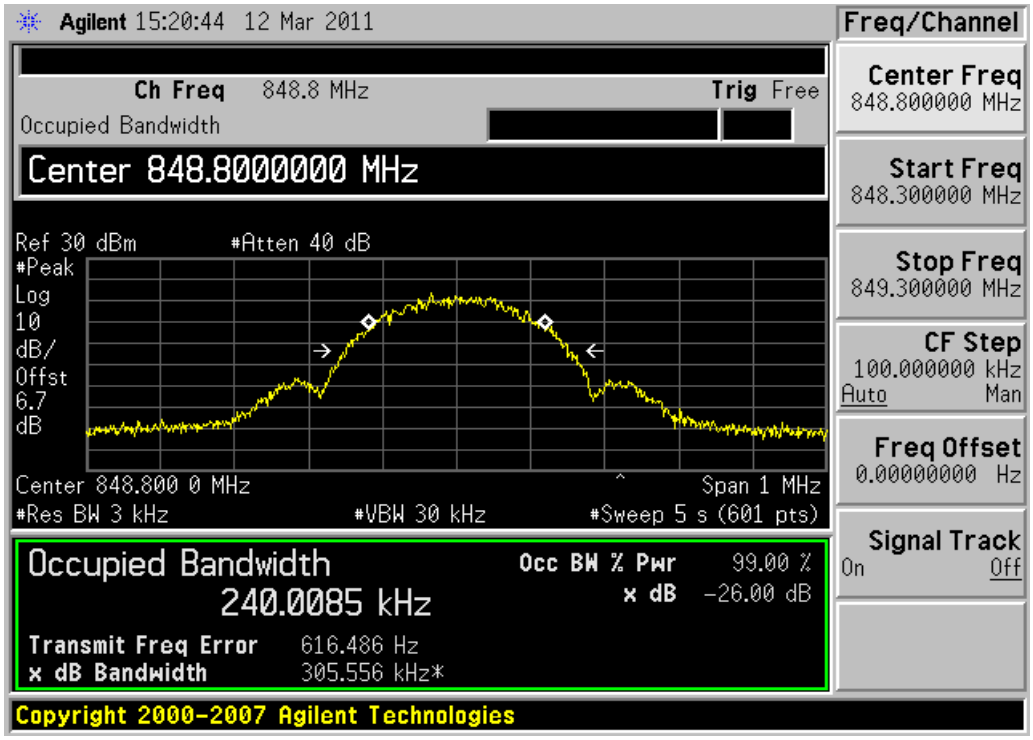
EDGE MODE:



Channel 128



Channel 189



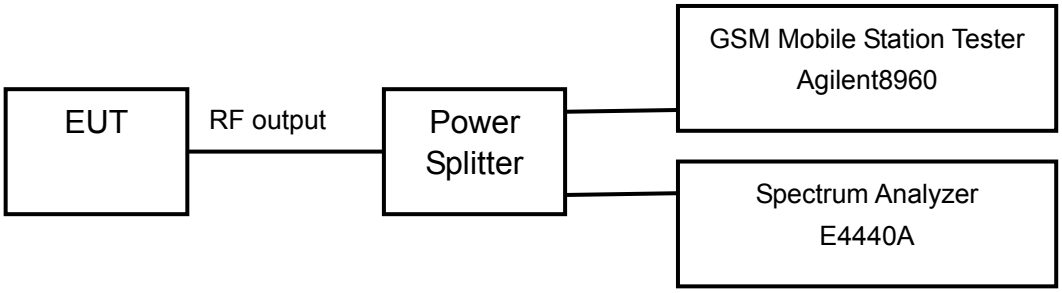
Channel 251

2.2.1.4 Spurious Emissions at antenna terminal-FCC Part2.1051/22.917(a)

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



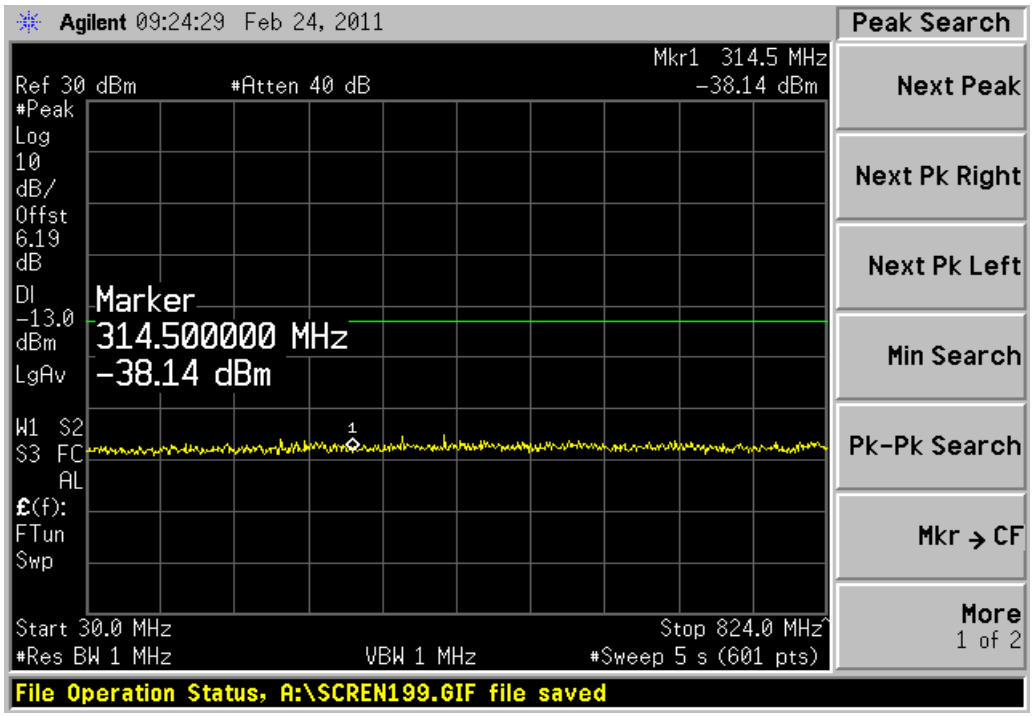
Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 9GHz (higher than the 10^{th} harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.
The measurement will be conducted at one channel No189 (middle channel of GSM850 band)

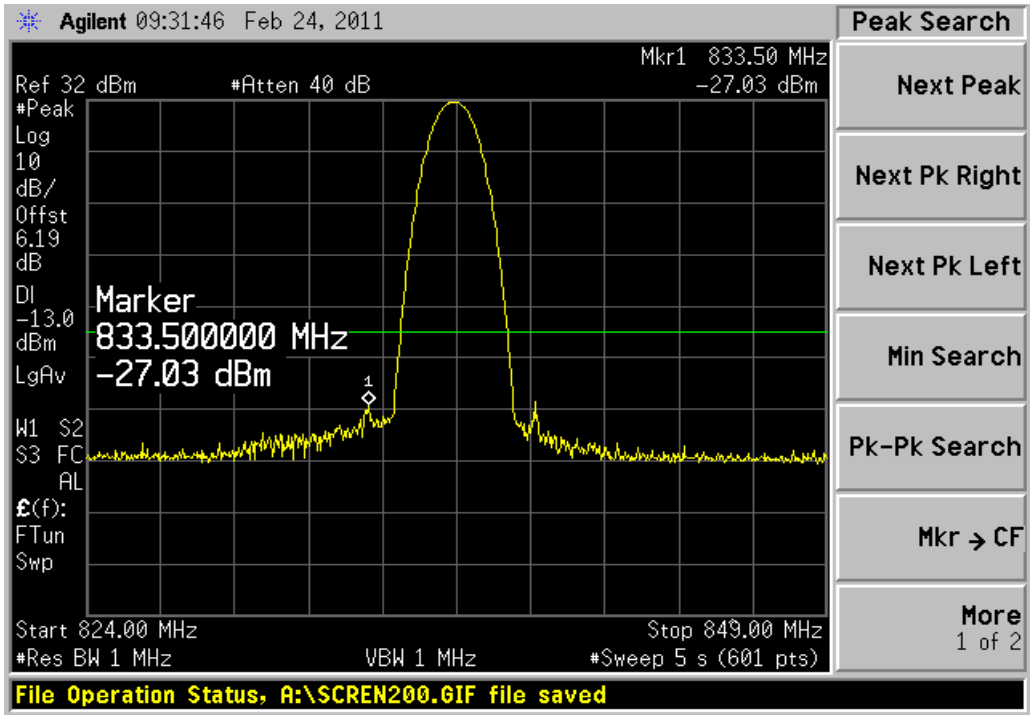
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

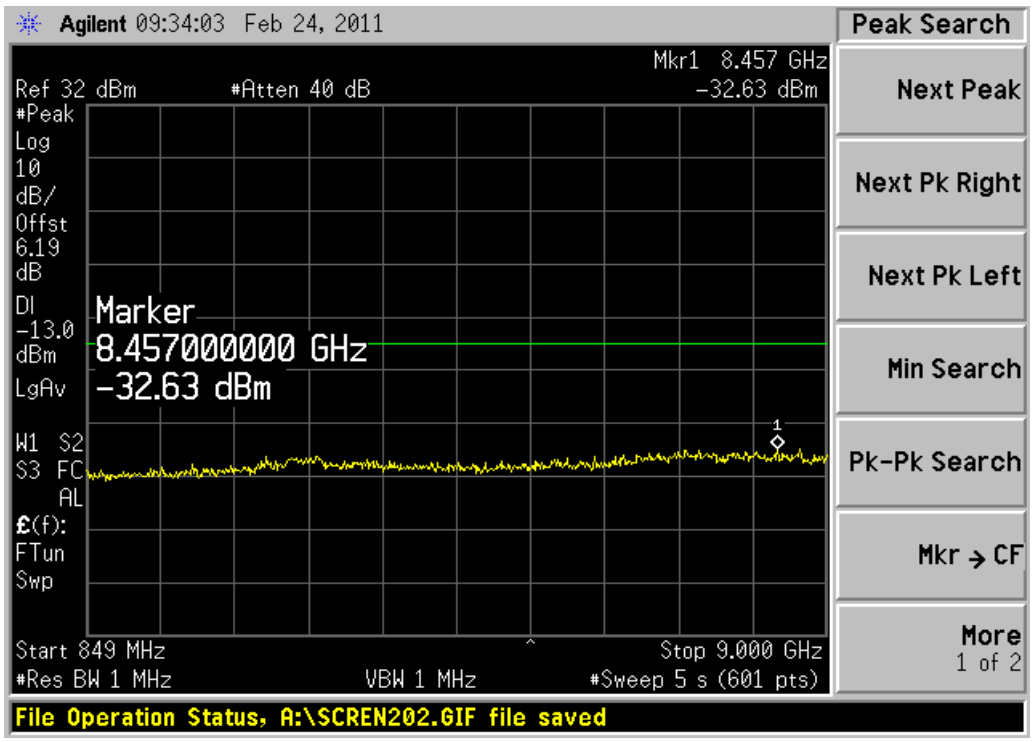


Channel 189, 30MHz~824MHz



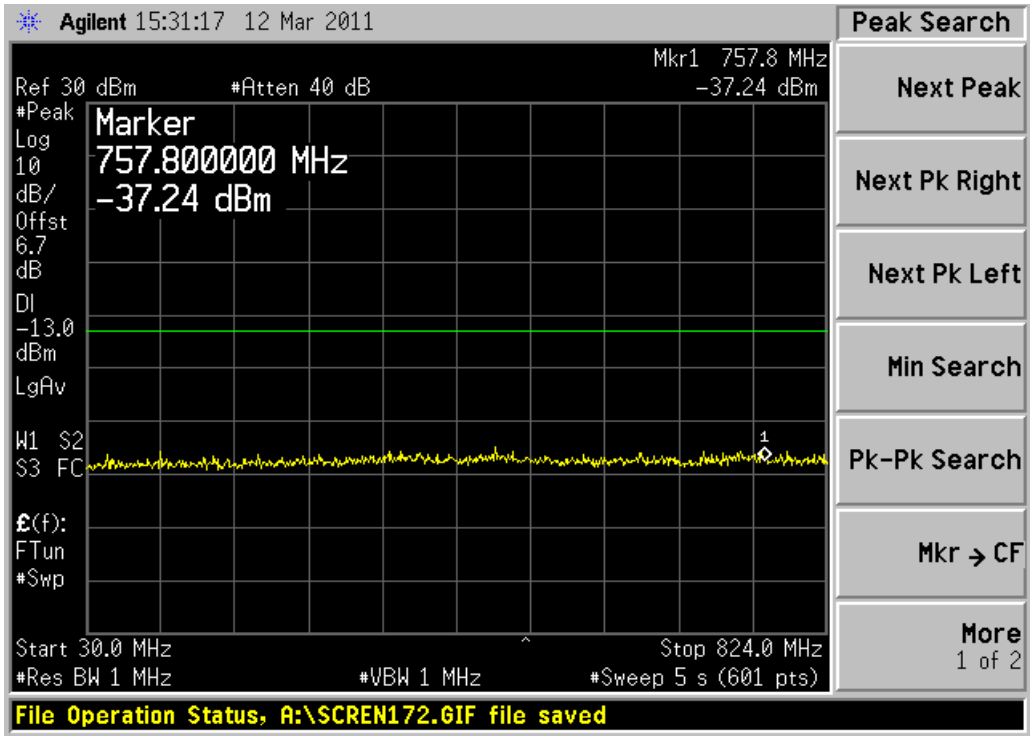
Channel 189, 824MHz~849MHz

Note: The signal beyond the limit is the base station simulator carrier.

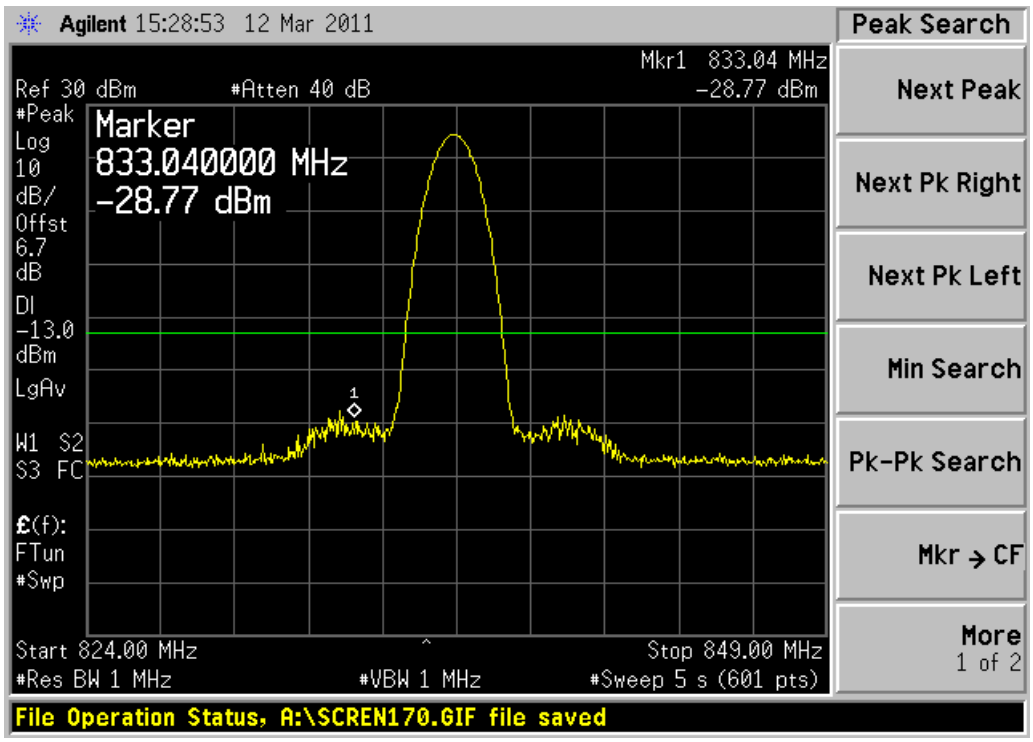


Channel 189, 849MHz~9GHz

EDGE MODE:

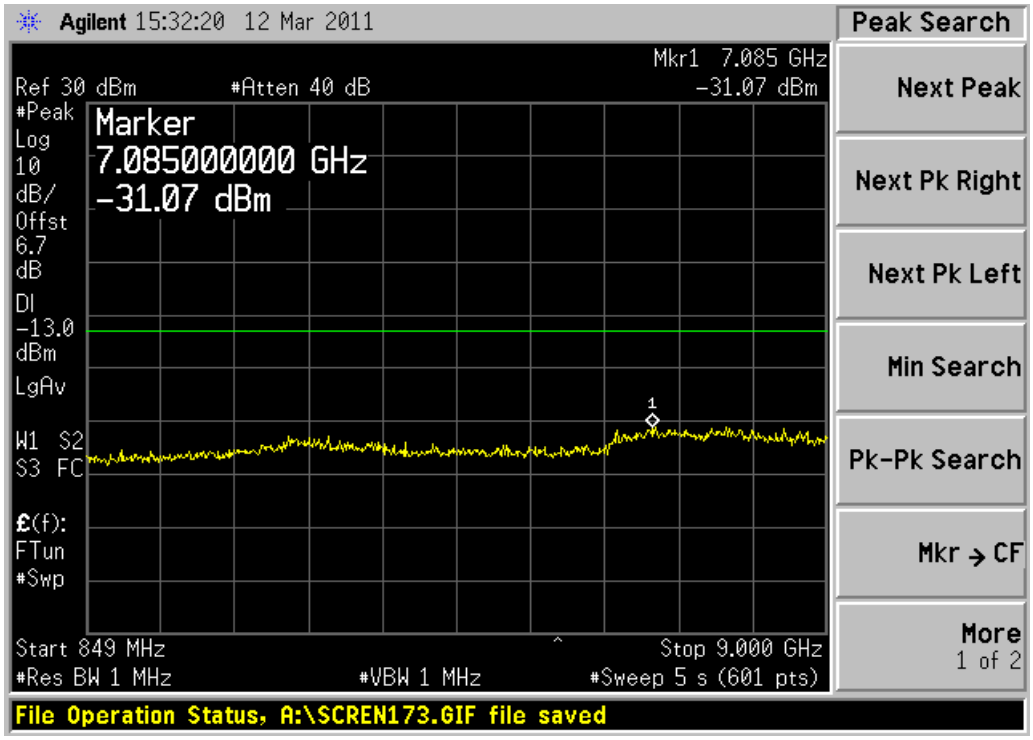


Channel 189, 30MHz~824MHz



Channel 189, 824MHz~849MHz

Note: The signal beyond the limit is the base station simulator carrier.



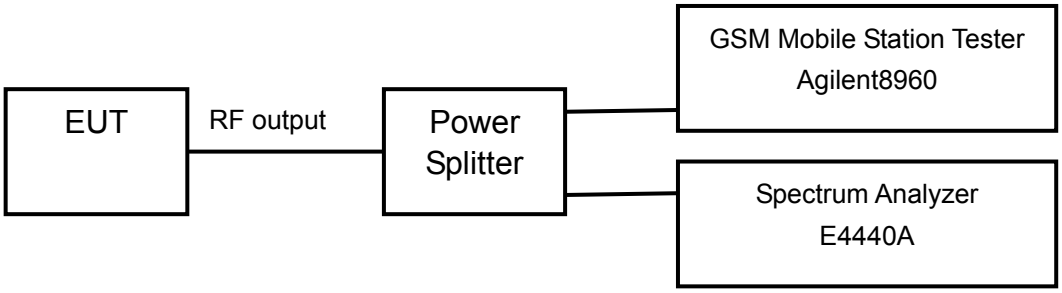
Channel 189, 849MHz~9GHz

2.2.1.5 Band Edges Compliance-FCC Part2.1051/22.917(a)

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



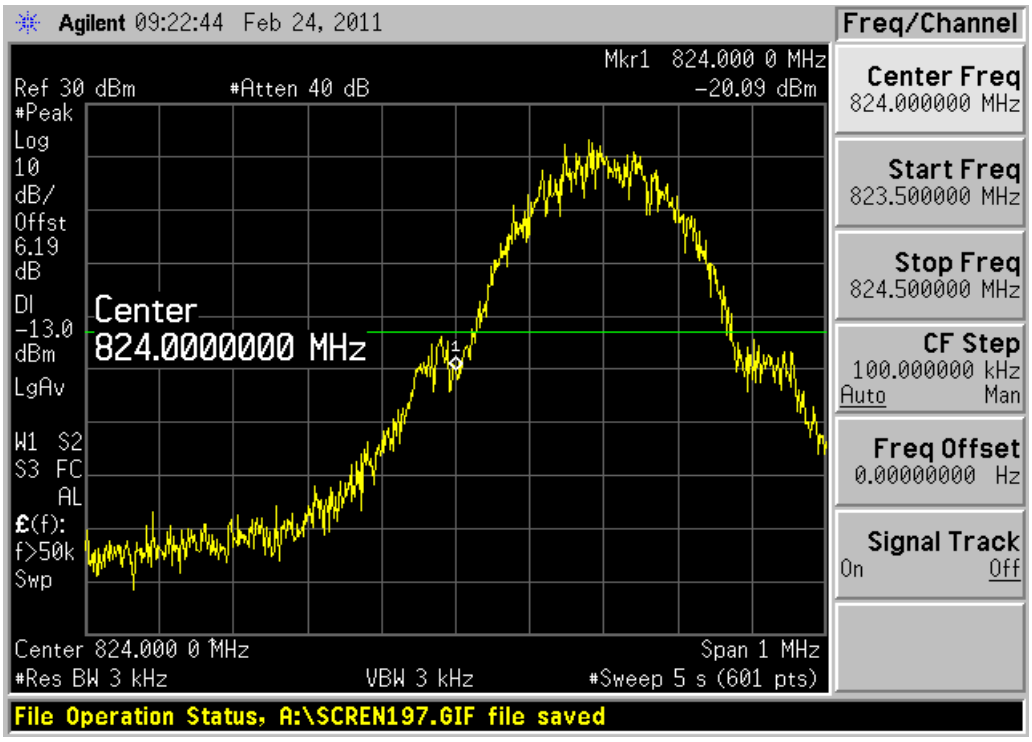
Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to 3KHz on spectrum analyzer.
The measurement will be conducted at two channels No128 and No251 (Bottom and top channels of GSM850 band)

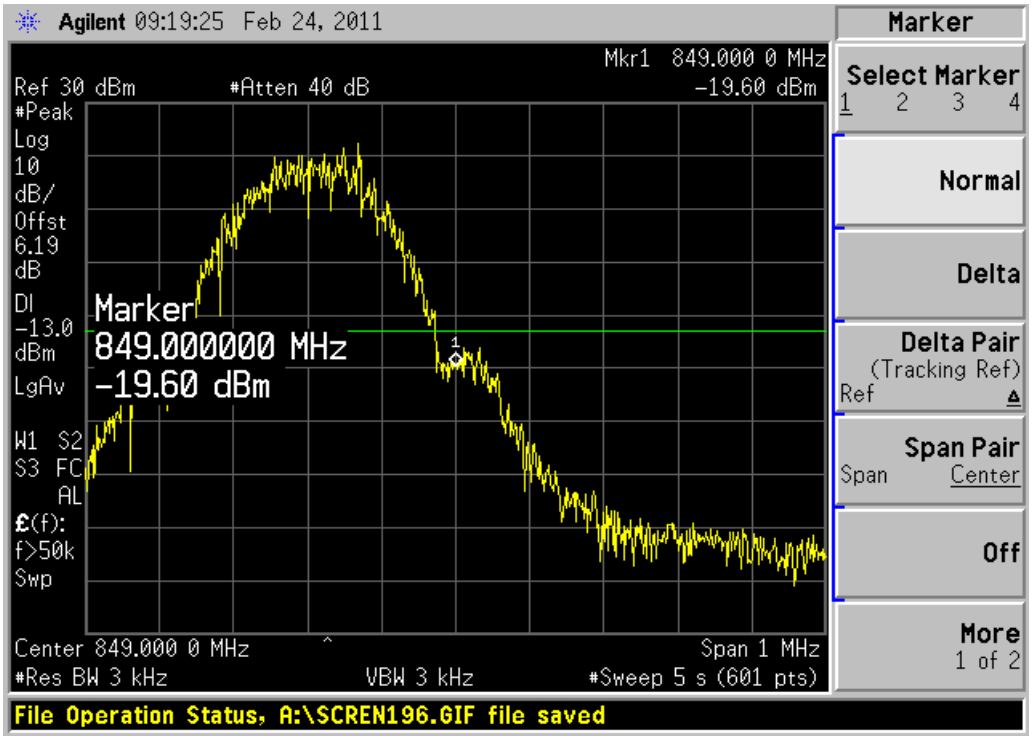
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

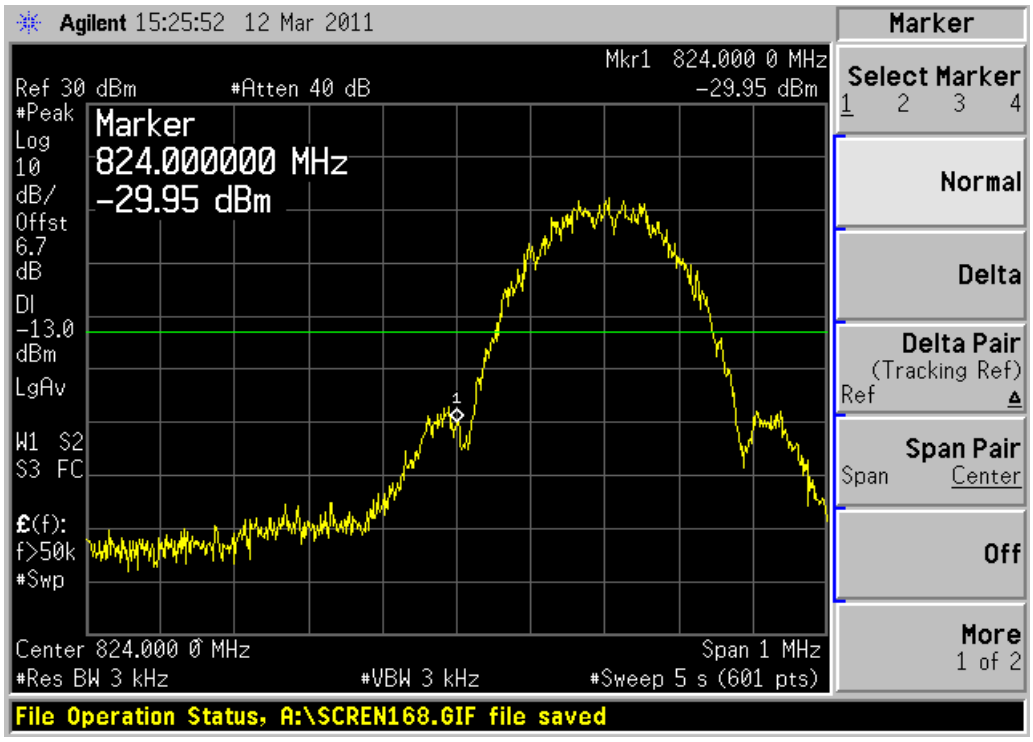


Channel 128

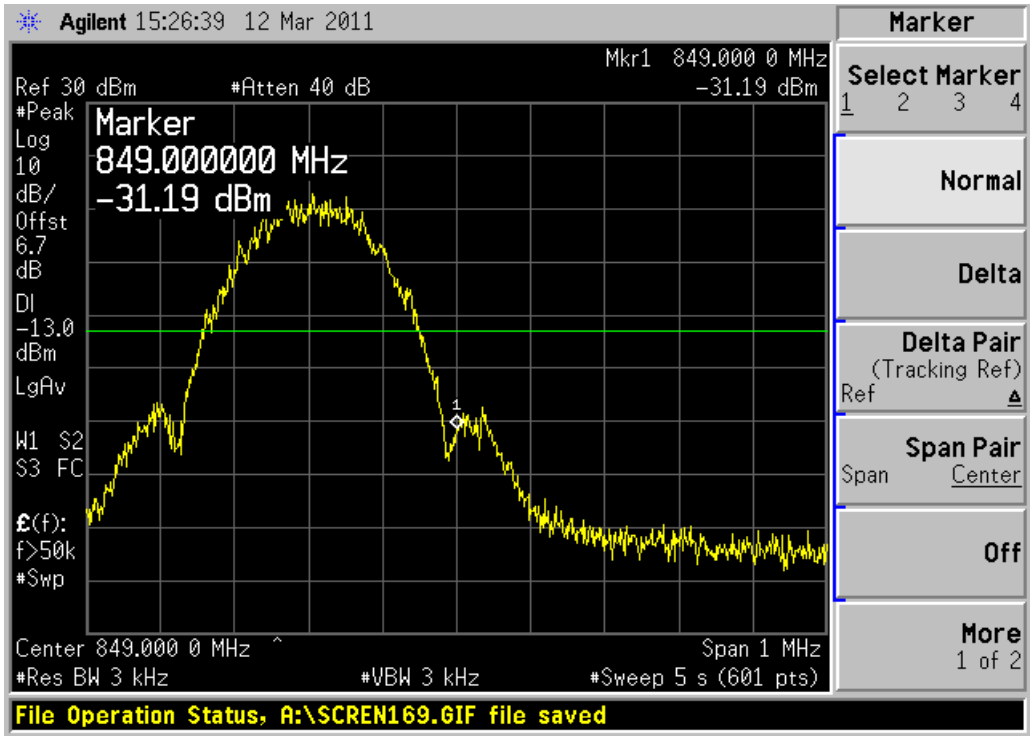


Channel 251

EDGE MODE:



Channel 128



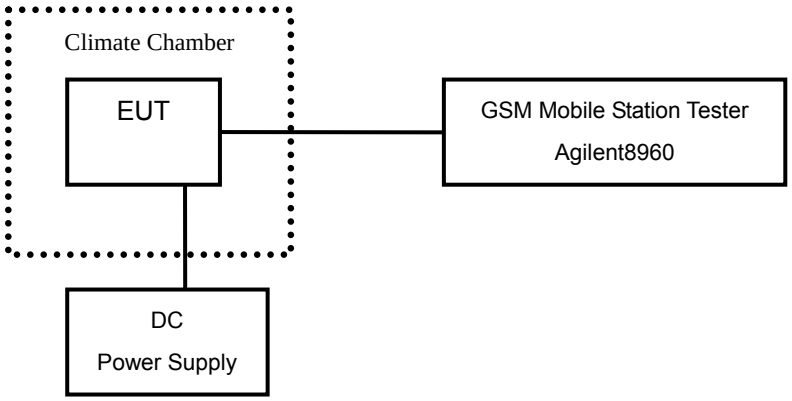
Channel 251

2.2.1.6 Frequency Stability-FCC Part2.1055/Part22.355

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test setup:



Test Procedure:
A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50° C in 10° C step size, and also the DC power supply voltage to the EUT is varied from 3.5 to 4.2 V. The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band).

Limits: No specific frequency stability requirements in part 2.1055 and part 22.355.

Test result:

GSM/GPRS MODE:

Temperature(° C)	Test Result (ppm)@3.8V		
	Channel 128	Channel 189	Channel 251
-30	0.009	0.008	0.013
-20	0.010	0.007	0.005
-10	0.010	0.004	0.005
0	0.003	0.004	0.003
+10	0.003	0.002	0.003
+20	0.003	0.002	0.003
+30	0.001	0.003	0.002
+40	0.003	0.004	0.003
+50	0.003	0.003	0.002

Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.5	0.010	0.008	0.009
4.2	0.009	0.007	0.007

EDGE MODE:

Temperature(° C)	Test Result (ppm)@3.8V		
	Channel 128	Channel 189	Channel 251
-30	0.005	0.003	0.003
-20	0.004	0.003	0.002
-10	0.003	0.005	0.005
0	0.002	0.003	0.004
+10	0.001	0.001	0.002
+20	0.002	0.003	0.004
+30	0.004	0.002	0.004
+40	0.003	0.005	0.005
+50	0.003	0.004	0.004

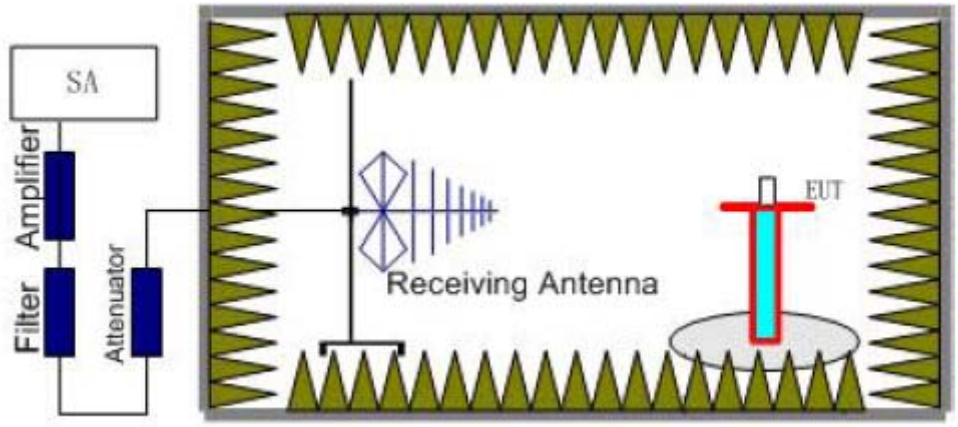
Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.5	0.007	0.005	0.008
4.2	0.010	0.006	0.007

2.2.1.7 Radiated Spurious Emissions-FCC Part2.1053/22.917(a)

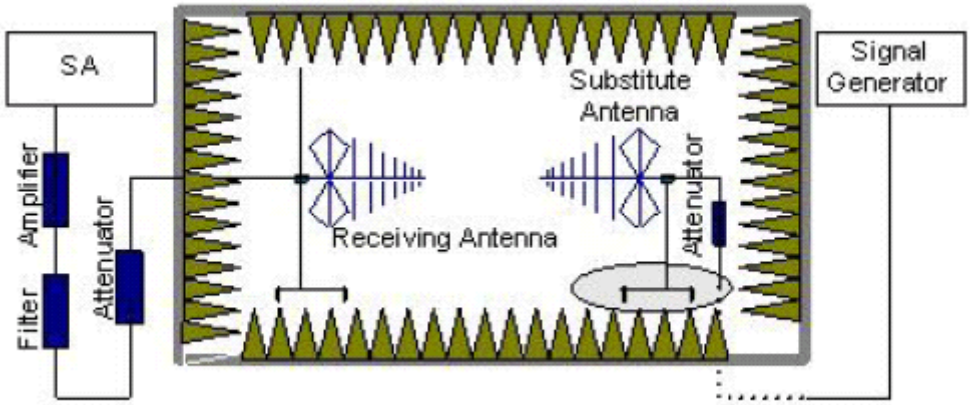
Ambient condition

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test Setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

The spectrum was scanned from 30MHz to the 10th harmonic of the highest frequency generated within the equipment.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was

placed on a 2.4 meter high non-conductive table at a 3 meter test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10^{th} harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:
A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
A power (Pmea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (Pmea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna (Pca) and the Substitution Antenna Gain (Ga).

Calculation procedure:
The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:
Power(EIRP) = P_{mea}+ P_{ca} + G_a
This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.
$P=P_{mea}+P_{ca}+G_a=(-20dBm)+(-30dB)+(11dB)= -39dBm$

The measurement will be done at carrier frequencies that pertain to bottom (Channel 128), middle (Channel 189) and top (Channel 251) channels of the GSM 850 band.

Test result

GSM/GPRS MODE Channel 128:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1648.51	-37.9	-4.5	8.6	-42.0	-13	Vertical
2822.65	-42.7	-5.7	9.3	-46.3	-13	Vertical
3339.83	-52.2	-5.9	9.3	-55.6	-13	Horizontal
6991.57	-55.1	-10.8	12.0	-56.3	-13	Vertical
9929.07	-56.0	-11.8	13.8	-58.0	-13	Horizontal

EDGE MODE Channel 128:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1648.60	-38.4	-4.6	8.6	-42.4	-13	Horizontal
2822.39	-43.1	-5.7	9.3	-46.7	-13	Vertical
3340.33	-51.8	-5.9	9.3	-55.2	-13	Horizontal
6991.97	-55.6	-10.8	12.0	-56.8	-13	Vertical
9928.79	-55.8	-11.8	13.8	-57.8	-13	Horizontal

GSM/GPRS MODE Channel 189:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1673.23	-44.2	-4.6	8.6	-48.2	-13	Vertical
1754.51	-41.5	-4.8	8.9	-45.6	-13	Horizontal
2509.8	-43.1	-5.7	9.3	-46.7	-13	Vertical
2510.77	-42.7	-5.9	9.3	-46.1	-13	Horizontal
7058.36	-43.6	-10.8	12.0	-44.8	-13	Vertical
9953.6	-39.1	-11.8	13.8	-41.1	-13	Vertical

EDGE MODE Channel 189:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1673.23	-43.1	-4.6	8.6	-47.1	-13	Vertical
1675.14	-43.8	-4.8	8.9	-47.9	-13	Vertical
2508.93	-39.5	-5.7	9.3	-43.1	-13	Vertical
2510.8	-39.7	-5.9	9.3	-43.1	-13	Vertical
7060.21	-38.6	-10.8	12.0	-39.8	-13	Vertical
9993.4	-36.3	-11.8	13.8	-38.3	-13	Horizontal

GSM/GPRS MODE Channel 251:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1693.43	-41.8	-4.7	8.6	-45.7	-13	Vertical
1772.92	-43.4	-4.9	8.9	-47.4	-13	Horizontal
2515.55	-43.2	-5.7	9.3	-46.8	-13	Horizontal
2495.50	-42.2	-5.9	9.3	-45.6	-13	Horizontal
7070.65	-44.0	-10.8	12.0	-45.2	-13	Vertical
9950.78	-39.3	-11.8	13.8	-41.3	-13	Vertical

EDGE MODE Channel 251:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1693.53	-41.7	-4.6	8.6	-45.7	-13	Vertical
1773.30	-43.1	-4.1	8.9	-47.1	-13	Horizontal
2515.10	-43.4	-5.7	9.3	-47.0	-13	Vertical
2495.64	-42.2	-5.9	9.3	-45.6	-13	Vertical
7070.63	-44.1	-10.8	12.0	-45.3	-13	Vertical
9950.29	-39.2	-11.8	13.8	-41.2	-13	Vertical

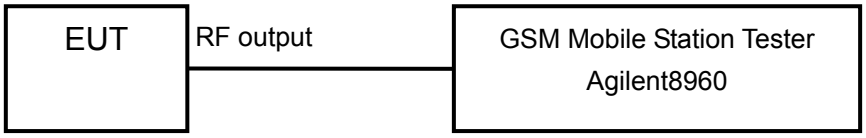
2.2.2 PCS1900

2.2.2.1 RF Power Output-FCC Part2.1046

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.
The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits	≤30dBm

Test result:

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	28.7
1880.0	661	28.7
1909.8	810	28.3

EDGE MODE:

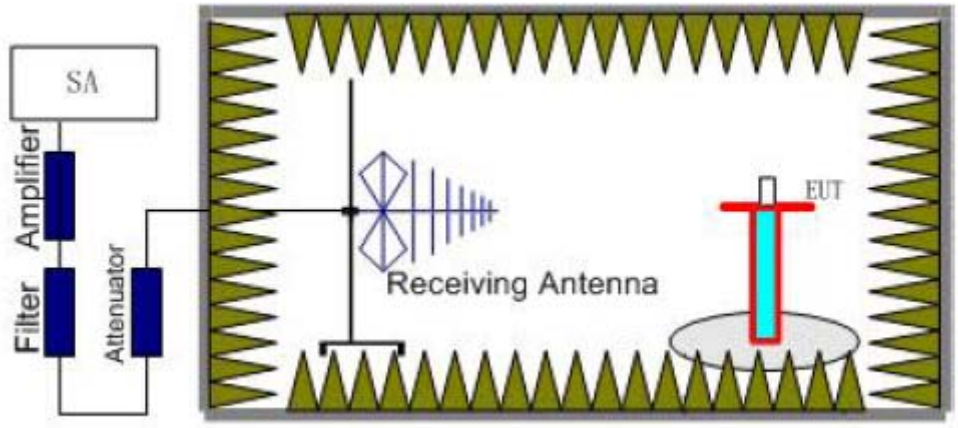
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	21.4
1880.0	661	21.1
1909.8	810	21.3

2.2.2.2 Effective Isotropic Radiated Power-FCC Part24.232(c)

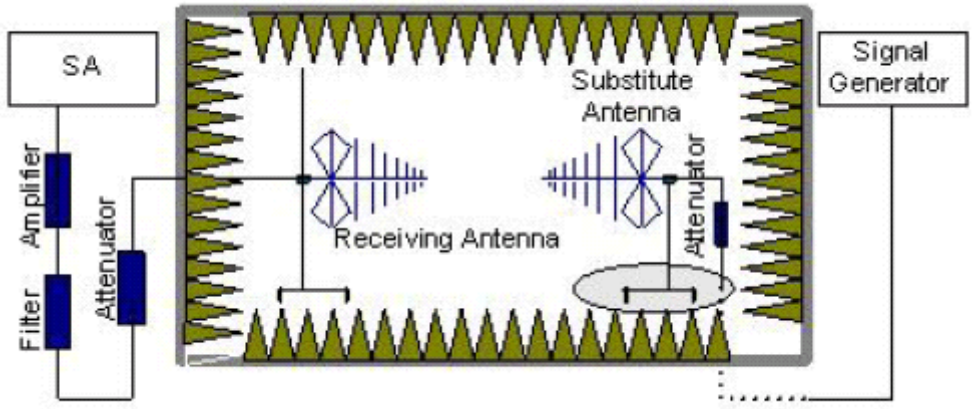
Ambient condition:

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna

mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 3MHz.Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. And the maximum value of the receiver should be recorded as (Pr).

Step 2:
A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator. To repeat the same procedure as step1 and the level of signal generator will be adjusted till the same power value on the spectrum analyzer or receiver. The ERP/EIRP of the EUT can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
A power (Pmea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (Pmea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna (Pca) and the Substitution Antenna Gain (Ga).
The measurement results are obtained as described below:
Power (EIRP) = Pmea+ Pca+ Ga

The measurement will be done at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits:

Operation Mode	Power Step	E.I.R.P. (dBm)
GSM	0	≤33
GPRS	3	≤33
EDGE	5	≤33

Test result:
GSM/GPRS MODE:

Frequency (MHz)	Power step	Peak EIRP(dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Polarization
1850.2	0	23.6	-4.8	8.6	19.8	Vertical
1880.0	0	25.4	-4.8	8.6	21.6	Vertical
1909.8	0	27.1	-4.8	8.6	23.3	Vertical

EDGE MODE:

Frequency (MHz)	Power step	Peak EIRP(dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Polarization
1850.2	5	20.3	-4.8	8.6	16.5	Vertical
1880.0	5	20.5	-4.8	8.6	16.7	Vertical
1909.8	5	20.8	-4.8	8.6	17.0	Vertical

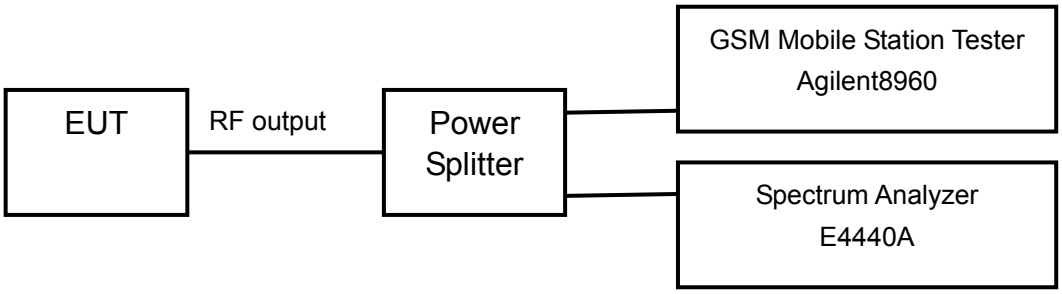
Frequency: 1909.8MHz
Peak EIRP (dBm) =Pmea (23.3dBm)+Pca(-4.8dB)+Ga(8.6dB) =27.1dBm

2.2.2.3 Occupied Bandwidth-FCC Part2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer.
The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits: No specific occupied bandwidth requirements in part 2.1049

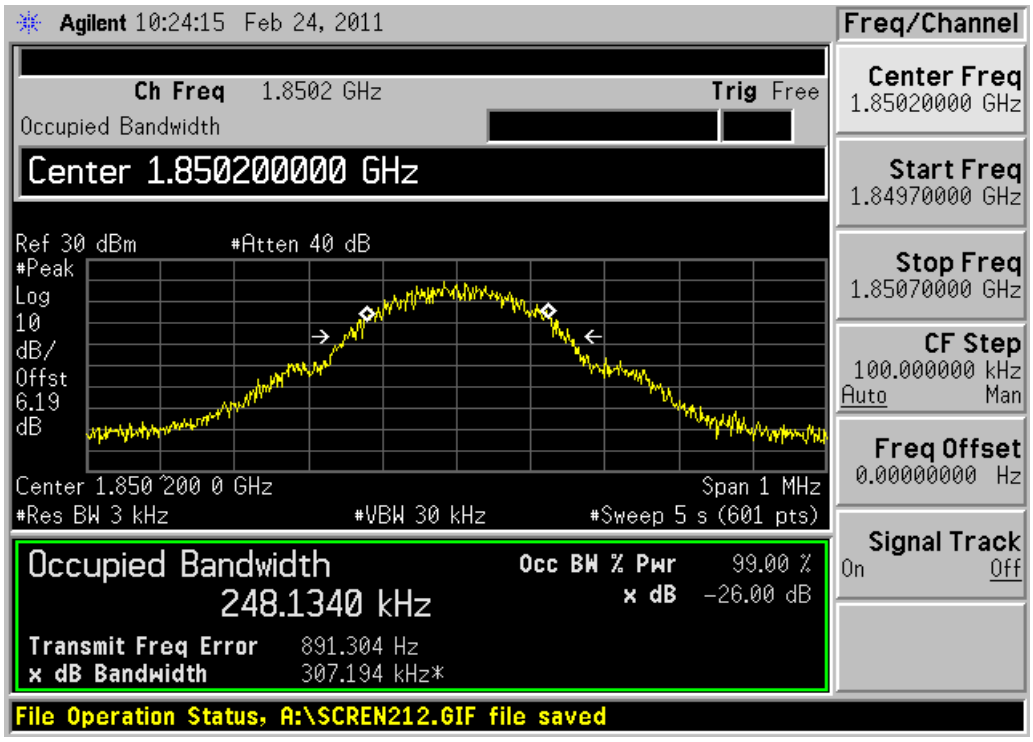
Test result:
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	248.13
1880.0	661	247.06
1909.8	810	245.36

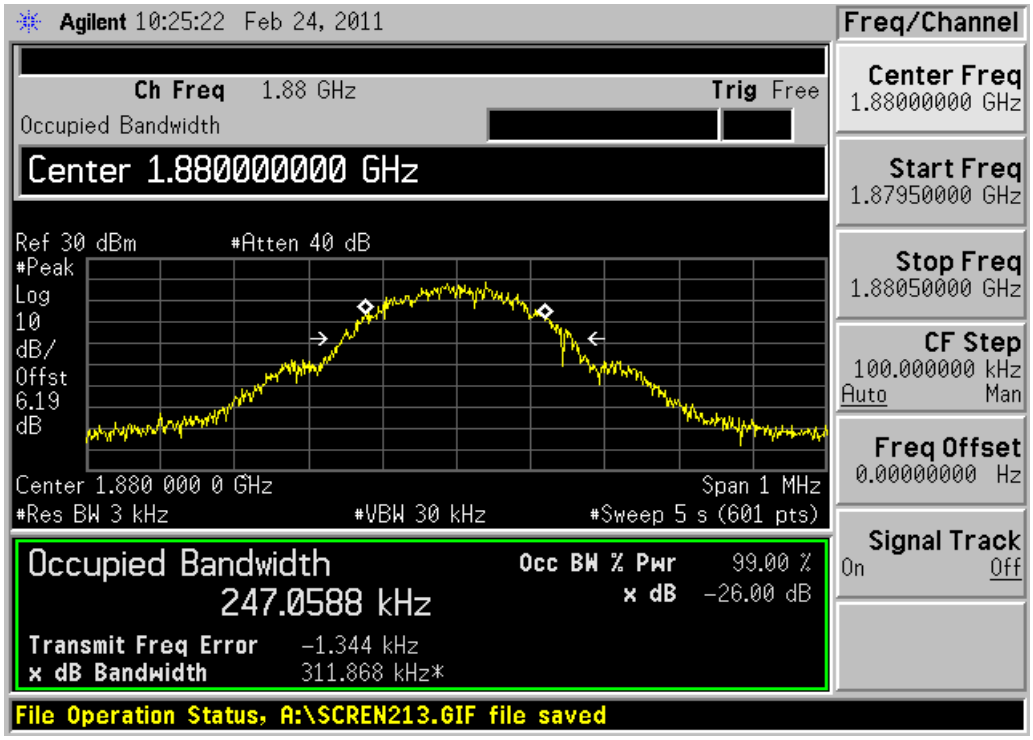
EDGE MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	246.43
1880.0	661	245.94
1909.8	810	257.54

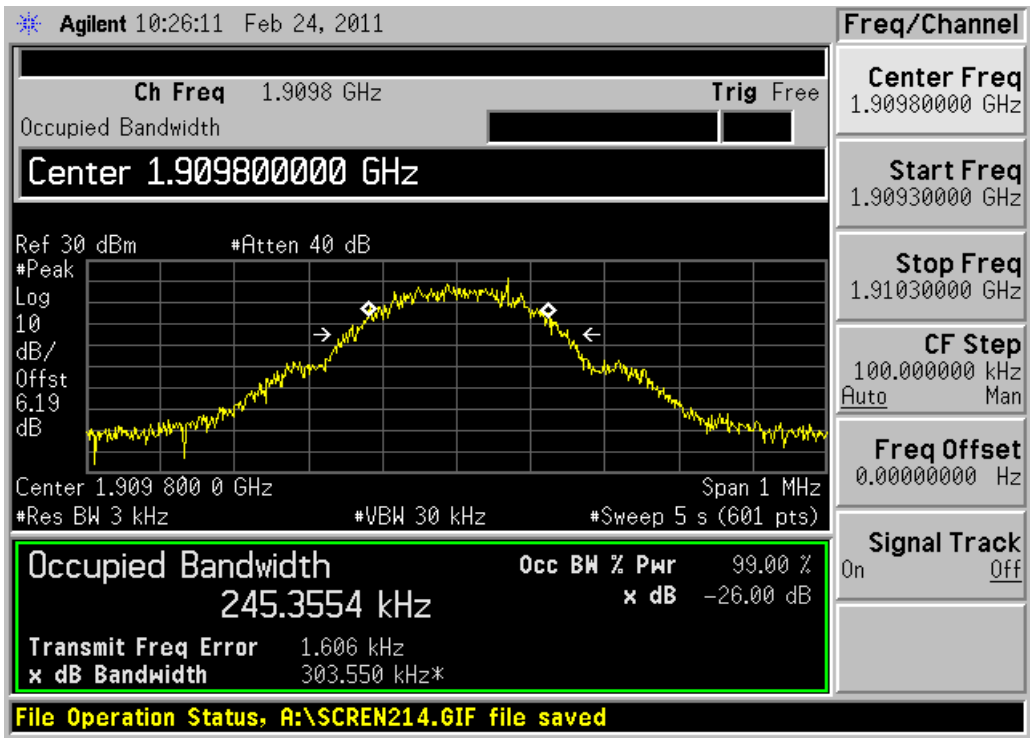
GSM/GPRS MODE:



Channel 512

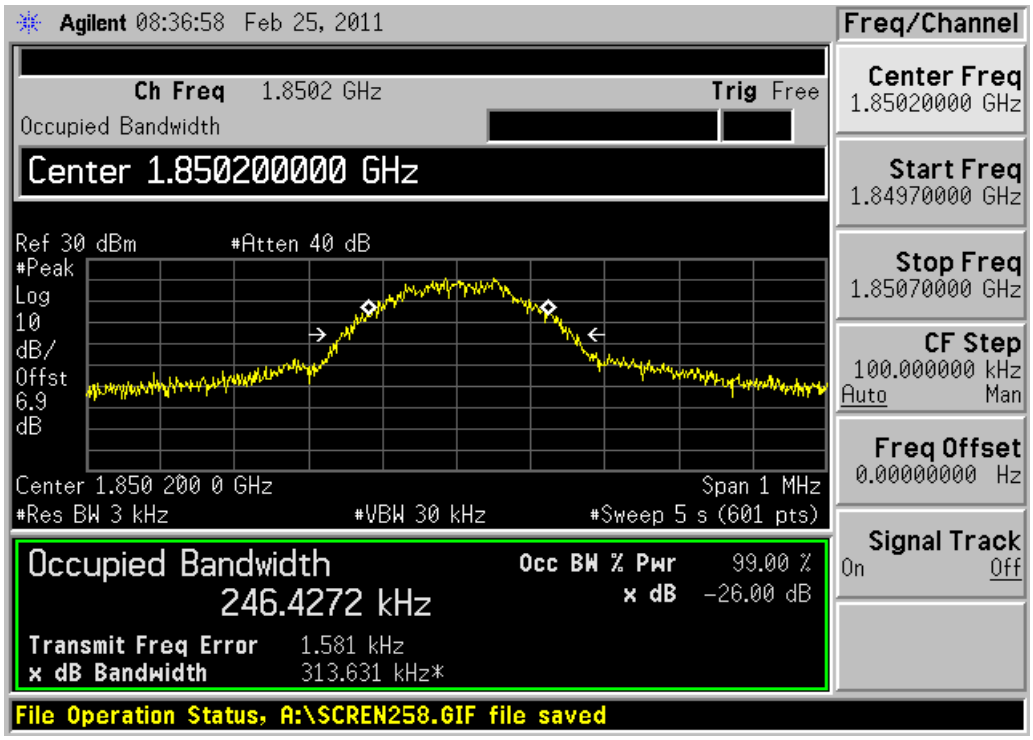


Channel 661

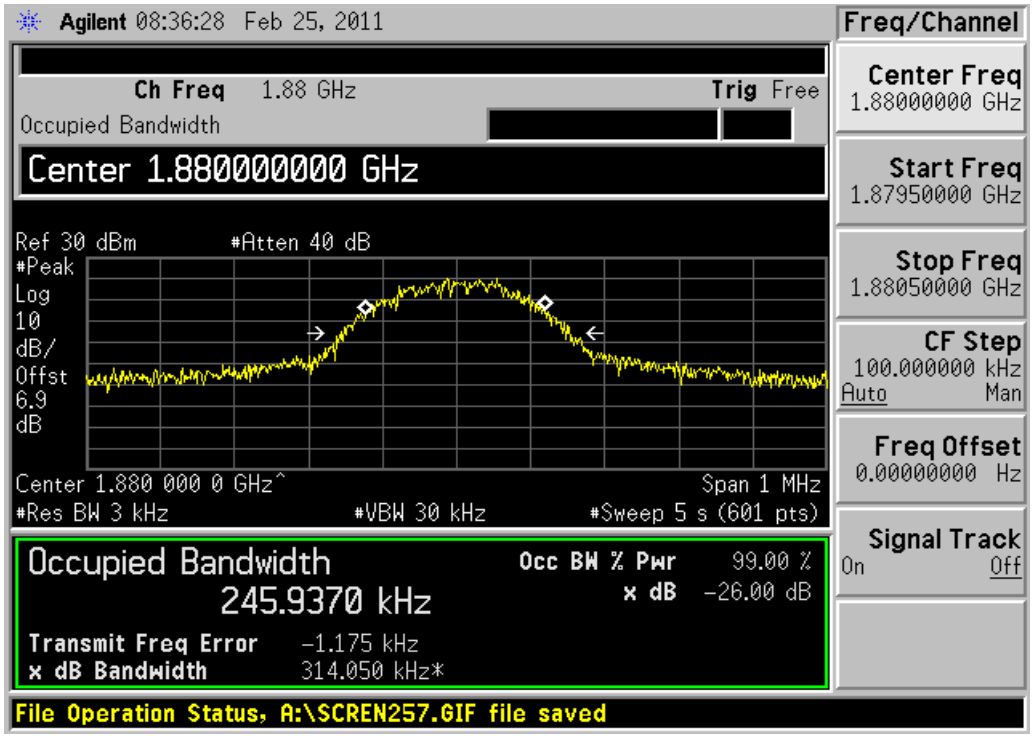


Channel 810

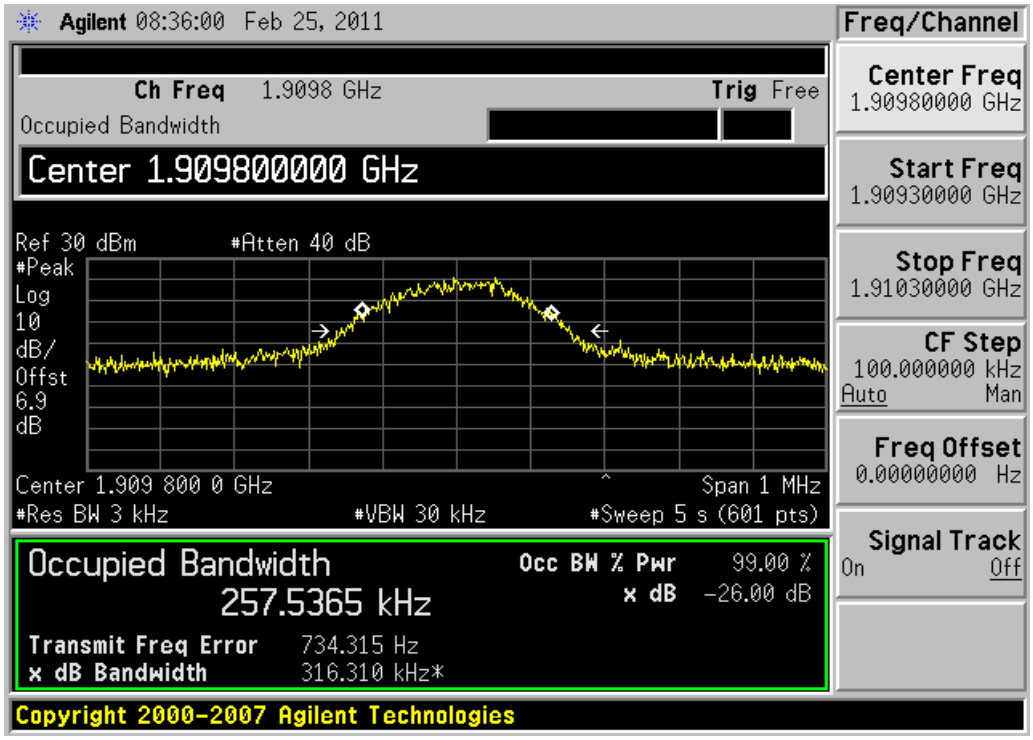
EDGE MODE:



Channel 512



Channel 661



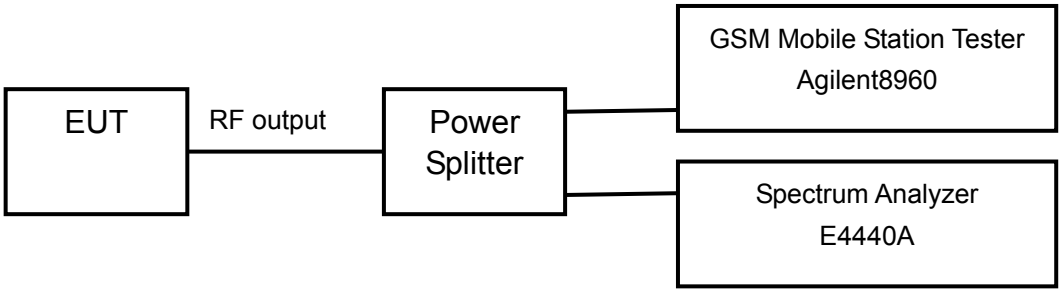
Channel 810

2.2.2.4 Spurious Emissions at antenna terminal-FCC Part2.1051/24.238(a)

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



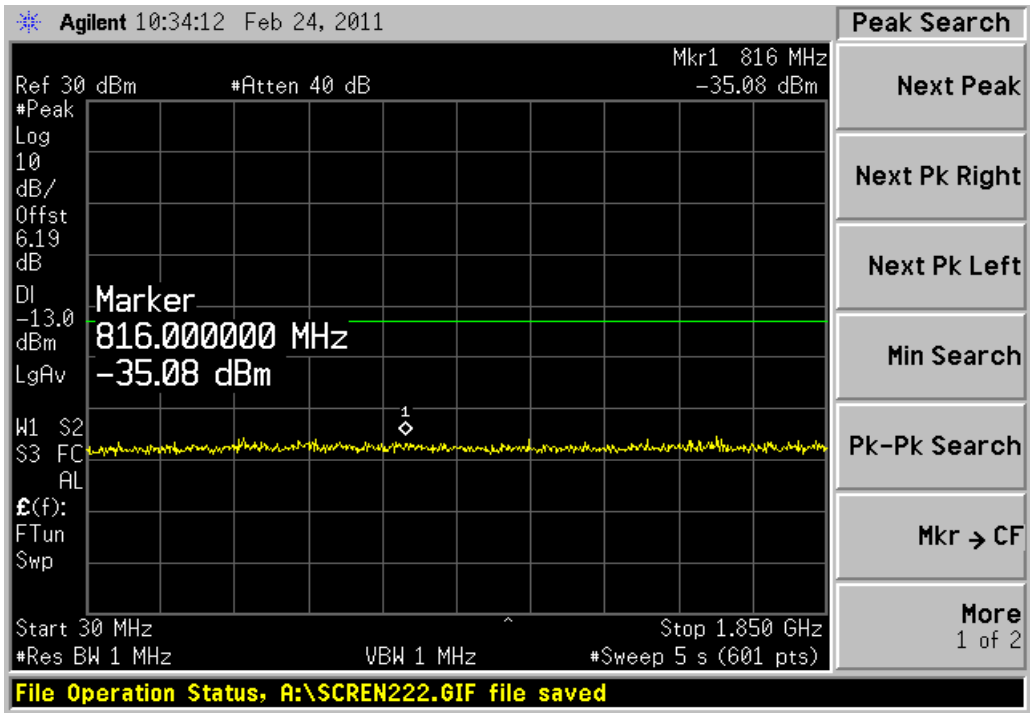
Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10^{th} harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.
The measurement will be conducted at one channel No661 (middle channel of PCS1900 band)

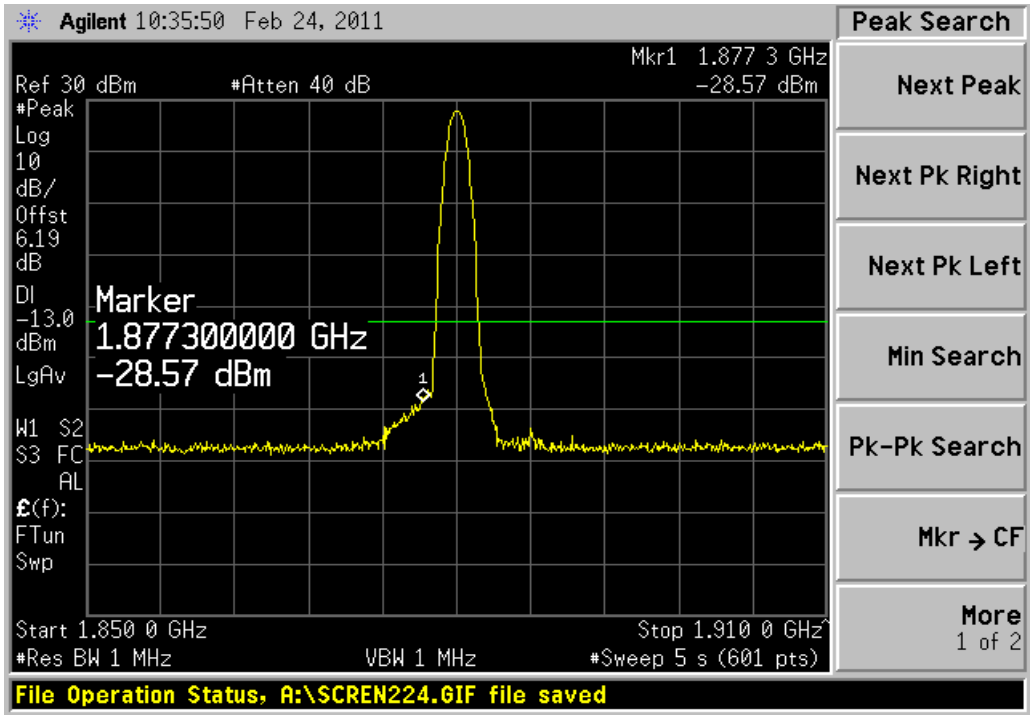
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

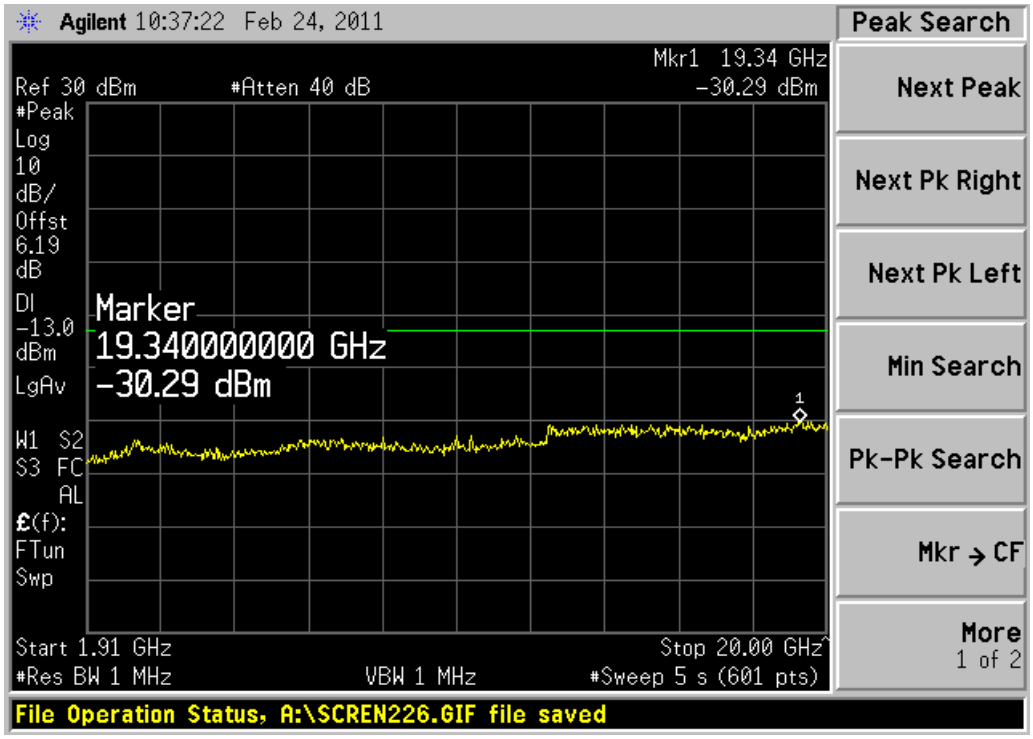


Channel 661, 30MHz~1850MHz



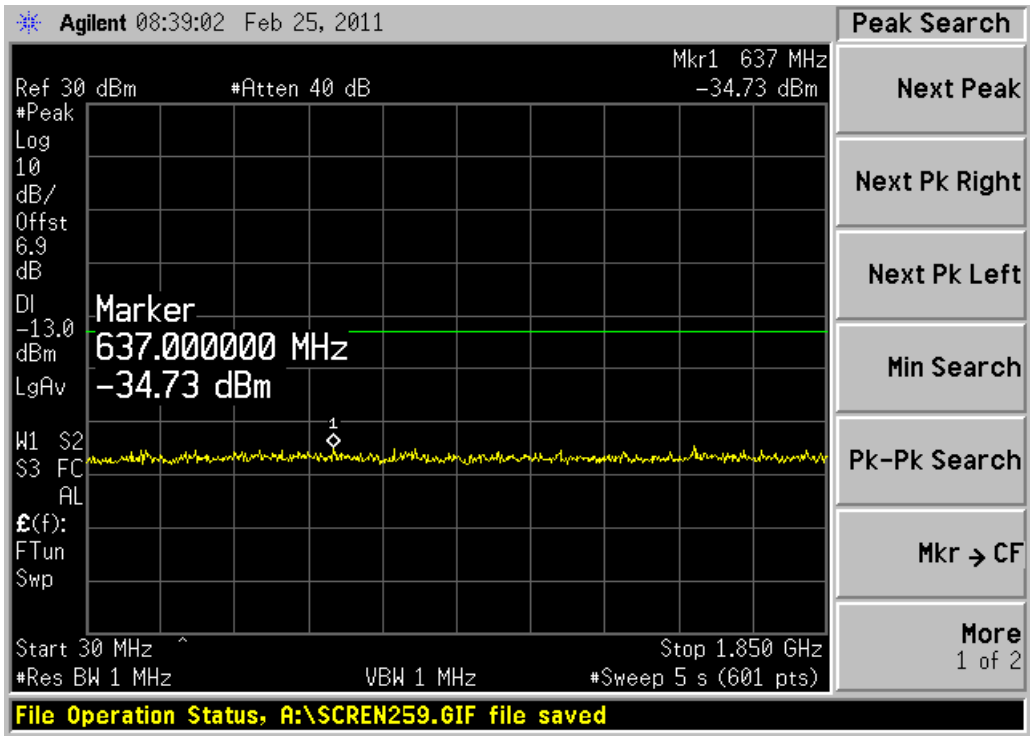
Channel 661, 1850MHz~1910MHz

Note: The signal beyond the limit is the base station simulator carrier.

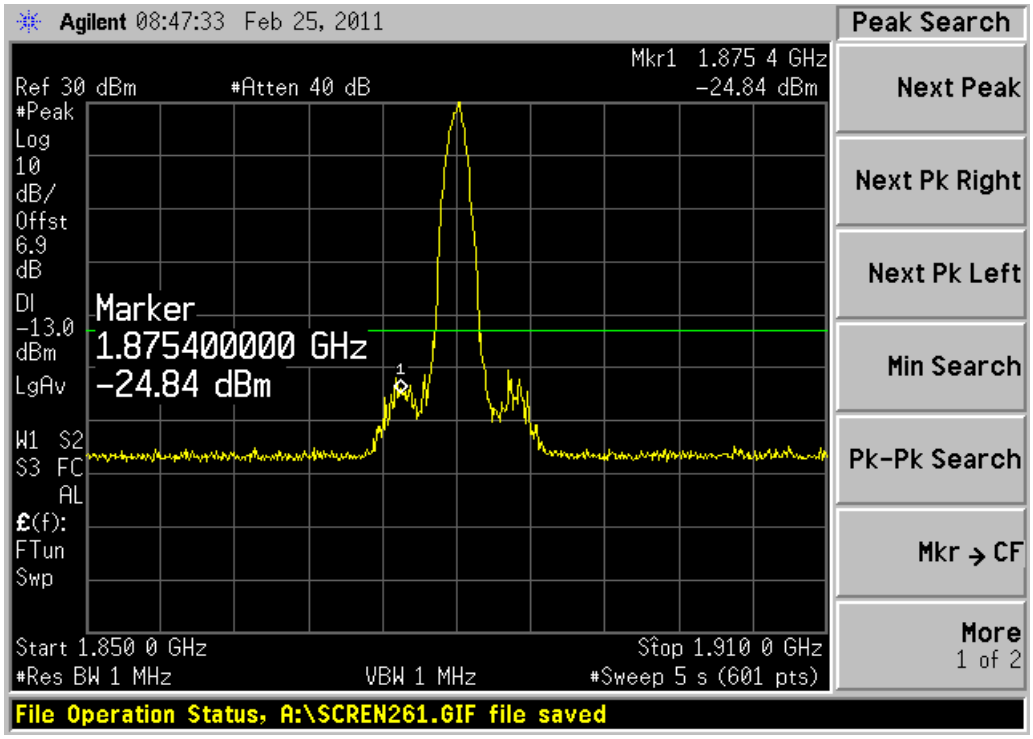


Channel 661, 1910MHz~20GHz

EDGE MODE:

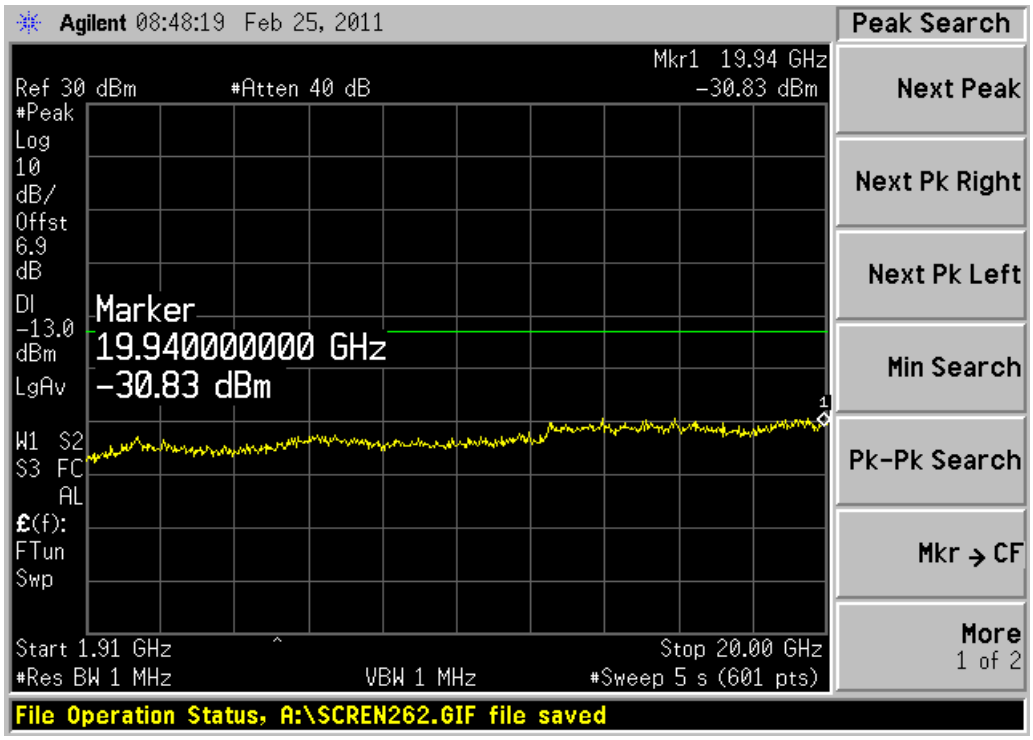


Channel 661, 30MHz~1850MHz



Channel 661, 1850MHz~1910MHz

Note: The signal beyond the limit is the base station simulator carrier.



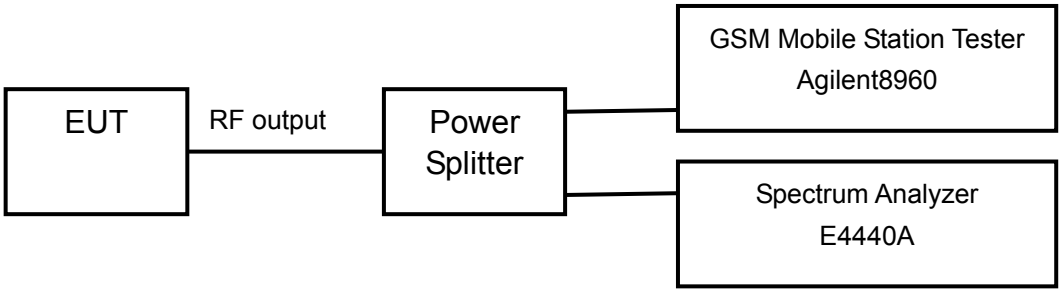
Channel 661, 1910MHz~20GHz

2.2.2.5 Band Edges Compliance-FCC Part2.1051/24.238(a)

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



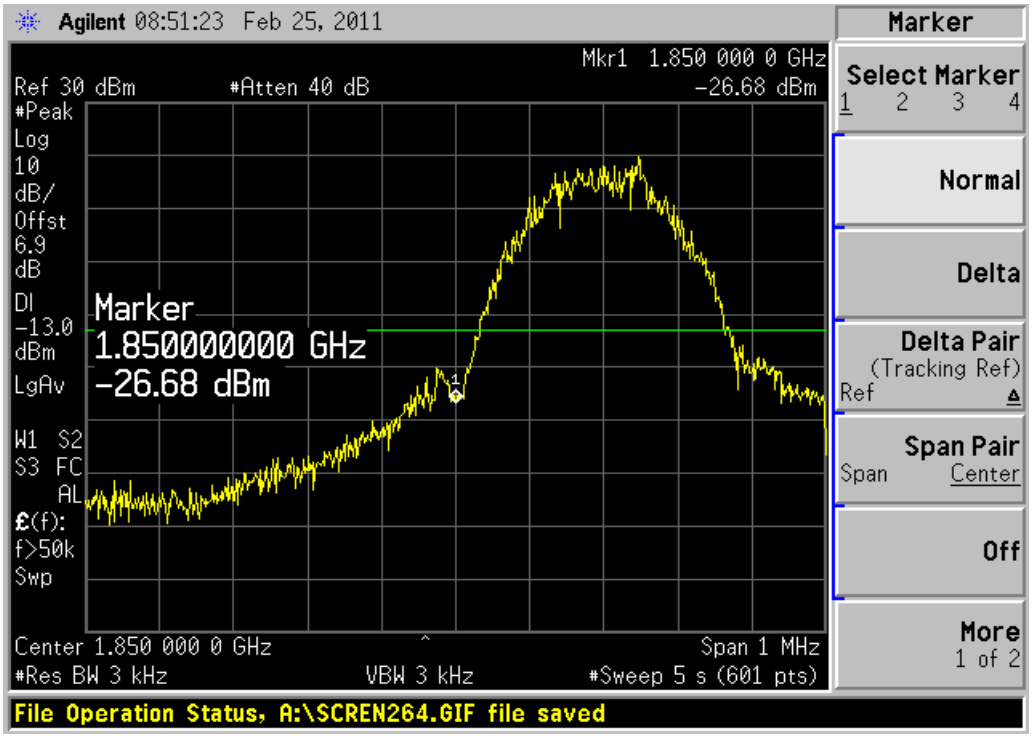
Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to 3KHz on spectrum analyzer.
The measurement will be conducted at two channels No512 and No810 (Bottom and top channels of PCS1900 band)

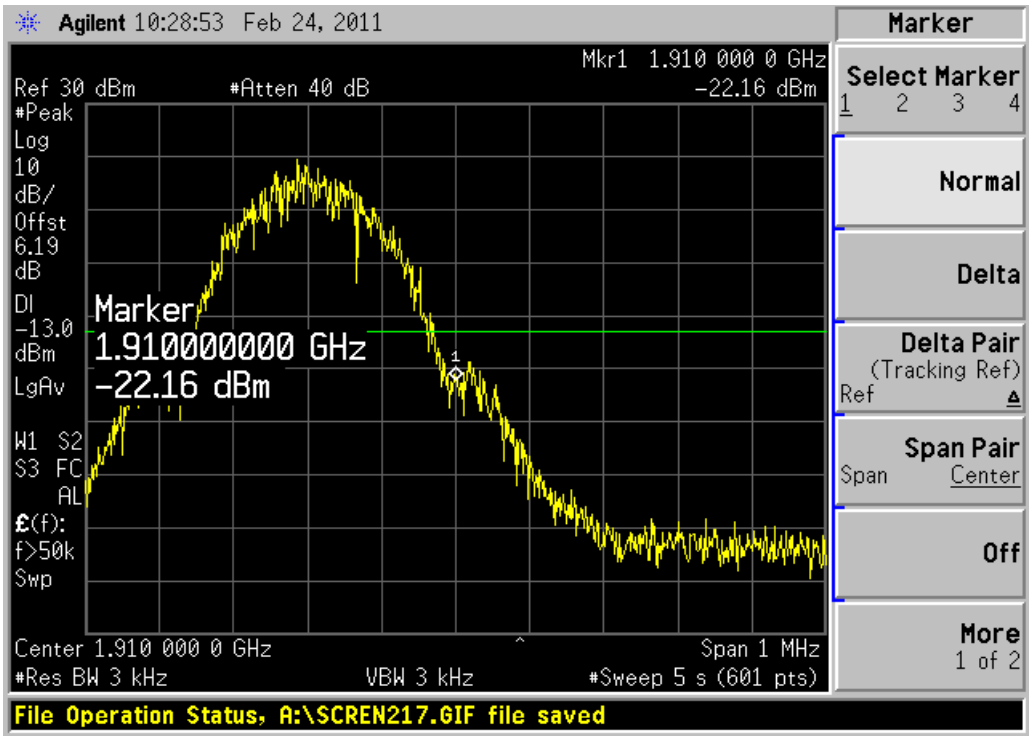
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

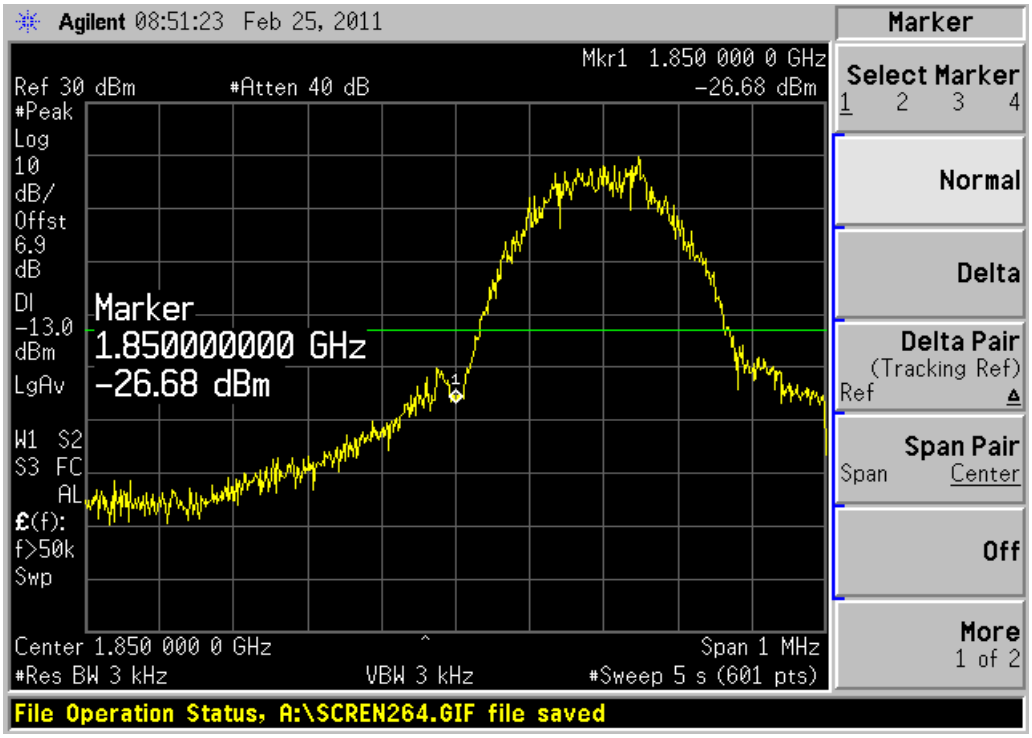


Channel 512

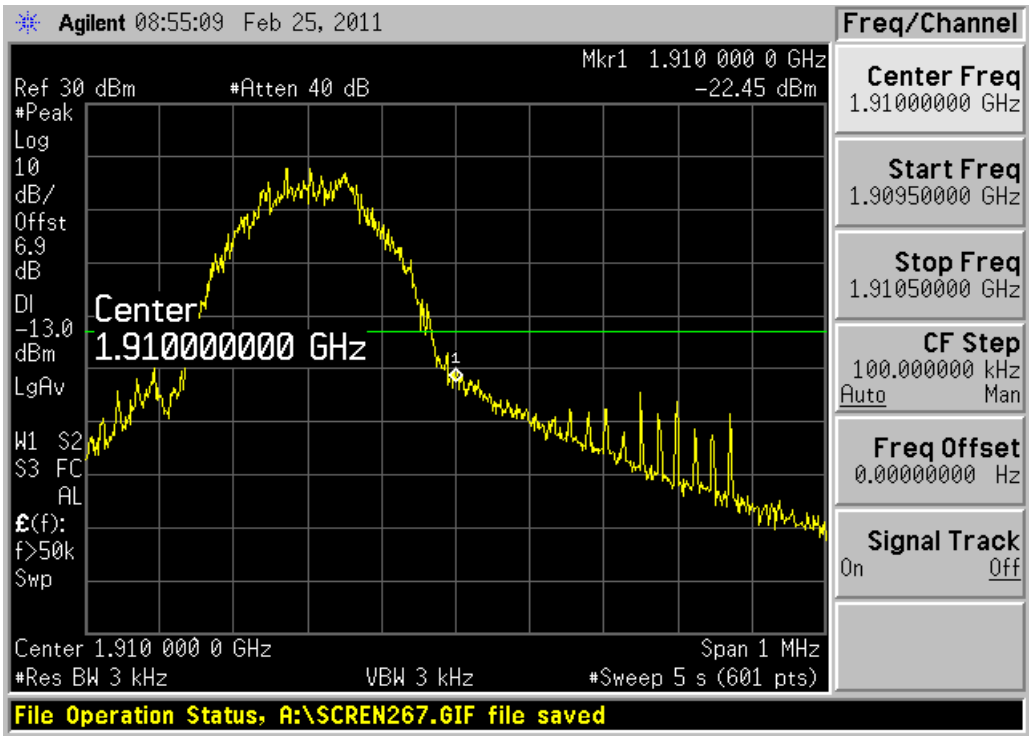


Channel 810

EDGE MODE:



Channel 512



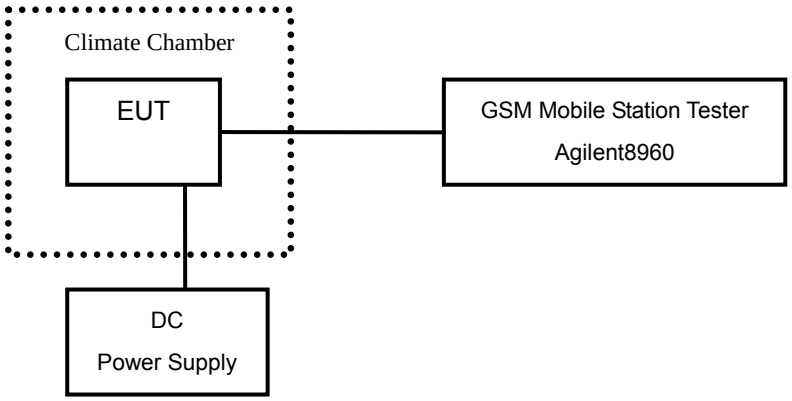
Channel 810

2.2.2.6 Frequency Stability-FCC Part2.1055/Part24.235

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test setup:



Test Procedure:
A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50° C in 10° C step size, and also the DC power supply voltage to the EUT is varied from 3.5 to 4.2 V. The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band).

Limits: No specific frequency stability requirements in part 2.1055 and part 24.235.

Test result:

GSM/GPRS MODE:

Temperature(° C)	Test Result (ppm)@3.8V		
	Channel 512	Channel 661	Channel 810
-30	0.009	0.010	0.009
-20	0.010	0.010	0.008
-10	0.004	0.004	0.003
0	0.000	0.002	0.002
+10	0.001	0.002	0.000
+20	0.002	0.002	0.002
+30	0.003	0.002	0.002
+40	0.002	0.003	0.004
+50	0.003	0.003	0.003

Voltage (V)	Test Result (ppm)@20° C		
	Channel 512	Channel 661	Channel 810
3.5	0.005	0.005	0.006
4.2	0.007	0.006	0.004

EDGE MODE:

Temperature(° C)	Test Result (ppm)@3.8V		
	Channel 512	Channel 661	Channel 810
-30	0.004	0.009	0.005
-20	0.007	0.005	0.003
-10	0.005	0.004	0.001
0	0.004	0.004	0.001
+10	0.001	0.003	0.002
+20	0.001	0.003	0.002
+30	0.002	0.002	0.003
+40	0.003	0.001	0.004
+50	0.002	0.003	0.004

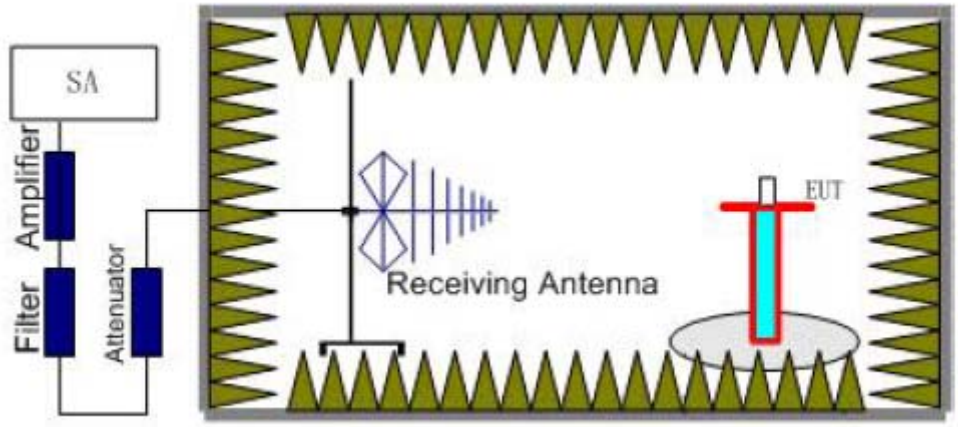
Voltage (V)	Test Result (ppm)@20° C		
	Channel 512	Channel 661	Channel 810
3.5	0.004	0.005	0.004
4.2	0.007	0.004	0.005

2.2.2.7 Radiated Spurious Emissions-FCC Part2.1053/24.238(a)

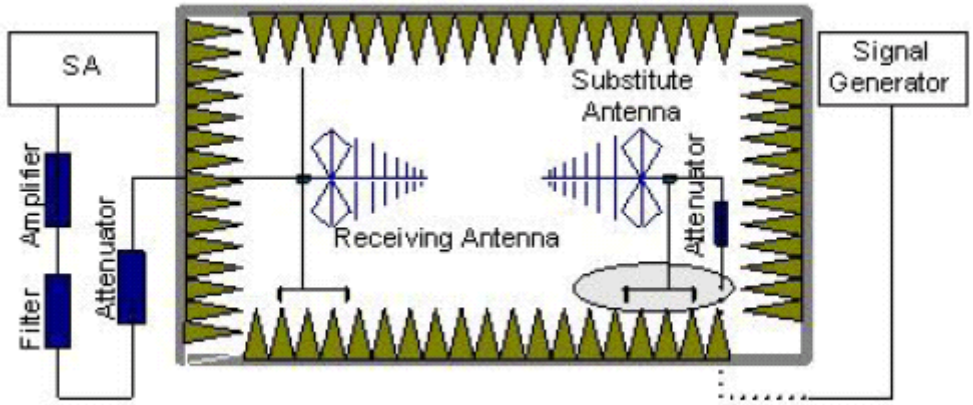
Ambient condition

Temperature	Relative humidity	Pressure
26°C	43%	101.3kPa

Test Setup:



Step 1



Step 2

Test procedure:

The measurements procedures in TIA-603C-2004 are used.

The spectrum was scanned from 30MHz to the 10th harmonic of the highest frequency generated within the equipment.

Step 1:

The measurement is carried out in the fully anechoic chamber. EUT was

placed on a 2.4 meter high non-conductive table at a 3 meter test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna is 2.4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10^{th} harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:
A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
A power (Pmea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (Pmea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna (Pca) and the Substitution Antenna Gain (Ga).

Calculation procedure:
The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:
Power(EIRP) = P_{mea}+ P_{ca} + G_a
This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).

Assumed the power of signal source record is -20dBm. A cable loss of -30dB and an antenna gain of 11dB are added.
$P=P_{mea}+P_{ca}+G_a=(-20dBm)+(-30dB)+(11dB)= -39dBm$

The measurement will be done at carrier frequencies that pertain to bottom (Channel 512), middle (Channel 661) and top (Channel 810) channels of PCS 1900 band.

Test result:

GSM/GPRS MODE Channel 512:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2019.93	-53.6	-5.6	8.6	-56.6	-13	Horizontal
2584.00	-45.7	-5.8	8.9	-48.8	-13	Vertical
8975.83	-41.8	-10.6	12.7	-43.9	-13	Vertical
10010.17	-39.3	-11.8	13.6	-41.1	-13	Horizontal
17765.05	-32.2	-12.6	12.5	-32.1	-13	Vertical
17799.30	-32.2	-13.9	12.3	-30.6	-13	Vertical

EDGE MODE Channel 512:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2020.20	-53.6	-5.6	8.6	-56.6	-13	Horizontal
2583.93	-45.4	-5.8	8.9	-48.5	-13	Vertical
8976.05	-41.7	-10.6	12.7	-43.8	-13	Horizontal
10009.73	-39.5	-11.8	13.6	-41.3	-13	Vertical
17764.72	-32.6	-12.6	12.5	-32.5	-13	Vertical
17799.64	-32.3	-13.9	12.3	-30.7	-13	Horizontal

GSM/GPRS MODE Channel 661:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2031.4	-53.6	-5.6	8.6	-56.6	-13	Horizontal
2580.1	-45.7	-5.8	8.9	-48.8	-13	Vertical
8977.6	-41.8	-10.6	12.7	-43.9	-13	Horizontal
10008.9	-38.9	-11.8	13.6	-40.7	-13	Vertical
17783.5	-32.3	-13.9	12.3	-30.7	-13	Vertical

EDGE MODE Channel 661:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2152.3	-54.1	-5.6	8.6	-57.1	-13	Vertical
2575.8	-43.4	-5.8	8.9	-46.5	-13	Vertical
8992.5.6	-42.3	-10.6	12.7	-44.4	-13	Vertical
10005.7	-37.8	-11.8	13.6	-39.6	-13	Horizontal
17863.5	-33.5	-13.9	12.3	-31.9	-13	Vertical

GSM/GPRS MODE Channel 810:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2034.62	-53.2	-5.6	8.6	-56.2	-13	Horizontal
2580.28	-45.3	-5.8	8.9	-48.4	-13	Vertical
8995.42	-41.9	-10.6	12.7	-44.0	-13	Vertical
10018.10	-39.0	-11.8	13.6	-40.8	-13	Horizontal
17755.12	-32.3	-12.6	12.5	-32.2	-13	Vertical
17801.01	-32.2	-13.9	12.3	-30.6	-13	Vertical

EDGE MODE Channel 810:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2035.00	-52.9	-5.6	8.6	-55.9	-13	Horizontal
2580.25	-45.1	-5.8	8.9	-48.2	-13	Horizontal
8994.97	-41.5	-10.6	12.7	-43.6	-13	Vertical
10018.30	-39.4	-11.8	13.6	-41.2	-13	Vertical
17755.11	-32.4	-12.6	12.5	-32.3	-13	Horizontal
17801.12	-32.4	-13.9	12.3	-30.8	-13	Vertical

2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date
1	E5515C(8960) Mobile Station Tester	Agilent	GB44050904	19th Aug. 2011
2	PSA E4440A Spectrum Analyzer	Agilent	MY41000183	19th Aug. 2011
3	66309B DC Power Supply	Agilent	MY43000461	19th Aug. 2011
4	1506A Power Splitter	Weinschel	MN154	19th Aug. 2011
5	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	19th Aug. 2011
6	ESI 40 EMI test receiver	R&S	100015	19th Aug. 2011
7	SMR 20 Signal generator	R&S	100086	19th Aug. 2011
8	CMU 200 Radio tester	R&S	100313	19th Aug. 2011
9	12.65m*8.03m*7.50m Fully-Anechoic Chamber	FRANKONIA	-----	19th Aug. 2011
10	HL562 Ultra log test antenna	R&S	100016	19th Aug. 2011
11	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	-----	19th Aug. 2011
12	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	19th Aug. 2011
13	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	19th Aug. 2011
14	PS2000 Turn Table	FRANKONIA	-----	19th Aug. 2011
15	MA260 Antenna Master	FRANKONIA	-----	19th Aug. 2011
16	SH-241Climatic Chamber	ESPEC	92000389	19th Aug. 2011
17	ES-K1EMI test software	R&S	-----	19th Aug. 2011
18	HL562 Receive antenna	R&S	100167	19th Aug. 2011

Appendix

Appendix1 Test Setup