D-PL-12111-01-01

CNAS L0447

Registration No.910917

TEST REPORT

Report No.: SRTC2011-H024-E0062

Product Name: GSM/GPRS/EGPRS Digital Mobile Phone with Bluetooth

Marketing Name: Sonim XP3300 Z1

Product Model: Sonim XP3300-A-X1 / Sonim XP3300-A-Y1

Type Number: P25C005AJ / P25C005AI

Applicant: Sonim Technologies Inc.

Manufacturer: Sonim Technologies Inc.

Specification: FCC Part 24E, Part 22H, Part 2
(October 1, 2009 edition)
IC RSS-132 (Issue 2, September 2005)
IC RSS-133 (Issue 5, February 2009)

FCC ID: WYPP25C005AJ / WYPP25C005AI

IC: 8090A-P25C005AJ / 8090A-P25C005AI

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

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC).
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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1.3 Applicant's details

Company: Sonim Technologies Inc.
Address: 1875 S. Grant Street, Suite 620, San Mateo, CA 94402, USA
City: San Mateo
Country or Region: USA
Grantee Code: WYP
Contacted Person: Jasen Kolev
Tel: +1 650 504 4411
Fax: +1 650 378 8190
Email: jasen@sonimtech.com

1.4 Manufacturer's details

Company: Sonim Technologies Inc.
Address: 1875 S. Grant Street, Suite 620, San Mateo, CA 94402, USA
City: San Mateo
Country or Region: USA
Contacted Person: Jasen Kolev
Tel: +1 650 504 4411
Fax: +1 650 378 8190
Email: jasen@sonimtech.com

1.5 Application details

Date of reception of test sample: 7th Jun 2011
Date of test: 8th Jun 2011 to 9th Jun 2011

1.6 Reference specification

FCC Part 24E, Part22H, Part 2 (October 1, 2009 edition)
IC RSS-132 (Issue 2, September 2005)
IC RSS-133 (Issue 5, February 2009)
ANSI/TIA-603-C-2004

1.7 Information of EUT

1.7.1 General information

Name of EUT	GSM/GPRS/EGPRS Digital Mobile Phone with Bluetooth
FCC ID	WYPP25C005AJ / WYPP25C005AI
IC	8090A-P25C005AJ / 8090A-P25C005AI
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	GSM/GPRS:GMSK EDGE:8PSK
Emission Designator	GSM/GPRS:300KGXW EDGE:300KG7W
Duplex mode	FDD
Duplex spacing	GSM850:45MHz PCS1900:80MHz
Antenna type	Fixed Internal
Power Supply	Battery or charger
Rated Power Supply Voltage	3.7V
Extreme Temperature	Lowest: -30°C Highest: +50°C
Extreme Voltage	Minimum: 3.4V Maximum: 4.2V
HW Version	A
SW Version	500030SW03A00_Ex-Handy_07_2

1.7.2 EUT details

Product Name	Marketing Name	Product Model	Type Number	IMEI
GSM/GPRS/EGPRS Digital Mobile Phone with Bluetooth	Sonim XP3300 Z1	Sonim XP3300-A-X1	P25C005AJ	001800000192112

1.7.3 Auxiliary equipment details

Equipment	Charger
Manufacturer	DEE VAN ENTERPRISE CO., LTD
Model Number	DSA-3PFC-05 FUS 050065

Equipment	Battery
Manufacturer	ecom instruments GmbH
Model Number	Ex-BPH 07 HC
Capacity	2000mAh
Rated Voltage	3.7V d.c.

Equipment	Battery
Manufacturer	ecom instruments GmbH
Model Number	Ex-BPH 07 SC
Capacity	1280mAh
Rated Voltage	3.7V d.c.

Note 1: The Sonim XP3300-A-X1 and Sonim XP3300-A-Y1 are all the GSM/GPRS/EDGE Digital Mobile Phones with bluetooth operating in the 850MHz and 1900MHz frequency bands. These two devices are all the same at nearly every functional aspect. The only difference between these two models of mobile phones is that Sonim XP3300-A-X1 can supports camera, and Sonim XP3300-A-Y1 can not. Therefore, the test values of Sonim XP3300-A-X1 provide a worst result which we could get in these two devices. And also the results could represent all the features which Sonim XP3300-A-Y1 has. So this report is just to provide the test values of The Sonim XP3300-A-X1.

Note 2: As the information described in section 1.7.3, there are two different models of battery manufactured by the same company. The only difference between these two models of battery is the capacity. The relevant tests have been performed in order to verify that the EUT has the same features when exercised by each model. So all the tests shown in this test report are performed when the EUT exercised by the battery Ex-BPH 07 HC.

2. Test information

2.1 Summary of the test results

No.	Test case	FCC and IC reference	Verdict
1	RF Power Output	FCC Part2.1046 IC RSS-132 § 4.4 IC RSS-133 § 6.4	Pass
2	Effective Radiated Power and Equivalent Isotropically Radiated Power	FCC Part22.913(a)/24.232(c) IC RSS-132 § 4.4 IC RSS-133 § 6.4	Pass
3	Occupied Bandwidth	FCC Part2.1049 IC RSS-132 § 4.5 IC RSS-133 § 6.5	Pass
4	Spurious Emissions at antenna terminals	FCC Part2.1051/22.917(a)/24.238(a) IC RSS-132 § 4.5 IC RSS-133 § 6.5	Pass
5	Band Edges Compliance	FCC Part2.1051/22.917(a)/24.238(a) IC RSS-132 § 4.5 IC RSS-133 § 6.5	Pass
6	Frequency Stability	FCC Part2.1055/24.235/22.355 IC RSS-132 § 4.3 IC RSS-133 § 6.3	Pass
7	Radiated Spurious Emissions	FCC Part2.1053/22.917(a)/24.238(a) IC RSS-132 § 4.5 IC RSS-133 § 6.5	Pass
8	Receiver Spurious Emission	IC RSS-Gen § 6a	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: **2011.09.15**

2.2 Test result

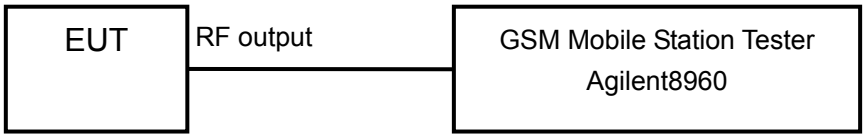
2.2.1 GSM850

2.2.1.1 RF Power Output-FCC Part2.1046/IC RSS-132 § 4.4

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	32.83
836.4	189	32.84
848.8	251	32.83

EDGE MODE:

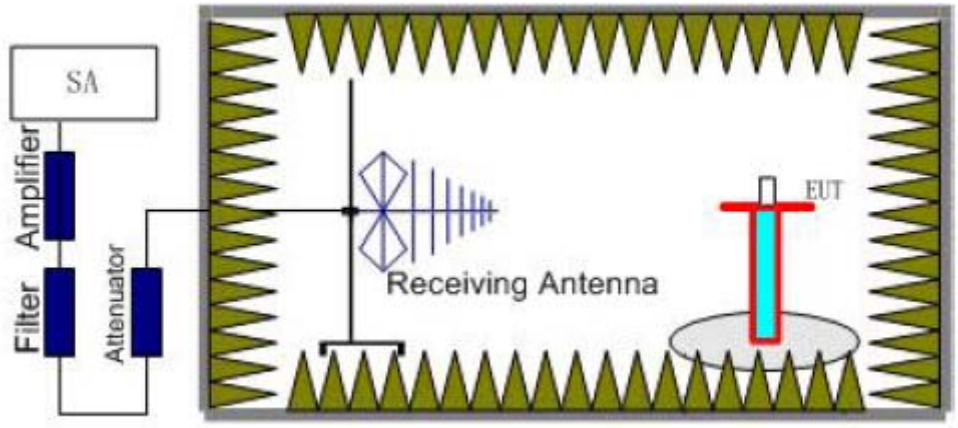
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	23.39
836.4	189	23.38
848.8	251	23.43

2.2.1.2 Effective Radiated Power-FCC Part22.913(a)/IC RSS-132 § 4.4

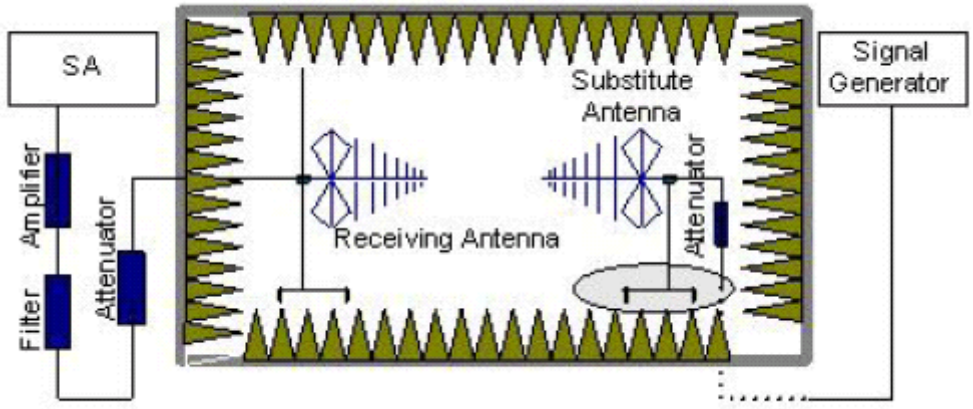
Ambient condition:

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 height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value 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	30.53	-3.8	8.6	2.15	27.88	Vertical
836.6	5	31.22	-3.8	8.6	2.15	28.57	Vertical
848.8	5	30.43	-3.8	8.6	2.15	27.78	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	21.42	-3.8	8.6	2.15	18.77	Vertical
836.6	6	22.25	-3.8	8.6	2.15	19.6	Vertical
848.8	6	22.29	-3.8	8.6	2.15	19.64	Vertical

Frequency: 836.6MHz

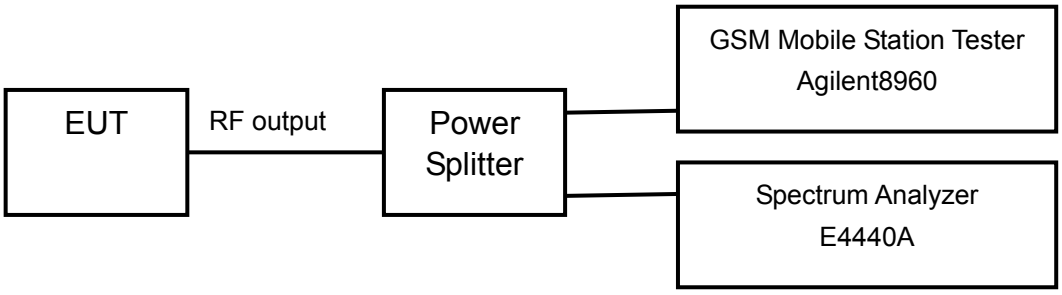
Peak ERP(dBm) =Pmea (28.57dBm)+Pca (-3.8dB)+Ga(8.6dB)–2.15dB=31.22dBm

2.2.1.3 Occupied Bandwidth-FCC Part2.1049/IC RSS-132 § 4.5

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

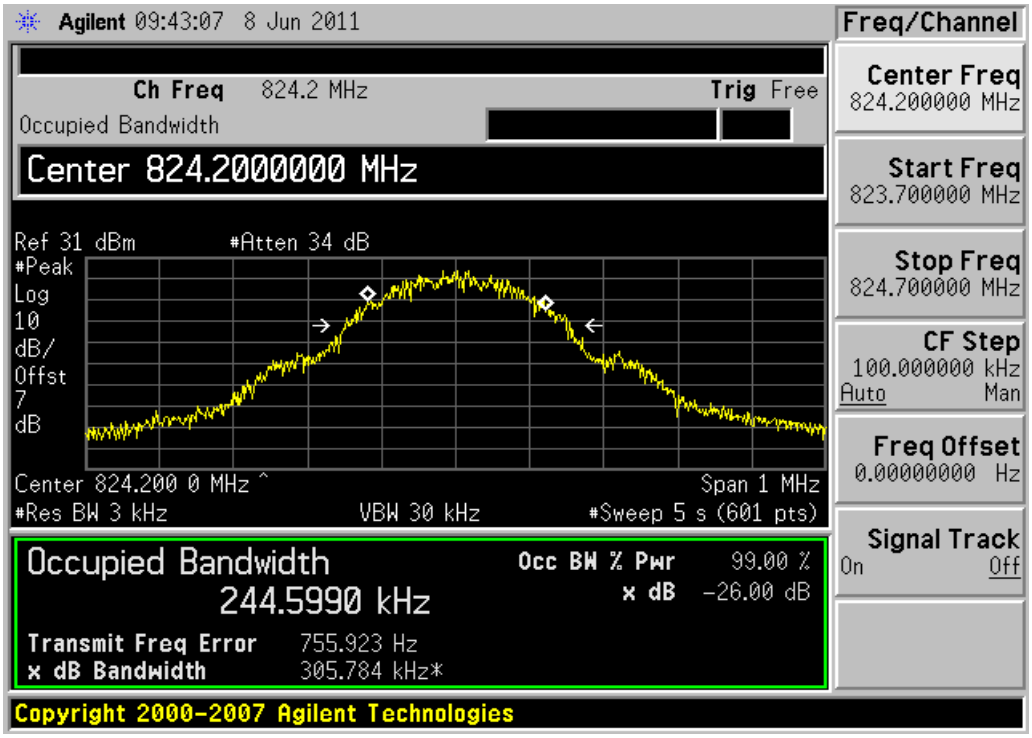
Test result:
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	244.60
836.4	189	245.46
848.8	251	246.63

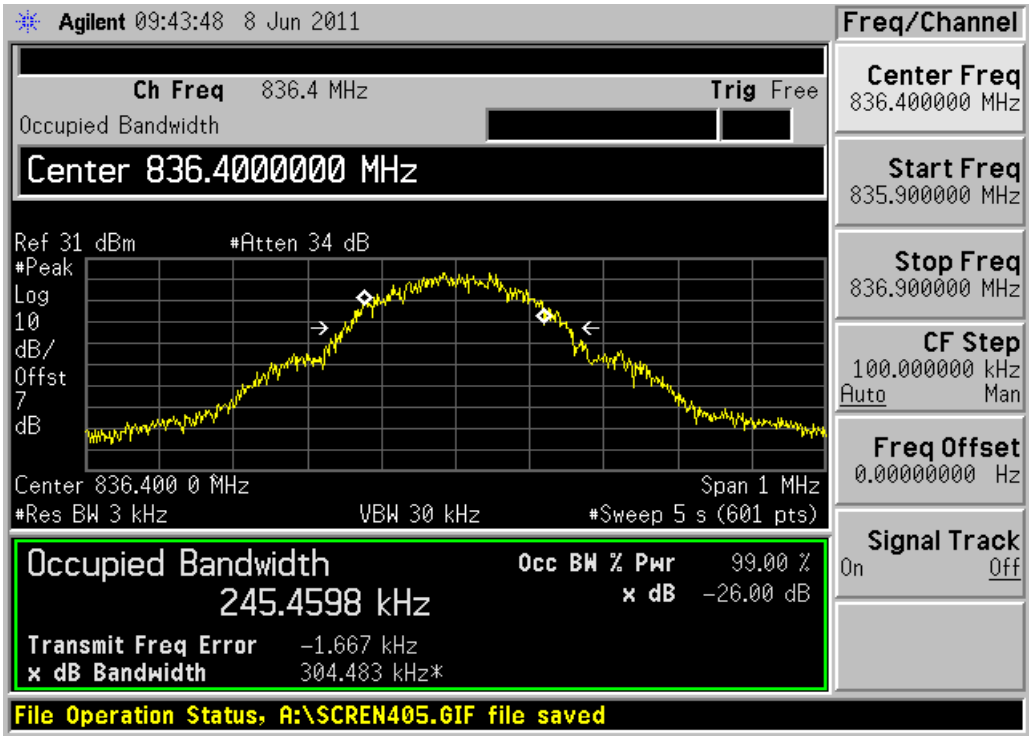
EDGE MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	239.39
836.4	189	241.36
848.8	251	243.94

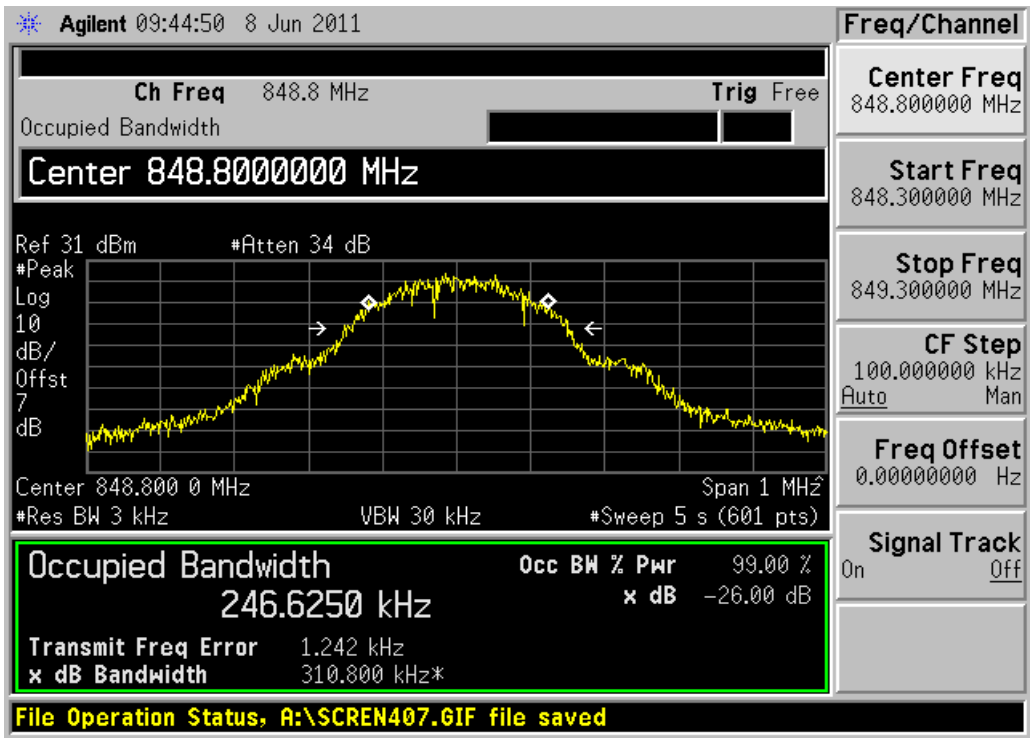
GSM/GPRS MODE:



Channel 128

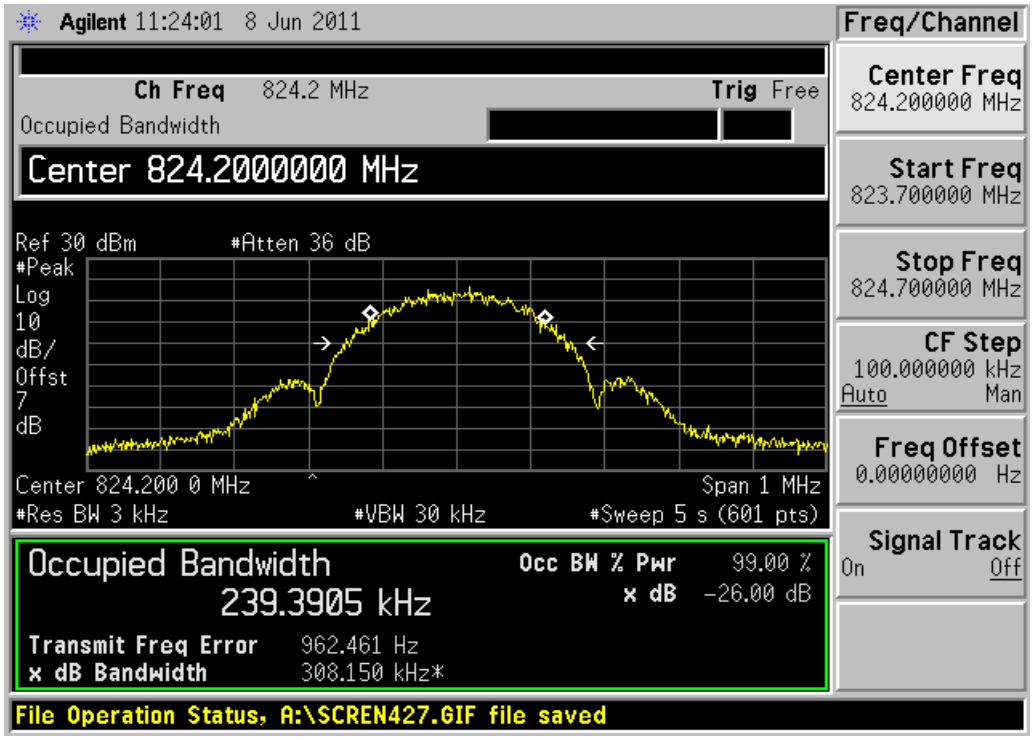


Channel 189

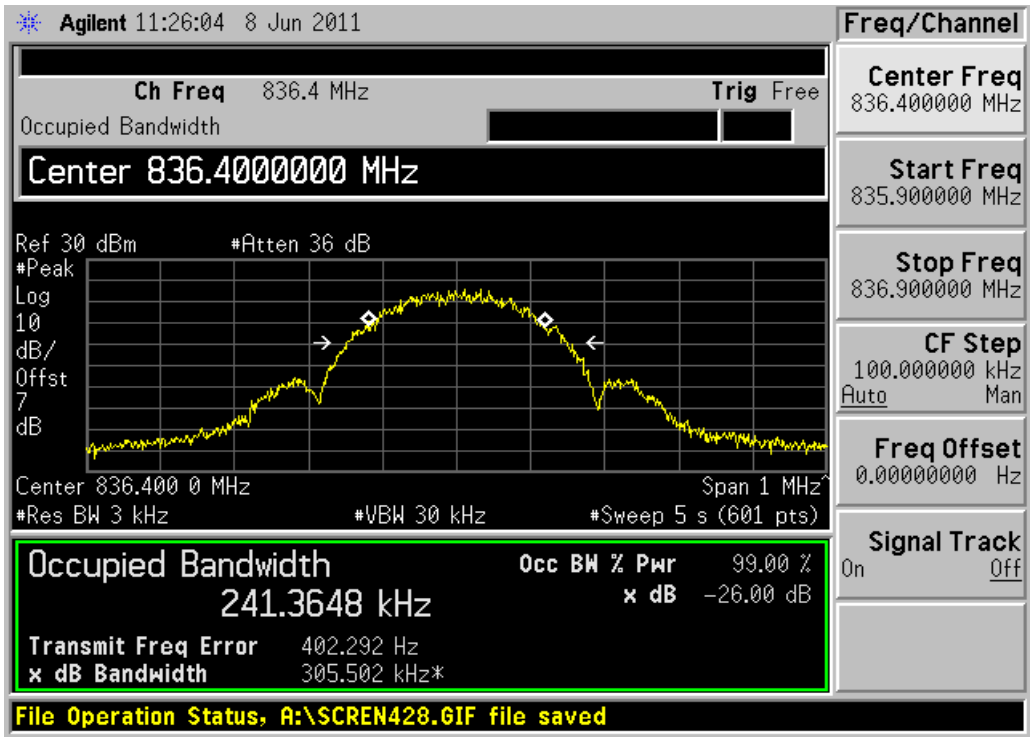


Channel 251

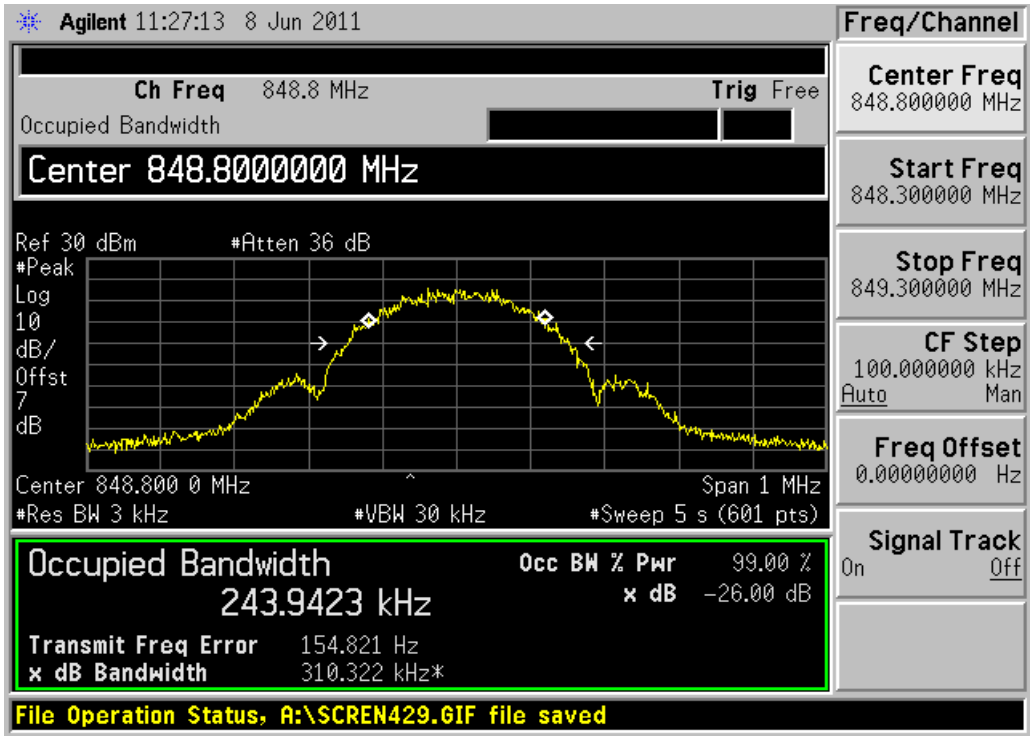
EDGE MODE:



Channel 128



Channel 189



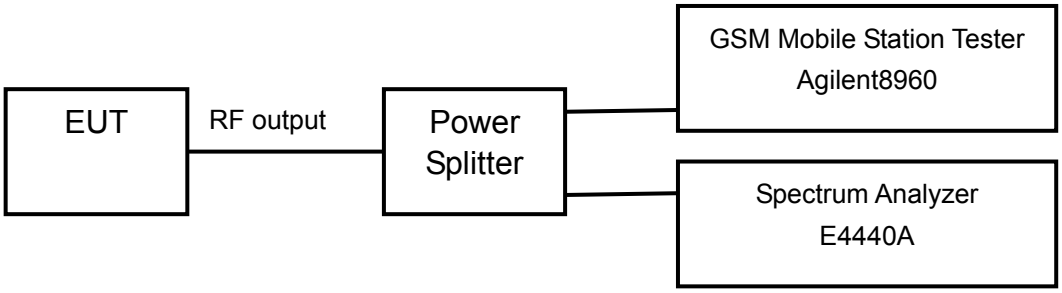
Channel 251

2.2.1.4 Spurious Emissions-FCC Part2.1051/22.917(a)/IC RSS-132 § 4.5

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



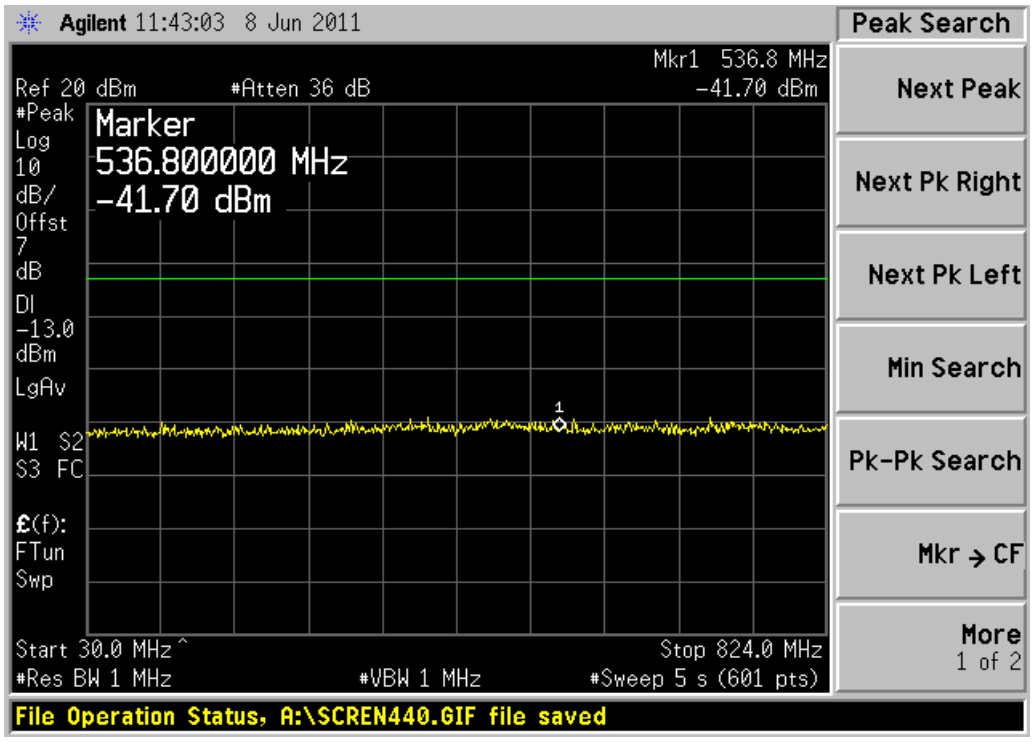
Test procedure:

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)

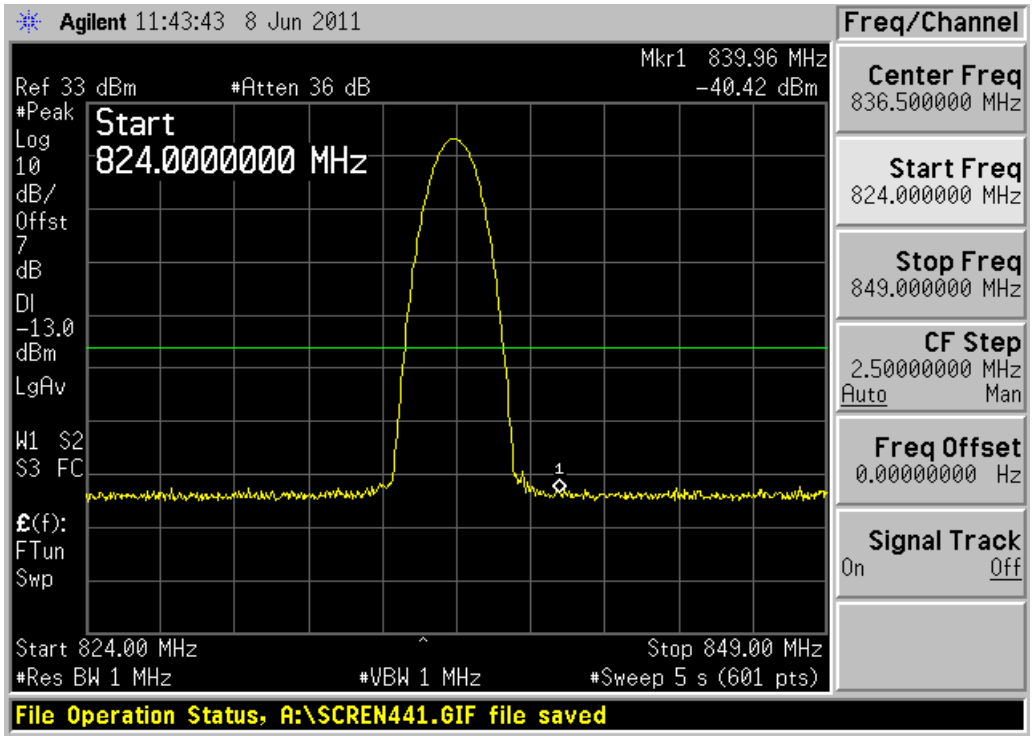
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

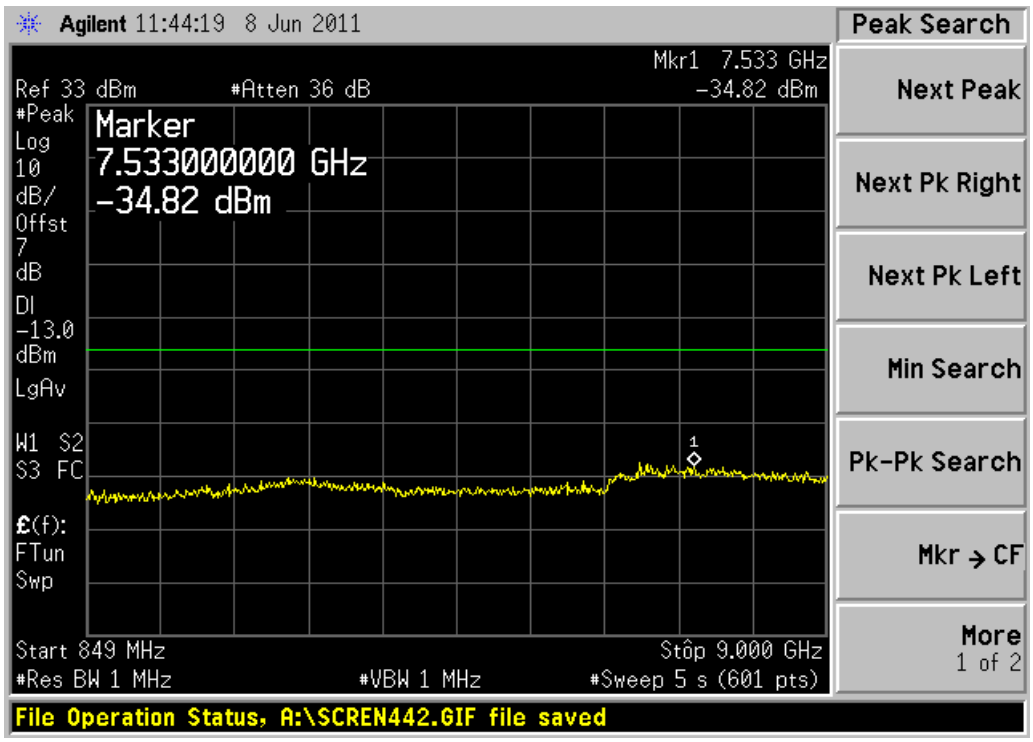


Channel 189, 30MHz~824MHz



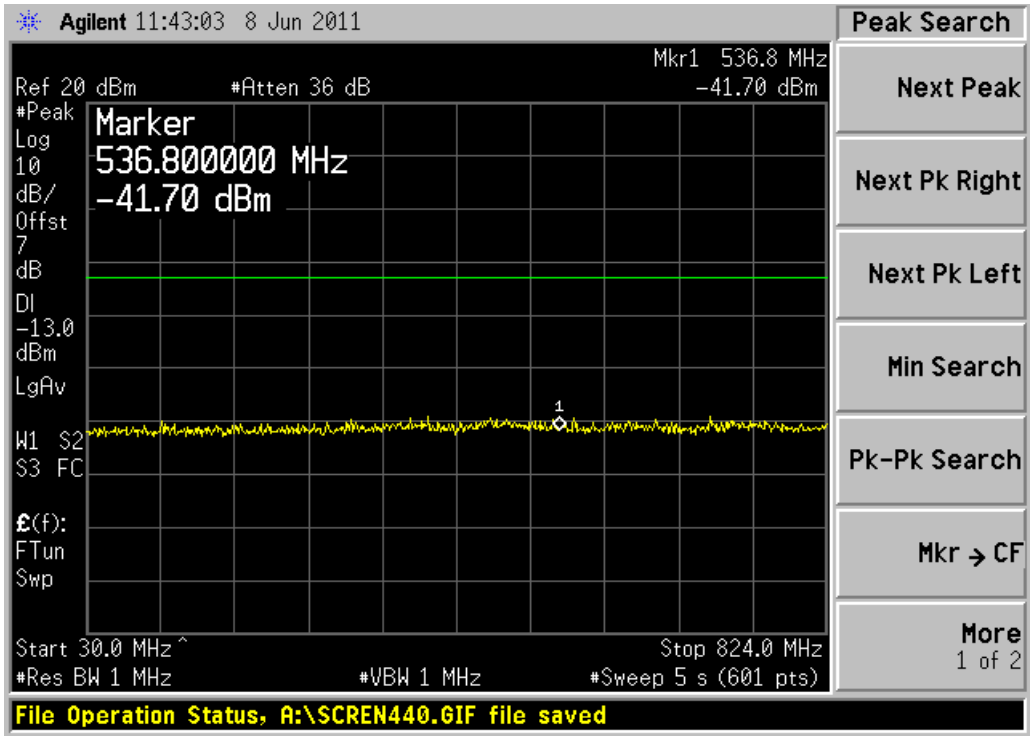
Channel 189, 824MHz~849MHz

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

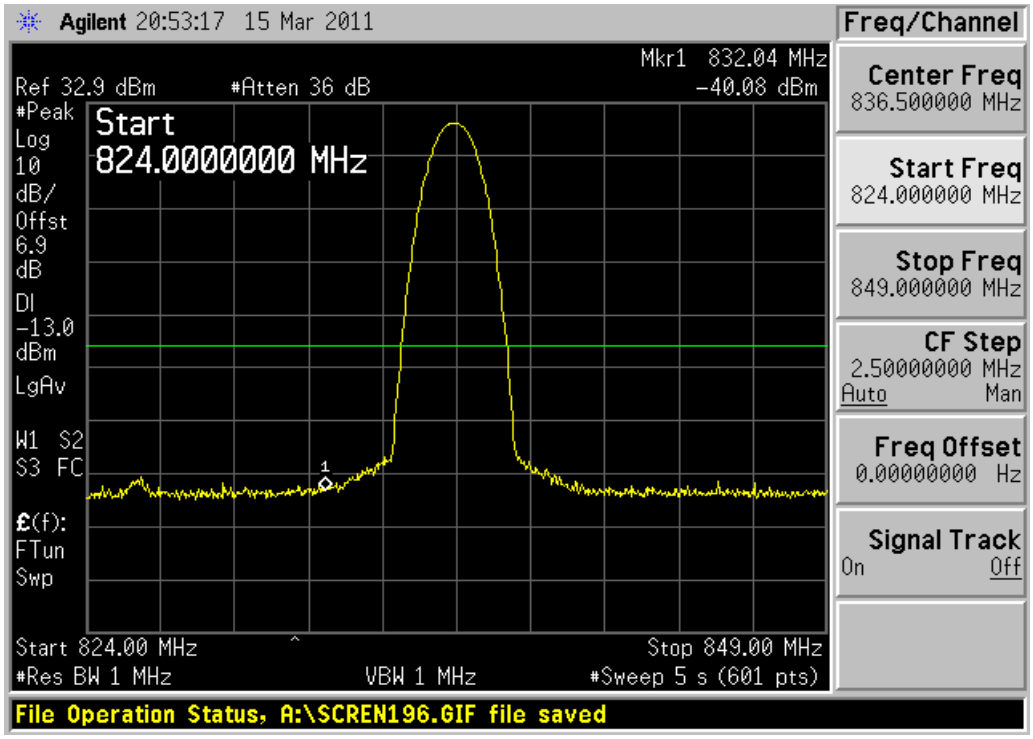


Channel 189, 849MHz~9GHz

EDGE MODE:

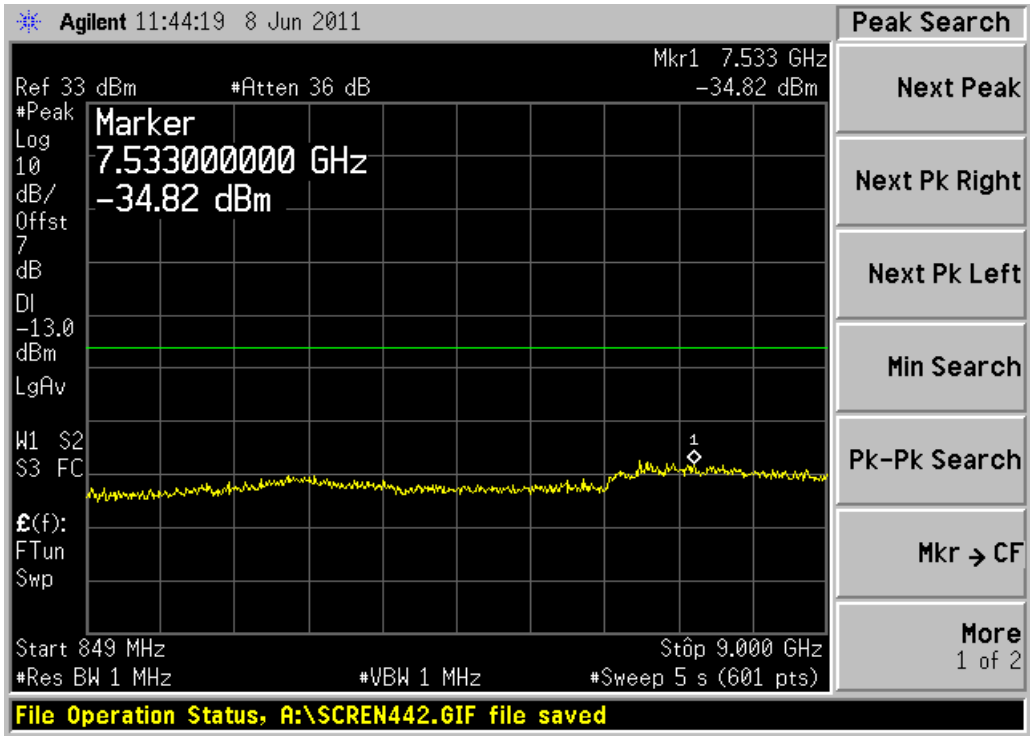


Channel 189, 30MHz~824MHz



Channel 189, 824MHz~849MHz

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



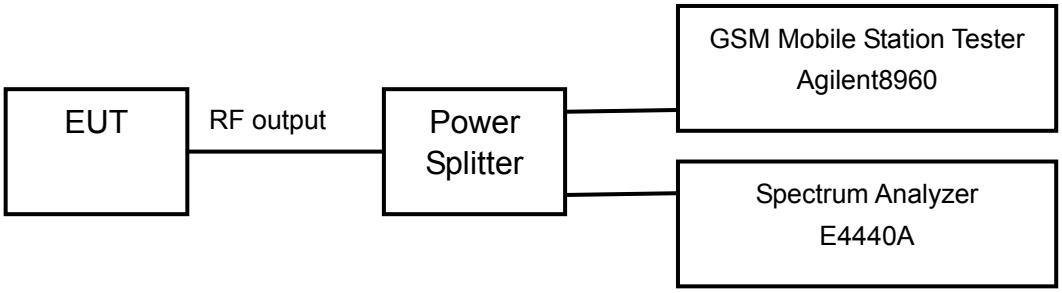
Channel 189, 849MHz~9GHz

2.2.1.5 Band Edges Compliance-FCC Part2.1051/22.917(a)/IC RSS-132 § 4.5

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



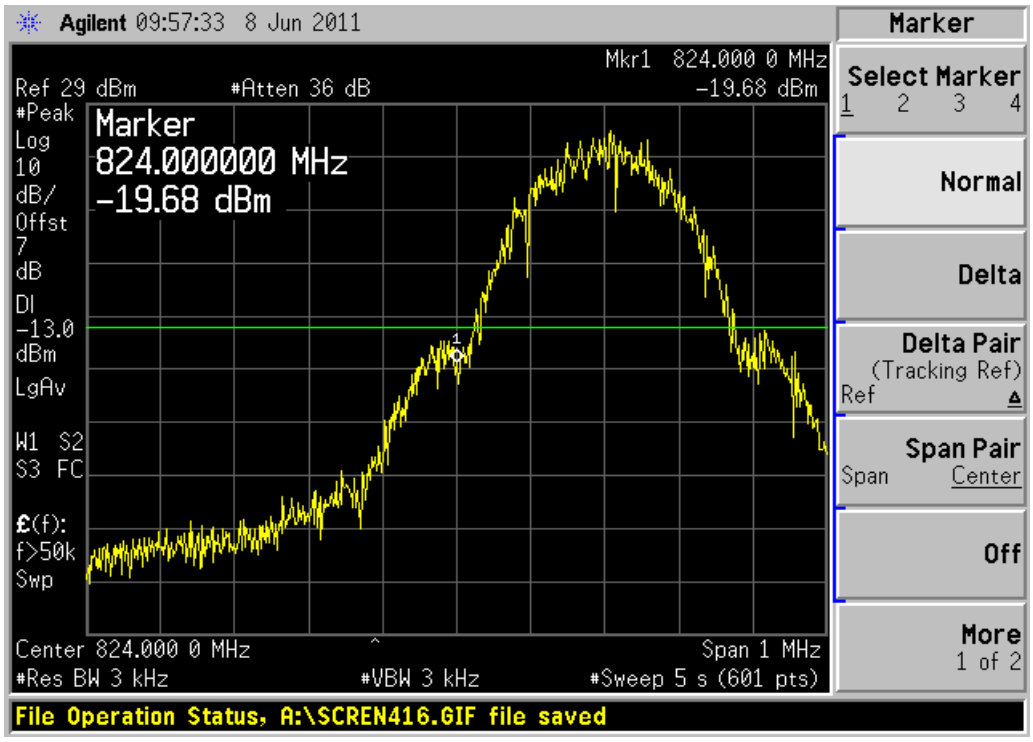
Test procedure:

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)

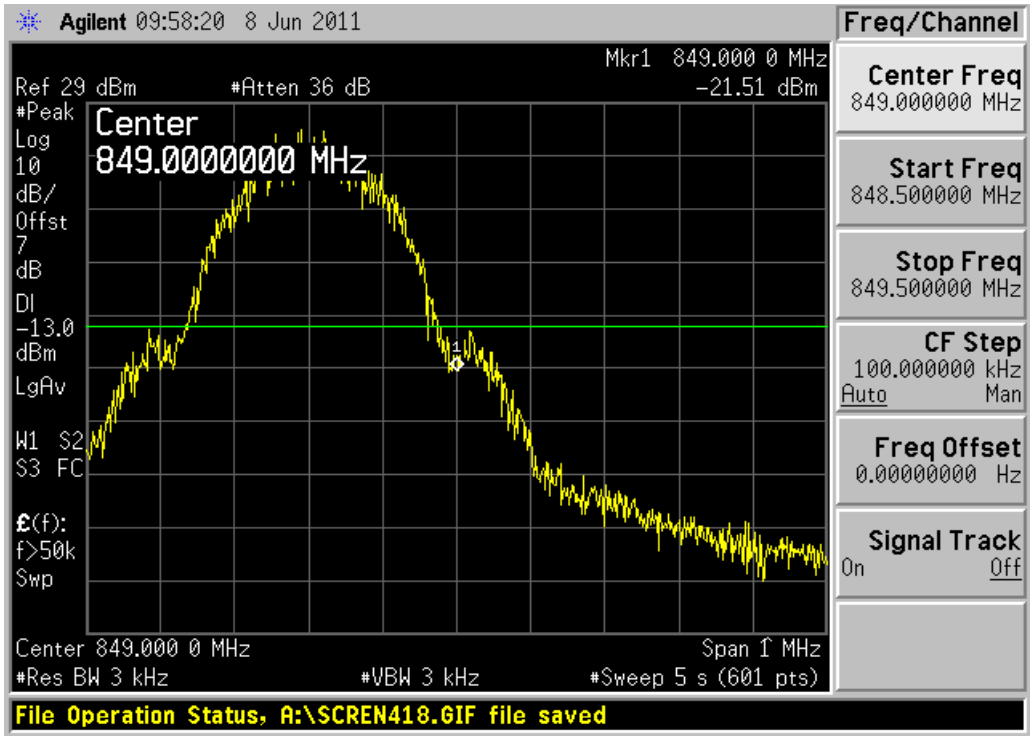
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

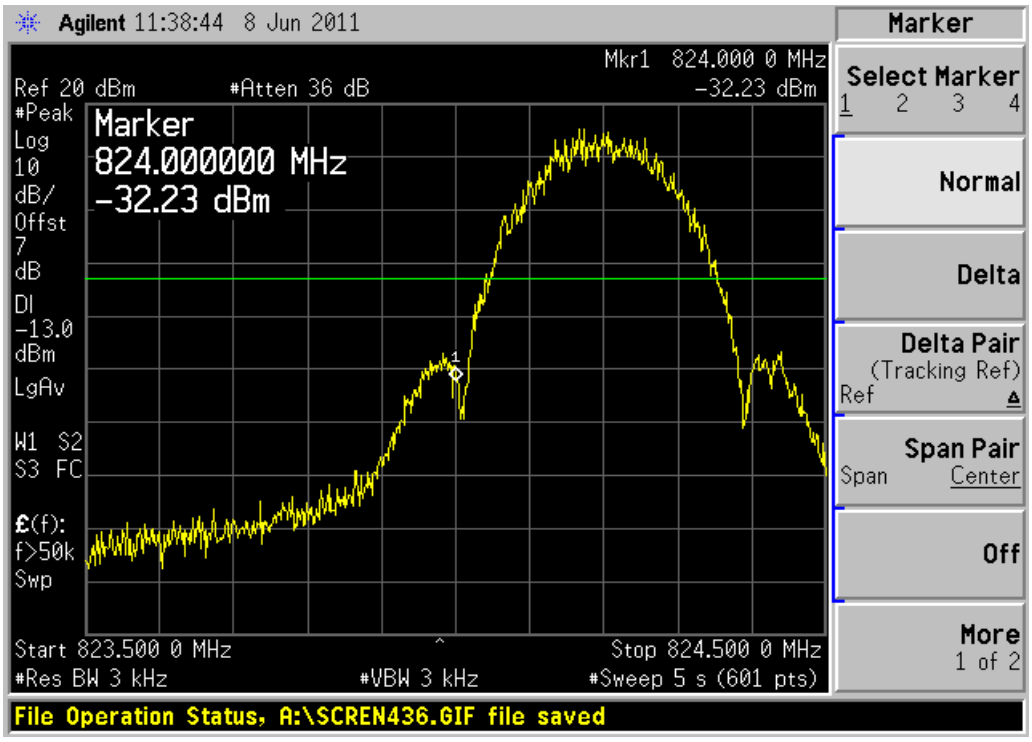


Channel 128

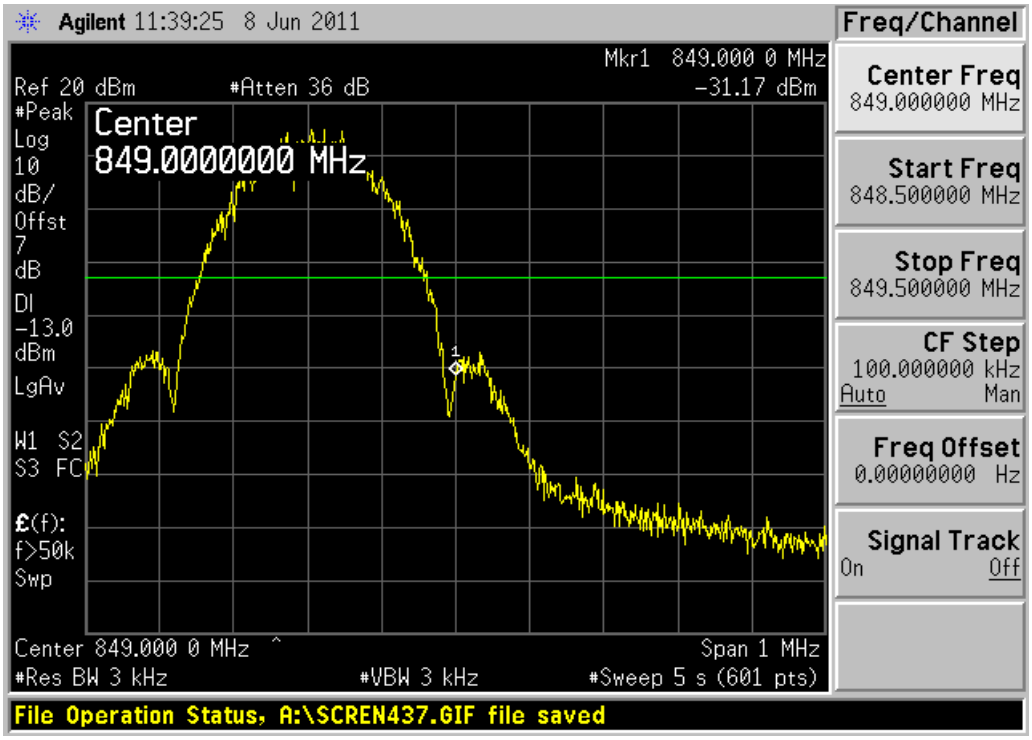


Channel 251

EDGE MODE:



Channel 128



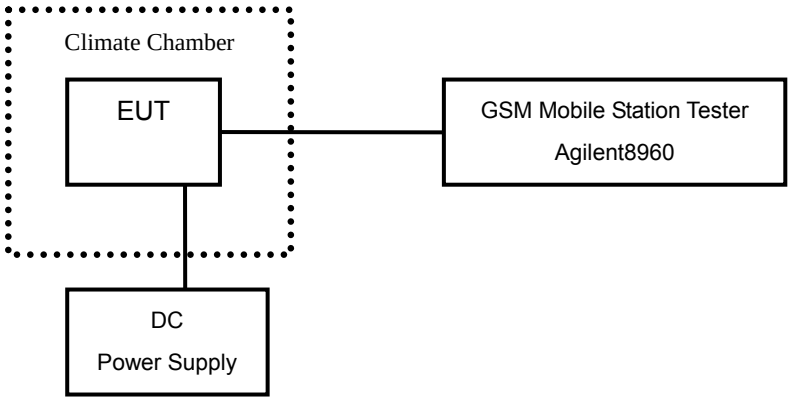
Channel 251

2.2.1.6 Frequency Stability-FCC Part2.1055/Part22.355/IC RSS-132 § 4.3

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 3.4 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 FCC part 2.1055 and part 22.355. According to the standard of RSS-132 § 4.3, the carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

Test result:

GSM/GPRS MODE:

Temperature(° C)	Test Result (ppm)@3.7V		
	Channel 128	Channel 189	Channel 251
-30	0.020	0.013	0.020
-20	0.007	0.015	0.010
-10	0.014	0.015	0.014
0	0.001	0.008	0.016
+10	0.014	0.004	0.007
+20	0.002	0.007	0.018
+30	0.015	0.007	0.009
+40	0.006	0.005	0.019
+50	0.022	0.020	0.013

Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.4	0.003	0.015	0.011
4.2	0.004	0.009	0.002

EDGE MODE:

Temperature(° C)	Test Result (ppm)@3.7V		
	Channel 128	Channel 189	Channel 251
-30	0.016	0.022	0.023
-20	0.009	0.021	0.022
-10	0.002	0.004	0.006
0	0.004	0.008	0.012
+10	0.010	0.002	0.005
+20	0.005	0.003	0.019
+30	0.012	0.003	0.011
+40	0.004	0.014	0.023
+50	0.017	0.010	0.014

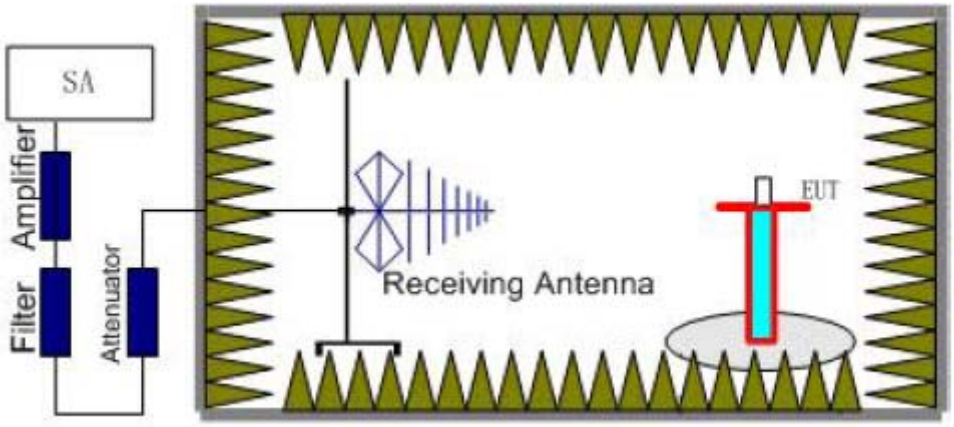
Voltage (V)	Test Result (ppm)@20°C		
	Channel 128	Channel 189	Channel 251
3.4	0.003	0.012	0.010
4.2	0.009	0.011	0.007

2.2.1.7 Radiated Spurious Emissions-FCC Part2.1053/22.917(a)/IC RSS-132 § 4.5

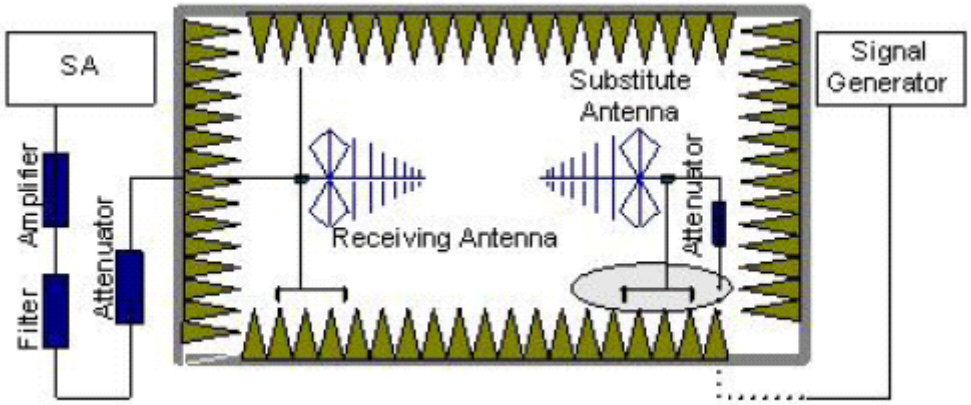
Ambient condition

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
1648.78	-36.88	-4.6	8.6	-40.88	-13	Vertical
1674.10	-48.48	-4.8	8.9	-52.58	-13	Vertical
2518.09	-49.49	-5.9	9.3	-52.89	-13	Vertical
3297.34	-40.93	-6.3	9.5	-44.13	-13	Vertical
6502.24	-38.47	-10.6	13.1	-40.97	-13	Vertical
9974.16	-36.43	-11.8	13.8	-38.43	-13	Horizontal

EDGE MODE Channel 128:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1648.92	-36.85	-4.6	8.6	-40.85	-13	Vertical
1666.11	-49.13	-4.8	8.9	-53.23	-13	Vertical
2512.07	-49.20	-5.9	9.3	-52.6	-13	Vertical
3296.32	-41.47	-6.3	9.5	-44.67	-13	Vertical
6469.39	-39.32	-10.6	13.1	-41.82	-13	Horizontal
9998.61	-35.95	-11.8	13.8	-37.95	-13	Vertical

GSM/GPRS MODE Channel 189:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1673.57	-37.34	-4.6	8.6	-41.34	-13	Vertical
1695.69	-48.56	-4.8	8.9	-52.66	-13	Vertical
2510.12	-49.34	-5.9	9.3	-52.74	-13	Vertical
3346.87	-42.12	-6.3	9.5	-45.32	-13	Vertical
6478.45	-39.56	-10.6	13.1	-42.06	-13	Horizontal
9987.34	-37.45	-11.8	13.8	-39.45	-13	Vertical

EDGE MODE Channel 189:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1672.89	-37.27	-4.6	8.6	-41.27	-13	Vertical
1684.08	-48.84	-4.8	8.9	-52.94	-13	Horizontal
2509.47	-49.18	-5.9	9.3	-52.58	-13	Vertical
3346.87	-41.35	-6.3	9.5	-44.55	-13	Vertical
6483.78	-38.97	-10.6	13.1	-41.47	-13	Vertical
9993.67	-35.94	-11.8	13.8	-37.94	-13	Horizontal

GSM/GPRS MODE Channel 251:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1697.82	-37.35	-4.6	8.6	-41.35	-13	Vertical
1672.19	-49.33	-4.8	8.9	-53.43	-13	Vertical
2498.66	-49.07	-5.9	9.3	-52.47	-13	Vertical
3395.63	-40.98	-6.3	9.5	-44.18	-13	Vertical
6497.78	-39.29	-10.6	13.1	-41.79	-13	Horizontal
9981.48	-36.15	-11.8	13.8	-38.15	-13	Vertical

EDGE MODE Channel 251:

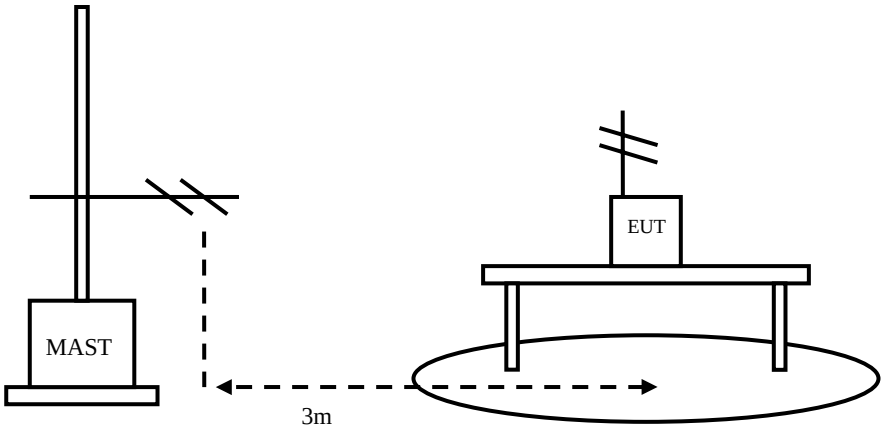
Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
1697.95	-37.56	-4.6	8.6	-41.56	-13	Vertical
1688.64	-48.35	-4.8	8.9	-52.45	-13	Horizontal
2518.69	-49.25	-5.9	9.3	-52.65	-13	Vertical
3395.51	-41.79	-6.3	9.5	-44.99	-13	Horizontal
6475.04	-38.58	-10.6	13.1	-41.08	-13	Vertical
9994.03	-35.73	-11.8	13.8	-37.73	-13	Vertical

2.2.1.8 Receiver Spurious Emission-IC RSS-Gen § 6a

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	54%	101.5kPa

Test Setup:



Test Procedure:
The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.
The EUT should work in idle mode. The accessories of the EUT are connected with the EUT such as headset etc.
Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.
During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow: 1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.
The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing.

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of

the preamplifier, the cable loss.

The measurement results are obtained as described below:

Result= P_{mea} + A_{Rpl}

Limit:

Spurious Frequency (MHz)	Field Strength at 3 metres		
	Detector	Unit (microvolts/m)	Unit (dBμV/m)
30～88	Quasi-peak	100	40
88～216	Quasi-peak	150	43.5
216～960	Quasi-peak	200	46
960～1000	Quasi-peak	500	54
Above 1000	Average	500	54

Test result:

Frequency(MHz)	Result(dBuV/m)	A_{Rpl} (dB)	P_{mea} (dBuV/m)	Polarity
47.72	20.01	3.1	16.91	Vertical
60.82	20.45	3.1	17.35	Vertical
107.24	20.37	3.2	17.17	Vertical
176.87	24.63	3.2	21.43	Horizontal
541.23	24.58	3.9	20.68	Vertical
946.51	29.98	5.7	24.28	Vertical

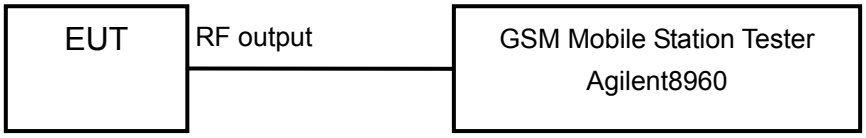
2.2.2 PCS1900

2.2.2.1 RF Power Output-FCC Part2.1046/IC RSS-133 § 6.4

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	29.29
1880.0	661	29.48
1909.8	810	29.22

EDGE MODE:

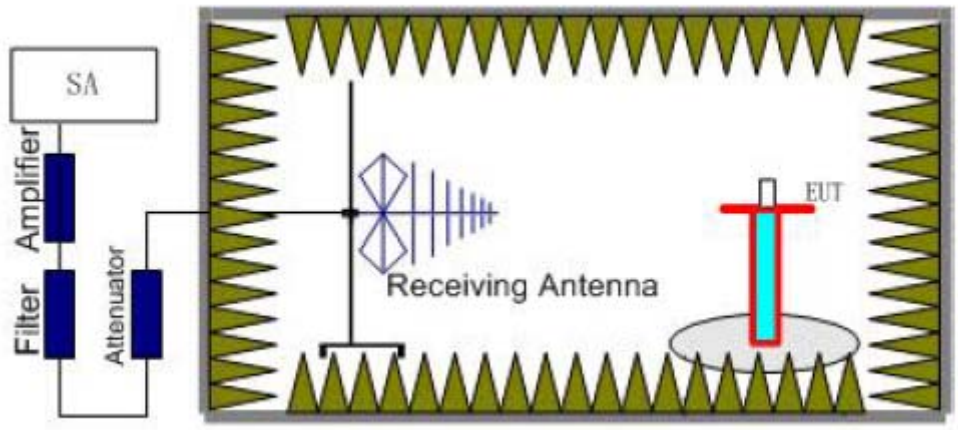
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	21.58
1880.0	661	21.47
1909.8	810	21.13

2.2.2.2 Effective Isotropic Radiated Power-FCC Part24.232(c)/IC RSS-133 § 6.4

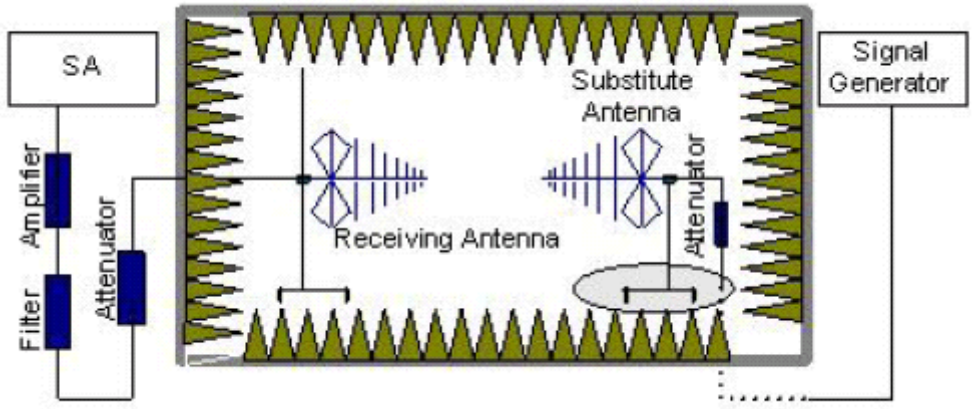
Ambient condition:

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 height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value 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	27.23	-4.8	8.6	23.43	Vertical
1880.0	0	27.12	-4.8	8.6	23.32	Vertical
1909.8	0	27.17	-4.8	8.6	23.37	Vertical

EDGE MODE:

Frequency (MHz)	Power step	Peak EIRP(dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Polarization
1850.2	5	20.41	-4.8	8.6	16.61	Vertical
1880.0	5	20.52	-4.8	8.6	16.72	Vertical
1909.8	5	21.12	-4.8	8.6	17.32	Vertical

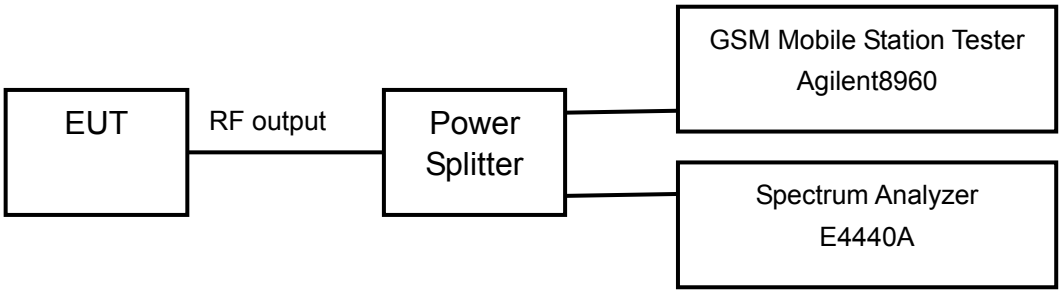
Frequency: 1909.8MHz
Peak EIRP (dBm) =Pmea (27.12dBm)+Pca(-4.8dB)+Ga(8.6dB) =23.32dBm

2.2.2.3 Occupied Bandwidth-FCC Part2.1049/IC RSS-133 § 6.5

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

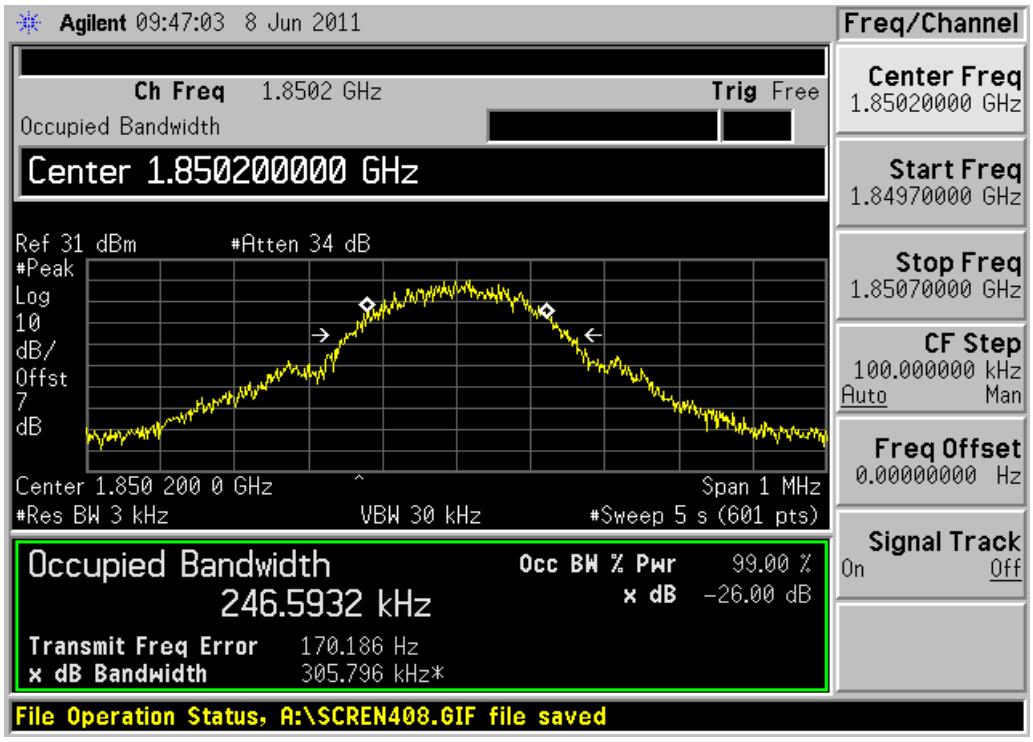
Test result:
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	246.59
1880.0	661	241.78
1909.8	810	243.00

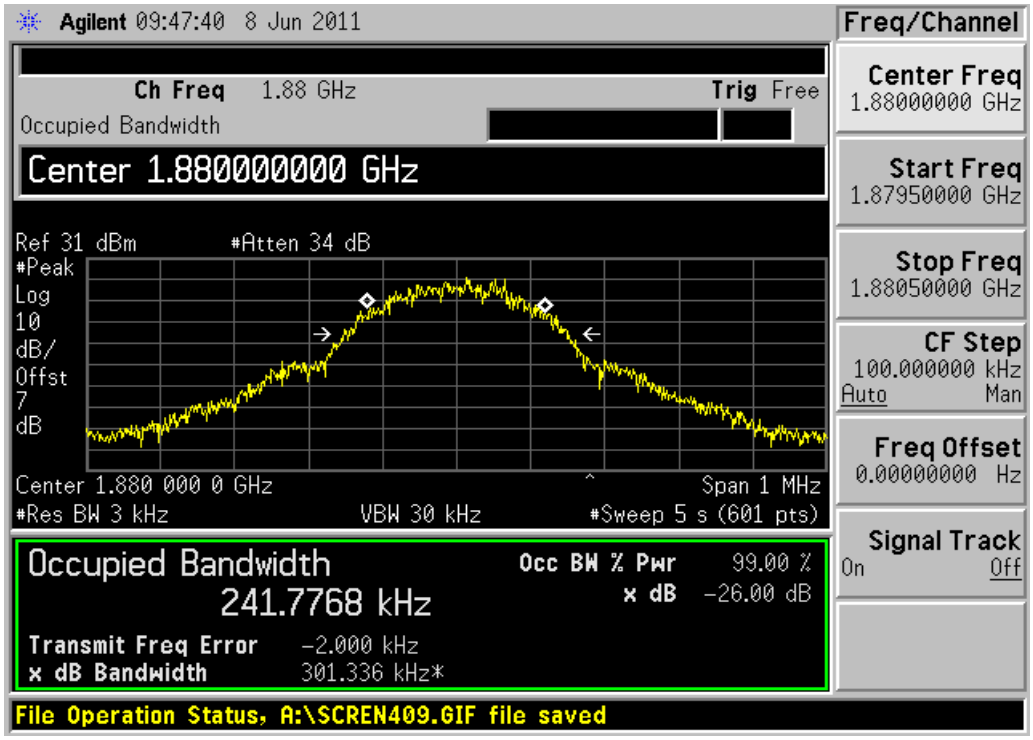
EDGE MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	238.95
1880.0	661	241.87
1909.8	810	240.30

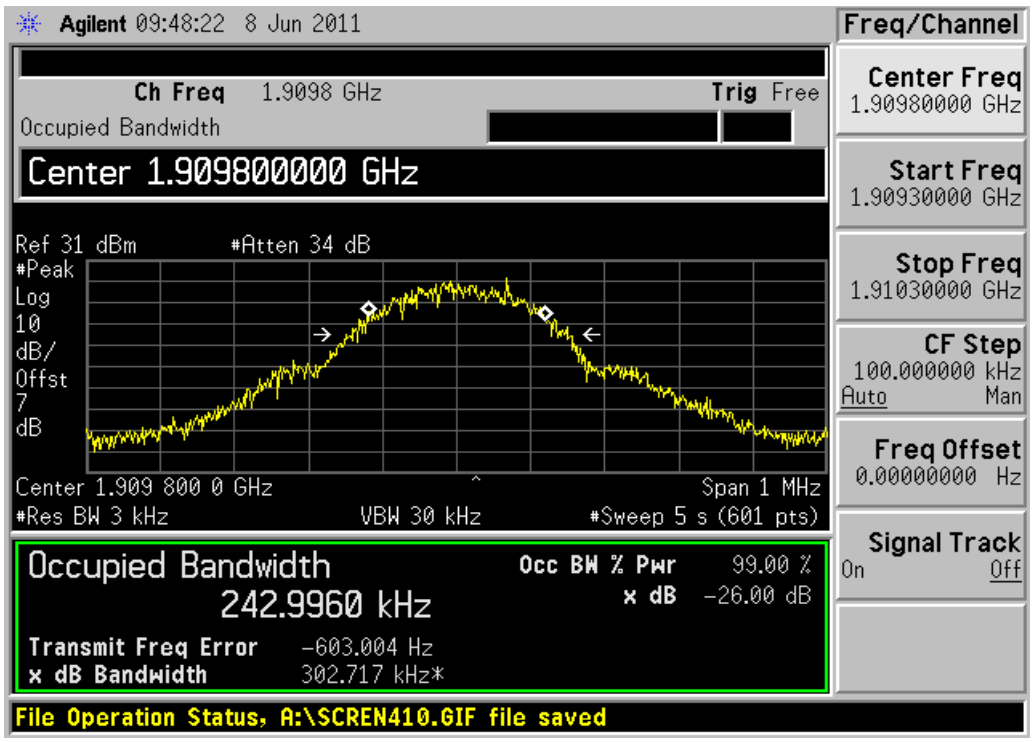
GSM/GPRS MODE:



Channel 512

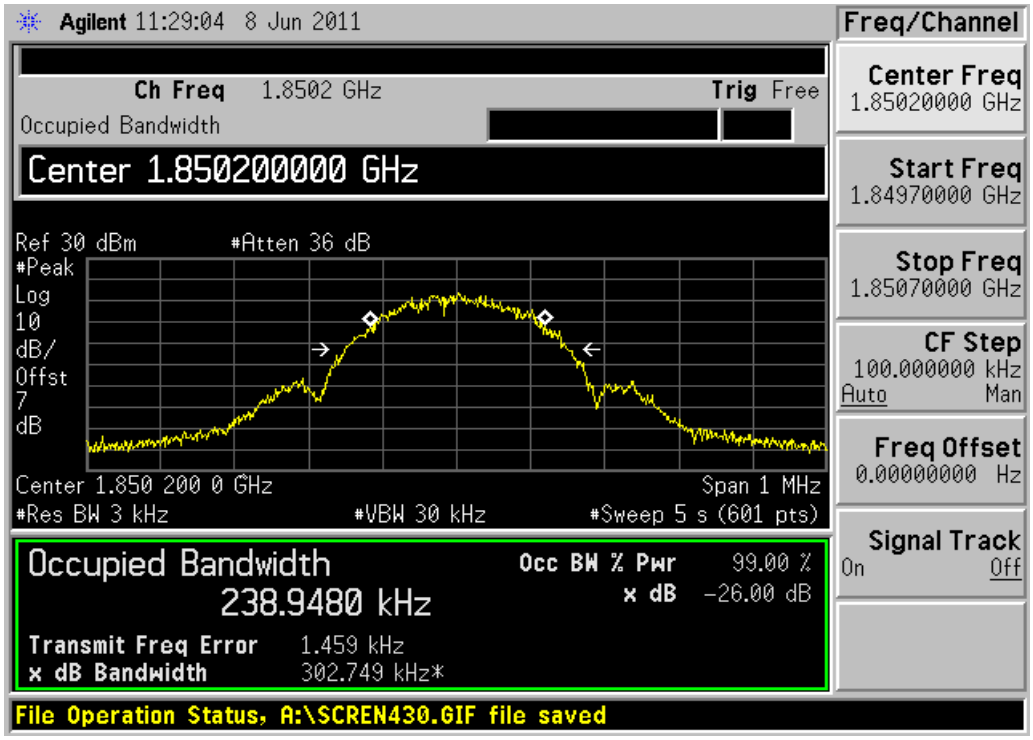


Channel 661

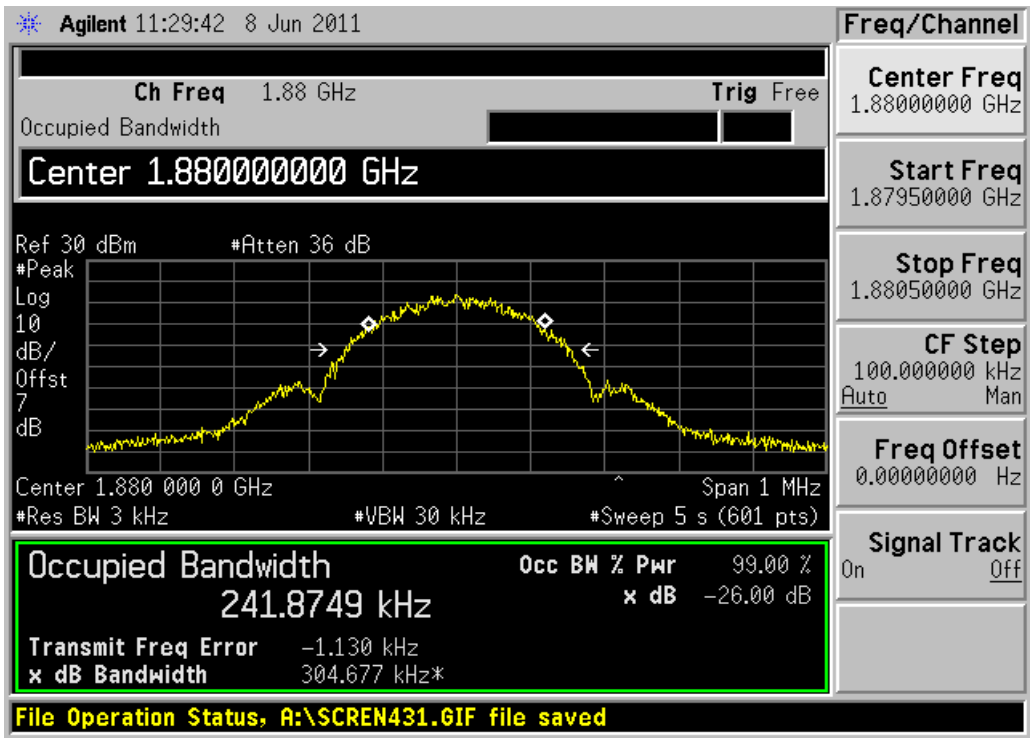


Channel 810

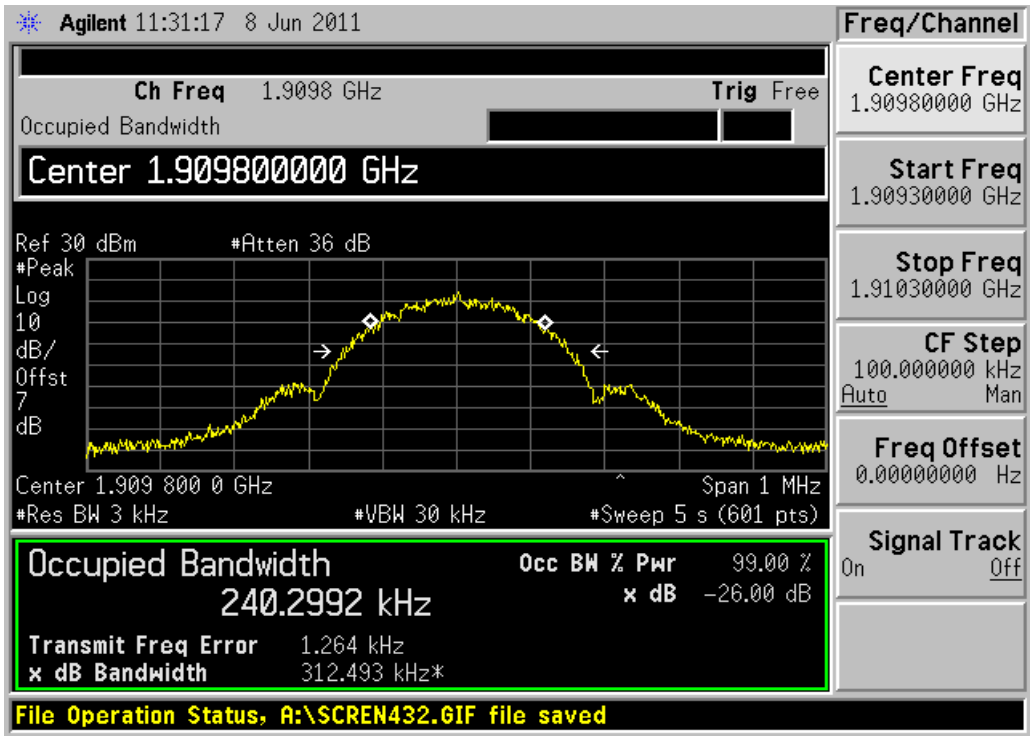
EDGE MODE:



Channel 512



Channel 661



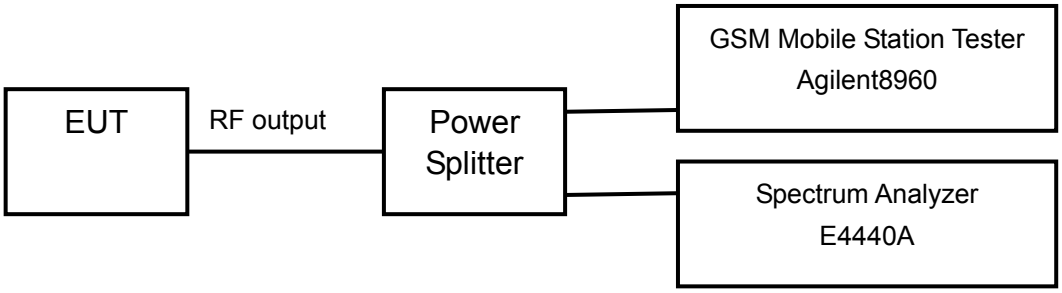
Channel 810

2.2.2.4 Spurious Emissions-FCC Part2.1051/24.238(a)/IC RSS-133 § 6.5

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



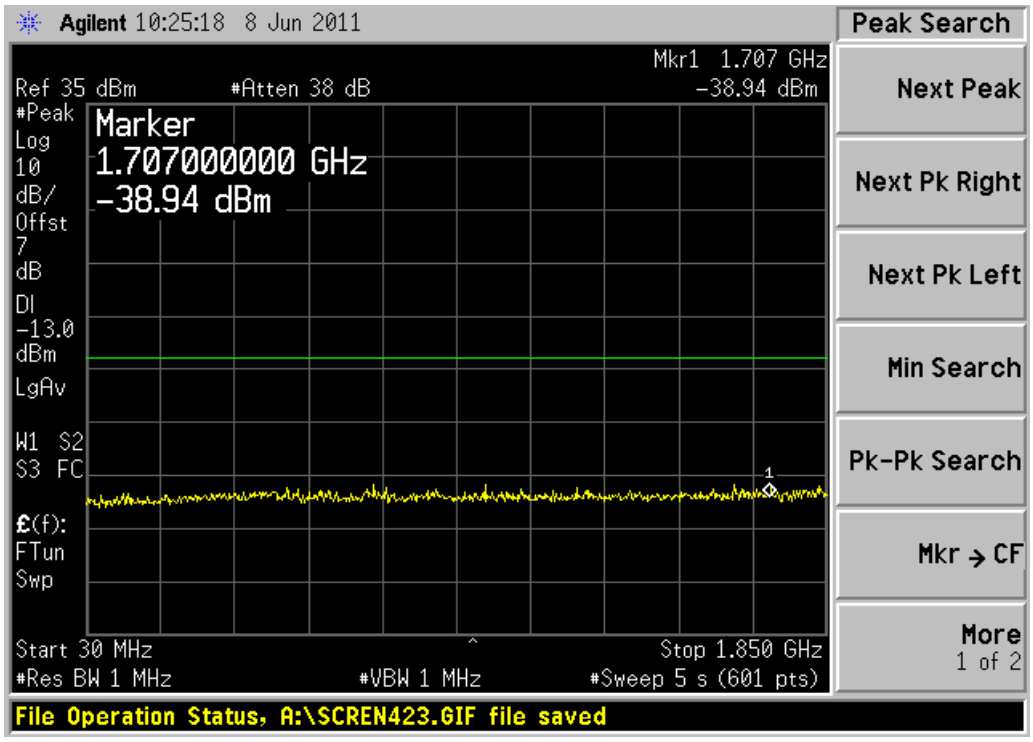
Test procedure:

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)

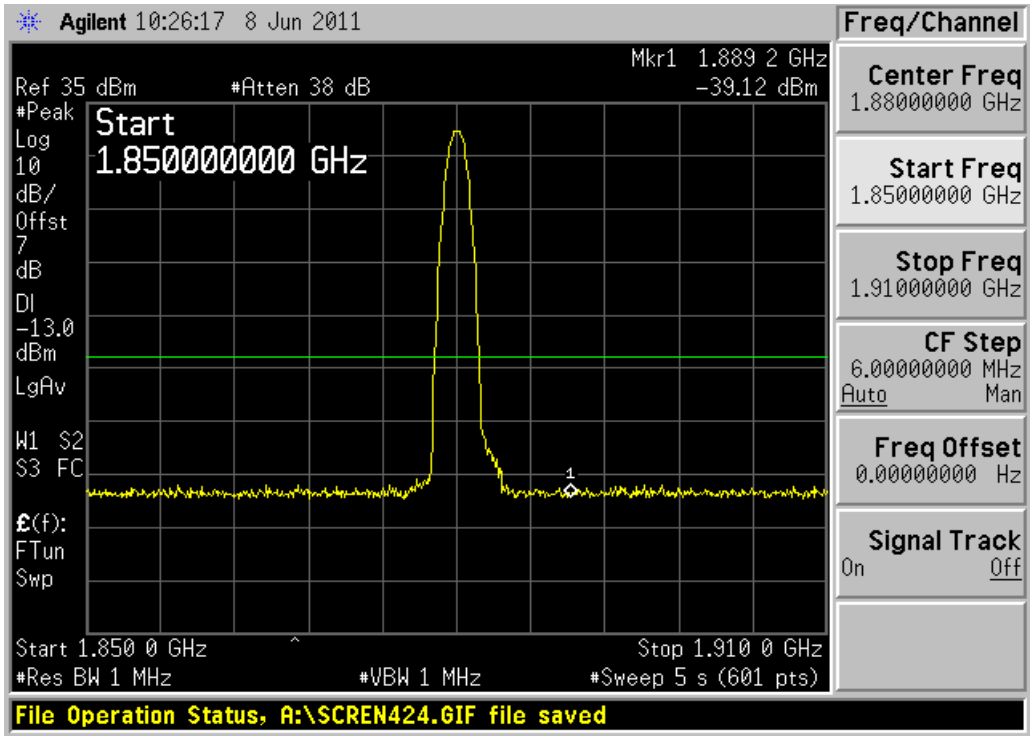
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

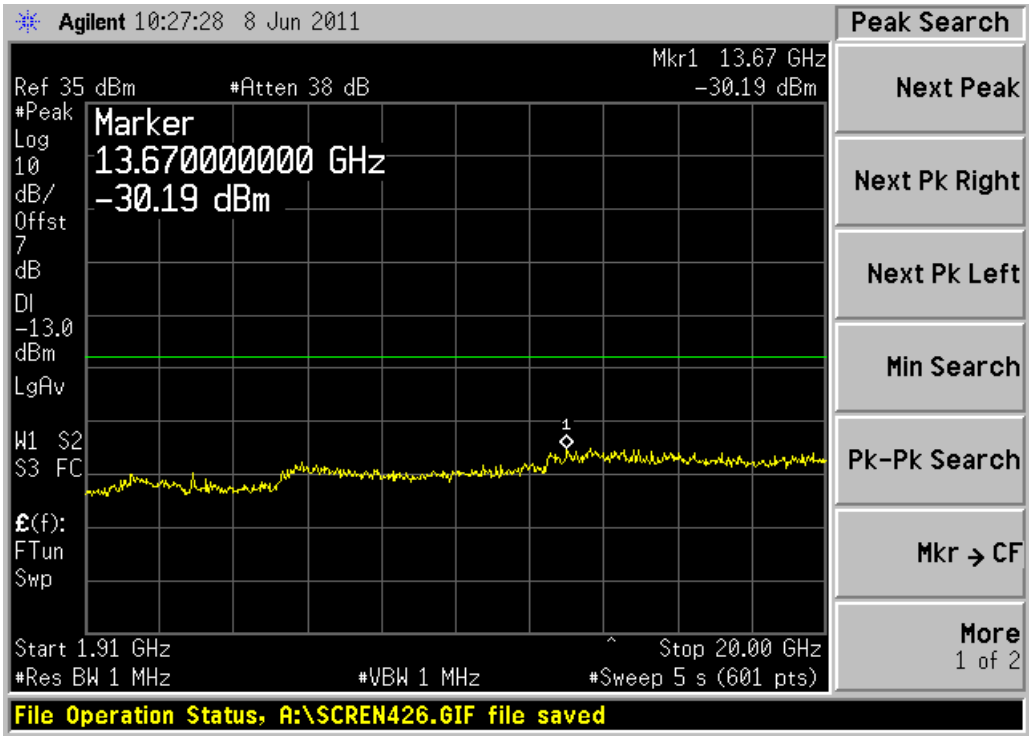


Channel 661, 30MHz~1850MHz



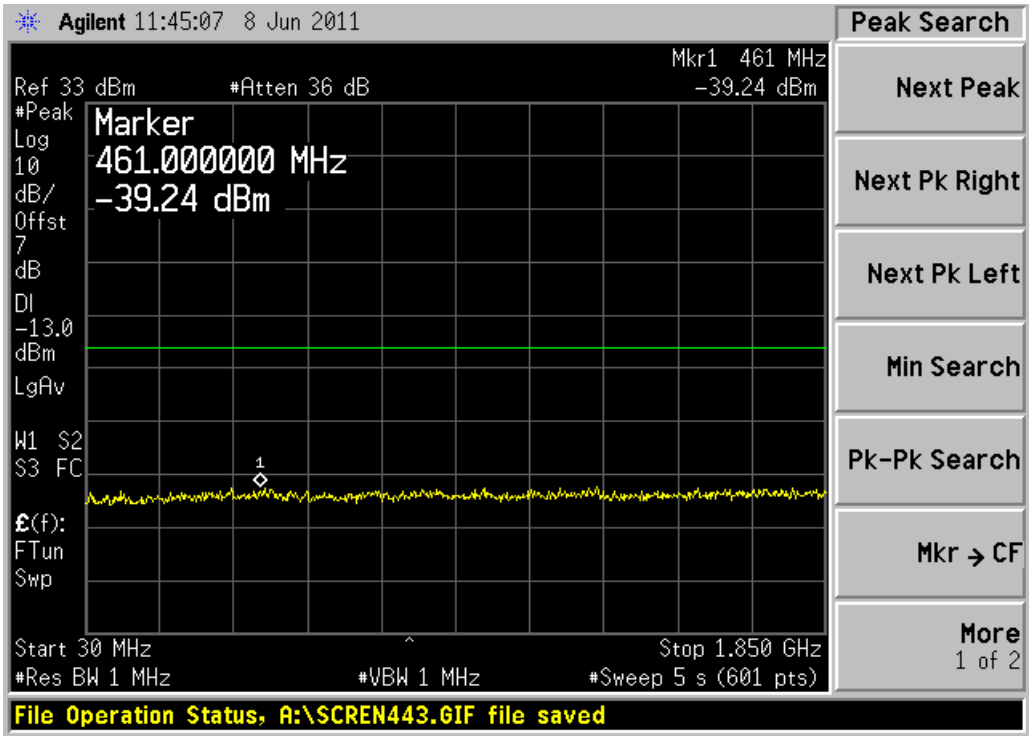
Channel 661, 1850MHz~1910MHz

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

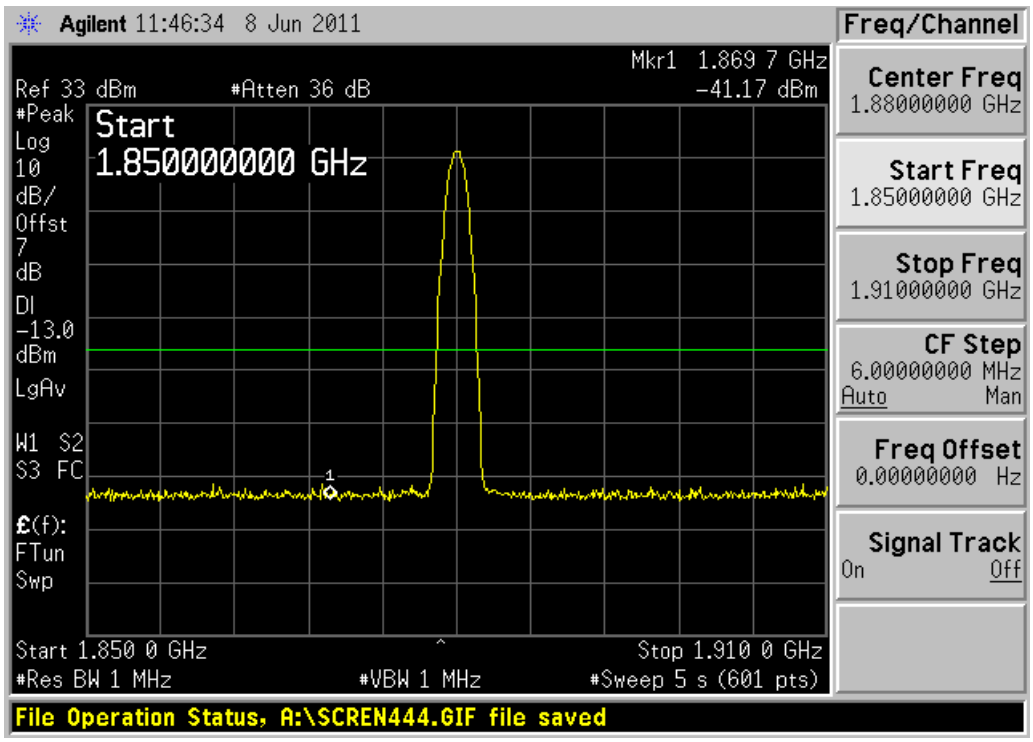


Channel 661, 1910MHz~20GHz

EDGE MODE:

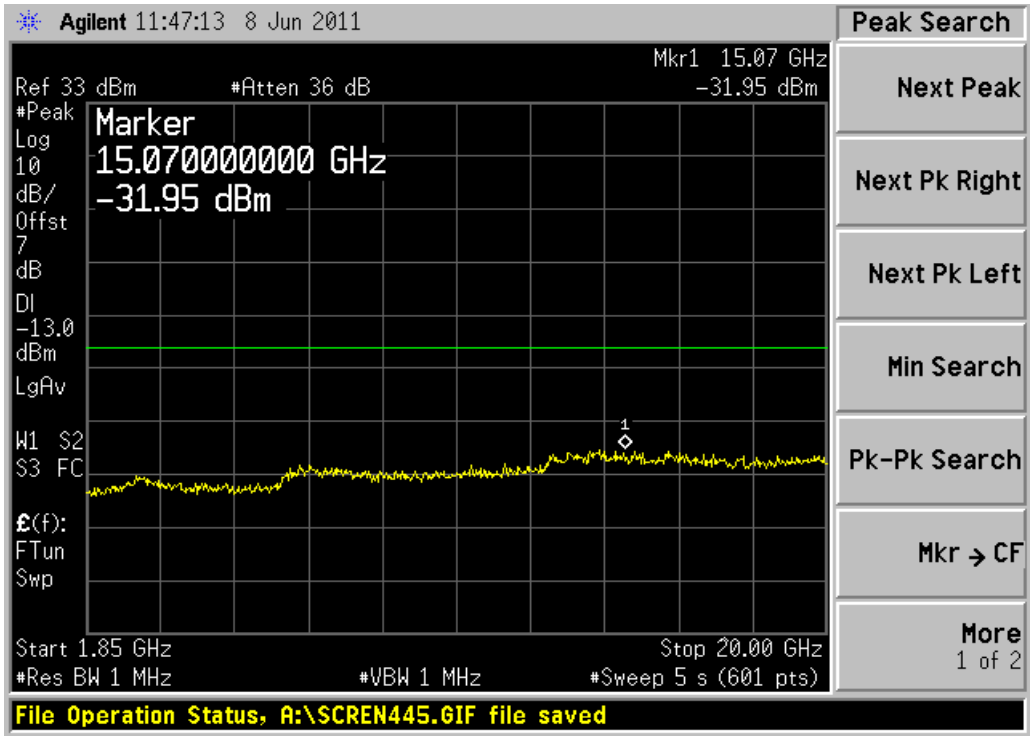


Channel 661, 30MHz~1850MHz



Channel 661, 1850MHz~1910MHz

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



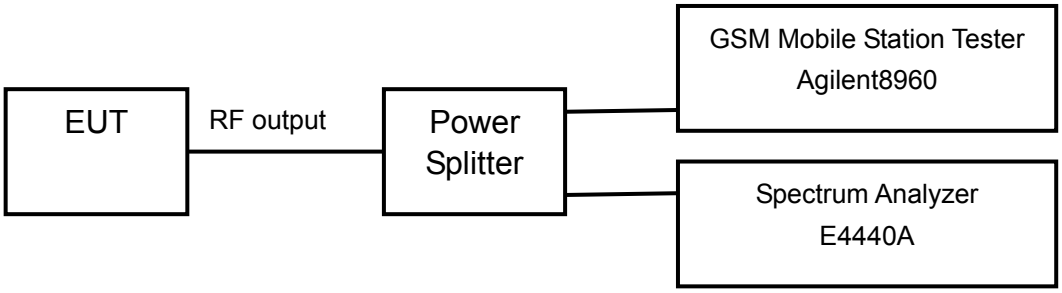
Channel 661, 1910MHz~20GHz

2.2.2.5 Band Edges Compliance-FCC Part2.1051/24.238(a)/IC RSS-133 § 6.5

Ambient condition:

Temperature	Relative humidity	Pressure
23°C	42%	101.9kPa

Test Setup:



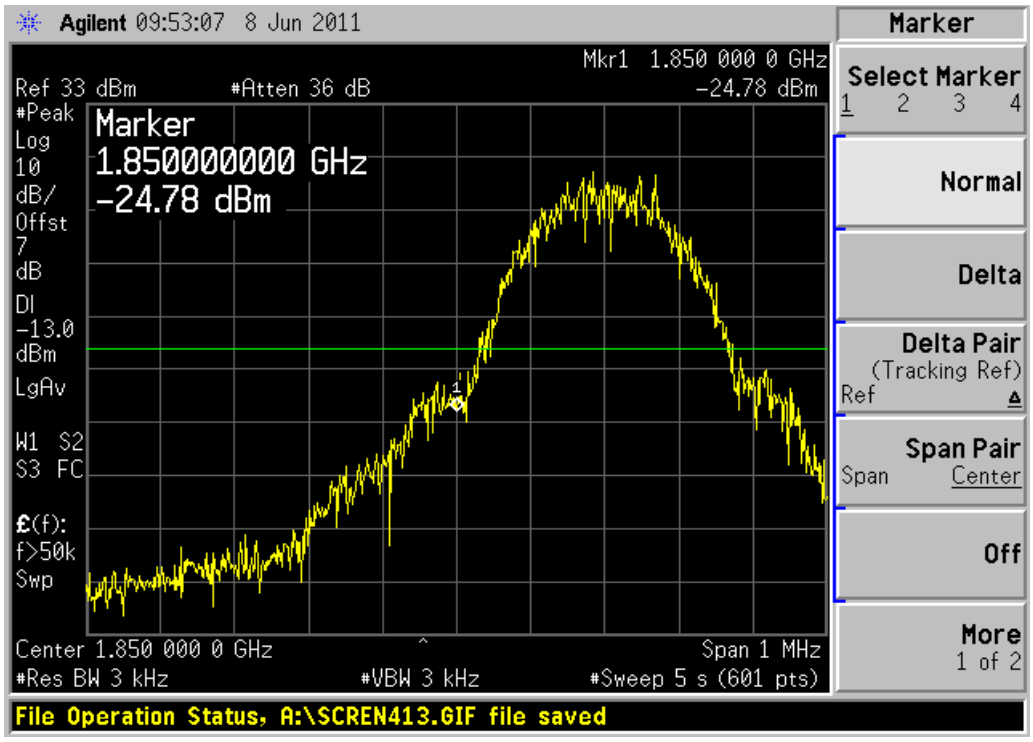
Test procedure:

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)

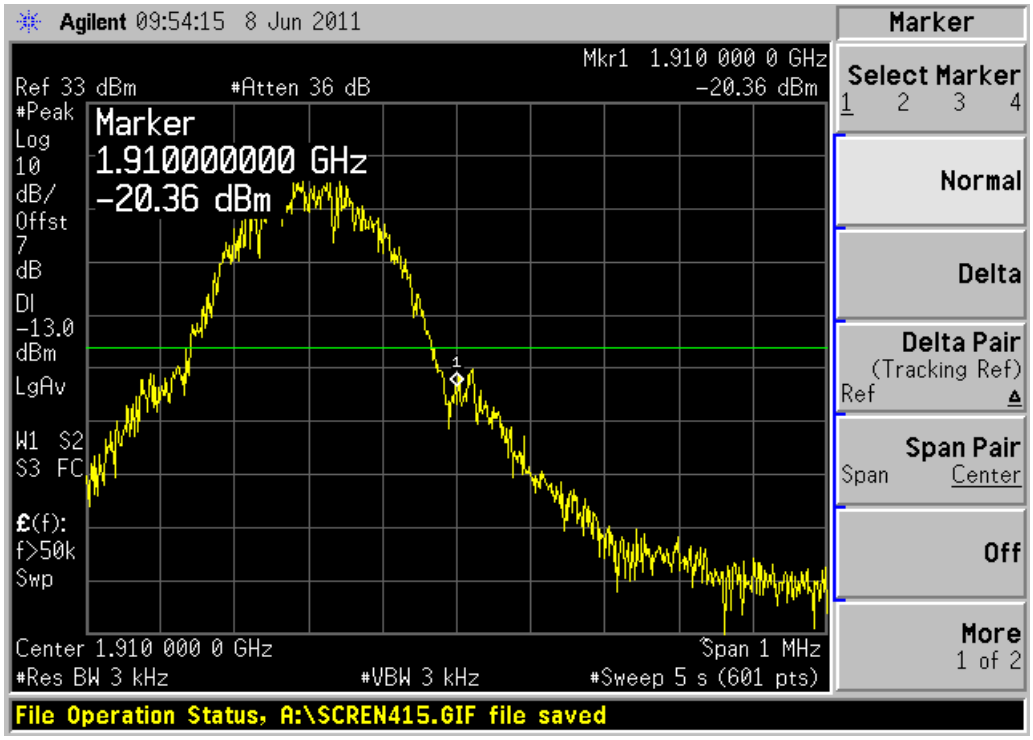
Limits	≤-13dBm

Test result:
Refer to the following figures.

GSM/GPRS MODE:

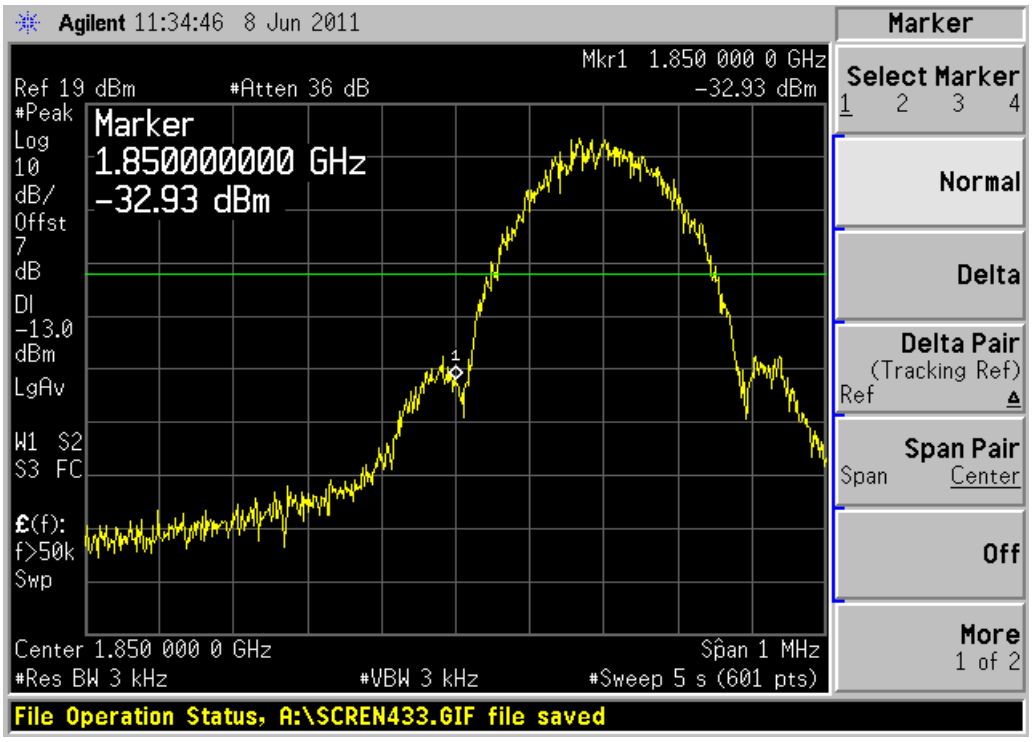


Channel 512

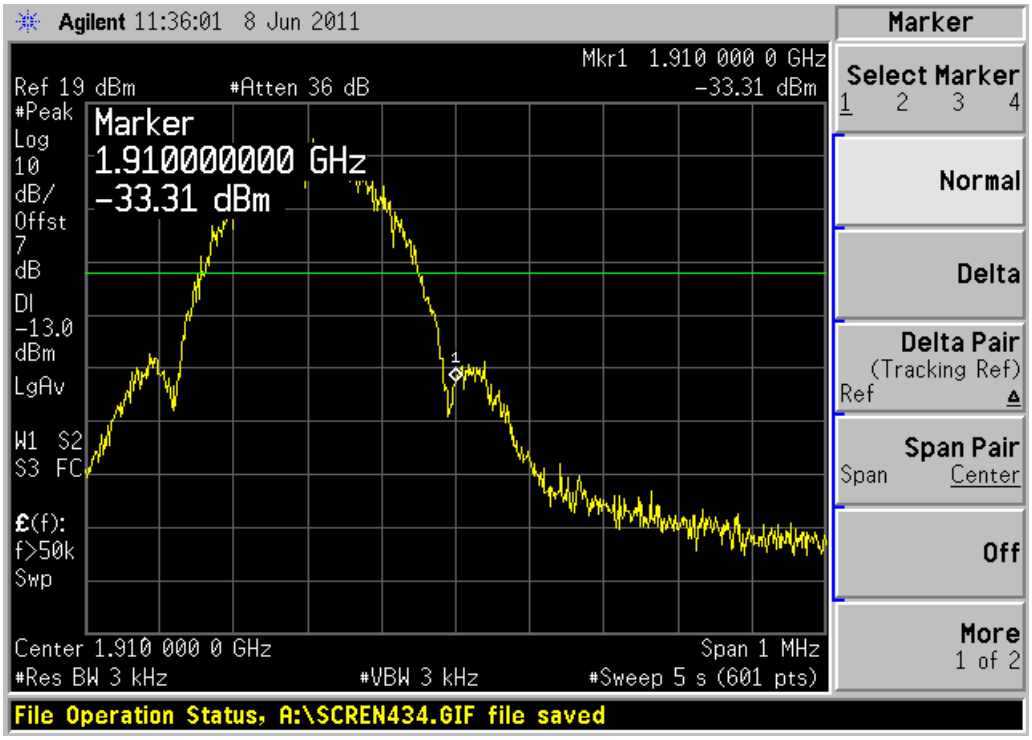


Channel 810

EDGE MODE:



Channel 512



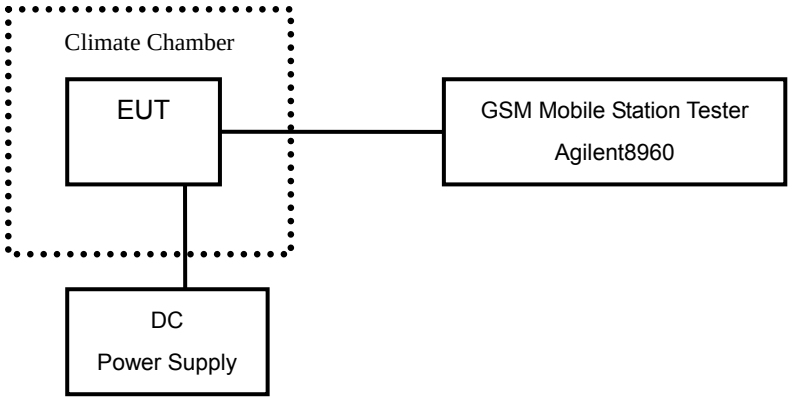
Channel 810

2.2.2.6 Frequency Stability-FCC Part2.1055/Part24.235/IC RSS-133 § 6.3

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 3.4 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 FCC part 2.1055 and part 24.235. According to the standard of RSS-133 § 6.3, the carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

Test result:

GSM/GPRS MODE:

Temperature(° C)	Test Result (ppm)@3.7V		
	Channel 512	Channel 661	Channel 810
-30	0.016	0.015	0.017
-20	0.016	0.013	0.012
-10	0.008	0.013	0.013
0	0.007	0.006	0.009
+10	0.010	0.010	0.008
+20	0.004	0.004	0.009
+30	0.001	0.002	0.003
+40	0.002	0.014	0.012
+50	0.017	0.010	0.008

Voltage (V)	Test Result (ppm)@20° C		
	Channel 512	Channel 661	Channel 810
3.4	0.014	0.003	0.009
4.2	0.002	0.013	0.005

EDGE MODE:

Temperature(° C)	Test Result (ppm)@3.7V		
	Channel 512	Channel 661	Channel 810
-30	0.022	0.024	0.017
-20	0.016	0.007	0.009
-10	0.012	0.007	0.015
0	0.004	0.007	0.001
+10	0.000	0.009	0.004
+20	0.002	0.008	0.004
+30	0.002	0.004	0.002
+40	0.013	0.020	0.006
+50	0.005	0.008	0.011

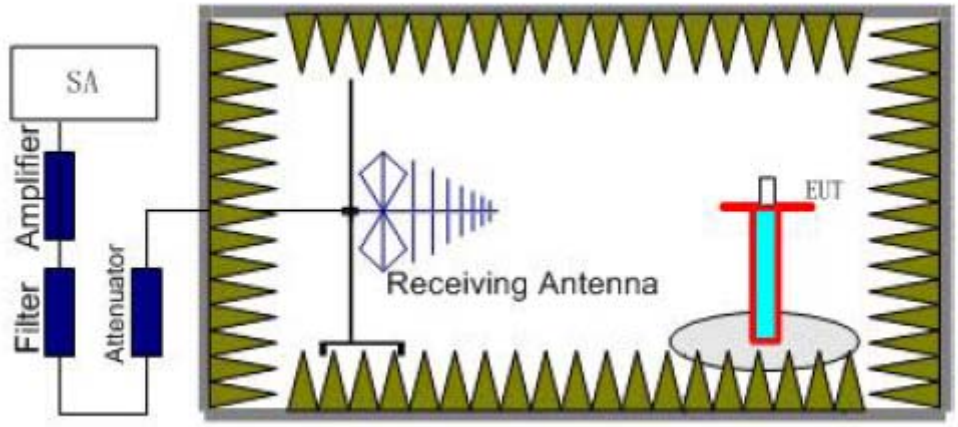
Voltage (V)	Test Result (ppm)@20° C		
	Channel 512	Channel 661	Channel 810
3.4	0.005	0.007	0.012
4.2	0.012	0.011	0.004

2.2.2.7 Radiated Spurious Emissions-FCC Part2.1053/24.238(a)/IC RSS-133 § 6.5

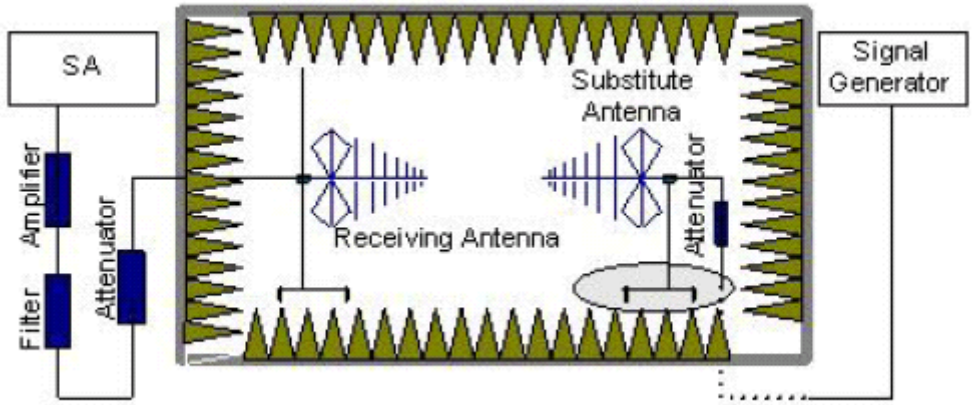
Ambient condition

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
2056.60	-42.22	-5.6	8.6	-45.22	-13	Vertical
2557.46	-41.65	-5.8	8.9	-44.75	-13	Vertical
2932.94	-40.12	-10.6	12.7	-42.22	-13	Vertical
6996.13	-44.81	-11.8	13.6	-46.61	-13	Vertical
10019.33	-37.73	-12.6	12.5	-37.63	-13	Horizontal
17755.25	-32.77	-13.9	12.3	-31.17	-13	Horizontal

EDGE MODE Channel 512:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2042.48	-42.22	-5.6	8.6	-45.22	-13	Horizontal
2550.45	-41.24	-5.8	8.9	-44.34	-13	Vertical
2934.21	-40.95	-10.6	12.7	-43.05	-13	Vertical
6993.04	-44.07	-11.8	13.6	-45.87	-13	Horizontal
10025.11	-38.33	-12.6	12.5	-38.23	-13	Horizontal
17774.44	-32.72	-13.9	12.3	-31.12	-13	Vertical

GSM/GPRS MODE Channel 661:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2050.95	-42.51	-5.6	8.6	-45.51	-13	Vertical
2555.77	-41.72	-5.8	8.9	-44.82	-13	Vertical
2935.09	-40.48	-10.6	12.7	-42.58	-13	Horizontal
6978.57	-44.82	-11.8	13.6	-46.62	-13	Horizontal
10038.4	-37.96	-12.6	12.5	-37.86	-13	Vertical
17759.3	-32.31	-13.9	12.3	-30.71	-13	Horizontal

EDGE MODE Channel 661:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2048.12	-42.62	-5.6	8.6	-45.62	-13	Vertical
2551.66	-42.17	-5.8	8.9	-45.27	-13	Horizontal
2949.21	-40.00	-10.6	12.7	-42.1	-13	Vertical
6988.28	-44.71	-11.8	13.6	-46.51	-13	Horizontal
10027.98	-38.21	-12.6	12.5	-38.11	-13	Vertical
17755.35	-31.93	-13.9	12.3	-30.33	-13	Horizontal

GSM/GPRS MODE Channel 810:

Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2070.39	-42.94	-5.6	8.6	-45.94	-13	Horizontal
2562.51	-41.69	-5.8	8.9	-44.79	-13	Vertical
2934.45	-40.74	-10.6	12.7	-42.84	-13	Vertical
6992.05	-44.70	-11.8	13.6	-46.5	-13	Horizontal
10056.28	-38.32	-12.6	12.5	-38.22	-13	Horizontal
17776.68	-31.90	-13.9	12.3	-30.3	-13	Vertical

EDGE MODE Channel 810:

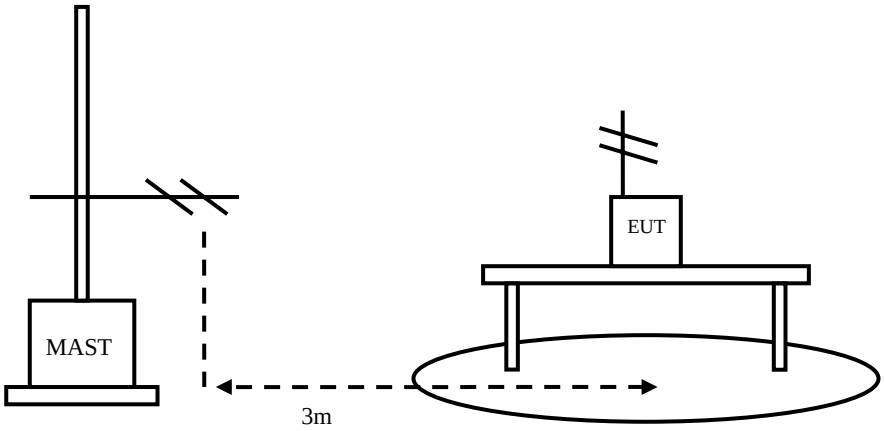
Frequency (MHz)	Power (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Limited (dBm)	Polarization
2062.21	-42.87	-5.6	8.6	-45.87	-13	Vertical
2538.69	-42.00	-5.8	8.9	-45.1	-13	Horizontal
2952.39	-40.76	-10.6	12.7	-42.86	-13	Horizontal
6966.82	-44.86	-11.8	13.6	-46.66	-13	Vertical
10039.59	-37.71	-12.6	12.5	-37.61	-13	Vertical
17741.24	-32.12	-13.9	12.3	-30.52	-13	Horizontal

2.2.2.8 Receiver Spurious Emission-IC RSS-Gen § 6a

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	54%	101.5kPa

Test Setup:



Test Procedure:
The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.
The EUT should work in idle mode. The accessories of the EUT are connected with the EUT such as headset etc.
Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.
During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow: 1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.
The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing.

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

Result= P_{mea} + A_{Rpl}

Limit:

Spurious Frequency (MHz)	Field Strength at 3 metres		
	Detector	Unit (microvolts/m)	Unit (dBμV/m)
30～88	Quasi-peak	100	40
88～216	Quasi-peak	150	43.5
216～960	Quasi-peak	200	46
960～1000	Quasi-peak	500	54
Above 1000	Average	500	54

Test result:

Frequency(MHz)	Result(dBuV/m)	A_{Rpl} (dB)	P_{mea} (dBuV/m)	Polarity
35.41	19.21	3.1	16.11	Vertical
123.98	18.86	3.1	15.76	Horizontal
177.42	22.33	3.2	19.13	Vertical
946.78	29.98	5.7	24.28	Vertical
6999.38	35.03	-14.2	49.23	Vertical
10000.00	36.25	-9.6	45.85	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

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205